Jacobs

Challenging today. Reinventing tomorrow.

Affordability: A Driver for Consent Order Driven CSO Abatement

Zachary Monge, PE Program Manager Onondaga County Save the Rain Zachary.monge@jacobs.com



Onondaga County Executive J. Ryan McMahon, II



Onondaga County Save the Rain – Regulatory Primer

- 1988 Atlantic States Legal Foundation (ASLF) files lawsuit against County for CSO violations of the CWA
 - -Consent Judgement Signed in 1989
- 1998 Amended Consent Judgment (ACJ) with US EPA
 - -Framework to upgrade Metro (N & P) and address CSOs
 - -Focused on conventional gray infrastructure
- 2009 4th Amendment to the ACJ
 - -Required 95% CSO capture by volume <u>and</u> meeting of water quality standards in CSO tributaries and Onondaga Lake
 - –<u>First</u> Consent Order to authorize the use of GI for CSO abatement



A Balanced Green and Gray Approach to Meet the ACJ

Gray Infrastructure

- -Completed 2 Regional Treatment Facilities
- -3 major storage facilities
- -CSO conveyances improvements
- -Constructed 4 Floatables Control Facilities
- -Several sewer separations
- -Regulator modifications
- -469 MG CSO capture/elimination; \$670M



Clinton Storage Facility



Lower Harbor Brook Storage Facility ^{©Jacobs 202}

A Balanced Green and Gray Approach to Meet the ACJ

Green Infrastructure

- -240+ green projects throughout CSS \rightarrow 190+ MG runoff reduced
- -206 MG CSO capture; \$90M















We've Achieved More for Less Than Budgeted Cost

- Incorporating GI into CSO program lowered overall cost allowing us to achieve more
- <u>\$425M</u> authorized for CSO program in 2008 to meet <u>95%</u> CSO reduction requirement
- Through 2020, <u>\$400M</u> spent
- 98.1% CSO Capture/Elimination achieved through end of 2020
- Under Budget!



Lake Water Quality Improvement – Generally In Compliance with WQS





Photo Credit: Nicholas Lisi / The Post-Standard





Tributary Fecal Coliform Reductions – Still an Issue...Watershed Wide?

- Wet weather standard for bacteria = 200 CFU/100 mL
- Onondaga Creek
 - 1985 1989: 3,500
 - 2015 2018: 700
- Harbor Brook
 - 1985 1989: 2,700
 - 2015 2018: 950



Typically <u>4-6 days</u> for tributaries to return to pre-storm levels

Overall Spending to Comply with the ACJ – Diminishing Returns

- Over \$700M+ spent through 2020 to comply with the ACJ
 - CSO abatement, WWTP upgrades, monitoring, engineering, etc.
- Substantial progress in improving water quality with preliminary spending
- Recent spending leading to limited additional benefit
- So What's Next? How do we proceed?



Financial Capability Assessment (FCA)

- <u>\$3B</u> worth of investment required in water sector over next 30 years
 - Drinking water, I/I reduction, AMRR, CMOM, MS4
- Current sewer/water rates are <u>very</u> low, not sustainable to meet investment needs
- Even with current low rates, average resident faces a "medium" burden and lowincome residents face a "high" burden to fund water infrastructure
 - Assessment focused on impacts to lower income residents (LQI Lowest Quintile Income)

Description	MHI	LQI
2017 US Census ACS	\$57,893	\$25,647
Adjusted value (2019 dollars)	\$60,129	\$26,638
Estimated Annual Cost per Household	\$1,263	\$1,263
 Residential Indicator (CPH as % of)	2.1	4.7
Designation	Mid-Range	High

© Jacobs 2021

Lower Income Areas in Red

County-Wide – 16% Below Poverty Level



City-Wide – 32% Below Poverty Level



10

Onondaga County Wastewater System – Combined Sewer Areas in Yellow



Current Water and Sewer Rates are Unsustainable



FCA Conclusions

- Considering:
 - 98.1% CSO capture/elimination achievement,
 - > \$700M investment thus far,
 - WQ improvement progress is slowing or stagnating,
- Limiting future investment in CSO program to ease burden on rate payers and freeing up funds for other areas of water sector is advisable
 - The community can only afford so much and with other needs ("musts") available funding should be focused elsewhere
- Projecting \$160M in future investment in CSO program (inclusive of projects, maintenance, lifecycle costs, monitoring program, etc.)
- Focus CSO projects in highest priority CSO basins
- Greatest Bang for Our Buck" How?

By Integrating GI Into the CSO Program, We Have Been Able to Accomplish More



By Doing GI, We Have Been Able to Accomplish More - Examples

- Clinton Storage Facility (CSF) 6.5 MG of CSO storage
 - 75 GI projects within CSF drainage basin 30 MG of CSO reduction
- Lower Harbor Brook Storage Facility (LHBSF) 4.9 MG CSO storage – 22 GI projects within LHBSF drainage basin – 8 MG CSO reduction
- Without the GI, larger CSFs would have been needed → greater capital investment → less \$ for other areas

GI Is More Cost Effective than Gray

Project Type	Average County Construction Cost/Gallon of Runoff Captured or Eliminated	
Offset/Voluntary Projects with no County Contribution	\$0.00	
City Road Reconstruction GI	\$0.21	
GIF – Ground Based	\$0.23	
Gray Infrastructure – CSO Regulator Optimization	\$0.38	
Green Parks	\$0.42	
Green Vacant Lots	\$0.47	
Green Streets (Excluding Road Reconstruction Projects)	\$0.58	
GIF – Green Roofs	\$0.90	
Gray Infrastructure – Sewer Separation	\$5.13	
Gray Infrastructure – Storage	\$12.28	

Case Study – CSO 075

- Prior to CSO abatement discharged on avg. 17 times per year with 3 MG CSO (typical year)
- Primarily a residential collection area
- Utilized SWMM and project cost metrics to assess CSO abatement opportunities
- Post-abatement SWMM projects 0 discharges (metering to confirm)



Case Study – CSO 075: Green Project

- Washington Square Park
 - Porous Pavement Basketball Court
 - \$320,000 construction cost, 1.25MG runoff reduction (\$0.22/gal runoff removed)





Case Study – CSO 075: Gray Project

 CSO Regulator Modification EX MH-3 (EXISTING) RIM EL = 373.7' (EX) INVT E = 362.8' - \$350,000 (EX) INVT W = 363.5' (EX) INVT S = 364.8' (PLUG AFTER BYPASS IS COMPLETE) INVT SE = 363.5' construction 19 LF OF 18" SOLID PVC PIPE OVERFLOW CONNECTION TO CITY STORM AT 0.5% cost INSTALL BACKFLOW PREVENTER IN NEW CSO OVERFLOW PIPE - 1.8MG CSO MH-1 (NEW) INSTALL 6' DOGHOUSE MANHOLE OVER EXISTING SEWER WITH ADJUSTABLE HEIGHT WEIR (UP TO EL. 370.5') RIM EL = 373.5 reduction (EX) INVT E = 363.7 W = 363.7' (REMOVE DURING BYPASS) 363.6 ······ ARD New Regulator (\$0.22/gal 363.6' EIR EL = 367.5' and Overflow **CSO** removed) 0 P Existing : TOP AND FILL EXISTING MANHOLE OWABLE FILL AFTER BYPASS IS COMPLETE, ABANDON MANHOLE IN PLACE Flowpath **New Underflow** FILL UNUSED EXISTING SEWER WITH FLOWABLE FILL AND ABANDON IN to WWTP PLACE AFTER BYPASS IS COMPLETE CAP EXISTING SEWERS AT LIMIT NECESSARY FOR INSTALLATION OF HH BENCHMA NEW SEWER 27 LF OF 33" SOLID FLEV: 377 **PVC AT 0.6%** MH-2 (NEW) INSTALL 6' DOGHOUSE MANHOLE C-1 OVER EXISTING SEWER FULLL DEPTH PAVEMENT RESTORATION RIM EL = 373.3' USING BINDER ONLY PER COUNTY (EX) INVT N = 363.5' (REMOVE DURING BYPASS) STANDARD DETAIL PS.05 INVT E = 363.5' (EX) INVT S = 363.5

Case Study – CSO 075: Gray Project





Case Study – CSO 075: Gray Project



Zachary Monge, PE Zachary.monge@jacobs.com



Onondaga County Executive J. Ryan McMahon, II



Jacobs Challenging today. Reinventing today.

Reinventing tomorrow.

