1. Philadelphia Water Department
2. GIS and PWD
3. Green City, Clean Waters Program
4. What is Green Stormwater Infrastructure (GSI)
5. Area Wide Planning
6. Site Suitability Analysis
7. Enterprise Data Model for GSI
We provide the City with integrated water, wastewater, and stormwater services

Vision: To become America’s model 21st century urban water utility

- 1.6 million drinking water customers
- 2.3 million wastewater customers
- 3,000 miles of water mains
- 3,700 miles of sewer
- 3 water treatment facilities
- 3 sewage treatment plants
- 522 million gallon average daily capacity
Plan Implementation

25-year plan to reduce pollution in our rivers and streams due to combined sewer overflows.

Green stormwater infrastructure (GSI)
Green Stormwater Infrastructure (GSI)
Swale

Stormwater from road flows into swale.

- Stormwater flows downhill into swale from surrounding area.
- Water filters through soil.
- Plants filter water and enhance streetscape.
Stormwater Bumpout

Plants filter water and enhance streetscape.
Water filters through soil.

Stormwater flows from street into bumpout.

Stone and other materials provide additional stormwater storage.
Neighborhood Stormwater Potential Inventory & Analysis
Neighborhood Analysis

Kensington AOA

Total Area: 450 acres

Mix of Landuses:
- Parks
- City Owned Facilities
- City Owned Vacant
- School Properties
- Residential
- Commercial
Neighborhood Analysis

Impervious Cover

- Total Area: 450 acres
- Pervious: 100 acres
- Total Impervious Area: 350 acres (78%)
  - 140 acres ROW
  - 50 acres ground
  - 160 acres roof top

Area Goal:
150 greened acres
Neighborhood Analysis

Opportunities for Public GSI

ROW Already Managed

8 acres of ROW drainage area is already being managed by street SMPs
Neighborhood Analysis

Opportunities for Public GSI

- **ROW Already Managed**
- **Recommended Street Projects**

40 acres can be managed following standard GSI design guidelines
Neighborhood Analysis

Opportunities for Public GSI

- **ROW Already Managed**
- **Recommended Street Projects**
- **City Owned Parks**
- **12 Acres** of drainage can be managed on Park Sites

4 of these acres could be managed in the ROW but would be more cost effectively managed on the parks.
Neighborhood Analysis

Opportunities for Public GSI
- ROW Already Managed
- Recommended Street Projects
- City Owned Parks

Opportunities for Private GSI
- REGS
- SMIP/GARP

13 Acres Managed by SMIP/GARP Applicants
Neighborhood Analysis

Opportunities for Public GSI
- ROW Already Managed
- Recommended Street Projects
- City Owned Parks

Opportunities for Private GSI
- REGS
- SMIP/GARP
- Future Development
- Future SMIP/GARP
Neighborhood Analysis

Opportunities for Public GSI
- ROW Already Managed
- Recommended Street Projects
- City Owned Parks

Opportunities for Private GSI
- REGS
- SMIP/GARP
- Future Development
- Future SMIP/GARP

Additional Opportunities
- City Owned Facilities, Vacant, Parking
- Schools
- Residential Roof
Preliminary Site Analysis Process in GIS
Preliminary Site Analysis Process in GIS

- Site is identified added to Analysis Queue
- Drainage areas manually drawn
- Drainage Area Classified by GSI potential based on criteria:
  - Slope
  - Direction of flow
  - Utilities in place (gas, water, power, etc.)
  - Road function
  - Unique constraints
- Attributes are completed
- High & Medium Potential Drainage Areas Identified
- Conceptual GSI Footprints Drawn
- Summary Report prepared and shared with staff.
Kemble Park

- Combined Sewer Inlet
- Street Flow
- 2" Contours

Drainage Area Feasibility

- High Potential
- Medium Potential
- Low Potential
Editing Workflow in GIS - Tools

- Versioning enabled editing environment (10 active editors)
- Automated nightly database change reconciliation & posting to master database & compression
- Attribute Assistant
  - Automated Unique IDs and field population
- Attribute Domains
SDE Domains to manage standardized dropdown lists
**KEMBLE PARK**

**Existing Conditions**

Program Type: Park  
Address: 5643 Ogontz Ave  
Owner: City of Philadelphia  
Council District/Person: B | Cindy Bass  
Watershed: Tacony/Upper Frankford Watershed  
PPC/Neighborhood: Upper North | Ogontz  
PWS GSP: Planning District 3

Site Conditions: PPR Park Asset located in a lower elevation than surrounding streets.

Potential Drainage Area ("High"): 57,715 SF (1.32 acres)  
Max Potential Drainage Area ("High" + "Medium"): 252,625 SF (5.80 acres)

Opportunity/Constraint:

1. Proposed SMP Type: rain garden  
   - Propose capturing ROW DA from Ogontz, Chew & N 17th St.  
   - Parallel utilities in footway include a water lateral and gas lines.

Opportunity/Constraint:

2. Proposed SMP Type: stormwater garden  
   - Propose capturing ROW DA from Chew, Virginia & N 16th St.  
   - Parallel utilities in footway include a water lateral.

Opportunity/Constraint:

3. Proposed SMP Type: infiltration storage trench  
   - Propose capturing ROW DA from Chew, Virginia & N 16th St.  
   - Parallel utilities in footway include gas lines.

Opportunity/Constraint:

4. Proposed SMP Type: infiltration storage trench  
   - Propose capturing ROW DA from N 16th  
   - Parallel utilities in footway include a water lateral and gas lines.

Utilities Sources Referenced: PGW gas plats, ArcGIS, HSP
GSI Data Model

1. Modeling GSI Assets in GIS
2. GSI Field Maintenance Reliance on GIS
Cataloging GSI within Stormwater Data Model
Cataloging GSI within Stormwater Data Model

4 Feature Classes Added to Accommodate GSI
Cataloging GSI within Stormwater Data Model

6 Feature Classes
Modified to Accommodate GSI

4 Feature Classes
Added to Accommodate GSI
Cataloging GSI within Stormwater Data Model
GSI Outgrowing Stormwater Data Model

- Database Schema Modifications
- Database Query Confusion/Not Intuitive
- Field Maintenance Issues
New GSI Data Model
GSI Maintenance & Monitoring: Cityworks
GSI Maintenance & Monitoring: Field Inspection Maps
GSI Maintenance & Monitoring: Protocols

**Surface Maintenance**
- Remove trash, sediment, organic debris
- Apply mulch
- Remove invasive vegetation
- Prune trees and shrubs
- Water trees and shrubs

**Subsurface Maintenance**
- Jet pipes
- Vacuum clean structures
Thank you!

Jessica Gould, GISP
jessica.gould@phila.gov

Mary Ellen McCarty, GISP
maryellen.mccarty@phila.gov