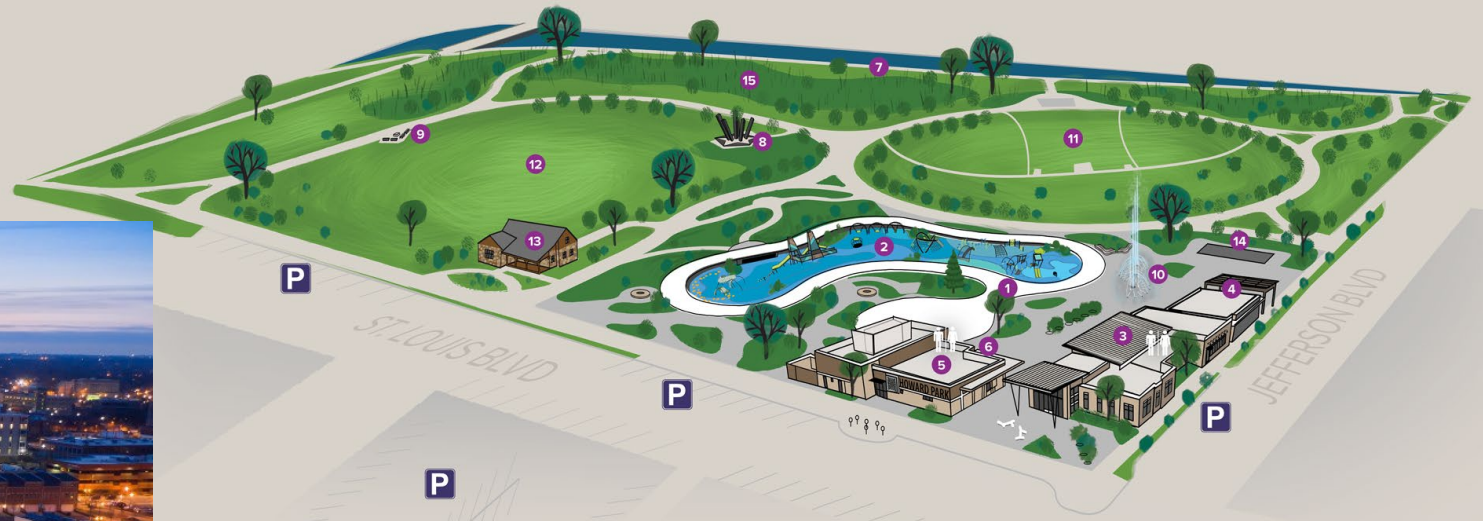
Panel: Climate Change Planning & Impacts on Water Infrastructure

Kieran Fahey: Using Smart Technology to Plan Future Infrastructure Needs

CITY OF SOUTH BEND
PUBLIC WORKS

HOWARD PARK



1. ICE TRAIL & POND
2. PLAYGROUND
3. COMMUNITY BUILDING
4. HOWARD PARK PUBLIC HOUSE
5. SUPPORT BUILDING
6. CHOCOLATE CAFÉ EXPRESS
7. RIVERWALK TRAIL
8. VIETNAM VETERANS' MEMORIAL
9. WORKERS' MEMORIAL
10. THE RASK FAMILY FOUNTAINS
11. INOVATEUS SOLAR EVENT LAWN
12. FESTIVAL LAWN
13. HISTORIC LODGE
14. BOCCE COURT
15. NATURALIZED BIOSWALES

CITY OF SOUTH BEND
PUBLIC WORKS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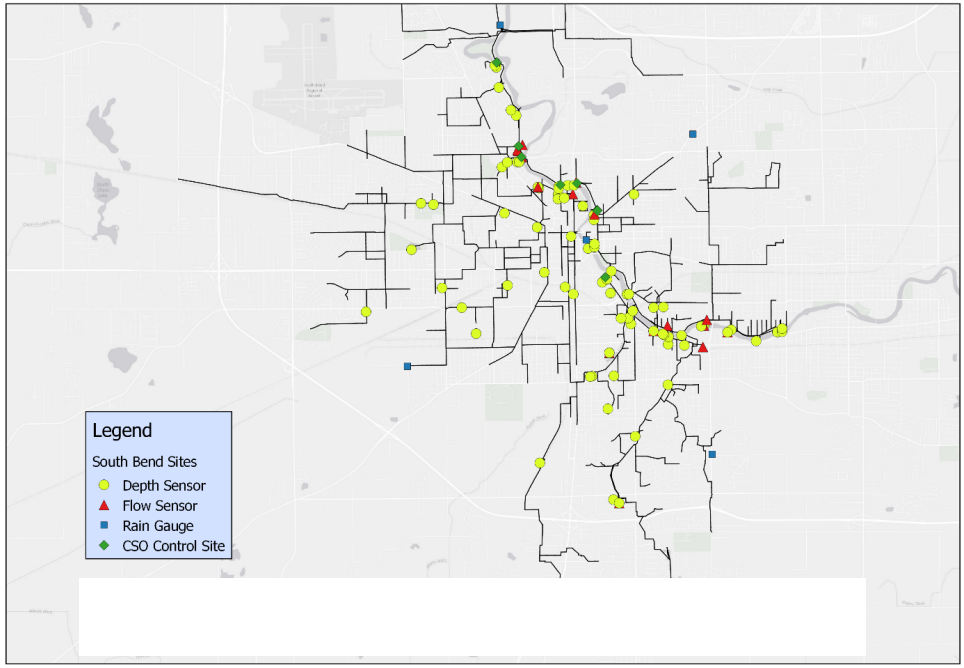
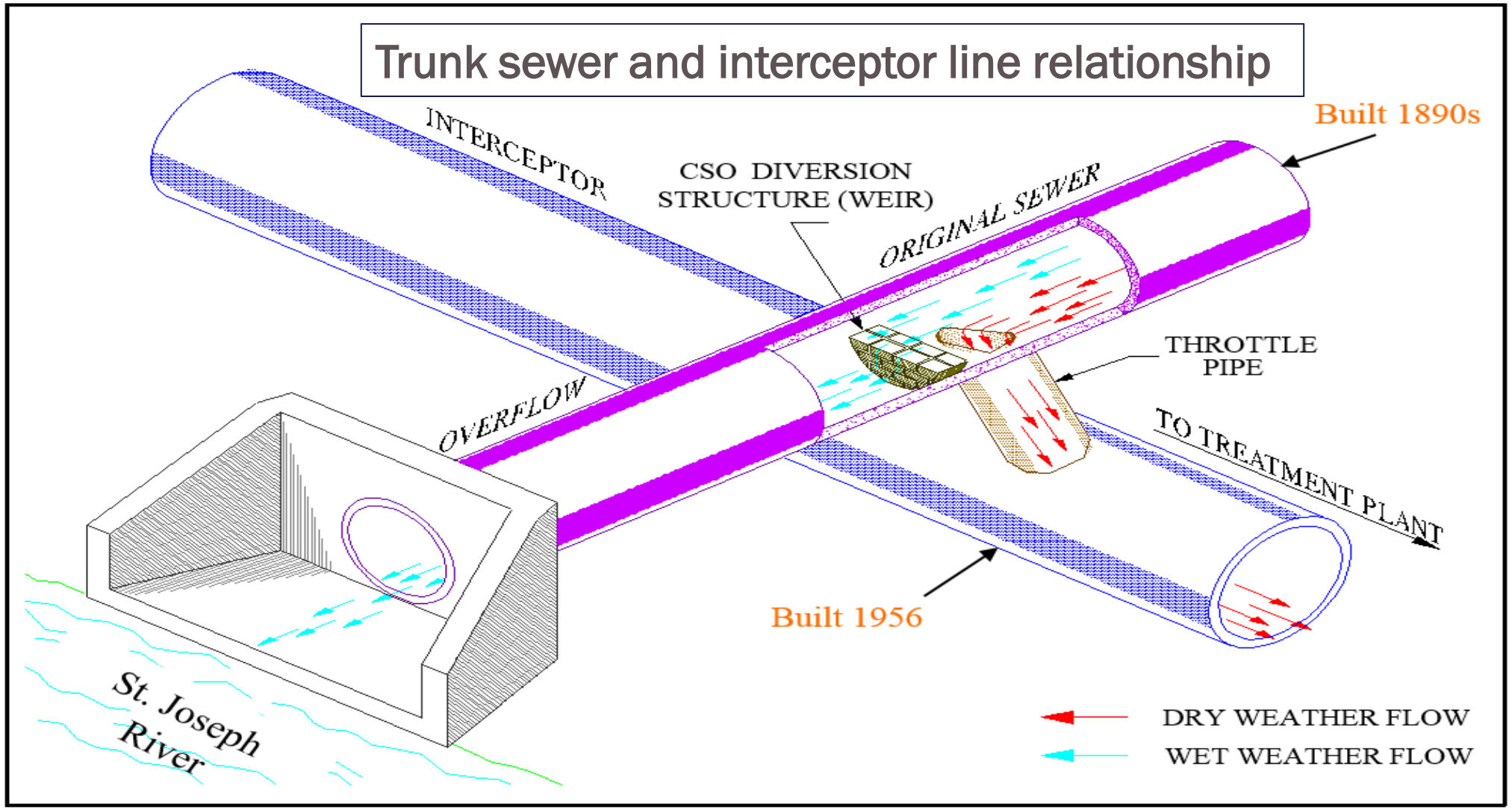

Legend
South Bend Sites
Depth Sensor
Flow Sensor
Rain Gauge
CSO Control Site

Trunk sewer and interceptor line relationship



South Bend

Real time control – RTC - via flow sensors

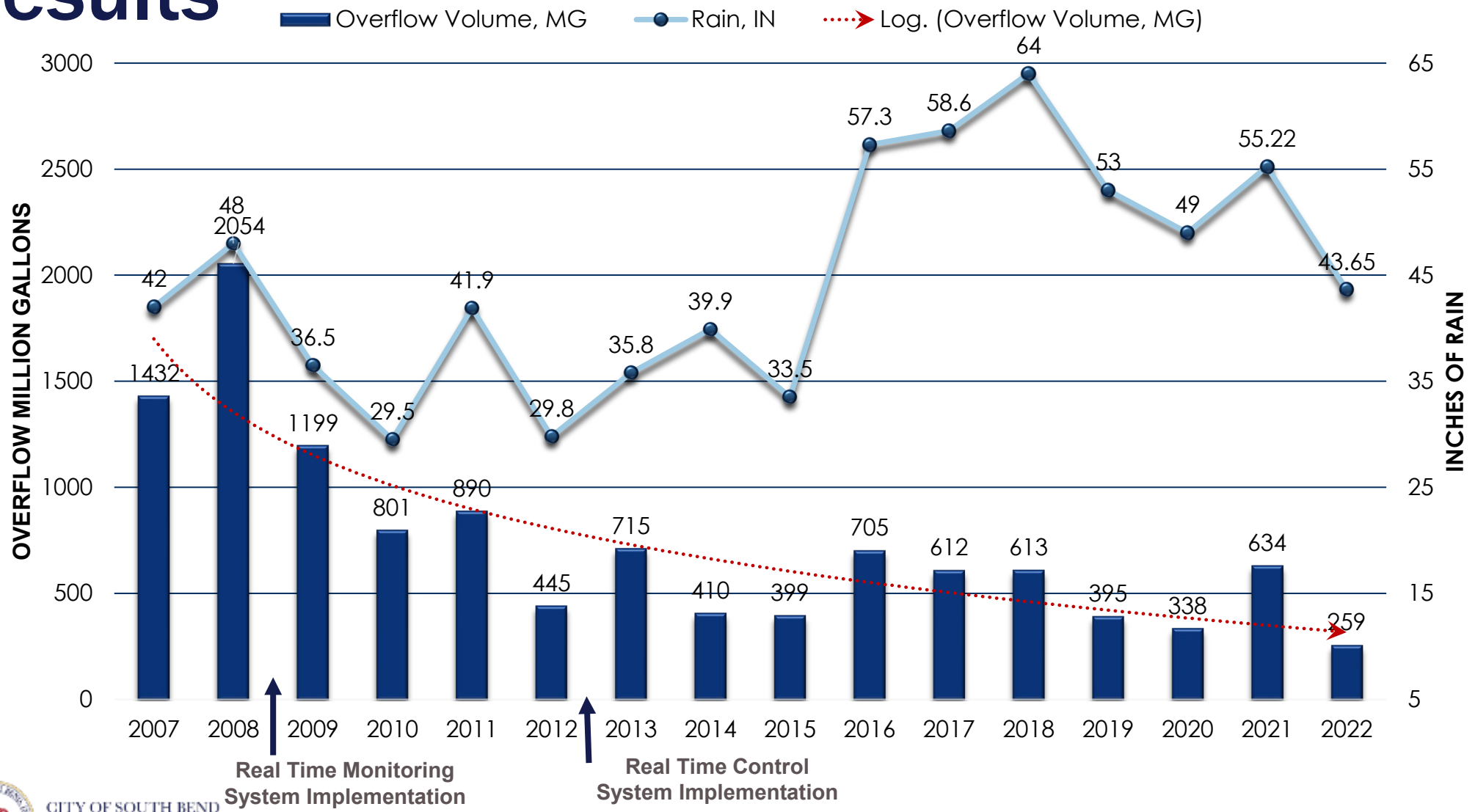
Smart valves on the throttle lines that connect the trunk sewer to the interceptor allocate interceptor capacity to the trunk lines that need it most.

Give interceptor capacity to the trunk lines that are about to (otherwise) overflow.

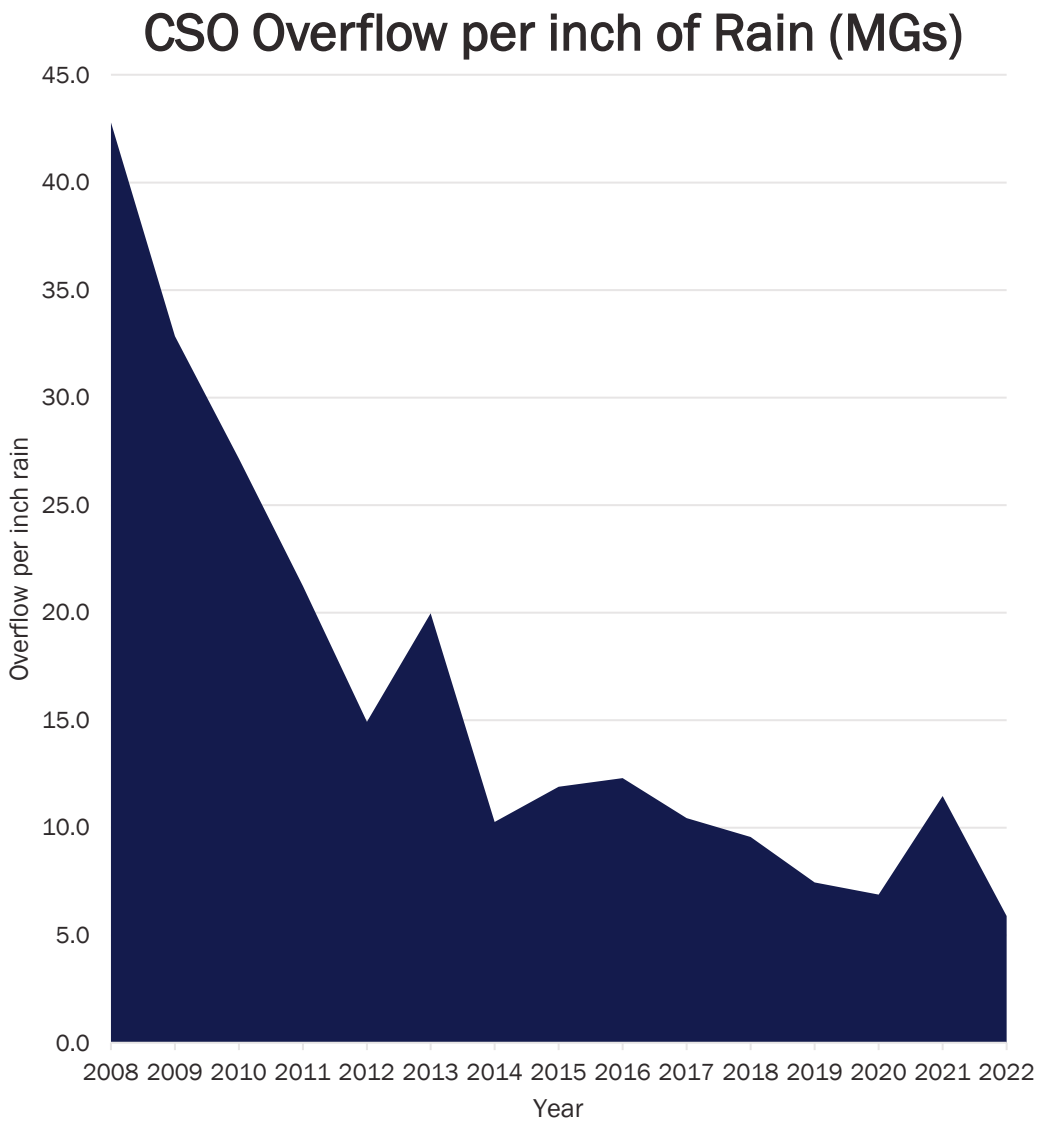
Trunk lines not near overflow (due to differences in rainfall across the City) get less capacity.

Sensor network makes allocation decisions.

Results


Overflow Volume, MG
Rain, IN
Log. (Overflow Volume, MG)
OVERFLOW MILLION GALLONS
INCHES OF RAIN
3000
2500
2000
1500
1000
500
0
65
55
45
35
25
15
5
1432
2054
1199
801
890
445
715
410
399
705
612
613
395
338
634
259
42
48
36.5
29.5
41.9
29.8
35.8
39.9
33.5
57.3
58.6
64
53
49
55.22
43.65
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Real Time Monitoring System Implementation
Real Time Control System Implementation

Year	Rain (Inches)	CSO (MGs)	CSO Overflow per inch of rain (MGs)
2008	48	2054	42.8
2009	37	1199	32.8
2010	30	801	27.2
2011	42	890	21.2
2012	30	445	14.9
2013	36	715	20.0
2014	40	410	10.3
2015	34	399	11.9
2016	57	705	12.3
2017	59	612	10.4
2018	64	613	9.6
2019	53	395	7.5
2020	49	338	6.9
2022	43	259	5.94



New Infrastructure via smart water tech:

- $437m less expensive;
- Better wet weather capture (99.96%);
- 12% less E. Coli in River;
- Fewer overflow events;
- Less community disruption (3 vs 7 storage tanks)
- Eliminate river crossing;
- No construction in nicest parks;
- Developed with community input

Smarter infrastructure planning

1. Data-driven maintenance created increased capacity;
2. New hyper-accurate model shows deficiencies in old LTCP model;
3. Real Time Control exceeded expectations in reducing overflows;
4. Original LTCP builds infrastructure but does not address the problem.
5. Updated program:
    1. Cost less
    2. Achieved superior results
    3. Additional time

THANK YOU

Steelhead

Longnose Gar