



CHAPTER 1

Introduction

Chapter 1 – Introduction

1.1 Background

The City of Richland (City) has experienced several accelerated growth rates over the past 60 years in the form of residential housing developments as well as commercial development. Due to this growth, the General Sewer Plan has been updated at a frequency of about every 10 years – with updates in 1992 and 2004. The General Sewer Plan provides a tool that the City can use to maintain, operate, and expand the sewer system to meet the needs of the existing customers as well as planned growth.

The 2004 Plan identified a number of improvements to the existing system. Several of the CIP projects from the 2004 General Sewer Plan have been constructed by the City including: Leslie-Badger Sewer Trunk, Logston Boulevard Sewer Trunk, East Amon Wasteway Sewer Trunk, Duportail Sewer Relocation, SR 240 West Sewer Trunk Extension, Battelle Sewer Trunk Extension, Broadmoor Lift Station Replacement, Bellerive Lift Station and Force Main, and Conversion to Anoxic Selector at WWTP.

In 2013, the South Sewer Study was performed in order to provide more detailed sewer master planning for the portion of the City that is generally south of the Yakima River. As part of this Study, the existing collection system model in the south half of the City was updated with improvements made since the 2004 Plan and also included planned extensions for future growth. The land use and flow generation layers of the previous hydraulic model were also reevaluated for the study area through additional flow monitoring and calibration. The South Sewer Study was developed in such way as to be easily incorporated into this 2015 General Sewer Plan Update for the entire City.

1.2 Related Plans

1.2.1 City of Richland Comprehensive Land Use Plan

The City of Richland's Comprehensive Land Use Plan (2012) provides the land use planning that is assumed for future development of currently undeveloped areas within the sewer service area. The Land Use Plan also discusses guidelines for the provision of utility service in new and re-developed areas in order to provide orderly expansion of the utility services. Financing for capital projects is also discussed in the Land Use Plan. The financial plan section of the Land Use Plan will be updated by the City based upon the capital projects recommended in this General Sewer Plan Update.

1.2.2 Benton County Comprehensive Plan

The Benton County Comprehensive Plan (2013) has a number of components that are applicable to the City's sewer planning. The County is responsible for administering certain aspects of Washington's Growth Management Act (GMA) – the most important of which is the determination and management of the Urban Growth Areas (UGA) within the County. The County Comprehensive Plan also includes population projections that are directly applicable to the City's sewer planning. County-wide population projections are developed by the Washington State Office of Financial Management (OFM) for GMA planning purposes. The OFM projections forecast when growth will occur within the counties. In 2013, Benton County and jurisdictions within Benton County determined the percent allocation of the OFM population projections to each City and rural area in the County. The results of this allocation are used

for population projections and planning purposes in this document. See **Section 2.11** for more details regarding population.

1.2.3 City of Kennewick

The City of Kennewick operates a sewer system adjacent to the City of Richland. Kennewick's system does not discharge to or otherwise interconnect with Richland's system. The City of Kennewick's General Sewer Plan reveals no service area boundary conflicts.

1.2.4 City of West Richland

The City of West Richland also operates a sewer system adjacent to the City of Richland. West Richland's system likewise does not discharge to or otherwise interconnect with Richland's system. The City of West Richland's most recent sewer plan was published in 1997. There are no apparent service area boundary conflicts between West Richland and Richland.

1.3 Study Scope

Since the last General Sewer Plan was completed nearly ten years ago, the City authorized J-U-B to undertake a General Sewer Plan Update in 2014. This plan identifies the sewer capital improvement projects that will be needed for rehabilitation and replacement to meet the needs of the planning period through 2035.

The items specifically addressed in this General Sewer Plan are as follows:

- Update the hydraulic model to incorporate infrastructure that has been constructed since 2004
- Update current and planned land uses during the study period
- Analyze available water meter usage and evaluate flow generation assumptions used in the previous modeling efforts
- Re-calibrate the updated collection system model with new flow monitoring information
- Evaluate the existing collection system trunk pipes based on existing dry weather flows and wet weather flows to determine recommended improvements under current conditions
- Evaluate the existing collection system trunk pipes to provide service to all lands within the current UGA
- Estimate probable build-out extents, densities, and total population in conjunction with City Planning and available population projection data to aid in developing the Committed and Master Plan hydraulic model scenarios
- Review existing gravity sewer alignments and lift stations to determine if future pipes could be constructed to eliminate the lift stations
- Conceptually route future trunk sewers ten inches and larger to the ultimate service boundary
- Determine preferred flow routing through the existing system and impacts to the existing system
- Establish long-term improvements for the collection system with a specific 5-year Capital Improvement Plan (CIP) based on established prioritization criteria
- Provide a general overall evaluation of the condition and capacity of the Wastewater Treatment Plant
- Document the sewer utility's financial condition and assess its ability to support the recommendations of CIP

- Summarize the City's current Operations & Maintenance Program
- Summarize the City's current Pre-Treatment Program

Subsequent chapters in this report are summarized as follows:

Chapter 2 – Planning Information

The planning area characteristics, land use, and population projections are presented in this chapter. In addition, service area agreements and policies are summarized. The information presented in this chapter is intended for consistency with the City's Comprehensive Plan and Growth Management Act compliance.

Chapter 3 – Flow and Load Projections

The flow and load projections for the WWTP are summarized in this chapter. In addition, wastewater usage is classified by user type and significant users are discussed. A discussion on infiltration and inflow is also provided in this chapter.

Chapter 4 – Performance and Design Criteria

This chapter provides a summary of collection system design criteria as well as reference to Federal and State Regulations relating to WWTP performance criteria.

Chapter 5 – Wastewater Treatment Plant

This chapter describes the condition and existing capacity of the WWTP. A brief history of the improvement projects since 2004 is provided as well as a summary of future planned CIP projects at the WWTP. This chapter was developed by Carollo Engineers, Inc.

Chapter 6 – Collection System

The update of the hydraulic model of the collection system is summarized in this chapter. An evaluation of the existing capacity of the collection system as well as development of a Master Plan for collection system expansion and development is also presented.

Chapter 7 – Capital Improvement Plan

A prioritized list of collection system and WWTP capital projects is provided in this chapter.

Chapter 8 – Financial Plan

An overview of the City's revenues, projections, and plans for financing the projects identified in the CIP is provided in this chapter. This chapter was developed by FCS Group.

Chapter 9 – Operations Program

This chapter includes an overview of the organizational structure and staffing requirements for the Wastewater Utility operations program.

Chapter 10 – Pretreatment

A summary of the City's Pretreatment Program and Fats, Oils, and Grease (FOG) Program are provided in this chapter.

1.4 System Overview

The City of Richland is part of the Tri-Cities urban area, which is an important transportation and trade center for the Columbia Basin of central Washington. The major economic influences in the area include the Hanford Atomic Energy Reservation and irrigation-dependent agriculture.

The original Richland wastewater collection and treatment system was constructed by the federal government to serve the Hanford Reservation in 1942 and 1943. An additional, parallel treatment plant was constructed in 1948 and 1949. These facilities, expected to become obsolete soon after construction, were in use until 1985. In 1976 a study was completed and a plan developed for providing secondary treatment to meet state and federal requirements. A new wastewater treatment facility was recommended to replace the existing plant. Construction of new interceptors was commenced in 1980, and construction of the new wastewater treatment facility began in 1983. The new wastewater treatment facility, the WWTP began operation in September 1985.

The Richland sewer collection system is divided into 17 basins based on topography, configuration, and parcel boundaries – reference **Figure 1-1**. **Table 1-1** lists the sewer basins and the area of each basin.

Table 1-1 – Sewer System Drainage Basins

Sewer Drainage Basin	Area (acres)
A	4,700
B	1,209
C	911
E	869
F	301
G	495
H	447
I	1,071
J	381
K	7,560
L	1,770
M	576
N	738
O	312
P	2,616
Q	1,400
RY	370
TOTAL	25,726

Figure 1-1 Sanitary Sewer Drainage Basins

Legend

- City Limits
- UGA
- 50-yr Planning
- Interstate/Highway
- Major Streets

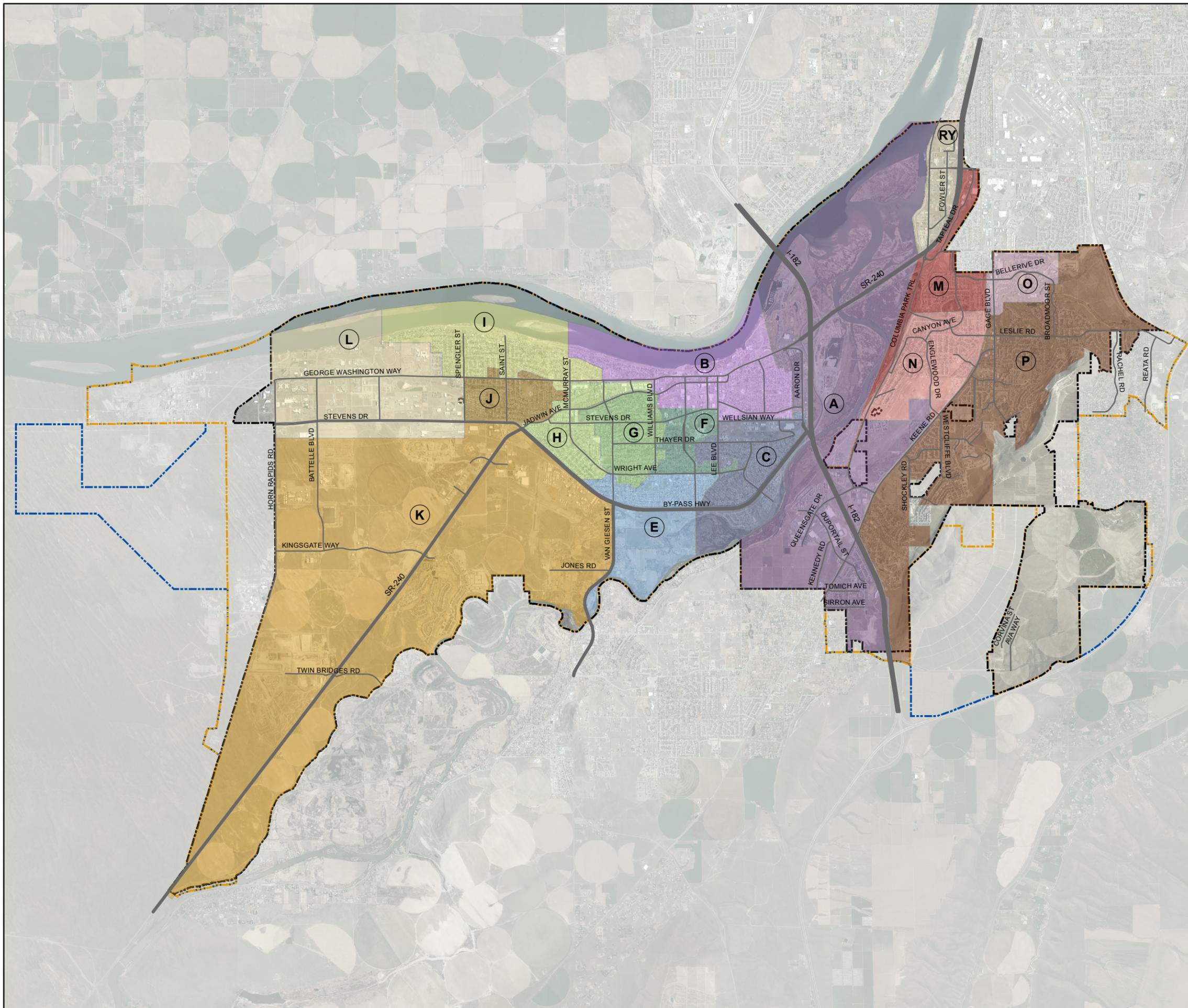
Sewer Basin ID

- A
- B
- C
- E
- F
- G
- H
- I
- J
- K
- L
- M
- N
- O
- P
- RY

0 6,000 12,000 Feet



Date: Apr 1, 2016





The City's sewer collection system has expanded from an initial series of pipelines serving the City core to a system containing over 262 miles of gravity pipelines and 14 pumping stations providing public sewer service to a residential population of 53,054. The total area that is provided with public sewer service totals 25,726 acres.

The existing wastewater collection system consists of gravity pipelines ranging in size from 6 inches in diameter up to 54 inches in diameter. Based on the City's sewer GIS information, **Table 1-2** provides a summary of the size and lengths of collection pipes that make up the public collection system.

Table 1-2 – Existing Gravity Collection System Pipes

Diameter (inches)	Length (feet)	Length (miles)
≤6	69,941	13.2
8	965,829	182.9
10	80,282	15.2
12	120,080	22.7
14	5,618	1.1
15	21,153	4.0
16	2,952	0.6
18	30,988	5.9
21	16,601	3.1
24	30,504	5.8
27	411	0.1
30	10,059	1.9
36	1,315	0.2
42	6,058	1.1
54	24,941	4.7
TOTAL	1,386,732	262.6

Roughly 75 percent of the collection system consists of pipelines 8 inches and smaller in diameter. These pipelines are generally referred to as local collection pipelines and provide service to individual sub-drainage basins located within the Service Area. Pipelines 10 inches and greater in diameter are often referred to as trunk or interceptor pipelines and may provide service to entire drainage basins or more than one drainage basin within the Service Area.

The ability of the collection system to provide gravity sewer service within the Service Area is dependent upon the topography of the Service Area. Much of the Richland sewer service area is flat, which has presented a challenge to constructing sewers with the minimum slopes required to maintain self-cleansing velocities while minimizing pumping. The City has several lift stations and forcemains that are an integral part of the collection system. The City desires to minimize the number of lift stations to reduce operation and maintenance requirements and has eliminated several lift stations with recent interceptor improvements. There are presently 14 sewage pumping stations located throughout the collection system. The name and capacity of these sewage pumping stations are summarized in **Table 1-3**.

Table 1-3 – Sewage Pumping Stations

Name	Rated Flow ^(a) (gpm)	HP	Pump Type	Pump Manufacturer
Battelle	400	5	Submersible	Flygt
Waterfront	600	15	Centrifugal	Fairbanks Morse
Terminal Dr	150	3	Centrifugal	Fairbanks Morse
Mental Health	260	5	Centrifugal - Chopper	Vaughan
Bradley	180	10	Submersible	Flygt
Columbia Pt	270	6.5	Submersible	Flygt
Wellhouse Loop	100	1.5	Centrifugal	Hydromatic
Duportail	200	7.5	Submersible	Flygt
Montana St	970	30	Centrifugal	Smith & Loveless
Columbia Park Trail	400	10	Submersible	Flygt
Meadows South	100	3	Centrifugal	Hydromatic
Bellerive	260	15	Submersible	Flygt
Meadow Ridge	245	10	Submersible	Flygt
Dallas Rd	260	35	Submersible	Flygt

^(a) The rated flow is based on the operation of one pump. All of the stations have a duplex pump setup.

The City does not have any connections to other wastewater systems. Richland collects and treats all of the wastewater within its service area and does not receive wastewater from other jurisdictions.