

**PARSONS  
BRINCKERHOFF**



# Trash Talk

Cleaning up the waters in Baltimore City and  
the Watershed 263 Trash Collection Program

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# Enforcing Clean Water

- Total Maximum Daily Loads
  - A calculated loading of any given pollutant that if obtained will allow a water body to meet all applicable water quality standards
- LA River Basin (2001/2007)
- Anacostia River (2010)

**Total Maximum Daily Loads of Trash for the Anacostia River  
Watershed, Montgomery and Prince George's Counties,  
Maryland and the District of Columbia**

**FINAL**



and

**District of Columbia Department of the Environment -  
Natural Resources Administration**

Submitted to:

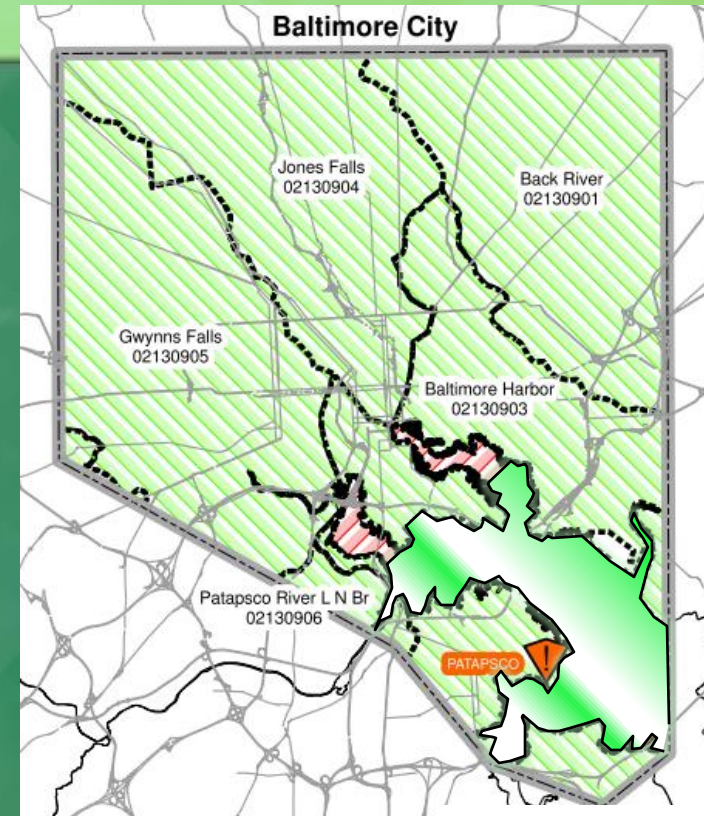
U.S. Environmental Protection Agency, Region 3  
Water Protection Division  
1650 Arch Street  
Philadelphia, PA 19103-2029

August 2010

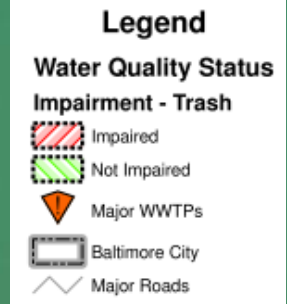
EPA Submittal Date: September 8, 2010  
EPA Approval Date: September 21, 2010

# Baltimore City

- Inner Harbor is 303d listed for trash impairment
- TMDL for trash has not been formally established, but is anticipated
- City has begun several programs to address trash prior to regulatory involvement



**Baltimore City  
303d Trash  
Impairment Map**  
(Source: MDE - 2008)



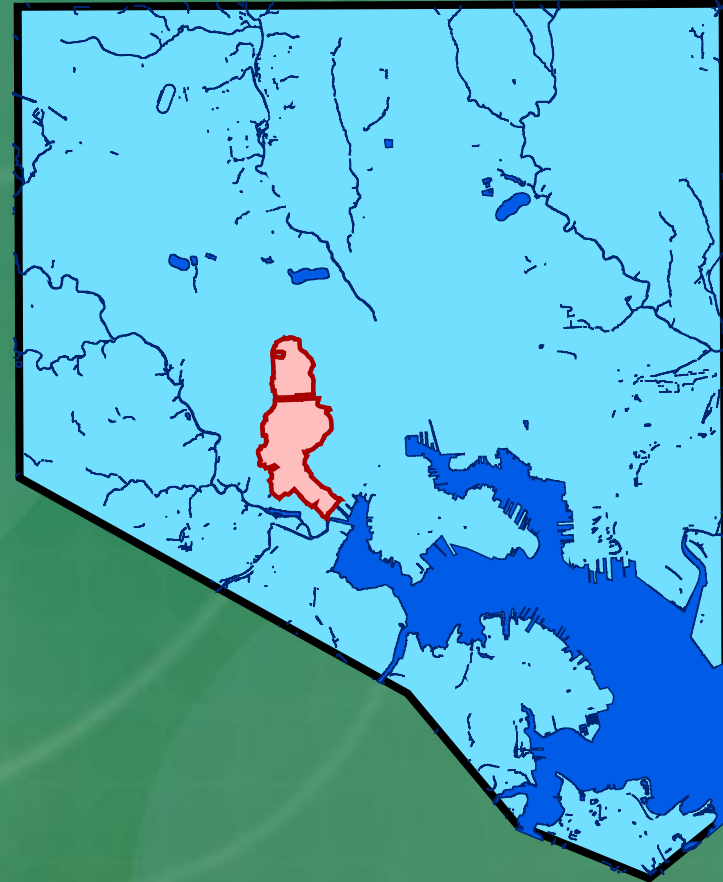
# Baltimore City's Efforts

- Street Sweeping
- City currently has deployed four in-line trash collection devices
  - Harris Creek
  - Braircliff
  - Alluvion Street
  - Gwynn's Run
- Trash Skimmer



# Bush Street Project Need

- Watershed 263 drains to Bush Street Outfall
  - Several other projects in watershed
- Drainage Area = 910 Ac
- Watershed drains a highly urbanized portion of Baltimore City to the Patapsco River and the Chesapeake Bay
- Receiving waters are 303d listed for various water quality impairments



# Project Goals

Meet anticipated future gross pollutant regulatory requirements

Minimize visible presence of debris and debris collection device

Minimize potential for vandalism or theft of debris collection device and components

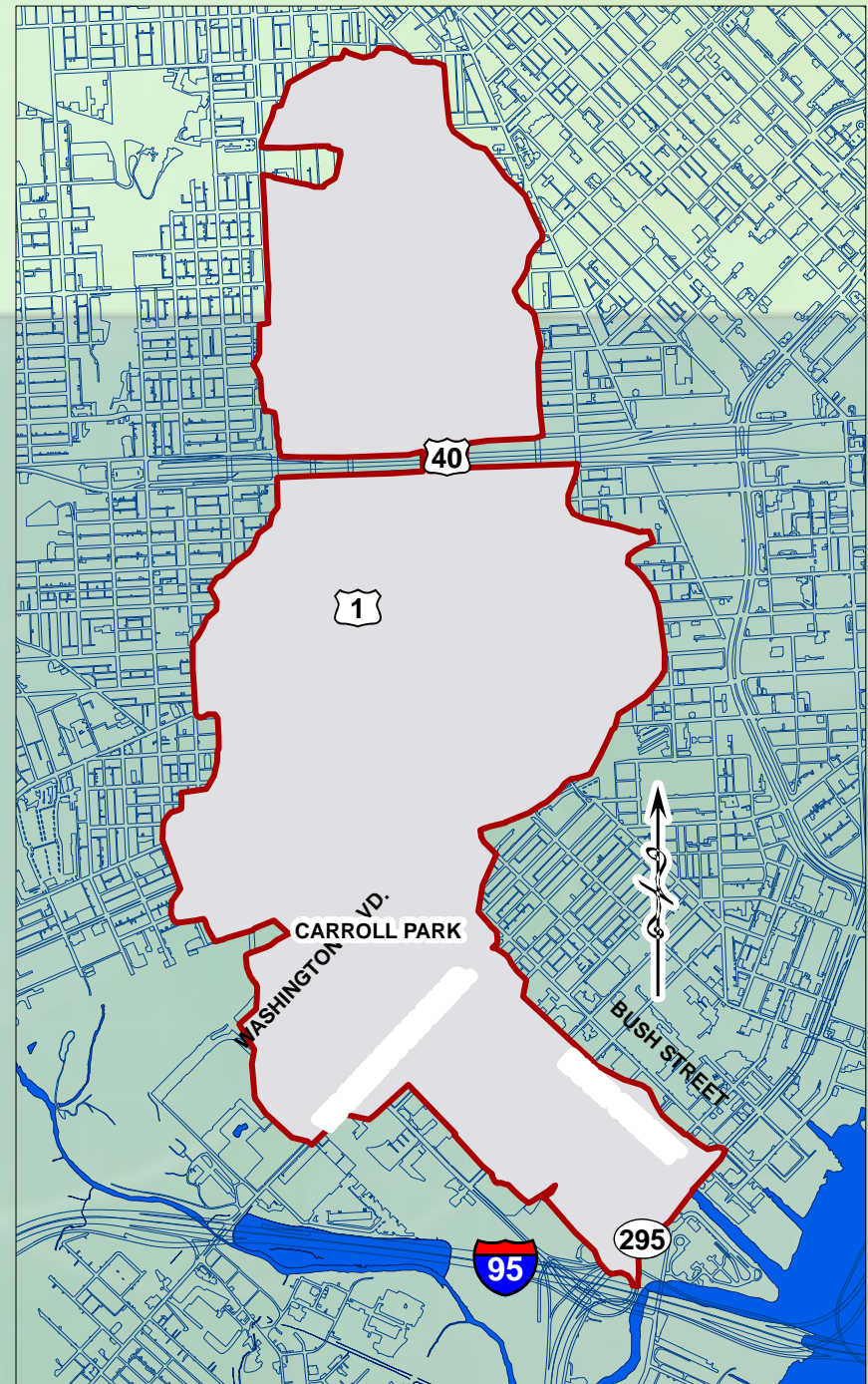
Select an easily accessible area for maintenance activities

Select an area for construction activities that minimizes the impacts to traffic on busy arterials



# Drainage Area

- Water Quality Discharge = 595 cfs
- 1-Yr = 1,220 cfs
- 2-Yr = 1,560 cfs
- 10-Yr = 2,740 cfs
- 100-Yr = 5,610 cfs



# Comparable Systems

- Wilmington Drain

- L.A. DPW

- 1-Year Storm = 1,100 cfs (Design Storm for Treatment)
    - 22 Net collection systems across a 110-foot wide open concrete channel
    - Largest netting based system constructed to date

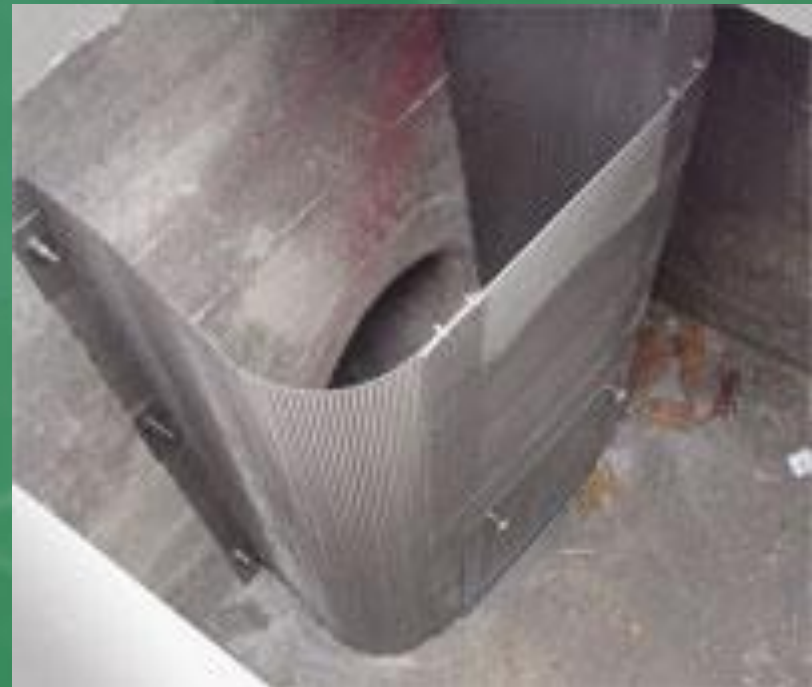
- L.A. Freeway

- CalTrans

- Water Quality Discharge = 175 cfs
    - Largest CDS system constructed to date
    - Construction Cost ~\$2 Million

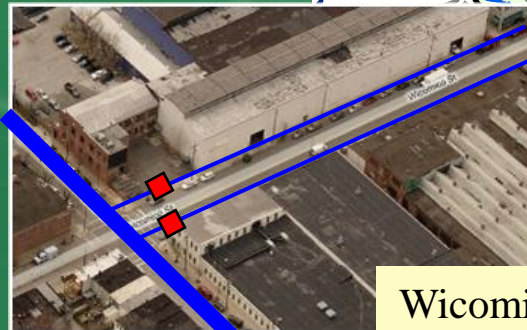
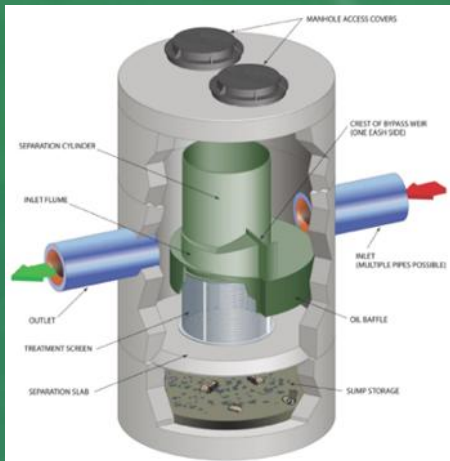
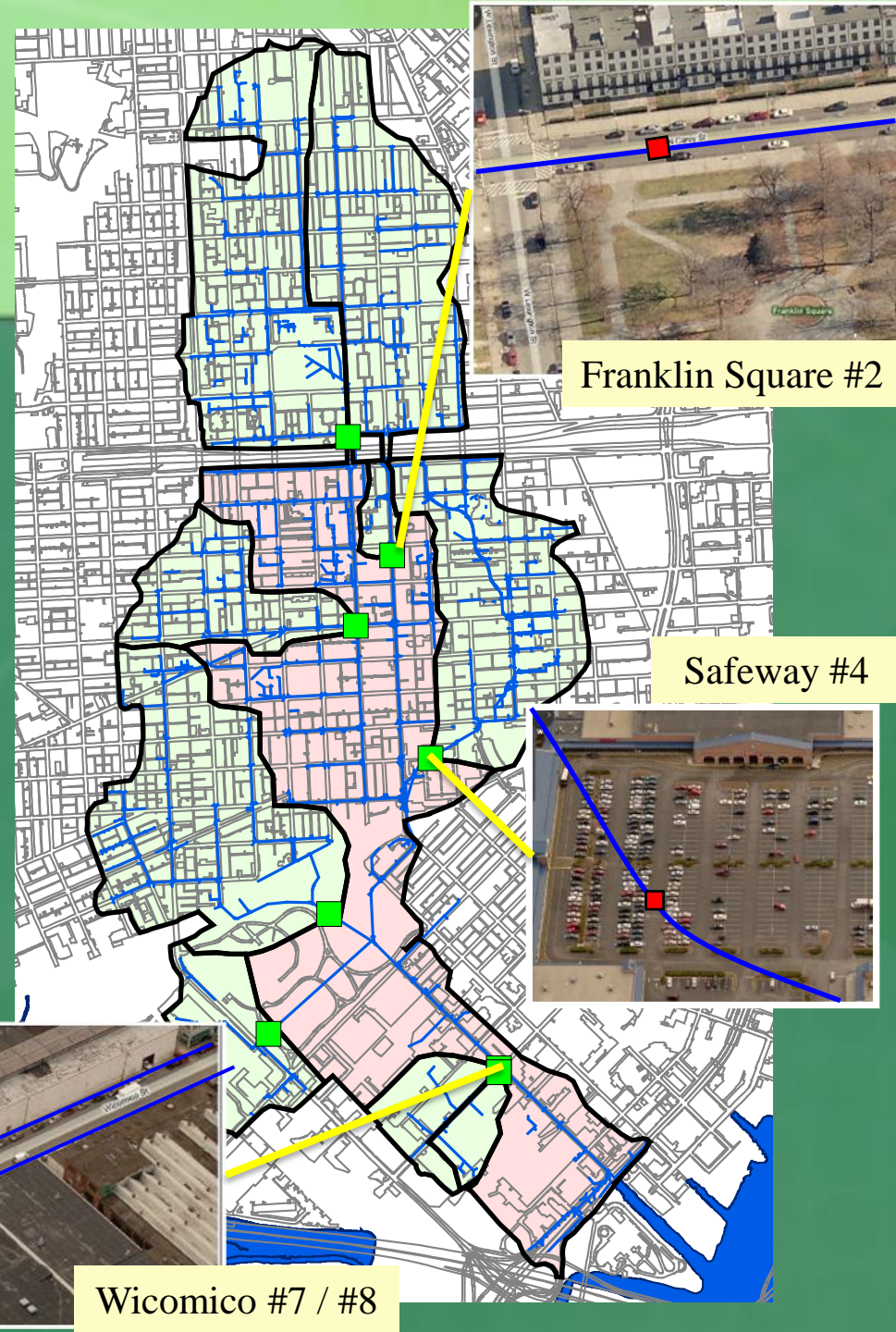
# Source Treatment

- Involves control devices that prevent trash from entering storm drain system
- Requires a comprehensive street sweeping program
- Requires regular maintenance clean-out of all catch basins



# Small BMP Systems

- 8 Treatment Locations identified from preliminary screening
- Total DA Treated
  - 598.7 Acres
  - 66% of Total DA
- Treatment designed for the water quality storm



# Smaller Systems

## Advantages:

- Smaller flow rates for treatment
- Smaller cost per unit
- Lower trash loading per site / decreases maintenance cleanout needs
- Additional Water Quality Treatment Benefits (TSS and Metals)

## Disadvantages:

- Lower percentage of watershed for treatment
- Disparate locations for maintenance cleanout
- Traffic disruptions during cleanout & construction
- Construction activities in residential neighborhoods
- Utilities will likely interfere with many of the system locations

# Open Channel Systems

- Open Channel netting systems
- Floating system (Alluvion)
- Fixed mounted system (Gwynn's Run)
- Removable netting capture/containment system
- Maintained by a truck mounted crane from street level



# Open Channel System

## Advantages:

- Treatment of a large percentage of the watershed
- Construction site located in single area with minimal disruptions to community
- Applicable to tidal areas

## Disadvantages:

- System bypass potential significantly increased
  - Overtopping flows & sunken trash
- Significant maintenance effort at clean-out
- Vandalism
- Low aesthetic value – highly visible presence of trash in the waterway

# Waterwheel System

- Floating System
- Driven by water and solar power – powers a conveyor belt
- Self contained dumpster for collection
- Turbidity curtain system to feed trash to system





# Waterwheel System

## Advantages:

- Treatment of the entire watershed
- Single location for maintenance and cleanout activities
- Construction site located in single area with minimal disruptions to community
- Powered by renewable energy
- Aesthetic value – lowers trash visibility

## Disadvantages:

- Bypass potential similar to netting systems
- Complex system with several parts
- Mechanical System Maintenance
- **The Unknown**

# Vault System

- In-line storm drain system
- Underground vault
- Removable netting capture/containment system
- Maintained by a truck mounted crane from street level



# Vault System

## Advantages:

- Treatment of a large percentage of the watershed
- Single location for maintenance and cleanout activities
- Construction site located in single area with minimal disruptions to community
- Can have a very high capture rate

## Disadvantages:

- High unit cost
- Capture efficiency decreases as flow rates increase
- Only applicable for upland treatment

# Carroll Park Vault Site

- Current storm drain is a 17' x 10' elliptical masonry pipe
- Site has minimal underground utilities
  - Local electrical line for park lighting
- Site will likely have impacts to trees
  - Rec. and Parks owned property
    - 32" DBH Oak
    - 46" DBH Oak
    - Various small pine, maple, & oak (>12"



# Debris Collection Summary

System	Catch Basin Retrofits	Small BMPs	Large Vault	Floating Net Collection	Trash Mill
Location	900+ Sites	8 Sites	Carroll Park	Bush St. Outfall	Bush St Outfall
Drainage Area Treated (Acres)	<b>910</b>	<b>598.7</b>	786.8	<b>910</b>	<b>910</b>
Estimated Life Cycle	25	<b>50</b>	30	30	<b>25</b>
Total Construction Cost	\$1,000,000	\$ 1,900,000	\$ 1,800,000	\$ 700,000	<b>\$ 630,000</b>
Estimated Annual Maintenance Cost	\$ 250,000	\$ 135,840	<b>\$ 205,080</b>	\$ 283,920	<b>\$ 101,840</b>
Life Cycle Cost (2010 \$ / yr)	\$ 290,000	\$ 173,840	\$ 265,080	\$ 307,253	<b>\$ 131,183</b>
Cost/Benefit (\$ / Acre / Year)	\$ 318	\$ 290	\$ 337	\$ 338	<b>\$ 144</b>
Goals Attained	<b>2 of 5</b>	<b>2 of 5</b>	4 of 5	2 1/2 of 5	<b>4 1/2 of 5</b>
Estimated Percent of Trash Captured from Watershed 263	86%	<b>43%</b>	65%	90%	95%

# Funding Sources

- Maryland Port Authority
- Baltimore City DPW

