City of Poulsbo
2016 Comprehensive Sewer Plan Update
City Council Presentation

FCS GROUP
Solutions-Oriented Consulting

BHC CONSULTANTS

Presentation Outline

- Background
  - 2008 Plan Recommendations and Conclusions
  - 2016 Plan Update Objectives
- Document Outline
- Population and Flow Projections
- Existing System Facilities and Analysis
- Capital Improvement Program
- Financial Plan
- Q & A

2008 Plan Summary - Catalysts

- 2008 City Comprehensive Plan/Land Use Update for GMA compliance
- 6th Ave Basin I/I reduction project successful, I/I still high
- Pre-Recession growth ongoing
- Separately analyzed/observed collection system segments with capacity concerns
- Kitsap County facility capacity and cost concerns

2008 Plan Summary – Findings

- Pump Station Improvements (Bond Rd, Lindvig, Marine Science Center, 6th, 9th, Village, Liberty Rd)
- Central Poulsbo Basin I/I Reduction
- Lemolo Siphon capacity of 3.2 mgd
- Annual growth rate of 2.7%
- 2025 planning horizon population projection of 14,808
- West Poulsbo conveyance cost prohibitive

2016 Plan Objectives

- Consistency w/ 2016 City Comprehensive Plan Update
  - Capital Facilities Plan element to reflect current sewer needs
- Establish updated SR 305 interceptor and Lemolo siphon capacities
- Again evaluate West Poulsbo alternative
- Evaluate winter storm surcharge events
- Add condition/reliability assessments to capacity evaluation in formulating capital improvements
- Develop and analyze funding program alternatives

Draft CSP Update – Chapter Outline

Executive Summary

1. Introduction
2. **Service Area, Population, and Flow Projections**
3. **Sewer System Description**
4. **Sewer System Evaluation**
5. **Downstream Conveyance and Treatment**
6. Operation and Maintenance Program
7. **Capital Improvement Program**
8. **Financial Program**
9. References

Appendices

Historical Population

Table 2-2. City of Poulsbo Historical Population 2005 to 2015		
Year	**City Population**	**Annual Growth Rate**
2005	7,657	4%
2006	7,722	0.8%
2007	7,823	1.3%
2008	8,110	3.6%
2009	9,106	12.2%
2010	9,200	1.0%
2011	9,245	0.4%
2012	9,360	1.2%
2013	9,585	2.4%
2014	9,775	1.98%
2015	9,950	1.79%

Population Forecast

Table 2-3. Poulsbo Population Forecast			
Population Distribution	Year		
	2015	2021	2036
City Limits + UGA	9,950	11,336	14,808

2036 planning horizon projection of 14,808 matches the 2008 Plan projection for 2025

Per Capita Flows

Per Capita Flows			
Year	Average Annual Flow (Gallons/Day)	Service Area Population	Gallons/Capita/Day
2013	588,659	9,391	62.7
2014	603,645	9,607	62.8
2015	603,348	9,809	61.5
Average			62.3

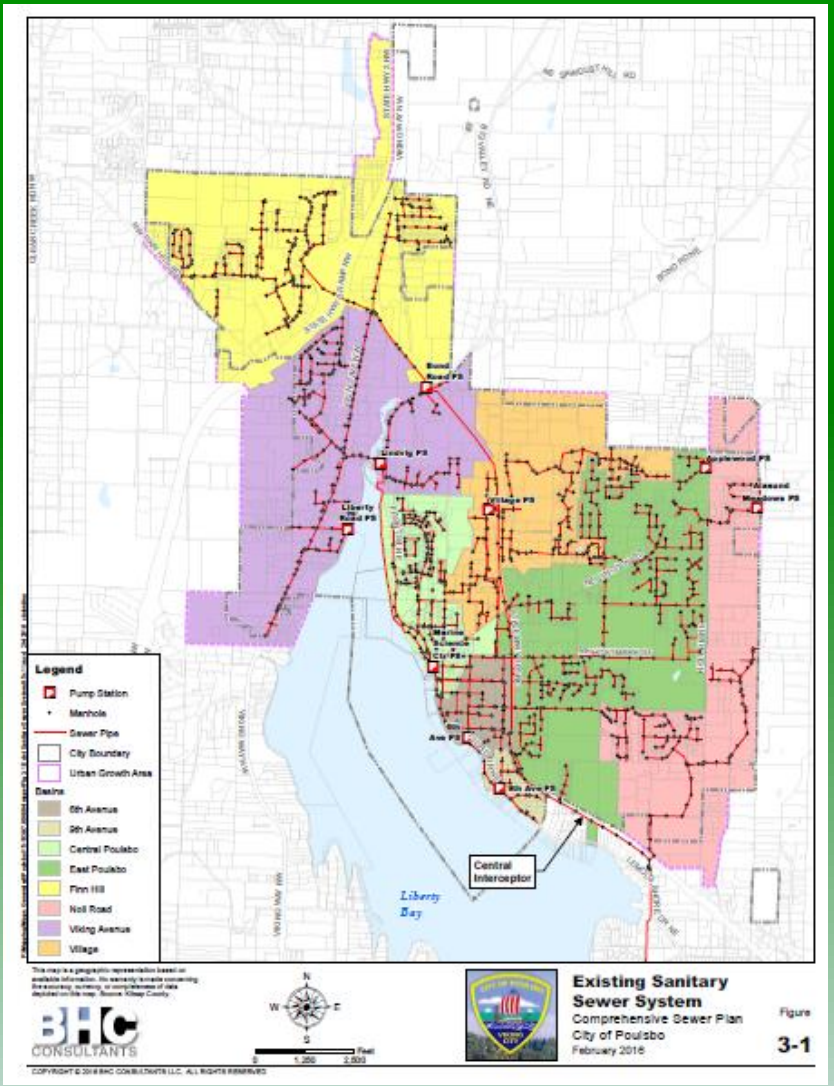
- Average Annual Dry Weather Flow = 0.46 mgd
- Average Annual Wet Weather Flow = 0.67 mgd

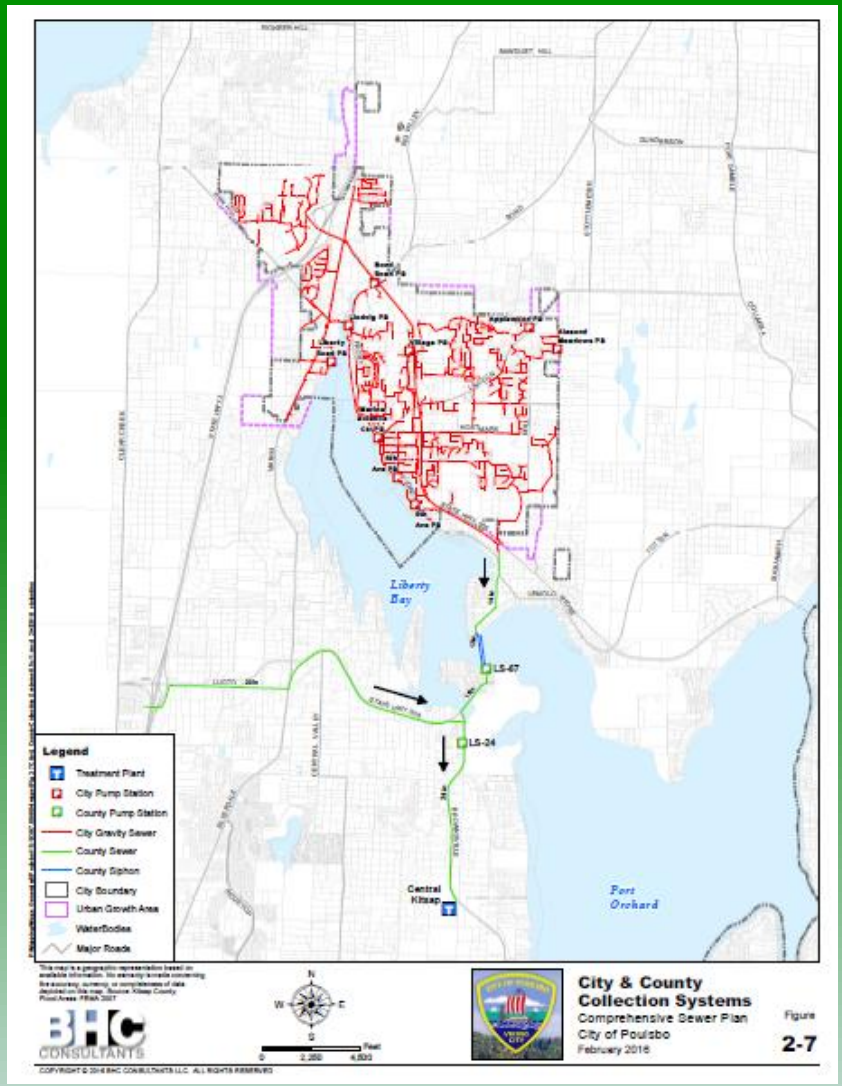
Future Flows

Future Flow Projections					
Year	Service Area Population Projection	Per Capita Flow (gpcpd)	Peak Hour Peaking Factor	Average Annual Flow (mgd)	Peak Hour Flow (mgd)
2015	9,809	62	3.61	0.62	2.72
2021	11,077	62 / 70	4.05 / 2.8	0.71	3.05
2036	14,808	62 / 70	4.05 / 2.8	0.96	3.86

- Existing flows established through Johnson Rd metering station records

Existing Sewer System





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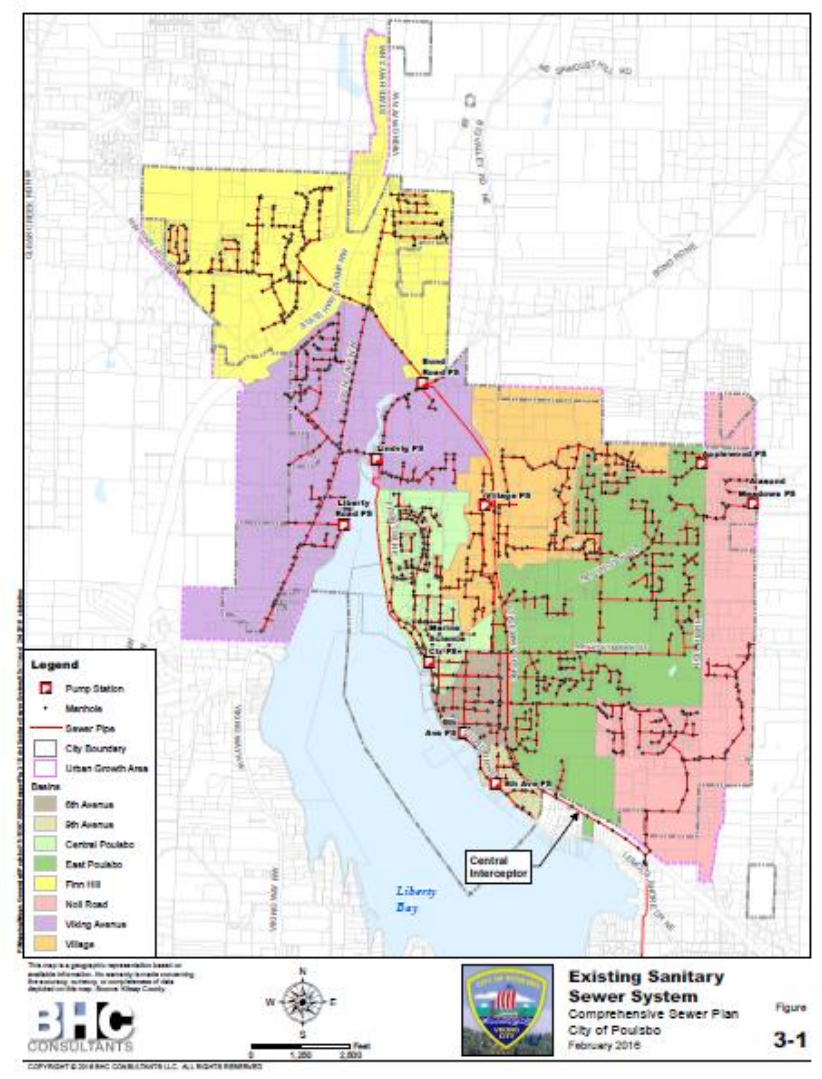
System Capacity Analysis

- Village Basin
- 305 Interceptor
- Lemolo Siphon



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Village Analysis

- Projected 2036 peak hour flow = 0.72 mgd
- 2016 Village Pump Station firm capacity = 0.72 mgd
- No recommended capacity improvements, but continued monitoring

Village Basin Gravity Analysis		
Pipe Size	**Capacity, min. slope (mgd)**	**2036 Peak Hour Flow (mgd)**
8-inch	0.49	0.72
10-inch	0.75	0.83
12-inch	1.08	0.92
15-inch	1.62	1.48

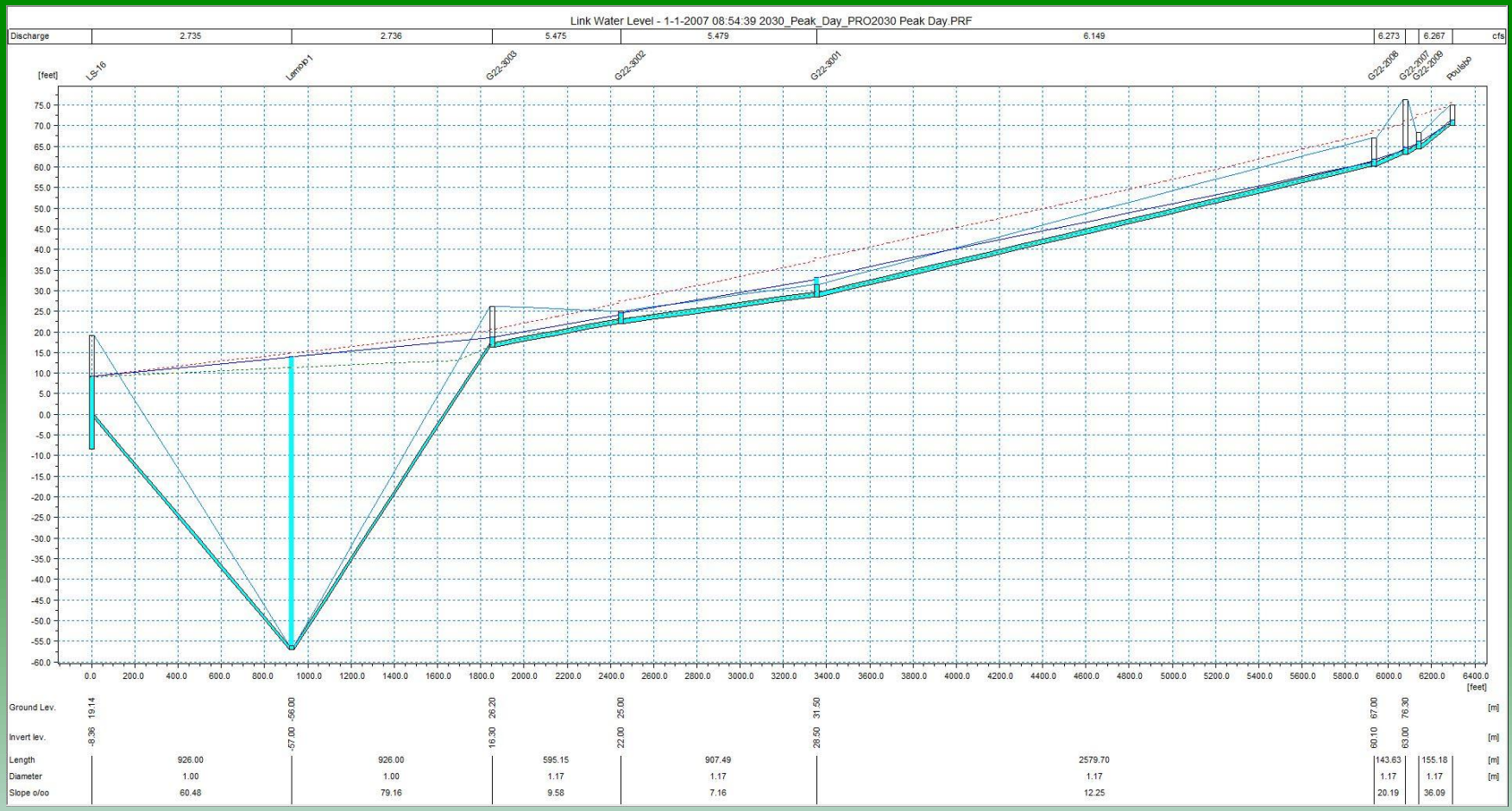
305 Interceptor Analysis

- Projected 2036 peak hour flow = 3.55 mgd
- 2015 peak hour flow = 2.67 mgd
- 18-inch gravity, 0.12% slope = 2.35 mgd
- Minimally sloped portion of interceptor currently deficient
- Increase capacity of 4,315 lf of 18-inch pipe
  - New parallel interceptor
  - Upsize existing pipe (bursting, reaming)
  - Extend Bond Road PS force main

Lemolo Siphon Analysis

- Current project under construction
  - New gravity sewer to PS 67
  - Abandon PS 16
  - Manhole sealing upstream of Lemolo Siphon
- Existing siphon capacity = 3.54 MGD
- Projected 2036 peak hour flow = 3.86 MGD
- Unless significant continued I/I reduction can be achieved, plan to install new siphon pipe/enhanced capacity

Lemolo Siphon HGL



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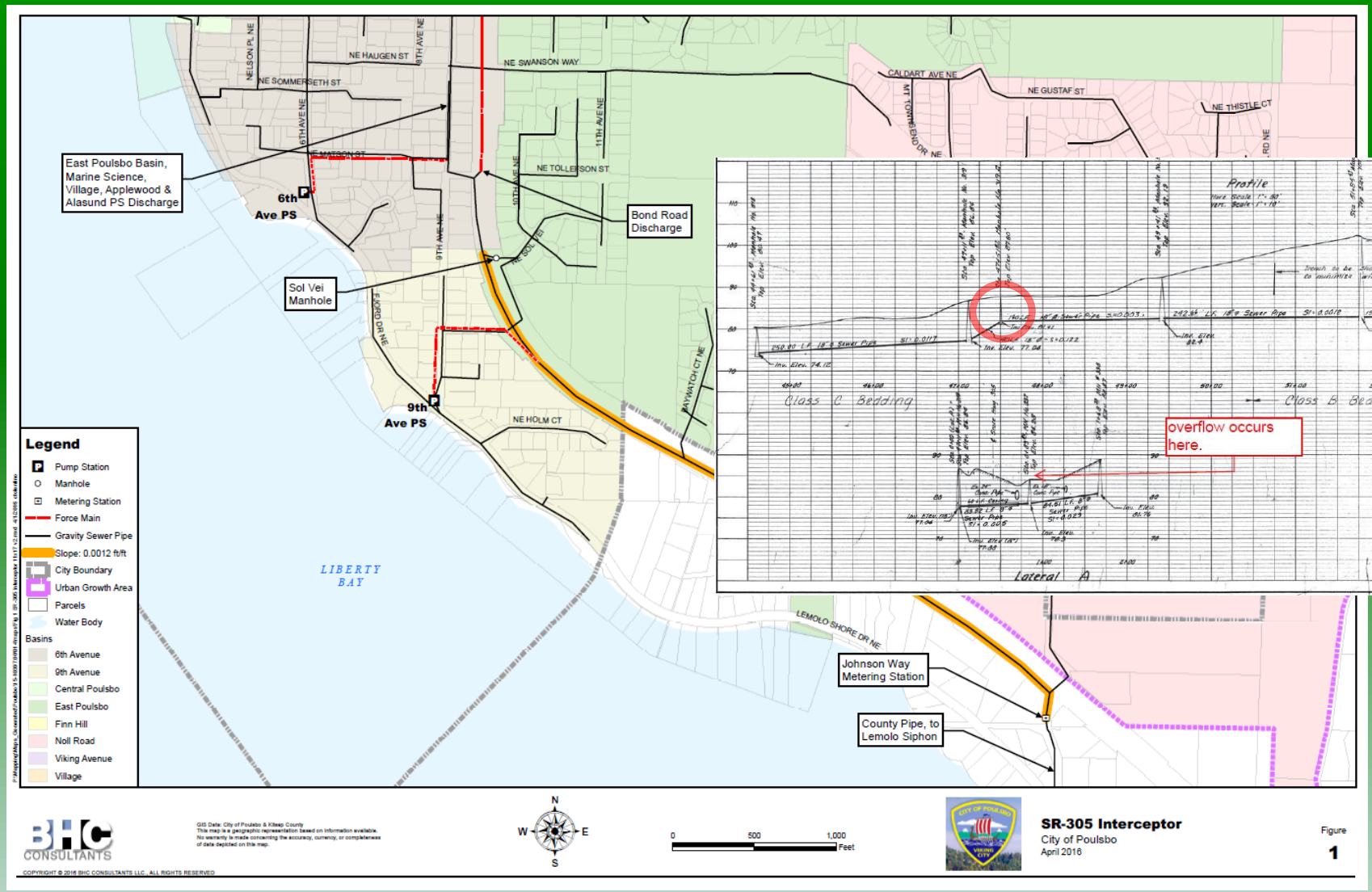
System Capacity Analysis – SSO Events

- SR 305 Interceptor Surcharge
  - January 21, 2016
  - March 13, 2016

Sol Vei Manhole Location



Local Rainfall Gauges

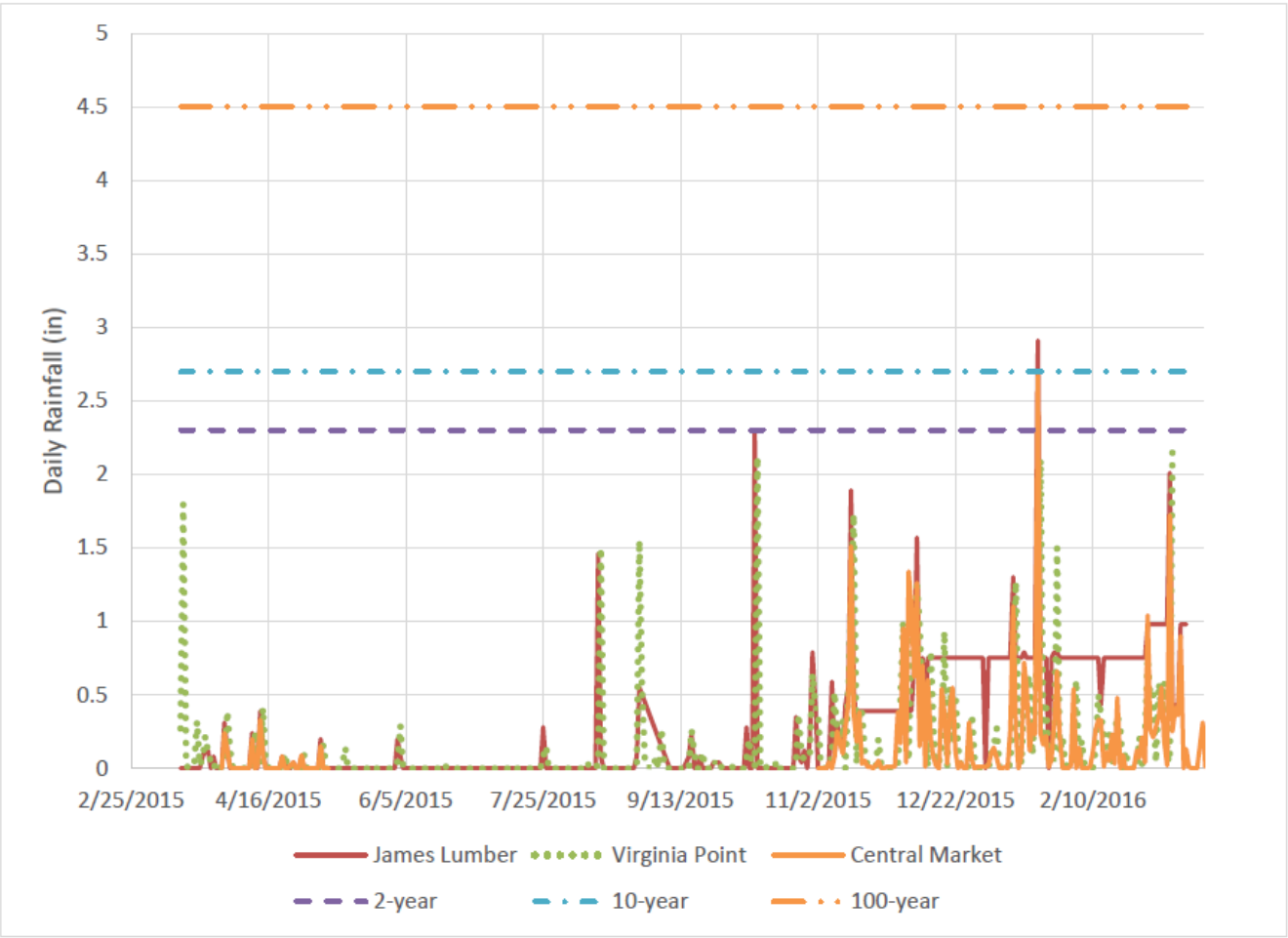


Figure 3: Total Daily Rainfall Comparison

Estimated System Flows

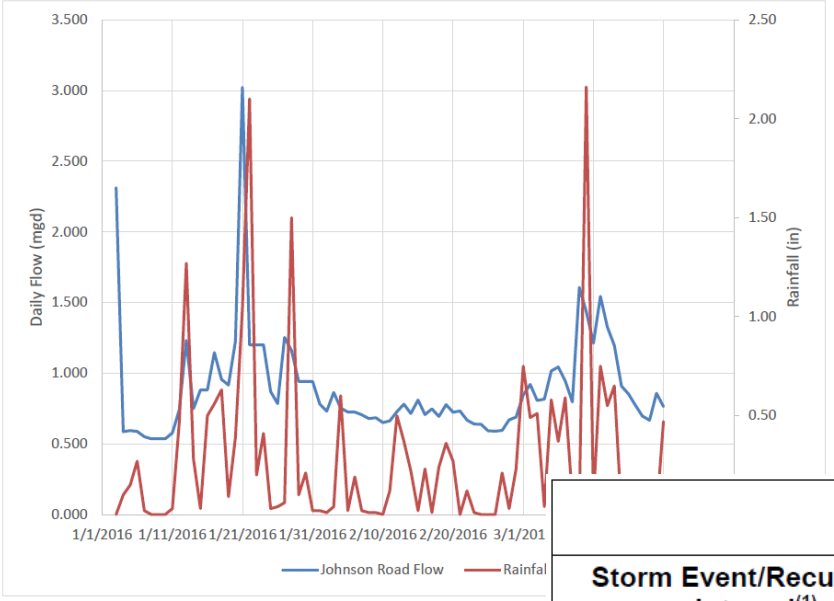


Figure 2: Johnson Road Flow M

Table 1
Storm Event Comparison

Storm Event/Recurrence Interval[1]	Daily Rainfall[2] (in)	Estimated Collection System Flow[3] (mgd)
March 12, 2016 (1.2 year)	2.16	1.33
2-year	2.3	2.52
10-year	2.7	2.85
January 21, 2016 (20-year)	2.91	3.02
100-year	4.5	4.33

Notes:

1) Recurrence interval was interpolated for March 12 and January 21.
2) Daily rainfall was from the rain gauge with the highest recorded rainfall.
3) Collection system flow was estimated for the 2-, 10-, and 100-year flows by assuming all flows greater than the average annual flow of 0.62 mgd are directly proportional to the rainfall on January 21. It was calculated as 0.62 mgd + (3.02 mgd – 0.62 mgd) * (Daily Rainfall in / 2.91 in). Flows were measured at the Johnson Road Metering Station.

SSO Events – Suspected Factors

- Particularly wet winter > high groundwater
- Recently bolted manhole lids downstream on the SR 305 interceptor
- Pump station reconfigurations/capacity increases
- Continuing high levels of I/I might be originating from the Marine Science, Village, Sixth Ave, and East Poulsbo gravity basins

SR 305 Capacity Recommendations

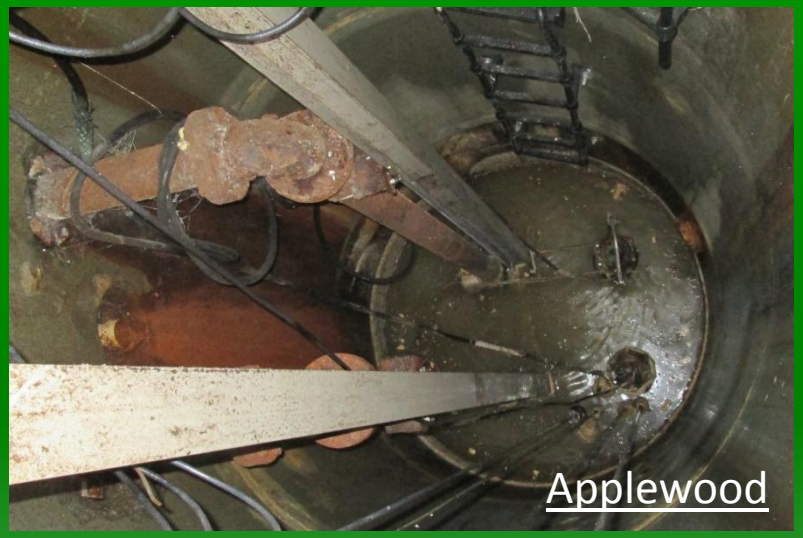
- Pipeline/manhole inspection and cleaning
- Coordinated pump station control could be considered
- Continuation of annual I/I reduction program
- Capacity enhancing capital improvements
  - Construction of parallel interceptor, or
  - Extension of the Bond Road PS force main
- Peak flow mitigation capital improvement
  - Construct off line storage for storm events

Condition/Reliability Improvements

Alasund Meadows

-Wet Well Corrosion (pipes, anchors, supports)

-Inadequate Eqpt (pumps, elect)


Applewood


Applewood


Lindvig


Lindvig

Condition/Reliability Improvements

No Fall Protection

Safety Grate/Net Fall Protection

West Poulsbo Pumping Alternative

- 2007 Technical Memorandum
  - Alternative 1, all flow pumped
  - $49,292,000
  - 5 new pump stations (Lemolo, Johnson Road, Forest Rock, Johnson Creek, Scandia)
  - Modifications to 4 pump stations (Bond, MSC, Village, PS 24)
  - 35,000 lf of pipe

West Poulsbo Pumping Alternative

- Revised analysis
  - Alternative 1, all flow pumped
  - $36,080,000
  - 3 new pump stations (Lemolo, Johnson Creek, Scandia)
  - Modifications to 4 pump stations (Bond, MSC, Village, PS 24)
  - 27,400 lf of pipe

Capital Improvement Program

Table 7-1 - City Sewer Capital Improvement Projects

CIP #	Project Name	2016 Project Costs	2017 Project Costs	2018 Project Costs	2019 Project Costs	2020 Project Costs	2021 Project Costs	Total 6-year Project Costs	2022-2036 Project Costs	2022-2036 Project Year
1	Annual Inflow Reduction Program[3]	180,000	180,000	180,000	180,000	180,000	180,000	1,080,000	180,000	Annual
2	Poulsbo Village Pump Station Upgrades[1]	500,000						500,000		
3	Harrison Force Main Replacement[1]	250,000						250,000		
4	SR-305 Force Main Extension[2]			200,000	2,610,000			2,810,000		
5	Telemetry System[1]	175,000						175,000		
6	Liberty Bay Pump Station Improvements[1]	360,000						360,000		
7	Purchase and Demolition of Lemolo House[1]		350,000					350,000		
8	Public Works Facility[1,5]		150,000	150,000	150,000	150,000	150,000	750,000	150,000	Annual through 2030
9	Noll Road Sewer Improvements[1]			20,000	210,000			230,000		
10	Applewood Pump Station Replacement[2]			730,000				730,000		
11	Annual Pump Station Rehabilitation/Replacement[2,3]	100,000	100,000	100,000	100,000	100,000	100,000	600,000	100,000	Annual
12	Storage Facility[1]		500,000					500,000		
	Total City Sewer Capital Projects	1,565,000	1,280,000	1,380,000	3,250,000	430,000	430,000	8,335,000	5,270,000	

Notes:
1) Project costs generated by City Engineering Department.
2) Project costs generated by BHC Consultants, see Appendix I.
3) Annual/bi-annual allocation for continuing City sewer utility programs.
4) Project costs developed by Kitsap County; allocations included are based on City-obligated contractual percentages
5) Costs are for annual bond payments.
6) All CIP projects are in 2015 dollars.

Table 7-2 - County Sewer Capital Improvement Projects (Projected Poulsbo Cost-Share by Current Agreement)

CIP #	Project Name	2016 Project Costs	2017 Project Costs	2018 Project Costs	2019 Project Costs	2020 Project Costs	2021 Project Costs	Total 6-year Project Costs	2022-2035 Project Costs	2022-2036 Project Year	Poulsbo's percentage of project
1	Capital Facilities Charge for CK Plant[4]	133,000	133,000	133,000				399,000			15.83%
2	Kitsap County Pump Station #16 & 67 Replacement[4]		5,000,000					5,000,000			93.60%
3	Lemolo Capacity/Condition Improvements[4]				1,140,000		3,600,000	4,740,000			100.00%
4	CKTP Primaries and Aeration Tanks 5 & 6[4]						523,182	523,182	4,011,005	2024 (estimated)	15.83%
5	CKTP UltraViolet Disinfection Upgrade[4]	316,600						316,600			15.83%
6	CKTP Screw Press[4]				158,300			158,300			15.83%
7	CKTP Campus Buildings[4]						221,620	221,620	1,646,320	2022 (estimated)	15.83%
8	Lemolo Siphon Phase 2[4]	200,000	300,000		250,000	250,000	8,000,000	9,000,000	X	X	100.00%
	Total County Sewer Capital Projects	649,600	5,433,000	133,000	1,548,300	250,000	12,344,802	5,657,325	649,600		

Notes:
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2) Project costs generated by BHC Consultants, see Appendix I.
3) Annual/bi-annual allocation for continuing City sewer utility programs.
4) Project costs developed by Kitsap County; allocations included are based on City obligated contractual percentages.
5) Costs are for annual bond payments.
6) All CIP projects are in 2015 dollars.

Financial Plan Overview

- Verifies that the City can fund the CIP and maintain affordable rates
- Elements of Financial Plan analysis:
  - Review of historical financial performance
  - Forecast of operating revenues and expenses
  - Capital needs forecast / funding strategy
  - Revenue sufficiency evaluation
  - Affordability evaluation

Key Assumptions

Annual Cost Escalation

- General: 3.0% *(Based on CPI)*
- Labor Costs: 5.8%
- Treatment Costs: 5.0%
- Construction Costs: 4.0%

General Facilities Charge

- Current Charge: $8,430 per ERU
- Increases with CPI inflation
- Additional $1,750 increase in 2017

Debt Financing Terms

- Type: Revenue Bonds
- Term: 20 Years
- Interest Rate: 4.5%
- Coverage Requirement:
- 1.25 × Bond Debt Service Without GFCs
- 1.50 × Total Debt Service With GFCs

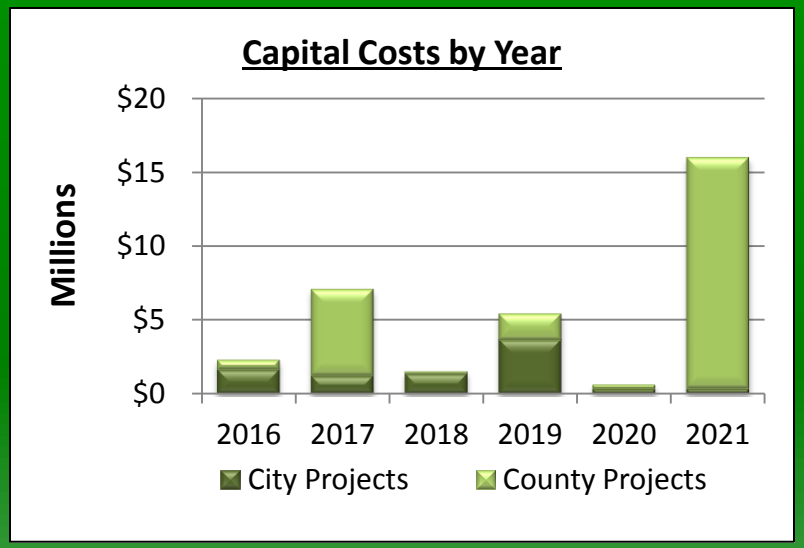
Operating Forecast

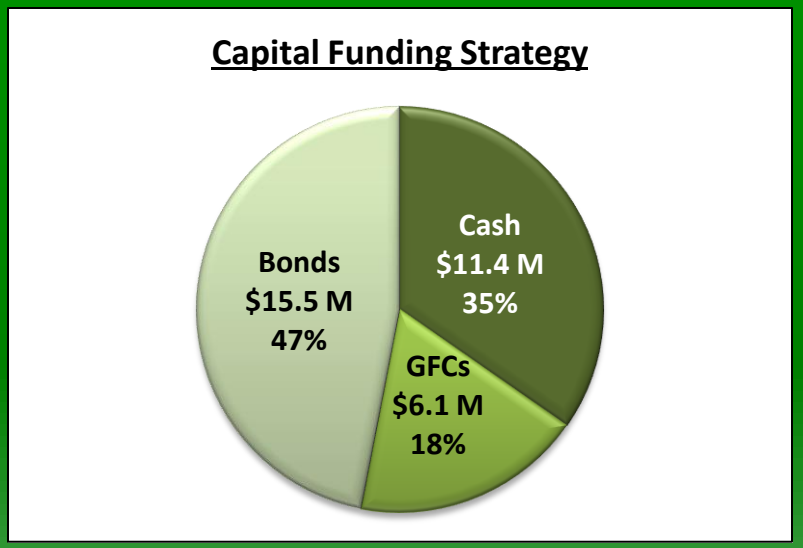
- Based on 2015 Budget + inflation
- Operating expense adjustments:
  - Treatment costs
  - Incremental labor costs (FTE additions)
- Rate revenue projection based on:
  - 2014 actual rate revenue
  - Customer growth (95 ERUs per year)
  - 2015 rate increase (2%)

Financial Policies

- Minimum operating reserve balance of 60 days (12%) of projected expenses
- System reinvestment funding
  - Provides cash for capital projects, offsetting debt issuance
  - Depreciation funded through rates

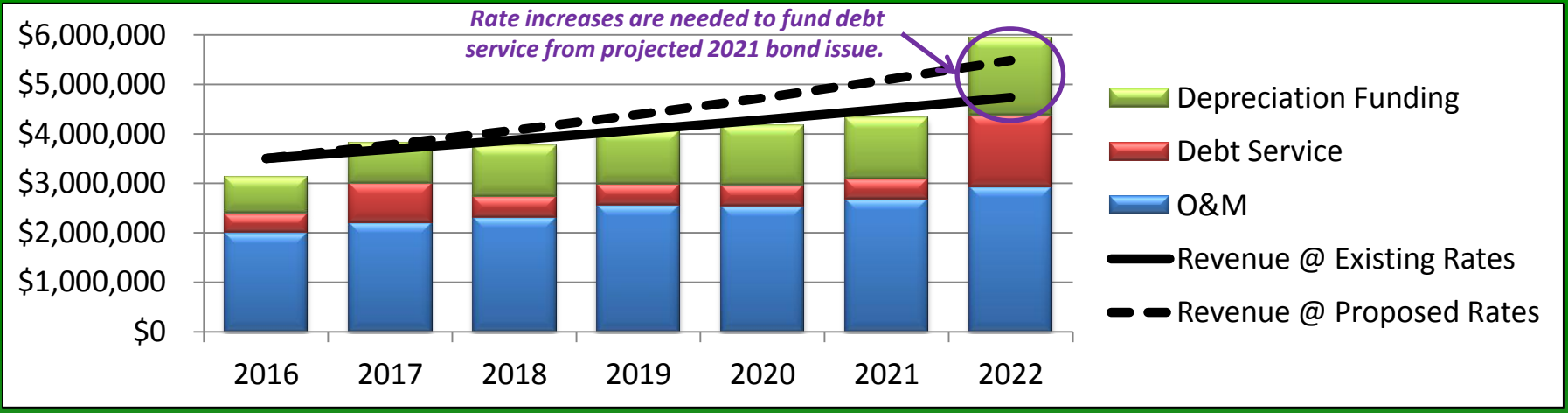
Capital Needs Forecast





- $33,013,000 in capital projects from 2016 – 2021
  - City Projects: $8,576,000
    - SR 305 FM Extension: $3,278,000
    - Inflow Reduction: $1,262,000
    - Other: $4,036,000
  - County Projects: $24,437,000
    - Lemolo Siphon: $11,252,000
    - Lemolo Capacity Imp.: $5,889,000
    - Pump Station Replacement: $5,408,000
    - Other: $1,888,000
- The City appears to be able to cash-fund ≈ 53% of the planned projects; the remaining 47% is expected to be bond-funded.
  - New debt service expected to be around $296,000 – $1.4 million per year

Revenue Requirement Analysis



Recommended Scenario	2016	2017	2018	2019	2020	2021
Annual Rate Increase *(Above CPI)*		2.5%	2.5%	2.5%	2.5%	2.5%
Projected Monthly Residential Bill @ 7 ccf[1]	$67.40	$71.11	$75.02	$79.15	$83.50	$88.09
Change From Prior Year		+$3.71	+$3.91	+$4.13	+$4.35	+$4.59

No GFC Increase Above CPI	2016	2017	2018	2019	2020	2021
Annual Rate Increase *(Above CPI)*		3.5%	3.5%	3.0%	3.0%	3.0%
Projected Monthly Residential Bill @ 7 ccf[1]	$67.40	$71.78	$76.45	$81.04	$85.90	$91.05
Change From Prior Year		+$4.38	+$4.67	+$4.59	+$4.86	+$5.15

Max GFC Increase	2016	2017	2018	2019	2020	2021
Annual Rate Increase *(Above CPI)*		2.0%	2.0%	2.0%	2.0%	2.0%
Projected Monthly Residential Bill @ 7 ccf[1]	$67.40	$70.77	$74.31	$78.03	$81.93	$86.03
Change From Prior Year		+$3.37	+$3.54	+$3.72	+$3.90	+$4.10

[1]Assumes CPI inflation rate of 3% per year; includes 9.0% utility tax.

Findings of Financial Analysis

- Recent historical performance of sewer utility has been strong
  - Positive net income due to growth / rate increases
- Rate increases above CPI are needed to:
  - Fund depreciation to provide cash for CIP projects
    - Depreciation increases with completion of CIP projects
  - Make payments on new debt issued to fund CIP
  - Cover treatment / labor operating costs that increase by more than CPI
- Even with rate increases, rates are within affordable range
  - Defined as 2.0% of median household income (MHI)
  - Sewer bills at 7 ccf per month expected to be 1.3 – 1.5% of MHI
    - Based on 2014 MHI of $57,296
    - Assumes that MHI increases with CPI (3.0% per year)