



FEASIBLE AND AFFORDABLE: SSO ELIMINATION AND THE NFA PROCESS

August 27, 2014

Agenda

- Introduction
- History
- Modeling
- Alternatives
- Affordability
- Recommendation
- Conclusion

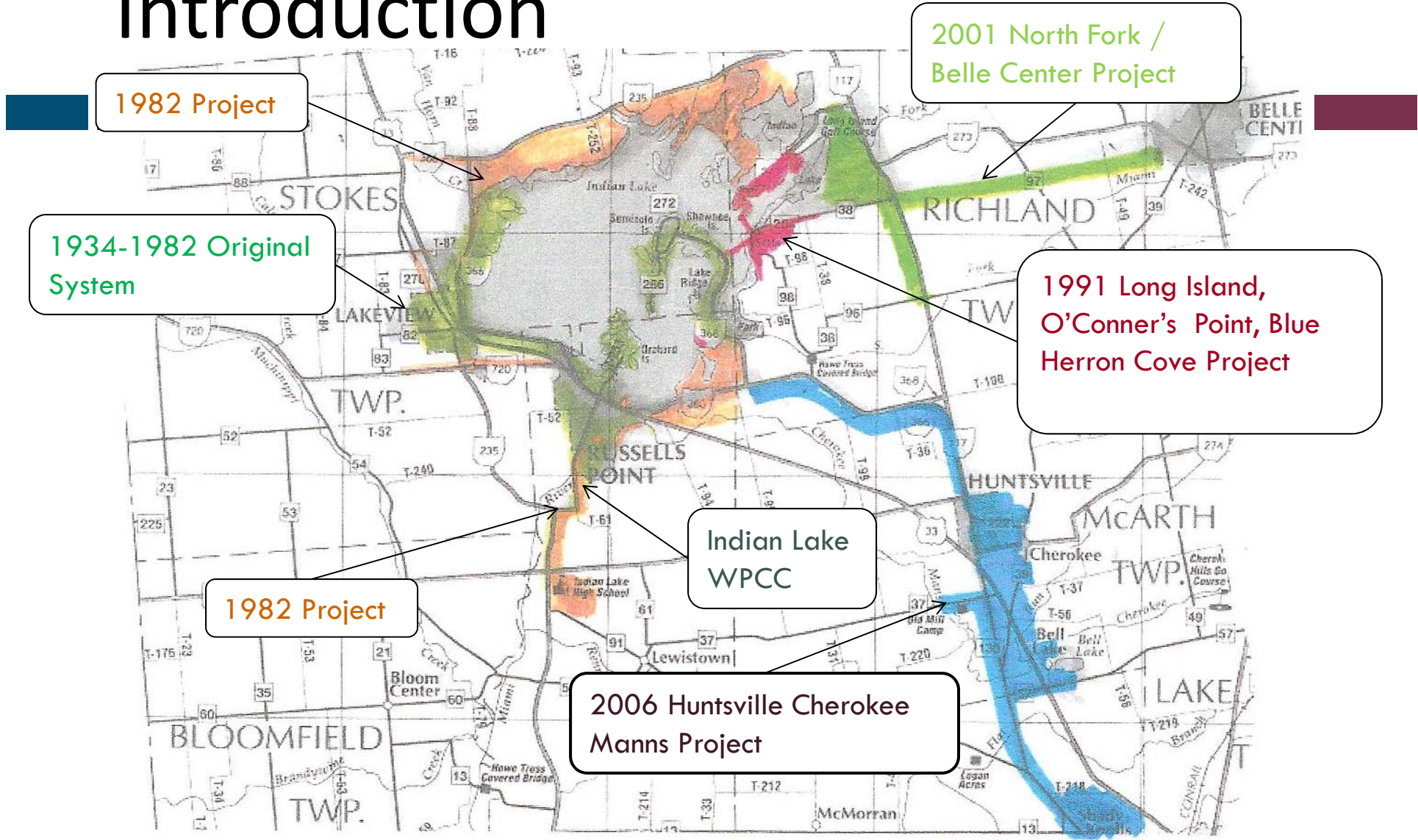


Introduction

- Additional Credits:
 - Chris Clark
District Director
Logan County WPC
 - Ron Jacob
Operations Manager
Logan County WPC



Introduction



Introduction

- System Description
 - Approximately 7,000 customers
 - 4 Villages
 - Indian Lake periphery
 - State campground, ODOT rest area
 - Approximately 50 miles of 6” – 27” gravity sewer
 - 29 lift stations, >250 E-One grinder pumps
 - WWTP – 2.3 MGD Average Flow, 4.6 MGD Secondary Treatment, 16 MGD Peak Flow



History

- Studies and Reports

- Infiltration and Inflow (I/I) Study July 2004
- Wastewater Master Plan February 2005
- Wastewater General Plan June 2005
- No Feasible Alternatives Report June 2006

- WWTP Improvements, Phase 1

- Design 2006 – 2008
- Construction 2008 – 2010

First Step = Get Flow to the Plant

- *Reduce/Eliminate SSOs*
- *Minimize Blending Events*
- *Get a Handle on Actual Flows*



History

- WWTP Improvements, Phase 1 (\$10 million)
 - Fine Screens (16 MGD)
 - Equalization Basin (1.5 MG)
 - Convert Primary Clarifiers to EQ (0.5 MG)
 - Aeration Diffuser Improvements (4.6 MGD)
 - Ultraviolet Disinfection
 - Anaerobic to Aerobic Digestion
 - New Solids Dewatering Facilities
 - Slough Pump Station / Force Main (6 MGD)



History



History

- Additional WWTP Efforts
 - Initiated Laboratory Audit and SOP Development
 - Developed Septage Receiving Policy
 - Completed SSO and CMOM Annual Reporting
 - Improvements to SCADA System
 - Semi-Annual Tank Cleanings
 - All New Raw Sewage Pumps and Piping



History

- Collection System Improvements
 - Midway Sewer Improvements 2006
 - Indian Lake Shores Lift Station Project 2006
 - Minnewauken Lift Station Project 2007
 - Seminole Lift Station Project 2011
 - Slough Area Sealed Manholes 2011
 - Orchard Island Sewer Main Lining – 800 ft of 18” going under lake
 - Implemented Sewer Flushing/Cleaning Program – reduce SSO’s caused by blockages



History

- Collection System Improvements (continued...)
 - Belle Center Bypass Force Main Project
 - Huntsville Pump Station Rehabilitation
 - Cleaned approximately 25,000 feet of sanitary sewer in 2013
 - Televised approximately 4.2 miles of sanitary sewer in 2013
 - Major Repair
 - Eliminated farm field tile connection to sanitary sewer; repaired 4"-6" hole in side of 15" main sewer
 - Sewer was televised due to modeling results indicating an issue



History

- Collection System Improvements (continued...)
 - Rehabilitation of Major Pump Stations
 - Mini-Sewer Study of Minnewauken Island Service Area
 - Installed over 100+ Access/Termination Valves in 2013
 - Purchased 17 flow meters and began flow monitoring program
 - Purchased two GPS Units and Arcview Software
 - Purchased two Toughbooks for service trucks
 - Will have access to District Sewer Maps; Tap Locates; etc.
 - GIS Mapping of entire sewer system has been completed



History

- Administration Improvements
 - Developed Sewer Construction Engineering Standards
 - Increased Enforcement
 - Modified Sewer Tap Permit and Reconnect Permits
 - Implemented Access/Termination Valve Program
 - Development of Sewer Use Regulations
 - Developing Private Property I&I Policy
 - Annual Newsletter to Update Residents on I&I Program
 - Working with Village of Belle Center (Satellite Collection System) on their I&I problem



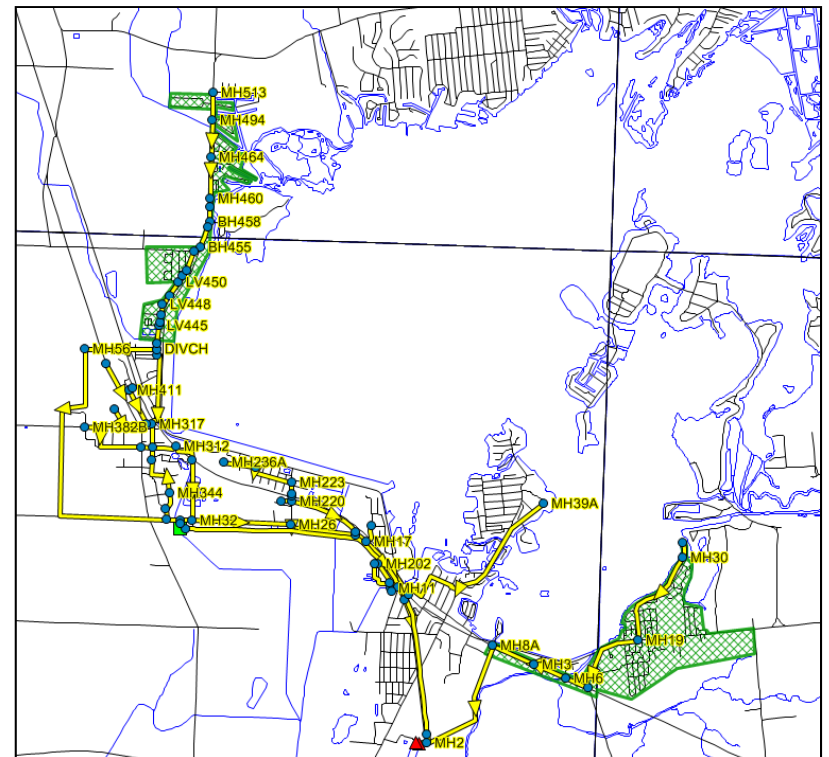
History

- Phase 2
 - After Phase 1 WWTP Improvements
 - Compliance schedule called for a new No Feasible Alternatives report
 - NPDES Permit modification to allow for extended flow monitoring and modeling
 - No Feasible Alternatives report due February 2014
 - Compliance schedule assumed a Phase 2 WWTP improvements project



Collection System Model

- Flow monitoring
 - Twelve months completed
 - Data collected, analyzed, and input into SWMM model
- SWMM model
 - Set-up
 - Dry weather calibration
 - Wet weather calibration
- Results
 - Two critical areas found



WPCC Model

- Biological sampling
 - Additional soluble/insoluble testing completed
 - Data collected, analyzed, and input into BioWin model
- BioWin model
 - Calibrated to match WPCC influent/effluent data
- Clarifier Performance Evaluation
- Hydraulic calculations
 - Utilizing flow patterns from SWMM model
 - Flow to secondary treatment, EQ, and blending



Collection System Alternatives

- Utilizing calibrated SWMM model
- Design events – 2-year, 5-year, 10-year, 15-year 6-hour Huff distributions
- Alternatives reviewed
 - Increased O&M
 - System Optimization
 - Conveyance
 - Storage
 - I/I Reduction
 - Combinations of Conveyance, Storage, and I/I Reduction



Collection System Alternatives

Scenario (using 10-year, 6-hour Huff unless otherwise noted)	Flooded MHs	SSO Volume (MG)	Volume to WPCC (MG)
2-year, 6-hour Huff Existing System	1	0.001	11.860
5-year, 6-hour Huff Existing System	3	0.047	13.158
10-year, 6-hour Huff Existing System	5	0.123	14.064
15-year, 6-hour Huff Existing System	5	0.277	14.696
Increased O&M	2	0.077	14.184
System Optimization	4	0.107	14.081



Collection System Alternatives

Scenario (using 10-year, 6-hour Huff unless otherwise noted)	Flooded MHs	SSO Volume (MG)	Volume to WPCC (MG)
REF: 10-year, 6-hour Huff Existing System	5	0.123	14.064
Conveyance – increase pipe size	0	0	14.192
Conveyance – relief pipe	0	0	14.164
Conveyance – combo	0	0	14.174
Storage	0	0	13.828
Conveyance and Storage	0	0	13.930



Collection System Alternatives

Scenario (using 10-year, 6-hour Huff unless otherwise noted)	Flooded MHs	SSO Volume (MG)	Volume to WPCC (MG)
REF: 10-year, 6-hour Huff Existing System	5	0.123	14.064
10% local I/I reduction	4	0.057	13.570
20% local I/I reduction	1	0.019	13.050
30% local I/I reduction	0	0	12.503
Conveyance and 10% local I/I reduction	0	0	13.633
Conveyance and 20% local I/I reduction	0	0	13.074



WPCC Alternatives

- Utilizing flow patterns predicted by SWMM model
- Alternatives reviewed
 - Additional equalization
 - Additional secondary treatment
 - Combinations of process optimization, equalization, and/or additional secondary treatment



WPCC Alternatives

Scenario (using 10-year, 6-hour Huff unless otherwise noted)	Peak Influent Flow (mgd)	Total Influent Flow (MG)	Flow to Secondary (MG)	Flow to EQ (MG)	Blended Flow (MG)
2-year, 6-hour Huff Existing System	12.35	11.86	9.63	2.24	0.25
5-year, 6-hour Huff Existing System	14.75	13.16	9.96	3.21	1.23
10-year, 6-hour Huff Existing System	15.79	14.06	10.15	3.93	1.93
15-year, 6-hour Huff Existing System	16.28	14.70	10.29	4.41	2.45



WPCC Alternatives

Scenario (using 10-year, 6-hour Huff unless otherwise noted)	Peak Influent Flow (mgd)	Total Influent Flow (MG)	Flow to Secondary (MG)	Flow to EQ (MG)	Blended Flow (MG)
REF: 10-year, 6-hour Huff Existing System	15.79	14.06	10.15	3.93	1.93
10% local I/I reduction	15.37	13.57	10.03	3.55	1.55
20% local I/I reduction	14.67	13.05	9.91	3.15	1.17
30% local I/I reduction	13.82	12.50	9.76	2.73	0.73
50% local I/I reduction	11.97	11.38	9.43	1.97	0.00
20% global I/I reduction	13.61	12.57	9.82	2.74	0.75
30% global I/I reduction	12.26	11.79	9.61	2.18	0.18



WPCC Alternatives

Scenario (using 10-year, 6-hour Huff unless otherwise noted)	Peak Influent Flow (mgd)	Total Influent Flow (MG)	Flow to Secondary (MG)	Flow to EQ (MG)	Blended Flow (MG)
REF: 10-year, 6-hour Huff Existing System	15.79	14.06	10.15	3.93	1.93
Conveyance – increase pipe size	15.37	13.57	10.03	3.55	1.55
Conveyance and 10% local I/I reduction	14.67	13.05	9.91	3.15	1.17
Conveyance and 20% local I/I reduction	13.82	12.50	9.76	2.73	0.73



WPCC Alternatives

Scenario (using 10-year, 6-hour Huff unless otherwise noted)	Peak Influent Flow (mgd)	Total Influent Flow (MG)	Flow to Secondary (MG)	Flow to EQ (MG)	Blended Flow (MG)
REF: 10-year, 6-hour Huff Existing System	15.79	14.06	10.15	3.93	1.93
Increase to 9.2mgd secondary treatment	15.79	14.06	12.57	1.51	0.00
Increase to 4MG EQ	15.79	14.06	10.15	3.93	0.00
30% local I/I reduction and increase to 6.0mgd secondary treatment	13.82	12.50	10.52	1.97	0.00
30% local I/I reduction and increase to 3MG EQ	13.82	12.50	9.76	2.73	0.00



Affordability

- Income Survey
 - 400 surveys, MHI = \$36,418
- District Diversity
 - Composition of the District – Lakeview and Russells Point make up 85% of the EDU and have a lower MHI
 - 81% of the responders below the poverty limits were in these two communities.
 - 31.3% of respondents were 65 or older. The state average is 14.8 %. 55% of this group was below the MHI.



Affordability

- Rate Increase
 - District proactive and recognizes need
 - District plans to set in place an equal rate structure across all areas of \$41/month
 - Rate to be implemented over 4 years
 - This is an average increase of 13.1%
 - This is a 250% increase from the 2006 rate!
- Additional Burdens
 - Water rates, storm water costs, coordination, etc.



Affordability

- Conclusions
 - Residential Indicator
 - Entire District - 42% High Impact or Nearly High (1.97)
 - Lakeview - 49.9% High Impact or Nearly High (1.97)
 - Russells Point - 50.4% High Impact or Nearly High (1.97)
 - Financial Capability Indicator – overall score 2.2
 - Financial Affordability Matrix – overall High Burden
 - Based on the high burden and unknown storm water burdens, the District feels a 25 year time frame is appropriate.



Recommendations

- Clean and televise the two critical areas and create a priority list of improvement areas
- Pursue I/I reduction projects, such as relining and replacement, to achieve 30% I/I reduction in these critical areas over the next 25 years
- Continue to work with the villages and townships to address private property I/I reduction issues and to address the lack of stormwater infrastructure

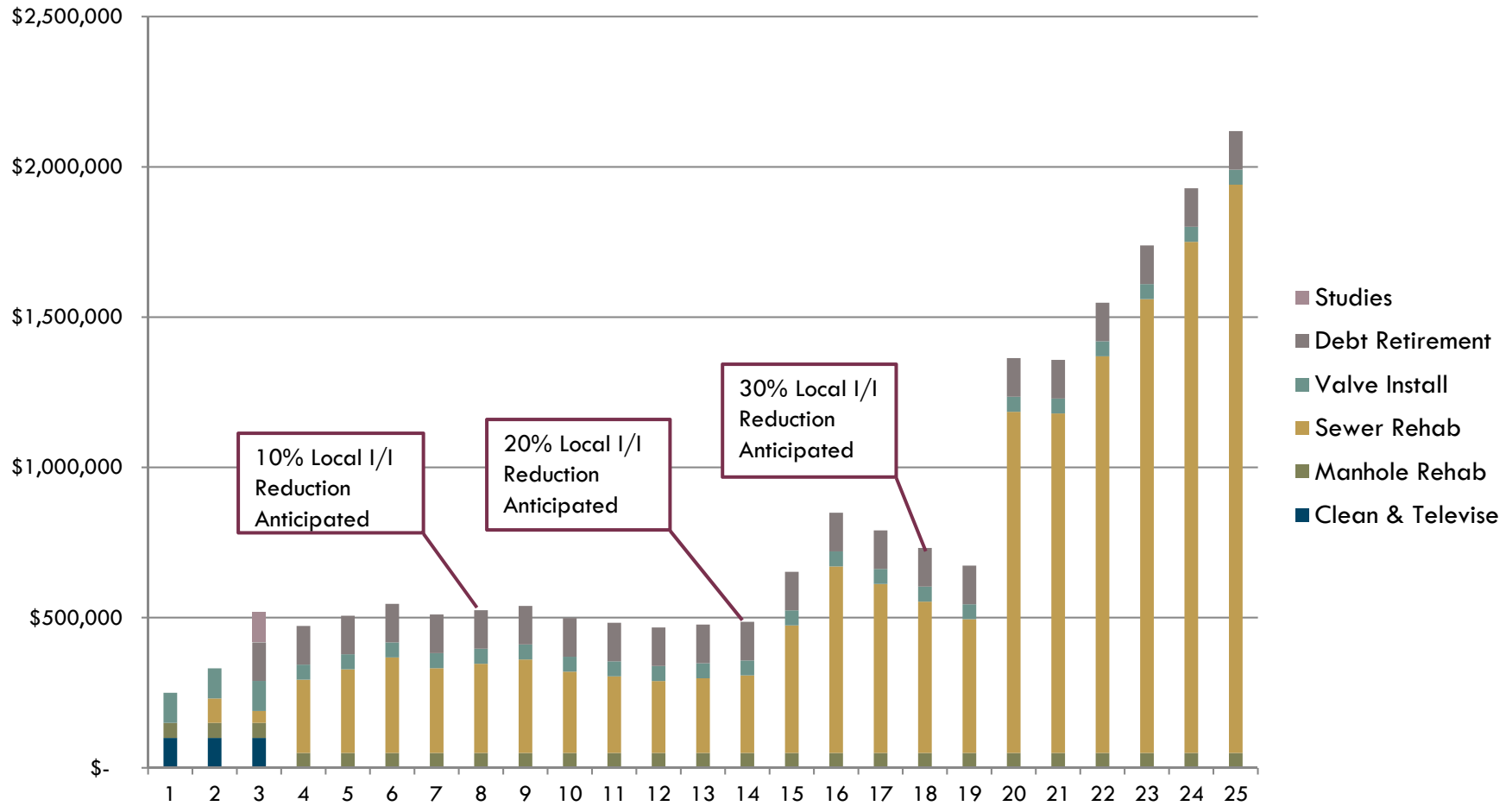


Recommendations

- Complete the miscellaneous improvements at the treatment plant due to age and condition
- Complete a study at the treatment plant regarding increasing secondary treatment from 4.6 MGD maximum to 6.0 MGD maximum based on the Clarifier Performance Evaluation
- Complete a study at the treatment plant regarding adding biological treatment to the existing equalization basins



Recommendations



Conclusions

The submittal fulfills this schedule requirement.

The planned approach with the following schedule modification is acceptable.



John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

April 30, 2014

Mr. Chris Clark
Director Logan County WPCD
8100 State Route 708 South
P.O. Box 1550
Russells Point, Ohio 43348

RE: Indian Lake WPCD
No Feasible Alternatives Analysis
Correspondence
NPDES
Logan County
1PK00002

Subject: No Feasible Alternatives Analysis Meeting (February 21, 2014).

Dear Mr. Clark:

I am writing in follow-up to your submittal of a No Feasible Alternatives Evaluation (2014 Update). This submittal was provided as part of the facility's National Pollutant Discharge Elimination System (NPDES) compliance schedule. The submittal fulfills this schedule requirement.

The preferred alternative described in the plan involves maximizing treatment capacity at the plant with the intent of expanding the treatment capacity to 6 MGD. In addition to the treatment system upgrades the district will pursue infiltration and inflow elimination in the main sewers and satellite systems. A cooperative approach with the contributing communities to establish storm water utilities while eliminating infiltration and inflow will be pursued. The goal is to achieve a total system wide reduction in infiltration and inflow of approximately 30%. This combination of approaches will eliminate surcharge Sanitary Sewer Overflows (SSO's), and eliminate the need for partial secondary treatment system bypasses. A time line of 25 years is being proposed for completion of the various project and final compliance with all permit conditions. Affordability issues have necessitated the extended schedule.

The planned approach with the following schedule modification is acceptable. As discussed with a 30% reduction in infiltration and inflow (projected completion 18 years) and expansion of plant capacity to 6 MGD this should eliminate all bypassing. As additional information becomes available the schedule and approved plans may need to be adjusted. Where ever possible the district needs to pursue both projects and funding sources that can help reduce the schedule time lines and final permit compliance.

Southwest District Office • 401 East Fifth Street • Dayton, OH 45402-2911
www.epa.ohio.gov • (937) 285-6357 • (937) 285-6249 (fax)



Questions/Comments

Logan County WPCD
8100 State Route 708 South
Russells Point, OH 43348
937-843-3328

CT Consultants
7965 N. High St, Suite 340
Columbus, Ohio 43235
614-885-1700

