



Preserving The Environment •
Improving Water Quality



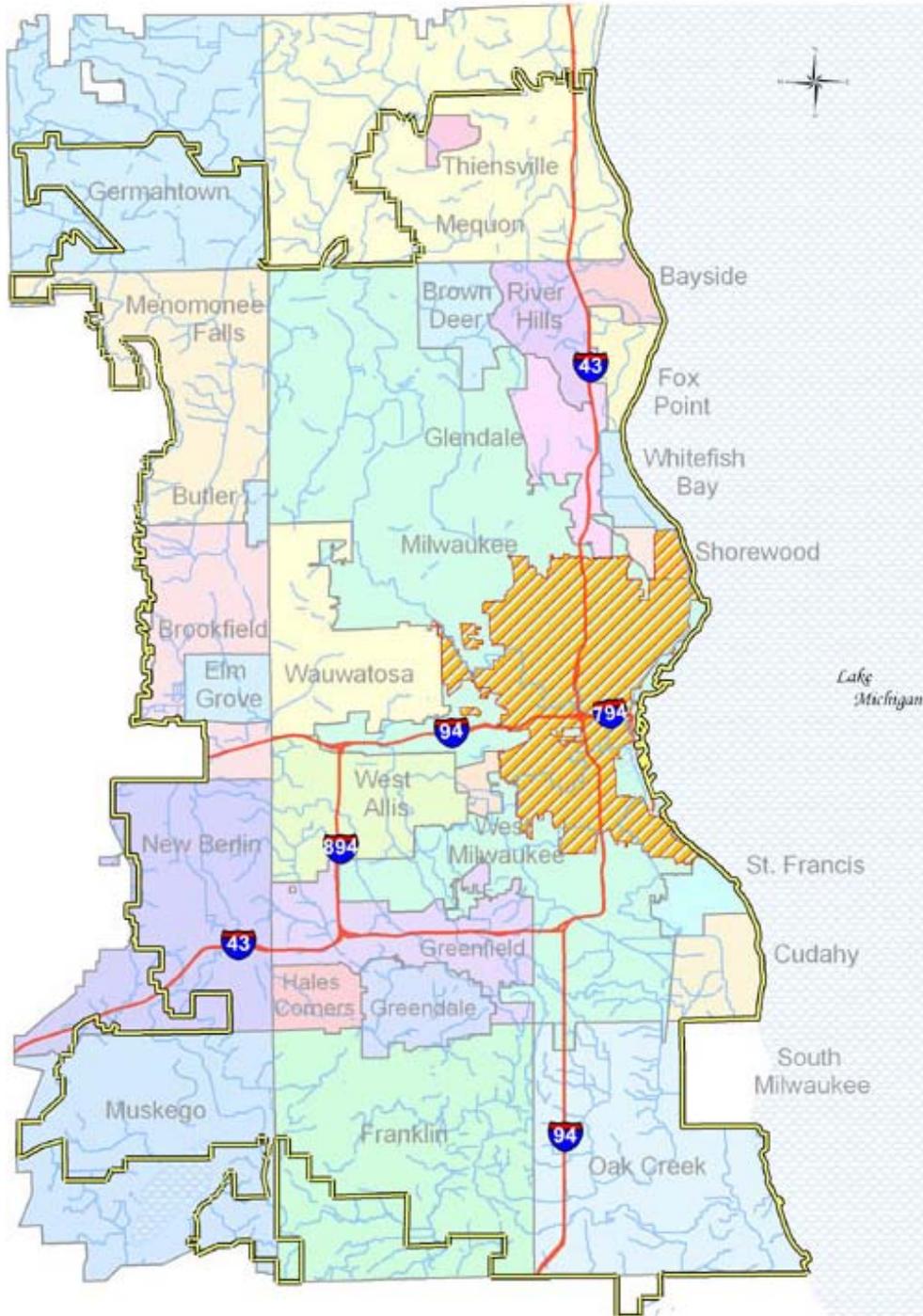
Water Reclamation Facilities



Jones Island

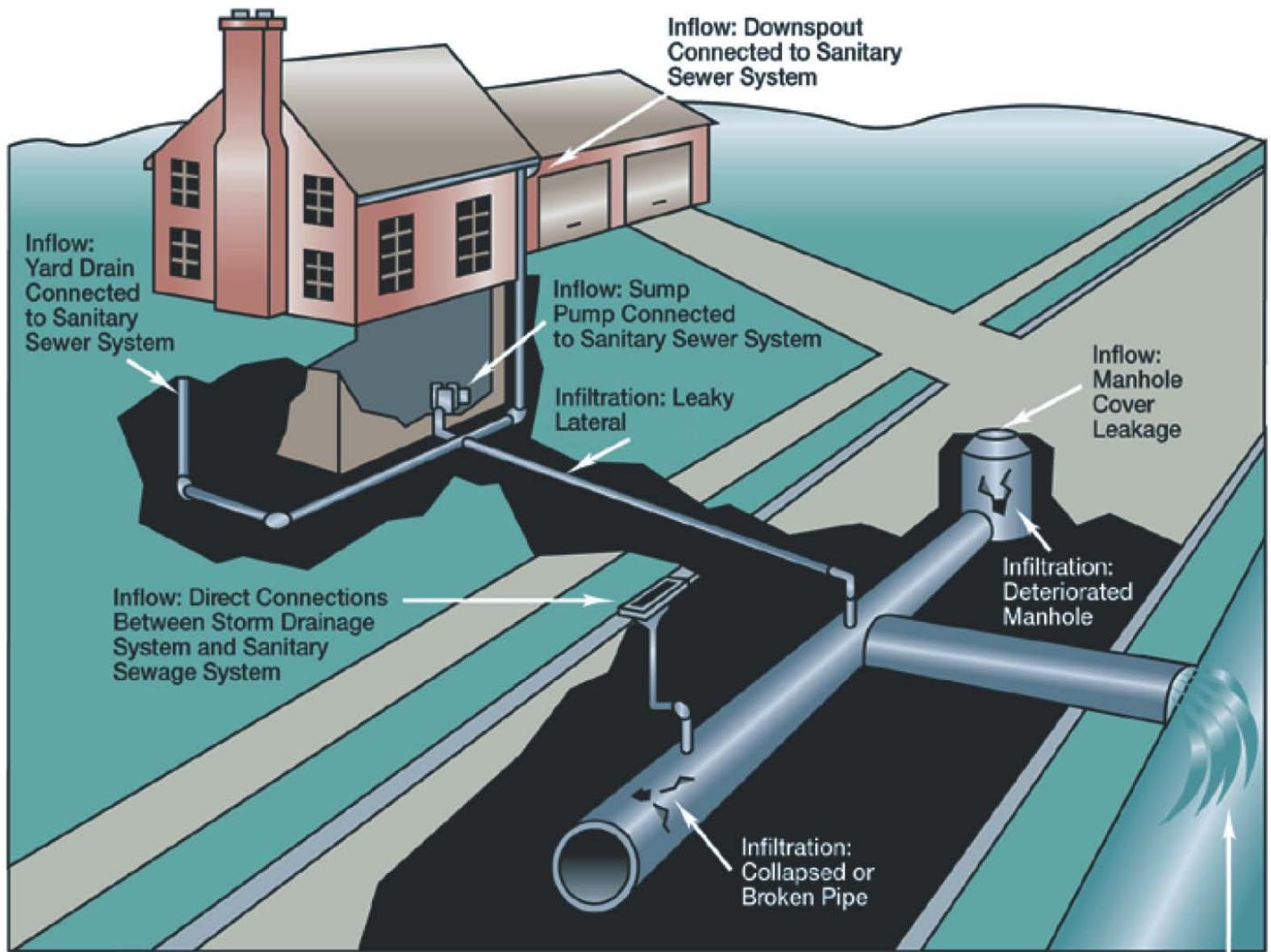


South Shore



MMSD Serves:

- 1.1 Million Customers
- 28 Municipalities
- 411 Square Miles



**Inflow: Downspout
Connected to Sanitary
Sewer System**

**Inflow:
Yard Drain
Connected
to Sanitary
Sewer System**

**Inflow: Sump
Pump Connected
to Sanitary Sewer System**

**Infiltration: Leaky
Lateral**

**Inflow:
Manhole
Cover
Leakage**

**Infiltration:
Deteriorated
Manhole**

**Inflow: Direct Connections
Between Storm Drainage
System and Sanitary
Sewer System**

**Infiltration:
Collapsed or
Broken Pipe**

**Inflow: Surface Water Entering
System Through Bypasses,
Crossovers, and Overflows**





Wet Basement Occurrence 7/22/2010

- ▲ Sanitary Backup
- MIS
- NSC
- ISS
- Diversion Chamber
- Whitefish Bay Sanitary Manholes
- Whitefish Bay Sanitary Pipeline
- Water
- Municipality Boundary



0 0.1 0.2 0.3 0.4 Miles

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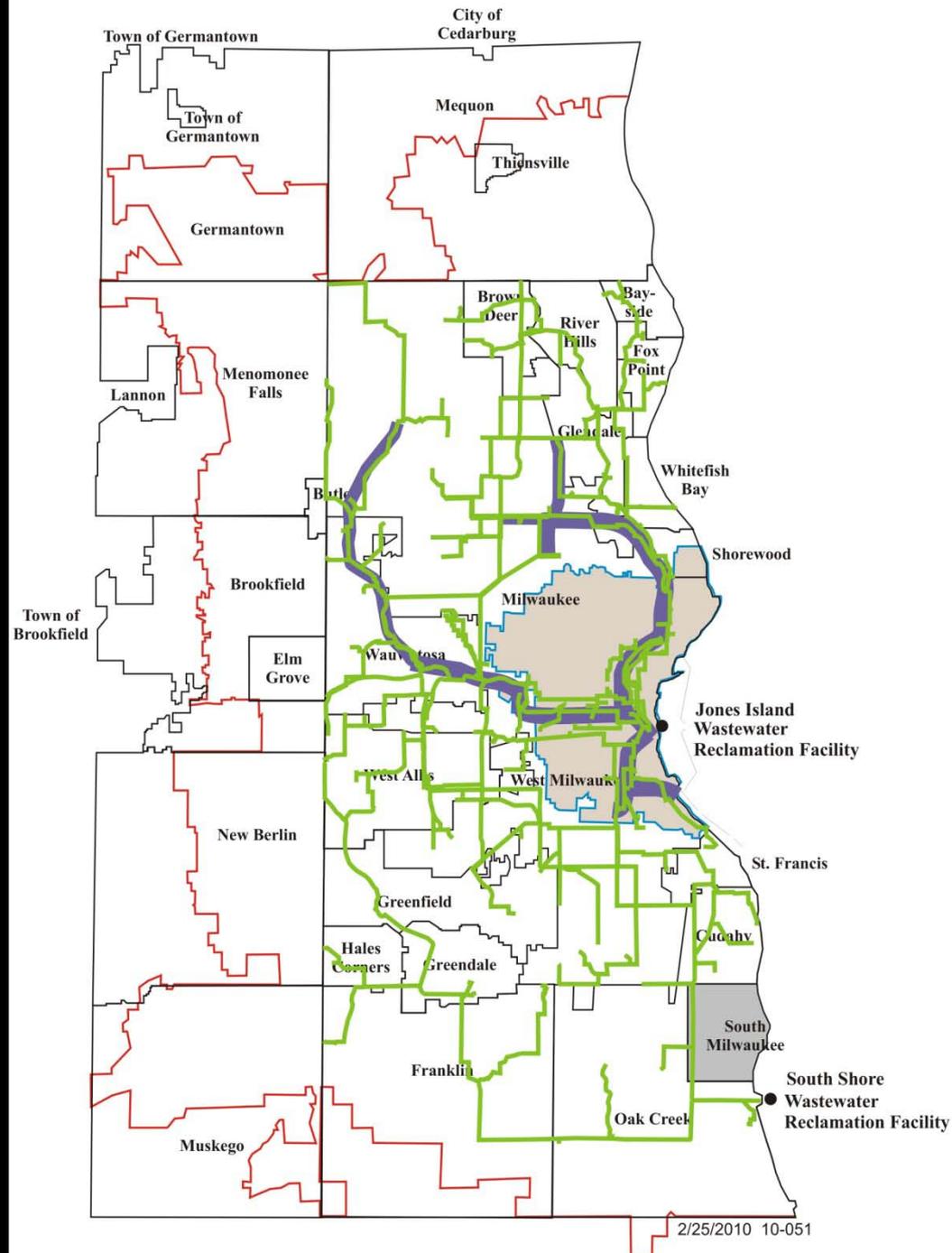


Sewers

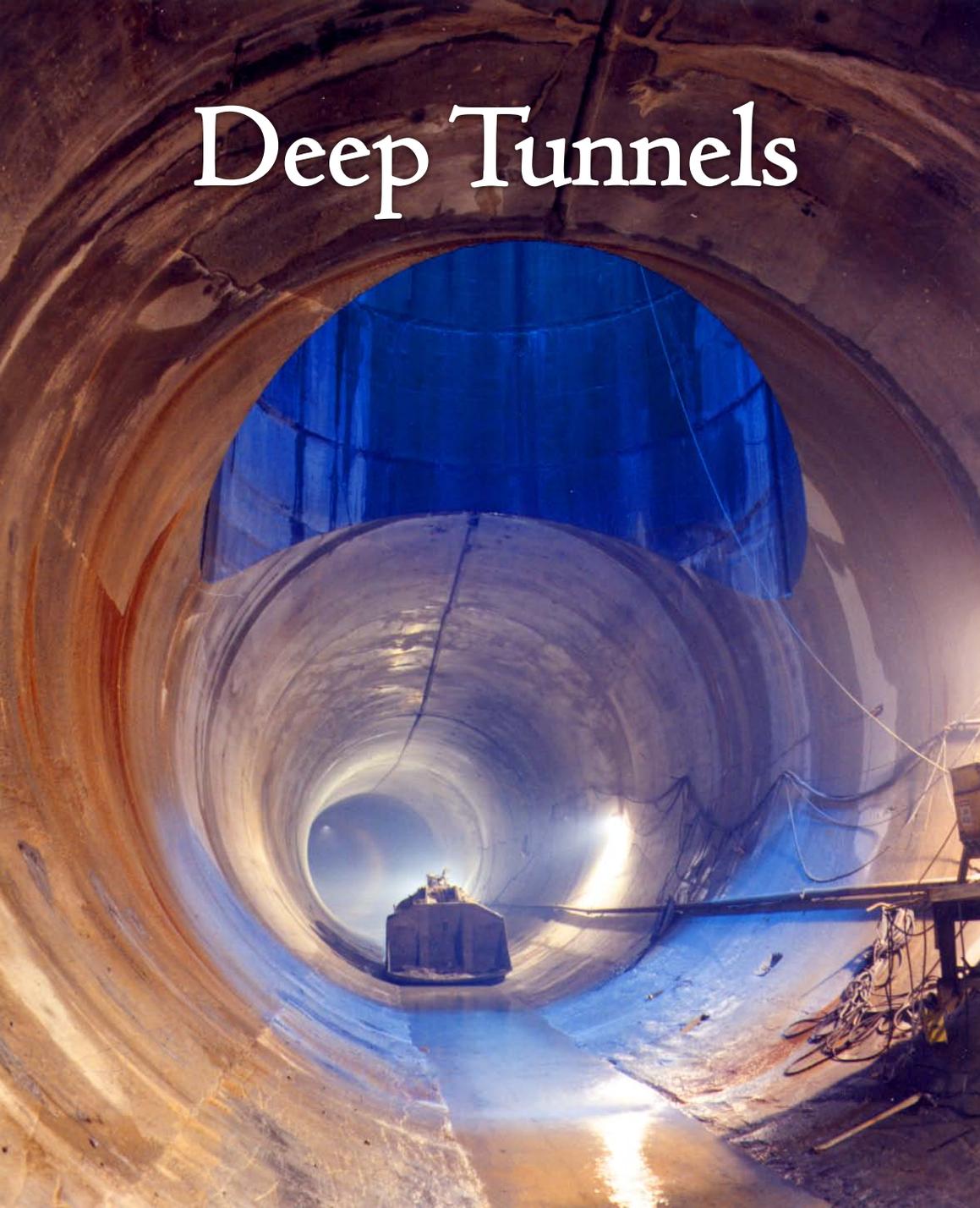
300 Miles
MMSD Sewers

3,000 Miles
Municipality Owned Sewers

3,000 Miles
Private Laterals



Deep Tunnels

A large, circular tunnel under construction. The tunnel is made of concrete and has a smaller, corrugated metal tunnel inside it. The scene is lit with blue and white lights, creating a dramatic atmosphere. A small structure is visible at the end of the inner tunnel.

300 Feet
Below ground

521 Million
Gallons of Storage

28.5 Miles
Long

17- to 32-feet
In Diameter

Designed to minimize
basement backups and for
I-2 overflows per year.

Northwest Side Deep Tunnel



89 million gallons

7.1 miles long

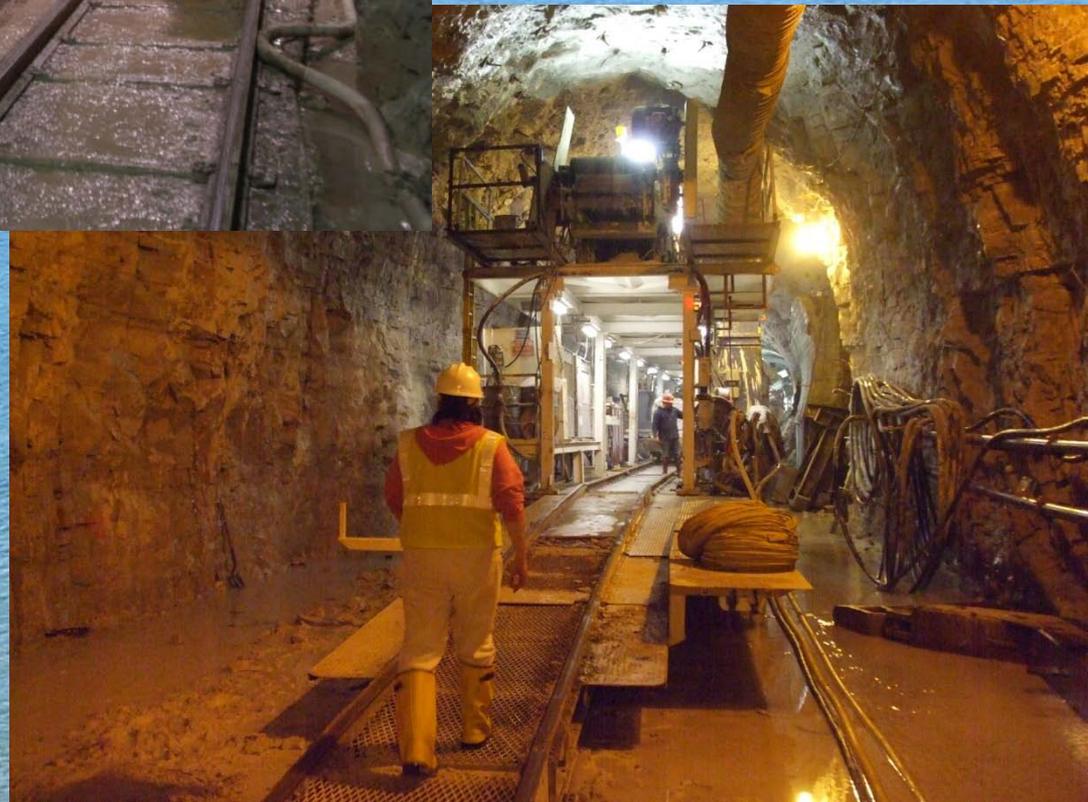


27th Street Deep Tunnel

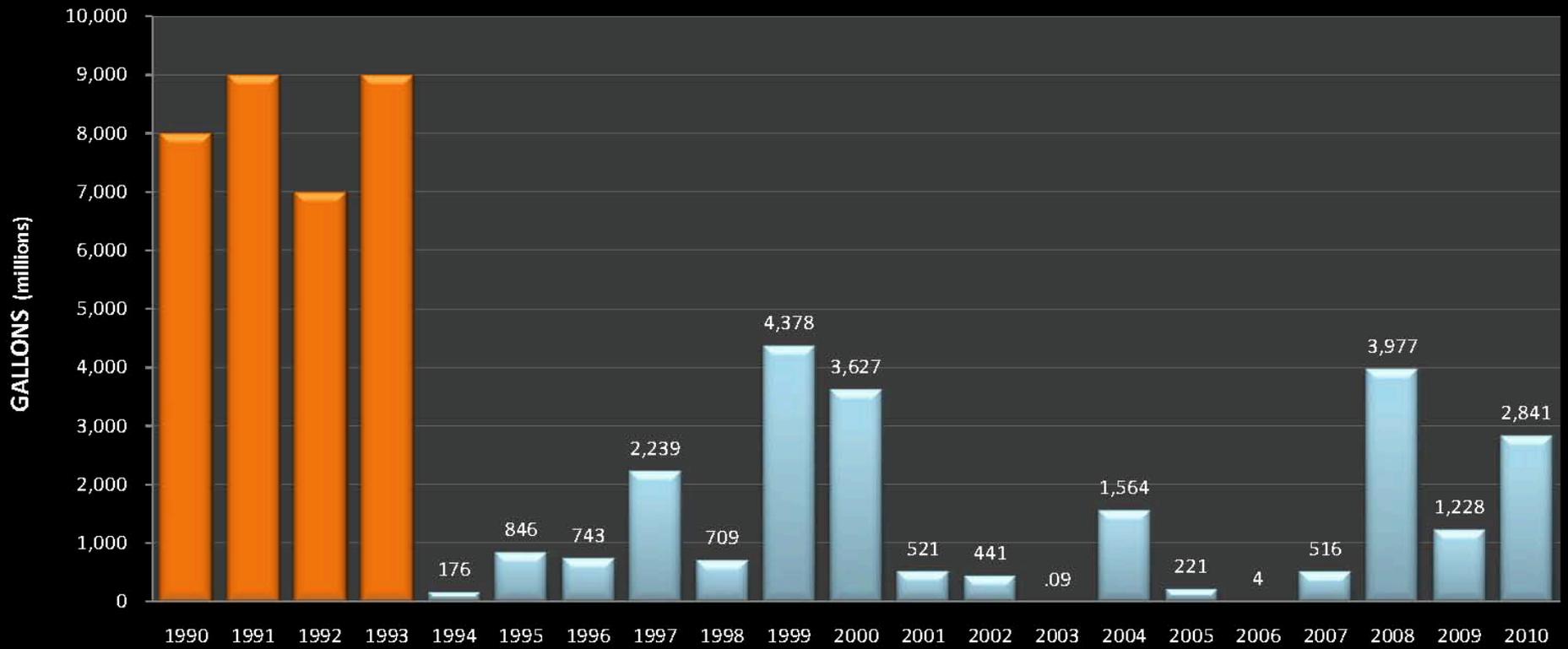


27 million gallons

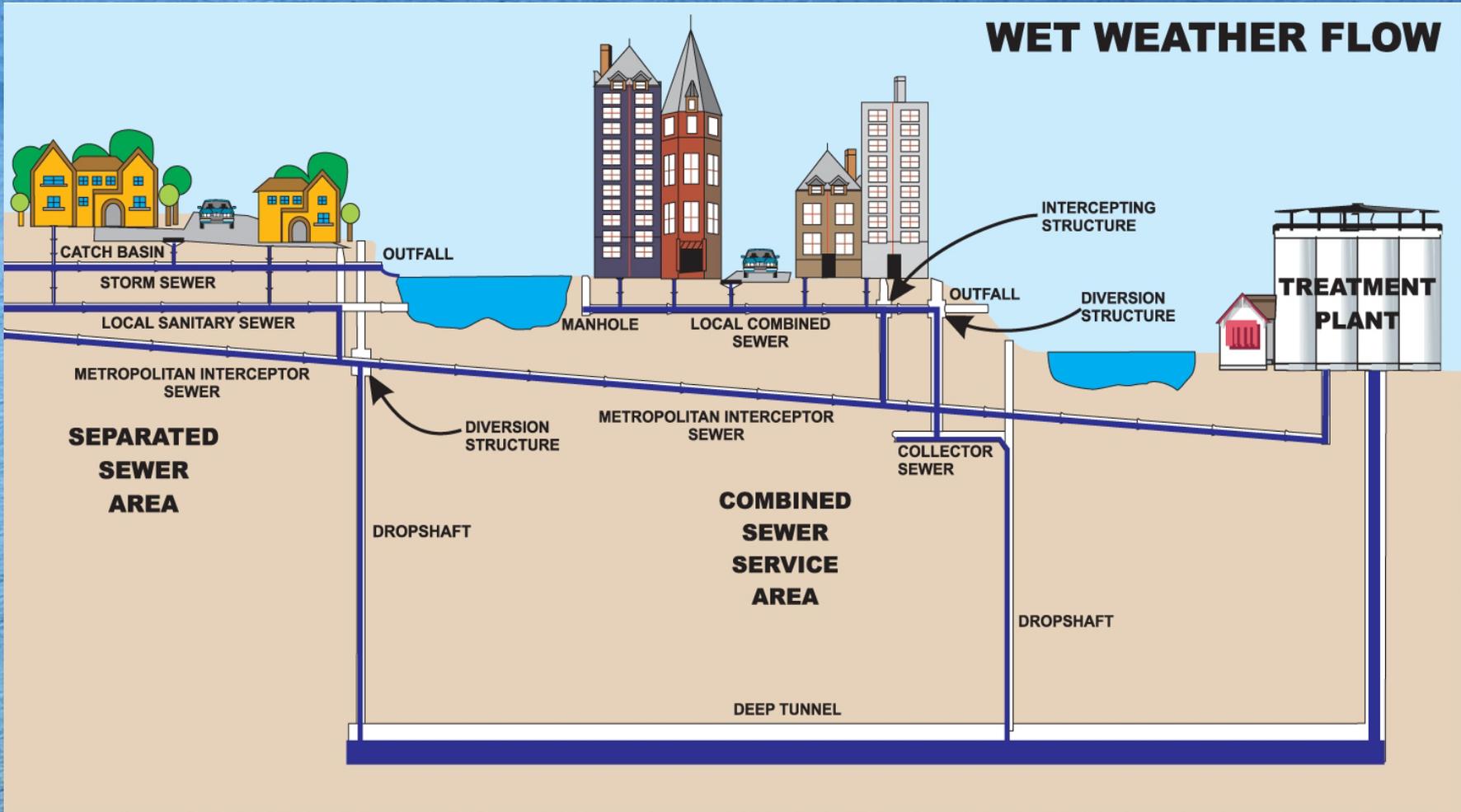
2 miles long



MMSD OVERFLOW VOLUMES

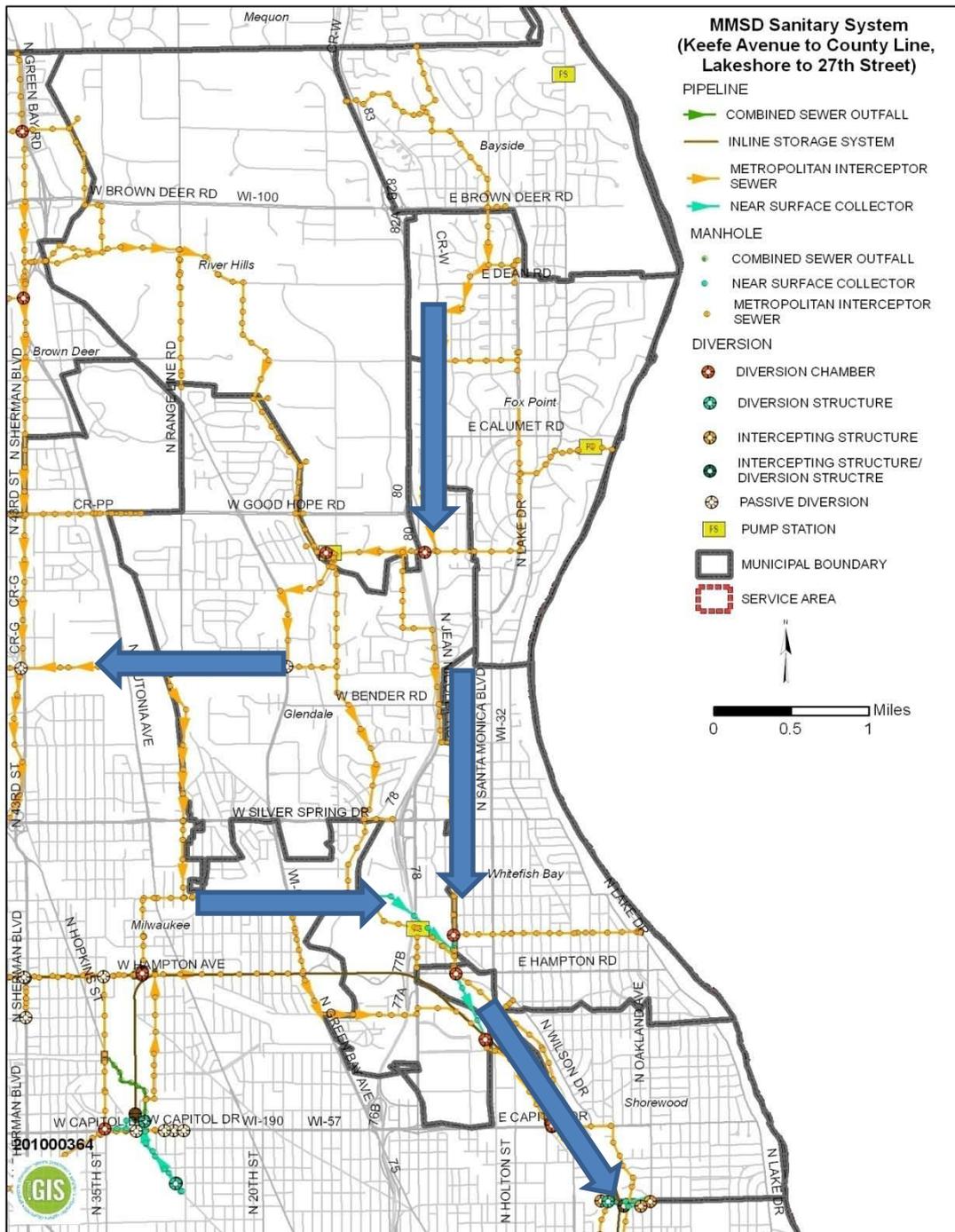


WET WEATHER FLOW



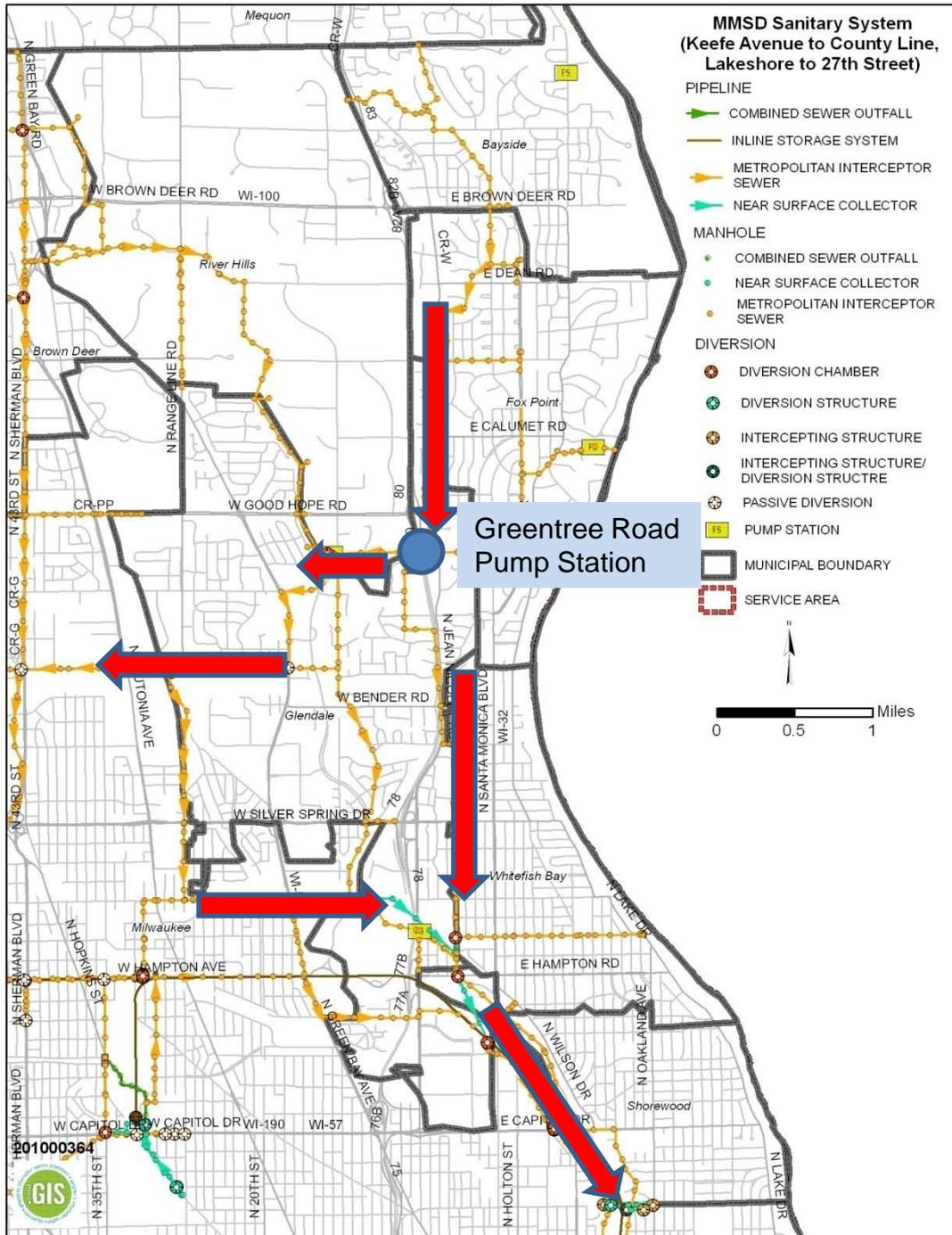


Dry
Weather
Flow Path





Wet
Weather
Flow Path



Northeast MIS Network Hydraulic Analysis Technical Memorandum completed in 2000

- As a result of flooding in the late 1990's
- This report was an analysis based on hypothetical storm conditions
- It identified some areas that needed to have further examination.

Technical Memorandum Northeast MIS Network Hydraulic Analysis Alternatives Screening completed in 2001

- Analyzed 6 different alternatives
- Costs of alternatives ranged from \$49 million to \$69 million
- Alternative #1 (\$49 million) was selected. It verifies and addresses the recommendations from the 2000 report

Technical Memorandum Northeast MIS Network Hydraulic Analysis Alternatives Screening Alternative #1

•Alternative #1 includes 10 recommendations:

1. Install a new 7' x 5' cast iron sluice gate in the outlet of the NS-3 Junction Chamber. **Implemented in 2002.**
2. Construct a new Flow Control Chamber with a new inline isolation sluice gate on the 42" Estabrook MIS upstream of the Courtland Avenue connection to the MIS. **Implemented in 2002.**
3. Install manual operated normally closed stainless steel sluice gates on the overflow outlet at the existing MIS overflow structure at West Hampton and North Lydell Avenues and on the existing MIS overflow structure at West Lancaster and North Lydell Avenues. **Implemented in 2002.**

Technical Memorandum Northeast MIS Network Hydraulic Analysis Alternatives Screening Alternative #1 (Continued)

•Alternative #1 includes 10 recommendations:

4. Modify the operation of the sluice gates at existing Diversion Structure DC0507 structure located at West Lancaster (actually Fairmount) and North Lydell Avenues to continue to direct wet weather flow to the North Side High Level Relief Sewer during a wet weather event even after the ISS is filled and taken off line. This project was implemented as part of Contract No. C048GX010 (the “North East Side Flow Control Gates” project). **Implemented in 2002.**
5. Construct a new overflow riser and overflow structure on the North Side High Level Relief Sewer and route overflows to a proposed relocated City of Milwaukee storm sewer outfall on the Milwaukee River. This project was built in a different form by converting two existing manholes along the North Side High Level Relief Sewer into bypass points. **Implemented in 2002.**
6. Construct a new 72” Port Washington Relief Sewer from Green Tree Pump Station to DC 5-8 at West Villard Avenue and the Milwaukee River. This recommended project evolved into the 27th Street ISS Extension, which has been built and provides additional relief storage capacity for Whitefish Bay as well as the rest of the service area. **Implemented in 2010.**

Technical Memorandum Northeast MIS Network Hydraulic Analysis Alternatives Screening Alternative #1 (Continued)

•Alternative #1 includes 10 recommendations:

7. Replace the existing electrically operated sluice gate with a manually operated, normally closed sluice gate at the existing diversion structure 80034 at North Richards and East Congress Streets. Provide an overflow weir in the structure to limit settable materials from entering the overflow sewer. **This project was implemented but does not affect Whitefish Bay.**
8. Construct a new 60" Green Tree Relief Sewer from the Range Line Road Pump Station to the Green Tree Pump Station. **This project was not implemented but does not affect Whitefish Bay.**

Technical Memorandum Northeast MIS Network Hydraulic Analysis Alternatives Screening Alternative #1 (Continued)

•Alternative #1 includes 10 recommendations:

9. Construct a new Pump Station at West Villard Avenue and the Milwaukee River to operate to provide property protection when the MMSD system capacity is exceeded. This project has evolved into the District's current plan to provide an enlarged pumped overflow location on the North Side of the District's service area. **This project is currently being implemented. Completion in 2012. This project does not affect Whitefish Bay.**
10. Construct a new MIS overflow structure and outfall sewer at North Lydell and Montclair Avenues by relaying an existing Village of Whitefish Bay WPDES permitted storm sewer. This project evolved into the placement of a backflow preventer on the Montclair bypass. **Implemented in 2000.**

Preliminary Engineering Report on Port Washington Road Relief Sewer completed in 2006

- Through preliminary engineering, this project evolved into the 27th Street Deep Tunnel extension.
- This project is the same as project #6 from the 2001 report.

MMSD Sanitary System (Keefe Avenue to County Line, Lakeshore to 27th Street)

PIPELINE

-  COMBINED SEWER OUTFALL
-  INLINE STORAGE SYSTEM
-  METROPOLITAN INTERCEPTOR SEWER
-  NEAR SURFACE COLLECTOR

MANHOLE

-  COMBINED SEWER OUTFALL
-  NEAR SURFACE COLLECTOR
-  METROPOLITAN INTERCEPTOR SEWER

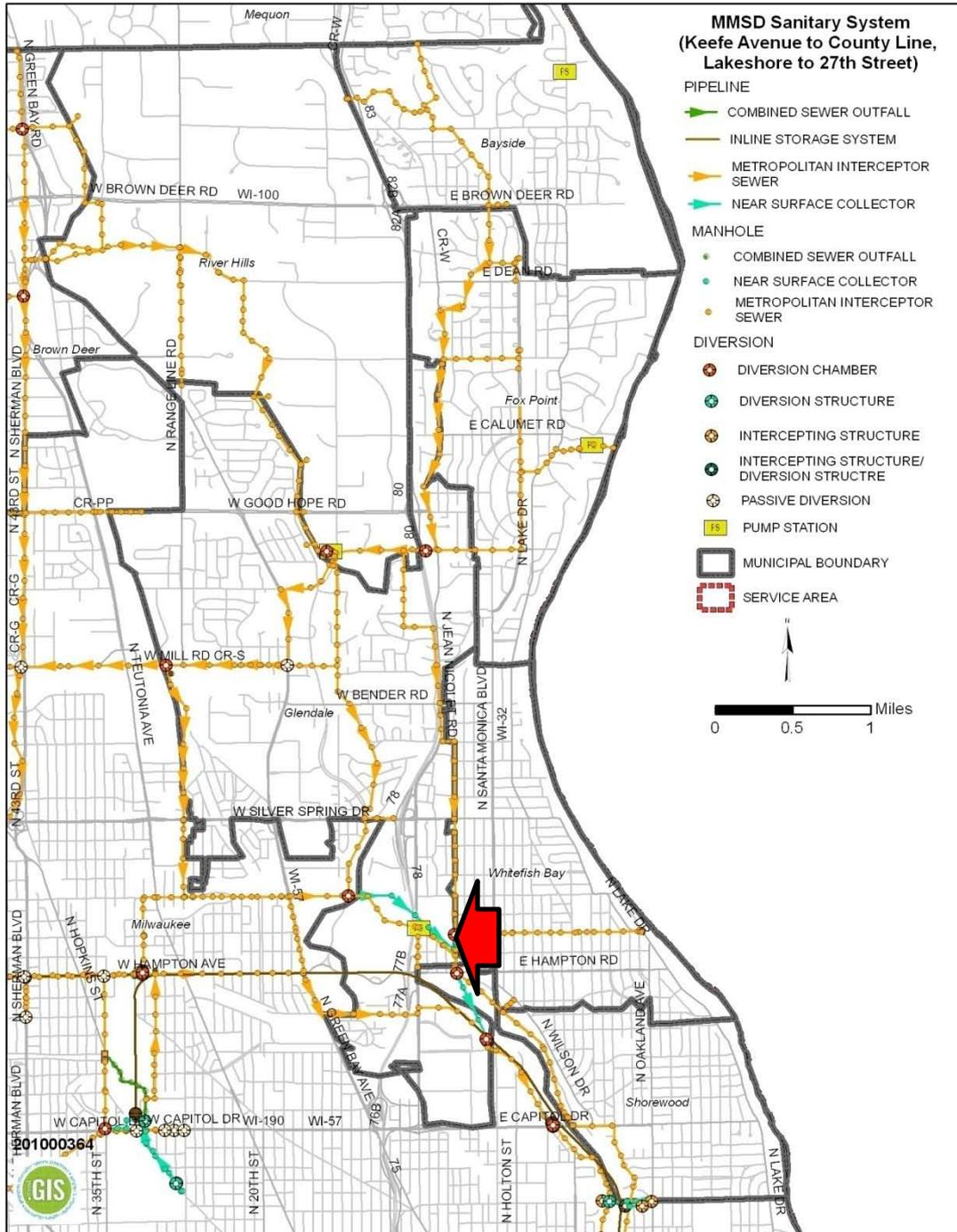
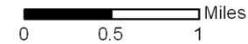
DIVERSION

-  DIVERSION CHAMBER
-  DIVERSION STRUCTURE
-  INTERCEPTING STRUCTURE
-  INTERCEPTING STRUCTURE/
DIVERSION STRUCTRE
-  PASSIVE DIVERSION

-  PUMP STATION

-  MUNICIPAL BOUNDARY

-  SERVICE AREA



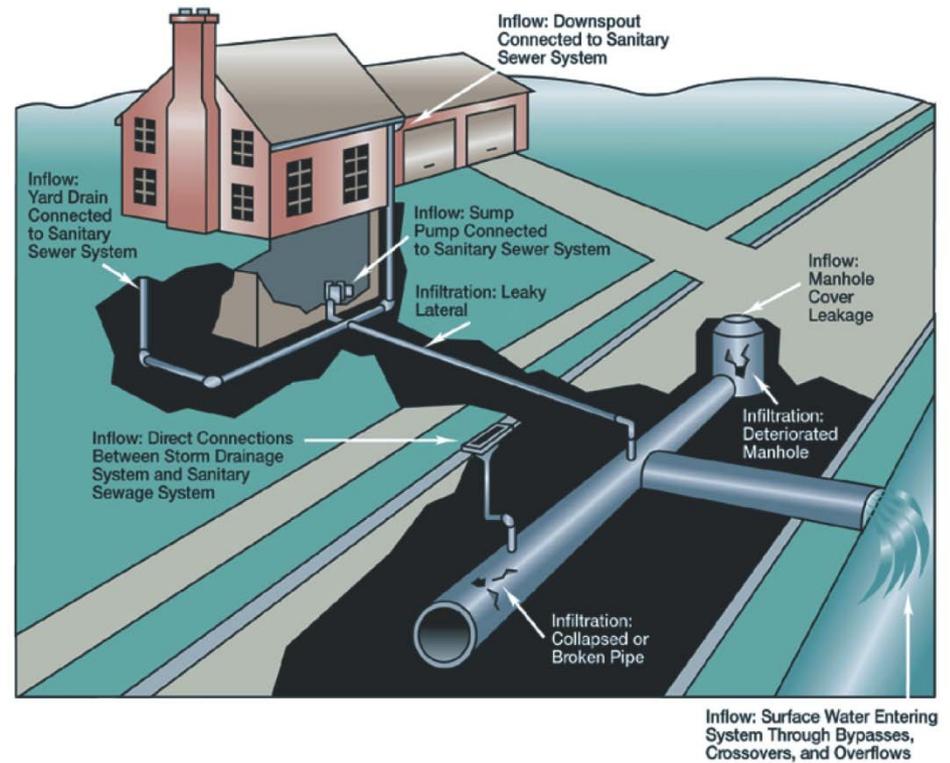
Private Property Inflow and Infiltration

- In January 2010, MMSD initiated a program which is currently providing \$5 million over 5 years to the municipalities

- MMSD Commission is being requested to increase this to \$150 million over 10 years

- Work that can be performed under this contract includes:

1. Downspout Disconnection
2. Foundation Drain Disconnection
3. Lateral inspection and repair/replacement
4. Installation of backflow preventers



MMMSD
Rain
barrels



More than
14,700
SOLD
Since 2002



Green Roofs



MMSD



Mequon



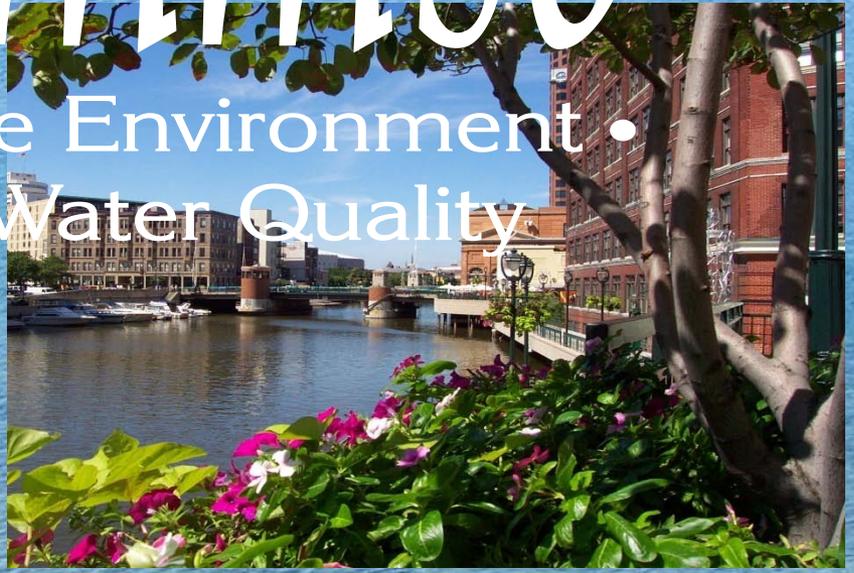
Milwaukee
County
Zoo



MillerCoors



MMSO



Preserving The Environment •
Improving Water Quality