PWD’s Stormwater Billing and Crediting Program

- Parcel-based billing program implemented in 2010
- Non-residential customers are charged for stormwater based on GA and IA
- FY2018 monthly charges are $4.91/500 sf of IA and $0.63/500 sf of GA – total of $0.13/sf per year
- Customers can appeal, apply for existing credits, and are eligible for up to 80% credit for installing GSI practices
- Credits must be renewed every 4 years
- PWD offers incentives (e.g. CAP program, Green Roof Tax Credit, SMIP grants, Design Assistance Program)
AKRF’s Design Assistance Role

- Work with customers to provide design assistance for stormwater credit projects
  - Conceptual designs
  - Financial analysis
- Worked with approx. 250 customers
- Help to increase awareness and education through public presentations to local community groups and one-on-one, face-to-face meetings with property owners
Stormwater Retrofit Design Assistance

- **Assess Feasibility**
  - Data Collection – Site Visit and Questionnaire
  - Determine SMP Type
  - Design Issues

- **Review the Importance of an Inspection and Maintenance Program**
Assess Site Feasibility
Assess Site Feasibility

- Evaluate existing drainage patterns and land use
- Desktop Due Diligence – Limited Phase I
- Subsurface utility investigation
- Soil Borings and Infiltration Testing
  - Urban Fill and soil profile variability
Determine SMP Type

- Large-scale surface practices are the most cost effective
- Small-scale surface practices are next (e.g. rain gardens/bioretenion facilities)
- Porous Pavement, Subsurface Storage and Blue Roofs are recommended for highly constrained properties
- Rainwater Harvesting offers multiple savings
- Green Roof is most expensive
AKRF Cost Curve for Vegetated SMPs

\[ y = 27.175x^{-0.257} \]
Design Issues

- Infiltration vs. Extended Detention

- Diversion and Conveyance Piping
  - Internal/External Downspouts
  - Diversion piping sized to convey first inch
  - Safe Overflow – on-site vs off-site

- Avoid existing utilities!

- Landscaping Plan – emphasis on drought tolerant native species

- Simple approach and pre-treatment minimizes risk of clogging (e.g. sediment, debris, trash, etc.)
Findings

- Retrofit costs vary significantly based on:
  - Site constraints/opportunities
  - SMP type
  - SMP size

- Stormwater fees are approximately $5,700 per acre per year (or $0.13 per sf per year).

- For most properties, the cost to retrofit is greater than $40,000 per acre (or $1 per square foot), often significantly higher.

- Customers are often not able to invest at this level due to lengthy payback periods.

- SMIP grant program will pay up to $100,000 per acre (or $2.30 per sf) for SMPs.
Example

Project Cost and Stormwater Fee Breakdown

- Total Project Cost: $109,000
- SMIP Grant Amount: $100,000
- Customer Contribution: $9,000
- Stormwater Fee: $5,700
Other cost reducing strategies include the following:

- PWD cost share for managing public runoff
- Water reuse
- Regional management
- Offsite mitigation
- Volunteer or in-house labor
- Larger project size (economy of scale)
Concluding Thoughts from Design Assistance

- PWD’s Stormwater Credit Program offers significant potential for reducing customer stormwater charges, however in most cases the credit alone is not significant enough to incentivize private investment.
- The SMIP grant program has resulted in a significant increase in private investment.
- Regional planning helps to identify feasible cost-effective projects over a larger area.
- Simple surface practices work the best (i.e. less chance for clogging) and offer additional social, economic and environmental benefits.
American Street GSI Planning Study

- 14-Block Underdeveloped industrial corridor
- Extended Study Area – 1 square mile
- Proposing GSI to stimulate transformation
- Over-widened right-of-way and underdeveloped area creates opportunity
Project Goals

- Manage 1” of public and private runoff
- Multi-objective
  - Maintain multiple uses – pedestrian, truck traffic, bicycles, public space
  - Preserve industrial character
  - Enhance economic development potential
  - Maintain community connections – schools, green space, trails
  - Design low maintenance systems
  - Enhance safety
Opportunities and Constraints

- Wide ROW
- Contiguous vacant lots
- Few existing street trees & poor sidewalks
- Active community organizations
- Large amounts of IA
- Simple and consistent drainage patterns
American Street Design

- Developed typical layouts and renderings
  - Curbside bioretention areas
  - Curbless design to allow direct sheet flow
  - Modular low-maintenance forebays
  - Slow-release irrigation trenches
  - Access ports for private customers
Major Strategies for Wider Study Area

- Vacant Lots
- Development/Redevelopment Partnerships
- School/Park Retrofits
- Sidewalk Bioretention
American Street Summary

- **Corridor only**
  - 55 greened acres
  - $300 - $400k per greened acre
  - Total Cost is $16.5 – 22M

- **Vacant Lots**
  - 43 Greened Acres
  - $100 - $300k per greened acre
  - Total Cost is $4.3 – 12.9M

- **Schools and Parks**
  - 36 Greened Acres
  - $100 - $300k per greened acre
  - Total Cost is $3.6 – 10.8M

- **Sidewalk Bioretention**
  - 70 Greened Acres
  - $300 - $400k per greened acre
  - Total Cost is $21 – 28M
School District of Philadelphia SWM Project

- Designed and installed 13 GSI facilities on 3 schools
- Projects manage 1 to 1.5 inches of runoff from nearly 9 acres of impervious area (on-site and off-site)
School District of Philadelphia SWM Project

- Educational and aesthetic amenities
- Remove existing asphalt and reduce flow to combined sewer system
School District of Philadelphia SWM Project

- Educational and aesthetic amenities
- Remove existing asphalt and reduce flow to combined sewer system
Minimized cost through on-site disposal of excess soil material
Reduce maintenance costs by using hardy native plants such as black-eyed susans, iris and sedges.
School District of Philadelphia SWM Project

- **School District SWM Project Cost Data**
  - Total Project Cost was $2,144,000 (design and construction)
  - Project Unit Cost is $250,000 per acre
Questions?