CHAPTER 2

STUDY AREA AND PLANNING CONSIDERATIONS

Chapter Outline

CHAPTER 2 STUDY AREA AND PLANNING CONSIDERATIONS

2.1. STUDY AREA

The study area for this study does not coincide with the City Limits or the Urban Growth Boundary (UGB) of the City of Dayton, as the UGB is larger than the City limits. The extent of the wastewater system expansion during the study period is likely somewhere in between. The UGB is bounded on the north by the Yamhill River and Oregon State Highway 18 (OSH 18), while the City limits are bounded on the north solely by OSH 18. Palmer Creek flows northeast and bounds the majority of the City Limits and UGB along the south boundary except for a small portion that is located southeast of Palmer Creek and west of Yamhill River.

Highway 223 (Amity – Dayton HWY) bisects Dayton northwest and southeast and is known as Ferry Street in town. Oregon State Highway 18 (Dayton Bypass) provides the major road transportation to the City from Portland to McMinnville. Hwy 221 (Wallace Road) also bisects Dayton north to south and is known as 3rd Street in town. These roadways are shown on Figure 2-6.

Dayton's Comprehensive Plan was developed in 1986 and last updated in 2008. An Urban Growth Boundary (UGB) was established which encompasses approximately 824 acres. Currently there is approximately 306 acres outside the City limits but within the UGB. During the 20-year planning period the estimated growth will not exceed the UGB boundary. This report is based on the assumption that there will be no significant changes to the Urban Growth Boundary or zoning during the study period.

The improvements recommended in this plan are based on development of land within the UGB in its present location, as well as the existing land use zoning for these areas. It is assumed that no significant development will occur within the study area that will require major changes to the existing zoning, and that there will be no significant expansions of the UGB within the study period. Changes in any of these assumptions could change the recommendations contained in this master plan. Should significant changes in any of the above occur, the facilities plan should be updated accordingly.

2.2. PHYSICAL ENVIRONMENT

2.2.1 Climate and Rainfall Patterns

The study area is located in the Willamette Valley along the eastern foothill of the coast range. The climate in Dayton is relatively mild throughout the year, characterized by cool, wet winters and warm, dry summers. The study area has a predominant winter rainfall climate. Typical distribution of precipitation includes about 50 percent of the annual total from December through February, lesser amounts in the spring and fall, and very little during summer. Rainfall tends to vary inversely with temperatures -- the cooler months are the wettest, the warm summer months the driest.

Extreme temperatures in the study area are rare. Days with maximum temperature above 90°F occur only 5-15 times per year on average, and below 0°F temperatures occur only about once every 25 years. Mean high temperatures range from the low 80s in the summer to about 40°F in the coldest months, while average lows are generally in the low 50s in summer and low 30s in winter.

Although snow falls nearly every year, amounts are generally quite low. Willamette Valley floor locations average 5-10 inches per year, mostly during December through February. High winds occur several times per year in association with major weather systems.

Relative humidity is highest during early morning hours, and is generally 80-100 percent throughout the year. During the afternoon, humidity is generally lowest, ranging from 70-80 percent during January to 30-50 percent during summer. Annual pan evaporation is about 35 inches, mostly occurring during the period April through October.

Winters are likely to be cloudy. Average cloud cover during the coldest months exceeds 80 percent, with an average of about 26 cloudy days in January (in addition to 3 partly cloudy and 2 clear days). During summer, however, sunshine is much more abundant, with average cloud cover less than 40 percent; more than half of the days in July are clear.

Since there is no National Weather Service recording station in Dayton, rainfall and temperature data were examined from several weather stations including McMinnville, Hillsboro, Beaverton, and the OSU North Willamette Experimental Station near Wilsonville. Overall these stations exhibit similar climate patterns, and with Dayton being in the center of the group, a reasonable approximation for Dayton's climate can be developed.

The study area receives an average of approximately 40 inches of precipitation annually, with the majority of the rainfall occurring during the winter months. Precipitation extremes are somewhat difficult to verify because rainfall records are not always complete. The referenced stations have been in operation for differing periods of time: McMinnville (1928-present), Hillsboro (1930-2003), Beaverton (1972-present), and Wilsonville (1963-present). The wettest year recorded for these stations was 1996 with the following accumulations: McMinnville (64.17 inches), Hillsboro (61.03 inches), Beaverton (66.49 inches), and Wilsonville (74.10 inches). The referenced stations have experienced their driest years at different times: McMinnville (1929, 24.52 inches), Hillsboro (1930, 24.47 inches), Beaverton (1976, 27.52 inches), and Wilsonville (1985, 27.15 inches). Approximately 2/3 of the annual precipitation occurs between November 1 and April 30. July and August are typically the driest months with an average rainfall for the month of less than one inch.

2.2.2 Topography

Dayton is located on the western edge of the Willamette Valley, approximately 5 miles upstream of the point where the Yamhill River enters the Willamette River. The City center is located on the first bench west and south of the Yamhill River. The natural surface drainage across the study area flows into the Yamhill River.

The topography within the City Limits generally is gently sloping and undulating within the main section of town. The topography within the study area ranges from relatively flat from Flower Lane east to 3rd Street and from Ash Street south to Joel Palmer Lane and Mill Street. The topography begins to drop down to the north and east of town along the Yamhill River and south of town along Palmer Creek. The elevation within the study area ranges from approximately 100 feet along the Yamhill River to a high point of over 165 feet at the north central portion of the City. The majority of the land within the UGB is at or below an elevation of 170 feet, with the City center having an elevation of approximately 160 to 170 feet.

2.2.3 Soils

Although a detailed analysis of the soils and geology is outside the scope of this report, one soil characteristic evaluated by the Soil Conservation Service was the drainage capacity of the soils. The major soil association within the study area is the Woodburn-Willamette association, and the predominant soil type in the Dayton area are alluvial deposits of Woodburn silt loam. This soil typically is moderately permeable to water in the upper layers, and slowly permeable in the lower layers.

Within the Study area eleven different soils have been identified and mapped. The soil types found in the study area are shown in Figure 2-1. Each soil has its own unique qualities and while some soils may be excellent for agriculture, they may pose substantial problems with regards to foundation suitability. In general none of the soil types outright preclude the construction of typical wastewater facilities from a foundation stability point of view. A detailed geotechnical report will be required prior to final design of the recommended improvements. This discussion on soil types is based on the information included in the Soil Survey of Yamhill County, Oregon (January 1974) prepared by the Soil Conservation Service (now the Natural Resource Conservation Service) showing the approximate locations of the Yamhill County soil types. The reader is referred to the Yamhill County Soil Survey for more detailed definitions and descriptions of the individual soil designations.

2.3. GEOLOGIC HAZARDS

Known geologic hazards within the study area include high seasonal groundwater, steep and unstable slopes, flooding, and seismic concerns.

2.3.1 High Groundwater.

Seasonal high groundwater is a common occurrence within the study area. The high groundwater levels are caused primarily by perched water tables due to soil saturation and lack of local drainage. Perched water tables during the winter time infiltrate the City's sanitary sewer collection system and increase the amount of wastewater that has to be pumped and treated.

2.3.2 Flooding.

The Yamhill River is the primary stream within the study area, with Palmer Creek being the only tributary within the study area. Dayton is located along the Yamhill River approximately 5 miles upstream from the Willamette River. The Yamhill River extends west to its headwaters. Palmer Creek enters the Yamhill River between river mile 4.9 and 5.0 (approximate). The Yamhill River has a stream flow pattern similar to other Willamette Valley streams. It is typified by high flows during the winter and low flows during the summer months.

The Federal Emergency Management Agency (FEMA) has established a 100-year floodplain designation and insurance ratings for the study area. While sometimes referred to as the "100 year flood", it is more accurate to consider it the flood having a 1 percent chance of occurrence in any year, or a 10 percent chance of occurrence during any 10 year period.

During a 100-year flood (as defined by the Federal Emergency Management Association, FEMA), the Yamhill River and Palmer Creek rise out of their normal channels creating a floodplain. Flood profiles and maps for these streams are included in the Flood Insurance Study prepared for the Yamhill County and include City of Dayton. The latest FEMA (March 2, 2010) maps are illustrated

in Figure 2-2 and Figure 2-3. The 1982 and 1983 FEMA Maps were referenced below along with the new March 2, 2010 Maps.

- 2010 FEMA Maps
  - FIRM panel 41071C0427D, March 2, 2010
  - FIRM panel 41071C0429D, March 2, 2010

- 1982 and 1983 FEMA Maps
- Inside City Limits
  - FIRM panel 410252-0001 B, June 1, 1982.

- Outside City Limits
  - FIRM panel 410249-0327C (panel 327 of 525), September 30, 1983.
  - FIRM panel 410249-0329C (panel 329 of 525), September 30, 1983.

It should be noted that the Floodplain and Floodway boundaries shown on the FEMA flood maps are based on flood elevations. Therefore the actual boundaries may vary slightly from the location shown. Final determinations of whether property is within the floodway or floodplain must be determined based on a topographic survey of the property in question. Due to the topography of Dayton, most of the land within the City limits is out of the flood plain except for a few locations that are very close to the Yamhill River and Palmer Creeks.

Soil Map—Yamhill Area, Oregon
(City of Dayton)

USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

9/29/2009
Page 1 of 3

Figure 2-1: Soils Map

2.3.2.1 Seismic

The current building code (Oregon Structural Specialty Code) drives seismic structural design criteria based on longitude and latitude of the proposed building site. If the alternative(s) selected by the City include the construction of buildings or other significant structures, a detailed geotechnical report and seismic hazard study will be required prior to design. Therefore, a more detailed review of local geology and faulting, as well as seismic and settlement considerations specific to the site selected, may be deferred until any required predesign reports.

2.3.2.2 Steep/Unstable Slopes

The only areas of potential slope stability concerns within the study area are the steep slopes near Yamhill River and Palmer Creek in the north and east sides of town. Steep slopes can have the potential for either mass movement or slope erosion. Mass movement results from shifting of rock or soil material in response to gravity, such as landslides and rock slides. These mass movements are often aggravated by excessive groundwater. Slope erosion is the removal of soils or rock that occurs as a result of sheet flow, resulting in surface erosion or gully erosion. This is primarily caused by private land use practices (mainly land clearing and road construction) that can exacerbate slope erosion.

Although this area shows no signs of recent movement, the steep slopes around Yamhill River and Palmer Creek can be considered a geologically sensitive area for siting critical facilities, such as pump stations, reservoirs, or treatment plants.

2.3.2.3 Stream Erosion

As is common with most valley bottom streams, the Yamhill River and Palmer Creek channels are continuously eroding and depositing bank material. This is especially prevalent on the outer bends of the river where undercutting and caving of the banks is common within the study area. The potential for stream bank erosion is an important design issue that must be carefully considered for facilities sited near the Yamhill River and Palmer Creek.

NOTES TO USERS

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

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

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

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

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 10. The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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

Base map information shown on this FIRM was derived from multiple sources. Base map files were provided in digital format by the State of Oregon. This information was compiled from the U.S. Geological Survey (2007), Oregon Department of Transportation (2007), OR/WA Bureau of Land Management (2005), Oregon Department of Forestry (2003), NGS (2007), and USDA-FSA (2006) at a scale of 1:24,000.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline,** in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

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

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

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

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

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary
0.2% Annual Chance Floodplain Boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A) — (A) Cross section line
(23) — (23) Transect line
45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT — 5000-foot ticks: Oregon State Plane North Zone (FIPS Zone 3601), Lambert Conformal Conic projection
5209000mN — 1000-meter Universal Transverse Mercator grid values, zone 10N
DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
March 2, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0427D

FIRM

FLOOD INSURANCE RATE MAP

YAMHILL COUNTY, OREGON AND INCORPORATED AREAS

PANEL 427 OF 675

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DAYTON, CITY OF	410252	0427	D
YAMHILL COUNTY	410249	0427	D

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

MAP NUMBER
41071C0427D
EFFECTIVE DATE
MARCH 2, 2010

Federal Emergency Management Agency

Figure 2-2 | Flood Plain Map North

NOTES TO USERS

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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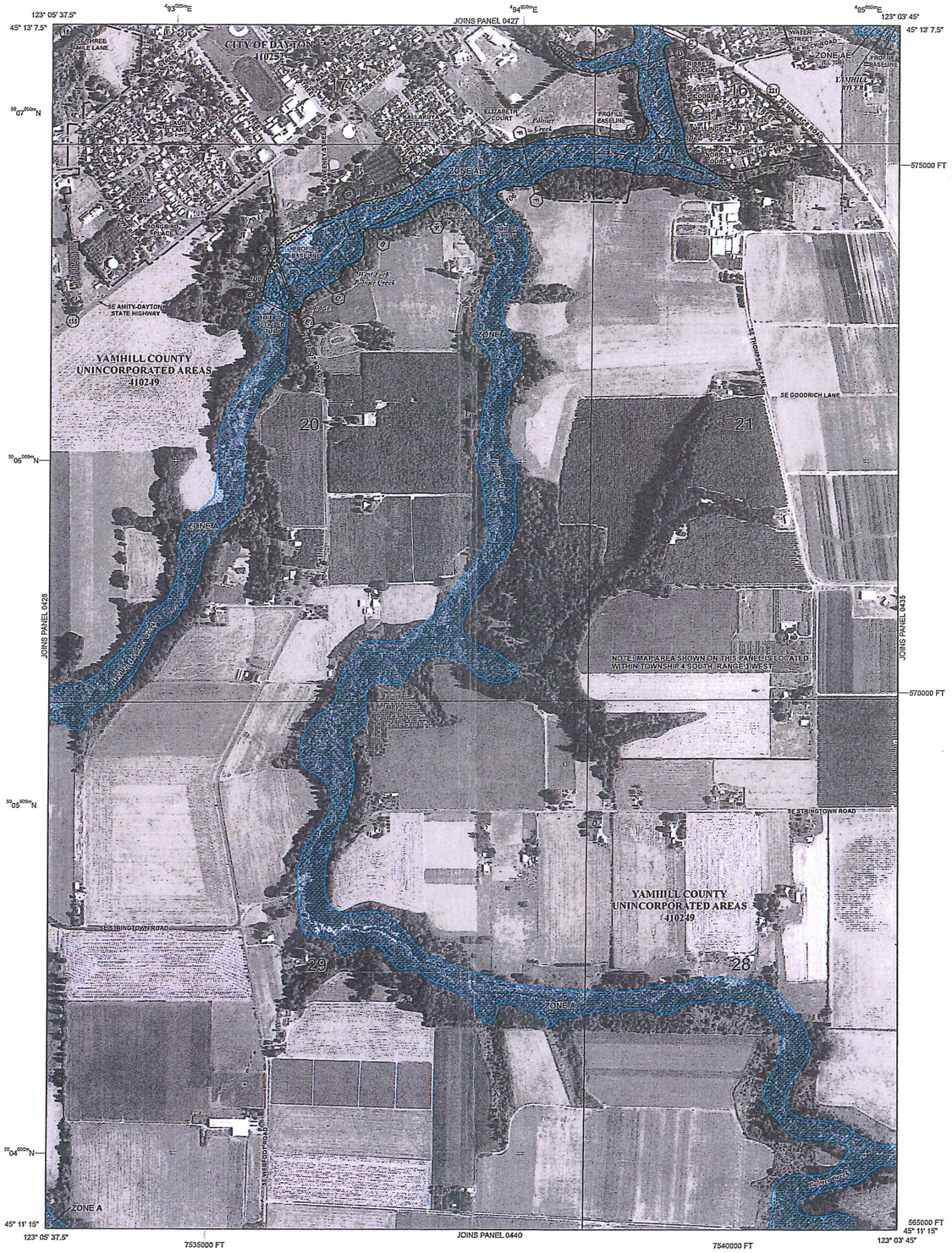

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
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ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3160000 FT	5000-foot ticks: Oregon State Plane North Zone (FIPS Zone 3601), Lambert Conformal Conic projection
4893000mN	1000-meter Universal Transverse Mercator grid values, zone 10N
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
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EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
March 2, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0429D

FIRM

FLOOD INSURANCE RATE MAP

YAMHILL COUNTY, OREGON AND INCORPORATED AREAS

PANEL 429 OF 675
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

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YAMHILL COUNTY	410249	0429	D

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MAP NUMBER
41071C0429D
EFFECTIVE DATE
MARCH 2, 2010

Federal Emergency Management Agency

Figure 2-3 | Flood Plain Map South

2.3.3 Public Health Hazards

The City of Dayton has experienced several raw sewage overflows in recent years. Including the 2006 calendar year, there have been 14 documented raw sewage overflows. A listing of these is included in the NPDES permit evaluation report included in **Appendix B**. These overflows represent a notable public health hazard. Once implemented, the improvements described later in this document should eliminate most causes of raw sewage overflows.

2.3.4 Energy Production and Consumption

The proposed wastewater system will not produce any electricity or other energy sources. With regards to energy consumption, the major energy consumers in a wastewater collection and treatment system are the electric motors required to drive pumps, and other equipment. It is recommended that these components be specified as having high or premium efficiency motors, which will reduce the operating costs over the life of the project. Depending on the current programs in place with the electric utility providing service, there may be rebates available if high/premium efficiency electrical motors are specified that will tend to offset the slightly higher capital construction cost.

Prior to the new WWTP construction the City should consider contacting the Energy Trust of Oregon about conducting an energy audit to determine if there are any opportunities for potential savings.

2.3.5 Water Resources

There are two classes of water resources within the study area, namely surface water and ground water.

2.3.5.1 Surface Water

Surface water includes all drainage channels that convey storm and surface runoff. This includes the Willamette River, the Yamhill River, Palmer Creek and tributaries and springs. Groundwater is also an available resource in the Willamette Valley. The City currently utilizes a series of City owned springs and wells as its primary water supply. The Oregon Department of Water Resources regulates the use of both surface and groundwater resources. Water resource regulations are summarized in **Section 3** of this report.

2.3.5.2 Groundwater

Groundwater protection is also important from the standpoint of both natural resource protection and public health protection. The City's primary source of drinking water comes from the springs located in the watershed located north east of town. The secondary source of water comes from ground water wells in the Dayton-Lafayette wellfield located southeast of town. The primary groundwater concern relating to wastewater collection and treatment is the potential for contamination of drinking water wells from sewage or treated effluent. This is the basis for the minimum separation distances between wastewater facilities and groundwater wells.

2.3.6 Flora and Fauna

2.3.6.1 Flora

The natural vegetation within the study area has been largely replaced by urban or agricultural (pasture or seed grass) uses. The area is capable of supporting valley bottom meadows or forests but to a large extent these have been replaced. Typical native vegetation along these areas include such tree species as Douglas Fir, Big Leaf Maple, Hazelnut, Vine Maple, California Black Cottonwood,

Ash, Oregon White Oak, and Hawthorn. Shrubs that can be found are Snowberry, Indian Plum and Western Hazel. Willows and various grasses are also found in this habitat.

2.3.6.2 Fauna

A variety of wildlife species are found within the study area. Big game species include black-tailed deer. Several species of birds and small animals are found in and around the study area. Included in this group are ring-necked pheasant, turkeys, grouse, quail, waterfowl, doves, pigeons, and several varieties of song birds.

Forest Cover and riparian areas provide the habitat necessary for most big-game, bird, and small animal species. The agricultural areas within the study area provide feeding and cover for a variety of waterfowl and song birds.

The Yamhill River and its tributaries are important habitat for a variety of fish. Common fish species found include large mouth bass, rainbow trout, coastal cutthroat trout, dace and sculpin as well as anadromous salmonids, including coho salmon, chinook salmon, and steelhead.

2.3.7 Air Quality and Noise

2.3.7.1 Air Quality

The existing air quality in the study area is generally good. Agricultural, slash and field burning can be significant intermittent air pollution sources, primarily during July and August. During cold periods with stagnant air, residential wood heating may impact local air quality.

The DEQ maintains Air Quality Index information. Dayton is not among the listed cities subject to monitoring. Further, according to DEQ, the City is not within the Portland Metropolitan Area "non-attainment" area. On balance, it would appear that while there are periods of lower air quality, e.g., during field burning or other farm activities – the air quality within the City is considered good.

2.3.7.2 Noise

There are no significant generators or sources of noise in the study area. Noise levels are low and do not exceed DEQ standards described in OAR-340-035. Noise sources within the study area are largely limited to vehicular traffic. None of the alternatives evaluated herein are expected to generate significant noise.

2.3.8 Environmentally Sensitive Areas

2.3.8.1 Riparian Zone

Riparian zones include the riparian zone adjacent to the Yamhill River and creeks, as well as incidental riparian zones that are a part of the intermittent drainage channels found throughout the study area. Riparian zones are considered sensitive due to the variety of vegetative and wildlife species that utilize these areas as habitat. Riparian zones provide erosion control, drainage and runoff water quality management, wildlife habitat, and shading for surface waters.

2.3.8.2 Wetlands

Wetlands are considered to be one of the most biologically productive components of the environment. Their functions and value include primary production, fish and wildlife habitat, flood control, water quality improvement, erosion control and point of entry for groundwater recharge. Detailed wetland surveys or delineations are not included in the scope of this Master Plan.

The methodology for determining wetland areas is based on the Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987), used by the U.S. Army Corps of Engineers and the Oregon Division of State Lands (DSL). The regulatory definition of wetlands in the 1987 Manual requires that, under normal circumstances, positive indicators of wetland hydrology, hydric soil, and hydrophytic vegetation be present. Wetlands are defined as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas, but also include seasonal wet meadows, farmed wetlands and other areas that may not appear "wet" all the time. Wetland determinations consist of documenting three criteria: hydrophytic (water-tolerant) vegetation, hydric (wet) soils, and wetland hydrology.

The Oregon Division of State Lands (DSL) is responsible for developing and maintaining the Statewide Wetlands Inventory (SWI). The inventory consists of two types of inventories - the National Wetlands Inventory (NWI) developed by the U.S. Fish and Wildlife Service and Local Wetlands Inventories (LWI) developed by cities according to standards set by the DSL.

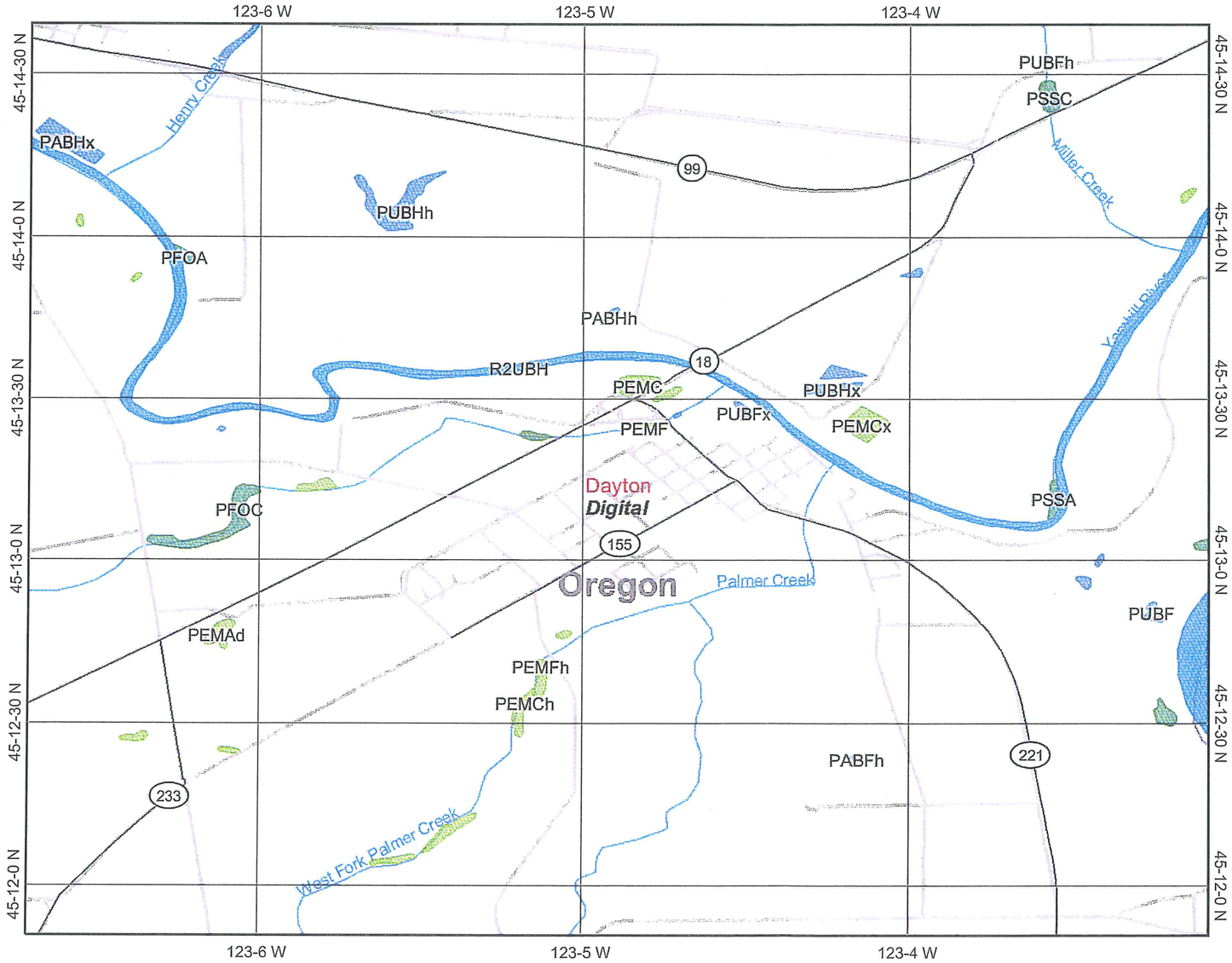
The National Wetlands Inventory (NWI) was developed by the U.S. Fish and Wildlife Service (FWS) and is available statewide. Wetlands and deepwater habitats (streams, lakes, estuaries, etc.) are mapped on a USGS quad map base; most are at a scale of 1:24,000. Only those wetlands and other waters that are visible on high altitude aerial photographs are mapped, and most maps date to the mid-1980s. There are 1,865 maps for Oregon. These maps are available from the Oregon Division of State Lands (DSL). The NWI completed in 1994 for Dayton (Dayton quadrangle) delineates wetlands along the Yamhill River and some small portions of land located outside of town. The relevant National Wetlands Inventory Map for the study area is the Dayton Quadrangle. These maps show jurisdictional wetlands along and within the study area that had been identified as of that date, including along stream corridors and drainage channels. The wetlands shown on this map that are near the study area are included in Figure 2-4.

Local Wetlands Inventories (LWIs) are comprehensive maps and information about wetlands throughout a city. They supplement the National Wetlands Inventory in urban areas. However, at this time Dayton has not completed a local wetland inventory map for the City.

Wetlands can affect the master planning effort if the land within the UGB contains a substantial amount of wetlands. Dayton has very little wetland area within the UGB and of the area that does have wetlands nearby is surrounded by very steep slopes and is for all intents and purposes undevelopable.

As discussed in **Section 6**, the projected wastewater distribution system needs are based on the complete development of land within the UGB. Since there are relatively few areas classified as wetlands, the development projections were made without reserving large areas for wetland protection.

Of the improvements recommended herein, the proposed WWTP improvements have the greatest likelihood of impacting wetlands. That said, we anticipate a relatively small amount of wetland impacts that can be mitigated for. Depending on the funding source of the improvements a wetland field investigation and survey may be required on the property impacted by the WWTP improvements. At a minimum, a qualified wetland scientist should perform a reconnaissance level investigation early in the preliminary design phase of the treatment plant project.



Interstate
Major Roads

Other Road
Interstate
State highway
US highway

Roads
Cities
USGS Quad Index 24K
Lower 48 Wetland Polygons
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other
Riverine

Lower 48 Available Wetland Data
Non-Digital
Digital
No Data
Scan

NHD Streams
Counties 100K
States 100K
South America
North America

Figure 2-4: Wetlands Map

2.3.8.3 Historical and Archaeological Sites

Founded in 1878, Dayton has a rich history as one of the first settlements in the Willamette Valley. Several buildings and structures throughout town are included on the National Register of Historic Places. The selected alternative will likely not have any impact on these historical sites.

The mid-Willamette Valley was inhabited with the Calapooia people when the first western settlers arrived in the mid 1840's. It is also likely that prehistoric people inhabited the study area at one time. Remains of these cultures will likely be located adjacent to the Yamhill River and its tributaries. Therefore, an archaeological assessment may be required during the predesign phase. This is especially true in areas adjacent to the river.

2.3.9 Threatened or Endangered Species

A comprehensive inventory for threatened or endangered species in the study area has not been completed. Significant discussion and interest in anadromous salmonids exists in the Willamette Basin including the Yamhill River. The National Marine Fisheries Service (NMFS) is responsible for evaluating the "health" of different species and individual runs under the terms of the Endangered Species Act (ESA). The NMFS has defined the Upper Willamette Evolutionarily Significant Unit (ESU) as the Willamette basin upstream of Willamette Falls (Oregon City). This unit includes the Yamhill River and is illustrated in OAR-340-0041.

Per OAR Division 41 the Upper Willamete ESA and the lower stem of the Yamhill River is classified as rearing and migration habitat for spring chinook.

How the listings of steelhead and salmon will impact projects, including public wastewater projects, is not fully known at this time. A general consensus is that work that impacts riparian vegetation or work within the stream channels proper will come under increasing scrutiny. To the extent feasible, alternatives that either do not impact or minimize impacts to riparian zones should be considered. Based on past projects, work below the ordinary high water level, such as outfall diffuser construction, is permitted as long at the in-stream work windows and fish salvage procedures are followed

No other threatened or endangered species are known to reside in the study area. However, a biological inventory has not been completed. Prior to implementing the improvements recommended herein, the City should retain a qualified biologist to perform the surveys necessary to assure that impacts to threatened or endangered species do not occur.

2.4. SOCIO-ECONOMIC ENVIRONMENT

Growth within the study area will depend on socio-economic conditions within the City of Dayton. The following section contains a general discussion of economic conditions, trends, population, land use, and public facilities relating to both the study area and the City of Dayton.

2.4.1 Economic Conditions and Trends

Population growth and the resultant wastewater production within the study area are linked to the economic conditions and trends of the City of Dayton and the Portland and McMinnville metropolitan areas. Dayton is an attractive town with a rural atmosphere that offers more affordable housing options than Portland. Dayton is to some extent evolving into a bedroom community for persons employed in Portland and McMinnville. With limited significant industrial or commercial growth

expected in the near future, this characterization is likely to remain valid throughout the planning period.

Dayton has experienced rapid levels of development during the past few years before the recent recession. Due to poor economic conditions that currently exist, development is anticipated to be slow in the immediate future and slowly increase in the future. Currently, the City believes most of the future residential development within the current city limits will be infill development. The majority of developable land outside the city limits and within the UGB is located in the northeast section of town.

2.4.2 Historical Population & Growth Projections

2.4.2.1 Historic Population

Population histories provide a tool for determining the future growth of the sewer system. Much of the challenge in projecting wastewater flows and loading within the study area relates to the difficulty in accurately tracking or projecting actual populations. The population trends for the City of Dayton from 1970 to the present are plotted in Figure 2-5. In addition to census data, PSU population projections are also plotted in Figure 2-5.

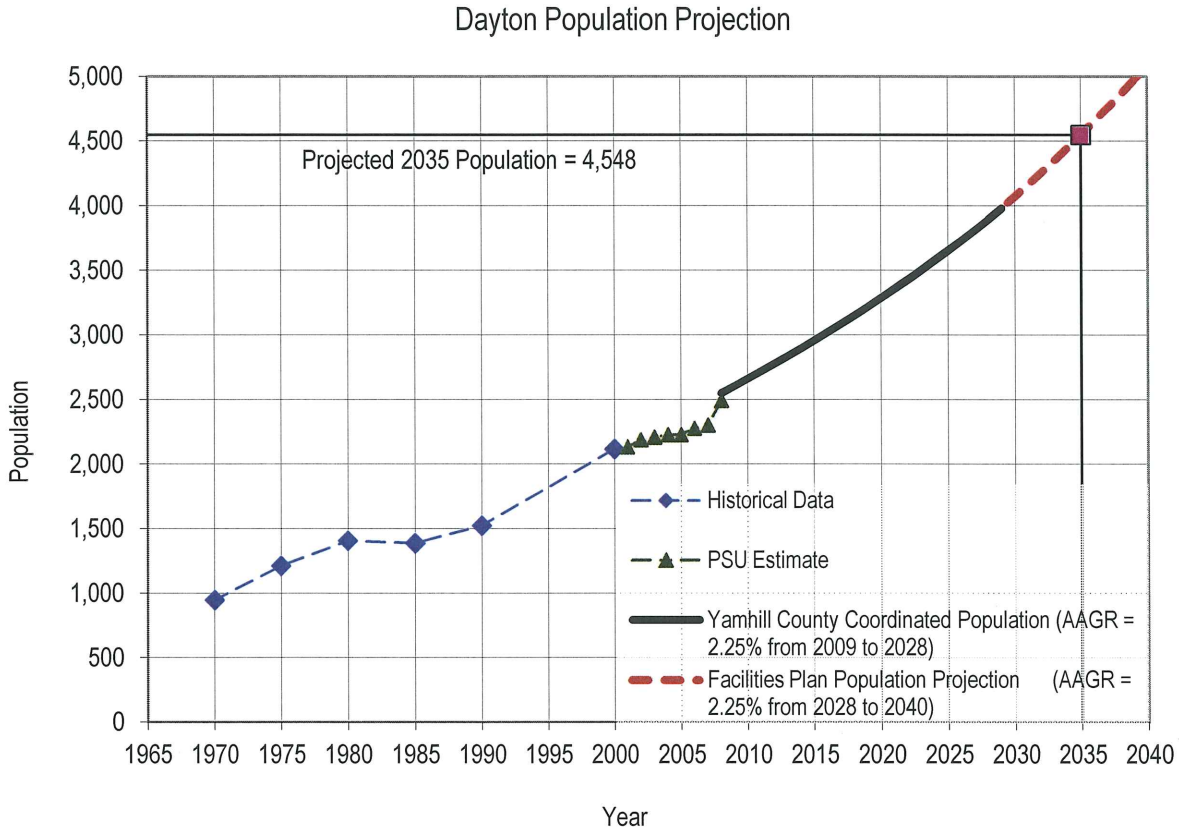
The population in Dayton has steadily increased from approximately 949 people in 1970 to approximately 2,230 people in 2005. Growth has been particularly rapid during the last few years due to the development of residential areas along the north and south sides of town. The current population of Dayton is approximately 2,718 people.

2.4.2.2 Future Population

In the review of Facilities Plans, the DEQ relies on the County population allocations as the 'coordinated number' for evaluating population projections. The City is obligated under ORS 195.036 to conform to the County population allocation in order for the Department to approve the Facilities Plan. In June 2008 Dayton made a 20-year population projection through 2028, which was agreed to by Yamhill County as the coordinated number (Refer to **Appendix A**) based on an average annual growth rate of 2.25%. The 2028 population allocation for Dayton was estimated to be 3,892 as described in the City memo (**Appendix A**) and illustrated in Figure 2-5. As described in **Section 2.6**, the planning period for public sewer facilities is typically 20-25 years.

As described in **Section 2.6**, the planning year for this study is 2035. In order to estimate the population in the year 2035, the County coordinated growth projection was extended from 2028 to 2040. This projection is based on the average annual growth rate of 2.25%. This is the same growth rate as the County coordinated population projection as shown in Figure 2-5. Based on this growth model the projected population for 2035 is 4,548. This number will be used throughout the remainder of this plan.

Figure 2-5| Dayton Population Projection



2.5. LAND USE REGULATIONS

2.5.1 Comprehensive Plan

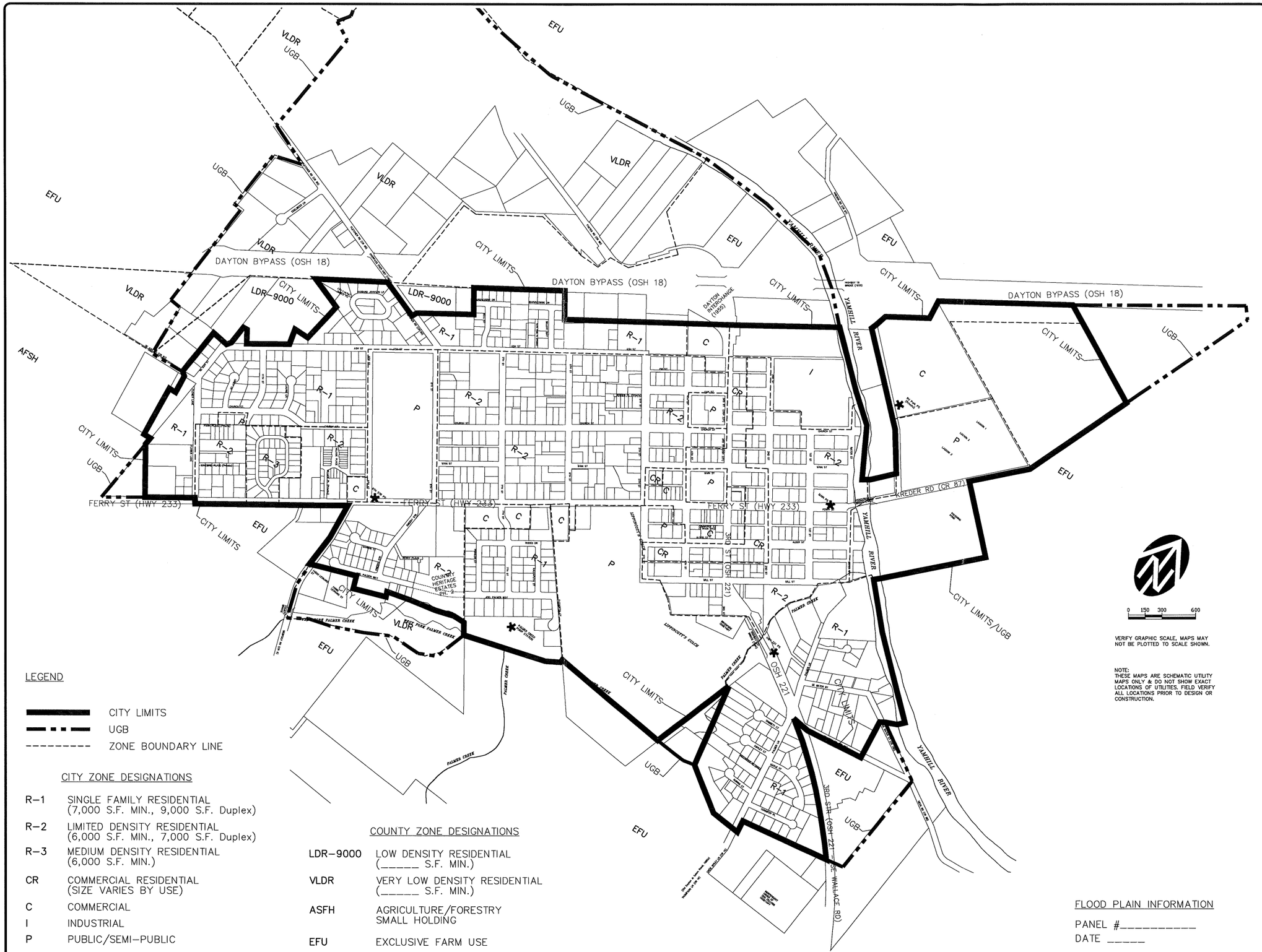
All of the land within the planning area is within the Dayton UGB. The City's Comprehensive Plan was adopted in 1979 and has been revised most recently and adopted in December of 1986.

2.5.2 Land Use Zoning

It is assumed that the land within the planning area at the end of the planning period (2035) will exceed the present City limits boundary but will stay within the UGB of Dayton. Land use zoning in the City of Dayton is comprised primarily of residential uses, although there is a relatively large undeveloped area for industrial development in the east corner of town (approximately 27.5 acres). Lesser amounts of land are designated for commercial and public uses.

The location of the UGB, City limits, and land use zoning designations within the City of Dayton are illustrated in Figure 2-6.

The total areas contained under each zoning designation are listed in Table 2-1. There are small areas of residential land within the City Limits which are currently undeveloped.



LEGEND

- CITY LIMITS
- UGB
- ZONE BOUNDARY LINE

CITY ZONE DESIGNATIONS

R–1	SINGLE FAMILY RESIDENTIAL (7,000 S.F. MIN., 9,000 S.F. Duplex)
R–2	LIMITED DENSITY RESIDENTIAL (6,000 S.F. MIN., 7,000 S.F. Duplex)
R–3	MEDIUM DENSITY RESIDENTIAL (6,000 S.F. MIN.)
CR	COMMERCIAL RESIDENTIAL (SIZE VARIES BY USE)
C	COMMERCIAL
I	INDUSTRIAL
P	PUBLIC/SEMI–PUBLIC

COUNTY ZONE DESIGNATIONS

LDR–9000	LOW DENSITY RESIDENTIAL (_____ S.F. MIN.)
VLDR	VERY LOW DENSITY RESIDENTIAL (_____ S.F. MIN.)
ASFH	AGRICULTURE/FORESTRY SMALL HOLDING
EFU	EXCLUSIVE FARM USE

TOWNSHIP 4 SOUTH, RANGE 3 WEST, W.M.

0 150 300 600

VERIFY GRAPHIC SCALE, MAPS MAY NOT BE PLOTTED TO SCALE SHOWN.

NOTE:
THESE MAPS ARE SCHEMATIC UTILITY MAPS ONLY & DO NOT SHOW EXACT LOCATIONS OF UTILITIES. FIELD VERIFY ALL LOCATIONS PRIOR TO DESIGN OR CONSTRUCTION.

FLOOD PLAIN INFORMATION

PANEL #_____
DATE _____

NO.	DATE	DESCRIPTION REVISIONS	BY

SCALE
HORIZ:
VERT:

DSN. DM
DRN. MJT/DM
CKD. DM
DATE: JUN 2011

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: mail@westech-eng.com

CITY OF DAYTON, OREGON

ZONING MAP

FIGURE 2–6

JOB NUMBER 2609.3010.0

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Table 2-1 | Approximate Area by Land Use

Land Use Category	Area (Acres)
Single Family Residential (R-1) (7,000 S.F. Min., 9000 S.F. Duplex)	150
Limited Density Residential (R-2) (6,000 S.F. Min., 7,000 S.F. Duplex)	154
Medium Density Residential (R-3) (6,000 S.F. Min.)	7
Commercial Residential (CR)	15
Commercial (C)	36
Public, Semi-Public (P)	112
Industrial (I)	44
Total Area w/in City Limits	± 518
Area Outside City Limits w/in UGB	± 306
TOTAL	± 824

2.6. PLANNING PERIOD

In order to evaluate alternatives and identify system shortcomings, a planning period must be selected. Choosing a "reasonable" planning period for which a utility system should be designed is a somewhat arbitrary decision. If the planning period is too short, the public faces the prospect of demands exceeding capacity, requiring the system to be continually upgraded or replaced. For systems that do not lend themselves to economical incremental expansion, short planning periods lead to excess expenditures of capital. Sewage collection and treatment facilities fall into this category, including collector and trunk sewers. For these components, DEQ suggests a design period of 30-50 years.

On the other hand, choosing a planning period which is too long can lead to facilities with excess capacity which may never be needed if population growth does not occur at the projected rates. Such facilities can place an economic burden upon the present population and may become obsolete before being fully used.

The Department of Environmental Quality (DEQ) has established 20 years as being the proper planning period for sanitary sewer system improvements. This report will evaluate the anticipated sewage collection, pumping, treatment and disposal needs during the 20 year planning period. The collection system piping will be planned for the ultimate development of land within the UGB based on current land use designations. Although this may result in capacities greater than those needed during the 20-year planning period, sewage collection lines are, by their very nature, unsuited for incremental expansion without extensive capital outlays. The planning period for proposed wastewater treatment systems will be 20 years from the projected completion of the improvements.

It should be recognized that projections into the future are subject to many variables and inaccuracies. Accordingly, it is recommended that the sewer system capabilities and needs be reviewed at five-year intervals and this report updated as appropriate.