City of Pendleton

Water, Sewer Collection and Stormwater Master Planning

City Council Workshop

February 28, 2015

INTRODUCTIONS

- Bob Patterson, P.E. - City of Pendleton, Public Works Director
- David Stangel, P.E. - MSA, GIS Lead & Overall Project Manager
- Deb Galardi - Galardi-Rothstein Group, Financial Lead
- Brian Ginter, P.E. - MSA, Water Master Plan Lead
- Dennis Galinato, P.E. - MSA, Sewer Master Plan Lead
- Mike Carr, P.E. - MSA, Stormwater Master Plan Lead

OVERALL AGENDA

- Pendleton Water/Sewer/Storm History
- Justification and Overview of Project
- GIS Development
- Water
  - Master Plan Presentation
  - Financial Discussion
- Collection System Collection
  - Master Plan Presentation
  - Financial Discussion
- Stormwater
  - Master Plan Presentation
  - Financial Discussion
- Feedback & Next Steps

WHY MASTER PLAN?

- Identify short and long term needs
  - Capital Improvements
  - Staffing levels
  - Policy Updates
  - Financial Strategy
- Improve level of service to customers
  - Supports economic development
  - Redundancy
  - Identifies developer standards
- Develop short and long term roadmap for system improvements

WHY UPDATE PENDLETON'S MASTER PLANS?

- No recent Plans (Water System Master Plan, 1979, Water Supply 1994, Collection System 1963, Sewer Facility Plan 2007, Storm NA)
- Kick-start GIS development
- No hydraulic assessment tools
- Needed basis for improvements
- Pressing development at airport
- Assess staffing levels
- Develop ongoing repair and replacement programs
- Develop updated financial strategy

OVERALL SCOPE OF WORK

- GIS Development
- Planning included analysis of full build-out of the UGB
- Master Plans for:
  - Water
  - Sewer Collection (no treatment)
  - Stormwater
- Updated Rates & SDCs for Water and Sewer
- Timing of the formation of a stormwater utility

HIGH LEVEL TAKEAWAYS

- City is generally understaffed compared to similar communities
- Need to continue building/improving infrastructure database
- No comprehensive infrastructure replacement program is in place
- Current rates do not support staffing or capital needs
- No System Development Charges (SDC) in place
- City fees and charges relatively low in comparison to other communities
- Evaluate creation of stormwater utility to support infrastructure & staffing needs
- City needs to invest (staff and capital projects) or risk falling further behind

FINANCIAL ANALYSIS

Determine Revenue Needs by System

- Operations & maintenance costs (e.g., staffing levels)
- Capital improvements (20-year CIPs)
- Repair & replacement

Evaluate Funding Options

- Existing rates and charges
- New funding sources
  - *System development charges*
  - *Stormwater rates*

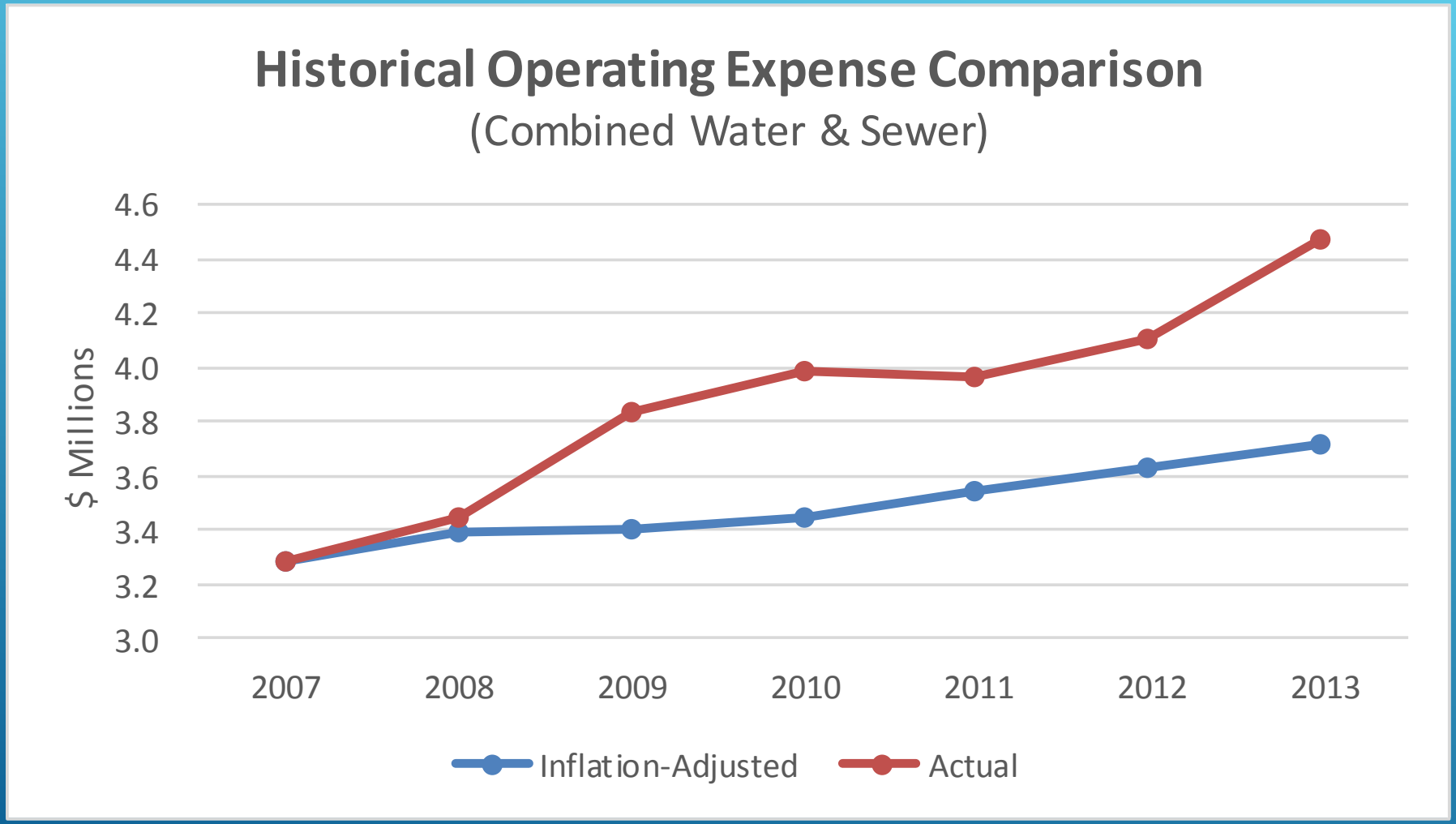
Develop Phase-in Strategies

- Annual rate adjustments
- Stormwater utility implementation

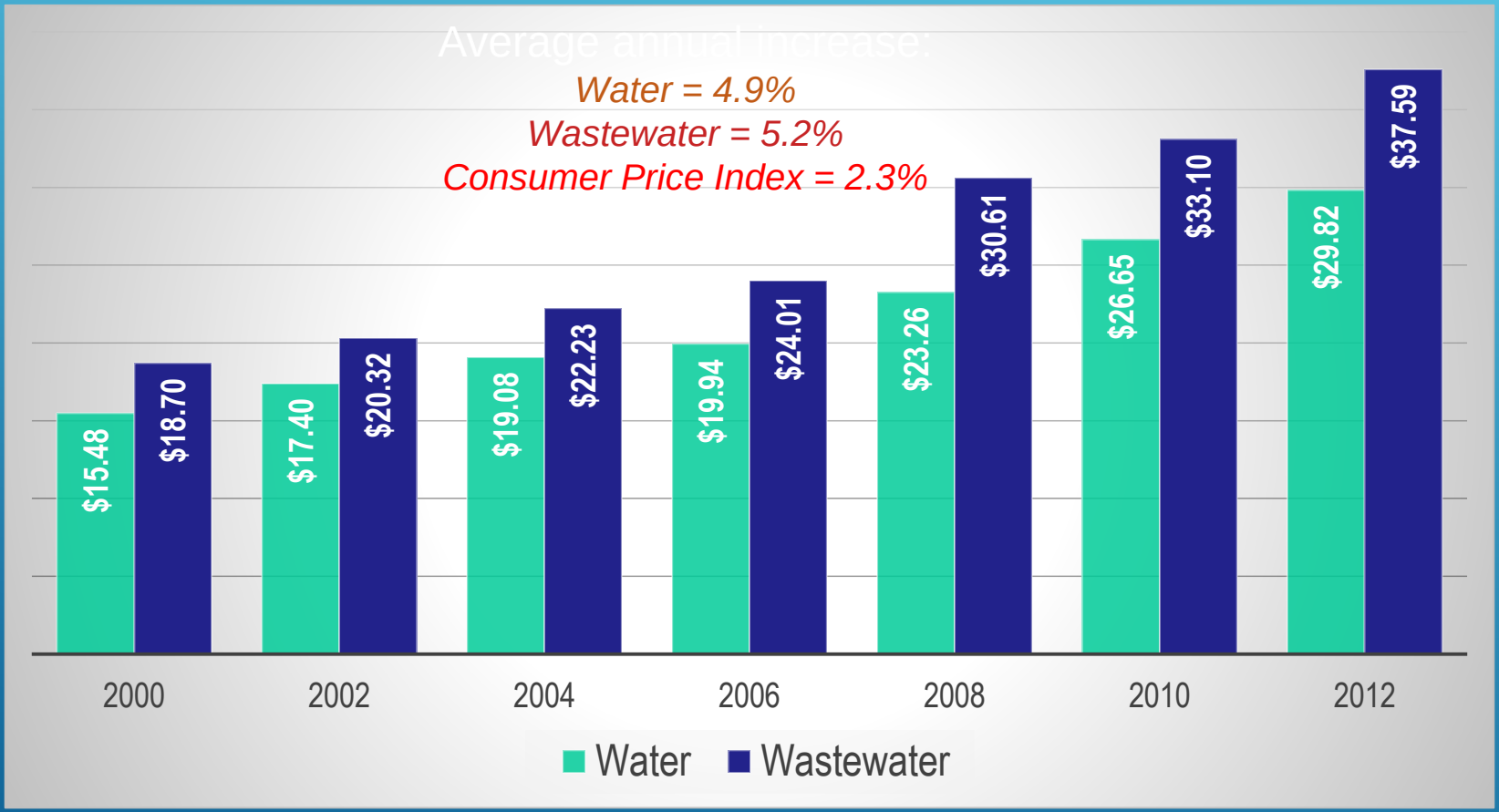
HISTORICAL RATE INCREASES

Water & Sewer:		
2005 Annualized (inflationary) rate adjustment introduced		
Water Rate Increases		
2005	12%	
2013	5%	
2014	7%	Membrane replacement
1994-2014	***192%***	***Total Bill Increase (Based on 15 ccf use)***
Sewer Rate Increases		
2005	18%	
2006	5%	
2007	98%	RRF Debt ($15 m)
2014	-7%	Shift membrane replacement cost to water
1994-2014	***197%***	***Total Bill Increase***

INFLATIONARY INCREASES HAVE NOT KEPT PACE WITH OPERATING COSTS

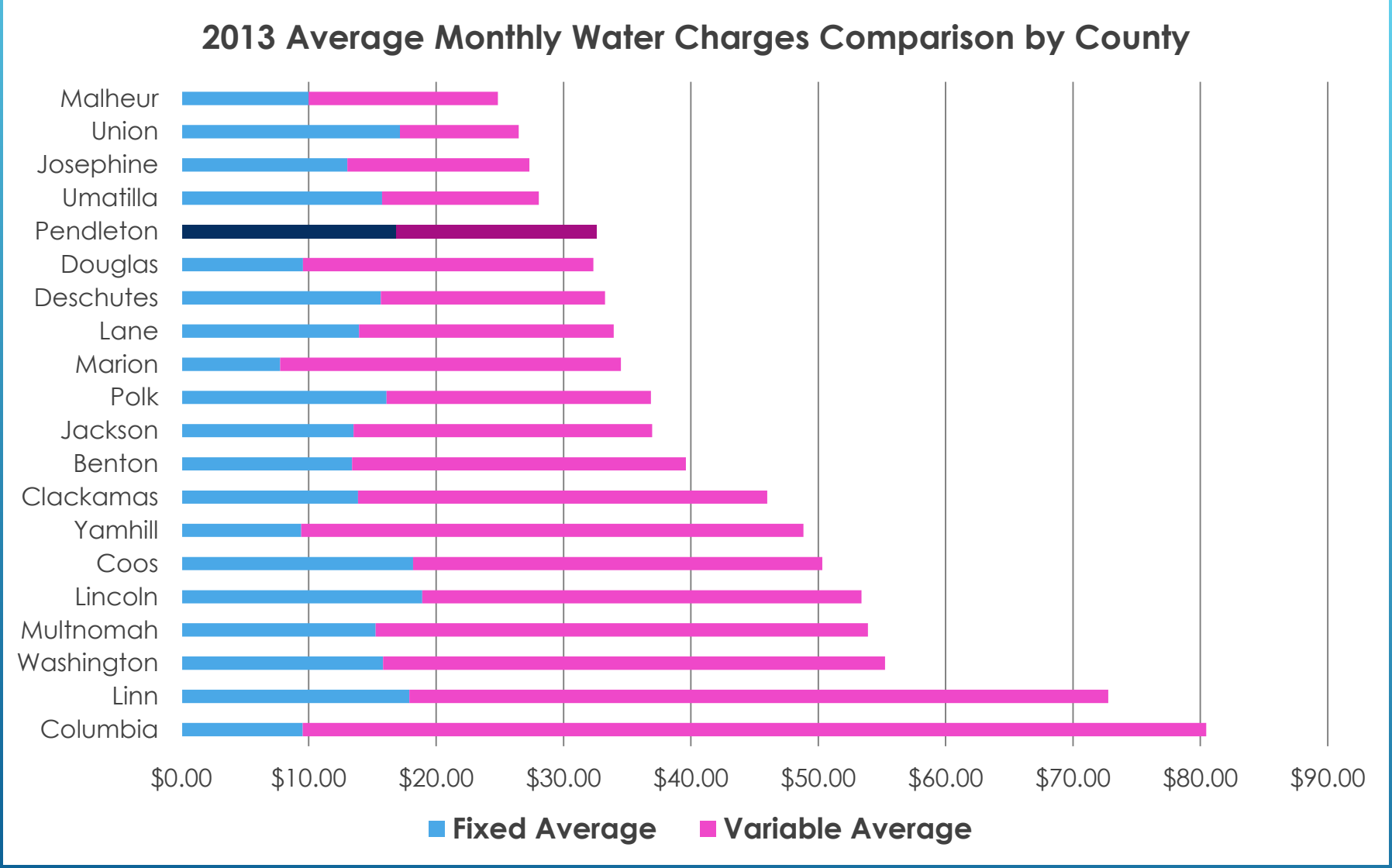


MONTHLY BILLS* INCREASED 2X INFLATION

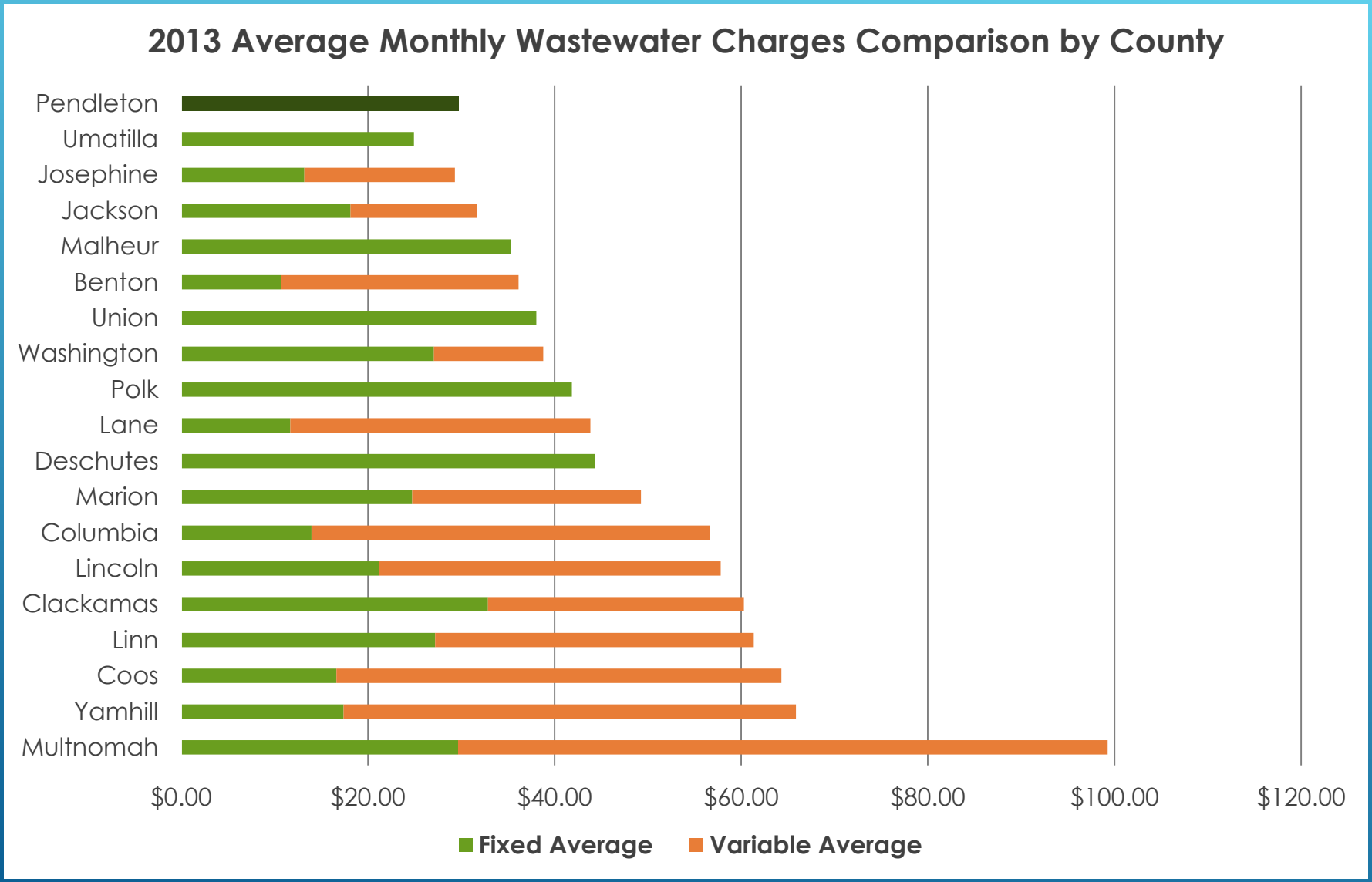


2012 Rate Survey: American Water Works Association and Raftelis Financial Consultants
*Based on 7,480 gallons (28 m3) per household

OREGON WATER RATE COMPARISONS FOR CITIES WITHIN THE FOLLOWING COUNTIES



OREGON SEWER RATE COMPARISONS FOR CITIES WITHIN THE FOLLOWING COUNTIES



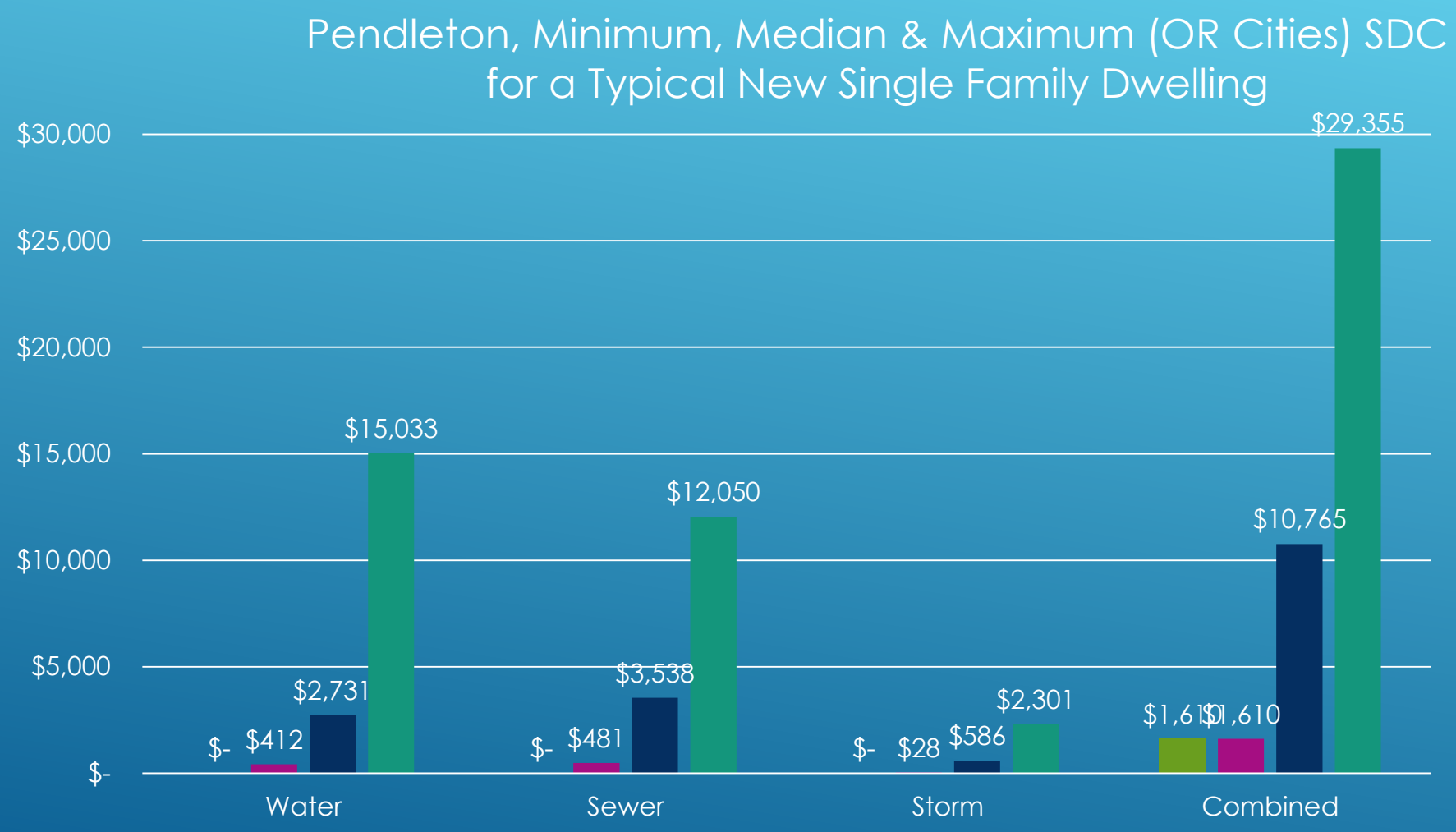
SYSTEM DEVELOPMENT CHARGES (SDC)

- An important component of capital funding plan (capacity costs for new development)
- State statutes provide guidelines for development & administration of SDCs
- Eligible systems: water, wastewater, storm drainage, transportation, parks & recreation
  - Current ordinance only covers water, transportation & parks
  - Current methodology (charges) limited to transportation

SDC METHODOLOGY CONCEPTS

- Reimbursement fee
  - Based on existing facility costs
  - Must establish that available capacity exists
- Improvement fee (current transportation SDC)
  - Based on improvements to be constructed
  - Demonstrates consideration of capital improvements identified in the plan and list….needed to increase capacity of the system
- Compliance Charge
  - Cover costs associated with complying with SDC statutes

SDC COMPARISONS



Combined category includes transportation and parks SDCs

HOW SHOULD PLANS BE USED?

- Reviewed annually
- Updated every 5 years to assess changes
- Used as basis for project predesigns

GENERAL PLAN STRUCTURE

- Executive Summary
- System Description
- Population Projections, Service Area, Project Flows
- System Analysis
  - Design Criteria
  - Develop Hydraulic Models
- Operations and Maintenance
  - Benchmarking
  - Ongoing repair and replacement
- Capital Improvement Plan
  - Airport Industrial Area
- Financial Analysis
- Appendix
  - Standard Specifications

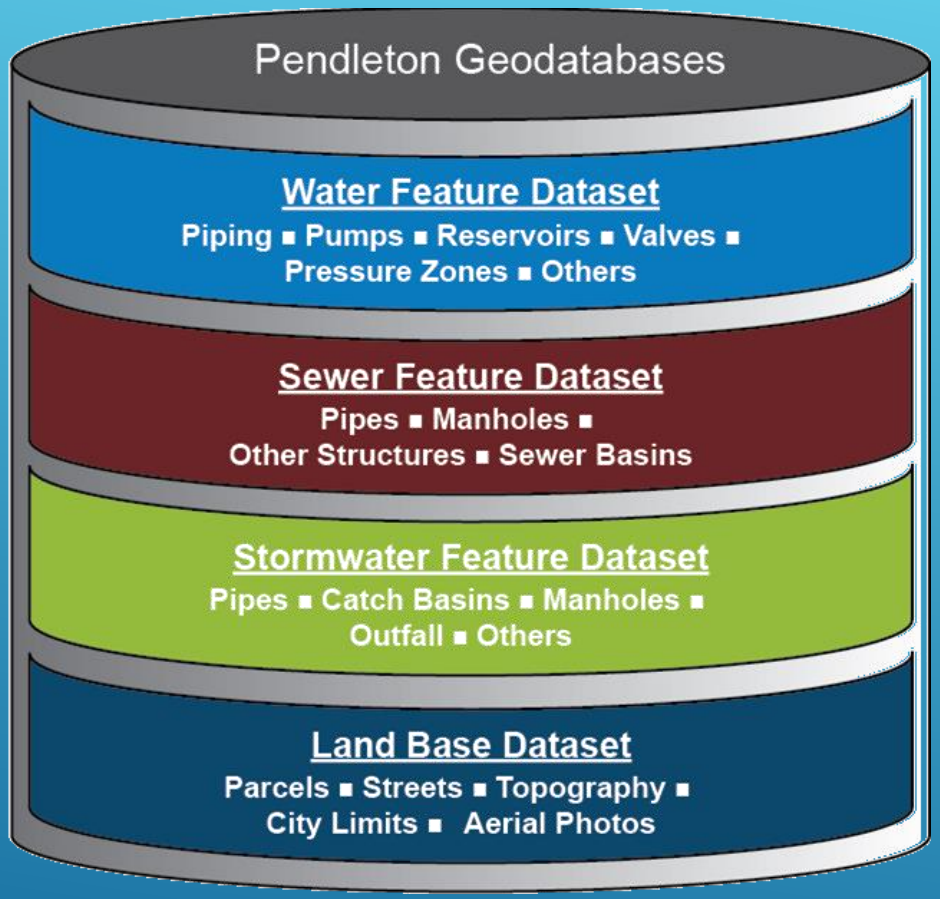
GIS DEVELOPMENT

GIS DEVELOPMENT ACKNOWLEDGEMENTS

- Significant Contributions were made by the following staff:
  - Jeff Brown
  - Wayne Green
  - Bob Patterson
  - Mark Milne
  - Tim Smith
  - Tim Simons
  - ….and of course Katey Jones!

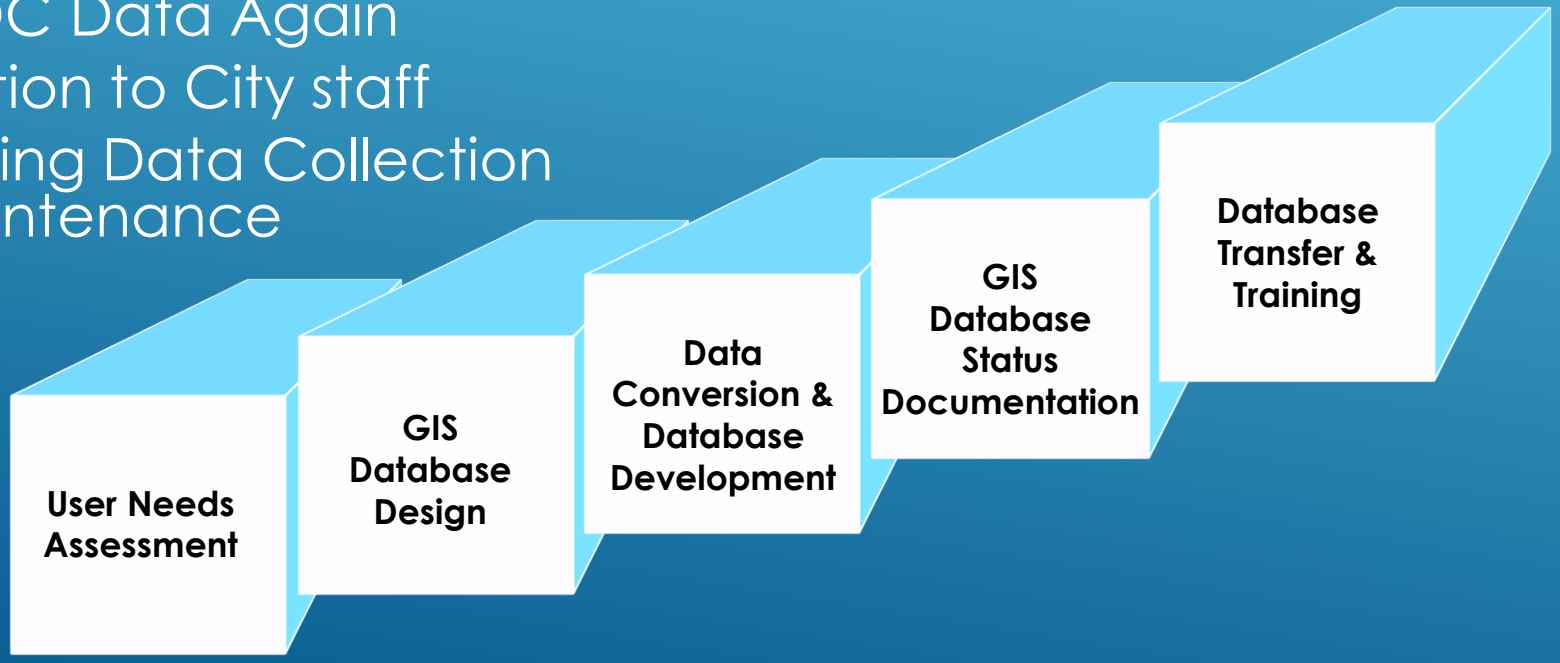
PROJECT OVERVIEW

- Create GIS Databases for water, sewer, and stormwater to support master planning and other public works functions



PROCESS OVERVIEW

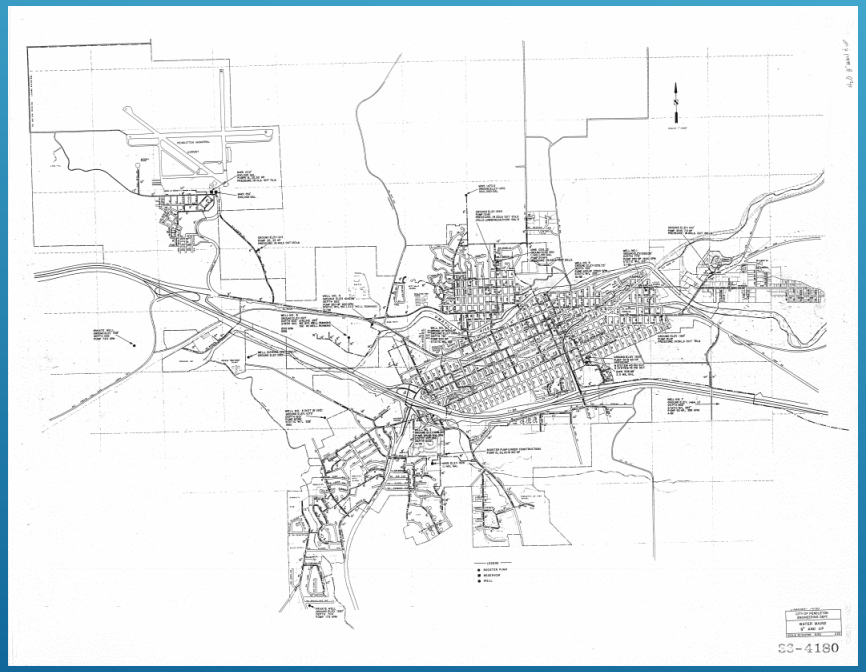
- Assess Needs
- Develop Database Design
- Facility Tours
- Data Conversion into Database
- QA/QC Data
- Model Integration
- QA/QC Data Again
- Transition to City staff
- Ongoing Data Collection & Maintenance



BACKGROUND

- Data was in AutoCad and different hard copy maps/as-builts

- Those sources didn't necessarily contain the same information…



DATA CONVERSION

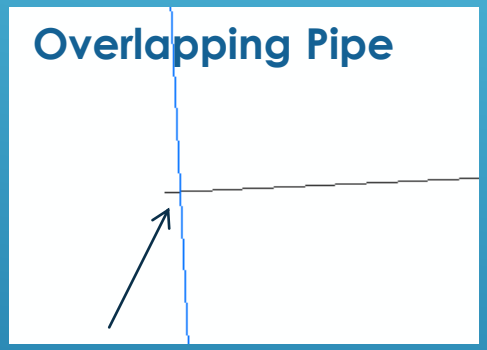
- Combination of automated & manual processes
  - CAD data imported where available
  - Attribute data (e.g. diameter, material) manually added from hard copy maps
  - Facilities converted from CAD structure to GIS features
- Issues identified
  - Cross connected or unconnected piping
  - Hard copy mapping provided for review
    - Missing infrastructure hand drawn by City staff
  - Several iterations of QA/QC was completed

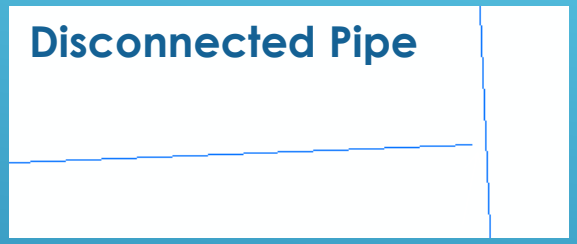
GIS ISSUES

- Coordinate System differences
- Attributes
- Incorrect topology (connectivity)
- Facilities not represented accurately
- County data challenges (e.g. duplicate, overlapping parcels)
- Staff had little GIS experience
- No software to review initial mapping

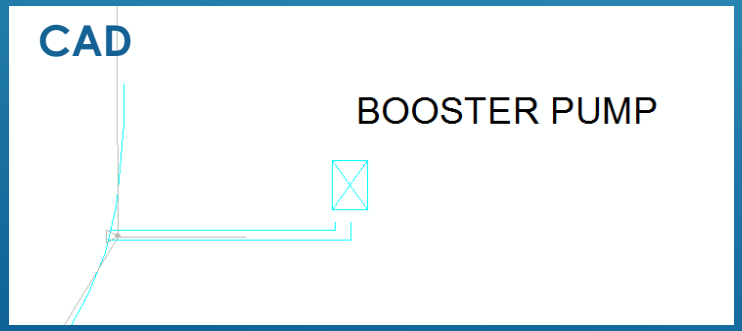
GIS ISSUES

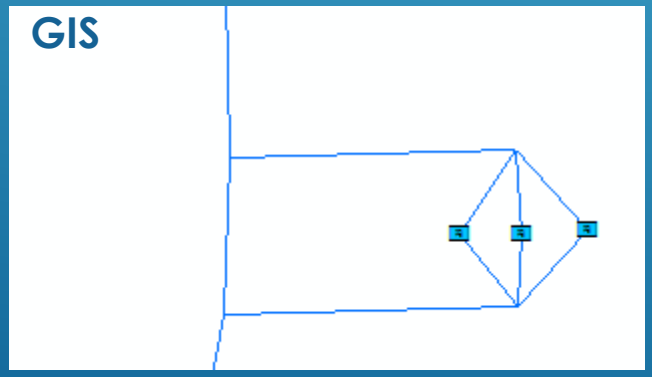
- Incorrect topology/connectivity





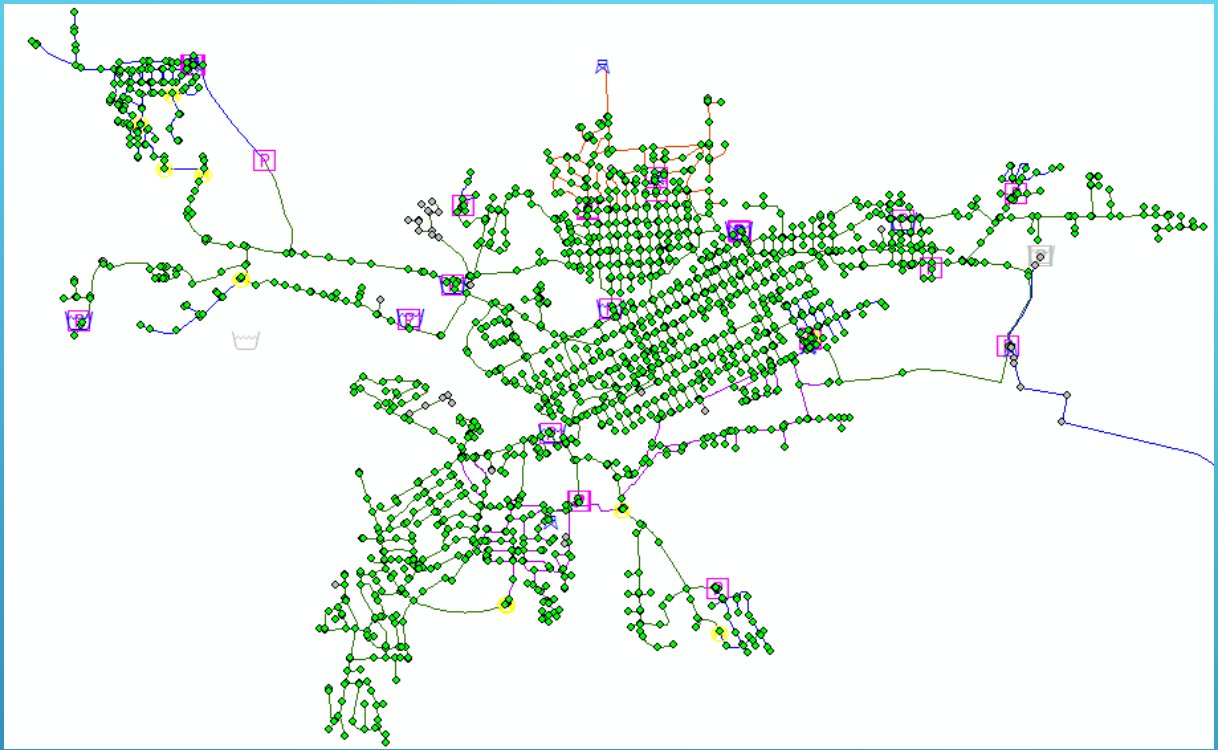
- Facility Representations





SURVEYING

- Mix of City & Contracted Staff
- Survey focus on Sewer & Stormwater systems
- No time or budget for entire systems to be surveyed
- Subset of features identified for surveying
- Survey points selected at key elevations for hydraulics otherwise at every 3rd manhole
- Ongoing data collection - all points will be surveyed over time



- Unique Opportunity to develop GIS and model concurrently
  - Ensures database design and network structure were compatible with model
- Model provides a significant QA/QC tool

MODEL INTEGRATION

TRANSITION DATA TO CITY STAFF

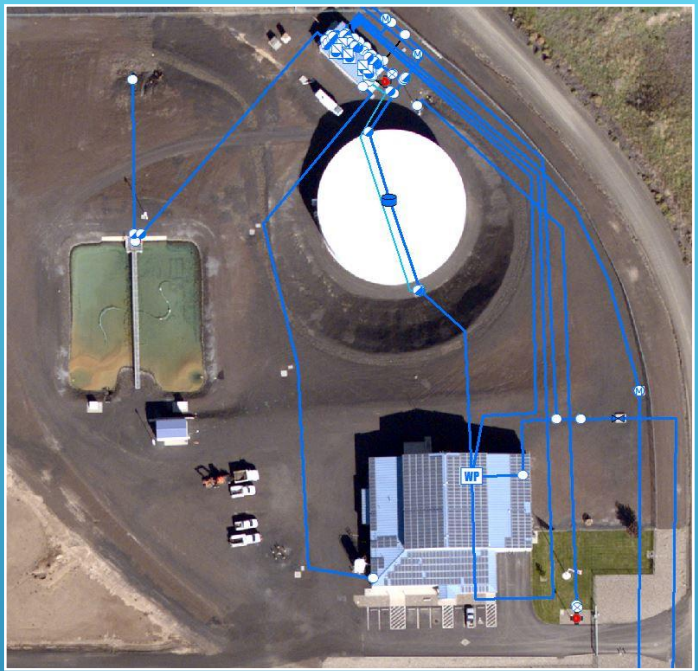
- Critical that everyone knows:
  - Who owns the data
  - How data moves between departments and staff
- Ideally have utility GIS staff not reside in Planning Dept.
- The key, as with almost everything in life, is……

Effective Communication

CITY'S STATUS

- Purchased GIS software
- Hired GIS Coordinator in summer 2014 – Katey Jones
- Future Goals
  - Ensure Accuracy of Data
  - Populate Missing Attributes
  - Link GIS with Billing
  - Asset/Maintenance Management
  - Consistent Model Updating Process
  - Increasing Staff GIS Skills
  - Focus on Public Works in Near Term
    - As-builts
    - Utility System Wide Mapping
    - Utility Locating
    - Shut offs/Turn ons
    - Tracking abandoned assets

INFORMATION USED FOR MASTER PLAN



RECENT DATA ENHANCEMENTS

RECENT CITY GIS IMPROVEMENTS

FINAL TAKE AWAY THOUGHTS

- Almost everything is in a constant state of change:
  - Staff
  - Software
  - Organizational Structures
  - Priorities
  - Budgets
  - Users
- A well-structured and maintained GIS can provide consistency and continuity when everything else changes
- Need standards and protocol in place to maintain and continue to improve accuracy of GIS
- Emphasis of Planning Effort

WATER SYSTEM MASTER PLAN

Brian Ginter/MSA

WATER PLAN ACKNOWLEDGEMENTS

- Significant contributions were made by the following staff:
  - Jeff Brown
  - Wayne Green
  - Bob Patterson
  - Tim Smith
  - Tim Simons

PROJECT OVERVIEW

1. Executive Summary
2. Existing System Description
3. Population and Wastewater Flow Projections
4. System Analysis
5. Operations and Maintenance
6. Capital Improvement Program
7. Financial Evaluation

SYSTEM DESCRIPTION – SUPPLY

- Source Water
  - Surface Water from the Umatilla River
    - River Intake
    - Membrane WFP
  - Groundwater/ ASR Wells
    - 8 active wells (5 are ASR capable)

SYSTEM DESCRIPTION – DISTRIBUTION

- Distribution System
  - 13 Pressure Zones
  - ~107 miles of pipe, ¾-inch to 24-inch diameter
  - 13 Booster Pump Stations
  - 8 Storage Reservoirs

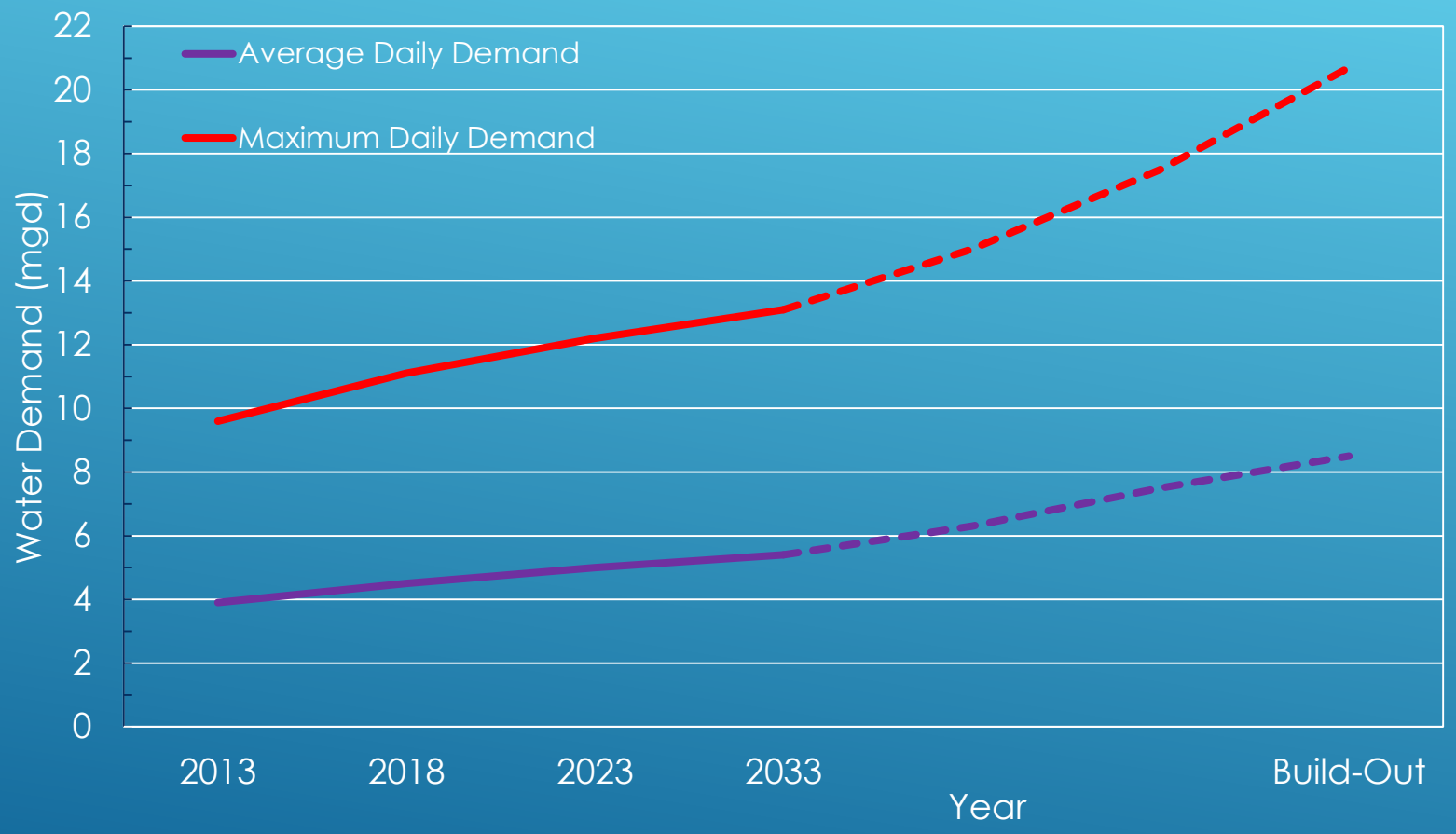
POPULATION & DEMAND PROJECTIONS

- Population projections consistent with comprehensive plan update
  - Continued infill
  - Growth areas within the UGB
- Water demand forecasting:
  - Analyze Historical Usage Trends
  - Project Future Water Use Characteristics
  - Apply to New Customer Areas

POPULATION PROJECTIONS

Planning Horizon	Population
Existing	17,611
2018	19,716
2023	21,897
2033	23,970
Build-Out	31,324

WATER DEMAND PROJECTIONS



Note: Maximum Daily Demand must be provided by supply sources

PLANNING CRITERIA

- Standards based on:
  - Oregon Administrative Rules – Rule 333 Division 61 (OAR333-61)
  - Recommended Standards for Water Facilities, 2007 Edition (Ten States Standards)
  - Water System Design Manual, 2009, Washington State Department of Health
- Primary Criteria
  - Supply >= Max Day Demand
  - Pressure
    - Min. 40 psi non-fire, Min. 20 psi fire conditions, Max 80 psi
  - Velocity
    - < 5 ft/s Max Day, < 10 ft/s Peak Hour or Fire Flow
  - Booster Stations
    - Firm Capacity (largest out of service)
    - Backup Power
  - Storage
    - Sum of equalizing, operational, standby and fire requirements

SYSTEM ANALYSIS – SUPPLY CAPACITY

Supply Source	Existing Capacity (mgd)
Wells	
Wells 1-5, 8 & 14	11.52
Well 5 out of service	-2.66
Wells Subtotal	**8.86**
Water Filtration Plant	
Umatilla River	1.60
Well 7	0.43
WFP Subtotal	**2.03**
Total	**10.89**

	Current	5-year (2018)	10-year (2023)	20-year (2033)	Build-Out
Existing Firm Supply	10.89	10.98	11.02	11.13	11.13
MDD	9.60	11.10	12.20	13.10	20.70
Deficiency	-	**0.12**	**1.18**	**1.97**	**9.57**

SYSTEM ANALYSIS – STORAGE

- Adequate storage volume for existing conditions
- 0.29 MG deficit by 2033
- 1.04 MG deficit at build-out
- Storage needs
  - Skyline Pressure Zone
  - Gravity Zone west of Northgate to provide supply to Airport Pump Station

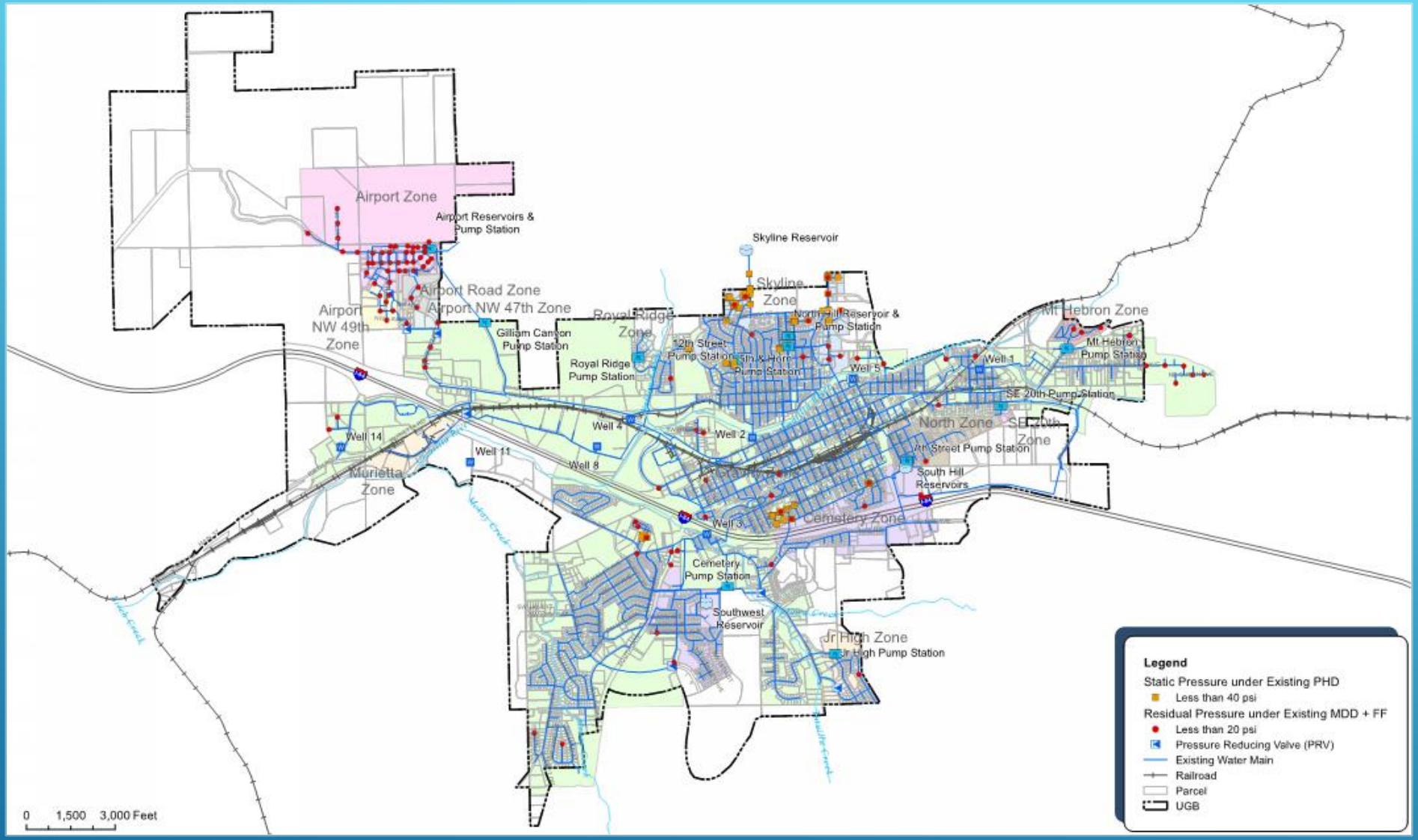
MG: Million Gallons

SYSTEM ANALYSIS – PUMP STATIONS

- 6 of 7 pump stations have existing capacity deficiencies
- Deficiencies increase over the 20-year planning horizon
- Backup power recommended for all pump stations.
  - Now in place at Mt. Hebron
  - Airport PS in progress

SYSTEM ANALYSIS – DISTRIBUTION

- Hydraulic Model Development
  - Build Model – InfoWater
    - "All Pipe" model
    - Based on GIS – City Records and Mapping
  - Demand Allocation
    - Actual customer locations and usage records
  - Calibrate Model
    - Field testing – Hydrant pressures and flows
    - Model adjustment



SYSTEM ANALYSIS
DISTRIBUTION DEFICIENCIES

WATER OPERATIONS & MAINTENANCE

- Regulations and Guidelines
  - Oregon Administrative Rule (OAR) 333-061-0065
    - The OAR specifies that all water systems maintain a current operations manual that provides detailed guidelines to assure a continuous supply of drinking water.
  - Other industry standards
    - APWA Public Works Management Practices Manual
    - Ten States Standards Recommended Standards for Water Works
    - City/County Insurance Services – Best Practices

KEY ASPECTS OF O&M PROGRAMS

- Safety
  - Public/customers
  - Staff
  - Protect the Environment
- Data Collection
  - Maintenance Management Systems
- Scheduled Activities
  - Valve exercising, leak detection, flushing, and meter calibration program
  - Pump station inspection and maintenance
  - Reservoir inspection and maintenance
- Manuals
  - Standard Operation Procedures (SOPs)

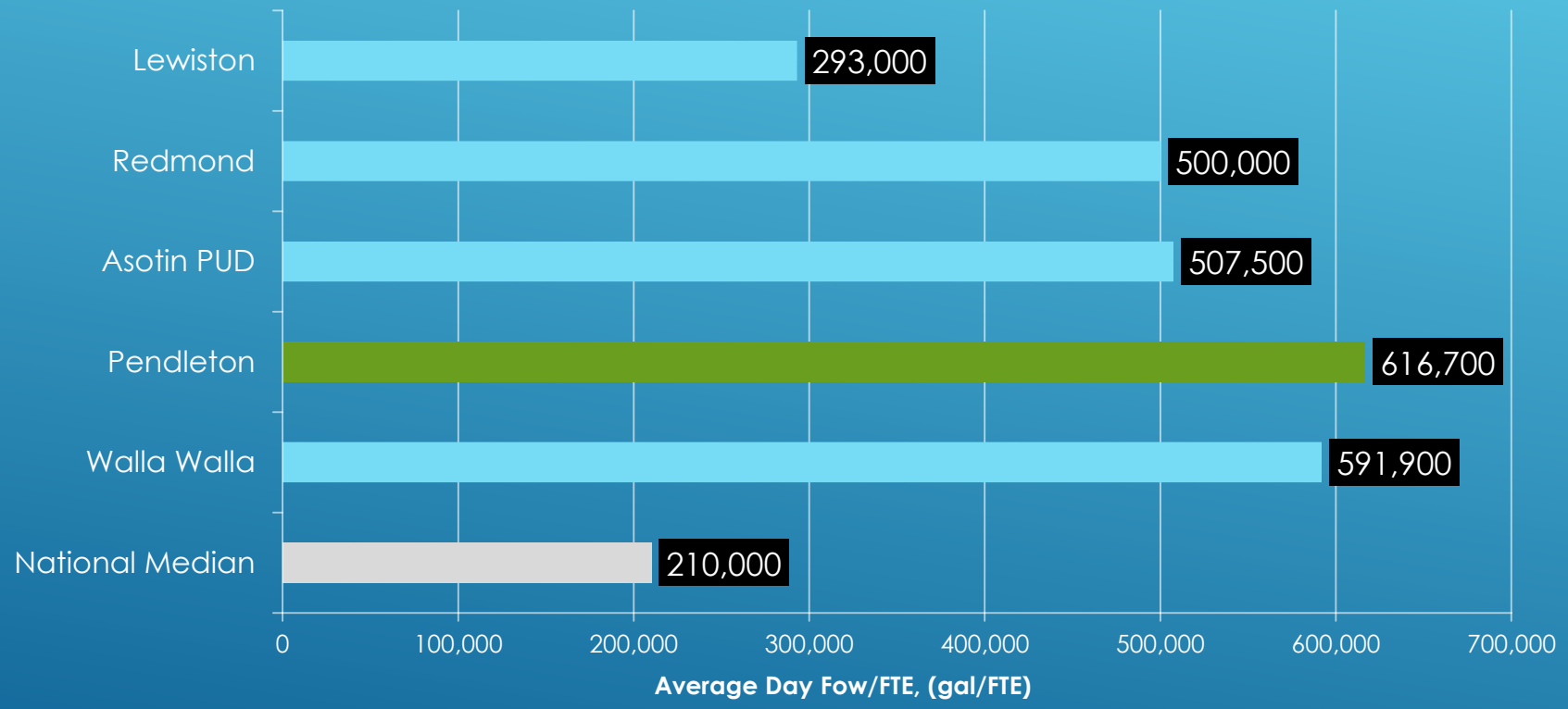
BENCHMARKING

- Compare performance relative to others in the industry
  - Budget
  - Staffing (Efficiency of operations)
- Water Utilities Surveyed

Utility Name	Population Served	Number of Service Connections	Service Area, (square miles)	Number of FTEs on Staff
Walla Walla	34,858	10,900	13	16
Redmond	26,924	9,989	10.2	10
Asotin PUD	19,750	7,050	20	8
Pendleton	**17,600**	**6,184**	**13.4**	**6**
Lewiston	16,000	5,980	17	14

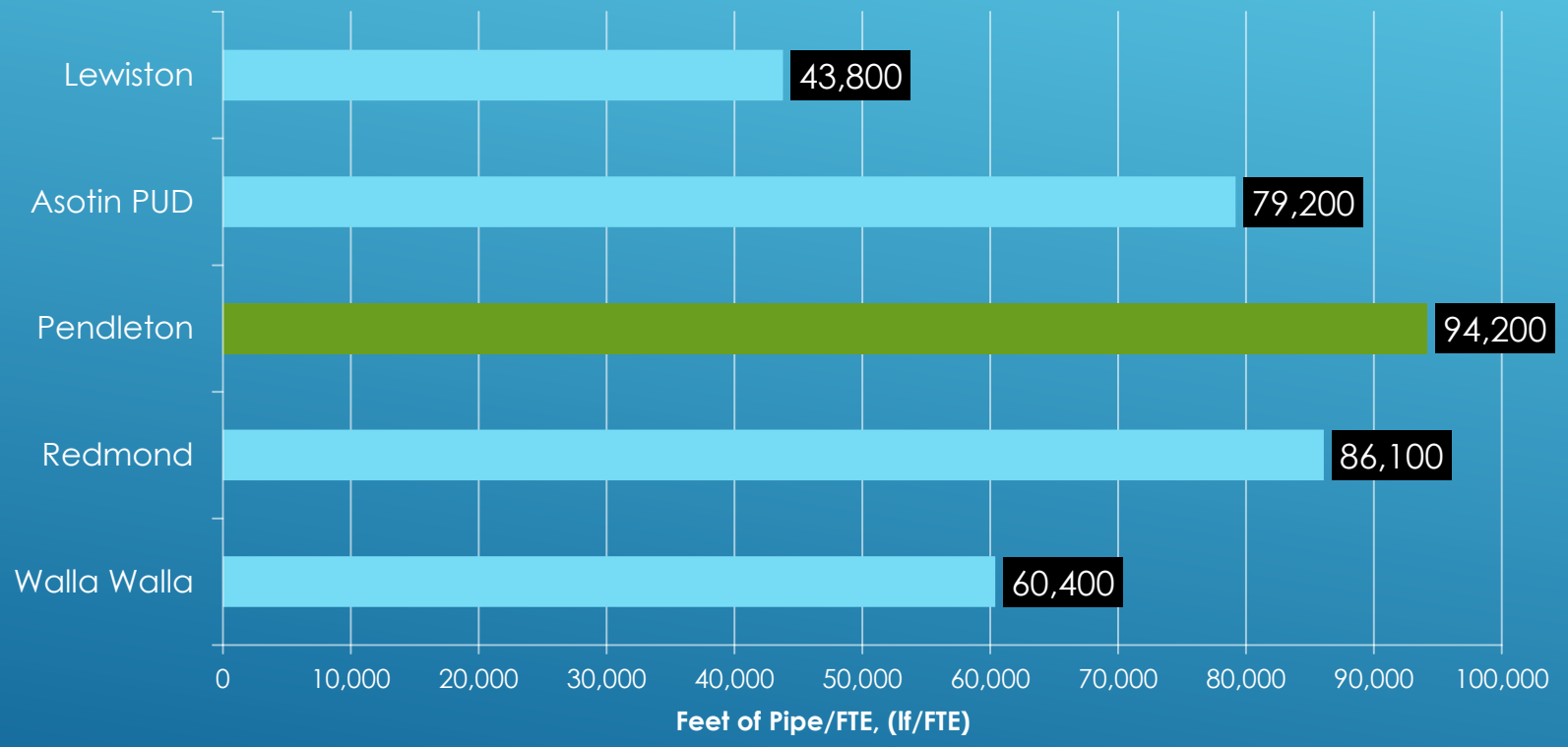
BENCHMARKING SUMMARY

Average Day Flow/FTE, (gal/FTE)



BENCHMARKING SUMMARY

Feet of Pipe/FTE, (lf/FTE)



PIPE REPLACEMENT PROGRAM

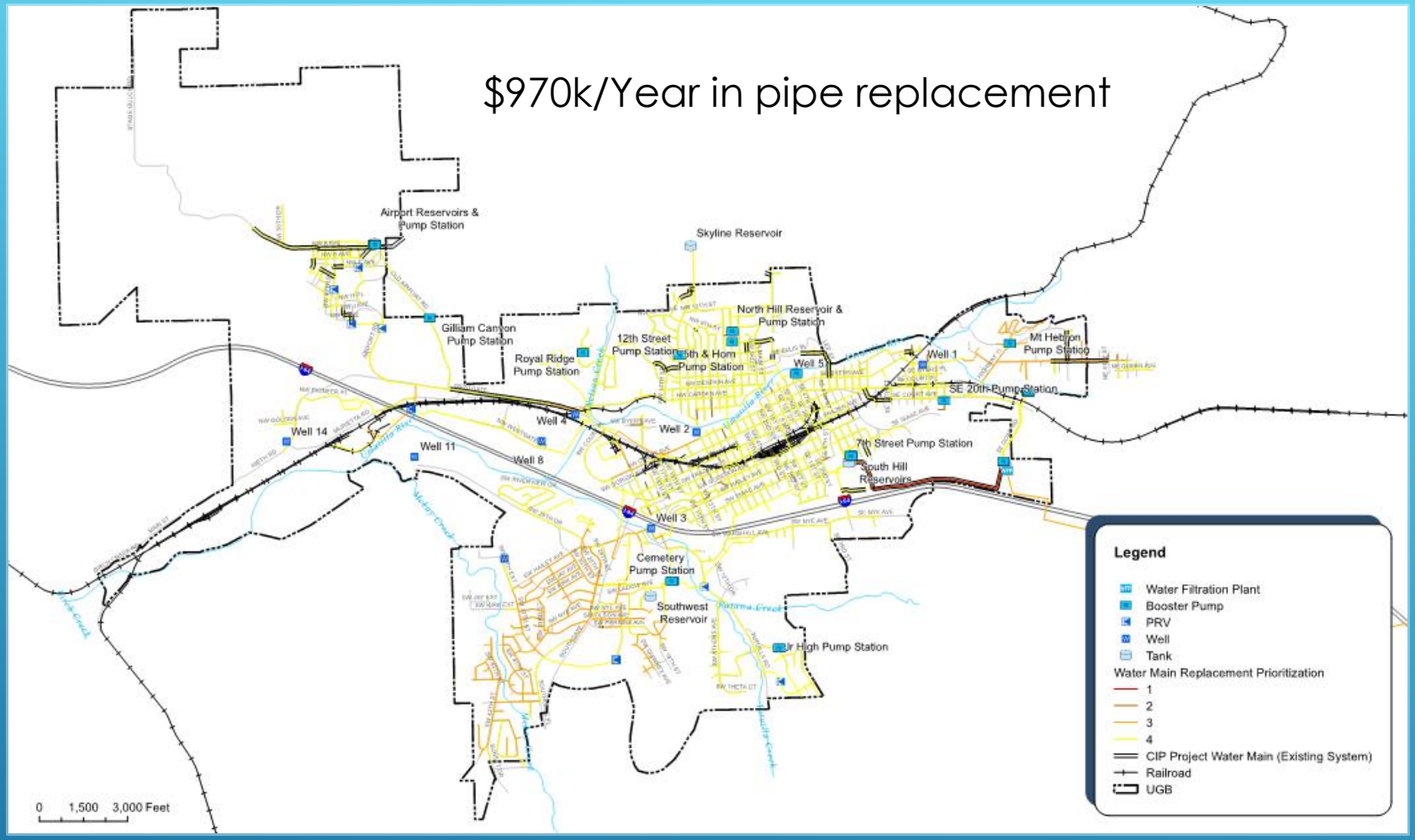
- System renewal and replacement
- Based on 100-year design life
- Prioritization
  - Condition and Capacity Issues
  - Galvanized Iron, Post-1950's Cast Iron, Older Unknown
  - Pre1950's Cast Iron, Newer Unknown
  - Ductile Iron and PVC

WATER O&M RECOMMENDATIONS

- Develop a water system O&M program based on incorporation of the PWMP Manual BMPs
- Hire 5.5 additional FTEs
  - Hire 3.5 additional FTEs
    - 3 FTEs to implement Flushing and Valve Exercising Program, and for leak detection
    - A partial FTE to implement O&M program and associated record keeping
  - Hire 2 additional FTEs to perform ongoing pipe replacement program
    - Part of a 2nd crew of 4 FTEs
    - Dedicated equipment
  - Continue overall pipe repair/replacement program

CAPITAL IMPROVEMENT PLAN

- Pipeline Replacement
- Capacity Related Improvements
  - 0-5 Year Projects
  - 6-10 Year Projects
  - 11-20 Year Projects
  - Beyond 20 Years Projects
- Airport Industrial Area Projects



Assumes a 100-year pipe replacement schedule

PIPE REPLACEMENT PROGRAM

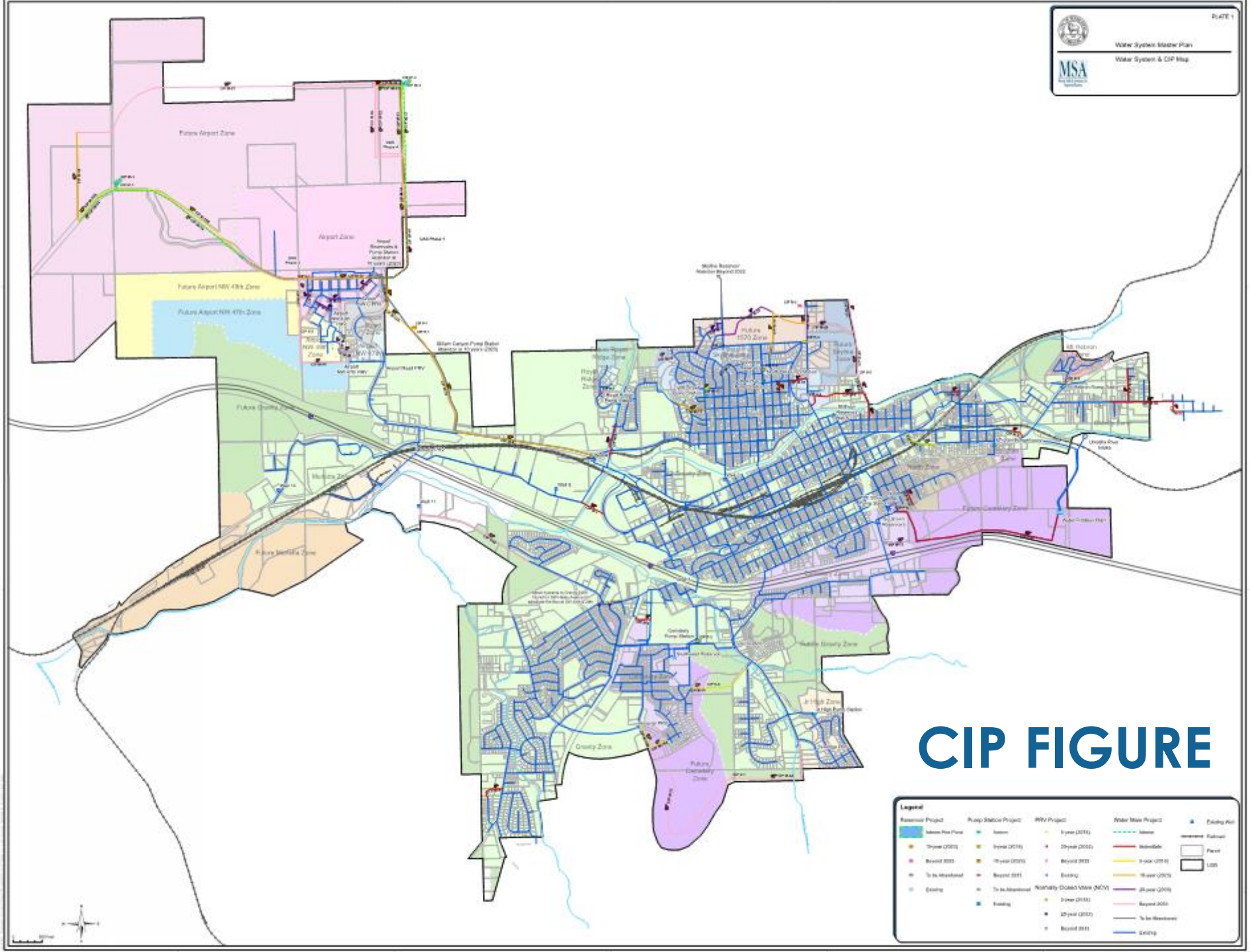
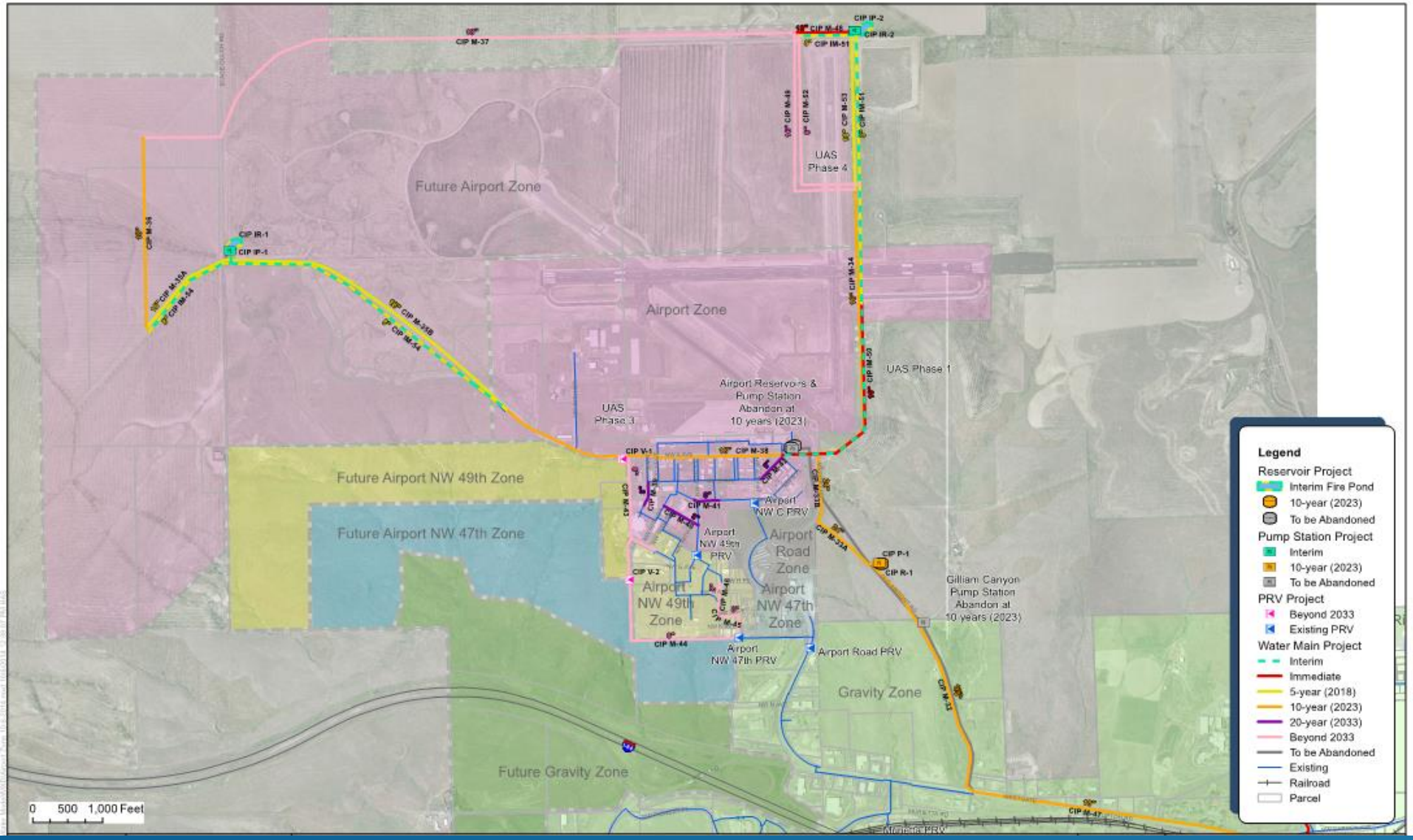


PLATE 1
Water System Master Plan
Water System & CIP Map
MSA
Future Airport Zone
Airport Zone
Future Airport NW 48th Zone
Future Airport NW 47th Zone
Future Gravity Zone
Future Nemaha Zone
Future Gravity Zone
Gravity Zone
Future Cemetery Zone
Future Cemetery Zone
Legend

CIP FIGURE

AIRPORT INDUSTRIAL AREA EXPANSION



CAPITAL IMPROVEMENT PLAN

Project Category	CIP Schedule and Project Cost Summary				
	0-5 Year	6-10 Year	11-20 Year	Beyond 20 Year	TOTAL
Supply and Transmission	$1,500,000	$1,552,000		$4,850,000	$7,902,000
Distribution Storage Reservoir		$3,625,000		$906,000	$ 4,531,000
Pump Station	$1,960,000	$12,660,000	$3,520,000	$2,272,000	$20,412,000
Water Main Improvements	$3,612,000	$6,012,000	$3,993,000	$10,274,000	$23,891,000
Pipe Replacement Program	$1,250,000	$4,850,000	$9,700,000	$81,200,000	$97,000,000
PRV	$150,000		$150,000	$ 750,000	$1,050,000
Airport Interim Fire Suppression	$5,361,000				$5,361,000
Planning & Other	$200,000	$200,000	$600,000		$1,000,000
Total	$14,033,000	$28,899,000	$17,963,000	$100,252,000	$161,147,000

OVERALL RECOMMENDATIONS

- Implement improvements identified in 0-5 years by the CIP to address existing capacity and condition issues and support AIA development
- Implement an annual repair and replacement program to maintain infrastructure based on a 100 year cycle
- Implement O&M programs to increase the lifespan of infrastructure and reduce unplanned maintenance
- Hire additional O&M staff to ensure system is adequately maintained

OVERALL RECOMMENDATIONS

- Reassess improvements beyond 5 years using future WSMP updates: future regulations and amount and location of development
- Continue improving the quality of available data:
  - Continue to refine existing GIS water system information
  - Track customer complaints and unplanned repair data
  - Regularly update and utilize the hydraulic model as a tool for predicting system performance

QUESTIONS

WATER FINANCIAL ANALYSIS

BASIC SDC FORMULA

Growth Costs ($) ÷ System-wide Growth Units* = Cost ($)per Unit of Growth

*For water growth units are generally equivalent residential units

SDC-ELIGIBLE WATER COSTS

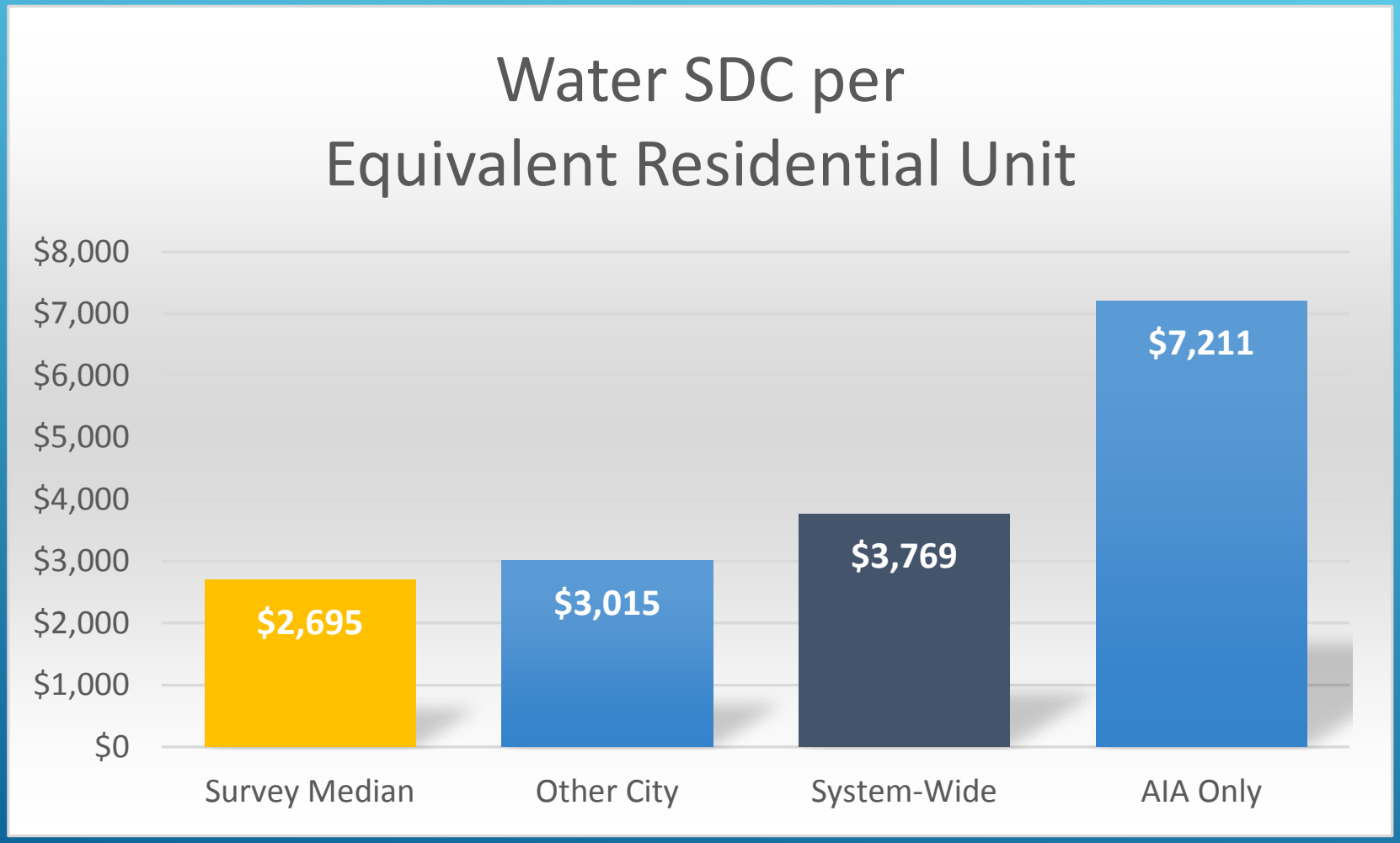
- Costs related to increased capacity of the system for future users
  - Existing system available capacity (WFP and wells)
  - Provide new facilities
  - Increases the level of performance or service (upgrade existing facilities)
  - Compliance with SDC statutes
- SDCs may not be expended for:
  - Correcting existing deficiencies
  - Operation and maintenance expenses

GROWTH COSTS AND SDCS (WATER)

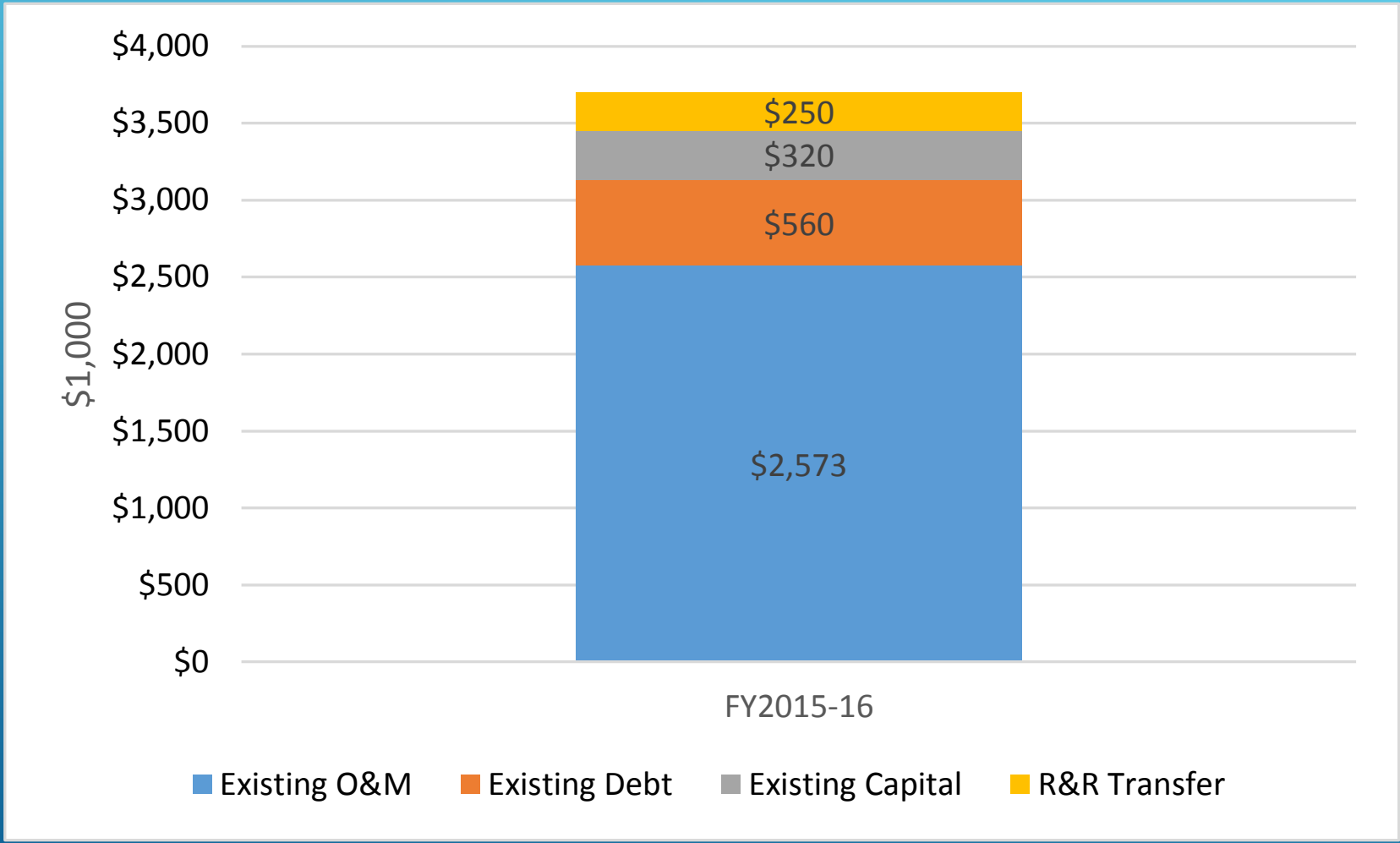
Item	Reimbursement[1]	Improvement[2] Other City	Improvement[2] AIA	Total	Annual Compliance
			$ Millions		
Growth Costs	$3.38	$27.76	$11.60	**$42.74**	$0.02
		SDC per Equivalent Residential Unit			
System-wide	$534	$3,167		**$3,769**	$68
2-Tier Model					
AIA	$534	$2,412	$4,197	**$7,211**	$68
Non-AIA	$534	$2,412		**$3,015**	$68

[1] Growth share of Water Filtration Plant and other source facilities
[2] Growth share of Water System Master Plan CIP

WATER SDC COMPARISON



EXISTING WATER RATE CAPACITY



ADDITIONAL REQUIREMENTS FROM WATER RATES (10-YEAR PERIOD)

Item	Annual Cost	Required % Increase
Current Rate Revenue	**$3,706,050**	
Additional Staff[1]	$500,000	13.5%
Additional Debt Service[2]	$2,142,000	57.8%
Additional Avg Annual CIP Expenses[3]	$480,000	13.0%
Additional R&R Reserve Transfer[4]	$150,000	4.0%
Subtotal Additional Requirements	**$3,272,000**	88%
Additional AIA Project Debt[5]	**$400,000**	11%
Total Additional Requirements[6]	**$3,672,000**	**99%**

[1] Inflation-adjusted cost of additional 5.5 FTE

[2] $33 million principal; @5% interest over 20 years

[3] $10 m inflation-adj. total (excluding interim AIA projects); net of bond & SDC rever

[4] Repair & Replacement reserve for WFP, wells, and pumps

[5] $5.5 m principal for interim fire improvements

[6] In addition to annual inflation adjustments

KEY WATER FINANCIAL PLAN ASSUMPTIONS

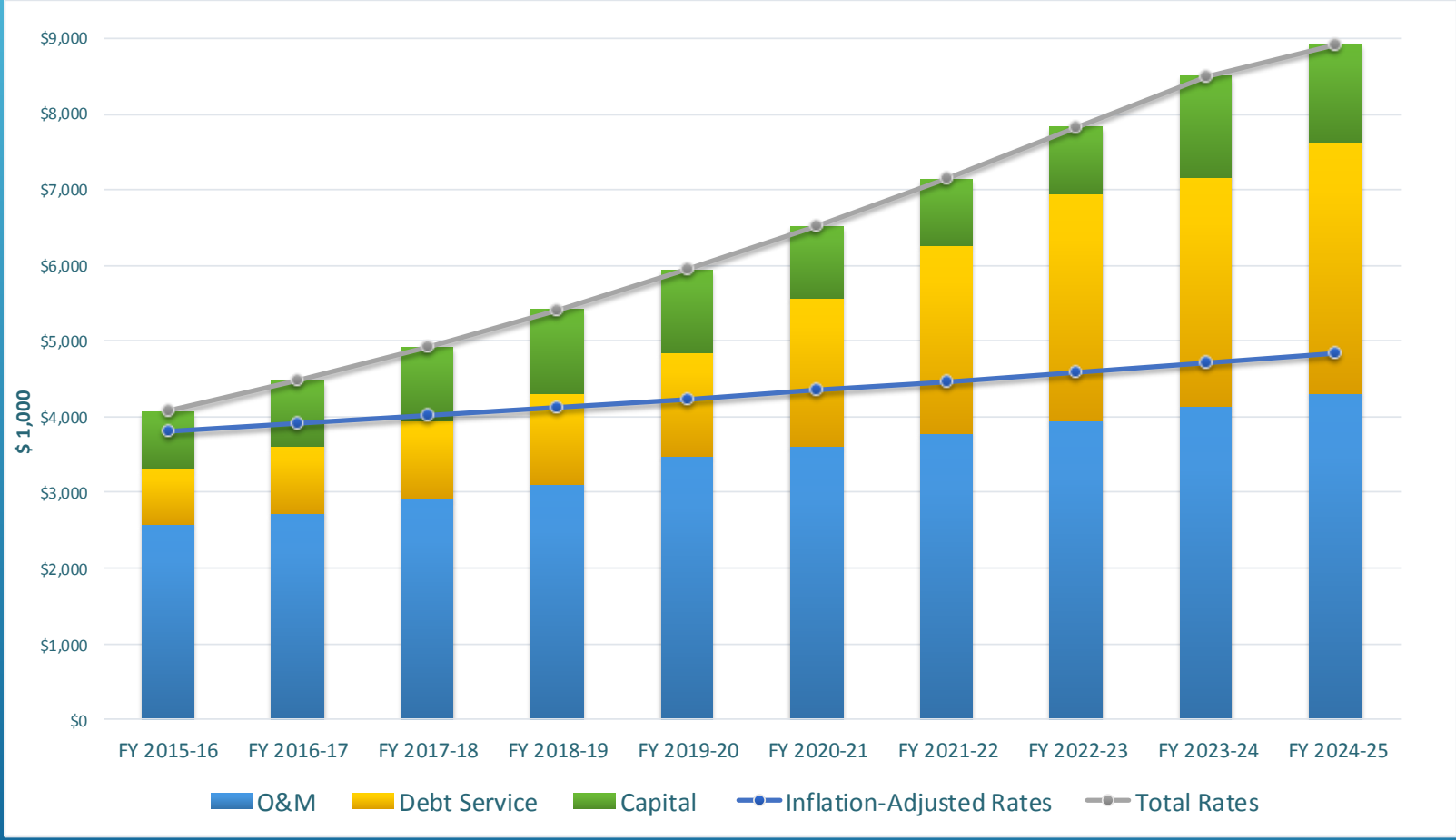
- Additional Staffing (5.5 FTE) phased in over five years
- Significant debt funding to mitigate short-term rate increases (75% of CIP in first 10 years)
- Source Facilities: Phase-in funding of annual $400K R&R transfer over five years
- Future inflationary adjustments based on historical trend in Engineering News Record Construction Cost index (2.7%)
- July 1, 2015 initial implementation

PROJECTED MASTER PLAN CIP* FUNDING SOURCES

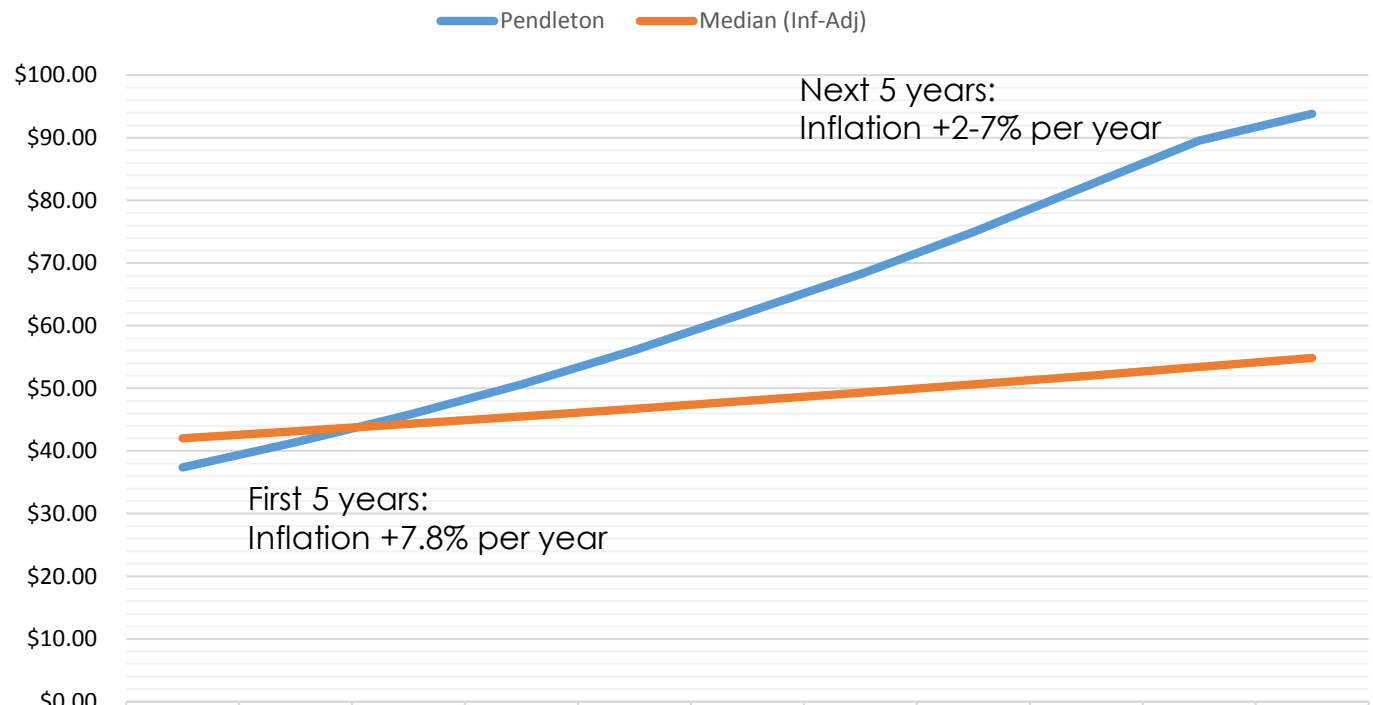
	FY2016 - FY2020	FY2021 - FY2025	Total
Rates	$3,005,058	$3,258,503	$6,263,562
SDCs	$550,000	$1,040,000	$1,590,000
Debt Proceeds	$11,300,000	$30,550,000	$41,850,000
Total	**$14,855,058**	**$34,848,503**	$49,703,562
Average Annual Costs			
Rates	$601,012	$651,701	
SDCs	$110,000	$208,000	

*Inflation-Adjusted

PROJECTED ANNUAL REQUIREMENTS FROM WATER RATES (10-YEAR PERIOD)



PROJECTED RESIDENTIAL WATER BILLS



	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25
Pendleton	$37.40	$41.39	$45.75	$50.64	$56.09	$62.13	$68.24	$74.95	$82.29	$89.57	$93.83
Median (Inf-Adj)	$42.01	$43.14	$44.31	$45.51	$46.73	$48.00	$49.29	$50.62	$51.99	$53.39	$54.83

FUTURE KEY RATE DRIVERS

- More rapid customer growth
- External funding support (grants, developers, wholesale customer)

- Increase in interest rates
- Declining water sales

KEY WATER FINANCIAL PLAN RECOMMENDATIONS

- Implement system-wide water SDC with annual inflation adjustment
- Modify rate inflation index to ENR 20-City Average
- Budget annual contingency of 30-90 days of O&M expenses
- Review financial plan annually, and modify as needed to balance performance goals

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- Current inflation index not keeping pace with operating cost inflation
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  - Establish a 'floor' (e.g., 2.5%) to enhance revenue sufficiency
- Rate increases for Master Plan Recommendations and WFP repair & replacement
  - Approximately 100% increase needed to fund requirements in 10-year period
  - Phase-in Options
    - Smooth increases: approximately 7.8%* (10.5% with inflation) in first 5 years to fund short-term needs
    - Large up-front increase(s), followed by smaller increases

*In addition to inflation

COLLECTION SYSTEM MASTER PLAN

Dennis Galinato/MSA

COLLECTION PLAN ACKNOWLEDGEMENTS

- Significant Contributions were made by the following staff:
  - Jeff Brown
  - Wayne Green
  - Mark Milne
  - Bob Patterson
  - Tim Simons

PROJECT OVERVIEW

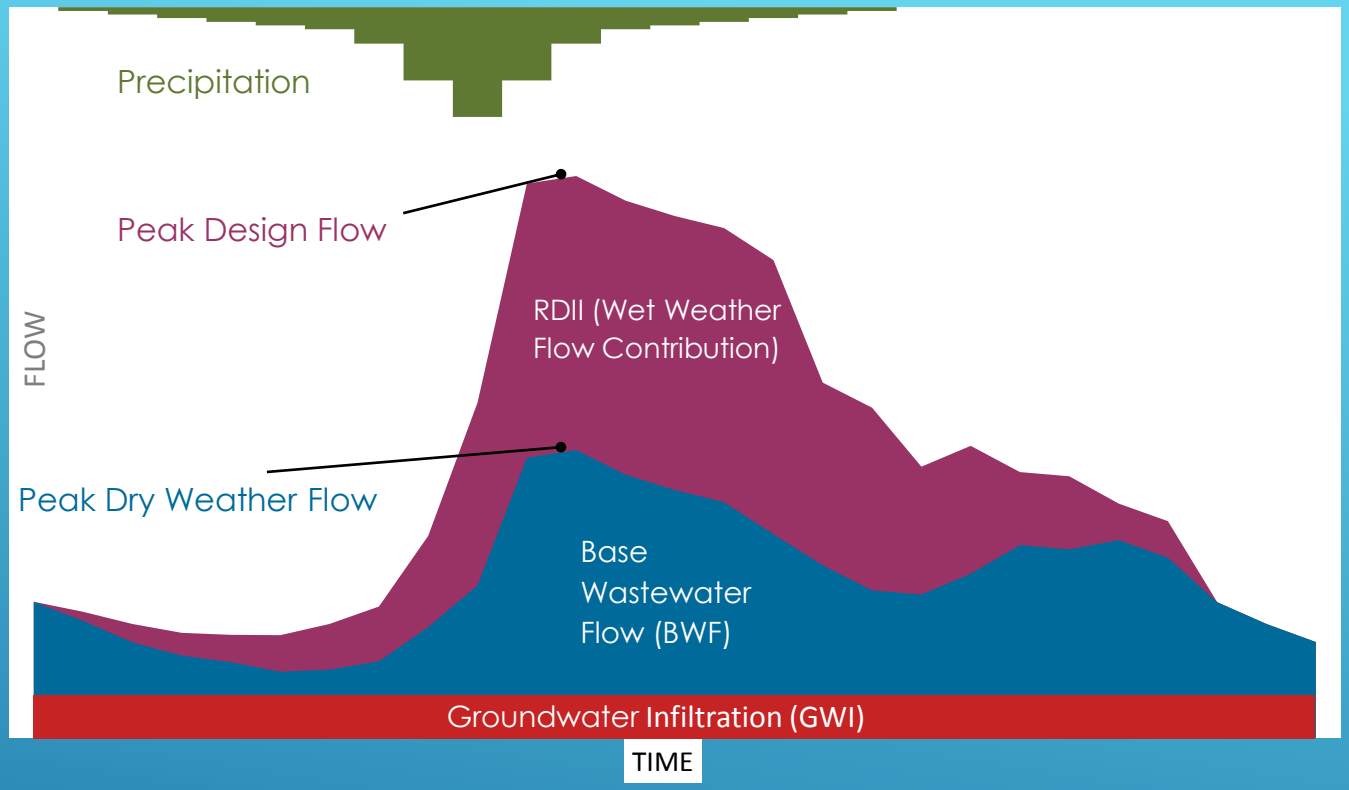
1. Executive Summary
2. Existing System Description
3. Population and Wastewater Flow Projections
4. System Analysis
5. Operations and Maintenance
6. Capital Improvement Program
7. Financial Evaluation

SYSTEM DESCRIPTION

- Basins
  - 11 basins covering an area of 13 square miles
- Gravity Sewer
  - 3 to 36 inch diameter
  - 87 miles total length
  - Material:
    - Concrete, PVC, Clay, AC, Unknown
- City also receives flow from CTUIR and Rieth

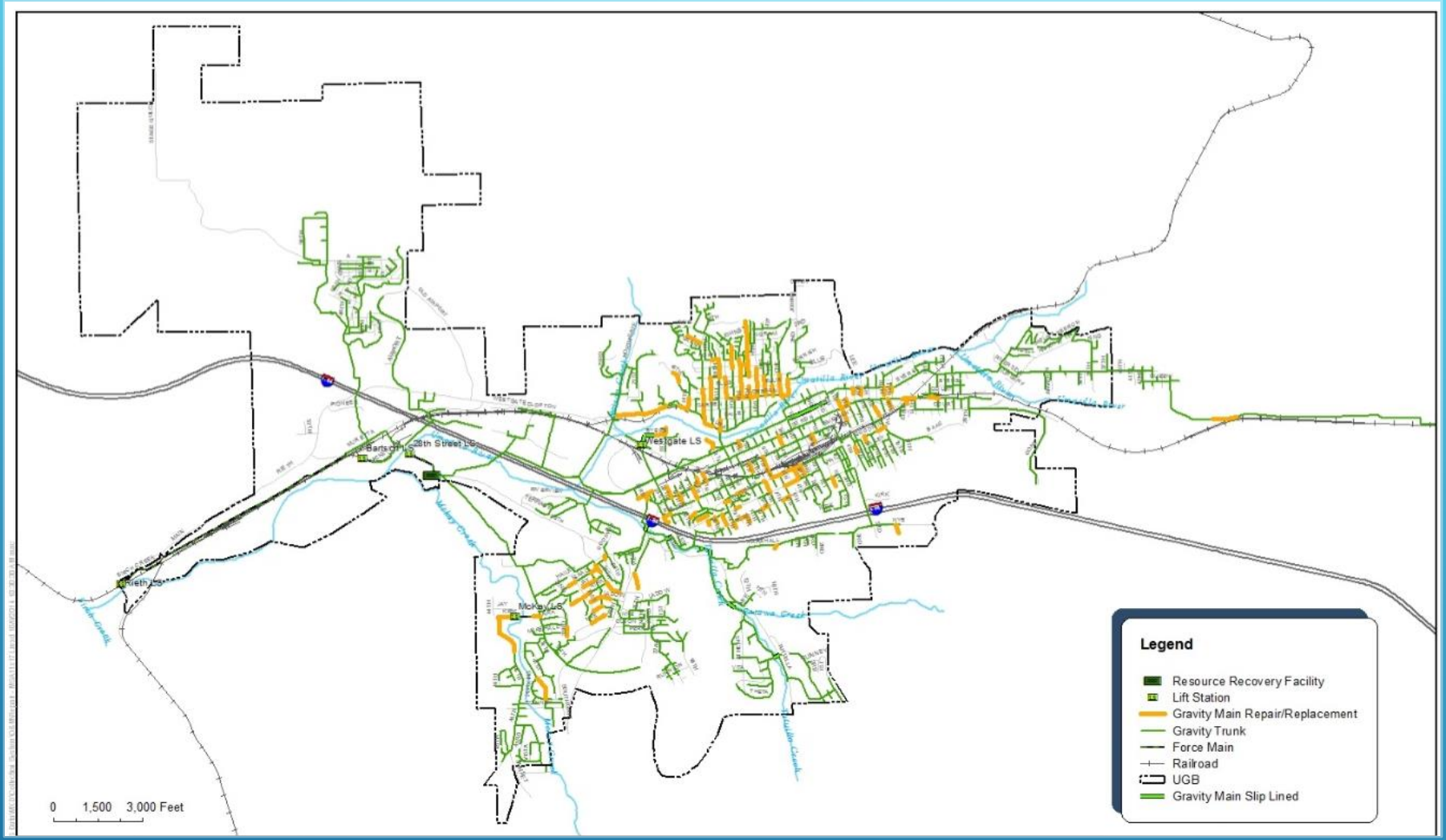
SYSTEM DESCRIPTION

- Lift Station
  - 5 lift stations
  - 4 to 10 hp
  - Capacity
    - Firm: 65 to 500 gpm
    - Total: 130 to 1,000 gpm
- Force Main
  - 4- to 8-inch diameter
  - 2 miles total length

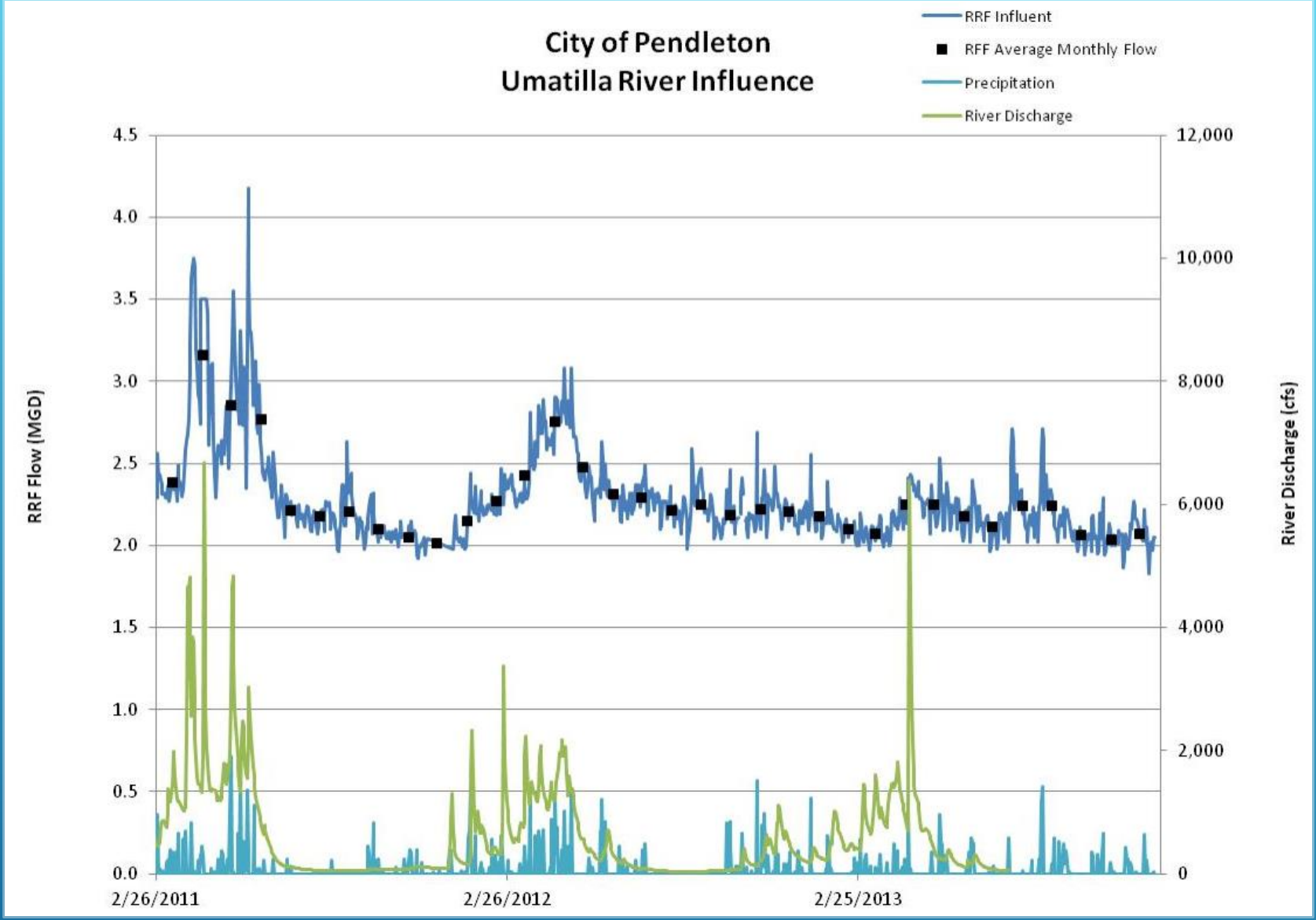


- Base Wastewater Flow (BWF)
- Groundwater Infiltration (GWI)
  - River-Dependent Infiltration (Seasonal)
- Rainfall-Dependent Infiltration/Inflow (RDII)

WASTEWATER FLOW COMPONENTS


Legend
Resource Recovery Facility
Lift Station
Gravity Main Repair/Replacement
Gravity Trunk
Force Main
Railroad
UGB
Gravity Main Slip Lined
0 1,500 3,000 Feet
Westgate LS
28th Street LS
McKay LS
Rieth LS

REPAIRS

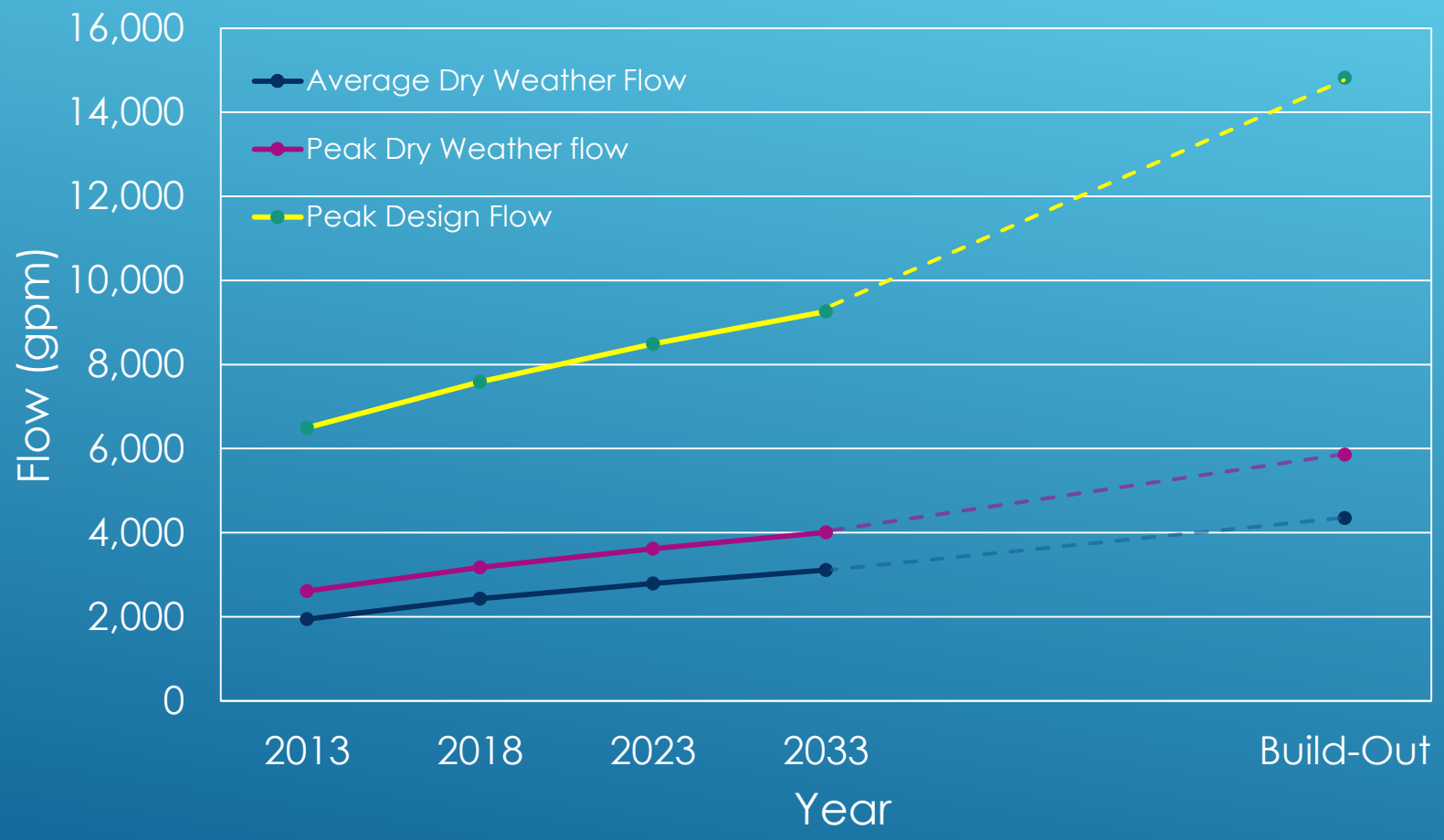


RIVER INFLUENCE ON RRF FLOW

POPULATION AND FLOW PROJECTIONS

1. Existing Winter Water Consumption used as basis for dry weather loading
2. Sewer Flow Meter Data used to adjust dry flows by basin
3. Future flows projected using Land Use and UGB
4. Major Sewer Contributors
    1. Eastern Oregon Correctional Institute (EOCI)
    2. Confederated Tribe of the Umatilla Indian Reservation (CTUIR)

WASTEWATER FLOW PROJECTIONS

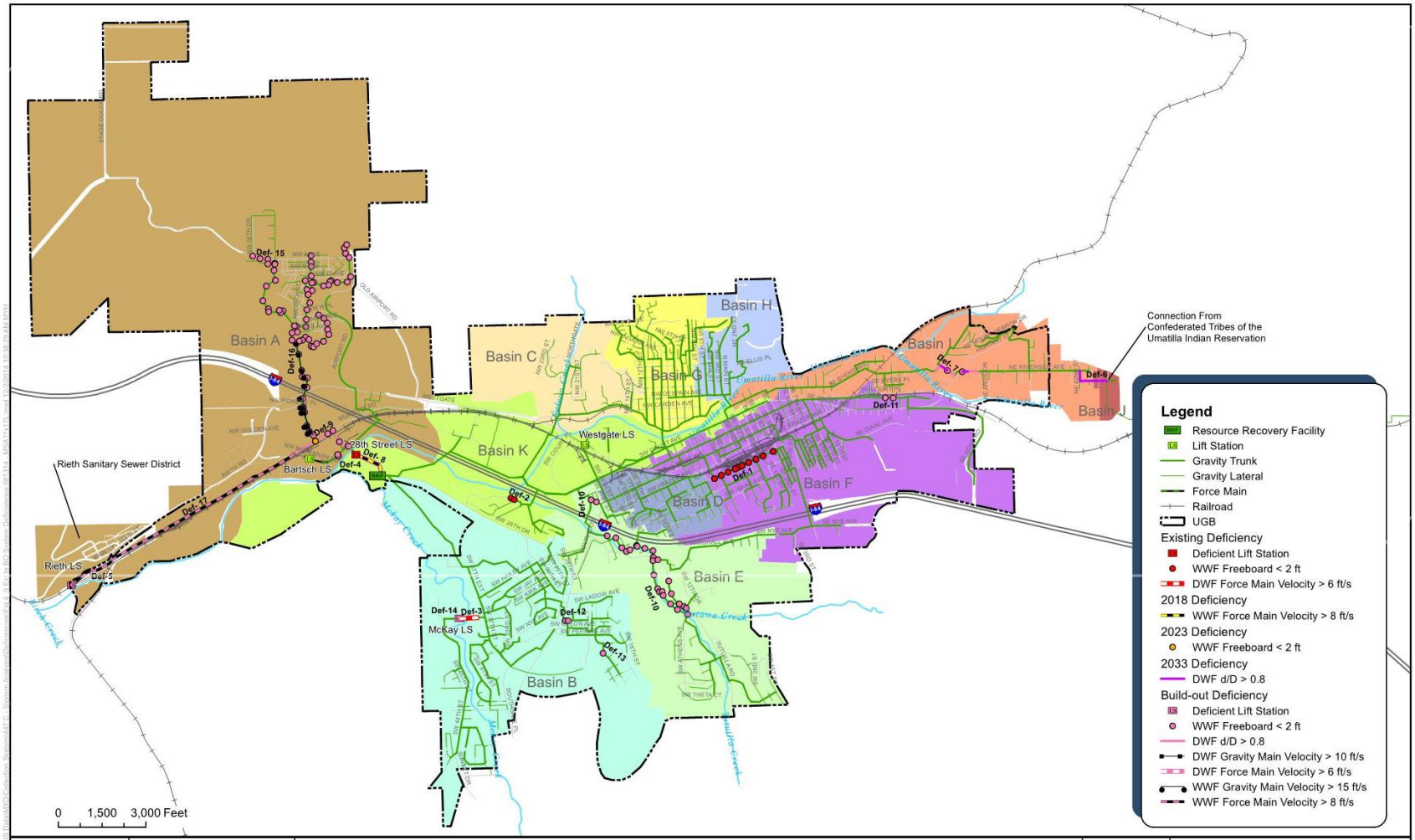


SYSTEM ANALYSIS

- Model Development
  - Utilized GIS
  - Facility Information
- Model Calibration
  - Dry Weather
  - Wet Weather
- Hydraulic Capacity Evaluation
  - Existing
  - 5 year
  - 10 year
  - 20 year
  - Build-out

PLANNING CRITERIA

- Standards based on:
  - Oregon Administrative Rules – Rule 340 Division 52 (OAR340-52)
  - Recommended Standards for Wastewater Facilities, 2012 Edition (Ten States Standards)
- Primary Criteria
  - Gravity Pipelines
    - Depth of flow (d/D), Surcharging, Velocity
  - Lift Stations
    - Firm Capacity (largest out of service)
    - Backup Power
  - Force Mains
    - Velocity
  - Siphon
    - Velocity, Number of Barrels



CAPACITY ANALYSIS RESULTS

SEWER OPERATIONS & MAINTENANCE

- Benchmarking
  - O&M procedures
  - Evaluate current budgets and staffing levels
- Regulations and Guidelines
  - American Public Works Association's Public Works Management Practices Manual – 8th Edition
  - Guide for Evaluating CMOM Programs at Wastewater Collection Systems
  - Ten States Standards Recommended Standards for Wastewater Facilities
  - City/County Insurance Services – Best Practices

KEY ASPECTS OF O&M PROGRAMS

- Safety
  - Public/customers/staff
  - Protect the Environment
- Data Collection
  - Maintenance Management Systems
- Scheduled Activities
  - Collection System Inspection and Flushing Program
  - Lift station and force main inspection
- Manuals
  - Standard Operating Procedures (SOPs)

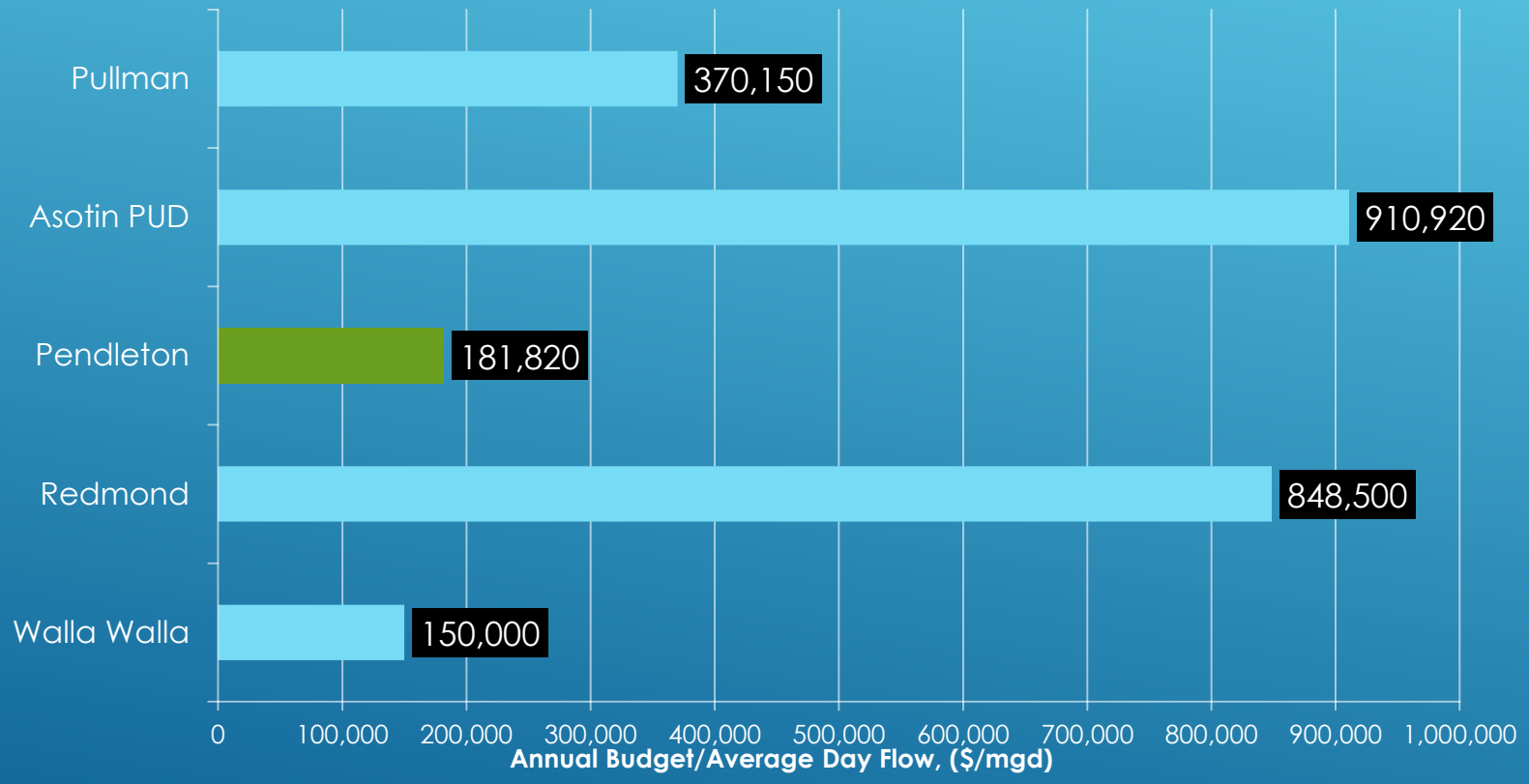
BENCHMARKING

- Compare performance relative to others in the industry
  - Budget
  - Staffing (Efficiency of operations)
- Sewer Utilities Surveyed

Utility Name	Population Served	Service Area, (square miles)	Number of FTEs on Staff
Walla Walla	32,000	13	5
Redmond	28,000	9.1	5
Pullman	27,150	10	4.6
Pendleton	**17,600**	**13.4**	**2**
Asotin PUD	3,800	19	1

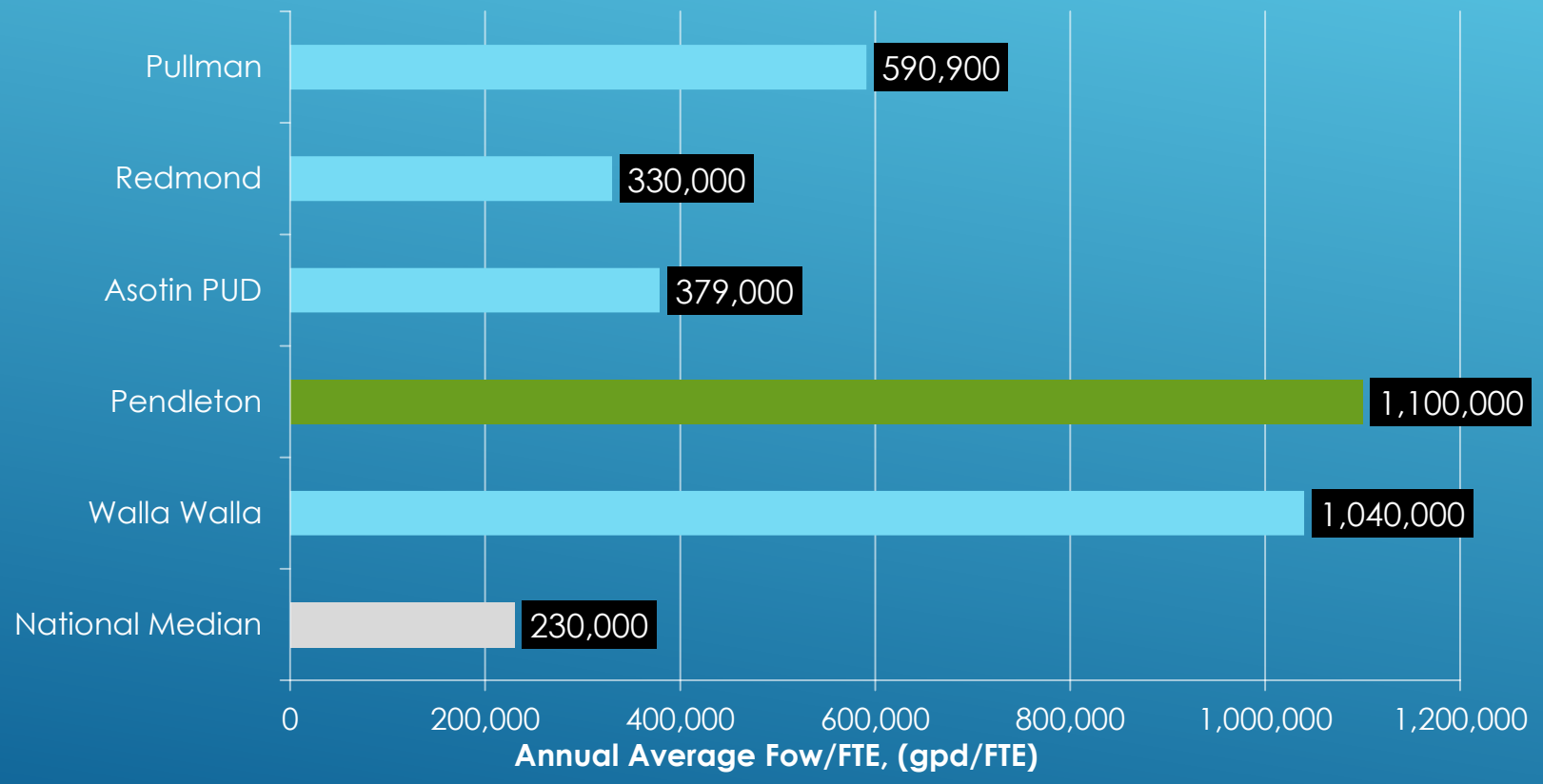
BENCHMARKING SUMMARY

Annual Budget/Annual Average Flow, ($/MGD)



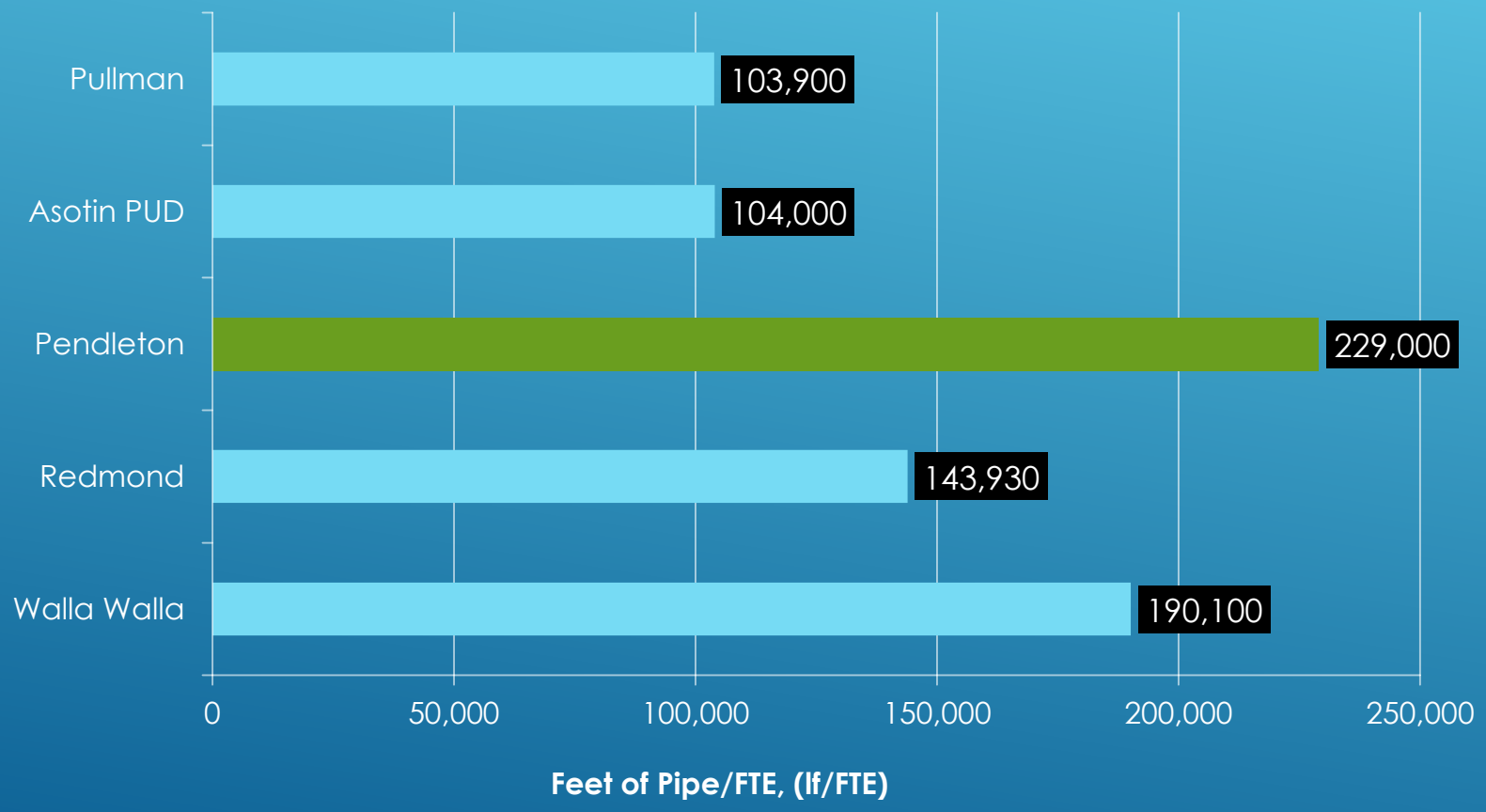
BENCHMARKING SUMMARY

Annual Average Flow/FTE, (GAL/FTE)



BENCHMARKING SUMMARY

Feet of Pipe/FTE, (LF/FTE)



PIPE REPLACEMENT PROGRAM

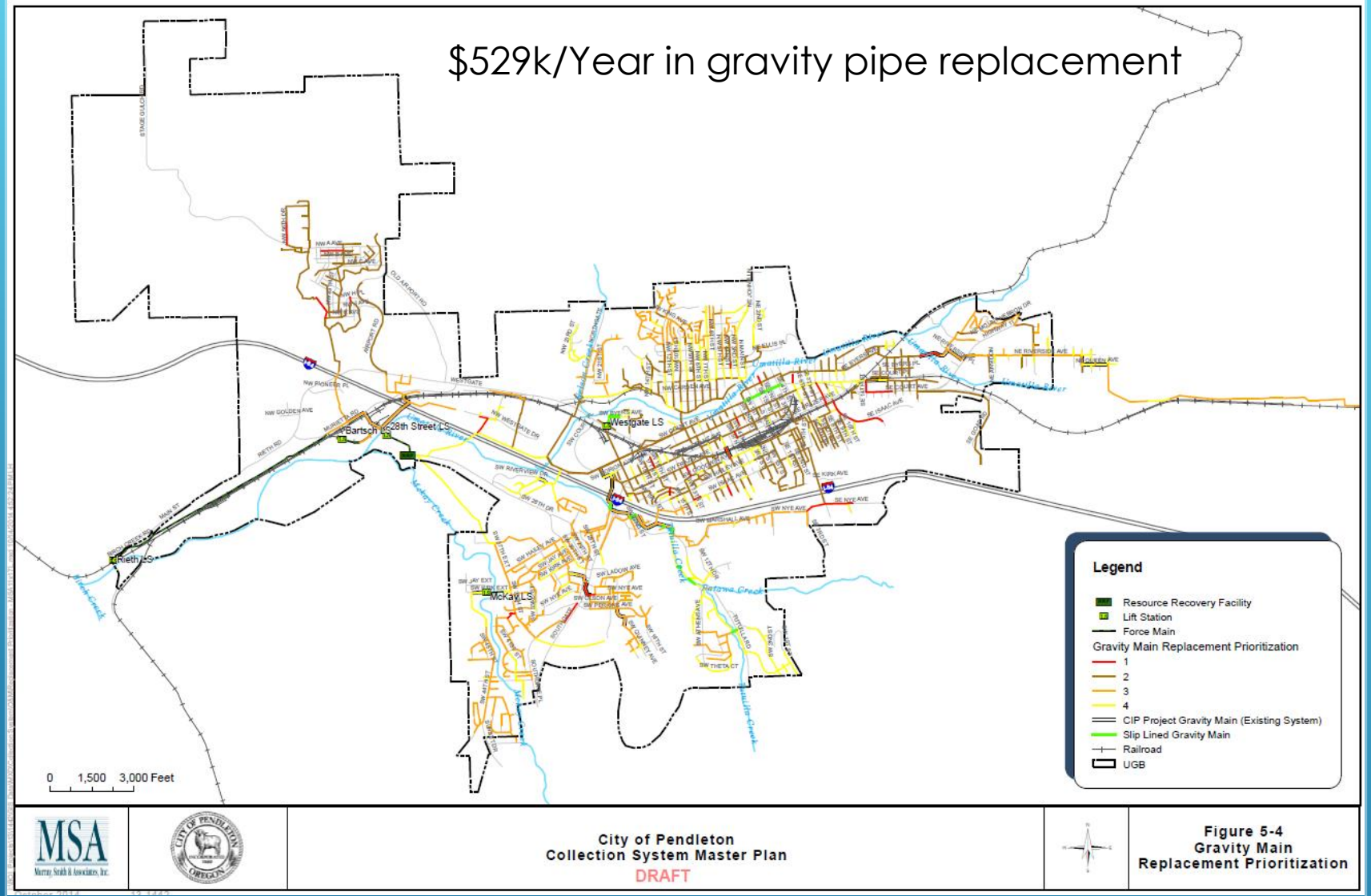
- System renewal and replacement
- Based on 100-year design life
- Prioritization
  - Condition and Capacity Issues
  - Clay Pipe, pre-1950's Asbestos Cement and Unknown
  - Concrete Pipe, Cast Iron Pipe, Post-1950's Unknown
  - PVC

SEWER O&M RECOMMENDATIONS

- Update, adopt, and implement the *2007 Wastewater Collection System Maintenance Program*
  - Based on incorporation of the PWMP Manual BMPs
- Hire 4 additional FTEs
  - Hire 2.5 additional FTEs
    - 2 FTEs to implement Cleaning and Inspection Program
    - A partial FTE to implement O&M program and associated record keeping
    - Shared and funded with the Water and Storm Utilities
  - Hire 1.5 additional FTEs to perform ongoing pipe replacement program
    - Part of a 2nd crew of 4 FTEs
    - Dedicated equipment
- Implement overall pipe repair/replacement program (included in CIP)

CAPITAL IMPROVEMENT PLAN

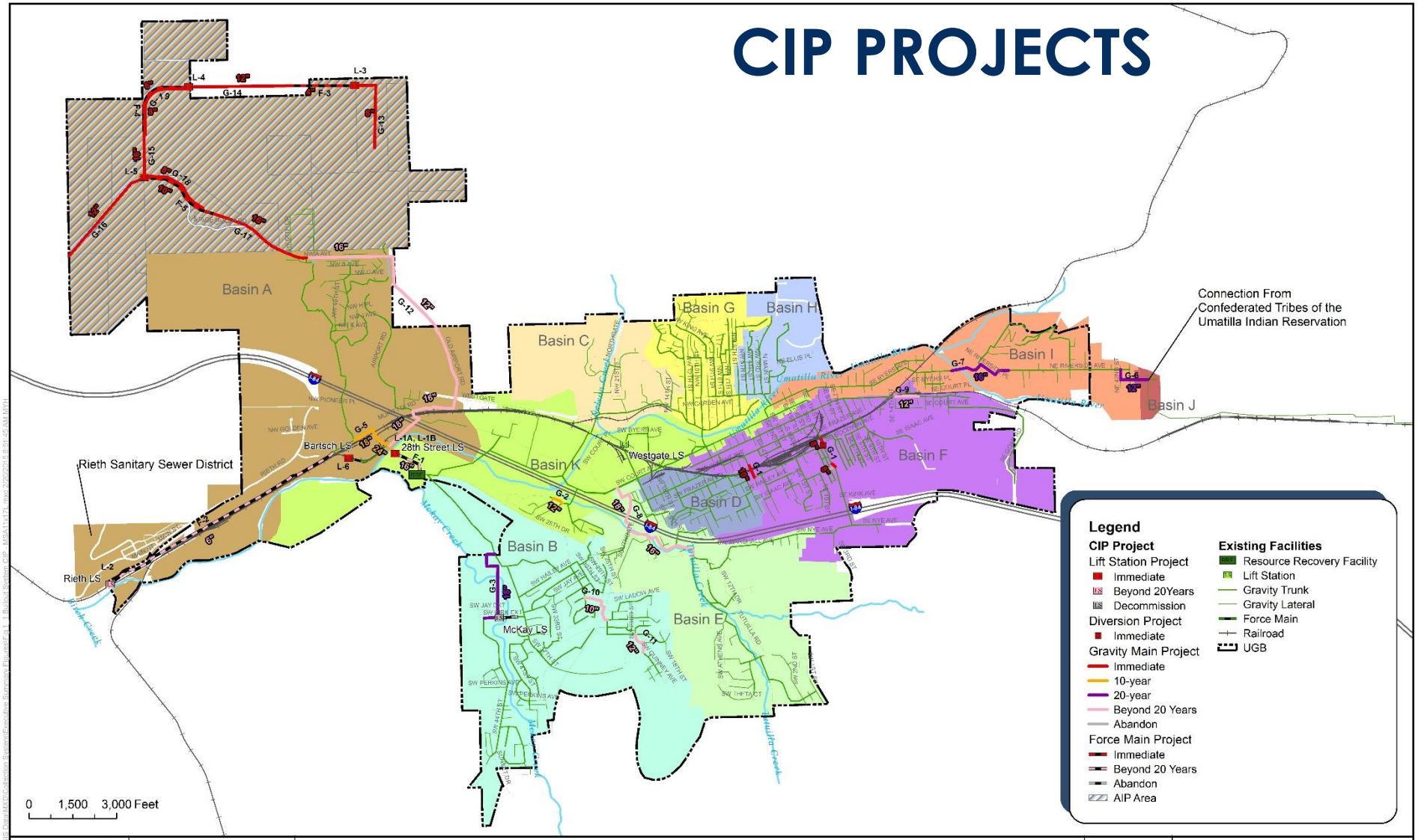
- Capacity Projects
  - 0-5 Year Projects
  - 6-10 Year Projects
  - 11-20 Year Projects
  - Beyond 20 Years Projects
- Airport Industrial Area Projects
- Pipe Replacement



Assumes a 100 year replacement schedule

PIPE AND LIFT STATION REPLACEMENT

CIP PROJECTS

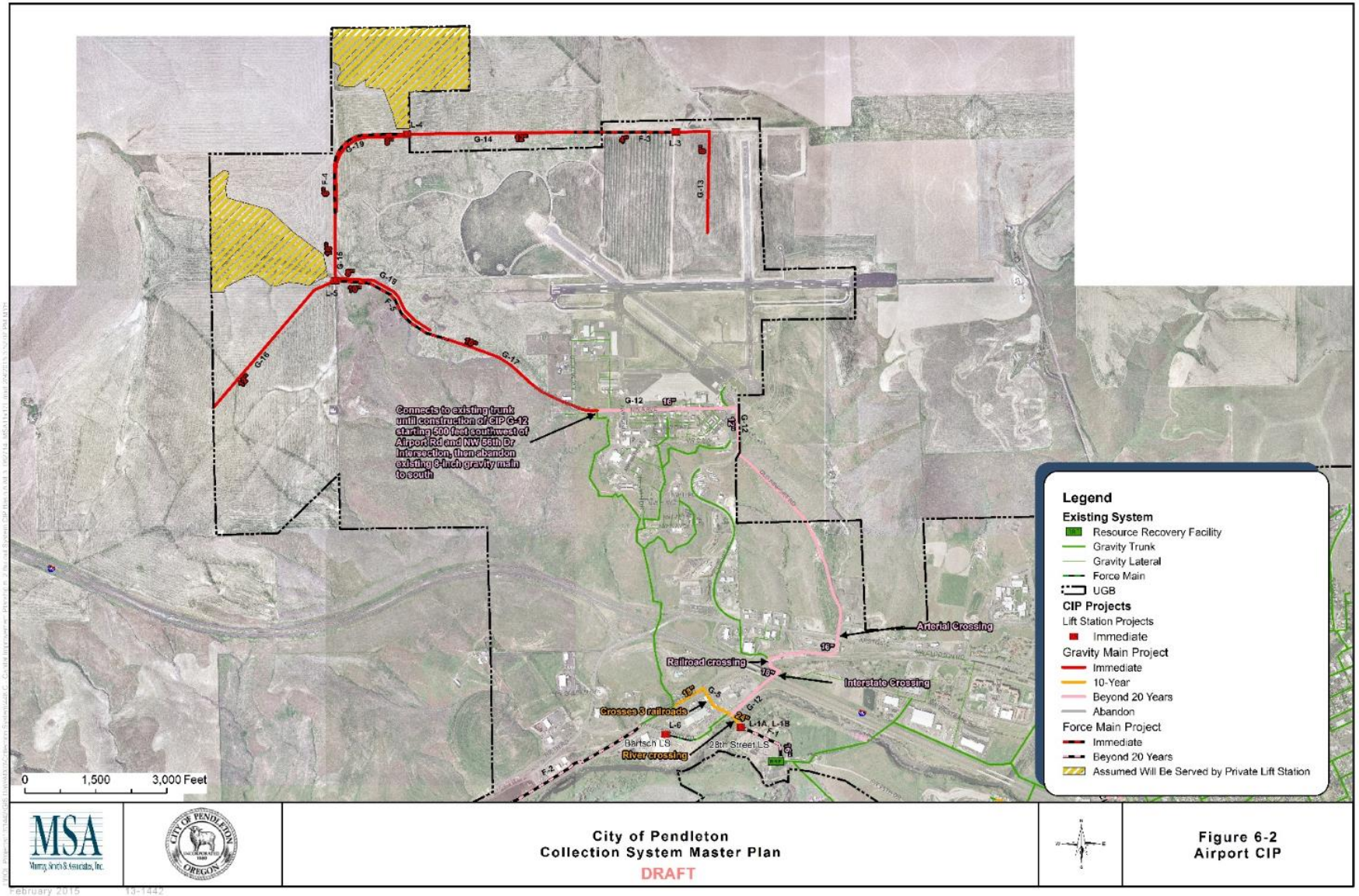


MSA
Murray, Smith & Associates, Inc.

City of Pendleton
Collection System Master Plan
DRAFT

Figure 1-1
CIP Projects

February 2015 13-1442



AIRPORT INDUSTRIAL AREA

CAPITAL IMPROVEMENT PLAN

Project Category	Project Description	CIP Schedule and Project Cost Summary[1]		
		0-5 Years	6-10 Years	10 Year Total
Gravity Main	Capacity Projects	$204,000	$104,000	$308,000
	AIA Projects	$3,025,000	$597,000	$3,622,000
	Annual Replacement Program	$1,250,000	$2,645,000	$3,895,000
	Subtotal	$4,479,000	$3,346,000	$7,825,000
Lift Station	Capacity Projects	$574,000		$574,000
	AIA Projects	$3,791,000		$3,791,000
	Annual Replacement Program		$690,000	$690,000
	Subtotal	$4,365,000	$690,000	$5,055,000
Force Main	Capacity Projects			$0
	AIA Projects	$467,000		$467,000
	Annual Replacement Program		$25,000	$25,000
	Subtotal	$467,000	$25,000	$492,000
Other	Collection System Master Plan Updates	$150,000	$150,000	$300,000
	Combo Truck[2]	$370,000		$370,000
	Subtotal	$520,000	$150,000	$670,000
CIP Total		$9,831,000	$4,211,000	$14,042,000

1. *Cost are based on the* Engineering News Record December 2013 Construction Cost Index.
2. *Cost is based on an estimated $50,000 trade-in value for the current truck that will go toward the estimated $420,000 cost of a new truck.*

CAPITAL IMPROVEMENT PLAN

	CIP Schedule and Project Cost Summary				
	0-5 Years	6-10 Years	11-20 Years	Beyond 20 Years	Total
CIP Total	$9,831,000	$4,211,000	$8,735,000	$65,693,000	$88,470,000

OVERALL RECOMMENDATIONS

- Implement improvements identified in 0-5 years by the CIP to address existing capacity and condition issues and support AIA development
- Implement an annual repair and replacement program to maintain infrastructure based on a 100 year cycle
- Implement O&M programs to increase the lifespan of infrastructure and reduce unplanned maintenance
- Hire additional O&M staff to ensure system is adequately maintained

OVERALL RECOMMENDATIONS

- Reassess improvements beyond 5 years using future CSMP updates: future regulations, amount and location of development and flow monitoring information
- Continue improving the quality of available data:
  - Collect flow monitoring to quantify:
    - wet weather events
    - river influence
    - available capacity and system performance
  - Collect CCTV related pipe condition and link to the GIS database to prioritize repair and replacement
  - Regularly update the hydraulic model

QUESTIONS

SEWER FINANCIAL ANALYSIS

BASIC SDC FORMULA

Growth Costs ($) ÷ System-wide Growth Units* = Cost ($)per Unit of Growth

*For sewer, growth units are generally equivalent residential units

SDC-ELIGIBLE SEWER COSTS

- Costs related to increased capacity of the system for future users
  - Existing system available capacity (RRF)
  - Provide new facilities
  - Increases the level of performance or service (upgrade existing facilities)
  - Compliance with SDC statutes
- SDCs may not be expended for:
  - Correcting existing deficiencies
  - New capacity costs for development in CTUIR or RSSD*
  - Operation and maintenance expenses

*Under existing agreements

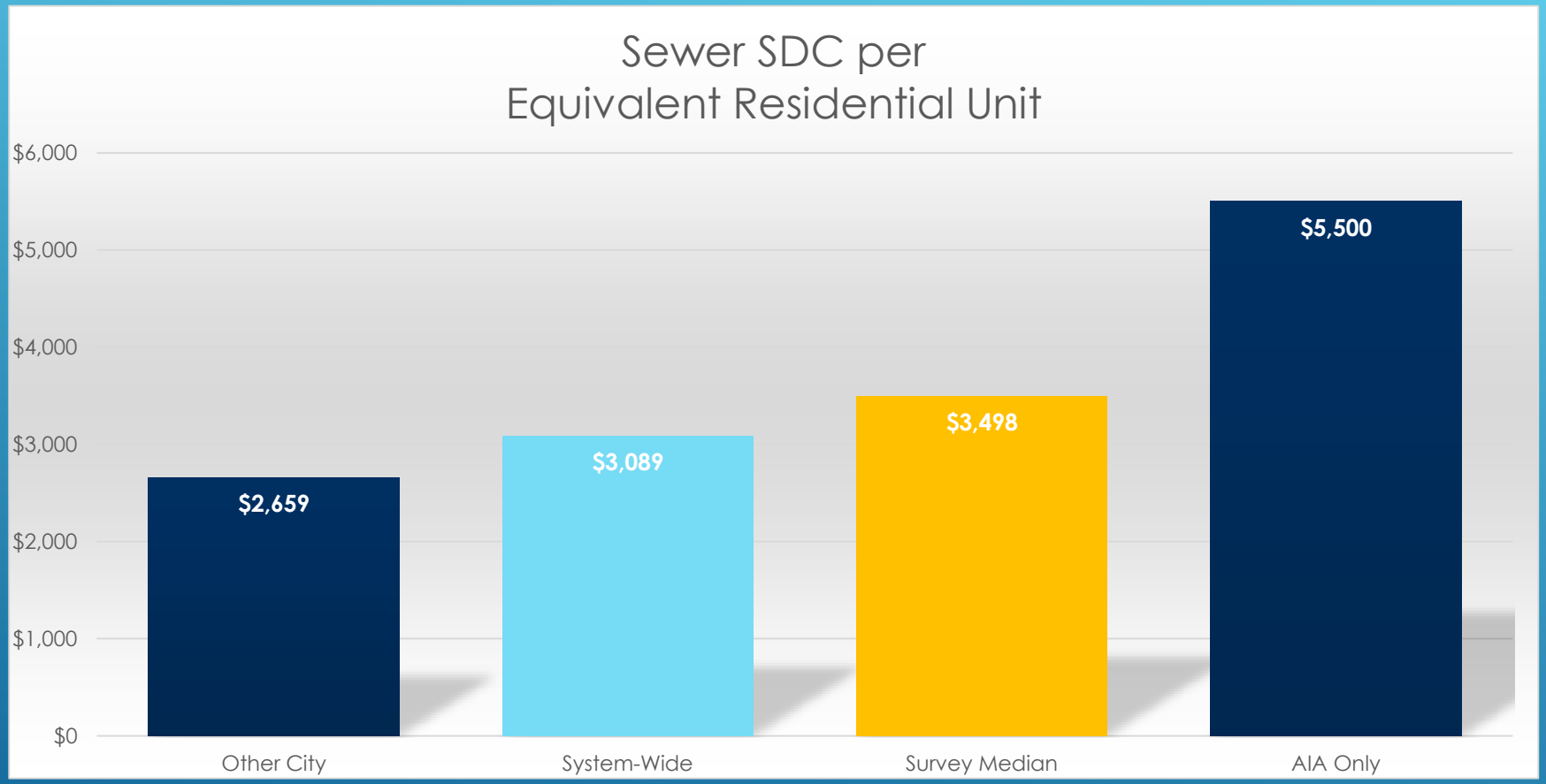
GROWTH COSTS AND SDCS (SEWER)

Item	Reimbursement[1]	Improvement[2] Other City	Improvement[2] AIA	Total	Annual Compliance
			$ Millions		
Growth Costs	$11.81	$15.23	$7.28	**$34.32**	$0.02
			SDC per Equivalent Residential Unit		
System-wide	$1,635	$1,328		**$3,089**	$126
2-Tier Model					
AIA	$1,635	$899	$2,841	**$5,500**	$126
Other City	$1,635	$899	$0	**$2,659**	$126

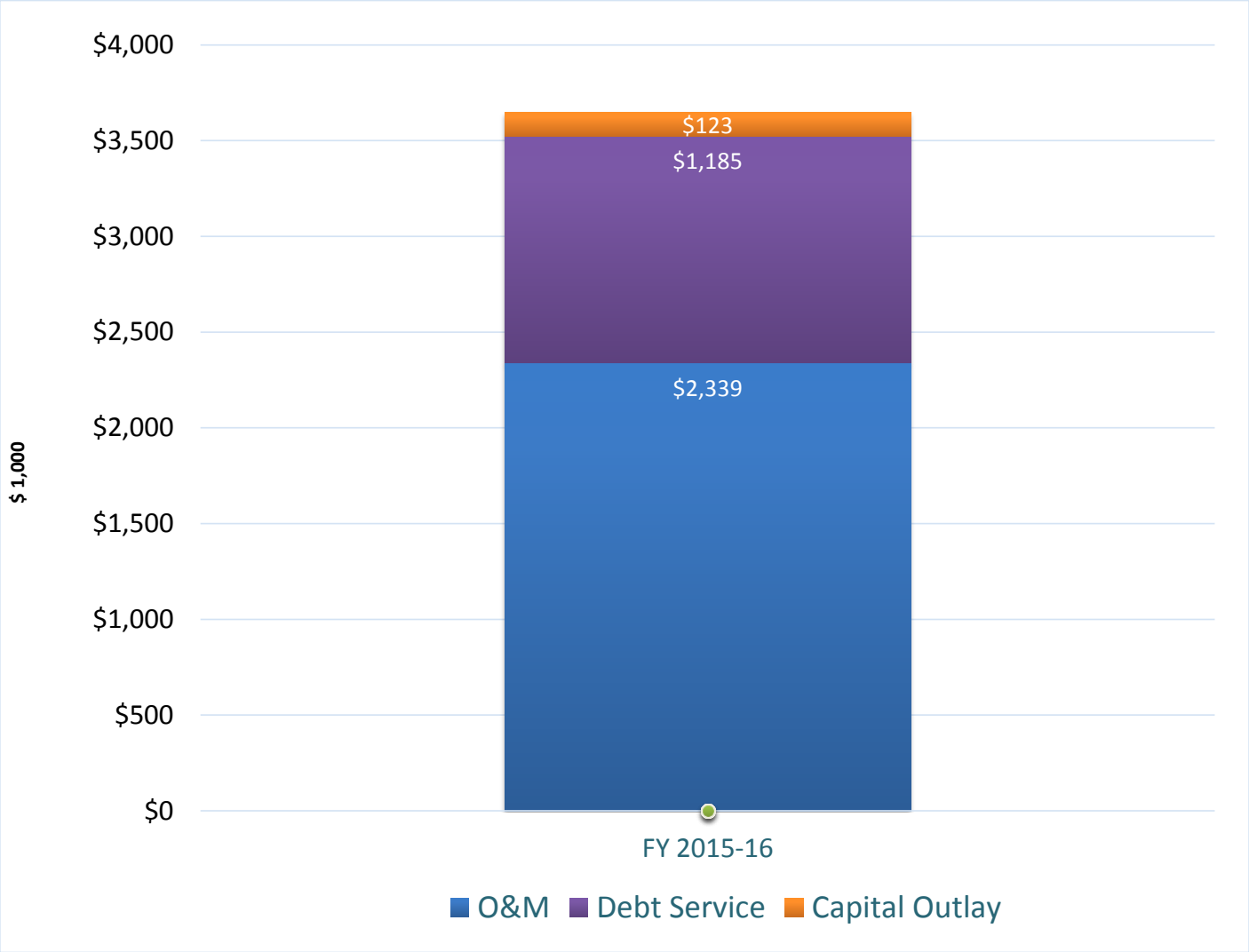
[1] Growth share of Resource Recovery Facility Phase I expansion

[2] Growth share of Collection System Master Plan CIP

SEWER SDC COMPARISON



EXISTING SEWER RATE CAPACITY



ADDITIONAL REQUIREMENTS FROM SEWER RATES (10-YEAR PERIOD)

Item	Annual Cost	Required % Increase
Current Rate Revenue	**$3,565,000**	
Additional Staff[1]	$270,000	8%
Average Annual CIP Expenses[2]	$650,000	18%
RRF Reserve Transfer[3]	$600,000	17%
Subtotal Additional Requireme	**$1,520,000**	**43%**
Additional AIA Project Debt[4]	$500,000	14%
Total Additional Requirements[5]	**$2,020,000**	**57%**

[1] Inflation-adjusted cost of additional 4.0 FTE
[2] Excludes AIA projects; adjusted for inflation
[3] Additional annual contribution to reserve for Phase II
[4] Inflation adjusted
[5] In addition to annual inflation adjustments

KEY SEWER FINANCIAL PLAN ASSUMPTIONS

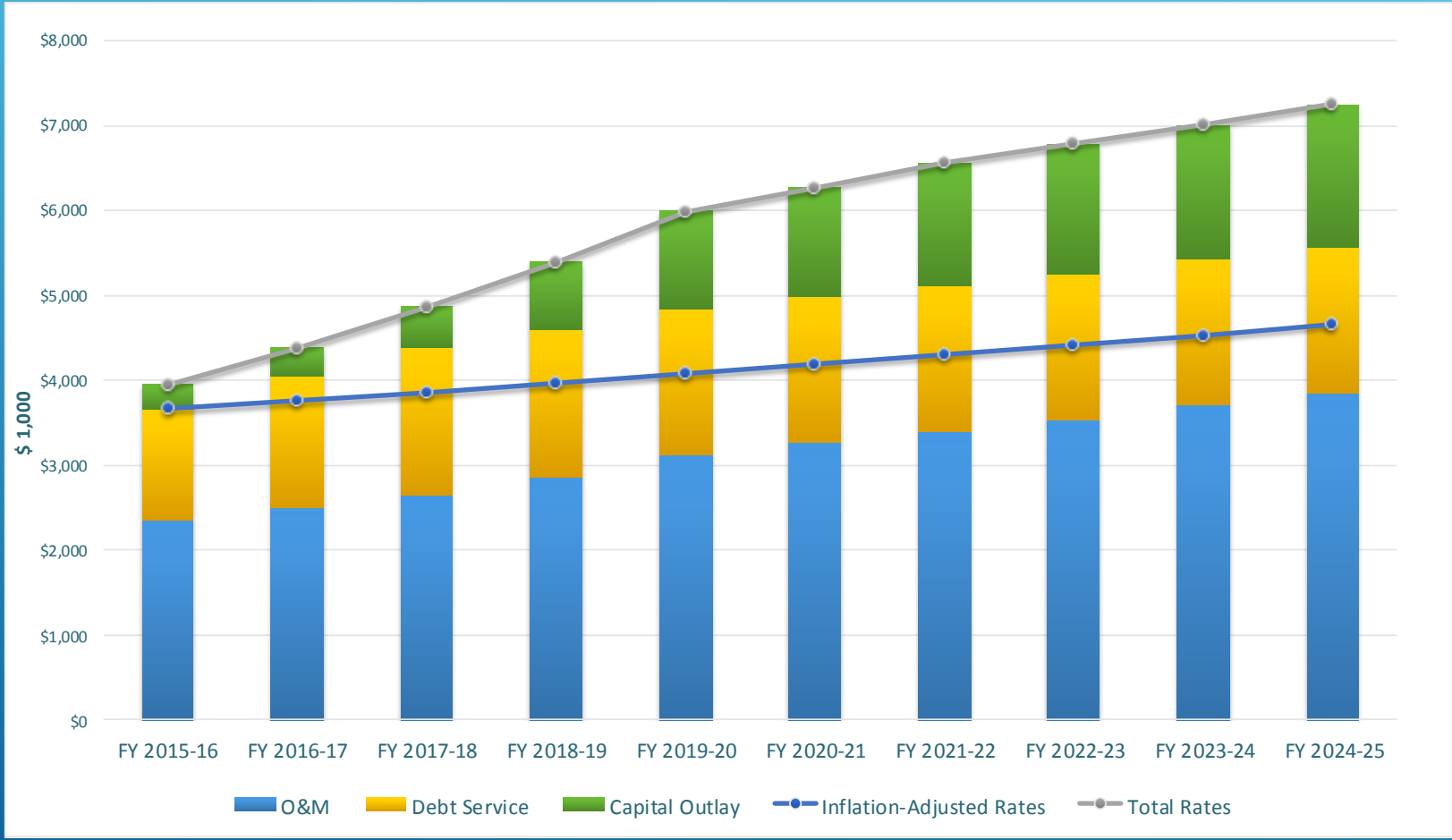
- Additional Staffing phased in over five years
- Cash funding of other Collection System Master Plan CIP, except AIA projects
- Resource Recovery Facility
  - Maintain existing reserve for Phase II expansion (timing dependent on regulatory requirements)
  - Phase-in funding of annual $600K R&R transfer over five years
- Future inflationary adjustments based on historical trend in Engineering News Record Construction Cost index (2.7%)

PROJECTED MASTER PLAN CIP* FUNDING SOURCES

	FY2016 - FY2020	FY2021 - FY2025
Rates	$2,283,101	$4,227,928
SDCs	$466,972	$837,585
Debt Proceeds	$7,500,000	$0
Existing Reserve	$550,000	$0
Total	**$10,800,073**	**$5,065,513**
Average Annual Costs		
Rates	$456,620	$845,586
SDCs	$93,394	$167,517

*Inflation-Adjusted

PROJECTED ANNUAL REQUIREMENTS FROM RATES (10-YEAR PERIOD)



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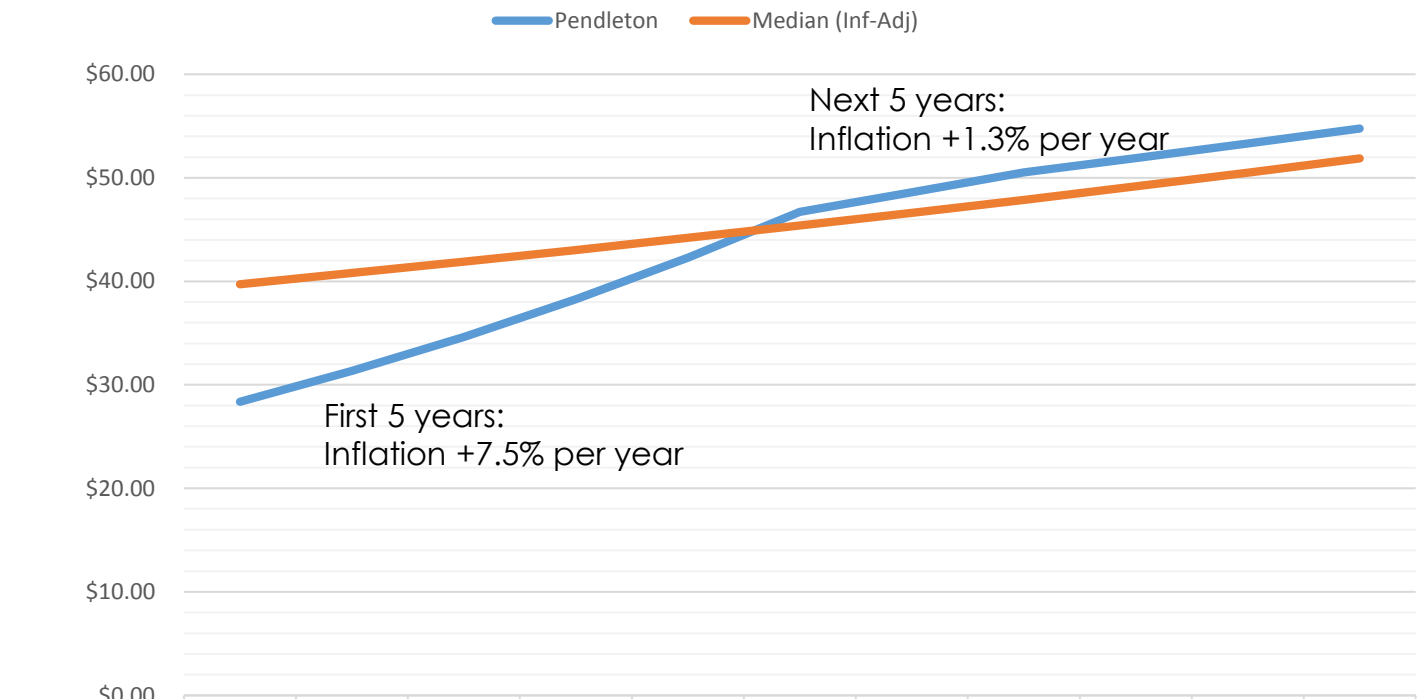

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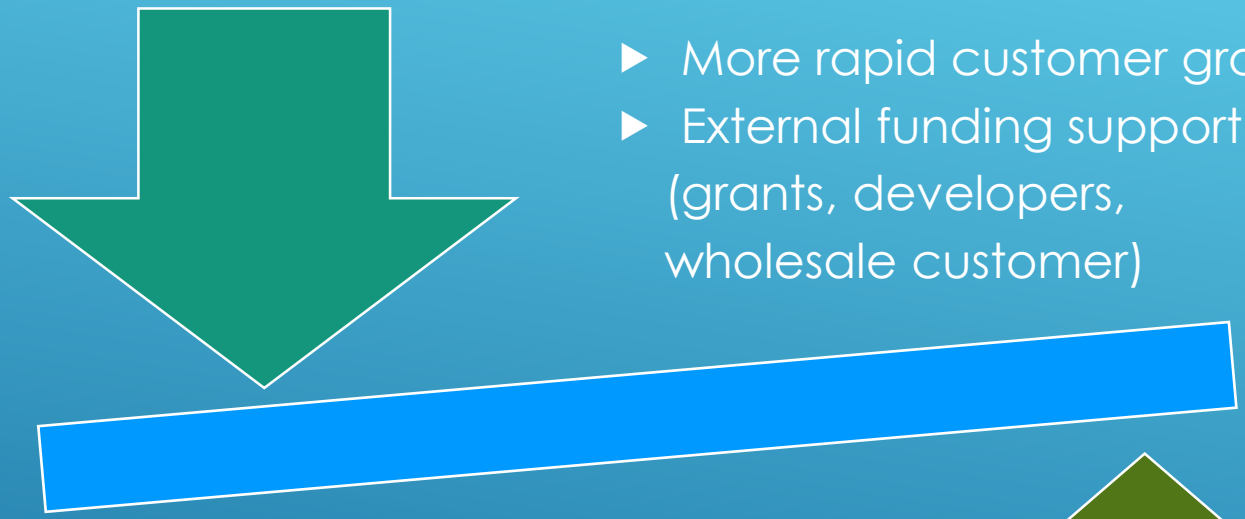
Median (Inf-Adj)	$39.73	$40.80	$41.90	$43.04	$44.20	$45.39	$46.62	$47.88	$49.17	$50.50	$51.86

FUTURE KEY RATE DRIVERS



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- Modify rate inflation index to ENR 20-City Average
- Budget annual contingency of 30-90 days of O&M expenses
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- July 1, 2015 initial implementation

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  - Approximately 57% increase needed to fund requirements in 10-year period
  - Phase-in Options
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*In addition to inflation

PHOTO BY PATTY ARNOLD, PENDLETON, OR

STORMWATER MASTER PLAN

MICHAEL CARR, P.E. / MSA

STORMWATER PLAN ACKNOWLEDGEMENTS

- Significant Contributions were made by the following staff:
  - Jeff Brown
  - Wayne Green
  - Bob Patterson
  - Tim Simons

PROJECT OVERVIEW

1. Section 1 – Executive Summary
2. Section 2 – Study Area Characteristics
3. Section 3 – Existing System Description
4. Section 4 – Regulations and Policies
5. Section 5 – System Analysis
6. Section 6 – Operations and Maintenance
7. Section 7 – Capital Improvement Plan
8. Section 8 – Financial Evaluation

STUDY AREA CHARACTERISTICS

- Topography
- Climate And Rainfall
  - Average rainfall = 12.65" Per Year
- Geology
- Natural Resource Areas
- Population Projections
- Land Use
- Tributary Drainage Basins

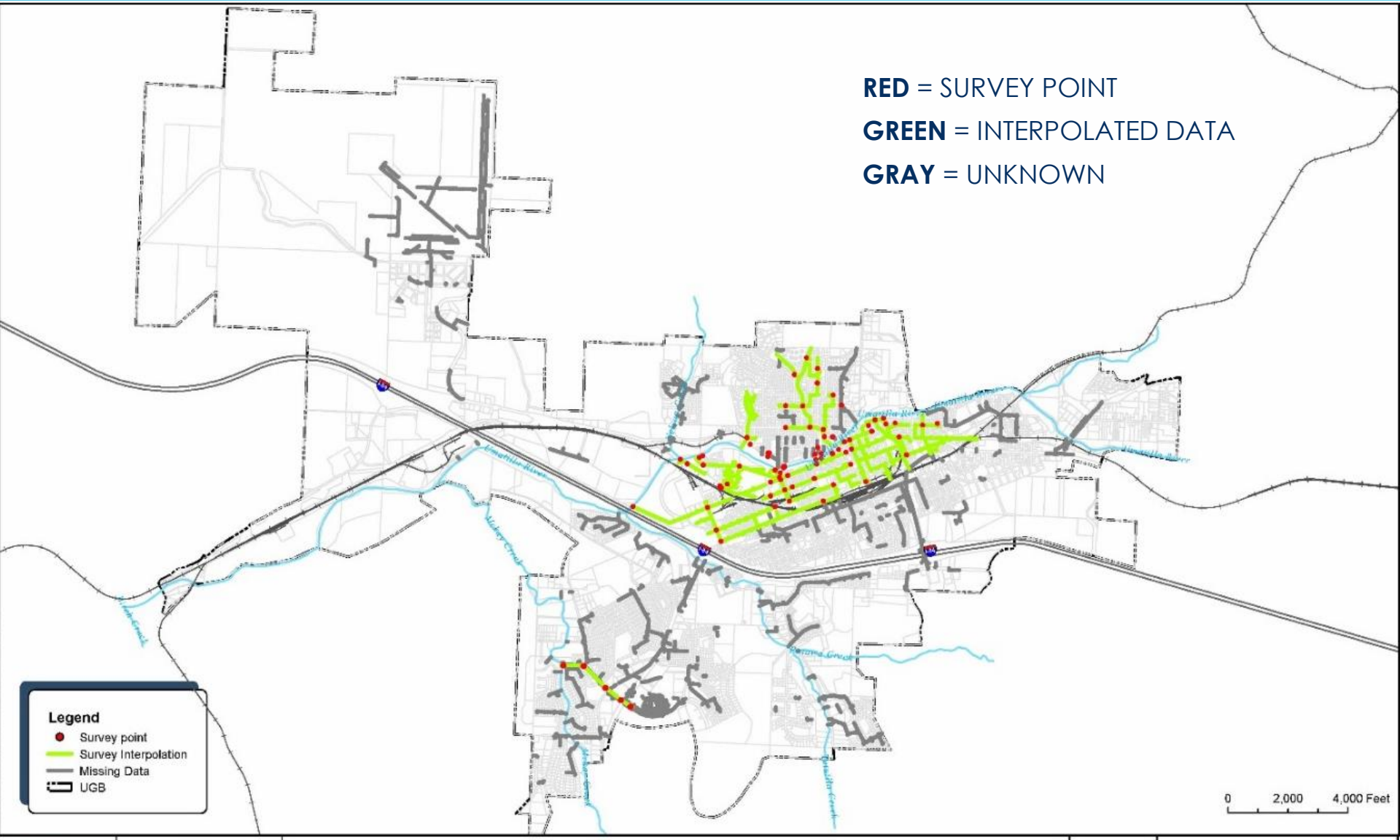
PHOTO BY MICHAEL ROGERS, BUHL, ID

EXISTING SYSTEM DESCRIPTION

- Summary of conveyance facilities
  - 46 miles of buried piping
  - 646 manholes
  - 3.5 miles of open channels/ditches
  - 15 flow-control facilities
  - 73 stormwater outfalls
- Flood control levees
  - 3.5 miles of levee along Umatilla River
- Significant amount of unknown data
  - 38% of piping system is unknown size

DATA COLLECTION

- City's first attempt to document system in GIS
  - General lack of data
  - Limited 2-d mapping available
  - Little elevation/invert data
- Acquiring first round of data
  - Prioritize efforts
  - Field surveys (manholes, outfalls, downtown, Southgate)
  - City interviews
  - Anecdotal accounts
  - Time-intensive process to develop system characteristics



MSA

City of Pendleton
Stormwater System

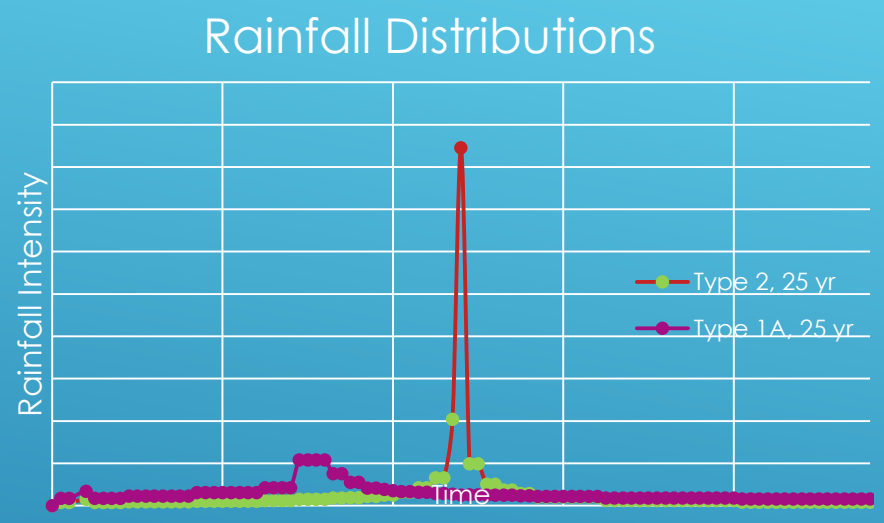
Stormwater System
Data Coverage
Figure 5-2

REGULATIONS AND POLICIES

- Current Regulatory Framework
  - Clean Water Act
  - Total Maximum Daily Loads (TMDL)
  - Endangered Species Act
  - National Flood Insurance Act
  - Comprehensive Plans/Public Facility Plans
- Future Regulations
  - NPDES MS4 Permit Program
  - FEMA PAL Certification
- Local Policies
  - No current formalized stormwater standards

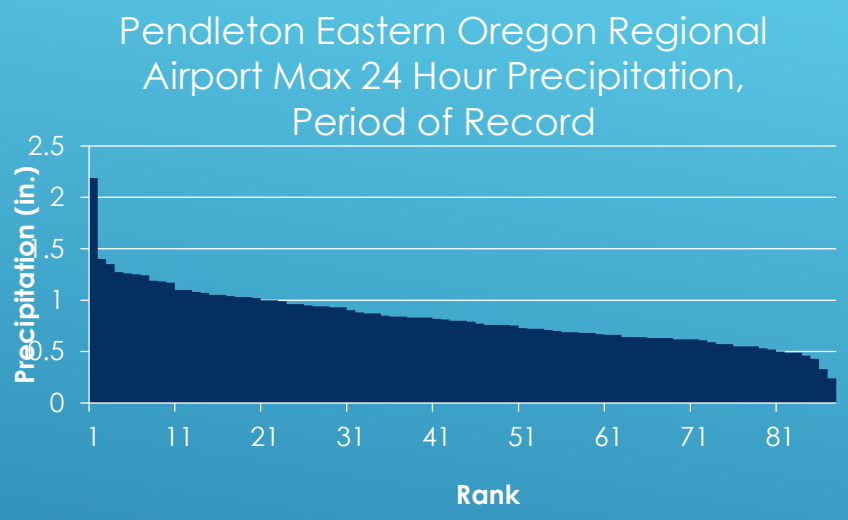
SYSTEM ANALYSIS

- Analysis methodologies varied based on known data
  - Dynamic modeling for well defined areas
  - HEC_HMS analysis for data deficient areas



SYSTEM ANALYSIS

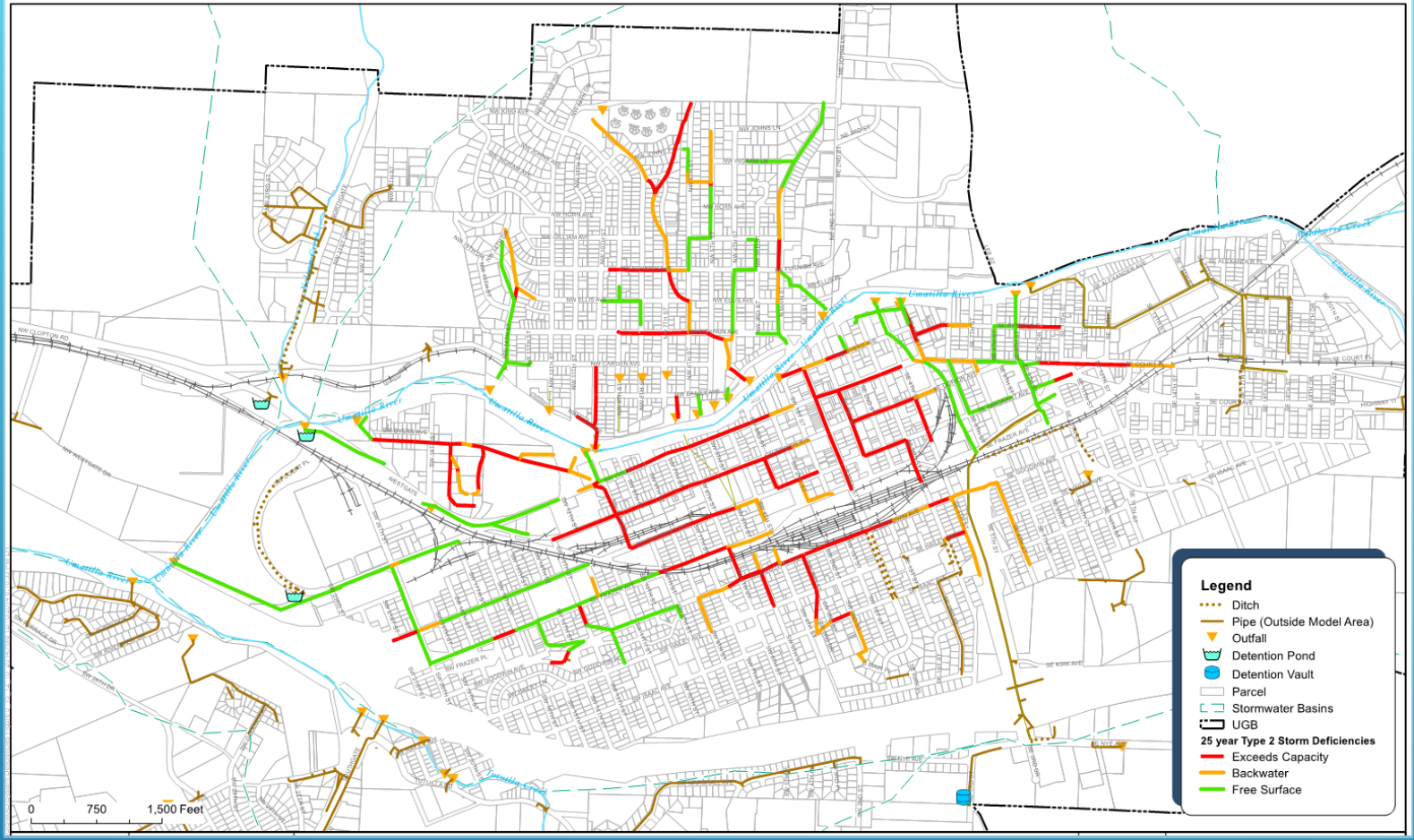
- Pendleton design storm development
  - Type 1A versus type 2
  - NOAA rainfall isopluvial maps
  - These isopluvials triggered system-wide deficiencies, so we looked into historical data
  - Rain gage data ranked by intensity over 86-year span



THE PERIOD OF RECORD IS JANUARY 1ST 1928 TO AUGUST 4TH, 2014.

PLANNING CRITERIA

- Pipe capacity selected as primary deficiency criteria
  - Pipe flowing full primary criteria
- System assessed to convey 25-year, type 2 rain event of 1.35-inches over 24-hours
- Hydraulic grade line was compared to topography to evaluate system overflows



- Model calibration
- Model results and deficiencies
- Evaluated under both existing and future conditions
- Alternatives analysis

SYSTEM ANALYSIS

OPERATIONS AND MAINTENANCE

- Currently have 0.5 FTE in Street Division dedicated to Stormwater O&M responsibilities
- Current O&M practices
  - Street sweeping, catch basin cleaning
  - Manhole/pipe cleaning as needed
  - Levees: annual vegetation management, semi-annual outfall inspection/cleaning

OPERATIONS AND MAINTENANCE

- Levee O&M requirements
  - Completion of FEMA provisionally accredited levee requirements
  - Vegetation management
  - Outfall inspection/cleaning
    - Routine on annual/semi annual basis
    - River flow triggered at 10,000 cubic feet per second
  - Slope stability repairs
  - Flood fight response
    - New 8th Street Bridge will eliminate this requirement

OPERATIONS AND MAINTENANCE

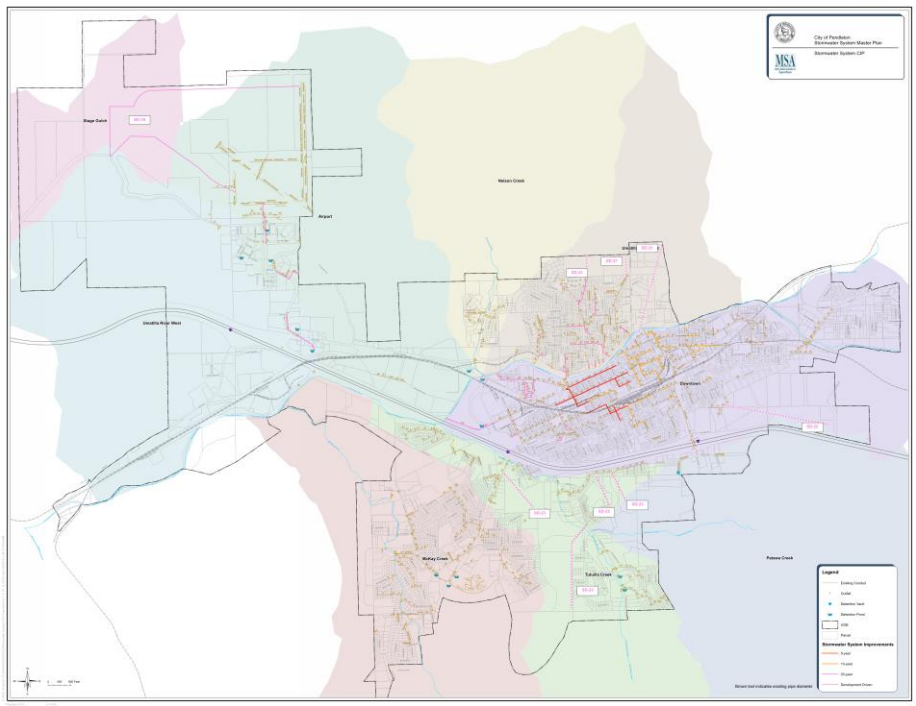
- Benchmark comparisons
  - Very few similar agencies in Oregon
  - Used Redmond, OR for benchmarking
  - Area served: 9.1 square miles (vs. 13.4 sq mi in Pendleton)
  - System size: 176,500 lf pipe (vs. 242,900 lf in Pendleton)
  - O&M staff: 3.0 FTES (VS. 0.5 FTEs in Pendleton)
  - Budget: $5.90/lf (vs $0.80/lf in Pendleton)
  - Utility fee: $7.06 per residential account (none in Pendleton)
- Future data collection may lead to identification of additional system deficiencies and increased O&M efforts

STORMWATER O&M RECOMMENDATIONS

- Develop a stormwater system O&M program based on incorporation of the PWMP Manual BMPs
- 3 additional FTEs
  - Transfer 1 FTE from Street Division (street sweeping)
  - 2 new FTEs to implement O&M
    - 0.5 FTE to perform ongoing pipe replacement program (4 FTEs between water, sewer & storm)
    - 1.5 FTE to perform other identified O&M

CAPITAL IMPROVEMENT PLAN

- Development of project cost estimates
- Project implementation timeframe
- Recommended capital improvements
  - Near term focused on O&M, data collection and revisions to system model
  - 150-year annual pipeline replacement program
  - Long term focus on deficiencies attributed to analysis criteria
- Percent attributed to growth



CAPITAL IMPROVEMENT PLAN

- Prioritization criteria for recommended improvements

Implementation Time Frame	Priority Description
0-5 Year	• Continued data collection • Creation of stormwater utility – identify dedicated funding – hire dedicated staff • Begin proactive maintenance program
6-10 Year	• Reanalyze system using hydraulic model – update CIP • Reassess condition of system based on updated information – update R&R program • Address flooding occurring in developed area
11-20 Year	• Reanalyze system using hydraulic model – update CIP • Reassess condition of system based on updated information - update R&R program • Address flooding occurring in developed areas
Developer-Paid (Time Varies)	• Assess impacts using hydraulic model – identify developer specific requirements

RECOMMENDED 0-5 YEAR PROJECTS

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

**Part of Sewer budget*
***Proposed for deferral until 6-10 year CIP*

OVERALL RECOMMENDATIONS

- Levees need on-going maintenance
  - Requirements become more stringent under certification
- Drainage system is in need of maintenance and is deteriorating
  - Change to "proactive" O&M
  - Increase cleaning and visual/CCTV inspections
  - Budget for annual pipe replacement
  - Increase staffing levels commensurate with other systems
- System analysis indicates capacity deficiencies, however existing data limits confidence in results
  - Obtain more complete data about system
  - Update GIS and model
  - Reanalyze system and implement CIP in 3-5 years

OVERALL RECOMMENDATIONS

- Adopt Central Oregon Stormwater Manual
  - Formalizes and documents design & construction standards
  - Provides developers consistent requirements
  - Provides DEQ-approved standards for stormwater treatment
  - Provides detention standards to reduce impacts to existing system
- Evaluate creation of stormwater utility
  - Use to provide dedicated funding source
  - Hire 3.0 FTE dedicated staff

QUESTIONS

STORMWATER FINANCIAL ANALYSIS

SDC-ELIGIBLE STORMWATER COSTS

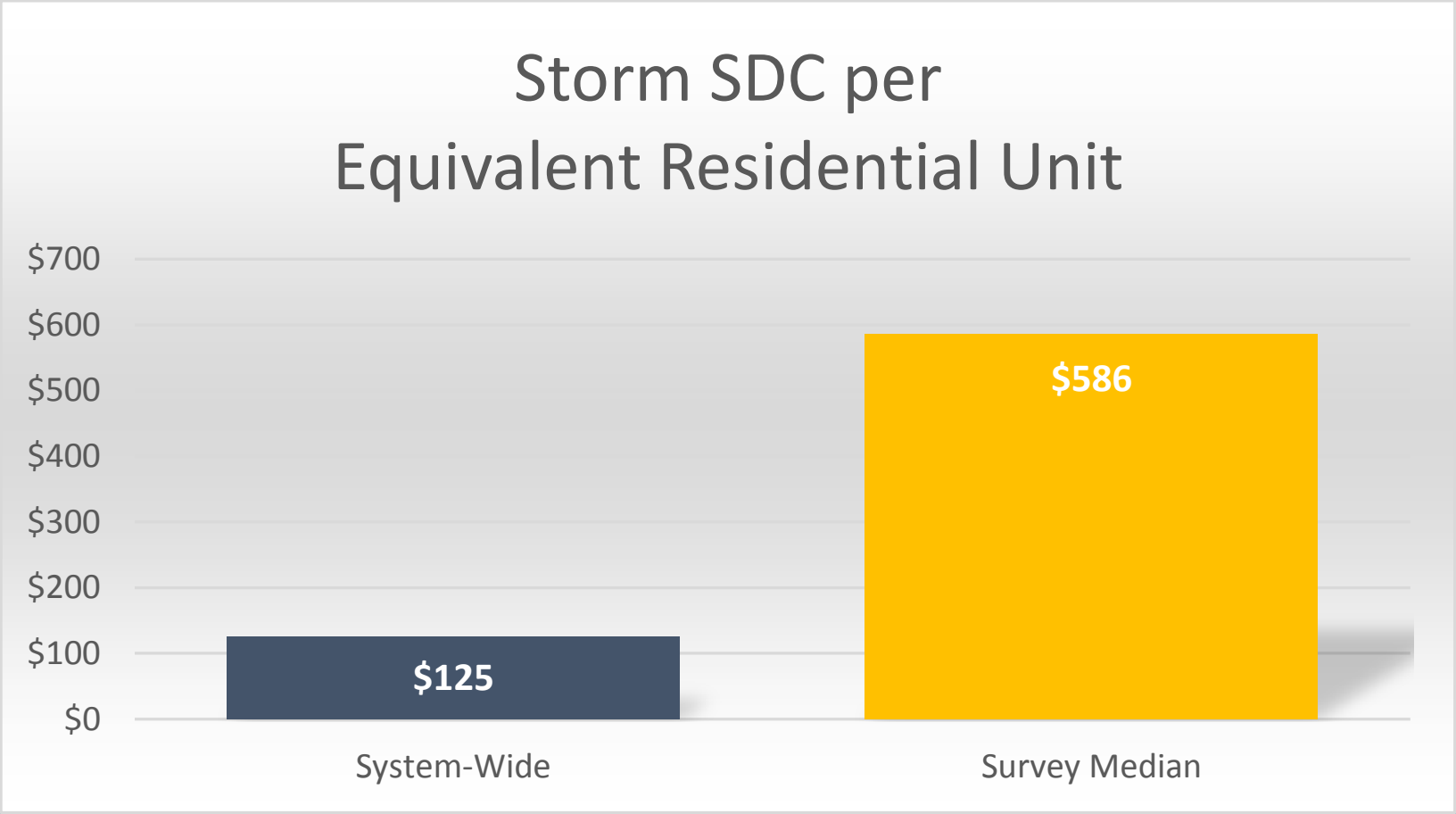
- Costs related to increased capacity of the system for future users
  - Provide new facilities
  - Increases the level of performance or service (upgrade existing facilities)
  - Compliance with SDC statutes
- SDCs may not be expended for:
  - Correcting existing deficiencies
  - Operation and maintenance expenses

STORMWATER SDC FORMULA

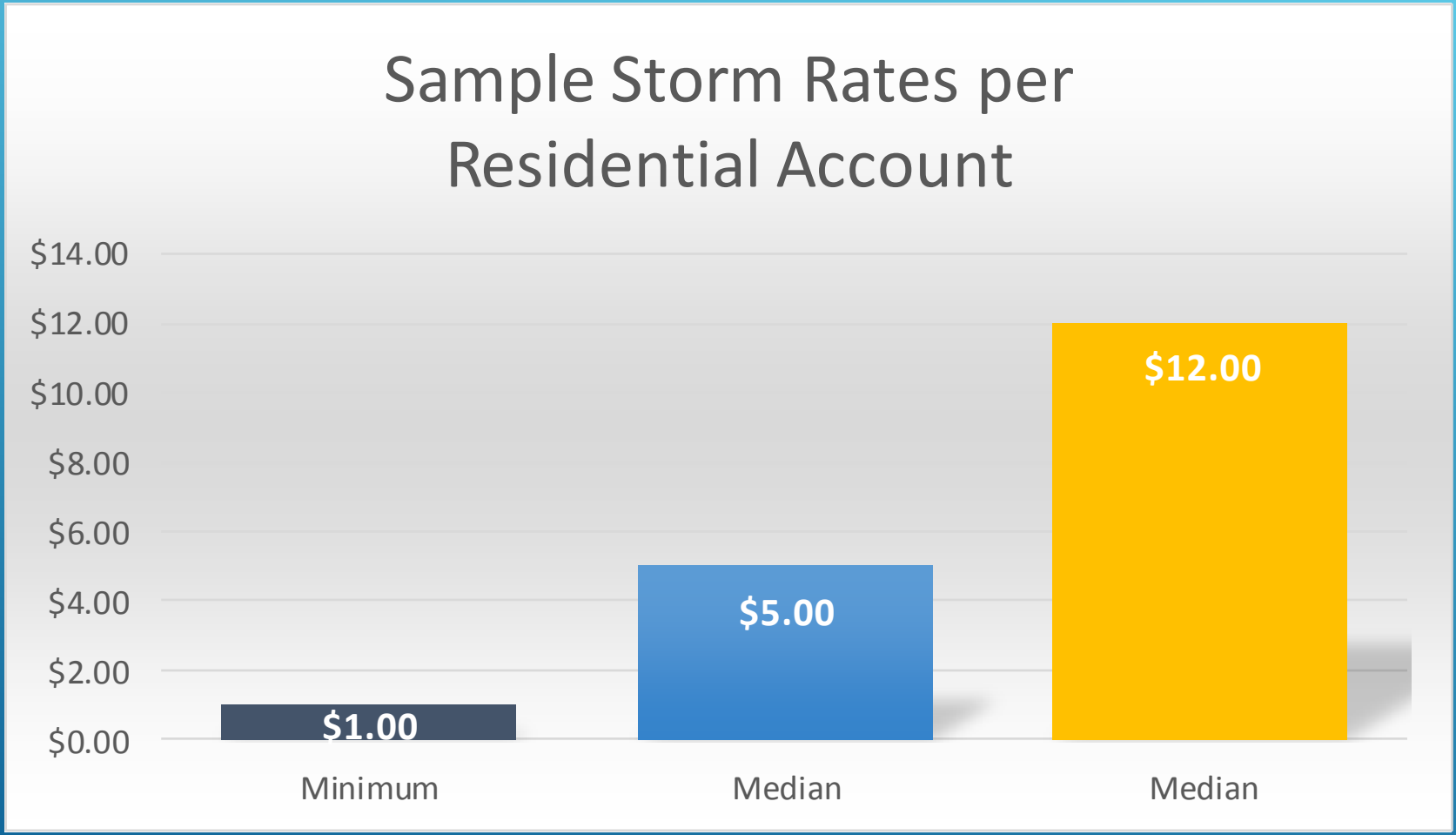
Growth Costs ($12.5m) ÷ System-wide Growth (239,796K sq ft. impervious area) = Cost ($52) per 1,000 sq. ft. impervious area

*Typical Residential = 2,400 sq. ft. impervious area (SDC = $125)

STORM SDC COMPARISON



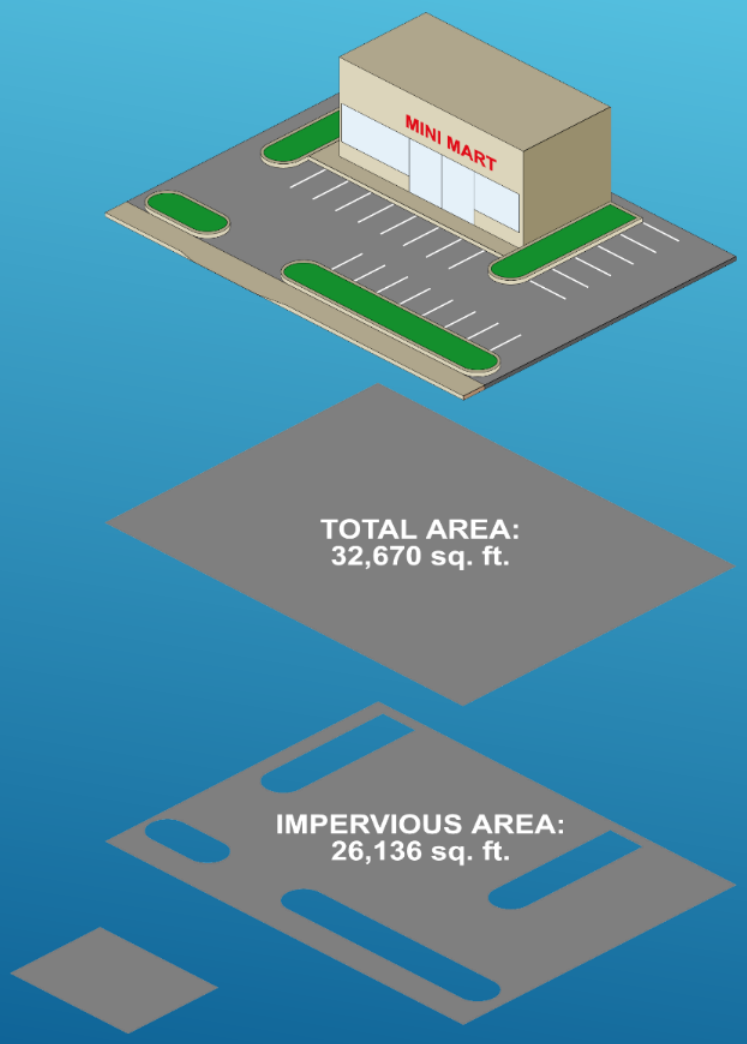
STORMWATER RATE SURVEY (BASED ON 2013 DATA)



PROJECTED MASTER PLAN RECOMMENDED REQUIREMENTS (5-YEAR PERIOD)

Item		Amount
Personnel (3 FTE)		$200,000
Average CIP		$300,000
Total		$500,000
Water Accounts		5,800
Projected Revenue		**Annual $**
Monthly $/Acct	$5.00	$348,000
Monthly $/Acct	$7.25	$504,600

KEY STORMWATER RECOMMENDATIONS



- Implement new stormwater SDC and phased Rates

Phase 1: (3-5 years)

- Uniform charge per utility customer
- Recover Master Plan CIP costs
- Fund levee certification from sewer reserve

Phase 2: (5 years +)

- Variable Rate based on property area or impervious area; inflationary index
- Requires further development of GIS data

QUESTIONS

WRAP UP

COMPARISON OF 20-YEAR INCREASES

Water Bill Increases (15 ccf use)	
Historical 20-year	192%
Projected 20-year	243%
Sewer/Storm Rate Increases	
Historical 20-year	197%
Projected 20-year	107%

NEXT STEPS

- Feedback from Council
  - Is Council supportive of Water, Sewer & Storm CIP and associated staffing levels?
  - Define funding strategy over next 5 years
- Content and format of Public Open House?
  - Informational and feedback related to how to structure rate increases
- Timing of rate increase
  - Target - July 1, 2015