DRAFT

CITY OF PENDLETON

Stormwater Master Plan

MSA Murray, Smith & Associates, Inc.
Engineers | Planners

MARCH 2015

STORMWATER MASTER PLAN

FOR

THE CITY OF PENDLETON
MARCH 2015

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COMMON ENGINEERING ACRONYMS & ABBREVIATIONS

A

AACE	AACE International
ABF	activated biological filter
AC	asbestos cement
ADA	Americans with Disabilities Act
ADD	average daily demand
AF	acre-feet
AIA	Airport Industrial Area
AMCL	alternative maximum concentration level
AMI	automated metering infrastructure
AMR	automated meter reading
AMZ	asset management zone
AOR	actual oxygen required
APWA	American Public Works Association
ASR	aquifer storage and recovery
AWWA	American Water Works Association

B

BFP	belt filter press
BLI	buildable lands inventory
BOD	biochemical oxygen demand
BWF	base wastewater flow

C

C&R	construction and replacement
CAA	Clean Air Act
CAD	computer aided drafting
CAS	cast iron
ccf	100 cubic feet
CCI	Construction Cost Index
CCR	Consumer Confidence Report
CCTV	closed-circuit television
cf	cubic feet
cfs	cubic feet per second
CHL	clarifier hydraulic loading
CIA	current impact area
CIP	capital improvement program
CMOM	capacity, management, operation and maintenance
CN	curve number
COD	chemical oxygen demand
COMPASS	Community Planning Association of Southwest Idaho
COSM	Central Oregon Stormwater Manual
CP	concrete pipe

CPI-U	Consumer Price Index, Urban Consumers
CSL	clarifier solids loading
CSMP	Collection System Master Plan
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CWA	Clean Water Act

D

DBP	disinfection byproducts
d/D	depth to diameter ratio
D/DBP	disinfectants and disinfection byproducts
DEQ	Department of Environmental Quality
DIP	ductile iron pipe
DOD	depth of flow over diameter of pipe
DOE	Department of Ecology
DWF	dry weather flow

E

ENR	Engineering News Record
EOCI	Eastern Oregon Correctional Institution
EPA	U.S. Environmental Protection Agency
ERP	Emergency Response Plan
EUAC	Equivalent Uniform Annual Cost

F

FEMA	Federal Emergency Management Agency
FM	flow monitors
FMB	flow meter basin
FOG	fats, oils, grease
fps	feet per second
ft	foot, feet
FTE	full-time equivalent
FV	future value
FY	fiscal year

G

GAC	granular activated carbon
GBT	gravity belt thickener
GIS	geographical information system
gpapd	gallons per acre per day
gpcpd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
GPS	Global Positioning System
gpupd	gallons per unit per day
GWI	groundwater infiltration

H

HDPE	high-density polyethylene
HGL	hydraulic grade line
hp	horsepower
hr	hour
HRT	hydraulic retention time
HVAC	heating, ventilating and air conditioning

I

ID	inside diameter
IEEE	Institute of Electrical and Electronics Engineers
I/I	inflow/infiltration
in	inch, inches
IOC	inorganic compound

K

kVA	kilovolt-ampere
kW	kilowatt

L

L	liter
lb	pound
LCR	Lead and Copper Rule
lf	linear feet
LRAA	locational running annual averages
LS	lift station

M

M	million
ma	milliamp
MCL	maximum concentration level
MCLG	maximum concentration level goal
M/DBP	microbial and disinfection byproducts
MDD	maximum day demand
mg	milligram
MG	million gallons
mgd	million gallons per day
mgh	million gallons per hour
mg/L	milligrams per liter
MH	manhole
mL	milliliter
MLSS	mixed liquor suspended solids
MLVSS	mixed liquor volatile suspended solids
mm	millimeter
MRDL	maximum residual disinfectant levels
mrem	millirems

MSA	Murray, Smith & Associates, Inc.
MSL	mean sea level
N	
NPDES	National Pollutant Discharge Elimination System
NPV	net present value
O	
O&M	operations and maintenance
OAR	Oregon Administrative Rules
ODOT	Oregon Department of Transportation
P	
%	percent (use with numerals – e.g., 13%)
PAL	provisionally accredited levee
pCi/L	picoCuries per liter
PDF	peak design flow
PDWF	peak dry weather flow
PER	Preliminary Engineering Report
PFP	Public Facility Plan
pH	measure of acidity of alkalinity
PHD	peak hour demand
ppb	parts per billion
ppm	parts per million
PRS	pressure-reducing stations
PRV	pressure reducing valve
psi	pounds per square inch
PSV	pressure-sustaining valve
PUD	public utility district
PV	present value
PVC	polyvinyl chloride
PWMP	Public Works Management Practices Manual
PWWF	peak wet weather flow
Q	
QA	quality assurance
QC	quality control
R	
RDII	rainfall dependent infiltration/inflow
ROW	right-of-way
RRF	resource recovery facility
RSSD	Rieth Sanitary Sewer District
S	
SBOD	soluble biochemical oxygen demand
SCADA	supervisory control and data acquisition
SDC	system development charge

SDR	standard dimension ratio
sec	second (measurement of time)
SOC	synthetic organic compound
SOW	scope of work
SRT	solids retention time
SSOAP	Sanitary Sewer Overflow Analysis and Planning
SVI	sludge volume index
SWMP	Stormwater Master Plan

T

TAZ	traffic analysis zones
Tc	time of concentration
TCR	Total Coliform Rule
TDH	total dynamic head
TMDL	total maximum daily load
TP	transite pipe
T/S	transit/storage
TSS	total suspended solids
Tt	travel time
TTHM	total trihalomethanes

U

UGA	urban growth area
UGB	urban growth boundary
UIC	underground injection control
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

V

VFD	variable-frequency drive
VCP	vitrified clay pipe
VFD	variable frequency drive
VOC	volatile organic compound
VSS	volatile suspended solids

W

WAS	waste-activated sludge
WFP	water filtration plant
WRF	water reclamation facility
WSMP	Water System Master Plan
WWTP	wastewater treatment plant

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EXECUTIVE SUMMARY

Introduction

The City of Pendleton (City) owns and operates a municipal stormwater drainage system serving the residents and businesses within its service area. This Stormwater Master Plan (SWMP) serves as a planning document to help guide sound stewardship of this system by addressing the City's need to maintain existing infrastructure and improve identified conveyance capacity deficiencies to facilitate growth. Future development anticipated to build-out of the City's urban growth boundary (UGB) will approximately double the number of current residents and increase anticipated stormwater flows. The UGB covers an area of 13.4 square miles and defines the extent to which the City may expand in the future; it was used as the boundary for build-out projections within this SWMP.

How This Plan Should Be Used

This SWMP serves as the guiding document for future stormwater drainage system improvements, infrastructure investments and maintenance activities and should:

- Be reviewed annually in accordance with other utilities to prioritize and budget needed improvements.
- Have its mapping updated regularly to reflect new system data, ongoing development and construction.
- Have its specific system improvement recommendations regarded as conceptual. (The location, size and timing of projects may change as additional site-specific details and potential alternatives are investigated and analyzed in the preliminary engineering phase of project design).
- Update and refine its cost estimates with preliminary engineering and final project designs.

Scope of Work

The City selected Murray, Smith & Associates, Inc. (MSA) to create master plans for the potable water, stormwater, and sewer collection systems. The scope of work (SOW) for this SWMP includes the following major tasks and deliverables:

- Describe the City's existing stormwater drainage system.
- Review regulations and policies relevant to the City's stormwater drainage system for both present and future conditions.
- Develop and calibrate a hydraulic model.
- Develop flow projections consistent with the 2011 Comprehensive Plan Update.

- Develop planning and design criteria, including the selection of a City-specific storm event to define the minimum level of system performance.
- Evaluate the stormwater drainage system's hydraulic capacity to identify deficiencies for existing and future planning horizons.
- Conduct and summarize benchmarking data comparing the City's operations and maintenance (O&M) practices to similar municipalities.
- Review the City's current O&M program and present recommendations.
- Develop an ongoing repair and replacement program for system piping, catch basins and manholes.
- Develop capital improvement program (CIP) recommendations and cost opinions for projects identified by the plan.
- Develop a stormwater drainage system financial plan that identifies a funding strategy for the CIP, aging infrastructure repair and replacement (R&R), and staffing.

Organization of the SWMP

This SWMP is organized into seven sections, as described in Table 1-1. Detailed technical information and support documents are included in the appendices.

Table 1-1
SWMP Organization

Section	Description
1 – Executive Summary	Purpose and scope of the SWMP and summary of key components of each part of the plan.
2 – Study Area Characteristics	Description of the service area.
3 – Existing System Description	Description of the existing stormwater drainage system, both in terms of its general management and physical infrastructure.
4 – Regulations and Policies	Summary of the current and potential future regulations applicable to the stormwater drainage system.
5 – System Analysis	Summary of calibration methodology and results, overview of the evaluation criteria and approach, discussion of the hydraulic deficiencies for existing and future planning horizons.
6 – Operations and Maintenance	Describes current operations and maintenance procedures, summary of benchmarking results comparing the City to similar municipalities, summary of recommendations.
7 – Capital Improvement Program	Improvement recommendations including cost opinions and timeframe for implementation.
8 – Financial Plan	Strategy for funding collection system improvements.

Study Area Characteristics

An understanding of land use and demographic characteristics within the study area is important in stormwater planning because of the impact these characteristics have on the transformation of rainfall to runoff. Land use characteristics in particular are critical in estimating existing and future stormwater flows in an urban setting. The way land is used impacts the percentage of impervious area within a basin, and as a result influences the behavior of stormwater runoff. All land within the City has been assigned a land use designation consistent with the amended Comprehensive Plan, which includes various categories of commercial, industrial, institutional, and residential land uses. As part of this SWMP, the City's service area was separated into nine tributary basins shown in Figure 1-1.

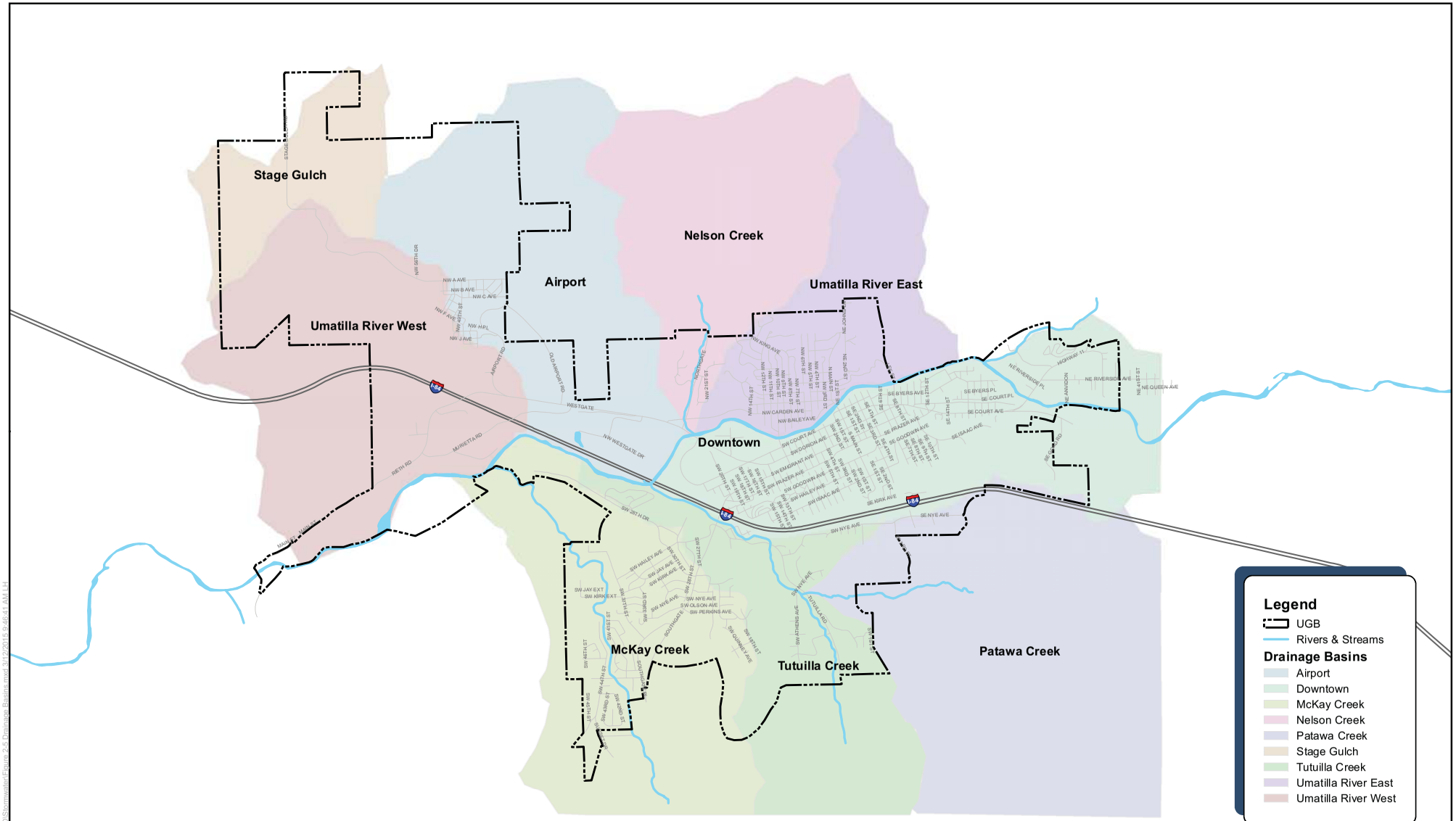
The City is located centrally within Umatilla County, Oregon and lies at the bottom of a large chasm carved by the Umatilla River through the rolling terrain of eastern Oregon's upper plateau areas. Ground elevations range from approximately 950 feet to approximately 1,570 feet above MSL. The lower elevations are located along the Umatilla River, which flows east to west. Pendleton is nestled in the western base of the Blue Mountains. The highest mountain peaks within the range, such as the Elkhorn, Ireland, and Strawberry, exceed 9,000 feet. These mountains directly influence the weather patterns and precipitation experienced at their base.

Detailed information on the soils found throughout the study area is summarized in the U.S. Soil Conservation Service's Soil Survey of Umatilla County Oregon (OR 667, 2013). The soil types identified in this survey are organized into hydrologic groups, and are used to predict area-wide hydrologic responses to rainfall. These groups are particularly important when assigning pervious area runoff curve numbers during stormwater modeling.

There are generally no instances of well-drained soils within the UGB. Moderately drained soils can be found within the study area where the topography flattens out into gently sloping terrain. The steeper sloping regions within the UGB are typical of poorly drained soils, with very poorly drained soils located around the City's surface waters.

Existing System Description

The Public Works Director manages the City-owned stormwater drainage system and supervises the Public Works Superintendent, who oversees the system's operation. The City's existing stormwater drainage system consists of 46 miles of gravity drainage piping, 646 manhole structures, 3.5 miles of open channels, and 15 flow control facilities. There are 73 outfalls within the City's system, which drain into the Umatilla River, McKay Creek, Tutuilla Creek, Nelson Creek and other ditches and drainages. Of these 73 outfalls, 38 discharge directly into local waterways, with the remainder discharging to ditches, drainages or other manmade drainage structure. The City's levee system along the Umatilla River comprises approximately 3.5 miles of embankment. Figure 1-2 depicts an overview map of the conveyance system.



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City of Pendleton
Stormwater Master Plan

Figure 1-1
Drainage Basins

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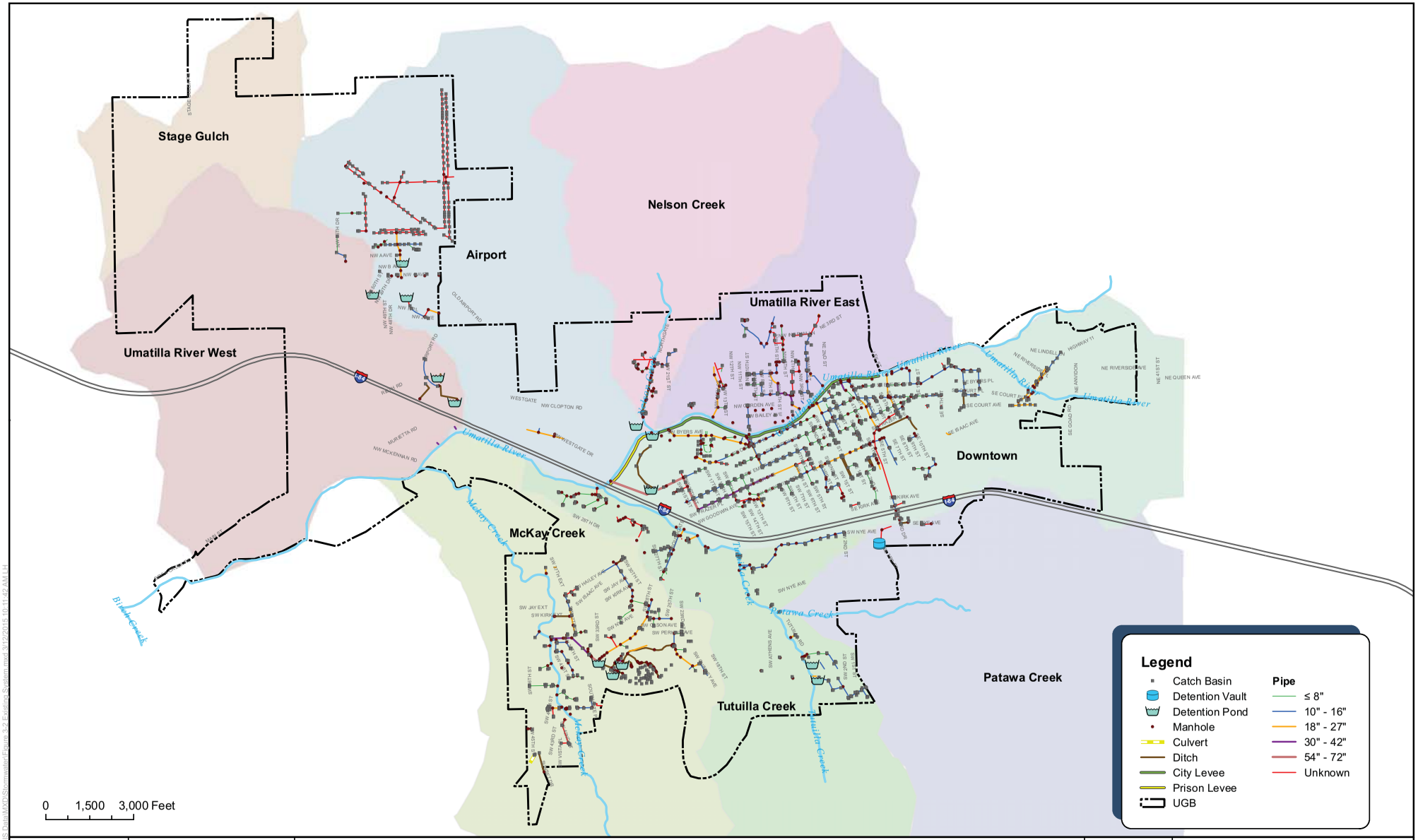

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City of Pendleton
Stormwater Master Plan

Figure 1-2
Existing Stormwater System

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Prior to the planning process, MSA and the City undertook an effort to create a Geographic Information System (GIS) of the water, sewer, and stormwater drainage systems. The City recently hired a GIS Coordinator who is working to improve the quality of the information in addition to collecting new data points and attributes. It is recommended that the City continue to improve the system's GIS through the continued inventory and system updates. This updated GIS would further serve to improve the accuracy of the hydraulic model, to confirm identified deficiencies and recommended improvements.

Regulations and Policies

The City is ultimately responsible for management and operation of infrastructure provided under its jurisdiction in accordance with all known federal, state, and local regulations. The Clean Water Act (CWA) is the principal federal law in the United States governing surface water pollution. The law was passed by Congress in 1972 with the goal of protecting and restoring the nation's surface waters to fishable and swimmable conditions. The CWA was amended in 1987 to include non-point stormwater discharges generated from large communities, industries, and construction sites. These discharges are managed through the National Pollutant Discharge Elimination System (NPDES) Permit Program; the national Environmental Protection Agency (EPA) has delegated primary enforcement of these permits to the state Department of Environmental Quality (DEQ).

Because of its population size, the City has not been required by DEQ to obtain an NPDES Permit for its stormwater discharges. Due to several economic and political factors, the City's potential for incorporation into the NPDES Permit program is unlikely in the immediate future. Although no indication or timetable currently exists for expanding the NPDES program to include Pendleton, federal regulations provide the EPA and DEQ the discretion to require the City to apply for a permit.

Because the requirement for an NPDES Permit may materialize in the future, the formation of a stormwater utility within the City's Public Works Department would be highly desirable. This City would be responsible for enforcement of the conditions of the permit, including routine operation and maintenance of the stormwater drainage system. Creation of stormwater standards applicable to development within the City is also anticipated to be required by a future permit.

Presently, the City lacks a formal stormwater management manual of development standards. These types of documents help formulate cohesive policy and guide orderly development within the jurisdiction through a transparent set of drainage criteria, rules, and guidelines. They also allow for the transfer of knowledge on the administrative side of system operations as staffing changes occur. It is recommended that the City adopt the Central Oregon Stormwater Manual (COSM), either outright or with modifying addenda unique to the City. Another more costly option could be to generate a similar manual specific to the City's needs. Either of these actions would serve to position the City favorably, should NPDES Permit be required in the future, necessitating development of stormwater standards.

The City is currently in the process of obtaining a Provisionally Accredited Levee (PAL) certification of the City Levee and Prison Levee with the Federal Emergency Management Agency (FEMA) under the requirements of the National Flood Insurance Program (NFIP) and 44 CRF 65.10. A general summary of the approach towards achieving this certification is provided in Table 1-2.

Table 1-2
PAL Certification Summary

Phase	Completed	Next Steps	Description
I	X		Review historical documentation and assess data gaps to complete levee certification application. Develop a SOW, schedule and budget for Phase II.
II		X	Conduct field reconnaissance and technical evaluation of levees.
III		X	Apply to FEMA for levee certification.

The formation of a stormwater utility by the City would be a desirable step towards maintaining the levee system in conformance with NFIP and FEMA requirements. Ongoing operation and maintenance activities to keep the levees functional would be funded through the utility fees established and collected by the utility.

System Analysis

The stormwater drainage system analysis includes a hydraulic model calibration process followed by evaluations of gravity pipe and open channel conveyance capacity. Stormwater basins were delineated as part of this SWMP and were used to assist in describing deficiency locations.

The City's entire stormwater drainage system was analyzed during this master planning process; however, due to the lack of system information in most locations, the hydraulic modeling of the system was conducted using two separate methods. Where survey and general system information was more readily available and flooding had been reported during past rain events, a dynamic simulation was performed using InfoSWMM. These areas were primarily confined to the downtown commercial area, but selected areas near the airport and Southgate districts were analyzed in InfoSWMM using supplemental data at the request of the City. The InfoSWMM model provides dynamic system results, including backwater effects and surcharging. For the rest of the system, a simplified non-dynamic HEC-HMS calculation method was used for system analysis.

Model calibration was based on comparing model results to firsthand accounts of the system during August 2013 and June 2014 rain events. Following model calibration and verification,

a design storm was used to evaluate the stormwater drainage system and identify system deficiencies.

A 25-year recurrence period was selected for the design storm to evaluate the system for deficiencies. A rainfall frequency analysis was completed to validate the *NOAA Atlas 14 Type 2* precipitation maps for the Pendleton area. In addition to comparing the general frequency analysis to the *Atlas* rainfall depth, historical summer and winter rainfall events were reviewed to examine the seasonal variation in storm events in the City. Each component of the modeled stormwater drainage system was assessed based on the ability to convey the peak flow generated by a 1.35-inch, Type 2 (Pendleton Storm) rain event. This storm event was determined by compiling and ranking maximum annual rainfall events for each year on record by total rainfall depth. These data points were fitted to a probability distribution function for each data set. The probability distribution function was then used to estimate the rainfall depth for storm events with a 25-year recurrence interval.

These general conclusions were developed through the system analysis and subsequent validation with City staff:

- A large portion of the existing stormwater drainage system is deficient when the 25-year storm is applied to the system, most notably in the downtown commercial area.
- System deficiencies were primarily due to undersized conveyance pipes, not undersized outfalls.
- Existing deficiencies are not appreciably exacerbated by future conditions attributed to new development.
- No deficiencies were observed in the Southgate area.
- A number of potential deficiencies were observed outside of the dynamic simulation area. These deficiencies should be investigated further and verified before any additional action is planned.
- The stormwater drainage system was calibrated using a historic rainfall event and firsthand descriptions of the system during the event. The model was adjusted to produce results consistent with first-hand reports. Further calibration can be conducted in the future with the collection of additional system data.
- Being the first stormwater master planning effort within the City, it is recommended that the City continue to improve the inventory information available for the system through the continued development of stormwater GIS.
- The system should be re-analyzed as additional inventory information, including survey data becomes available.

Operations and Maintenance

The assessment of the City's stormwater drainage system O&M program included review of information from City staff and comparison to the O&M practices of similarly sized utility

and regulatory requirements. Staff from the City's Street Division are responsible for the operations and maintenance of the stormwater collection system. The Street Division is currently structured to have 0.5 full-time equivalent employees (FTEs) for operating and maintaining the stormwater collection system.

The current scheduled maintenance activities include the following:

- Regular street sweeping on a six-week rotation.
- Catch basin cleaning in early spring.
- Manhole and pipe cleaning as needed.
- Semiannual outfall obstruction removal and cleaning.
- Flow Control Facility vegetation control as needed.
- Levee vegetation removal and management.

Historically, the City's stormwater maintenance program has focused on addressing drainage capacity and flooding problems. This approach can generally be characterized as a "reactive" maintenance program.

For a benchmark comparison, one other storm utility in the region (Redmond) was surveyed in order to compare their current O&M practices to the City's. Unlike the City, which enacts no service fees, Redmond assesses a monthly stormwater utility service charge, which is used to fund water quality improvement projects. Also, Redmond has three O&M FTEs dedicated to the stormwater drainage system, while the City has none.

The City's current levee maintenance practices of outfall cleaning and vegetation management will need to continue if it is to comply with the levee certification requirements of FEMA and the NFIP. Additional levee O&M activities must be implemented to meet levee maintenance requirements. These additional activities drive the need for the City to create a new stormwater utility, as the staffing and equipment necessary to operate the levee system within federal requirements will necessitate a recurring financial commitment from the City. These funds can be derived from stormwater utility fees.

The following conclusions and recommendations are based on a review of the City's O&M practices and benchmarking of the other stormwater drainage system:

- Transfer one FTE for street sweeping activities from Streets Division to Storm Utility.
- Add two FTEs as dedicated staff for the operations and maintenance of the stormwater collection system. This is in addition to transferring the street sweeper FTE positon from the Streets Division.
- Hire 0.5 additional FTEs, which will be part of a second crew of four full time staff with dedicated equipment to perform the ongoing pipe replacement program on a 150-year cycle. The other 3.5 FTEs on the crew would be shared and funded with the

Water and Sewer Utilities. This also includes transferring the funding of 0.5 FTEs from the existing dedicated pipe crew from the Sewer Utility to Storm Utility.

- Acquire a dedicated Combo Truck for the stormwater drainage system to improve structure cleaning deficiencies.
- Consider developing an annual inspection program.
- Consider developing an Annual Storm Drainage Main Replacement Program.
- Continue to improve the stormwater drainage system inventory through continued development of the City's public works GIS.
- The City should consider maintenance agreements that are defined for individual land owners or for legal entities in charge of developments to provide for the perpetual maintenance of all elements of the stormwater drainage system located outside of the public right-of-way.
- Begin implementing a stormwater drainage system O&M program that would meet NDPES Permit requirements and is based on incorporation of the American Public Works Association's *Public Works Management Practices Manual* – 8th Edition best management practices.

Capital Improvement Program

The CIP describes projects identified to address existing and future capacity deficiencies and to plan for ongoing stormwater drainage system repair and replacement of aging infrastructure. Implementation timeframes for these projects include immediate to 5-year, 10-year, and 20-year planning horizons. Projects needed to facilitate private development in key areas within the City have also been estimated, and are noted as "developer-paid". These are private projects, and the cost would be borne by the developer rather than the City. Regular SWMP updates are also recommended and budgeted for approximately every five years. The total expected cost by timeframe, per category and infrastructure type, is shown in Tables 1-3 through 1-6. All CIP projects are presented in Figures 1-3 and 1-4.

In general, it is recommended that the City focus short-term financial resources towards data collection and maintenance of the existing storm drainage infrastructure. Once those needs have been met, additional resources may be directed towards revising the stormwater model which will produce a robust identification of system deficiencies that can be prioritized accordingly. Other short-term resources may be directed towards the existing gravity system within the downtown commercial area. This section of the City's storm drainage system is inadequately sized to serve existing flows, and represents the highest priority area to receive stormwater improvements over the study period.

This CIP includes $45,586,000 in improvements over the study period, including capacity projects, levee system operations and maintenance, 150 years of an annual pipeline replacement program, and developer-paid projects.

The City does not currently collect System Development Charges (SDCs) to fund stormwater capital improvements associated with future development, or growth, as allowed under Oregon Revised Statute 223.297 through 223.314. A column has been included in Tables 1-3 through 1-6 to aid the City in establishing SDCs for the stormwater conveyance system. Because SDCs may only be collected based on the infrastructure needed for future growth, the percentage listed for each project correlate the SDC charge associated with providing service towards new development. For improvements that benefit both current and new customers, a fraction of the project cost is allocated to SDCs proportional to the benefits. A summary of all recommended projects is in Table 1-7.

Table 1-3
Recommended Immediate to 5-Year Projects

Project ID	Project Name	Project Description	Project Cost	Percentage Attributed to Growth
SD-01	Combo Truck	New Combo Truck	$50,000	0%
SD-02	Provisional City and Prison Levee Certification	PAL application to FEMA by consultant team, to include field testing, surveying and engineering	$527,000[1]	0%
SD-03	City and Prison Levee O&M	Inspection of levees, including maintenance repairs and report documentation[2]	$665,000	0%
SD-04	Local Improvement Fund	Maintenance of the existing system by City staff	$200,000[3]	0%
SD-05	Annual Storm Drainage Main Replacement Program	Average approximately 400 feet of pipe replacement each year	$270,000[3]	0%
SD-06	GIS Data Field Work	Field survey work of existing conveyances and updating the GIS	$50,000	0%
SD-07	Deficiency Upgrades	10,165 feet of piping upgrades, ranging from 8-inch to 36-inch	$5,761,000	10%
Total 5-Year Project Costs			**$7,523,000**	

[1] *Costs identified by MSA subconsultant Phase I levee review.*
[2] *Levee inspection requirements vary depending on structure from annual to bi-annual. Flows in the Umatilla River exceeding 10,000 cubic feet per second trigger additional inspection requirements.*
[3] *Costs provided by City of Pendleton.*

Table 1-4
Recommended 10-Year Projects

Project ID	Project Name	Project Description	Project Cost	Percentage Attributed to Growth
SD-08	Stormwater Master Plan Update	Periodic review provisions of OAR Chapter 660, Section 25	$150,000	5%
SD-09	City and Prison Levee O&M	Inspection of levees, including maintenance repairs and report documentation[1]	$560,000	0%
SD-10	Local Improvement Fund	Maintenance of the existing system by City staff	$200,000[2]	0%
SD-11	Annual Storm Drainage Main Replacement Program	Average approx. 400 feet of pipe replacement each year	$270,000[2]	0%
SD-12	GIS Data Field Work	Field survey work of existing conveyances and updating the GIS	$50,000	0%
SD-13	Deficiency Upgrades	14,950 feet of pipe upgrades, ranging from 10-inch to 36-inch	$9,075,000	5%
Total 10-Year Project Costs			**$10,305,000**	

[1] *Levee inspection requirements vary depending on structure from annual to bi-annual. Flows in the Umatilla River exceeding 10,000 cubic feet per second trigger additional inspection requirements.*
[2] *Costs provided by City of Pendleton.*

Table 1-5
Recommended 20-Year Projects

Project ID	Project Name	Project Description	Project Cost	Percentage Attributed to Growth
SD-14	City and Prison Levee O&M	Inspection of levees, including maintenance repairs and report documentation[1]	$1,120,000	0%
SD-15	Local Improvement Fund	Maintenance of the existing system by City staff	$400,000	0%
SD-16	Annual Storm Drainage Main Replacement Program	Average approx. 400 feet of pipe replacement each year	$540,000[2]	0%
SD-17	Stormwater Master Plan Update	Periodic review provisions of OAR Chapter 660, Section 25	$300,000	5%
SD-18	Deficiency Upgrades	18,500 feet of pipe upgrades, ranging from 8-inch to 54-inch	$12,250,000	10%
SD-19	Eastern Oregon Regional Airport Expansion	450 feet of 24-inch diameter gravity piping and 13,000 feet of open channel conveyance	$3,530,000	100%
SD-20	Combo Truck	Purchase of new Combo Truck	$420,000	0%
Total 20-Year Project Costs			**$18,560,000**	

[1] *Levee inspection requirements vary depending on structure from annual to bi-annual. Flows in the Umatilla River exceeding 10,000 cubic feet per second trigger additional inspection requirements.*
[2] *Costs provided by City of Pendleton.*

Table 1-6
Recommended Developer-Paid Projects

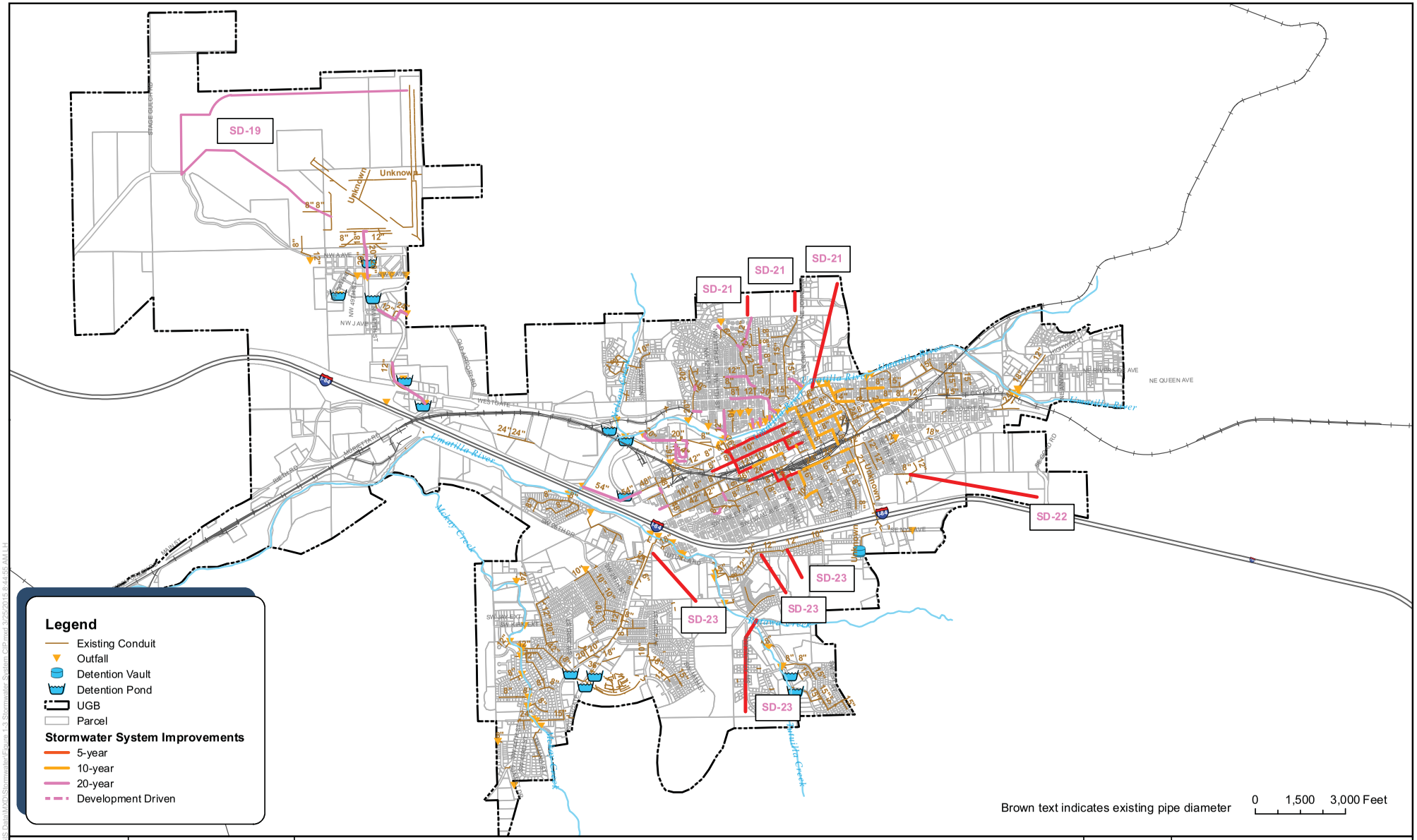
Project ID	Project Name	Project Description	Project Cost	Percentage Attributed to Growth
SD-21	North Hill Development	3,500 ft of 24-inch and 2,000 ft of 36-inch gravity piping	$2,500,000	100%
SD-22	Pendleton East End and Goad Property Development	4,500 ft of 36-inch gravity piping	$2,657,000	100%
SD-23	Southgate Development	2,400 ft of 18-inch and 5,500 ft of 36-inch gravity piping and one new outfall to Patawa Creek	$4,041,000	100%
Total Developer-Paid Project Costs			**$9,198,000**	

General note: Project timelines vary.

Table 1-7
CIP Summary

Project Name	CIP Schedule and Project Cost Summary				
	0-5 Years (Immediate)	6-10 Years	11-20 Years	Developer Paid	Total
Data Collection	$50,000	$50,000			$100,000
Combo Truck	$50,000		$420,000		$470,000
Levee Certification	$527,000[1]				$527,000
Levee O&M	$665,000	$560,000	$1,120,000		$2,345,000
System Maintenance	$200,000[2]	$200,000[2]	$400,000[2]		$800,000
Annual Replacement Program	$270,000[2,3]	$270,000[2,3]	$540,000[2,3]		$1,080,000
Deficiency Upgrades	$5,761,000	$9,075,000	$12,250,000		$27,086,000
Stormwater Master Plan Update		$150,000	$300,000		$450,000
Airport Expansion			$3,530,000		$3,530,000
North Hill Development				$2,500,000	$2,500,000
Pendleton East End and Goad Property Development				$2,657,000	$2,657,000
Southgate Development				$4,041,000	$4,041,000
CIP Total	**$7,523,000**	**$10,305,000**	**$18,560,000**	**$9,198,000**	**$45,586,000**

[1] *Costs identified by MSA subconsultant Phase I levee review.*
[2] *Costs provided by City of Pendleton.*
[3] *Costs based on 150 years of annual replacement programs.*



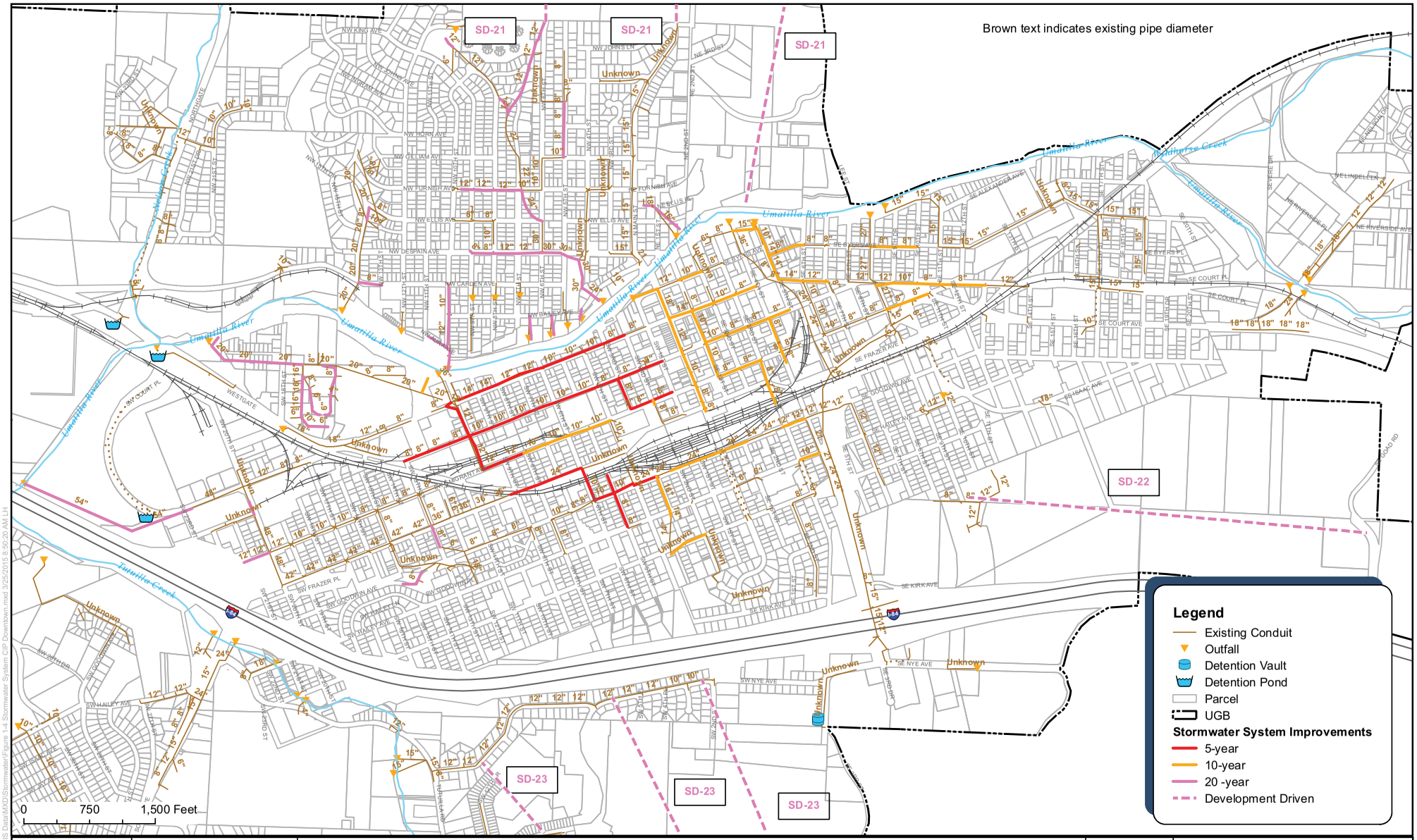
MSA Murray, Smith & Associates, Inc.

CITY OF PENDLETON INCORPORATED 1880 OREGON

City of Pendleton
Stormwater Master Plan

Figure 1-3
Stormwater System CIP

March 2015 13-1442



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City of Pendleton
Stormwater System Master Plan

Figure 1-4
Stormwater System
CIP Downtown

March 2015 13-1442

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Financial Plan

Background

The City's stormwater system currently lacks a dedicated funding source. Some stormwater-related maintenance activities such as street sweeping are funded out of the Street Fund, and limited capital projects (levee certification) and maintenance are funded from the Sewer Fund. As the Street and Sewer funds face their own funding challenges to address a backlog of capital improvements and staffing needs, it will be necessary for the City to establish a separate Stormwater Utility in order to fund ongoing maintenance and capital needs associated with its stormwater system.

The City's 2013 survey of small cities in Oregon found that about half of the cities surveyed charge separate stormwater fees, with monthly bills for residential customers ranging from $1.00 to $12.00, with a median bill of about $5.00.

Financial Capacity

Without a separate funding source for stormwater, the Street and Sewer funds do not provide sufficient financial capacity to address the projected stormwater system needs (both operating and capital). Over the next five years, additional stormwater system requirements are projected to average about $500,000 per year, including $200,000 for staffing three FTEs, and $300,000 for capital improvements.

It is recommended that the additional revenue come by implementing dedicated stormwater rates and a new System Development Charge (SDC). The City currently charges SDCs for the street system, but not for the water, wastewater, or stormwater systems, and is missing an important funding source for capital improvements. Following industry standards for development of SDCs, the recommended CIP would support an SDC of approximately $125 per equivalent residential unit. A recent survey by the League of Oregon Cities indicated the typical range for stormwater SDCs is about $100 to $2,000, with the median equal to about $500 per unit.

While SDCs are generally an important part of a capital funding strategy, they are only part of the solution, as user fees will be needed to fund the majority of capital improvements related to rehabilitation and replacement, and remedying existing deficiencies, and all increases to operating costs (SDCs may not be used for system O&M). Stormwater charges are generally assessed based on property size, with impervious area being the most common measure of system impact (owing to increased stormwater runoff).

The City will need to further develop its GIS and billing systems in order to implement an area-based fee. In the interim, the City could implement a flat fee per customer account to begin generating needed revenue for capital improvements and maintenance. A monthly fee of $5 per account (equal to the median charge in other small communities) would generate approximately $350,000 per year (based on 5,800 water system accounts). To fully fund the

estimated $500,000 per year of expenses, a monthly fee of $7.25 would be required, which is still within the range of surveyed communities.

Recommendations

The following recommendations are offered for the City's consideration related to funding the staffing and capital improvements recommended in the Stormwater Master Plan:

- Adopt a new SDC based on the growth-related portion of this SWMP CIP. Adjust the SDCs annually for inflation based on the Engineering News Record (ENR) Construction Cost index (20-city average). Update SDCs as necessary to incorporate significant changes to the CIP.
- Create a new Stormwater Fund, and implement monthly stormwater rates. Initially, implement a flat rate per account, and then move to an area-based fee, following development of GIS and billing system capacity.
- Index future rates to an inflationary index such as the ENR.
- Review the financial plan annually, and make modifications to planned rate increases and capital phasing as needed to meet system performance targets.

Summary and Overall SWMP Recommendations

This SWMP constituted a major investment of time and resources for City staff and consultant team. The City, and in particular the Public Works Department, should be commended for their foresight in initiating such a comprehensive SOW in order to successfully operate, maintain, design and improve the City's stormwater drainage system. This SWMP utilized industry-standard approaches by compiling and converting information to a GIS database and successfully utilizing hydraulic modeling software.

Prior to this SWMP no single stormwater drainage system inventory nor hydraulic model existed. Collecting and compiling system data allowed for a more accurate and comprehensive look at the stormwater drainage system as a whole than what was previously available. The hydraulic modeling allowed for the evaluation of stormwater drainage system alternatives based on system hydraulics. The capital projects that have been identified and prioritized provide the City with a phased plan over the next 20 years that is affordable and realistic.

Based on the findings in this SWMP, the following recommendations are made:

- Further consider the option of creating a distinct stormwater utility to provide funding to facilitate system operation, management and necessary improvements.
- The City should focus short-term financial resources towards improving the quality of system data and expanding the GIS database and updating the hydraulic model to reevaluate system deficiencies and improvements.
- Reassess improvements using future SWMP updates.

- After additional data collection and validation of the recommended improvements, the City can prioritize improvements in the short term (immediate to five years), prioritizing the existing gravity system within the downtown commercial area and provide for operation of the levee system in conformance with FEMA requirements. In order to maintain infrastructure, an annual repair and replacement program should also be implemented.
- Implement O&M programs to increase the lifecycle of infrastructure and reduce unplanned maintenance.
- Transfer one FTE for street sweeping activities from Streets Division to Storm Utility.
- Add two FTEs as dedicated staff for the operations and maintenance of the stormwater collection system. This would be in addition to the transfer of the street sweeper FTE positon from the Streets Division.

Policy Recommendations

In order to prevent unnecessary large expenditures in the future, it is recommended that the City reconsider its financial and planning review policies, as follows:

Planning Review Policies

Although planning documents have detailed stormwater drainage system upgrades, there are no policies in place requiring regular updates, public discussion, or review. Consequently, as updated information becomes available and changes in the system occur, planning may be altered and significant investments could be made when an alternative based on new information may be a better option. The following policy recommendations will better define the requirements of future stormwater drainage system planning and help future City councils and the public plan for future investments long before they are needed:

- Require City staff to provide an annual review to Council on the status of the master plan.
- Provide an updated or new master plan to City Council every five years for adoption.

Once the City revises its policies, it is crucial that future City councils and staff understand the rationale behind these policies. To realize the potential impact of any future policy revisions, the historical context and reasoning behind existing policies must be clearly understood.