MMSD

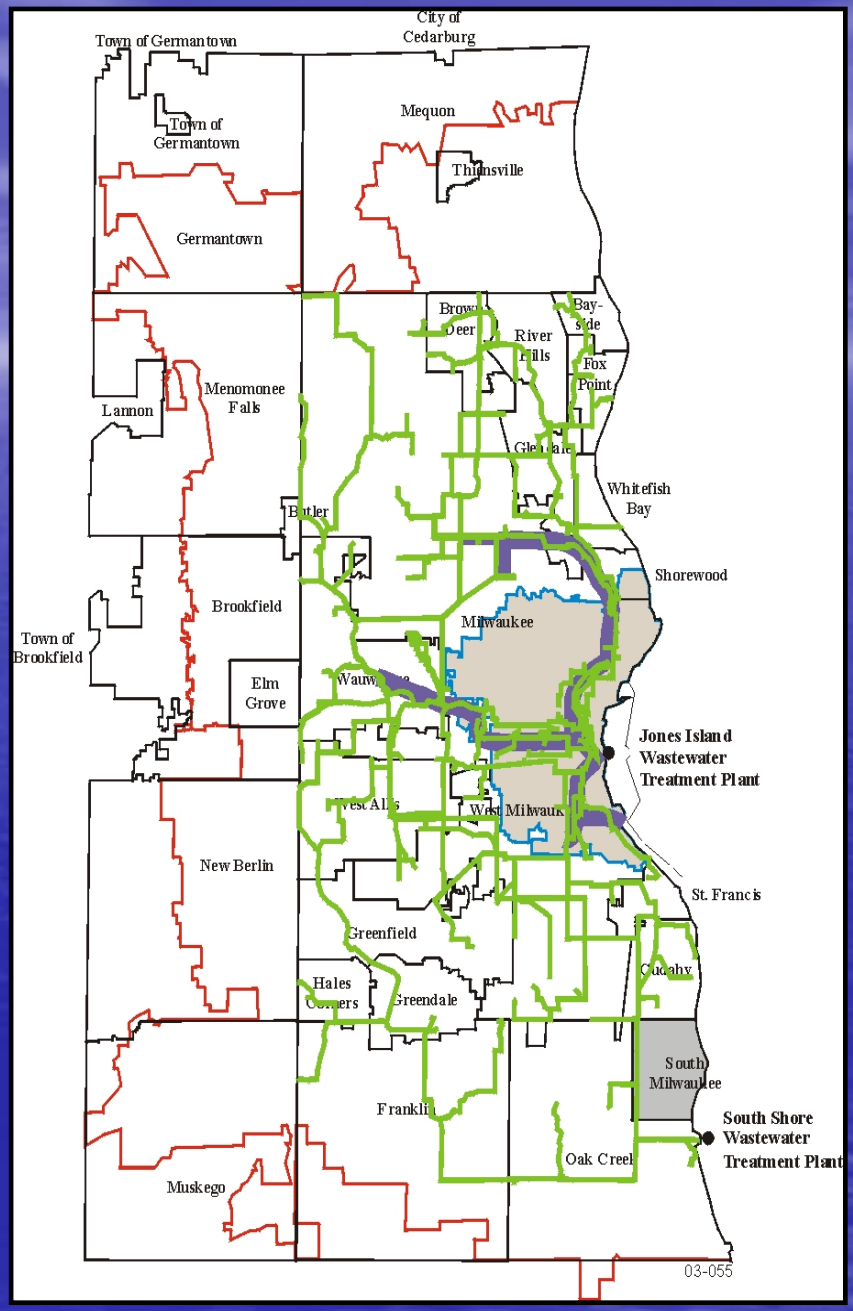
Preserving The Environment •
Improving Water Quality

What is MMSD?

- State-chartered regional agency
- Provides wastewater treatment and flood management
- Serves 1.1 million customers in 28 communities
- Covers 420 square miles

Sewer Facts

- 300 miles/ MMSD sewers
- 3,000 miles/ Community sewers
- 3,000 miles/ Private property sewers

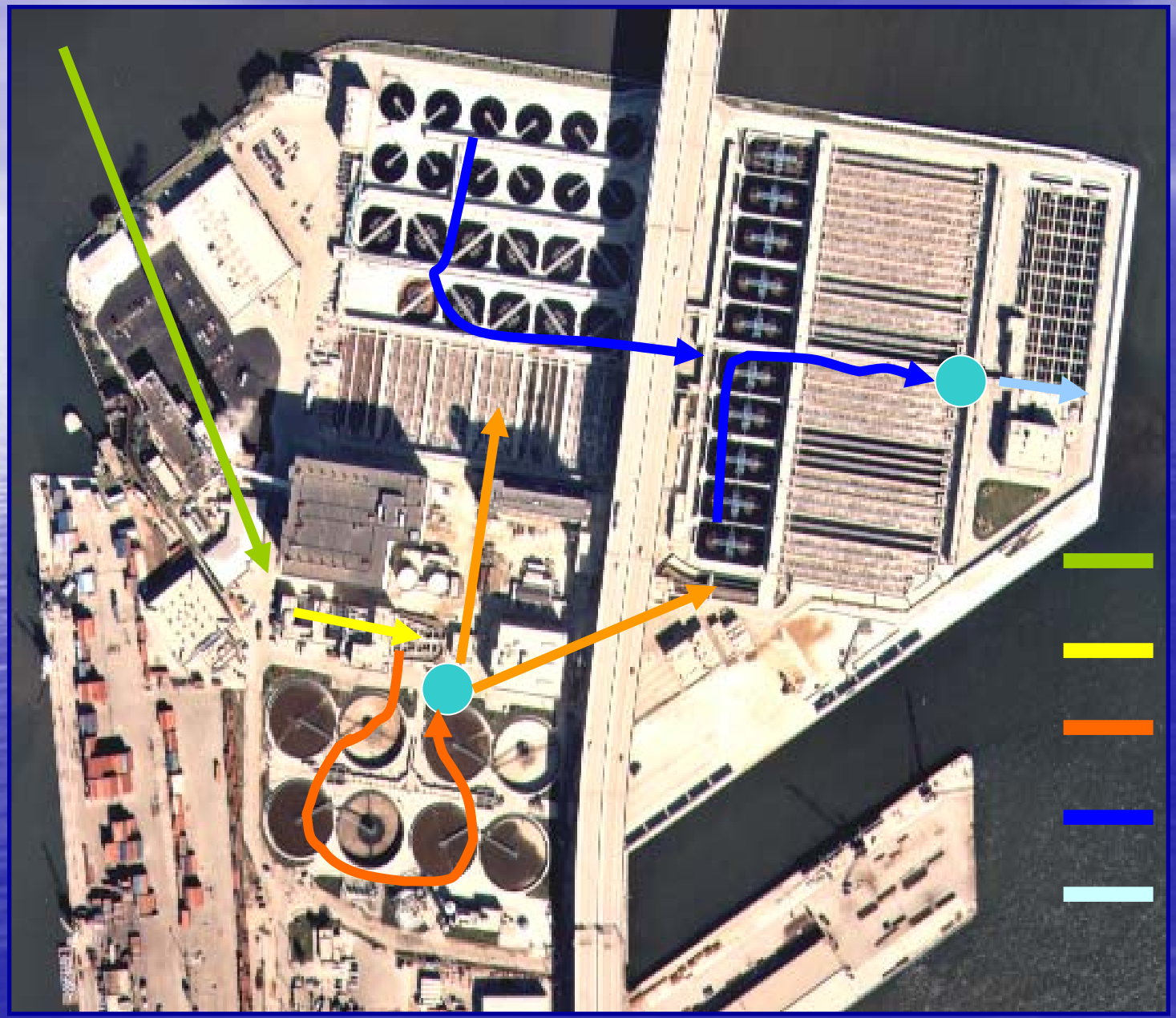


Wastewater Treatment Facilities

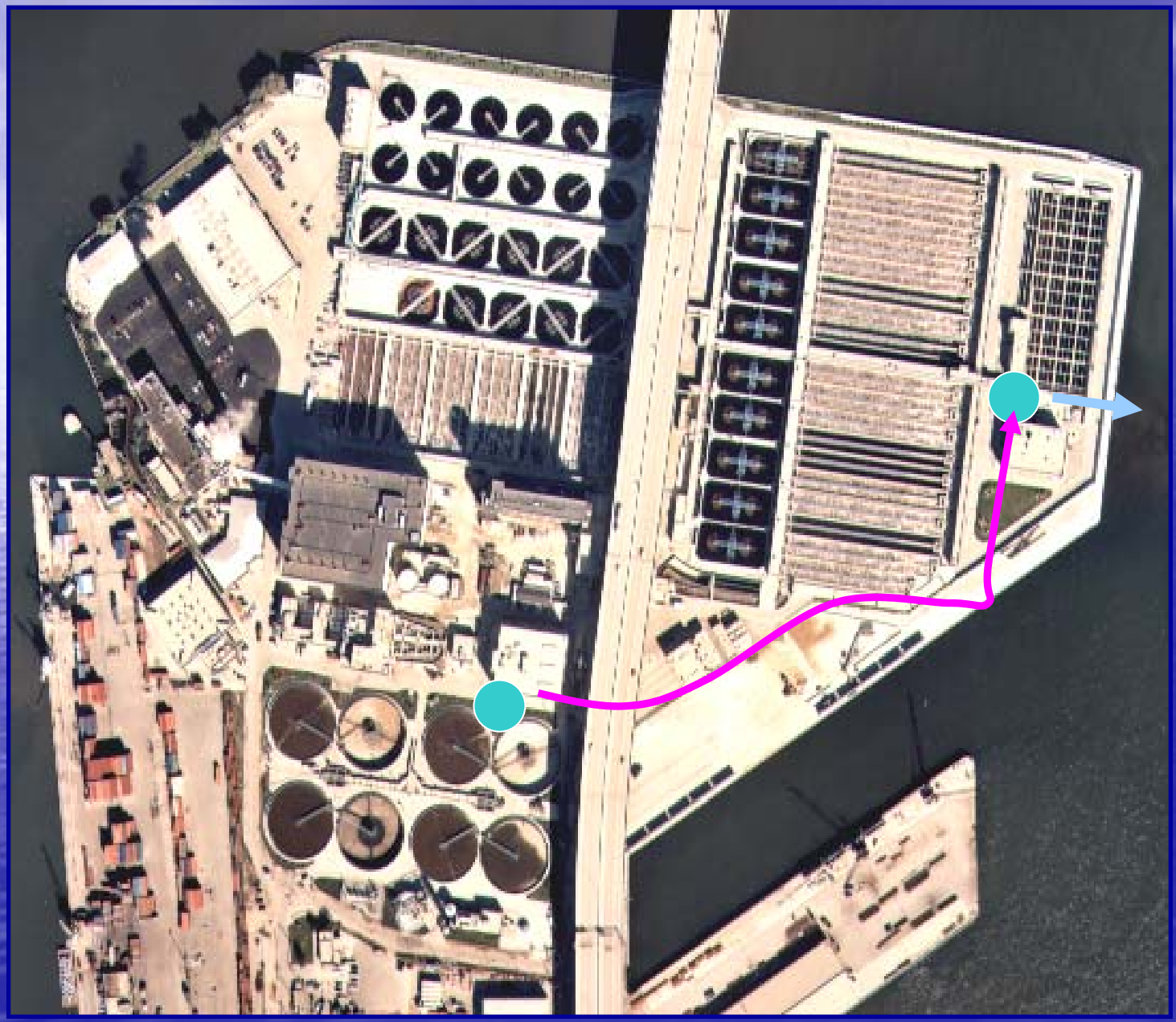
Jones Island

South Shore

What is the Treatment Process?

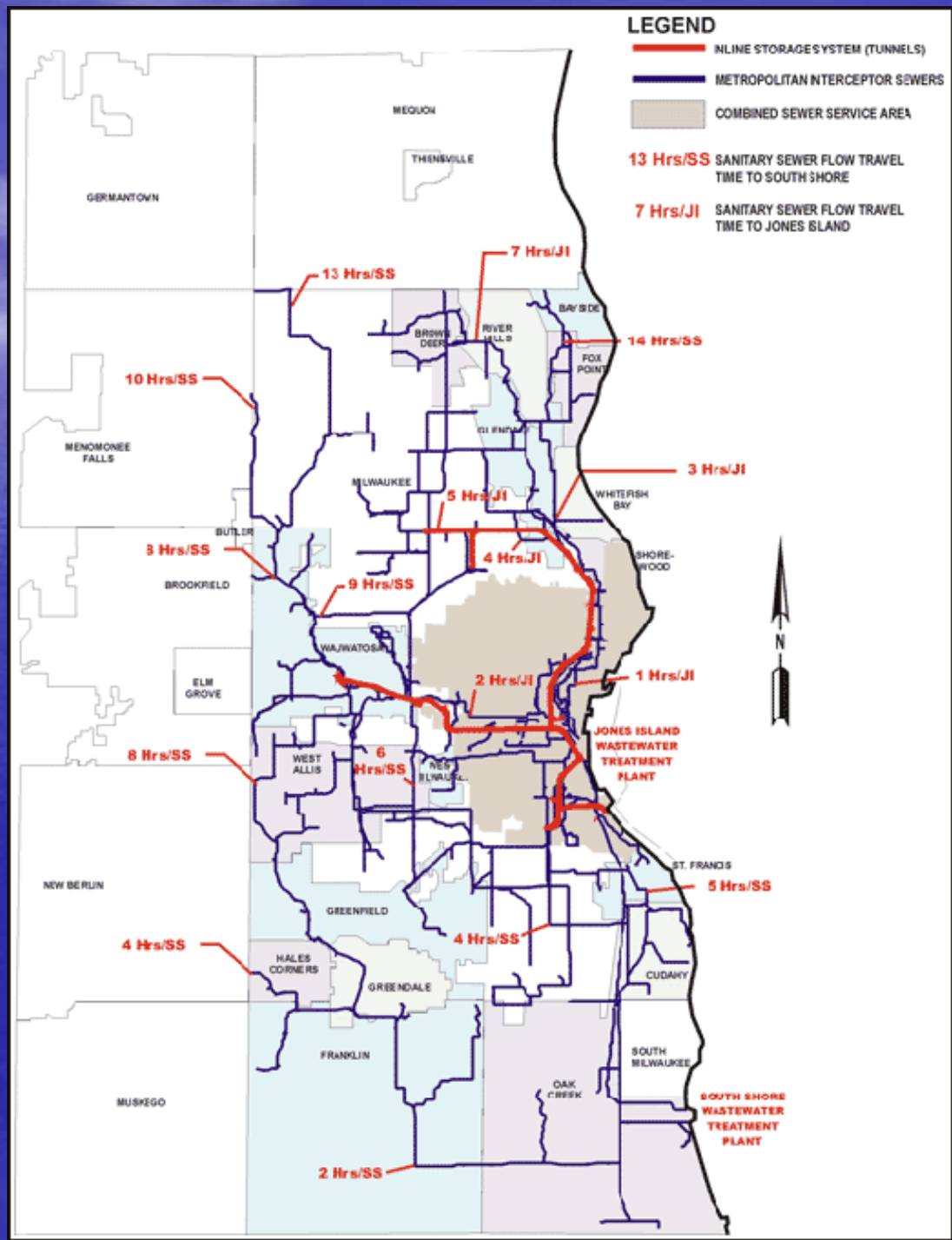


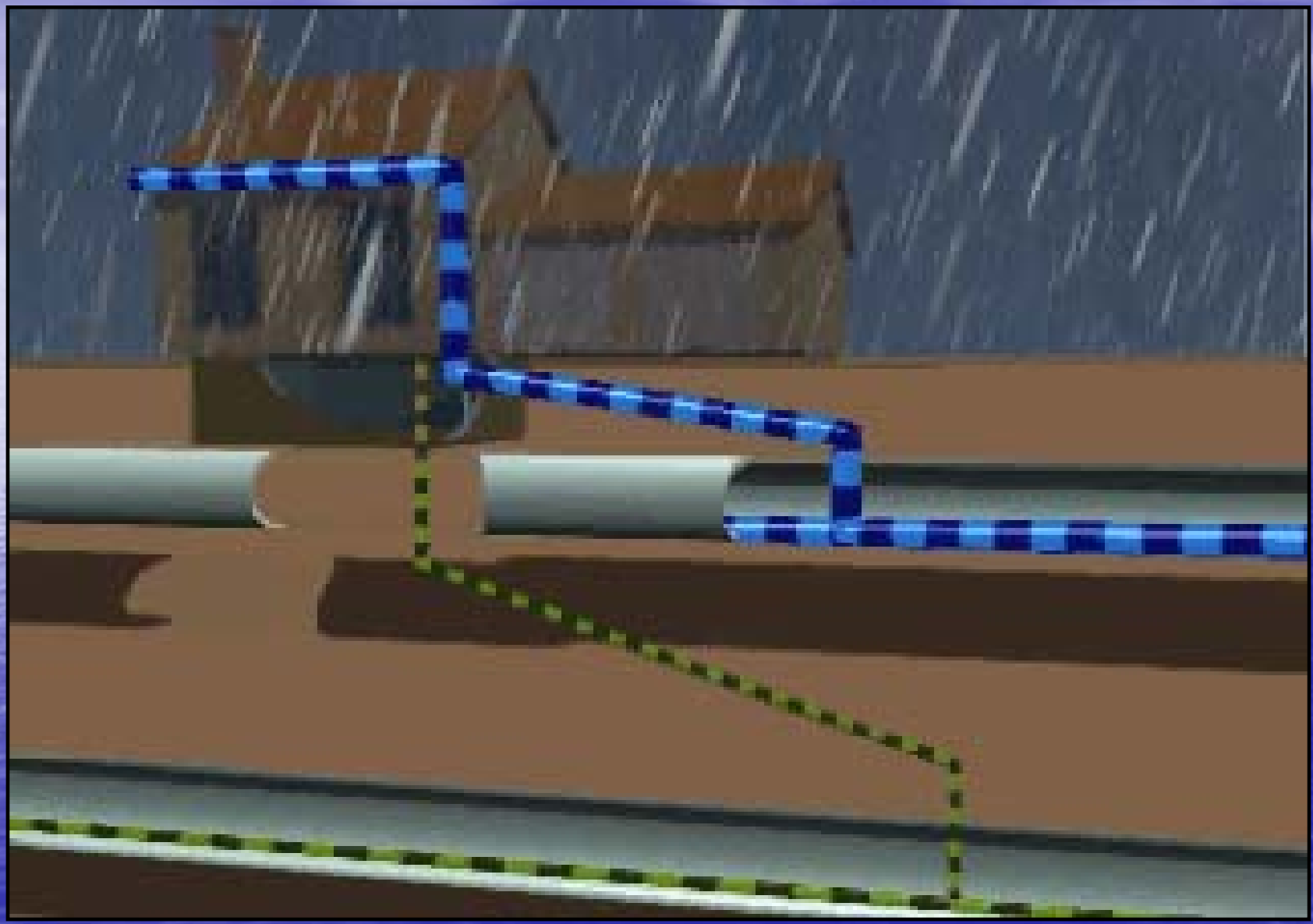
What is an In-Plant Diversion?



Travel Time

It takes a long time for flow to reach the Treatment Plants





Water Pollution Abatement Program (WPAP)

- Treatment Plant Upgrades
- Deep Tunnel
- Sewer Rehabilitation

WPAP Cost Summary

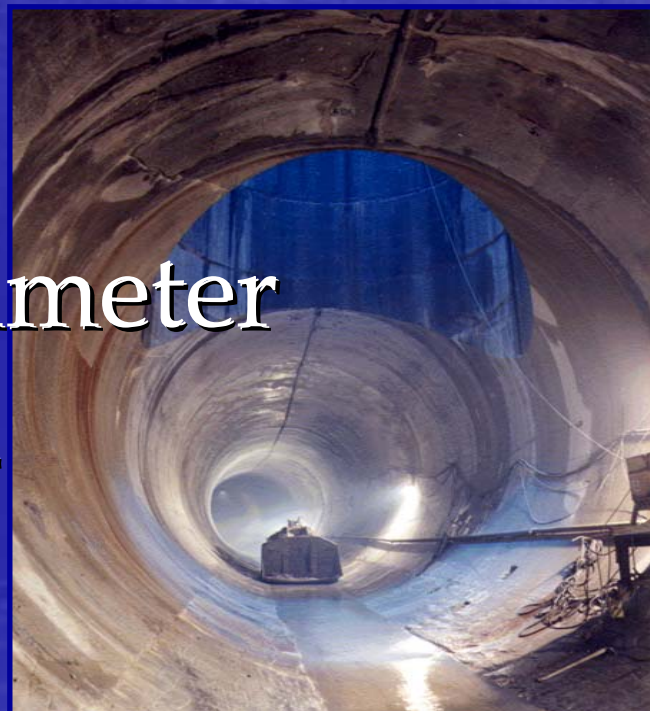
- Deep Tunnel: $1 billion
- Other Projects (Plants, Conveyance): $1.3 billion

- Total WPAP: $2.3 billion
- Grant Funding: $1.1 billion

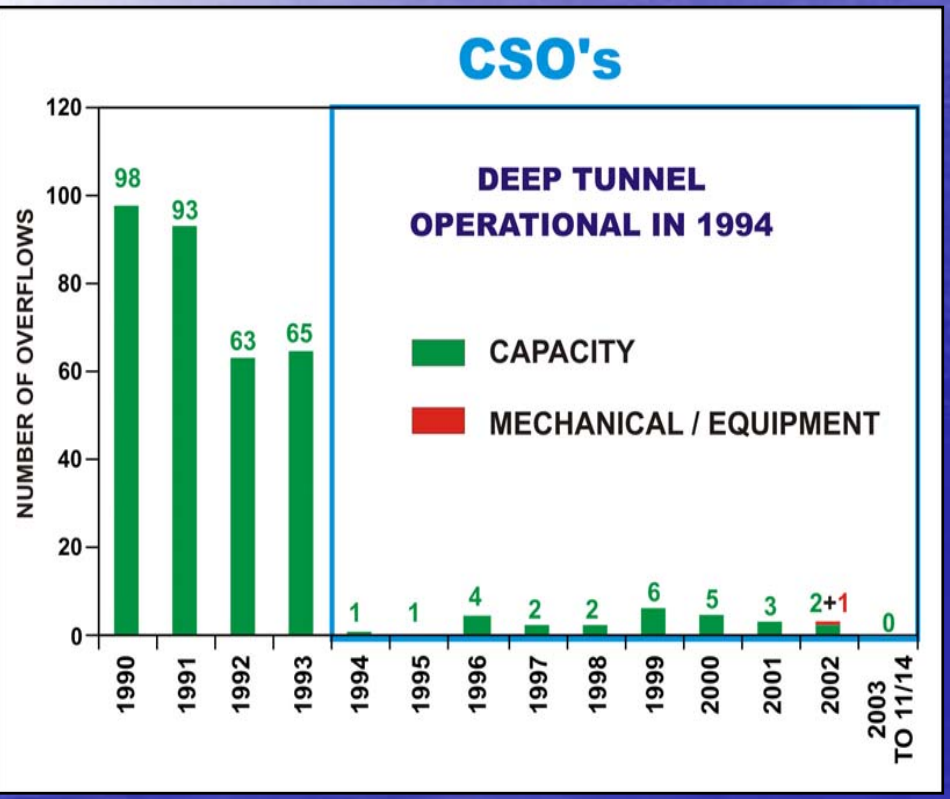
Deep Tunnel System

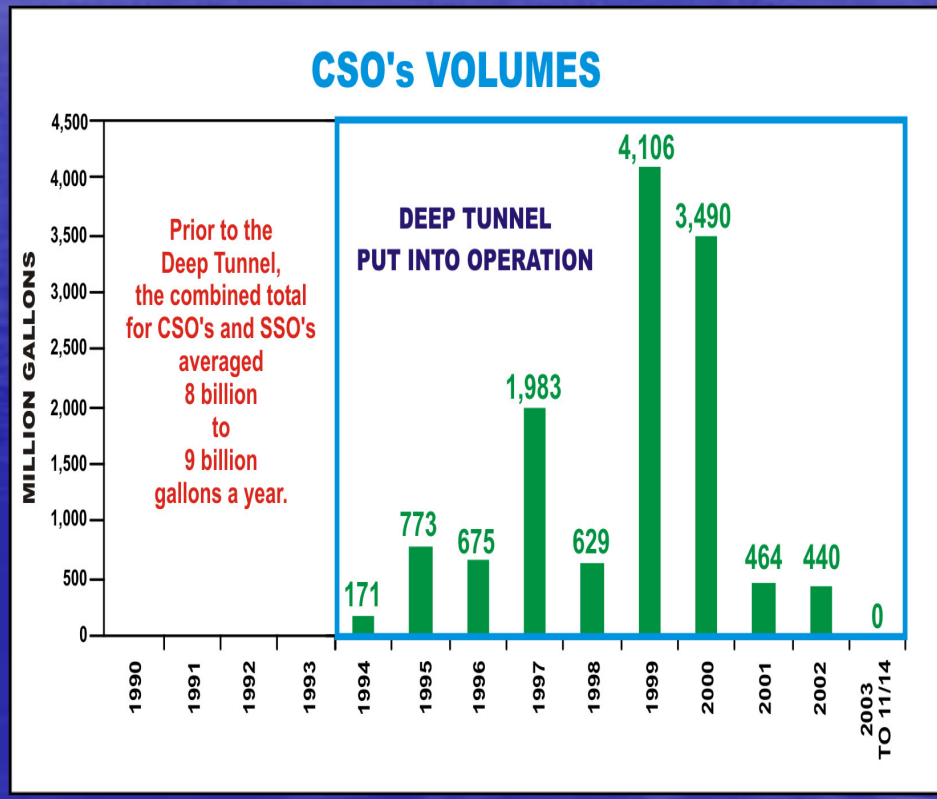
Deep Tunnel System

- 300 feet below ground
- 405 million gallons
- 19.4 miles long
- 17- to 32-foot diameter
- Designed for 1-2 overflows a year

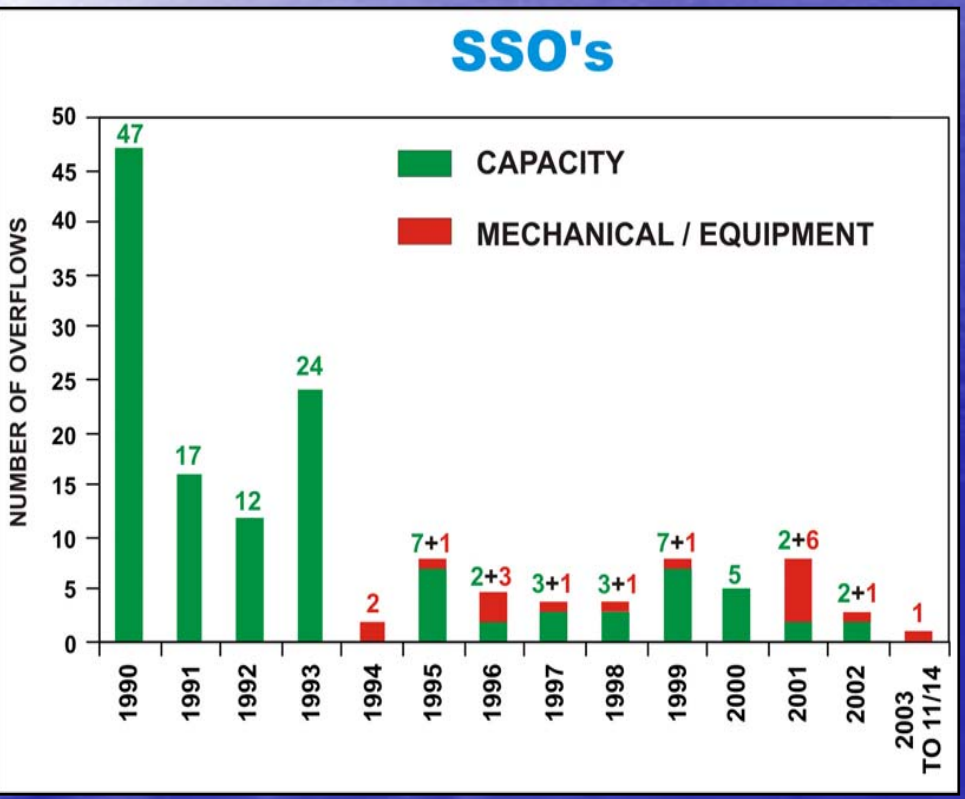


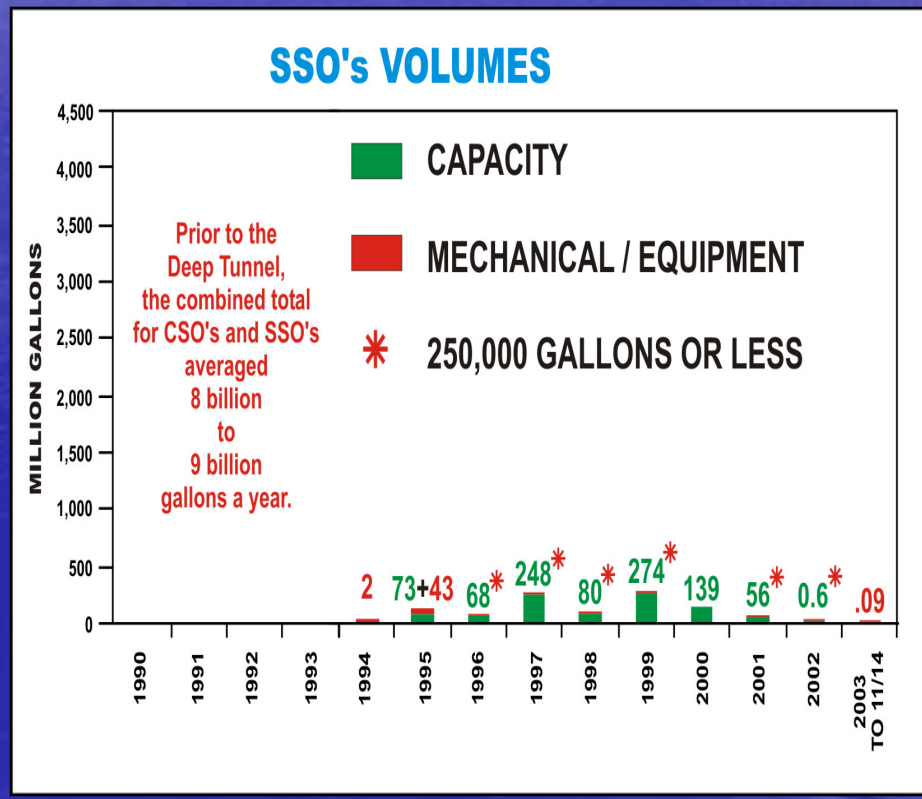
Combined Sewer Overflows (CSO)

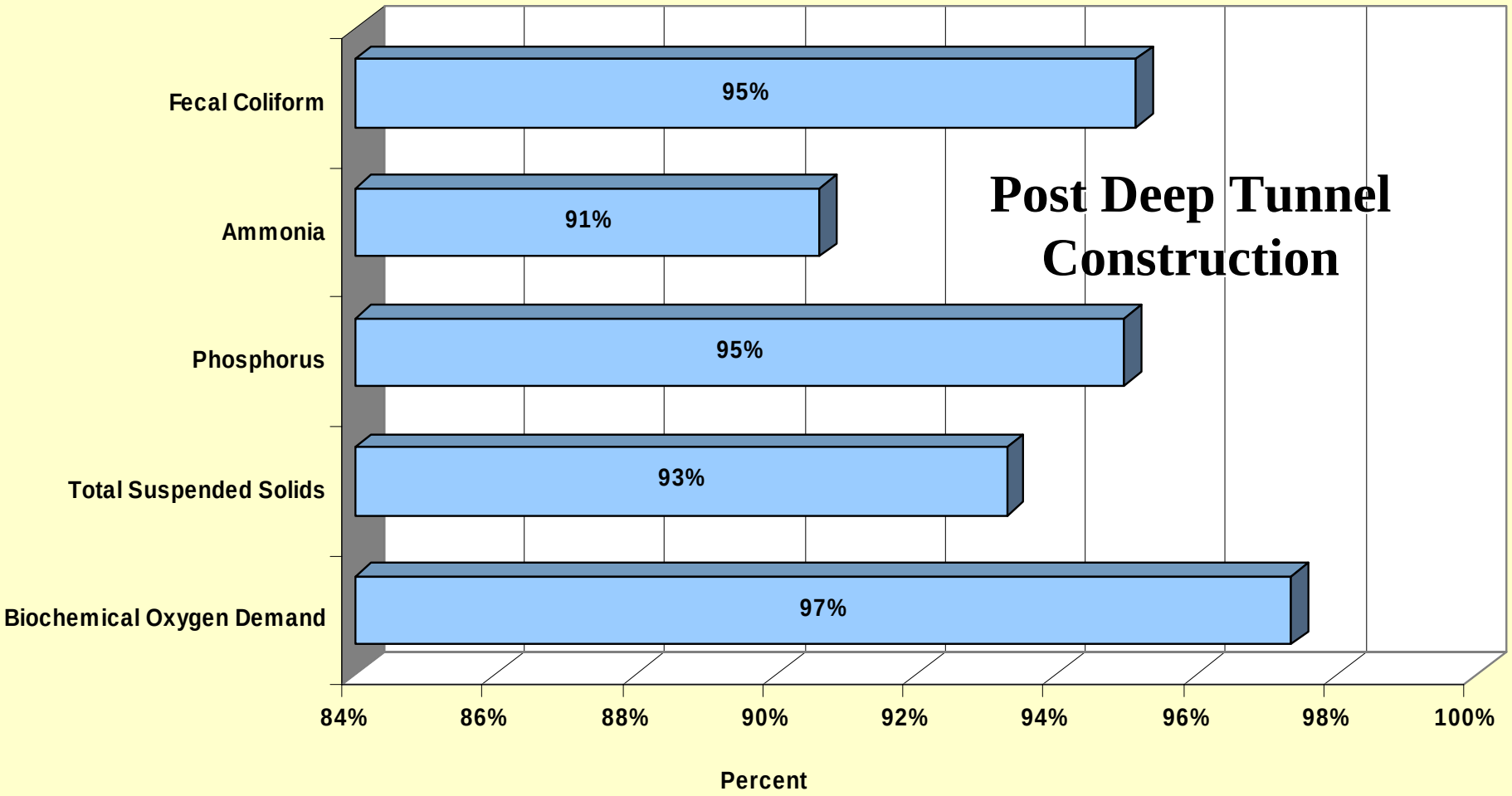




Sanitary Sewer Overflows (SSO)






Post Deep Tunnel Construction
Fecal Coliform
95%
Ammonia
91%
Phosphorus
95%
Total Suspended Solids
93%
Biochemical Oxygen Demand
97%
84%
86%
88%
90%
92%
94%
96%
98%
100%
Percent

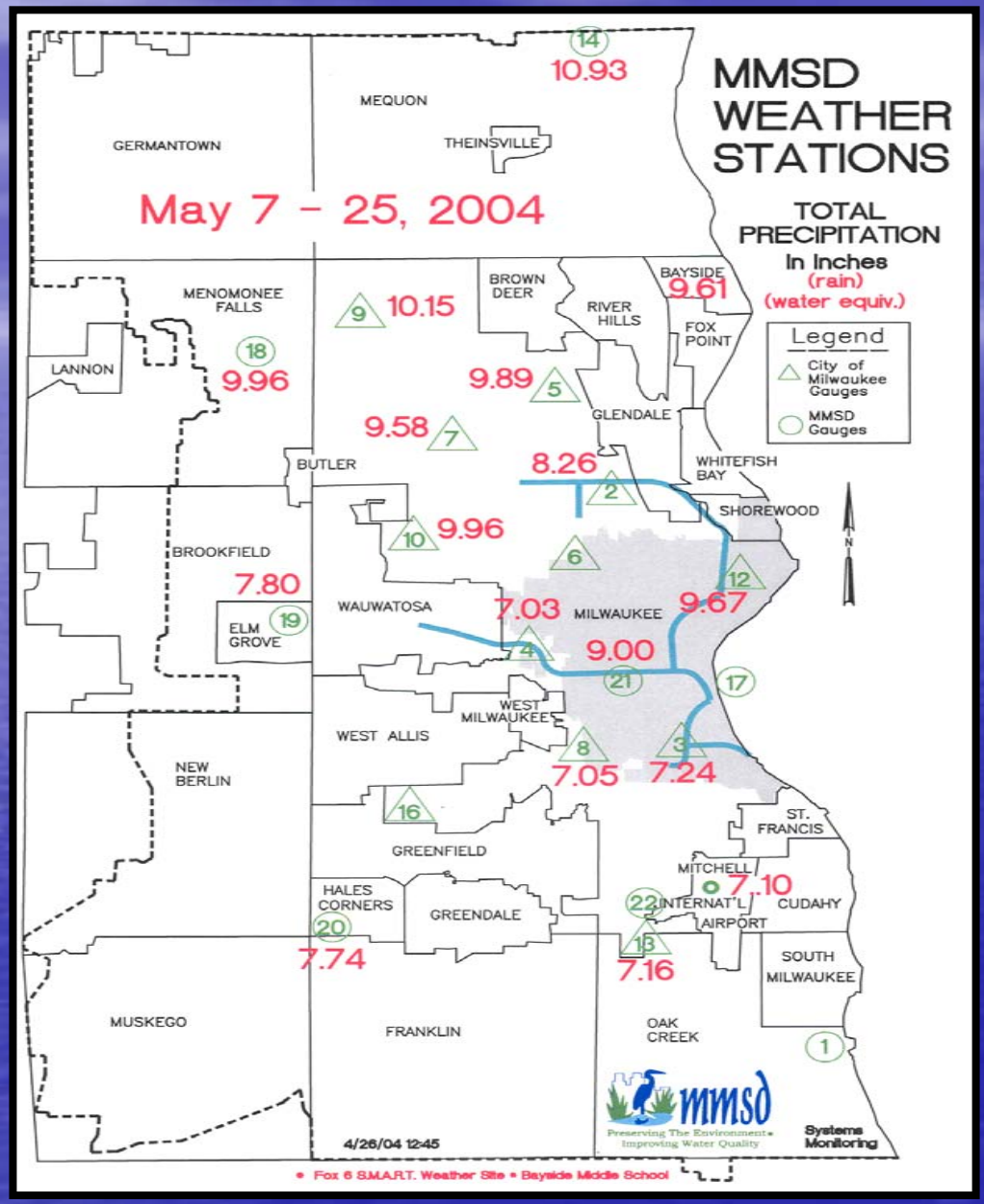
MMSD

Preserving The Environment •
Improving Water Quality

United Water

- United Water operates and maintains the treatment plants, sewer system and Milorganite production.

May 13, 2004 Wisconsin Ave.


MMSD WEATHER STATIONS
May 7 – 25, 2004
TOTAL PRECIPITATION
In Inches
(rain)
(water equiv.)
Legend
City of Milwaukee Gauges
MMSD Gauges
14
10.93
MEQUON
GERMANTOWN
THEINSVILLE
MENOMONEE FALLS
9
10.15
BROWN DEER
RIVER HILLS
BAYSIDE
9.61
FOX POINT
18
9.96
LANNON
9.89
5
GLENDALE
9.58
7
BUTLER
8.26
2
WHITEFISH BAY
SHOREWOOD
10
9.96
6
12
BROOKFIELD
7.80
WAUWATOSA
7.03
MILWAUKEE
9.67
19
ELM GROVE
4
9.00
21
17
WEST MILWAUKEE
WEST ALLIS
8
7.05
3
7.24
NEW BERLIN
16
ST. FRANCIS
GREENFIELD
MITCHELL
7.10
HALES CORNERS
GREENDALE
22
INTERNAT'L AIRPORT
CUDAHY
20
7.74
13
7.16
SOUTH MILWAUKEE
MUSKEGO
FRANKLIN
OAK CREEK
1
mmsd
Preserving The Environment • Improving Water Quality
Systems Monitoring
4/26/04 12:45
• Fox 6 S.M.A.R.T. Weather Site • Bayside Middle School

CONVEYANCE SYSTEM
May 7-10

PRECIPITATION

Hi: 2.77”

Lo: 1.02”

Ave: 1.82”

Cumulative Avg. = 1.82”

OVERFLOWS

May 10

Sanitary Sewer Overflows (SSOs)

(Non-Tunnel Related)

–Ravine Lane & Lake Drive

–Rangeline Road & Milwaukee River

–North 31st & West Cameron Avenue

Tunnel Volume Peaked @ 186 MG

CONVEYANCE SYSTEM
May 12-13

PRECIPITATION

Hi: 1.80”

Lo: 0.75”

Ave: 1.21”

Cumulative Avg. = 3.03”

OVERFLOWS

May 13

Combined Sewer Overflows (CSOs)

–CSO Event #1: Began at approximately 5:30 pm

–Tunnel reserve for separate sewage was 125 million gallons

Tunnel Volume Peaked @ 300 MG

CONVEYANCE SYSTEM
May 14

PRECIPITATION

Hi: 1.55”

Lo: 0.78”

Ave: 1.13”

Cumulative Avg. = 4.16”

OVERFLOWS

May 14-15

Combined Sewer Overflows (CSOs)

–CSO Event #1 continued until May 16 @ 1:00 a.m.

Sanitary Sewer Overflows (SSOs)

(Tunnel Related: Began 1:30 pm on May 14)

–South 6th & Oklahoma

–North 59th & Trenton

–4400 North Port Washington Road

–Green Tree & River Road

Tunnel Volume Peaked @ 392 MG

CONVEYANCE SYSTEM
May 14 (Continued)

PRECIPITATION

Hi: 1.55”

Lo: 0.78”

Ave: 1.13”

Cumulative Avg. = 4.16”

OVERFLOWS

May 14-15

Sanitary Sewer Overflows (SSOs)

(Non-Tunnel Related)

–Ravine Lane & Lake Drive

–Rangeline Road & Milw. River

–North 31st & Cameron

–KK & St. Francis Ave.

–North 27th & Silver Spring Ave.

–North 27th & Villard Ave.

–Basement backups reported in Milwaukee & Glendale

CONVEYANCE SYSTEM
May 17-18

PRECIPITATION	OVERFLOWS
Hi: 1.06” **Lo: 0.43”** **Ave: 0.61”** **Cumulative Avg. = 4.77”**	**May 17-18** **Combined Sewer Overflow (CSOs)** –CSO Event #2: Began at 11:00 pm on May 17th –Concluded: 6:00 am on May 18th **Tunnel Volume Peaked @ 307 MG**

CONVEYANCE SYSTEM
May 20-21

PRECIPITATION

Hi: 2.20”

Lo: 0.30”

Ave: 1.04”

Cumulative Avg. = 5.81”

OVERFLOWS

May 20-21

Combined Sewer Overflow (CSOs)

–CSO Event #3: Began at 8:15 PM on May 21

Sanitary Sewer Overflows (SSOs) (Non-Tunnel Related)

–Ravine Lane & Lake Drive (May 21)

–Rangeline Road & Milw. River (May 20&21)

Tunnel Volume Peaked @ 306 MG

CONVEYANCE SYSTEM
May 22-23

PRECIPITATION

Hi: 2.52”

Lo: 0.98”

Ave: 2.08”

Cumulative Avg. 7.89”

OVERFLOWS

May 22-23

Combined Sewer Overflow (CSOs)

–CSO event #3 continued

Sanitary Sewer Overflows (SSOs)

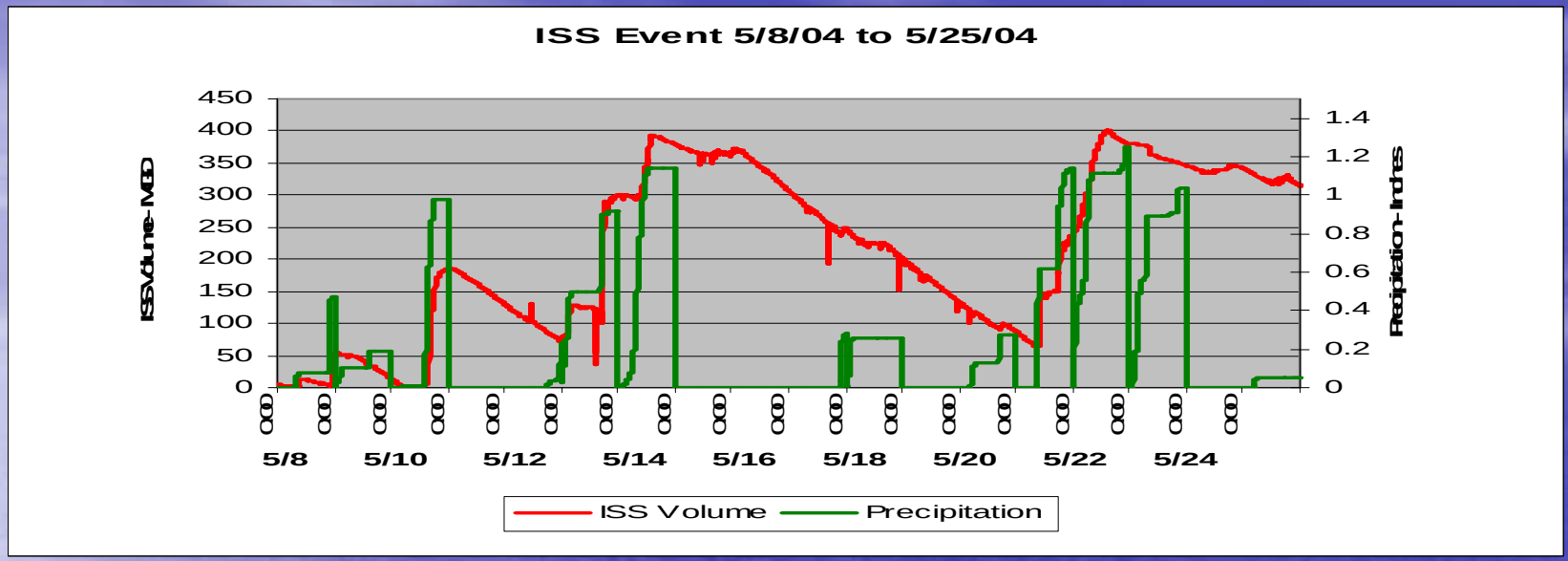
Old computer system failed at 4:30 AM on May 22, new SCADA system brought on line to operate tunnel system.

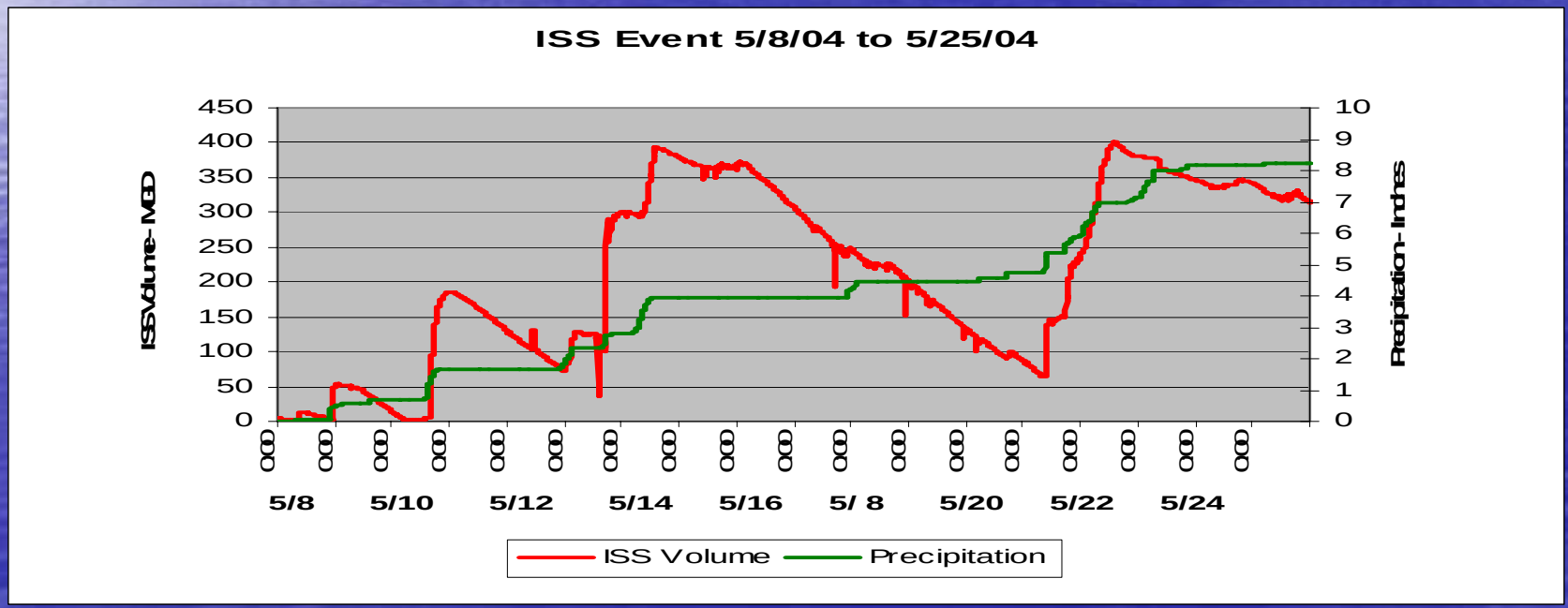
Tunnel SSO gates were closed at 12:30 PM on May 22

Tunnel Volume peaked at 401 MG

CONVEYANCE SYSTEM
May 24-25

PRECIPITATION	OVERFLOWS
Hi: 0.08”	**Combined Sewer Overflow (CSOs)**
Lo: 0.00”	–CSO event #3 ended at 6 PM on 5/25
Ave: 0.06”	**Sanitary Sewer Overflows (SSOs)**
Cumulative Avg. 7.94”	–SSO gates were opened by 4 PM on May 24th and tunnel related SSO’s ceased.
	Tunnel Volume peaked at 345 MG


ISS Event 5/8/04 to 5/25/04
ISS Volume-MGD
Precipitation-Index
450
400
350
300
250
200
150
100
50
0
1.4
1.2
1
0.8
0.6
0.4
0.2
0
5/8
5/10
5/12
5/14
5/16
5/18
5/20
5/22
5/24
ISS Volume
Precipitation


ISS Event 5/8/04 to 5/25/04
ISS Volume-MGD
Precipitation-Index
450
400
350
300
250
200
150
100
50
0
10
9
8
7
6
5
4
3
2
1
0
5/8
5/10
5/12
5/14
5/16
5/ 8
5/20
5/22
5/24
ISS Volume
Precipitation

OVERFLOW SUMMARY

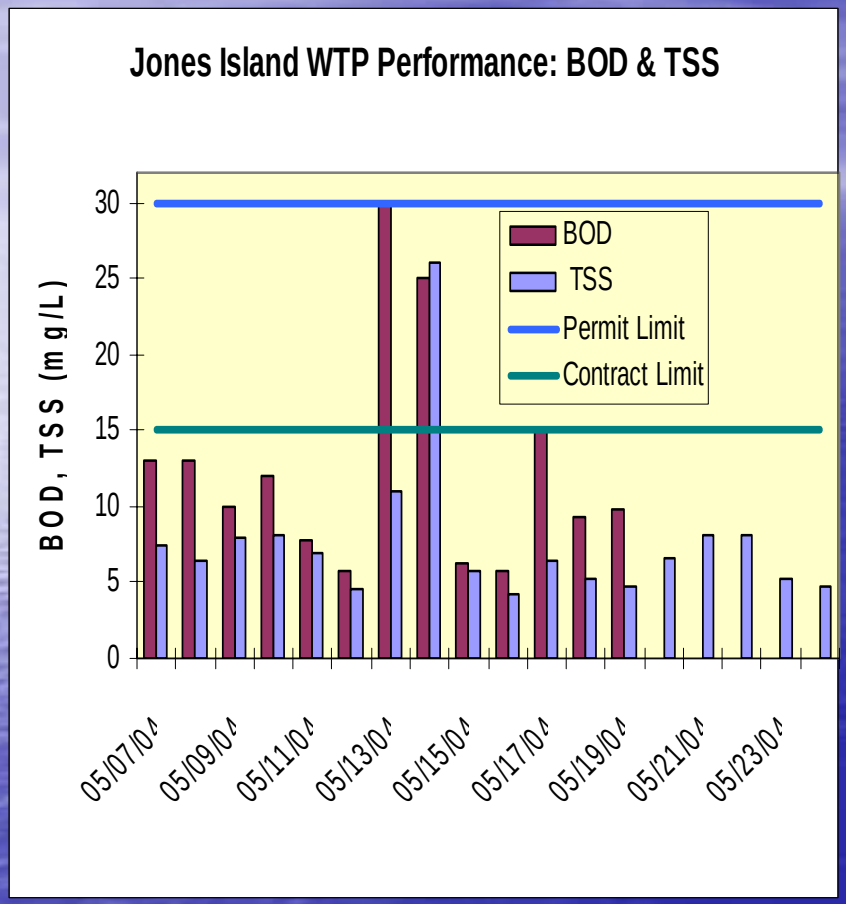
Date(s)	Combined Sewer Overflows *	Sanitary Sewer Overflows *	
		(Tunnel Related)	(Non-Tunnel Related)
5/10	0	0	0.5
5/13-16	1395	90.6	10.6
5/17-18	65	0	0
5/20 - 24	2681	323.9	48.4
Totals	**4141**	**414.5**	**59.5**

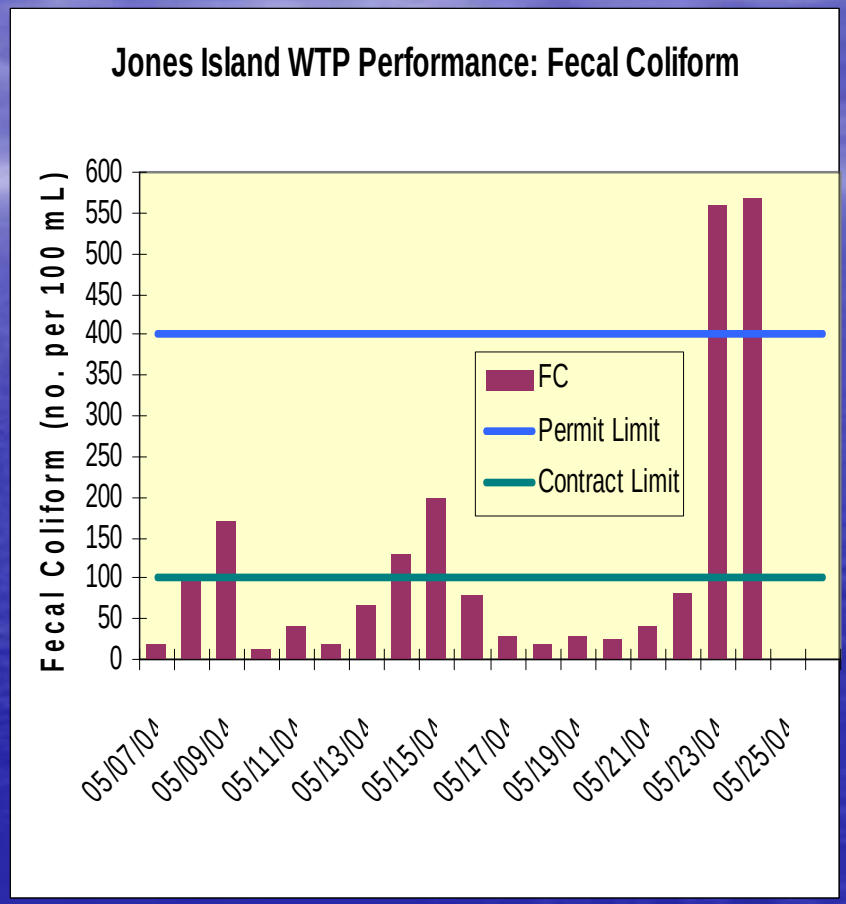
* All amounts in million of gallons

IN-PLANT DIVERSION

- Primary Effluent Diversion on May 14th
- 16.2 Million Gallons
- Effluent Quality
  - TSS = 26 mg/L
  - BOD = 25 mg/L
  - Fecal Coliform = 130 /100 mL
- Peak Jones Island Flow > 315 MGD

PLANT OPERATIONS





PLANT OPERATIONS