Agenda

- Background
- Planning Considerations
- Procurement and Contract Packaging
- 100-year Design Life

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BACKGROUND

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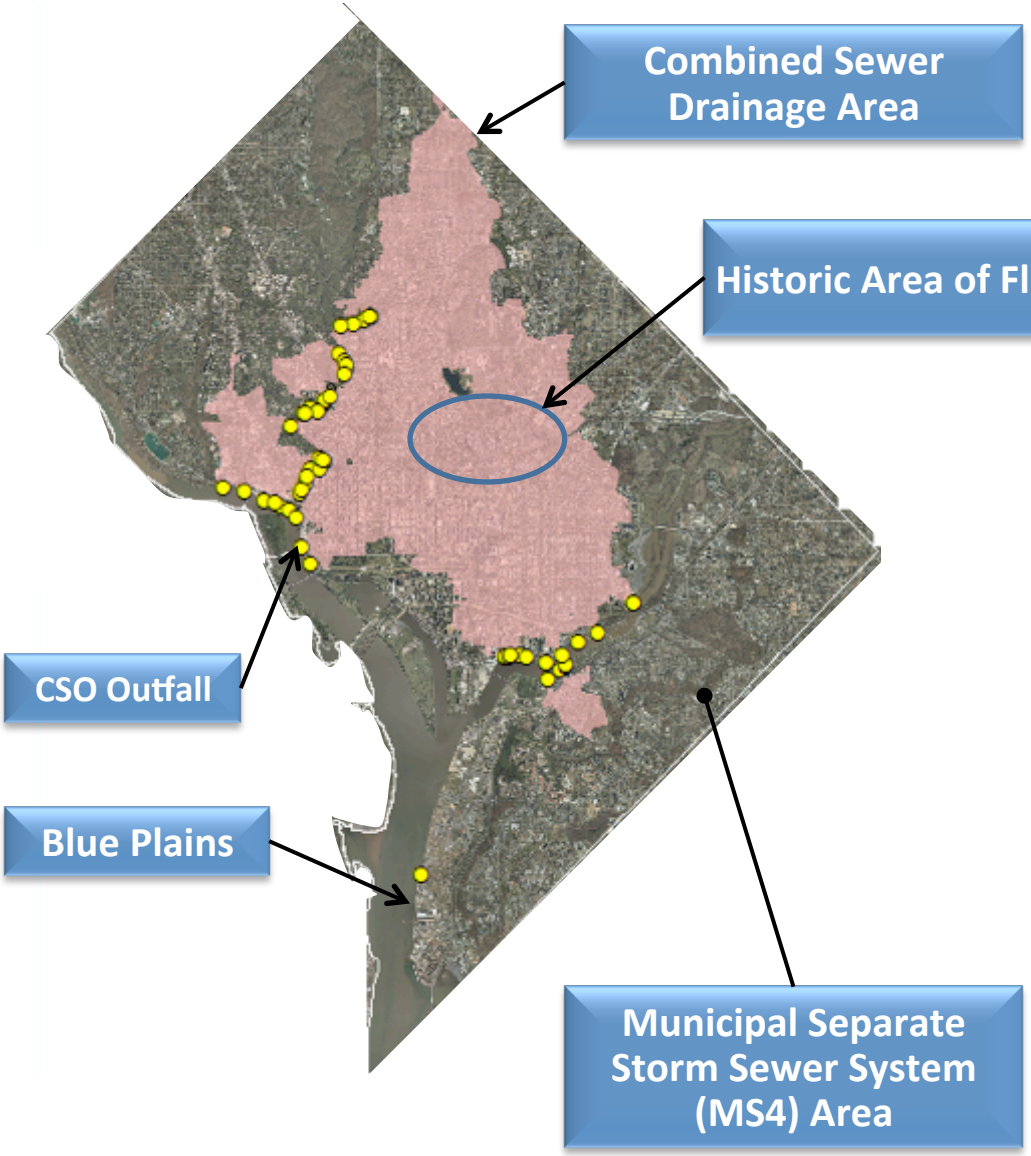
Magnitude of the Challenge: CSO Control



- 1/3 area is combined (12,478 acres)
- 53 CSO outfalls at start of program (47 currently)
- Significant Flooding in Neighborhoods

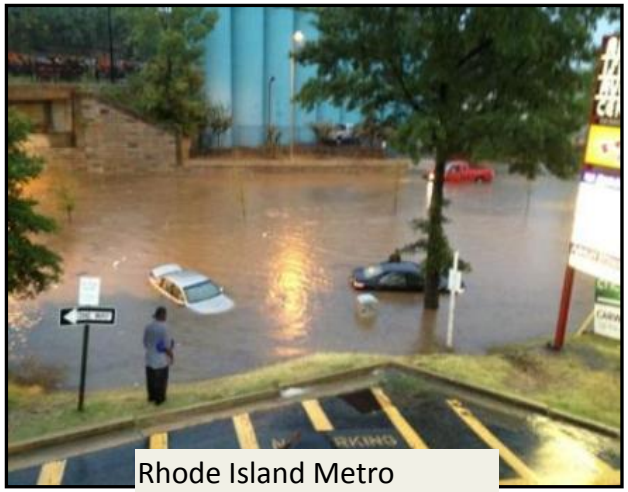
Parameter	Anacostia	Potomac	Rock Creek	Total System
CSO Overflow Volume (mg/avg yr)	2,142	1,063	49	3,254
No. of Overflows (#/avg yr)	82	74	30	186

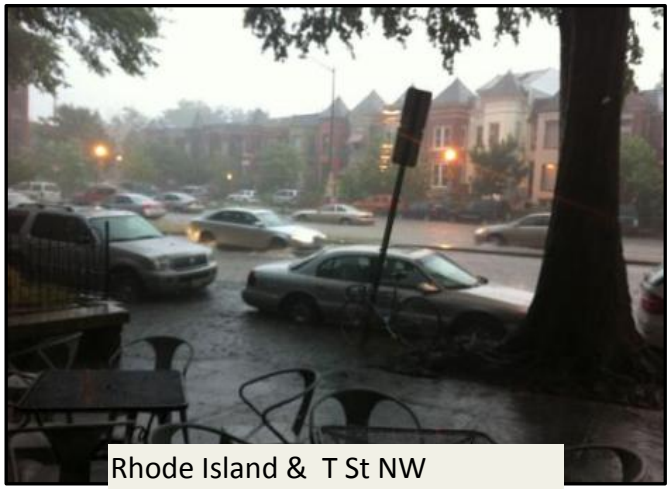
Magnitude of the Challenge: Flooding Relief


First & P St NW


Rhode Island & T St NW

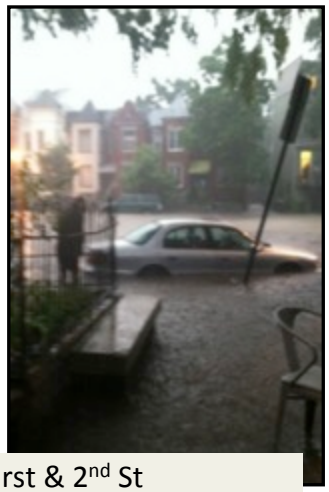

Rhode Island & First St NW


Rhode Island Metro


Rhode Island & T St NW


First & V St NW


Flagler St NW

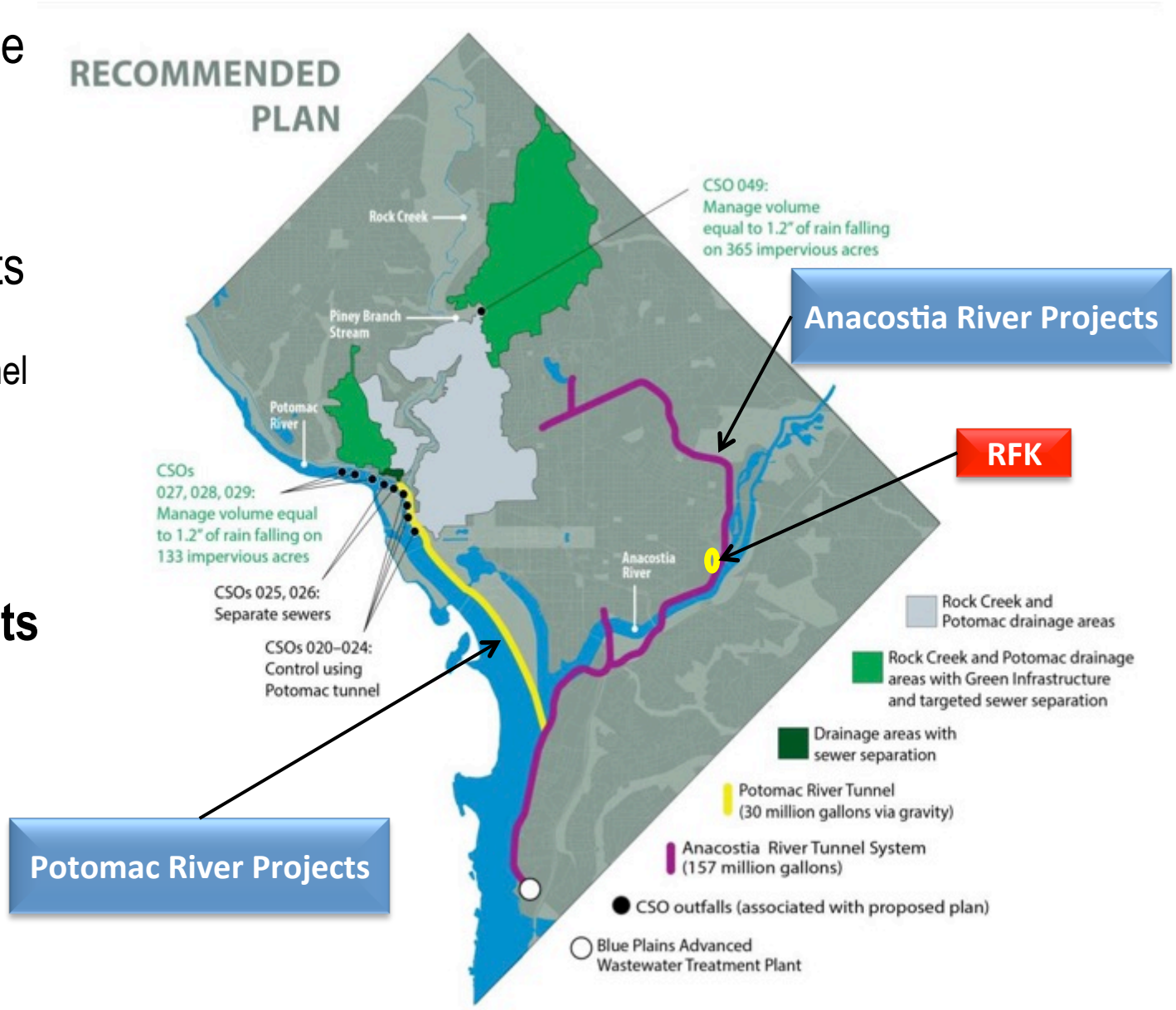

Rhode Island Between First & 2nd St

DC Clean Rivers Projects
Anacostia & Potomac River

Federal Consent Decree
US EPA / US DOJ
DC / DC Water

Anacostia River Projects
23 ft. Diameter Tunnels
12.5 miles of Soft Ground Tunnel
22 Shafts
On-line 2018 (South of RFK)
On-line 2022 (North of RFK)

Potomac River Projects
18 ft. Diameter Tunnels
3 miles of Soft Ground Tunnel
1.2 miles of Hard Rock Tunnel
6 Shafts
On-line 2030



PLANNING

Planning Considerations
Complex Technical & Stakeholder Coordination

- Facility Size & Alignment
- Geotech / Environmental
- Protection of Structures
- Risk Analysis
- 3rd Party Coordination
- Public Outreach
- Agreements / Easements / Permitting
- Maintenance of Traffic

Environment Assessment
Third Parties & Agreements
Public Outreach
Land/ROW/Easement
Agency Approval
Construction Staging Layout
Constructability
Route Selection
Boring/Coring
Laboratory testing
Geophysical
Geotechnical Reports
Public Outreach
Traffic Study

Shaft Design
Tunnel Design
Trenchless Design
Underground Connection
Near Surface Structural Design
Constructability Review
Risk Analysis - Mitigations
Cost Estimating
Green Infrastructure
Survey Arial
Survey (Dray & Wet utilities)
Survey Staging Areas & Control
Existing Facility Research
Maintenance of Traffic

Hydraulics
Site Civil (Existing/Final/Staging)
Pipeline Design
Utility Relocation
SCADA
Electrical
Mechanical
Enhancements & Landscaping
Environmental Reports
Security
Wetland Studies
Hazardous Waste/Soil Testing/LSP
Operating Procedures
Commissioning Procedures

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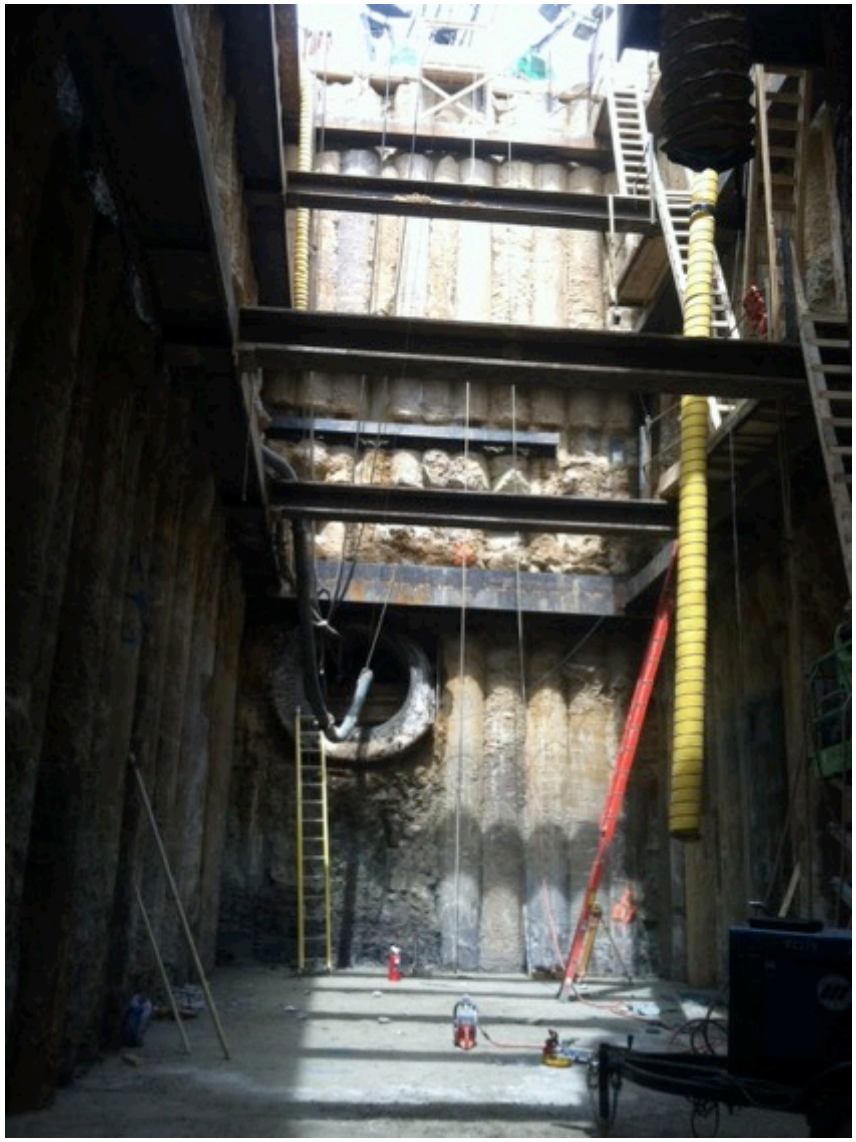
Planning Consideration
Construction Site Area Requirements

Shaft	Contract	Site Area (Acres)	Shaft Diameter (Feet)	Shaft Depth (Feet)	Comment
Blue Plains Pumping Station & Screening Shafts	**Division A**	4.1	**130 & 75**	**175**	Mining Shaft
Joint Base Bolling Drop Shaft		1.7	**50**	**150**	In-line
Poplar Point Junction Shaft		**0.5**	**55**	**130**	In-line
Main Pumping Station Drop Shaft		0.85	**60**	**125**	In-line
CSO 019 Drop South & North Shafts	**Division H**	6.1	**65**	**110**	Mining Shaft
CSO 005 Drop Shaft		0.95	**15**	**110**	Offset
CSO 007 Drop Shaft		2.1	**16.5**	**105**	Offset
M Street Drop Shaft		1.4	**63.5**	**100**	In-line
CSO 018 Drop Shaft		1.2	**32**	**130**	Offset
Channing Street Mining Shaft	**Division P**	3	**65**	**90**	Mining Shaft
Pump Station Shaft		0.24	**22.5**	**80**	Offset
V Street Drop Shaft		**0.21**	**23**	**100**	Offset
Adams Street Drop Shaft		0.25	**20**	**170**	Offset

Site Constraint Challenges

First Street Tunnel Diversion and Adit



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Construction of First St. Tunnel - First & V St NW

Community Interface

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Community Interface

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PROCUREMENT & CONTRACT PACKAGING

Procurement and Packaging Drivers

- Consent Decree Schedule
  - Fixed Completion Milestones
- Complexity and Type of the Work
  - Near surface Facilities
  - Deep Tunnels and Shafts
  - Inside the Plant (PS)
  - Green Infrastructure
- Third Parties
  - Public Agency Projects (DDOT)
  - Private Development (e.g. CSO 021)
  - Neighborhood Impacts
- Other
  - Mayor's Task Force

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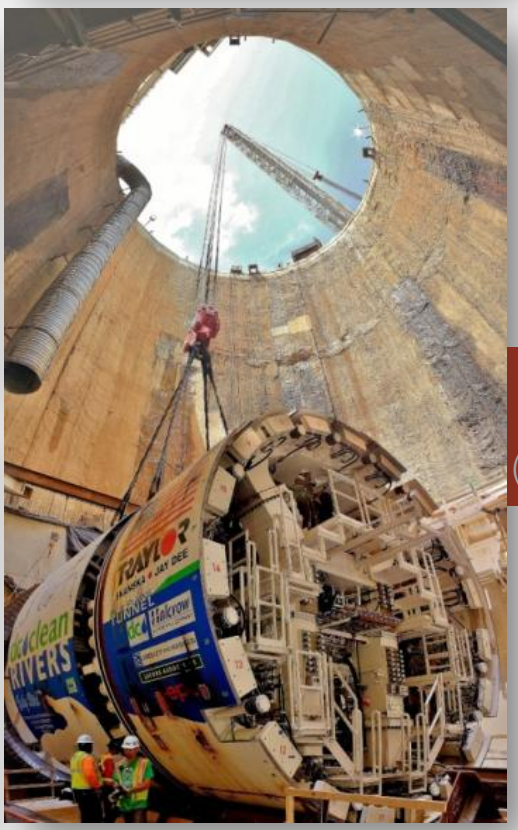
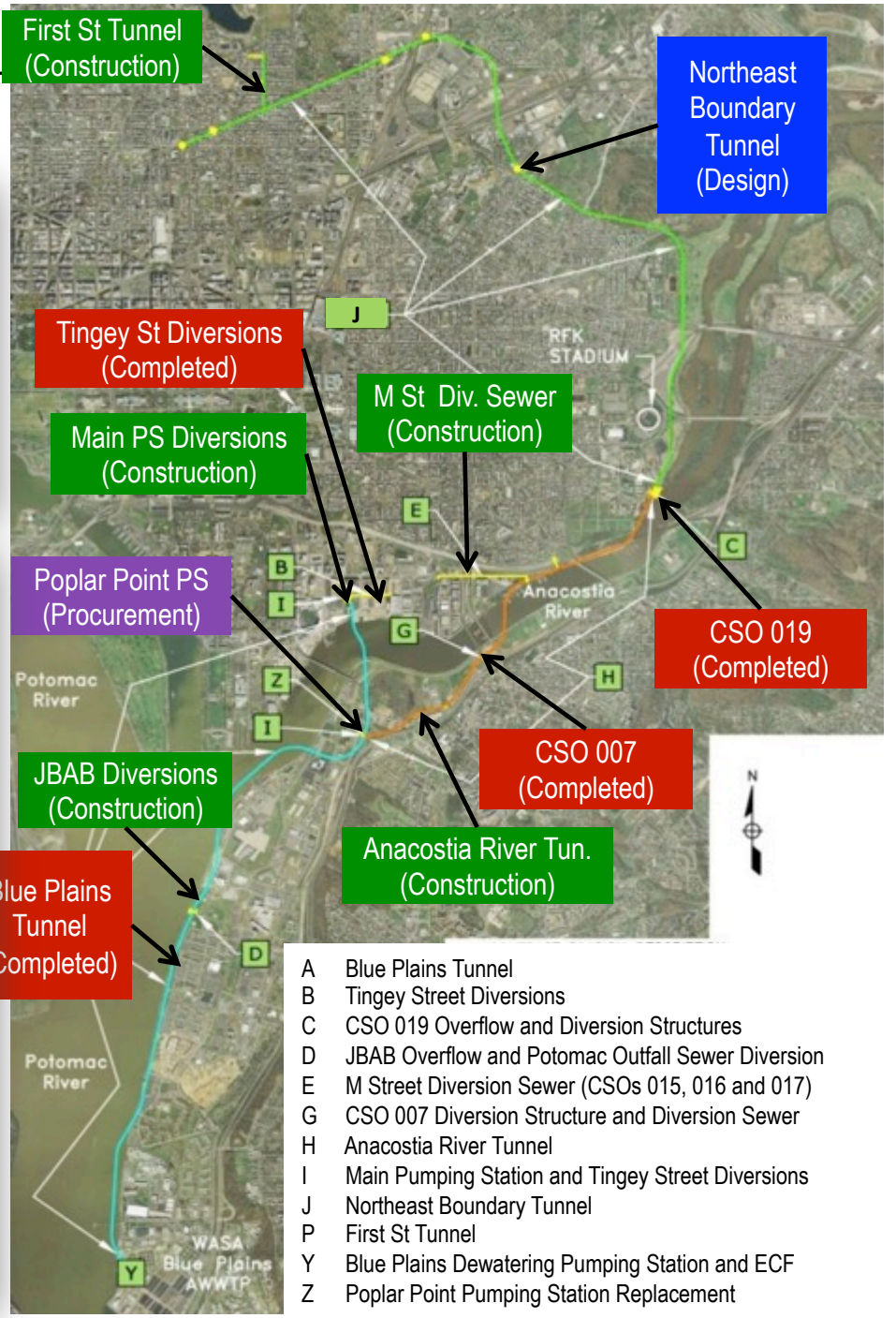
Contract Packages





Contract Packages

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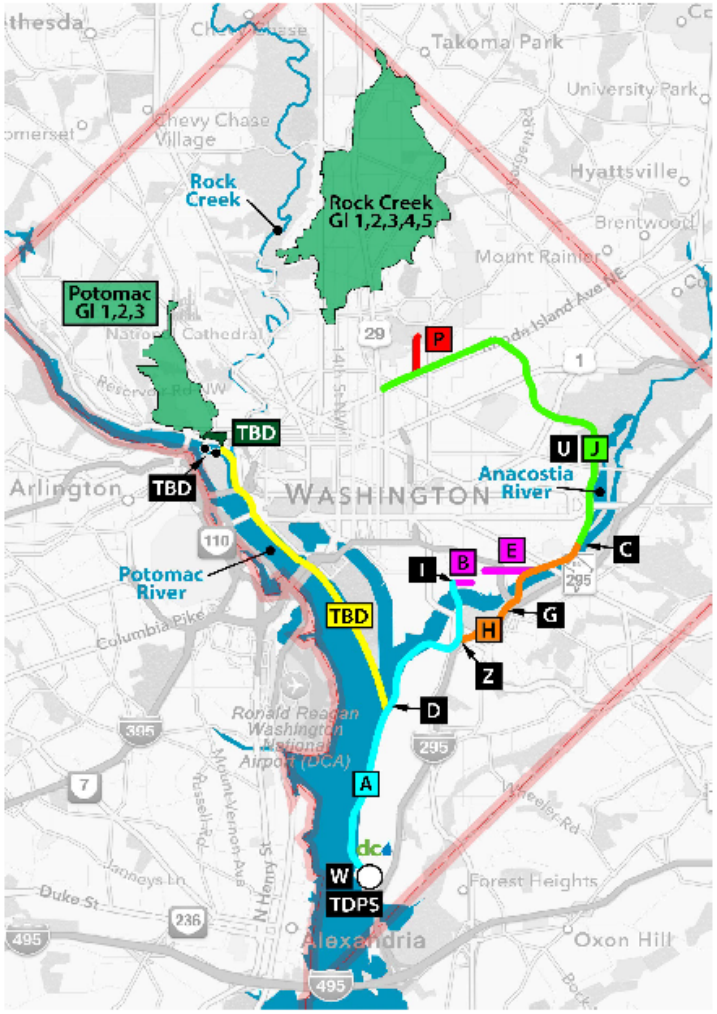
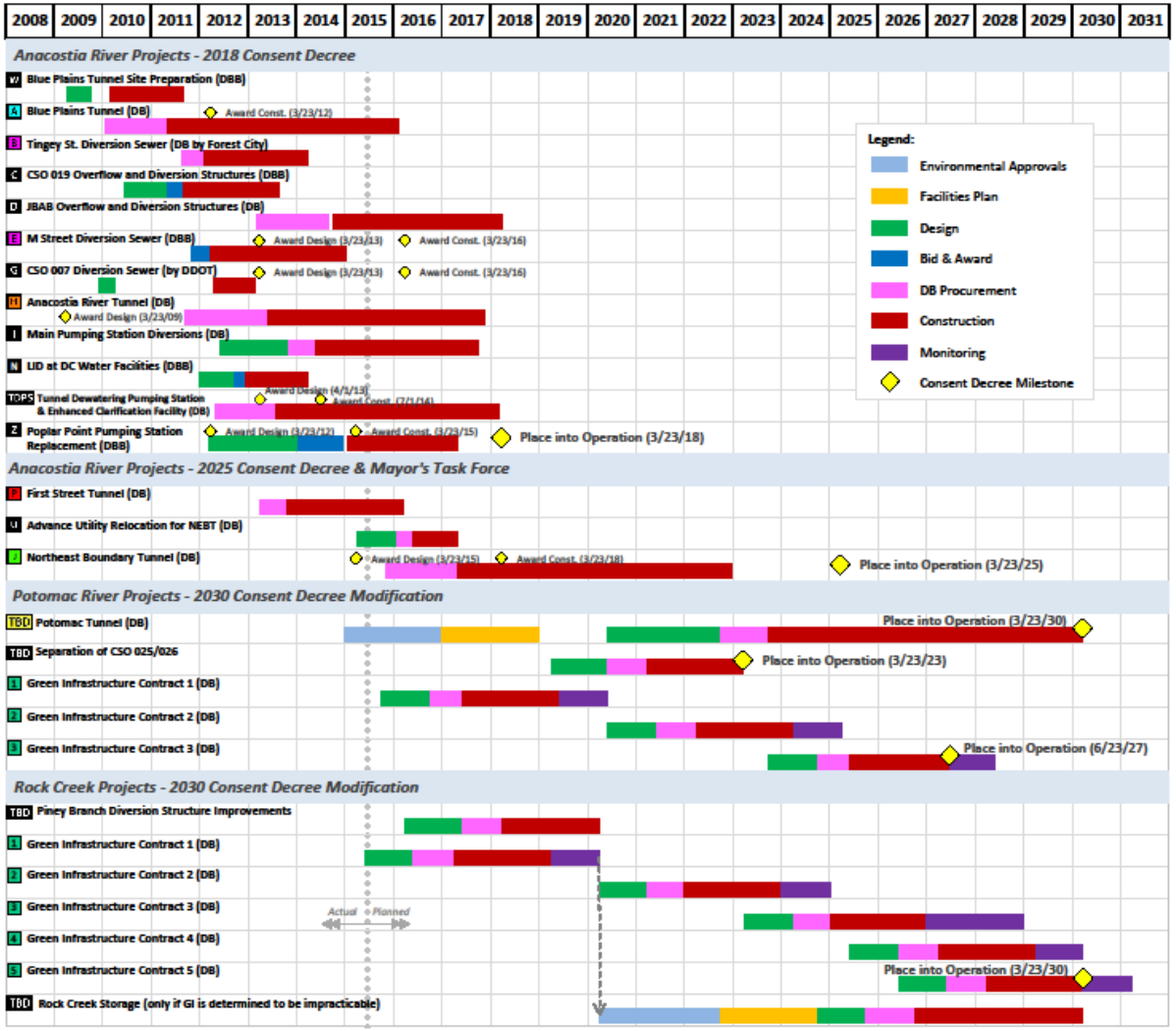
Updated: June 2015



Program at a Glance

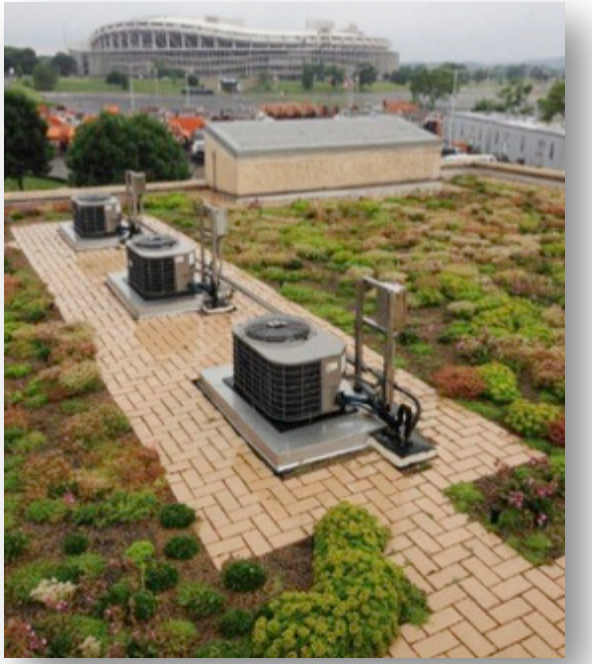
Source: PCO Program Master Schedule & Consent Decree Modification

dc water is life



Procurement Strategies: *Design-Bid-Build*

- Near-Surface Diversion Facilities
  - Familiar with work (sewer, pump stations, vaults)
  - DC Water controls design
    - Maintenance
    - Operation
  - Approach is straight forward
  - Local contractors familiar with the work & associated risks
  - Select the lowest-priced bidder
- Green Infrastructure



Procurement Strategies: *Design-Build*

- Deep Tunnels and Shafts
  - Early Contractor Involvement
    - Design integration with means and methods
    - Mitigate risks
    - Maximize innovation & understand means & methods
    - Reduce contractor contingencies
  - Schedule compression and flexibility
  - Permanent design is influenced by means & methods
  - Successful use of this project delivery approach on tunnel projects in US
- Critical Near Surface Diversion Facilities
  - Schedule Critical
  - Means and Methods Intense
- Selection based on Best Value (Technical / Price)

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Procurement and Packaging Results

	Contract Division	Description	Cost (M)	Status
Design-Build	A	Blue Plains Tunnel	$330	Complete
	H	Anacostia River Tunnel (DB Hybrid)	$253	Construction
	P	First Street Tunnel (DB Hybrid)	$157	Construction
	J	Northeast Boundary (DB Hybrid)	$550	Design
	I	Main Pumping Station Diversions	$65	Construction
	D	JBAB Outfall and Diversions	$40	Construction
	B	Tingey Street Diversions	$17	Construction
		Total D-B	$1,412	
Design-Bid-Build	W	Blue Plains Demolition	$5	Complete
	C	CSO-019 Outfall	$28	Complete
	G	CSO-007 Diversion	$5	Complete
	E	M Street Diversions	$26	Construction
	Z	Poplar Point Pumping Station	$42	Design
		Total D-B-B	$106	

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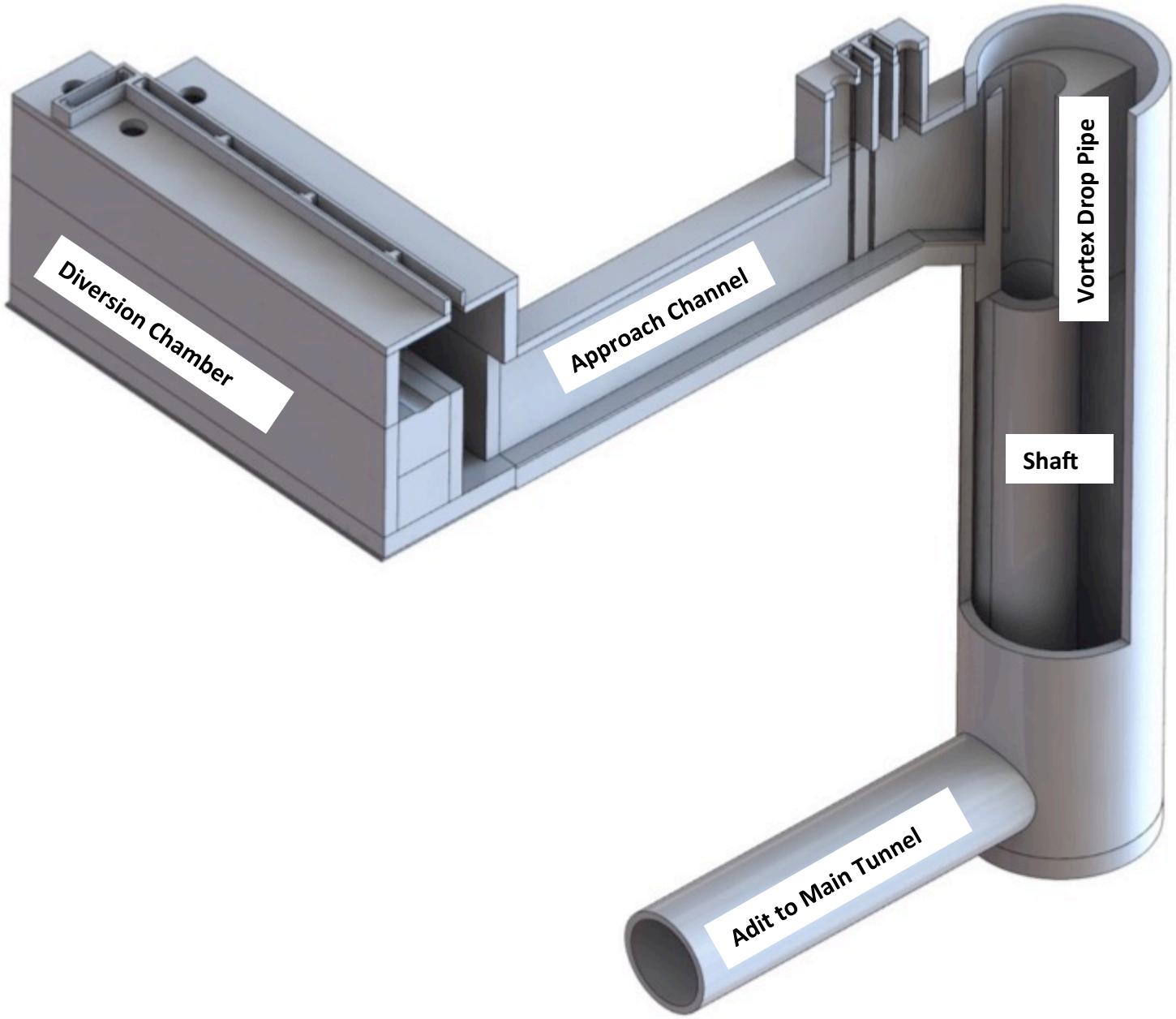
100-year Design Life



Why Design for 100-years

- Providing system redundancy too costly
- Removal from service for inspection and repair extremely difficult
- Partially funded by Century Bonds

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Why Design for 100-years

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100 –Year Design Considerations

- ACI 350 Code
- ACI 365.1R Service Life Predictions
- Watertight Construction
- Concrete Mix Design
- Temperature Control
- Limiting service load stresses
- Increase sacrificial concrete cover over reinforcing

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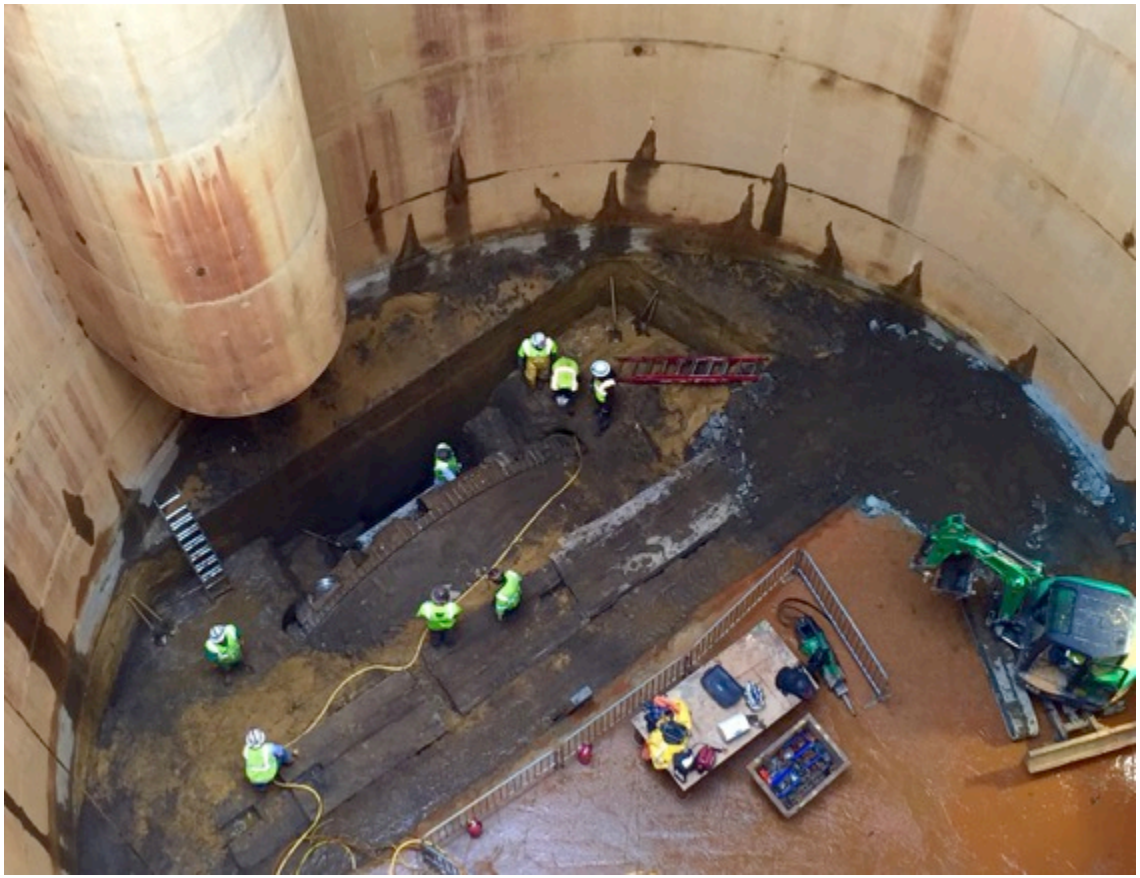
Acknowledgements

- Carlton Ray – Director of DC Clean Rivers Project
- All Engineers and Contractors Working on this Project



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Questions and answers

Carlton Ray
email: CARLTON.RAY @DCWATER.COM
phone: 202-787-4469