

## Kansas City's Overflow Control Program

Post-Construction Stormwater Management Workshop  
March 21, 2013



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## Overflow Control Program



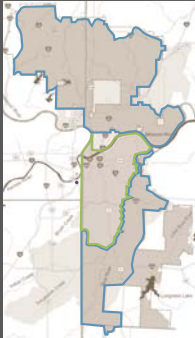
Developed to meet regulatory requirements related to reducing and preventing sewer overflows

\$2.5 Billion (2008 Dollars)

25-year completion schedule

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## Kansas City's Sewer System



Over 653,000 people are served by Kansas City's sewer system


27 satellite communities

Two types of sewer systems

Combined Sewer System  
Separate Sanitary Sewer System

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## Combined Sewer System



7 Basins

58 Square Miles

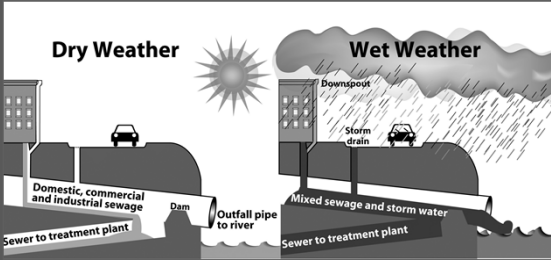
1,050 miles of pipe

Planned Improvements:

- Separation Projects
- Neighborhood Sewer Rehabilitation
- Storage Projects
- Green Infrastructure
- System Improvements

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## Combined Sewers & Overflows



**Dry Weather**

Domestic, commercial and industrial sewage

Sewer to treatment plant

**Wet Weather**

Downspout

Storm drain

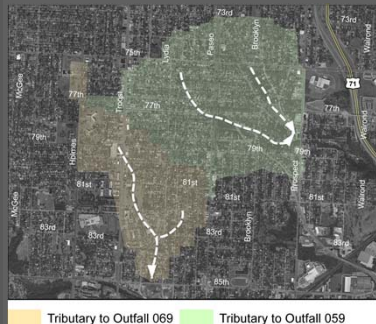
Mixed sewage and storm water

Outfall pipe to river

Sewer to treatment plant

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## Middle Blue River Basin



2 Watersheds

3.5 Million Gallons of Anticipated Overflow

744 Acres in Total

Tributary to Outfall 069

Tributary to Outfall 059

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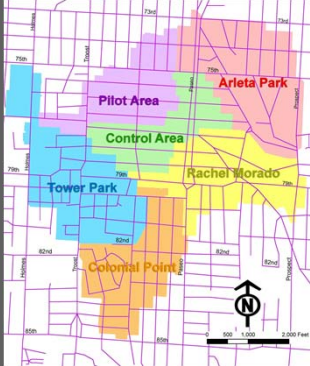
## Green Infrastructure

\$28 million for green infrastructure pilot projects and partnerships

\$40 million for the Middle Blue River Green Infrastructure Project

Work includes:

- Sewer repairs
- Curbs and sidewalks
- Raingardens and bioswales
- Utility relocation
- Street repair




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## The Pilot Area

### Commercial Corridor – Troost Avenue



### Residential Street



Photos: David Dady, URS

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## The Pilot Project Process

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## Public Involvement = Informed Designs



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## Neighborhood Involvement



On the street meetings  
Breakfast meetings  
Door-to-Door Outreach  
Rain Barrel Workshops  
Mailers and Signage

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## We came to talk about a Combined Sewer Overflow Project

They came to talk about:



- Curbs
- Sidewalks
- Traffic Speed
- Trash Collection
- Snow Removal
- Safety

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### Coordination and Collaboration

Within the department, with other city departments and with outside agencies and organizations

Allowed for the City to

- be efficient with its resources;
- share ideas; and
- reduce the impacts on residents and business owners.



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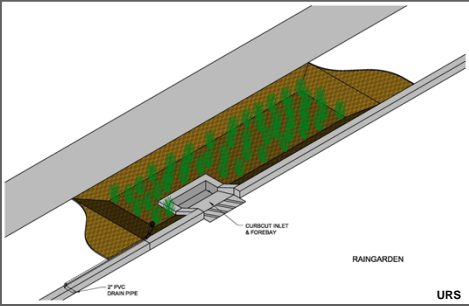
### We Installed



- Rain gardens
- Bioretention gardens
- Cascades
- Curb extensions
- Porous pavers
- Porous sidewalk

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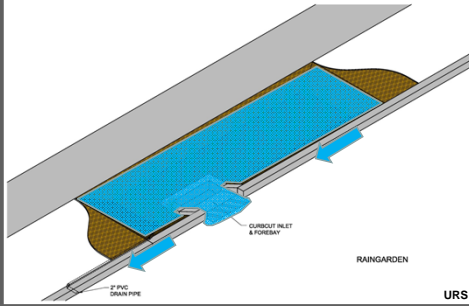
### Rain Gardens



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### Rain Gardens



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### Rain Gardens: Retrofit between existing curb & sidewalk



Rain Garden (Wayne Avenue, north of 75<sup>th</sup> Street)

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### Rain Gardens



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### Rain Gardens – Soil Preparation is Critical

URS Green Solutions, Kansas City

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### Rain Gardens – Do They Infiltrate?

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### Cascades: Stair-stepped gardens on slopes

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### Cascades

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### Curb Extensions with Below-Grade Storage

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### Curb Extensions with Below-Grade Storage

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### Curb Extensions with Below Grade Storage




- Stormwater Storage
- Traffic Calming
- Sidewalks (porous)

Photos Courtesy of URS Corporation

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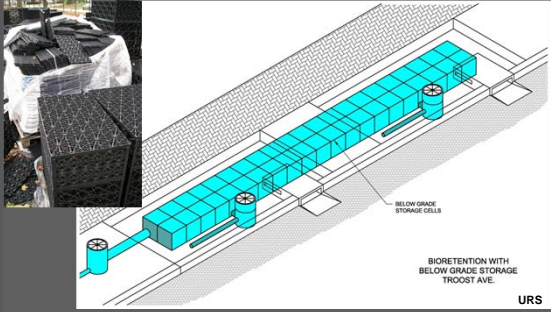
### Curb Extension Rain Garden



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### Porous Paver Sidewalks




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### Porous Paver Sidewalks




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### Porous Paver Sidewalks



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### Porous Concrete Sidewalks



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### Porous Concrete Sidewalks



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### Evaluating Green Infrastructure Designs



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### Evaluating Green Infrastructure Designs



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### The good things we thought about in advance

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### Involved the Neighborhood



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### Diversified the Types of BMPs



Detention Storage

Porous Pavements

Vegetated Infiltration

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## Used readily available materials and flexible design



Pipes were used on residential streets.



Cubes used on commercial streets with lots of utilities

## Combined Native and Ornamentals



## Education



## Coordination of Projects

Overlapped Construction with other City Departments for maximum efficiency and use of resources

Coordination with utility companies resulted in moving up neighborhood gas line work to coincide with project area construction



## Lessons Learned...

## Construction Sequencing



Late plantings mixed with drought and high heat required extra watering and plant replacement costs




### Porous Pavement Issues

Wooded Neighborhoods and Construction Projects Pose Maintenance Challenges




Photos: David Dods, URS

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### Trash



Ended up in the gardens...





...or ended up in the storm drains



Photo: David Dods, URS

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### Theft






Plants

Metals


Underground Storage

Photo: David Dods, URS

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### Vandalism

Crate Storm 2010




River Rocks

Underground Storage Crates

Permeable Pavers

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### Commercial Corridor Utility Conflicts

Even when they tell you where they are they are somewhere else




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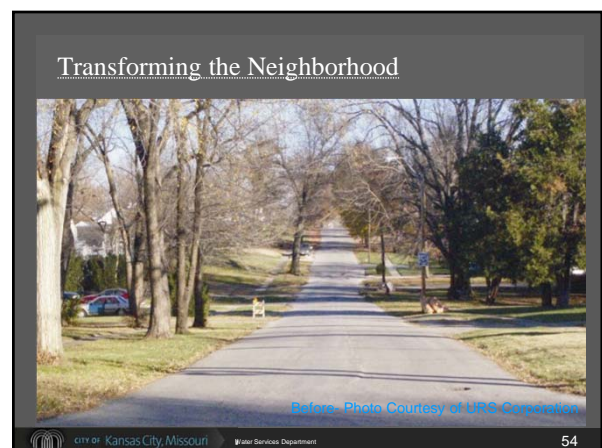
### Managing Expectations





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### Transforming the Neighborhood

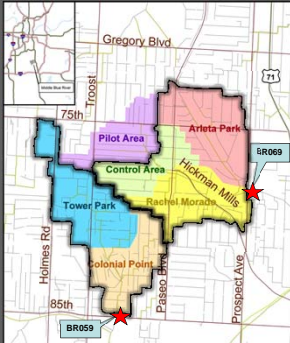


After- Photo Courtesy of URS Corporation

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### Next Phases of the Project



**Design Professionals:** Burns & McDonnell, CDM Smith, CH2M Hill, Phronesis

**Contractor:** TDB

**Description:**  
**Total Area:** 644 Acres  
**Total Volume Capture:** 2.52 MG  
**Design Storm:** 1.4 inch/hour

Design Competition underway to determine contractor selection

**Design Competition Completion:** March 2013

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### Kansas City's Overflow Control Program



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