



**Ad Hoc Combined Sewer System Plan Stakeholder Group
(CSS Stakeholder Group)**

1101 Sister Cities, 301 King Street City Hall
Alexandria, VA 22314

Thursday, February 4, 2016

7:00 PM – 9:00 PM

Agenda

- | | |
|--|-------------|
| 1) Welcome and Call to Order | 7:00 – 7:05 |
| a) Acceptance of Meeting #3 Summary | |
| 2) Infrastructure Sizing Recap and Recommendation | |
| a) Technical Presentation | 7:05 – 7:15 |
| b) Stakeholder Group Discussion | 7:15 – 7:25 |
| c) Public Comment | 7:25 – 7:30 |
| 3) Tunnel Alignments and Tank Sites | |
| a) Technical Presentation | 7:30 – 8:10 |
| b) Stakeholder Group Discussion | 8:10 – 8:30 |
| c) Public Comment | 8:30 – 8:35 |
| 4) Green Infrastructure Strategy Recommendation | |
| a) Technical Presentation | 8:35 – 8:45 |
| b) Stakeholder Group Discussion | 8:45 – 8:55 |
| c) Public Comment | 8:55 – 9:00 |
| 5) Wrap up and Adjournment | 9:00 |
| a) Next Meeting March 3, 2016 7 pm – 9 pm Sister Cities Conference Room 1101 | |



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Agenda

Discussion Questions

1. City staff is recommending a 10-foot diameter tunnel and a 3.0 million gallon storage tank for the infrastructure sizing. Did we capture the discussion on sizing accurately? Do you agree with this recommendation? Do you have any additional input or concerns?
2. The City staff, and their consultant, have identified several alignment and tank options to control overflows from CSO-003/004 and CSO-002. We have presented the advantages, disadvantages, and range of costs for each option. Given Engineer's Recommendation of storage tanks over tunnels for CSO-002, what are your concerns? What are your thoughts about the locations? What should be considered to minimize construction impacts?
3. Over the last several meetings information on the potential green infrastructure strategy has been presented. Based on feedback from the group this strategy includes:
 - a. A commitment in the LTCPU
 - b. Green infrastructure will be implemented city-wide
 - c. \$1-2 million commitment for first permit cycle (2018-2023)Do you agree with the recommended green infrastructure strategy? What changes, if any, would you propose?

City of Alexandria, Virginia

Long Term Control Plan Update

CSS Stakeholder Group
Meeting #4
February 4, 2016

Department of Transportation and Environmental
Services



ECO-CITY  ALEXANDRIA

City of Alexandria, Virginia

PRESENTATION OUTLINE

- Infrastructure Sizing Recommendation
- Tunnel Alignments and Tank Sites
- Green Infrastructure Strategy Recommendation



Long Term Control Plan Update Overall Strategy



Short List of Strategies for Further Evaluation

Primary Strategies

(will select one for final plan)

1. Separate storage tunnels (CSO 003/004 tunnel and CSO 002 tunnel)
2. Storage tunnel for Hooffs Run (CSO 003/004) and storage tank at Royal Street (CSO 002)
3. One storage tunnel for CSOs 002 (Royal Street), 003 and 004 (Hooffs Run)

Complementary Strategies

1. Green Infrastructure
2. Area Reduction Plan (Targeted Sewer Separation)
3. Other opportunities to be considered
 - Downspout disconnection
 - Low flow-fixture rebates

Infrastructure Sizing Recommendation



CSO-003/004 Tunnel Comparison

Tunnel Diameter	Tunnel Volume (MG)	Typical Year (1984) ¹		Recent (2004-2013) ¹		NPW Cost (\$M)
		Number of Overflows	Volume of Overflows (MG)	Number of Overflows per year	Volume of Overflows (MG)	
Current Conditions (no tunnel)	-	67	29.1	65	52.4	-
8-foot	1.0	5	2.9	11	27.1	\$69-\$103
10-foot	1.6	3	1.1	6	22.7	\$77-\$115
12-foot	2.3	0	0	3	19.8	\$85-\$127

Notes:

1. Expected performance estimated for the years indicated. Actual overflows and volume will be more or less based on specific rainfall events each year.

NPW = Net Present Worth
 MG = million gallons
 \$M = cost in millions

CSO-002 Tunnel Comparison

Tunnel Diameter	Tunnel Volume (MG)	Typical Year (1984) ¹		Recent (2004-2013) ¹		NPW Cost (\$M)
		Number of Overflows	Volume of Overflows (MG)	Number of Overflows per year	Volume of Overflows (MG)	
Current Conditions (no tunnel)	-	48	35.8	50	67.6	-
8-foot	2.0	6	5.7	10	34.8	\$59-\$89
10-foot	3.2	2	2.8	7	26.0	\$67-\$100
12-foot	4.5	1	1.4	4	20.1	\$80-\$120

Notes:

- Expected performance estimated for the years indicated. Actual overflows and volume will be more or less based on specific rainfall events each year.

NPW = Net Present Worth

MG = million gallons

\$M = cost in millions

CSO-002 Tank Comparison

Tank Volume (MG)	Typical Year (1984) ¹		Recent (2004-2013) ¹		Cost (\$M)
	Number of Overflows	Volume of Overflows (MG)	Number of Overflows per year	Volume of Overflows (MG)	
Current Conditions (no tank)	48	35.8	50	67.6	-
2.0	6	5.7	10	34.8	\$30-\$45
3.0	2	3.1	7	26.7	\$45-\$67
4.0	1	1.9	4	21.8	\$56-\$84

Notes:

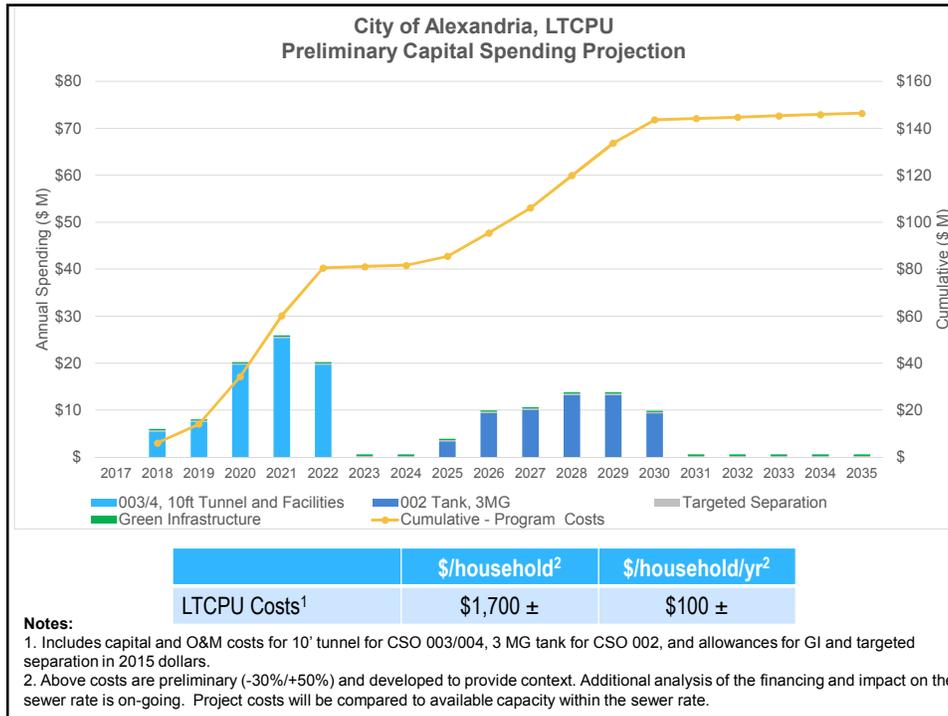
- Expected performance estimated for the years indicated. Actual overflows and volume will be more or less based on specific rainfall events each year.

What We Heard

- * Tunnels and Tanks
 - Tunnel Sizes (all CSOs)
 - Majority supported a 10-foot diameter tunnel
 - 2 supported an 8-foot diameter tunnel
 - Potential for cost savings towards green infrastructure
 - 1 supported a 12-foot diameter tunnel
 - Or 10-foot tunnel with cost savings towards green infrastructure
 - Tank Sizes (CSO-002 only)
 - Majority supported a 3.0 million gallon storage tank

Staff Preliminary Sizing Recommendation

- * 10-foot Diameter Tunnel and 3.0 million gallon Tank
 - More than the minimum
 - Helps to mitigate regulatory uncertainty
 - Helps to mitigate climate change
 - Less than 4 overflows per year during the typical year (1984)
- * CSO-003/004
 - 10-ft tunnel has 4-6 overflows per year for recent climate period
- * CSO-002
 - Tunnel/Tank: 7 overflows per year for recent climate period as opposed to 10 with the smaller size



Rate Impact Next Steps

- * Finalize preliminary cost estimates
- * Determine implementation schedule
- * Coordinate capital and O&M cost projections with AlexRenew and the City's Capital Improvement Plan (CIP)
- * Evaluate financing options
- * Determine impact to the sewer rates
- * Present finding to CSS Stakeholder Group in April

Question for Stakeholder Group

City staff is recommending a 10-foot diameter tunnel and a 3.0 million gallon storage tank for the infrastructure sizing.

- * Did we capture the discussion on sizing accurately?
- * Do you agree with this recommendation?
- * Do you have any additional input or concerns?

City of Alexandria, Virginia

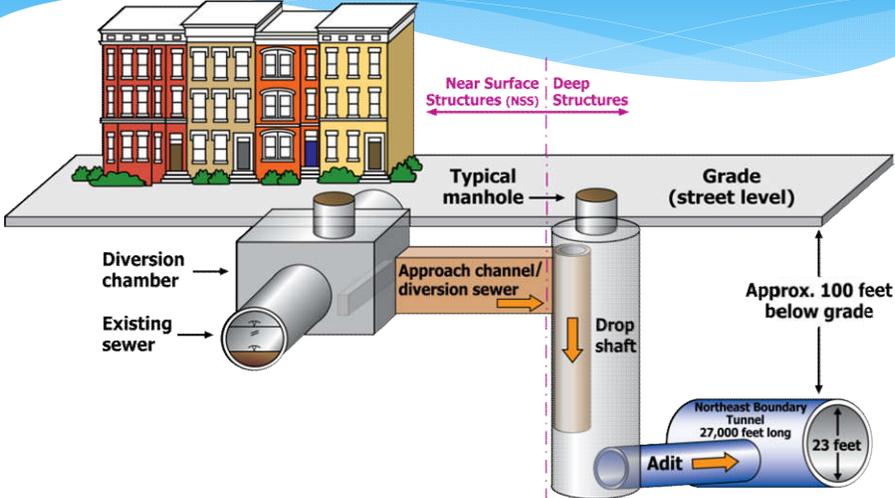
Tunnel Alignments and Tank Sites



Tanks and Tunnels



Finished Tunnel

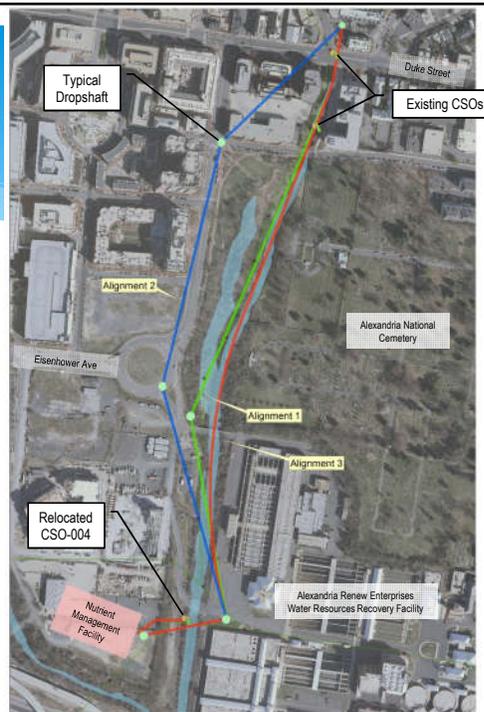


DC Shaft/Tunnel Construction



CSO-003/004 Tunnel Alignments

- * Alignments work for all diameters under consideration
- * Shafts range in diameter from 20-ft to 30-ft
- * Shafts range in depth from 60-ft to 100-ft



CSO-003/004 Alignments

	Advantages	Disadvantages
Alignment 1	<ul style="list-style-type: none"> • Avoids all buildings • Avoids cemetery 	<ul style="list-style-type: none"> • Dropshaft located in African American Heritage Park • Dropshaft construction area located near Commonwealth Interceptor, Hooffs Run, and 230kV electric lines
Alignment 2	<ul style="list-style-type: none"> • Avoids African American Heritage Park and Hooffs Run 	<ul style="list-style-type: none"> • Passes underneath several buildings • Passes underneath Dominion substation
Alignment 3	<ul style="list-style-type: none"> • Avoids all buildings and African American Heritage Park • Eliminates 1 dropshaft 	<ul style="list-style-type: none"> • Entirely under Hooffs Run and AlexRenew site

Potential Upstream Dropshaft Location



Potential Upstream Dropshaft Location

	Advantages	Disadvantages
Location 1	<ul style="list-style-type: none"> • Within City right-of-way • No closure of Duke St 	<ul style="list-style-type: none"> • Directly on top of Hooffs Run • Requires a major stream relocation • Closure of Dangerfield Road
Location 2	<ul style="list-style-type: none"> • Within City right-of-way • Minimizes piping needed for diversion structures 	<ul style="list-style-type: none"> • Must close Duke Street for the duration of construction (approximately 3 years) and maintenance/cleaning
Location 3	<ul style="list-style-type: none"> • Within City right-of-way • No closure of Duke St 	<ul style="list-style-type: none"> • Closure of Peyton Street • Requires a shaft at one of the other 3 locations • Adds cost and complexity
Location 4	<ul style="list-style-type: none"> • No closure of Duke St • Parking lot can be restored following construction (potential loss of parking spaces) 	<ul style="list-style-type: none"> • Constructed on private property • Entire parking lot used for construction and laydown area • Access required for maintenance/cleaning

CSO-002 Tunnel Alignments (Joint Tunnel Option)



CSO-002 Joint Tunnel Alignments

	Advantages	Disadvantages
Alignment 1	<ul style="list-style-type: none"> • Shortest alignment • Underneath AlexRenew WRRF and City property 	<ul style="list-style-type: none"> • Passes underneath buildings at the AlexRenew WRRF
Alignment 2	<ul style="list-style-type: none"> • Minimizes impact to residential neighborhood 	<ul style="list-style-type: none"> • Entirely in VDOT right-of-way and private cemeteries • Major utility conflicts at the AlexRenew WRRF
Alignment 3	<ul style="list-style-type: none"> • Much of alignment in City right-of-way 	<ul style="list-style-type: none"> • Passes under 4 different cemeteries • Requires significant infrastructure to be built on Royal Street to convey CSO flows back to the north

CSO-002 Separate Tunnel Alignments



CSO-002 Separate Tunnel Alignments

	Advantages	Disadvantages
Alignment 1	<ul style="list-style-type: none"> • Shortest alignment • Entirely within City right-of-way 	<ul style="list-style-type: none"> • Short, large diameter tunnels lose the economies of scale
Alignment 2	<ul style="list-style-type: none"> • Minimizes impact to residential neighborhood 	<ul style="list-style-type: none"> • Short, large diameter tunnels lose the economies of scale • Entirely in VDOT right-of-way and private cemeteries
Alignment 3	<ul style="list-style-type: none"> • Entirely within City right-of-way 	<ul style="list-style-type: none"> • Short, large diameter tunnels lose the economies of scale • Requires significant infrastructure to be built on Royal Street to convey CSO flows back to the north

One Tunnel vs Separate Tunnels

CSO-002	Advantages	Disadvantages
One Tunnel	<ul style="list-style-type: none"> • Allows for control of overflow location 	<ul style="list-style-type: none"> • Complex hydraulics • Must pass under building on AlexRenew site • More shafts constructed in community
Separate Tunnels	<ul style="list-style-type: none"> • One less shaft (less construction impact) 	<ul style="list-style-type: none"> • Short, large diameter tunnels lose the economies of scale • Larger diameter tunnel (18-ft) • Larger shaft size (40-ft) • Larger construction areas • Additional pump station

CSO-002 Storage Tanks Alternatives



CSO-002 Storage Tank Alternatives

	Advantages	Disadvantages
Alternative 1	<ul style="list-style-type: none"> • Opportunities to clean up Hunting Creek embayment 	<ul style="list-style-type: none"> • On private property • Potential permitting issues in Resource Protection Area (RPA)
Alternative 2	<ul style="list-style-type: none"> • In City right-of-way 	<ul style="list-style-type: none"> • Disrupts access to Jones Point Park during construction and maintenance activities
Alternative 3	<ul style="list-style-type: none"> • Reclaim part of embayment • Opportunities to clean up embayment • Increase public access to waterfront 	<ul style="list-style-type: none"> • Potential permitting issues • Potential ownership/easement issues (still being researched)
Alternative 4	<ul style="list-style-type: none"> • Likely the least costly alternative, quickest construction 	<ul style="list-style-type: none"> • National Park Service staff currently does not support this alternative

Alexandria Renew Enterprises Nutrient Management Facility



Located on the AlexRenew WRRF site, just south of the Eisenhower Avenue traffic circle (approximately 18 million gallon of storage)

CSO-002 Tunnel vs Tank

CSO-002	Private Property	Park Impacts	Community Impacts	Cost (\$M)
10-ft Tunnel ¹ ≈3.0 MG	All work in City right-of-way	No dropshafts in Jones Point Park	Construction (tunnel shafts) at multiple locations in Old Town, will require some road closures	\$67 - \$100
3.0 MG Tank	Potential construction on private property (Alt. 1 & 3)	Potential to limit access to park (Alt. 2 & 4)	Construction at one location	\$45 - \$67

Notes:

1. 10-foot tunnel is based on the joint tunnel option; a shorter separate tunnel would be 18-ft diameter

Engineer's Recommendation

- * CSO-003/004
 - Tunnel Alignment #1 – Keep available
 - Tunnel Alignment #2 – Eliminate
 - Tunnel Alignment #3 – Preferred, select as basis of planning

- * CSO-002
 - Storage tank is preferred over tunnels
 - Cheaper for the same volume (more cost effective)
 - Construction at 1 location, less impact on Old Town residents
 - Provides opportunities to improve the embayment
 - Keep storage tank site location options open in Long Term Control Plan Update

Question for Stakeholder Group

The City staff, and their consultant, have identified several alignment and tank options to control overflows from CSO-003/004 and CSO-002. We have presented the advantages, disadvantages, and range of costs for each option

- * Given Engineer's Recommendation of storage tanks over tunnels for CSO-002, what are your concerns? What are your thoughts about the locations? What should be considered to minimize construction impacts?

City of Alexandria, Virginia

Green Infrastructure Strategy



Green Infrastructure Strategy Preliminary Recommendation

- * Continue to implement existing green infrastructure pilot permit for current permit cycle (2013-2018)
- * For next permit cycle (2018-2023), expand upon existing green infrastructure program by:
 - Add funding in 10-year Capital Improvement Program and implement variety of green infrastructure practices
 - Evaluate incentive programs for private property
 - Evaluate increasing number of street trees (tree canopy) in CSS
- * Assess effectiveness of different practices compared to cost of implementation and neighborhood impacts
- * Based on assessment, consider establishing program and target goals for future permit cycles

Green Infrastructure Target Goals

- * Target goals to potentially be established following implementation and assessment period
 - Implementation and assessment through next 5-year permit cycle (2018-2023)
- * Target goals could be established based on a number of factors
 - Specific \$ amount or % of overall Long Term Control Plan Program for green infrastructure
 - Stormwater volume reduction target
 - Impervious area (acres) treated by green infrastructure
 - Number of trees planted (tree canopy)

Proposed Green Infrastructure Target Goals (2018-2023)

- * Cost Commitment
 - \$1-2 M of the LTCPU costs in City-led green infrastructure projects both in the combined sewer area and outside of it
- * Returns on Green Investment to Be Assessed
 - Stormwater volume reduction
 - Impervious area treated
 - Nutrient credits
 - Number of trees planted and tree canopy
 - Community benefits
- * Types of Projects
 - Green alleys, bioretention, trees (boxes), stream restoration, pond retrofits, etc.

Question for Stakeholder Group

Over the last several meetings information on the potential green infrastructure strategy has been presented. Based on feedback from the group this strategy includes:

- * A commitment in the LTCPU
- * Green infrastructure will be implemented city-wide
- * \$1-2 million commitment for first permit cycle (2018-2023)

Do you agree with the recommended green infrastructure strategy? What changes, if any, would you propose?