City of Lancaster
Long Term Control Plan

Complying with the Ohio EPA Mandate

July 14, 2014

ARCADIS

Presentation Agenda

- History of CSO Compliance
- Flow Monitoring and Modelling
- Capital Improvement Projects
- Financial Capability
- Impacts to the City
- Questions and Answers
- Public Comment

System History

- Oldest parts of the system over 100 years old
- Drainage Districts were created starting 1911 to drain to the streams
- Indoor Plumbing started connecting to drainage system creating Combined Sewers
- Core sanitary sewer system constructed in 1939 as a combined sewer system. 33 overflow locations plus pump station overflows
- Current system
  - 447,000 ft storm sewer
  - 850,960 ft sanitary sewer
  - 52,631 ft combined sewer
  - 9 Combined Sewer Overflows

1993-2003

1993 US EPA issued Combined Sewer Overflow (CSO) regulations and City initiated flow monitoring and system analysis

- 1995 Ohio EPA ordered submission of Long Term Control Plan (LTCP) by 2000
- Downtown Sewer Separation Project
- South Broad Street Storm Sewer Project
- Closure 6 CSO locations
- 2003 Ohio EPA orders addendum addressing 4 CSO locations

2004-2008

- Detailed look at each CSO location
- Formation of Stormwater Utility to share of CSO projects
- Lake Allen Maple Sewer Separation
- Closed or modified 21 CSO locatio
- Submitted LTCP Addendum

2008-2012

- Ohio EPA issued compliance schedule for following
  - Completion of Lake Allen Maple Sewer Separation (2008)
  - Construction of Upper Hocking Water Pollution Control Facility (2012)
  - System Flow Monitoring and Modeling and Phase 2 LTCP (2014)
  - Construction of Baldwin Run Express Sewer (2013)
  - Construction of South Broad Street Express Sewer (2016)
  - Construction of Lawrence Street Equalization Basins (2017)
  - **Full Compliance with CSO policy 2025**

OhioEPA
Ohio Environmental Protection Agency

2008-2012

- Construction of the Upper Hocking WPCF
- Elimination of Baldwin Run Express Sewer Project due to closure of CSO 1034
- Closed 1 CSO location

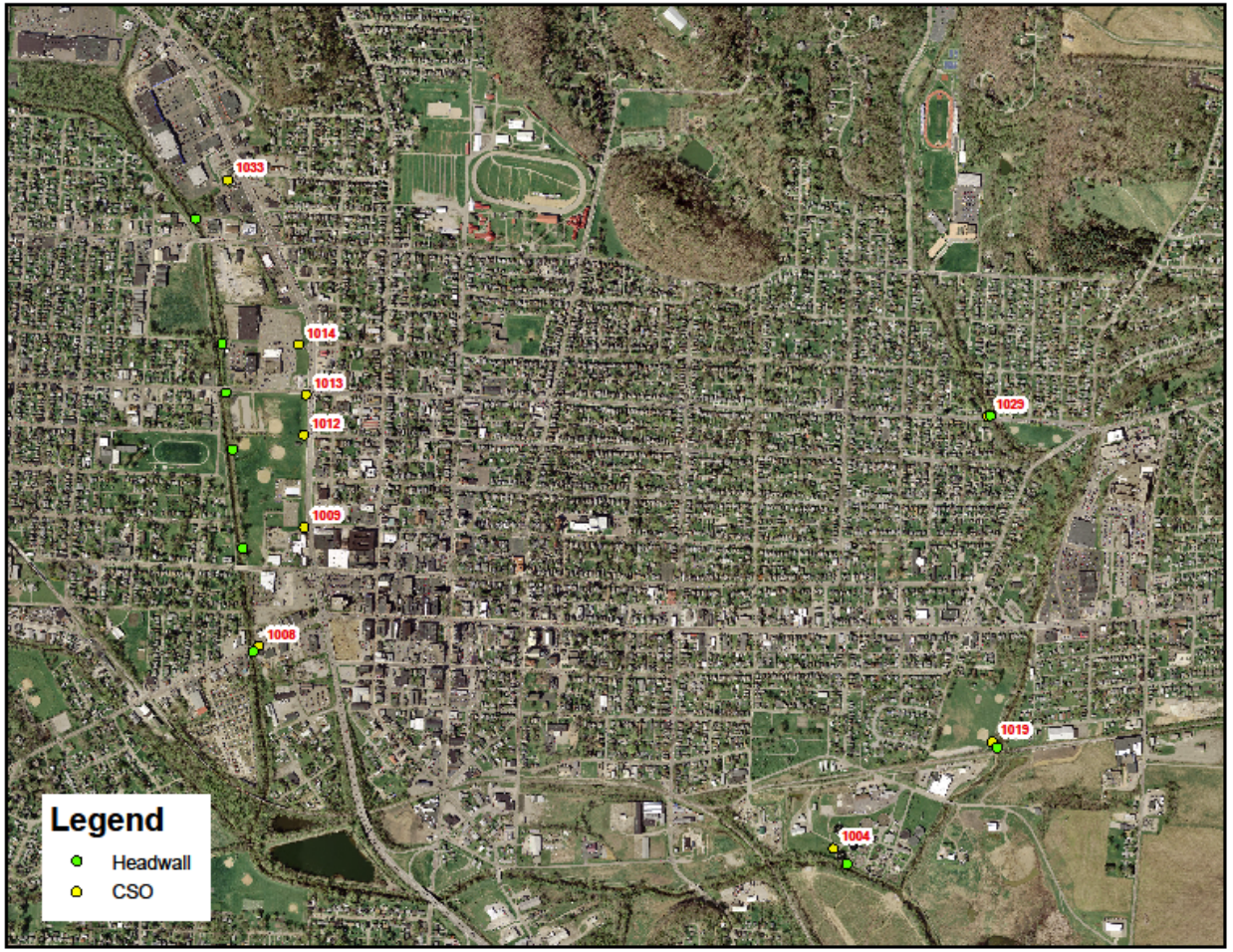
2012-Present

- 2012 Renegotiated Compliance Schedule
  - Flow Monitoring and LTCP 2014
  - Forest Rose Storm Sewer Project 2013
  - CSO 1026 Project 2013
  - CSO 1014 Project 2015
  - CSO 1033 Project 2016
  - South Broad Street Express Sewer 201
  - Lawrence Street Flow Equalization 2021
  - **Full Compliance with CSO Policy 2025**

2012-Present

- Flow Monitoring, Modeling and LTCP 2012
- Forest Rose Storm Sewer 2013
- Walnut Whiley (CSO 1027) 2013
- CSO 1026 Sewer Extension 2013
- Total Cost to Date $67 million

Current CSO Locations



The Necessary Nine

Ohio EPA Compliance Goals

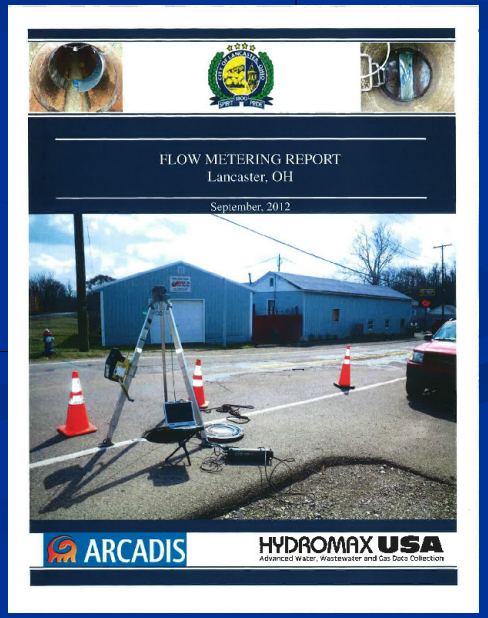
- 2-4 Overflow Events Citywide
  year”
- Routing of Separated Sewer Ar
  Combined Sewer Areas
- Maximizing Treatment Capacity
- Achieve Water Quality Standar

City Goals

- Comply with 2-4 Events in "Typical Year"
- Where Possible Close CSO
- Where Possible 0 Events In "Ty
- Maximize Interceptor Flows
- Maintain Hydraulic Grade Lines
  Basement
- Eliminate Catch Basin Connections

Flow Monitoring

- Needed to Update Collection System Model
- Data Collected in 1996 Must be Updated to Account For:
  - CSO Program Reduction Projects that Have Been Since Implemented
  - CSO Closures
  - Customer Growth/Contraction
  - System Expansion
  - System Deterioration



Flow Monitoring

Update of the Wastewater Collection System Model Will:

- Document Impact of CSO Projects Implemented and Other System Changes
  - Determine Current CSO Occurrences and Volumes
- Develop Alternatives to Meet Compliance Goals
  - Project Future CSO Occurrences and Volumes

Flow Monitoring

- 40 Flow Meters Installed
  - 32 Flow Meters by Hydromax USA
  - 8 Flow Meters by City of Lancaster
  - All Data Collected and Managed by Hydromax USA
- Rain Gauges
  - 4 Temporary Gauges Maintained by Hydromax USA
  - 1 National Weather Service Gauge at County Airport
- Stream Gauge at South Broad Street Bridge

Flow Monitoring

- 5 Month Flow Monitoring (3/15/12 – 8/15/12)
- Data Collected from 29 Wet Weather Events
  - Greater than 0.1 Inches Rain per Event
  - Event Separated by at Least 6 Hours
  - Several Nested Storms
- Statistical Storm Frequencies:
  - Two 1-Year or Greater Events
  - 11 Additional 5-Month or Greater Events
- Total Rainfall at 15.5 Inches

Modeling

- Update and Calibrate Ex. XP-SWMM Model
  - Migrate to PCSWMM
  - Incorporate All Collection System Improvements
  - Incorporate CSO Closures (12 were still open during monitoring – currently 9 are open)
  - Understand Collection System Response to Various Wet Weather Events
  - Calibrate to 2012 Conditions Using 2012 Flow Data

Modeling

- Update Model to 2014 Baseline Conditions by Incorporating the Following Updates
  - Close CSOs 1011, 1026, and 1027
  - Incorporate Broad Street Express Sewer
  - Allow Free Flow to EQ Tank at LSWPCF
  - Incorporate Cherokee CDBG Project
- Add Projected 2035 Growth

Modeling

- Develop "Typical Year" Rainfall For Lancaster
  - Based "Typical Year" on Data From 1966 – 2012
  - 79 Events per Year
  - 36.7 Inches per Year

- Plug Into 2014 Baseline Conditions Model
  - Determine CSO Frequency and Volume
  - Develop/Evaluate Alternatives to Meet OEPA Objectives and City Goals

Alternative Options Considered

- Sewer Separation
- CSO Modifications
  - Change Weir Elevation
  - Change Underflow Size
- Remote Equalization
- In-Plant Equalization
- Interceptor Capacity Modifications
- No Changes

Alternatives Modeled/Evaluated

- West Side System Alternatives :
  - In-Plant EQ at LSWPCF for All Alternatives
  - 2W7A – CSO Mods
  - 3W3A & 4A – Remote EQ
  - 4W3A1 – Sewer Separation w/ In-System EQ
  - 5W7A1 & A2 - Sewer Separation w/o CSO Mods
  - 6W7A1 & A2 – Sewer Separation w/ CSO Mods
  - 7W7A – CSO Mods w/ Interceptor Capacity Mods
  - 8W7A – Sewer Sep, CSO Mods, and Interceptor Capacity Mods

Alternatives Modeled/Evaluated

- East Side System Alternatives:
  - In-Plant EQ at LSWPCF for All Alternatives
  - 2E1A – CSO Mods
  - 3E1A1 & A2 – Sewer Separation w/o CSO Mods
  - 4E1A1 – Sewer Separation, CSO Mods, and Interceptor Capacity Mods

Evaluation Criteria

Capacity and Condition

Cost

Water In Basements

Wellhead Protection

Regulatory Requirements

Long Term Investment

Constructability

Effectiveness

Maintenance

Land Acquisition

Additional Limitations

- Street Paving
- Traffic and Detours
- Existing Utilities
- Miller Park Wellfield
- Street Crossings
  - Memorial Drive and Main Street
- Stream Corridors

Findings West Side CSO 1008

- 2012 Existing Conditions
  - 19 Activations/Typical Year
  - 1.3 MG Overflow Volume/Typical Year
- Recommended Improvements
  - Sewer Separation
  - Weir Height Adjustment
- Results
  - 4 Activations/Typical Year
  - 0.1 MG Overflow Volume/Typical Year
- Cost $600,000

Findings West Side CSO 1009

- 2012 Existing Conditions
  - 76 Activations/Typical Year
  - 5.2 MG Overflow Volume/Typical Year
- Recommended Improvements
  - Sewer Separation
- Results
  - 0 Activations/Typical Year
  - 0.0 MG Overflow Volume/Typical Year
- Cost $1.5 Million

Findings West Side CSO 1011

- 2012 Existing Conditions
  - 55 Activations/Typical Year
  - 3.2 MG Overflow Volume/Typical Year
- Recommended Improvements
  - CSO Closed 2013
- Results
  - 0 Activations/Typical Year
  - 0.0 MG Overflow Volume/Typical Year

Findings West Side CSO 1012

- 2012 Existing Conditions
  - 56 Activations/Typical Year
  - 4.3 MG Overflow Volume/Typical Year
- Recommended Improvements
  - Sewer Separation
- Results
  - 0 Activations/Typical Year
  - 0.0 MG Overflow Volume/Typical Year
- Cost $3.8 million

Findings West Side CSO 1013

- 2012 Existing Conditions
  - 76 Activations/Typical Year
  - 4.8 MG Overflow Volume/Typical Year
- Recommended Improvements
  - Sewer Separation
- Results
  - 0 Activations/Typical Year
  - 0.0 MG Overflow Volume/Typical Year
- Cost $1.5 Million

Findings West Side CSO 1014

- 2012 Existing Conditions
  - 18 Activations/Typical Year
  - 1.7 MG Overflow Volume/Typical Year
- Recommended Improvements
  - Increase Size of Underflow Pipe
- Results
  - 0 Activations/Typical Year
  - 0.0 MG Overflow Volume/Typical Year
- Cost $250,000

Findings West Side CSO 1033

- 2012 Existing Conditions
  - 6 Activations/Typical Year
  - 1.1 MG Overflow Volume/Typical Year
- Recommended Improvements
  - Sewer Separation
  - Increase Size of Underflow Pipe
- Results
  - 3 Activations/Typical Year
  - 0.5 MG Overflow Volume/Typical Year
- Cost $300,000

Findings West Side CSO 1027

- 2012 Existing Conditions
  - 29 Activations/Typical Year
  - 0.8 MG Overflow Volume/Typical Year
- Recommended Improvements
  - CSO Closed 2013
- Results
  - 0 Activations/Typical Year
  - 0.0 MG Overflow Volume/Typical Year

Findings East Side CSO 1029

- 2012 Existing Conditions
  - 30 Activations/Typical Year
  - 3.6 MG Overflow Volume/Typical Year
- Recommended Improvements
  - Sewer Separation
  - Raise Weir Elevation
- Results
  - 3 Activations/Typical Year
  - 0.3 MG Overflow Volume/Typical Year
- Cost $2.2 Million

Findings East Side CSO 1026

- 2012 Existing Conditions
  - 54 Activations/Typical Year
  - 4.2 MG Overflow Volume/Typical Year
- Recommended Improvements
  - CSO Closed 2013
- Results
  - 0 Activations/Typical Year
  - 0.0 MG Overflow Volume/Typical Year

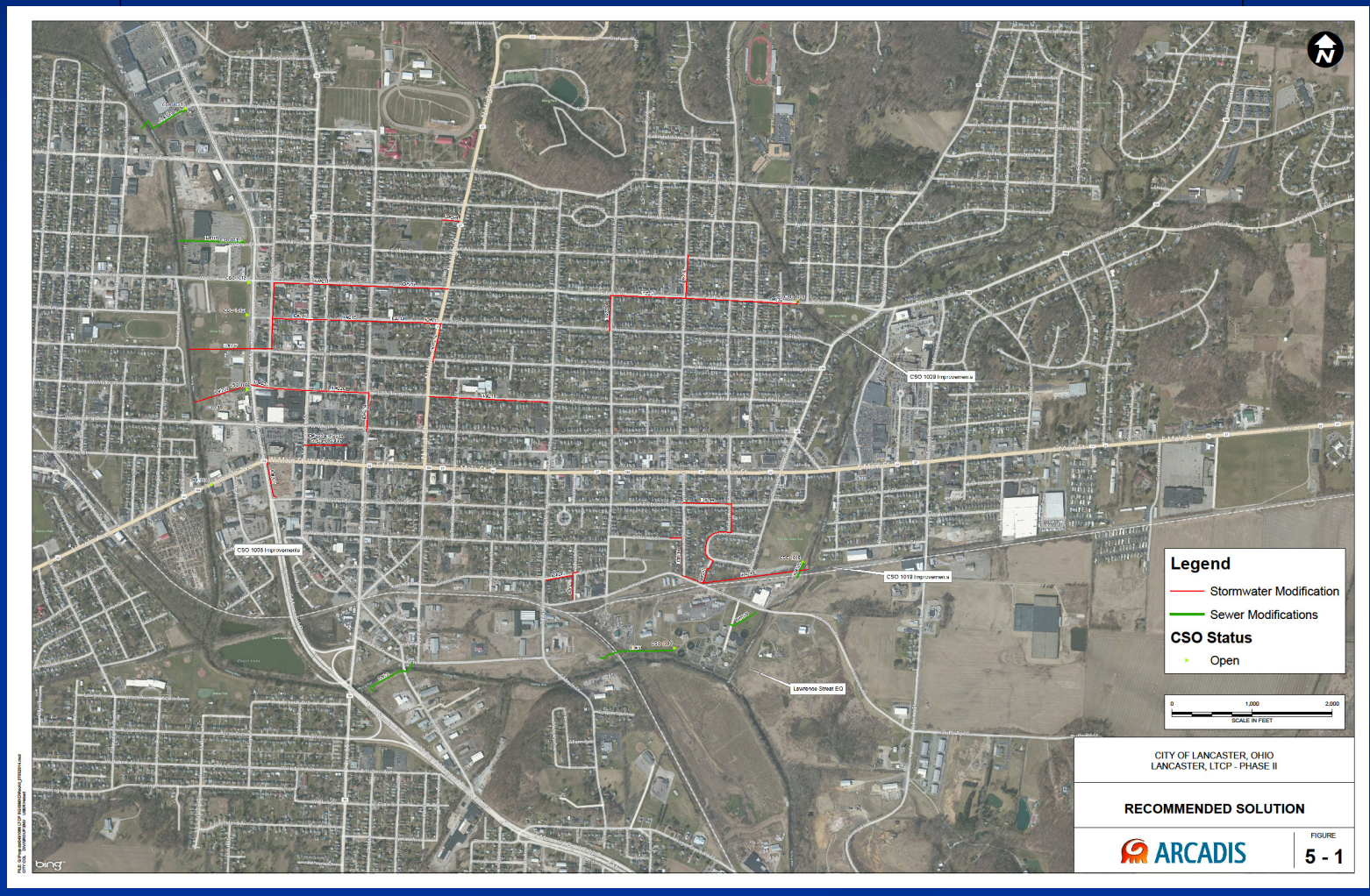
Findings East Side CSO 1019

- 2012 Existing Conditions
  - 26 Activations/Typical Year
  - 6.0 MG Overflow Volume/Typical Year
- Recommended Improvements
  - Increase CSO Orifice Size & Size of Underflow Pipe
  - Increase Size of Downstream Interceptor
- Results
  - 3 Activations/Typical Year
  - 0.7 MG Overflow Volume/Typical Year
- Cost $700,000

Findings East Side CSO 1004

- 2012 Existing Conditions
  - 43 Activations/Typical Year
  - 26.8 MG Overflow Volume/Typical Year
- Recommended Improvements
  - Sewer Separation
  - EQ at Lawrence Street WPCF
- Results
  - 0 Activations/Typical Year
  - 0.0 MG Overflow Volume/Typical Year
- Cost $12 million

Compliance Projects



Long Term Control Plan Summary

July 14, 2014

CSO	Location	2014 Baseline Overflow Events	2025 LTCP Overflow Events	Solution	Cost
West Side					
1008	Lincoln Avenue	27	4	Separation, Overflow Modification	$600,000
1009	Mulberry and Memorial Drive	77	0	Separation	$1.5 Million
1012	Fifth Avenue and Memorial Drive	58	0	Separation	$3.8 Million
1013	Sixth Avenue and Memorial Drive	77	0	Separation	$1.5 Million
1014	Allen St and Memorial Drive	18	0	Overflow Modifications	$250,000
1033	Park Street and Memorial Drive	6	3	Sewer Separation	$300,000
East Side					
1029	Sixth Avenue at Fetters Run	31	3	Separation, Overflow Modifications	$2.2 Million
1019	Mary Burnham Park	16	3	Overflow Modifications	$700,000
1004	Lawrence Street WPCF	10	0	Separation Equalization	$12 Million

That is almost $23 million in improvements by 2025

Financial Capability

- US EPA Residential Indicator Financial Impacts
- Cost Per Household of Wastewater Costs
  - Low Impact < 1% of Median Household Income
  - Mid Range 1-2% of Median Household Income
  - High Impact >2% of Median Household Income
- Lancaster Median Income $39,411
- Cost Per Household $1,132.58
- % Median Household Income 2.9%

Median Income Varies

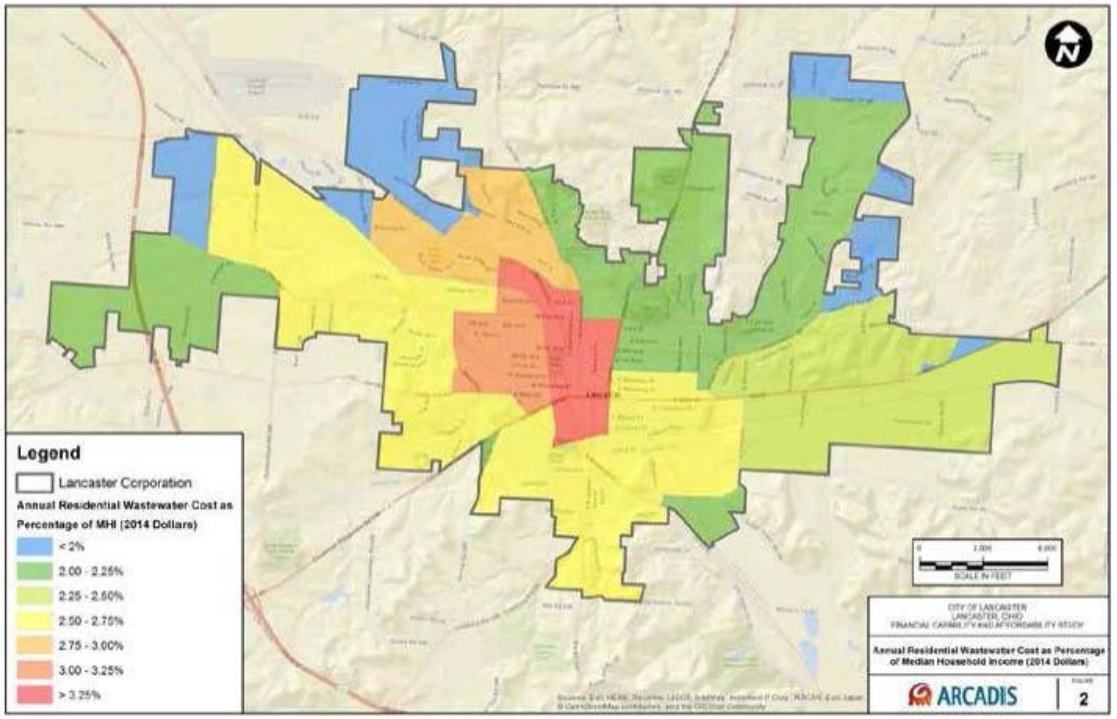


Figure 4-1: Annual Residential Wastewater Cost as Percentage of MHI by Census Tract (2014 Dollars)

Community Financial Capability

- Bond Rating — Strong 
- Overall Net Debt — Strong 
- Unemployment — Strong 
- Adjusted Median Income — Weak 
- Property Tax Revenues — Strong 
- Property Tax Collections — Mid Range 

Overall Community Financial Capability

Mid Range

Under US EPA Guidance

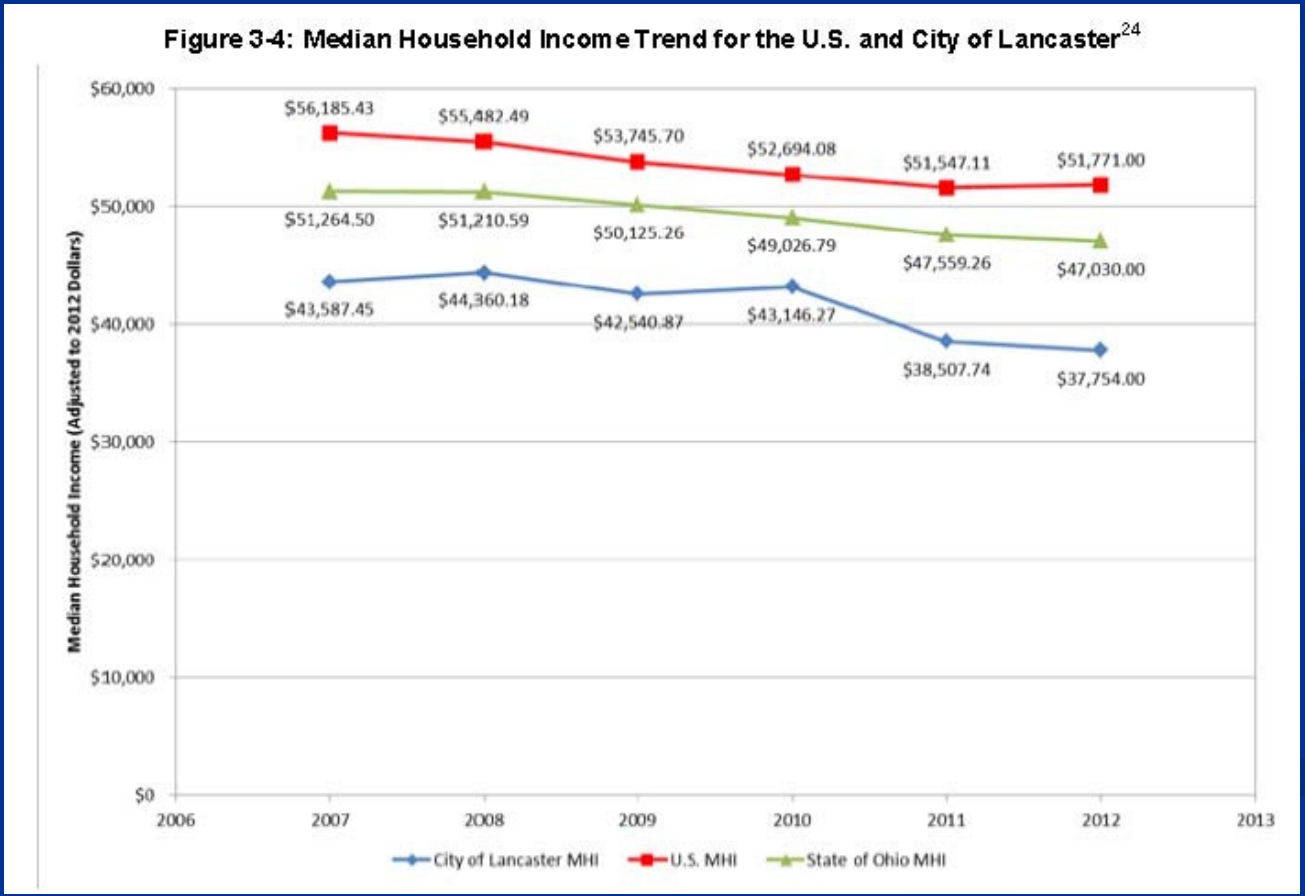
- High Residential Indicator
- Mid Range Community Indicator
- High Community Burden for CSO Projects

20 Year Compliance Schedule for Improvements

United States Environmental Protection Agency

Affordability Assessment Tool

- Income Levels

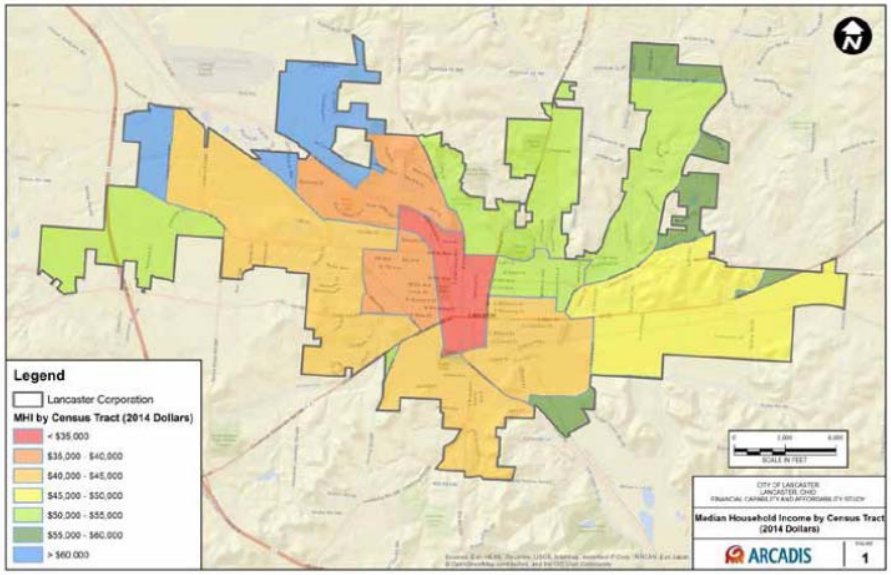


Affordability Assessment Tool

- Income Distribution

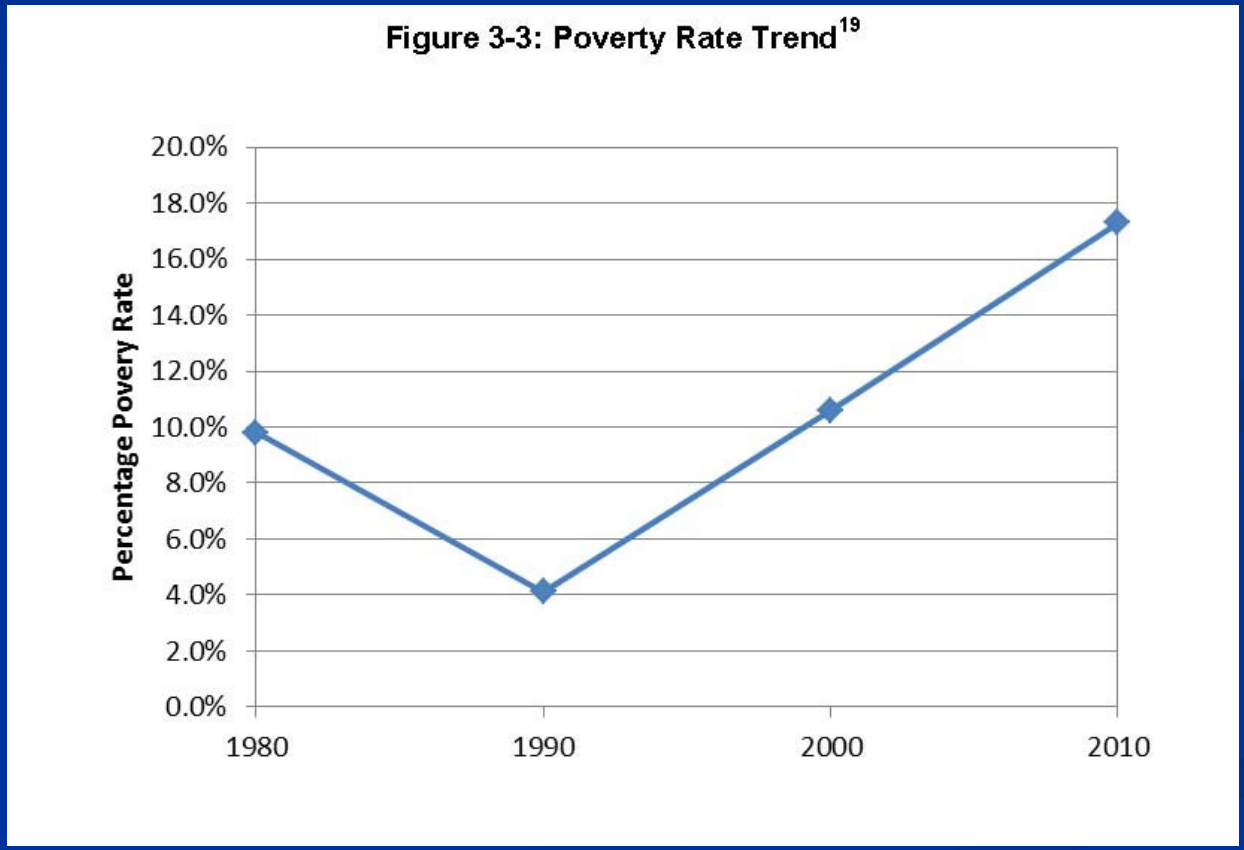
Table 3-6: Income Quintiles

Household income quintile upper limits (2012$)				Percent Below the Ohio	Percent Below the U.S.
	Lancaster, OH	Ohio	United States		
Lowest Quintile	$16,034	$19,611	$21,195	18.2 percent	24.4 percent
Second Quintile	$29,729	$36,901	$40,569	19.4 percent	26.7 percent
Third Quintile	$46,642	$58,827	$64,847	20.7 percent	28.1 percent
Fourth Quintile	$72,683	$92,314	$104,062	21.3 percent	30.2 percent
Lower Limit of Top 5	$119,798	$162,063	$191,391	26.1 percent	37.4 percent



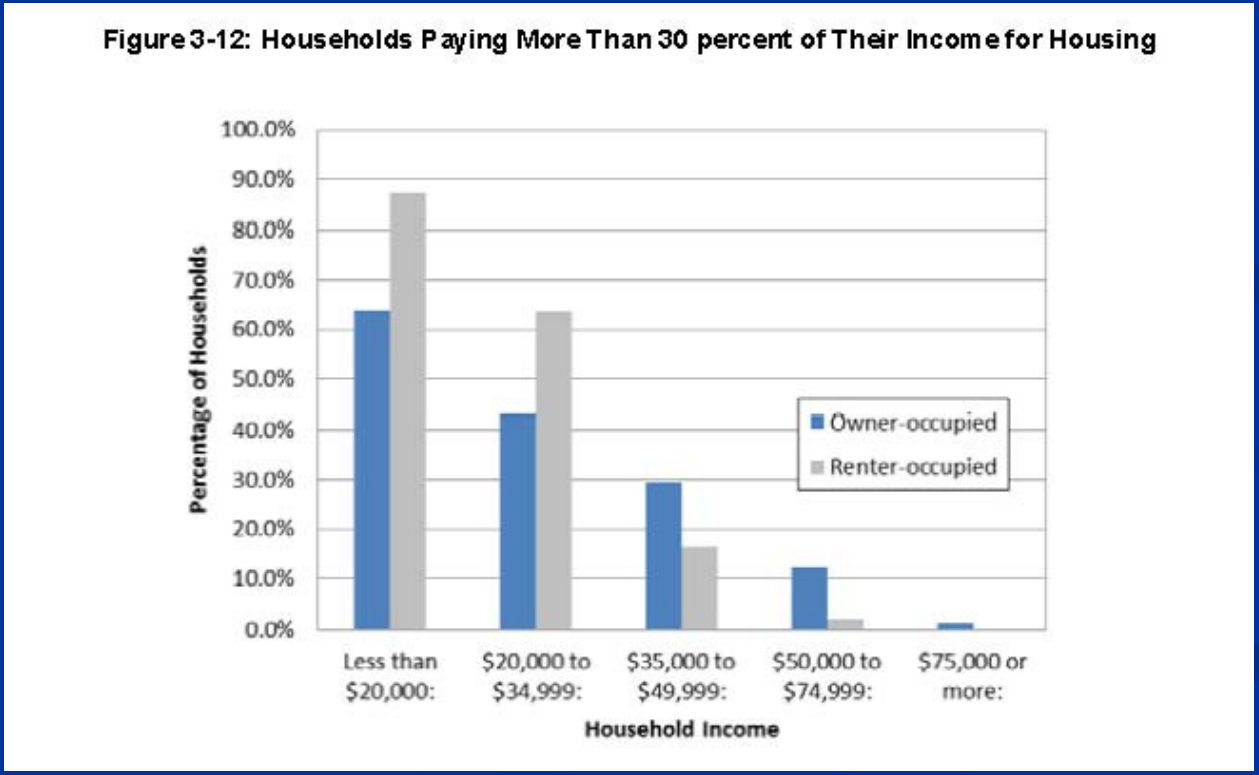
Affordability Assessment Tool

- Poverty Rates



Affordability Assessment Tool

- Housing Burdens and Nondiscretionary Spending



Affordability Assessment Tool

- Additional Socioeconomic Indicators
- 9.5% Households Enrolled in HEAP Program
- 13% accounts Receive Shut Off Notices each month
- 19 Accounts are shut off each month
- For Households < $20,000 City Utilities account for 20% of income

What Does It Mean to Us?

Stormwater Budget

2013 Budget $3,305,364

2014 Budget $2,497,094

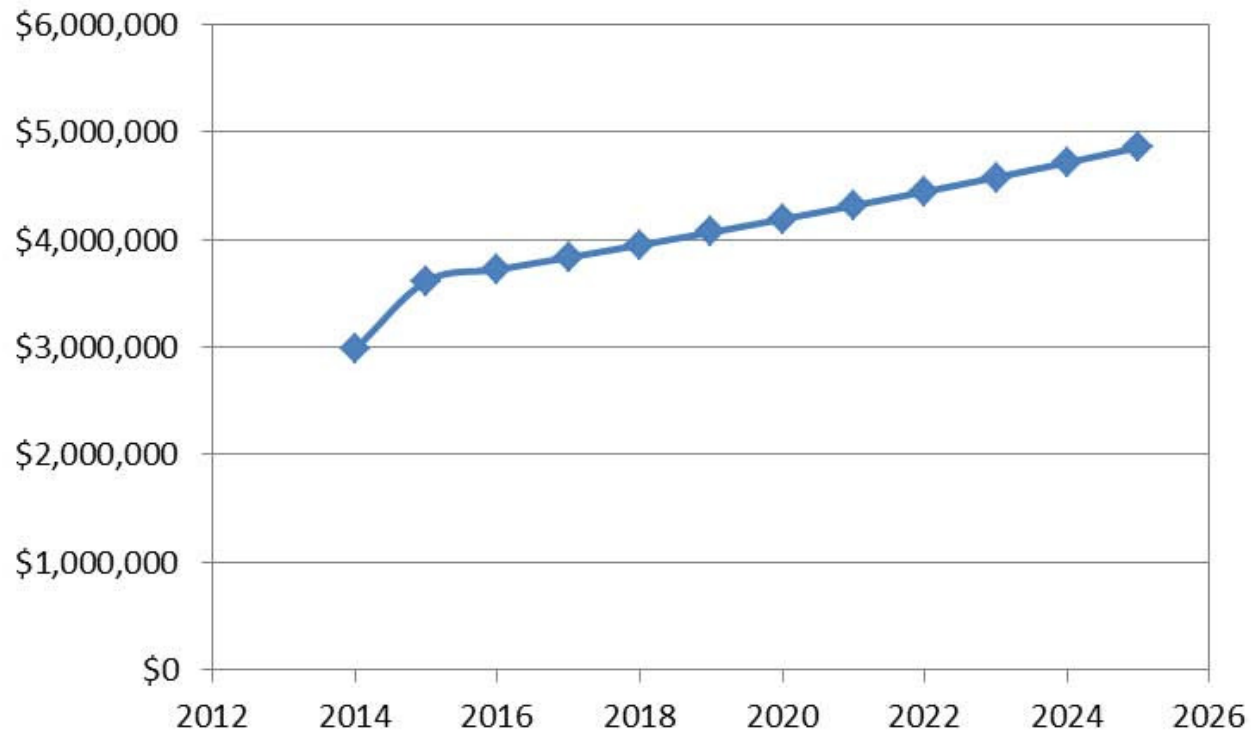
2013 Regulatory Costs $1,183,651 (36%)

Outstanding Debt

- $1,131,000 Bond Anticipation Notes (2018)
- $346,088 OWDA Loan (2031)

Stormwater Rates

Figure 5-9: Stormwater Revenue Requirements



Stormwater Program

- Existing Capital Improvement Projects Delayed
- No New Major Capital Improvement Projects outside CSO Program
- $500,000 set aside for drainage related to street paving work
- $100,000 set aside for curb fund
- Only Critical Repairs
- Additional projects after 2025 to further reduce overflows and stormwater at plan

Water Pollution Budget

2013 Budget $10,204,735

2014 Budget $11,259,074

2013 OM&R $3,963,953 (39%)

2013 Debt Service $6,240,782 (61%)

Outstanding Debt-$68 Million

$165,000 2004 Bonds (2014)

$18,4300,000 2008 Bonds (2033)

$3,665,000 2012 Bonds (2029)

$1,731,387 OWDA Loan (2016)

$1,026,040 OWDA Loan (2017)

$31,214,890 OWDA Loan (2031)

Water Pollution Rates

Figure 5-1: Wastewater Revenue Requirements

Water Pollution Program

- Existing Capital Improvement Projects Delayed
- Impact on Economic Development
- $600,000 set aside for System Repairs
- Only Critical Repairs
- Minimum Staffing

Total Utility Bill

Table 3-11: Annual Average Utility Bills

Utility	Annual Average Bill
Gas	$730.15
Sanitation	$162.00
Stormwater	$91.68
Wastewater	$534.10
Water	$370.79
Total Utility Bill	$1,888.72

Table 3-12: Average Utility Bill as a Percentage of MHI by Income Category

Income Category	Percentage of Households	MHI within Income Category	Average Wastewater Bill as a Percentage of MHI	Average Water, Stormwater, and Wastewater Bill as a Percentage of MHI	Average Total Utility Bill as a Percentage of MHI
Less than $20,000	25 percent	$10,000	5.3 percent	10.0 percent	18.9 percent
$20,000 to $39,999	28 percent	$29,999	1.8 percent	3.3 percent	6.3 percent
$40,000 to $74,999	28 percent	$57,499	0.9 percent	1.7 percent	3.3 percent
$75,000 to $99,999	10 percent	$87,499	0.6 percent	1.1 percent	2.2 percent
$100,000 to More	9 percent	$149,999	0.4 percent	0.7 percent	1.3 percent

Summary

- Long Term Control Plan has been developed over the last 20 years
- Reduced Number of Overflows from 33 to 9
- Spent $69 million in last 20 years
- Ohio EPA requires Compliance by 2025
- Cost $25 million
- Required rates will cause hardship on citizens

Schedule

- Draft Report July 25, 2014
- Final Report Submitted September 1, 2014
- Proposed Rate Changes Submitted to Council by September 30, 2014
- Capital Improvements 2014-2025
  - South Broad Street Advertised September 19, 2014
- Ohio EPA Review and Approval Unknown

Public Comment Period

- Draft Report released for Public Comment on July 25, 2014
- Report Available at Chamber of Commerce, Library, City Engineering and on website
- Interested Parties Briefing Week of August 4th
- Public will have until August 25, 2014 to submit comments

Questions and Answers

ARCADIS