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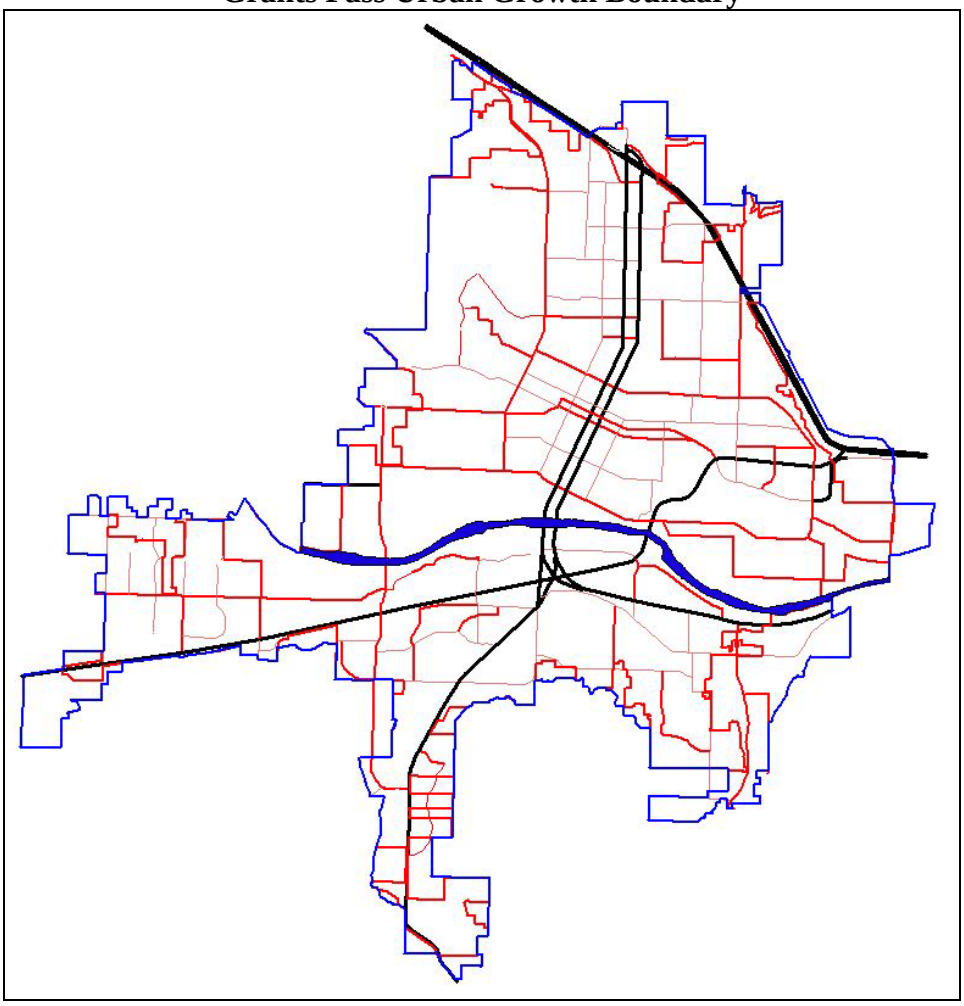
10.20.1 PURPOSE AND INTENT

10.20.1.1 Purpose.

The purpose of this section is to determine the domestic water demand requirements for the build-out of the Urban Growth Boundary (UGB), plus other areas served by municipal water, to assess the ability of the existing municipal water system to meet the projected requirements; to determine what capital improvements are necessary to serve the UGB at built-out, and to approximate costs; to suggest alternative methods for financing the required improvements; and to propose policies for the orderly provision of the required improvements.

Figure 10.20.1
Grants Pass Urban Growth Boundary



10.20.1.2 Intent.

The intent of this section is to enact the following public facilities water system master plans by ordinance as an update to the Public Facilities Element of the City of Grants Pass Comprehensive Plan:

1. *City of Grants Pass Water Management and Conservation Plan, Final Report,* West Yost and Associates, June 2002.
2. *City of Grants Pass Water Treatment Plant Facility Plan, Final Report,* MWH/Montgomery Watson Harza, April 2004.
3. *City of Grants Pass Water Distribution System Master Plan,* West Yost and Associates, January 2001.

NOTE: The Dyer Partnership, Inc. prepared a "Water Master Plan" for Merlin and North Valley in April 2001. The recommended alternative was connection to the City of Grants Pass system. The "Water Master Plan" was adopted by Josephine County as part of its' Merlin / North Valley Community Plan (see Article 101.015 of the Josephine County Rural Land Development Code.) The County has not taken steps to implement the plan, and the City of Grants Pass has not adopted the plan. The City will continue to provide water service to specific properties through individual service agreements; however there are no additional obligations to provide service to properties other than those which are currently served (as of 2008.) The North Valley Industrial Park and some residential uses adjacent to the Merlin Landfill are currently served by City water, and facilities have also been extended to serve the Paradise Ranch Development.

NOTE: Several of the tables within this section contain numbers that have been updated since the above-listed plans were completed. The plans are based on data which was available at the time they were adopted, and have not been updated based on more recent data.

10.20.2 WATER SOURCES

10.20.2.1 Ground Water.

Within the Grants Pass area, an "alluvial deposit" geologic formation is the only reliable source of ground water. In this formation, however, the expected maximum yield from wells of standard construction is 50 gallons per minute, which is insufficient for a municipal supply. Due to lack of adequate quantity, ground water in the Grants Pass area has no potential for municipal use beyond that presently developed. (City of Grants Pass Water System Study, May 1974, Brown and Caldwell)

10.20.2.2 Surface Water.

In the Grants Pass area, surface waters have been in the past, and will continue to be, the only reliable source for large quantities of potable water required for municipal purposes. (Ibid.) The Rogue River is the principal supply of surface water; however, water rights to the Rogue River are limited. The Rogue River drains a large watershed extending from the Cascade Mountains to the Pacific Ocean. Grants Pass is located at approximately River Mile 100 and there are approximately

2,460 square miles of watershed area upstream of the City. As a result of this extensive drainage area, the Rogue River is a plentiful and reliable source of drinking water for the community.

The U.S. Geological Survey (USGS) maintains a river gauging station at the Grants Pass water treatment plant that provides extensive historical data on the flow characteristics of the Rogue River. Because the Lost Creek Reservoir was constructed upstream of Grants Pass in 1977, USGS statistical data for the river are typically based on records from 1978 to the present. Based on USGS data for this station, Table 10.20.2 presents the average, maximum, and minimum monthly flow rates for the Rogue River. Since construction of Lost Creek Reservoir, the lowest daily average flow at Grants Pass was 744 cubic feet per second (cfs) on October 10, 1994, and the lowest seven-day average flow was 799 cfs during the week of September 22, 1994. In general, dry weather flows are maintained by the combination of snow melt from the Cascades in the early summer and the release of stored water from Lost Creek Reservoir in the late summer.[1]

Table 10.20.2 Rogue River Average Monthly Flows at Grants Pass
USGS Data for the 28-Year Period Oct 1978 to Sept 2006

Month	Average Monthly Flow, cfs	Maximum Monthly Flow, cfs	Minimum Monthly Flow, cfs
January	5,094	16,600	1,348
February	4,500	10,960	1,250
March	4,020	8,119	1,099
April	3,950	6,843	1,211
May	3,750	6,428	1,857
June	2,790	4,572	1,549
July	2,120	3,485	1,059
August	2,080	3,080	1,620
September	1,780	2,642	1,333
October	1,450	2,282	1,008
November	2,530	7,669	1,160
December	4,910	17,620	1,557

Source: Grants Pass Water Management Plan, June 2002 (Updated 2/25/2008 by Jason Canady from USGS River Data.)

1 Source: Grants Pass Water Management Plan, June 2002, West Yost and Associates, LLC., page 2-1.

10.20.3 WATER RIGHTS

10.20.3.1 Rogue River.

The City has four separate permits for diverting water from the Rogue River for municipal use. The first is a "perfected right" of 12.5 cfs, dated 1888. The second and third are permits for 25 cfs each dated 1960 and 1965. The fourth permit, dated 1983, provides for an additional 25 cfs for a total of 87.5 cfs. The City's present water rights and water permits are shown in Table 10.20.3.

As water permits and rights are typically subject to cutbacks under conditions of low flow to serve parties with prior year rights, stored water can allow jurisdictions to augment flow otherwise cut back. Cutbacks during the 1977-78 drought years approached the 1965 level. Without Lost Creek Dam, cutbacks in 1981 would have reached back to the early 1900's, as released water accounted for 50% of stream flow that summer. However, since the City's point of diversion is downstream from the Savage Rapids Dam[2,] and cutbacks are established by law as being those jurisdictions and individuals above the dam, there is some question as to whether the City could in fact be cut back, even under low water conditions.

TABLE 10.20.3
Grants Pass Water Rights

Permit Number	Priority Date	Permitted Use	Permitted Rate, cfs	Available Quantity, cfs	Source Availability Analysis		
					Reliability	Impact of ESA	Water Quality
D15839	1888	Municipal / Irrigation	12.5 cfs		High	Undefined	Good
S26901	1960	Municipal	25.0 cfs	735 cfs*	High	Undefined	Good
S45827	1965	Municipal	25.0 cfs		High	Undefined	Good
S47346	1983	Municipal	25.0 cfs		High	Undefined	Good

* Restriction that water can be diverted only when flow at the mouth of the Rogue exceeds 735 cfs.
Source: Grants Pass Water Management Plan, June 2002

Each Water Right and Permit has a specific geographical area within which the water may be used. The 1888 right stipulates "the city limits," which the City holds to be those city limits as they exist at any point in time. The 1960 permit shows an area approximating the City's 1979 Urban Growth Boundary (20 year expansion); the 1965 and 1983 permits show an area approximating a 50-year expansion.

10.20.3.2 Long-Term Reliable Yield.

Due to the nature of the City's surface water supply source, the long-term sustainability of drinking water supplies for Grants Pass is generally good. As noted earlier, the large size of the watershed drained by the Rogue River typically provides abundant water supplies throughout the year. Even

2 Savage Rapids Dam is slated for removal to resolve anadromous fish passage issues. Dam removal will occur once the GPID secures an appropriation of funding from both the federal and state sources. GPID will then pump water from the Rogue River and deliver water to its customers, including those within the City of Grants Pass.

during extreme dry weather periods when river flows are at their lowest, the reliable flow rate in the Rogue River is approximately 750 cfs or nearly fifty times larger than the highest drinking water demand ever experienced in Grants Pass. There are some special circumstances that may affect the long-term reliable yield for the Rogue River. For example, the listing of the Coho Salmon as an endangered species in the Rogue River may influence operational procedures at the Lost Creek Reservoir, which in turn may affect dry weather flow levels. Another issue is related to climate change and snow pack levels in the Cascade Range. Any reduction in average precipitation or the average snow pack will tend to reduce dry weather flow rates in the Rogue River. Since these factors are complex in nature, it is difficult to quantify their potential effect on the river's reliable yield at this time.[3]

10.20.3.3 Grants Pass Irrigation District.

The Grants Pass Irrigation District was organized by the local water users in January 1917. The area of the district was then about 6,000 acres. It originally was planned to irrigate by an extension of the Gravity Canal of the Gold Hill Irrigation District, which was further upstream on the Rogue River and was being organized at the same time. That plan was abandoned in 1920 and the present design was adopted to provide for a direct diversion system with permanent pumping units. The original works were constructed with private funds.

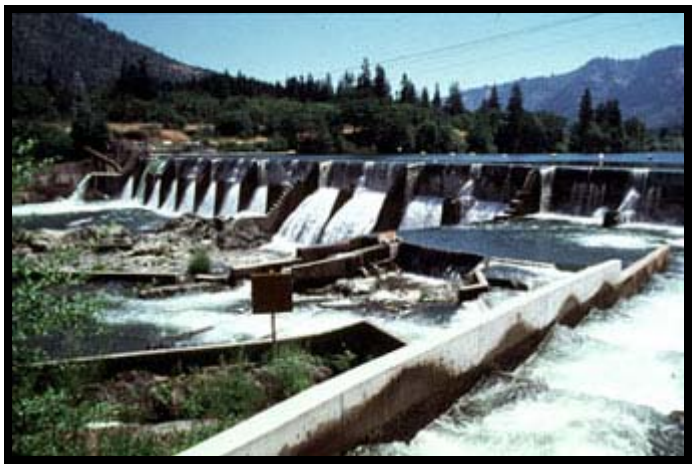
The Savage Rapids Diversion Dam was dedicated November 5, 1921, marking the beginning of the operating history of the district. Settlement and clearing of the undeveloped lands, which constituted a high proportion of the district's area, did not develop to the extent of the expectations upon which the district was founded and financed. As a result, just over one-half of the irrigable area was in production and therefore carried the entire tax burden.

The Savage Rapids Dam and the Northwest Unit pipeline were badly damaged by a flood in 1927. Emergency repairs were made at that time, but lack of sufficient funds prevented satisfactory completion of the work. The cost of maintenance on the pipeline had become almost prohibitive by 1949.

In 1949, the Bureau of Reclamation was requested to replace the old suspension pipeline and siphon with a new buried line under the Rogue River. Several years later Reclamation was asked to rehabilitate Savage Rapids Dam. After thorough investigations, both requests were undertaken and completed. In 1974, the Bureau of Reclamation and Bureau of Sport Fisheries and Wildlife investigated and prepared a report on anadromous fish passage improvements at Savage Rapids Dam.

On February 12, 1982, the Grants Pass Irrigation District perfected a right to 96.7 cfs with a priority date of 1916. In addition, the District "transports" 83 cfs for the Department of Fish and Game after use as irrigation water for stream enhancements, and was granted a "non-consumptive" right of 800 cfs of pass through water needed to drive the water turbines that lift irrigation water to the canals. The GPID point of diversion is at Savage Rapids Dam, see photo below.

3 Source: Grants Pass Water Management Plan, June 2002, West Yost and Associates, LLC., page 2-2.



Savage Rapids Dam
Source: U.S. Department of Interior, Bureau of Reclamation

10.20.3.4 Savage Rapids Diversion Dam.

The Savage Rapids Diversion Dam is on the Rogue River 5 miles east of Grants Pass. It is about 456 feet long and consists of a 16-bay spillway section and a hydraulic-driven pumping plant section at the right abutment. Maximum height of the spillway section is about 39 feet. The first seven bays at the right end of the dam are multiple arches with buttresses on 25-foot centers; the remaining nine bays have a concrete gravity section below the gates. Sixteen wooden-faced radial gates originally provided spillway control. Each of them constructed 23 feet wide and 10 feet high. During rehabilitation, the radial gates were replaced with metal stoplogs, and one double-gated river outlet with a capacity of 6,000 cubic feet per second was installed at the center of the dam. During the irrigation season, the stoplogs are used to raise the reservoir elevation 11 feet.

The Savage Rapids Diversion Dam diverts water from the Rogue River into the South Main Canal to serve the lowlands on the south side of the river. The main pumping plant pumps water from the reservoir to the Tokay Canal to serve lands on the north side of the river, and to the South Highline Canal to irrigate lands above the gravity-type South Main Canal. There are also four lateral relift pumping plants along the canals.

A study by the Bureau of Reclamation (October, 1979) showed that the District served 400 acres zoned exclusive farm use utilized by commercial growers, while serving 7,000 acres of "urban-suburban" lands to irrigate lawns, gardens and pastures. Diversion of water was between 180 to 220 cfs. The Bureau of Reclamation Study indicated that urban-suburban development posed a major problem for canal maintenance and water distribution, being a prime contributor to the District's loss of 2,600 acres of formerly irrigated lands. One of the key factors contributing to maintenance problems is the silting up of those parts of the system from winter runoff, as many of the system canals and laterals also serve to carry storm drainage. The City's Storm Drainage Master Plan calls for a continuance and intensification of this practice, and will require improvements and maintenance coordination between the City and the District. As of 2007, no agreement exists between the City and GPID.

Some 15% of the District's 55 miles of major canals are lined or enclosed in pipe, the rest being unlined. The Bureau of Reclamation recommended either merger of the City and GPID into a water control district (Oregon Revised Statute 553) with both drainage and irrigation services, or some combination of improvements to the canal system to maintain or extend the provision of irrigation water through the system.

A 1974 Grants Pass Water System Study by Brown and Caldwell estimated that the combined water rights of the City and GPID would be sufficient to meet the needs of both the UGB and agricultural users outside the Boundary area.

While discussions with GPID and the Josephine County Water Advisory Board touched on this possibility, the present GPID Board policy is to continue to supply water through the irrigation delivery system, even though development should occur. The District supplies water to almost all of the urbanizing area, and in fact, much of the City, at this time. The District has elected to encourage the continued supply of irrigation water to urbanizing land as development proceeds within the UGB. The District feels this benefits the developer, as the cost of supplying water through a piped system does not often exceed the buy-out cost per acre; benefits the homeowner; and benefits the City, as it saves treatment costs for irrigation water, does not require an increase in the size of the distribution system piping to carry the additional water demand, and reduces the peak per capita usage of water in the summer, thus effectively expanding the capacity of the City's permits.

10.20.3.5 Dam Removal.

In 1995, the Bureau of Reclamation filed a Final Planning Report/Draft Environmental Statement to enhance the salmon and steelhead populations of the Rogue River by removing Savage Rapids Dam. Two pumping plants, one on the north bank and one on the south bank, would be constructed to lift water into Grants Pass Irrigation District's canal system. This plan and environmental law suits resulted in a court order to remove the dam by 2005. To date, the GPID has secured federal and state funding to accomplish dam removal by 2009, including the construction of a new pump station. The uncertainty of these mandated changes has the City and GPID uncertain about any future plans or agreements.

10.20.4 CITY OF GRANTS PASS WATER TREATMENT PLANT, DISTRIBUTION SYSTEM AND WATER DEMAND

10.20.4.1 System History.

The Grants Pass Water Treatment Plant, located at 821 SE"M" Street, was originally built in 1931 with a single basin and three filters for a designed capacity of approximately 3.5 mgd. The plant has undergone several upgrades and expansions through the years to incrementally adjust to a growing population and more stringent treatment standards, including:

- 1950 – Capacity increased to 9 mgd through the addition of second basin and two additional filters.
- 1961 – Minor improvements to treatment process.
- 1983 – Capacity increased to 20 mgd through addition of third basin and three additional filters,

construction of a new raw water intake and new chemical feed systems.

- 1995-2001 – Filter media and gravel support replaced due to suspected gravel/under drain upset caused by excessive air in the backwash line.
- 1997 – Filter-to-waste added for improved CT-removal credit.
- 1998 – SCADA upgrade; VFD included on BW pump.
- 1999-2000 – Improvements to the Equalization basin pumping station.
- 2001 – Liquid sodium hypochlorite system installed to replace gas system.
- 2001 – Riverbank stabilization adjacent to the intake structure, in cooperation with US Army Corps of Engineers.
- 2002 – New PLC-based SCADA system and new monitoring devices were installed in the plant to replace outdated analog transmitters and to allow for more accurate and complete process performance monitoring and automated process control. The PLC replaced obsolete analogue loop-controllers and chemical feed controllers.
- 2006 - Installation of one additional booster pump/ replacement of one aging inefficient booster pump. Reconstruction of the Intake Structure and complete rebuild of the filters and Surface Wash System.

The *City of Grants Pass Water Distribution System Master Plan*, 2001 (West Yost & Associates) inventories and evaluates the performance of the City's water distribution system for critical service standards. This analysis identified system improvements necessary to maintain adequate performance through build-out of the UGB. (**NOTE:** In its' "Future Water Demand" analysis, the plan also acknowledges that there are some properties contiguous to the UGB that are likely candidates for receiving water in the future, as well as some additional areas within the North Valley-see Chapter 3 of the *2001 Water Distribution System Master Plan*.) These identified improvements were developed to either eliminate existing deficiencies in system performance or expand service to satisfy community growth. The elements of the water distribution system that were evaluated include water treatment plant capacity, treated water storage capacity, booster pumping capacity, and pipeline network performance. Table 10.20.4, *Estimated Capital Costs for CIP Projects*, presents the specific costs of reservoir, pump station, and pipeline projects that are targeted for implementation through build-out of the UGB. The costs shown are the City's estimated share of the pipeline extensions and do not include the cost which will need to borne by developers. Timing of projects is based on the City's review of the expansion plans and reflects developer interest and submitted development plans. Some adjustment of timing and priorities should be expected.

Table 10.20.4 Estimated Capital Costs for CIP Projects

Recommended Improvements	Capital Cost, $1,000
Period 2005-2010	
Pipelines	1,049
Pipeline Replacement	1,124
Total	2,173
Period 2010-2020	
Treated Water Storage	5,720
Pipelines	2,042
Pipeline Replacement	2,248
Total	10,010
Period Post 2020	
Treated Water Storage	1,560
Pump Stations	400
Pipelines	184
Total	2,144
Grand Total	14,327

Source: Grants Pass Water Distribution System Master Plan, January 2001

Per the *2001 Water Distribution System Master Plan*, the Grants Pass water supply system distributes water to developed properties covering an area of more than 3,500 acres. The majority of the properties currently connected to the water distribution system are within the present city limits, although the City does provide service to some areas outside the city limits, including the Redwood and Harbeck-Fruitdale areas within the UGB, as well as parts of North Valley. The overall system is composed of a water treatment plant, thirteen booster-pumping stations, eight reservoirs, three pressure-reducing valves, five altitude valves, and approximately 160 miles of pipelines ranging in size between 1" and 30"(most of which are made of cast iron or ductile iron and range in age up to approximately 80 years).

10.20.4.2 Service Pressures.

The urban growth boundary for the City of Grants Pass encompasses lands of wide ranging elevations. As a result, the water distribution system service area contains eight separate service pressure zones serving the UGB and North Valley (See Pressure Zone Map in the *City of Grants Pass Water Distribution System Master Plan*, West & Yost & Associates, 2001). Table 10.20.6 summarizes the service elevations and static range for each pressure zone. The lower end of the pressure range is based on reservoirs at 80 percent full and the upper end is based on full reservoirs. At this time, there are properties receiving City water service in each of the pressure zones except Zone 5.

In some areas, the pressure zone boundaries are modified slightly from these elevation ranges in order to accommodate special service pressure requirements. Pressure Zone 2A is a hybrid between Zones 1 and 2, as is the Rogue Community College's Zone 2B. The North Valley service area spans pressure Zones 1, 2, and 3, serving properties between the elevations of 995 and 1,165 feet. Due to the great range of elevations served in the North Valley, this pressure zone requires pressure reduction valves at service connections to maintain appropriate service pressures. Table 10.20.5 displays the water distribution system pipeline sizes and lengths.

Table 10.20.5
Water Distribution System Pipeline Network

Pipe Size (inches)	Length (miles)
2	5.23
4	1.80
6	40.89
8	43.63
10	7.64
12	19.49
14	0.38
16	7.88
20	2.40
24	1.02
30	0.95
36	0.01
	131.32

Table 10.20.6 Pressure Zone Ranges

Zone	Elevation (feet)	Pressure (psi)
1	900 - 1,020	36 – 90
2	1,020 – 1,140	41 – 95
2A	960 – 1,035	61 – 94
2B	1,000 – 1,060	35 – 60[a]
3	1,140 – 1,280	36 – 100
4	1,280 – 1,420	42 – 104
5	1,420 – 1,560	41 – 104
NV	995 – 1,165	101 - 177

Source: Grants Pass Water Distribution System Master Plan, January 2001

10.20.4.3 Fire Protection.

The Grants Pass Department of Public Safety provides fire protection for properties within the City, and some properties with Service and Annexation Agreements within the Urban Growth Boundary. Since the water distribution system is an integral part of the City's fire protection system, the Department of Public Safety has adopted the Oregon Fire Code recommendations as the required fire flows for the various land use classifications within the City. These fire protection requirements are discussed in detail in Chapter 4, "*Water Distribution System Service Standards," Grants Pass Water Distribution System Master Plan*, January 2001.

10.20.4.4 Booster Pumping Stations.

The water distribution system includes the water treatment plant pumps and thirteen booster pumping stations that transfer water to the higher pressure zones. These pump stations either fill the reservoirs that serve these higher pressure zones or pump to maintain a minimum pressure in those areas that are not served by reservoirs. On the following page, Table 10.20.7 details the technical information for each of the system's pumping stations.

Table 10.20.7 Existing Booster Pumping Stations

Pump Station Location	Service Level	Feeds Reservoir	Number of Pumps	Horsepower and RPM	Rated Capacity	Rated Head (TDH)
Lawnridge	2	Yes (6)	4	1 – 25HP @ 1750 RPM 2 – 50 HP @ 1750 RPM 3 – 50 HP @ 1750 RPM 4 – 100 HP @ 1750 RPM	400 GPM 1000 GPM 1000 GPM 2000 GPM	120 TDH 120 TDH 120 TDH 148 TDH
Madrone	2	Yes (4)	3	1 – 60 HP @ 1750 RPM 2 – 30 HP @ 1750 RPM 3 – 40 HP @ 1750 RPM	2000 GPM 900 GPM 1200 GPM	170 TDH 170 TDH 170 TDH
Champion	3	Yes (8)	3	1 – 100 HP @ 1750 RPM 2 – 150 HP @ 1750 RPM 3 – 50 HP @ 1750 RPM	1600 GPM 2300 GPM 800 GPM	165 TDH 165 TDH 165 TDH
Hefley	3 & 4	Yes (13)	4	1 – 7.5 HP @ 3500 RPM 2 – 15 HP @ 3500 RPM 3 – 60 HP @ 3500 RPM 4 – 60 HP @ 3500 RPM	40 GPM 120 GPM 600 GPM 600 GPM	250 TDH 250 TDH 300 TDH 300 TDH
Starlite	3	No	5	1 – 5 HP @ 3461 RPM 2A – 7.5 HP @ 3525 RPM 2B – 7.5 HP @ 3525 RPM 3 – 60 HP @ 1760 RPM 4 – 30 HP @1760 RPM	30 GPM 84 GPM 84 GPM 1050 GPM 450 GPM	315 TDH 208 TDH 208 TDH 185 TDH 185 TDH
North Valley	5	Yes (15)	3	1 – 7.5 HP @ 3500 RPM 2 – 30 HP @ 3500 RPM 3 – 30 HP @ 3500 RPM	70 GPM 500 GPM 500 GPM	170 TDH 174 TDH 174 TDH
Harbeck	2	No	3	1 – 5 HP @ 3600 RPM 2 – 5 HP @ 3600 RPM 3 – 50 HP @ 3600 RPM	90 GPM 90 GPM 1200 GPM	112 TDH 112 TDH 125 TDH
Hilltop	2	No	3	1 – 5 HP @ 3600 RPM 2 – 7.5 HP @ 3600 RPM 3 – 40 HP @ 3600 RPM	100 GPM 150 GPM 750 GPM	120 TDH 120 TDH 120 TDH
New Hope	2	No	4	1 – 30 HP @ 3600 RPM 2 – 30 HP @ 3600 RPM 3 – 30 HP @ 3600 RPM 4 – 150 HP @ 1800 RPM 5A – 5 HP @ 3600 RPM 5B – 5 HP @ 3600 RPM	350 GPM 350 GPM 350 GPM 2000 GPM 53 GPM 53 GPM	212 TDH 212 TDH 212 TDH 200 TDH 227 TDH 227 TDH
Laurel Ridge	3	No	3	1 – 15 HP @ 3500 RPM 2 – 15 HP @ 3500 RPM 3 – 60 HP @ 3500 RPM	350 GPM 350 GPM 1100 GPM	127 TDH 127 TDH 160 TDH
Meadow Wood	2 & 3	No	6*	1 – 7.5 HP @ 3500 RPM 2A – 15 HP @ 3500 RPM 2B – 60 HP @ 3500 RPM 2C – 60 HP @ 3500 RPM 3 – 100 HP @ 3500 RPM 4 – 7.5 HP @ 3500 RPM	80 GPM 150 GPM 500 GPM 500 GPM 1500 GPM 63 GPM	280 TDH 155 TDH 275 TDH 275 TDH 150 TDH 341 TDH
Williams Crossing	3	No	2	1 – 5 HP @ 3500 RPM 2 – 5 HP @ 3500 RPM	70 GPM 70 GPM	145 TDH 145 TDH
Panoramic Loop	3	No	4	1 – 25 HP @ 3600 RPM 2 – 10 HP @ 3600 RPM 3 – 60 HP @ 3600 RPM 4 – 60 HP @ 1800 RPM	70 GPM 150 GPM 1000 GPM 1000 GPM	316 TDH 138 TDH 157 TDH 157 TDH
Treatment Plant	1	Yes	6	1 – 250 HP @ 1780 RPM 2 – 300 HP @ 1775 RPM 3 – 250 HP @ 1780 RPM 3A – 250 HP @ 1780 RPM 4 – 250 HP @ 1780 RPM 5 – 200 HP @ 1780 RPM	3500 GPM 3500 GPM 3500 GPM 3500 GPM 3500 GPM 2600 GPM	210 TDH 220 TDH 210 TDH 210 TDH 210 TDH 210 TDH

* Pumps 1, 2A and 3 service Zone 2 exclusively. Pump 4 services Zone 3 exclusively. Pumps 2B and 2C service both Zones 2 and 3.

10.20.4.5 Reservoirs.

There are eight water storage reservoirs within the Grants Pass water distribution system that provide a total of 19 million gallons of treated water storage. These reservoirs were constructed between the years 1946 and 1999. Design information for these reservoirs is detailed in Table 10.20.8.

Table 10.20.8 Existing Reservoirs

Reservoir Location	Reservoir Number	Pressure Zone Served	Year Built	Construction Materials	Capacity (mg)	Bottom Elevation (ft)	Overflow Elevation (ft)
500 Block Woodson Drive	3	1	1946	Concrete	3.5	1,089.5	1,108.5
1500 Block Ridge Road	4	2	1953	Concrete	0.75	1,216	1,240
1400 Block Sherman Lane	5	1	1983	Concrete	3.5	1,079.5	1,108.5
2200 Block Crown Street	6	2	1982	Concrete	3.5	1,211	1,240
Heiglen Loop Road	8	3	1983	Concrete	2.0	1,341	1,370
1420 Denton Trail	11	1	1999	Concrete	4.5	1,080.1	1,108.5
1700 Block Sunset Lane	13	4	1980	Concrete	0.08	1,510	1,520
3900 Block Highland Ave.	15	4	1985	Concrete	1.2	1,374	1,403

Source: Grants Pass Water Distribution System Master Plan, January 2001

10.20.4.6 System Operation.

The general procedures for operation of the Grants Pass water distribution system are discussed in the following:

- The water treatment plant operates as necessary to fill storage reservoirs in the distribution system on a daily basis. Therefore, the operating schedule adjusts to seasonal variations in water demand. During winter months, the plant generally operates seven days per week for an eight-hour period. Operational hours are extended during the high demand summer months, when the plant must operate up to twenty four hours a day in order to keep the storage reservoirs full.
- Those booster pumping stations that fill storage reservoirs are automatically controlled to maintain preset water levels. When sensors show that the water level of a reservoir has fallen below a preset threshold, the lead pump will activate and begin filling the reservoir to a high water level. If water demand on the reservoir is such that a single pump cannot maintain the water level, a lag pump (or pumps) will activate as necessary until the reservoir fills to a high water level.
- Those booster pumping stations that serve areas without storage reservoirs are automatically controlled to maintain a minimum discharge pressure at the pumping stations. When pressure sensors show that the discharge pressure has fallen below a preset threshold, the lead pump activates and pumps until the discharge pressure exceeds a high pressure level. If water demand in the pump station's service area is such that a single pump cannot maintain the pressure level, a lag pump (or pumps) will activate as necessary until the system pressure is restored.

- The reservoirs in the water distribution system are generally maintained between 80 and 100 percent full. This fluctuating volume represents the operating storage. The remaining storage is allocated to providing fire flow requirements and emergency reserves. In the case of Reservoir No. 15 in the North Valley, water levels are maintained at a much lower level due to limited demand in that portion of the distribution system. Altitude valves control the flow into and out of Reservoirs No. 3, No. 4, No. 5, No. 6, and No. 11. These valves are designed to close when the reservoir is full and open when the system pressure drops. The other reservoirs in the distribution system float on the system.
- There are three pressure reducing valve stations in the Grants Pass water distribution system. Two of the stations control the flow of water from Pressure Zone 2 to Pressure Zone 2A. Pressure Zone 2A extends to slightly lower elevations than Pressure Zone 2 and thus requires some pressure reduction. Each station contains a single pressure-reducing valve (one is a 10-inch valve and one is a 6-inch valve). The third pressure reducing valve station on NE Beacon Drive reduces Zone 4 water to Zone 3.
- The City upgraded the water distribution system to a Supervisory Control and Data Acquisition (SCADA) system in 1999. SCADA system monitors reservoir levels, pump operating status, and local pressures throughout the system. The central computer system for the man-machine interface is located at the water treatment plant.

10.20.4.7 Water Treatment Plant.

The City of Grants Pass Water Treatment Plant (WTP) has successfully met the City's drinking water needs for over 70 years. The Rogue River supply is typical of many Pacific Northwest surface waters with low mineral content, low pathogen concentrations, and normally low turbidity, but with seasonal increases in turbidity due to precipitation and runoff. The Rogue River quality and flow is also influenced by the operation of upstream reservoirs including Lost Creak Reservoir and Savage Rapids Dam (slated for removal). Peak withdrawals by the WTP to meet demands in the summer months coincide with minimum river flows and low turbidities.

The WTP's main purposes include removal of suspended particulates, removal and inactivation of pathogens, and production of non-corrosive, palatable water in accordance with Federal and State drinking water regulations. The plant has historically met all regulations and the few customer complaints are limited to occasional chlorinous tastes and odors. The plant appears well positioned to continue to meet current and future drinking water needs.

The plant's production has steadily increased over the last decade in response to increasing water demands within the City's service area. The City's service area has been expanding as areas previously served by small groundwater systems have been incorporated into the City's water system. Significant investments have been made to upgrade the distribution and storage systems over the past few years. Water production at the plant has increased by approximately 20% since 1995. In 2007, peak day water production was 11.87 mgd, and the average annual production was 5.85 mgd.

The plant has rated maximum capacity of 20 mgd with all raw water and finished water pumps in operation. The reliable plant capacity is approximately 15 mgd with one of the largest pumps out of service. The plant is operated in a start/stop mode each day, with the hours of production varying

between 8 to 24 hours per day depending on demands and raw water quality. The plant occasionally operates at the peak production rate of 20 mgd (14,000 gpm) during the high demand season. Recently the plant has had to increase its operating staff to allow for 24-hour operations, to more reliably meet demand during peak summer season.

The *Water Treatment Plant Facilities Plan*, April 2004 (WTPFP) provides guidance for improving this major element of the City's water system and recommends a capital improvement program (CIP) that will meet the City's water treatment needs for 20 to 25 years. Based on a water demand increase of 2.5 to 3 percent per year, it is expected that the plant will continue to be able to meet the City's water needs for at least the next 20 years, with some modifications and improvements. A major plant expansion is not envisioned until the middle to end of decade 2020. Although the existing plant site is extremely confined, the plant is capable of being expanded to approximately 30 mgd with major modifications. The plant expansion to provide 30 mgd of treatment would be required in 25 years (on-line by 2028) if demand growth is steady at 2.5 percent per year. The expansion would be required in 20 years (on-line by 2023) if demand growth is steady at 3 percent per year. The existing plant structures appear to have significant remaining useful life. However, the older plant structures are vulnerable to damage during a severe seismic event.

While the plant has been able to successfully meet the City's water demands and also produce good water quality, the *Water Treatment Plant Facility Plan* identified the following challenging issues which have regulatory compliance implications and which create production inefficiencies. Note that the WTPFP was adopted in 2004 and since then measures have been taken to address the following issues:

- The existing Rogue River intake does not comply with current Endangered Species Act (ESA) regulations to protect juvenile fish including salmonids, due to high approach velocities and screen deficiencies. **NOTE:** This problem has since been fixed. Completed in 2006, the intake structure screen was replaced and the intake inlet was increased in size to reduce intake velocity.[4]
- The backwash/sludge holding pond is completely full of solids and immediate action is required, including development of a long-term solids management plan, to ensure continued compliance with the City's NPDES permit for discharge to Skunk Creek. **NOTE:** A master plan for a long-term solution to this problem was being developed as of September 2007. Short-term solids handling procedures are in place until the plan is completed.[4]
- The filter media is in a degraded condition and the plant (specifically the filters and sedimentation basins) is operating inefficiently requiring frequent backwashing and excessive raw water pumping, resulting in higher operating costs. **NOTE:** The filter media has been upgraded and the resulting operational inefficiency is no longer a problem.[4]
- Proposed drinking water regulations, including the Disinfectants/Disinfection By-Products Rule and the Long-Term 2 Enhanced Surface Water Treatment Rule, have the potential to require significant plant modifications depending on the outcome of monitoring programs. **NOTE:**

4 Per Dave Wright and Joey Wright, City of Grants Pass Public Works Department, September 2007

Increased monitoring programs will be underway in the near future. Depending on the outcome of these programs, plant modifications may be required to maintain drinking water compliance.[5]

These and other challenges require the City to implement near-term improvements to the plant. The plant also requires a longer-term capital improvement program to ensure reliability and redundancy of major equipment, including adding new equipment, replacement/repair of major equipment as it becomes less reliable, and to prepare for a major plant expansion.

10.20.4.8 Water Demand Analysis.

Analysis of the City of Grants Pass historic water production and demand data allows for the identification of the unique water use patterns that characterize the City and provides a basis for estimating future water demand in the community. Additional analysis relates the various measures of water demand (maximum monthly demand, maximum daily demand, and peak hour demand) to the average annual demand through the use of peaking factors.

The projection of future water demand is based on unit demand factors developed by land use type and corresponding customer classifications. These future demand projections provide the basis for assessing the adequacy of the existing water production and distribution system and planning for future improvements.

10.20.4.9 Recent Water Use Statistics.

There are several measures of water use that are important to analyze during the development of the water master plan. Following is a description of the influential water demand factors that will guide planning decisions with respect to the Grants Pass water systems:

- Annual average demand – A measure of the amount of water that must be obtained from the available sources of supply on an annual basis.
- Monthly average demand – Review of monthly average water demand illustrates seasonal variations in demand due to such factors as climate, irrigation, industrial production, and domestic use patterns.
- Maximum day demand – The maximum daily water demand is used to size booster pumping stations that serve areas with storage reservoirs. This measure of demand is also used along with fire demands to size storage reservoirs.
- Peak hour demand – The peak hour water demand is used to size pipelines and booster pumping stations that serve pressure zones without reservoirs.

Three water usage rate variations are generally used in the design of water system facilities. These are the average annual demand, maximum day demand and peak hour demand. The annual average, monthly average, and maximum day water demand are calculated from analyzing WTP daily operational data. The analysis allows for the identification of annual average, monthly average, and maximum day water demand based on the period from 1995 to 1999. The average annual demand increased from 3.73 mgd to 4.50 mgd. The highest peak daily demand was 9.47 in August of 1998.6

5 Per Jason Canady, City of Grants Pass Water Treatment Plant Supervisor, September 2007
6 Data excerpted from *2001 Water Distribution System Master Plan*. Water use has since increased substantially. See Table 10.20.16 for more recent water use data.

10.20.4.10 Per Capita Water Demand.

Per capita water demand is a useful demand measure that is derived from historical data. However, it was not used in determining demand in the *2001 Water Distribution Plan* (which uses land use-based demand) or *2004 Water Treament Plant Facility Plan* (which is based on a water demand growth rate factor.) Table 10.20.9 presents the population for Grants Pass along with the average annual demand during the years 1995 to 1999, which allows for calculation of the average demand in gallons per capita per day (gpcd). Ranging from 190 to 215 gpcd, the average daily water demand for the years 1995 to 1999 is 202 gpcd. Note that this unit demand factor is based on water production and includes all uses: residential, commercial, industrial, public/institutional, and unaccounted. The variation in per capita demand for the different years reflects the regular variation in water use patterns caused by seasonal conditions and possible changes in end user demand characteristics.

For reference, an engineering report of the water distribution system, prepared by CH2M Hill in 1979, identified an average annual demand of 253 gpcd.

Table 10.20.9 Grants Pass Water Use for 1995 to 1999, gpcd*

Year	Population (City Limits)	Average Demand, mgd	Average Demand, gpcd
1995	19,660	3.73	190
1996	20,255	4.11	203
1997	20,535	3.97	193
1998	20,590	4.17	203
1999	20,935	4.50	215
2000	23,170	4.55	196
2001	23,670	4.86	205
2002	23,870	4.98	209
2003	24,470	4.81	197
2004	24,790	5.00	202
2005	26,085	4.75	182
2006	30,930	5.26	170
2007	31,740	5.84	184
13-Year Average	--	5.66	196

Source: For years 1995-1999, Grants Pass Water Distribution System Master Plan, January 2001;
For years 2000-2007, updated 4/2008 by Jason Canady and Jared Voice using population estimates from Portland State University's Population Research Center)

*Demands include all uses, including residential, commercial, industrial, and public/institutional.

NOTE: Not all City residents are connected to the municipal water system. There are also users outside of the City limits that are not included in the population data in this table. Therefore, although the demand for all users is shown, the per capita demand shown likely overstates actual per capita use.

10.20.4.11 Unaccounted for Water.

All water distribution systems experience losses of water during transmission from the treatment plant to the end user. These losses, known as unaccounted for water, result from many situations including un-metered customers, transmission system leaks, main breaks, faulty meters, fire fighting activities, system flushing, and other miscellaneous hydrant uses. Thus, the total volume of water metered for all end users is always somewhat less than the volume of water produced at the WTP.

Since the City meters water use for all customers, a comparison of water billing records and treatment plant production data provides a good estimate of the volume of unaccounted for water in the system. Table 10.20.10 shows the estimated volume of unaccounted for water in millions of gallons and also as a percentage of total production during the period of 1998 through 2000. Since a water loss rate of 10 to 15 percent is considered good, the calculated unaccounted for water rate indicates that the distribution system is in good condition. The City is also conducting several programs that will reduce the unaccounted for water rate. The programs include residential meter replacements, commercial meter upgrades, and improved monitoring of hydrant use.

Table 10.20.10 Unaccounted for Water; 1998-2000

Year	Million Gallons	Percent of Total Water Production
1998	146	9.6%
1999	190	11.6%
2000	177	10.9%

Source: Grants Pass Water Management Plan, June 2002

10.20.4.12 Unit Demand Factors by Land Use Pattern.

Water demand factors related to land use patterns are used to analyze water demand in the community. Based on historical billing data provided by the City's Utilities Department for 1998 and 1999, Table 10.20.11 shows water demand within each land use pattern classification: commercial, single family residential, and multi-family residential showing the annual average and percent of total annual average demand for both years. The commercial classification includes general business, industrial, institutional and governmental-public land use categories. As indicated in the percentage summary of annual average demand by land use, the single-family residential classification accounts for nearly half of the water used in Grants Pass.

Table 10.20.11 Grants Pass Water Use by Customer Class for 1998 and 1999

Demand				
	Commercial	Multi-Family Residential	Singe-Family Residential	Total
1998 Annual Average	1.36	0.61	1.80	3.77
Percent of total annual average demand	36.0%	16.2%	47.8%	100%
1999 Annual Average	1.40	0.67	1.91	3.98
Percent of total annual average demand	35.2%	16.8%	48.0	100%

Source: Grants Pass Water Management Plan, June 2002

To develop a unit demand factor for the three different land use patterns, the water demand data presented in Table 10.20.11, above, are combined with estimated areas for each of the land use classifications. Table 10.20.12, below, summarizes the acreages by land use classification and pressure zone for all areas receiving water service from the City of Grants Pass, including those within the Urban Growth Boundary and North Valley. This summary was derived from analysis of a distribution system for Pressure Zones 1 through 4. The acreage for Pressure Zone NV is based on an estimate of the properties connected to the system in the North Valley area. The

quotient of water demand and acreage yields a unit demand factor for each land use classification in gallons per acre per day (gpad), as presented in Table 10.20.13 below. Table 10.20.11 above does not include unaccounted for water, the calculation of these unit demand factors includes an allowance for unaccounted for water.

Table 10.20.12 Land Use by Pressure Zone (Acres)

	Customer/Class	PZ/1	PZ/2	PZ/3	PZ/4	PZ/NV	Total	%
	Commercial	924	125	57	0	40	1,146	32%
	Residential	1,197	594	114	67	5	1,977	56%
	Multi-Family	358	42	35	0	0	435	12%
Total		2,479	761	206	67	45	3,558	100%
%		70%	21%	6%	2%	1%	100%	

*The Commercial customer class includes commercial, industrial, and public connections to the system.
Source: Grants Pass Water Distribution System Master Plan, January 2001

Table 10.20.13 Unit Demand by Customer Class

Customer Class	1999 Average Demand (mgd)	Land Use Area (Acres)	Average Unit Demand (gal/acre day)
Commercial/Industrial/Public	1.56	1,146	1,400
Multi-Family Residential	0.75	435	1,700
Single-Family Residential	2.13	1,977	1,100

*The 1999 average demand is based on billing records plus 11.6 percent to reflect unaccounted for water.
Source: Grants Pass Water Management Plan, June 2002

10.20.4.13 Peak Hourly Demand.

The peak hour demand on the water distribution system typically occurs during the hottest, driest period of the year when customers are heavily irrigating landscaped yards and parks. For the City of Grants Pass service area, the peak hour demand usually happens in the month of August during the peak day demand. In order to evaluate this peak hour demand, hourly water level data was collected from each of the reservoirs in the distribution system during the summer of 1999. This data was analyzed in combination with the water production rate for the water treatment plant to identify the peak hour demand on each day for which data was available. Based on this analysis, the peak hour demand is estimated to be 4.5 times the average annual demand.

10.20.4.14 Historical Peaking Factors.

The water demands observed over the five years from 1995-1999 can also be expressed as a ratio to the annual average demand known as peaking factors. Although peaking factors vary significantly from user to user, these historical peaking factors are useful for comparing system-wide water use patterns in Grants Pass to other communities and for projecting future water use patterns. Table 10.20.14 identifies Grants Pass water demand patterns for 1995 to 1999 and shows peaking factors based on ratios to annual average demand. The identified peak hour demands for the system are not

actual measurements, but rather estimates derived from the reservoir level analysis conducted during the summer of 1999 as described above. Tables 10.20.14 and 10.20.15 below summarize the average peaking factors for the system. These values are fairly typical for a Western Oregon community. In general, they are slightly higher than the peaking factors for Corvallis and slightly lower than values for Portland.

Table 10.20.14 Grants Pass Maximum Month, Peak Day, and Peak Hour Demand Ratio

Year	Annual Average Demand, (mgd)	Maximum Month Demand, (mgd)	Peak Day Demand (mgd)	Peak Hour Demand, (mgd)	Ratio of Maximum Month to Annual Average Demand	Ratio of Peak Day to Annual Average Demand	Ratio of peak Hour to Annual Average Demand
1995	3.73	6.48	8.32	17.01	1.74	2.23	4.56
1996	4.11	7.22	9.09	18.60	1.76	2.21	4.52
1997	3.97	6.82	8.83	18.10	1.72	2.22	4.56
1998	4.17	7.62	9.47	19.40	1.83	2.27	4.66
1999	4.50	7.79	9.35	19.20	1.73	2.08	4.26
5 Yr. Avg.	4.10	7.18	9.01	18.46	1.76	2.20	4.51

Source: Grants Pass Water Distribution System Master Plan, January 2001

Table 10.20.15 Peaking Factor Summary

Description	Factor
Maximum month demand	1.8
Maximum daily demand Average for city	2.2
Peak hourly demand Average for city	4.5

NOTE: The average demand multiplied by the peaking factor yields the respective peak demand.
Source: Grants Pass Water Distribution System Master Plan, January 2001

The following table identifies Grants Pass Water demand patterns for the years 1995 through 2006. The data used in this table was obtained from the City Water Treatment Plant supervisor in 2007 to provide updated information that was not included in the previous planning documents referenced in this chapter. This more recent data shows that water demand has continued to increase since the previous plans were completed. Note that the more recent data was not contained in the *2001 Water Distribution System Master Plan*, the *2002 Water Management Plan* or the *2004 Water Treatment Plant Facility Plan*. The capital improvement and implementation plans developed in these documents and referenced later in this chapter pre-dated this more recent data.

Table 10.20.16 Grants Pass Maximum Month, Peak Day and Peak Hour Data, 1995-2006

Year	Annual Average Flow (mgd)	Maximum Month Demand (mgd)	Peak Day Demand (mgd)	Peak Hour Demand (mgd)
	Finished	Finished	Finished	Finished
1995	3.93	6.48	8.32	17.69
1996	4.23	7.22	9.09	19.04
1997	4.03	6.82	8.83	18.14
1998	4.24	7.62	9.47	19.08
1999	4.56	7.79	9.35	20.52
2000	4.55	7.82	9.73	20.48
2001	4.86	7.74	9.25	21.87
2002	4.98	8.88	10.54	22.41
2003	4.81	9.21	10.31	21.65
2004	5.00	9.33	10.17	22.50
2005	4.75	9.57	10.52	21.38
2006	5.27	9.55	11.69	23.72
12-Yr. Avg.	4.60	8.17	9.77	20.71

NOTE: Annual average flow, maximum month demand and peak day demand obtained from Water Treatment Plant data; Peak hour demand is an estimate calculated by multiplying the average flow by the actual 1995 to 1999 peaking factor average of 4.5 (see Tables 10.20.14 & 10.20.15)
Data Source: Jason Canady, City of Grants Pass Water Treatment Plant Supervisor

10.20.4.15 Future Water Demand.

NOTE: The information presented in this section was excerpted from the *Grants Pass Water Distribution System Master Plan*, prepared by West Yost and Associates in January 2001.

Committed Service Areas.

The land use demand factors developed in the previous sections provide a basis for projecting future water demand in the Grants Pass service area. The land use demand factors can be used in conjunction with land development projections to estimate water demand.

Although the timing of land use development within the UGB is unknown, information is available regarding the current zoning designation for all properties within the UGB. Table 10.20.17 summarizes the acreage of properties with the UGB according to land use, differentiating between properties that are were receiving water service as of January 2001 and those that will connect to the water distribution system in the future. Using the unit demand factors developed for these land use classifications, the table also projects average annual water demand at the UGB build-out condition. This analysis assumes the existing mix of residential/commercial properties will stay the same in the future.

Table 10.20.17 Land Use Based Water Demand Projections for UGB Build-Out

Land Use	Existing Acreage	Future Acreage	Total Acreage	Unit Demand, gallons/acre-day	Estimated Average Annual Demand, mgd
Commercial	1,146	598	1,744	1,400	2.4
Single-Family Residential	1,977	2,419	4,396	1,100	4.8
Multi-Family Residential	435	440	875	1,700	1.5
Total	3,558	3,457	7,015	4,200	8.7

Source: Grants Pass Water Distribution System Master Plan, January 2001

Based on this estimate of the UGB build-out average annual demand, the future maximum month, maximum day, and peak hour demand can be estimated using historical peaking factors. Table 10.20.18 summarizes water demand at the time of the *2001 Water Distribution System Master Plan* and projections for the build-out condition.

Table 10.20.18 Water Demand Summary for Grants Pass

	Current Water Demand, mgd	Future Total Water Demand, mgd
Average Annual	5.85	9
Maximum Month	10.13	16
Maximum Day	11.87	20
Peak Hour	23.72	40

Source: Grants Pass Water Distribution System Master Plan, January 2001 (Updated Jason Canady, 3/08)

Potential Service Areas Independent of UGB.

The City has also evaluated its potential to serve properties outside the Urban Growth Boundary, mainly related to the existing distribution system serving the Merlin / North Valley area, and some additional areas contiguous to the UGB.

One location with potential for future water system expansion is Merlin / North Valley. A portion of this area, including the North Valley Industrial Park and several residents along Merlin Road, is being serving by a service connection to the City at NW Highland Ave. near NW Vine St. (as of 2008.) The North Valley pump station was constructed at this connection to pump water from the City's Pressure Zone 3 to fill a 1.2 million gallon reservoir though an 8-inch pipeline in Highland Ave. The reservoir is located approximately one mile north of the North Valley pump station. The water coming out of the storage tank then feeds the Merlin / North Valley system by gravity through a 1.6-mile long 16-inch pipeline. The North Valley pump station consists of three booster pumps with a total capacity of 1,070 gallons per minute (gpm).

The existing North Valley Reservoir and Pump Station have the capacity to accommodate some additional demand in the area. Based on a Technical Memorandum issued by West Yost Associates in December 2007, in addition to serving existing users, there is adequate capacity to serve the airport, Manzanita Rest area, the North Valley schools and Paradise Ranch. To expand service beyond these specific users, including adding any additional residential users, would require significant upgrades to the system, including pipeline improvements and an upgrade of the North Valley pump station. Because of limited space within the existing pump station vault, it may be necessary to relocate the pump station to accommodate any expansion. Additionally,

water storage issues will need to be addressed if the service expansion is large enough. The City can continue to provide water service to specific properties within Merlin / North Valley through individual service agreements; however there are no additional obligations to provide service to properties other than those which are currently served (as of 2008.)

In addition to properties within the UGB, there are also properties contiguous to the UGB that are potential candidates to receive water service in the future. Based on information obtained by West Yost Associates from City staff in about 2001, a rough estimate of the area of these properties is 400 acres. Assuming that these properties largely fall within the single-family residential and industrial land use classifications, the additional acreage would increase the annual average demand on the system by approximately 0.5 mgd.

10.20.5 CITY OF GRANTS PASS WATER SYSTEM CAPITAL IMPROVEMENTS PROGRAM (CIP)

Based on the evaluation of existing system performance and future expansion requirements presented in Section 10.20.4, and upon projected improvements required for ensuring the Water Treatment Plant (WTP) continues to serve the City's needs for the next 20 years and beyond, this section integrates the projects into a staged Implementation Plan for WTP improvements and Capital Improvement Program (CIP) for water distribution system improvements (including pipes, pump stations, etc.)

Table 10.20.19 identifies the WTP facility improvements required to meet the build-out of the City of Grants Pass UGB. The Implementation Plan for WTP improvements was initially completed by MHW Americas, Inc. in 2004 as part of the *City of Grants Pass Water Treatment Plant Facility Plan*. The Plan was also included in the Technical Memorandum that was produced by Parametrix in March 2005 and adopted by City Council Resolution No. 4954 in May of 2005.

Table 10.20.19 City of Grants Pass Water System
Implementation Plan for WTP Improvements (2003 Dollars)

Fiscal Year	Improvements	Estimated Project Costs ($1000)
2004/2005	Intake Modifications (Engr. And Permitting)*	400
2005/2006	Intake Modifications (Engr and Construction)* Filter Upgrades (Engr. And Construction* Basin Modifications (Engr. and Construction)	500 200 200
2006/2007	Intake Modifications (Construction)* Filter Upgrades (Construction)* Basin Modifications (Construction)	700 400 400
2008/2009	Filter Gallery Upgrades (Engr. And Construction) Solids Handling	480 800
2009/2010	Filter Gallery Upgrades (Construction) Chemical System Upgrades (Engr. And Const.)	510 53
2010/2011	Chemical System Upgrades (Construction) Sludge Removal Systems (Engr. And Const.) New Storage Building (Engr. And Construction)	138 80 27
2011/2012	Sludge Removal Systems (Construction) New Storage Building (Construction)	239 53
2012/2013	Emergency Generator for 5 mgd (Engr. and Const.)	319
2024	Expand Capacity to 30 mgd	7,813

*Completed as of September 2007, per Jason Canady, City of Grants Pass Water Treatment Plant Supervisor
Source: Capital Improvement Program, Parametrix Technical Memorandum Dated 4/25/2005,
Adopted By Council Resolution No. 4954, 5/6/2005

In addition to the capital improvements presented above, the City should also implement the following efforts for the Water Treatment Plant (WTP) over the next few years:

- Continue to explore alternative coagulation options to reduce solids production, improve plant performance and reduce operating costs;
- Continue collecting Cryptosporidium samples from the Rogue River to determine "bin classification" according to the LT2ESWTR;
- Develop a DBP sampling program based on the proposed regulations, in conjunction with State of Oregon DHS, to monitor for trihalomethanes (THMs) and haloacetic acids (HAAs), to verify compliance with the proposed Stage 2 D/DBP Rule;
- Complete a Seismic Vulnerability Study; and
- Assess the viability and costs of the sludge handling and disposal program, of which evaluation and implementation has been ongoing for several years and is anticipated to continue for the next 3 to 5 years (as of 2007.)

As of November 2007, it is anticipated that over the next 2 to 3 years the City will verify that it can meet the LT2ESWTR and D/DBP Rule with the existing plant. LT2ESWTR requires 2 years of data collection. The data has been collected once and the WTP is currently completing a second round to ensure compliance with the rule. The stage 2 D/DBP rule requires extensive planning and testing to determine new sampling points before compliance can be determined. If compliance is ultimately determined to be unlikely, then the City may have to implement an alternative disinfection scheme at the WTP.

The City should periodically monitor plant performance and water demands over the next 10 years as it makes capital improvements and to verify that planned improvements are still required. An update of the WTP Facilities Plan should be completed in 5 to 10 years depending on water demands and regulations, including a review of plant expansion requirements.

The WTP is capable of being expanded to approximately 30 mgd with major modifications. Based on current growth estimates, the plant expansion will not be required until the middle to end of decade 2020. The estimated project cost for a plant expansion to 30 mgd is $7.5 million dollars in 2003, which minimizes the use of additional footprint on the existing site. It is recommended that the City assess available property for a future new plant to expand and partially replace the existing plant within the next 50 years.

The following CIP identifies specific improvements for each of the first five years and for the full build-out of the City's service area. For each of the recommended projects, the CIP also presents cost estimates based on the unit construction costs identified on pages 7-1 of the *Grants Pass Water Distribution System Master Plan*, January 2001, West Yost & Associates. Cost estimates were adjusted by Parametrix in its Technical Memorandum dated March 2005 to reflect 2005 dollar amounts.

Table 10.20.20 City of Grants Pass Water System Capital Improvements Project List & Estimated Capital Costs 2000-2005 (2005 Dollars)

Recommended Improvements	Capital Cost ($1000)
Pump Stations	
Hilltop/Harbeck Heights Fire Pumps	60
Rogue Community College Pump Station	280
Subtotal	340
Pressure zone boundary modifications	114
Pressure reduction valves	149
P-101 West Harbeck to Allen Creek	62
P-103 Leonard Street Looping	46
P-104 Lower River Road	86
P-105 Prospect Avenue Looping	16
P-106 Hawthorne to Crescent	427
P-107 9th to 10th at Midland	139
P-108 Sherman Lane to Tokay Heights	259
P-109 Marion Lane	131
P-110 C St to D St Loop	56
P-113 Bridge to Brownell	325
P-114 Lincoln Rd Looping	95
P-115 10th and Savage Tie-In	8
P-202 Redwood Ave Looping North	200
P-203 Redwood Ave Looping South	202
P-204 Rogue Community College Extension	4,372
P-207 Williams Hwy Extension	53
P-220 Southeast North Street Extension	26
P-221 Shannon Lane Extension	55
P-222 Lincoln Road Extension	118
P-223 Ament Road Extension	754
P-224 Starlite Connector	290
Subtotal	7,983
Total	8,323

Source: Capital Improvement Program, Parametrix Technical Memorandum Dated 4/25/2005, Adopted By Council Resolution No. 4954, 5/6/2005; Subtotal and total dollar amounts have been adjusted by City staff due to mathematical errors that appear in original document.

NOTE: Several of the above-listed projects have been fully or partially completed. Uncompleted projects will continue to be identified and included in the work plan / budget for completion.

Table 10.20.21 City of Grants Pass Water System Capital Improvements Projects List & Estimated Capital Costs 2005-2010 (2005 Dollars)

Recommended Improvements	Capital Cost ($1000)
Pipelines	
P-208 Williams Hwy Looping	336
P-214 Rogue River Hwy Extension	749
P-225 Starlite Extension	114
Subtotal	1,199
Pipeline Replacement	
12,500 feet total replacement	1,124
Subtotal	1,124
Total	2,323

Source: Capital Improvement Program, Parametrix Technical Memorandum Dated 4/25/2005, Adopted By Council Resolution No. 4954, 5/6/2005

Table 10.20.22 City of Grants Pass
Water System Capital Improvements Projects List &
Estimated Capital Costs 2010-2020 (2005 Dollars)

Recommended Improvements	Capital Cost ($1000)
Treated Water Storage	
Reservoir No 12	1,955
Reservoir No. 14	972
Reservoir No. 16	1,097
Reservoir No. 17	1,543
Reservoir No. 13 (replacement)	972
Subtotal	6,539
Pipelines	
P-206 Reservoir No. 12 Extension	488
P-209 Reservoir No. 17 Extension	111
P-215 Fruitdale Dr Extension	892
P-216 Cloverlawn Loop	64
P-218 Cloverlawn to Crestview Loop	162
P-219 Reservoir No.16 Extension	207
P-226 Greenfield Rd Loop	273
P-229 Reservoir No. 14 Extension	78
Subtotal	2,275
Pipeline Replacement	
25,000 feet total replacement	2,248
Subtotal	2,248
Total	11,062

Source: Capital Improvement Program, Parametrix Technical Memorandum Dated 4/25/2005, Adopted By Council Resolution No. 4954, 5/6/2005

Table 10.20.23 City of Grants Pass Water System
Capital Improvements Projects List and Estimated Capital Costs 2020 (2005 Dollars)

Recommended Improvements	Capital Cost ($1000)
Treated Water Storage	
Reservoir No. 10	1,783
Subtotal	1,783
Pump Stations	
Treatment Plant Pumps	457
Subtotal	457
Pipelines	
P-217 Reservoir No 10 Extension	210
Subtotal	210
Total	2,450

Source: Capital Improvement Program, Parametrix Technical Memorandum Dated 4/25/2005, Adopted By Council Resolution No. 4954, 5/6/2005

10.20.6 PRIVATE WATER UTILITIES

All domestic water services within the UGB area that are not served by the City of Grants Pass system derive their water supply from wells. Prior to requirements for subdivisions and other developments to connect to City water, developments were often served through private water systems. Private water companies supply water through small distribution systems mostly to subdivisions, motels, and mobile home parks. A list of private water systems and approximate populations served by each is available through the United States Environmental Protection Agency.

Private utility companies have developed various areas within the City's Urban Growth Boundary, especially south of the Rogue River. Most remaining systems were constructed prior to requirements that they be constructed to municipal system standards. These systems rely upon wells for their supply, and their distribution piping systems consist of small diameter pipe and cannot be used effectively in the Grants Pass Water System. In order for the City to accept these private systems into theirs, the private companies are required to meet or exceed the City's standards. In most cases, the private companies cannot afford the capital improvement costs to comply and naturally resist connecting with the City System.

There are three existing private water systems that are scheduled to be connected to the City Water System within the next two years. These include Bluegrass Park Water Company, Meadow Creek Subdivision and Twilight View Estates7. Per EPA records, the total population served by these three private water companies is approximately 245. At least two additional private water systems, College Oaks and Willow Glenn, were built to City standards and may eventually be connected in the future. However, only the originally-mentioned three systems were planned for connection to City water as of September 2007.

City policy prevents the development of any new private water systems within the UGB.

10.20.7 URBAN SERVICE MASTER PLANS AND MANAGEMENT AGREEMENTS FOR WATER

1. The Grants Pass City Council prepared the *Grants Pass Water Distribution System Master Plan*, 2001; *Water Treatment Plant Facility Plan*, 2004; and the *City of Grants Pass Water Management and Conservation Plan*, 2002 all of which are hereby incorporated into the City of Grants Pass Comprehensive Plan by reference and furthermore, establish the Capital Improvement Program (CIP) and associated costs for keeping pace with build-out of the UGB and serving additional areas outside of the UGB, including portions of the North Valley.

2. The City-County Urban Service Policies, adopted with the UGB in August, 1979, require a public water system with fire flow capacities to serve urban levels of development. A Management Agreement initially adopted January 1981, set out interim development standards to determine domestic and fire requirements for utilizing wells and storage tanks prior to municipal system extension. On August 8, 1998, Josephine County, City of Grants Pass, Harbeck-Fruitdale Sewer District and Redwood Sanitary Sewer Service District signed an Intergovernmental Agreement for the Orderly Management of the Grants Pass Urban Growth Boundary Area. This Intergovernmental Agreement replaces each of the earlier agreements.

3. The City has additional agreements to serve specific properties in the North Valley. These include residential properties in the vicinity of the Merlin Landfill, the North Valley Industrial Park, and Paradise Ranch.

7 Per Bob Hamblin and Kathy Mannon, City of Grants Pass Utilities Division, September 2007

10.20.8 CAPITAL IMPROVEMENT PROJECT IMPLEMENTATION PLAN AND FUNDING MECHANISMS FOR WATER

Implementation and funding plans for the City of Grants Pass Water System are found in each respective Master Plan identified below.

10.20.8.1 Water Treatment Plant.

Please refer to the April 2004, *City of Grants Pass Water Treatment Plant Facility Plan*, Chapter 7 - Implementation Plan, pages 7-1 through 7-8 (MWH).

10.20.8.2 Water Distribution System.

Please refer to the *City of Grants Pass Water Distribution System Master Plan*, January 2001, West Yost & Associates, Chapter 7 – Cost of Recommended Capital Improvement Program, pages 7-1 through 7-7 and associated maps locating each improvement.

10.20.9 WATER SERVICES FINDINGS

10.20.9.1 Water Source.

1. Groundwater from the area's alluvial deposit yields a maximum 50 gallons per minute, which is insufficient for municipal supply. Problems of salt intrusion and a dropping water table further limit the groundwater resource. The only reliable source for the large quantities of potable water required for municipal purposes is the Rogue River.

2. The Rogue River yearly flow is effectively fully subscribed, and can support additional subscriptions only by impounding winter flow behind Lost Creek Dam for dry season release.

3. The City has one "perfected right" (priority date 1888) and three permits (priority dates 1960, 1965, and 1983) for withdrawing 12.5 cubic feet per second (cfs), 25 cfs, 25 cfs and 25 cfs, respectively, for a total of 87.5 cfs from the river for municipal purposes.

4. The following information regarding the Grants Pass Irrigation District (GPID) was included in the previously adopted version of this chapter, and should be updated when more current information can be obtained from GPID.

    a. The Grants Pass Irrigation District has a "perfected right" of 96.7 cfs with a 1916 priority date, and in addition has a Fish and Game "transport right" of 83 cfs and an "as through" right for the turbine lifts of 800 cfs, also diverted at the Savage Rapids Dam Site. The GPID perfected right may be used for municipal purposes. One-third of this right could provide for 30,490 persons, and one-half could provide for 45,730 persons at maximum day demand levels.

    b. The GPID canal and delivery system serves 400 exclusive farm use acres and 7000

urban-suburban acres. The District has 55 miles of major canals and laterals of which 85% are unlined or uncovered. Many of these canals and laterals serve as major drain ways of the City and urbanizing area, and have been incorporated into the Master Storm Drain Plan of the UGB area.

c. Some 2600 acres of irrigated lands have passed out of the District over the years, due mainly to urban level development and the silting and washout problems associated with winter drainage accommodation. The GPID has elected to continue supplying water through canals and laterals as development proceeds, citing as rationale that the improvements required by development often don't exceed "buy-out" costs, that the City's maximum day demand for water in the summer is thereby reduced, and that the irrigation water, being untreated and un-pressurized is cheaper for both the user and the provider.

10.20.9.2 Water Treatment.

5. The City began providing treated water for domestic use in 1931 (3.5/mgd), with expansions in 1950 (4.5 mgd), 1961 (11.5 mgd), and 1983 bringing the total current capacity to 20 mgd (as of 2007.) The WTP is capable of being expanded to approximately 30 mgd with major modifications. Based on a water demand increase of 2.5 to 3 percent per year, the plant expansion will not be required until the middle to end of decade 2020. The estimated project cost for a plant expansion to 30 mgd is $7.5 million dollars in 2003, which minimizes the use of additional footprint on the existing site. It is recommended that the City assess available property for a future new plant to expand and partially replace the existing plant within the next 50 years

10.20.9.3 Water Storage and Distribution.

6. Waters must be stored to allow for hourly fluctuation in demand ("equalizing storage" at 25% maximum daily demand), must meet fire flow demand when normal consumption is at the maximum daily rate ("fire storage" as per ISO tables), and must provide for water supply during a major disruption ("reserve storage," at 50% maximum day demand, or a 12 hour supply under maximum use conditions and 1 1/3 days supply under average use).

7. The annual average, monthly average, and maximum day water demand are calculated from analyzing WTP daily operational data. The analysis allows for the identification of annual average, monthly average, and maximum day water demand based on the period from 1995 to 1999. The average annual demand increased from 3.73 mgd to 4.50 mgd. The highest peak daily demand was 9.47 in August of 1998.

8. There are eight water storage reservoirs within the Grants Pass water distribution system that provide a total of 19 million gallons of treated water storage. These reservoirs were constructed between the years 1946 and 1999.

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10.30.1 PURPOSE AND INTENT

10.30.1.1 Purpose

The purpose of this section is to identify existing sanitary sewer service facilities and capacities, identify areas of immediate concern, project capacities needed through the planning period, present financial methods of paying for and regulating the service, and present policies of the orderly provision of services. Within and contiguous to the UGB, there are currently three systems providing sanitary sewer service: City of Grants Pass, Harbeck-Fruitdale Sanitary Sewer Service District, and the Redwood Sanitary Sewer Service District.

10.30.1.2 Intent

The intent of this section is to enact the following public facilities sanitary system master plans by ordinance as an update to the Public Facilities Element of the City of Grants Pass Comprehensive Plan:

1. *Wastewater Facilities Plan Update, City of Grants Pass Water Restoration Plant, Final Report* (Parametrix, June 2001);
2. *Wastewater Facilities Plan Update, City of Grants Pass Water Restoration Plant, Appendices – Final Report* (Parametrix, June 2001)
3. *Collection System Master Plan, City of Grants Pass* (Parametrix, September 2004)
4. *Redwood Sanitary Sewer Service District Engineering Report* (Parametrix, April 1999, Revised November 1999) (**NOTE:** This report evaluated alternatives for either upgrading/expanding the Redwood Wastewater Treatment Plant, or conveying the waste water to the Grants Pass Water Restoration Plant (WRP) for treatment. The preferred alternative identified in the report was conveying the waste water to the WRP for treatment, and the work has since been completed.)

10.30.2 NATURAL ENVIRONMENT

The natural environment includes topography, geology, soils, climate, and water resources of the region. This section presents a brief discussion of these items in relation to sanitary sewer collection system planning and analysis. The information provided in this section was excerpted from the *City of Grants Pass Collection System Master Plan*, completed by Parametrix in September 2004.

10.30.2.1 Topography, Geology, and Soils

The topography, geology, and soils of a region can have a significant effect on the design and construction requirements of entire sanitary sewer system. Topography can determine the route and slope of sewer lines, as well as the need for and location of pumping stations. The geology and soil conditions in an area can affect construction costs for pipelines and determine locations for system components.

10.30.2.2 Topography

Grants Pass lies in the Rogue River Valley in the Klamath Mountain Range of Oregon. The Rogue River Valley begins at the base of the surrounding hills and exists as a well-defined stream terrace some 10 to 15 feet above the bed of the Rogue River. The valley slopes toward the river at an average gradient of 1 to 2 percent. Elevations on the low-lying valley flow range from 880 to 1,100

feet above sea level. The Rogue River traverses the valley in a general east-west direction on an average slope of about 6 feet per mile. Away from the valley floor, the terrain grows steep relatively quickly. Beacon Hill (located northeast of the City) and Baldy Mountain (located southeast of the City) are 2,117 feet and 2,740 feet in elevation, respectively. The Siskiyou Mountains, part of the Klamath Mountains, lie to the south and west of Grants Pass. To the northeast, a spur connects the Klamath Mountains to the Cascade Range.

10.30.2.3 Geology

The service area contains several major geologic units, including alluvium deposits, diorites and granites, ultramafic and metavolcanic rocks, and gneisses and schists. The alluvium deposits, between 100 and 150 feet thick, formed the valley floor by eroding away from the surrounding rock units. The lava and metavolcanic rock composing Beacon Hill and Baldy Mountain does not weather easily. Its ruggedness has limited development in these areas. The softer granite of Dollar Mountain to the northwest, and various hills to the south and southwest of the city shows greater weathering. The rounded ridges and gentle slopes of these areas have encouraged development.

10.30.2.4 Soils

Weathering of the different geologic units has given the soils of this area a wide range of characteristics. The soils that underlie the developable portions of the Rogue River Valley are of the greatest importance to the collection analysis. Soils with poor drainage can increase the potential for infiltration and inflow (I/I) into the collection system, leading to increased flows to the Water Restoration Plant (WRP.) A survey conducted by the U.S Department of Agriculture (USDA, 1983) identified the soil types found in this area for agricultural purposes. A brief summary of the USDA survey with generalized engineering interpretations is presented below.

The most important soil types in the valley are Newberg fine sandy loam, Barron coarse sandy loam, and Clawson sandy loam. Newberg fine sandy loam is principal soil type in the floodplain and terraced areas of the valley. It occupies a strip along the Rogue River Valley that is generally about a mile in width; however, it narrows to about 2,500 feet at Grants Pass. The soil is well drained and presents no major problems for the collection system. Barron coarse sandy loam occupies extensive portions of the Rogue River Valley and underlies most of the city west of Gilbert Creek. The soil generally occurs upslope from Columbian fine sandy loam and extends as valley fill material into most of the minor tributary valleys. This soil has slightly higher clay content than the Newberg loam, but does not significantly impact drainage or increase I/I impacts.

Clawson sandy loam underlies a major portion of the city east of Gilbert Creek. This soil typically consists of about 1 foot of smooth-textured silt loam overlying a compact silty loam or clay loam subsoil. At a depth of about 30 inches, the subsoil assumes an extremely gritty texture, reflecting the presence of coarse granitic material. The subsoil terminates at shallow depths in coarse granitic rock. The soil is flat lying and poorly drained. Because of the impervious nature of the shallow bedrock, it is waterlogged during the winter and spring months. In some areas, the water table is less than 3 feet below the ground level well into the summer. The high groundwater conditions that accompany this soil type can be a problem when wastewater pipelines lying in the soil have cracks or leaks. Groundwater infiltrates into the cracks and leaks, significantly increasing the flow of liquid to the WRP.

10.30.2.5 Climate

Precipitation, temperature, and other climatic factors can significantly affect the design and construction of wastewater facilities. Rainfall is especially significant, because it can cause large flow increases in the collection system due to storm water runoff, illicitly connected roof drains, and raised groundwater levels.

10.30.2.6 General Climatic Conditions

The climate of Grants Pass is generally mild, although temperatures below freezing and above 100 degrees Fahrenheit occur for short periods annually. Climate is influenced by the Pacific Ocean, which is located about 60 miles west of the city. The intervening coastal mountains modify the effect of the marine air masses, causing this portion of the Rogue River Valley to receive less annual rainfall and to have fewer cloudy and rainy days than most other portions of Western Oregon. Monthly temperature and precipitation data for Grants Pass are summarized in Table 10.30.1.

Table 10.30.1 Climate Summary[a]

	Temperature, Degrees Fahrenheit					Precipitation in Inches	
Month	**Mean Maximum**	**Mean Minimum**	**Mean**	**Highest Recorded**	**Lowest Recorded**	**Mean**	**Greatest Daily**
January	47.4	31.1	39.3	69	13	5.0	3.4
February	54.1	32.7	43.4	76	12	4.4	2.2
March	59.8	34.1	47.0	81	22	3.7	2.2
April	65.6	35.8	50.7	93	24	2.0	1.4
May	73.1	40.5	56.8	102	26	1.2	1.5
June	80.8	45.4	63.1	106	33	0.5	1.0
July	88.8	49.5	69.2	109	39	0.4	1.3
August	89.0	48.9	69.0	110	36	0.5	0.8
September	82.7	43.0	62.9	108	29	0.9	2.9
October	70.4	37.4	53.9	98	20	2.1	1.7
November	53.3	34.6	44.0	77	12	5.1	4.8
December	45.7	31.3	38.5	67	-1	5.4	4.0
Annual	67.6	38.7	53.2	110	-1	31.2	4.8

[a] Source: Records of the Oregon Climate Services, 1971-2000

10.30.2.7 Precipitation

Nearly 75 percent of annual rainfall in Grants Pass occurs between the months of November through March. A majority of the annual precipitation is in the form of rain, although about 4 to 5 inches of snow falls each year. Seasonal snowfall rarely exceeds 10 inches, which usually melts immediately.

10.30.2.8 Temperature

Temperatures in Grants Pass usually remain moderate through the winter. Subfreezing temperatures may persist long enough to freeze water in aboveground facilities; however, it rarely lasts long enough to cause freezing in buried facilities. Summers are warm and dry. Temperatures exceed 100 degrees Fahrenheit on an average of 6 days a year. Nighttime temperatures are generally cool, averaging about 51 degrees Fahrenheit during July, the warmest month.

10.30.2.9 Other Climatic Factors

Sunshine is usually abundant during the spring, summer and fall, but the area is generally cloudy

during the winter months. Early morning fog occurs frequently during November, December and January. Fog is less common in October and February and rarely occurs during the rest of the year. Wind speed and direction are not routinely measured at Grants Pass. The prevailing wind direction, however, is from the west, approximately parallel to the axis of the Rogue River Valley.

10.30.2.10 Water Resources

The principal water resources in the service area are surface water from The Rogue River and its tributaries and groundwater from the alluvium covering the river valley. The water resource most important for this Plan, the Rogue River, drains 2,460 square miles above Grants Pass before traversing the study area. The Rogue River is used for the City's potable water supply, irrigation, and recreation.

A number of individual wells rely on area groundwater. The alluvium is the major aquifer, with typical yield of 40 gallons per minute (gpm). Volcanic formations usually yield less water, but in a few highly fractured areas wells have yields as high as 60 gpm. Many of the high yields are not sustainable, as the aquifers are small and substantial drawdown occurs.

10.30.2.11 Water Quality

The *2004 Collection System Master Plan* discusses regulatory framework for both existing water quality and the quality of water discharged from the Water Restoration Plant. The City's NPDES Permit takes into account existing temperature and pollutant loading in setting discharge limits from the Water Restoration Plant. Oregon Administrative Rules (OAR), Division 41, Section 340-41-365, sets standards for water quality in the Rogue River basin. The rules cover dissolved oxygen concentrations, temperature increases, pH values, coliform counts, creation of tastes or odors, toxic conditions that harm aquatic life or affect drinking water, and the formation of sludge. The regulations and associated water quality information relating to wastewater treatment and disposal are discussed in Section 10.30.7.

10.30.2.12 Water Quantity

The most recent 30 years of Rogue River flow data collected by the U.S Geologic Survey (USGS) are summarized in Table 10.30.2.

Table 10.30.2 Historical Rogue River Stream Flow Data

Month	Monthly Stream Flow Data (1973-2002)[a]

	Maximum (ft^3/s)	Minimum (ft^3/s)	Mean (ft^3/s)
January	16,610	1,348	5,123
February	10,960	1,162	4,512
March	10,760	1,099	4,364
April	8,395	997	4,076
May	6,428	1,538	3,703
June	4,572	1,016	2,796
July	3,484	974	2,060
August	3,080	878	2,009
September	2,642	1,098	1,724
October	2,282	1,008	1,503
November	9,086	1,160	2,833
December	17,620	1,386	4,866

[a] Data from US Geologic Survey Rogue River Monitoring Station (14361500) at Grants Pass, Oregon.

Flows in the Rogue River can fluctuate widely from year to year. The largest recorded discharge, 152,000 cubic feet per second (cfs), occurred during a December 1964 flood. The lowest recorded discharge was minimum day of 606 cfs during 1968. Reservoirs have since been constructed in the Rogue River basin to provide storage of high wet weather flows for release during dry weather periods.

10.30.2.13 Flood Potential

It is necessary to identify flood-prone areas in order to safely locate wastewater collection and treatment system components. A detailed description of the flood history, mapped locations, and an evaluation of the degree of hazard are found in the Natural Hazards Element of the City's Comprehensive Plan, 1983. The City has adopted Ordinance 4471, which prohibits development in the floodway without a certified "No-Rise" Analysis. Development in the floodway fringe is permitted provided the main living floor is elevated at least one foot above the 100-year Base Flood Elevation, or for nonresidential structures, floodproof construction techniques are utilized.

10.30.3 DEMAND FACTORS

Sewerage demand is driven by factors such as population growth, land use, and to a lesser extent, infiltration from GPID. This section examines the factors driving demand. Unless otherwise noted, the information provided in this section was excerpted from the *City of Grants Pass Collection System Master Plan*. This plan, completed by Parametrix in September 2004, used a planning horizon through the year 2020 and a horizon of 2060 for sizing the distribution system.

10.30.3.1 Population

Consideration of population trends is crucial to long-term sewerage planning. In order to size new facilities and expansions, historical population trends must be examined to predict future population growth. The Grants Pass area has experienced steady population growth since the 1920s. This increase has been in line with the national population trend of people moving to the west and southwest from the northeastern and central states and to rural areas from urban areas. The population in Josephine County rose during the 1970s (5.11 percent annually), but slowed dramatically during the 1980s (0.6 percent annually). The City of Grants Pass grew more rapidly

than the county during the last decade (1.5 percent annually).

10.30.3.1.1 Estimate of Population Equivalent for Sewer Service Area

The 1990 census lists the population of Grants Pass at 17,424. Population within the city limits in 2003 was estimated at 22,444. This is the base year population estimate used for the *2004 Collection System Master Plan*. Population estimates completed after the *2004 Collection System Master Plan* are presented in the Population element of the Comprehensive Plan.

The population within the sewer service area consists primarily of the population within the city limits, and the Harbeck-Fruitdale and Redwood areas outside the city limits. Prior to 2001, the City's Water Restoration Plant (WRP) treated sewage only from within the city and Harbeck-Fruitdale area. The *2004 Collection System Master Plan* estimated a 2003 population of 4,620 for Harbeck-Fruitdale, based on sewer connection and billing records. In addition, the City began serving the Redwood Sanitary Sewer Services District (RSSSD) in 2001, and has subsequently converted the Redwood Treatment Plan to a pump station and sewage is now pumped to and treated at the City's WRP. The *2004 Collection System Master Plan* used a 2003 estimated population of 5,714 for the Redwood area. Based on the estimates for the City, Harbeck-Fruitdale and Redwood, the sewer service area population was estimated to be 32,778 in 2003. It is also necessary to take into account the commercial and industrial contribution as a form of population equivalent. The *2004 Collection System Master Plan* assumed that commercial/industrial population equivalent is 35 percent of the total residential population, which equals 11,472. Therefore, the total sewer service area population equivalent was estimated to be 44,250 in 2003.

The *2001 Wastewater Facilities Plan Update* projected the future sewerage area to also include Merlin / North Valley. This area lies outside the UGB to the north of the city and has largely been dependent on on-site sewage treatment systems. The subsequent *2004 Collection System Master Plan* acknowledged that although this area may begin contracting with the City for wastewater services in the future, there are no current plans for service expansion. Therefore, consideration of flows from the North Valley area was not addressed in the *2004 Collection System Master Plan*. In summary, the *2001 Wastewater Facilities Plan Update* would provide sufficient capacity of the WRP to accommodate sewage from Merlin / North Valley. However, the *2004 Collection System Master Plan* does not plan for facilities to collect and convey sewage from this area to the WRP.

10.30.3.1.2 Projection of Population Equivalent for Sewer Service Area

The *2004 Collection System Master Plan* developed a future equivalent population projection for the service area by applying sub-area growth rates from the City's Comprehensive Plan to the base population estimates for the sub-areas and adding 35% to the resulting population for commercial/industrial population equivalent. Estimated growth rates were respectively: 1.5% for Grants Pass, 1.6% for Harbeck-Fruitdale and 3.1% for Redwood. Maintaining the commercial/industrial equivalent as 35% of the population share in 2020 resulted in an estimated 1.8% growth rate in commercial/industrial equivalent population. As of 2003, the Grants Pass WRP was serving an estimated population equivalent of 44,250 (including the 35 percent commercial/industrial equivalent.) After applying these growth rates, year 2020 service area population equivalent was estimated as 60,157**.** For years beyond 2003, it is likely that the city limits and UGB would have enlarged from what existed in 1997. The Redwood and Harbeck-

Fruitdale populations would probably then be reflected in the city limit population.
A summary of the population projection used in the *2004 Collection System Master Plan* is shown in Table 10.30.3. In addition to projections for the years 2020 and 2025, the plan also created a projection assuming all available land was at saturation levels of development, which was referred to as Year 2060. The 2060 projections provide a good representation of the build-out conditions that are typically used to determine the size of long-term infrastructure improvements, such as collection system pipelines.

Table 10.30.3 Population Growth by Area

Area	1997 Population	Average growth rate (% per year)	Population Projection			
			2003	2020	2025	2060
City Limits	20,526	1.5	22,444	28,908	31,143	52,440
Harbeck-Fruitdale	4,200	1.6	4,620	6,053	6,550	11,417
Redwood	4,758	3.1	5,714	9,600	11,186	32,563
Commercial / Industrial Equivalent	10,319	1.8	11,472	15,596	17,107	33,747
Total Service Area Population Equivalent:	39,803		44,250	60,157	65,986	130,167

Source: City of Grants Pass Collection System Master Plan, Parametrix Inc., 2004

10.30.3.2 Land Use

The *2004 Collection System Master Plan* used land use estimates to generate wastewater flow estimates. These estimates were used to determine the size of long-term collection system improvements. However, land use data was not used in determining plant capacity. Plant capacity was determined exclusively by utilizing the population projections found in the previous section, and applying a 35 percent commercial / industrial equivalency factor. The land use data used in developing the flow analysis can be found in Section 2 of the *2004 Collection System Master Plan*.

10.30.3.3 Grants Pass Irrigation District

The Grants Pass Irrigation District was formed in the early 1920s to supply irrigation water to land located between the town of Rogue River and the confluence of the Applegate and Rogue Rivers. Currently about 7,700 acres of agricultural and residential lands are irrigated. The district has water rights to divert up to 150 cfs from the Rogue River during irrigation season. A series of canals constructed by the district carries the water from Savage Rapids Dam throughout the area covered by the district. Many residents in the sewerage service area use water from the canals to irrigate landscaping and gardens. The canals are also used to carry storm water away from these lands.

The irrigation season typically lasts from about April 15 to October 1. Examination of flows received at the treatment plant shows that the influent flows increase during those months, even though little precipitation occurs during that period. It appears that one source of infiltration and inflow in the Grants Pass sewage treatment plant is irrigation water that has seeped into the ground and infiltrated the sewer system. Although there is a court order to remove Savage Rapids Dam (now underway), GPID will continue to function as it does now through the installation of pumps that will deliver water to the district's canal system.

10.30.3.4 Hydraulic and Biologic Loading

The *2001 Wastewater Facilities Plan Update* made flow projections based on existing wastewater flow, plus a typical flow per capita assumed for all future connections. These future flow factors in gallons per capita per day (gpcd) are shown in Table 10.30.4. The per capita flow assumed for future connections was typical for new construction at the time. Table 10.30.5 shows the wastewater flow projections made through the 2020 planning period. **NOTE:** The population figures shown in Table 10.30.5 were extracted from the *2001 Wastewater Facilities Plan Update* and include the Harbeck-Fruitdale Sewer Service District, the Redwood Sanitary Sewer Service District, and the Merlin / North Valley area.

Table 10.30.4 Future Flow Factors

Flow Type	Contribution (gpcd)
Average Flow	105
Maximum Month Dry Weather Flow (MMDWF)	100
Maximum Month Wet Weather Flow (MMWWF)	130
Peak Day	275
Peak Wet Weather Flow	360
Summer Average	85
Winter Average	125

Source: Waste Water Facilities Plan Update, Parametrix, 2001

Table 10.30.5 Wastewater Flow Projections

YEAR						
Types of Flow	**1999 (Pop. 42,900)**		**2010 (Pop. 52,200)**		**2020 (Pop. 62,700)**	
	Calculated (mgd)	Calculated (Gal/cap-day)	Design (mgd)	Design (Gal/cap-day)	Design (mgd)	Design (Gal/cap-day)
Summer Max. Month	7.3	173	8.4	160	9.4	150
Winter Max. Month	10.8	256	12.2	233	13.5	216
Peak Day	21.5	514	24.6	471	27.5	438
PWWF	30.1	715	34.0	652	37.8	603
Summer Average	5.0	120	6.0	113	6.8	109
Winter Average	6.4	155	7.80	149	9.1	145
Annual Average	5.7	137	6.9	131	8.0	127

Source: Waste Water Facilities Plan Update, Parametrix, 2001

Table 10.30.6 Organic and Solids Loading (pounds per day)

Type of Loading	Year		
	1999	2010	2020
Average BOD_5	7,490	9,400	11,400
Maximum Monthly BOD_5	10,985	13,700	16,800
Average NH_3-N	327	390	450
Maximum Monthly NH_3-N	636	760	870
Average TSS	8,564	10,500	12,700
Maximum Monthly TSS	11,623	14,300	17,300

Source: Waste Water Facilities Plan Update, Parametrix, 2001

Because the Rogue River is used for salmon spawning, fish passage, and rearing Coho, wastewater discharge requirements are strict. To properly evaluate upgrading/expanding the Grants Pass WRP, an analysis of the facilities wastewater discharge permit limit is necessary. Table 10.30.6 presents the anticipated year 2020 BOD_5 and TSS treatment requirements as mandated by OAR 340-41-375. These values represent the dry weather season BOD_5 and TSS effluent concentrations that the plant should meet monthly.

Table 10.30.7 Anticipated Year 2020 BOD_5 and TSS Treatment Requirements Based on OAR 340-41-375

	Flow (mgd)	Effluent Concentration (mg/L)			Mass Discharge, lbs/day		
		Monthly	Weekly	Daily	Monthly	Weekly	Daily
Permit Limits Based on Effluent Quality							
Summer, Dry Weather	8	10	15	-	670	1,000	1,300
Winter, Wet Weather	10	30	45	-	2,500	3,750	5,000

Source: Waste Water Facilities Plan Update, Parametrix, 2001

The DEQ has determined that the Rogue River is a high priority concern for implementing management strategies to attain compliance with water quality standards. The first step in this process is to develop the total maximum daily load (TMDL) pollutant loading allocations. This TMDL will include both point and non-point sources.

The TMDL process is now underway and is currently scheduled to be completed in the next several years. Following TMDL allocation, new discharge permit requirements may be established for the Grants Pass WRP that will modify Table 10.30.7. These new permit requirements may also impact the capacity of the existing plant.8

10.30.4 CITY OF GRANTS PASS SANITARY SEWER SERVICES

10.30.4.1 Service Area

Situated near the Rogue River, the Grants Pass Water Restoration Plant (WRP) serves the City and the Harbeck-Fruitdale area. In the fall of 2000, the plant began receiving sewage from the Redwood area.

8 Per Steve Gilbert, Parametrix, June 2007

The *2004 Collection System Master Plan* estimated that the Grants Pass WRP had a service area population equivalent of approximately 44,250 in 2003. With estimated growth rates of 1.5 percent for Grants Pass and 1.6 percent for Harbeck-Fruitdale, and the addition of Redwood at a 3.1 percent population growth rate, it was estimated that the Grants Pass WRP would be serving an equivalent of 60,157 people by the year 2020.

10.30.4.2 Treatment Plant

Since 1935, the City of Grants Pass WRP has been operating at its current site. Subsequent plant additions occurred in 1953 and 1962. In 1974, the treatment plant was renovated and expanded. More improvements occurred from 1994-96 in response to the Department of Environmental Quality's concerns about the effluent toxicity, and the discharging directly into the Rogue River. The improvements consisted of a fourth raw sewage pump, a temporary belt filter press to improve wet weather solids disposal, two rectangular primary clarifiers, a computer based supervisory control and data acquisition system, and an ultraviolet disinfection system. In January 1999, Brown & Caldwell completed a facilities plan for the Grants Pass Water Restoration Plant (WRP). Also in 1999, the addition of a second Ultraviolet channel was implemented. This allowed the increase of disinfection capacity from 21.5 million gallons per day (mgd) to 43 mgd.9

10.30.4.3 Treatment Level

At the time of the *2001 Wastewater Facilities Plan Update*, the Grants Pass WRP treated 4.5 mgd of average dry weather flow (ADWF), with a record peak storm flow of 26.5 mgd. More recent data has also been compiled. As of April 2008, the WRP treated an ADWF of 5.5 mgd and peak wet weather flow of 30.0 mgd. The WRP is comprised of numerous unit treatment processes for both liquid and solid streams, a control/laboratory building, and a maintenance shop. There is a 27 mgd hydraulic capacity for influent pumping10, screening, and primary treatment, a 13 mgd hydraulic capacity for secondary treatment, and a 43 mgd hydraulic capacity for UV disinfection. Flow exceeding the secondary treatment capacity receives only primary treatment and disinfection. This occurs only a few days a year during wet weather storm conditions.

10.30.4.4 Biosolids Handling and Disposal

Currently, the Grants Pass WRP sends the Class B Biosolids to JO-GRO™, a green waste and biosolid waste composting plant.

To produce Class B biosolids, processing must occur. The process starts with a primary clarifier. Solids, which are thickened in the gravity thickener and the gravity belt thickener, are dewatered by the secondary clarifier to produce waste activated sludge. The primary and secondary sludge are then combined and sent to the 50-foot-diameter anaerobic digester. Dewatered biosolids are loaded into a dumpster and hauled to the Merlin Landfill for the JO-GRO™ composting process.

10.30.4.5 Collection System

Per the *2001 Wastewater Facilities Plan Update*, it was believed that prior to 1927 sewer pipes were

9 Information from this section was excerpted from the *2001 Wastewater Facilities Plan Update*. Additional WRP upgrades have occurred since that time (see Water Restoration Plant Capital Improvement Plan, Table 10.30.11).
10 As of January 2008 a project was completed to increase the hydraulic capacity for influent pumping to 45 mgd.

constructed of vitrified clay, although records are not available to confirm this. From 1927 to 1964, sewers were constructed of non-reinforced concrete pipe with bell and spigot joints caulked with cement mortar. Since 1964, sewers have been constructed of concrete pipe with bell and spigot joints and rubber ring gaskets. The concrete pipes are caulked at the joints with cement mortar. Over time, the cement caulking dissolves leaving the joints vulnerable to cracking and resulting in infiltration of groundwater and penetration of tree roots.

At the time of the *2001 Wastewater Facilities Plan Update* the City's collection system consisted of approximately 110 miles of gravity sewers, one force main (approximately 2,000 feet long), and three pumping stations. As of 1983, three hundred fifty acres of the downtown area were still served by vitrified clay pipe installed prior to 1927. The portion of the collection system constructed prior to 1964 has shown severe deterioration in both pipe materials and joint integrity. From 1992 to 2001, the city reported 17 sinkholes due to pipe failure.

The City of Grants Pass completed a *Collection System Master Plan* in 1983 (James Montgomery, 1983). A number of the 1983 recommendations for improving the collection system have been implemented. The City has, however, experienced sewer line failures and occasional overflows due to sewer line obstructions. The City has also expanded its collection system to include the Redwood Sanitary Sewer Service District (RSSSD) collection system located west of the City. The Oregon Department of Environmental Quality made completion of an updated Collection System Master Plan a provision in the National Pollutant Discharge Elimination System (NPDES) permit for the City's Water Restoration Plant, issued in December of 2000.

The *2004 Collection System Master Plan* is the most recent in a series of reports/studies focusing on wastewater infrastructure. In 2000, the City commissioned a *Wastewater Facilities Plan Update* (Parametrix, 2001) for improvements to the City WRP. The *Facilities Plan* focused on the WRP but also provides some analysis of the existing collection system to assess the impact of infiltration and inflow (I/I) on peak flow events at the WRP. Additional collection system analyses that were presented in the *RSSSD Facilities Plan* (prepared in 1999 by Parametrix) assessed the RSSSD wastewater collection system. In September 2004, Parametrix prepared the City's latest *Collection System Master Plan*, which provides for the capital improvement programming (see tables 10.30.11, 10.30.14, and 10.30.15) to accommodate orderly and cost-effective methods to operate, maintain and expand the collection system while reducing the risk of system failures.

10.30.4.6 Pump Stations

The topography of the City's service area is such that most of the system is operated under gravity flow conditions. As such, there are only a few pump stations in the collection system. The Webster No. 1 Lift Station, Webster No. 2 Lift Station, and Bridge Street Pump Station are all located in the southwestern portion of the city. Under an intergovernmental agreement, the City also operates two pump stations serving the RSSSD: the RSSSD pump station, located at the site of the abandoned RSSSD wastewater treatment plant at 4960 Leonard Road, and the Darneille Pump Station at 3100 South River Road.

10.30.4.6.1 City Pump Stations: The collection system includes three pumping stations, two of which are simply lift stations. Design data for all three pump stations is included in Table 10.30.8.

The lift stations, Webster Lift Station 1 and Webster Lift Station 2, are both located on Webster Lane and serve the mobile home park in the western section of Basin A. Each station is equipped with two vertical, non-clog, and centrifugal pumps. The pumps in Station 1 are 7.5 hp pumps, each with a capacity of 100 gallons per minute (gpm) at 23 feet total dynamic head (TDH). Station 2 pumps are 3 hp pumps, each with a capacity of 100 gpm at 10 feet TDH.

The third station, designated the Bridge Street Station, is located at the intersection of Bridge Street and Tami Court. Dual (4- and 8-inch diameter) force mains travel east from the pump station along Bridge Street about 1,900 feet and discharge in Manhole B111. The station is equipped with two submersible non-clog centrifugal pumps. Each of the 20 hp pumps has a capacity of 650 gpm at 75 feet TDH. Air injection is also provided for the force main to control sulfides. A 50 kW natural gas fueled engine generator is provided standby power.

10.30.4.6.2 Redwood Sanitary Sewer Service District (RSSD) Pump Stations: The Redwood Conveyance System, which transfers all flow from the old Redwood Wastewater Treatment Plan (WWTP) to the Grants Pass WRP, includes the Redwood Pump Station, the Redwood force main, the Darneille force mains and Darneille Pump Station, and a gravity sewer which brings the transferred flow to the Grants Pass WRP. The Redwood Pump Station is located at the old Redwood WWTP. It is a duplex submersible pump station with a capacity of 0.48 mgd, based on one pump in operation. The station has a Bioxide chemical injections system with a 3,000-gallon chemical storage tank. From the Redwood Pump Station, flow is routed through approximately 10,300 feet of 6-inch-diameter force main to an influent manhole at the Darneille Pump Station.

The Darneille Pump Station accepts the majority of the flow from the RSSSD, as well as the flow pumped from the Redwood Pump Station. The Darneille Pump Station has a firm capacity of 4.2 mgd, based on operation of two of three pumps. The station is a wet well/dry well type station with above-grade electrical panels, generator, and chemical feed system. The chemical feed system is identical to that provided at the Redwood Pump Station, except that the chemical feed pumps are slightly larger. From the Darneille Pump Station, flow is pumped through approximately 17,740 feet of dual 12-inch force main and the 1,000 feet of single 14-inch force main. From the pump station, the dual force mains are routed south to South River Road; then east through road rights-of-way and easements to the south side of the Pedestrian Bridge. The dual 12-inch force mains join into a single 14-inch force main that crosses the Rogue River on the Pedestrian Bridge and then discharges into a gravity sewer, which flows to the WRP. Table 10.30.8 provides pump station data.

Table 10.30.8 Pump Station Data

Location	Year Built	No. of Pumps	Pump Type	Horsepower (hp)	Drive Type	Capacity/Head (gpm)/(feet)
Webster No. 1 Lift Station: East edge of Roguelea Estates	1967	2	Self-priming, vertical close-coupled, non-clog centrifugal	7.5	Constant Speed	100/23
Webster No. 2	1967	2	Self-priming, vertical close-	3	Constant	100/10

Lift Station: All Sports Park -Basin A			coupled, non-clog centrifugal		Speed	
Bridge Street Pump Station: Bridge Street and Tami Court – Basin A	1994	2	Submersible, non-clog centrifugal	20	Variable Speed	650/75
Redwood Pump Station: 4960 Leonard Road – RSSSD	2000	2	Submersible, non-clog, centrifugal	40	Variable Speed	335/163
Darneille Pump Station: 3100 South River Road - RSSSD	2000	3	Immersible dry-pit, screw centrifugal	110	Variable Speed	1,460/180

Source: City of Grants Pass Collection System Master Plan, Parametrix Inc., 2004

10.30.5 TREATMENT ALTERNATIVES CONSIDERED

In January 1999, Brown and Caldwell (BC) completed a Facilities Plan (FP) for the Grants Pass Water Restoration Plant (WRP). A concern regarding the future flow and population projections prompted a Value Engineering (VE) Workshop in June 1999. During this VE Workshop with Parametrix, Inc. and the City, these projections were recalculated and other treatment alternatives for both the liquid and solid streams were conceptualized. Also during the VE Workshop, the projected population, flow, Biological Oxygen Demand (BOD), and Total Suspended Solids (TSS) loadings were recalculated. These recalculations and treatment alternatives were incorporated into the *2001 Grants Pass Wastewater Facilities Plan Update* (WFP).

To select the best method for meeting Grants Pass treatment needs in the year 2020, the WFP evaluated three liquid stream alternatives and four solids streams alternatives. The liquid stream treatment includes a conventional expansion alternative, a ballasted sedimentation alternative, and a Zenon process alternative. The biosolids disposal and handling alternatives propose a Merlin Landfill co-compost facility, hauling dewatered biosolids to the Dry Creek Landfill, land application of Class B biosolids, and using an Aerobic Thermophilic Pretreatment (ATP) component. The alternatives are summarized below.

10.30.5.1 Liquid Stream Alternatives

10.30.5.1.1 Upgrades Common to the Liquid Stream Alternatives. All of the liquid stream treatment alternatives have several component upgrades in common. At the headworks, an additional mechanical bar screen would be installed with a 23.5 mgd capacity. This provides redundancy and a maximum capacity of 47 mgd, which is well beyond the projected future flows. An outfall diffuser would be added to improve and reduce the ammonia toxicity into the Rogue River. Several miscellaneous plant improvements, which existed in the Facility Plan, have also been included in the value engineering alternatives. These improvements include laboratory upgrades, operations building repairs and modifications, and instrumentation and control system expansion.

10.30.5.1.2 Alternative One – Conventional Expansion. Alternative One is the recommended improvement from the WFP using a conventional expansion approach. By replicating the existing components, this option allows continuing ease of operation due to staff familiarity of the process. This alternative has been modified to treat the peak wet weather flow. A summary of the upgrades include:

- Additional mechanical bar screen with a capacity of 23.5 mgd.
- Removal of the four existing influent pumps and replacement with three 19 mgd pumps
- Additional rectangular primary clarifier. Rehabilitate existing primary clarifiers.
- Two additional aeration basins. Rehabilitate existing aeration basins.
- Two additional 115-foot secondary clarifiers. Rehabilitate existing secondary clarifiers.
- Outfall diffuser in the Rogue River.
- Miscellaneous improvements: laboratory upgrades, operations building and modifications, and instrumentation and control system expansion.

10.30.5.1.3 Alternative Two – Ballasted Sedimentation. Alternative Two uses ballasted sedimentation to treat peak flows greater than 13.5 mgd. It is proposed to convert the existing gravity thickener into the ballasted sedimentation tank. The peak flows would be conveyed to this system and then recombined with the main treatment train to receive UV disinfection. Other upgrades to the Grants Pass WRP include:

- Install additional influent pumping capacity.
- Additional mechanical bar screen with a 23.5 mgd capacity.
- Odor containment at the influent pump station and mechanical bar screen area,
- Converting the circular primary clarifier to a combination primary clarifier/gravity thickener.
- The existing primary clarifiers would be rehabilitated.
- Addition of a bioselector in the aeration basin to provide filamentous bacteria control, which would improve the settling performance in the secondary clarifiers. The aeration basin would also be modified with fine bubble diffusers, dissolved oxygen control, and motorized gates.
- Two additional 90-foot secondary clarifiers. Rehabilitate the secondary clarifiers.
- Outfall diffuser in the Rogue River.

- Miscellaneous improvements: laboratory upgrades, operations building and modifications, instrumentation and control system expansion, plant equipment audit, additional plant landscaping, public education program, and yard piping upgrades.

10.30.5.1.4 Alternative Three – Zenon Process. Alternative Three incorporated the use of Zenon for secondary treatment. The wastewater can flow directly into the primary clarifiers, thereby eliminating the need for secondary clarifiers. Zenon is a microfiltration membrane system located in a suspended growth biological reactor. For this alternative, the membranes would be placed into the aeration basin to serve as a biological reactor. Other upgrades to the Grants Pass WRP for this alternative include:

- Additional influent pump to meet the projected firm capacity.
- Additional mechanical bar screen with a 23.5 mgd capacity.
- Odor containment at the influent pump station and mechanical bar screen area.
- For peak overflows greater than 13.5 mgd, the existing gravity thickener would be converted into a ballasted sedimentation tank.
- Converting the circular primary clarifier to a combination primary clarifier/gravity thickener.
- The existing primary and secondary clarifiers rehabilitated for enhanced performance.
- Outfall diffuser in the Rogue River.
- Miscellaneous improvements include: Laboratory upgrades, operations building and modifications, instrumentation and control system expansion, plant equipment audit, additional plant landscaping, public education program, and yard piping upgrades.

10.30.5.1.5 Liquid Stream Alternatives Cost Estimate Comparison. A preliminary cost estimate for these liquid stream alternatives is summarized in Table 10.30.9. Engineering, administration, and contingency are included in these costs.

Table 10.30.9 Comparison of Liquid Stream Alternatives

Alternative	Capital Cost (millions)
One- Conventional Expansion	$12.23
Two- Ballasted Sedimentation	$13.59
Three- Zenon Process	$23.96

Source: City of Grants Pass Water Restoration Plan Update, June 2001, Parametrix Inc.

10.30.5.2 Biosolids Disposal and Handling Alternatives

The following subsections generally describe the alternatives for biosolids disposal and handling proposed at the Merlin Landfill co-compost facility, for hauling dewatered biosolids to the Dry Creek Landfill, for applying to land the Class B biosolids, and for using an Aerobic Thermophilic Pretreatment (ATP) component.

10.30.5.2.1 Alternative One– Merlin Landfill Co-compost Facility. Alternative One would co-compost digested primary and raw secondary biosolids. The existing digester would be rehabilitated and used only for digesting primary biosolids. A new component for dewatering digested primary biosolids to 15 percent solids would be installed in an existing building located on site. The biosolids would be hauled to the co-composting facility located at the Merlin

Landfill. This facility would produce Class A biosolids, which would be available for public purchase.

10.30.5.2.2 Alternative Two- Dry Creek Landfill. Alternative Two hauls raw primary and secondary dewatered biosolids to the Dry Creek Landfill. These biosolids would be dewatered at the Grants Pass WRP to 15 percent solids using a belt filter press (BFP). The existing press and one new additional BFP would be installed in an existing building located on site. Extra hauling equipment would be required for handling the transport of all the biosolids to the landfill.

10.30.5.2.3 Alternative Three- Land Applying Class B Biosolids. Alternative Three is the recommended alternative from the WFP. It is a continuation of the current biosolids management program of long hauling Class B biosolids to be land applied. However, because of an increase in future biosolids production, contracting with landowners of large parcels of land in Eastern Oregon to expand the land application area would be necessary. Biosolids would be dewatered to 15 percent, hauled to the site in large tractor/trailers, and applied with a manure spreader. During the winter, the biosolids would be stored near the application site. An additional gravity thickener, gravity belt, anaerobic digester, and belt filter press are necessary to meet the future solids production. The existing anaerobic digester would need to be rehabilitated. Class A biosolids can be produced by adding low cost aeration equipment to the future storage building to create a pilot-scale co-composting facility.

10.30.5.2.4 Alternative Four- Aerobic Thermophilic Pretreatment (ATP). Alternative Four is to produce Class A biosolids and distribute them to the public as fertilizer. To accommodate increasing loads in the future, an ATP would be installed instead of adding a new digester. To reduce plastics in the biosolids, a Muffin Monster would be added prior to the ATP. The existing digester would need to be rehabilitated to enhance performance, increase capacity, and repair deficiencies.

10.30.5.2.5 Biosolids Alternatives Cost Estimate Comparison. Preliminary cost estimates for the four biosolids disposal alternatives are in Table 10.30.10. These values include engineering, administration, and contingency costs.

Table 10.30.10 Comparison of Biosolids Disposal and Handling Alternatives

Alternative	Capital Cost (millions)
One – Merlin Landfill Co-compost Facility	$3.60
Two – Dry Creek Landfill	$1.40
Three – Land Apply Class B Biosolids	$11.00
Four – Aerobic Thermophilic Pretreatment (ATP)	$2.30

Source: City of Grants Pass Water Restoration Plan Update, June 2001, Parametrix Inc.

10.30.5.3 Miscellaneous Plant Improvements

- Plant Equipment Audit. A full analysis of the existing component conditions would be conducted. This audit would analyze the remaining life span of each component and develop an operations and maintenance schedule for the 20-year planning period.
- Additional Plant Landscaping. Currently a substantial amount of landscaping at the treatment plant has occurred to promote a good-neighbor environment. However, to continue this effort, additional landscaping would be necessary.

10.30.6 PREFERRED TREATMENT ALTERNATIVES

10.30.6.1 Biosolids Handling and Disposal

For the biosolids handling and disposal, the *2001 Wastewater Facilities Plan Update* found the Merlin Landfill Co-compost Facility (Alternative One) to be the preferred alternative. This alternative would consist of the existing digester, a new dewatering device, and a co-composting facility. Under this solid waste handling system, rehabilitated digesters would be used to treat only primary clarifier solids. The secondary clarifier solids would be combined with the digested primary solids, dewatered in a new dewatering component, and trucked to the new co-composting facility located at the Merlin Landfill.

10.30.6.2 Liquid Stream Treatment

The *2001 Wastewater Facilities Plan Update* found the ballasted sedimentation alternative to be the preferred alternative for the liquid stream treatment. Table 10.30.11 lists the anticipated costs and time-line of when the components or upgrades would occur at the Water Restoration Plant, and a proposed construction schedule follows. Both are excerpted from the *2001 Wastewater Facilities Plan Update*.

10.30.6.3 Capital Improvements Water Restoration Plant

Table 10.30.11 City of Grants Pass
Water Restoration Plant Capital Improvement Plan

Project Item	Probable Cost	Construction Schedule		
		2001-2004	2005-2006	2010-2011
PRELIMINARY AND PRIMARY TREATMENT				
Influent Pumping*	$560,000		$560,000	
Raw Sewage Pipeline to Ballasted Sedimentation	$240,000		$240,000	
Screening Odor Control*	$390,000	$390,000		
Mechanical Bar Screen No. 2*	$230,000		$230,000	
Modify Gravity Thickener to Ballasted Sedimentation	$3,510,000		$3,510,000	
Modify Existing Primary to Combination Clarifier/Thickener	$610,000		$610,000	
Yard Piping*	$270,000		$270,000	
SECONDARY TREATMENT				

Aeration Basin Fine Bubble*	$530,000	$530,000		
Aeration Basin Selector*	$260,000	$260,00		
Blowers and DO Control*	$870,000	$870,000		
Rehabilitate Existing Clarifiers*	$770,000	$770,000		
New Secondary Clarifiers*	$2,400,000	$1,200,000		$1,200,000
Yard Piping*	$770,000	$400,000		$370,000
Motorized Gates*	$340,000	$340,00		
FINAL TREATMENT				
Outfall Diffuser*	$540,000	$540,000		
OTHER PLANT IMPROVEMENTS				
Lab Improvements*	$100,000	$100,000		
Operation Building Repairs and Office*	$130,000	$130,000		
SCADA System Expansion*	$670,000	$250,000	$250,000	$170,000
Equipment Improvements from Audit Results*	$250,000	$100,000	$75,000	$75,000
Plant Landscaping*	$100,000	$40,000	$30,000	$30,000
Public Education*	$50,000	$20,000	$20,000	$10,000
SOLIDS THICKENING AND DIGESTION				
Rehabilitate Existing Digester*	$740,000	$740,000		
Dewatering Centrifuge*	$1,000,000	$1,000,000		
SOLIDS HANDLING OFF-SITE				
Co-composting Facility*	$1,850,000	$1,850,000		
COLLECTION SYSTEM				
Pine Street*	$1,050,000	$1,050,000		
2nd Street	$700,000	$700,000		
Western Avenue	$580,000	$580,000		
Master Plan*	$170,000	$170,000		
TOTALS	$19,680,000	$12,030,000	$5,795,000	$1,855,000

Source: City of Grants Pass Water Restoration Plan, June 2001, Parametrix Inc. *(1999-2000 dollars)
*Item has been completed or partially completed as of April 2008 (Per Public Works Dept.)

Year 2000

- Install odor containment and control at the influent pump station and mechanical screening areas of the plant.
- Add an anoxic selector basin to the aeration basin.
- Modify the existing aeration basin, convert the existing aeration system to fine bubble diffusers, and add dissolved oxygen control and motorized gates. This would require new or modified aeration blowers.

- Rehabilitate the existing secondary clarifiers to correct short circuiting and flow distribution problems.
- Add a third secondary clarifier.
- Begin laboratory upgrades and improvements.
- Begin operations building repairs and modifications.
- Begin instrumentation and control system expansion.
- Conduct a plant equipment audit.
- Continue to install plant landscaping.
- Develop and institute a public education program.

Year 2005

- Install additional influent pumping capacity.
- Add a second mechanical bar screen.
- Convert the existing circular primary clarifier to a combination primary clarifier/gravity thickener.
- Modify the existing gravity thickener to a ballasted sedimentation tank to treat peak flow.

Year 2010

- Add a fourth secondary clarifier.

10.30.7 RECOMMENDED COLLECTION SYSTEM IMPROVEMENTS

The recommended collection system improvements presented below are based upon deficiencies in the pipeline hydraulic capacity that were identified in the Hydraulic Analysis found in Section 6 of the *2004 Collection System Master Plan* (Parametrix) and the needed collection system improvements that were identified in the Maintenance and Reliability Analysis presented in Section 7. A Capital Improvement Program (CIP) for the collection system was developed based on a priority analysis of these improvements.

10.30.7.1 Collection System Goals

Three goals were used in developing a CIP for the collection system, identifying the improvements required and a schedule for implementation.

- Service to Saturation-Level Populations: All of the needed improvements were selected to serve the 2060 populations that could occur in the collection system service area.
- Attention to Critical Improvements: Attention was given to collection system pipelines and sub-basin service areas that City staff identified as problems areas. City staff experience in the frequency of maintenance of various pipelines and witnessing surcharged pipelines (hydraulic capacity deficiencies) have been used, particularly to schedule needed improvements.
- Distribution of Capital Expenditures: In the selection and scheduling of the required collection system improvements, the goal was to develop a CIP that is financially viable for the City of Grants Pass.

10.30.7.2 Hydraulic Capacity Improvements

Based on the hydraulic analysis conducted on the wastewater collection system serving the City of Grants Pass, five capital improvement projects have been identified that need to be completed in the next 20 years. These improvements are necessary to maintain adequate conveyance system capacity in the collection system and prevent sewer system overflows. These five projects are found in Section 8 of the *2004 Collection System Master Plan*.

10.30.7.3 Maintenance and Reliability Improvements

Very old and small pipelines serve the downtown area of Grants Pass. The pipelines are greater than 60-years-old, and often only 6-inches in diameter. Based on the Maintenance and Reliability Analysis conducted on the wastewater collection system, six areas of the City are served by these old small-diameter collection lines need further investigation and will likely require repair or replacement. These areas are described in Section 8 of the *2004 Collection System Master Plan*.

10.30.7.4 Estimated Cost of Improvements

By using the gravity sewer pipeline construction cost unit prices, total project costs for each of the recommended pipeline improvement projects are listed in the following table.

Table 10.30.12 Cost of Recommended Pipeline Improvement Projects (in $1M)

Project	Length (feet)	Preliminary Diameter (inches)	Construction Cost ($/foot)	Base Construction Cost	Construction Contingency 40%	Engineering Legal and Administration 30%	Total Estimated Project Cost
Pine Street*	7,010	24	$200	$1.40	$0.56	$0.59	$2.55
Western Avenue	4,720	18	$170	$0.80	$0.32	$0.34	$1.46
Mill Street	9,140	21	$185	$1.69	$0.68	$0.71	$3.08
7th Avenue	4,530	18	$170	$0.77	$0.31	$0.32	$1.40
Nebraska	2,710	18	$170	$0.46	$0.18	$0.17	$0.81

Source: City of Grants Pass Collection System Master Plan, Parametrix Inc., 2004

*Item has been completed or partially completed as of April 2008 (Per Joey Wright, Public Works Dept.)

Similarly, the total project costs for the recommended structural repair areas have been prepared. A minimum diameter of 8-inch sewer pipeline has been assumed to estimate project cost. This is because replacing existing 6-inch-diameter sewer pipe with 6-inch does not meet generally accepted sewer design criteria. Given that different repair/replacement technologies will be implemented in these areas, rather than just assume replacement of all old pipelines with new pipelines to estimate the total project costs in each of these areas, it was assumed that total cost would equal the cost to replace one-half of all pipelines in these areas. These costs are developed and presented in Table 10.30.13 below.

Table 10.30.13 Cost of Recommended Structural Repair Areas (in $1M)

Structural Repair Area	Pipeline Diameter (inches)	Length (feet)	Construction Cost ($/foot)	Base Construction Cost	Construction Contingency 40%	Engineering (Legal and Administration) 30%	Total Estimated Cost*
Pine Street (*completed*)	8 10 12	7,667 402 48	$150 $150 $155	$1.22	$0.49	$0.51	$1.11
5th Street	8 10 12	11,672 1,244 2,606	$150 $150 $155	$2.34	$0.94	$0.98	$2.13
7th Street	8 10 12 18	9,326 400 692 260	$150 $150 $155 $170	$1.61	$0.64	$0.67	$1.46
Subbasin B/C	8 10 12	7,409 945 644	$150 $150 $155	$1.35	$0.54	$0.57	$1.23
Subbasin H	8 10	7,919 1,005	$150 $150	$1.34	$0.53	$0.56	$1.21
Lawnridge-Washington	8 10 12	11,362 612 16	$150 $150 $155	$1.80	$0.72	$0.76	$1.64

Source: City of Grants Pass Collection System Master Plan, Parametrix Inc., 2004
*Total of base cost, construction contingency, and engineering divided by two

10.30.7.5 Collection System Capital Improvement Program

Using the prioritization of Collection System Improvements described in Section 8.4 of the *2004 Collection System Master Plan* (Parametrix) and the estimated cost of these improvements presented in Table 10.30.12 and Table 10.30.13, a recommended Capital Improvement Program for the City collection system has been developed and is presented in Table 10.30.14.

Table 10.30.14 Recommended Capital Improvement Program
Grants Pass Collection System

Project	Schedule	Cost ($1M)
Pine Street Sewer*	2004-2006	$2.55
Western Avenue Sewer	2006-2009	$1.46
Pine Street Structural Repair*	2009-2011	$1.46
5th Street Structural Repair	2010-2012	$1.11
7th Street Structural Repair	2013-2015	$1.46
Lawnridge-Washington Structural Repair		$1.64
Mill Street Sewer	2016-2018	$3.08
Sub-basin Structural Repair		$1.23
Nebraska Avenue Sewer	2022-2024	$0.81

Total Collection System Capital Improvement Program:	$18.08

Source: City of Grants Pass Collection System Master Plan, Parametrix Inc., 2004
*Item has been completed or partially completed as of April 2008 (Per Joey Wright, Public Works Dept.)

10.30.8 REGULATORY AND PROCEDURAL ISSUES

Federal, state, and local regulatory agency policies and procedures affect the installation, upgrades, and operation of the City's wastewater collection system and treatment facility. The impacts of these policies and procedures on wastewater management planning in the Grants Pass area are described below. The discussion of regulations presented is not exhaustive and is focused on those regulations and laws that are relevant to wastewater conveyance and treatment.

10.30.8.1 FEDERAL POLICY

Federal policies that will affect the planning process include the Federal Water Pollution Control Act/Clean Water Act; Safe Drinking Water Act; and the proposed Capacity, Management, Operation and Maintenance Rules.

10.30.8.1.1 Federal Water Pollution Control Act/Clean Water Act

Since its enactment, the Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), has formed the foundation for regulations detailing specific requirements for pollution prevention and response measures. The CWA requires states to adopt water quality standards consistent with federal limitations on pollutant and thermal loading. The standards are to take into consideration the use of the waters for public water supplies; propagation of fish and wildlife; recreational purposes; and agricultural, industrial, and other beneficial uses.

The City's collection system conveys wastewater to the City WRP, where it is treated before discharge to the Rogue River. State policies specifically regulate pollutant and thermal loading to comply with federal policy detailed in the CWA.

10.30.8.1.2 Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) authorizes the Environmental Protection Agency (EPA) to set national health-based standards for drinking water to protect against contaminants that may be found in drinking water. Wastewater flows that are collected in or travel through substandard collection systems have the potential to contaminate drinking water systems. State and local regulations are designed to comply with the SDWA, and prohibit activities that could cause an adverse impact on existing or potential beneficial use of groundwater.

10.30.8.1.3 Proposed Capacity, Management, Operation, and Maintenance Rule

EPA is proposing rules that will govern the manner in which municipalities and special service districts manage and operate wastewater collection systems. The proposed Capacity, Management,

Operation, and Maintenance (CMOM) Rule, depending on its final promulgated form, may have a significant affect on collection system development and operation and maintenance (O&M) for the City.

Under the proposed rule, sanitary sewer overflows (SSOs) would be prohibited unless caused by severe natural conditions such as widespread flooding, earthquakes, or other natural disasters. Owners of collection systems would be required to provide adequate capacity for peak flows in all parts of the system, monitor and report on SSOs, and make the SSO control program and reports available for public review.

There are two aspects of the proposed rule that are under close scrutiny of the reviewing community. First, satellite sewer systems would be operated under separate NPDES permits. Satellite sewer systems are loosely defined in the proposed CMOM rule as any agency that conveys wastewater to another agency for additional conveyance and final treatment and discharge. For Grants Pass, the RSSSD would be considered a satellite system requiring its own NPDES permit.

Second, the proposed CMOM rule is vague on the design threshold to which SSOs must be controlled. For instance, the proposed rule is silent on the recurrence interval of a storm event above which SSOs would be allowed (e.g., would SSOs be permitted during storms greater than 1-in-5 year event?). As such, EPA offers wastewater agencies little or no clear guidance regarding the amount of additional pipeline and pump station construction that would be required under CMOM, nor understanding about the amount of additional maintenance effort required to ensure elimination of SSOs.

As of February 2008, the CMOM rule had not yet been implemented. Based on an April 2004 statement on the EPA SSO web page, "SSO Proposed Rule was with-drawn from publication in the Federal Register," the timeline for implementation of the CMOM rule is uncertain. How the CMOM rule will eventually be interpreted and applied in Oregon is also uncertain. One possibility is that Oregon's "bacteria rule," will be used to set a minimum threshold for SSO prevention.

10.30.8.2 STATE POLICY

10.30.8.2.1 National Pollutant Discharge Elimination System

Section 402 of the CWA provides the legal basis for the NPDES permit program, which regulates point and non-point source discharges. Oregon Department of Environmental Qualtiy (ODEQ) is authorized by EPA to administer the NPDES program through Oregon Revised Statute 468B and associated OARs. These rules and statutes include regulations for wastewater collection, treatment, control, and disposal. Under the conditions of the NPDES permit, permittees are allowed to construct, install, modify, or operate these systems only in conformance with the Federal Clean Water Act and the above-mentioned State statues that set forth requirements, limitations, and conditions for such activities.

The Grants Pass WRP plant operates under NPDES Permit Number 101985 issued December 29, 2000.

10.30.8.2.2 Bacterial Control Management Plan

As noted previously, EPA is currently considering proposed CMOM rules that will limit the number of allowable SSOs. While the proposed CMOM rule is silent on collection system design criteria, Oregon has already adopted a rule that addresses the "bacteria rule," therefore, indirectly offers some guidance to design engineers and collection system owners. The OAR seeks to protect receiving waters and drinking water sources by prohibiting discharge of untreated wastewater to waters of the state except during the following conditions:

- During the period November 1 though May 21, except during a storm event greater than the 1-in-5-year, 24-hour duration storm.
- During the period of May 22 through October 31, except during a storm event greater than the 1-in-10-year, 24-hour duration storm.

The State Environmental Quality Commission may approve a change to these rules on a case-by-case basis as described in OAR 340-41-120. Determining the causes and preventing against SSOs usually requires a municipality to thoroughly evaluate both the collection and treatment system to determine the extent of extraneous weather-related flow, system structural condition and reliability, system hydraulic and treatment capacity, and the efficiency of operation and maintenance practices. The City has already performed a thorough analysis of the treatment and collection system.

10.30.8.2.3 Groundwater Regulation

The Federal SDWA requires that state underground injection control programs be established to ensure that underground injection will not endanger drinking water sources. In Oregon, groundwater regulations, including regulatory requirements for injection controls, are administered by ODEQ. On-site drain fields and septic systems that serve 20 or more persons are considered injection wells by ODEQ. The City Development Code requires that all new development within the service area be connected to the wastewater collection and treatment system. Existing development using septic systems is required to connect to the public sewer system at such time as repair or replacement of existing facilities is necessary, if public sewer is within 300 feet of the property.

10.30.8.3 LOCAL ORDINANCES, POLICY, AND MANAGEMENT AGREEMENT

Local requirements of particular concern to the planning process are related to the City Municipal Code, City Development Code, and the Sanitary Sewer Lateral Replacement Policy.

10.30.8.3.1 City of Grants Pass Municipal Code

City Ordinances 4861 and 5028 have been adopted by the City as Chapter 8.50 of the City Municipal Code. Chapter 8.50 is intended to protect public health and safety; protect the environment; and ensure compliance with all applicable state and federal laws as they pertain to wastewater collection, conveyance, treatment, and discharge.

Sewer use requirements set forth in Chapter 8.50 include general and specific prohibited discharge standards. The general prohibitions state that no user shall introduce or cause to be introduced into the City WRP any pollutant or wastewater which causes pass-through or interference, or which will cause the WRP to violate its NPDES permit or harmfully impact the receiving water quality

standards. Chapter 8.50 also sets forth procedures for the allowance of intentional occurrences, and the reporting of unanticipated bypass.

10.30.8.3.2 City of Grants Pass Development Code

Title 10 of the City Municipal Code may also be cited as the City Development Code. The purpose of the Development Code is to coordinate City regulations governing the development and use of land. Standards for sewer and septic systems are set forth in the Development Code to ensure compliance with state and federal statutes, policies, and laws designed to prevent harmful impact to receiving waters.

10.30.8.3.3 Sanitary Sewer Lateral Replacement Policy.

Substandard or combined sewer laterals discovered during public sewer, water, or storm drain projects are required to be replaced. The City considers the sewer lateral to be the responsibility of the private property owner from the point of connection to the main to the building being served. Replacement of substandard sewer laterals may often include work within the public right-of-way, with the possibility of additional costs such as pavement patching, traffic control, and other construction items not usually associated with work within private property boundaries. To assist the property owner in the cost of lateral replacement, the City has adopted a Sanitary Sewer Lateral Replacement Policy. Under this policy, the City Manager can authorize payment of 50 percent of the cost of replacing failed or otherwise substandard laterals.

10.30.8.3.4 Urban Growth Boundary Management Agreement.

The City-County Urban Service Policies, adopted with the UGB in August 1979, require a public sewer system with capacities to serve urban levels of development. On August 8, 1998, Josephine County, City of Grants Pass, Harbeck-Fruitdale Sewer District and Redwood Sanitary Sewer Service District signed an Intergovernmental Agreement for the Orderly Management of the Grants Pass Urban Growth Boundary Area.

10.30.9 FINANCING PLAN

Various funding alternatives exist for the City of Grants Pass to implement the Capital Improvement Plan (CIP). The purpose of this section is to determine the best option for financing. Unless otherwise noted, the information from this section was excerpted from the *2001 Wastewater Facilities Plan Update*.

As part of the work in developing a financing plan, a computer model was created to assist the City in future modifications to both the CIP and operation/maintenance funding. This model is the basis for the conclusions presented herein.

10.30.9.1 Capital Costs

The CIP includes three major elements: Treatment Plant (liquid treatment), Biosolids, and Collection System. The proposed phasing plan is shown in Table 10.30.15.

Table 10.30.15 Capital Improvement Plan

(Year 2000 dollars)

	YEAR 2001-2004	Year 2005-2006	Year 2010-2011
Treatment Plant	$5,940,000	$5,795,000	$1,855,000
Biosolids	$3,590,000		
Collection System	$2,500,000		
TOTAL	$12,030,000	$5,795,000	$1,855,000

Source: City of Grants Pass Water Restoration Plan, June 2001, Parametrix Inc.

In addition to capital costs, the City must be able to fund the ongoing cost of operating and adequately maintaining its sewer utility. A breakdown of these operation and maintenance costs is shown in Table 10.30.16.

Table 10.30.16 Operation and Maintenance Expenses
(Year 2000 dollars)

Wastewater Collection Services	$333,488
Wastewater Treatment Services	$887,513
Customer Services	$167,910
General Program Operations	$361,393
TOTAL	$1,750,304

Source: City of Grants Pass Water Restoration Plan, June 2001, Parametrix Inc.
NOTE: Updated operation and maintenance expenses can be obtained from annual city budgets.

10.30.9.2 Current Funding

The City of Grants Pass has two main revenue sources: monthly user charges and system development charges. The monthly user charge is collected for all system customers, and has increased since the *2001 Wastewater Facilities Plan Update*.

All new connections to the system pay a Sewer System Development Charge (SSDC). This charge is designed so new customers pay their share of wastewater collection and treatment infrastructure costs. At the time of the *2001 Wastewater Facilities Plan Update*, SSDCs averaged about $1,000 per new connection. SSDCs have increased substantially since that time, and vary depending upon use and location (properties within the Redwood Sanitary Sewer District are subject to a different SDC schedule than other properties connecting to the system.)

10.30.9.3 Capital Funding Mechanisms

To fund the CIP, the City will need to consider other funding mechanisms. These other funding mechanisms include: Revenue Bonds; Low interest loans – State Revolving Fund (SRF); and, Grants.

A revenue bond is a very common tool to fund capital improvements. Rates are determined by market conditions and currently are around 5 to 6 percent. Due to the significant financing cost and associated coverage, this funding method is normally a last resort if other funds are no available.

Grants used to be the only way to finance wastewater treatment improvements. Many of the upgrades to secondary treatment across the United States were funded by grants, sometimes up to 75 percent of the costs. Wastewater construction grants, while still available, are insufficient compared

with the current demand.

One of the best governmental programs available is the State Revolving Fund loan program. This fund, seeded by money from the Environmental Protection Agency (EPA), is giving state governments, including Oregon, funds to loan to municipalities for treatment and collection system improvements. These loans, administered by the Oregon Department of Environmental Quality Wastewater Finance Office, are "low interest" with current rates at less than 4 percent. Unlike bonds, normally these loans have a smaller reserve amount and no coverage requirements. Due to federal funding, cities like Grants Pass seeking SRF funding must comply with EPA requirements for a Facility Plan, thus this plan has been developed according to said requirements. The City secured approximately $7M in SRF loans in 2003-2004 for work on Phase I of the CIP. The work was completed as of July 2004, and the loans were in the process of being repaid as of January 2008.11

10.30.9.4 Projected Cash Flow

The major components of both revenue and expenses in a simplified view of the wastewater utility are:

- Revenue: Monthly Sewer Service Charges, SDCs, Loan Proceeds, and Interest
- Expenses: Operation and Maintenance, Capital Expenditures, Debt Service, and Reserve Amounts

In reality, these revenues and expenses are tracked in separate accounts; however, for the purpose of this simplified analysis, all revenue and expenses will be considered as one amount. Table 10.30.17 projects the annual cash flow for the Grants Pass wastewater utility. This projection is for the period of the CIP. With the funding from the SRF, and the current cash on hand (based on the City's construction fund only), it appears that the City will be able to fully fund the CIP. In addition, the City may be able to fund an ongoing sewer rehabilitation program. This amount, shown in the cash flow during non-CIP funded years, is $250,000. It will have to be determined if this amount is sufficient to address the long-term needs of the City.

11 Per Joey Wright, City of Grants Pass Public Works Department, January 2008

Table 10.30.17 Simplified Cash Flow Analysis

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Beginning Balance	$6,800,000	$7,700,000	$4,486,415	$1,068,894	$1,750,927	$2,363,994	$2,245,196	$269,835	$681,984	$1,044,057	1,401,552$	$931,076
Rate Revenue	$2,650,000	$2,689,750	$2,730,096	$2,771,048	$2,812,613	$2,854,803	$2,897,625	$2,941,089	$2,985,205	$3,029,983	$3,075,433	$3,121,565
SDC Revenue		$100,000	$101,500	$103,023	$104,568	$106,136	$107,728	$109,344	$110,984	$112,649	$114,339	$116,054
O&M Cost	$1,750,000	$1,802,500	$1,856,575	$1,912,272	$1,969,640	$2,028,730	$2,089,592	$2,152,279	$2,216,848	$2,283,353	$2,351,854	$2,422,409
Loan Funding		$2,000,000	$2,000,000		$2,000,000							
Debt Service		$145,435	$290,871	$290,871	$290,871	$436,306	$436,306	$436,306	$436,306	$436,306	$436,306	$436,306
Reserve Account		$150,000	$150,000			$150,000						
Capital Cost		$6,195,400	$6,195,400	$100,000[a]	$100,000[a]	$2,547,000	$2,547,000	$100,000[a]	$100,000[a]	$100,000[a]	$921,000	$921,000
Investment Income		$290,000	$243,728	$111,106	$56,396	$82,298	$92,184	$50,301	$19,036	$34,521	$48,912	$46,653
Ending Balance	$7,700,000	$4,486,415	$1,068,894	$1,750,927	$2,363,994	$2,245,196	$269,835	$681,984	$1,044,057	$1,401,552	$931,076	$435,633

Source: 2001 Grants Pass Wastewater Facilities Plan Update, Parametrix

[a] Balances reflect both Capital and Operations Accounts

10.30.9.5 Conclusion.

The financial situation of the City's wastewater utility is good. Given the ability to secure loans from the SRF program, and the sound fiscal management of the utility, the City will be able to fully fund the CIP as outlined in the Facilities Plan.

10.30.10 SANITARY SEWER SERVICES FINDINGS

10.30.10.1 Existing Sewer Capacity

- At the time of the *2001 Wastewater Facilities Plan Update*, the Grants Pass Water Restoration Plant (WRP) treated 4.5 mgd of average dry weather flow (ADWF) to a record peak storm flow of 26.5mgd. More recent data has also been compiled. As of April 2008, the WRP treated an ADWF of 5.5 mgd and peak wet weather flow of 30.0 mgd. The plant is comprised of numerous unit treatment processes for both liquid and solid streams, a control/laboratory building, and a maintenance shop. The Grants Pass WRP has a 27 mgd hydraulic capacity for influent pumping[12], screening, and primary treatment. There is a 13 mgd hydraulic capacity for secondary treatment. In addition, there is a 43 mgd hydraulic capacity for UV disinfection. Flow exceeding the secondary treatment capacity receives only primary treatment and disinfection. This occurs only a few days a year during wet weather storm conditions. For the final phase of disposal, dewatered biosolids are loaded into a dumpster and hauled to the Merlin Landfill for the JO-GRO composting process.

- The Harbeck-Fruitdale Sewer Service District uses the Grants Pass WRP plant for the processing of its waste. The sewer collection system has a capacity that can accommodate the population equivalent of approximately 14,000 persons.

- The Redwood Sanitary Sewer Service District uses the Grants Pass WRP for the processing of its waste. The sewer collection system has a capacity that can accommodate the population equivalent of approximately 16,000 persons.

10.30.10.2 Future Need

- The City and County have already established pumping of Redwood's wastewater to Grants Pass WRP and are not likely to extend services to the North Valley during this planning period.

- The *2004 Collection System Master Plan* developed a future equivalent population projection for the service area by applying sub-area growth rates from the City's Comprehensive Plan to the base population estimates for the sub-areas and adding 35% to the resulting population for commercial / industrial population equivalent. As of 2003, the Grants Pass WRP was serving an estimated population equivalent of 44,250. Estimated growth rates are respectively: 1.5% for Grants Pass, 1.6% for Harbeck-Fruitdale and 3.1% for Redwood. By the year 2020, it was

12 As of January 2008 a project was completed to increase the hydraulic capacity for influent pumping to 45 mgd.

anticipated that the Grants Pass WRP could be serving a total population of 60,157. Year 2060 service area population, assumed by the *2004 Collection System Master Plan* to represent build-out, was estimated at approximately 130,167.

- The *2001 Wastewater Facilities Plan Update* identified a need for several improvements: At the head works, an additional mechanical bar screen to be installed with a 23.5 mgd capacity this provides redundancy and a maximum capacity of 47 mgd, which is well beyond the projected future flows); An outfall diffuser to be added to improve and reduce the ammonia toxicity into the Rogue River; Several miscellaneous plant improvements, which existed in the Facility Plan, were also included in the value engineering alternatives. These improvements include laboratory upgrades, operations building repairs and modifications, and instrumentation and control system expansion. All of these improvements have since been completed.

- Plant Equipment Audit. The *2001 Wastewater Facilities Plan* recommended that a full analysis of the existing component conditions be conducted. This audit would analyze the remaining life span of each component and develop an operations and maintenance schedule for the 20-year planning period. The audit has since been completed.

- Additional Plant Landscaping. As of the *2001 Wastewater Facilities Plan*, a substantial amount of landscaping at the treatment plant had occurred to promote a good-neighbor environment. However, to continue this effort, the *WFP* recognized that additional landscaping would be necessary. The installation of additional landscaping has been ongoing.

- The City of Grants Pass continues upgrading its sanitary sewer system facilities to provide the appropriate level of services for the impending growth and development of its service area. Through its master facility planning, the City is prepared to meet its growth challenges in compliance with federal, state and local regulations, provided it continues to implement the respective Capital Improvements Plans as scheduled.

- Feasibility for Effluent Reuse, *(*Chapter 7 – *Grants Pass Facilities Plan*, Parametrix, 1999) concluded that reclaimed water (treated effluent) from the Grants Pass Water Restoration Plant (WRP) could be used beneficially instead of being discharged. Low river levels coinciding with the period of peak crop water use make irrigation a potentially feasible alternative for the City of Grants Pass and local agricultural water users. Reclaimed water can irrigate agricultural land, parks, highway landscaping, and golf courses. It can be used to grow wood fiber for fuel, pulp, or lumber. Other potential uses include increased flow to wetlands and storage in reservoirs or other impoundments specifically designated for effluent reuse only.

    - An extra incentive to "get out of the river" during the summer months is provided by concerns over meeting temperature requirements, potential future nutrient limitations, and listing of certain fish species as endangered. Reclaimed WRP effluent can also be viewed as a valuable resource that could help bridge the gap created by the planned removal of the Savage Rapids Dam. Dam removal has sparked a controversy about the availability of irrigation water, and new costs associated with pumping irrigation water from the Rogue River.

- Effluent reuse is complex and requires further planning to address implementation issues of effluent reservoir and storage siting, piping route selection, right-of-way acquisition, system ownership, financing and management.

10.40 STORM DRAINAGE SERVICES INDEX

10.40.1 PURPOSE

10.40.2 EXISTING STORM DRAINAGE FACILITIES AND SYSTEMS

. Existing Storm Drainage Problems

10.40.3 AREAS OF CONCERN

. Flooding and Storm Drainage
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10.40.4 FUTURE NEEDS ANALYSIS

. Reducing Storm Water Runoff
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10.40.5 FINANCING METHODS

. Capital Improvement Costs
    Federal Grants
    Municipal General Obligation Bond
    Revenue Bonds
    Improvements Bonds
    Sinking Fund
. Operation and Maintenance Costs

10.40.6 FINDINGS

10.40 STORM DRAINAGE FACILITIES

PURPOSE

The purpose of this section is to assess existing storm drainage facilities, identify areas of concern, project facilities or improvements that will be needed during the planning period, examine financial methods of paying for the facilities, and propose policies for the orderly provision of facilities.

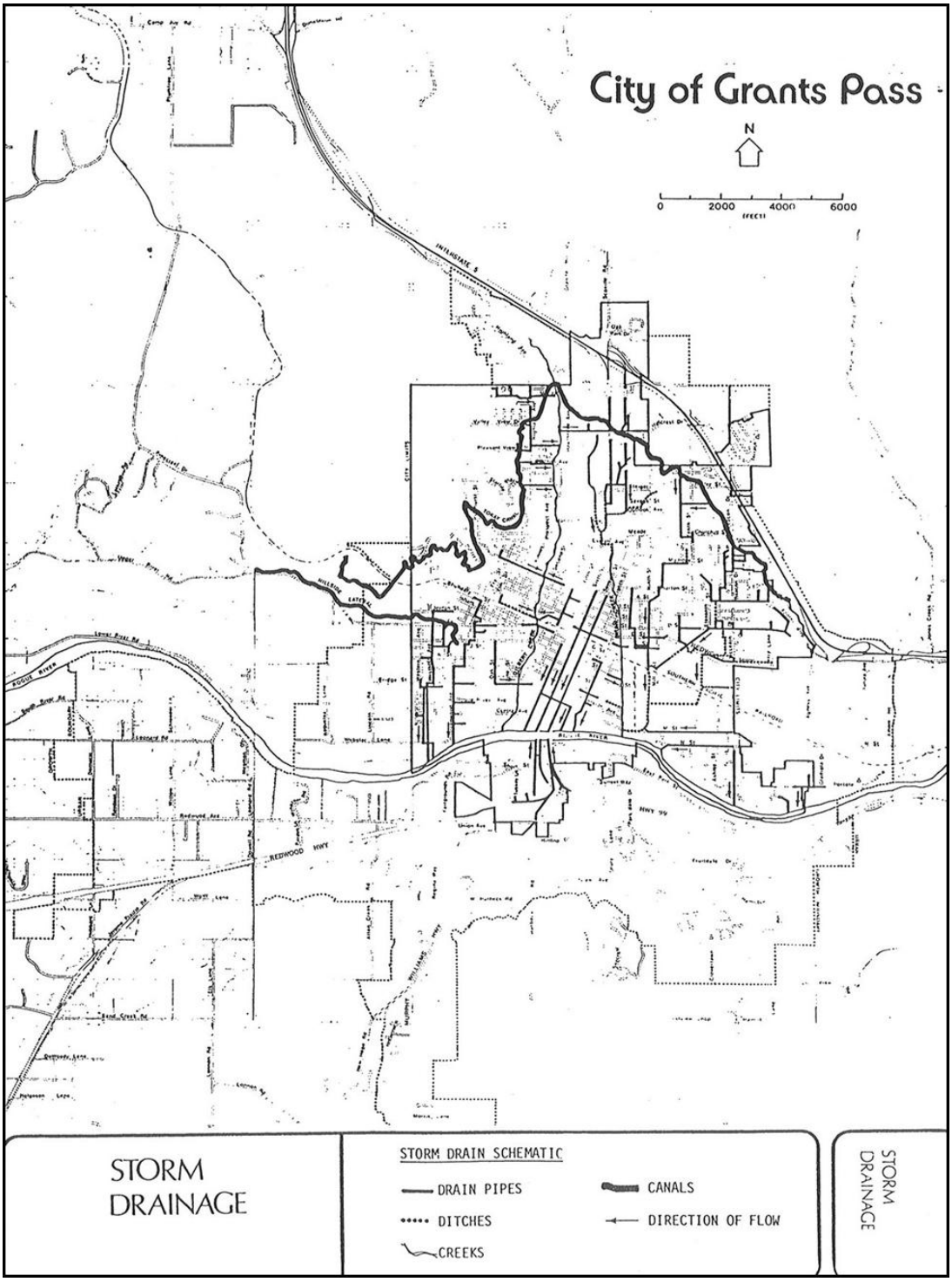
EXISTING STORM DRAINAGE FACILITIES

The City and urbanizing area are lacking adequate urban storm drainage facilities. The City is not fully served by storm drains. In some cases, the existing drainage facilities have inadequate capacity to carry the high volumes of storm runoff during peak storm conditions. (Engineering Report, 1963, CH2M/Hill Engineering Consultants)

The UGB area contains approximately 13 square miles (5+ in the City) and is part of a larger drainage basin comprising about 31 square miles. Much of this area is flat with poor surface drainage (Redwood Area), subject to flooding (west of City area), or in steep slopes draining into season creeks. Future development within the UGB area, increasing population from approximately 22,000 persons to 38,300 persons to 44,750 persons, requires serious consideration of a comprehensive drainage system.

The principal sub-basins of the larger basin are: Gilbert Creek, Skunk Creek, Fruitdale Creek, Allen Creek and Sand Creek. All of these creeks flow through the UGB and drain into the Rogue River. See Map 10.40.1. A detailed description of these sub-basin can be found in the preliminary "Master Storm Drainage Facilities and Management Plan," HGE Engineers and Planners. That plan further describes the function of each sub-basin in the storm water run-off and the conditions of the drainage facilities within each sub-basin. The following material summarizes the existing storm drainage problems within the study area, as identified by the Storm Drain Plan.

MAP 10.40.1
Sub Basins of UGB Area
(Derive from Storm Drain Plan Map)



Existing Storm Drainage Problems

1. Vegetative overgrowth along stream beds and side slopes.

   Skunk Creek: lower 2000 feet (heavy buildup)

   Mill Street drainage way: 3000 feet (heavy buildup)

   Gilbert Creek: lower 1500 feet (light buildup on side slopes)

   Fruitdale Creek: lower 2500 feet (heavy buildup on side slopes)

   Allen Creek: Redwood Highway south 2500 feet (debris and vegetative buildup on the side slopes)

   Sand Creek: lower 1000 feet (light buildup on side slope)

2. Box culverts with silt buildup causing inverted slopes.

   - <u>Gilbert Creek Sub-basin:</u>

   Gilbert Creek:
   "K" Street culvert crossing: 12' x 6.5' conc. arch
   "H" Street culvert crossing: 12' x 7.0' conc. arch
   "D" Street culvert crossing: 12' x 6.0' conc. arch
   "A" Street culvert crossing: 12' x 12' conc. arch
   Savage Street culvert crossing: 9'x 7' conc. arch

   - <u>Skunk Creek Sub-basin:</u>

   Skunk Creek:
   "J" Street culvert crossing: 9.0' x 6.5' cmp arch
   between "L" and "J" streets: 9.0' x 6.5' cmp arch
   "D" Street culvert crossing: 7.0' x 5.0' cmp arch
   "I" Street culvert crossing: 9.0' x 12.0" cmp arch

   Mill Street Drainage Way:
   "J" Street culvert crossing: 8.0' x 5.5' cmp arch

   - <u>Allen Creek Sub-basin:</u>

   Allen Creek
   Williams Hwy north of Arroyo Dr.:14' x 7' conc. Box

- Sand Creek Sub-basin:

Sand Creek:
Leonard Rd west of Schroeder Ln: 12' x 3' conc. box

3. Undersized or structurally unsound culverts and pipe.

Gilbert Creek Sub-basin:

Major culverts Numbers: 3, 4, 5, 6, 7, 8, 11, 12, 13, 19

Skunk Creek Sub-basin:

Major culverts Numbers: 9, 10, 11, 12, 13, 14, 16, 20, 21, 22

Pipeline along Sixth Street south of Evelyn Avenue.

4. Silted Roadside Drainage Ditches.

Sand Creek Sub-basin:

a. Redwood Avenue ditches have areas of ponding water due to inverted roadside culverts and silt buildup.

5. Irrigation canal system.

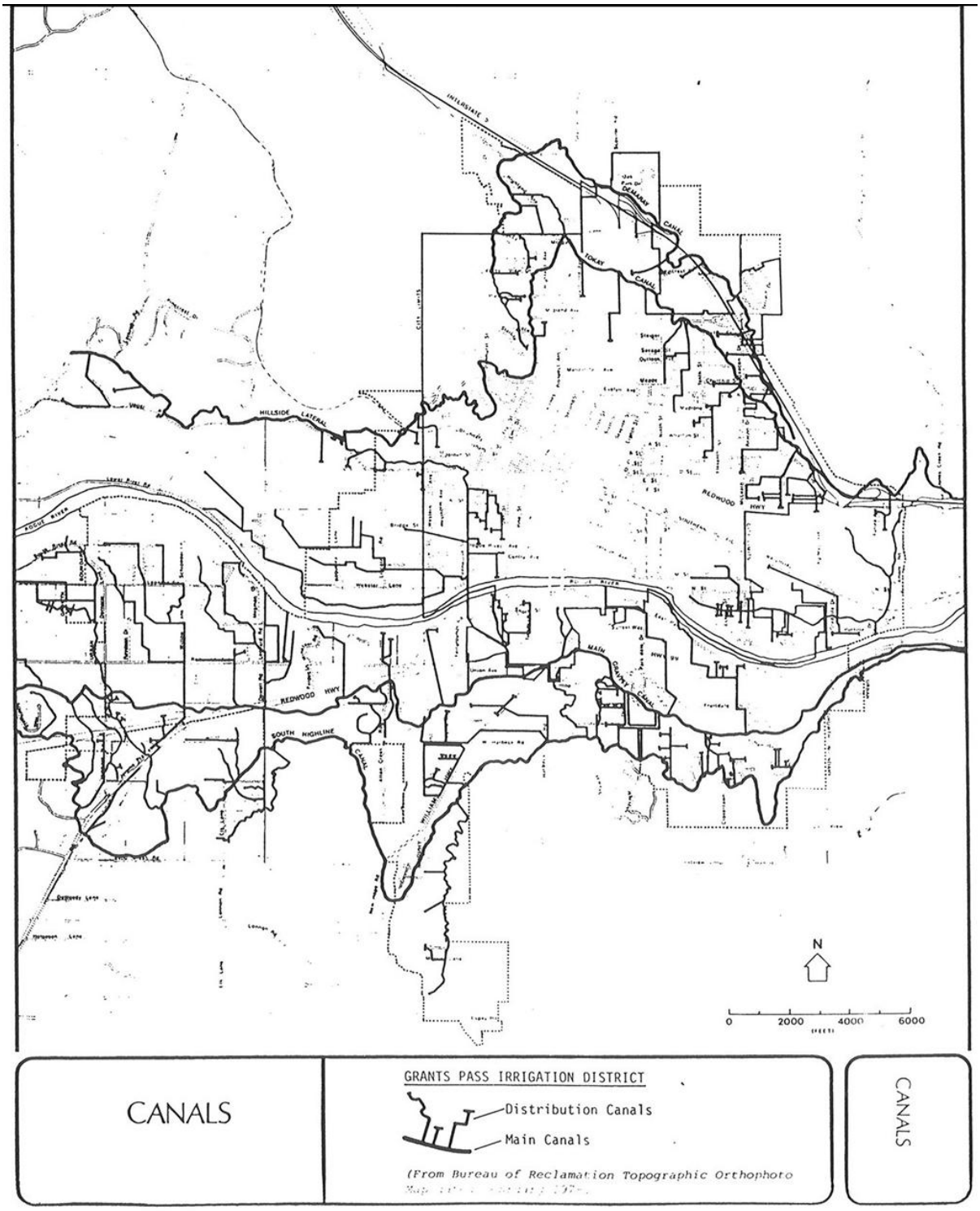
a. A few isolated diversion structures are leaking and have debris buildup.

b. The canal system has many areas with vegetative buildup.

c. Soil erosion problems exist in several unlined areas of the canal.

Irrigation canals are also prominent component of the overall system. Water that is diverted from the Rogue River at Savage Rapids Dam is carried into the study area via a series of canals. The major canals that are within the UGB are: the Tokay and Demaray Canals located north of the Rogue River which divert natural storm water flows to Gilbert and Skunk Creeks; and the main gravity and high-line canals located south of the Rouge River which divert the natural storm water flows into Fruitdale, Allen and Sand Creeks. (See Map 10.40.2) The canal system is constantly plagued with erosion problems, leaking diversion structures and vegetative and debris buildup. As the canals are an integral part of the existing and proposed storm drainage system, it is appropriate that the City, County and Irrigation District work together to improve the canal system within the UGB.

MAP 10.40.2
GPID Canal Map - UGB Area



Areas of Concern

Flooding and Storm Drainage

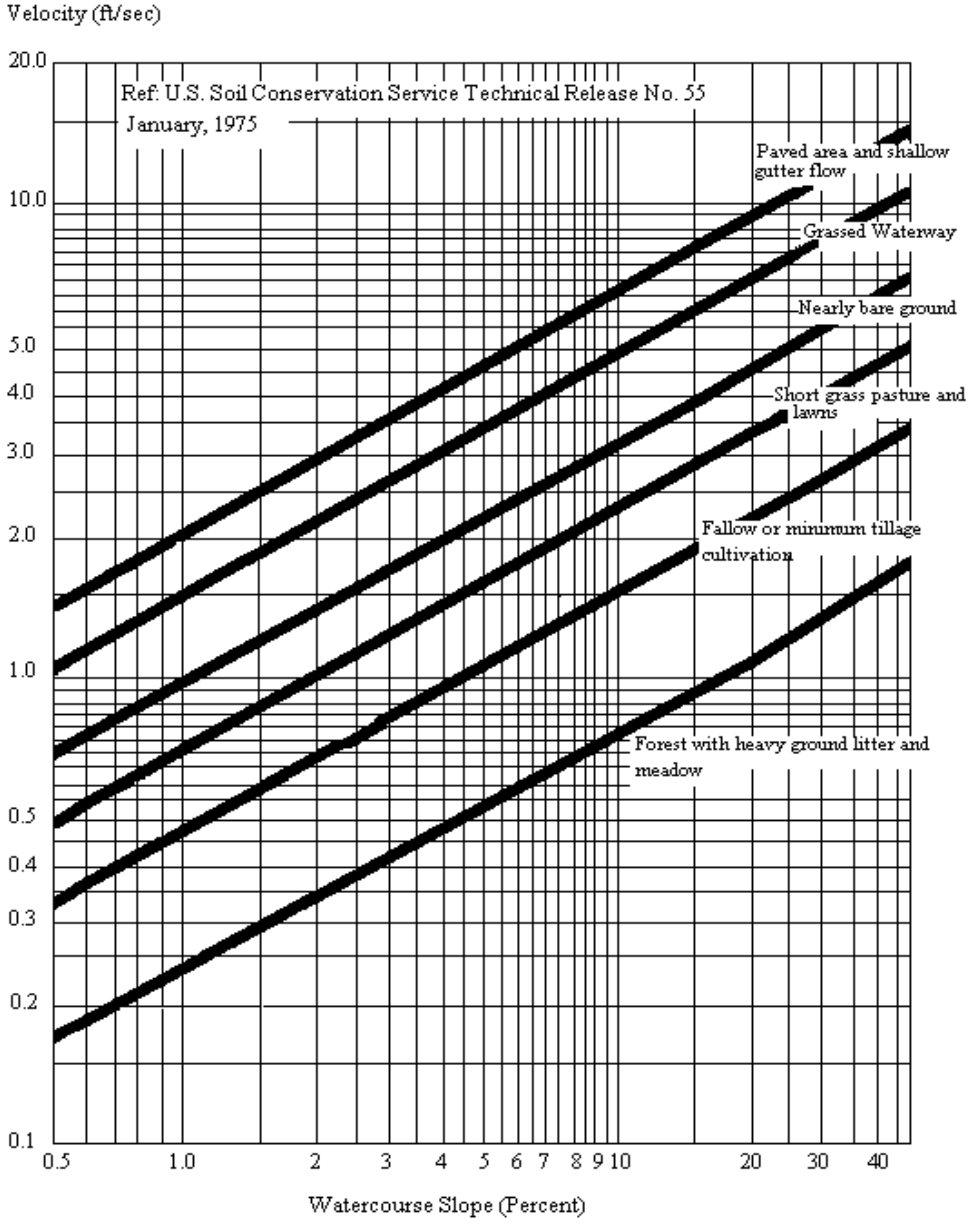
Flooding is an ever present possibility in the Rogue River Basin. There have been thirteen major floods over the past 100 years, with the last flood occurring in 1974. The record discharge flow at the Grants Pass gauging station is 152,000 cubic feet per second (cfs), occurring in December, 1964. The 1964 flood was reported to have a recurrence frequency of 50 years prior to the construction of Lost Creek Dam. (Postflood Report, January 1974. Portland District, U.S. Army Corps of Engineers.) Grants Pass has experienced flood damage as the result of inadequate drainage facilities. In October, 1950, 2.8 inches of rain fell in three hours and 5.3 inches fell in 24 hours. Nearly 11 inches fell during a four day period. A number of streets, homes, and buildings, including the Grants Pass High School suffered flood damage. In 1955, an unusually rapid run-off caused the Rogue River and Gilbert Creek to overflow their banks, flooding the City park, the sewage disposal plant, "A" Street, and homes along Greenwood Drive. Flood damage was estimated at $250,000. In February, 1956, 4.3 inches of rain fell during a 24 hour period, causing the culvert at Sixth and Evelyn Streets to fail. The Central Business District flooded as did portions of "I," "J" and "K" streets along Gilbert Creek. (A Survey of Drainage in the Grants Pass Area, 1959, Bureau of Municipal Research & SERVICES.) Following the 1950 flood, various drainage improvements were proposed by the City Council. The citizens approved a 10 year levy to finance the construction of the improvements. After subsequent floods, additional improvements were needed; the City received a federal grant to finance construction of some of these improvements. Some of the improvements to the system were also funded by Josephine County during 1972-1974. As development of the City continued, improvements to the system have occurred; however, the basic drainage problem still remains. The City and County have recently entered into contract with HGE, Inc., Engineers and Planners (August 21,1980), to have prepared a "Master Storm Drainage Facilities and Management Plan for the Grants Pass Urban Growth Area." As adopted in May, 1982, the plan will: provide the basis for sizing facilities to match expected runoff over the 20 year planning period, lay out a drainage system to meet projected growth, estimate cost of the system and propose methods for financing the facilities.

Natural Waterways and Storm Water Flow

Much of the UGB is developed to urban levels, and is consequently covered to a great extent with impervious surfaces such as streets, parking lots and buildings. Storm water runs over impervious surfaces very rapidly and can increase storm water flooding as a result. One water to help reduce levels of storm water flooding is to provide natural water retention areas such as ponds, grassed waterways, vegetative open spaces such as lawns, gardens and pasture, and forested wares with ground litter and meadow. Table 10.40.3 shows the rate of storm water overland flow on various ground surfaces and slopes. The vacant buildable lands within present City limits are found mostly along the foothills where storm water flow can be reduced by maintaining the forest cover or grass covered meadows. The vacant buildable land west of the City and north of the Rogue River is generally located on more level terrain that has some flood hazard. Storm water run off can be reduced in these areas by maintaining landscaped and turfed open spaces. The pattern of development in that area should encourage cluster housing developments that create large open spaces. Where natural ground depressions exist, it may be judicious to develop these as natural water retention areas for storm water flows, as has been done by the Rogue Lea Estates

development. In the urbanizing area south of the Rogue River, especially in the Redwood subarea, there are many acres of grassed waterways as well as pastures and lawns. Developments that preserve these natural waterways and create well planted open spaces will enhance storm water infiltration into the water table, and reduce overland storm water.

TABLE 10.40.3
Storm Water Flow on Various Surfaces



Future Need

"The Master Storm Drainage Facilities and Management Plan for the Grants Pass Urban Growth Boundary Area," adopted in May, 1982, will serve to guide the development of storm drainage facilities within the UGB from 1980 to the year 2000. The Plan addresses the methods of receding storm water run off and of improving the capacity of the existing storm water facilities.

Reducing Storm Water Run-off

The Storm Drain Plan recommends the following controls:

1. Retain trees, grass, vegetation and pervious cover wherever possible.

2. Design improvements to maximize infiltration/ recharge and minimize run-off.

3. Avoid development on slopes to minimize run-off velocities.

4. Schedule construction and development activities to minimized the duration of bare soil exposure, and control such activities in erosion-prone areas during the winter.

5. Control development in flood plains.

6. Select land that has optimum soils, topography and natural drainage for future development.

7. Select erosion prone areas for such uses as parks, open spaces and natural recreation.

8. Use temporary vegetation or mulch to protect areas under development.

9. Provide adequate drainage to storm drains, surface storage, canals or diversion structures.

10. Require that roof drainage and other on-site run-off be discharged to pervious areas or seepage pits.

11. Require on-site water detention facilities to offset potential higher run off rates.

12. Planning and design efforts should attempt to retain natural flow conditions.

13. Drainage facilities should not substantially increase or divert surface water run off without careful consideration of downstream impacts.

14. Public officials should exercise reasonable care in administering drainage improvements.

15. Planning and design of drainage improvements should be based on reasonable estimates of future urban development.

Improving Capacity of Existing Facilities

The Storm Drain Plan makes the following recommendations for improving the capacity of existing storm drain facilities:

1. A comprehensive maintenance program should be established to remove excessive vegetative over-growth in all major drainage ways.

2. All culvert crossings reported with silt buildup should be cleaned and all culverts should be annually maintained.

3. All roadside ditches should be inspected and cleaned annually if necessary.

4. The canal system should be cleaned and the deteriorating or undersized structures systematically reconstructed to eliminate distribution problems and labor intensive operation expenses relating to debris buildup.

5. A four-man staff should be used to perform annual operation and maintenance tasks associated with implementing the above program.

Facilities Plan and Cost

The 1982 Storm Drain Plan developed a computer model of the entire 22,000 acres within the drainage basin, using the Storm Water Management Model program (SWMM) developed by the Environmental Protection Agency in 1972. The model has the capability to predict the quantity and quality of runoff from a watershed, route to the runoff through a conveyance system and into storage or treatment facilities, and simulate the response of receiving waters subject to storm water loadings. In the Plan, the SWMM computer model quantity analysis was used to determine the specific areas that are surcharged under present condition and upon complete development. The Rational Method was then used to size specific improvements for each deficiency.

An important factor used in designing the master storm drain system was the concept of retention. If every impervious area receiving storm water is so designed to retain a certain portion of that water during a heavy storm, the peak flow conditions used to desiring a storm drain system can be significantly reduced, reducing costs of both the developer and the City.

The Master Storm Drain Plan assumed a 25 year frequency storm to determine surcharged areas, and established three priority classes based upon the 25 year storm surcharging, as follows:

Priority A

- Projects needed where surcharging exists or will exist by the year 1990 when analyzed using a 25 year storm condition.

- Projects that are presently in the planning phase in conjunction with proposed development.

- Projects that are major trunk lines to serve areas where development pressure is expected prior to 1990.

Priority B

- Projects needed where surcharging will exist prior to the year 2000.

- Projects serving areas where development pressures are anticipated between 1990-2000.

Priority C

- Projects directed at replacing natural drainage-ways or open ditches where no surcharging is anticipated when analyzed using a 25 year storm upon complete buildout.

- Projects serving development beyond the year 2000.

Using a target population of between 39,000 and 40,400 persons, some 46.2 miles of drainline improvements were required to meet the additional runoff demand, in addition to the needs of the existing system. Costs for the system, using an "Engineering News Record Construction Index" of 3510 (current construction costs), and including contingencies for the engineering, administration and inspection of construction, but not including financing charges, come to a total of $17.8 million. The top priority projects require over 19% of the total, or $3.5 million for 6.5 miles of line. (See Table 10.40.4) An additional annual operation, maintenance and culvert improvements cost of $265,000 per year, was also projected.

The Storm Drain Plan suggested utilizing a combination user fee/tax levy for the top priority items (1982-1988), which benefit mostly existing residents, and a sinking fund covered by system development charges for the second priority items (1988-1995), benefiting mostly new development. Assuming the uniform growth of each land use type (residential, commercial and industrial) and assuming 10% yearly capital cost inflation and assessed value increases, and assuming operation and maintenance costs to increase 8% per year, a user fee of $1.50 single family residential drainage equivalent per month would finance the first six years of improvements, including all top priority projects. Cost per land use type would be as follows:

Single Family Residence	$ 1.50 du/month
Commercial	$24.10 Ac/month
Industrial	$13.05 Ac/month

TABLE 10.40.4
UGB Drainage System Improvements Extent and Lost

Improvement Line Size	Linear Feet of Line Required			Totals
	Priority A	Priority B	Priority C	
54"	950	---	---	
48"	3,240	2,050	1,300	
42"	1,200	8,600	1,200	
36"	8,450	14,800	3,150	
30"	4,300	4,200	5,200	
27"	700	8,860	4,800	
24"	2,700	14,700	20,240	
21"	2,500	7,900	11,800	
18"	5,020	10,050	27,200	
15"	1,710	6,280	15,850	
12"	3,500	6,660	35,070	
Subtotal	6.5 miles	15.9 miles	23.8 miles	46.2 miles
Installation Cost	$3,457,200	$6,740,300	$7,623,700	$17,821,200
Recommended Implementation	1982 - 1988	1988 - 1995	Beyond 1995	1981 - 1995 and Beyond

For purposes of developing a user fee, HGE assumed that one single family residence equaled 2,500 square feet of impervious area per dwelling unit. Further, HGE assumed that 100% of commercial land was covered with imperious surface, and 50% of industrial land was covered for any given development. The SRE value for any development type may then be determined as per Table 10.40.5. A determination of SRE's for each land use type (residential, commercial and industrial) follows in Table 10.40.6. These values then may be used to compute monthly billing charges in any given area for operation and maintenance bond service.

TABLE 10.40.5
Single Family Equivalent (SRE) Values

Residential (1 SRE/dwelling unit)	1 SRE/2500 SF Impervious surface
Commercial	1 SRE/2500 SF of lot
Industrial	1 SRE/5000 SF of lot

TABLE 10.40.6
UGB Estimated SRE Units By Land Use Type

Land Use Type	Development Existing	Total SRE	Percentage
Residential	9,283 D.U.	9,283	47%
Commercial	429 acres	7,465	38%
Industrial	324 acres	2,819	15%
		19,567	100%

Financing Methods

Financing a storm water system improvement program for the UGB area requires the City and County to implement a long range financial plan. The initial phase of that plan requires that the citizenry be informed as to the needs and related financial costs associated with such a program. There are two major costs of a storm water system improvement program: a) costs for capital improvements, and b) costs for operation and maintenance of the system.

The funding of capital improvements may be accomplished by the acquisition of federal grants, the sale of general obligation bonds, special assessments, and by capital improvement (sinking) funds created by systems development charges.

Capital Improvement Costs

Federal Grants - Currently only one source of federal grants funding is applicable to the storm water system improvement needs of the Grants Pass Urban Growth Boundary: that source is the Economic Development Administration. Grants and loans are authorized under the Economic Development Act of 1965 to assist communities that are identified as being economically depressed by the Commerce Department. The program is directed toward community projects that will stimulate permanent economic development. The projects should assist increasing the opportunity

for new industry and/or development, or in maintaining present levels of employment within the community. Eligibility for the program is heavily weighted in favor of economic development.

Municipal General Obligation Bond - A general obligation bond (GOB) is backed by the full credit of the issuer (City). That credit is determined by the true cash value of the real property within the City and secured by the power to tax that real property in order to finance the bond. The credit supporting the bond is usually many times greater in value than the bond. That fact consequently implies great security and justifies a lower interest rate commensurate with the level of risk. In addition, interest earned by the bond holder is tax exempt from the IRS. However, even with these inducements, GOB's can be difficult to sell.

The bond market can be influenced by such economic factors as inflation, high interest rates and a tight money supply. When these factors work in conjunction, then the real interest rates of non-municipal bonds can then become relatively high. This high interest paid for non-municipal bonds can then compete very strongly with the tax deductive interest paid by the GOB. This means that municipal governments must then offer a higher tax deductible interest on GOB. The higher interest increases the total municipal indebtedness, and therefore increases the tax rate necessary to amortize that indebtedness. Not only does GOBs become difficult to sell to bond buyers during such times, but the GOB becomes difficult for the taxpayer to accept as well.

Revenue Bonds - A revenue bond is payable from user fees. (See discussion above) In rating revenue bonds for the bond market, bond buyer consider the economic justification for the project, the reputation of the bond issuer, the methods for billing and collection, rate structures, and the degree to which forecasts of net revenues are realistic.

Improvement Bonds - Improvement bonds, also known as Bancroft bonds, can be issued under an Oregon law called the Bancroft Act. Cities and special districts are limited to improvement bonds not exceeding three percent of the true cash value of the real property of the improvement district. All property within the improvement district is assessed on an equal basis for the specific improvement. That assessment becomes a direct lien against the property. The owner can either pay the assessment or apply for the improvement bond. The City or district then sells Bancroft bonds to finance the construction while the assessment is paid over 20 years in 40 semi-annual installments with interest. The construction of storm drainage facilities through the formation of improvement districts is viable when the properties bordering or served by the improvements are specifically benefitted.

Sinking Fund - Sinking funds are established by the municipal budget for a specific construction purpose. Revenues of the fund can either be allocated from the annual budget or derived from system development charges or serial levies.

Operation and Maintenance Costs

The funds required for operating and maintaining effective storm drainage facilities can best be obtained through establishing a user fee, based on the relative amount of impervious area. This method of apportionment is a fair and equitable way of assessing costs since it is mainly the impervious area that contributes the largest significant amount of storm water run off.

A special district could be established that could encompass the entire area within the Urban Growth Boundary area, and user fees could be collected from all property owners within this area.

10.40.6 STORM DRAINAGE SERVICES FINDINGS

1. The City and urbanizing area are lacking in adequate urban storm drainage facilities. The City is not fully served by storm drains and the existing drainage facilities are often inadequate to carry storm water run off.

2. The Master Storm Drainage Facilities and Management Plan for the Grants Pass Urban Growth Boundary area, adopted by the City in May 1982, describes the existing drainage facilities and problems. That plan also proposes improvement to the drainage system and examines the financing alternatives for those improvements.

3. Some 46.2 miles of storm drain line will be required within the UGB to serve present and future needs for the existing and target population. Total capital costs for these improvements is $17.8 million and an additional $265,000 per year is recommended for operation, maintenance and current repair.

4. The top priority projects (1982-1988), benefiting mostly the existing residents of the UGB, could be financed with a combination of a user fee and tax levy. The tax levy would vary between $0.59 and $0.62 per $1000.00 of assessed valuation and the user fee would stay at $1.50 per SRE as follows:

Single Family Residence	$ 1.50 du/month
Commercial	$24.10 Ac/month
Industrial	$13.05 Ac/month

5. A variety of financing mechanisms are available to finance capital and operating costs, and included user fees, system development charges, federal grants, municipal general obligation bonds, revenue bonds, and improvement bonds.

6. The Grants Pass Irrigation Canals are identified as an important part of the overall storm drainage system for the UGB. The existing canals are in need of repair and maintenance.

7. Flooding is a major problem for the existing storm drainage system for the UGB. The existing canals are in need of repair and maintenance.

8. Natural waterways can help reduce the rate of storm water run off. Surfaces which allow the water to infiltrate into the soil such as grass covered or forest covered open spaces also help recede the area of storm water run off. Retention is an important tool for use in reducing run off. Buildings, streets and parking lots have imperious surfaces and greatly increase the rate of storm water run off.

9. The undeveloped land area of the UGB has areas that are suitable for storm water retention such as grassed waterways, pastures, forested areas and natural land depressions. These areas also serve as recharge areas for the water aquifer of the UGB.

10. Developed areas can be designed to retain some portion of storm water, thus reducing the

peak design flow of the drainage system resulting in cost savings for both the developer and the City.

10.50 SOLID WASTE SERVICES INDEX

10.50.1 PURPOSE

10.50.2 EXISTING CONDITIONS
. Present Waste Volume
. Disposal Service and Capacity

10.50.3 AREAS OF CONCERN
. Soil Properties
. Subsurface Water
. Leachate

10.50.4 PROJECTED LANDFILL NEED

10.50.5 ALTERNATIVES TO LANDFILL DISPOSAL OF SOLID WASTE
. Transfer Sites
. Resource Recovery
. Energy Recovery

10.50.6 FINANCING METHODS
. Ongoing Financing
. Capital Improvement Financing

10.50.7 MANAGEMENT AGREEMENT

10.50.8 FINDINGS

10.50 SOLID WASTE SERVICES

PURPOSE

The purpose of this section is to assess existing volumes of solid waste production and disposal capacity, identify areas of concern, project capacities needed through the planning period, examine alternatives to conventional solid waste disposal, evaluate financial methods of paying for the service, and present policies for the provision of solid waste disposal service.

EXISTING CONDITIONS

Present Waste Volume - Solid waste, by definition, is any waste in solid or semi-solid form. It is defined by Oregon Administrative Rules, (OAR) as "putrescible and non-putrescible wastes, including but not limited to garbage, rubbish, refuse, ashes, waste paper and cardboard; sewage sludge, septic tank and cesspool pumping or other sludge; commercial, industrial, demolition and construction wastes; discarded or abandoned vehicles or parts thereof; discarded home and industrial appliances; manure, vegetable or animal solid and semi-solid wastes, dead animals and other wastes."

The state of solid waste as it is originally discarded is termed "loose density" waste. Loose density waste has an average density of 200 pounds per cubic yard (200 lbs/cy). Table 10.50.1 depicts the loose density waste volumes from 1974 to 1980 for the Grants Pass Service District.

TABLE 10.50.1
Loose Density Waste Volumes: Merlin Refuse Site

Year	Waste Volume in Cubic Yards *
1974	189,680
1975	188,400
1976	187,933
1977	220,022
1978	248,104
1979	254,801
1980	232,150

According to the Solid Waste Management Plan for Josephine County, approximately 45% of the solid waste volumes of the Merlin Refuse Site are generated by the Grants Pass Urban Growth Boundary Area. (Solid Waste Management Plan. Stevens, Thompson and Runyan, Inc. 1975, page 111-45, Figure III-9 Merlin Site.) That means that the proportionate volume of solid waste for the UGB was approximately 105,000 cubic yards in 1980. In 1980, the estimate of population for the UGB was 22,000 persons. Therefore, the solid waste per capita figure was 4.77 cubic yards per person per year in 1980. A loose density of 200 lbs/cy, which equates to 954 pounds of solid waste per capita per year in 1980. That figure includes per capita waste for commercial and industrial waste generators.

Disposal Service and Capacity - Currently, solid waste generated by the Grants Pass Urban Growth Boundary area is disposed of at the Grants Pass Sanitary Landfill Site, which is located at Merlin, four mile north of the City of Grants Pass. Since 1967, the City has leased approximately 100 acres from the Bureau of Land Management to be utilized for a sanitary landfill under a franchise arrangement with the Grants Pass Sanitation Service. Grants Pass Sanitation Service is in partnership with Pat's Sanitary Service for operation of the site.

Collection of solid wastes in the UGB is accomplished primarily by commercial collection SERVICES utilizing 20 cubic yard compactor trucks, and drop boxes of various sizes. Two privately owned and operated companies provide collection service within the UGB.

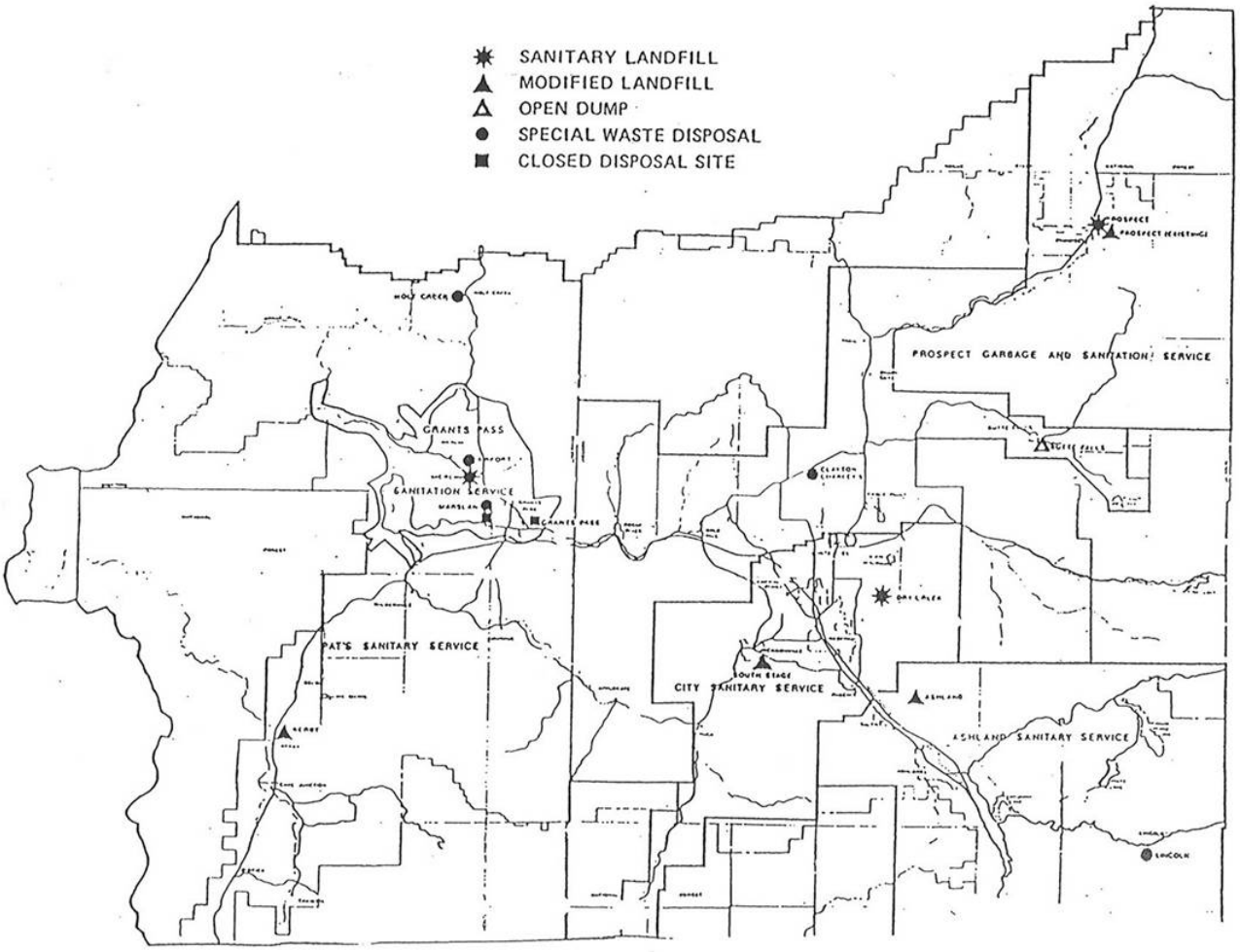
Grants Pass Sanitation Service - The City of Grants Pass has a franchise agreement with the company to perform solid waste collection service within the City limits. Collection of waste is voluntary with an estimated _____ accounts in 1982. (Henry Turk, owner/operator of Grants Pass Sanitation Service.) The unincorporated UGB north of the Rogue River is also served by the company.

Pat's Sanitary Service - This company serves the remaining UGB south of the Rogue River and has a franchise agreement with Josephine County to serve this area. (See Map 10.50.1 for service districts.)

The Merlin site is considered to be a sanitary landfill with daily compaction and cover during the summer months. During wet weather, compaction and cover are provided to the maximum extent possible. The site receives household wastes, wood residues, slash, demolition material, tires and appliances. Dead animals are occasionally received from the Josephine County Animal Shelter, three veterinary clinics, and highway pickup. About 2 cubic yards and 10 cubic yards of solid wastes are collected weekly from Southern Oregon Hospital and Josephine Memorial Hospital, respectively. Automobiles and sludge are not handled in any way at the Merlin site. Digested sewage sludge may be disposed of at the Merlin site, on an emergency basis, from the City of Grants Pass.

There are six pre-selected landfill operation areas at the Grants Pass Sanitary Landfill. The first four areas have a total estimated capacity of 445,000 compacted cubic feet. Compacted density waste is 3 1/2 times denser than loose density waste. Therefore, the four areas have the capacity to receive 1,592,500 cy of loose density waste. These areas will require minimal site preparation costs.

MAP 10.50.1
Existing Regional Service Areas and Site Locations



In addition, the two remaining areas which will be more costly to develop for solid waste disposal, are three to four times larger than the total of the first four areas. (Josephine County Public Works Dept., 1982) If we choose the low value of three times the capacity of the first four areas, then the additional loose density waste capacity for the two remaining areas is 4,777,500 cy. Therefore, the total loose density waste capacity of the Grants Pass Sanitary Landfill at Merlin is estimated to be 6,370,000 cy.

Areas of Concern

Soil Properties - There are two predominant soil types in the landfill area: Holland clay loam and Siskiyou gravelly sand loam. Both soils are underlain by a weathered granitic bedrock. The Holland clay loam has a high erosion hazard and a consequent channeling of waste leachate through the soil covering the waste. Leachate is the liquid that emerges from solid waste, either buried or exposed, and which contains objectionable impurities, including but not limited to organic, metals, microorganisms, such as bacteria and viruses, minerals (primarily nitrates and sulfates) and dissolved gases (primarily methane and hydrogen sulfide). (Solid Waste Management Plan, 1975. pg. a-i, Glossary 8.)

Soil erosion of the old landfill final cover has been a continuing problem. Seeding the final cover with grasses has been marginally successful due to the low fertility and high erosion hazard of the Holland clay loam soil type.

The Siskiyou gravelly sand loam soil type is excessively permeable and may readily transmit rainfall and surface water downward into the refuse. Such a high permeability may saturate the refuse and lead to the production of large quantities of leachate. These soil properties indicate that the important of more suitable final cover material may be required for the active fill areas.

Subsurface Water - Subsurface water flows beneath the ground surface and is a localized phenomenon. In the permeable soils of the Siskiyou gravelly sand loams, subsurface water may be a source of water causing saturation of the refuse and production of leachate. It is likely that rainfall on slopes uphill from the active fill area percolates rapidly below the ground surface and flows downhill through the soil structure into the refuse. A deep interceptor trench either open or with a tile bottom and gravel backfill may be necessary to intercept subsurface water flow and carry it away from the refuse site to a natural drainage way.

Leachate - The causes of leachate have been previously discussed in soil properties and subsurface water. The quantity of leachate produced at the Merlin site is unknown, but it does occur in significant amount during the wet season. (Solid Waste Management Plan, 1975, page 111-52 Leachate)

Projected Landfill Need

The Population Element projects that the population of the UGB will be between 38,300 and 44,750 persons by the year 2000. The following table depicts the Distribution of that population during the planning period in five year increments.

TABLE 10.50.2
Estimated Population Growth During Planning Period

Year	Population Range	
	low	high
1985	26,326	27,951
1990	30,318	33,568
1995	34,308	39,183
2000	38,300	44,750

Under subsection 10.50.2, the solid waste volumes per capita per year were determined from the existing population and water volumes. The per capita loose density waste volume was determined to be 4.77 cy or 954 pounds per person. In order to project an approximate need for waste disposal service for the UGB, one must determine the projected waste of the population of the UGB, and also project the rate of growth of volume of waste for the UGB. That can be approximately by multiplying the per capita waste factor of 4.77 cy times the projected populations for each five year increment of the planning period. The rate of growth of discarded waste can be determined from the differences in volume overtime. Table 10.50.3 depicts total discarded waste overtime for the UGB for selected five year increments of the planning period.

TABLE 10.50.3
Solid Waste Projections for the UGB: Loose Density

Year	Population		Per Capita Waste Factor	Total Solid Waste	
	low	high		low	high
1980	22,000		4.77	104,940	
1985	26,326	27,951	4.77	125,575	133,326
1990	30,318	33,568	4.77	144,616	160,119
1995	34,308	39,183	4.77	163,646	186,902
2000	38,300	44,750	4.77	182,691	213,457

From the above table we can calculate that the annual rate of growth in total solid waste from 1980 to 2000 is 2.8% for the low population and 3.6% for the high population. If we add the solid waste produced by annual growth rates, the 1980 total solid wastes of the UGB and continue to do so for each subsequent year of the twenty year planning period, then the total solid waste of the UGB at year 2000 for each target population is as follows:

TABLE 10.50.4
Total Cumulative Low Density Solid Waste for the Merlin Site:
Year 2000 (in cubic yard)

	Year	Low Population (38,300)	High Population (44,750)
UGB	2000	2,840,465 cy	2,989,593 cy
TOTAL	2000	4,402,720 cy	4,633,869 cy

It is assumed the UGB will continue to maintain 45% of its relative share of the total waste disposed of at the Merlin site. Therefore, the total figure in Table 10.50.4 represents projection of the total waste to be generated by the UGB and the area outside the UGB but within the Grants Pass Solid Waste Service District.

As stated in subsection 10.50.2, the loose density waste capacity of the first four selected landfill operation areas is 1,592,500 cubic yards. The two remaining operations areas have a capacity of 5,573,750 cubic yards. Therefore, the total capacity of the Merlin site is 6,370,000 cubic yards. According to the above analysis, by the year 2000 approximately 27% of the capacity of the Merlin site will remain as excess capacity for solid waste disposal after the planning period.

Alternatives to Landfill Disposal of Solid Waste

As the County and its cities continue to develop, the need for additional solid waste disposal capacities will increase. The Solid Waste Management Plan (1975) discussed a long range alternative for waste disposal. Inherent in the alternative is the concept of a "transfer station," where residents and collection vehicles bring local waste to centrally located "drop box" stations. When full, the drop boxes would be hauled to the transfer station where "transfer trucks" would then haul the refuse to a resource recovery center. It was suggested that such a center be located either in White City or the south Grants Pass industrial area.

Transfer Sites - The alternative suggested developing the Merlin Landfill site into a transfer site for mixed refuse. The refuse would be hauled to White City for regional resource recovery and final disposal. Josephine County, through a Solid Waste Advisory Committee, did adopt the Solid Waste Management Plan that incorporated the concept of a transfer site and resource recovery center.

The time frame for implementation of the plan's alternatives will realistically occur when the demand for replacement facilities increases and when such facilities can be commercially justified.

Resource Recovery - Resource Recovery is defined as the extraction and utilization of materials and energy from solid waste components. Objectives of resource recovery are twofold: first, to recover materials that have an economic value as a substitute for virgin raw material or for use as fuel; and second, to reduce the weight and volume of the solid wastes that will ultimately be disposed.

There are two approaches to resource recovery. One is source separation in which individual recyclable components such as paper, metals, and glass are segregated and collected separately. Though this is a labor intensive undertaking, many municipalities, companies, and volunteer groups conduct successful programs of source separation. The second involves mechanical separation and, although not labor intensive, requires substantial capital investment. This method is considered feasible for larger metropolitan centers.

There are two low level recycling operations occurring in the Grants Pass community: The Grants Pass Boys Club which collects glass containers, newspapers, paper bags, and used motor oil; and the Adult Retarded Activity Center which collects newspapers, cardboard and aluminum.

Energy Recovery Energy can be recovered from municipal solid wastes either directly by burning raw "as-received" waste, or by first upgrading the raw refuse by mechanical, thermal or other processes to enhance its usefulness as a fuel: of the existing technologies, Direct Combustion (i.e., the Waterwall combustion furnace widely used in Europe and Japan), Mechanical Separation (Fluff Refuse Derived Fuel), Pyrolysis (heat application in oxygen deficient atmosphere) and Bioconversion (breakdown of organic waste through action of living organisms to methane gas) are the most practical and marketable methods. Certainly, a larger population than Grants Pass is required to feasibly consider most of these methods; however, as existing fuel costs increase the possibility of using one or more of these methods may be more practical.

Financing Methods

Ongoing Financing - The Grants Pass Solid Waste District is currently served by two commercial franchises for the collection and disposal of solid waste. The operations and maintenance of the Merlin site are financed from the revenues of the primary franchise, Grants Pass Sanitary Service. Josephine County provides in-kind service to the franchise service in the form of paperwork for disposal applications, and surveying the gradework of the public access road to the landfill. The franchise agreement between the City and the contractor specifies the schedule of charges and SERVICES to be provided during the term of the agreement.

Capital Improvement Financing - Financing for long range capital improvements of disposal sites and transfer stations should be by a combination of private and public funds to enable the use of state grants and low interest loans. The following items are excerpts from the Solid Waste Management Plan 1975 concerning possible sources of funds for capital improvements such as a new landfill site on a waste recovery center.

U.S. Environmental Protection Agency - At the present time, no EPA grants or loans are authorized for implementation of solid waste projects. Some grants have been provided in the past for solid waste planning, but these funds are not longer available. It is unlikely EPA funds will be available for future implementation of the plan unless a unique process were to be demonstrated within the system.

Oregon Department of Environmental Quality - Grants and loans for implementation of solid waste transfer, processing and disposal systems are available from the DEQ pollution control bonds fund. Generally, the funds can only be disbursed to a public body such as a city, county or special district. Portions of a project which are eligible for these funds have not been formally defined but are expected to include both improvements and equipment for solid waste facilities. Land costs have not been included in past funding of sewerage works so there is some question whether land would be an eligible cost for solid waste projects. It is likely grants and loans will also be available for land purchase for long-range facilities, such as a resource recovery center. Equipment replacement will not be eligible for loan or grant funds.

Thirty percent of the eligible costs could be financed through a grant, but the remaining 70% must be repaid over a 20 year period at approximately 5% interest. Equipment life of less than 20 years will reduce the period of repayment. An adequate financial program must be established to assure repayment of the bonds. Any facilities may be leased or franchised or private enterprise for operation. Of the 30% grant, deductions are made for planning grants previously given to a public body if the portion of the funds previously spent on a given project can be identified. The Solid Waste management plan, 175 (considered Phase I planning) was financed through a DEQ grant. Phase II (advanced planning) funds are also available for 100% funding of more specific solid waste system plans.

Facilities eligible for DEQ grants and loans include rural transfer stations at Murphy and Kerby, an urban transfer station at Grants Pass, site development at the present Kerby and Merlin landfills, site development at a bulky waste concentration point at Grants Pass and the regional resource recovery center.

Management Agreement

After lengthy negotiation, the City and County adopted a Management Agreement in January 1981 that set interim development standards for the urbanizing area, and called for basic service plans to be developed for the provision of water, sewer, streets, storm drainage and parks. The Management Agreement acknowledged the Solid Waste Management Pan (1975) adopted by the County, and required the City and County to adopt an implementation plan, including the financing of and joint participation in the siting of regional solid waste facilities within 24 months of the Management Agreement. (See Joint Urban Area SERVICES Management Agreement, Section III-7) No such implementation plan has been initiated to date.

10.50.8 SOLID WASTE SERVICES FINDINGS

1. Solid waste generated by the Grants Pass Urban Growth Boundary area is disposed of at the Grants Pass Sanitary Landfill which is located at Merlin, four miles north of the City.

2. The Merlin site serves as the landfill area for the Grants Pass Solid Waste Service District. The UGB's proportionate share of the total volume of loose density solid waste of the District is 45%

3. Solid waste is collected by commercial collection SERVICES that serve the City and UGB. Compactor trucks and drop boxes are utilized for the collection of the waste.

4. There are six landfill operation areas at the Grants Pass Sanitary Landfill. The first four areas have a total loose density waste capacity of 1,592,500 cy. The two remaining areas, which will require costly site preparation, have a loose density waste capacity of 4,777,500 cy. Therefore, the total loose density waste capacity at the Merlin site is 6,370,000 cy.

5. There are three areas of concern at the Merlin site:
   - The soil properties are such that erosion of the fill cover and water infiltration into the waste both affect the formation and distribution leachate, a liquid that emerges from solid waste and which contains objectionable impurities.
   - Subsurface water infiltration into the cover waste causes saturation of the refuse and production of leachate.
   - Leachate occurs in significant quantities during the wet season.

6. The volume of loose density solid waste disposed of by the population of the Urban Growth Boundary area in 1980 as 105,000 cubic yards. The estimated population of the UGB in 1980 was 22,000 persons, computing to a loose density solid waste disposal per capita of 4.77 cubic yards per person per year. Loose density waste is valued at 200 pounds per cubic yard (lb/cy). The pounds of solid waste per capita was 954 pounds per year, including commercial and industrial generators of waste.

7. The Population Element projects that the population of the UGB will be between 38,300 to 44,750 persons by the year 2000. The annual growth rates of total volumes of solid waste produced by the population of the UGB are 2.8% for the low population of 38.300 persons and 3.6% for the high population of 44,750 persons. The cumulative low density volume of solid waste produced by the UGB by the year 2000 is as follows:

TABLE 10.50.5

	Year	Low Population (38,300)	High Population (44,750)
UGB	2000	2,840,465 cy	2,989,593 cy
TOTAL*	2000	4,402,720 cy	4,633,869 cy

*Total loose density solid waste of Grants Pass Solid Waste Service District. The UGB population's proportionate share of the total waste is 45%.

8. By the year 2000, approximately 27% of the total loose density waste capacity of the Merlin site will remain for future use.

	Year 2000
Capacity	6,370,000
Need	4,633,869
Excess	1,736,131

9. Resource recovery is an alternative to the disposal of solid waste in landfills. Objectives of resource recovery are twofold: first, to recover materials that have an economic value as a raw material or fuel; and second, to reduce the volume of solid waste that will be disposed of at a land fill. A resource recovery site in the UGB has been identified in the Josephine County Solid Waste Management Plan. The site is located in the south Grants Pass industrial area. It is assumed that when resource recovery becomes economically feasible then the site will be developed.

10. Energy recovery of the potential caloric value of the solid waste is cost-effective either when the population is of a metropolitan size (50,000) and/or when the cost of imported energy is greater than domestic (city produced) energy. Neither of these situations exist at this time.

11. Josephine County as adopted a Solid Waste Management Plan that has objectives which affect the management of solid waste within the UGB. These objectives are as follows:

- Both the Short and Long-Range Plans presume that Jackson and Josephine County's will develop a Regional Resource Recovery Center as proposed. If, for some reason the plans for this facility do not come to fruition, then the Kerby and Merlin landfills established in the Short-Range Plan will carry forward through 1994 with additional lands being purchased and developed if needed. The possibility will exist to initiate and Illinois Valley Transfer Station with refuse going to the Merlin Landfill if for some reason the continuation of the Kerby Landfill becomes unfeasible. Development of financial programs should be accomplished, when applicable, through a combination of state grants and loans, municipal and County funds and private capita. Plans should be coordinated with the DEQ on all solid waste transfer, processing and disposal systems.

- The Kerby and Merlin landfill sites will be upgraded to meet proper operational and environmental standards. This work would be coordinated with the DEQ in order to obtain permits that are workable while providing for adequate protection of the quality of the environment. Also state grants and/or loans would be sought for financing site development.

- An urban transfer station in the South Grants Pass area would not be established during this planning period. As a practical matter, the design and construction of the urban transfer station should be somewhat concurrent with that of the Resource Recovery Center. (It should be noted that a potential Grants Pass Transfer Station site is owned by a firm presently engaged in the County's Solid Waste Sanitary Service.)

- The Marlsan Sludge Pond will be phased out and replaced with a receiving facility at the Redwood or the Grants Pass Sewage Treatment Plant.

10.60 POLICE PROTECTION SERVICES INDEX

10.60.1 PURPOSE

10.60.2 EXISTING SERVICE LEVELS

. Grants Pass Police Department
- Personnel and Equipment
- Cost of Protection
- Response Time

. Josephine County Sheriff's Office
- Personnel and Equipment
- Cost of Protection
- Response Time
- Juvenile Detention Center

10.60.3 CRIME LEVELS

. Regional
. Local

10.60.4 PROJECTED NEED

10.60.5 FINDINGS

10.60 POLICE PROTECTION SERVICES

PURPOSE

The purpose of this section is to assess the existing level of police protection SERVICES within the UGB, determine additional needs through the planning period, and estimate the cost of providing the required service.

EXISTING SERVICE LEVELS

The Planning area is served by two law enforcement agencies: the Grants Pass Police Department and the Josephine County Sheriff's Office.

Grants Pass Police Department

This Department provides municipal police protection to the corporate City limits, and has 39 employees, as follows:

1	Police Chief		
1	Police Captain		
2	Lieutenants		
5	Sergeants	)	
6	Corporals	)	field officers
15	Patrol Officers	)	
1	Secretary		
4	Clerks		
4	Dispatchers		
Total 39			

Thus, using a population figure of 15,032, the ratio of field enforcement officers is 1.73 per thousand, or one officer per 578 persons; however, three of these field positions are federally funded, leaving a permanent employee ratio of 1.53 per thousand, or one officer per 654 persons.

The police station is located in Building County Law Enforcement Building, behind the Courthouse, where 5,168 square feet of office space is leased from Josephine County. The Department has a total inventory of 18 vehicles, three of which are motorcycles, and one radar unit.

Cost of Protection - The City allocated $886,507 in 1979-1980 budget for police SERVICES. The total 1980 true cash value of residential, commercial, and industrial lands within the City limits is $380,833,436. (Josephine County Assessor's Office, October 1980) Thus, police service cost is $2.27 per $1,000 of assessed valuation. Cost for police protection per Grants Pass resident is $57.76 ($886,507 ÷ 15,000 persons).

Response Time - The goal of the Department is to achieve a two minute average response time to emergency situations. Factors affecting response time are street network, area of coverage, size and shape of the area, topography, day of week and time of day, number of available on-duty personnel, and type of land occupancy. According to the Grants Pass Police Chief, the Department does maintain an average two minute response time for emergency situations within the current City

limits; however, with the current police force size and street network, average response times will be higher without additional personnel in areas adjacent to the City limits that may be annexed in the near future. Thus to maintain the fast response time, additional personnel, vehicles, and an upgraded circulation network will be required as the City limits are extended.

Josephine County Sheriff's Office

The County Sheriff's Office is primarily responsible for law enforcement to all Josephine County areas outside the Grants Pass City limits. Thus, the Sheriff's Office currently protects the unincorporated Grants Pass UGB area.

Personnel and Equipment - The Sheriff's Office budgets the following positions:

29	Uniformed Deputies
5	Detectives
22	Jail Personnel
3	Special SERVICES
6	Administration
3	Traffic Control
16	Clerical
Total 84	

The ratio of active deputies to population is 1 deputy per 1,242 persons. The vehicle inventory consists of 30 vehicles, two boats and two trail bikes. The main Sheriff's station is located at 5th and "B" Street, which includes a 70 bunk jail with holding area, a 24 bunk work-out area, a detoxification area, and a photography lab.

Cost of Protection – The County's 1980 budget allocated $1,972,794 for law enforcement. The 1980 total taxable assessed valuation in unincorporated Josephine County was $852,152,846. The 1980 cost, therefore, for police protection is $2.31 per $1,000 of assessed valuation. Currently, revenue for law enforcement is derived from Oregon and California timber receipts, and not from local property taxes. With a total 1980 population of 43,823 (does not include Grants Pass), the cost per person for police protection is $45.02.

Response Time - According to the County Under-Sheriff, the Sheriff's Office averages five to six minutes in responding to emergency situations in the unincorporated UGB. Patrol coverage for this area is accomplished by two roving patrolmen; however, patrol coverage is not exclusively limited to this areas, but rater includes a much larger unincorporated area. Therefore, response time depends heavily upon the location of the patrolman at the time the emergency call is received.

Juvenile Detention Center - By state law, the County is required to separate juvenile offenders from adult offenders. To comply with this law, Josephine County has proposed the construction of a center for juveniles to accommodate a maximum of 22 persons. Projected construction completion of this facility was mid-1982, but funding was rejected by County voters on November 3, 1981.

CRIME LEVELS

Regional Crime Levels

Josephine County is grouped with Jackson County as Administrative District #8 by the Oregon Law Enforcement Council for the purpose of crime reporting. The following data is extracted from their report.

Analysis of Crime in Oregon, 1979 - Of the 36 Oregon Counties, Josephine County ranks 13th in total population; however, in terms of crime, the County has consistently ranked much lower than its total population ranking. For example, in 1979 Josephine County ranked 23rd in Part I crimes (murder, rape, burglary, assault, robbery, etc.), while neighboring Jackson County (ranks 6th in total population) ranked 6th in Part I crimes. Possibly contributing to this low ranking status in Part I crimes could be the fact that Josephine County population is less dense, 36 persons per square mile, than Jackson County, 44 persons per square mile. Crime is generally expected to rise with greater concentrations of population. Also, the fact that 30% of the County's population is over 50 years of age tends to bring down crime rates. The following table shows crime characteristics for Josephine County taken over a five year period, 1975-1979.

TABLE 10.60.1
Josephine County Crime Rates
Compared with Other Oregon Counties

Year	Index Crime	Violent Crime	Property Crime	% of Index Crime by Juveniles
1975	17th	12th	16th	n/a
1976	16th	23rd	17th	44%
1977	18th	25th	18th	46%
1978	21st	28th	18th	42%
1979	23rd	32nd	20th	47%

As illustrated, Josephine County consistently ranks below its population ranking (13th) for crime rate. Also, noted this five-year period a pattern emerges showing a steady decline in crime rate ranking (i.e., for Index crime from 17th in 1975 to 23rd in 1979). This either suggests that crime in Josephine County is declining, or crime for other areas of the state is increasing, or both.

Local Crime Levels - The City of Grants Pass participates in the Oregon Uniform Crime Reporting (OUCR) system. Crime information is collected and processed into a computer. Monthly, biannual, and annual reports are products of that system which summarize crime data for the agency. The following is information extracted from the annual reports for 1975, 1978, 1979 and 1980 (1980 is for a six month reporting period). The information presented lists Part I crimes reported each year.

TABLE 10.60.2
Crimes Reported

Year	Homicide	Assault	Rape	Robbery	Burglary	Larceny	TOTAL
1975	0	52	5	15	252	958	1,282
1978	1	85	5	22	227	831	1,171
1979	1	106	1	6	234	960	1,308
1980	0	82	0	3	144	576	805
TOTAL	2	325	11	46	857	3,325	4,566

This information indicates a decrease has occurred for some crimes (i.e., assault, larceny, etc.), while some crimes have remained fairly constant (i.e. homicide, burglary, etc.). During this five year period, the City has increased in population by an average of 255 persons per year. Thus, the Part I crime rate for the City in 1975 was one reported crime for every 10.7 persons. In 1979, the rate was 1:11.2.

Projected Need

The City Police Chief has reviewed the projected target population range for the UGB and has determined the following needs. Most of the projected need will be required south of the Rogue River as follows:

Additional Need Required for Personnel

38,300 Population	44,750 Population
1 Sergeant	1 Sergeant
3 Corporals	3 Corporals
2 Detectives	4 Detectives
16 Patrolmen	22 Patrolmen
4 Clerks	5 Clerks
	1 Crime Prevention Officer
26 Additional Personnel	36 Additional Personnel

- **Equipment**: 7 vehicles, 7 radios, 1 radar unit, 2 typewriters, 1 computer terminal
- **Office Area:** 1,000 square feet, located south of the river and protected 24 hours per day. Location within a fire department building would suffice.

The additional personnel would result in a ratio of 1.70 field officers per thousand persons (1 officer per 588 persons) at 38.300 population, and 1.67 officers per thousand persons (1 officer for 595 persons) at 44,750 population. These ratios are deemed to be sufficient levels of enforcement considering that response time is the most important factor.

10.60.5 POLICE PROTECTION SERVICES FINDINGS

1. Josephine County, while 13th in the state total population (1979), has constantly ranked below its population for crime rate (1975 to 1979). See Table 10.60.1.

2. The total number of crimes committed has maintained at a steady level for each year, despite the increasing population. Certain crimes (such as rape and robbery) have decreased, while the crimes (such as assault and larceny) have increased.

3. The Part I crime rate for the City in 1975 as one reported crime for every 10.7 persons, while for 1979 the rate was one reported crime for every 11.2 persons.

4. Expanding police protection service to include the urbanizing area over time as development occurs will require from 26 to 36 additional enforcement officers, together with support personnel. In addition, office space must be found or constructed south of the Rogue River.

5. The resulting enforcement officer/population ratio will range from one officer to every 588 to 595 persons by the year 2000. This is deemed adequate protection, even though lower than the urban level ratio of 1:600 required by the Management Agreement.

6. Residential development to urban levels within the Urban Growth Boundary may be scattered, due to the presence of existing sanitary sewer systems and the interim use of wells. Protection of this population by the County Sheriff's Department at a Management Agreement ratio is 1 officer per 1,240 persons.

10.70 FIRE PROTECTION SERVICES INDEX

10.70.1 PURPOSE

10.70.2 FIRE PROTECTION FACTORS

. Water Availability
. Fire Flow
. Personnel and Equipment
. Response Time
. Fire Rating

10.70.3 EXISTING SERVICE LEVELS

. Grants Pass Fire Department
    Facilities and Personnel
    Cost of Protection
    Response Time
    City Fire Flow Capability
. Valley Fire Service
. Grants Pass Rural Fire Department

10.70.4 PROJECTED NEED

10.70.5 MANAGEMENT AGREEMENT

10.70.6 FINDINGS

10.70 FIRE PROTECTION SERVICES

PURPOSE

The purpose of this section is to describe existing fire protection SERVICES within the UGB, determine minimum fire protection standards for the various land use allocations, project future needs, identify existing deficiencies and estimate the cost of providing the required service.

FIRE PROTECTION FACTORS

An effective fire protection program is primarily concerned with the following factors:

Water Availability - The critical ingredient in combating fire is the application of water at sufficient volumes, pressure and duration. Thus, any fire protection program must have adequate access to water at required fire flow capacities.

Fire Flow - Fire flow is an expression of the amount of water, in gallons per minute (gpm), which should be available and applied to control and extinguish a fire. The total fire flow required for combating a fully developed fire is a function of construction, fire loading material, type of occupancy, area, height, and distance from other buildings. The density and type of development, therefore, affects degree of fire flow required. As part of the overall water development plan for the Grants Pass UGB area, the Insurance SERVICES office recommended the following fire flow standards:

TABLE 10.70.1
Recommended Fire Flow Standards

Land Use Type	Fire Flow (gpm)	Duration of Flow (hours)	Volume of Water Required (million gpd)
Residential			
Suburban	1000	2	0.12
Urban (low density)	1000	2	0.12
Urban (medium density)	2500	2	0.30
Urban (high density)	3500	3	0.63
Commercial			
Central Business District	4500	4	1.08
Tourist	3000	3	0.54
Limited	3000	3	0.54
Strip	2500	2	0.30
Industrial	5000	5	1.50
Hospitals	4500	4	1.08
Institutional Schools	3500	3	0.63

Source: Insurance SERVICES office, Engineering Report of the Water Distribution System, Grants Pass, Oregon, CH2M Hill, February 1979, Table III-2.

Personnel and Equipment - The number of trained persons available to apply fire flow is another critical component of a system's ability to suppress fire. Generally, the larger the required fire flow, the more personnel and equipment needed to apply water. This component of the system usually comes up first when a municipality considers budgetary cutbacks; however, the effectiveness of fire suppression depends heavily upon the number of persons and equipment to apply water. Communities requiring sprinkler systems in industrial and most commercial structures generally have more flexibility in determining minimum personnel requirements.

Modern fire fighting equipment enables fire departments to suppress fires under most conditions. Thus, the type, condition and quality of equipment is essential to effective systems.

Response Time - This is the period within which required numbers of personnel and equipment can be marshaled to a fire to effect rescue and/or fire suppression. Thus location of fire stations, transportation networks, and fire coverage area are significant factors in determining response time.

Fire Rating - The Insurance Service Office (ISO) grades individual fire suppression departments in determining fire insurance premium rates for a given service area. The grading system is primarily concerned with the quality of a system's individual components (i.e., water availability, equipment, etc.) and does not necessarily include the system's general fire suppression effectiveness. The rating is important as it sets homeowner's insurance rates for the service area. For example, the following are 1980 homeowner insurance rates for each of the fire departments serving the UGB, based on an appraised residential structure of $50,000:

TABLE 10.70.2
ISO Ratings and Residential Insurance Premiums

Fire Department	ISO Residential Rating 1 = Excellent 10 = Unprotected	Annual Premium*
City of Grants Pass Fire Dept.	5	$152.00
Valley Fire Department	8**	$182.00
Grants Pass Rural Fire Dept.	9	$264.00
No Fire Service (unprotected)	10	$331.00

** Valley Fire Service has an 8 residential rating only within 5 road miles of their stations. All other areas are rated 9 at this time.

Comparing insurance cost of commercial/industrial properties reveals a significant savings to properties protected by the City Fire Department. Valley Fire Service and Grants Pass Rural are rated "9" for commercial/industrial property while the City is rated "5." The following 1980 costs are based on a retail structure less than 5,000 square feet of floor area with an assessed valuation of $130,000. (Bob Hart Insurance, September 26, 1980.)

TABLE 10.70.3
ISO Rating and Commercial Industrial Insurance Premiums

Fire Department	Commercial/Industrial ISO Rating	Annual Premium
City of Grants Pass Fire	5	$1,196
Valley Fire Service	9	$1,976
Grants Pass Rural	9	$1,976
Unprotected	10	$2,106

As shown, the 9 rating for Valley Fire and Grants Pass Rural increase insurance rates for commercial-industrial properties by 60%.

Cost of Protection - In the 1979-1980 City Budget, 16% of the total general fund budget ($673,471) was allocated to fire suppression and prevention. In the same year, Josephine County contributed $40,000 per year for the protection of the County Fairgrounds and other public structures within the UGB, but contributed only $15,000 the following year.

Existing Service Levels

The UGB is served by three fire protection companies: City of Grants Pass Fire Department, Grants Pass Rural Fire Department and Ambulance, and Valley Fire Service. See Map 10.70.4.

MAP 10.70.4
Fire Station Locations: UGB Area

City of Grants Pass Fire Department

The City Fire Department was created in 1891 and provides protection to: City corporate area, certain properties under annexation agreement, and to some public structures south of the Rogue River within the UGB. The total service area is estimated to have a population of 18,000 persons. (Office of State Fire Marshal- Annual Statistics Report for 1979.)

Facilities and Personnel - Two fire stations serve the total service area, with 24 full time, paid personnel, and 40 paid volunteers. There are five pumpers, two tankers and one aerial apparatus available for fire response duty. The department has no ambulance service. Mutual aid agreements exist with the City of Rogue River, Williams, Illinois Valley, Jackson County Rural #3, and the State Forestry Department. In 1979, the department responded to 383 alarms, of which 162 were fires (42%). In 1980, 400 alarms, of which 180 were fires (45%). In 1981, 417 alarms of which 204 were fires (49%). Not only are the number of fires increasing (21 additional fires per year), but also the percentage of alarms that are fires is also increasing. With an estimated population of 18,000 persons, the 1979 per capita fire protection service cost was $39.63. Most of the cost was allocated for wages and salaries for the department's full time personnel and paid volunteers.

Response Time - Map 10.70.5 shows the location of the existing fire stations within the City. Also mapped are response time zones, the time generally needed to respond to a first alarm. The quickest response zones are those areas adjacent to or near the fire stations. It is noteworthy that each station is north of the Rogue River and west of Sixth Street. As expected, the worst response zones are south of the river and in the eastern portions of the City. There is some consideration of moving the City's southerly station from Fourth and “H” streets to Eighth and “M” streets in order to locationally balance the City's fire protection service.

Fire Flow Capacities - A water distribution system must be capable not only of meeting domestic, commercial and industrial needs, but also of providing water in adequate quantities and at adequate pressures to meet any fire fighting requirement. In 1977, the Oregon Insurance Rating Bureau evaluated the City's water distribution system. Fire flow tests were conducted and revealed varying deficiencies at eight out of 14 tests locations. A deficiency doesn't necessarily mean that system is incapable of fighting a fire, but rather the fire fighting conditions are not considered ideal. Partly based on the findings of the Bureau, the City contracted for a complete water improvement plan which is currently under construction, with Phase I expected to be completed in early to mid 1981. When completed, Phase I will provide water storage and fire flow pressures to all areas of the City based on the maximum daily water demand, improving the City's ISO rating to a 4, and quite possibly a 3.

Valley Fire Service

Refer to Map 10.70.4 for station locations. Although primarily a rural fire service, Valley Fire serves a significant area within the unincorporated UGB. Service is provided by individual subscription, with an estimated total service district population of 30,000 persons.

In 1979 Valley responded to 137 alarms, of which 100 were fires (73%), and assisted in 12 mutual aid responses. Currently, they have 12 paid, full-time personnel, and 16 volunteers. Equipment inventory includes three pumpers, tow tankers, and no aerial apparatus. Water supply is via ground water wells, ponds, etc. Maximum water storage capability is 5,200 gallons.

Valley Fire has the potential to assist in urban fire protection; however, due to the extensive fire protection area they are responsible for (approximately 160 square miles), mutual aid assistance may not be cost-effective for the City's fire department.

MAP 10.70.5
City Fire Response Time Zones

Grants Pass Rural Fire Department

This department is located in the Redwood area, serves some residences within the UGB, but primarily serves rural subscribers. Their source of water is from ground water wells. Due to their limited facilities, urban level protection is not considered feasible for this department.

Projected Need
The City Fire Chief has reviewed the projected target populations of the UGB and has determined the following needs:

Personnel	3 Lieutenants 3 Firefighters 1 Fire Prevention Specialist = **7 Persons** total
Equipment	1 Tanker (3,000 gallons)
Station	Capacity for two vehicles, bunk room, kitchen, office.

The additional equipment, personnel and station will be located south of the Rogue River to serve Fruitdale-Harbeck, Redwood and the Williams Highway corridor. In the case of Grants Pass, the amount of equipment and personnel required for a given ISO rating is more a function of the commercial/industrial requirements, the availability of water, and the location of equipment stations, rather than the number of persons within the Boundary area, in contrast to police protection needs (see Section 10.60.4). For this reason the projected need is the same for the entire projected population range of 38,300 to 44,750 persons.

Financing of the required improvements and equipment could occur by many methods, of which several are outlined below:

Upon Annexation Agreement:

a. City finance capital costs with voter approval of a special levy to cover both capital and ongoing costs.
b. City advance finance capital costs, with payback by benefiting properties as a system development charge.
c. County advance finance capital costs with payback by benefiting properties, ongoing costs to be shared by City and County until sufficient revenue is generated by benefiting properties.

Upon establishment of a special district to include areas committed to urban level development:

a. City advance finance capital costs for urbanizing area, with special district assessed for 10 year payback, or
b. County advance finance capital costs in a similar fashion.

Management Agreement

Scattered urban level residential development either without any fire flow capacity, or using wells and storage tanks to store fire flow water, is permitted by the Management Agreement within the urbanizing area outside City limits. Regardless of the agency providing fire protection, a uniform set of standards determining the amount of storage and the nature of access to fire flow water is required to assure adequate protection of the developing areas within the Urban Growth Boundary.

FIRE PROTECTION SERVICES FINDINGS

1. In spite of a relatively low population growth over the last several years when compared to the County's population growth, the number of alarms and fires within City limits shows a steady increase, averaging 17 more fires each year.

2. Fires as a percentage of alarms also have increase, averaging 3.5 additional percentage points per year.

3. At the present time, fire protection SERVICES are provided within the City limits exclusively by the Grants Pass Fire Department, while in the urbanizing area fire protection is provided by the Grants Pass City, Valley and Grants Pass Rural department.

4. The City requires City fire protection when municipal fire flow water is extended, while the City-County Management Agreement, governing the extension of service within the urbanizing area, allows urban level residential development with either reduced fire flow requirement, or water storage requirement, or both.

5. Minimum levels of fire protection for urban level development are required to safeguard life and property within the urbanizing area, as the area develops over time.

6. Although most of the urbanizing area is presently served by a sanitary sewer system, and ground water is available to a certain degree, virtually none of the urbanizing area is served by a municipal water system at fire flow capabilities. The availability of fire flow water in sufficient qualities on demand is a critical part of any fire suppression system, a basic fact reflected in fire insurance premium rates and the ISO rating system. However, extending fire flow water throughout the urbanizing area at this time would be prohibitively expensive, and some alternate methods of providing fire flow water for residential development is desirable.

10.80 SCHOOL SERVICES INDEX

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10.80 SCHOOL SERVICES SECTION

PURPOSE

The purpose of this section is to assess existing student demand, levels of service, and existing capacities, and project future student demand and facility requirement based on the projected target population range of the Urban Growth Boundary area. The section will review the following:

- projected student demand over the planning period.
- ability to meet demand, what additional facilities are required, and estimated facility costs.
- the role of the City of Grants Pass in providing for public education.

HISTORICAL PERSPECTIVE

The Grants Pass UGB is now served by two school districts, Grants Pass School District No. 7 and Josephine County School District No. 35. Combined, these two districts administer 25 public schools, elementary, middle and high, for the entire Josephine County area.

Prior to 1944, 60 public school and districts existed. Most of the schools were one room structures serving small individual communities. In 1945, the County school system reorganized into the "unit" system. The reorganization resulted in the basic structure which exists today.

The introduction of the school bus into Josephine County was significant as it reduced the number of schools to 18. The resulting schools have become large facilities, serving larger areas and numerous communities.

From 1960 to 1980, change has occurred more rapidly in the County Unit than District 7. The in-migration of persons to rural Josephine County has been dramatic, bringing with it new types of problems and challenges. Some of the problems are associated with the economy while others relate to the demographic profile. Southern Oregon is experiencing a large in-migration of retired and semi-retired persons. It is estimated that 21% of the existing population is 60 and over and 27% are over the age of 55. (U.S. Census, 1980, preliminary results.)

Southern Oregon also experiences high numbers of transient, migratory people. As these people "pass through" the region, the general attractiveness of the environment and climate lures them to seek jobs and permanent residence. It is estimated that 60% of the persons in today's labor force who choose to locate in Josephine County do so without committed employment. (Joe Stevens, The Demand for Public Goods..., Academic Press.) However, due to the scarcity of employment in this area, little time passes before many of these people have to seek employment elsewhere (i.e., Seattle, Portland, San Francisco). As a consequence, schools in Josephine County, elementary schools in particular, experience a high degree of fluctuating attendance. However, their overall attendance remains high as there appears to be a steady immigration and out migration of people. A survey of transfer student conducted in 1978 by the County School Unit indicated that of the total 1,082, 43% were from out-of-state; and although the District had 860 new students, some 690 moved out of the District. For the year 1978, the district had a net gain of 170 students.

The Economic Element of this Comprehensive Plan lists the significance of income contribution by the various sectors of the economy. Of special interest is the fact that transfer payment income (out of region money brought into the community via pensions, retirement funds, and public assistance programs) has increased over the last 20 years from 13% to 23%. (Lord & Associates, Economic Base for Josephine County, 1980) This generally indicates that retired and semi-retired people have become a larger portion of the Grants Pass population. Lower fertility rates, smaller family sizes, changes in marriage and divorce rates and in adult living arrangements have all contributed to a decline in household size throughout the nation. Comparing household size over time for the City of Grants Pass indicates a steady decline in family size.

TABLE 10.80.1
Grants Pass Household Size

1970	1980	1990
2.90	2.73	2.42

Thus, the recent population profile for Grants Pass and urbanizing areas shows a high percentage of older persons and a decline in household size.

Existing School Districts & Enrollment Characteristics

As shown on Map 10.80.2, most of the Grants Pass Urban Growth Boundary areas is served by Grants Pass District No. 7. At present, the entire City Limits is served by District No 7; however, the two boundaries (City and District No. 7) are not contiguous. The County Unit School District serves a comparatively small portion of the Urban Growth Boundary: the unincorporated area north of the Rogue River and west of the City Limits.

The following Table illustrates population and student enrollment changes over the last 20 years for the City of Grants Pass, Josephine County, School District No. 7, and Josephine County Unit School District:

TABLE 10.80.3
Population Change and Student Enrollment

Population Change						Student Enrollment Change				
Year	City of Grants Pass	% of Total	Remainder Josephine County	% of Total	Total	District No. 7	% of Total	County Unit District	% of Total	Total
1960	10,125	34	19,774	66	29,900	3,720	60	2,470	40	6,190
1970	12,400	35	22,900	65	35,300	4,375	56	3,435	44	7,810
1980	15,032	26	43,823	74	58,855	3,870	37	6,645	63	10,515

As shown, the City accounted for 34% of the total population in 1960; whereas in 1980 only 26% was attributed to the City. Thus, recent new growth occurred primarily in rural, unincorporated areas. In 1960, District No. 7 accounted for 60% of all students, but in 1980 the percentage was only 37%. In this 20 year period, the District 7 student count remained virtually constant, while the county unit student count increased by 70%. Not only were more people settling in the rural areas, but also more people with families and children of school age were settling in the non-urban areas. The result of the large increase in student enrollment within the County Unit District has been larger classrooms and student/teacher ratios, expansion of existing facilities to capacity, additional expansion requiring large sums of money to augment existing core facilities, and the need to seek new serial levies and/or tax base to meet additional demand. In 1980, the County Unit District sought a new tax base during two separate elections. Both were defeated.

The following describes each school district's relationship to the planning areas, focusing on existing level of service and capacity to accommodate future growth.

District Structures

District No. 7. The following table shows the enrollment structure of Grants Pass School District No. 7:

TABLE 10.80.4
District No. 7 Enrollment

School Type	Grades	# of Schools	April 1980 Enrollment
Elementary	1-5	5	1,653
Middle	6-8	2	952
High	9-12	1	1,273
Total		8	3,878

Of the eight existing schools, five are located north of the Rogue River and within the City Limits. Of these, three are elementary schools, with the remaining two being North Middle School and Grants Pass High. It is noteworthy that of the five schools within the City, all but one are located in the northwest and northeast ward areas. The remaining school is in the southeast area, with no school facilities in the southwest area.

In the unincorporated UGB area served by District No. 7, three schools exist: two elementary and one middle school. All of these schools are located south of the Rogue River. Thus, District No. 7 residents are served by one high school, two middle schools and five elementary schools.

Josephine County Units - The following is the enrollment of the County Unit District:

TABLE 10.80.5
Josephine County Unit Enrollment

School Type	Grades	# of Schools	March 1980 Enrollment
Elementary	1-5	12	2,843
Middle	6-8	3	1,677
High	9-12	3	2,125
Total		18	6,645

The schools which are directly or indirectly affected by the UGB are Fort Vannoy and Fruitdale Elementary schools; Lincoln Savage and Fleming Middle schools; and North Valley and Hidden Valley High schools.

Only Fruitdale Elementary School is physically located within the Urban Growth Boundary. Thus residents living within the UGB who are served by the County Unit travel to outlying schools, except Fruitdale Elementary.

Attendance Boundaries

District No. 7
As of January 1, 1980, Map 10.80.6 reflects attendance boundaries for District No. 7. Generally, attendance boundaries relate to type of school (elementary, middle, high), land use, population, capacity of school, and natural or man-made features such as rivers or roads. The attendance boundaries are adjusted as required each year, and are shown here as an indication of their function only.

For District No. 7 elementary schools, the boundaries relate to the Rogue River the Southern Pacific Railroad tracks, 6th Street and Allen Creek. The most notable exception to this pattern is the area south of the Rogue River. Also, to the west of this area, from Pine Street to the western City Limits, students attend Riverside School. This area is geographically separated from the main Riverside School attendance area.

For middle schools, the Southern Pacific Railroad is the basic boundary. North Middle serves north of the tracks and South Middle serves south of the tracks. Note that students living south of the railroad tracks between Pine Street and the west City Limits attend North Middle School.

The high school boundary is simple. All students in District No. 7 attend Grants Pass High School.

Josephine County School District

Map 10.80.6 illustrates school attendance for the County Unit. As shown, the attendance boundaries conform to the Rogue River and School District No. 7 boundary.

Students living within the UGB, south of the Rogue River and not in District No. 7, attend Fort Vannoy Elementary School, Fleming Middle School, and North Valley High School. Many of those students travel five to six miles by bus to attend school.

Facilities, Capabilities, and Potential Expansion

The purpose of this subsection is to assess each school's existing enrollment demand and compare it to the school's design capacity. From this comparison, we may determine how much additional student enrollment, if any, the facility can absorb and the costs in both dollars and educational quality.

TABLE 10.80.7
District No. 7 Facility Capacity

School Attendance Boundary	1980 Student Enrollment	Practical Design* Capacity	No. Of Classrooms	Student Teacher Ratio	Potential Enlargement No. Of Classrooms	Original Construction Date	Dates of Additions
Elementary							
Allendale	298	321	16	20:1	0	1965	0
Highland	350	360	18	23:1	0	1956	1959, 1960
Lincoln	322	440	18	23:1	0	1951	1952, 1962
Redwood	335	445	20	25:1	0	1951	1957
Riverside	328	378	17	23:1	0	1966	0
Subtotal	**1,633**	**1,948**	**90**	**22:9:1**	**0**		
Middle School							
South	433	616	25	23:1	0	1958	1968
North	519	747	36	27:1	0	1965	0
Subtotal	**1,633**	**1,948**	**90**	**22:9:1**			
High School							
Grants Pass High School	1,302	2,007	80	24:1	0	1948	1948, 1950, 1952, 1953, 1954, 1955, 1956, 1958, 1959, 1962, 1963, 1966, 1969

TABLE 10.80.8
County Unit UGB Facility Capacity

Grade School Attendance Boundary	1980 Student Enrollment	Operating Design Capacity*	No. Of Classrooms	Student Teacher Ratio	Potential Enlargement No. Of Classrooms	Original Construction Date	Dates of Additions
Fruitdale	232	248	13	25:1	2	1947	1948,1951, 1953, 1955, 1963, 1972
Fort Vannoy	338	338	15	27:1	0	1949	1955, 1952, 1953, 1962, 1967, 1979
Total	617	586	18	26.1	2		
Middle School							
Lincoln Savage	670	598	27	27:1	0	1962	1967, 1975, 1976, 1979
Flemming	637	637	24	27:1	0	1962	1979 (new wing)
Total	1,307	1,235	51	27:1	0		
High School							
Hidden Valley	951	900	50	2.5:1	2	1978	0
North Valley	836	720	35	18.67:1	4	1978	0
Total	1,787	1,620	85		6		

*Operating capacity is 90% of design capacity.

Rogue Community College

Rogue Community College is the only public institution for higher education in Josephine County. Opened in 1971 with a student enrollment of 2,276, the college has experienced a steady increase in enrollment to a high in 1980 of 6,315 students. The college is located at the most southwesterly corner of the Urban Growth Boundary and serves all of Josephine County.

Enrollment profile indicates that the age distribution of student population generally reflects that of the County with ages ranging from 17 to 75. The college anticipates an enrollment of ____ by __.

Private Schools

Although private schools account for only 45% of the total enrolled students in Josephine County there is a national trend showing a substantial increase in private school enrollment. (Demographic School Facility Studies for Jackson and Josephine County Education Service Districts.) According to information published by Association of Christian Schools International, for the years 1978-1979, three new private schools opened for instruction each day.

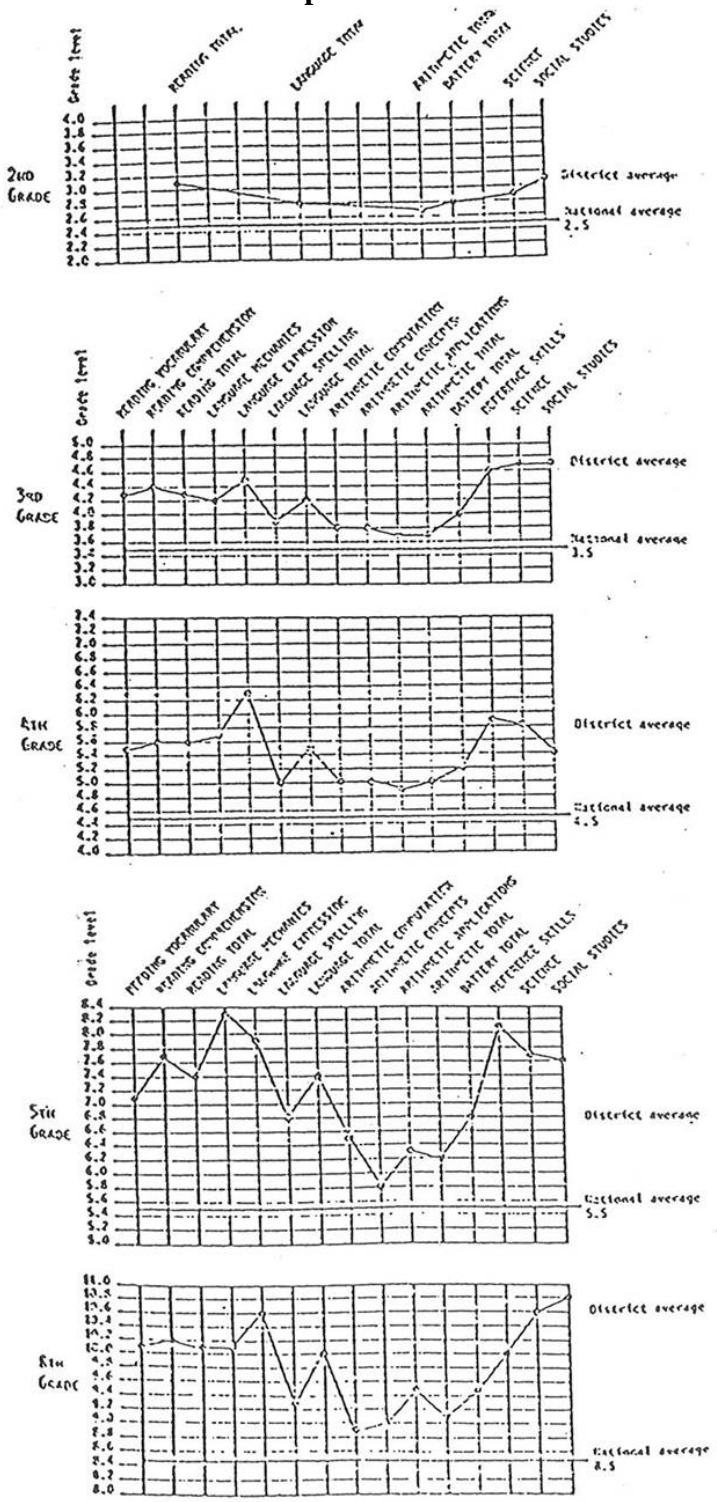
In the Grants Pass Urbanizing Area, there are three parochial schools providing instruction for grades 1-12. The 1980 student enrollment was 700 students.

Educational Quality

Measuring academic progress is normally determined by administering standardized test to individual students. Results are computed, compiled and compared to the "national norm." School District No. 7 and Josephine County Unit administer these "achievement" tests; however, each district used a different test so strict comparison between test results are not valid. The results indicate the academic progress of each district as compared to the national norm of other districts taking the same test.

District No. 7 - Tests used in this are the "Comprehensive Tests of Basic Skills" and the "Short Form Test of Academic Aptitude." These tests were administered in February, 1980 to all second, third, fourth, fifth and eighth grade students. "The scores were well above the national average for all skill areas." The following graphs compare each grade level tested to the national norm. Figures along the left of each graph refer to grade level in years and months. For example, the number 8.0 refers to the beginning of the eighth grade; 8.5 is the fifth month into the eighth grade. The heavy line across each chart is the national average and the broken line shows the average in each test for the Grants Pass Public Schools.

GRAPH 10.80.9
District No. 7 Comprehensive Skills Test 1980



Test results for high school level students were not available.

The results indicate progress exceeding the national norm for all grades, especially in language and reading skills. Scores were lower for math, although still above the national average.

Josephine County Unit School District - The County Unit School District uses the "California Achievement Test" for measuring academic progress. In 1979, all grades were administered the test. The following table and graph compare the results of test taken by third, fifth, seventh, ninth and eleventh grades to the national average of other districts taking the same test. (Summary of Student Performance Northwest Regional Educational Laboratory 1979)

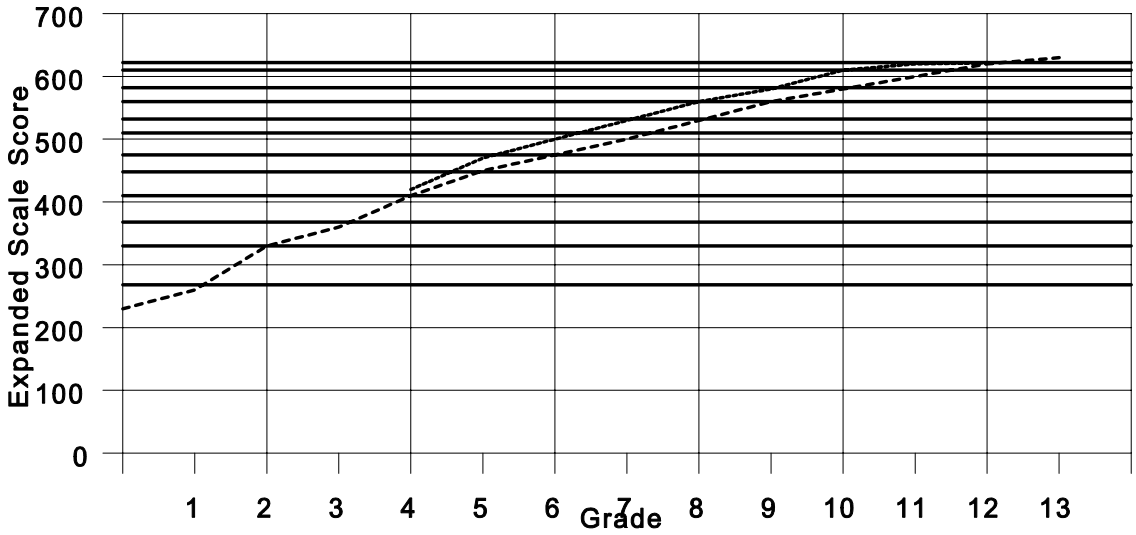
TABLE 10.80.10
Josephine County Unit Achievement Test 1981

Titles		3	5	7	9	11
Total Reading	MNSS	420	500	554	608	634
	SGE	4.1	6.7	8.7	11.1	12.8
	SNP	63	67	66	66	56
	SNCE	57	59	58	59	53
No. Of Students Tested		**503**	**601**	**551**	**507**	**464**
Spelling	MNSS	465	533	574	609	628
	SGE	4.1	6.8	9.5	11.5	12.5
	SNP	59	62	64	62	54
	SNCE	55	56	58	57	52
No. Of Students Tested		**502**	**600**	**554**	**509**	**450**
Total Language	MNSS	461	536	572	600	617
	SGE	4.1	7.4	9.2	10.7	11.6
	SNP	60	69	66	60	50
	SNCE	55	60	59	55	50
No. Of Students Tested		**502**	**600**	**555**	**508**	**437**
Total Math	MNSS	396	471	541	601	615
	SGE	3.7	6.0	8.1	10.7	11.8
	SNP	51	55	62	60	50
	SNCE	51	53	57	56	50

No. Of Students Tested		**498**	**600**	**547**	**507**	**458**
Total Battery	MNSS	408	486	547	602	624
	SGE	3.8	6.4	8.4	10.8	12.1
	SNP	56	63	64	63	52
	SNCE	53	57	58	57	51
No. Of Students Tested		497	600	542	494	429
Reference Skills	MNSS		518	548	576	623
	SGE		7.0	8.3	10.0	11.9
	SNP		64	60	53	50
	SNCE		58	55	51	50
No. Of Students Tested		**0**	**599**	**548**	**509**	**460**

MNSS = Mean of Achievement Scale Scores
SGE = Grade Equivalent of Mean of Achievement Scale Scores
SNP = National Percentile of Mean of Achievement Scale Scores
SNCE = Normal Curve Equivalent of Mean of Achievement Scale Scores

TABLE 10.80.11
Josephine County Unit Achievement Test 1981



---------- Norm Group Achievement

---------- District Obtained Achievement

———— Grade Equivalent Levels, 1st (bottom line) to 12 (top line)

Grade	1	2	3	4	5	6	7	8	9	10	11	12
Obtained Achievement			3.8		6.4		8.4		10.8		12.1	
Norm Group Achievement			3.7		5.7		7.7		9.7		11.7	

Josephine County Unit scores consistently higher than the national average, especially in reading and language. Math skill performance is lower, although still above the national average.

Summary - Both school districts show high performance testing as compared with other districts in the nation taking the same test. Emphasis appears to be higher for reading and language skills than for mathematics. The exceptions test scores for both districts can be attributed to many factors: quality of program, teachers, equipment, material, classroom size, stable family life, etc.

One factor normally accepted as a good indicator of educational quality is class size. In District 7, average class sizes are:

Elementary	22
Middle School	25
High School	24
In the County Unit:	
Elementary	26
Middle School	27
High School	23

Class sizes are somewhat higher in the County Unit, but still quite manageable and acceptable. In District No. 7, class sizes are very good, especially for public schools.

Forty percent of the County's 1980 population arrived after 1970. These in-migrants considered the quality of schools as an important factor for relocating in Oregon. The level of education, then, is a significant policy decision which the community and school districts must address as the community becomes larger. What is the threshold class size at which time a new classroom or school is justified? At what point in time should this be considered?

Projected Facilities Demand

The following "needs assessment" is based on the projected population range of between 38,300 and 44,750 persons for the Grants Pass Urban Growth Boundary. In determining residential land use allocations for the UGB, two factors for family size were used: existing and projected. As documented elsewhere, family size within the City Limits is declining. (See Population and Housing Elements.)

Student Household Ratio - The 1980 Census estimates the "average" city family size to be 2.42 persons per household. Using the previous three decades census information (1960, 1970, 1980) a family size trend was established. The estimated family size for the year 2000, therefore, was established to be 2.08 persons per household for the City limits and 2.22 for the urbanizing area. Thus, the average is 2.15 persons per household. In establishing the average number of students per household, the number of students enrolled in District No. 7 was divided by the number of existing dwelling units within the District in 1980:

3803 students ÷ 6770 dwelling units = 0.56 students per household

This information was derived from land use information within the boundary of District No. 7, and was applied throughout the UGB.

To estimate the average number of students per household for the year 2000, it was assumed that the ratio of students to household size would remain constant and therefore, any decline in overall household size would reduce the student size proportionately. Thus, the current average household size for the UGB is 2.51 persons; and the current average number of students per household is 0.56 or 22% of the household. In the year 2000, the average household size is projected to be 2.15, and therefore, the average number of students per household would be 0.47.

Student Demand - Projecting the number of students within the UGB over the 20 year planning period was accomplished by using two sets of data: current family size and students per household, and projected family size and students per household. These factors were then applied to the proposed new households for the UGB. The following table illustrates these calculations:

TABLE 10.80.12
Projected Population of Students Within UGB by 2000

Population Range	1980 Existing UGB Population	2000 Net New Population	Year 2000 Avg. Household Size	Year 2000 Students Per Household	New Households	New Students	Estimated Existing Students Within UGB (1)	Total Future Students Within UGB
Low 38,300	22,000	16,300	2.15	.47	7,581	3,516	5,361	8,977
High 44,750	22,000	22,750	2.15	.47	10,581	4,973	5,361	10,334

1. Based on City population of 15,000, HHS of 2.42, and .56 students/HH and on urbanizing population of 7,000, HHS of 2.59 and .56 students/HH.

District No. 7 - The following data is compiled by total students within the UGB by the year 2000, using existing distribution percentages of students by school type. Existing distribution is the same for both school districts: 43% elementary, 25% middle school, and 32% high school. Therefore, the tables show the proportionate contribution of new students from the UGB to the respective schools by type in the year 2000.

TABLE 10.80.13
Elementary Student Demand

Pop.	Allendale	Highland	Lincoln	Redwood	Riverside	Total
38,300	348	212	181	318	106	1165
44,750	474	288	247	433	144	1586

TABLE 10.80.14
Middle School Student Demand

Population	North	South	Total
38,300	264	413	677
44,750	373	584	957

TABLE 10.80.15
High School Student Demand

Population	Grants Pass High School
38,300	866
44,750	1255

Josephine County Unit School District:

TABLE 10.80.16
Elementary Student Demand

Population	Fort Vannoy	Fruitdale	Total
38,300	151	196	347
44,750	124	162	286

TABLE 10.80.17
Middle School Student Demand

Population	Flemming	Lincoln Savage	Total
38,300	88	114	202
44,750	124	162	286

TABLE 10.80.18
High School Student Demand

Population	Hidden Valley	North Valley	Total
38,300	146	112	258
44,750	207	159	365

Thus, the proposed land use allocation will generate the following number of students for each school type, based on 0.47 students per household (includes both districts):

TABLE 10.80.19
Total Student Demand

School Type	38,300 Population	44,750 Population
	Number of Students	Number of Students
Elementary	1,512	2,060
Middle	879	1,243
High	1,125	1,590
TOTAL	**3,516**	**4,893**

Projected Need

In determining "need" based on projected student demand, existing and future policy decision can affect any "deeds assessment" conclusion. Thus, some of the potential policy strategies dealing with meeting future need will be discussed. However, for calculation purposes, existing policy positions will be assumed and projected over the planning period. The reader is referred to Subsection 10.80.6 of this Element for discussion of existing facilities capacities.

Urban Growth Boundary -The area wide need of the UGB can be demonstrated by comparing projected student demand of the UGB to actual student enrollment of District No. 7. District No. 7 is selected as existing population counts and projected population figures are similar. By adding in existing enrollment figures for the two County Unit Schools, Fruitdale and Fort Vannoy, total UGB existing enrollment ins 4,504. The projected student population could increase 146%-170% within the next 20 years.

TABLE 10.80.20
District No. 7 Enrollment

School Type	Existing Enrollment October 1980	Year 200 Total Student Demand	
Elementary	1,633	2,798	3,219
Middle	952	1,629	1,909
High	1,302	2,168	2,527
TOTAL	**3,887**	**6,595**	**7,655**

District No. 7
Discussion with District No. 7 officials and research of the literature indicates the following potential to accommodate additional student enrollment, either by existing classrooms capacity or by adding classrooms to existing school facilities. This information does not relate to "optimum" classroom size, rather it relates to "practical" design capacity.

Elementary Schools - Three hundred and fifteen additional students can be enrolled to practical design capacity. Existing mean classroom size is 23. The additional 315 students would increase the mean size to 24. School District officials indicate that all existing schools are at capacity with no potential for expansion. Therefore, enrollment increase beyond practical design capacity will necessitate a strategic move by the District to absorb the increase, either by attendance boundary adjustment, combining schools, or a new facility. The additional students to be accommodated are between 850 and 1,271. Using an average class size of 24, the 36 to 53 additional classrooms will be needed during the planning period.

Middle Schools

North Middle School - Practical design capacity will accommodate an additional 228 students. The existing mean classroom size is 27 and with 228 more students the classroom size would increase to 38, bringing the school to its practical design capacity. An additional 36-114 students will need to be accommodated during the planning period. That equates to an additional 1-4 classrooms.

South Middle School -The practical design capacity is 615 with existing enrollment at 433, leaving additional capacity for 183 students. The mean classroom size is 23 students. At practical design capacity, the classroom size will be 33 students. The net projected student demand is between 230 and 401. Using a classroom size of 33 students, that equates to 7 to 13 additional classrooms needed during the planning period.

With respect to Middle Schools, the District appears to have three choices:

(1) Build another school
(2) Research further to determine if existing sites can accommodate additional classrooms, or
(3) Increase class sizes at both Middle schools, and redesign attendance boundaries.

Grants Pass High School - The practical design capacity is 2007 and 1980 enrollment was 1,302. The school would accommodate 705 new students. Projected student demand is between 866 and 1,226, leaving between 161 and 520 students unaccommodated. No additional classrooms can be built. Thus, the District needs to consider providing for the projected additional students. With a design capacity class size of 30, between 6 and 18 classrooms will be needed during the planning period.

The District appears to have three choices:

(1) Increase class size.
(2) Build another school, perhaps south of the Rogue River.
(3) Investigate expanding the present school site through property acquisition.

Josephine County Unit School District

Fruitdale Elementary School - Operating capacity for this school is 248; 1980 enrollment was 232. The school can absorb 16 additional students. Two classrooms can be added at an average size of 26 students, resulting in an added student capacity of 52. Thus, the school can accommodate a total of 62 additional students. Projected student demand for this school is between 196 and 268, leaving between 128 and 200 students unaccommodated. That equates to an additional 5 to 8 classrooms needed during the planning period.

Fort Vannoy Elementary School - Design capacity for this school is 338 students enrolled in 1980. No additional students can be accommodated as no new classrooms can be added. Projected student demand is between 151 and 206. The operating capacity class size is 27. Therefore, between 6 and 8 additional classrooms are needed to accommodate these students.

Fleming Middle School - Existing enrollment is at design capacity of 647 students. No additional classrooms can be added. Projected student demand generated by the UGB is between 83 and 124. Thus, the operating capacity average class size is 27. Therefore, between 4 and 6 additional classrooms are needed to accommodate these students.

Lincoln Savage Middle School - This school exceeds the operating capacity by 72 students, with no additional classrooms able to be added. Between 114 and 162 additional students will be generated by the UGB. With an average class size of 25, between 8 and 10 additional classes will be needed to accommodate these students.

Hidden Valley High School - Current enrollment exceeds the operating capacity by 2 students. Projected additional demand is between 146 and 207 students. Two classrooms can be added to the school. With an operating capacity average class size of 23, 46 more students could be accommodated within existing capacity. The remaining number of potential future students is between 152 and 213. The additional number of classrooms needed is between 7 and 10

North Valley High School - Current enrollment exceeds the operating capacity by 113 students. Four additional classrooms can be added. The average class size is 24. A total of 96 additional students can be accommodated by existing capacity. Projected additional demand is between 129 and 176. That equates to an additional classroom need between 6 and 8.

The District should consider these impacts in addition to other projected impacts which may occur from rural residential growth outside of the UGB.

TABLE 10.80.22
Facilities Needed in Number of Classrooms

School Type	Facilities Needed in # Classrooms					
	District #7		County Unit		Total	
	Low	High	Low	High	Low	High
Elementary	36	53	11	16	47	73
Middle	8	17	12	16	20	33
High	6	18	13	18	19	36
	50	88	36	50	86	142

Summary

It's not known definitely to what degree any of the existing schools can accommodate additional classrooms given site layout and core facility considerations since considerations of "crowding" are partly matters of policy. It appears, however, that new elementary schools will be needed in both schools districts to insure desire education levels and management efficiency.

Existing Middle Schools in District No. 7 may be able to absorb some of the projected demand, but will probably need a new facility or major expansion at the existing sites. The High School appears able to accommodate only a portion of projected demand, leaving at least 21 classrooms to be provided. The District may want to consider conducting an in-depth analysis of service provision at the Middle and High School levels to determine site limitations more precisely.

Cost of Providing Facilities

The cost of providing public education is affected by many policy decisions (i.e. size of classrooms, double sessions, year-round curriculum, etc.); however, these issues are intangible when projecting cost over a long term period. Therefore, the following "cost" information relates to tangible factors, as they exist in 1980:

- Cost of construction of an "add on" classroom, fully equipped.
- Cost of "new" construction per classroom, fully equipped. New construction includes all associated "core facilities."
- Existing level of education is assumed and linked to existing classroom size.
- Cost of land is not included. Both school districts have vacant land available, however if a new site is required.

1. Cost of Add-on Classroom

Classroom	$40,000
Furnishings	4,000
	$44,000

(a) District No. 7 Need: 0 classrooms x $44,000 = $0
(b) County Unit Need: 8 classrooms x $44,000 = $352,000
$352,000

2. Cost of New Construction

Classrooms	$50,000
Furnishings	4,000
	$54,000

(a) District No. 7 Need: 91 classrooms x $54,000 = $4,914,000
(b) County Unit Need: 27 classrooms x $54,000 = $1,458,000
Sub-total $6,372,000

Total **$6,724,000**

(Includes all core facilities. School District No. 7 staff, 1980)

3. Cost by School District

(a)	District No. 7	$4,914,000
(b)	County Unit	1,210,000
	Total	$6,724,000

Revenue Sources

The most widely used means of financing public school is through the local property tax. Except for federal and state mandated programs (i.e., Special Education for Mentally Handicapped) and property tax relief, all school revenues in Josephine County are generated through property tax. It appears, therefore, that the property tax will be the primary tool for financing the future; however, there are other potential revenue sources which could supplement property tax:

1. Revenues derived from the sale of timber on federally owned property.
2. Dedication of property by developers at the time of development or payment of fees for land acquisition in lieu of dedication.

SCHOOL SERVICES FINDINGS

1. The Grants Pass Urban Growth Boundary area is served by two school districts: Grants Pass School District No. 7, and Josephine County Unit School District No. 35. These two districts administer 14 schools that enroll students from the UGB area. The County Unit School District serves a proportionately smaller area within the UGB; the unincorporated Fruitdale area, and the unincorporated area north of the Rogue River and west of the city limits. The population is increasing more rapidly in the urbanizing areas than in the incorporated urban area of the City. (See Population Element.)

2. The population profile for the Grants Pass Urban Growth Boundary area shows a high percentage of older persons, a decline in household size, and a significant increase in student enrollment for the Josephine County Unit School District.

3. The Grants Pass School District No. 7 administers 8 schools within the UGB area. Five schools are located north of the Rogue River and within the City limits: three are elementary schools, North Middle School and Grants Pass High School. Four of these schools are located in the Northwest and Northeast subareas, one in the southeast subarea, and none in the southwest subarea. Three schools, two elementary and one middle school, are located south of the Rogue River within the urbanizing area.

4. Generally, attendance boundaries relate to type of school (elementary, middle, high), land use, population, capacity of school, and natural man-made features (such as rivers, roads, etc) and are adjusted from time to time as necessary.

5. For District No. 7 elementary schools, the boundaries relate to the Rogue River, the Southern Pacific Railroad tracks, 6th Street, and Allen Creek. The most notable exception to this pattern is the area south of the railroad tracks, between Pine Street and Mill street. Students living in this area attend either Redwood or Allendale which are south of the Rogue River. Also, to the west of this area (from Pine Street to the west City limits) students attend Riverside School. All students in District 7 attend Grants Pass High School.

6. The Josephine County Unit attendance boundaries conform to the Rogue River and School District No. 7 boundary. Students living within the UGB, south of the Rogue River and not in District No. 7, attend Fruitdale Elementary School, Lincoln Savage Middle School, and Hidden Valley High School. Students living within the UGB, north of the Rogue River and not within School District No. 7 attend Fort Vannoy Elementary School, Fleming Middle School, and North Valley High School. Many of those students travel five to six miles by school bus to attend school. (See Map 10.80.6)

7. Rogue Community College is the only public institution of higher education in Josephine County. Opened in 1971 with student enrollment of 2,276, the college has experienced a steady increase in enrollment to a high in 1980 of 6,315 students. The college is located at the most southwesterly corner of the UGB, and served all of Josephine County.

8. In the Grants Pass Urban Growth Boundary area, there are three parochial school providing instruction for grades 1 through 12. The total student enrollment is 700.

9. Measuring academic progress is normally determined by administering standardized tests to individual students. Results are computed, compiled, and compared to the "national norm." School District and Josephine County Unit administer these "achievement" tests; however, each district uses a different test so strict comparison of the test results are not valid. The results do indicate the academic progress of each district as compared to the national norm of other districts taking the same test.

10. Both school districts show high performance testing as compared with other district in the nation taking the same test. Emphasis appears to be higher for reading and language skills than for mathematics. (see graphs 10.80.9 and 10.80.10) The exceptional test scores for both districts can be attributed to many factors: quality of program, teachers, equipment, material, classroom size, stable family life, etc.

11. One factor normally accepted as a good indicator of educational quality is class size. In District 7, average class sizes are: elementary 22, middle 25, high school 24. In the County Unit, class sizes are: elementary 26, middle 27, high school 23.

    Class sizes are somewhat higher in the County Unit but still quite manageable and acceptable. In District No. 7, class sizes are very good, especially for public schools.

12. In the year 2000, the projected household size for the City is 2.08 and 2.22 for the urbanizing area. The current average number of students per household in the UGB area is .56. An average projected household size for the UGB area by year 2000 is 2.15. If the ratio of students to household size remains constant over time, then a decline in household size would decrease the number of students per household. Therefore, the average number of students per household in the year 2000 would be .47.

13. The "Projected Population of Students" is based on the projected population range of between 38,300 and 44,750 persons for the Grants Pass Urban Growth Boundary. In determining residential land use allocation of the UGB, two factors for family size were used: existing and projected. As previously documented in the Population Element, family size within the UGB is declining.

14. The following table depicts the number of new students by school type that would be generated from the extremes of the population range projected for the UGB by the year 2000.

TABLE 10.80.24
Total Student Demand

School Type	38,300 Population	44,750 Population
	Number of Students	Number of Students
Elementary	1,512	2,060
Middle	879	1,243
High	1,125	1,590
TOTAL	**3,516**	**4,893**

15. The following table depicts the number by school type for 1980 enrollment and for the future (2000) enrollment, using the low and high population projections.

TABLE 10.80.25
District No. 7 Enrollment

School Type	Existing Enrollment October 1980	Year 2000 Total Student Demand	
Elementary	1,633	2,798	3,219
Middle	952	1,629	1,909
High	1,302	2,168	2,527
TOTAL	**3,887**	**6,595**	**7,655**

16. The following table depicts the relationship between the practical design capacity of school types within School District No. 7 and the projected new student demand. The result of that relationship creates the needed student capacity by the year 2000.

Table 10.80.26
District 7: Projected Needed Student Capacity

School Type	Existing Student Enrollment	Practical Design Student Capacity	Net Excess Student Capacity	Projected New Student Demand		Projected Shortfall	
Elementary	1633	1948	315	1165	1586	850	1271
Middle	952	1363	411	677	957	266	546
High	1302	2007	705	866	1225	161	520
Total	3887	5318	1431	2708	3768	1277	2337

"Low/high" refers to the low population projection of 38,300 persons and the high population projection of 44,750 persons. The numbers under these headings depict number of students that will be generated by the respective population.

17. The following table depicts the facilities needed in number of classrooms by school types for each school district and low/high population range of 38,300 to 44,750 persons by the year 2000.

TABLE 10.80.27
Facilities Needed in Number of Classrooms

School Type	Facilities Needed in Classrooms				Total	
	District No. 7		County Unit			
	Low	High	Low	High	Low	High
Elementary	36	53	11	16	47	73
Middle	8	17	12	16	20	33
High	6	18	13	18	19	36
	50	88	36	50	86	142

18. The cost of providing public education is affected by many policy decisions, such as classroom size, use of double-sessions, year round curriculum, etc, all possibly affecting the equality of education. Assuming that the present classroom sizes, support facilities and student-teacher ratios are linked to the high performance of the school districts at present, the following depicts the number and 1980 cost of additional facilities required to maintain present facility ratios, using the low end of the expected population range.

TABLE 10.80.28
Additional Facilities Required for 38,300 Projected Population*

School District	Add-On Classrooms		New Classrooms With Core Facilities	
	Number	Price	Number	Price
Grants Pass	---	---	50	$2,700,000
County Unit	8	$352,000	28	$1,512,000
Total	8	$352,000	78	$6,724,000

*Assumes "add on" classrooms at 1980 cost of $44,000 and new classrooms (with pro-rated share of core facilities at 1980 cost of $54,00 each. Costs include furnishings, but do not include land acquisition or financing costs.

Grants Pass and Urbanizing Area Community Comprehensive Plan
Element 10: Public Facilities

Addendum 1: 2015 Update

This addendum updates the following sections of the Public Facilities Element:

- 10.20. Water Services
- 10.30. Sanitary Sewer Services

Background

In 2008, the City Council adopted Ordinance 5460, which updated Element 10 of the Comprehensive Plan to reflect updates to several of the public facility plan documents. In 2014, the City Council adopted the following:

- **Resolution 14-6173. A resolution adopting the Water Treatment Plant Facility Plan Update.** This resolution adopted the Water Treatment Facility Plan Update prepared by Murray, Smith & Associates in association with MWH Americas, Inc. dated January 2014. It replaced the previous Water Treatment Plan Facility Plan adopted in April 2004.

- **Resolution 14-6205. A resolution adopting the Water Restoration Plant (WRP) Facility Plan.** This resolution adopted the Water Restoration Plant Facility Plan prepared by Carollo Engineers, Inc. dated May 2014. It replaced the previous Water Restoration Plant (WRP) Facility Plan completed in June 2001.

Statewide Planning Goal 11 addresses Public Facilities and Services, and Oregon Administrative Rules (OAR) Division 11 address Public Facilities Planning. OAR 660-011-0005(1) defines "Public Facilities Plan" as follows: "A public facility plan is a support document or documents to a comprehensive plan. The facility plan describes the water, sewer and transportation facilities which are to support the land uses designated in the appropriate acknowledged comprehensive plans within an urban growth boundary containing a population of greater than 2,500. Certain elements of the public facility plan shall also be adopted as part of the comprehensive plan, as specified in OAR 660-011-0045."

Consistent with OAR 660-011-0005, this addendum recognizes these 2014 updates as part of the City's Public Facilities Plan, as support documents to the Comprehensive Plan. This addendum also adopts certain elements of these plans as part of the comprehensive plan, as specified in OAR 660-011-0045.

Updates to the Water Distribution System Master Plan and the Sewer Collection Master Plan will also be completed to address future needs, including those associated with the UGB expansion and designation of Urban Reserves. Element 10 of the Comprehensive Plan will be subsequently updated to incorporate provisions of those plans at that time.

Section 1. Plans Adopted Part of the Public Facility Plan as Part of a Supporting Document to the Comprehensive Plan

The January 2014 Water Treatment Plant Facility Plan Update and the May 2014 Water Restoration Plant (WRP) Facility Plan are adopted as part of the Public Facilities Plan as a supporting document to the Comprehensive Plan.

Some of the information and provisions in the plans referenced in this addendum supersede materials in Section 10.20 pertaining to water services and Section 10.30 pertaining to sanitary sewer services.

Section 2. Sections Adopted as Part of Comprehensive Plan

1. The parts of the January 2014 Water Treatment Plant Facility Plan Update and the May 2014 Water Restoration Plant (WRP) Facility Plan identified in Table 2-1 are hereby adopted and incorporated as part of comprehensive plan.

2. In accordance with OAR 660-011-0045(2), certain public facility plan project descriptions, location, or service area designations will necessarily change as a result of subsequent design studies, capital improvement programs, environmental impact studies, and changes in potential sources of funding. It is not the intent of this section to:

    a. Either prohibit projects not included in the public facility plans for which unanticipated funding has been obtained;

    b. Preclude projects specification and location decisions made according to the National Environmental Policy Act; or

    c. Subject administrative and technical changes to the facility plan to ORS 197.610(1) and (2) or 197.835(4).

3. In accordance with OAR 660-011-0045(3), the public facility plan may allow for the following modifications to projects without amendment to the public facility plan:

    a. Administrative changes are those modifications to a public facility project which are minor in nature and do not significantly impact the project's general description, location, sizing, capacity, or other general characteristic of the project.

    b. Technical and environmental changes are those modifications to a public facility project which are made pursuant to "final engineering" on a project or those that result from the findings of an Environmental Assessment or Environmental Impact Statement conducted under regulations implementing the procedural provisions of the National Environmental Policy Act of 1969 (40 CFR Parts 1500-1508) or any federal or State of Oregon agency project development regulations consistent with the Act and its regulations.

    c. Public facility project changes made pursuant to subsection (3b) are subject to the administrative procedures and review and appeal provisions of the regulations controlling

the study (40 CFR Parts 1500-1508 or similar regulations) and are not subject to the administrative procedures or review or appeal provisions of ORS Chapter 197, or OAR Chapter 660 Division 18.

4. Land use amendments are those modifications or amendments to the list, location or provider of, public facility projects, which significantly impact a public facility project identified in the comprehensive plan and which do not qualify under subsection (3)(a) or (b). Amendments made pursuant to this subsection are subject to the administrative procedures and review and appeal provisions accorded "land use decisions" in ORS Chapter 197 and those set forth in OAR Chapter 660 Division 18.

Table 2-1. Sections Adopted as Part of Comprehensive Plan

OAR 660-011-0045 Requirement	Water Treatment Plant Facility Plan Section [1, 2, 4]	Water Restoration Plant Facility Plan Section [1, 3, 4]
(1)(a) The list of public facility project titles, excluding (if the jurisdiction so chooses) the descriptions and specifications of those projects.	***See Table 2-2.*** From Executive Summary, Table ES-1	***See Table 2-3.*** From Executive Summary, Section ES.3 and Table ES.5
(1)(b) A map or written description of the public facility projects' locations or service areas as specified in Sections (2) and (3) of this rule.	Appendix E: Long Term Water Demand Projections, 'Current and Future Service Area' plus Figure 2-1	Executive Summary, Section ES.2 and Figure ES.1, 'WRP Service Area', 'Population, Flow, and Load Projections' plus Figure 2-1
(1)(c) The policy(ies) or urban growth management agreement designating the provider of each public facility system. If there is more than one provider with the authority to provide the system within the area covered by the public facility plan, then the provider of each project shall be designated.	No change from adopted policies and management agreements regarding service provider.	No change from adopted policies and management agreements regarding service provider.

[1] The facility plans for the treatment plants pertain primarily to the total demand of the service areas based on population, employment, and land use of the service areas, and demand forecasts derived from population and employment forecasts (regardless of location of growth), while the water distribution and sewer collection master plans are dependent on location of growth.

[2] In addition to the current UGB, the principal service areas for the Water Treatment Plant include approximately 105 residential and commercial acres in the Merlin/North Valley Unincorporated Community Boundary. The demand forecasts account for growth to be accommodated within the UGB expansion areas and Urban Reserves. Also, it is noted that some areas within the current UGB are served with wells and community water systems.

[3] In addition to the current UGB, the principal service areas for the Water Restoration Plant include properties located within a portion of the former Redwood Sewer District established before the Urban Growth Boundary was adopted. This is located on the west side of the city, south of the Rogue River. The demand forecasts account for growth to be accommodated within the UGB expansion areas and Urban Reserves. Also, it is noted a very limited number of developed properties within the current UGB are on septic systems and unserved by public sewer.

[4]In addition to the current service areas, the future service areas include the UGB expansion areas and Urban Reserve areas shown in Figure 2-1, and as subsequently amended, in accordance with the applicable management agreements when they are eligible for municipal water and sewer service.

Table 2-2. Water Treatment Plant CIP (Table ES-1)

Table ES-1
Recommended Capital Improvement Program Summary

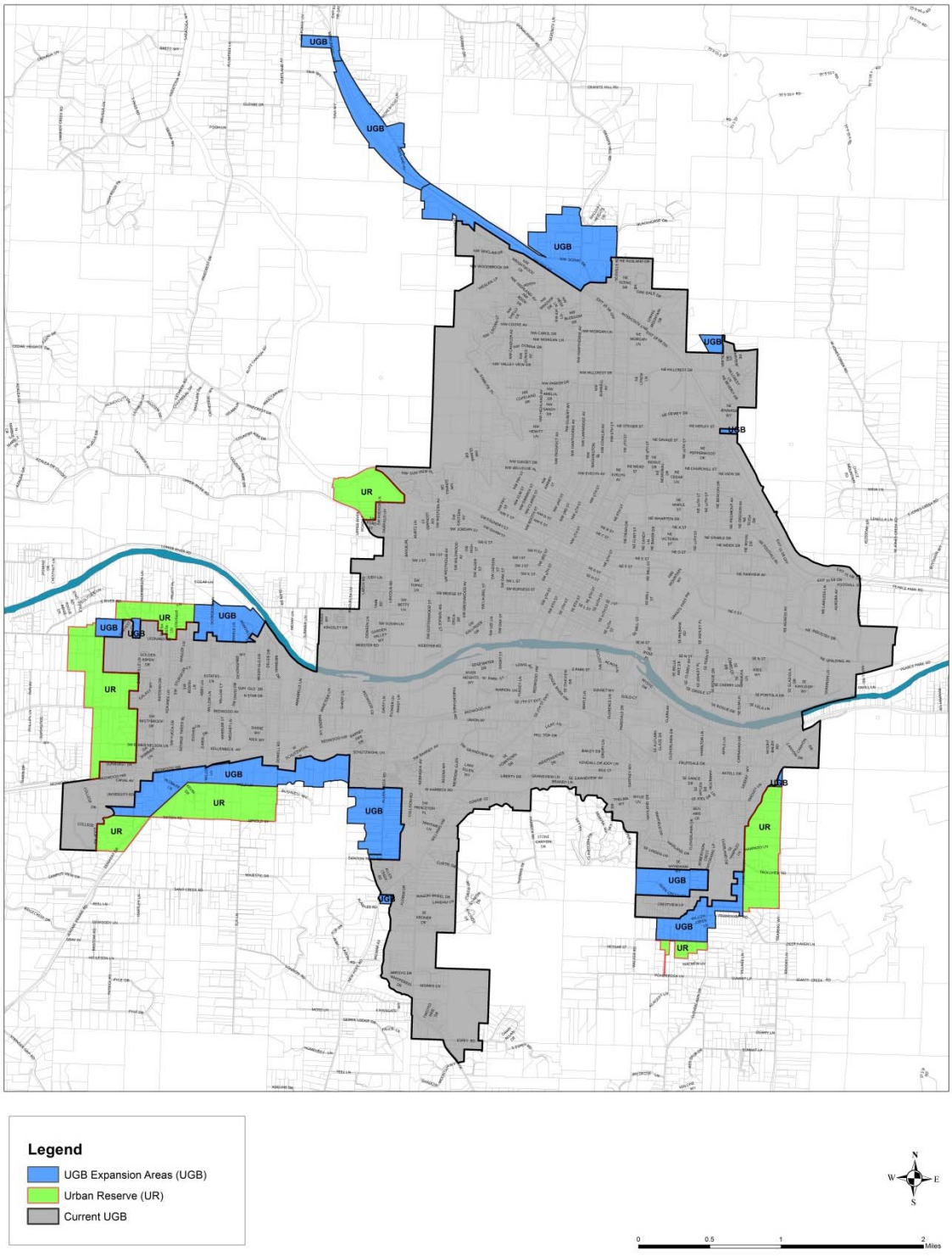
Capital Project	Capital Expenditure
New Water Treatment Plant Implementation	
Pilot Plant Study	$500,000
Siting Study and Property Acquisition	$1,300,000
Funding Study and Rate Impact Study	$200,000
Project Implementation Approach and Procurement Strategy	$50,000
Public Information/Involvement	$250,000
Permitting and Land-Use Approvals	$200,000
Preliminary Design	$1,000,000
Final Design	$4,000,000
Bidding and Award	$250,000
Construction	$47,200,000
Post-Construction and Warranty Period	$200,000
Existing Water Treatment Plant Investments	
Emergency Response Plan	$50,000
Decommission and Demolition of Existing Plant	$1,000,000
Total Anticipated Expenditures (2013 dollars)	**$56,200,000**

Table 2-3. Water Restoration Plant CIP (Table ES-3)

Table ES.3 Recommended CIP
City of Grants Pass – Executive Summary

CIP Project Phase	Cost, $	Fiscal Years
Phase 1	1,500,000	2015 – 2016
UV Disinfection	1,093,000	
Seismic Upgrades	407,000	
Phase 2	9,643,000	2016-2020
Primary Clarifier No. 3	2,703,000	
Aeration Basins No. 3 and 4	5,728,000	
Rehabilitate GT and One New GT	1,100,000	
Screening Hydraulic Improvements	112,000	
Phase 3	8,918,000	2020-2023
Primary Clarifier No. 4	2,703,000	
Secondary Clarifier No. 4	5,017,000	
WAS Diversion Pipeline and Mixing Upgrades	440,000	
Degritting Improvements	758,000	
Total CIP	20,061,000	

Figure 2-1. UGB Expansion Areas and Urban Reserve Areas



Grants Pass and Urbanizing Area Community Comprehensive Plan
Element 10: Public Facilities

Addendum 2: 2016 Update

This addendum updates the following sections of the Public Facilities Element:

- 10.20. Water Services
- 10.30. Sanitary Sewer Services
- 10.40. Storm Drainage Services

Background

In 2008, the City Council adopted Ordinance 5460, which updated Element 10 of the Comprehensive Plan to reflect updates to several of the public facility plan documents. In 2015, the City Council adopted Ordinance 15-5655 which updated Element 10, by adopting the Water Treatment Facility Plan Update prepared by Murray, Smith & Associates in association with MWH Americas, Inc. dated January 2014; and the Water Restoration Plant Facility Plan prepared by Carollo Engineers, Inc. dated May 2014. It replaced the previous Water Restoration Plant (WRP) Facility Plan completed in June 2001.

Statewide Planning Goal 11 addresses Public Facilities and Services, and Oregon Administrative Rules (OAR) Division 11 address Public Facilities Planning. OAR 660-011-0005(1) defines "Public Facilities Plan" as follows: "A public facility plan is a support document or documents to a comprehensive plan. The facility plan describes the water, sewer and transportation facilities which are to support the land uses designated in the appropriate acknowledged comprehensive plans within an urban growth boundary containing a population of greater than 2,500. Certain elements of the public facility plan shall also be adopted as part of the comprehensive plan, as specified in OAR 660-011-0045."

Consistent with OAR 660-011-0005, this addendum recognizes these 2015 updates as part of the City's Public Facilities Plan, as support documents to the Comprehensive Plan. This addendum also adopts certain elements of these plans as part of the comprehensive plan, as specified in OAR 660-011-0045.

Section 1. Plans Adopted Part of the Public Facility Plan as Part of a Supporting Document to the Comprehensive Plan

The February 2016 Stormwater Master Plan, February 2016 Water Distribution System Master Plan and the March 2016 Wastewater Collection System Master Plan are adopted as part of the Public Facilities Plan as a supporting document to the Comprehensive Plan.

Some of the information and provisions in the plans referenced in this addendum supersede materials in Section 10.20 pertaining to water services, Section 10.30 pertaining to sanitary sewer services and Section 10.40 pertaining to storm drainage services.

Section 2. Sections Adopted as Part of Comprehensive Plan

1. The parts of the February 2016 Stormwater Master Plan, February 2016 Water Distribution System Master Plan and the March 2016 Wastewater Collection System Master Plan identified in Tables 2-1, 2-2, 2-3 and 2-4 are hereby adopted and incorporated as part of the comprehensive plan.

2. In accordance with OAR 660-011-0045(2), certain public facility plan project descriptions, location, or service area designations will necessarily change as a result of subsequent design studies, capital improvement programs, environmental impact studies, and changes in potential sources of funding. It is not the intent of this section to:

    a. Either prohibit projects not included in the public facility plans for which unanticipated funding has been obtained;

    b. Preclude projects specification and location decisions made according to the National Environmental Policy Act; or

    c. Subject administrative and technical changes to the facility plan to ORS 197.610(1) and (2) or 197.835(4).

3. In accordance with OAR 660-011-0045(3), the public facility plan may allow for the following modifications to projects without amendment to the public facility plan:

    a. Administrative changes are those modifications to a public facility project which are minor in nature and do not significantly impact the project's general description, location, sizing, capacity, or other general characteristic of the project.

    b. Technical and environmental changes are those modifications to a public facility project which are made pursuant to "final engineering" on a project or those that result from the findings of an Environmental Assessment or Environmental Impact Statement conducted under regulations implementing the procedural provisions of the National Environmental Policy Act of 1969 (40 CFR Parts 1500-1508) or any federal or State of Oregon agency project development regulations consistent with the Act and its regulations.

    c. Public facility project changes made pursuant to subsection (3b) are subject to the administrative procedures and review and appeal provisions of the regulations controlling the study (40 CFR Parts 1500-1508 or similar regulations) and are not subject to the administrative procedures or review or appeal provisions of ORS Chapter 197, or OAR Chapter 660 Division 18.

4. Land use amendments are those modifications or amendments to the list, location or provider of, public facility projects, which significantly impact a public facility project identified in the comprehensive plan and which do not qualify under subsection (3)(a) or (b). Amendments made pursuant to this subsection are subject to the administrative procedures and review and appeal provisions accorded "land use decisions" in ORS Chapter 197 and those set forth in OAR Chapter 660 Division 18.

Table 2-1. Water Distribution Capital Improvement Program

Table 5-4
Capital Improvement Program (CIP) Summary

Improvement Category	CIP No.	Project Description	CIP Schedule and Project Cost Summary				Preliminary Cost % to Growth
			5-year thru 2021	10-year 2022-2026	20-year 2027-2036	Estimated Project Cost	
Storage Reservoirs	R-13	0.7 MG Ausland Reservoir - Zone 4 Reservoir No. 13 replacement	$ 2,100,000			$ 2,100,000	40%
	R-14	0.5 MG Laurel Ridge Reservoir			$ 1,500,000	$ 1,500,000	40%
	R-16	1.3 MG Meadow Wood Reservoir		$ 3,900,000		$ 3,900,000	69%
	R-17	1.2 MG New Hope (Cathedral Hills) Reservoir		$ 3,600,000		$ 3,600,000	42%
	R-19	1.2 MG Pearce Park Reservoir - Zone 2 Spalding Industrial Park			$ 3,600,000	$ 3,600,000	100%
		Capital Maintenance	$ 75,000			$ 75,000	52%
		Subtotal	$ 2,175,000	$ 7,500,000	$ 5,100,000	$ 14,775,000	$ 9,282,000
Pump Stations	P-1	Meadow Wood P.S. high (Zone 3MW) - fire flow capacity upgrade	$ 250,000			$ 250,000	52%
	P-2	Panoramic P.S. - fire flow capcity upgrade	$ 400,000			$ 400,000	52%
	P-3	Ausland P.S. supplying proposed Ausland Reservoir (R-13)	$ 500,000			$ 500,000	52%
	P-4	Zone 4N P.S. - constant pressure			$ 1,200,000	$ 1,200,000	100%
	P-5	North Valley P.S. replacement		$ 1,000,000		$ 1,000,000	79%
		Capital Maintenance	$ 125,000			$ 125,000	52%
		Subtotal	$ 1,275,000	$ 1,000,000	$ 1,200,000	$ 3,475,000	$ 2,654,145
PRVs	V-1	Spalding Industrial Area - Ament Rd PRV			$ 150,000	$ 150,000	100%
	V-2	Zone 4N Highland Ave PRV			$ 150,000	$ 150,000	100%
	V-3	Blue Gulch PRV			$ 150,000	$ 150,000	100%
	V-4	Overland PRV			$ 150,000	$ 150,000	100%
	V-5	10th Street PRV	$ 150,000			$ 150,000	52%
	V-6	NW B Street PRV			$ 150,000	$ 150,000	100%
	V-7	Zone 2A PRV replacements (Capital Maintenance)	$ 250,000			$ 250,000	52%
		Subtotal	$ 400,000	$ -	$ 750,000	$ 1,150,000	$ 958,000

Distribution Mains	M-1, 2, 3, 9, 10	Piping improvements for fire flow	$ 683,000			$ 683,000	52%
	M-4 to 8	Zone 2A - Hwy 99, Savage, Manzanita Loop	$ 758,000			$ 758,000	52%
	M-11, 12	Proposed Zone 2H - connect Harbeck and Hilltop			$ 532,000	$ 532,000	100%
	M-13 to 22	Spalding Industrial Area - Zone 2 expansion			$ 3,181,000	$ 3,181,000	100%
	M-24, 25, 26	Zone 3 Granite Hill to Scoville Loop			$ 1,415,000	$ 1,415,000	100%
	M-27 to 30	Zone 3 Scoville to Spring Moutain Loop			$ 1,107,000	$ 1,107,000	100%
	M-31 to 33, 42	Zone 3 I-5 crossing at Cedar Loop, Spring Moutain to Hillcrest Loop			$ 1,396,000	$ 1,396,000	100%
	M-34 to 41, 52	Proposed Ausland P.S. (P-3) and Reservoir (R-13) mains	$ 2,897,000			$ 2,897,000	52%
	M-43, 44	Zone 3 I-5 crossing at Humane Society			$ 570,000	$ 570,000	100%
	M-45, 46	Zone 3 Vine Street Loop - Highland to Hawthorne			$ 996,000	$ 996,000	52%
	M-47 to 51	Zone 4N mains			$ 1,996,000	$ 1,996,000	100%
	M-53 to M-57	Zone 1 Spalding Industrial Area loop			$ 1,362,000	$ 1,362,000	100%
	M-58 to 62	Meadow Wood future mains		$ 1,173,000		$ 1,173,000	100%
	M-63 to 68	New Hope future mains		$ 2,532,000		$ 2,532,000	100%
	M-69 to 75	Laurel Ridge and Blue Gulch future mains			$ 1,870,000	$ 1,870,000	100%
	M-76, 77, 81, 82, 83	Zone 1 Fruitdale future mains			$ 2,087,000	$ 2,087,000	100%
	M-78, 79, 80	Zone 1 Looping- Cloverlawn & Grandview		$ 639,000		$ 639,000	52%
	M-84 to 87	Zone 1 Lincoln Road Loop		$ 814,000		$ 814,000	52%
		Routine Main Replacement Program (Capital Maint.)	$ 8,000,000	$ 8,000,000	$ 16,000,000	$ 32,000,000	52%
		Subtotal	$12,338,000	$13,158,000	$ 32,512,000	$ 58,008,000	$ 39,390,240
Planning		Seismic Resilience Study	$ 100,000			$ 100,000	52%
		Water Management & Conservation Plan update		$ 50,000		$ 50,000	52%
		Water Distribution System Master Plan update			$ 150,000	$ 150,000	52%
		Unidirectional Flushing (UDF) Program Development	$TBD			$ -	52%
		Distribution Piping Corrosion Study	$ 100,000			$ 100,000	52%
		Subtotal	$ 200,000	$ 50,000	$ 150,000	$ 400,000	$ 208,000
Capital Improvement Program (CIP) Total			**$16,388,000**	**$21,708,000**	**$ 39,712,000**	**$ 77,808,000**	**$ 52,492,385**

Annual Average CIP Cost		
$3,277,600	**$3,809,600**	**$3,890,400**
5-year	**10-year**	**20-year**

Table 2-2. Wastewater Collection System Master Plan CIP (Table 6.12)

Table 6.12 Detailed Capital Improvement Plan
Wastewater Collection System Master Plan
City of Grants Pass

Project Description				Project Size and Cost				Total CIP	Total CIP Cost ($) - Project Phasing		
Improv. ID	Improv. Type	Project Purpose	Address Description	Existing Size	Proposed Size	Replace/ New	Length (ft)	Total Capital Improvement Cost($)	Phase 1 (2015-2020)	Phase 2 (2021-2025)	Phase 3 (2026-2035)
Project 1 - SW Western Street / SW Spruce Street											
P-1A	Gravity	Capacity and R&R	Along SW Western Ave between I St and K St	8	12	Upsize	581	$184,000	$184,000		
P-1B	Gravity	Capacity and R&R	Along SW Western Ave between K St and SW Bridge St	10	15	Upsize	546	$195,000	$195,000		
P-1C	Gravity	Capacity and R&R	Along SW Spruce St between SW Bridge St and Webster Rd	8	18	Upsize	1,998	$791,000	$791,000		
P-1D	Gravity	Capacity and R&R	Along SW Bridge St between SW Western Ave and SW Westhom Ave	10	18	Upsize	481	$190,000	$190,000		
P-1E	Diversion	Capacity	Diversion to east Bridge St	10	-	Plug	-	-	-		
Total Project 1 - SW Western / SW Spruce Street								**$1,360,000**	**$1,360,000**	**$0**	**$0**
Project 2-1 - NW Highland Street											
P-2A	Gravity	Capacity	Along NW Highland Ave between 300 ft north of NW Parker Dr and NW Midland Ave	8	12	Upsize	939	$296,000	$296,000		
Total Project 2-1 - NW Highland Street								**$296,000**	**$296,000**	**$0**	**$0**
Project 2-2 - NW Prospect Street											
P-2B	Gravity	Capacity and R&R	Along NW Midland Ave between NW Highland Ave and NW Prospect Ave	8	12	Upsize	623	$196,000		$196,000	
P-2C	Gravity	Capacity and R&R	Along NW Prospect Ave between NW Midland Ave and 150 feet south of NW Sandy Dr	10	15	Upsize	834	$298,000		$298,000	
Total Project 2-2 - NW Prospect Street								**$494,000**	**$0**	**$494,000**	**$0**
Project 3 - NW Midland Avenue											
P-3A	Gravity	Capacity	Along Midland Ave between NW 6th St and NW Washington Blvd	-	12	New	710	$224,000	$224,000		
Total Project 3 - NW Midland Avenue								**$224,000**	**$224,000**	**$0**	**$0**
Project 4 - NE A Street											
P-4A	Gravity	Capacity and R&R	Along NE A St between NE 9th St and NE 7th St	12	18	Upsize	844	$334,000	$334,000		
Total Project 4 - NE A Street								**$334,000**	**$334,000**	**$0**	**$0**
Project 5 - NE Savage Street / NE 9th Street											
P-5A	Gravity	Capacity and R&R	Along NE Savage St between NE 10th St and NE 9th St and along NE 9th St between NE Savage St and NE Josephine St	8	12	Upsize	3,431	$1,084,000	$1,084,000		
Total Project 5 - NE Savage Street / NE 9th Street								**$1,084,000**	**$1,084,000**	**$0**	**$0**
Project 6 - SE Mill Street / SE Rogue View Lane											
P-6A	Gravity	Capacity and R&R	Along SE Mill St between NE D St and SE M St	12	18	Upsize	3,755	$1,486,000	$1,486,000		
P-6B	Gravity	Capacity and R&R	Along SE M St between SE Mill St and SE 12th St	12	21	Upsize	907	$395,000	$395,000		
P-6C	Gravity	Capacity and R&R	Along SE M St between SE 12th St and SE 7th St	-	21	New	2,177	$946,000	$946,000		
Total Project 6 - SE Mill Street / SE Rogue View Lane								**$2,827,000**	**$2,827,000**	**$0**	**$0**
Project 7 -Annabelle Lane											
P-7A	Gravity	Capacity	RSSD Interceptor between Wineteer Ln To Leonard Rd	15	21	Upsize	1,948	$848,000		$848,000	
Total Project 7 - Annabelle Lane								**$848,000**	**$0**	**$848,000**	**$0**
Project 8 -Leonard Road											
P-8A	Gravity	Capacity	Along Leonard Rd between Redwood Ave to south of Mesman Dr	8	12	Upsize	888	$281,000	$281,000		
P-8B	Gravity	Capacity	Along Leonard Rd between south of Mesman Dr and intersection of Leonard Rd with Mesman Dr	8	15	Upsize	384	$138,000	$138,000		
Total Project 8 - Leonard Road								**$419,000**	**$419,000**	**$0**	**$0**

Project 9 - Gilbert Creek Park											
P-9A	Gravity	Capacity	Along Gilbert Creek Park 500 ft north of NW Parker Dr and west of NW Hawthorne Ave	8	12	Upsize	451	$143,000			$143,000
Total Project 9 - Gilbert Creek Park								**$143,000**	**$0**	**$0**	**$143,000**
Project 10-1 - Rogue Drive / SE Blue Bird Drive											
P-10A	Gravity	Capacity and R&R	Along Rogue Dr between SE N St and SE Blue Bird Dr	15	18	Upsize	1,831	$725,000		$725,000	
P-10B	Gravity	Capacity and R&R	Through properties on north bank of river, south of Waterman Ln and Lela Ln to Blue Bird Dr	12	15	Upsize	1,890	$675,000		$675,000	
Total Project 10-1 - Rogue River / SE Blue Bird Drive								**$1,400,000**	**$0**	**$1,400,000**	**$0**
Project 10-2 - West SE Blue Bird Drive											
P-10C	Gravity	Capacity and R&R	Through properties on north bank of river, from Blue Bird Dr to just upstream of pipe split under Rogue River	18	24	Upsize	2,208	$1,051,000			$1,051,000
Total Project 10-2 - Rogue River / SE Blue Bird Drive								**$1,051,000**	**$0**	**$0**	**$1,051,000**
Project 11 - Park Street											
P-11A	Gravity	Capacity and R&R	Through properties on south bank of the river between Mystic Dr and Gold River Ln	18	27	Upsize	20 2	$108,000		$108,000	
P-11B	Gravity	Capacity and R&R	Through properties on south bank of the river between Gold River Dr and SE Acacia Ln	24	27	Upsize	795	$426,000		$426,000	
Total Project 11 - Park Street								**$534,000**	**$0**	**$534,000**	**$0**

Table 6.12 Detailed Capital Improvement Plan
Wastewater Collection System Master Plan
City of Grants Pass

Project Description				Project Size and Cost				Total CIP	Total CIP Cost ($) - Project Phasing		
Improv. ID	**Improv. Type**	**Project Purpose**	**Address Description**	**Existing Size**	**Proposed Size**	**Replace/ New**	**Length (ft)**	**Total Capital Improvement Cost($)**	**Phase 1 (2015-2020)**	**Phase 2 (2021-2025)**	**Phase 3 (2026-2035)**
Project 12 - Darneille Lane											
P-12A	Gravity	Capacity	Along Darneille Ln between the intersection of Darneille Ln with SW Harvest Dr and Darneille PS	12	18	Upsize	1,551	$614,000			$614,000
Total Project 12 - Darneille Lane								**$614,000**	**$0**	**$0**	**$614,000**
Project 13 - Mesman Drive to Coutant Lane											
P-13A	Gravity	Capacity	RSSD Interceptor between Mesman Dr and Schroeder Ln	18	21	Upsize	2,047	$890,000			$890,000
P-13B	Gravity	Capacity	RSSD Interceptor between Schroeder Ln and Coutant Ln	18	24	Upsize	1,282	$610,000			$610,000
Total Project 13 - Mesman Drive to Coutant Lane								**$1,500,000**	**$0**	**$0**	**$1,500,000**
Project 14 - NE 7th Street											
P-14A	Gravity	Capacity and R&R	Along NE 7th Street between NE A St and NW F St	12	18	Upsize	1,531	$606,000	$606,000		
Total Project 14 - NE 7th Street								**$606,000**	**$606,000**	**$0**	**$0**
Project 15 - NE Dean Drive / NE D Street											
P-15A	Gravity	Capacity	Along NE Dean Dr and NE D St from NE A St to SE Mill St	-	18	New	2,009	$795,000	$795,000		
Total Project 15 - NE Dean Drive / NE D Street								**$795,000**	**$795,000**	**$0**	**$0**
Project 16 - NW Evelyn Avenue											
P-16A	Gravity	Capacity	Along Evelyn Ave between Washington Boulevard and NW 2nd St	-	8	New	727	$190,000	$190,000		
Total Project 16 - NE Evelyn Avenue								**$190,000**	**$190,000**	**$0**	**$0**
Project 17 - NW Morgan Lane											
P-17A	Gravity	Capacity	Along Morgan Ln between NW 6th St and NW Washington Blvd	-	12	New	208	$66,000		$66,000	
Total Project 17 - NW Morgan Lane								**$66,000**	**$0**	**$66,000**	**$0**

Project 18 - NW Washington Boulevard											
P-18A	Gravity	Capacity and R&R	Along NW Washington Blvd between NW Midland Ave and NW Manzanita Ave	8	12	Upsize	2,239	$708,000			$708,000
P-18B	Gravity	Capacity and R&R	Along NW Washington Blvd between NW Manzanita Ave and NW Evelyn Ave	10	12	Upsize	727	$230,000			$230,000
Total Project 18 - NW Washington Boulevard								**$938,000**	**$0**	**$0**	**$938,000**
Project 19 - Darneille Pump Station											
PS-19A	Pump Station	Capacity and R&R	Alternatives Analysis Study	-	-	Study	1	$75,000	$75,000		
PS-19B	Pump Station	Capacity and R&R	Darneille PS	4.2	7.8	Upsize	1	$5,038,000	$5,038,000		
Total Project 19 - Darneille Pump Station								**$5,113,000**	**$5,113,000**	**$0**	**$0**
Project 20 - Webster No.1 Lift Station											
PS-20A	Pump Station	Capacity and R&R	Webster No. 1 PS	0	0.66	Upsize	1	$614,000	$614,000		
Total Project 20 - Webster No. 1 Pump Station								**$614,000**	**$614,000**	**$0**	**$0**
Project 21 - Webster No.2 Lift Station											
PS-21A	Pump Station	Capacity and R&R	Webster No. 2 PS	0	0.23	Upsize	1	$998,000		$998,000	
Total Project 21 - Webster No. 2 Pump Station								**$998,000**	**$0**	**$998,000**	**$0**
Project 22 - Spalding Area Development Expansion											
PS-22A	Pump Station	Expansion	SE Portola Dr	-	0.16	New	1	$986,000		$986,000	
P-22B	Force Main	Expansion	From Spalding PS to NE Portola Dr	-	6	New	1,227	$351,000		$351,000	
P-22C	Gravity	Expansion	In Spalding Area	-	8	New	4,779	$1,249,000		$1,249,000	
P-22D	Gravity	Expansion	In Splading Area	-	8	New	8,461	$2,211,000			$2,211,000
P-22E	Casing	Expansion	Railroad crossing	-	12/24	New	200	$385,000		$385,000	
Total Project 22 - Spalding Area Development Expansion								**$5,182,000**	**$0**	**$2,971,000**	**$2,211,000**
Project 23 - North I-5 Area Development Expansion											
PS-23A	Pump Station	Expansion	Monument Dr and I-5	-	0.14	Upsize	1	$813,000			$813,000
P-23B	Force Main	Expansion	From I-5 PS to pipe on Pony Ln and NW Highland Ave	-	6	New	5,622	$1,611,000			$1,611,000
P-23C	Gravity	Expansion	In I-5 North Area	-	8	New	31,251	$8,166,000			$8,166,000
P-23D	Casing	Expansion	I-5 Crossings (3)	-	12/24	New	750	$1,445,000			$1,445,000
Total Project 23 - North I-5 Area Development Expansion								**$12,035,000**	**$0**	**$0**	**$12,035,000**
Project 24 - South Highway Development Expansion											
P-24A	Gravity	Expansion	In South Highway Area	-	8	New	11,377	$2,973,000			$2,973,000
Total Project 24 - South Highway Development Expansion								**$2,973,000**	**$0**	**$0**	**$2,973,000**
Project 25 - Bridge Street Pump Station											
PS-25A	Pump Station	R&R	Bridge Street	0.94	0.94	Upgrade	1	$25,000	$25,000		
Total Project 25 - Bridge Street Pump Station								**$25,000**	**$25,000**	**$0**	**$0**

Table 6.12 Detailed Capital Improvement Plan
Wastewater Collection System Master Plan
City of Grants Pass

Project Description				Project Size and Cost				Total CIP	Total CIP Cost ($) - Project Phasing		
Improv. ID	Improv. Type	Project Purpose	Address Description	Existing Size	Proposed Size	Replace/ New	Length (ft)	Total Capital Improvement Cost($)	Phase 1 (2015-2020)	Phase 2 (2021-2025)	Phase 3 (2026-2035)
Project 26 - Condition Only Projects - Phase 1 North of Rogue River											
P-26A	Gravity	R&R	North of Rogue River	8 and less	8	Replace	48,231	$12,603,000	$12,603,000		
P-26B	Gravity	R&R	North of Rogue River	10	10	Replace	5,262	$1,509,000	$1,509,000		
P-26C	Gravity	R&R	North of Rogue River	12	12	Replace	2,060	$651,000	$651,000		
P-26D	Gravity	R&R	North of Rogue River	15	15	Replace	104	$38,000	$38,000		
P-26E	Gravity	R&R	North of Rogue River	18	18	Replace	923	$365,000	$365,000		
P-26F	Gravity	R&R	North of Rogue River	21	21	Replace	1,926	$838,000	$838,000		
P-26G	Gravity	R&R	North of Rogue River	24	24	Replace	492	$234,000	$234,000		
Total Project 26 - Condition Only Projects - Phase 1 North of Rogue River								**$16,238,000**	**$16,238,000**	**$0**	**$0**
Project 27 - Condition Only Projects - Phase 1 South of Rogue River											
P-27A	Gravity	R&R	South of Rogue River	8 and less	8	Replace	60	$15,000	$15,000		
P-27B	Gravity	R&R	South of Rogue River	10	10	Replace	462	$133,000	$133,000		
P-27C	Gravity	R&R	South of Rogue River	15	15	Replace	378	$135,000	$135,000		
Total Project 27 - Condition Only Projects - Phase 1 South of Rogue River								**$283,000**	**$283,000**	**$0**	**$0**
Project 28 - Condition Only Projects - Phase 2 North of Rogue River											
P-28A	Gravity	R&R	North of Rogue River	8 and less	8	Replace	38,468	$10,051,000		$10,051,000	
P-28B	Gravity	R&R	North of Rogue River	10	10	Replace	8,581	$2,460,000		$2,460,000	
P-28C	Gravity	R&R	North of Rogue River	12	12	Replace	6,618	$2,090,000		$2,090,000	
P-28D	Gravity	R&R	North of Rogue River	18	18	Replace	1,278	$506,000		$506,000	
P-28E	Gravity	R&R	North of Rogue River	21	21	Replace	385	$168,000		$168,000	
Total Project 28 - Condition Only Projects - Phase 2 North of Rogue River								**$15,275,000**	**$0**	**$15,275,000**	**$0**
Project 29 - Condition Only Projects - Phase 2 South of Rogue River											
P-29A	Gravity	R&R	South of Rogue River	8 and less	8	Replace	1,402	$366,000		$366,000	
P-29B	Gravity	R&R	South of Rogue River	10	10	Replace	76	$21,000		$21,000	
P-29C	Gravity	R&R	South of Rogue River	15	15	Replace	417	$149,000		$149,000	
P-29D	Gravity	R&R	South of Rogue River	30	30	Replace	542	$319,000		$319,000	
Total Project 29 - Condition Only Projects - Phase 2 South of Rogue River								**$855,000**	**$0**	**$855,000**	**$0**

Project 30 - Condition Only Projects - Phase 3 North of Rogue River											
P-30A	Gravity	R&R	North of Rogue River	8 and less	8	Replace	59,905	$15,653,000			$15,653,000
P-30B	Gravity	R&R	North of Rogue River	10	10	Replace	6,181	$1,773,000			$1,773,000
P-30C	Gravity	R&R	North of Rogue River	12	12	Replace	2,760	$871,000			$871,000
P-30D	Gravity	R&R	North of Rogue River	15	15	Replace	433	$155,000			$155,000
P-30E	Gravity	R&R	North of Rogue River	18	18	Replace	217	$86,000			$86,000
P-30F	Gravity	R&R	North of Rogue River	21	21	Replace	243	$106,000			$106,000
P-30G	Gravity	R&R	North of Rogue River	24	24	Replace	914	$435,000			$435,000
P-30H	Gravity	R&R	North of Rogue River	48	48	Replace	22	$16,000			$16,000
Total Project 30 - Condition Only Projects - Phase 3 North of Rogue River								**$19,095,000**	**$0**	**$0**	**$19,095,000**
Project 31 - Condition Only Projects - Phase 3 South of Rogue River											
P-31A	Gravity	R&R	South of Rogue River	8 and less	8	Replace	19,049	$4,978,000			$4,978,000
P-31B	Gravity	R&R	South of Rogue River	10	10	Replace	3,525	$1,010,000			$1,010,000
P-31C	Gravity	R&R	South of Rogue River	12	12	Replace	4,499	$1,421,000			$1,421,000
P-31D	Gravity	R&R	South of Rogue River	15	15	Replace	2,556	$913,000			$913,000
P-31E	Gravity	R&R	South of Rogue River	18	18	Replace	1,228	$486,000			$486,000
P-31F	Gravity	R&R	South of Rogue River	24	24	Replace	1,164	$554,000			$554,000
P-31G	Gravity	R&R	South of Rogue River	27	27	Replace	5,276	$2,824,000			$2,824,000
P-31H	Gravity	R&R	South of Rogue River	30	30	Replace	1,524	$898,000			$898,000
Total Project 31 - Condition Only Projects - Phase 3 South of Rogue River								**$13,084,000**	**$0**	**$0**	**$13,084,000**
Project 32 - General Projects											
G-1	General	General	Asset Management Program	-	-	-	1	$150,000	$150,000		
G-2A	General	General	Master Plan Updates (2021)	-	-	-	1	$300,000		$300,000	
G-2B	General	General	Master Plan Updates (2031)	-	-	-	1	$300,000			$300,000
Total Project 32 - General Projects								**$750,000**	**$150,000**	**$300,000**	**$300,000**
Total CIP ($)								**$108,243,000**	**$30,558,000**	**$23,741,000**	**$53,944,000**
Total CIP (%)									**28.2%**	**21.9%**	**49.8%**

Notes:

(1) ENR CCI = 10,037 (20-City Average, July 2015).

(2) Capital Improvement Cost includes a 20% construction contingency applied to the Baseline Construction Cost to account for unforeseen events and unknown conditions, a 30% allied cost applied to the Estimated Construction Cost to account for engineering services, construction management, and project administration, and a 25% planning contingency applied to the Total Allied Project Costs.

Table 2-3. Stormwater Master Plan CIP (Table 6-1: Priority 1A Improvements)

Table 6-1: Priority 1A Improvements

ID#	Priority	Item	Total Estimated Cost (2015)
Priority 1A Improvements (0-15 years)			
Allen Fruitdale			
AF-1	1A	Golf Course	$ 371,000
AF-2	1A	South Highline Canal near Allen Creek	$ 1,211,000
AF-3	1A	Harbeck Road, Nebraska Avenue	$ 200,000
AF-4	1A	Pond Near Calvary Chapel off Harbeck Road	$ 629,000
AF-5	1A	Grandview Avenue and the Hospital	$ 611,000
AF-7	1A	Lower Parkdale Drive/Highway 199 Trunkline	$ 1,590,000
AF-11	1A	Sugar Beet Line, East Park Street	$ 1,330,000
AF-12	1A	Sunset Way and Tributary Pipes	$ 2,226,000
AF-13	1A	Harbeck Road and Southridge Way	$ 1,082,000
AF-14	1A	Highway 238	$ 661,000
AF-15	1A	Main Gravity Canal Spills and Central Parkdale Drive Trunkline	$ 889,000
AF-16	1A	Upper Parkdale Drive Trunkline and South Highland Canal Spill	$ 601,000
AF-17	1A	Highways 238/199/99 Intersection Detention	$ 959,000
AF-18	1A	Union Avenue	$ 646,000
AF-19	1A	Meadow Glen	$ 236,000
AF-20	1A	Liberty Drive	$ 473,000
Gilbert			
G-1	1A	5th Street, 6th Street	$ 1,656,000
G-3	1A	G Street, I Street, Alder Street, L Street	$ 795,000
G-4	1A	Demoray Canal Spills- Southwest	$ 127,000
G-5	1A	Demoray Canal Spills- Central West	$ 29,000
G-6	1A	Hilcrest Drive, 6th Street, 7th Street	$ 1,664,000
G-7	1A	Demoray Spill-South East	$ 106,000
G-8	1A	Demoray Canal Spills- North Central	$ 810,000
G-9	1A	Demoray Canal Spills- Northwest	$ 460,000
G-10	1A	Demoray Canal Spills- Northeast	$ 438,000
Sand			
S-1	1A	Trunkline from South Main Canal to River along Dowell Road	$ 3,412,000
S-2	1A	Flow-split Kellenback Avenue to Dowell Road	$ 691,000
S-3	1A	Expansion of South Main Canal	$ 583,000
S-6	1A	Leonard Road to Ditch	$ 926,000
S-7	1A	Willow Lane to Ditch	$ 975,000
S-8	1A	Willow Court, Estates Lane	$ 696,000
S-10	1A	Kokanee Lane, Leonard Road	$ 1,613,000
S-12	1A	Rainwood Lane to Leonard Road	$ 141,000
S-13	1A	ODOT Pond South of Redwood Highway	$ 1,353,000
S-14	1A	New Flow Diversion to Sand Creek at I-5	$ 168,000
S-15	1A	Yellowtail Lane to Mary Lynn Lane	$ 392,000
S-16	1A	Darnelle Lane	$ 1,138,000
Skunk Jones			
SJ-10	1A	Channel Northwest of Dewey Drive and 10th Street	$ 3,000
		Total Priority 1A Improvements	**$ 31,891,000**

Table 2-4. Stormwater Master Plan CIP (Table 6-2: Priority 1B, 2A, & 2B Improvements)

Table 6-2: Priority 1B, 2A, & 2B Improvements

ID#	Priority	Item	Total Estimated Cost (2015)
Priority 1B Improvements (15-20 years)			
Allen Fruitdale			
AF-6	1B	West Park Street, Josephine County Yard, Tussing Park	$ 407,000
Sand			
S-4	1B	Redwood Circle to River	$ 650,000
Skunk Jones			
SJ-1	1B	F Street	$ 1,829,000
SJ-8	1B	Spill Northwest of I-5 and Hilcrest Drive to 7th Street	$ 386,000
SJ-11	1B	Rogue Drive Trunkline	$ 2,938,000
SJ-12	1B	M Street	$ 759,000
SJ-13	1B	A Street-West	$ 1,126,000
		Total Priority 1B Improvements	**$ 8,095,000**
Priority 2A Improvements (20-25 years)			
Gilbert			
G-2	2A	9th Street	$ 457,000
Skunk Jones			
SJ-7	2A	Demoray Canal	$ 61,000
		Total Priority 2A Improvements	**$ 518,000**
Priority 2B Improvements (20-25 years)			
Skunk Jones			
SJ-2	2B	D Street	$ 2,181,000
		Total Priority 2B Improvements	**$ 2,181,000**

Full Copies of the February 2016 Water Distribution System Master Plan, March 2016 Wastewater Collection System Master Plan and the February 2016 Stormwater Master Plan are incorporated herein by reference.

WATER DISTRIBUTION SYSTEM MASTER PLAN

FOR

CITY OF GRANTS PASS

FEBRUARY 2016

DRAFT

MURRAY, SMITH & ASSOCIATES, INC.
121 SW Salmon, Suite 900
Portland OR 97204
503.225.9010

Full Copies of the February 2016 Water Distribution System Master Plan, March 2016 Wastewater Collection System Master Plan and the February 2016 Stormwater Master Plan are incorporated herein by reference.

February 2016

City of Grants Pass, Oregon
Stormwater Master Plan
Final

KELLER associates

KELLER associates

Keller Associates
707 13th St. SE. Suite 280
Salem, OR 97301

212047/5/S15-013

REGISTERED PROFESSIONAL ENGINEER
2/15/16
83510PE
OREGON
NOV. 10, 2009
PETER OLSEN
EXPIRES: 12/31/16

Signed by:
Peter Olsen, P.E.
Project Manager

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CITY OF GRANTS PASS

WASTEWATER COLLECTION SYSTEM MASTER PLAN

March 2016

DRAFT REVIEW