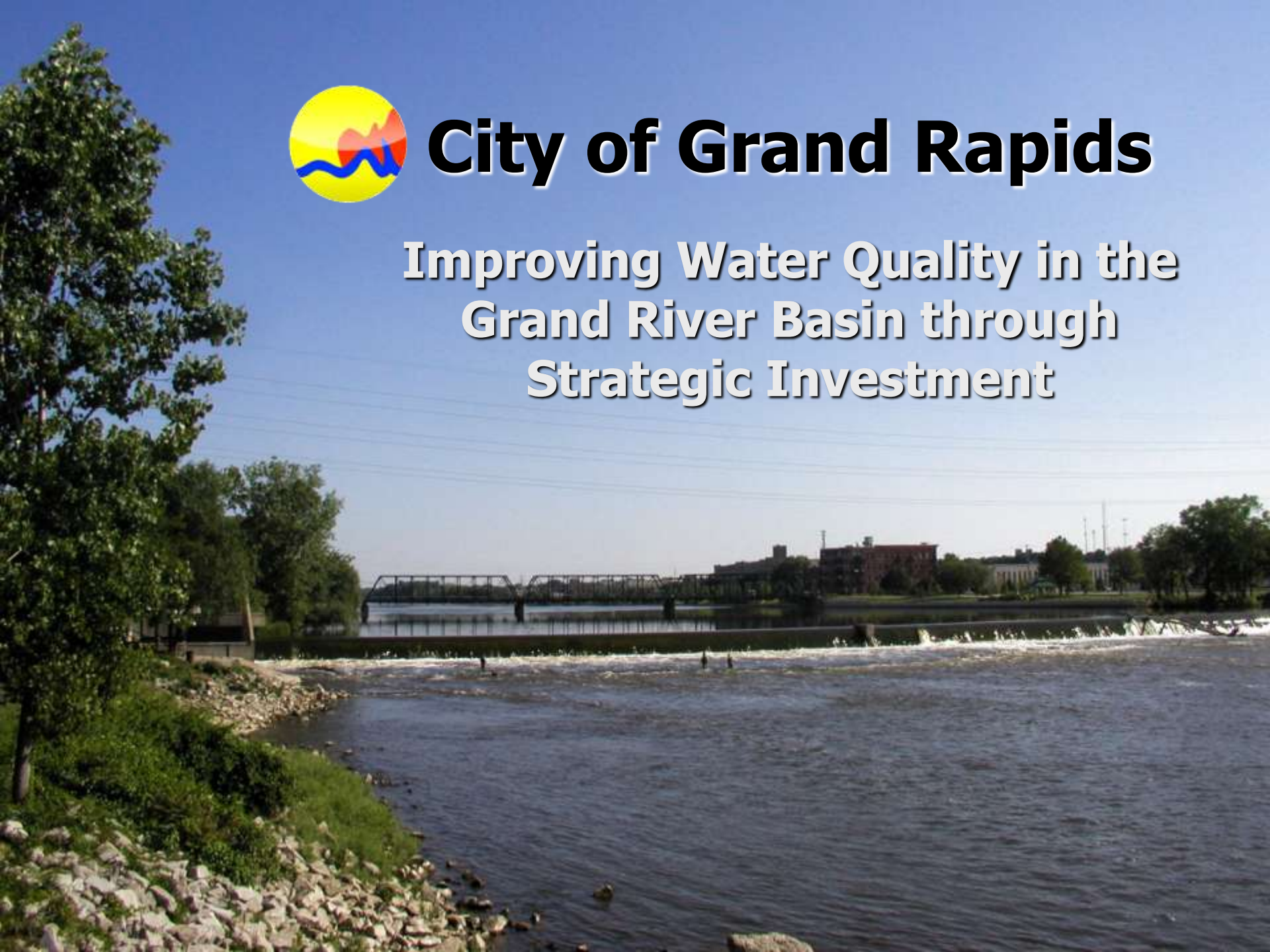




City of Grand Rapids

**Improving Water Quality in the
Grand River Basin through
Strategic Investment**

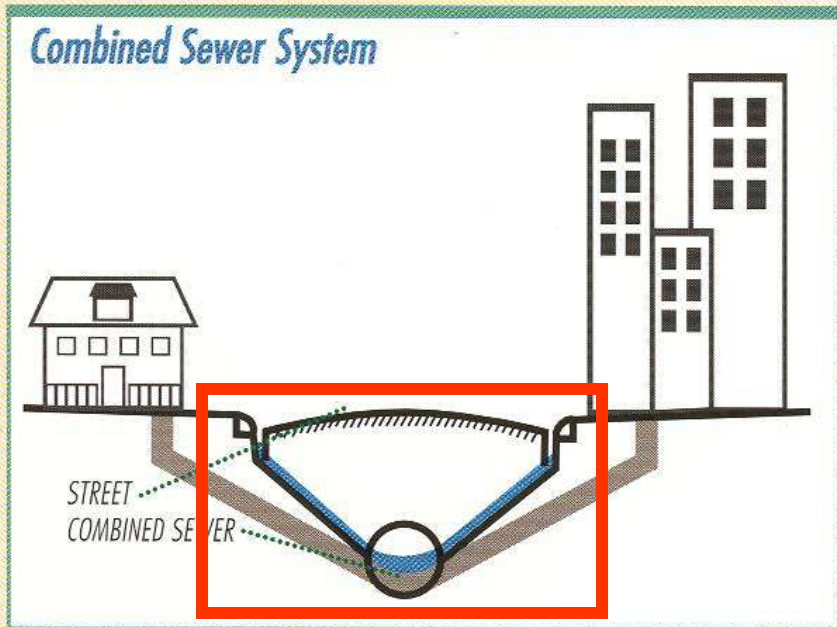


Cities With Combined Sewers in the United States

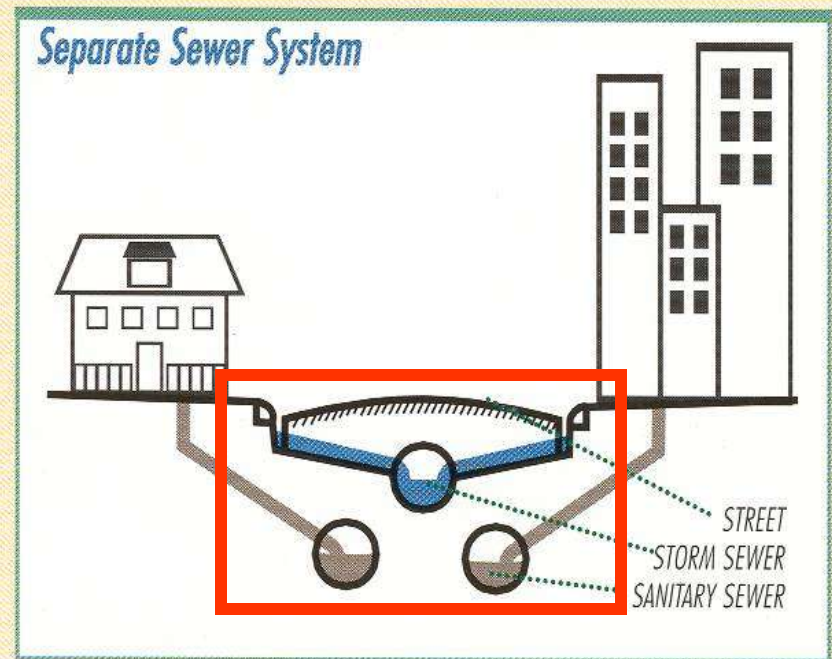
- **Common construction practice until 1920's**
- **772 communities nationwide**
- **31 communities in Michigan**



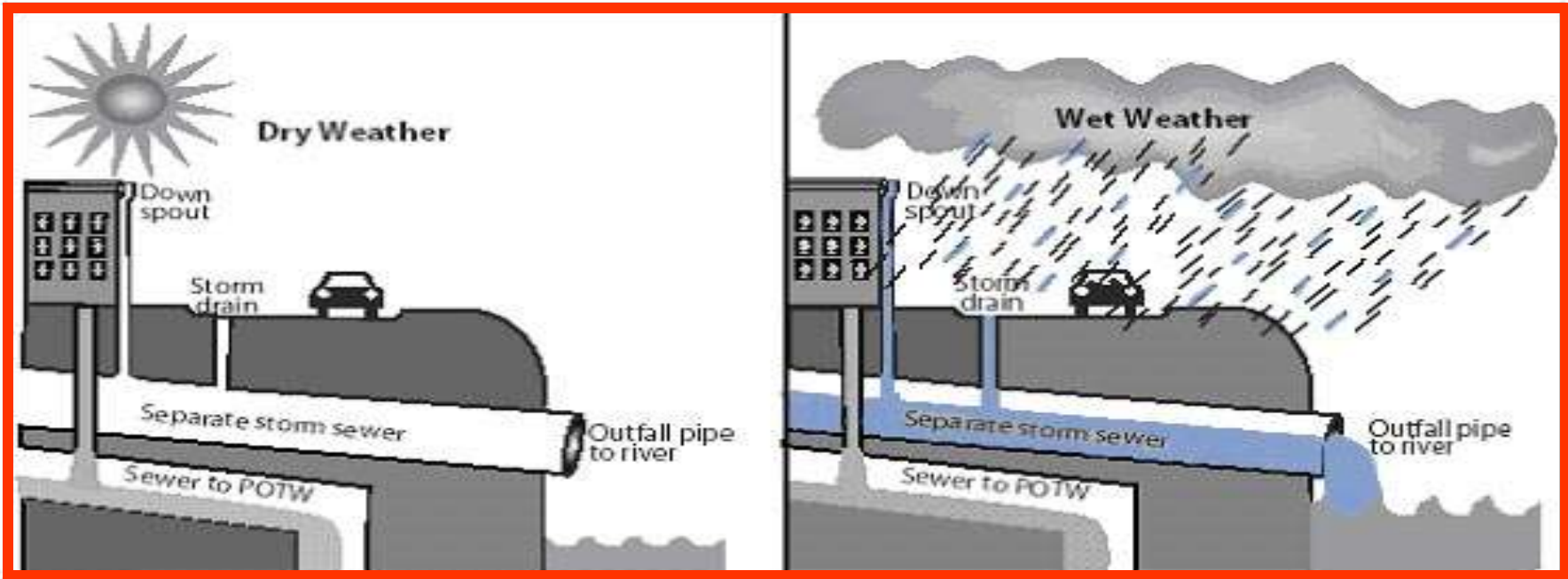
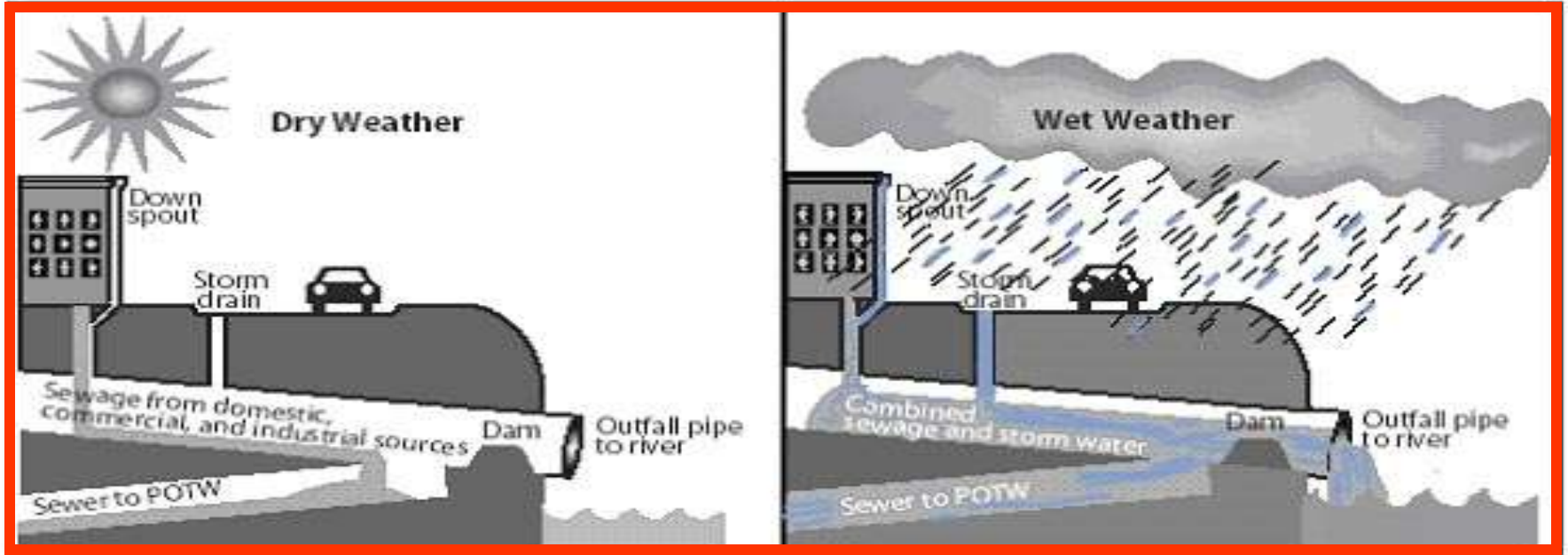
What are Combined Sewers?



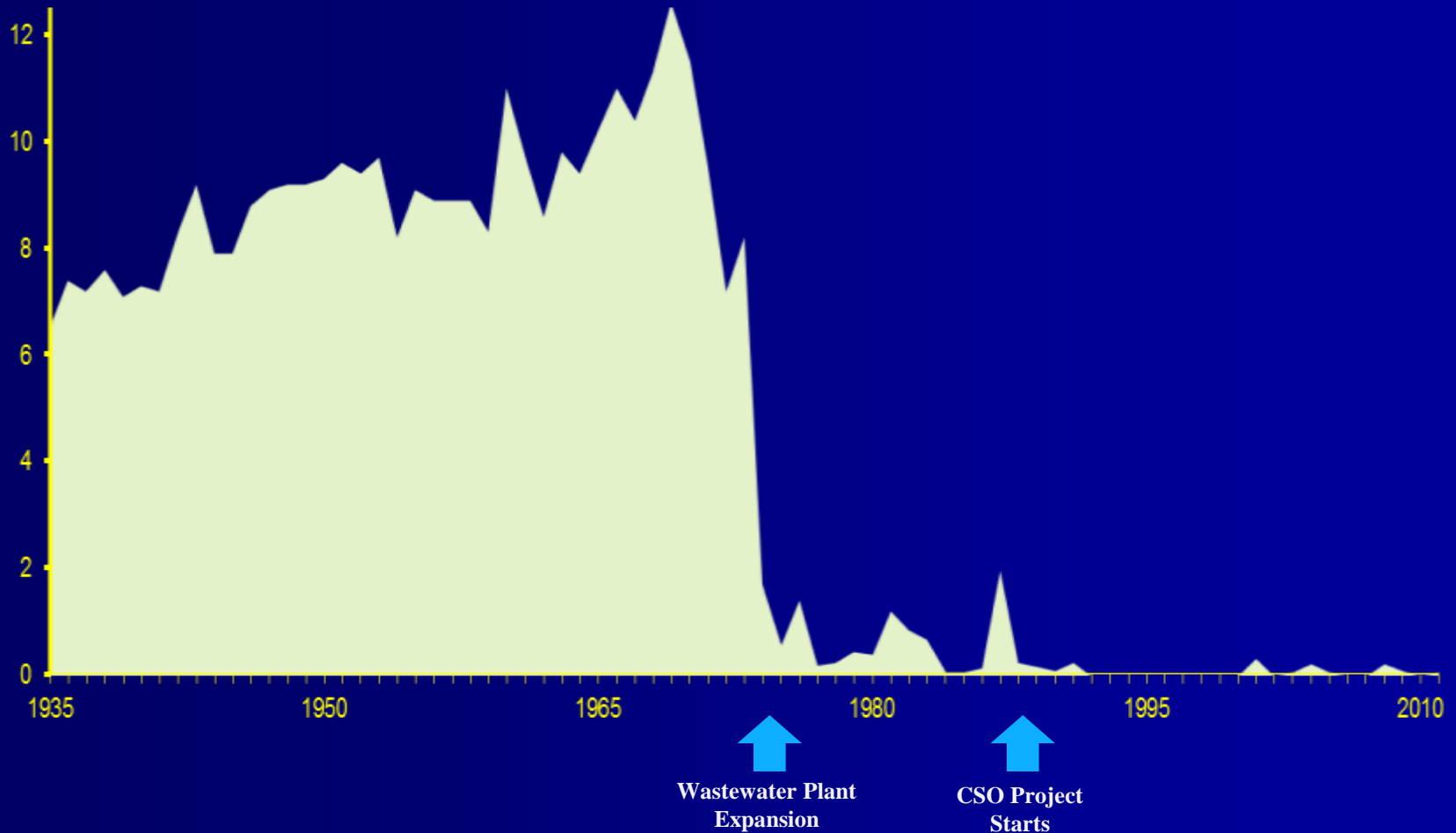
Combined sewer overflow (CSO) occurs when a single collection pipe is used to convey both storm runoff and sanitary wastes. During heavy rains or snow melts, the overflow, which includes sewage, is discharged into a nearby river or lake.



Recognizing that combined sewer overflows are sources of pollution, state and federal legislation and guidelines have been adopted to reduce or eliminate them by various means, including separation of combined sewers.



Grand Rapids Combined Sewer Overflow History (Billion Gallons)



Market Avenue Retention Basin (MARB)



Front & Scribner Storm Water Pump Station



Wealthy Storm Water Pump Station

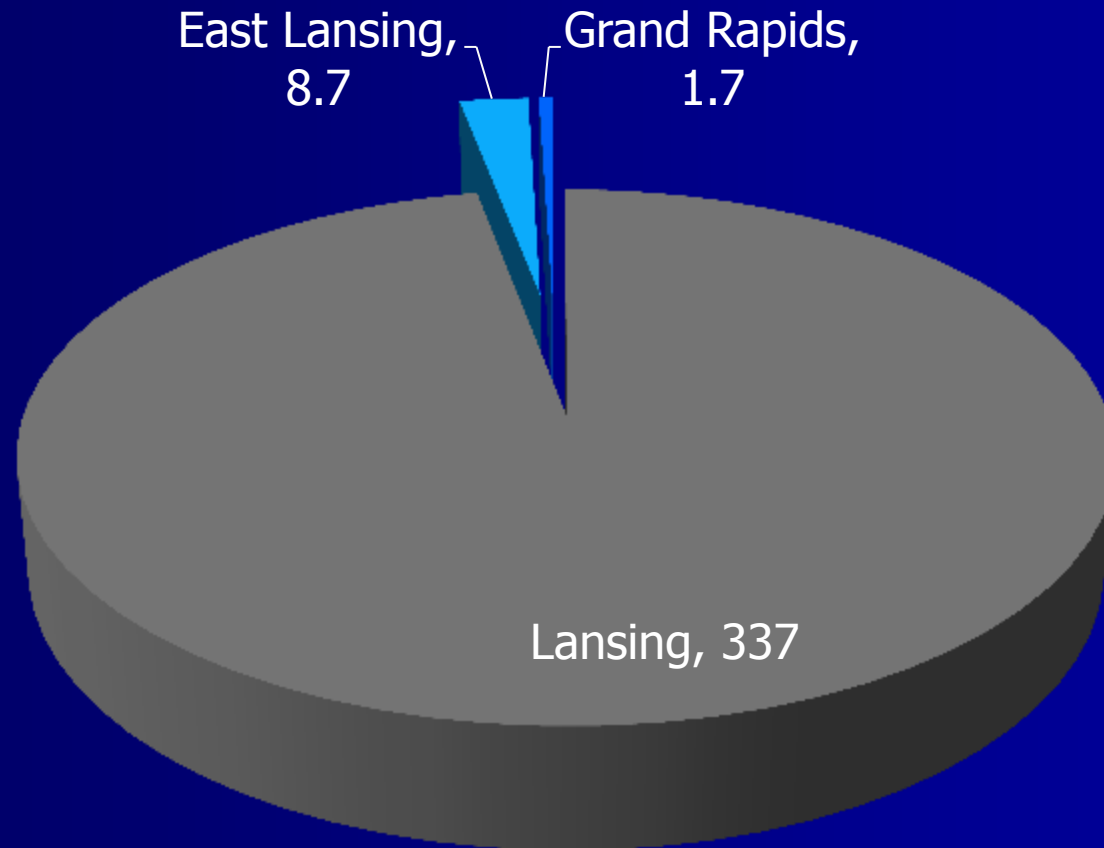


Impact on Neighborhoods



Grand River CSO's 2010

Million Gallons



Source: Michigan Department of Environmental Quality
Combined Sewer Overflow (CSO) Sanitary Sewer Overflow (SSO) and Retention Treatment Basin (RTB) Discharge
2010 Annual Report
(January 1, 2010 - December 31, 2010)

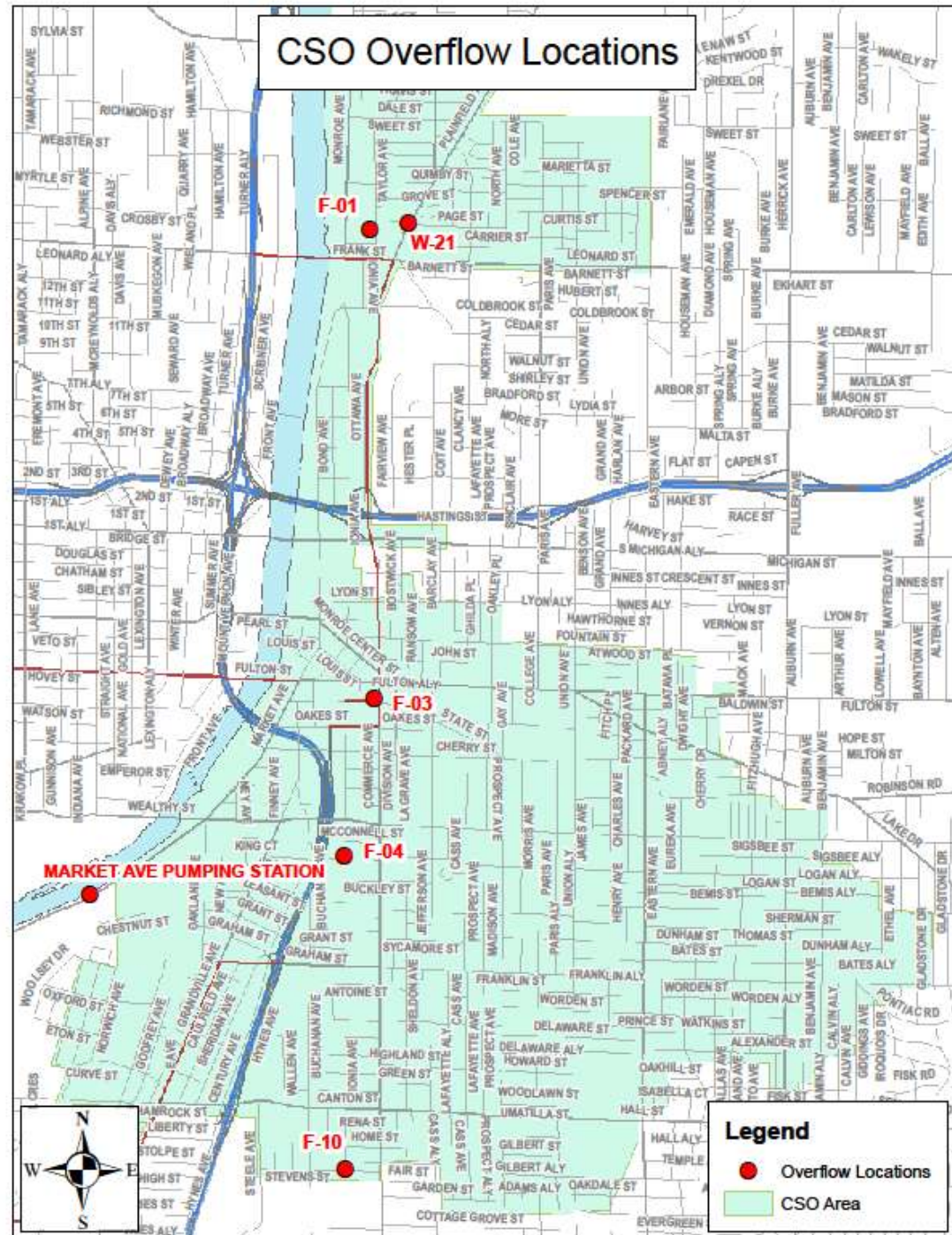
Remaining CSO Overflow Locations

59 CSO locations prior to corrective work started in the early 90's

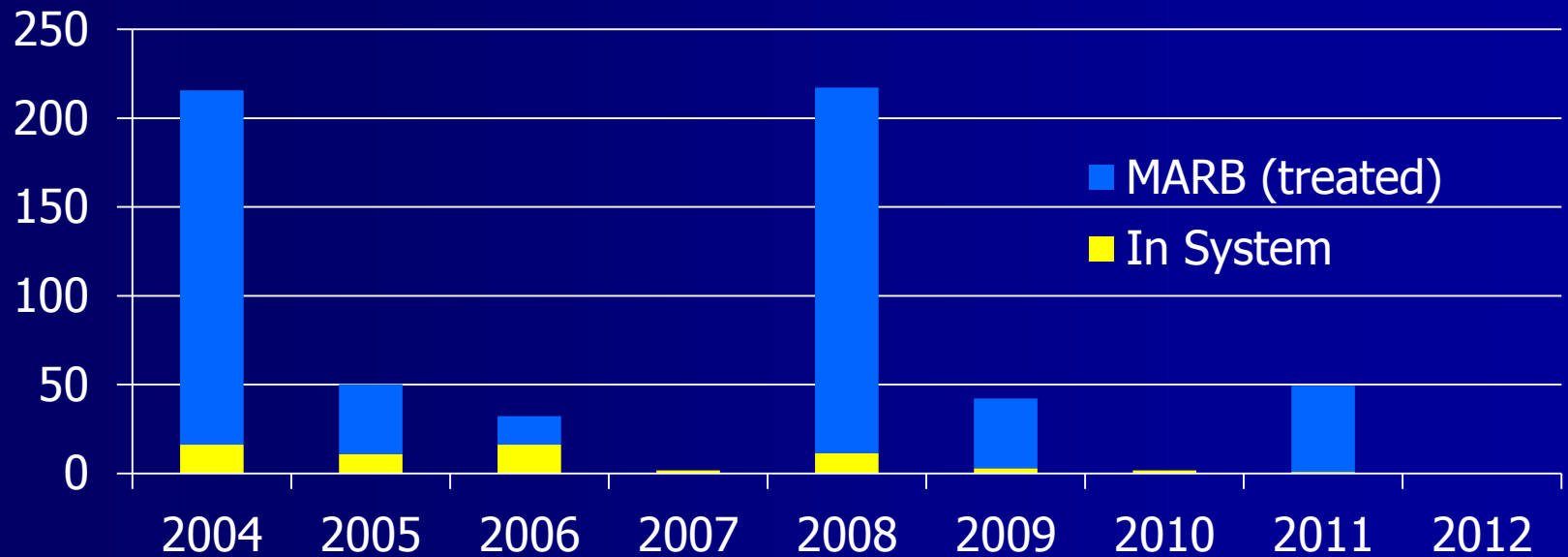
Today 4 CSO locations remain and annual CSO volumes have been reduced by over 99.8%

Construction Timeline

F-10	Complete
F-01	2013
W-21	2013
F-03	2016
F-04	2016



2004-2012 CSO Discharge Comparison In System vs. MARB



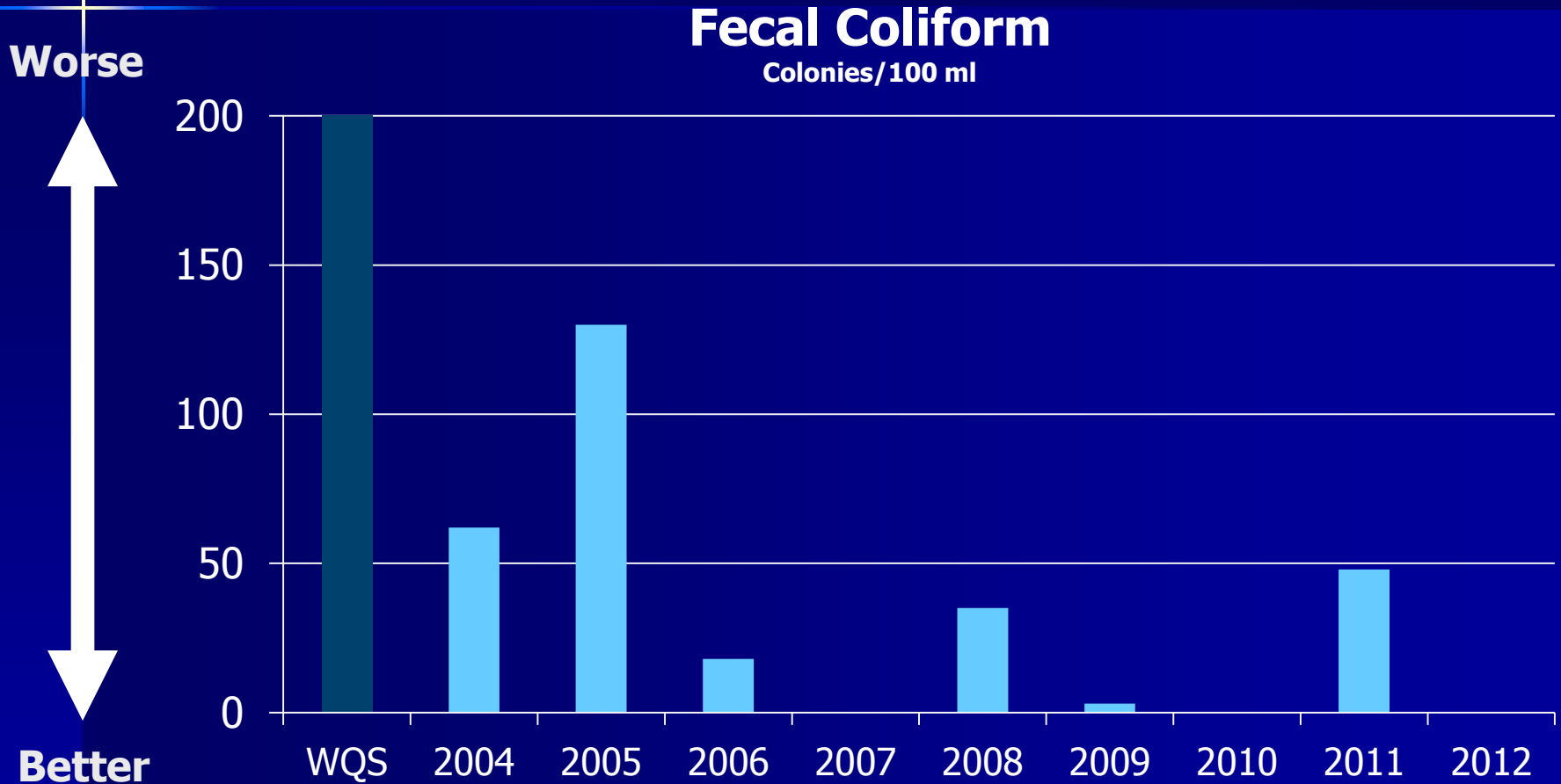
Grand Rapids CSO (MG)

- 1987 = 1,960
- 2004-2012 Total = 610
- 2004-2012 In System = 62
- 2004-2012 MARB = 548

Screening }
 Settling }
 Disinfection }
 Dechlorination }



Market Avenue Retention Basin (MARB) Effluent Quality 2004 – 2012



Water Quality Standard – 7-Day 400 colonies per 100/ml, 30-Day 200 colonies per 100/m

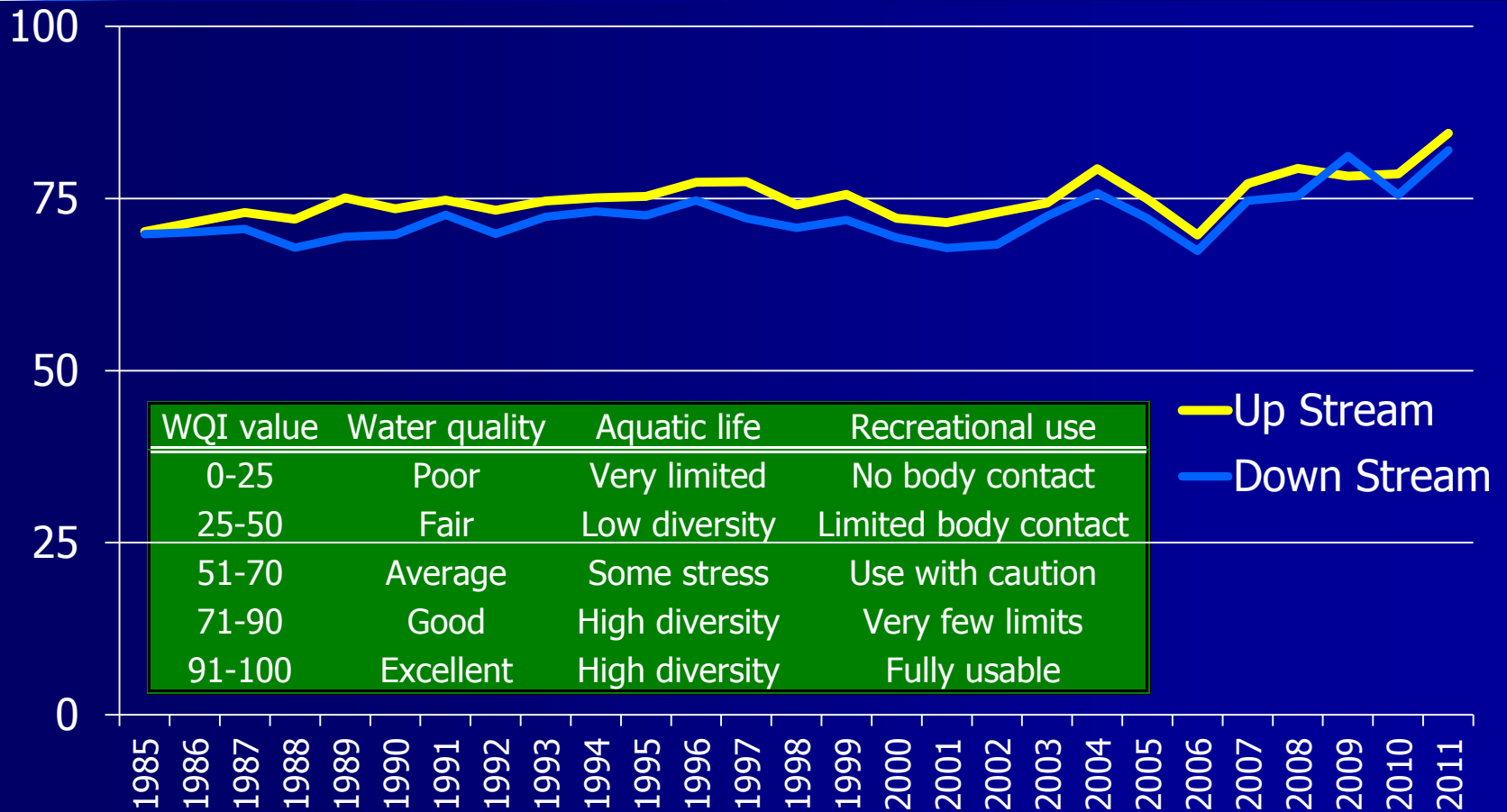
Wright Township Sewer System Connected to Grand Rapids System

- **Connected to Grand Rapids system, added another sewer partner**
- **Eliminated failing lagoon system**
- **Approximately 50,000 GPD routed to Grand Rapids Wastewater Plant**
- **Eliminated discharge to Sand Creek**
 - Eliminate BOD
 - Eliminate SS
 - Eliminate Fecal
 - Eliminate Phosphorous
 - Eliminate Odor Problems in Tallmadge Township
- **Eliminated sewage leaking into ground water**
- **Total Cost - \$2,650,000**
 - Grand Rapids - \$800,000
 - Wright Township - \$850,000
 - Tallmadge Township - \$1,000,000

Grand River Water Quality Monitoring



Grand Rapids Region Upstream (Yellow)/Downstream (Blue) Water Quality Index (WQI)



Sources of Pollutants in Michigan Rivers

Source	Total Miles
Atmospheric deposition	52,316
Source unknown	6,139
Habitat alterations	3,986
Hydromodifications	3,200
Municipal permitted discharges	2,516
Storm water permitted discharges	2,434
Agriculture - grazing	2,180
Agriculture - crop production	2,165
Agriculture - animal feeding/handling	2,110
Spills and unpermitted discharges	1,750
Urban related runoff/storm water	1,899
Legacy/historical pollutants	839
Industrial permitted discharges	637
NPS	545
Land application/waste sites	570
Natural	215
Resource extraction	168
Groundwater loadings	26
Construction	22
Turf management	4



Source: MDEQ Draft 2012 Integrated Report

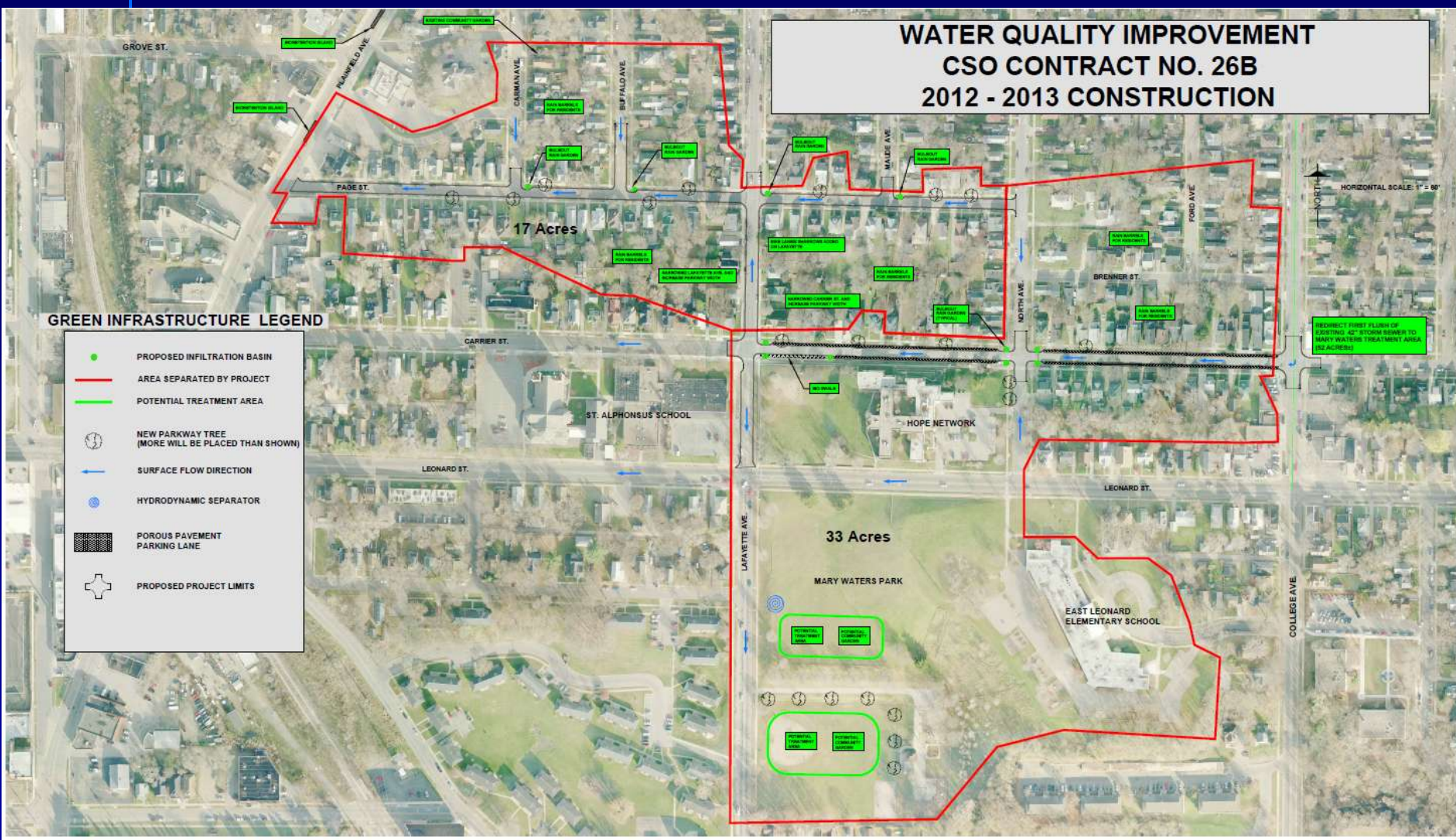
Sources of Pollutants in Michigan Rivers

■ NONPOINT SOURCES

- Livestock
- Cropland
- Impervious Surfaces
- Construction Sites
- Illicit Connections to Storm Sewers
- Septic Systems
- Channelization
- Steambank Erosion



Green Infrastructure – 26B & 26C



Green Infrastructure



Rain Garden Bulb Out



Porous Pavement Parking Lane



Infiltration Catch Basin

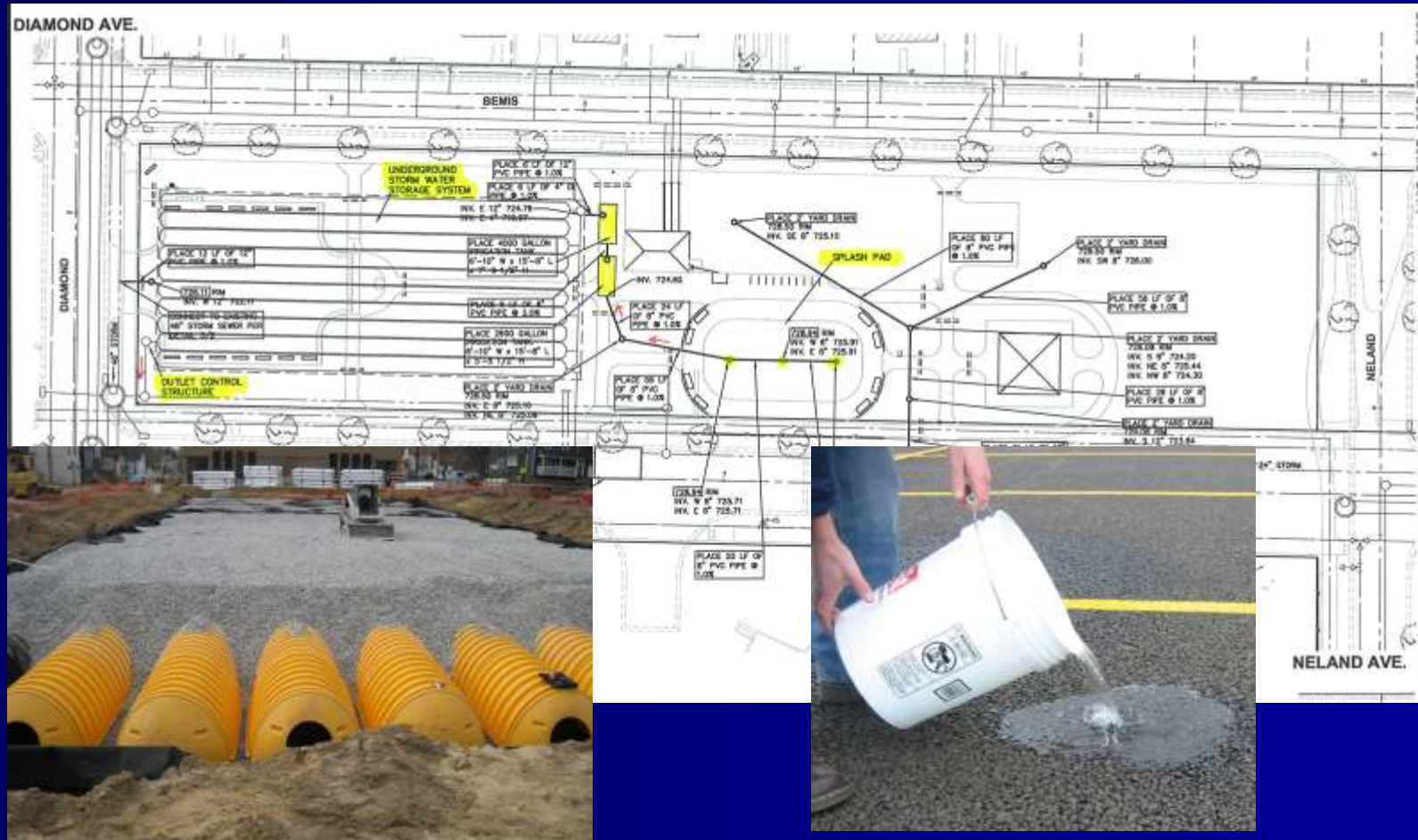


Rain Garden Bulb Out



Hydro Separator

Joe Taylor Park – 40 acres



CSO Project Costs (Sewer Fund)

- Westside Separation
 - 52 Contracts
 - \$114,667,585
- Eastside Separation
 - \$102,423,429 (Expenditure to Date)
 - \$20,000,000 Construction (Remaining – Last Drop)
- Total - \$237,091,014

Water Quality Initiatives

- Lower Grand Watershed Organization
- Green Grand Rapids Master Plan Update
- Sustainability Plan
- Renewable Energy
- Green Infrastructure Portfolio Standards
- Energy Efficiency Projects
- Stormwater Master Plan
- Soil Erosion and Sedimentation Control
- Grand River Water Quality Monitoring

In Conclusion

- **Grand Rapids CSO all but eliminated**
- **Only the last drop remains of the CSO Program**
- **There is a plan in place to eliminate all CSO's**
- **Grand Rapids has been leader in the State**
- **There are many sources of pollutants**
- **Green Infrastructure is part of our future**
- **A watershed approach must be taken to improve Water Quality.**

**City of Grand Rapids web site
www.grcity.us**

Questions?

Presenters;

Eric Delong,
Deputy City Manager

Mike Lunn
Environmental Service Manager