

City of
Prineville, Oregon

WASTEWATER FACILITIES PLAN UPDATE



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We wish to thank the members of the Prineville City Council and mayor; Eric Klann, P.E., City Engineer; Jerry Brummer, Public Works Superintendent; and other City staff for their interest, guidance, and assistance during the course of this study.

CHAPTER 1 INTRODUCTION

INTRODUCTION

This report presents the results of a Wastewater Facilities Plan (WWFP) Update authorized by agreement between the City of Prineville, Oregon, and Anderson·Perry & Associates, Inc., dated April 16, 2010. The City of Prineville completed a Wastewater Facilities Plan in 2000 and a Wastewater Master Plan Update in 2005 for their wastewater system. Due to accelerated growth of the City, the 2005 Plan Update recommended reevaluating the proposed wastewater system improvements at the time the next update was required in 2010 (see page 1-3, 2005 Plan Update). The City of Prineville also wanted to evaluate other options for disposal of treated wastewater that were not evaluated in the 2005 Update. This report should be considered as an update to the 2005 Plan Update. Much of the information contained in the 2005 Plan Update, particularly with regard to the City's wastewater collection system, was not reproduced herein and the reader is encouraged to refer to all three documents for the complete planning information for the City's wastewater system.

BACKGROUND INFORMATION

The City of Prineville is located in Central Oregon along the Crooked River, a major tributary of the Deschutes River that flows north into the Columbia River. The valley through which the river flows is bordered on the north by the slopes of the Ochoco Mountains and on the south by the steep escarpments that rise to an extensive lava plateau south of the Prineville area. A location and vicinity map for the City of Prineville is shown on Figure 1-1. The City of Prineville is the County seat and the only incorporated city in Crook County, with a population of 7,356 at the 2000 Census. The current year 2010 estimated population for Prineville is 10,370, as estimated by the Population Research Center at Portland State University. At the time this WWFP Update was prepared, the 2010 federal census population data for Prineville were not available. Due to rapid growth, the wastewater collection system and the wastewater treatment plant (WWTP) have been at or approaching design capacity and have gone through recent improvements and expansions to meet the needs of the quickly growing population.

In 2000, a WWFP was developed to provide the City of Prineville with an analysis of their wastewater collection and treatment systems, to identify needs and deficiencies, to project anticipated future needs for the next 20 years, and to provide an analysis of alternatives for meeting those needs. The wastewater collection system at that time had adequate capacity, but there were several areas with flow restrictions and some extensions and upgrades needed to support projected growth. The WWFP recommended collection system improvement projects to eliminate restrictions and surcharge conditions, as well as provide additional capacity for projected subdivisions. The WWFP also recommended construction of a new 1.14 million gallon per day (MGD) partially aerated facultative lagoon treatment plant. The plant would include a storage lagoon sized to store treated effluent through the winter months without any increase in

the effluent discharge to the Crooked River and would utilize irrigation reuse to dispose of the remaining effluent during the summer months. Effluent discharge to the Crooked River is allowed during the winter months, from November to April, when river flow exceeds 15 cubic feet per second (cfs).

In 2005, a Wastewater Master Plan Update was developed to address the City's rapidly growing population. The City of Prineville was growing at a faster rate than the projection in the 2000 WWFP and was estimated to reach the capacity of the wastewater treatment plant by 2013 (see page 1-1, 2005 Plan Update). At the time the 2005 Plan Update was being developed, the first half of a planned 1.14 MGD plant expansion was under construction. The expansion included treatment and storage lagoons adequate for 0.57 MGD. The 2005 Plan Update recommended the conversion of the existing wastewater treatment plant to a submerged membrane reactor mechanical treatment plant, to be constructed in two 1.25 MGD phases (see page 1-3, 2005 Plan Update). For disposal, the maximum amount of treated effluent permitted would be discharged to the Crooked River in the winter with the remainder held in storage lagoons and disposed of by irrigation reuse during the summer on the Meadow Lakes Golf Course, on City-owned pasture land, and on non-City-owned property to be identified and contracted for as needed.

The WWTP is composed of a partially aerated facultative lagoon system operated under permits issued by the Oregon Department of Environmental Quality (DEQ). The lagoon system began operation in 1960 and was upgraded to a capacity of 1.1 MGD in 1993. In 2005, a parallel partially aerated facultative lagoon system with a capacity of 0.57 MGD was completed that brought the total flow capacity of the plant to 1.67 MGD. The treated effluent is generally of Class C quality with some restrictions on reuse that must be closely monitored. A portion of the treated effluent is discharged to the Crooked River with the remainder stored in effluent storage ponds for disposal by irrigation reuse. As noted on page 1-2 of the 2005 Plan Update, the storage and disposal methods as constructed are adequate for about 1.6 MGD of the 1.67 MGD design flow and cannot accommodate future growth.

PURPOSE

The following purposes were identified for this Update to the City's 2005 Wastewater Master Plan Update:

- Provide an overview on the current status of wastewater treatment in the City of Prineville.
- Update design criteria developed in the 2005 Wastewater Master Plan Update.
- Update population projections contained in the 2005 Wastewater Master Plan Update.
- Provide an updated evaluation of alternatives with cost estimates for the 20-year (2030) projected needs.
- Provide a conceptual evaluation of wastewater treatment and disposal for an estimated population of 50,000 for long-term planning purposes.

SCOPE

In order to accomplish the purposes identified above, the following outline is followed for this WWFP Update:

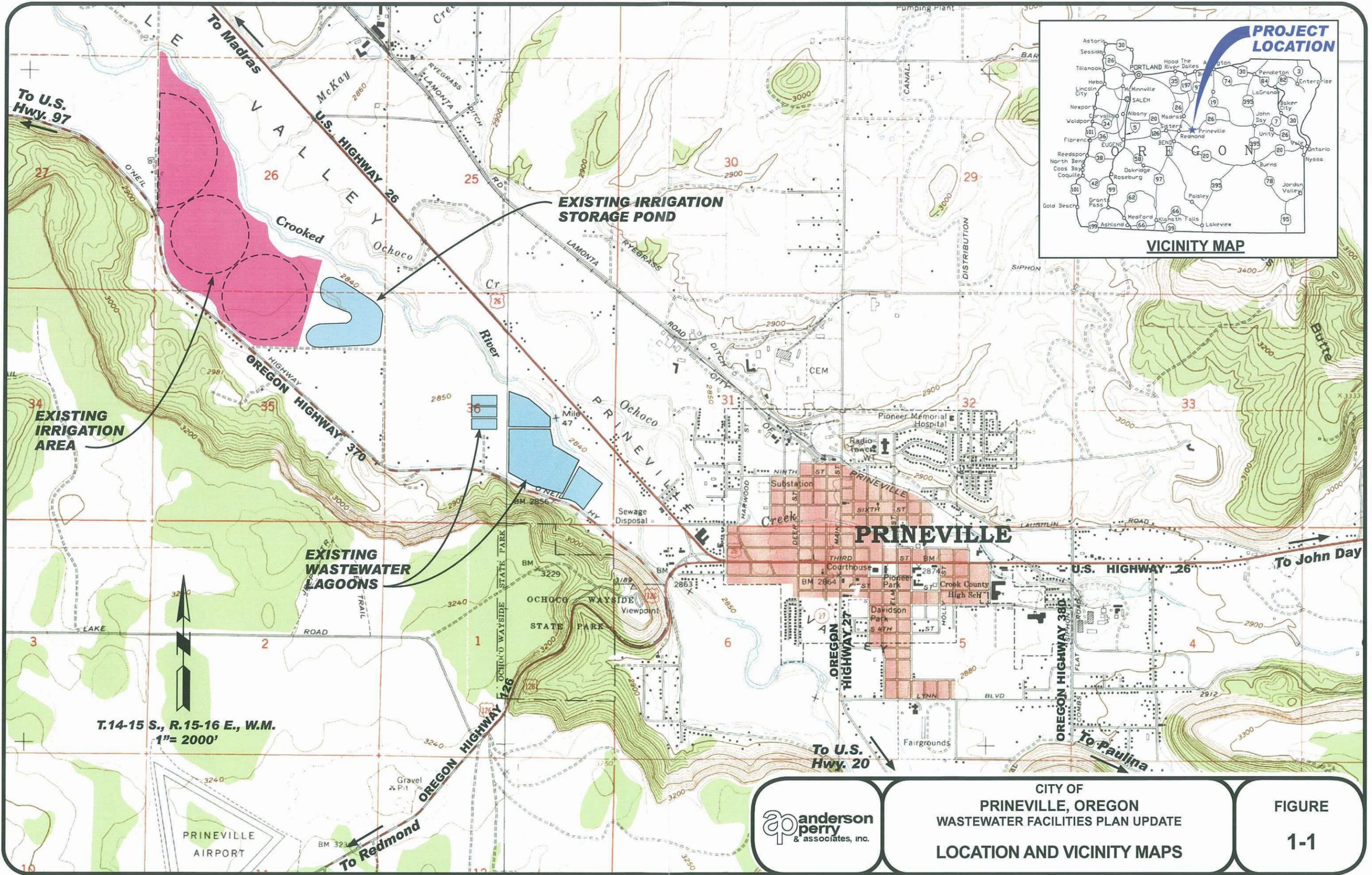
Chapter 1, Introduction. This chapter provides historical information on the City's wastewater system and describes the purpose and scope of the 2010 WWFP Update.

Chapter 2, Design Criteria Update. This chapter includes an updated chart of historical and projected populations for the City and their associated wastewater flows and loadings. A summary of the City of Prineville's wastewater testing data is included, along with a summary of the City of Prineville's National Pollutant Discharge Elimination System (NPDES) Permit.

Chapter 3, Consideration of Improvement Options. This chapter evaluates the City's options for wastewater treatment and disposal. The WWFP Update includes an evaluation of the feasibility of and requirements for extending wastewater service to key expansion areas of the City of Prineville. The Update also includes an evaluation of the no-action alternative and analysis of the cost effectiveness of the alternatives over a 20-year period. Treatment standards and cost estimates for each alternative are identified.

Chapter 4, Selected Improvement Option. This chapter provides further development of the preferred alternative. Cost estimates and other technical information for the preferred alternative are provided.

Chapter 5, Project Financing and Implementation. This chapter provides a summary of the financial status of the City's Wastewater Department and outlines alternatives for financing the City of Prineville's proposed wastewater system improvements. A summary of state and federal funding programs is presented, including a review of funding options available to the City for the selected wastewater system improvements project.





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 WASTEWATER FACILITIES PLAN UPDATE
 LOCATION AND VICINITY MAPS

FIGURE
 1-1

CHAPTER 2 DESIGN CRITERIA UPDATE

GENERAL

This chapter of the 2010 Wastewater Facilities Plan (WWFP) Update presents the basic planning and design data necessary to evaluate the City of Prineville's existing wastewater treatment and disposal facilities. These data are used to determine the facility's ability to serve the wastewater system needs for the City of Prineville for the selected planning period and form the basis for evaluating alternatives for required improvements. Updated population information is provided and 20-year population projections for the City are presented. The design criteria used for this WWFP Update are based on projected population growth for the next 20-year period ending in 2030, as well as a future population of 50,000 for long-term planning purposes.

UPDATED POPULATION PROJECTIONS

In order to estimate future wastewater system demands, population projections must be made. Projections are usually made on the basis of an annual percentage increase estimated from past growth rates combined with future expectations. The historical population data shown hereafter and on Figure 2-1 was provided by the Population Research Center at Portland State University (PSU). This agency is the official source of population data available in Oregon between the official census data generated at the beginning of each decade. Because PSU does not project future population increases for individual cities within the state, no official projection is available for the City. The population projections shown on Figure 2-1 appear to be a realistic range based on current data as well as recent historic population increases for Prineville.

The City of Prineville's population at the 2000 Census was 7,358. The population projection used in the 2005 Wastewater Master Plan Update was 8,942. The population used to determine the average wastewater influent flow for this Update was 9,462, which is an average of the population from 2003 to 2008. The Population Research Center at PSU approximated the population of Prineville at 10,370 in 2009. Although PSU's estimated population is higher than the population used to evaluate wastewater flows, the City estimates that there are several residents who are not currently connected to the sewer system. Therefore, 9,462 was used for the average population of Prineville for this WWFP Update.

From an examination of historical data, the growth rate over the previous 40 years averaged 3.0 percent per year, though that growth rate increased to 4 percent per year for the 10-year period from 2000 to 2010 (see Figure 2-1). Using 3.5 percent for the projected annual growth rate would match well with historic growth rates for the City of Prineville. The City selected a 3.5 percent growth rate for the 20-year period analyzed by this Update. Using the historical population data and a projected annual growth rate of 3.5 percent results in a 20-year (year 2030) population estimate of 21,356. This Update to the WWFP uses 21,356 as the 20-year design population in the

development of design criteria. The estimated build-out population of the urban growth boundary is 36,060, and this number was used in the calculation of system development charges (see Chapter 5 for more discussion on this topic). The City of Prineville has also requested a preliminary assessment for wastewater disposal for a population of 50,000 to aid the City in long-term planning.

HISTORICAL WASTEWATER CHARACTERIZATION

Chemicals and Materials. The only chemical currently used at the wastewater site is chlorine for final disinfection of effluent prior to discharging to the Crooked River or effluent reuse. A sulfur dioxide dechlorination system was installed but is not used, as dechlorination is achieved in the storage ponds via atmospheric stripping. See Appendix A for the Material Safety Data Sheet (MSDS).

Characterization of Wastes and Wastewater. Wastewater samples are obtained by the City at the point of discharge to the Crooked River during the time of year when discharge is permitted. As dictated by the City's National Pollutant Discharge Elimination System (NPDES) Permit, effluent samples are collected regularly (when discharging to the river) for carbonaceous biochemical oxygen demand (CBOD), total suspended solids (TSS), pH, chlorine residual, ammonia, Total Kjeldahl Nitrogen (TKN), phosphorus, nitrate, and nitrite. In addition, a total coliform sample is collected as a grab sample and tests are performed bi-weekly. Concentrations are measured from composite samples and mass loading is calculated from concentration and flow data. See Table 2-1 for a summary of the NPDES Permit and Appendix B for a copy of the Permit.

During the irrigation season, samples are collected from the wastewater before it enters the irrigation storage ponds for total coliform bacteria (weekly), chlorine residual (daily), and pH (bi-weekly). All other samples are collected monthly. Nutrients tested for include TKN, nitrate, and nitrite.

The City has maintained compliance with all permit requirements (CBOD, TSS, pH, chlorine, and coliform) over the last several years. The Permit requirements are outlined on Table 2-1. Test results for nutrients in 2007 in the treated effluent showed that TKN ranged from 2.5 to 21 milligrams per liter (mg/L), nitrate ranged from 0.9 to 15 mg/L, and phosphorus ranged from 0.28 to 3.4 mg/L. Treated effluent samples taken in September 2009 showed nitrates/nitrites to be 0.42 mg/L and TKN to be 6.9 mg/L.

A sample of treated wastewater was taken in September 2009 to test for additional water quality parameters to see if there were any additional parameters of concern. These test results are summarized on Table 2-2. Based on these sample results for the parameters tested, no pollutants of concern were identified in the wastewater.

Characterization of Solids. Solids are accumulated in the lagoons where they continue to decompose over a period of several years. These solids are referred to as biosolids. The lagoon biosolids are normally removed from the lagoon when they accumulate to an average depth over 2 feet. This usually occurs over a period of 15 to

30 years depending on wastewater characteristics. When the biosolids are removed, they must be characterized and disposed of in accordance with Oregon Department of Environmental Quality (DEQ) rules and guidelines. This WWFP Update does not characterize existing biosolids or evaluate requirements for their removal.

Information for the review of the historical wastewater data for the City of Prineville's WWTP was obtained from the City's discharge monitoring reports (DMRs). Historical average influent CBOD and TSS concentrations for the 10-year period from 1995 to 2004 can be seen in Chapter 5 of the 2005 Wastewater Master Plan Update and were used during development of the design criteria of this report. The influent monthly flows for the period of August 2003 through July 2008 were analyzed from DMR data. The average annual flow, maximum daily flow, peak hour flow, average summer and winter flows, and influent CBOD and TSS are shown on Table 2-3 for the current and projected populations. One should note that the CBOD and TSS loadings appear to be significantly lower than typical loadings that would be expected from a similar population.

UPDATED DESIGN CRITERIA

Table 2-3 provides the updated 20-year design criteria for the City of Prineville's wastewater system based on current population projections and wastewater characteristics. These design criteria provide the basis to complete alternatives as outlined in Chapters 3 and 4.

CURRENT NPDES PERMIT LIMITS

Parameter	Average Effluent Concentrations		Monthly* Average lbs/day	Weekly* Average lbs/day	Daily* Maximum lbs
	Monthly	Weekly			
CBOD ₅	25 mg/L	40 mg/L	230	340	460
TSS	40 mg/L	60 mg/L	370	550	730
Other Parameters (Year-round)			Limitations		
Total Coliform Bacteria			Shall not exceed a 7-day median of 23 organisms with no two consecutive samples to exceed 240 organisms.		
pH			Shall be within the range of 6.0 - 9.0		
CBOD ₅ and TSS Removal Efficiency			Shall not be less than 65 percent monthly average for CBOD ₅ and 65 percent monthly for TSS.		
Total Chlorine Residual			Shall not exceed a monthly average of 0.10 mg/L and a daily maximum of 0.16 mg/L.		
Effluent Discharge			When the daily average flow of the Crooked River is 15 cfs or greater but less than 25 cfs, the quantity of effluent discharged to the Crooked River shall not exceed 1/15 of the flow of the Crooked River at the point of discharge.		

* Average dry weather design flow to the existing facility equals 1.1 MGD. Mass load limits are based on average dry weather design flow to the facility.

CBOD = Carbonaceous Biochemical Oxygen Demand
 cfs = Cubic Feet per Second
 lbs = Pounds
 mg/L = Milligrams per Liter
 MGD = Million Gallons per Day
 NPDES = National Pollutant Discharge Elimination System
 TSS = Total Suspended Solids



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CURRENT NPDES PERMIT LIMITS

**TABLE
 2-1**

**WATER QUALITY TESTING RESULTS
IN WASTEWATER EFFLUENT**

Parameter	Result (mg/L)
Chloride	84
Fluoride	0.54
Nitrite	BDL
Sulfate	28
Alkalinity	330
Alkalinity, Bicarbonate	170
Cyanide	0.018
Nitrate-Nitrite	0.42
TKN	6.9
Total Dissolved Solids (TDS)	670
Antimony	BDL
Arsenic	BDL
Barium	0.038
Beryllium	BDL
Cadmium	BDL
Calcium	66
Chromium	BDL
Copper	BDL
Iron	0.23
Lead	BDL
Manganese	0.095
Nickel	BDL
Potassium	16
Selenium	0.021
Sodium	110
Thallium	BDL
Zinc	0.12

BDL = below detection limit
mg/L = milligrams per liter

Note: The above testing results are for treated wastewater obtained in September 2009.

SUMMARY OF DESIGN CRITERIA

General	Current ¹	Future 2030 ²	50,000
Population	9,462	21,356	50,000
Average Annual Wastewater Flow (MGD) ³	1.02	2.31	5.41
Per Capita (gpcd)	108	108	108
Max Daily Flow, (MGD)	1.93	4.36	10.21
Per Capita (gpcd)	204	204	204
Peak Hour Flow, (MGD) ⁴	4.83	10.91	25.54
Per Capita (gpcd)	511	511	511
Average Summer Flow, (MGD) ⁵	0.89	2.01	4.70
Per Capita (gpcd)	94	94	94
Average Winter Flow, (MGD) ⁶	1.11	2.50	5.86
Per Capita (gpcd)	117	117	117
Average Annual Influent BOD ₅ , mg/L ⁷	95	95	95
lbs/day	811	1830	4285
lbs/capita/day	0.09	0.09	0.09
Average Annual Influent TSS, mg/L ⁷	111	111	111
lbs/day	948	2139	5007
lbs/capita/day	0.10	0.10	0.10

¹ = Current population based on the Center for Population Research and Census at Portland State University's 2009 estimate of 10,370 minus an estimate of unconnected population.

² = Population is projected from current population using an average annual increase of 3.5 percent per year.

³ = Current flow is based on a review of DMR data from January 2003 to July 2008.

⁴ = Peak hour flow is 2.5 times the maximum daily flow.

⁵ = Average of August, September, and October.

⁶ = Average of December, January, and February.

⁷ = Current data is taken from the 2005 WWFP Update 10-year Average from an analysis of DMR records from 1995 to 2004.

BOD = Biochemical Oxygen Demand

gpcd = Gallons per Capita Day

lbs = Pounds

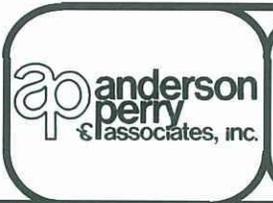
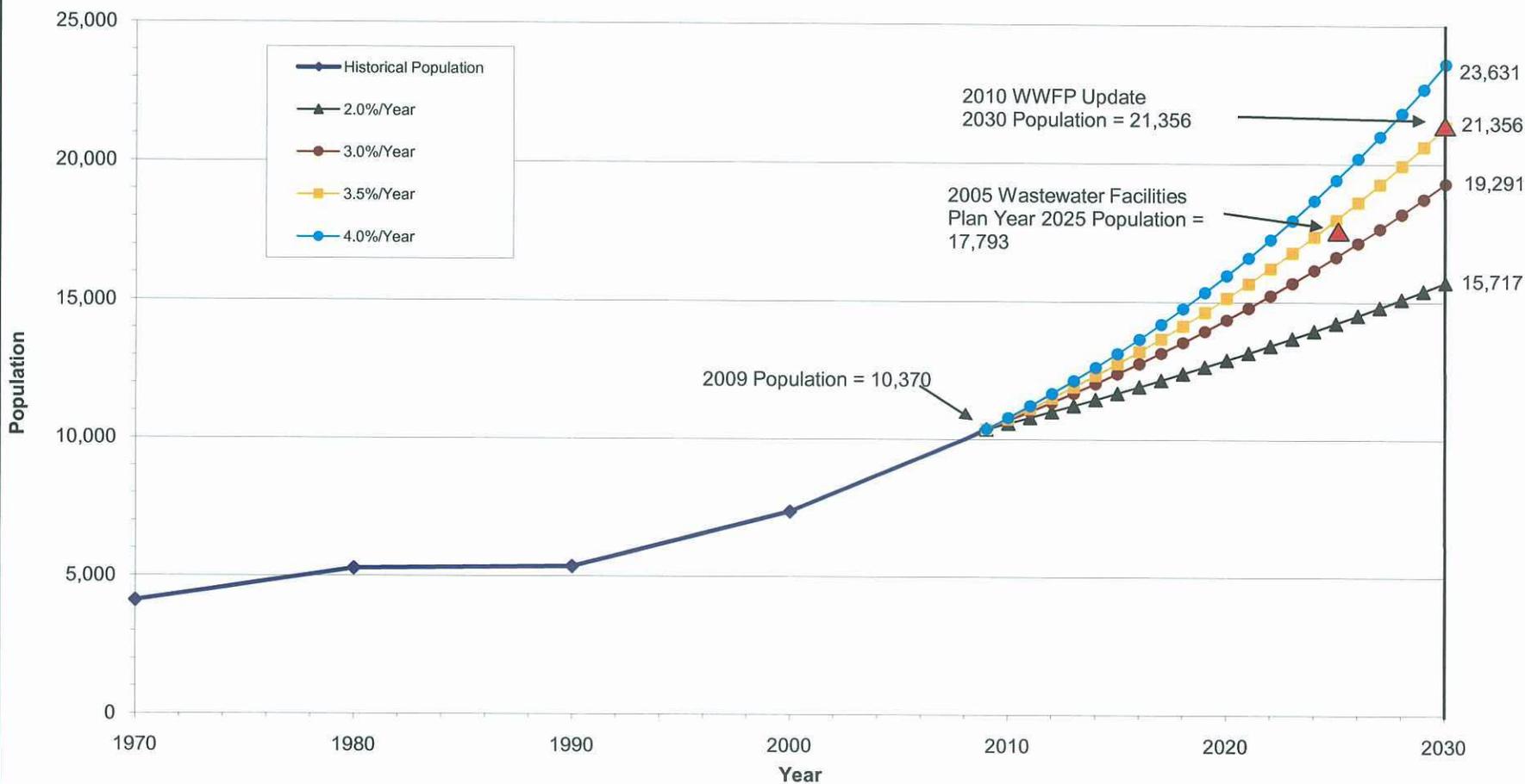
mg/L = Milligrams per Liter

MGD = Million Gallons per Day

TSS = Total Suspended Solids



Historical and Projected Populations for the City of Prineville



CITY OF PRINEVILLE, OREGON
 WASTEWATER FACILITIES PLAN UPDATE
 HISTORICAL AND PROJECTED POPULATIONS

FIGURE 2-1

CHAPTER 3 CONSIDERATION OF IMPROVEMENT OPTIONS

GENERAL

This chapter of the Wastewater Facilities Plan (WWFP) Update discusses wastewater system improvement options. First, a summary of the wastewater system deficiencies identified in the 2005 Wastewater Master Plan Update is provided. Next, the disposal requirements of the wastewater system are evaluated and associated options for treatment and disposal of the effluent examined. Using the current estimated population and average annual wastewater flow and composition, storage and disposal requirements are analyzed for several alternate options for the current population as well as projected populations. The following options for treatment, storage, and disposal of the treated effluent are considered in detail in this WWFP Update:

- A "do nothing" option.
- Option 1 - Disposal in constructed wetlands.
- Option 2A - Winter storage with summer irrigation combined with direct discharge to the Crooked River.
- Option 2B - Winter storage with summer irrigation and no discharge to the Crooked River.
- Option 3A - Construction of a mechanical treatment plant with disposal of treated effluent by irrigation and direct discharge to the Crooked River.
- Option 3B – Construction of a mechanical treatment plant with disposal of treated effluent by irrigation only.

Requirements for storage lagoon size are determined for each of the disposal options, with consideration also given to an aerated lagoon treatment system where applicable. Cost estimates are determined for each of the options, and the advantages and disadvantages of each option are considered. Using the current population and associated wastewater flows, a water balance was developed for current conditions as a means for analyzing the various options; see Table 3-1. Also included in this chapter is an evaluation of the feasibility for extending sewer service to key expansion areas of the City of Prineville.

SUMMARY OF COLLECTION SYSTEM DEFICIENCIES

In the 2005 Wastewater Master Plan Update by ACE Consultants, Inc., an extensive sewage collection system inventory and cost estimates were completed. ACE modeled the sewer system to identify possible problem areas and estimate infiltration and inflow (I/I). ACE identified several main areas in the existing collection

system that they considered problem areas at 2005 maximum daily flow rates. The identified problems in three main areas are as follows (see the 2005 Wastewater Master Plan Update):

1. The area along N.E. 7th and N.W. 7th Street in the collection system serving the downtown and the eastern portion of the City.
2. The area along N.W. Locust Street and W. 1st Street in the collection system serving the fairgrounds and Crook County High School.
3. The area along the collection system on N.E. Mariposa Way.

The identified collection system improvements are proposed in areas needing improved service and areas needing new service to eliminate existing septic systems. These are described hereafter and are also illustrated on Figure 3-1.

1. **North Sewer** - This sewer main line will be installed on Main Street from 13th Street to Rawhide Lane.
2. **Railroad Sewer** - This sewer main line will be installed on the railroad grade from Main Street to 2nd Street.
3. **Melrose-Bailey Sewer** - This sewer main line will include lines installed on Combs Flat Road starting at the connection with Railroad Sewer at 2nd Street extending south then southeast on the Paulina Highway to the City limits line, sewer main lines extended into areas in the southeast portion of the City to provide service to new areas, and a main line extended along Lynn Boulevard from Combs Flat Road west to Main Street.
4. **Colson & Colson and White Deer Ranch Sewer** - This main line will extend south on the Crooked River Highway from Lynn Boulevard to the south City limits.
5. **Rimrock Park PS Sewer** - This main line will extend on Rimrock and Crestview Roads from the west side of the Crooked River northwest to the existing wastewater lagoon area.
6. **Pinkard Lane Railroad Sewer Connection** - This main line will extend south on Harwood Street to 10th Street then west to Locust Street and south to 9th Street.
7. **Swamp Sewer** - Two main lines will be installed to extend service to existing areas in the northern portion of the City. These main lines will extend roughly southwest to Ritches Lane, connecting to a main line extending southeast on the railroad grade from Ritches Lane to Gardner Road, extending on Gardner Road to Highway 26, then southeast on Highway 26 to Studebaker Drive.

The proposed collection system improvements outlined above would be installed in existing rights-of-way adjacent to existing roads and gravel shoulders. Estimated costs for the recommended collection system improvements are updated for this WWFP Update as follows.

As part of the 2005 Wastewater Master Plan Update, ACE recommended that the priority of the City should be to focus on a long-term trunk sewer backbone, for which they prepared cost estimates. Cost estimates were prepared for each of seven trunk sewer lines and can be found in Chapter 7 of the 2005 Wastewater Master Plan Update, from pages 7-31 to 7-37. The following table summarizes the estimated costs.

Collection System - Improvement

	\$606,667	Railroad Sewer
	\$2,073,051	North Interceptor Sewer
	\$178,892	Pinkard Lane Sewer
	\$3,930,120	Swamp Sewer
	\$902,794	Colson & Colson Sewer
	\$3,239,025	Melrose-Bailey Sewer
	\$5,938,790	Rimrock Park Sewer
	\$16,869,339	Interceptor Sewer Costs
	8,431.30	November 2005 Construction Cost Index for Seattle, Washington (Wastewater Facility Plan Date)
	8,705.49	October 2010 Construction Cost Index for Seattle, Washington
	3.25%	Percentage Increase in Seattle Construction Cost Index
	\$17,417,938	Updated Interceptor Costs

The total estimated project construction cost for the trunk sewer lines in 2005 was \$16,869,339. Using the construction cost index for Seattle, Washington, as published by Engineering News Record to estimate inflation in cost, and adjusting the total estimated project construction cost for the trunk sewer lines for inflation, yields a new estimated cost of \$17,417,938 (2010 dollars) for these trunk line improvements. This WWFP Update does not include any further adjustments to the 2005 cost estimates for collection system improvements.

By reducing the volume of I/I in the wastewater to a more moderate level, the carbonaceous biochemical oxygen demand (CBOD) and total suspended solids (TSS) removal efficiency should improve because the influent will be less diluted. I/I improvements would also reduce the volume of wastewater needing to be treated and ultimately stored and discharged. Since I/I reduction from system improvements is difficult to predict, water balances for each option in this WWFP Update are evaluated assuming no I/I reduction to provide a conservative approach.

PRELIMINARY EVALUATION FOR EXTENDING SEWER SERVICE TO KEY EXPANSION AREAS OF THE CITY

A preliminary evaluation was completed to determine the feasibility of and requirements for extending sewer service to key expansion areas of the City of Prineville. These areas are shown on Figure 3-2 and include three potential expansion areas. Ground surface elevations were determined for the potential expansion areas utilizing a GPS survey unit mounted on a truck. These survey points were plotted on a map, which was delivered under separate cover to the City of Prineville. In order to determine if the areas could be served by a gravity sewer system, the elevations were also compared to the requirements of a typical gravity sewer line. The approximate distances for the sewers were measured and the estimated number of manholes determined. These distances were then multiplied by an average sewer line slope, with each manhole contributing a drop of 0.1 foot across its width.

Keeping in mind that the elevations are based on a ground elevation and no analysis was performed to see if the new sewer could connect to current in-place sewer lines, it appears that the areas analyzed at the City's request could be served by gravity sanitary sewer systems. All of the areas were checked using an assumed 8-inch diameter sewer line and a minimum slope of 0.4 percent with the exception of the sewer main that would be installed on the abandoned railroad grade. This sewer does not appear to have sufficient grade to maintain the minimum required slope of 0.4 percent. If the sewer line were larger than 8 inches in diameter, it could be placed at a lesser slope than 0.4 percent and, in that case, would be able to serve the railroad grade expansion area with gravity sewer. In examining the area and talking with City staff, it appears that this line will be a main collector and would likely be larger than 8-inch diameter.

Based on the preliminary evaluation, the determination is that the three key expansion areas shown on Figure 3-2 could be served by gravity sewer lines. In general, these areas include the area east of Southeast Combs Flat Road between Highway 380 and Ochoco Logging Road (Area A), the area along Highway 27 (Main Street) south of Southeast Lynn Boulevard for approximately 1-1/4 miles (Area B), and the developed areas to the south and west of Meadow Lakes Golf Course south of Highway 126 (Area C).

DISCUSSION OF TREATED EFFLUENT DISPOSAL OPTIONS

The "Do Nothing" Option. This option was not considered a feasible alternative for treated wastewater effluent disposal for long-term planning. The current disposal method of winter storage combined with direct discharge to the Crooked River and summer irrigation is adequate for current wastewater flows but would soon be inadequate as the population grows. Considering Prineville's rapidly growing population and the need to extend sewer service to approximately 1,250 residents who are not currently connected to the sewer system, the City would soon be producing more wastewater effluent than could be disposed of with the current system. By doing nothing, the City would face, in the near future, being out of compliance with the Oregon Department of Environmental Quality (DEQ) and would be required to find alternate methods for disposal of its treated effluent.

Increasing the amount of discharge to the river would require effluent of better quality, which would require further treatment than is already being done. The amount of discharge to the river could be increased only by reducing the level of pollutants in the treated effluent, thereby allowing the volume of treated wastewater to be increased while still discharging the same amount of pollutants. It should be noted, however, that the trend of the DEQ is to restrict or reduce discharges of pollutants and wastewater to surface waters of the state. Increasing the amount of irrigation could possibly be accomplished by acquiring additional property. Both of these options are considered in this WWFP Update.

Option 1 – Disposal in Constructed Wetlands. The City of Prineville is considering converting the existing irrigation reuse site to constructed wetlands for the disposal of treated effluent. This would allow the storage and effluent disposal characteristics of wetlands to be utilized to increase the disposal capacity of the treatment plant. The City is also pursuing this option for the added benefits wetlands have for water quality and wildlife habitat. This WWFP Update determines the required size of and provides an estimated cost for the constructed wetlands for current and projected populations on Figure 2-1.

Based on the 2005 Wastewater Master Plan Update, current system irrigation storage and disposal methods are adequate for up to 1.60 million gallons per day (MGD) of the 1.67 MGD design flow (see page 1-2 in the 2005 Plan Update). The current average annual wastewater flow is 1.023 MGD, based on a review of daily monitoring report (DMR) data from January 2003 to July 2008. Using the 20-year (year 2030) projected population for the City of Prineville of 21,356, average annual wastewater flow would be expected to increase to approximately 2.31 MGD, assuming the calculated average flow of 108 gallons per capital per day (gpcd) remains the same. As can be seen, the projected wastewater flow greatly exceeds the current wastewater treatment facility capacity.

Using the 20-year (year 2030) projected population of 21,356 and the associated wastewater flows, a water balance was developed to determine the area needed for disposal of the treated effluent; see Table 3-2. The total land needed for constructed wetlands is 230 to 240 acres, assuming that the golf course would continue to be irrigated during the full irrigation season. The wetland size assumes that dikes, buffer zones, access and service roads, and other related structures will account for approximately 15 percent of the total area. There would be no requirement for additional storage of treated effluent or any need to discharge treated effluent directly to the Crooked River in the wintertime. The wetlands would be constructed with the treated effluent first passing through a small, lined treatment wetland of the proper size to provide approximately a three-day detention time at a 12-inch depth. The effluent would then flow into one of several wetland cells of various sizes ranging from 15 to 30 acres, with a maximum depth of 24 inches. The wetland area is sized based on anticipated pond surface evaporation (projections based on historical data), evapotranspiration from wetland plants, and anticipated seepage amounts as determined in preliminary engineering efforts. Figure 3-3 illustrates the area required for improvements for the 20-year projected population of 21,356 as well as for a population of 50,000 for long-term planning purposes.

Estimated Costs. The 2010 estimated cost for Option 1, the construction of 240 acres of wetlands, is \$6,600,000. Table 3-3 provides a breakdown of estimated costs for this option. The required earthwork is significant and accounts for the majority of the costs.

In order to develop the cost estimate, bids from recent similar jobs were examined to estimate projected costs. Earthwork quantities for construction of the dikes are estimated based on a dike 4 feet high, with an 8-foot wide access road on top of the dike and side slopes with a 4:1 aspect ratio. The wetland would have a maximum depth of 2 feet with 2 feet of freeboard. The treatment wetland would provide a three-day detention time at 12 inches of depth and have a bentonite liner to prevent seepage. The earthwork costs are based on a typical cost that does not include significant rock removal. If substantial rock quantities are present, the estimated cost for earthwork could be significantly higher.

Two other major estimated costs are an upgrade to the effluent pump system and lagoon aeration system improvements. The effluent pump system would need to be upgraded to handle the higher effluent flows associated with a growing population. The lagoon aeration system improvements would provide improved wastewater treatment for the increased waste loads.

Advantages. The most significant advantage of this option is eliminating discharge of treated wastewater to the Crooked River. Other major advantages of this option are a significantly lower estimated capital cost when compared with the other options and no requirement for storage lagoons since the treated effluent would be stored in the wetlands. The City would not have to purchase any additional land for disposal of the treated effluent for a projected 20-year population. The amount of land required after the constructed wetlands reach design capacity and new wetlands would be needed is anticipated to be less than the amount of land needed for the other options. Constructed wetlands would eliminate the need for maintaining an irrigation system and represent the lowest cost for operation and maintenance of the options presented in this WWFP Update.

Another advantage of this option would be the additional habitat areas for wildlife, as wetlands typically feature a wide variety of species of plants, invertebrates, and animals. Wetlands provide public access to wildlife viewing areas as well as other recreational benefits such as hunting. Wetlands are typically considered the ecosystem with the most biological diversity and are the subject of many current conservation and preservation efforts. Environmentally, not only do the wetlands act to filter and clean wastewater, they also act as a carbon sink to help mitigate climate change.

The treatment characteristics of wetlands are explained in the Preliminary Groundwater Assessment (PGA) prepared in February 2010 by Anderson-Perry and Associates, Inc., and George Chadwick Consulting, and the reader is encouraged to refer to that report for additional information. Among other benefits, substantial treatment of various forms of nitrogen would be expected to occur in the constructed wetlands. Increased groundwater discharges to the

Crooked River from wetland seepage would also tend to have a small beneficial impact on the two water quality parameters, water temperature and pH, that have been determined to be limiting in the river. As can be seen, creating wetland areas for the treatment of wastewater effluent is responsible environmentally as well as financially for the City of Prineville.

Disadvantages. One of the main disadvantages of this option is that the potential exists for the wetlands to have a degradative effect on the surrounding groundwater quality. Controlling the amount of seepage from the disposal wetlands is dependent on the native soil conditions. Seepage from constructed wetlands could increase the total dissolved solids (TDS) of the shallow groundwater down-gradient of the wetlands to a degree dependent on the rate of recharge in comparison to the existing groundwater flow. The aforementioned disadvantages are discussed at length in the 2010 PGA. The PGA concludes that construction of some kind of groundwater controls is expected to be incorporated into the design of any new wetland and that TDS concentrations in the shallow aquifer will likely increase.

Another disadvantage of this option could be possible mosquitoes produced by wetlands located close to the City limits, although in the constructed wetlands in both La Grande and Salem, Oregon, mosquitoes have not been an issue. It is believed bird populations increase as a result of wetland habitat, which helps to control mosquito populations. Even though mosquitoes are not anticipated to be an issue, a monitoring and control program should be implemented.

Option 2A – Irrigation Plus Direct Discharge to the Crooked River (Current Method). The current method of disposal of the treated wastewater effluent is irrigation of the City-owned golf course and pasture land combined with direct discharge of treated effluent to the Crooked River in the wintertime. Effluent is treated in a lagoon system and then stored in one of two irrigation storage ponds or dechlorinated and discharged into the Crooked River. Effluent can be discharged into the river only during November through April of each year, as long as river flows exceed 15 cubic feet per second (cfs) and effluent quality meets permit limits. The permit limits the total amount of CBOD and TSS, among other things, which can be discharged to the river. The current levels of CBOD and TSS in the effluent limits this discharge to approximately 1.0 MGD of treated effluent during the period discharge is allowed. The effluent stored in the storage ponds is used to irrigate 123 acres of the City's municipal golf course and approximately 280 acres of City-owned property used as pasture during the typical irrigation season. Current water balance conditions are shown on Table 3-1.

Based on the 2005 Wastewater Master Plan Update, the current system irrigation storage and application is adequate for design flows up to 1.60 MGD. The current average annual wastewater flow is 1.023 MGD, based on a review of DMR data from January 2003 to July 2008. Using the 20-year (year 2030) projected population for the City of Prineville of 21,356, average annual wastewater flow would be expected to increase to approximately 2.31 MGD, assuming the calculated average flow of 108 gpcd remains the same. As can be seen, the projected wastewater flow greatly exceeds the current wastewater treatment facility capacity.

A water balance was developed using the projected average annual wastewater flow to determine the area needed for disposal of the treated effluent, see Table 3-4. By continuing to use the current method of irrigation combined with direct discharge to the Crooked River, the City would need to acquire additional land for disposal of the treated effluent from the projected population. The City would continue to irrigate the 123 acres of municipal golf course and would need approximately 440 total acres of irrigated pasture to dispose of the balance of the treated effluent for the 2030 population. Since the City already owns 280 acres, this equates to an additional 160 acres that would need to be purchased or leased by the City for irrigation. Figure 3-4 illustrates the area required for improvements for the 20-year projected population of 21,356 as well as for a population of 50,000 for long-term planning purposes.

The previous update to the WWFP planned for the City to lease the additional land they would need for irrigation. The City would lease property from local adjacent property owners with the understanding that the treated effluent would be used for irrigation and in compliance with all applicable laws and regulations. Leasing property rather than purchasing it could create several challenges. By leasing, the City risks not being able to find enough landowners within an economically viable area who are willing to irrigate with treated effluent and comply with the associated regulatory requirements. In addition, the areas to be irrigated could change from year to year. If this were to happen, the City could face additional costs associated with piping or transporting the treated effluent to areas where it could be disposed of by irrigation. The logistics of planning for the future, finding willing landowners, and dealing with each one of them could present a problem that the wastewater facility personnel is not desirous or prepared to manage. The best option as far as longevity for additional land for disposal of treated effluent is purchasing rather than leasing as it would be a permanent solution, keeping the City in full control of the facilities.

In addition to additional land for disposal, the City would need to have a total lagoon storage volume of 250 million gallons (MG), which is more than currently exists. For storage of the additional effluent, a lagoon with a depth of 10 feet and having a surface area of approximately 40 acres would be necessary. There would be additional costs incurred in the construction of the required storage lagoon.

Estimated Costs. The 2010 total estimated project cost for Option 2A is \$9,230,000. Table 3-5 provides a breakdown of estimated costs for this option. The purchase of additional property with associated structures and their demolition accounts for a considerable amount of the costs. Other considerable costs are the cost of the storage lagoon earthwork and the bentonite liner. There is also a cost associated with the increased power requirements for this option over the constructed wetlands.

As stated, one factor that could have a great influence on the overall cost of this option is the purchase of additional property. In order to remain with the current method of effluent disposal, the City would need to acquire approximately an additional 200 acres for irrigation and storage and maintain current discharge amounts to the Crooked River. The last 10 years have seen a great increase in the price of real estate in Central Oregon as a result of the rapid rate of growth in population. The preliminary layout of irrigation areas would require the purchase

of four to six farm houses with property and all the associated outbuildings, e.g., barns, pump houses, garages, livestock pens and shelters, etc. The costs of these structures could be quite variable and add significantly to the total estimated cost of this option.

The estimated cost for this option is based on several assumptions made regarding the cost of property and irrigation equipment. Based on a preliminary irrigation area layout, one pivot would be required with a radius of approximately 1,600 feet as well as several areas of various sizes with hand- or wheel-line application.

In order to accurately estimate the cost of purchasing land and other structures, several sources were consulted. The first source was Jerry Brummer, Public Works Superintendent for the City of Prineville, who recalled that the City purchased property in 2004 for the purpose of irrigating the treated wastewater effluent. The approximate cost of the irrigated land was \$3,000 to \$4,000 an acre for bare property with no structures or improvements. The second source was Mike Warren, Jr., a local real estate broker at Crook County Properties, telephone number (541) 447-3020. At the time of consultation with Mr. Warren in mid-July 2010, he estimated that irrigated land within a mile or two northwest of Prineville, which is the general location of the project, was selling in the range of \$6,000 to \$12,000 an acre, but prices are currently reducing due to economic conditions. He also estimated the cost of new home construction to be in the range of \$90 to \$95 per square foot (SF) with farm outbuildings at \$25 to \$35/SF. These values for the structures represent a significant drop in the last three years, from values that were at least 25 percent to 30 percent higher. In estimating the costs for this project, it was felt an average of \$6,000 an acre would be more appropriate for the 2010 projected cost of irrigated land.

The average size of the farmhouses and outbuildings within the project site were estimated using aerial photographs. The cost of purchasing the structures and property is based on the values obtained from the City of Prineville and the local real estate broker. Actual costs of purchasing the property could be significantly higher than the estimate, according to the condition and value of existing structures.

Advantages. The major advantages of this option are the significantly lower estimated capital cost when compared to the options involving the construction of a mechanical treatment plant, and less potential for adverse effects to the shallow groundwater when compared to the constructed wetlands. The City has personnel already in place and trained to irrigate using the treated effluent, although with the additional property, additional personnel could likely be necessary.

Disadvantages. The major disadvantage of this option is the considerable costs associated with procurement of property, installation and maintenance of irrigation equipment, and construction of the storage lagoon. There is also the possibility that sometime in the future the City would outgrow its ability to dispose of all the treated effluent produced by its population. While this is most likely

outside the 20-year planning period of this WWFP Update, the City's population could eventually grow large enough that it may not be economically feasible to dispose of treated effluent by irrigation and storage. The lagoon storage volume would be significant when considering the surface acreage needed, and the possibility of purchasing the amount of needed property for irrigation would be difficult.

Another disadvantage is the possibility that the City's National Pollutant Discharge Elimination System (NPDES) Permit could be revoked or pollutant discharge limits modified. This would eliminate or restrict the amount of direct discharge to the Crooked River. If the City were not allowed to directly discharge treated effluent to the Crooked River, then all of the effluent would have to be disposed of by irrigation.

Option 2B – Irrigation with No Discharge to the Crooked River. Option 2B is similar to the current method of treatment and disposal (Option 2A), with the one change being that no discharge of treated wastewater would be allowed to the Crooked River. This could be the case if the City's NPDES Permit was revoked or reevaluated such that no outfall was permitted. This could occur as a result of the attempt to reintroduce anadromous fish back into the Crooked River or to protect any of the native fish species in the river that have been listed as threatened or endangered. For example, the native bull trout is listed as a threatened species under the Endangered Species Act and conservation efforts have been underway to protect its habitat and recover the species. In this option, effluent would be treated in a lagoon system and then stored in irrigation storage ponds until the irrigation season. No direct discharge of treated effluent to the Crooked River would take place. A percentage of the treated effluent would be used to irrigate the 123 acres of the City's municipal golf course, as is currently done.

Using the same 20-year (year 2030) projected population for the City of Prineville of 21,356 with an average annual wastewater flow of 2.31 MGD, a water balance was developed to determine the area needed for disposal of the treated effluent; see Table 3-6. The City would need 600 acres of irrigated pasture in addition to the golf course for disposal of the treated effluent, plus a lagoon storage volume of 400 MG. The required additional lagoon would need to be 95 surface acres with a depth of 10 feet. This means the City would need to purchase approximately an additional 420 acres for disposal of the treated effluent if no outfall to the Crooked River was allowed. Figure 3-5 illustrates the area required for improvements for the 20-year projected population of 21,356 as well as for a population of 50,000 for long-term planning purposes.

Estimated Costs. The cost for this option would be significantly higher than Option 2A due to the greater amount of land that would need to be purchased, the additional storage lagoon that would need to be constructed, and the costs of added irrigation equipment. The overall estimated total project cost for this option is \$15,500,000, and represents approximately a 70 percent increase over Option 2A. Using Option 1 as a baseline, this option also represents a significant increase in operations and maintenance. Table 3-7 provides a breakdown of estimated costs for this option.

The areas of major costs for this option are similar to Option 2A with the difference being that magnitudes are considerably larger due to the elimination of river discharge. As discussed in Option 2A, the actual cost of purchasing property is highly variable and could be significantly higher than the estimate according to the condition and value of existing structures and the local real estate market.

Advantages. The most significant advantage of this option is eliminating discharge of treated wastewater to the Crooked River. Another major advantage of this option is the same as Option 2A, the significantly lower estimated capital cost when compared to the options involving the construction of a mechanical treatment plant and less potential for adverse effects to the groundwater when compared to the constructed wetlands. Due to the substantial increase in land required for irrigation with this option, the advantage is not as sizeable as with Option 2A. There is also a greater chance for the cost of real estate to influence the advantages and disadvantages of this option.

Disadvantages. As discussed in Option 2A, the major disadvantage of this option is the considerable costs associated with procurement of property, installation and maintenance of irrigation equipment, and construction of a new storage lagoon. There is also the possibility that sometime in the future the City could outgrow its ability to dispose of all the treated effluent produced by its population. The possibility of this happening is even greater with Option 2B, when compared to Option 2A, due to the greater amount of property, irrigation, and storage needed.

Option 3A – Mechanical Treatment Plant with Irrigation and River

Discharge. The 2005 Wastewater Master Plan Update included several options for the disposal of the City's treated effluent, four of the five options being the construction of a mechanical treatment plant. This WWFP Update also includes an option for the construction of a mechanical treatment plant. The construction of such a plant would reduce the CBOD and TSS loadings of the wastewater effluent to about 10 milligrams per liter (mg/L) each. When compared to the loadings of the treated effluent from the lagoon system of about 25 mg/L each, the mechanical treatment plant produces effluent of much better quality. Producing better quality effluent would allow a greater volume of discharge into the Crooked River during the wintertime while still meeting the City's NPDES Permit limits, which in turn reduces the amount of effluent that must be disposed of by irrigation. Since the effluent is of better quality, it would also have fewer restrictions placed on the reuse. Storage lagoons would still have to be constructed for the storage of the treated effluent in the summertime, as the current NPDES Permit allows the discharge of effluent only in the wintertime, from November to April. Using the 20-year projected population of 21,356 and associated wastewater flow, a water balance was developed to determine the area needed for disposal of treated effluent; see Table 3-8. Figure 3-6 illustrates the area required for improvements for the 20-year projected population of 21,356 as well as for a population of 50,000 for long-term planning purposes.

Estimated Costs. The 2010 total estimated project cost for Option 3A is \$21,000,000. Table 3-9 provides a breakdown of estimated costs for this option. The construction of the membrane bioreactor (MBR) treatment system itself would account for the majority of the costs. There would also be a significant increase in the operations and maintenance costs of this option when compared to the baseline cost of Option 1.

Advantages. The major advantage of this system is the greater range of options for disposal of effluent due to the higher quality of the effluent produced. The treated effluent would have fewer restrictions placed on its reuse as a result of having better treatment. A higher quality effluent would mean that the golf course irrigation could have less monitoring and restrictions. There would also be less chance for odor and mosquito problems or adverse effects to the groundwater quality in the vicinity of the plant and disposal sites.

Disadvantages. The major disadvantage of this option is the considerable estimated cost of capital improvements when compared to the other options, as well as the significantly higher cost of yearly operations and maintenance, including a higher operator classification. Although the treated effluent would be much better quality than that of a lagoon system, this option would still depend on the ability to directly discharge treated effluent to the Crooked River as a main component of its disposal method.

Option 3B – Mechanical Treatment Plant with Irrigation and No River Discharge. Option 3B also involves the construction of a mechanical treatment plant, the difference from Option 3A being that the treated effluent would be reused entirely for irrigation with no direct river discharge. Since the same volume of treated effluent would be produced, the amount of irrigated property and wintertime storage for this option is the same as that for Option 2B. Figure 3-5 illustrates the area required for improvements for the 20-year projected population of 21,356 as well as for a population of 50,000 for long-term planning purposes. The one difference might be the level of restrictions placed on the reuse of the treated effluent due to the higher quality produced by the mechanical treatment plant, in turn making the irrigation slightly easier and less costly. Using the 20-year projected population of 21,356 and associated wastewater flow, a water balance was developed to determine the area needed for disposal of treated effluent; see Table 3-10.

Estimated Costs. The 2010 total estimated project cost for Option 3B is \$33,000,000. Table 3-11 provides a breakdown of estimated costs for this option. The construction of the MBR treatment system and procurement of the additional property would account for the majority of the costs. There would also be a significant increase in the operations and maintenance costs of this option when compared to the baseline cost of Option 1.

Advantages. The major advantages of this option are the quality of effluent produced and the ability to dispose of all the treated effluent by irrigation, thus not being dependent on the need to directly discharge to the Crooked River.

Disadvantages. The major disadvantage of this option is the considerable estimated cost of capital improvements when compared to the other options, as well as the significantly higher cost of yearly operations and maintenance, including a higher operator classification.

CONCLUSION

This chapter has outlined six options for the City of Prineville to consider for their wastewater treatment and disposal system. Operational considerations, advantages and disadvantages, and estimated costs have been presented herein. The preferred option, as selected by the City of Prineville, is presented in Chapter 4, Selected Improvement Option.

CURRENT PRINEVILLE WASTEWATER TREATMENT PLANT WATER BALANCE

Month	Influent		Precipitation		Evaporation		Seepage (MG)	Irrigation		Outfall Flow (MG)		Storage + into Storage (- out of Storage) (MG)	Cumulative Storage Needed (MG)
	MGD	(MG)	(in.)	(MG)	(in.)	(MG)		(ac-in/ac)	(MG)	River	Permitted		
Jan	1.193	37.00	1.09	2.92	0.70	1.88	0.00	-	0.00	31.0	31.0	7.04	29.57
Feb	1.134	31.77	0.83	2.22	0.70	1.88	0.00	-	0.00	28.0	28.0	4.11	33.69
Mar	1.001	31.05	0.74	1.98	0.70	1.88	0.00	-	0.00	31.0	31.0	0.15	33.84
Apr	1.170	35.10	0.72	1.93	2.82	7.57	0.00	2.79	9.32	30.0	30.0	-9.86	23.98
May	1.112	34.46	1.09	2.92	4.96	13.29	0.00	5.88	19.64	-	-	4.45	28.43
Jun	1.060	31.79	1.06	2.84	6.36	17.06	0.00	7.29	24.35	-	-	-6.78	21.65
Jul	0.982	30.44	0.39	1.05	7.70	20.64	0.00	9.40	31.40	-	-	-20.55	1.10
Aug	0.870	26.98	0.43	1.15	6.57	17.61	0.00	7.56	25.25	-	-	-14.73	0.00
Sep	0.873	26.19	0.47	1.26	4.44	11.91	0.00	5.36	17.90	-	-	-2.36	0.00
Oct	0.924	28.65	0.80	2.14	0.70	1.88	0.00	2.41	8.05	-	-	20.87	20.87
Nov	0.962	28.87	1.25	3.35	0.70	1.88	0.00	-	0.00	30.0	30.0	0.34	21.22
Dec	0.997	30.92	1.22	3.27	0.70	1.88	0.00	-	0.00	31.0	31.0	1.31	22.53
TOTALS	1.02	373.20	10.09	27.05	37.06	99.34	0.00	40.69	135.90	181	181.00	-15.99	

Treatment/Storage Facility	Sq Ft.	Acres	Depth (ft.)	Storage Volume (MG)	Storage Volume Needed (MG)
Plant 1 - Primary Lagoon	1,611,720	37.0	5	-	-
Plant 1 - Secondary Lagoon	435,600	10.0	5	6.5	-
Plant 1 - Storage Lagoon	583,704	13.4	5	21.8	-
Plant 2 - Primary Lagoon	152,024	3.5	8.5	-	-
Plant 2 - Secondary Lagoons	253,519	5.8	5.5	4.7	-
Plant 2 - Storage Lagoon	1,263,240	29.0	11	103.9	-
New Wetlands (max. water surface)	0.0	0.0	-	-	-
TOTAL	4,299,808	98.7	-	137.0	33.84

	Permitted (in./acre- year)	Acres
Golf Course	40.69	123
Pasture Land	40.69	0
TOTAL		123

Notes:

1. Influent. Domestic influent flows are based on average monthly flow from August 2003 to July 2008.
2. Precipitation. Utilized precipitation on record with the Western Regional Climate Center (WRCC), for Prineville 4NW, Oregon, 1926 to 2007 data (used mean rainfall for each month).
3. Evaporation. Utilized pan evaporation data obtained from the WRCC 2000 to 2005, for Madras 2N, Oregon, with a pan coefficient of 0.70.
4. Seepage. Lagoon seepage assumed to be zero. Wetland seepage assumed to be 1/4 inch per day.
5. Irrigation. Taken from the City of Prineville - Wastewater Facility Plan prepared by ACE Consultants in December 2000.
6. Outfall. The City of Prineville NPDES Permit states that the City may discharge treated effluent into the Crooked River during the months of November through April. This is contingent on a minimum flow of 15 cubic feet per second in the Crooked River, and effluent discharge may not exceed 1/15 of river discharge. At current effluent quality, this discharge equates to 1.0 MGD.

ac = acre
ft = feet
in = inches
MG = Million Gallons
MGD = Million Gallons per Day
Sq Ft. = Square Feet



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
CURRENT PRINEVILLE WASTEWATER
TREATMENT PLANT WATER BALANCE

**TABLE
3-1**

PRINEVILLE WASTEWATER TREATMENT PLANT WATER BALANCE UTILIZING WETLANDS - OPTION 1
2030 POPULATION OF 21,356

Month	Influent		Precipitation		Evaporation		Seepage (MG)	Irrigation		Outfall Flow (MG)		Storage + into Storage (- out of Storage) (MG)	Cumulative Storage Needed (MG)
	MGD	(MG)	(in.)	(MG)	(in.)	(MG)		(ac-in/ac)	(MG)	River	Permitted		
Jan	2.694	83.51	1.09	8.99	0.70	5.77	43.14	-	0.00	0.0	31.0	43.58	116.78
Feb	2.561	71.70	0.83	6.85	0.70	5.77	38.97	-	0.00	0.0	28.0	33.80	150.58
Mar	2.260	70.07	0.74	6.10	0.70	5.77	43.14	-	0.00	0.0	31.0	27.26	177.84
Apr	2.641	79.22	0.72	5.94	2.82	23.29	41.75	2.79	9.32	0.0	30.0	10.80	188.64
May	2.509	77.79	1.09	8.99	4.96	40.90	43.14	5.88	19.64	-	-	-16.91	171.73
Jun	2.391	71.74	1.06	8.74	6.36	52.49	41.75	7.29	24.35	-	-	-38.10	133.64
Jul	2.216	68.70	0.39	3.22	7.70	63.49	43.14	9.40	31.40	-	-	-66.12	67.52
Aug	1.964	60.89	0.43	3.55	6.57	54.19	43.14	7.56	25.25	-	-	-58.15	9.37
Sep	1.970	59.11	0.47	3.88	4.44	36.64	41.75	5.36	17.90	-	-	-33.30	0.00
Oct	2.086	64.67	0.80	6.60	0.70	5.77	43.14	2.41	8.05	-	-	14.31	14.31
Nov	2.172	65.16	1.25	10.31	0.70	5.77	41.75	-	0.00	0.0	30.0	27.95	42.26
Dec	2.251	69.79	1.22	10.06	0.70	5.77	43.14	-	0.00	0.0	31.0	30.94	73.19
TOTALS	2.310	842.35	10.09	83.21	37.06	305.64	507.95	40.69	135.90	0	181.00	-23.93	

Treatment/Storage Facility	Sq Ft.	Acres	Depth (ft.)	Storage Volume (MG)	Storage Volume Needed (MG)	Land Needed (AC)
Plant 1 - Primary Lagoon	1,611,720	37.0	5	-	-	-
Plant 1 - Secondary Lagoon	435,600	10.0	5	6.5	-	-
Plant 1 - Storage Lagoon	583,704	13.4	5	21.8	-	-
Plant 2 - Primary Lagoon	152,024	3.5	8.5	-	-	-
Plant 2 - Secondary Lagoons	253,519	5.8	5.5	4.7	-	-
Plant 2 - Storage Lagoon	1,263,240	29.0	11	103.9	-	-
New Wetlands (max. water surface)	8,929,800	205.0	2	132.2	-	230-240
TOTAL	13,229,608	303.7	-	269.2	188.64	230-240

	Permitted (in./acre- year)	Acres
Golf Course	40.69	123
Pasture Land	40.69	0
TOTAL		123

Notes:

- Influent. Domestic influent flows are based on average monthly per capita flow from August 2003 to July 2008, projected to a 2030 population of 21,356.
- Precipitation. Utilized precipitation on record with the Western Regional Climate Center (WRCC), for Prineville 4NW, Oregon, 1926 to 2007 data (used mean rainfall for each month).
- Evaporation. Utilized pan evaporation data obtained from the WRCC 2000 to 2005, for Madras 2N, Oregon, with a pan coefficient of 0.70.
- Seepage. Wetland seepage assumed to be 1/4 inch per day.
- Irrigation. Taken from the City of Prineville - Wastewater Facility Plan prepared by ACE Consultants in December 2000.
- Outfall. The City of Prineville NPDES Permit states that the City may discharge treated effluent into the Crooked River during the months of November through April. This is contingent on a minimum flow of 15 cubic feet per second in the Crooked River, and effluent discharge may not exceed 1/15 of river discharge. At current effluent quality, this discharge equates to 1.0 MGD. This option is examined utilizing no direct discharge to the river.

ac = acre
ft = feet
in = inches
MG = Million Gallons
MGD = Million Gallons per Day
Sq Ft. = Square Feet



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
WASTEWATER TREATMENT PLANT
WATER BALANCE - OPTION 1

TABLE
3-2

CITY OF PRINEVILLE, OREGON
ESTIMATED COST
WASTEWATER FACILITIES PLAN UPDATE
OPTION 1 - WETLANDS OPTION WITHOUT RIVER DISCHARGE
2030 POPULATION OF 21,356
(YEAR 2010 COSTS)

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL 2010 PRICE
1	Mobilization/Demobilization	LS	\$ 233,000	All Req'd	\$ 233,000
2	Project Safety and Quality Control	LS	50,000	All Req'd	50,000
3	Demolition	LS	30,000	All Req'd	30,000
4	Wetland Earthwork	LS	2,100,000	All Req'd	2,100,000
5	Treatment Wetland Bentonite Liner	SF	0.50	1,180,000	590,000
6	Wetland Piping	LF	40	12,000	480,000
7	Control Structures	EA	20,000	10	200,000
8	Pump Station Improvements	LS	200,000	All Req'd	200,000
9	Seeding	AC	500	240	120,000
10	Planting of Treatment Wetland	AC	2,000	25	50,000
11	Fencing and Signing	LF	6	14,500	87,000
12	Lagoon Aeration System Improvements	LS	750,000	All Req'd	750,000
Subtotal Estimated Construction Cost					\$ 4,890,000
Administration, Legal, Engineering, Permitting, Contingency, etc. (35%)					1,710,000
TOTAL ESTIMATED PROJECT COST (2010 DOLLARS)					\$ 6,600,000

PRESENT WORTH ANALYSIS (2010 DOLLARS)

Option 1 is used as a baseline for comparison with all other options. The Present Worth shown for other options should be compared with the Total Estimated Project Cost shown above.



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE

ESTIMATED COST - OPTION 1

**TABLE
3-3**

PRINEVILLE WASTEWATER TREATMENT PLANT WATER BALANCE WITH IRRIGATION AND DIRECT DISCHARGE TO THE CROOKED RIVER - OPTION 2A
2030 POPULATION OF 21,356

Month	Influent		Precipitation		Evaporation		Seepage (MG)	Irrigation		Outfall Flow (MG)		Storage + into Storage (- out of Storage) (MG)	Cumulative Storage Needed (MG)
	MGD	(MG)	(in.)	(MG)	(in.)	(MG)		(ac-in/ac)	(MG)	River	Permitted		
Jan	2.694	83.51	1.09	2.92	0.70	1.88	0.00	-	0.00	31.0	31.0	53.55	158.47
Feb	2.561	71.70	0.83	2.22	0.70	1.88	0.00	-	0.00	28.0	28.0	44.05	202.52
Mar	2.260	70.07	0.74	1.98	0.70	1.88	0.00	-	0.00	31.0	31.0	39.18	241.70
Apr	2.641	79.22	0.72	1.93	2.82	7.57	0.00	2.79	42.65	30.0	30.0	0.93	242.63
May	2.509	77.79	1.09	2.92	4.96	13.29	0.00	5.88	89.89	-	-	-22.48	220.15
Jun	2.391	71.74	1.06	2.84	6.36	17.06	0.00	7.29	111.45	-	-	-53.92	166.23
Jul	2.216	68.70	0.39	1.05	7.70	20.64	0.00	9.40	143.71	-	-	-94.60	71.63
Aug	1.964	60.89	0.43	1.15	6.57	17.61	0.00	7.56	115.58	-	-	-71.15	0.48
Sep	1.970	59.11	0.47	1.26	4.44	11.91	0.00	5.36	81.94	-	-	-33.48	0.00
Oct	2.086	64.67	0.80	2.14	0.70	1.88	0.00	2.41	36.84	-	-	28.10	28.10
Nov	2.172	65.16	1.25	3.35	0.70	1.88	0.00	-	0.00	30.0	30.0	36.64	64.74
Dec	2.251	69.79	1.22	3.27	0.70	1.88	0.00	-	0.00	31.0	31.0	40.18	104.92
TOTALS	2.310	842.35	10.09	27.05	37.06	99.34	0.00	40.69	622.06	181	181	-33.00	

Treatment/Storage Facility	Sq Ft.	Acres	Depth (ft.)	Storage Volume Needed (MG)	Storage Volume Needed (MG)	Storage Lagoon Area Needed w/10-foot Depth (Acres)
Plant 1 - Primary Lagoon	1,611,720	37.0	5	-	-	-
Plant 1 - Secondary Lagoon	435,600	10.0	5	6.5	-	-
Plant 1 - Storage Lagoon	583,704	13.4	5	21.8	-	-
Plant 2 - Primary Lagoon	152,024	3.5	8.5	-	-	-
Plant 2 - Secondary Lagoons	253,519	5.8	5.5	4.7	-	-
Plant 2 - Storage Lagoon	1,263,240	29.0	11	103.9	-	-
New Wetlands (max. water surface)	0.0	0.0	-	-	-	-
TOTAL	4,299,808	98.7	-	137.0	242.63	37

	Permitted (in./acre- year)	Acres
Golf Course	40.69	123
Pasture Land	40.69	440
TOTAL		563

Notes:

1. Influent. Domestic influent flows are based on average monthly per capita flow from August 2003 to July 2008, projected to a 2030 population of 21,356.
2. Precipitation. Utilized precipitation on record with the Western Regional Climate Center (WRCC), for Prineville 4NW, Oregon, 1926 to 2007 data (used mean rainfall for each month).
3. Evaporation. Utilized pan evaporation data obtained from the WRCC 2000 to 2005, for Madras 2N, Oregon, with a pan coefficient of 0.70.
4. Seepage. Wetland seepage assumed to be 1/4 inch per day.
5. Irrigation. Taken from the City of Prineville - Wastewater Facility Plan prepared by ACE Consultants in December 2000.
6. Outfall. The City of Prineville NPDES Permit states that the City may discharge treated effluent into the Crooked River during the months of November through April. This is contingent on a minimum flow of 15 cubic feet per second in the Crooked River, and effluent discharge may not exceed 1/15 of river discharge. At current effluent quality, this discharge equates to 1.0 MGD.

ac = acre
ft = feet
in = inches
MG = Million Gallons
MGD = Million Gallons per Day
Sq Ft. = Square Feet

	CITY OF PRINEVILLE, OREGON WASTEWATER FACILITIES PLAN UPDATE WASTEWATER TREATMENT PLANT WATER BALANCE - OPTION 2A	TABLE 3-4
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**CITY OF PRINEVILLE, OREGON
ESTIMATED COST
WASTEWATER FACILITIES PLAN UPDATE
OPTION 2A - IRRIGATION WITH RIVER DISCHARGE
2030 POPULATION OF 21,356
(YEAR 2010 COSTS)**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL 2010 PRICE
1	Mobilization/Demobilization	LS	\$ 326,000	All Req'd	\$ 326,000
2	Project Safety and Quality Control	LS	50,000	All Req'd	50,000
3	Site Work	LS	60,000	All Req'd	60,000
4	Purchase Additional Land	AC	6,000	200	1,200,000
5	Purchase Farm Structures	LS	915,000	All Req'd	915,000
6	Demolition and Disposal of Structures, Fences, Irrigation Equipment, etc.	LS	100,000	All Req'd	100,000
7	Pump Station Improvements	LS	200,000	All Req'd	200,000
8	Irrigation Pivot	LS	120,000	All Req'd	120,000
9	Irrigation Hand Lines	LF	5	60,000	300,000
10	Irrigation Main Line	LF	30	10,000	300,000
11	Piping and Appurtenances	LS	100,000	All Req'd	100,000
12	Storage Lagoon Earthwork	LS	1,125,000	All Req'd	1,125,000
13	Storage Lagoon Piping	LF	40	4,000	160,000
14	Storage Lagoon Bentonite Liner	SF	0.50	2,000,000	1,000,000
15	Control Structure	EA	20,000	2	40,000
16	Fencing and Signing	LF	6	15,000	90,000
17	Lagoon Aeration System Improvements	LS	750,000	All Req'd	750,000
Subtotal Estimated Construction Cost					\$ 6,836,000
Administration, Legal, Engineering, Permitting, Contingency, etc. (35%)					<u>2,394,000</u>
TOTAL ESTIMATED PROJECT COST (2010 DOLLARS)					<u>\$ 9,230,000</u>

PRESENT WORTH ANALYSIS (2010 DOLLARS)

Item	Description	Annual Cost
<i>ANNUAL OPERATION AND MAINTENANCE (Using Option 1 as Baseline)</i>		
1	Increased Power Requirements (Irrigation)	20,000
		Total O&M \$ 20,000
		Present Worth O&M (5%, 20 years) \$ 250,000
		Present Worth (2010 Dollars) \$ 9,480,000



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE

ESTIMATED COST - OPTION 2A

**TABLE
3-5**

PRINEVILLE WASTEWATER TREATMENT PLANT WATER BALANCE WITH IRRIGATION AND NO OUTFALL TO THE CROOKED RIVER - OPTION 2B

2030 POPULATION OF 21,356

Month	Influent		Precipitation		Evaporation		Seepage (MG)	Irrigation		Outfall Flow (MG)		Storage + into Storage (- out of Storage) (MG)	Cumulative Storage Needed (MG)
	MGD	(MG)	(in.)	(MG)	(in.)	(MG)		(ac-in/ac)	(MG)	River	Permitted		
Jan	2.694	83.51	1.09	2.92	0.70	1.88	0.00	-	0.00	0.0	-	84.55	240.00
Feb	2.561	71.70	0.83	2.22	0.70	1.88	0.00	-	0.00	0.0	-	72.05	312.05
Mar	2.260	70.07	0.74	1.98	0.70	1.88	0.00	-	0.00	0.0	-	70.18	382.23
Apr	2.641	79.22	0.72	1.93	2.82	7.57	0.00	2.79	54.77	0.0	-	18.81	401.03
May	2.509	77.79	1.09	2.92	4.96	13.29	0.00	5.88	115.44	0.0	-	-48.02	353.01
Jun	2.391	71.74	1.06	2.84	6.36	17.06	0.00	7.29	143.12	0.0	-	-85.59	267.42
Jul	2.216	68.70	0.39	1.05	7.70	20.64	0.00	9.40	184.55	0.0	-	-135.44	131.98
Aug	1.964	60.89	0.43	1.15	6.57	17.61	0.00	7.56	148.42	0.0	-	-103.99	27.98
Sep	1.970	59.11	0.47	1.26	4.44	11.91	0.00	5.36	105.23	0.0	-	-56.77	0.00
Oct	2.086	64.67	0.80	2.14	0.70	1.88	0.00	2.41	47.31	0.0	-	17.63	17.63
Nov	2.172	65.16	1.25	3.35	0.70	1.88	0.00	-	0.00	0.0	-	66.64	84.26
Dec	2.251	69.79	1.22	3.27	0.70	1.88	0.00	-	0.00	0.0	-	71.18	155.45
TOTALS	2.310	842.35	10.09	27.05	37.06	99.34	0.00	40.69	798.85	0	0	-28.79	

Treatment/Storage Facility	Sq Ft.	Acres	Depth (ft.)	Storage Volume (MG)	Storage Volume Needed (MG)	Storage Lagoon Area Needed w/10-foot Depth (Acres)
Plant 1 - Primary Lagoon	1,611,720	37.0	5	-	-	-
Plant 1 - Secondary Lagoon	435,600	10.0	5	6.5	-	-
Plant 1 - Storage Lagoon	583,704	13.4	5	21.8	-	-
Plant 2 - Primary Lagoon	152,024	3.5	8.5	-	-	-
Plant 2 - Secondary Lagoons	253,519	5.8	5.5	4.7	-	-
Plant 2 - Storage Lagoon	1,263,240	29.0	11	103.9	-	-
New Wetlands (max. water surface)	0.0	0.0	-	-	-	-
TOTAL	4,299,808	98.7	-	137.0	401.03	93

	Permitted (in./acre- year)	Acres
Golf Course	40.69	123
Pasture Land	40.69	600
TOTAL		723

Notes:

- Influent. Domestic influent flows are based on average monthly per capita flow from August 2003 to July 2008, projected to a 2030 population of 21,356.
- Precipitation. Utilized precipitation on record with the Western Regional Climate Center (WRCC), for Prineville 4NW, Oregon, 1926 to 2007 data (used mean rainfall for each month).
- Evaporation. Utilized pan evaporation data obtained from the WRCC 2000 to 2005, for Madras 2N, Oregon, with a pan coefficient of 0.70.
- Seepage. Wetland seepage assumed to be 1/4 inch per day.
- Irrigation. Taken from the City of Prineville - Wastewater Facility Plan prepared by ACE Consultants in December 2000.
- Outfall. The City of Prineville NPDES Permit states that the City may discharge treated effluent into the Crooked River during the months of November through April. This is contingent on a minimum flow of 15 cubic feet per second in the Crooked River, and effluent discharge may not exceed 1/15 of river discharge. At current effluent quality, this discharge equates to 1.0 MGD.

ac = acre
ft = feet
in = inches
MG = Million Gallons
MGD = Million Gallons per Day
Sq Ft. = Square Feet



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
WASTEWATER TREATMENT PLANT
WATER BALANCE - OPTION 2B

TABLE
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**CITY OF PRINEVILLE, OREGON
ESTIMATED COST
WASTEWATER FACILITIES PLAN UPDATE
OPTION 2B - IRRIGATION WITHOUT RIVER DISCHARGE
2030 POPULATION OF 21,356
(YEAR 2010 COSTS)**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL 2010 PRICE
1	Mobilization/Demobilization	LS	\$ 547,000	All Req'd	\$ 547,000
2	Project Safety and Quality Control	LS	50,000	All Req'd	50,000
3	Site Work	LS	64,000	All Req'd	64,000
4	Purchase Additional Land	AC	6,000	420	2,520,000
5	Purchase Farm Structures	LS	915,000	All Req'd	915,000
6	Demolition and Disposal of Structures, Fences, Farm and Irrigation Equipment, etc.	LS	100,000	All Req'd	100,000
7	Pump Station Improvements	LS	260,000	All Req'd	260,000
8	Irrigation Pivots	LS	240,000	All Req'd	240,000
9	Irrigation Wheel Line	EA	15,000	5	75,000
10	Irrigation Hand Line	LF	5	70,000	350,000
11	Irrigation Main Line	LF	30	20,000	600,000
12	Piping and Appurtenances	LS	225,000	All Req'd	225,000
13	Storage Lagoon Earthwork	LS	2,200,000	All Req'd	2,200,000
14	Storage Lagoon Piping	LF	40	6,000	240,000
15	Storage Lagoon Bentonite Liner	SF	0.50	4,250,000	2,125,000
16	Control Structure	EA	20,000	2	40,000
17	Fencing and Signing	LF	6	30,000	180,000
18	Lagoon Aeration System Improvements	LS	750,000	All Req'd	750,000
Subtotal Estimated Construction Cost					\$ 11,481,000
Administration, Legal, Engineering, Permitting, Contingency, etc. (35%)					<u>4,019,000</u>
TOTAL ESTIMATED PROJECT COST (2010 DOLLARS)					<u>\$ 15,500,000</u>

PRESENT WORTH ANALYSIS (2010 DOLLARS)

Item	Description	Annual Cost
<i>ANNUAL OPERATION AND MAINTENANCE (Using Option 1 as Baseline)</i>		
1	Increased Labor	\$ 45,000
2	Increased Power Requirements (Irrigation)	27,000
Total O&M		\$ 72,000
Present Worth O&M (5%, 20 yrs.)		\$ 900,000
Present Worth (2010 Dollars)		<u>\$ 16,400,000</u>



**PRINEVILLE WASTEWATER TREATMENT PLANT WATER BALANCE UTILIZING MECHANICAL PLANT WITH IRRIGATION AND RIVER DISCHARGE - OPTION 3A
2030 POPULATION OF 21,356**

Month	Influent		Precipitation		Evaporation		Seepage (MG)	Irrigation		Outfall Flow (MG)		Storage + into Strg. (- out of Strg.) (MG)	Cumulative Storage Needed (MG)
	MGD	(MG)	(in)	(MG)	(in)	(MG)		(ac-in/ac)	(MG)	River	Permitted		
Jan	2.694	83.51	1.09	2.71	0.70	1.74	0.00	-	0.00	77.5	77.5	6.98	42.31
Feb	2.561	71.70	0.83	2.07	0.70	1.74	0.00	-	0.00	70.0	70.0	2.02	44.33
Mar	2.260	70.07	0.74	1.84	0.70	1.74	0.00	-	0.00	77.5	77.5	-7.33	37.00
Apr	2.641	79.22	0.72	1.79	2.82	7.03	0.00	2.79	22.96	75.0	75.0	-23.97	13.03
May	2.509	77.79	1.09	2.71	4.96	12.35	0.00	5.88	48.38	-	-	19.77	32.80
Jun	2.391	71.74	1.06	2.64	6.36	15.85	0.00	7.29	59.98	-	-	-1.44	31.35
Jul	2.216	68.70	0.39	0.97	7.70	19.17	0.00	9.40	77.34	-	-	-26.85	4.51
Aug	1.964	60.89	0.43	1.07	6.57	16.36	0.00	7.56	62.20	-	-	-16.61	0.00
Sep	1.970	59.11	0.47	1.17	4.44	11.06	0.00	5.36	44.10	-	-	5.12	5.12
Oct	2.086	64.67	0.80	1.99	0.70	1.74	0.00	2.41	19.83	-	-	45.09	50.21
Nov	2.172	65.16	1.25	3.11	0.70	1.74	0.00	-	0.00	75.0	75.0	-8.47	41.74
Dec	2.251	69.79	1.22	3.04	0.70	1.74	0.00	-	0.00	77.5	77.5	-6.42	35.33
TOTALS	2.310	842.35	10.09	25.13	37.06	92.29	0.00	40.69	334.79	453	453	-12.10	

Treatment/Storage Facility	Sq Ft.	Acres	Depth (ft.)	Storage Volume (MG)	Storage Volume Needed (MG)
Plant 1 - Primary Lagoon	1,306,800	30.0	5	48.9	-
Plant 1 - Secondary Lagoon	435,600	10.0	5	16.3	-
Plant 1 - Storage Lagoon	583,704	13.4	5	21.8	-
Plant 2 - Primary Lagoon	152,024	3.5	8.5	9.7	-
Plant 2 - Secondary Lagoons	253,519	5.8	5.5	10.4	-
Plant 2 - Storage Lagoon	1,263,240	29.0	11	103.9	-
TOTAL	3,994,888	91.7	-	211.0	50.21

	Permitted (in/acre- year)	Acres
Golf Course	40.69	123
Pasture Land	40.69	180
TOTAL		303

Notes:

- Influent. Domestic influent flows are based on average monthly per capita flow from August 2003 to July 2008, projected to a 2030 population of 21,356.
- Precipitation. Utilized precipitation on record with the Western Regional Climate Center (WRCC), for Prineville 4NW, Oregon, 1926 to 2007 data (used mean rainfall for each month).
- Evaporation. Utilized pan evaporation data obtained from the WRCC 2000 to 2005, for Madras 2N, Oregon, with a pan coefficient of 0.70.
- Seepage. Wetland seepage assumed to be 1/4-inch per day.
- Irrigation. Taken from City of Prineville - Wastewater Facility Plan prepared by ACE Consultants in December 2000.
- Outfall. City of Prineville NPDES Permit states that the City may discharge treated effluent into the Crooked River during the months of November through April. This is contingent on a minimum flow of 15 cubic feet per second in the Crooked River, and effluent discharge may not exceed 1/15 of river discharge. At current effluent quality, this discharge equates to 1.0 MGD. A mechanical plant reduces BOD levels from 25 to 10 mg/L; therefore, 2.5 times the volume of treated effluent may be released to the Crooked River.
- Mechanical Plant. Would be built at site of current Plant 1 - Primary Lagoon, although would only need a portion of the area. Current primary and secondary lagoons would be converted to storage lagoons.

ac = acre
ft = feet
in = inches
MG = Million Gallons
MGD = Million Gallons per Day
Sq Ft. = Square Feet



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
WASTEWATER TREATMENT PLANT
WATER BALANCE - OPTION 3A

**TABLE
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CITY OF PRINEVILLE, OREGON
ESTIMATED COST
WASTEWATER FACILITIES PLAN UPDATE
OPTION 3A - MEMBRANE BIOREACTOR ACTIVATED SLUDGE
MECHANICAL TREATMENT FACILITY WITH RIVER DISCHARGE
2030 POPULATION OF 21,356
(YEAR 2010 COSTS)

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL 2010 PRICE
1	Mobilization/Demobilization	LS	\$ 741,000	All Req'd	\$ 741,000
2	Site Work and Landscaping	LS	150,000	All Req'd	150,000
3	Earthwork	LS	150,000	All Req'd	150,000
4	New Preliminary Treatment System (Headworks)	LS	925,000	All Req'd	925,000
5	MBR Treatment System Equipment Package Including Contractor Markup and Installation	LS	4,900,000	All Req'd	4,900,000
6	MBR Treatment System and Aerobic Digester Concrete Structure		3,000,000	All Req'd	3,000,000
7	Chlorine Disinfection System	LS	375,000	All Req'd	375,000
8	Sludge Handling System (Dewatering and Storage)	LS	1,250,000	All Req'd	1,250,000
9	Blower/Generator/Electrical Building	LS	350,000	All Req'd	350,000
10	Operations Building	LS	425,000	All Req'd	425,000
11	Pump Station Improvements	LS	200,000	All Req'd	200,000
12	Process and Yard Piping	LS	650,000	All Req'd	650,000
13	Electrical, Controls, and Instrumentation	LS	1,800,000	All Req'd	1,800,000
14	Painting	LS	450,000	All Req'd	450,000
15	Fencing and Signing	LF	6	15,000	90,000
16	Miscellaneous Metals, Grating and Handrailing	LS	100,000	All Req'd	100,000
Subtotal Estimated Construction Cost					\$ 15,556,000
Administration, Legal, Engineering, Permitting, Contingency, etc. (35%)					5,444,000
TOTAL ESTIMATED PROJECT COST (2010 DOLLARS)					\$ 21,000,000

PRESENT WORTH ANALYSIS (2010 DOLLARS)

Item	Description	Annual Cost
<i>ANNUAL OPERATION, AND MAINTENANCE (Using Option 1 as Baseline)</i>		
1	Increased Labor	\$ 95,000
2	Increased Power Requirement	150,000
3	Increased Equipment Replacement/Maintenance	40,000
Total O&M		\$ 285,000
Present Worth O&M (5%, 20 yrs.)		3,550,000
Total Present Worth		\$ 24,550,000



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE

ESTIMATED COST - OPTION 3A

**TABLE
3-9**

**PRINEVILLE WASTEWATER TREATMENT PLANT WATER BALANCE UTILIZING MECHANICAL PLANT WITH IRRIGATION AND NO OUTFALL TO CROOKED RIVER - OPTION 3B
2030 POPULATION OF 21,356**

Month	Influent		Precipitation		Evaporation		Seepage (MG)	Irrigation		Outfall Flow (MG)		Storage + into Strg. (- out of Strg.) (MG)	Cumulative Storage Needed (MG)
	MGD	(MG)	(in)	(MG)	(in)	(MG)		(ac-in/ac)	(MG)	River	Permitted		
Jan	2.694	83.51	1.09	2.71	0.70	1.74	0.00	-	0.00	0.0	-	84.48	239.70
Feb	2.561	71.70	0.83	2.07	0.70	1.74	0.00	-	0.00	0.0	-	72.02	311.73
Mar	2.260	70.07	0.74	1.84	0.70	1.74	0.00	-	0.00	0.0	-	70.17	381.90
Apr	2.641	79.22	0.72	1.79	2.82	7.03	0.00	2.79	54.77	0.0	-	19.21	401.11
May	2.509	77.79	1.09	2.71	4.96	12.35	0.00	5.88	115.44	0.0	-	-47.29	353.82
Jun	2.391	71.74	1.06	2.64	6.36	15.85	0.00	7.29	143.12	0.0	-	-84.59	269.23
Jul	2.216	68.70	0.39	0.97	7.70	19.17	0.00	9.40	184.55	0.0	-	-134.05	135.18
Aug	1.964	60.89	0.43	1.07	6.57	16.36	0.00	7.56	148.42	0.0	-	-102.83	32.35
Sep	1.970	59.11	0.47	1.17	4.44	11.06	0.00	5.36	105.23	0.0	-	-56.01	0.00
Oct	2.086	64.67	0.80	1.99	0.70	1.74	0.00	2.41	47.31	0.0	-	17.61	17.61
Nov	2.172	65.16	1.25	3.11	0.70	1.74	0.00	-	0.00	0.0	-	66.53	84.14
Dec	2.251	69.79	1.22	3.04	0.70	1.74	0.00	-	0.00	0.0	-	71.08	155.22
TOTALS	2.310	842.35	10.09	25.13	37.06	92.29	0.00	40.69	798.85	0	0	-23.66	

Treatment/Storage Facility	Sq Ft.	Acres	Depth (ft.)	Storage Volume (MG)	Storage Volume Needed (MG)	Storage Lagoon Area Needed w/ 10 ft depth (Acres)
Plant 1 - Primary Lagoon	1,306,800	30.0	5	48.9	-	
Plant 1 - Secondary Lagoon	435,600	10.0	5	16.3	-	
Plant 1 - Storage Lagoon	583,704	13.4	5	21.8	-	
Plant 2 - Primary Lagoon	152,024	3.5	8.5	9.7	-	
Plant 2 - Secondary Lagoons	253,519	5.8	5.5	10.4	-	
Plant 2 - Storage Lagoon	1,263,240	29.0	11	103.9	-	
TOTAL	3,994,888	91.7	-	211.0	401.11	67

	Permitted (in/acre- year)	Acres
Golf Course	40.69	123
Pasture Land	40.69	600
TOTAL		723

Notes:

- Influent. Domestic influent flows are based on average monthly per capita flow from August 2003 to July 2008, projected to a 2030 population of 21,356.
- Precipitation. Utilized precipitation on record with the Western Regional Climate Center (WRCC), for Prineville 4NW, Oregon, 1926 to 2007 data (used mean rainfall for each month).
- Evaporation. Utilized pan evaporation data obtained from the WRCC 2000 to 2005, for Madras 2N, Oregon, with a pan coefficient of 0.70.
- Seepage. Wetland seepage assumed to be 1/4-inch per day.
- Irrigation. Taken from City of Prineville - Wastewater Facility Plan prepared by ACE Consultants in December 2000.
- Outfall. City of Prineville NPDES Permit states that the City may discharge treated effluent into the Crooked River during the months of November through April. This is contingent on a minimum flow of 15 cubic feet per second in the Crooked River, and effluent discharge may not exceed 1/15 of river discharge. At current effluent quality, this discharge equates to 1.0 MGD. A mechanical plant reduces BOD levels from 25 to 10 mg/L; therefore, 2.5 times the volume of treated effluent may be released to the Crooked River.
- Mechanical Plant. Would be built at site of current Plant 1 - Primary Lagoon, although would only need a portion of the area. Current primary and secondary lagoons would be converted to storage lagoons.

ac = acre
ft = feet
in = inches
MG = Million Gallons
MGD = Million Gallons per Day
Sq Ft. = Square Feet



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
WASTEWATER TREATMENT PLANT
WATER BALANCE - OPTION 3B

**TABLE
3-10**

CITY OF PRINEVILLE, OREGON
ESTIMATED COST
WASTEWATER FACILITIES PLAN UPDATE
OPTION 3B - MEMBRANE BIOREACTOR ACTIVATED SLUDGE
MECHANICAL TREATMENT FACILITY WITH IRRIGATION AND NO RIVER DISCHARGE
2030 POPULATION OF 21,356
(YEAR 2010 COSTS)

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL 2010 PRICE
1	Mobilization/Demobilization	LS	\$ 1,160,000	All Req'd	\$ 1,160,000
2	Site Work and Landscaping	LS	150,000	All Req'd	150,000
3	Earthwork for Mechanical Plant	LS	150,000	All Req'd	150,000
4	New Preliminary Treatment System (Headworks)	LS	925,000	All Req'd	925,000
5	MBR Treatment System Equipment Package Including Contractor Markup and Installation	LS	4,900,000	All Req'd	4,900,000
6	MBR Treatment System and Aerobic Digester Concrete Structure		3,000,000	All Req'd	3,000,000
7	Chlorine Disinfection System	LS	375,000	All Req'd	375,000
8	Sludge Handling System (Dewatering and Storage)	LS	1,250,000	All Req'd	1,250,000
9	Blower/Generator/Electrical Building	LS	350,000	All Req'd	350,000
10	Operations Building	LS	425,000	All Req'd	425,000
11	Process and Yard Piping	LS	650,000	All Req'd	650,000
12	Electrical, Controls, and Instrumentation	LS	1,800,000	All Req'd	1,800,000
13	Painting	LS	450,000	All Req'd	450,000
14	Miscellaneous Metals, Grating, and Handrailing	LS	100,000	All Req'd	100,000
15	Purchase Additional Land	AC	6,000	420	2,520,000
16	Purchase Farm Structures	LS	915,000	All Req'd	915,000
17	Demolition and Disposal of Structures, Fences, Farm and Irrigation Equipment, etc.	LS	100,000	All Req'd	100,000
18	Pump Station Improvements	LS	260,000	All Req'd	260,000
19	Irrigation Pivots	LS	240,000	All Req'd	240,000
20	Irrigation Wheel Lines	EA	15,000	5	75,000
21	Irrigation Hand Line	LF	5	70,000	350,000
22	Irrigation Main Line	LF	30	20,000	600,000
23	Piping and Appurtenances	LS	225,000	All Req'd	225,000
24	Storage Lagoon Earthwork	LS	1,500,000	All Req'd	1,500,000
25	Storage Lagoon Piping	LF	40	4,000	160,000
26	Storage Lagoon Bentonite Liner	SF	0.50	3,100,000	1,550,000
27	Control Structure	EA	20,000	2	40,000
28	Fencing and Signing	LF	6	30,000	180,000
Subtotal Estimated Construction Cost					\$ 24,400,000
Administration, Legal, Engineering, Permitting, Contingency, etc. (35%)					8,600,000
TOTAL ESTIMATED PROJECT COST (2010 DOLLARS)					\$ 33,000,000

PRESENT WORTH ANALYSIS (2010 DOLLARS)

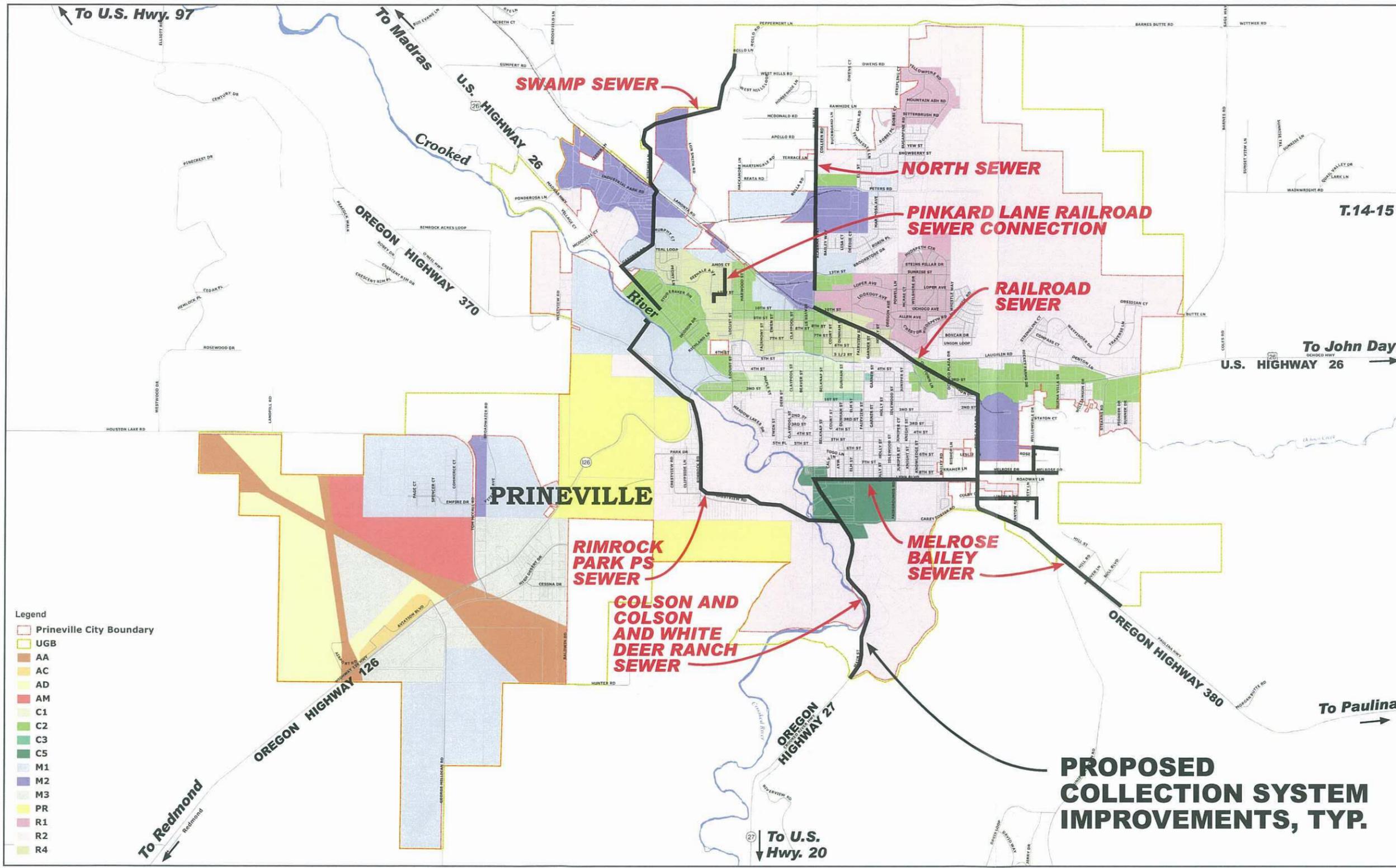
Item	Description	Annual Cost
<i>ANNUAL OPERATION, AND MAINTENANCE (Using Option 1 as Baseline)</i>		
1	Increased Labor	\$ 95,000
2	Increased Power Requirement	150,000
3	Increased Equipment Replacement/Maintenance	40,000
Total O&M		\$ 285,000
Present Worth O&M (5%, 20 yrs.)		3,550,000
Total Present Worth		\$ 36,550,000



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE

ESTIMATED COST - OPTION 3B

**TABLE
3-11**



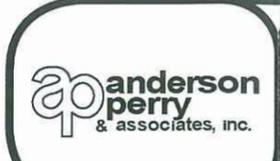
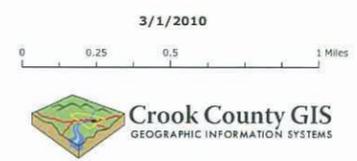
T.14-15 S., R.15-16 E., W.M.
1" = 3260'±



- Legend**
- Prineville City Boundary
 - UGB
 - AA
 - AC
 - AD
 - AM
 - C1
 - C2
 - C3
 - C5
 - M1
 - M2
 - M3
 - PR
 - R1
 - R2
 - R4

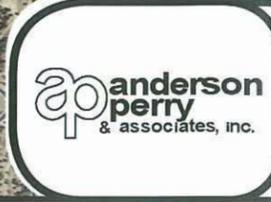
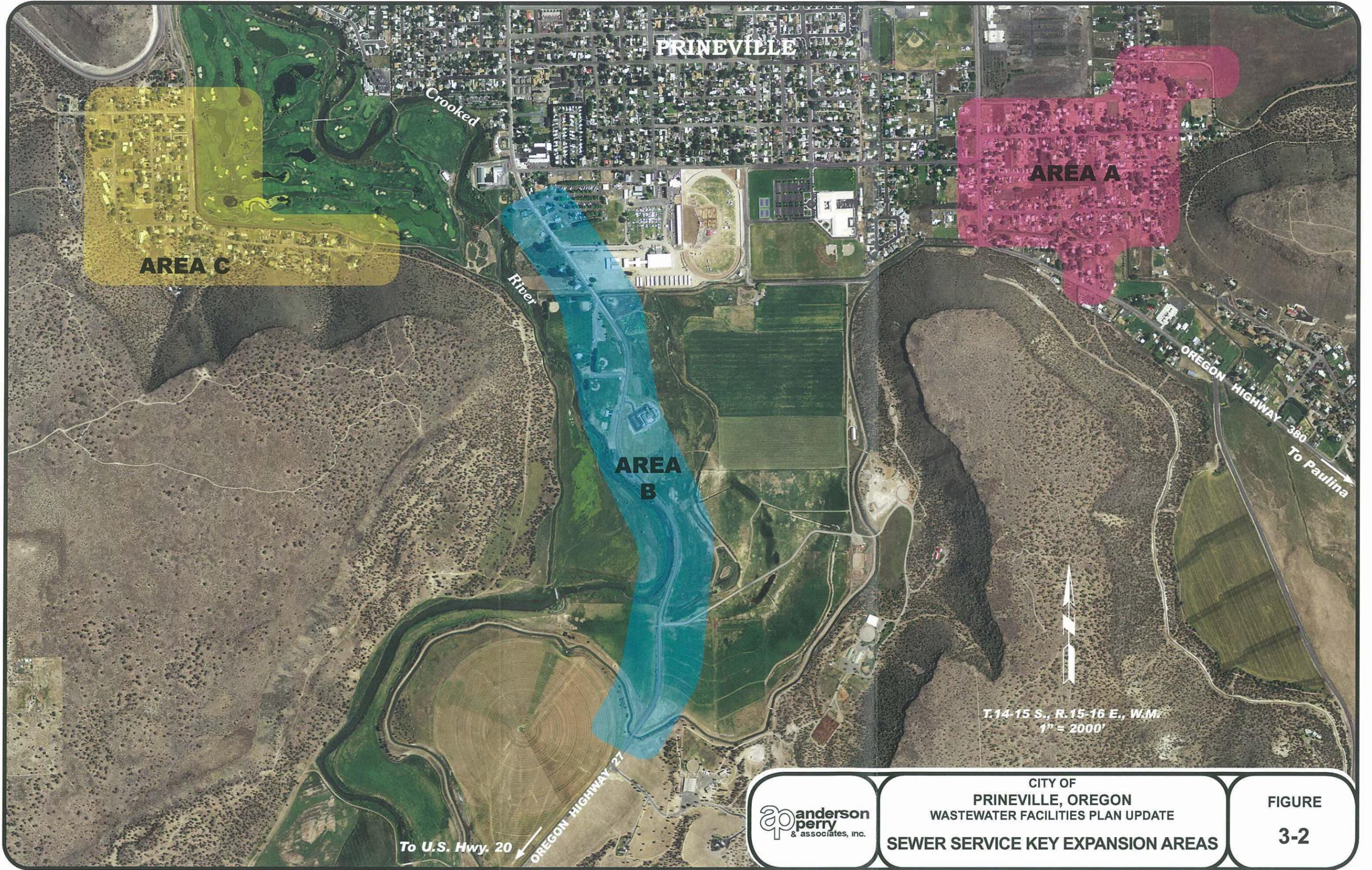
**PROPOSED
COLLECTION SYSTEM
IMPROVEMENTS, TYP.**

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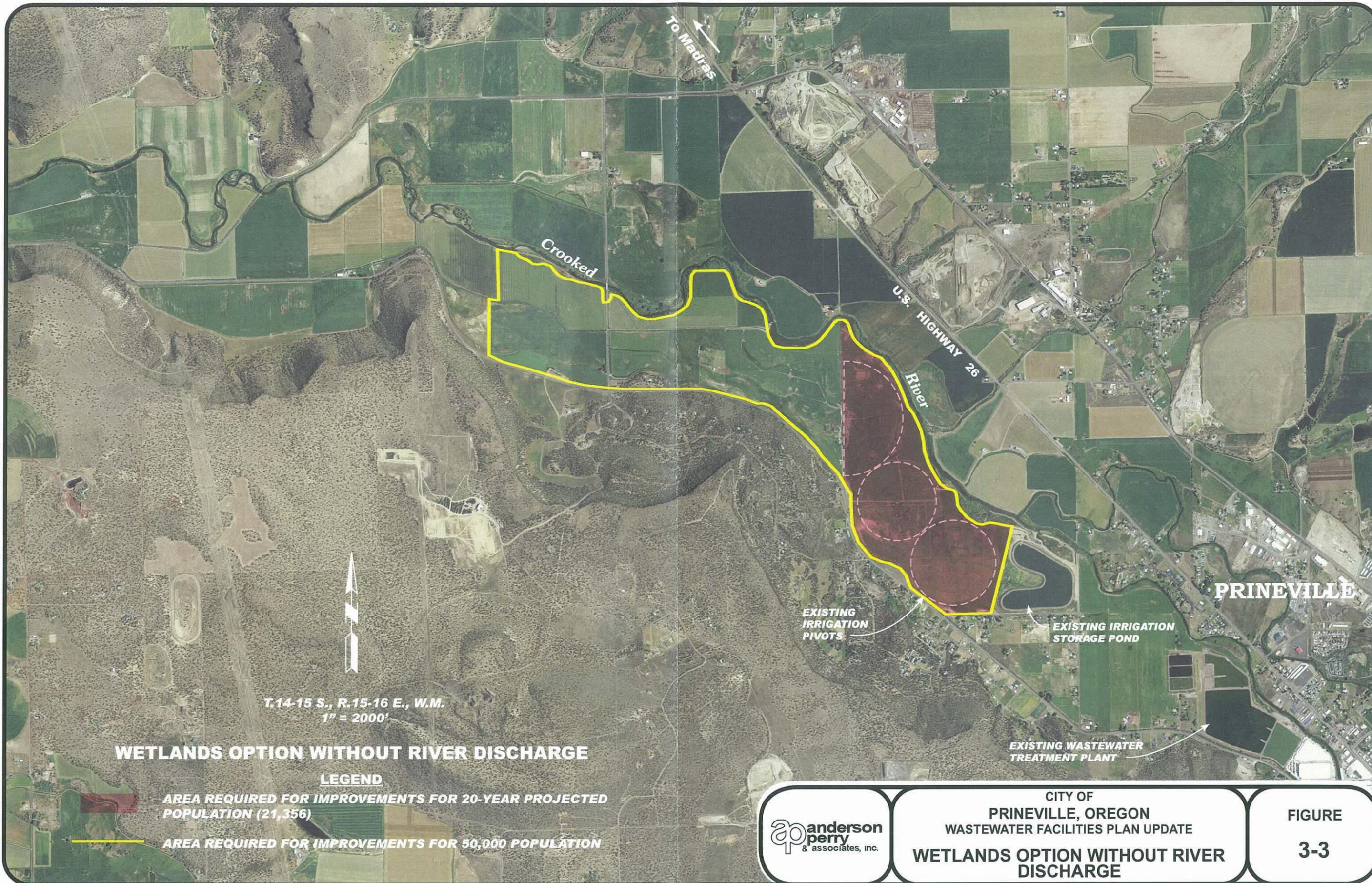
CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
COLLECTION SYSTEM IMPROVEMENTS

**FIGURE
3-1**



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
SEWER SERVICE KEY EXPANSION AREAS

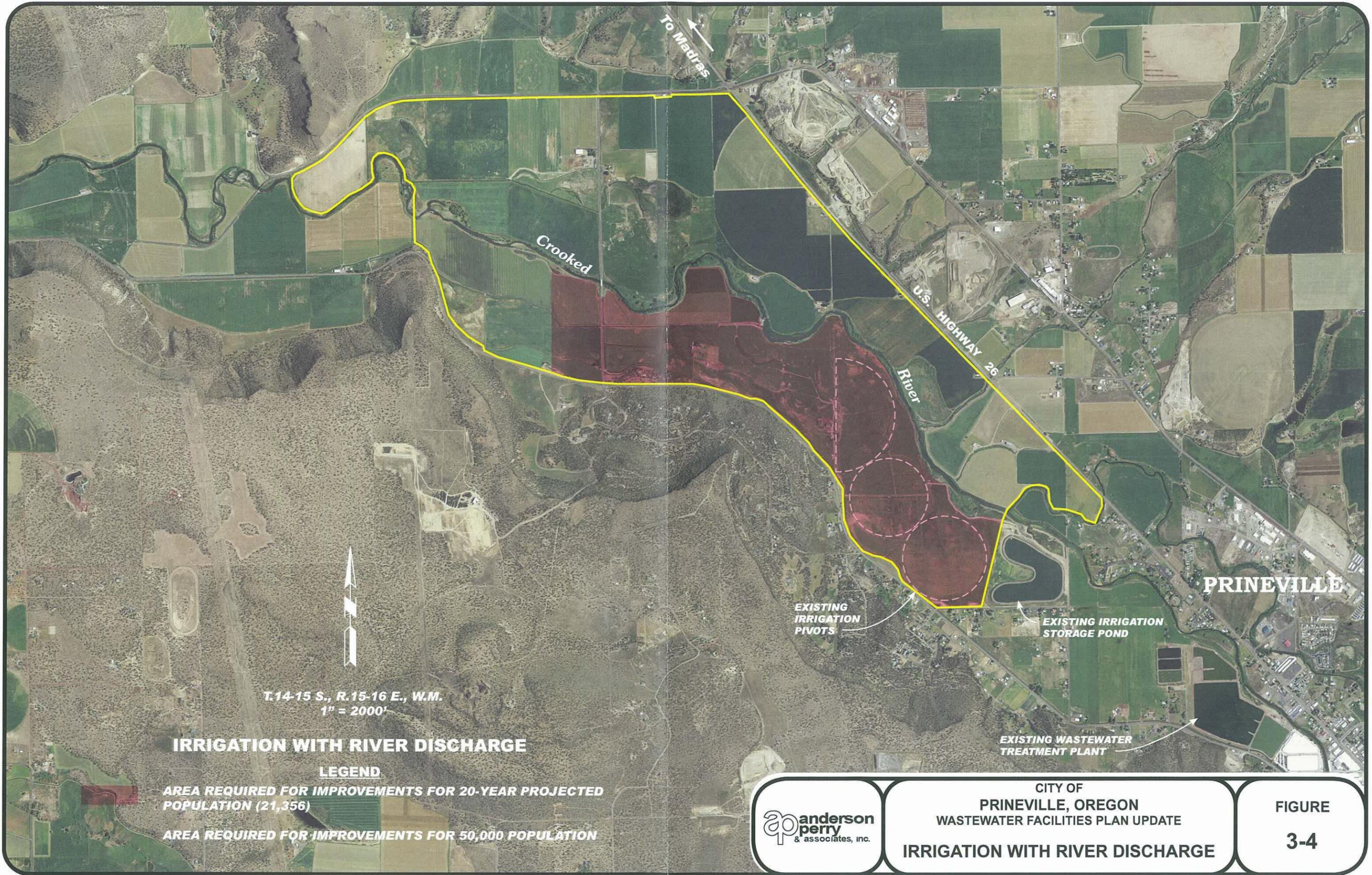
**FIGURE
3-2**



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE

WETLANDS OPTION WITHOUT RIVER DISCHARGE

FIGURE
3-3



T.14-15 S., R.15-16 E., W.M.
 1" = 2000'

IRRIGATION WITH RIVER DISCHARGE

LEGEND

AREA REQUIRED FOR IMPROVEMENTS FOR 20-YEAR PROJECTED POPULATION (21,356)

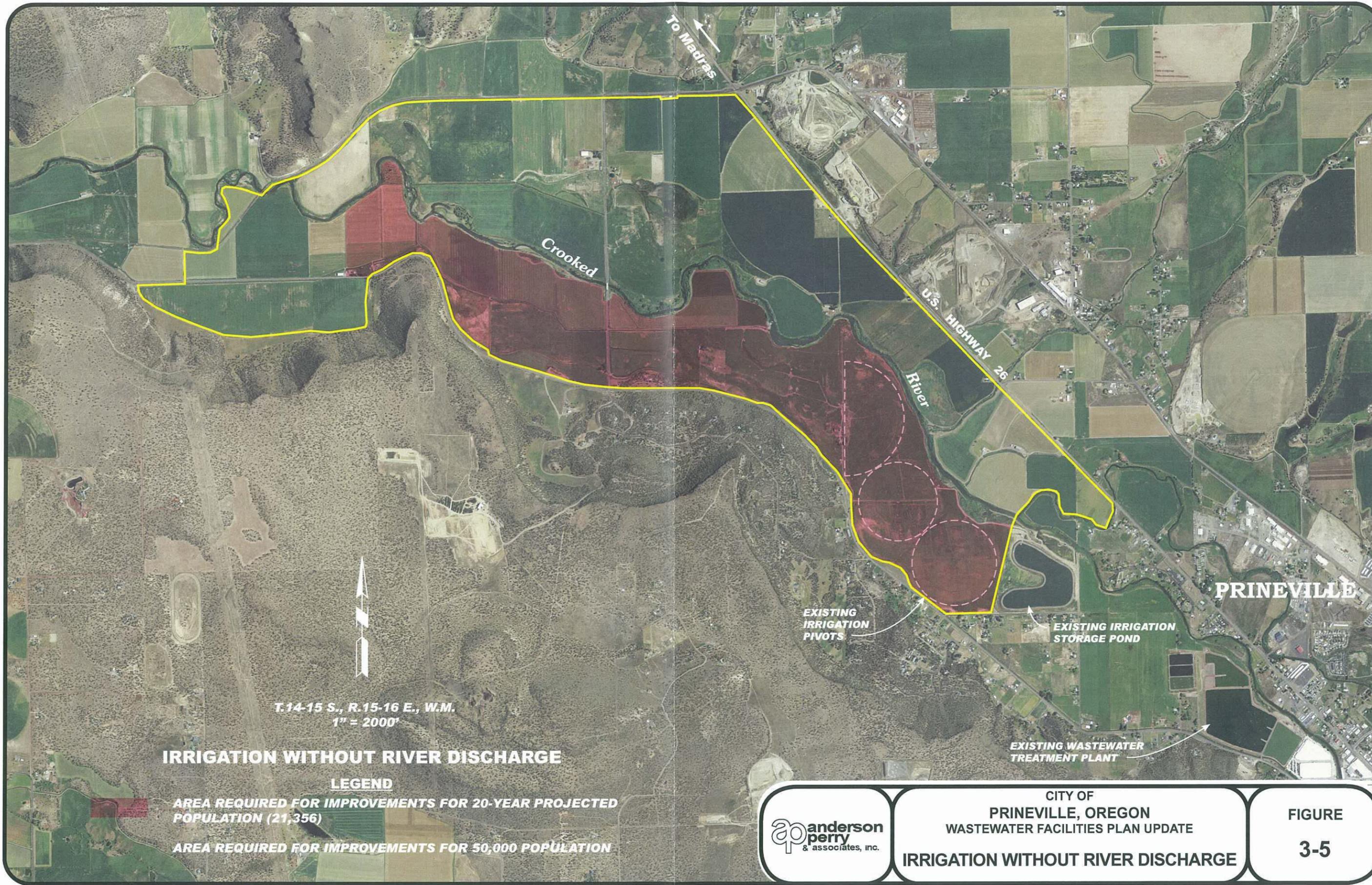
AREA REQUIRED FOR IMPROVEMENTS FOR 50,000 POPULATION



CITY OF
 PRINEVILLE, OREGON
 WASTEWATER FACILITIES PLAN UPDATE

IRRIGATION WITH RIVER DISCHARGE

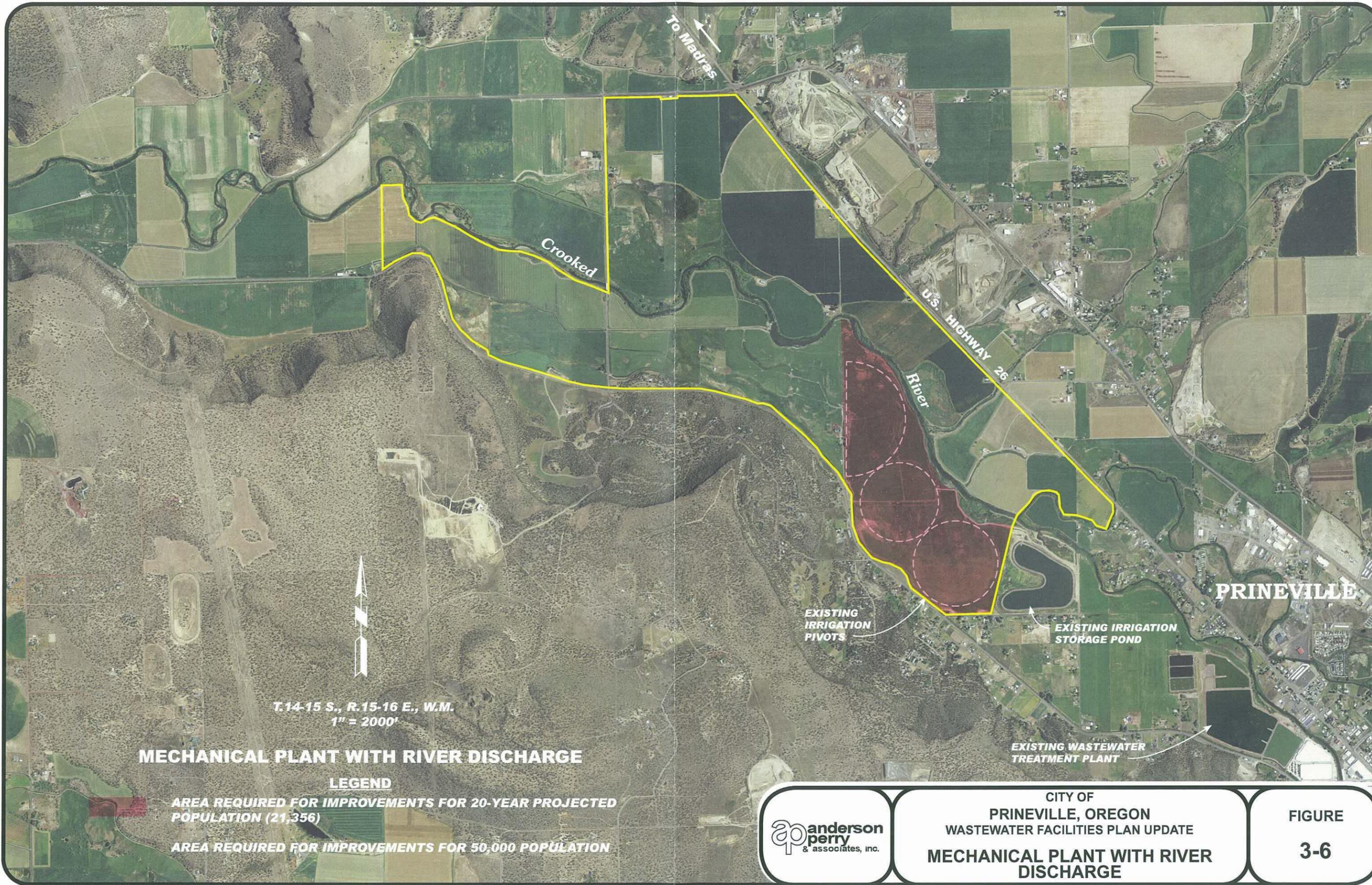
FIGURE
3-4




anderson perry
 & associates, inc.

CITY OF
PRINEVILLE, OREGON
 WASTEWATER FACILITIES PLAN UPDATE
IRRIGATION WITHOUT RIVER DISCHARGE

FIGURE
3-5



T.14-15 S., R.15-16 E., W.M.
1" = 2000'

MECHANICAL PLANT WITH RIVER DISCHARGE

LEGEND

AREA REQUIRED FOR IMPROVEMENTS FOR 20-YEAR PROJECTED POPULATION (21,356)

AREA REQUIRED FOR IMPROVEMENTS FOR 50,000 POPULATION



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
MECHANICAL PLANT WITH RIVER DISCHARGE

FIGURE
3-6

CHAPTER 4 SELECTED IMPROVEMENT OPTION

GENERAL

This chapter of the Wastewater Facilities Plan Update presents the selected improvement option to meet the 20-year design criteria for wastewater treatment and disposal. The improvement option was selected by the City from review, evaluation, and consideration of associated cost estimates and other factors of the options presented in Chapter 3. City staff and the participating City Council members each had a part in the review and selection process of the preferred option.

The selected improvements chosen by the City Council generally include minor improvements to the wastewater treatment facility (WWTF) and constructing a treatment and disposal wetland (Option 1). The selected wastewater treatment system improvements include a system capable of treating wastewater to acceptable levels, while at the same time eliminating the need to irrigate using effluent and eliminating the need to discharge effluent directly into the Crooked River. Irrigation of the City's municipal golf course was assumed to continue under this option. Table 4-1 provides a detailed cost analysis for the estimated project costs of the selected improvements. The estimated costs were projected to the year 2012 as this is a more likely time for construction assuming funding is pursued and acquired in a timely manner.

TREATMENT FACILITY IMPROVEMENTS

The treatment facility, with minor modifications, appears to be adequate to effectively treat the City's wastewater for the next 20 years in conjunction with constructed wetlands. This is dependent on no major industries being introduced to the system and the population increase not exceeding an annual average increase of approximately 3.5 percent. At the request of the City, a memo was prepared providing a list of assumptions and a preliminary estimated cost for utilizing the City of Prineville's treated wastewater for cooling water. A copy of the memo and estimated costs is included in Appendix C. One improvement to the existing treatment facility that would need to be implemented is the addition of mechanical aeration to the lagoons to improve treatment capabilities. Additional mechanical aeration units would enhance the treatment capacity of the existing lagoon system, allowing the lagoons to better meet the 20-year treatment needs of the City. It is estimated that 10 aeration units, 25 Hp each, would be needed. However, additional analysis would need to be completed to verify the total number of units required, as well as to evaluate the potential benefits from full lagoon aeration.

DISPOSAL FACILITY IMPROVEMENTS

The major portion of the improvements the City has chosen to pursue is related to how the wastewater is handled for disposal after being treated. The City has decided that construction of wetland disposal areas (Option 1) will best meet the City's needs in the future. The wetland areas would be constructed on property the City currently owns

and utilizes for irrigation northwest of the treatment facility. Figure 4-1 shows a conceptual wetland site layout. The first wetland would be a treatment wetland comprising approximately 25 acres. This wetland would be located adjacent to the existing storage reservoir. The remainder of the property would be converted from irrigated property to disposal wetlands comprising approximately 215 acres. Together these wetland areas would serve as a disposal site for treated wastewater and eliminate the need to irrigate existing pasture lands with wastewater and discharge wastewater directly into the Crooked River. The wetlands would also function as a storage site for the wastewater instead of constructing new storage lagoons. Figure 4-1 is intended to provide a general idea of possible site layout. Final site layout could vary from the conceptual layout shown.

PRELIMINARY ENVIRONMENTAL REVIEW OF THE SELECTED WASTEWATER SYSTEM IMPROVEMENTS

Introduction. This section presents the preliminary environmental review of the selected wastewater system improvements option to the anticipated year 2030 design requirements for wastewater treatment, biosolids management, and wastewater disposal. This is a preliminary environmental review and, as the project is further developed and funding is sought, a more detailed report will need to be completed to meet specific agency requirements.

Affected Environment/Environmental Consequences.

Land Use/Important Farmland/Formally Classified Lands. The City of Prineville's Comprehensive Land Use Plan outlines areas for land use as shown on Figure 4-2. The land use regions are established within the City limits and Urban Growth Boundary and include residential, commercial, industrial, airport, and other general uses.

According to the USDA Natural Resources Conservation Service (NRCS) Soil Survey of Crook County, Oregon, the following soil types are found within the project area (refer to Figure 4-3):

- Powder silt loam, 0 to 2 percent slopes
- Crooked-Stearns Complex, 0 to 2 percent slopes
- Metolius ashy sandy loam, 0 to 2 percent slopes
- Boyce silt loam, 0 to 2 percent slopes

Powder and Boyce silt loam are considered prime farmland if irrigated, while Crooked-Stearns Complex is considered farmland of statewide importance. No rating was given for the Metolius ashy sandy loam. Prime farmland identifies the location and extent of soils that are best suited for food, feed, fiber, forage, and oilseed crops.

Floodplains. The City of Prineville has developed around the Crooked River, a tributary of the Deschutes River. After Prineville, the Crooked River flows

generally northwest and empties into Lake Billy Chinook, an impoundment of the Deschutes River formed by Round Butte Dam. The dam also impounds the lower reaches of the Crooked River. The 100-year floodplain of the Crooked River, in the vicinity of Prineville, is illustrated on the Federal Emergency Management Agency (FEMA) 100-year floodplain map, a portion of which is included in Appendix D.

The existing treatment facility, storage reservoir, and irrigation site are located near the Crooked River outside of the 100-year floodplain. The proposed treatment wetland and disposal wetlands are not anticipated to be located within the floodplain or have any significant impact on the floodplain.

Wetlands. According to the National Wetland Inventory Map, wetlands in the project area include several small wetlands classified as freshwater emergent. These wetland areas are shown on Figure 4-4.

Cultural Resources. According to the National Register Information System, several locations are listed on the National Register of Historic Places in the Prineville area. Please refer to the www.nps.gov website for these locations. None of the listed locations appear to be in the project vicinity and, therefore, will not be affected by the proposed improvements. An in-depth survey of the site will need to be performed and in the event that a cultural resource is discovered, pertinent tribes, the Oregon State Historic Preservation Office, and a professional archaeologist will be notified.

Biological Resources. The City of Prineville is located along the Crooked River at the mouth of Ochoco Creek. The area is composed of both irrigated and non-irrigated farmland on the valley floor with rim rock formations forming the southern walls of the canyon. The vegetation in the project area consists of grazed pastureland with some riparian habitat along the Crooked River. The area supports populations of wildlife including deer, game birds, passerines, and other rural-area wildlife.

The Crooked River and Ochoco Creek are the primary surface drainage in the project area. Listed fish distribution in the Crooked River could occur adjacent to the project area.

According to the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), the following federally-listed species could occur in Crook County:

Threatened

- Middle Columbia River Steelhead (*Oncorhynchus mykiss*)
- Bull trout (*Salvelinus confluentus*)
- Canada lynx (*Lynx canadensis*)

Candidate

- Columbia spotted frog (*Rana luteiventris*)
- Greater sage-grouse (*Centrocercus urophasianus*)

It is not known if bull trout occur in the project area, although it is a possibility. None of the other species are known to occur in the project area, although NMFS has adopted a recovery plan for the recovery and restoration of Middle Columbia River steelhead, which spawn and rear in tributaries to the Columbia River in central and eastern Washington and Oregon. The Crooked River is one of these tributaries and significant programs are under way for natural reintroduction of the extirpated population of steelhead to historically accessible habitat, which would include the Crooked River adjacent to the project area.

Water Quality. According to the U.S. Environmental Protection Agency's (EPA) Office of Groundwater and Drinking Water National Summary of Sole Source Aquifer Designations, the project does not lie within a sole source aquifer area.

The wastewater collection and treatment system will continue to operate under the City's NPDES Permit. Completion of the proposed project should not adversely affect groundwater or surface water. In the February 2010 Preliminary Groundwater Assessment prepared by Anderson-Perry & Associates, Inc., and George Chadwick Consulting, potential water quality impacts were identified. The impacts on groundwater from constructing and operating wetlands are expected to extend primarily between the wetlands and the Crooked River. Within the impacted area, total dissolved solids (TDS) concentrations and the concentrations of the major components of TDS (i.e., the major cations and anions), may increase. Increased groundwater discharges to the Crooked River from wetland seepage will tend to have a small beneficial impact on the two water quality parameters, water temperature and pH, that have been determined to be limiting in the river.

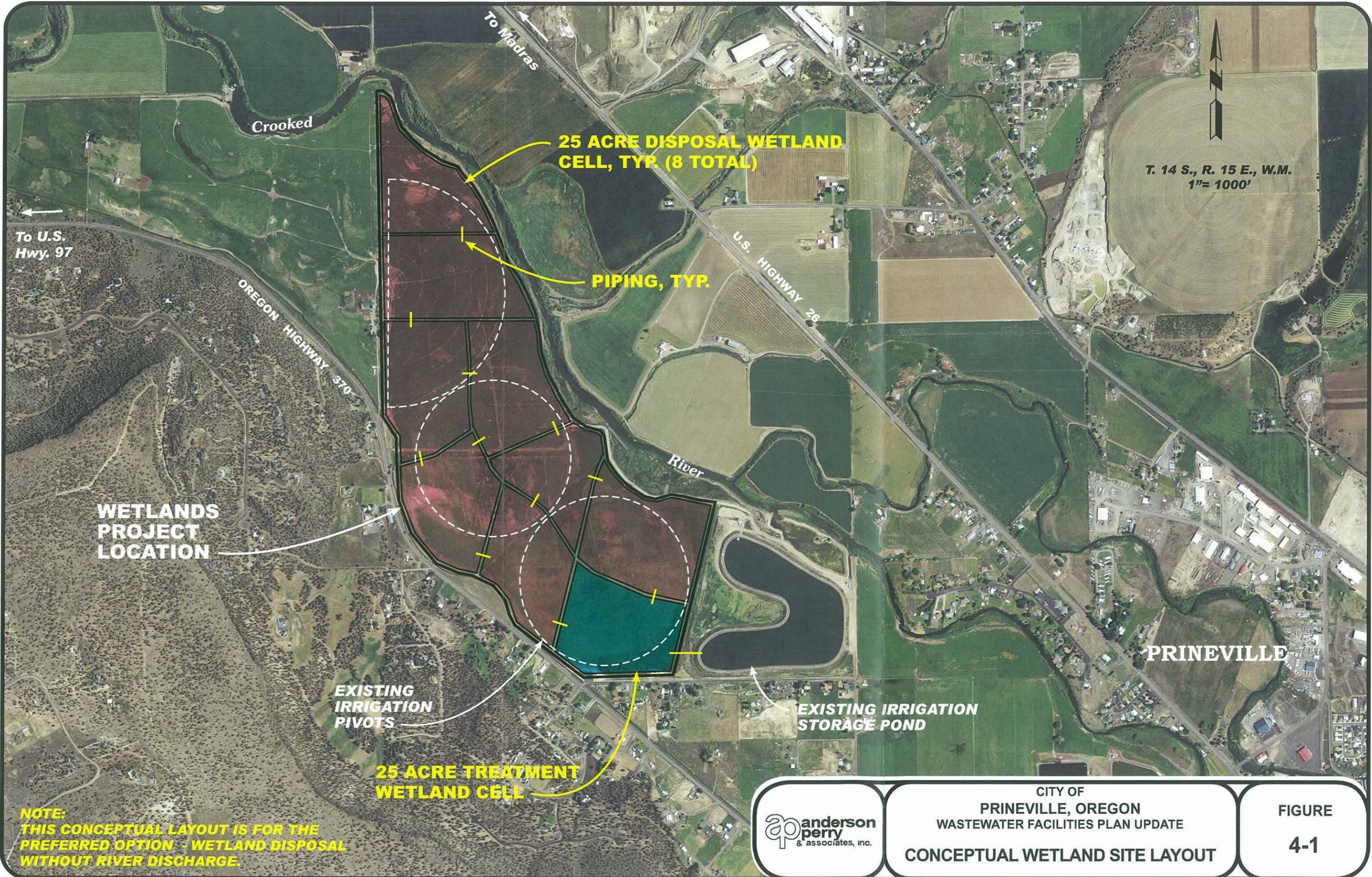
The Department of Environmental Quality (DEQ) sets in-stream water quality standards for each river basin, with the goal of providing full protection to beneficial uses. The beneficial uses for which the Crooked River water quality will be protected are listed in OAR 340-41-0130, Table 130A; see Figures 4-5 through 4-7. These uses are public domestic water supply, private domestic water supply, industrial water supply, irrigation, livestock watering, anadromous fish passage, salmonid fish rearing, salmonid fish spawning, resident fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, and hydro power. It is not expected that constructing and operating wetlands for treatment and disposal of wastewater will have any adverse effects on these beneficial uses.

Air Quality. This type of facility does not emit any particles or chemicals into the air; therefore, the EPA does not require a permit.

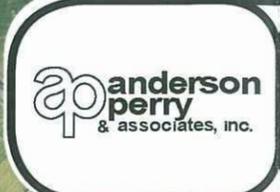
Summary. As previously mentioned, this limited environmental review is a brief summary of available information. There were no noted environmental issues with constructing and maintaining wastewater disposal wetlands at the City of Prineville's WWTF. A full environmental report would need to be completed in conjunction with a funding application to meet specific agency requirements should the City decide to pursue project funding.

**CITY OF PRINEVILLE, OREGON
ESTIMATED COST
WASTEWATER FACILITIES PLAN UPDATE
WETLANDS WITHOUT RIVER DISCHARGE
2030 POPULATION OF 21,356
(YEAR 2010 COSTS)**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL 2010 PRICE
1	Mobilization/Demobilization	LS	\$ 233,000	All Req'd	\$ 233,000
2	Project Safety and Quality Control	LS	50,000	All Req'd	50,000
3	Demolition	LS	30,000	All Req'd	30,000
4	Wetland Earthwork	LS	2,100,000	All Req'd	2,100,000
5	Treatment Wetland Bentonite Liner	SF	0.50	1,180,000	590,000
6	Wetland Piping	LF	40	12,000	480,000
7	Control Structures	EA	20,000	10	200,000
8	Pump Station Improvements	LS	200,000	All Req'd	200,000
9	Seeding	AC	500	240	120,000
10	Planting of Treatment Wetland	AC	2,000	25	50,000
11	Fencing and Signing	LF	6	14,500	87,000
12	Lagoon Aeration System Improvements	LS	750,000	All Req'd	750,000
Subtotal Estimated Construction Cost					\$ 4,890,000
Administration, Legal, Engineering, Permitting, Contingency, etc. (35%)					1,710,000
TOTAL ESTIMATED PROJECT COST (2010 DOLLARS)					\$ 6,600,000
TOTAL ESTIMATED PROJECT COST (2011 DOLLARS) (+5%)					\$ 6,930,000
TOTAL ESTIMATED PROJECT COST (2012 DOLLARS) (+5%)					\$ 7,280,000

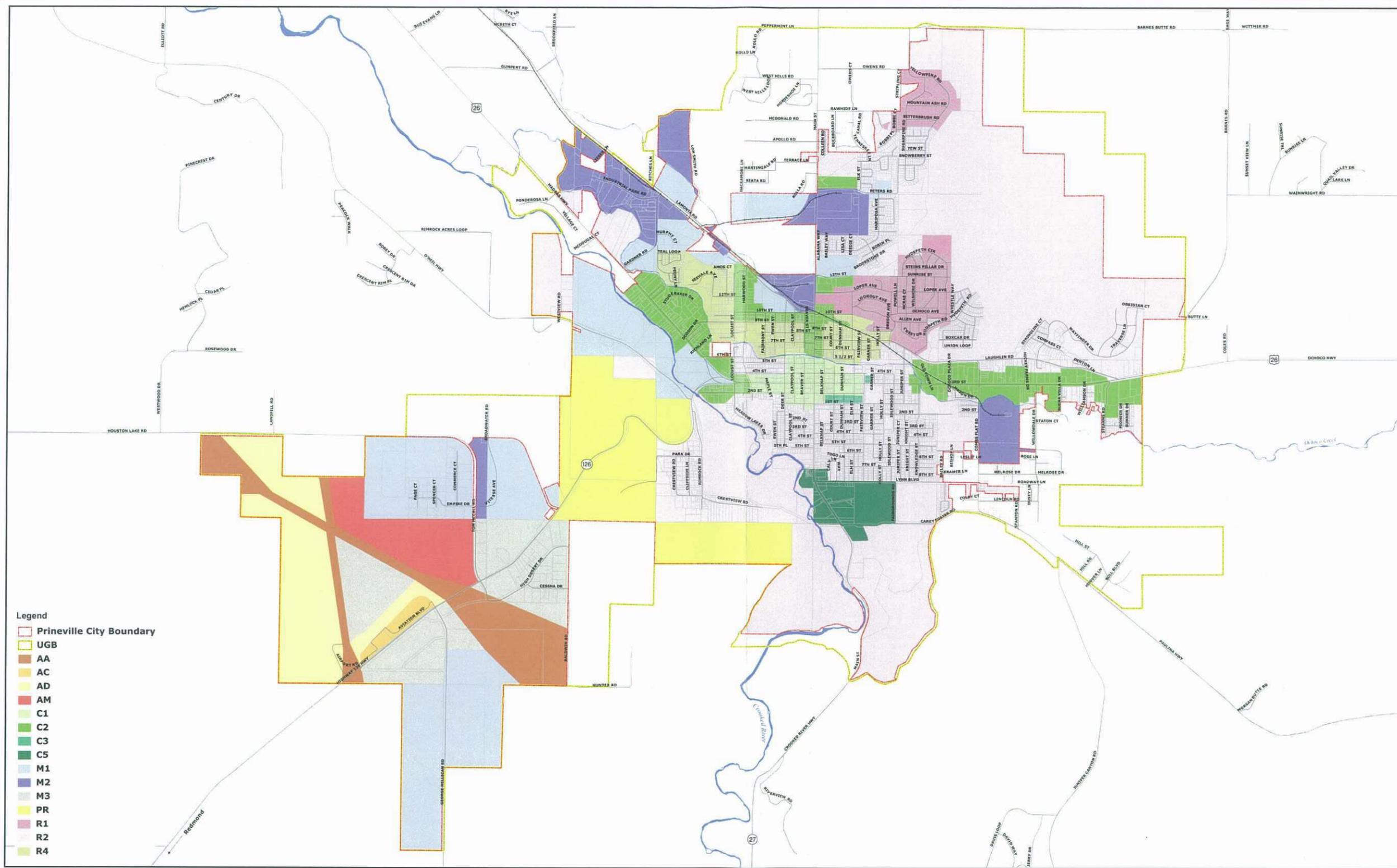


NOTE:
 THIS CONCEPTUAL LAYOUT IS FOR THE
 PREFERRED OPTION - WETLAND DISPOSAL
 WITHOUT RIVER DISCHARGE.



CITY OF
 PRINEVILLE, OREGON
 WASTEWATER FACILITIES PLAN UPDATE
CONCEPTUAL WETLAND SITE LAYOUT

FIGURE
4-1



- Legend**
- Prineville City Boundary
 - UGB
 - AA
 - AC
 - AD
 - AM
 - C1
 - C2
 - C3
 - C5
 - M1
 - M2
 - M3
 - PR
 - R1
 - R2
 - R4

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3/1/2010

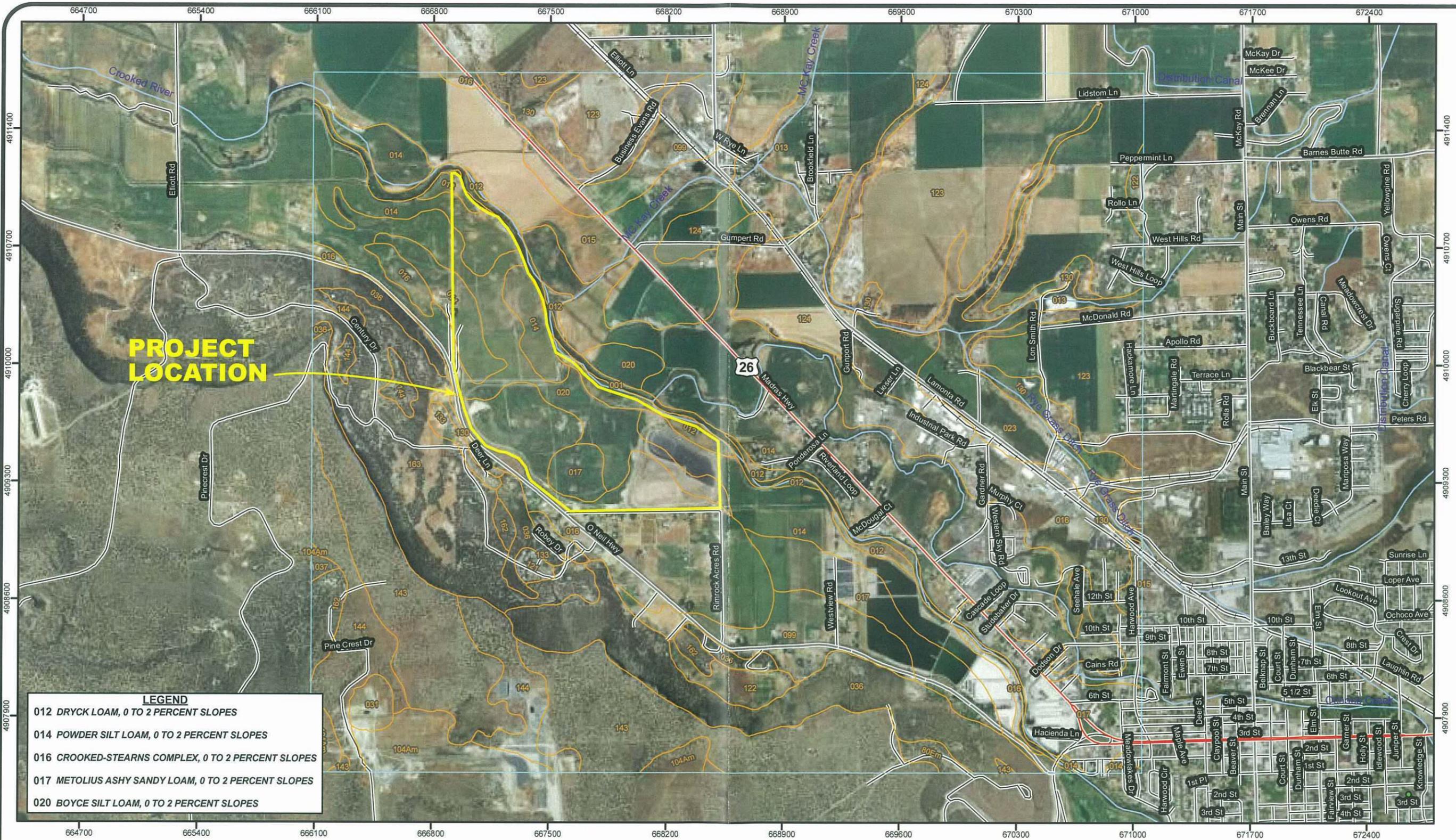
0 0.25 0.5 1 Miles

Crook County GIS
GEOGRAPHIC INFORMATION SYSTEMS



CITY OF PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
ZONING MAP

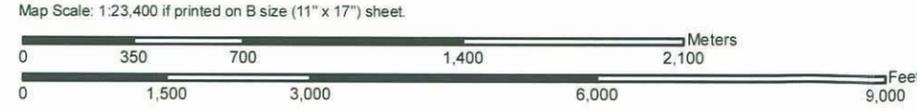
FIGURE 4-2



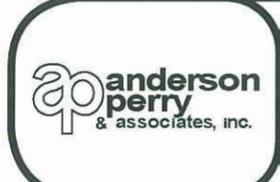
LEGEND

- 012 DRYCK LOAM, 0 TO 2 PERCENT SLOPES
- 014 POWDER SILT LOAM, 0 TO 2 PERCENT SLOPES
- 016 CROOKED-STEARN'S COMPLEX, 0 TO 2 PERCENT SLOPES
- 017 METOLIUS ASHY SANDY LOAM, 0 TO 2 PERCENT SLOPES
- 020 BOYCE SILT LOAM, 0 TO 2 PERCENT SLOPES

USDA Natural Resources Conservation Service
 Web Soil Survey
 National Cooperative Soil Survey



T.14-15 S., R.15-16 E., W.M.



CITY OF
PRINEVILLE, OREGON
 WASTEWATER FACILITIES PLAN UPDATE
SOILS MAP

FIGURE
4-3



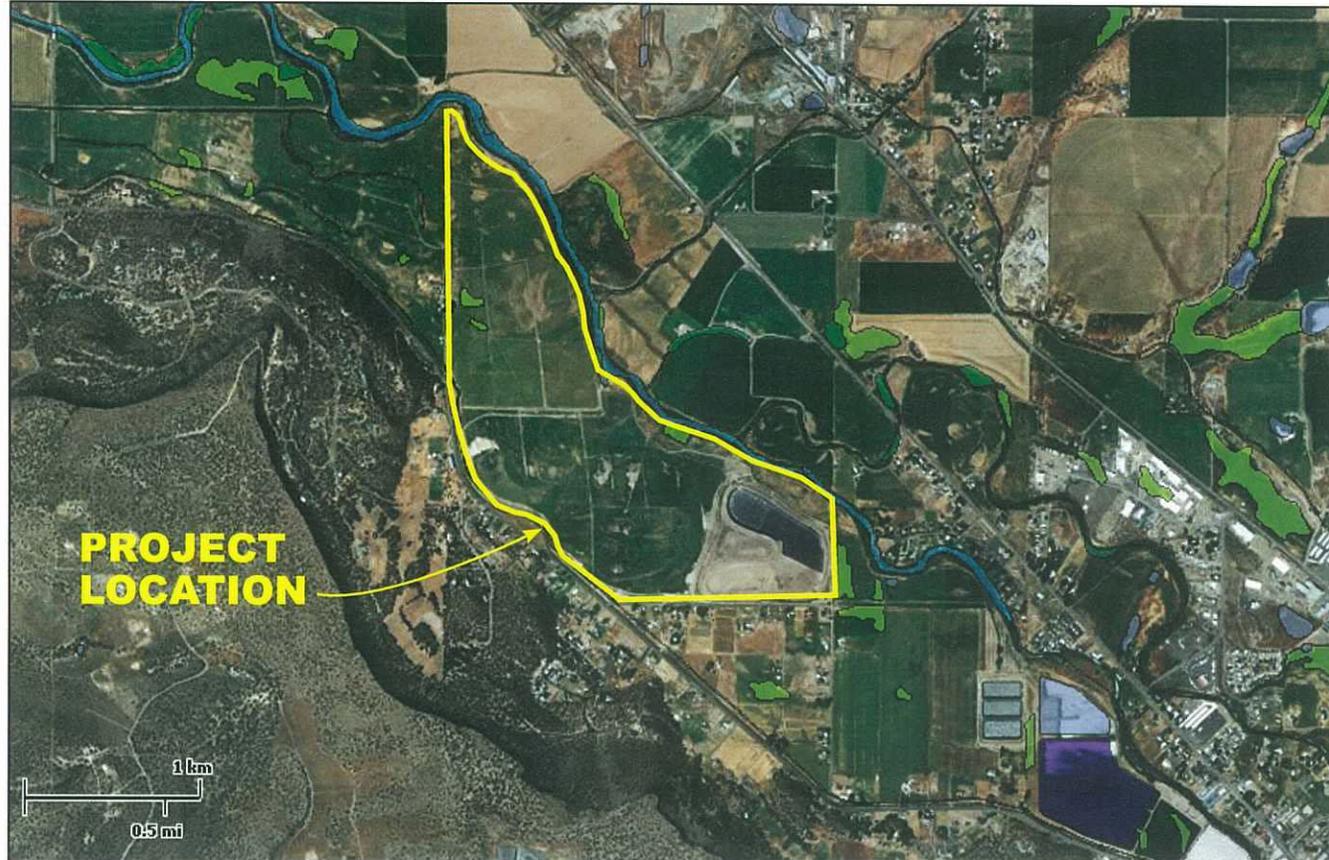
U.S. Fish and Wildlife Service National Wetlands Inventory

Prineville Wetland Areas

Aug 25, 2010

Wetlands

-  Freshwater Emergent
-  Freshwater Forested/Shrub
-  Estuarine and Marine Deetwater
-  Estuarine and Marine
-  Freshwater Pond
-  Lake
-  Riverine
-  Other



T.14-15 S., R.15-16 E., W.M.

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



**CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
WETLANDS INVENTORY MAP**

**FIGURE
4-4**

Table 130A

Designated Beneficial Uses
Deschutes Basin
(340-41-0130)

Beneficial Uses	Deschutes River Main Stem from Mouth to Pelton Regulating Dam	Deschutes River Main Stem from Pelton Regulating Dam to Bend Diversion Dam and for the Crooked River Main Stem	Deschutes River Main Stem above Bend Diversion Dam & for the Metolious River Main Stem	All Other Basin Stems
Public Domestic Water Supply ¹	X	X	X	X
Private Domestic Water Supply ¹	X	X	X	X
Industrial Water Supply	X	X	X	X
Irrigation	X	X	X	X
Livestock Watering	X	X	X	X
Fish & Aquatic Life ²	X	X	X	X
Wildlife & Hunting	X	X	X	X
Fishing	X	X	X	X
Boating	X	X	X	X
Water Contact Recreation	X	X	X	X
Aesthetic Quality	X	X	X	X
Hydro Power		X		
Commercial Navigation & Transportation				

¹ With adequate pretreatment (filtration and disinfection) and natural quality to meet drinking water standards.

² See also Figures 130A and 130B for fish use designations for this basin.

Table produced November, 2003

Notes:

Table taken from OAR 340-41-0130.

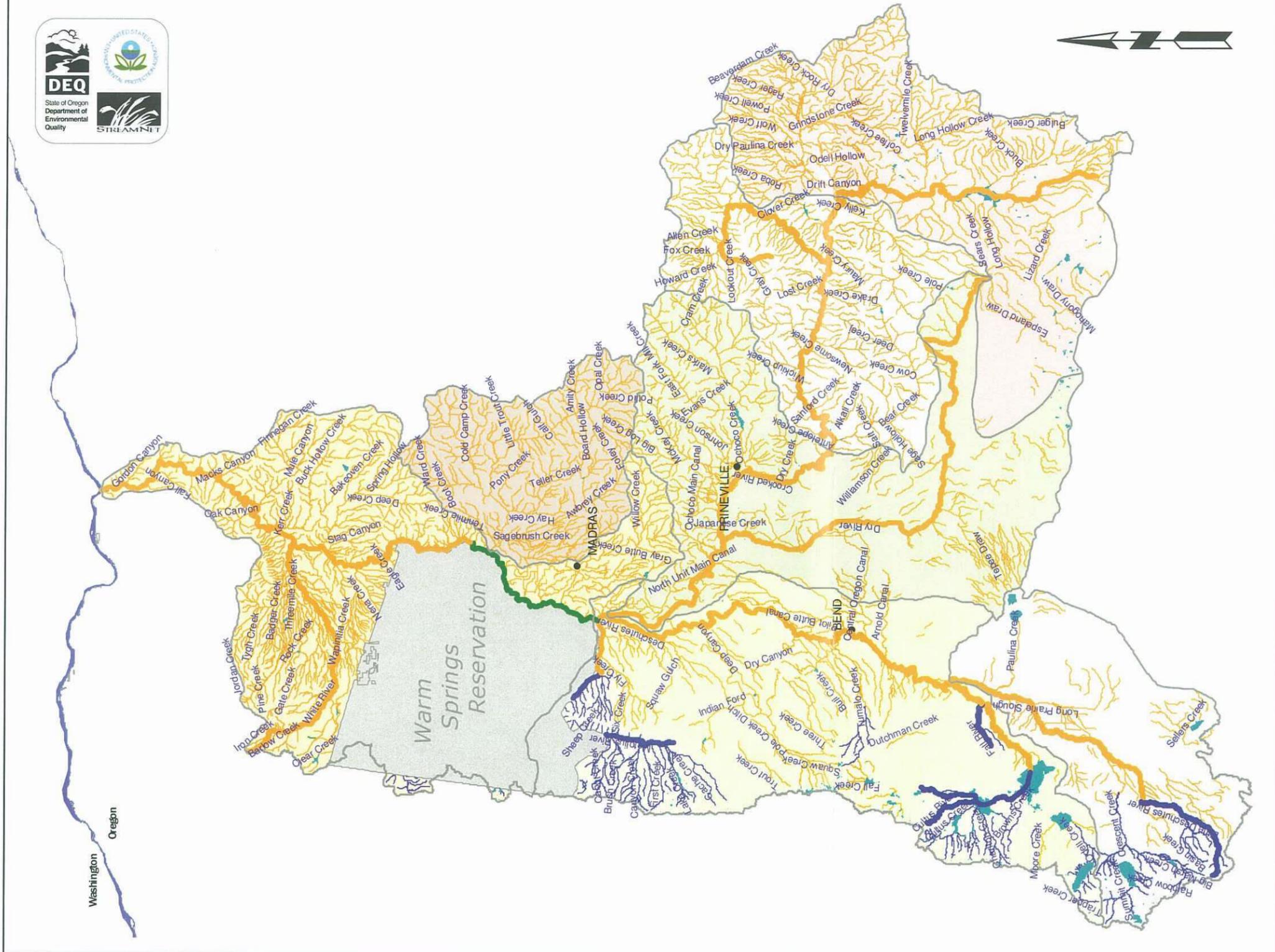
Figures 130A and 130B noted above are shown as Figures 4-6 and 4-7, respectively, in this WWFP Update.



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE

DESIGNATED BENEFICIAL USES

FIGURE
4-5



Legend

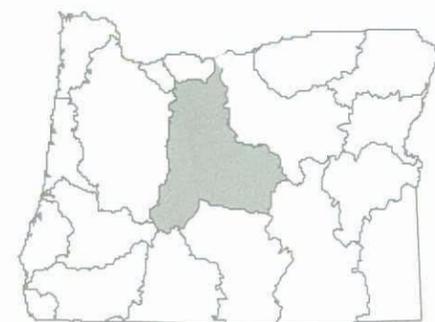
Designated Fish Use*:

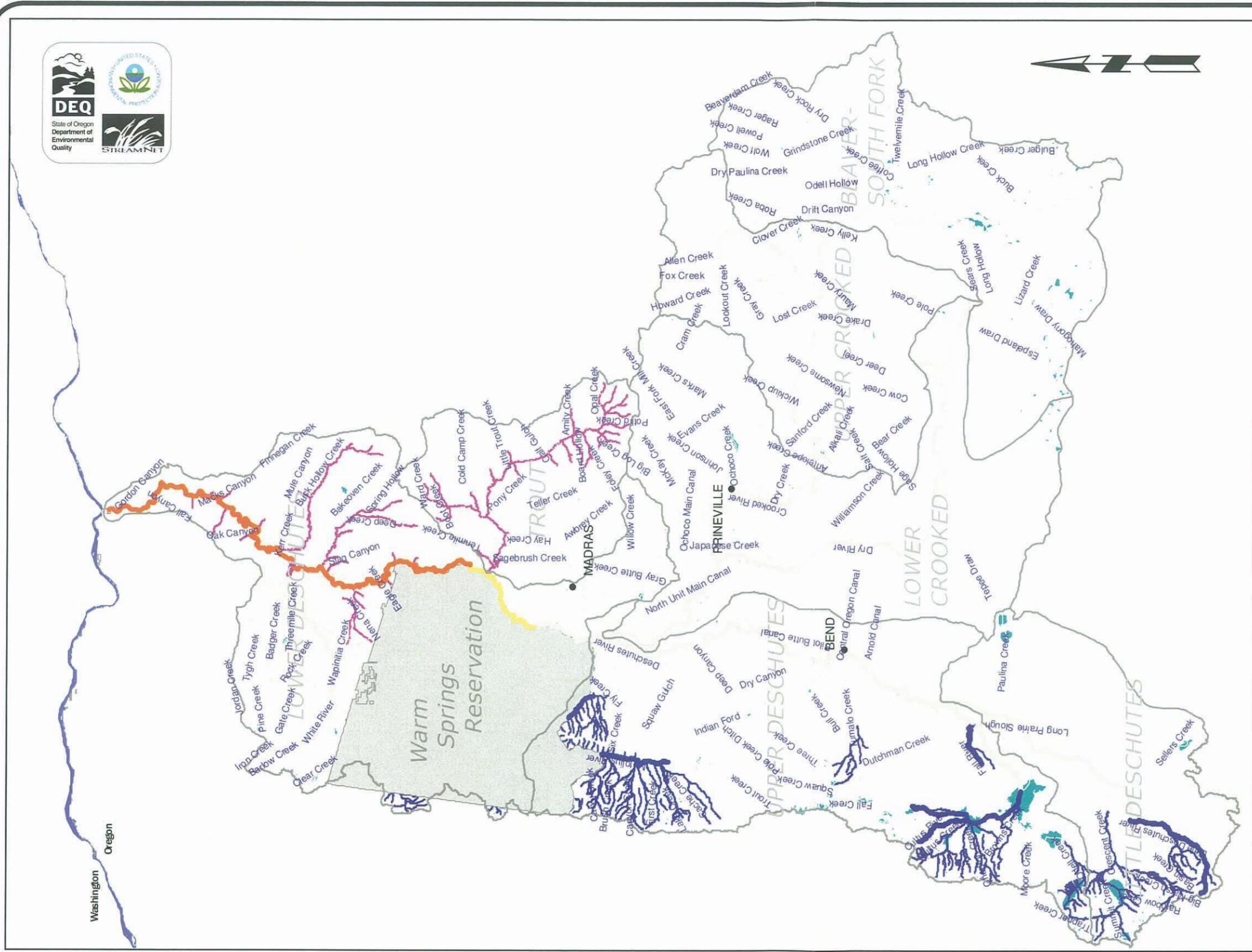
- Bull Trout Spawning & Juvenile Rearing
- Core Cold-Water Habitat
- Salmon & Trout Rearing & Migration**
- Salmon & Steelhead Migration Corridors
- No salmonid use

Subbasins:

- BEAVER-SOUTH FORK
- LITTLE DESCHUTES
- LOWER CROOKED
- LOWER DESCHUTES
- TROUT
- UPPER CROOKED
- UPPER DESCHUTES

NOTES:
 *Please see Figure 130B for spawning use designations.
 **Includes all salmon species, steelhead, rainbow, and cutthroat trout.
 Major rivers shown in bolder lines.
 Map produced November, 2003





Legend

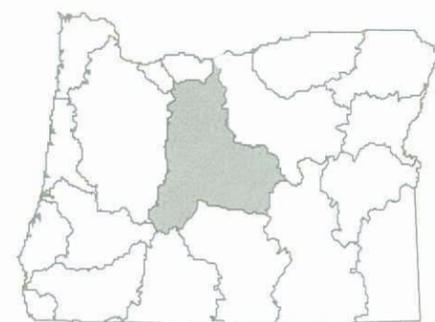
Designated Salmon and Steelhead Spawning Use*:

- August 15-May 15
- August 15-June 15
- October 15-May 15
- October 15-June 15
- January 1-May 15
- January 1-June 15
- No Spawning Use

Bull Trout Spawning and Rearing Use:

- Bull Trout Spawning and Rearing Habitat
- Subbasins

NOTES:
 *Please see Figure 130A for Fish Use Designations.
 Major rivers shown in bolder lines.
 Map produced November, 2003



Job# 1260-06-020 Oct. 20, 2010 lbauer

CHAPTER 5 PROJECT FINANCING AND IMPLEMENTATION

INTRODUCTION

This chapter of the Wastewater Facilities Plan (WWFP) Update evaluates the financial status of the City's Sewer Department and outlines alternatives for financing Prineville's proposed wastewater system improvements. A summary of state and federal funding programs is presented, including a review of funding options available to the City for the selected wastewater system improvements project. In order to construct the proposed improvements, a financing plan must be developed that is acceptable to the citizens of Prineville. Because of the high estimated cost of the improvements, financing resources should include local funding and loan/grant funding, if available.

Although a detailed analysis of Prineville's current sewer rate structure is beyond the scope of this WWFP Update, some discussion of the existing rate structure, and current and future wastewater system budgets, is included for the purpose of supporting calculations for funding scenarios. As a general rule, most utility rate structures include funding for periodic minor system improvements and maintenance items, payroll costs for staff, and a set-aside for future improvements. A summary of the current sewer rate structure is presented hereafter.

CURRENT SEWER RATES AND REVENUE

Operation and maintenance of the existing wastewater system is financed through the City's annual budget. Revenue is obtained primarily from sewer user fees. At the time of this report, the current sewer rates (per month), which were established via Resolution No. 1136 for the fiscal year 2010-11, are briefly summarized hereafter. A copy of Resolution No. 1136 is included in Appendix E for reference.

CITY OF PRINEVILLE MONTHLY SEWER RATE INFORMATION

Type of User	Rate as of November 2006
Residential	\$50.99 per Dwelling Unit
Commercial	\$50.99 per Dwelling Unit
Large General Service Uses	\$124.78 Flat Rate

The City of Prineville monitors monthly water usage from large system users to evaluate if additional monthly sewer charges should be levied. The City charges \$3.36 additional sewer fee per month for overage water use per unit (a unit is 100 cubic feet, or 748 gallons) beyond 30 base units.

As of September 15, 2010, the City of Prineville had the following number of sewer service accounts that were billed. These data were provided by the City of

Prineville and include a summary of the City's account code, description, number of connections, and estimated Equivalent Dwelling Units (EDUs).

CITY OF PRINEVILLE SEWER SERVICE CONNECTIONS

Code	Description	Number of Connections	EDUs
S01	Senior	190	190
S02	RV Park (81 Spots)	1	50
S03	Commercial	407	1,385
S04	Com-Dependent	59	
S06	Residential	2,975	2,975
S07	Second Additional Meter (Volume included in S04)	11	
S08	Third Additional Meter (Volume included in S04)	4	
S09	Well Meter for Sewer Charge	1	2
S10	No Charge	4	34
		3,652	4,636

The total number of residential connections is 3,246, which includes the 190 senior connections and the 81 RV spots shown as one connection above. The most recent population estimate for Prineville, as presented in Chapter 2, is 10,370. Dividing the total population with the number of residential accounts results in an average of 3.19 people per residential account for the City of Prineville.

The revenue generated from the City's sewer rates, connection fees, and interest income for the fiscal years 2006-07 through 2010-11 is presented in the following table. Using an annual average sewer revenue amount of \$3,023,575 for the most recent three years of data and assuming 3,246 connections, the City currently has an average monthly sewer cost of approximately \$77.62 per connection.

CITY OF PRINEVILLE SEWER DEPARTMENT REVENUE

Fiscal Year	Population	Total Revenue from Sewer Rates, Connection Fees, and Interest Income
2006-2007	10,190	\$2,633,672
2007-2008	10,370	\$2,927,558
2008-2009	10,370	\$3,042,924
2009-2010	10,370	\$2,994,000
2010-2011	10,370	\$3,033,800

CURRENT FINANCIAL STATUS

The annual cost of operating and maintaining the Prineville wastewater system is summarized in the following table. The costs presented were obtained from the City's financial statements and adopted budgets and include all costs for the wastewater system, such as operation, maintenance, and replacement (OM&R), staff payroll, and existing loan payments. These data should be considered approximate and are presented hereafter so the reader can gain some insight into the magnitude of costs required for operating the City's wastewater system. For funding and other financial analysis, it is recommended the actual audited financial statements be obtained and reviewed in detail to refine the actual costs prior to considering any available revenue for future debt purposes.

CITY OF PRINEVILLE SEWER DEPARTMENT BUDGET

Fiscal Year	Personnel Services	Materials and Services	Capital Outlay	Debt Service	Transfers	Total Expenditures
2008-09	\$302,753	\$434,691	\$0	\$1,525,942	\$909,000	\$3,172,386
2009-10	\$230,500	\$590,850	\$160,000	\$2,999,600	\$1,008,400	\$4,989,350
2010-11	\$246,800	\$606,800	\$100,000	\$1,476,600	\$915,000	\$3,345,200

Note: Data for fiscal years 2009-10 and 2010-11 were obtained from the adopted City budget.

Operating Reserve. The City indicated they prefer to allocate approximately 5 percent of their annual operating costs to a reserve account. Maintaining a healthy reserve account for anticipated wastewater system maintenance and replacement costs as well as unanticipated items that may occur is a wise practice. The City also indicated it has been difficult to maintain the annual allocation in recent years due to economic conditions. If possible, it would be wise to continue to allocate funds annually to a designated reserve account. It is recommended that the City transfer funds to the utility reserve fund regularly so a financially healthy reserve fund is maintained to help with future wastewater system expenses and emergencies. Pump replacement, line repairs, lift station work, etc., are items that require funds from time to time. It is anticipated this reserve fund allocation would be on the order of \$85,000 to \$90,000.

Existing Debt. Outlined hereafter is an approximate summary of the City of Prineville's Sewer Department existing debt. The estimated monthly sewer rate that supports the payment amount was calculated assuming 3,468 accounts as summarized earlier in this chapter.

Current Loan Amount	Approximate Annual Debt Payment and Fees	Loan Maturation Date	Monthly Sewer Rate To Support This Payment Amount
\$7,633,601	\$625,388	2027	\$15.02
\$4,458,253	\$389,919	2026	\$9.37
\$163,038	\$89,551	2012	\$2.15
\$465,377	\$164,524	2013	\$3.95
\$755,000	\$267,505	2013	\$6.43

The above data show that the City is due to retire three existing loans in the next two to three years. These loans have a total annual payment of \$521,580, representing a monthly sewer rate of approximately \$12.53. Thus, if the City desires to pursue possible wastewater system improvements funding, considerable debt capacity under the current rate structure will become available within the next few years.

STATE AND FEDERAL GRANT AND LOAN PROGRAMS

A number of state and federal grant and loan programs can provide assistance on municipal improvement projects to Oregon cities. These programs offer various levels of funding aimed at different types of projects. These include programs administered by Rural Development (RD) under the U.S. Department of Agriculture, the U.S. Economic Development Administration (EDA), the Oregon Business Development Department (OBDD), the Oregon Department of Environmental Quality (DEQ), and others. These agencies can provide low interest loan funding and possibly grant funding for assisting rural communities on public works projects. Most of these agencies will require a significant increase in sewer rates to support a loan for wastewater system improvements both as a condition of receiving monies and prior to being considered for grant funds.

U.S. Department of Agriculture, Rural Development program. This agency can provide financial assistance to communities with a population under 10,000 through both loans and direct grants. Under the loan program, the agency purchases the local bonds. The interest rate for these bonds is dependent on the median household income (MHI) of the community and other factors, and varies from year to year based on other economic factors nationally. Due to recent changes in the funding environment and an increased competition for funds, RD now sets a limit on the maximum amount of loan dollars a community can request. Currently the maximum loan amount is 25 percent of the total funding available state-wide, which would result in a maximum project loan in the range of \$4,500,000. The interest rate is currently about 4.5 percent with a repayment period of up to 40 years. Application for this type of funding is a fairly lengthy process involving an environmental review process, a detailed report, and a final application.

The agency presently requires communities to establish average residential user costs in the range of \$50 to \$52 per month before the community qualifies for grant funds. The equivalent monthly costs must provide sufficient revenue to pay for all system O&M costs and pay for the local debt service incurred as a result of the project. All project costs above this level may be paid for by grant funds, up to given limits, which are usually not more than 45 percent of the total project cost, but are typically 25 percent or less. The objective of the RD loan/grant program is to keep the cost for utilities in small, rural communities at a level that is affordable and similar to what other communities are paying.

Another of the agency's requirements is that loan recipients establish a reserve fund of 10 percent of the bond repayment during the first 10 years of the project, which makes the net interest rate a little higher. One of the major benefits of the RD program is that the agency can purchase either revenue or general obligation bonds. These bonds must be purchased for a period of 40 years if grant funding is also received. To

be eligible for the funding, the City must be willing to increase its user rates to the average monthly costs required by Rural Development.

Rural Development is a possible loan and grant funding source for the City of Prineville's wastewater system improvements. If the City were to pursue RD funding, two items of concern would need to be overcome, as follows.

- **10,000 Population Limit** – It may be necessary to prove to RD that the City of Prineville's actual population is below 10,000, not 10,370 as recently estimated by Portland State University.
- **Maximum Loan Amount** – The City of Prineville's needed loan would exceed 25 percent of the annual state allocation. However, RD can obtain additional loan funds from the national pool of funds that are not used by other states, so a larger loan may still be possible.

Clean Water State Revolving Loan Fund (CWSRF) Program. This program, administered by the DEQ, provides low interest rate loans to public agencies for the planning, design, and construction of water pollution control facilities (e.g., wastewater treatment facilities), as well as for some publicly-owned estuary management and non-point source control projects. Priority in the agency's ranking process is always given to projects addressing documented water quality problems and health hazards.

Under the CWSRF program rules, interest rates on all standard design and/or construction loans are set at 65 percent of the municipal bond rate as of the quarter proceeding signing of the loan agreement. Loans for design and construction currently have an interest rate of about 3.5 percent with repayment over 20 years or 3.2 percent with repayment over 15 years. In addition, fees are assessed to cover program administration costs by the Department. A loan processing fee of 1.5 percent is included in the loan amount, a servicing fee of 0.5 percent of the outstanding balance is added to the interest rate, and a loan reserve equal to 50 percent of the annual debt service is also set aside in a separate fund. This program has low interest rates, and the repayment period is typically 20 years. The DEQ loan program is an attractive low interest loan source for the City of Prineville.

Oregon Business Development Department (OBDD). This state agency administers the **Water/Wastewater Financing Program**. This program uses Oregon Lottery funds to help municipalities make improvements to their drinking water and wastewater systems. Project eligibility is limited to those projects necessary to ensure compliance with drinking water regulations of the Department of Human Services - Drinking Water Program or other statutes, rules, orders, or permits administered by the DEQ.

This program requires that the recipient have a monthly residential sewer rate of at least 1.48 percent of the City's 2000 MHI and that the wastewater system improvements project correct a compliance issue (such as permit compliance). By these guidelines, Prineville's minimum rate would need to be \$37.53. Funding from this program can be in the form of loans and/or grants. Determination of the final amount of financing available for a specific project, and the loan/grant mix, is based on several

factors including the financial strength of the municipality, per capita income of the applicant, existing water and sewer rates as compared to a statewide average, and more. The current grant eligibility criteria are as follows:

- Less than 100 percent of statewide MHI = maximum \$750,000 grant
- Greater than 100 percent of statewide MHI = no grant
- Maximum grant of \$10,000 per connection served

Since Prineville's MHI is less than the statewide MHI, the City could qualify for grant funds from the water/wastewater program. Sewer user rates for the City are already above the required threshold; however, the City's wastewater system is not currently out of compliance. Loan rates are currently at approximately 5.0 percent under this program and the repayment period is 20 years.

The OBDD is also responsible for administering the **Special Public Works Fund Program**, which is funded by monies from the Oregon Lottery. Loan funds are normally available through this program to be utilized by cities and counties for public utility improvements, and the program also offers grant funds once loan capacity limits are met. The maximum grant is typically \$500,000. Grants cannot be more than 85 percent of the total project cost. Funds can be made available, for the purpose of improving public facilities, in order to enable the area to be in a position to serve additional commercial and industrial businesses.

The availability of these funds is tied very closely to the need for economic growth and the creation of new jobs or retention of jobs. Grant funds are typically limited to \$5,000 per job that is retained or created. Depending on the ability of the City to demonstrate the creation of new family wage jobs or the retention of existing jobs, this funding program is a possible option for the City.

The State of Oregon has developed the **Oregon Bond Bank**. The Bond Bank is a loan source available to cities for improvement projects. The OBDD also uses the Bond Bank as the source of loan funds for the Water/Wastewater and Special Public Works Fund programs. Periodically, the State of Oregon sells bonds, using the State's credit rating, to maintain a pool of money that the state can, in turn, loan out to cities, counties, and special districts. The state pays the bonding costs and buys down the interest rate a small amount. The current interest rate is around 6 percent. Local government agencies can finance a loan obtained from the Oregon Bond Bank based on either a local general obligation bond election or a local revenue bond authorization; either way the interest rate is the same. Applications for loans through the Oregon Bond Bank are accepted at any time by the state. This loan source is attractive to small communities because of the slightly lower interest rate and because the local government is not faced with expensive bonding costs. This program will not be as helpful as financing through the Clean Water State Revolving Loan Fund because the interest rate from the Oregon Bond Bank could be higher. This funding program is a possible loan option for the City of Prineville.

The **U.S. Economic Development Administration** has grant and loan funds similar to those available through the OBDD's Special Public Works Fund Program. Monies are available to public agencies to fund projects that stimulate the economy of an area, and the overall goal of the program is to create or retain jobs. The EDA has invested a great deal of money in Oregon to fund public works improvement projects in areas where new industries were locating or planned to locate in the future. In addition, the agency has a program known as the Public Works Impact Program (PWIP) to fund projects in areas with extremely high rates of unemployment. This program is targeted toward creating additional local construction jobs during construction of the needed improvements, thus reducing the unemployment rate in the area. Unless the City's wastewater system improvements can be linked directly to industrial expansion or job retention, the City will not be in a competitive position to receive funding under these EDA programs.

The OBDD is also responsible for administering the **Oregon Community Development Block Grant (CDBG) Program**. Funding for this program is provided on an annual basis by the U.S. Department of Housing and Urban Development. Projects that qualify under the Public Works category of the CDBG program include municipal wastewater and water system improvement projects that are user-rate dependent. Also, the community and proposed project must be primarily residential in nature. The funds available from this program are reportedly scheduled to increase for 2011 to a maximum limit of \$2,000,000 per community or \$10,000 per user benefited by the project, whichever is less. Project eligibility is limited to those projects necessary to ensure compliance with water quality statutes, rules, orders, or permits administered by the DEQ. The OBDD considers factors such as the ability of the users to fund the project locally, the urgency of the area's need, the cost in grant dollars per person benefited by the project, and how well the project is targeted toward meeting the national objective of primarily benefiting persons of low to moderate income.

The OBDD, through its CDBG program, funds water and wastewater improvement projects, and preference is given to those projects that have documented compliance issues. The agency does not fund projects that are targeted toward growth related problems. The CDBG program also requires the community to have 51 percent or greater low to moderate income residents. The City of Prineville does not have a current compliance issue with the wastewater system. However, the City of Prineville's percentage of low to moderate income residents is approximately 48.2 percent (based on the 2000 Census). Therefore, funding under this program is not an alternative for the City to obtain grant funds for the wastewater system improvements project.

OTHER POTENTIAL FUNDING SOURCES FOR DISPOSAL WETLANDS

In recent years a particular interest has been shown in the conservation, restoration, and enhancement of wetland areas throughout the United States. The existence of wetlands in an area has many advantages including habitat for migratory birds and wetland dependent wildlife, and protection and improvement of water quality and recharge of groundwater. Some programs are willing to partially fund projects aimed at furthering the development of wetland areas. The following funding programs involve wetland conservation and are a potential source of grant monies for the City.

The **Oregon Department of Transportation (ODOT)** participates in various wetland mitigation efforts throughout Oregon. If a portion of the City's property were to involve creation of wetland habitat, ODOT might be able to assist with implementation costs. ODOT actively seeks off-site opportunities to replace lost wetland areas. Creation of a wetland might allow ODOT to obtain credits (wetland banking) for mitigation of lost wetland habitat at another site. The City would need to contact ODOT to become familiar with the program and determine whether they qualify.

The **U.S. Fish and Wildlife Service (USFWS)** administers the **North American Wetland Conservation Act (NAWCA) Grant Program**. The purpose of the NAWCA is to promote the long-term conservation of North American wetland ecosystems and the waterfowl and other migratory birds, fish, and wildlife that depend upon such habitat. Principal conservation actions supported by NAWCA are acquisition, establishment, enhancement, and restoration of wetlands and wetland-associated uplands. Applying for NAWCA funding is a competitive process. It is a matching grants program that supports public-private partnerships carrying out projects in the United States that further the goals of NAWCA. This is a potential funding source for construction of the disposal wetland portion of Prineville's selected alternative described in Chapter 4.

The **Wetlands Reserve Program** is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The **USDA Natural Resources Conservation Service (NRCS)** provides financial support to help landowners with their wetland restoration efforts. Program funding comes through the Commodity Credit Corporation. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection. It is important to note that these other potential funding programs will help fund only the disposal wetland portion of the selected alternative.

Summary. The most attractive funding source appears to be the USDA Rural Development due to the longer loan term and higher grant potential. In order to receive grant dollars from Rural Development, the City will need to be willing to maintain monthly sewer rates to the estimated range of \$50 to \$52.

It is important for the City to consult with funding agencies early in the project development stages to ascertain under which funding programs the City would be eligible to receive funding for their proposed improvements. This consultation with funding agencies is usually done at a "One-Stop" Meeting, which is described in more detail later in this chapter. The remainder of this chapter focuses on evaluating loan capacities and funding options for the City's wastewater system improvements project.

PRELIMINARY EQUIVALENT RESIDENTIAL UNIT ANALYSIS

When projecting future revenue for a wastewater system, an Equivalent Residential Unit (ERU) analysis is usually completed. One ERU is intended to represent the average residential wastewater flow for a "typical" user. As an example, each residential connection in Prineville would represent one ERU. A commercial or industrial connection user with wastewater flows similar to the average residential flow would also be considered one ERU. A commercial connection such as a café, with three times the typical wastewater flows as an average residential sewer connection,

would be considered three ERUs. Completion of a detailed ERU analysis is outside the scope of this WWFP Update. Such an analysis would be completed as part of a funding application for wastewater system improvements.

Most funding agencies will use an ERU evaluation as a basis for estimating future yearly revenues and debt capabilities for a city. An ERU determination is intended to equitably distribute wastewater system costs among all users. The ERU determination helps funding agencies determine the maximum loan (debt) amount a city can incur prior to being considered for grant funds for their wastewater system project. The City of Prineville will need both loan and grant funds to complete the wastewater system improvements project discussed in Chapter 4, should the City wish to do so. The analysis presented hereafter for the City's future sewer rate revenue and estimated loan capacity is based on the current total accounts of 3,652, resulting in 4,636 EDUs as shown below.

To complete the financial analysis in the remainder of this chapter, the total EDUs will be used as a basis to estimate sewer rate revenue. The City's sewer service connections and EDUs, as of September 15, 2010, were presented earlier in this chapter and are outlined again hereafter.

CITY OF PRINEVILLE SEWER SERVICE CONNECTIONS

Code	Description	Number of Connections	EDUs
S01	Senior	190	190
S02	RV Park (81 Spots)	1	50
S03	Commercial	407	1,385
S04	Com-Dependent	59	
S06	Residential	2,975	2,975
S07	Second Additional Meter (Volume included in S04)	11	
S08	Third Additional Meter (Volume included in S04)	4	
S09	Well Meter for Sewer Charge	1	2
S10	No Charge	4	34
		3,652	4,636

LOAN CAPACITY

In order to determine the City's ability to fund a wastewater system improvements project, an estimate of the loan capacity of the current sewer rate structure was prepared. Several assumptions were made:

1. Wastewater user fee revenue is based on the current number of EDUs of 4,636.

2. Future debt service was calculated based on typical RD financing (4.0 percent interest for a 40-year repayment period) and a typical OBDD loan (5.0 percent interest for a 20-year repayment period). These rates should be considered approximate and are intended for comparison purposes only. Each funding agency can likely provide more competitive loan rates.

CITY OF PRINEVILLE ESTIMATED LOAN CAPACITY INFORMATION

Revenue Scenario	Anticipated Annual Revenue (dollars)	RD Debt Capacity (4% @ 40 years)	OBDD Loan Capacity (5%, 20 years)
\$5 Sewer Rate Revenue	\$278,160	\$5,506,000	\$3,468,000
\$10 Sewer Rate Revenue	\$556,000	\$11,016,000	\$6,933,000

As a reminder, the sewer rate required to serve the three existing debt payments that are due to expire in the next two to three years was approximately \$12.50 (see analysis earlier in this chapter). Thus, retirement of these existing loans should free up sufficient sewer rate revenue to renew the practice of providing revenue to the sewer reserve fund while also supporting the RD loan option. The data shown in the above table provide a general idea of the amount of debt the City could afford to service at various average monthly wastewater costs. Due to the anticipated cost of the selected wastewater system improvements, it may be necessary to pursue RD funding to secure a lower interest rate coupled with a longer loan term to keep sewer rates as low as possible. While this alternative would result in higher total payments over the life of the loan, the City would be able to pay off the loan much earlier than 40 years if the anticipated growth did occur for the City of Prineville.

It should be recognized that this is only a very preliminary analysis, and the financial assumptions and figures presented in this WWFP Update should be refined as project implementation proceeds in the future and as agreements are worked out with funding agencies. If the City incurs further debt prior to obtaining loan or grant funds, these figures will need to be adjusted accordingly to reflect the debt payment requirements for the overall City budget.

SYSTEM DEVELOPMENT CHARGES

The City of Prineville has system development charges (SDCs) in place for their wastewater system. A Wastewater System Development Charge Methodology Report, dated June 30, 2007, was prepared by GEL Oregon, Inc., for the City of Prineville. That report outlines the current charges for SDCs based on proposed wastewater system improvements and their estimated costs as outlined in prior wastewater planning documents. Upon final selection of a preferred improvements option and finalizing this Wastewater Facilities Plan Update, the current wastewater SDC charges per ERU should be updated to reflect more recent improvement cost estimates. For reference, a copy of the City of Prineville's SDC Resolution (Resolution No. 1093) is included in Appendix F.

This WWFP Update does not include a detailed analysis of any accumulated SDC revenue the City may have, or how that revenue could potentially contribute to proposed wastewater system improvements. The brief financial analysis and funding scenario presented later in this chapter is intended to provide a general idea of possible loan and grant capabilities as compared to existing wastewater rate structures. If SDC revenue is available for use with any proposed improvements project, it should be considered as part of the overall project funding package prior to finalizing project funding applications.

PREFERRED OPTION AT FULL URBAN GROWTH BOUNDARY BUILDOUT

The City of Prineville's 2007 SDC report is based on a full urban growth boundary (UGB) buildout population of 36,000. The cost estimates for the options evaluated in Chapter 3 are prepared for a 20-year estimated population of 21,356. A water balance and estimated total project cost for the preferred option (Option 1, Disposal Wetlands with No River Discharge) were prepared for the full UGB buildout population of 36,000. The water balance is presented in Table G-1 and the total estimated project cost is presented in Table G-2 in Appendix G. This information is presented in this chapter rather than Chapter 3 to avoid potential confusion with comparing estimated project costs for different design populations.

The total estimated project cost for the preferred option for an anticipated population of 36,000 at full UGB buildout is \$12,350,000 (year 2010 estimated cost), as shown on Table G-2. This information is presented herein to provide the basis for the City to revise their wastewater SDC calculation, which is based on a future population of 36,000.

PROJECT FUNDING

Based on the estimated cost of the Prineville wastewater system improvements project, the City will need to obtain a low interest loan coupled with a grant to fund the desired improvements project. Of the various funding programs, the most likely source of loan and grant funding for the project would be the USDA Rural Development grant and loan program. As an improvements project is pursued, it is recommended that the City thoroughly investigate potential funding sources to ensure the best funding package is obtained for the project. The best way to bring the City's proposed project to the attention of funding agencies is the One-Stop Meeting, as outlined hereafter.

One-Stop Meeting and Project Intake Form. OBDD has revised what was formerly referred to as the "One-Stop Meeting" process. In the past, the City of Prineville would have needed to schedule a One-Stop Meeting in Salem where representatives of major funding agencies would have met with the City to discuss the project and funding needs and identify the funding program best suited for the project. To avoid requiring City representatives to travel to Salem, OBDD now either schedules One-Stop Meetings in the area of the project or can complete these meetings via conference call and a web computer connection to visually demonstrate funding scenarios. OBDD also utilizes the "Project Intake Form." The Project Intake Form outlines the City's project, including the needs, project requirements, affected area,

estimated project cost, timeframe, schedule, etc. OBDD evaluates the project based on information presented on the Intake Form to determine the best funding program suited to the project. OBDD then invites a city to submit a funding application to the particular funding program identified by OBDD, which could be one of their programs or Rural Development. It would be wise to consult with OBDD and, as necessary, complete and submit an Intake Form to OBDD to initiate OBDD review of potential funding for the project. The Intake Form can be submitted at any time.

USDA Rural Development Grant/Loan Funding Scenario. As discussed earlier, a Rural Development grant and loan funding package appears to be the most attractive funding source to pursue. It will require the City's willingness to maintain monthly sewer rates in the range of \$50 to \$52. With existing rates already at approximately \$51 per month, the City has already met this requirement, or would potentially need to raise rates a slight amount. Earlier analysis of the City's existing wastewater system debt showed three existing loans close to being paid off in the next two to three years. If project funding were pursued immediately, it is likely the first loan payment would not be due until approximately one year after construction is finished. Thus, the first loan payment would most likely be due toward the end of 2013 or slightly later, assuming construction ended toward the end of 2012 or in early 2013. The revenue generated from the existing sewer rates to service the three existing loans that are due to expire in the next two to three years could be used to service the new loan payment.

Assuming the primary option for a potential funding source for the wastewater system improvements project is Rural Development, and the City can obtain a \$1,000,000 grant from RD, an estimated breakdown of the funding amounts is as follows. The following breakdown assumes the City maximizes their loan amount to qualify for an RD grant.

RD Grant	\$1,000,000
RD Loan	<u>\$11,000,000 to \$12,000,000</u>

Total Year 2012 Estimated Project Funding \$12,000,000 to \$13,000,000

This funding package, if attainable, would allow the City of Prineville to complete the preferred option of constructed wetlands for treated wastewater disposal, and would provide some funds to complete as many collection system improvements as possible.

LOCAL FINANCING OPTIONS

Regardless of the ultimate project scope and agency from which loan and grant funds are obtained, the City may need to develop authorization to incur debt, i.e., bonding, for the needed project improvements. The need to develop authorization to incur debt depends on funding agency requirements and provisions in the City Charter. Rural Development requires a city to obtain authorization to incur debt. There are generally two options a city may use for its bonding authority: general obligation bonds and revenue bonds. General obligation bonds require a vote of the people to give the city the authority to repay the debt service through tax assessments, sewer rate revenues, or a combination of both. The taxing authority of the city provides the

guarantee for the debt. Revenue bonds are financed through revenues of the wastewater system. Authority to issue revenue bonds can come in two forms. One would be through a local bond election similar to that needed to sell a general obligation bond, and the second would be through Council action authorizing the sale of revenue bonds, if the City Charter allows. If citizens do not object to the bonding authority resolution during a 60-day remonstrance period, the city would have authority to sell these revenue bonds.

The Rural Development program accepts either revenue bonds or general obligation bonds. Bonding is not required for the OBDD and CWSRF programs. Due to current tax measure limitations in the State of Oregon, careful consultation with experienced, licensed bonding attorneys needs to be made if the City of Prineville begins the process of obtaining bonding authority for the proposed wastewater system improvements. It would be wise for the City to consult with their City Charter and attorney to see if additional debt for the wastewater system can be assumed.

PROJECT IMPLEMENTATION

The following action items and implementation steps need to be made by the City of Prineville if they desire to implement a wastewater system improvements project. The steps outlined are general in nature and include the major steps that need to be undertaken.

Action Items

1. The City should formally adopt the 2010 Wastewater Facilities Plan Update.
2. The City should consult with OBDD and, as necessary, complete the Project Intake Form and submit the form to OBDD to initiate funding discussions.
3. The City should also prepare a USDA Rural Development funding application and Environmental Report for the wastewater system improvements project.
4. The City would likely need to modify its NPDES Permit in accordance with the future wastewater disposal system.
5. The City will need to decide how to obtain the authorization to incur debt for the wastewater system improvements project. Once decided (revenue bond or general obligation bond), a bond attorney should be consulted and the appropriate resolution paperwork should be prepared and considered for implementation.
6. The City should also hold public information meetings to inform its citizens of the needs and scope of the project, to answer questions, and to generate support for a potential sewer rate increase.

IMPLEMENTATION STEPS

Should the City wish to proceed with a wastewater system improvements project, the following Implementation Plan outlines the key steps the City would need to undertake for project implementation.

<u>ITEM</u>	<u>COMPLETION DATE</u>
1. Initiate funding discussions with USDA Rural Development.	October 2010
2. Prepare and submit a Rural Development funding package.	October/November 2010
3. Prepare and submit a Rural Development Environmental Report.	October/November 2010
4. File with County Clerk for March 2011 election if election for a revenue bond or general obligation bond is desired, or, prepare the required bonding paperwork and undergo a 60-day remonstrance period (revenue bond only).	By January 2011
5. Hold public information meetings.	Spring 2011
6. Hold bond election (if election desired/ required).	March 2011
7. Finalize project funding.	Summer/Fall 2011
8. Complete project design.	Winter 2011/Spring 2012
9. Advertise, bid, award project construction.	Summer 2012
10. Complete construction.	Fall 2012 to Fall 2013
11. Project closeout.	Winter 2013

The key to implementing part or all of the Prineville wastewater system improvements project, as outlined in this chapter, is the ability of the City to acquire low interest loan funding coupled with grant funds, if possible. The City will have to work closely with its citizens to inform them of the system needs and the necessity for a possible slight increase in sewer user costs. Depending on the scope of improvements, the City will need to plan on average user costs being in the range of approximately \$50 to \$52 per month in order to obtain the loan and grant funds required to complete the project.

Wastewater system improvements as outlined in this Wastewater Facilities Plan Update will provide the City with a reliable, quality wastewater system that would meet the needs of the City for many years to come. The upgraded disposal treatment system will provide a more effective means to dispose of wastewater while eliminating discharge to the Crooked River. The new system will be easier to operate and also require less maintenance.

APPENDIX A
Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET
CHLORINE

ISSUED: 10/23/97
REVISED: 11/01/99

SECTION I - PRODUCT IDENTIFICATION

Westlake CA&O
2468 Industrial Parkway
P O Box 527
Calvert City, KY 42029

Telephone No.: (270) 395-4151
Transportation Emergency No.:
CHEMTREC: (800) 424-9300
Medical Emergency No.:
POISON CENTER: (216) 379-8562

Chemical Family: Halogen
Chemical Name/Synonyms: Chlorine
Trade Mark: None
Formula: Cl₂; (Cl-Cl)
C.A.S. Registry No.: 7782-50-5

TSCA Inventory Status: All ingredients are listed on the USEPA's TSCA inventory
Canadian Domestic Substances List Status: All ingredients have been nominated or are eligible for inclusion.

Workplace Hazardous Materials Information System (WHMIS) Classification: C,E
Product Use: Various Applications

SARA 313 Information: This product contains a toxic chemical or chemicals subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

SECTION II - HAZARDOUS INGREDIENTS

Hazard Summary Statement: WARNING! HIGHLY TOXIC. CORROSIVE. May be fatal if inhaled. Strong oxidizer. Most combustibles will burn in chlorine as they do in oxygen. Read entire Material Safety Data Sheet (MSDS).

<u>Material</u>	<u>C.A.S. Number</u>	<u>Amount in Product</u>	<u>ACGIH TLV-TWA</u>	<u>OSHA PEL-TWA</u>
Chlorine ^{1,2,4,5,6}	7782-50-5	> 99.5%	0.5 ppm 1 ppm short term exposure limit (STEL)	1 ppm - ceiling

N.A. - Not Applicable

N.E. - Not Established

Legislative Footnotes

¹Ingredient listed on SARA Section 313 List of Toxic Chemicals.

²Ingredient listed on the *Pennsylvania Hazardous Substances List*.

³Ingredient listed on the California listing of *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity*.

⁴Ingredient listed on the *Massachusetts Substance List*.

⁵*Workplace Hazardous Materials Information System* ingredient found on the Ingredient Disclosure List - Canada.

⁶Ingredient listed on the *New Jersey Right to Know Hazardous Substance List*.

Notes:

TLV-TWA - Threshold Limit Value - Time Weighted Average guideline for concentration of the chemical substance in the ambient workplace air. (The skin notation calls attention to the skin as an additional significant route of absorption of the listed chemical.) American Conference of Governmental Industrial Hygienists (ACGIH).

OSHA PEL - OSHA Permissible Exposure Limit, 8-hour TWA. 29 CFR 1910.1000, Transitional Limits column, Table Z-1-A, Table Z-2, and Table Z-3.

SECTION III - PHYSICAL DATA

Appearance: Greenish-yellow gas or amber liquid	Specific Gravity: Dry Gas (2.48 @ 0°C) Liquid (1.47 @ 0/4°C)
Odor: Pungent, suffocating bleach like odor	Melting Point: -101°C (-150°F)
Percent Volatiles: >99.5	Molecular Weight: 70.9
Solubility in Water: Slight	Vapor Pressure: 73 psia @ 50°F
Physical State: Gas (liquid under pressure)	Vapor Density: 2.5 (Air=1)

SECTION IV - FIRE & EXPLOSION HAZARD DATA

Flash Point: Test is not applicable to gases. Not combustible. Chlorine can support combustion and is a serious fire risk.

Flammable Limits in Air: Not Applicable

Note:

Flash Point: The lowest initial temperature of air passing around the specimen at which sufficient combustible gas is evolved to be ignited by a small external pilot flame.

Extinguishing Media: For small fires use dry chemical or carbon dioxide. For large fires use water spray, fog or foam.

Special Firefighting Procedures: Wear full face positive pressure self-contained breathing apparatus (SCBA). Wear full protective gear to prevent all body contact (moisture or water and chlorine can form hydrochloric and hypochlorous acids which are corrosive). Personnel not having suitable protection must leave the area to prevent exposure to toxic gases from the fire. Use water to keep fire-exposed containers cool (if containers are not leaking). Use water spray to direct escaping gas away from workers if it is necessary to stop the flow of gas. In enclosed or poorly ventilated areas, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

Unusual Fire and Explosion Hazards: Chlorine and water can be very corrosive. Corrosion of metal containers can make leaks worse. Although non-flammable, chlorine is a strong oxidizer and will support the burning of most combustible materials. Flammable gases and vapors can form explosive mixtures with chlorine. Chlorine can react violently when in contact with many materials and generate heat with possible flammable or explosive vapors. Chlorine gas is heavier than air and will collect in low-lying areas.

Explosive Characteristics: Containers heated by fire can explode.

SECTION V - Reactivity

Stability: Stable

Hazardous Polymerization: Will not occur.

Hazardous Decomposition Products: Hydrogen chloride may form from chlorine in the presence of water vapor.

CAUTION! Oxidizer. Extremely reactive.

Incompatibility (Materials to Avoid): Chlorine is extremely reactive. Liquid or gaseous chlorine can react violently with many combustible materials and other chemicals, including water. Metal halides, carbon, finely divided metals and sulfides can accelerate the rate of chlorine reactions. Hydrocarbon gases, e.g., methane, acetylene, ethylene or ethane, can react explosively if initiated by sunlight or a catalyst. Liquid or solid hydrocarbons, e.g., natural or synthetic rubbers, naphtha, turpentine, gasoline, fuel gas, lubricating oils, greases or waxes, can react violently. Metals, e.g., finely powdered aluminum, brass, copper, manganese, tin, steel and iron, can react vigorously or explosively with chlorine. Nitrogen compounds, e.g., ammonia and other nitrogen compounds, can react with chlorine to form highly explosive nitrogen trichloride. Non-metals,

e.g., phosphorous, boron, activated carbon and silicon can ignite on contact with gaseous chlorine at room temperature. Certain concentrations of chlorine-hydrogen can explode by spark ignition. Chlorine is strongly corrosive to most metals in the presence of moisture. Copper may burn spontaneously. Chlorine reacts with most metals at high temperatures. Titanium will burn at ambient temperature in the presence of dry chlorine.

SECTION VI - HEALTH HAZARD DATA

Threshold Limit Value: See Section II.

Primary Routes of Exposure: Inhalation, skin and eye contact.

Effects of Overexposure:

Acute: Low concentrations of chlorine can cause itching and burning of the eyes, nose, throat and respiratory tract. At high concentrations chlorine is a respiratory poison. Irritant effects become severe and may be accompanied by tearing of the eyes, headache, coughing, choking, chest pain, shortness of breath, dizziness, nausea, vomiting, unconsciousness and death. Bronchitis and accumulation of fluid in the lungs (chemical pneumonia) may occur hours after exposure to high levels. Liquid as well as vapor contact can cause irritation, burns and blisters. Ingestion can cause nausea and severe burns of the mouth, esophagus and stomach.

Chronic: Prolonged or repeated overexposure may result in many or all of the effects reported for acute exposure (including pulmonary function effects).

Emergency and First Aid Procedures:

Inhalation (of process emissions): Take proper precautions to ensure rescuer safety before attempting rescue (wear appropriate protective equipment and utilize the "buddy system"). Remove source of chlorine or move victim to fresh air. If breathing has stopped, trained personnel should immediately begin artificial respiration or, if the heart has stopped, cardiopulmonary resuscitation (CPR). Avoid mouth-to-mouth contact. Oxygen may be beneficial if administered by a person trained in its use, preferably on a physician's advise. Obtain medical attention immediately.

Eye Contact: Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 20 minutes while the eyelid(s) are open. Take care not to rinse contaminated water into the non-affected eye. If irritation persists, obtain medical attention immediately.

Skin Contact: As quickly as possible, flush contaminated area with lukewarm, gently running water for at least 20 minutes. Under running water, remove contaminated clothing, shoes, and leather watchbands and belts. If irritation persists, obtain medical attention immediately. Completely decontaminate clothing, shoes and leather goods before re-use, or, discard.

Ingestion: Not an anticipated hazard.

SECTION VII - SPILL & LEAK PROCEDURE

Steps to be taken in case material is released or spilled: Restrict access to the area until completion of the cleanup. Issue a warning: POISON GAS. DO NOT TOUCH SPILLED LIQUID. Do not use water on a chlorine leak (corrosion of the container can occur, increasing the leak). Shut off leak if safe to do so. Wear NIOSH/MSHA-approved, self-contained, full-face, positive pressure respirator and full protective clothing capable of protection from both liquid and gas phases. Persons without suitable respiratory and body protection must leave the area.

The following evacuation guide was developed by the U.S. Department of Transportation (DOT): Spill or leak from a smaller container or small leak from a tank - isolate in all directions 250 feet. Large spill from a tank or from a number of containers - first, isolate 520 feet in all directions; secondly, evacuate in a downwind direction 1.3 miles wide and 2.0 miles long. Keep upwind from leak. Vapors are heavier than air and pockets of chlorine are likely to be trapped in low-lying areas. Use water spray on the chlorine vapor cloud to reduce vapors. Do not flush into public sewer or water systems. Chlorine can be neutralized with caustic soda or soda ash. Alkaline solutions for absorbing chlorine can be prepared as follows:

For 100 pound containers: 125 lbs. of caustic soda and 40 gallons of water

For 2,000 pound containers: 2,500 lbs. of caustic soda and 800 gallons of water

For 100 pound containers: 300 lbs. of soda ash and 100 gallons of water

For 2,000 pound containers: 6,000 lbs. of soda ash and 2,000 gallons of water

CAUTION: Observe appropriate safety precautions for handling alkaline chemicals. Heat will be generated during the neutralization process.

Waste Disposal Method: Due to its inherent properties, hazardous conditions may result if the material is managed improperly. It is recommended that any containerized waste chlorine be managed as hazardous waste in accordance with all applicable federal, state, and local health and environmental laws and regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Effective exhaust ventilation should always be provided to draw fumes or vapors away from workers to prevent routine inhalation. Ventilation should be adequate to maintain the ambient workplace atmosphere below the legislated levels listed in Section II.

Respiratory Protection: Use NIOSH approved acid gas cartridge or canister respirator for routine work purposes when concentrations are above the permissible exposure limits. Use full facepiece respirators when concentrations are irritating to the eyes. A cartridge-type escape respirator should be carried at all times when handling chlorine for escape only in case of a spill or leak. Re-enter area only with NIOSH approved, self-contained breathing apparatus with full facepiece. The respiratory use limitations made by NIOSH or the manufacturer must be observed. Respiratory protection programs must be in accordance with 29 CFR 1910.134.

Eye/Face Protection: Non-ventilated chemical safety goggles or a full face shield.

Skin Protection: Wear impervious gloves, coveralls, boots and/or other resistance protective clothing. Safety shower/eyewash fountain should be readily available in the work area. Some operations may require the use of an impervious full-body encapsulating suit and respiratory protection.

Note: Neoprene, polyvinyl chloride (PVC), Viton, and chlorinated polyethylene show good resistance to chlorine.

Additional: Do not eat, drink or smoke in work areas. Maintain good housekeeping.

SECTION IX - SPECIAL PRECAUTIONS

Material Handling: Do not use near welding operations, flames or hot surfaces. Move cylinders by hand truck or cart designed for that purpose. Do not lift cylinders by their caps. Do not handle cylinders with oily hands. Secure cylinders in place in an upright position at all times. Do not drop cylinders or permit them to strike each other. Leave valve cap on cylinder until cylinder is secured and ready for use. Close all valves when not in actual use. Insure valves on gas cylinders are fully opened when gas is used. Open and shut valves at least once a day while cylinder is in use to avoid valve "freezing". Use smallest possible amounts in designated areas with adequate ventilation. Have emergency equipment for fires, spills and leaks readily available. Wash thoroughly after handling product. Provide a safety shower/eyewash station in handling area. An emergency contingency program should be developed for facilities handling chlorine.

Storage: Store in steel pressure cylinders in a cool, dry area outdoors or in well-ventilated, detached or segregated areas of noncombustible construction. Keep out of direct sunlight and away from heat and ignition sources. Cylinder temperatures should never exceed 51°C (125°F). Isolate from incompatible materials. Store cylinders upright on a level floor secured in position and protected from physical damage. Use corrosion resistant lighting and ventilation systems in the storage area. Keep cylinder valve cover on. Label empty cylinders. Store full cylinders separately from empty cylinders. Avoid storing cylinders for more than six months. Comply with applicable regulations for the storage and handling of compressed gases.

SECTION X - HAZARD CODES

NFPA
(National Fire Protection Association)

HMIS
(Hazardous Materials Identification System)

Health: 4
Flammability: 0
Reactivity: 0
Special: OXY

Health: 3
Flammability: 0
Reactivity: 0
Personal Protection: X*

Key:
0 = Insignificant
1 = Slight
2 = Moderate
3 = High
4 = Extreme
(MSDS - Chlorine)

* See MSDS for specified protection

USER'S RESPONSIBILITY

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of the user's operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained within this bulletin should be provided to the user's employees or customers. Westlake CA&O Corporation must rely upon the user to utilize this information to develop appropriate work practice guidelines and employee instructional programs for his or her operation.

DISCLAIMER OF LIABILITY

As the conditions or methods of use are beyond our control, we do not not assume any responsibility and expressly disclaim any liability for any use of this material. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding the accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user.

SHIPPING INFORMATION

IDENTIFICATION - DOMESTIC TRANSPORTATION

Proper Shipping Name (172.101(c)): **Chlorine**
(Technical Name(s)) 172.203(k): **N/A**
Hazard Class 172.101(d): **2.3**
UN/NA# 172.101(e): **UN 1017**
Haz. Substance 171.8: **RQ (Chlorine)**
Reportable Quantity (Appendix A to 172.101): **10 LB**
Inhalation Hazard 172.2a(b): **Zone B, Poison-Inhalation Hazard, Marine Pollutant**
Package Code 172.101(f): **N/A**
Placarded: **Poison Gas**

PACKAGING (Part 173)

- ◆ Packaging Section (172.101(i)) - Col. 8(a): None
Col. 8(b): 173.304
Col. 8(c): 173.314, 173.315

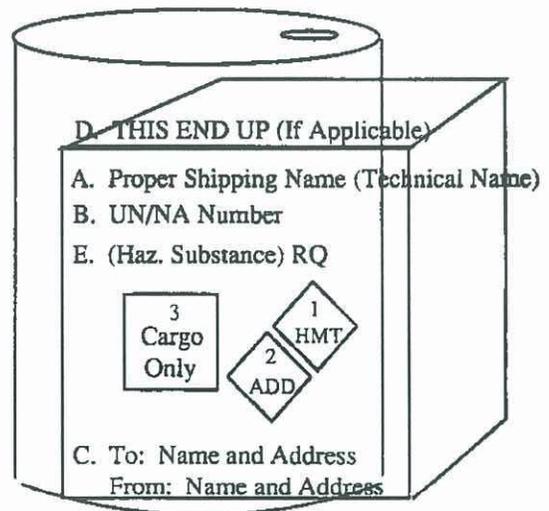
- ◆ General Packaging Section - General 173.24 Hazard Class: **POISON GAS**

MARKING

- A. Proper Shipping Name (172.301(a)) (Technical Name) (172.301(b))
- B. UN/NA Number (172.301(a))
- C. Name & Address (172.301(d))
- D. THIS END UP (172.312(a))
- E. Hazardous Substance RQ (Name) (172.324)
ORM Designation (172.316(a))
Inhalation Hazard (172.313(a))

DOMESTIC LABELING

- 1. HMT LABELS (172.400)
- 2. Additional Subsidiary Hazard (172.402(a)):
8 (Corrosive)



DANGEROUS GOODS DETERMINATION (38th Edition) IATA

- ◆ Air Transport of This Material if Forbidden (Passenger and Cargo)

APPENDIX B

NPDES Permit

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
 WASTE DISCHARGE PERMIT**

Department of Environmental Quality
 Eastern Region - Bend Office
 2146 NE Fourth, Bend, OR 97701
 Telephone: (541) 388-6146

Issued pursuant to ORS 468B.050 and The Federal Clean Water Act

ISSUED TO:

City of Prineville
 400 East 3rd Street
 Prineville, OR 97754

SOURCES COVERED BY THIS PERMIT:

<u>Type of Waste</u>	<u>Outfall Number</u>	<u>Outfall Location</u>
Treated Wastewater	001	R.M. 46.8
Reclaimed Water Reuse	002	Golf Course
Reclaimed Water Reuse	003	Land Irrigation
Emergency Overflow	004	Secondary Lagoon

FACILITY TYPE AND LOCATION:

Stabilization Lagoons with Aeration
 City of Prineville
 1 mile N.W. of Prineville
 Facultative Lagoon System
 City of Prineville
 Located northwest of existing system
 Treatment System Class: Level II
 Collection System Class: Level III

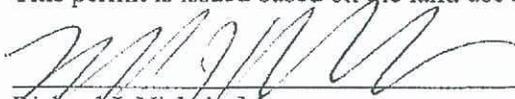
RECEIVING STREAM INFORMATION:

Basin: Deschutes
 Sub-Basin: Lower Crooked
 Receiving Stream: Crooked River
 Hydro Code: 25--CROO 46.3D
 LLID: 1212676445778-46.3-D
 County: Crook

EPA REFERENCE NO: OR-002361-2

Issued in response to Application No. 987253 received October 1, 2001.

This permit is issued based on the land use findings in the permit record.


 Richard J. Nichols, Manager
 Bend Water Quality Section
 Eastern Region

February 5, 2003
 Date

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to construct, install, modify, or operate a wastewater collection, treatment, control and disposal system and discharge to public waters adequately treated wastewaters only from the authorized discharge point or points established in Schedule A and only in conformance with all the requirements, limitations, and conditions set forth in the attached schedules as follows:

Schedule A - Waste Discharge Limitations not to be Exceeded.....	Page 2-3
Schedule B - Minimum Monitoring and Reporting Requirements.....	4-6
Schedule C - Compliance Conditions and Schedules.....	7
Schedule D - Special Conditions.....	7-11
Schedule E - Pretreatment Activities.....	--
Schedule F - General Conditions.....	12-22

Unless specifically authorized by this permit, by another NPDES or WPCF permit, or by Oregon Administrative Rule, any other direct or indirect discharge to waters of the state is prohibited, including discharge to an underground injection control system.

SCHEDULE A

Waste Discharge Limitations not to be exceeded after permit issuance.

1. Treated Effluent Outfall 001 (River Discharge) See Note 1/
 - a. May 1 - October 31: No discharge to waters of the State (unless approved in writing by the Department)
 - b. November 1 - April 30:
 - (1) No discharge when daily average flow in the Crooked River is less than 15 cfs.
 - (2) When the daily average flow in the Crooked River is 15 cfs or greater, the quality of effluent discharged shall meet the following:

Parameter	Average Effluent Concentrations		Monthly* Average lb/day	Weekly* Average lb/day	Daily* Maximum lbs.
	Monthly	Weekly			
CBOD ₅ (See note 2/)	25 mg/L	40 mg/L	230	340	460
TSS	40 mg/L	60 mg/L	370	550	730

* Average dry weather design flow to the existing facility equals 1.1 MGD. Mass load limits based upon average dry weather design flow to the facility.

(3)

Other parameters (year-round)	Limitations
Total Coliform Bacteria	Shall not exceed a 7-day median of 23 organisms with no two consecutive samples to exceed 240 organisms (See note 3/)
pH	Shall be within the range of 6.0 - 9.0
CBOD ₅ and TSS Removal Efficiency	Shall not be less than 65% monthly average for CBOD ₅ and 65% monthly for TSS.
Total Chlorine Residual	Shall not exceed a monthly average of 0.10 mg/l and a daily maximum of 0.16 mg/l.
Effluent Discharge	When the daily average flow of the Crooked River is 15 cfs or greater but less than 25 cfs, the quantity of effluent discharged to the Crooked River shall not exceed 1/15 of the flow of the Crooked River at the point of discharge.

- c. Except as provided for in OAR 340-45-080, no wastes shall be discharged and no activities shall be conducted which violate Water Quality Standards as adopted in OAR 340-41-0565 except in the following defined mixing zone:

The allowable mixing zone is that portion of the Crooked River contained within a band extending out 15 feet from the south bank of the river and extending from a point 0 feet upstream of the outfall to a point 50 feet downstream from the outfall. The Zone of Immediate Dilution (ZID) shall be defined as that portion of the allowable mixing zone that is within 5 feet of the point of discharge.

2. Reclaimed Wastewater Outfall 002 and 003 (Golf Course and Land Irrigation Site)
 - a. No discharge to state waters is permitted. All reclaimed water shall be distributed on land in accordance with the approved Reclaimed Water Use Plan, for dissipation by evapotranspiration and controlled seepage by following sound irrigation practices so as to prevent:
 - (1) Prolonged ponding of treated reclaimed water on the ground surface;
 - (2) Surface runoff or subsurface drainage through drainage tile;
 - (3) The creation of odors, fly and mosquito breeding or other nuisance conditions;
 - (4) The overloading of land with nutrients, organics, or other pollutant parameters; and,
 - (5) Impairment of existing or potential beneficial uses of groundwater.
 - b. Prior to land application of the reclaimed water, it shall receive at least level II treatment as defined in OAR 340-55 to:

Total coliform shall not exceed a 7-day median of 23 organisms/100 ml, with no two consecutive samples to exceed 240 organisms/100 ml. (See note 3/)
 - c. Except for processed food crops, no treated wastewater shall be applied to food crops destined for direct human consumption or shall otherwise be made available for a use that is inconsistent with the uses provided for in OAR 340-55.
3. Emergency Overflow Outfall 004
 - a. No wastes shall be discharged from this outfall and no activities shall be conducted which violate water quality standards as adopted in OAR 340-41-0565, unless the cause of the discharge is due to storm events as allowed under OAR 340-41-120 (13) or (14) as follows:
 - b. Raw sewage discharges are prohibited to waters of the State from May 22 through October 31, except during a storm event greater than the one-in-ten-year, 24-hour duration storm. If an overflow occurs between May 22 and June 1, and if the permittee demonstrates to the Department's satisfaction that no increase in risk to beneficial uses occurred because of the overflow, no violation shall be triggered if the storm associated with the overflow was greater than the one-in-five-year, 24-hour duration storm.
4. All wastewater and process related residuals shall be managed and disposed of in a manner that will prevent a violation of the Department's Groundwater Quality Protection Rules (OAR 340-040).

NOTES:

- 1/ All Outfall 001 limitations shall apply prior to discharge to the Crooked River except for total coliform, which shall apply prior to discharge into the storage pond.
- 2/ The CBOD₅ concentration limits are considered equivalent to the minimum design criteria for BOD₅ specified in Oregon Administrative Rules (OAR) 340-41. These limits and CBOD₅ mass limits may be adjusted (up or down) by permit action if more accurate information regarding CBOD₅/BOD₅ becomes available.
- 3/ If two consecutive samples exceed 240 total coliform per 100 ml, then five consecutive re-samples shall be taken at four hour intervals beginning 28 hours after the original samples were taken. If the log mean of the five re-samples is less than or equal to 23 total coliform per 100 ml, a violation shall not be triggered.

SCHEDULE B

1. **Minimum Monitoring and Reporting Requirements** (unless otherwise approved in writing by the Department).

The permittee shall monitor the parameters as specified below at the locations indicated. The laboratory used by the permittee to analyze samples shall have a quality assurance/quality control (QA/QC) program to verify the accuracy of sample analysis. If QA/QC requirements are not met for any analysis, the results shall be included in the report, but not used in calculations required by this permit. When possible, the permittee shall re-sample in a timely manner for parameters failing the QA/QC requirements, analyze the samples, and report the results.

a. **Influent**

The facility influent sampling location is the following:

- * Influent wet well

Item or Parameter	Minimum Frequency	Type of Sample
Total Flow (MGD)	Daily	Measurement
Flow Meter Calibration	Semi-Annual	Verification
CBOD ₅	2/Week	Composite
TSS	2/Week	Composite
pH	3/Week	Grab

b. **Treated Effluent Outfall 001 (River Discharge) 1/**

The facility effluent sampling locations are the following:

- * Effluent composite sampler in motor control building
- * At chlorine contact chamber (chlorine residual, pH)

Item or Parameter	Minimum Frequency	Type of Sample
Total Flow (MGD)	Daily	Measurement
Flow Meter Calibration	Semi-Annual	Verification
CBOD ₅	2/Week	Composite
TSS	2/Week	Composite
pH	3/Week	Grab
Temperature	3/Week	Record
Total Coliform 3/	2/Week	Grab
Quantity Chlorine Used	Daily	Measurement
Chlorine Residual 2/	Daily	Grab
Pounds Discharged (CBOD ₅ and TSS)	2/Week	Calculation
Average Percent Removed (CBOD ₅ and TSS)	Monthly	Calculation
Ammonia (NH ₃ -N)	1/Week	Composite
Nutrients:		
TKN, NO ₂ +NO ₃ -N, Total Phosphorus	1/Week	24-hour Composite

c. Outfall Number 002 and 003 (Golf Course and Land Irrigation Site)

Item or Parameter	Minimum Frequency	Type of Sample
Total Flow (MGD)	Daily	Measurement
Total Chlorine Residual ^{4/}	Daily	Grab
pH	2/Week	Grab
Quantity Irrigated (inches/acre)	Monthly	Calculation
TKN	Monthly	Grab
NO ₂ +NO ₃ -N	Monthly	Grab
Quantity Chlorine Used	Monthly	Calculation
Flow Meter Calibration	Annually	Verification
Total Coliform	1/Week	Grab

d. Crooked River at Outfall Number 001 (November 1-April 30)

Item or Parameter	Minimum Frequency	Type of Sample
pH	1/Week	Grab
Flow	Daily	Measurement

e. Groundwater Monitoring ^{5/}

Item or Parameter	Minimum Frequency	Type of Sample
Water Surface Elevation	Quarterly	Measurement
pH	Quarterly	Grab
NH ₃ -N	Quarterly	Grab
NO ₂ +NO ₃ -N	Quarterly	Grab
Conductivity	Quarterly	Grab

NOTES:

- ^{1/} All parameters in Schedule B, Condition 1.b. shall be measured prior to discharge to the Crooked River, except as noted below for total chlorine residual and total coliform.
- ^{2/} Total chlorine residual shall be measured at two locations: immediately following the chlorine contact chamber and prior to discharge to the Crooked River. For total chlorine residual, only the sample collected immediately prior to discharge to the Crooked River shall be used for determining compliance with the limitations for total chlorine residual in Schedule A, condition 1.b.(3).
- ^{3/} Total coliform shall be measured immediately following the chlorine contact chamber. If two consecutive samples exceed 240 total coliform per 100 ml, then five consecutive re-samples shall be taken at four hour intervals beginning as soon as practicable (preferably within 28 hours) after the original samples were taken.
- ^{4/} Measured immediately following the chlorine contact chamber.
- ^{5/} Groundwater monitoring shall be conducted in accordance with the approved Groundwater Monitoring Plan. Each monitoring well (L2, L3, and L4) shall be monitored. Grab samples from groundwater monitoring wells shall be collected after the well has been purged according to accepted practices for groundwater well monitoring.

2. Reporting Requirements

a. Monitoring Reports

- (1) Monitoring results shall be reported on Department approved forms. Except for groundwater monitoring, the reporting period is the calendar month. Groundwater monitoring shall be reported in accordance with this permit and the approved groundwater monitoring plan. Reports must be submitted to the Department's Eastern Region, Bend office by the 15th day of the following month.
- (2) State monitoring reports shall identify the name, certificate classification and grade level of each principal operator designated by the permittee as responsible for supervising the wastewater collection and treatment systems during the reporting period. Monitoring reports shall also identify each system classification as found on page one of this permit.
- (3) Monitoring reports shall also include a record of the quantity and method of use of all sludge removed from the treatment facility and a record of all applicable equipment breakdowns and bypassing.

b. By no later than January 1 of each year, the permittee shall submit to the Department an annual report describing the effectiveness of the reclaimed water system for both the golf course and the expanded facility to comply with the approved reclaimed water use plan, the rules of OAR 340-55, and the limitations and conditions of this permit applicable to reuse of reclaimed water.

c. By no later than April 1 of each year, the permittee shall submit to the Department an annual report which details sewer collection activities that reduce inflow or infiltration. The report shall state those activities that have been done in the previous year and those activities planned for the following year.

SCHEDULE C

Compliance Schedules and Conditions

1. By no later than one year after permit issuance, the permittee shall provide documentation to the Department showing that the City's wastewater certified operator has upgraded from a Collection System Class II to a Collection System Class III certification.
2. By no later than ninety (90) days after permit issuance, the permittee shall submit to the Department for approval a Reclaimed Water Use Plan for the expanded facility. The management plan shall be in accordance with Oregon Administrative Rules, Chapter 340, Division 55, "Regulations Pertaining to the Use of Reclaimed Water (Treated Effluent) from Sewage Treatment Plants". Upon approval of the plan by the Department, the plan shall be implemented by the permittee. No substantial changes shall be made in the approved plan without written approval of the Department.
3. With the next permit renewal application, the permittee shall submit an evaluation of the impact of ammonia on the Crooked River. The evaluation shall include the acute and chronic toxic effects of ammonia on aquatic organisms at the Zone of Immediate Dilution (ZID) and at the edge of the Mixing Zone.
4. Six (6) months prior to the removal of accumulated solids from the lagoon, the permittee shall submit to the Department a revised biosolids management plan developed in accordance with Oregon Administrative Rule 340, Division 50, "Land Application of Domestic Wastewater Treatment Facility Biosolids, Biosolids Derived Products, and Domestic Septage". Upon approval of the plan by the Department, the plan shall be implemented by the permittee.
5. Industrial Waste Survey/Pretreatment Program
 - a. As soon as practicable, but by no later than six (6) months from permit issuance date, the permittee shall submit to the Department an industrial waste survey as described in 40 CFR 403.8(f)(2)(i-iii) suitable to make a determination as to the need for development of a pretreatment program.
 - c. Should the Department determine that a pretreatment program is required, the Department may reopen and modify the permit in accordance with 40 CFR 403.8(e)(1) to incorporate a compliance schedule to require development of a pretreatment program. The compliance schedule requiring program development shall be developed in accordance with the provisions of 40 CFR 403.12(k), and shall not exceed twelve (12) months.
6. The permittee is expected to meet the compliance dates which have been established in this schedule. Either prior to or no later than 14 days following any lapsed compliance date, the permittee shall submit to the Department a notice of compliance or noncompliance with the established schedule. The Director or his authorized representative may revise a schedule of compliance if he determines good and valid cause resulting from events over which the permittee has little or no control.

SCHEDULE D

Special Conditions

1. Prior to increasing thermal load from the facility (design flow or temperature), the Permittee shall notify the Department in writing and obtain necessary approval.
2. **Whole Effluent Toxicity Testing**
 - a. The permittee shall conduct a whole effluent toxicity test prior to application for renewal of this permit.
 - b. Bioassay tests may be dual end-point tests, only for the fish tests, in which both acute and chronic end-points can be determined from the results of a single chronic test (the acute end-point shall be based upon a 48-hour time period).
 - c. Acute Toxicity Testing - Organisms and Protocols
 - (1) The permittee shall conduct 48-hour static renewal tests with the *Ceriodaphnia dubia* (water flea) and the *Pimephales promelas* (fathead minnow).
 - (2) The presence of acute toxicity will be determined as specified in **Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms**, Fourth Edition, EPA/600/4-90/027F, August 1993.
 - (3) An acute bioassay test shall be considered to show toxicity if there is a statistically significant difference in survival between the control and 100 percent effluent, unless the permit specifically provides for a Zone of Immediate Dilution (ZID) for biotoxicity. If the permit specifies such a ZID, acute toxicity shall be indicated when a statistically significant difference in survival occurs at dilutions greater than that which is found to occur at the edge of the ZID.
 - d. Chronic Toxicity Testing - Organisms and Protocols
 - (1) The permittee shall conduct tests with: *Ceriodaphnia dubia* (water flea) for reproduction and survival test endpoint, *Pimephales promelas* (fathead minnow) for growth and survival test endpoint, and *Raphidocelis subcapitata* (green alga formerly known as *Selenastrum capricornutum*) for growth test endpoint.
 - (2) The presence of chronic toxicity shall be estimated as specified in **Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms**, Third Edition, EPA/600/4-91/002, July 1994.
 - (3) A chronic bioassay test shall be considered to show toxicity if a statistically significant difference in survival, growth, or reproduction occurs at dilutions greater than that which is known to occur at the edge of the mixing zone. If there is no dilution data for the edge of the mixing zone, any chronic bioassay test that shows a statistically significant effect in 100 percent effluent as compared to the control shall be considered to show toxicity.

e. Quality Assurance

- (1) Quality assurance criteria, statistical analyses and data reporting for the bioassays shall be in accordance with the EPA documents stated in this condition and the Department's **Whole Effluent Toxicity Testing Guidance Document**, January 1993.

f. Evaluation of Causes and Exceedances

- (1) If toxicity is shown, as defined in sections c.(3) or d.(3) of this permit condition, another toxicity test using the same species and Department approved methodology shall be conducted within two weeks, unless otherwise approved by the Department. If the second test also indicates toxicity, the permittee shall follow the procedure described in section f.(2) of this permit condition.
- (2) If two consecutive bioassay test results indicate acute and/or chronic toxicity, as defined in sections c.(3) or d.(3) of this permit condition, the permittee shall evaluate the source of the toxicity and submit a plan and time schedule for demonstrating compliance with water quality standards. Upon approval by the Department, the permittee shall implement the plan until compliance has been achieved. Evaluations shall be completed and plans submitted to the Department within 6 months unless otherwise approved in writing by the Department.

g. Reporting

- (1) Along with the test results, the permittee shall include: 1. the dates of sample collection and initiation of each toxicity test; 2. the type of production; and 3. the flow rate at the time of sample collection. Effluent at the time of sampling for bioassay testing should include samples of required parameters stated under Schedule B, condition 1. of this permit.
- (2) The permittee shall make available to the Department, on request, the written standard operating procedures they, or the laboratory performing the bioassays, are using for all toxicity tests required by the Department.

h. Reopener

- (1) If bioassay testing indicates acute and/or chronic toxicity, the Department may reopen and modify this permit to include new limitations and/or conditions as determined by the Department to be appropriate, and in accordance with procedures outlined in Oregon Administrative Rules, Chapter 340, Division 45.

3. The permittee shall meet the requirements for use of reclaimed water under Division 55, including the following:

- a. All reclaimed water shall be managed in accordance with the approved Reclaimed Water Use Plan. No substantial changes shall be made in the plan without written approval of the Department. No reclaimed water shall be irrigated until such time that measurements show groundwater at or below 2 feet from the ground surface in those areas that are being irrigated.
- b. No reclaimed water shall be released by the permittee to another person, as defined in Oregon Revised Statute (ORS) 468.005, for use unless there is a valid contract between the permittee and that person that meets the requirements of Oregon Administrative Rule (OAR) 340-55-015(9).

- c. The permittee shall notify the Department within 24 hours if it is determined that the treated effluent is being used in a manner not in compliance with OAR 340-55. When the Department offices are not open, the permittee shall report the incident of non-compliance to the Oregon Emergency Response System (Telephone Number 1-800-452-0311).
 - d. No reclaimed water shall be made available to a person proposing to recycle unless the person certifies in writing that they have read and understand the provisions in these rules. This written certification shall be kept on file by the sewage treatment system owner and be made available to the Department for inspection.
4. The permittee shall comply with Oregon Administrative Rules (OAR), Chapter 340, Division 49, "Regulations Pertaining To Certification of Wastewater System Operator Personnel" and accordingly:
- a. The permittee shall have its wastewater system supervised by one or more operators who are certified in a classification and grade level (equal to or greater) that corresponds with the classification (collection and/or treatment) of the system to be supervised as specified on page one of this permit.

Note: A "supervisor" is defined as the person exercising authority for establishing and executing the specific practice and procedures of operating the system in accordance with the policies of the permittee and requirements of the waste discharge permit. "Supervise" means responsible for the technical operation of a system, which may affect its performance or the quality of the effluent produced. Supervisors are not required to be on-site at all times.

- b. The permittee's wastewater system may not be without supervision (as required by Special Condition 6.a. above) for more than thirty (30) days. During this period, and at any time that the supervisor is not available to respond on-site (i.e. vacation, sick leave or off-call), the permittee must make available another person who is certified at no less than one grade lower than the system classification.
 - c. If the wastewater system has more than one daily shift, the permittee shall have the shift supervisor, if any, certified at no less than one grade lower than the system classification.
 - d. The permittee is responsible for ensuring the wastewater system has a properly certified supervisor available at all times to respond on-site at the request of the permittee and to any other operator.
 - e. The permittee shall notify the Department of Environmental Quality in writing within thirty (30) days of replacement or redesignation of certified operators responsible for supervising wastewater system operation. The notice shall be filed with the Water Quality Division, Operator Certification Program, 811 SW 6th Ave, Portland, OR 97204. This requirement is in addition to the reporting requirements contained under Schedule B of this permit.
 - f. Upon written request, the Department may grant the permittee reasonable time, not to exceed 120 days, to obtain the services of a qualified person to supervise the wastewater system. The written request must include justification for the time needed, a schedule for recruiting and hiring, the date the system supervisor availability ceased and the name of the alternate system supervisor(s) as required by 6.b. above.
5. An adequate contingency plan for prevention and handling of spills and unplanned discharges shall be in force at all times. A continuing program of employee orientation and education shall be maintained to ensure awareness of the necessity of good inplant control and quick and proper action in the event of a spill or accident.

6. The permittee shall notify the DEQ Eastern Region – Bend Office (541) 388-6146 in accordance with the response times noted in the General Conditions of this permit, of any malfunction so that corrective action can be coordinated between the permittee and the Department.
7. Upon Department approval of a biosolids management plan, all biosolids shall be managed in accordance with the plan and the site authorization letters issued by the Department. The biosolids management plan shall be kept current and remain on file with the permit or license. No substantial changes shall be made in solids management activities which significantly differ from operations specified under the approved plan without the prior written approval of the Department.

This permit may be modified to incorporate any applicable standard for biosolids use or disposal promulgated under section 405(d) of the Clean Water Act, if the standard for biosolids use or disposal is more stringent than any requirement for biosolids use or disposal in the permit, or controls a pollutant or practice not limited in this permit.

8. Management and Maintenance of Groundwater Monitoring Wells
 - a. The permittee shall protect and maintain each groundwater monitoring well so that samples collected are representative of actual conditions.
 - b. All monitoring well abandonments, replacements, repairs, and installations must be conducted in accordance with the Water Resources Department Oregon Administrative Rules, Chapter 690, Division 240, and with the Department's guidance "Groundwater Monitoring Well Drilling, Construction, and Decommissioning", dated August 22, 1992. All monitoring well abandonments, replacements, repairs, and installations must be documented in a report prepared by an Oregon registered geologist.
 - c. If a monitoring well becomes damaged or inoperable, the permittee shall notify the Department in writing within 14 days of when the permittee becomes aware of the circumstances. The written report shall describe: what problem has occurred, the remedial measures that have been or will be taken to correct the problem, and the measures taken to prevent the recurrence of damage or inoperation. The Department may require the replacement of inoperable monitoring wells.
 - d. Prior to installation of new or replacement monitoring wells, the placement or design must be approved in writing by the Department. Well logs and a well completion report shall be submitted to the Department within 30 days of installation of the well. The report shall include a survey drawing showing the location of all monitoring wells, disposal sites, and water bodies.
 - e. Prior to abandonment of existing wells deemed unsuitable for groundwater monitoring, an abandonment plan must be submitted to the Department for review and approval.
9. The permittee shall have in place a program to identify and reduce inflow and infiltration (I&I) into the wastewater collection system. An annual I&I report shall be submitted to the Department as required in Schedule B, condition 2.c.

**NPDES GENERAL CONDITIONS
(SCHEDULE F)**

SECTION A. STANDARD CONDITIONS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of Oregon Revised Statutes (ORS) 468B.025 and is grounds for enforcement action; for permit termination, suspension, or modification; or for denial of a permit renewal application.

2. Penalties for Water Pollution and Permit Condition Violations

Oregon Law (ORS 468.140) allows the Director to impose civil penalties up to \$ 10,000 per day for violation of a term, condition, or requirement of a permit.

In addition, a person who unlawfully pollutes water as specified in ORS 468.943 or ORS 468.946 is subject to criminal prosecution.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. In addition, upon request of the Department, the permittee shall correct any adverse impact on the environment or human health resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and have the permit renewed. The application shall be submitted at least 180 days before the expiration date of this permit.

The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

5. Permit Actions

This permit may be modified, suspended, revoked and reissued, or terminated for cause including, but not limited to, the following:

- a. Violation of any term, condition, or requirement of this permit, a rule, or a statute;
- b. Obtaining this permit by misrepresentation or failure to disclose fully all material facts; or
- c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

The filing of a request by the permittee for a permit modification or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

6. Toxic Pollutants

The permittee shall comply with any applicable effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

7. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege.

8. Permit References

Except for effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants and standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act, all rules and statutes referred to in this permit are those in effect on the date this permit is issued.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls, and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Duty to Halt or Reduce Activity

For industrial or commercial facilities, upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced or lost. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Bypass of Treatment Facilities

a. Definitions

- (1) "Bypass" means intentional diversion of waste streams from any portion of the treatment facility. The term "bypass" does not include nonuse of singular or multiple units or processes of a treatment works when the nonuse is insignificant to the quality and/or quantity of the effluent produced by the treatment works. The term "bypass" does not

apply if the diversion does not cause effluent limitations to be exceeded, provided the diversion is to allow essential maintenance to assure efficient operation.

- (2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities or treatment processes which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Prohibition of bypass.

- (1) Bypass is prohibited unless:

- (a) Bypass was necessary to prevent loss of life, personal injury, or severe property damage;
- (b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and
- (c) The permittee submitted notices and requests as required under General Condition B.3.c.

- (2) The Director may approve an anticipated bypass, after considering its adverse effects and any alternatives to bypassing, when the Director determines that it will meet the three conditions listed above in General Condition B.3.b.(1).

c. Notice and request for bypass.

- (1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior written notice, if possible at least ten days before the date of the bypass.
- (2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in General Condition D.5.

4. Upset

- a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operation error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.
- b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of General Condition B.4.c are met. No determination made during administrative review of claims

that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

- c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
- (1) An upset occurred and that the permittee can identify the causes(s) of the upset;
 - (2) The permitted facility was at the time being properly operated;
 - (3) The permittee submitted notice of the upset as required in General Condition D.5, hereof (24-hour notice); and
 - (4) The permittee complied with any remedial measures required under General Condition A.3 hereof.
- d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

5. Treatment of Single Operational Event

For purposes of this permit, A Single Operational Event which leads to simultaneous violations of more than one pollutant parameter shall be treated as a single violation. A single operational event is an exceptional incident which causes simultaneous, unintentional, unknowing (not the result of a knowing act or omission), temporary noncompliance with more than one Clean Water Act effluent discharge pollutant parameter. A single operational event does not include Clean Water Act violations involving discharge without a NPDES permit or noncompliance to the extent caused by improperly designed or inadequate treatment facilities. Each day of a single operational event is a violation.

6. Overflows from Wastewater Conveyance Systems and Associated Pump Stations

- a. Definitions
- (1) "Overflow" means the diversion and discharge of waste streams from any portion of the wastewater conveyance system including pump stations, through a designed overflow device or structure, other than discharges to the wastewater treatment facility.
 - (2) "Severe property damage" means substantial physical damage to property, damage to the conveyance system or pump station which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of an overflow.
 - (3) "Uncontrolled overflow" means the diversion of waste streams other than through a designed overflow device or structure, for example to overflowing manholes or overflowing into residences, commercial establishments, or industries that may be connected to a conveyance system.
- b. Prohibition of overflows. Overflows are prohibited unless:

- (1) Overflows were unavoidable to prevent an uncontrolled overflow, loss of life, personal injury, or severe property damage;
- (2) There were no feasible alternatives to the overflows, such as the use of auxiliary pumping or conveyance systems, or maximization of conveyance system storage; and
- (3) The overflows are the result of an upset as defined in General Condition B.4. and meeting all requirements of this condition.

- c. Uncontrolled overflows are prohibited where wastewater is likely to escape or be carried into the waters of the State by any means.
- d. Reporting required. Unless otherwise specified in writing by the Department, all overflows and uncontrolled overflows must be reported orally to the Department within 24 hours from the time the permittee becomes aware of the overflow. Reporting procedures are described in more detail in General Condition D.5.

7. Public Notification of Effluent Violation or Overflow

If effluent limitations specified in this permit are exceeded or an overflow occurs, upon request by the Department, the permittee shall take such steps as are necessary to alert the public about the extent and nature of the discharge. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

8. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in such a manner as to prevent any pollutant from such materials from entering public waters, causing nuisance conditions, or creating a public health hazard.

SECTION C. MONITORING AND RECORDS

1. Representative Sampling

Sampling and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and shall be taken, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Director.

2. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than ± 10 percent from true discharge rates throughout the range of expected discharge volumes.

3. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

4. Penalties of Tampering

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than two years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person, punishment is a fine not more than \$20,000 per day of violation, or by imprisonment of not more than four years or both.

5. Reporting of Monitoring Results

Monitoring results shall be summarized each month on a Discharge Monitoring Report form approved by the Department. The reports shall be submitted monthly and are to be mailed, delivered or otherwise transmitted by the 15th day of the following month unless specifically approved otherwise in Schedule B of this permit.

6. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report. Such increased frequency shall also be indicated. For a pollutant parameter that may be sampled more than once per day (e.g., Total Chlorine Residual), only the average daily value shall be recorded unless otherwise specified in this permit.

7. Averaging of Measurements

Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean, except for bacteria which shall be averaged as specified in this permit.

8. Retention of Records

Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records of all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

9. Records Contents

Records of monitoring information shall include:

- a. The date, exact place, time and methods of sampling or measurements;

- b. The individual(s) who performed the sampling or measurements;
- c. The date(s) analyses were performed;
- d. The individual(s) who performed the analyses;
- e. The analytical techniques or methods used; and
- f. The results of such analyses.

10. Inspection and Entry

The permittee shall allow the Director, or an authorized representative upon the presentation of credentials to:

- a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and
- d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by state law, any substances or parameters at any location.

SECTION D. REPORTING REQUIREMENTS

1. Planned Changes

The permittee shall comply with Oregon Administrative Rules (OAR) 340, Division 52, "Review of Plans and Specifications". Except where exempted under OAR 340-52, no construction, installation, or modification involving disposal systems, treatment works, sewerage systems, or common sewers shall be commenced until the plans and specifications are submitted to and approved by the Department. The permittee shall give notice to the Department as soon as possible of any planned physical alternations or additions to the permitted facility.

2. Anticipated Noncompliance

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. Transfers

This permit may be transferred to a new permittee provided the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of the permit and the rules of the Commission. No permit shall be transferred to a third party without prior

written approval from the Director. The permittee shall notify the Department when a transfer of property interest takes place.

4. Compliance Schedule

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. Any reports of noncompliance shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements.

5. Twenty-Four Hour Reporting

The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally (by telephone) within 24 hours, unless otherwise specified in this permit, from the time the permittee becomes aware of the circumstances. During normal business hours, the Department's Regional office shall be called. Outside of normal business hours, the Department shall be contacted at 1-800-452-0311 (Oregon Emergency Response System).

A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. If the permittee is establishing an affirmative defense of upset or bypass to any offense under ORS 468.922 to 468.946, and in which case if the original reporting notice was oral, delivered written notice must be made to the Department or other agency with regulatory jurisdiction within 4 (four) calendar days. The written submission shall contain:

- a. A description of the noncompliance and its cause;
- b. The period of noncompliance, including exact dates and times;
- c. The estimated time noncompliance is expected to continue if it has not been corrected;
- d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and
- e. Public notification steps taken, pursuant to General Condition B.7.

The following shall be included as information which must be reported within 24 hours under this paragraph:

- a. Any unanticipated bypass which exceeds any effluent limitation in this permit.
- b. Any upset which exceeds any effluent limitation in this permit.
- c. Violation of maximum daily discharge limitation for any of the pollutants listed by the Director in this permit.

The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

6. Other Noncompliance

The permittee shall report all instances of noncompliance not reported under General Condition D.4 or D.5, at the time monitoring reports are submitted. The reports shall contain:

- a. A description of the noncompliance and its cause;
- b. The period of noncompliance, including exact dates and times;
- c. The estimated time noncompliance is expected to continue if it has not been corrected; and
- d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

7. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

Other Information: When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Department, it shall promptly submit such facts or information.

8. Signatory Requirements

All applications, reports or information submitted to the Department shall be signed and certified in accordance with 40 CFR 122.22.

9. Falsification of Information

A person who supplies the Department with false information, or omits material or required information, as specified in ORS 468.953 is subject to criminal prosecution.

10. Changes to Indirect Dischargers - [Applicable to Publicly Owned Treatment Works (POTW) only]

The permittee must provide adequate notice to the Department of the following:

- a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the Clean Water Act if it were directly discharging those pollutants and;
- b. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
- c. For the purposes of this paragraph, adequate notice shall include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

11. Changes to Discharges of Toxic Pollutant - [Applicable to existing manufacturing, commercial, mining, and silvicultural dischargers only]

The permittee must notify the Department as soon as they know or have reason to believe of the following:

- a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - (1) One hundred micrograms per liter (100 µg/L);
 - (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - (3) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or
 - (4) The level established by the Department in accordance with 40 CFR 122.44(f).
- b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - (1) Five hundred micrograms per liter (500 µg/L);
 - (2) One milligram per liter (1 mg/L) for antimony;
 - (3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or
 - (4) The level established by the Department in accordance with 40 CFR 122.44(f).

SECTION E. DEFINITIONS

1. BOD means five-day biochemical oxygen demand.
2. TSS means total suspended solids.
3. mg/L means milligrams per liter.
4. kg means kilograms.
5. m³/d means cubic meters per day.
6. MGD means million gallons per day.
7. Composite sample means a sample formed by collecting and mixing discrete samples taken periodically and based on time or flow.
8. FC means fecal coliform bacteria.
9. Technology based permit effluent limitations means technology-based treatment requirements as defined in 40 CFR 125.3, and concentration and mass load effluent limitations that are based on minimum design criteria specified in OAR 340-41.
10. CBOD means five day carbonaceous biochemical oxygen demand.

11. Grab sample means an individual discrete sample collected over a period of time not to exceed 15 minutes.
12. Quarter means January through March, April through June, July through September, or October through December.
13. Month means calendar month.
14. Week means a calendar week of Sunday through Saturday.
15. Total residual chlorine means combined chlorine forms plus free residual chlorine.
16. The term "bacteria" includes but is not limited to fecal coliform bacteria, total coliform bacteria, and E. coli bacteria.
17. POTW means a publicly owned treatment works.

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT EVALUATION**

Department of Environmental Quality
Eastern Region – Bend Office
2146 NE 4th, Bend, OR 97701
Telephone: (541) 388-6146

Issued pursuant to ORS 468B.050 and The Federal Clean Water Act

ISSUED TO:

City of Prineville
400 East 3rd Street
Prineville, OR 97754

SOURCES COVERED BY THIS PERMIT:

<u>Type of Waste</u>	<u>Outfall Number</u>	<u>Outfall Location</u>
Treated Wastewater	001	R.M. 46.8
Reclaimed Water Reuse	002	Golf Course
Reclaimed Water Reuse	003	Land Irrigation
Emergency Overflow	004	Secondary Lagoon

FACILITY TYPE AND LOCATION:

Stabilization Lagoons with Aeration
City of Prineville
1 mile N.W. of Prineville
Facultative Lagoon System
City of Prineville
Located next to existing system
Treatment System Class: Level II
Collection System Class: Level III

RECEIVING STREAM INFORMATION:

Basin: Deschutes
Sub-Basin: Lower Crooked

Receiving Stream: Crooked River
Hydro Code: 25--CROO46.8D
LLID: 1212676445778
County: Crook

EPA REFERENCE NO: OR-002361-2

Issued in response to Application No. 987253 received October 1, 2001.

This permit is issued based on the land use findings in the permit record.

BACKGROUND

The City of Prineville, in Crook County, owns and operates a secondary wastewater treatment facility which serves approximately 7,750 people located within and just beyond the City limits. Prineville's treatment facility became operational in about 1960. Modifications were made to the facility in 1969, 1982, and 1993. A major facility upgrade was completed in 1993, increasing the design capacity from 0.83 MGD to 1.1 MGD. The upgrade consisted of the following elements: 1) addition of aeration to half of the existing primary cell; 2) construction of two 1.2 acre rock filters to polish secondary cell effluent (secondary cell reduced from 13 to 10 acres to create space for the rock filters); 3) addition of a rock filter backwash pump station; 4) addition of another chlorine contact basin and replacement of the chlorine gas equipment; 5) addition of an intermediate lift station (1.5 MGD capacity) to convey chlorinated effluent to a storage basin; 6) construction of an approximately 10.5-acre (78 acre-foot volume) storage/dechlorination basin; 7) relocating the Crooked River outfall upstream to river mile 46.8; 8) addition of an irrigation pump station; 9) land application of effluent to a municipal golf course during the summer; and, 10) discharge of treated and dechlorinated wastewater to the Crooked River during the winter months.

On September 24, 2001, the Department received a renewal application, number 987253, from Prineville for a National Pollutant Discharge Elimination System (NPDES) waste discharge permit pursuant to provisions of Oregon Revised Statutes (ORS) 468B.050 and the Federal Clean Water Act. This permit evaluation report describes proposed effluent limitations, monitoring and reporting, compliance schedules, and special conditions necessary to carry out state and federal law.

Prineville has been experiencing accelerated growth over the past 10 years and the sewage treatment plant is nearing plant design capacity. The population for the City in 2020 is projected at 14,750 people. The City is planning to expand the treatment facility to accommodate the increase in population. A Wastewater Facility Plan was submitted to

the Department for approval on January 18, 2001 by ACE Consultants, Inc. and describes several alternatives for the expansion. The selected alternative is described below in the Expanded Facility section.

FACILITY DESCRIPTION

The existing facility currently consists of a 37-acre primary lagoon and a 13-acre secondary lagoon, 10.5-acre storage pond, rock filter system, chlorine disinfection, dechlorination, summertime effluent reuse, and wintertime river discharge. The facility's approved design average dry weather flow (DADWF) is 1.1 million gallons per day (MGD). The winter discharge is to Crooked River at river mile 46.8. Summer effluent is beneficially reused for irrigation on the 123-acre Meadow Lakes Golf Course.

The wastewater collection system is a combination of different pipe materials (concrete, asbestos cement, and PVC) with varying dates of installation. The collection system is primarily a gravity system, however, there are five pump stations on the system. The collection system is comprised of a total of 204,597 feet of gravity sewers and five wastewater-pumping stations with 3,632 feet of pumped forcemain. The collection system contains a total of 39.4 miles of pipelines ranging in size from 3-inches to 21-inches in diameter and approximately 775 manholes. Wastewater from the collection system passes over a grit chamber and through a comminutor prior to being lifted into the primary treatment cell. The pump station preceding the primary cell was constructed in the mid-1970's, and has a capacity of about 1.94 million gallons per day (MGD). Modeling efforts have identified several bottlenecks in the collection system where surcharging occurs. The City plans on upgrading these problem areas and expanding the collection system to support the projected growth.

EXPANDED FACILITY DESCRIPTION

The City of Prineville's STP is nearing capacity. This capacity problem coupled with the rapidly increasing population has made an expansion to the plant imperative. The City is proposing to construct a 1.13 MGD partially aerated lagoon treatment facility on land northwest of and adjacent to the existing facility. The City is planning on purchasing this property. The construction will take place in two phases each totaling 0.565 MGD. Phase I construction will begin in 2002 and Phase II is scheduled to begin in the year 2010.

Two parallel treatment trains consisting of three treatment lagoons operated in series, and one storage pond will be constructed during each Phase. The primary treatment cells will be 2.45 acres each, 10 feet deep with twelve, 10-HP aerators. The other treatment cells will be 1.42 acres each, and 5 feet deep.

Two storage lagoons will be constructed (one in Phase I and the other in Phase II) with a capacity to hold 218 million gallons total or 29.45 acres each. Treated effluent will be irrigated at agronomic rates on approximately 390 acres of existing farmland located north of the facility during the growing season. No effluent will be discharged to the Crooked River from the expanded portion of the facility. Effluent will be disinfected prior to irrigation.

As mentioned, modeling efforts have identified several bottlenecks in the collection system where surcharging occurs. Also, several new subdivisions are proposed for development in the City which would require upgrades to expand the collection system. The City is committed to improving areas of concern and upgrading the collection system to serve development as it occurs.

PRETREATMENT

Although the service population is primarily residential and commercial, several new industries have started up in Prineville since the last permit was issued. The current waste streams and processes of these industries are unknown and so in order to determine if a Pretreatment program will be required in the future a condition has been included in Schedule C of the proposed permit which requires an industrial waste survey. Once the survey is complete the Department will determine if the City will be required to develop a Pretreatment Program.

INFILTRATION AND INFLOW

The City has worked diligently over the years on reducing their I/I and continues to be a long-term commitment for Prineville. The amount of I/I currently is considered insignificant and with the new sewer construction I/I is expected to become an even smaller percentage of the total flow.

BIOSOLIDS MANAGAEMENT

No biosolids have been removed from the lagoons to date. Stabilization of the facility's sludge occurs within the lagoons. During backwashing of the facility's rock filters, biosolids, especially algae, are removed from the rock filters and sent back to the primary cell. No sludge is removed from the lagoon site on a regular basis. Lagoon systems, however, generally require sludge removal as the sludge accumulates.

MUTUAL AGREEMENT AND ORDER (MAO)

In conjunction with the last permit renewal on November 25, 1996, the Department also issued a MAO to the City. At that time, the City was unable to consistently meet effluent BOD₅ and TSS limits, despite optimizing system performance. The Department and the City believed that the excessive BOD₅ and TSS, in part, was due to the growth of algae in the effluent storage pond. The MAO required the City to submit a report, approvable by the Department, that included an evaluation of the City's existing treatment system to determine if there were operational changes that could be employed which would enable the City to consistently comply with effluent limitations. The MAO also provided for less stringent interim effluent limitations.

To comply with the conditions of the MAO, the City submitted a Pre-Design Technical Memorandum which proposed the following modifications to the facility: the addition of a disinfection system using chlorine gas with an emergency chlorine gas scrubber system; addition of a sulfur dioxide feed system with an emergency gas scrubber system; addition of an effluent storage pond by-pass pipeline to allow treated, disinfected, and dechlorinated effluent to be discharged directly to the river, by-passing the storage pond. On January 13, 1997, the Department approved the City's proposal and the City proceeded to complete all upgrade activities. With this upgrade all conditions of the MAO were met and the City was found in compliance with their NPDES permit. The MAO is considered expired.

ODORS

The City of Prineville has experienced odor problems off and on for several years. Many local residents have complained about the nuisance odors from the lagoons and also from the irrigation on the golf course. The City received a Notice of Noncompliance (NON) on July 22, 1997 for nuisance odors and was required to investigate and eliminate the odors. Spring turn over of the lagoons and the formation of sulfides in the storage lagoon and in the irrigation pipeline appear to be the main cause of the odors. Specifically, it appears that significant decomposition of residual organic matter, mostly algal cells, occurring while the effluent sits in the pipeline between irrigation cycles was causing most of the odor complaints. Another source of odors which were affecting residents along Park Drive was due to the infrequent pumping of the Oregon Youth Authority (OYA) lift station.

On December 6, 1999 the City submitted an Odor Nuisance Study and on March 20, 2000, the Department approved the proposal. To remedy the odor problems the City proposed a combination of remedies including: adding Bioxide at a point upstream of the rock filters and operating the rock filters continuously throughout the irrigation season, super-chlorination of the effluent in the pipeline, and increasing the amount of Bioxide at the storage lagoon before pumping to the golf course. Bioxide is a calcium nitrate derivative which acts as a source of food for the microorganism in the effluent. This constant source of nitrates prevents the consumption of sulfates and the formation of sulfide gas which causes odors. The City has also been using the existing rock filter to help reduce the total suspended solids in the effluent. To eliminate the odors from the OYA lift station the City used a combination of compressed air and Bioxide. The Department did not receive any odor complaints during the summer of 2001.

COMPLIANCE HISTORY

Following is a summary of activity for the existing permit:

<u>Effective Date</u>	<u>Action</u>
July 22, 1997	Notice of Noncompliance (NON) issued for nuisance odors at the Meadow Lakes Golf Course
September 18, 1998	NON for total coliform exceedences, failure to monitor or report total chlorine residual, and failure to properly operate and maintain all facilities of treatment and control.
February 23, 1998	Permit Action; Department approval for changing effluent limitation from BOD ₅ to CBOD ₅
September 20, 1999	Letter from the Department requesting an engineering evaluation for elimination of the nuisance odors.
December 6, 1999	Odor Nuisance Study submitted by the City proposing to use Bioxide in conjunction with compressed air as a solution to the odor problems.
December 22, 1999	Letter from the Department with comments on Odor Nuisance Study.
February 28, 2000	Letter from the City requesting approval to proceed with alternative solution to odor problem.
March 20, 2000	Letter from the Department approving alternative solution.
September 6, 2001	NON for TSS limit exceedences and TSS removal efficiency violations. The City has been experiencing increasing TSS due to excessive algal growth in the storage lagoon. The expanded facility is expected to help by diverting influent from the existing facility.

WATER QUALITY

The Department is responsible for protecting water quality in the state of Oregon. To fulfill this responsibility, the Department sets instream water quality standards for each river basin. The standards are set with the goal of providing full protection to beneficial uses. The City's wastewater treatment facility discharges to the Crooked River at river mile 46.8. OAR 340-41-562, Table 9 lists the beneficial uses for which Crooked River water quality will be protected. Included in Table 9 are: public domestic water supply; private domestic water supply; industrial water supply; irrigation; livestock watering; anadromous fish passage; salmonid fish rearing; salmonid fish spawning; resident fish & aquatic life; wildlife & hunting; fishing; boating; water contact recreation; aesthetic quality; and hydro power. The applicable water quality standards for the Crooked River which protect these uses are found in OAR 340-41-565.

The Department's 1994-1996 303d list indicates that the Crooked River between its mouth and Baldwin Dam (located at RM 57) is water quality limited for:

1. Fecal coliform annually;
2. Flow modification;
3. pH annually; and
4. Temperature during the summer.

It does not appear that the Prineville sewage treatment facility is contributing much to the impairment of Crooked River and its listing on the 303d list since the discharge occurs only during the winter months, and also, since the monitoring station is located upstream of the treatment facility.

In addition, the Crooked River flows into Lake Billy Chinook, which is also on the Department's 303d list of impaired waterbodies. Lake Billy Chinook is a reservoir located at the mouth of the Crooked River and is water quality limited for chlorophyll *a* and pH in the summer. These two problems are assumed to be caused by excessive phosphorus concentrations that foster the growth of algae. The photosynthetic processes utilized by algae create high pH levels during daylight hours. The City could be a contributor to this problem. The Department is scheduled to develop a Total Maximum Daily Load (TMDL) for Lake Billy Chinook and the Upper Deschutes over the next year. Once the TMDL is complete the existing discharge may be required to be reduced or even eliminated.

In addition to the responsibility of protecting water quality of surface waters of the state, the Department also is responsible for protecting groundwater quality. The use of reclaimed water is not authorized unless all the requirements of OAR 340-40, Groundwater Quality Protection, are satisfied. Division 40 is considered satisfied by the Department if the City demonstrates that reclaimed water will not be used in a manner or applied at rates that cause contaminants to be leached into the groundwater in quantities that will adversely affect groundwater quality. The Department has approved a reclaimed water use plan submitted by the City that indicates that reclaimed water will be applied to the golf course at agronomic rates and follow sound irrigation practices. Similarly, the City will also be required to submit a reclaimed water use plan for the proposed expanded irrigation site, consisting of farmland located just northwest of the existing facility (see Expanded Facility Description), to ensure that groundwater is being protected. The Department requires that the City submit an annual report which demonstrates compliance with their permit, their approved reclaimed water use plan, and OAR 340-55, Regulations Pertaining to the Use of Reclaimed Water (Treated Effluent) from Sewage Treatment Plants.

MONITORING WELLS

The City currently monitors seven groundwater monitoring wells according to Schedule B of the existing permit. Three wells are located at the wastewater treatment facility and four wells are located at the golf course. Samples collected from groundwater monitoring wells located at the golf course effluent reuse area show no adverse effect to groundwater. Similarly, monitoring wells located adjacent to the wastewater lagoons show no adverse effects resulting from lagoon leakage. Results for nitrates in wells located around the lagoons from 1996 to present range from non-detect to 5.24 mg/l. All samples taken from drain tile at the golf course were either non-detect or no water was present to sample. Based on these results (attached) the requirement for sampling at the golf course has been removed from Schedule B of the proposed permit. Quarterly sampling from monitoring wells at the treatment facility will remain the same.

Two of the monitoring wells at the treatment facility may need to be relocated due to the proposed location of the expanded facilities lagoons. Upon relocation of the wells, quarterly monitoring as required in Schedule B will resume.

TEMPERATURE

Each basin in the State has adopted water quality standards. The purpose of the temperature standard, like all water quality standards, is to protect the beneficial uses of waters of the state and to preserve the health of our aquatic ecosystems. In achieving these purposes, the water quality standards also serve the goal of the federal Clean Water Act: to maintain and restore the chemical, physical and biological integrity of the nation's waters. The beneficial uses most sensitive to water temperature are fish and aquatic life and, therefore, the temperature standard is based on protecting these beneficial uses.

The Crooked River is listed on the 303(d) list for temperature during the summer. Temperature at this time, however, is not an issue for Prineville since they only discharge to the Crooked River during the winter months. For this reason a temperature management plan is not required. Prior to increasing thermal load from the facility (design flow or temperature), the Permittee shall notify the Department in writing and obtain necessary approval.

FACE PAGE

There are two changes to the face page of the proposed permit.

On the face page of the permit the Department has added an LLID number. The LLID or Longitude/Latitude Identification is a unique system of identifiers for streams. An LLID consists of the longitude and latitude at the mouth of the stream and only one LLID exists per stream. Using LLIDs for permittees will allow permit information related to receiving streams to be linked directly to other water quality databases.

The collection classification has increased from a II to a III. The Phase I upgrade to the sewage treatment system increases the design flow from 1.1 MGD to 1.6 MGD (1.1 MGD+0.5 MGD). This in turn has increased the population equivalent to 22,857 which is greater than the 15,000 upper limit for a Class II collection system.

SCHEDULE A-WASTE DISCHARGE LIMITATIONS

Lagoons are exempt from having to meet federal secondary treatment limits of 30 mg/l each and 85% removal for BOD₅ and TSS. Under 40 CFR 133.105 “treatment equivalent to secondary treatment”, lagoon systems qualify for less stringent effluent limits. However, 40 CFR 133.105(f) requires that BOD₅ and TSS permit limitations be more stringent than the “equivalent to secondary” limits for those existing and new facilities capable of achieving more stringent limitations through proper operation and maintenance of the treatment works.

The TSS limits in the proposed permit will remain the same as the existing permit at a maximum of 40 mg/l average monthly effluent concentration; maximum of 60 mg/l weekly effluent concentration; and a minimum of 65% removal.

BOD₅ has been replaced by CBOD₅ in the proposed permit. Since the last permit renewal the City has determined through an evaluation that the CBOD₅ test would be more representative of the effluent than BOD₅ because of interfering effects from nitrifying bacteria coming from the rock filter. The City has requested to use the CBOD₅ test instead of the BOD₅ test. The allowable alternate CBOD₅ permit limits for concentration and percent removal are set by federal law (40 CFR, Part 133). The equivalent values are as follows:

CBOD₅ – maximum of 25 mg/l average monthly effluent concentration; maximum of 40 mg/l weekly effluent concentration; and a minimum of 65% removal.

The permit establishes mass load limits for the wintertime discharge of wastewater to Crooked River. In accordance with OAR 340-41-120(9)(b), these mass load limits are calculated based on the treatment facility’s capabilities and the highest and best practicable treatment to minimize the discharge of pollutants. Winter monthly average mass load limits for TSS are based upon the achievable monthly average effluent concentration of 40 mg/l and a DADWF of 1.1 MGD. Winter monthly average mass load limits for CBOD₅ are based upon a monthly average effluent concentration of 25 mg/l and a DADWF of 1.1 MGD. Weekly average and daily maximum load limits are calculated using standard 1.5 and 2.0 multipliers of the calculated monthly average mass load limits. The table below indicates the seasonal effluent limitations along with mass load calculations.

Parameter	Monthly Average		Weekly Average		Daily Maximum	
	mg/l	lb/day	mg/l	lb/day	mg/l	lb/day
CBOD ₅	25	230	40	340	--	460
TSS	40	370	60	550	--	730

(a) CBOD₅ Winter Load Calculations:

- (1) 25 mg/l achievable monthly average x 8.34 lb/gal x 1.1 MGD = 229.35 (230) lb/day monthly average.
- (2) 229.35 lb/day monthly average x 1.5 = 344.03 (340) lb/day weekly average.

(3) $229.35 \text{ lb/day monthly average} \times 2.0 = 458.70 \text{ (460) lb/day daily average.}$

(b) TSS Winter Load Calculations:

(1) $40 \text{ mg/l achievable monthly average} \times 8.34 \text{ lb/gal} \times 1.1 \text{ MGD} = 366.96 \text{ (370) lb/day monthly average.}$

(2) $366.96 \text{ lb/day monthly average} \times 1.5 = 550.44 \text{ (550) lb/day weekly average.}$

(3) $366.96 \text{ lb/day monthly average} \times 2.0 = 733.92 \text{ (730) lb/day daily average.}$

Bacteria Limitations

Upon disinfection and discharge into the storage/dechlorination pond, wastewater, after a period of storage, is discharged either to the river (winter) or the golf course (summer). Instream standards for bacteria is typically *E. coli*, however, since Prineville discharges to the river in the winter and the golf course in the summer (which requires a total coliform standard), the City has requested that they be allowed to monitor and meet limitations for total coliform only, rather than for both total coliform and *E. coli*.

Pursuant to OAR 340-41-120, wastewater treatment facilities that are authorized to use reclaimed wastewater pursuant to OAR 340-55, and which also use a storage pond as a means to dechlorinate their effluent prior to discharge to public waters, effluent limitations for bacteria shall, upon request by the permittee, be based upon appropriate total coliform limits as required by OAR 340-55.

pH

In accordance with the Code of Federal Regulations (CFR) minimum secondary treatment standards (40 CFR, Part 133), the effluent values for pH shall be maintained within the limits of 6.0 to 9.0. This limitation is unchanged from the current permit.

Total Residual Chlorine

The City uses chlorine in its disinfection stage of treatment. Unfortunately, chlorine is very toxic to aquatic organisms in receiving streams. The City's storage pond allows for de-chlorination of the treated effluent prior to discharge. Like the existing permit, the proposed permit contains a limitation for total chlorine residual to assure that toxicity due to chlorine in the effluent is controlled. The Department modeled the discharge (approximately 1992) and determined that a monthly average concentration of 0.10 mg/l and a daily maximum of 0.16 mg/l would prevent acute toxicity at the edge of the Zone of Dilution (ZID) and chronic toxicity at the edge of the mixing zone. These limits have been included in the proposed permit and are the same as the existing permit.

Ammonia

Ammonia is a common constituent in sewage, and its conversion to nitrates varies among treatment facilities. Ammonia can be toxic to aquatic organisms, and therefore, sewage treatment plants in Oregon must meet the state toxicity standards for ammonia. Ammonia also exerts a very large oxygen demand on the receiving stream.

Ammonia limits are included in permits under two circumstances; if the discharge violates toxicity standards; or if the receiving stream is water quality limited for dissolved oxygen. Ammonia toxicity varies depending on the stream temperature and pH, and are used in setting the effluent limit.

A reasonable potential analysis for ammonia was conducted to determine if the ammonia in the effluent had the potential to cause toxicity in the Crooked River. The analysis indicated that there was a potential for ammonia toxicity to occur from the discharge. Subsequently, the Department modeled for ammonia in the discharge using Cormix to determine if a limit would be necessary in the permit. The results of the modeling were inconclusive due to the variability of existing data. The Department, therefore, has determined that at this time the best approach is to increase the frequency of monitoring for ammonia to gather more accurate data. This data will be used during the next permit

renewal to determine if ammonia is causing toxicity to occur and whether a permit limit for ammonia should be included in subsequent permits.

Effluent Discharge

OAR 340-41-575(1)(e) requires that, for the Crooked River sub-basin, effluent BOD₅ concentrations in mg/l, divided by the dilution factor (ratio of receiving stream flow to effluent flow) shall not exceed one unless otherwise approved by the EQC. The dilution rule, if applied would require discharge only if the discharge effluent flow were limited to 1/30 of the river flow. During the last permit renewal, the City requested and was granted an exception to the dilution rule based upon a water quality analysis that shows that the dissolved oxygen standard would not be violated provided discharge is limited to periods when river flow is 15 cfs or greater and such that up to 25 cfs, discharged effluent flow is limited to 1/15 of the flow of the river. This requirement is unchanged in the proposed permit.

Mixing Zone and Zone of Immediate Dilution

OAR 340-41-565(4)(a) allows the Department to designate a portion of the receiving stream water to serve as a zone of dilution for wastewaters and receiving waters to mix. OAR 340-41-565(4)(b) allows the Department to suspend all or part of the water quality standards, or set less restrictive standards, in the defined mixing zone provided a number of conditions are met. The section also allows for the establishment of a Zone of Immediate Dilution (ZID) on a case-by-case basis.

The current permit for the treatment facility allows for a 15-foot wide mixing zone along the south shore of the Crooked River extending 50 feet downstream from the point of discharge. The Department has also established a ZID for chlorine with a five foot radius measured downstream from the point of discharge. The mixing zone in the proposed permit has remained the same as the existing permit.

Compliance with the acute chlorine toxicity standard is required at the edge of the ZID. All water quality standards must be met at the edge of the mixing zone.

Outfall Number 002 - Meadow Lakes Golf Course

No discharge to state waters is permitted from Outfall Number 002. All reclaimed water is to be irrigated on the golf course in accordance with the approved Reclaimed Water Use Plan.

The reclaimed water shall receive at least Level II treatment as defined in OAR 340-55.

Outfall Number 003-Land Irrigation – New Expanded Site

As described in the Expanded Facility Description above, the City of Prineville is proposing to expand its facility to accommodate population growth over the next 20 years. Treated effluent from the expanded facility will be land applied at agronomic rates on 390 acres of farmland north of the existing facility. No discharge to state waters is permitted from Outfall Number 003. All reclaimed water shall be irrigated in accordance with an approved Reclaimed Water Use Plan. The reclaimed water shall receive at least Level II treatment as defined in OAR 340-55.

SB 212 Findings

As required under SB 212 and based on a review of the proposed plan, the Department has determined that the application rates and site management practices for the land application of reclaimed water will ensure continued agricultural, horticultural, or silvicultural production. The land application of reclaimed water will not reduce the productivity of land if materials are applied in strict compliance with an approved reclaimed water use plan and all applicable statutes, rules, permits, plans, and federal guidance.

The Department has received all required Land Use Compatibility Statements (LUCS) for the proposed upgrade. The LUCS for the irrigation site contains necessary findings that the facilities proposed in the upgrade and which are located on exclusive farm use (EFU) are accessory and reasonably necessary for the application of treated effluent.

Water Resources Department Findings

The Department has made the finding that the City of Prineville is not subject to the requirements of ORS537.130, which requires any person intending to acquire the right to the beneficial use of any of the surface waters of this state to first obtain a permit from Water Resources Department. It has been determined that since the additional wastewater collected from the proposed expansion was never part of the Crooked River, that no right to the beneficial use of surface water is needed. Based on this finding then, no exemption to the rule is needed, and therefore, ODFW was not consulted on the impact to fish and wildlife.

The reclaimed water will need to be registered with the Water Resources Department.

SCHEDULE B – MINIMUM MONITORING AND REPORTING REQUIREMENTS

The authority to require periodic reporting by permittees is included in ORS 468.065 (5). The proposed monitoring and reporting requirements are based on the Department's monitoring matrix for similar facilities of this type and size.

Except as noted below, monitoring and reporting requirements of the proposed permit are the same as the existing permit.

Under Outfall 001, temperature and quantity chlorine used monitoring has been added to the proposed permit. Total coliform monitoring has increased from weekly to twice a week and monitoring for nutrients has increased from monthly to once per week. Ammonia monitoring has increased from monthly to once per week as described in the Ammonia section above.

Under Outfall 002 and 003, golf course and land application site, respectively, monitoring for pH, and quantity chlorine used have been added to the proposed permit.

The City of Prineville is not required to have a formal pretreatment program at this time. As such, monitoring for specific toxic parameters has not been included in the proposed permit.

Groundwater monitoring requirements are the same as the existing permit.

SCHEDULE C – COMPLIANCE CONDITIONS AND SCHEDULES

As described above in the Face Page Section, the Collection System Class has been changed from a II to a III. The current certified Level II operator for the City will need to upgrade his collection certification to meet this requirement which includes passing a Department administered test. Schedule C includes a condition requiring the City to demonstrate within one year of permit issuance this increase in the level of certification.

Presently, the permittee does not have an approved Biosolids Management Plan filed with the Department. The permittee will be required to submit for review and approval a biosolids management plan prepared in accordance with the recently amended regulations of OAR 340-50 and 40 CFR Part 503 prior to land application of any biosolids.

Since the last permit cycle several new wood products industries have located in Prineville and discharge wastewater to the STP. It is unknown at this time what pollutants make up these wastestreams and at what concentrations. Therefore, the proposed permit includes a condition which requires the permittee to conduct a pretreatment survey as described in 40 CFR 403.8(f)(2)(I-iii) suitable to make a determination as to the need for development of a pretreatment program.

Also in Schedule C the permittee is required to develop a Reclaimed Water Use Plan for review and approval for the new expanded irrigation site in accordance with OAR 340-55.

As discussed in the Ammonia section above, the Department is concerned that ammonia toxicity may be occurring from the discharge in the Crooked River. Frequency of monitoring has increased for ammonia from monthly to weekly to gather sufficient data. A requirement has been added to the proposed permit to submit an evaluation on ammonia toxicity with the next permit renewal application.

SCHEDULE D - SPECIAL CONDITIONS

All facilities with an average dry weather design flow greater than 1 MGD must include the results of a whole effluent toxicity test with their application for permit renewal. Schedule D of this permit includes a condition requiring such submittal and specifying the necessary procedures.

A special condition has been added to the proposed permit on the management and maintenance of groundwater monitoring wells.

SCHEDULE F – GENERAL CONDITIONS

The permittee must conform with all General Conditions including, but not limited to, conditions relating to operation and maintenance of pollution controls, monitoring and record keeping, and reporting requirements.

Prepared by: Jayne West
Eastern Region

APPENDIX C
Information Regarding Treated
Wastewater Reuse for Cooling Water

MEMO

To: Eric Klann, P.E., City Engineer, City of Prineville, Oregon
From: Brad D. Baird, P.E. *Brad*
Subject: Treated Wastewater Reuse for Cooling Water
Date: June 9, 2010
Job/File No. 1260-06-02

The purpose of this memorandum is to provide a preliminary estimated cost for utilizing the City of Prineville's treated wastewater for cooling water (cooling data processing equipment). The information outlined herein should be considered preliminary. Estimated costs and assumptions should be refined in more detail prior to considering final project costs.

The assumptions for preparation of this information are as follows:

- 500 gallons per minute are needed.
- The site is located northeast of the airport in Prineville, Oregon, on the elevated bluff west of the City.
- The treated wastewater will need to be filtered utilizing a membrane filter and possibly chemical addition to help reduce total dissolved solids.
- The water will be delivered at the site with a site pressure of approximately 60 pounds per square inch.
- After use for cooling, the water will be returned to the City's lagoon area for disposal.
- The estimated costs assume the improvements are completed utilizing the public bid process.
- The estimated costs include design and construction engineering, permitting, a 10 percent construction contingency, legal, administration, etc.

Estimated Costs

The attached Table 1 outlines the total estimated cost for the improvements. The estimated cost assumes the effluent treatment filter and pump station are located just east of the current City lagoons and the pipeline can be routed due south to the site. The estimated cost assumes the project is constructed in 2010. It would be prudent to add approximately 3 to 5 percent per year to the estimated construction cost for construction in future years. The total estimated project cost is approximately \$2,443,000. This cost should be considered preliminary and will need to be revised if the project is pursued.

BDB/cd

G:\Clients\Prineville\Wastewater\1260-02\Correspondence\MemoCoolingWater060910.doc

CITY OF PRINEVILLE
 PRELIMINARY COST ESTIMATE
 WASTEWATER REUSE FILTRATION AND DELIVERY COOLING WATER
 (YEAR 2010 COSTS)
 June 10, 2010

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
1	Mobilization	LS	\$ 90,000	All Req'd	\$ 90,000
2	150 Hp Booster Pump Station (500 gpm)	LS	250,000	All Req'd	250,000
3	Membrane Filter	LS	450,000	All Req'd	450,000
4	Filter Building	SF	125	1,200	150,000
5	Pilot Test	LS	10,000	All Req'd	10,000
6	Install Filter	LS	50,000	All Req'd	50,000
7	Site Work	LS	50,000	All Req'd	50,000
8	8-inch Pipe	LF	40	8,000	320,000
9	6-inch Pipe	LF	35	8,000	280,000
10	Restrained Pipe	LF	1,000	50	50,000
11	Highway Crossing	LS	30,000	All Req'd	30,000
12	Electrical Service Drop	LS	30,000	All Req'd	30,000
13	Rock Excavation	CY	50	1,000	50,000
Total Estimated Construction Cost					\$ 1,810,000
Administration, Legal, Engineering, and Contingencies @ 35%					633,000
TOTAL ESTIMATED PROJECT COST					\$ 2,443,000



CITY OF
 PRINEVILLE, OREGON
 PRELIMINARY COST ESTIMATE
 WASTEWATER REUSE FILTRATION AND
 DELIVERY COOLING WATER

TABLE
 1

APPENDIX D
FEMA Flood Insurance Rate Map,
Panel 0384C

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Oregon State Plane south zone (FIPSZONE 3602). The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

Base map information shown on this FIRM was derived from multiple sources. Base map files were provided in digital format by Crook County GIS Department. This information was photogrammetrically compiled at a scale of 1:2000 from aerial photography dated 2003 and 2005.

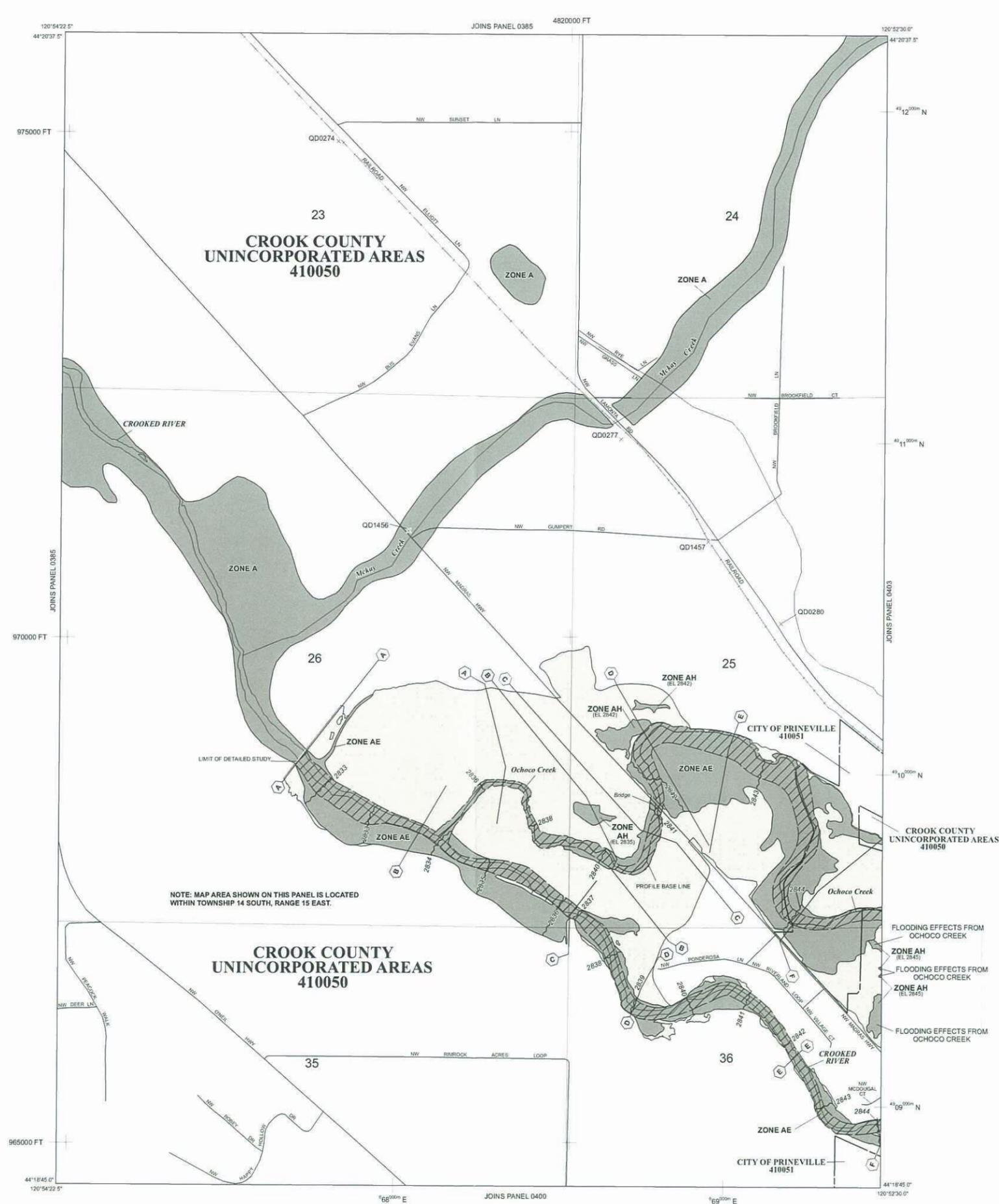
This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/>.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 14 SOUTH, RANGE 15 EAST.

LEGEND

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS
- ZONE D** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
- OTHERWISE PROTECTED AREAS (OPAs)
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*
- * Referenced to the North American Vertical Datum of 1988 (NAVD 88)
- Cross section line
- Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid ticks, zone 10
- 5000-foot grid ticks; Oregon State Plane coordinate system, south zone (FIPSZONE 3602), Lambert Conformal Conic
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile
- MAP REPOSITORIES
- Refer to Map Repositories list on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**
July 17, 1989
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL**
- to update corporate limits, to change Base Flood Elevations, to change Special Flood Hazard Areas, and to add roads and road names.



NFP
PANEL 0384C

FIRM
FLOOD INSURANCE RATE MAP
CROOK COUNTY,
OREGON
AND INCORPORATED AREAS

PANEL 384 OF 1825
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CROOK COUNTY	410050	0384	C
PRINEVILLE, CITY OF	410051	0384	C

PRELIMINARY
APRIL 30, 2010

Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
41013C0384C
MAP REVISED

Federal Emergency Management Agency

APPENDIX E
Sewer System User Rate Information

RESOLUTION NO. 1136
A RESOLUTION ESTABLISHING FEES AND CHARGES FOR THE
CITY OF PRINEVILLE FOR FISCAL YEAR 2010-2011

The Prineville City Council specifically finds that:

WHEREAS, various City Ordinances and state statutes allow the City to establish certain fees by Resolution; and

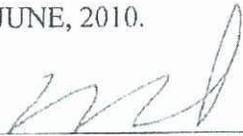
WHEREAS, the City of Prineville desires to establish and recover certain City costs from fees and charges levied in providing City services, products, and regulations; and

WHEREAS, the City Manager has caused review of all City fees and charges and determined the costs of such fees and charges; and

NOW, THEREFORE, it is hereby resolved that the fee and charge schedule attached to this Resolution as Exhibit A is hereby adopted with said fees and charges to be effective July 1, 2010, and continue in effect until modified by the Prineville City Council.

APPROVED BY THE CITY COUNCIL ON THE 8th DAY OF JUNE, 2010,

SIGNED BY THE MAYOR ON THE 8th DAY OF JUNE, 2010.



Mike Wendel, Mayor

ATTEST:



Steve Forrester, City Manager/Recorder

2.1.4.4	Each Additional 100,000 sqft. over 200,000 sqft	700.00
2.1.5	Expansion of Existing Approved Outright Use < 25%	50% of fee listed above
2.2	Conditional Use Permits (plus hearing fee if required)	
2.2.1	Residential	
2.2.1.1	1-2 Family	200.00
2.2.1.2	Multi-Family	1,325.00
2.2.1.3	Mobile Park	2,850.00
2.2.1.4	Use Change	375.00
2.2.2	Commercial	
2.2.2.1	Use Change	500.00
2.2.3	New Construction	
2.2.3.1	1 - 20,000 sqft	1,475.00
2.2.3.2	20,001 - 50,000 sqft	2,175.00
2.2.3.3	50,001 - 100,000 sqft	3,050.00
2.2.3.4	100,001 - 200,000 sqft	4,225.00
2.2.3.5	Each Additional 100,000 sqft. over 200,000 sqft	1,000.00
2.2.4	Industrial	
2.2.4.1	0 - 10,000 sqft.	1,475.00
2.2.4.2	10,001 - 50,000 sqft.	2,175.00
2.2.4.3	50,001 - 200,000 sqft.	3,050.00
2.2.4.4	Each Additional 100,000 sqft. over 200,000 sqft	1,000.00
2.2.5	Expansion of Existing Approved Conditional Use < 25%	50% of fee listed above
2.2.6	Hearings Fee	600.00
2.3	Other Applications	
2.3.1	Home Occupations	659.00
2.3.2	Telecommunications Tower	2,787.00
2.3.3	Espresso Stands	1,105.00
2.3.4	Government Non-profit	1,105.00
2.3.5	Revision/Amendment	75% of new application fee
2.3.6	Reconsideration	659.00
2.3.7	Declaratory Ruling	1,452.00
2.3.8	Additional Pre-application Meeting	609.00
2.3.9	Street Renaming	275.00 plus cost of sign(s)
2.3.10	Revocable Permit	50.00
2.3.11	Miscellaneous requests	Charged at actual cost per hour
2.4	Nonconforming Use Determination	
2.4.1	Administrative	224.00
2.4.2	Planning Commission	462.00
2.5	Variance Application	
2.5.1	Major	1,230.00
2.5.2	Minor	200.00 plus 200.00 if hearing required
2.5.3	Riparian Adjustment - Single Family/Duplex Residential	350.00
2.5.4	Riparian Adjustment - Multifamily and Commercial	500.00
2.6	Sign Permits	3.00 per sqft.
2.7	Land Partitioning Applications	
2.7.1	Major Partition	3,220.00
2.7.2	Minor Partition	1,325.00
2.7.3	Boundary Line Adjustment	500.00
2.7.4	Lot Consolidation	300.00 plus 100.00 per additional lot
2.7.5	Final BLA Plat	150.00 60.00 per lot GIS fee (see fee 2.20)
2.7.6	Final Partition Plat	300.00 60.00 per lot GIS fee (see fee 2.20)
2.7.7	Final Lot Consolidation Plat	100.00 60.00 per lot GIS fee (see fee 2.20)
2.8	Subdivisions	
2.8.1	Outline Development Plan 5 Acres or less	6,908.00
2.8.1.1	Outline Development Plan 5.1 acres or more	6,908.00
2.8.2	Tentative Plans	2,075.00 plus 22.00 per additional lot
2.8.3	Tentative Plan Revision	75% of new application fee
2.8.4	Final Plat	600.00 plus 12.00 per lot & 60.00 per lot GIS fee (see fee 2.20)
2.8.5	Final Plat Bonding Review and Development Agreements	2,836.00
2.8.6	Final Plat Extensions	450.00 plus engineering fees for construction drawings
2.8.7	Final Plat Revision/Amendment	40% of new application fee
2.9	Comprehensive Plan Amendment	
2.9.1	Comp. Plan Amendment (no UGB)	9,435.00
2.9.2	Comp. Plan Amendment (UGB)	9,608.00
2.9.3	Text Amendment (consistent w/intent of Comp Plan)	3,944.00
2.9.4	Text Amendment (new policy or program)	4,476.00
2.10	Zoning Ordinance Amendment	
2.10.1	Ordinance Text Amendment	3,944.00
2.10.2	Zoning Map Amendment	4,476.00
2.10.3	Street/Alley Vacate or Dedication	1,068.00
2.11	Appeals	

2.11.1	To Planning Commission	250.00	
2.11.2	To City Council	1,744.00	
2.12	Administrative Determination		
2.12.1	Written - i.e. Zoning Verifications	15.00	
2.12.2	Space intentionally left blank	-	
2.12.3	Bonding Forms and Review (2% of application fee)	74.00	
2.13	Document Purchase		
2.13.1	Other Document	0.30	per page
2.13.2	Photocopies/Printed Reports	0.30	per page
2.13.3	Maps	5.15	minimum (actual costs)
2.13.4	Fax	2.25	first page plus 1.15 each additional page
2.13.5	Agenda (one year)	25.75	base plus 0.60 per page
2.13.6	Agenda Packets (one year)	257.50	
2.14	Flood Zone Determination		
2.14.1	Written Administrative	15.00	
2.15	Annexation		
2.15.1	Petition to Annex	1,894.00	
2.15.2	Other Annexation	1,894.00	
2.16	Consortium Agreements w/ Legislative or Quasi judicial changes		Charged at actual cost
2.17	Public Works Review Fees		
2.17.1	Space intentionally left blank	-	
2.17.2	Water System Analysis (Fire Flow)	1,072.00	
2.17.3	Sewer System Analysis (Capacity)	1,397.00	
2.17.4	Traffic Review Fee	2,200.00	Plus consultant cost
2.17.5	Water Construction Drawing Review & Approval	1,175.00	
2.17.5.1	Per Lineal Foot	1.00	
2.17.5.2	Per Service	9.00	
2.17.5.3	Per Fire Hydrant	101.00	
2.17.5.4	Per Tee / Valve Assembly	52.00	
2.17.5.5	Per Vault Assembly	261.00	
2.17.5.6	Water Master Plan Improvements	1,918.00	
2.17.6	Water Inspection & As-Builts (8 Hours)	1,015.00	
2.17.6.1	Per Lineal Foot	2.00	
2.17.6.2	Per Fire Hydrant	148.00	
2.17.6.3	Per Service	74.00	
2.17.6.4	As-Built fee	90.00	
2.17.6.5	Additional Hours of Inspection	Per hour	
2.17.7	Sewer Construction Drawing Review & Approval	1,015.00	
2.17.7.1	Per Lineal Foot	1.00	
2.17.7.2	Per Manhole	101.00	
2.17.7.3	Per Service	9.00	
2.17.7.4	Pump Station / Master Plan Improvements	1,918.00	
2.17.8	Sewer Inspection & As-Builts (8 Hours)	1,015.00	
2.17.8.1	Per Lineal Foot	2.00	
2.17.8.2	Per Manhole	148.00	
2.17.8.3	Per Service	19.00	
2.17.8.4	As-Built fee	45.00	
2.17.8.5	Additional Hours of Inspection	Per hour	
2.17.9	Street Construction Drawing Review & Approval	1,893.00	
2.17.9.1	Per Lineal Foot	7.00	
2.17.9.2	Per Catch Basin	304.00	
2.17.9.3	Traffic Control Impacts / Master Plan	4,089.00	
2.17.10	Street Construction Inspection & As-Builts (8 Hours)	451.00	
2.17.10.1	Per Lineal Foot	3.00	
2.17.10.2	Per Catch Basin	74.00	
2.17.10.3	Additional Hours of Inspection	Per hour	
2.17.11	Sidewalk Permit	148.00	
2.17.12	Driveway Permit	74.00	
2.17.13	Utility Street Cut Permit (Base)	177.00	
2.17.13.1	Per soft	3.00	
2.17.14	Special Permits and Agreements		Charges will be on a per hour basis
2.17.15	Pre-application Review		First hour complementary
2.17.15.1	Each Additional Hour	609.00	
2.17.16	Outside Consultant Review		Actual cost of consultant
2.17.17	Space intentionally left blank	-	
2.17.18	Space intentionally left blank	-	
2.17.19	Space intentionally left blank	-	
2.17.20	Additional Plan Review (Drawing Time)	106.00	
2.17.21	Additional Inspection time	74.00	
2.17.22	Space intentionally left blank	-	

2.17.23	Space intentionally left blank...		
2.18	System Development Charges		
2.18.1	Transportation SDC Fees		
2.18.1.1	Single Family Dwelling (1 Peak Hour Trip)	2,925.00	
2.18.1.2	Per Peak Hour Trip* (See Transportation SDC Help Sheet) * Based on Institute of Transportation Engineers Trip Generation Manual	2,925.00	
2.18.2	Water SDC Fees		
2.18.2.1	3/4" Meter (1 EDU) - max. 810 gpd	2,587.00	
2.18.2.2	1" Meter (2.5 EDU) - max. 2025 gpd	6,467.00	
2.18.2.3	1.5" Meter (5 EDU) - max. 4050 gpd	12,934.00	
2.18.2.4	2" Meter (8 EDU) - max. 6460 gpd	20,695.00	
2.18.2.5	3" Meter (16 EDU) - max. 12960 gpd	41,390.00	
2.18.2.6	4" Meter (25 EDU) - max. 20250 gpd	64,672.00	
2.18.2.7	6" Meter (50 EDU) - max. 40500 gpd	129,344.00	
2.18.2.8	Per Additional 810 gallons per day (GPD) over maximum	2,587.00	
2.18.3	Wastewater SDC Fees		
2.18.3.1	3/4" meter (1 EDU) - max. 260 gpd Improvement Fee	7,457.00	
2.17.3.1.1	Treatment expansion	55.02%	
2.17.3.1.2	Collection improvements	22.87%	
2.17.3.1.3	Reimbursement fee		
2.17.3.1.3	Treatment	14.75%	
2.17.3.1.4	I & I reduction improvements	3.47%	
2.17.3.1.5	Administration Fee	3.89%	
	Total Wastewater SDC	7,457.00	
2.18.3.3	1.5" meter (5 EDU) - max. 1,300 gpd	37,281.00	Percentage breakdown above applies to all meter sizes
2.18.3.4	2" meter (8 EDU) - max. 2,080 gpd	59,649.00	Percentage breakdown above applies to all meter sizes
2.18.3.5	3" meter (16 EDU) - max. 4,160 gpd	119,298.00	Percentage breakdown above applies to all meter sizes
2.18.3.6	4" meter (25 EDU) - max. 6,500 gpd	186,403.00	Percentage breakdown above applies to all meter sizes
2.18.3.7	6" meter (50 EDU) - max. 13,000 gpd	372,806.00	Percentage breakdown above applies to all meter sizes
2.18.3.8	Per Additional 260 gallons per day (gpd) over maximum	7,457.00	Percentage breakdown above applies to all meter sizes
2.19	Crook County Parks & Recreation SDC Fees	1,887.00	
	Note: Parks & Recreation fees are not regulated by the City of Prineville. Fees are mandated by Crook County and are subject to change.		
2.20	GIS Fee	60.00	
	Note: GIS fees are not regulated by the City of Prineville. Fees are mandated by Crook County and are subject to change.		
	Base 10-11		
3.0	Water Rates & Fees	Charge	Additional Charges / Comments
3.1	Residential Rates		
3.1.1	Senior Citizen Credit	(3.20)	per month (income must qualify)
3.1.2	Monthly water rates (minimum charges)		
3.1.3	3/4" Meter	13.45	
3.1.4	1" Meter	16.08	
3.1.5	1.5" Meter	28.07	
3.1.6	2" Meter	43.44	
3.1.7	3" Meter	59.66	
3.1.8	4" Meter	70.17	
3.1.9	6" Meter	134.51	
3.1.10	Commodity charge	1.40	per unit (100 cubic feet) of water used
3.1.11	Service Restoration		
3.1.11.1	During Business Hours	25.00	
3.1.11.2	After Business Hours	51.50	
3.1.11.3	After/Unauthorized Use	53.00	
3.2	Commercial & Industrial Rates		
	Monthly Water Rates (minimum charges)		
3.2.1	3/4" Meter	20.48	14 units (1400 cubic feet) included
3.2.2	1" Meter	25.15	17 units (1700 cubic feet) included
3.2.3	1.5" Meter	59.07	42 units (4200 cubic feet) included
3.2.4	2" Meter	87.73	62 units (6200 cubic feet) included
3.2.5	3" Meter	163.75	116 units (11600 cubic feet) included
3.2.6	4" Meter	274.87	196 units (19600 cubic feet) included
3.2.7	6" Meter	514.64	367 units (36700 cubic feet) included
3.2.8	Commodity Charge	1.40	per unit (100 cubic feet) of water used
3.2.9	Service Restoration		
3.2.9.1	During Business Hours	25.00	
3.2.9.2	After Business Hours	51.50	
3.2.9.3	After/Unauthorized Use	53.00	
3.2.11	Bulk Water Rates		
3.2.11.1	First 18,000 Gallons	8.78	rate per each 750 gallons used to 18,000 gallons
3.2.11.2	Additional	7.89	rate per each 750 gallons over 18,000 gallons
3.2.12	Monthly Standby Fire Protection		

3.2.12.1	2" or Less	12.86	
3.2.12.2	3"	16.38	
3.2.12.3	4"	19.88	
3.2.12.4	6"	26.90	
3.2.12.5	8"	30.99	
3.2.12.6	10" or Above	37.36	
3.2.13	Water Connection		
3.2.13.1	3/4"	456.19	Plus actual cost of meter
3.2.13.2	1" Meter	519.84	Plus actual cost of meter
3.2.13.3	1.5" Meter	1,188.21	Plus actual cost of meter
3.2.13.4	2" Meter	1,432.22	Plus actual cost of meter
3.2.13.5	3" Meter	2,355.20	Plus actual cost of meter
3.2.13.6	4" Meter	2,408.24	Plus actual cost of meter
3.2.13.7	6" Meter	3,394.88	Plus actual cost of meter
3.3	Water Deposit	70.00	
3.4	Meter Test Fee	85.00	
3.5	Delinquent Fee (Late Fee)	1.50%	
3.6	Penalty Fee (for items sent to lien)	10.00%	
Note: The base charge for water service shall apply at all times whether or not the property is occupied.			
4.0	Sewer Fees and Charges		
4.1	Residential Rates		
4.1.1	Senior Citizen Credit	(6.20)	per month (income must qualify)
4.1.2	Monthly Flat Rate	50.99	per dwelling unit
4.2	Commercial Rates		
4.2.1	General Service Uses		
4.2.1.1	Monthly Flat Rate	50.99	per dwelling unit
4.2.2	Large General Service Uses		
4.2.2.1	Flat Rate	124.78	
4.2.2.2	Metered or estimated water usage in excess of 30 units per month (a unit of water = 100 cubic feet)	3.36	per excess unit
4.2.3	Industrial Use		To be determined on a case by case basis
4.2.4	Connection Fee	727.60	per EDU
4.3	Sewer Deposit	70.00	
4.4	Delinquent Fee (Late Fee)	5.00	plus 1.00%
4.5	Penalty Fee (For items sent to lien)	10.00%	
Note: The base charge for sewer service shall apply at all times whether or not the property is occupied.			
5.0	Franchise Fees and Other Taxes		
5.1	Transient Room Tax	8.50%	
5.2	Franchise Fees		
5.2.1	Cascades Natural Gas	5.00%	
5.2.2	Crestview Cable	5.00%	
5.2.3	Pacific Power	5.00%	
5.2.4	Prineville Disposal	5.00%	
5.2.5	Qwest	7.00%	
6.0	Administrative Fees and Charges		
6.1	Photocopies/Printed Reports	0.30	
6.2	Fax Charges		
6.2.1	1st Page	2.25	
6.2.2	Each Additional Page	1.15	per page
6.3	NSF Charges	25.00	
6.4	Notary Fee	5.00	
6.5	Research / Accounting	Actual Cost Incurred	
6.6	Lien Search Fee	25.00	
7.0	City Wide Standard Hourly Billing Rate		
7.1	Multiplier	2.5 x Employee Hourly Pay Rate	

APPENDIX F

System Development Charge Resolution

**RESOLUTION NO. 1093
CITY OF PRINEVILLE**

**A RESOLUTION ESTABLISHING SYSTEM DEVELOPMENT CHARGES FOR
SEWER, WATER, AND TRANSPORTATION IN THE CITY OF PRINEVILLE**

WHEREAS, the City of Prineville passed Resolution 1088 establishing regarding System Development Charges for sewer, water, and transportation in the City of Prineville; and

WHEREAS, water and sewer SDCs were based on water meter sizes with no specific rates for constant use of water or for users of large amounts of water; and

WHEREAS, constant and/or large users of water place a great burden on City water and sewer systems; and

WHEREAS, the City desires to amend Resolution 1088 to establish SDCs based not only on water meter size, but also under certain circumstances, the use of large amounts of water.

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF PRINEVILLE
RESOLVES AS FOLLOWS:**

SECTION 1. GENERAL PROVISIONS

1. This Resolution shall provide for the basic framework, schedule and implementation of SDCs for sewer, water, and transportation in the City of Prineville, Oregon.
2. The fees established by this Resolution are a separate revenue measure apart from and in addition to any applicable tax, assessment, charge or fee otherwise provided by law, except as expressly stated to the contrary.
3. As required by ORS Chapter 223.309 as the basis for said SDCs, the City has prepared and adopted the following Public Facility Master Plans. Said Plans are hereby adopted by reference as if set forth in full herein, and may be modified, revised, amended and/or updated by the City at any time. These Plans are available for public inspection at the office of the City Manager of the City of Prineville in City Hall located at 387 N.E. Third Street, Prineville, Oregon.
 - (a) The City's most recent version of the Transportation System Plan;
 - (b) The City's most recent version of the Water Facility Master Plan; and
 - (c) The City's most recent version of the Wastewater Facility Plan.
 - (d) The City's most recent version of the Public Facilities Plan.
4. The methodologies used to establish SDCs by this Resolution are set forth in the foregoing referenced Public Facility Master Plans and in those documents entitled "Transportation SDC and Water/Sewer Revenue Requirement" dated June 21, 2000, and "Transportation System Development Charge Analysis Findings" dated July 28, 2000, as prepared for the City by Financial Consulting Solutions Group, Inc. These Reports are

attached to this Resolution, are hereby adopted by reference as though set forth in full herein, and may be modified, revised, amended and/or updated by the City at any time.

5. The SDCs provided for in this Resolution shall be effective on and after the date of City Council passage and approval by the Mayor in accordance with the Schedule set forth herein.
6. The water system development charge is payable concurrent with issuance of a permit to connect to the water system. The sewer system development charge is payable concurrent with issuance of a permit to connect to the sanitary sewer system. The transportation system development charge is payable concurrent with issuance of a building permit for any new construction, including a building permit for a manufactured home. However, in the event additional SDCs are owed for water and/or sewer because water consumption exceeds the maximum gallons per day amount, such SDCs shall be paid within 30 days from the date billed by the City.
7. The SDCs established by this Resolution shall be effective until superseded, modified, revised, amended and/or updated by a future Resolution of the City Council.
8. The SDCs established by this Resolution shall be collected, deposited and expended in compliance with ORS Chapters 223.297 to 223.314 (including the provisions for credits for qualified public improvements contained in ORS Chapter 223.304), and other applicable State and City of Prineville laws, rules and regulations.

SECTION 2. DEFINITIONS

1. As used in this Resolution, the following words and phrases, unless the context of this Ordinance, State law, or other City ordinance or regulation requires or provides otherwise, shall have the meaning set forth herein:
 - (1) “Applicant” means the owner or authorized agent of the owner requesting a City Permit.
 - (2) “Average Daily Water Use” means the average (mean) number of gallons of water flowing through a City water meter or meters serving a parcel over a period of not less than 90 days.
 - (3) “Building Permit” shall mean a permit for construction issued by the City-County Building Department pursuant to the structural specialty code and fire and life safety code as adopted by the State of Oregon and in effect within the City.
 - (4) “Capital Improvement” means facilities or assets used for the following:
 - (a) Water supply, treatment, storage and distribution;
 - (b) Waste water collection, transmission, treatment, storage and disposal;
 - (c) Transportation.
 - (5) “City” means the City of Prineville.
 - (6) “Commercial use, industrial use, owner, residential use, and/or structure” shall be given the same meaning or definition given to them by the City’s Land Development Ordinance No. 1057 as amended.

(7) “Development” means the act of making a manmade change to improved or unimproved real estate (e.g. constructing a building or conducting a mining operation) or making a physical change in use or appearance of a structure or land which increases the usage of any capital improvements or which creates the need for additional capital improvements.

(8) “Equivalent Dwelling Unit (EDU)” means the single-family residential dwelling has been selected as the basic unit defined as Equivalent Dwelling Unit (EDU). Every other land use is converted to EDUs.

(9) “Improvement fee” means a fee for costs associated with capital improvements to be constructed.

(10) “Peak Hour Vehicle Trips” means the amount of vehicle trips, which occur during the peak period for traffic analysis, typically 4-6 PM.

(11) “Qualified Public Improvement” means a capital improvement that is required as a condition of development approval, identified in one or more of the Plans referenced in Subsection 3 of Section 1 of this Resolution and either is:

- (a) Not located on or contiguous to property that is the subject of development approval; or
- (b) Located in whole or in part on or contiguous to property that is the subject of development approval and required to be built larger or with greater capacity than is necessary for the particular development project to which the development fee is related.

(12) “Reimbursement fee” means a fee for costs associated with capital improvements associated with capital improvements already constructed or under construction at the time the applicable fee is established, and for which the City determines that capacity exists.

(13) “System Development Charge” or “SDC” means a reimbursement fee, an improvement fee or a combination thereof assessed or collected at the time of increased usage of a capital improvement or concurrent with issuance of a development permit, building permit or connection to the capital improvement.

SECTION 3. SYSTEM DEVELOPMENT CHARGE IMPLEMENTATION AND FEE SCHEDULE

1. System Development Charges (SDCs) shall be effective within the City of Prineville using rates established and authorized by the City Council.
2. SDCs assigned to those periods ending in a fiscal year (e.g. FY2007) shall be effective on and after the beginning date of each respective fiscal year (e.g. July 1, 2007).

SECTION 4. SYSTEM DEVELOPMENT CHARGES FOR SEWER AND WATER

1. Except as otherwise provided for in this Resolution, the SDC shall be made for each connection to the city's sewer or water system on the basis of equivalent dwelling units (EDUs) as that term is defined in this Resolution.
2. The rate of the SDC for water and sewer systems development will be based on the number of EDUs defined hereinafter in this section.
3. Except as otherwise provided for in this Resolution or the authorizing Ordinance No. 1111 as amended, the applicable SDC charge shall be paid concurrent with the issuance of a building permit for new construction or placement permit for a manufactured home, or, in the case of a new business in an existing building, at the time a building permit is issued or at the time a change of address is provided on an existing business or issuance of a land use permit for a new business. In the event there is development without the issuance of a building permit, the SDC shall be paid concurrent with connection to City facilities and prior to any construction associated with the development plan approved by the City. For computation of the SDC, the applicable Equivalent Dwelling Unit fee shall be multiplied by the number of Equivalent Dwelling Units, determinable by the following chart. The minimum number of Equivalent Dwelling Units is one. Partial units will be charged as one (1) EDU.

EQUIVALENT DWELLING UNITS (EDUs)

A. Residential:

(1) A single family dwelling on a parcel is one EDU if there is one $\frac{3}{4}$ " water meter serving the parcel. If the water meter serving the parcel is larger than $\frac{3}{4}$ " the number of EDUs shall be determined by the greater of the water meter size or maximum gallons per day according to the chart in B. below.

(2) EDUs for multi-family residential use including, but not limited to duplexes, manufactured or mobile home parks, and apartments shall correspond to the size of the water meter or water meters serving the parcel or the maximum gallons of water per day delivered to the parcel upon which the multi-family use is located as shown in B. below.

B. EDUs for single family dwellings served by a water meter larger than $\frac{3}{4}$ ", multi-family residential use, and non-residential uses, including, but not limited to institutions (churches, schools, nursing homes, etc.), commercial, industrial, and all other uses not previously described, shall be based on the size of the water meter or water meters serving the parcel according to the following chart. However, if the average daily water use exceeds the maximum gallons per day on the following chart, the owner of the parcel upon which the excess water use occurs shall pay additional water and sewer SDCs calculated as follows:

(1) For water SDCs: The maximum gallons per day based on the corresponding meter size shall be deducted from the average daily water use. The difference will be divided by 810. The quotient will be rounded up to the next whole number, which number shall be the additional number of EDUs which the parcel owner shall pay to the City at the then current SDC rate.

(2) For sewer SDCs: The maximum gallons per day based on the corresponding meter size shall be deducted from the average daily water use. The difference will be divided by 260. The quotient will be rounded up to the next whole

number, which number shall be the additional number of EDUs which the parcel owner shall pay to the City at the then current SDC rate.

WATER

<u>Water Meter Size</u>	<u>Number of EDUs</u>	<u>Maximum Gallons Per Day</u>
3/4"	1	810
1"	2.5	2,025
1.5"	5	4,050
2"	8	6,480
3"	16	12,960
4"	25	20,250
6"	50	40,500

SEWER

<u>Water Meter Size</u>	<u>Number of EDUs</u>	<u>Maximum Gallons Per Day</u>
3/4"	1	260
1"	2.5	650
1.5"	5	1,300
2"	8	2,080
3"	16	4,160
4"	25	6,500
6"	50	13,000

4. If more than one water meter serves a parcel the total EDUs and the total maximum gallons per day shall be determined according to the chart in B., above by adding together the EDUs and maximum gallons per day corresponding to the size of each water meter serving the parcel.
5. If the average daily water use on any parcel is not over one percent of the maximum gallons per day corresponding to the water meter size serving the parcel, the City shall not charge additional SDCs.
6. If a parcel owner provides proof by metering or other methods acceptable to City the number of gallons per day of waste water being discharged into the City's sewer system, that number rather than the average daily water use shall be used when determining the additional sewer SDCs pursuant to Section 4 3. B. (2).
7. When a water meter size is increased an EDU credit equal to the number of EDUs corresponding to the replaced water meter shall be allowed. After deducting the credit, the difference in EDUs shall be multiplied by the current water SDC rate for the total water SDC and the difference shall also be multiplied by the current sewer SDC rate for the total sewer SDC. No refunds will be granted or credits allowed if a water meter size is decreased.

SECTION 5. SYSTEM DEVELOPMENT CHARGES FOR TRANSPORTATION

1. Except as otherwise provided for in this Resolution or in the authorizing Ordinance No. 1111 as amended, a transportation SDC is imposed on all new or expansion developments

requiring or utilizing City transportation facilities. This charge is imposed on all development concurrent with the actual issuance of a building permit or in the case of a manufactured home in a manufactured home park prior to the actual issuance of a placement permit. In the event there is development without the issuance of a building permit, the SDC shall be paid concurrent with any construction associated with the land use development plan approved by the City.

2. The rate of the charges for transportation systems development shall be based on the peak hour vehicular trip generation as set forth in the document entitled "Trip Generation" put forth by the Institute of Transportation Engineers, alternatively the City Planning Director may also consider alternative methods for trip calculations based on other industry approved methodology.
3. Except as otherwise provided for in Section 1.6 of this Resolution subject to City approval, the SDC fee shall be paid concurrent with the issuance of a building permit for new construction or, in the case of a new business in an existing building or the expansion of an existing use, at the time a building or land use permit is issued that results in a change or expansion in use that impacts the number of individuals in the building and/or the capacity. Except as otherwise provided for in this Resolution or the authorizing Ordinance No. III I as amended, for a manufactured or mobile home in a manufactured or mobile home park, the SDC fee shall be paid concurrent with the issuance of a placement permit or connection to City sewer and/or water facilities or services.

SECTION 6. CREDITS AGAINST SDC FEES

1. In the case of an Improvement SDC fee, credits against such applicable SDC fees and refunds shall be provided for the construction of a qualified public improvement as provided for by ORS Chapters 223.297 to 223.314 and City Ordinance.
2. Notwithstanding the provisions of this section, a special agreement has been approved by the City for the East 3rd Street and Peters Road Local Improvement Districts, said agreement having been set forth as Attachment "A" to City of Prineville Resolution No. 1059.
3. SDC Credit or refund shall be a credit or refund against only the SDC fee applicable to that improvement (e.g. street SDC fees for street improvements, water SDC fees for water improvements, or sewer SDC fees for sewer improvements).
4. Once an SDC Credit or refund is determined to apply to a qualified public improvement, the developer/owner shall enter into an agreement with the City defining the extent of the credit or refund and the manner in which the credit shall be applied to building permits applicable to that project or refunded.
5. SDC credit or refunds on building permits shall be allowed within ten (10) years after the completion and acceptance of the improvement giving rise to credit or refund unless otherwise approved by the City.
6. There shall be no interest accruing on any SDC credit or refund.

7. There shall be no adjustments made to the amount of any SDC credit as the result of inflation or increase/decreases to the maximum allowable SDC.
8. The City Manager or designee shall establish a procedure to provide for a review of requests for credit or refund made pursuant to this section within 30 days of the date of approval of this Resolution. Said procedures shall be reviewed and approved by the City Council. An applicant making such a request, after following the procedure established by the City Manager or designee and approved by the City Council, shall have the right to have any determination made on the request reviewed by the Council in the manner the Council deems appropriate.

SECTION 7. APPEAL PROCEDURE

1. A person aggrieved by a decision required or permitted to be made by the City Manager or the designee thereof under these provisions or a person challenging the propriety of an expenditure of SDC revenues may appeal the decision or the expenditure to the City Council by filing a written request with the City Manager or designee thereof, or the expenditure from which the person appeals
2. An appeal of a decision regarding an assigned SDC fee or a credit or a refund thereto may be appealed to the City Council by filing a written request with the City Recorder within ten (10) days from the date of the decision, describing with particularity the decision from which the person appeals, the sets forth in detail the specific relief requested, and substantiates the basis for the request. The Council shall, at its next regularly scheduled Council meeting within not less than 10 days or more than 21 days of the receipt of such appeal, hear and consider the appeal. The Council may affirm, modify, extend, or overrule said decision in a manner that is consistent with the applicable provisions of this document and/or State Law. The Council decision on the appeal shall be set forth in writing within 21 days of the date of the hearing thereon. The decision of the Council shall only be reviewed as provided in ORS 34.010 to 34.100, and not otherwise.
3. An appeal of an expenditure must be filed within two years of the date of the alleged improper expenditure. The Council shall, at its next regularly scheduled Council meeting within not less than 10 days or more than 21 days of the receipt of such appeal, hear and consider the appeal. The Council decision on the appeal shall be set forth in writing within 21 days of the date of the hearing thereon. The decision of the Council shall only be reviewed as provided in ORS 34010 to 34.100, and not otherwise. After hearing evidence presented by the appellant and the City Manager and the designee thereof (as applicable), the Council shall determine whether the City Manager's or designee's decision or the expenditure is in accordance with this Resolution and the provisions of ORS 223.297 to 223.314 and may affirm, modify, or overrule the decision. If the Council determines that there has been an improper expenditure of SDC revenues, the Council shall direct that a sum equal to the misspent amount shall be transferred from the appropriate facility fund(s) within one year to replace the misspent amount.

SECTION 8. PENALTIES

The maximum fine for violation of any provision of this Resolution is \$500.

SECTION 9. REPEAL

This Resolution is intended to replace Resolution No. 1088 and therefore, Resolution No. 1088 is hereby repealed.

SECTION 10. SEVERABILITY

Findings by any court of competent jurisdiction that any provision of this Resolution is unconstitutional or invalid shall not invalidate any other provision or the remaining provisions of this Resolution.

SECTION 11. ENACTMENT

This Resolution shall be in full force and effect on and after February 10, 2009.

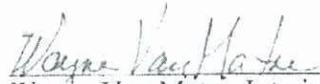
Passed by the City Council this 10th day of February, 2009.

Signed by the Mayor this 10th day of February, 2009.



Mayor Mike Wendel

ATTEST:



Wayne Van Matre, Interim City Manager / City Recorder

APPENDIX G
Water Balance and Cost Estimate for
Future Population of 36,000 at
Full Urban Growth Boundary Buildout

**PRINEVILLE WASTEWATER TREATMENT PLANT WATER BALANCE UTILIZING WETLANDS - OPTION 1
BASED ON UGB BUILDOUT POPULATION OF 36,000**

Month	Influent		Precipitation		Evaporation		Seepage (MG)	Irrigation		Outfall Flow (MG)		Storage + into Storage (- out of Storage) (MG)	Cumulative Storage Needed (MG)
	MGD	(MG)	(in)	(MG)	(in)	(MG)		(ac-in/ac)	(MG)	River	Permitted		
Jan	4.541	140.77	1.09	14.17	0.70	9.10	79.97	-	0.00	0.0	31.0	65.87	172.21
Feb	4.317	120.86	0.83	10.79	0.70	9.10	72.23	-	0.00	0.0	28.0	50.32	222.53
Mar	3.810	118.12	0.74	9.62	0.70	9.10	79.97	-	0.00	0.0	31.0	38.67	261.21
Apr	4.451	133.54	0.72	9.36	2.82	36.72	77.39	2.79	9.32	0.0	30.0	19.48	280.69
May	4.230	131.13	1.09	14.17	4.96	64.47	79.97	5.88	19.64	-	-	-18.78	261.91
Jun	4.031	120.94	1.06	13.78	6.36	82.73	77.39	7.29	24.35	-	-	-49.75	212.16
Jul	3.736	115.80	0.39	5.07	7.70	100.08	79.97	9.40	31.40	-	-	-90.57	121.59
Aug	3.311	102.64	0.43	5.59	6.57	85.41	79.97	7.56	25.25	-	-	-82.40	39.19
Sep	3.321	99.64	0.47	6.11	4.44	57.75	77.39	5.36	17.90	-	-	-47.29	0.00
Oct	3.517	109.02	0.80	10.40	0.70	9.10	79.97	2.41	8.05	-	-	22.30	22.30
Nov	3.661	109.84	1.25	16.25	0.70	9.10	77.39	-	0.00	0.0	30.0	39.60	61.91
Dec	3.795	117.64	1.22	15.86	0.70	9.10	79.97	-	0.00	0.0	31.0	44.43	106.34
TOTALS	3.893	1419.96	10.09	131.16	37.06	481.75	941.57	40.69	135.90	0	181.00	-8.10	

Treatment/Storage Facility	Sq Ft.	Acres	Depth (ft.)	Storage Volume (MG)	Storage Volume Needed (MG)	Land Needed (AC)
Plant 1 - Primary Lagoon	1,611,720	37.0	5	-	-	
Plant 1 - Secondary Lagoon	435,600	10.0	5	6.5	-	
Plant 1 - Storage Lagoon	583,704	13.4	5	21.8	-	
Plant 2 - Primary Lagoon	152,024	3.5	8.5	-	-	
Plant 2 - Secondary Lagoons	253,519	5.8	5.5	4.7	-	
Plant 2 - Storage Lagoon	1,263,240	29.0	11	103.9	-	
New Wetlands (max. water surface)	16,552,800	380.0	2	245.7	-	440-460
TOTAL	20,852,608	478.7	-	382.7	280.69	440-460

	Permitted (in./acre- year)	Acres
Golf Course	40.69	123
Pasture Land	40.69	0
TOTAL		123

Notes:

- Influent. Domestic influent flows are based on average monthly per capita flow from August 2003 to July 2008, projected to a UGB buildout population of 36,000.
- Precipitation. Utilized precipitation on record with the Western Regional Climate Center (WRCC), for Prineville 4NW, Oregon, 1926 to 2007 data (used mean rainfall for each month)
- Evaporation. Utilized pan evaporation data obtained from the WRCC 2000-2005, for Madras 2N, Oregon with a pan coefficient of 0.70.
- Seepage. Wetland seepage assumed to be 1/4 inch per day.
- Irrigation. Taken from City of Prineville - Wastewater Facility Plan prepared by ACE Consultants in December 2000.
- Outfall. City of Prineville NPDES Permit states that the City may discharge treated effluent into the Crooked River during the months of November through April. This is contingent on a minimum flow of 15 cubic feet per second in the Crooked River, and effluent discharge may not exceed 1/15 of river discharge. This option was examined without discharge to the Crooked River.

ac = acre
ft = feet
in = inches
MG = Million Gallons
MGD = Million Gallons per Day
Sq Ft. = Square Feet

	CITY OF PRINEVILLE, OREGON WASTEWATER FACILITIES PLAN UPDATE WASTEWATER TREATMENT PLANT WATER BALANCE - OPTION 1	TABLE G-1
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CITY OF PRINEVILLE, OREGON
ESTIMATED COST
WASTEWATER FACILITIES PLAN UPDATE
OPTION 1 - WETLANDS OPTIONS WITHOUT RIVER DISCHARGE
UGB BUILDOUT POPULATION OF 36,000
(YEAR 2010 COSTS)

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL 2010 PRICE
1	Mobilization/Demobilization	LS	\$ 436,000	All Req'd	\$ 436,000
2	Project Safety and Quality Control	LS	50,000	All Req'd	50,000
3	Site Work	LS	45,000	All Req'd	45,000
4	Purchase Additional Land	AC	6,000	170	1,020,000
5	Demolition	LS	40,000	All Req'd	40,000
6	Wetland Earthwork	LS	3,950,000	All Req'd	3,950,000
7	Treatment Wetland Bentonite Liner	SF	0.50	1,750,000	875,000
8	Wetland Piping	LF	40	18,000	720,000
9	Control Structures	EA	20,000	18	360,000
10	Pump Station Improvements	LS	220,000	All Req'd	220,000
11	Seeding	AC	500	450	225,000
12	Planting of Treatment Wetland	AC	2,000	40	80,000
13	Fencing and Signing	LF	6	21,500	129,000
14	Lagoon Aeration System Improvements	LS	1,000,000	All Req'd	1,000,000
Subtotal Estimated Construction Cost					\$ 9,150,000
Administration, Legal, Engineering, Permitting, Contingency, etc. (35%)					<u>3,200,000</u>
TOTAL ESTIMATED PROJECT COST (2010 DOLLARS)					<u>\$ 12,350,000</u>



CITY OF
PRINEVILLE, OREGON
WASTEWATER FACILITIES PLAN UPDATE
ESTIMATED COST - OPTION 1

**TABLE
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