



Stormwater Authority of Chester

A Catalyst for the Greening and Revitalization of the City of Chester

December 1, 2017

Presentation Agenda

- Stormwater Runoff – What is it? Why is it a problem?
- Addressing the Stormwater Pollution Challenge
- Stormwater Fee:
 - Why is it needed?
 - How is the fee developed?
 - What is an ERU?
 - How are ERUs Calculated?
- City of Chester Parcel Breakdown and Statistics
- Fee Comparison with other Local Communities
- What will the Stormwater Fee be used for?
- Benefits to the Community
- Case Studies

Stormwater Runoff – What is it?

- When it rains, water either soaks into the ground or travels downhill along the surface as runoff
- Runoff plays an important role in replenishing rivers, lakes, and other waterbodies
- Different land surfaces and slopes affect the volume and speed of runoff



Addressing the City's Stormwater Pollution Challenge

- The Stormwater Authority of the City of Chester, established by City Ordinance No. 17, is the first stormwater authority created pursuant to the Pennsylvania Municipalities Authorities Act, 53 Pa. C.S. Section 5601 et. Seq. (the Authorities Act) in October 2016.
- The City established the Stormwater Authority to **“Protect”** the City & Delaware County's water bodies and groundwater and to safeguard the public health, safety and welfare of the residents of the City.
- **“Take the Lead”** to address stormwater-related issues through planning, management, and implementation of stormwater controls.
- **“Build a Sustainable Community”** through community outreach and implementation of the City's Vision 2020 Climate Adaptation Plan to increase Resiliency and Reduce Flooding
- **“Reduce Pollution”** into its waterways through the implementation of large-scale Green Stormwater Infrastructure
- **“Create Economic Impact”** that will contribute to the revitalization of the City through creating local job and contracting opportunities

Stormwater Runoff – Why is it a problem?

- Impervious surfaces (roads, roofs, and parking lots) increase the volume and speed of runoff which can lead to erosion and surface flooding
- Runoff in urban environments collect sediment, chemicals, nutrients, and bacteria that pollute waterways (Chester Creek, Ridley Creek, and the Delaware River)
- In combined sewer systems, large volumes of runoff can overwhelm treatment plants and cause untreated sewage to overflow to nearby rivers. Sewage and stormwater is discharged through (27) outfalls in the City directly into the watersheds

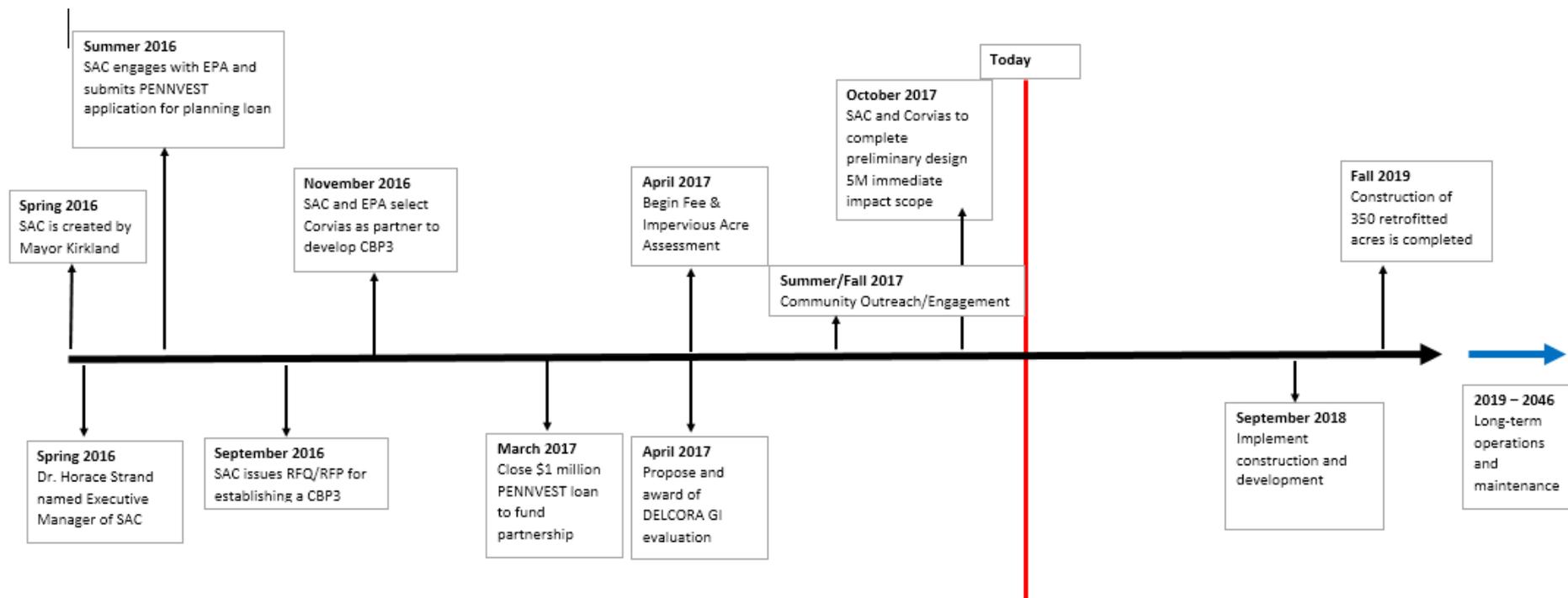


Public Outreach Process

- The Stormwater Authority (i.e. Board members & private partner) have met with a host of stakeholders to inform and educate the various groups about the Stormwater Authority, the CBP3 program, stormwater and community improvements
 - Included representatives from the Residential, Business, Non Profit, Higher Education, and City Council and Staff sectors

Engagement Effort	# of Meetings	Dates
SAC Public Board Meetings	4	February,,May, August, December
City Agency Mtgs (Council, DPW, Finance)	6	August, September 2017
Federal/State Regulator Meetings	5	September 2016, May 2016, September 2017, October 2017
Community and Business Outreach Meetings	9	June – November 2017
Regional Roundtable and Media Events	10	June – November 2017
EPA Technical Assistance 50K Award	>>	November 2016
Chesapeake Bay Trust Grant \$65k Award	>>	January 2017
PennVest Grant \$1M Award	>>	January 2017

Milestones



Stormwater Fee – Why is it needed?

- Provides a funding source for stormwater management needs such as source control, network improvements, and flood mitigation
- Provides funding source for stormwater management program in compliance with NPDES/MS4 permit
- Can generate more capital improvements due to increased bonding authority
- Allows for long-term solutions with a designated revenue source



Stormwater Fee – Regulatory Mandate

- The Clean Water Act (CWA) is the primary federal law in the United States governing water pollution. The goal of the CWA is to restore all “waters of the United States” to their “fishable” and “swimmable” conditions
- As a current Phase II Municipal Separate Storm Sewer System (MS4) permit holder, the City of Chester (the “City”) is required to comply and adhere to the permit requirements issued by the PA Department of Environmental Protection (PA DEP)
- Chester’s combined sewer system was constructed in the early 1900’s when combined sewers were commonplace in urban areas. SAC will conduct a GI evaluation of the combined sewer system to assist Delcora in their long term control plan to reduce CSOs

Stormwater Fee – How Can We Address the Stormwater Challenge and Regulatory Mandate?

- The Stormwater Program is intended to include education, buy-in and investment from the entire community
- The more stormwater generated, the greater the contribution to the problem, so basing the stormwater management fee on the impervious surface area present on each property is an equitable method, because runoff from impervious areas is the primary contributor to the storm sewer system.*
- Although green infrastructure techniques are more cost-effective than their alternatives in the long-term, they do require an up-front investment. Implementing a stormwater fee, instead of relying on general tax revenue, ensures that all members of the community who contribute to the generation of stormwater runoff, and who benefit from stormwater management, will contribute to paying for the solution.*

* Source: PennFuture – Funding Stormwater Management in Pennsylvania Municipalities

Stormwater Fee – How is the fee developed?

- Stormwater fees are allocated based on the amount of impervious land cover per parcel
- Since impervious surfaces generate more runoff, this is considered the most equitable way to distribute stormwater management costs
- Examples of impervious surfaces include:



Rooftops



Parking Lots



Paved Plazas and Walkways

Stormwater Fee – What is an ERU?

- The stormwater fee in Chester is based on an Equivalent Residential Unit (ERU), which equals the average amount of impervious area on a single-family parcel
- 1 ERU = 1,139 square feet (SF) of impervious area

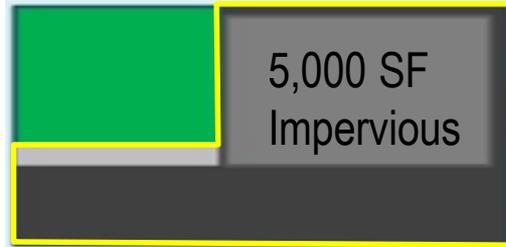


Stormwater Fee – How are ERUs Calculated?

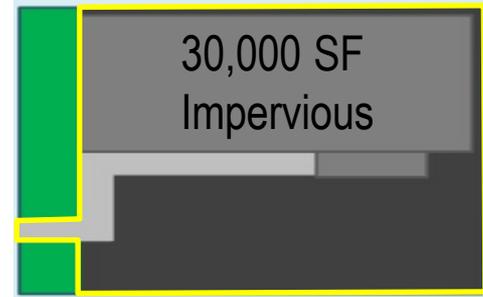
- All parcels will be billed by their number of ERUs
- For simplification, all single-family residential parcels will be considered to be 1 ERU
- All other parcels will calculate their Total ERUs based on their impervious cover area:
 - Total ERUs = Impervious Cover (SF) / 1,139 (SF)
- Examples (impervious surfaces are shown in grey):



Single-family
1 ERU (Always)



Non-Single Family
 $5,000 \text{ SF} / 1,139 \text{ SF} = 4.4 \text{ ERUs}$

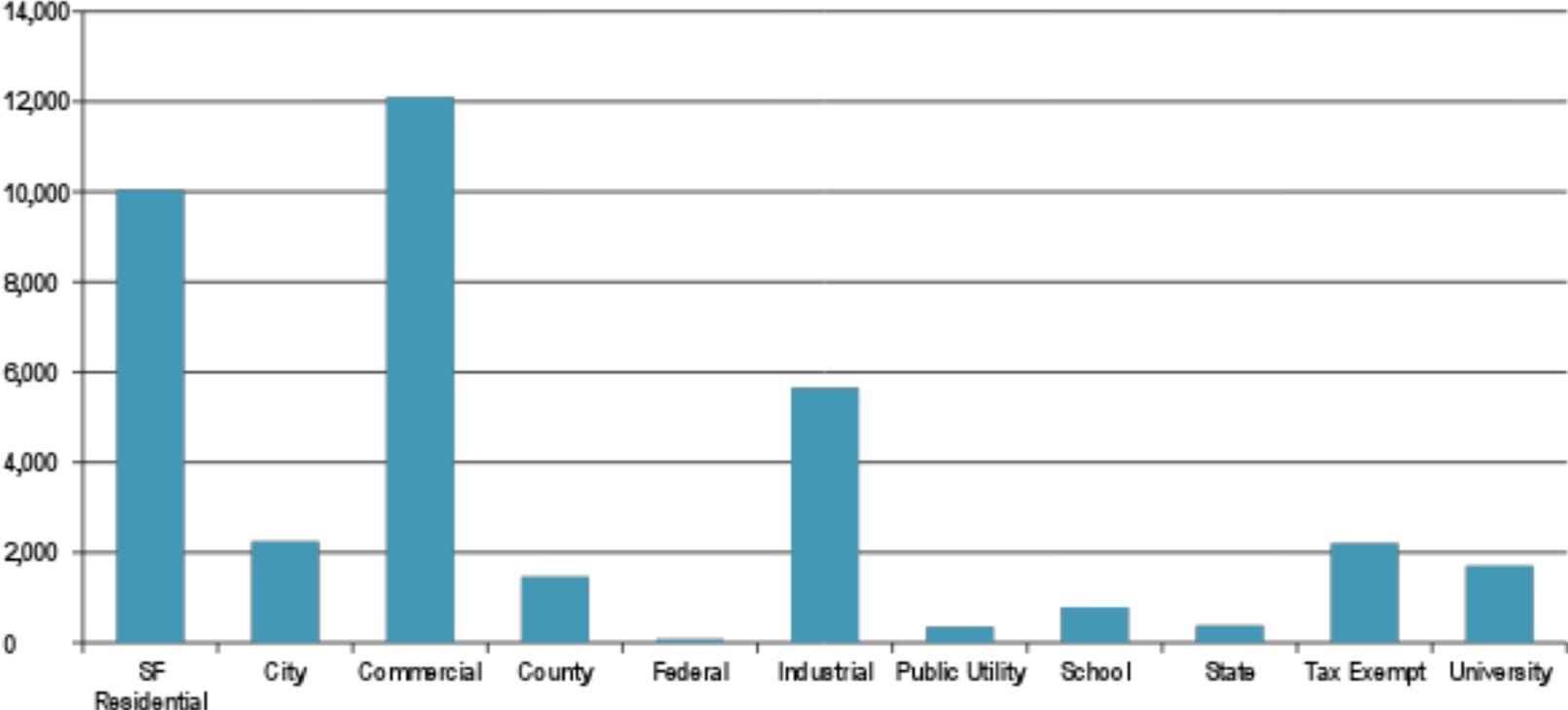


Large Non-Single Family
 $30,000 \text{ SF} / 1,139 \text{ SF} = 26.3 \text{ ERUs}$

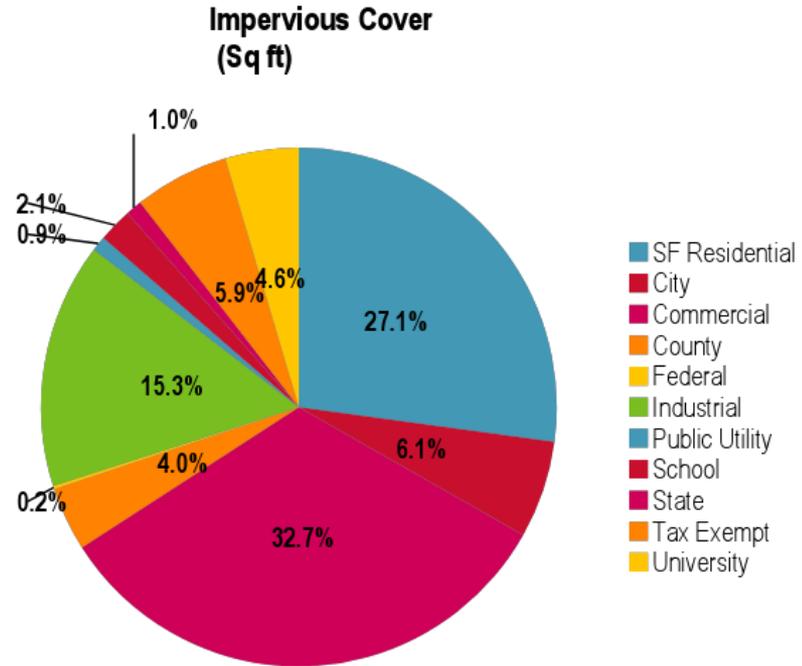
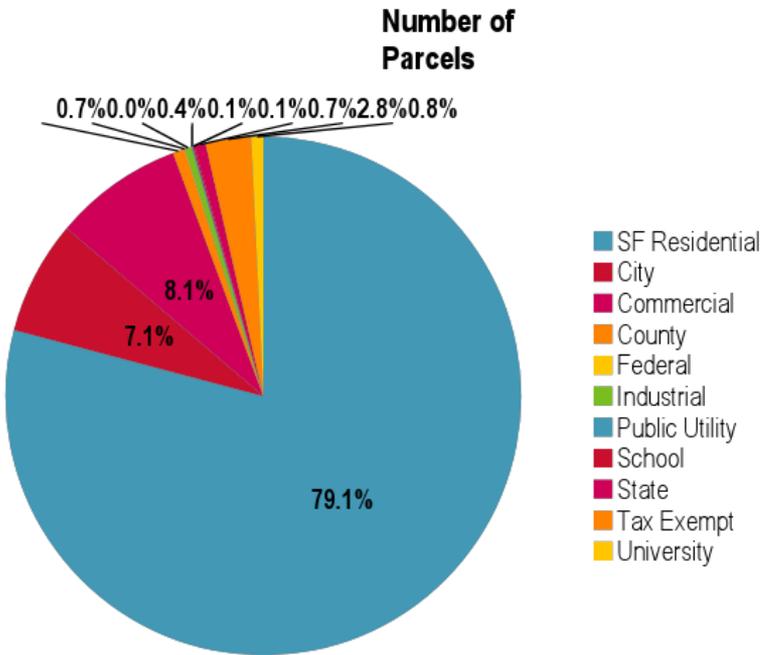
Parcel Type Breakdown for the City of Chester

Land Use	Number of Parcels	Developed Parcels	Impervious Cover (sq ft)	Average Impervious Cover for Developed Parcels	ERUs
SF Residential	11,048	10,040	11,439,185	1,139	10,040
City	990	217	2,558,665	11,791	2,246
Commercial	1,131	796	13,780,527	17,312	12,095
County	103	91	1,673,415	18,389	1,469
Federal	6	6	89,160	14,860	78
Industrial	59	47	6,446,782	137,166	5,658
Public Utility	12	9	394,846	43,872	347
School	15	13	895,902	68,916	786
State	98	25	427,435	17,097	375
Tax Exempt	397	253	2,502,496	9,891	2,196
University	106	91	1,943,704	21,359	1,706
Total	13,965	11,588	42,152,116		36,996

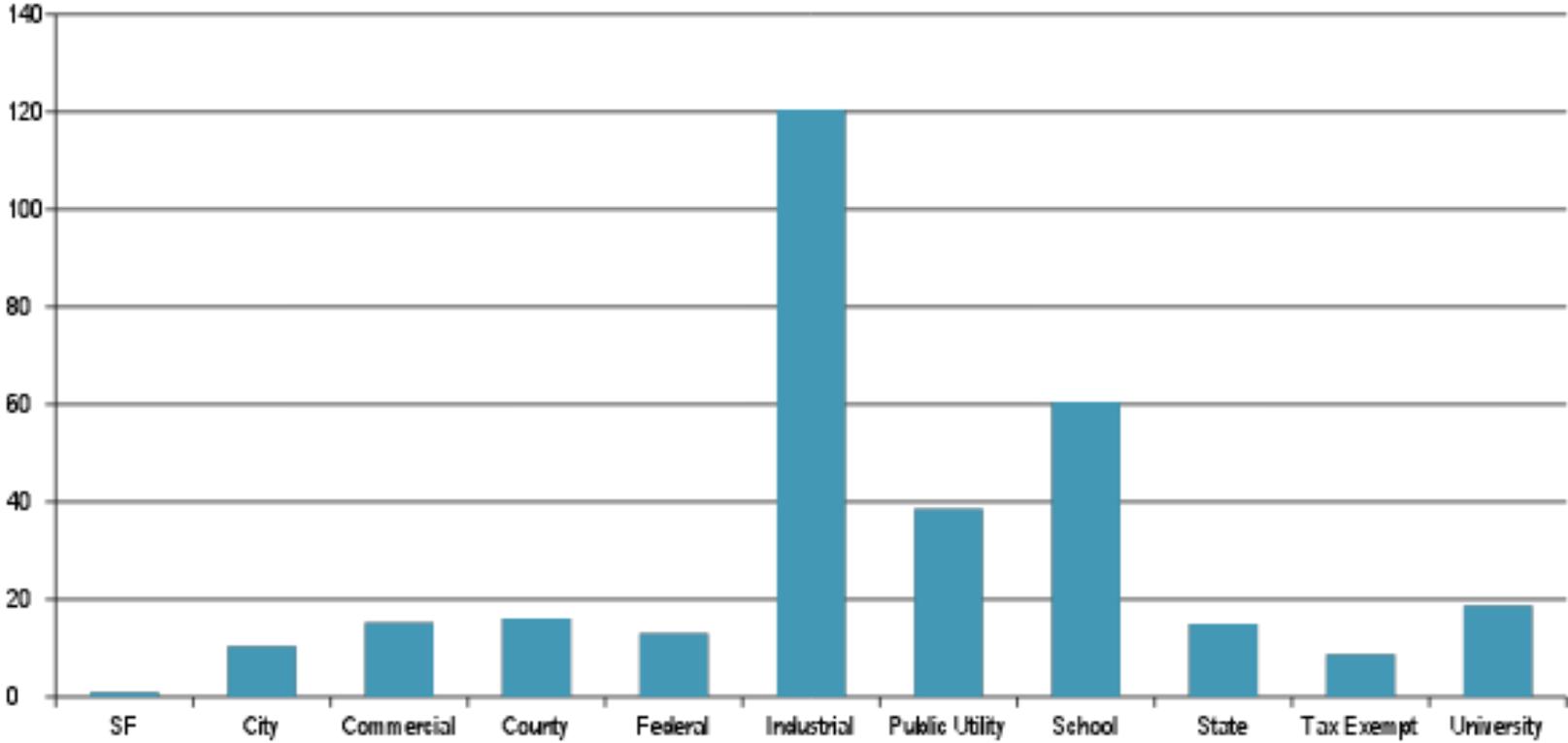
Total Number of ERUs by Property Type



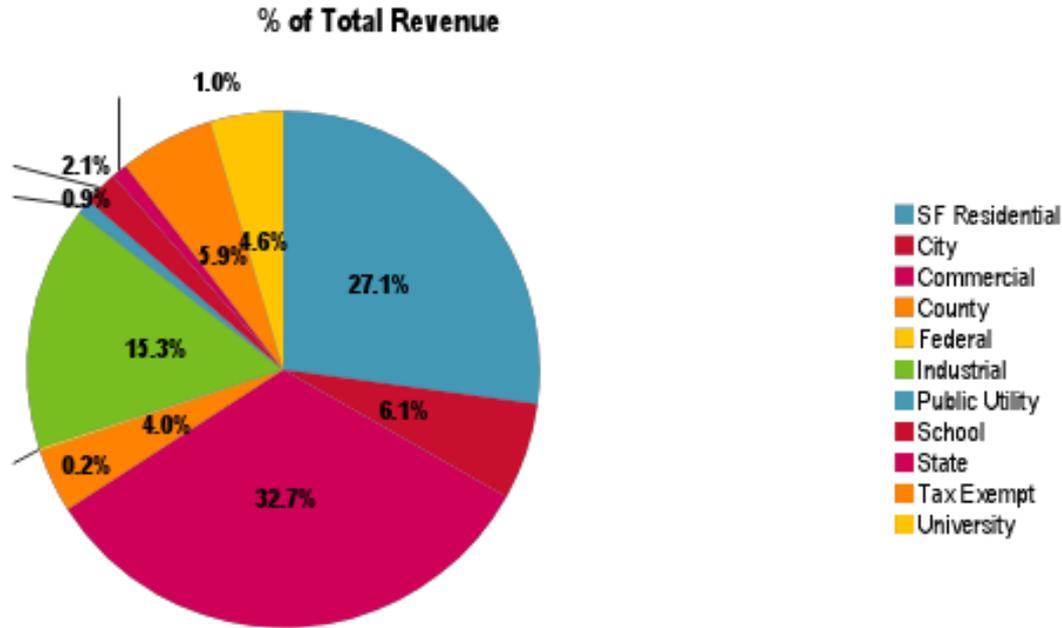
Number of Parcels vs. Impervious Cover



Average ERUs Billed per Property Type



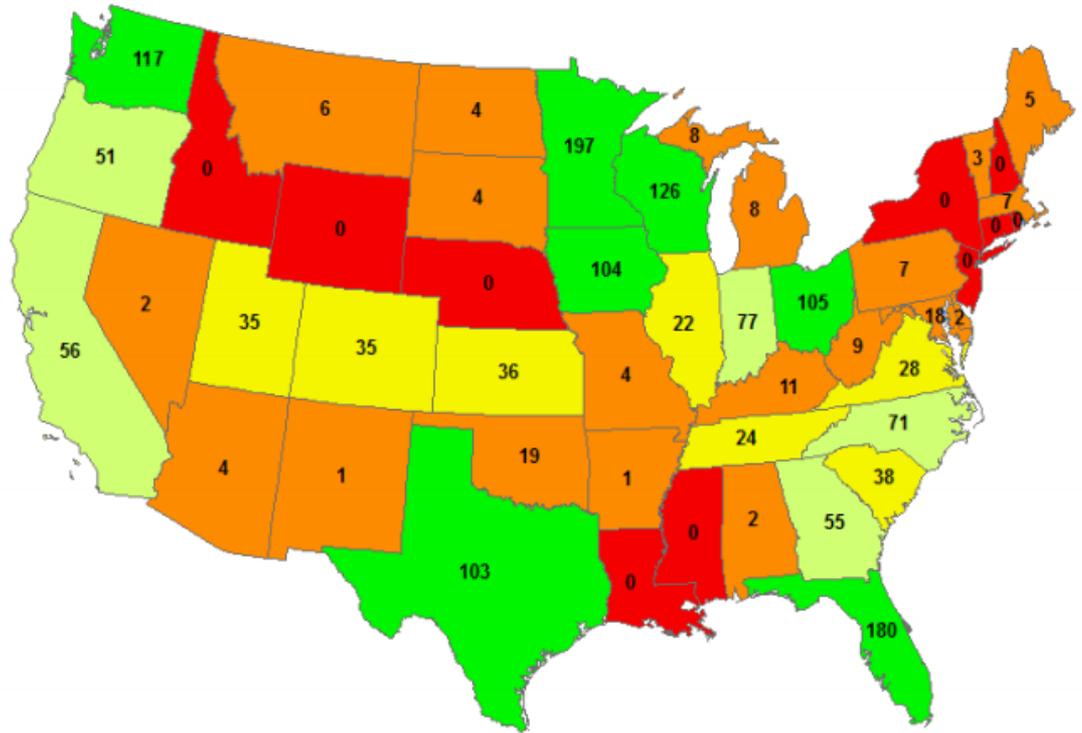
Revenue Distribution



The revenue distribution will mirror the impervious cover by land use type as this was the criteria for assigning billing units.

Stormwater Fees: Commonplace for Many Communities

- Based on the 2016 survey's findings, WKU estimated over 1,550 stormwater utilities exist across the country.
- Multiple Communities in Pennsylvania are collecting stormwater fees:
 - Hampden Township, Jonestown, Lancaster, Meadville, Mount Lebanon, Philadelphia, and West Chester
- Neighboring municipalities have shown interest via engagement and community outreach attendance



* Source: Western Kentucky University Stormwater Utility Survey, 2016

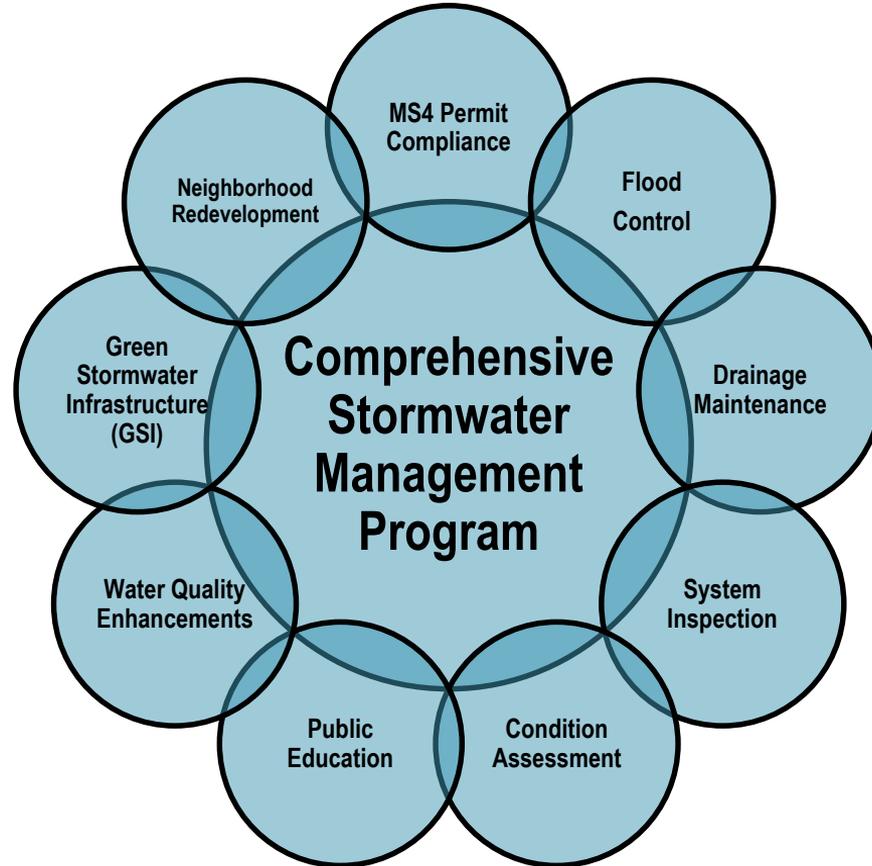
Fee Comparison with Other Communities

Bill for Single Family Residential

Wilmington, DE	<ul style="list-style-type: none">• > 2,400 sq. ft. - \$21.78/month• 1,300 to 2,399 sq. ft. - \$12.27/month• 800 to 1,299 sq. ft. - \$7.18/month• 0 to 799 sq. ft. - \$4.95/month
Philadelphia, PA	<ul style="list-style-type: none">• \$14.71/month
Baltimore, MD	<ul style="list-style-type: none">• Tier 3 - \$10.00/month• Tier 2 - \$5.00/month• Tier 1 - \$3.33/month
Lancaster, PA	<ul style="list-style-type: none">• \$9.12/month
Chester, PA	<ul style="list-style-type: none">• \$8.25/month
Mt. Lebanon, PA	<ul style="list-style-type: none">• \$8.00/month
Meadville, PA	<ul style="list-style-type: none">• \$7.50/month
Jonestown, PA	<ul style="list-style-type: none">• \$6.67/month

The Authority has considered a range of possible rates depending on the revenue needs of the utility. A final rate will be approved after more discussion by the Board.

What will the Stormwater Fee be used for?



Types of Projects to be Implemented

- Rain Gardens
- Right-of-way Bioswales
- Tree Trenches
- “Green Streets”
- Permeable Pavement
- Turf Fields
- Constructed Wetlands
- Green Roofs
- Catch Basin Retrofits
- Drainage Improvements

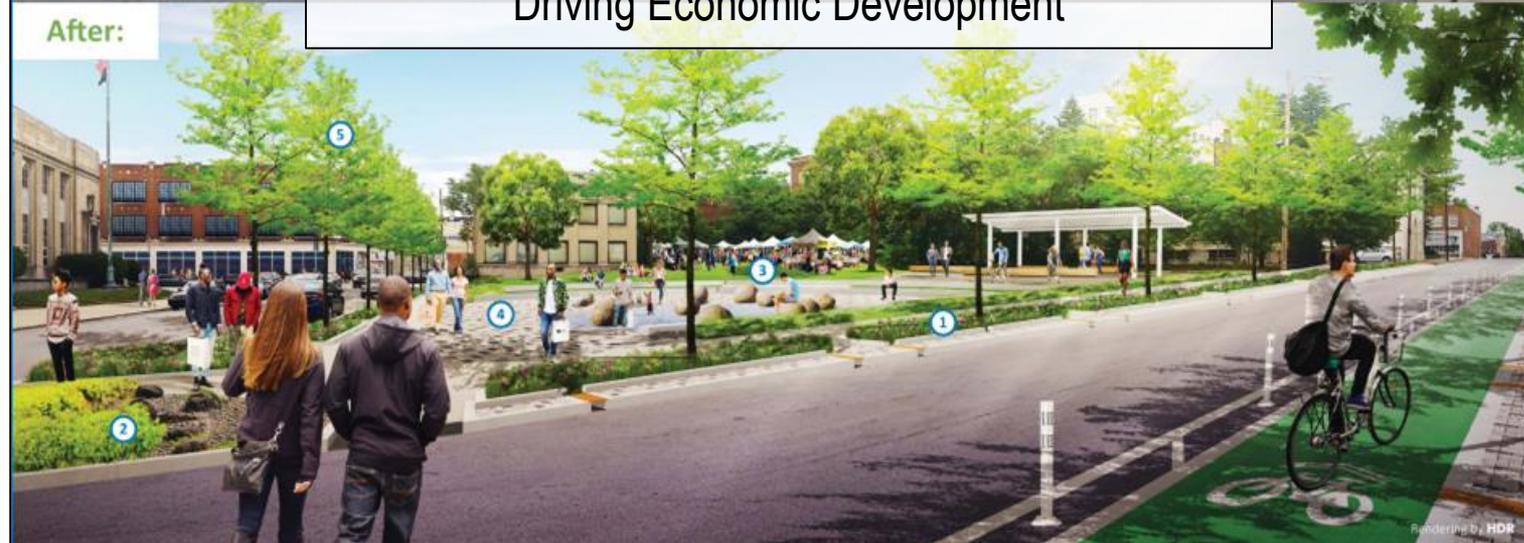


Before:



Driving Economic Development

After:



- 1 **Streetside Rain Gardens** collect stormwater runoff from the gutter and beautify the corridor using native flowers, grasses, and trees. They can also extend into the roadway to promote traffic calming on busy streets.
- 2 Streetside Rain Garden **"bump-outs"** reduce the crossing distances at intersections to improve public safety in pedestrian areas.
- 3 Green infrastructure in **open spaces** can accommodate recreation and public events such as concerts and markets.
- 4 **Porous Pavement** is incorporated into the water feature as an attractive and functional way to manage surface runoff.
- 5 **New tree plantings** intercept rainfall, provide shade, reduce ambient temperatures, and enhance public spaces.

Before:



After:

Improving Our Community



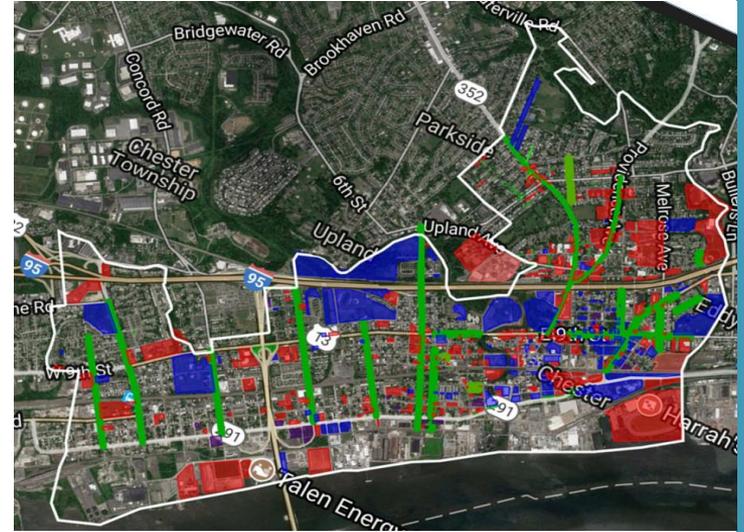
- ① **Permeable Pavement** in the parking bays is an attractive and subtle way to add stormwater management to previously impervious areas.
- ② **Streetside Rain Gardens** can be used in combination with permeable pavement to enhance aesthetics and offer additional stormwater storage capacity.
- ③ **Pedestrian paths** can be constructed using permeable pavements or sloped to drain stormwater runoff to adjacent rain gardens.
- ④ **Rain Gardens** incorporate native flowers and vegetation to manage large amounts of stormwater runoff and add landscaping features to open spaces.
- ⑤ **Turf fields** and other permeable play surfaces can replace impervious surfaces such as asphalt to reduce the strain on site drainage systems and improve public safety.
- ⑥ Green infrastructure practices can include **educational signs** to explain their function and benefits to the community and the environment.

Rendering by HDR

Site Screening

400 sites were reviewed and the 26 sites with the greatest potential to meet program goals were selected.

The following criteria were used to prioritize the sites:



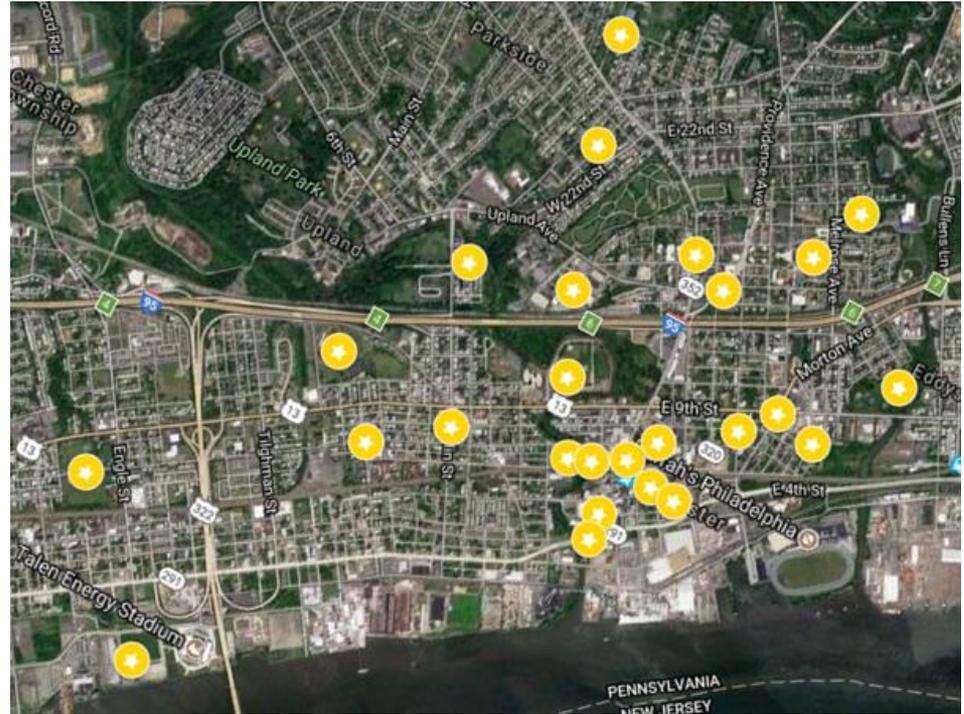
- **Significantly Large Impervious Area.** Managing these areas will aid in addressing flooding and water quality concerns.
- **Largest Publicly-Owned Open Spaces.** Public property will likely require less time to implement related to real estate coordination or acquisition.
- **Large Private Parcels Owned by Private Partners Identified in the Green Stormwater Infrastructure Plan.** These private partners may have a pre-existing relationship with the City which allow for a more efficient implementation.
- **Highest Potential for Economic Growth, Community Revitalization, Recreational Facilities, Public Education, and Community Partnerships.** These reflect the overall program goals and could provide the greatest benefits to residents and local businesses.

Projects Currently Being Implemented

City-wide evaluation identified 26 priority project locations.

Five projects were recently submitted to PENNVEST for construction funding:

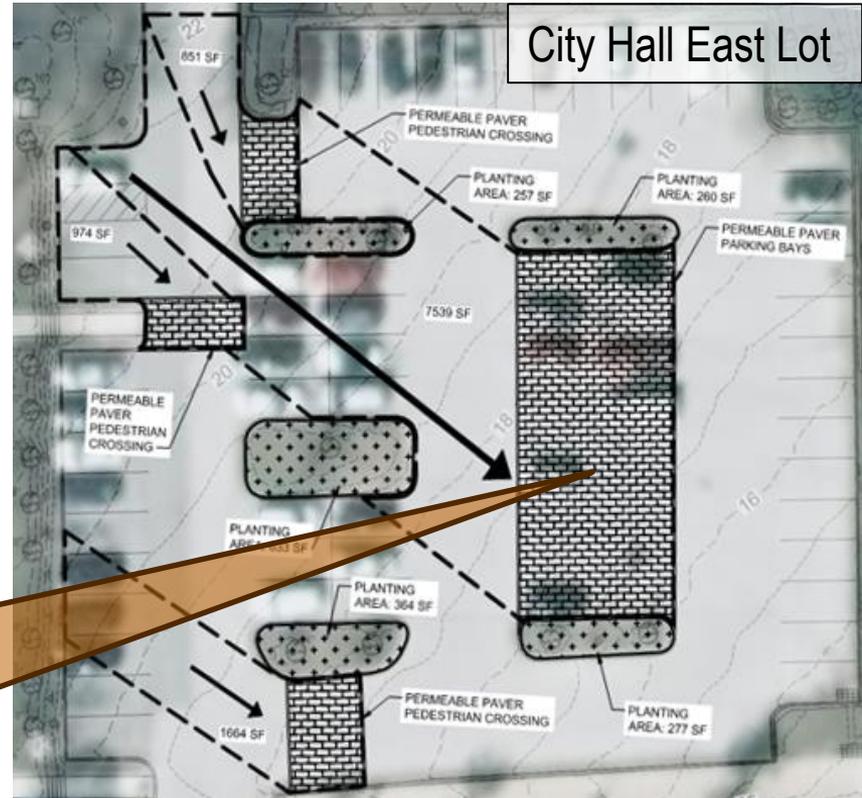
- City Hall Permeable Pavers
- Chester High School & Eyre Park GSI
- Catch Basin Retrofit Program Pilot
- Veterans Memorial Park GSI
- Eyre Park Greenway



City Hall

Phase 1 Permeable Pavers

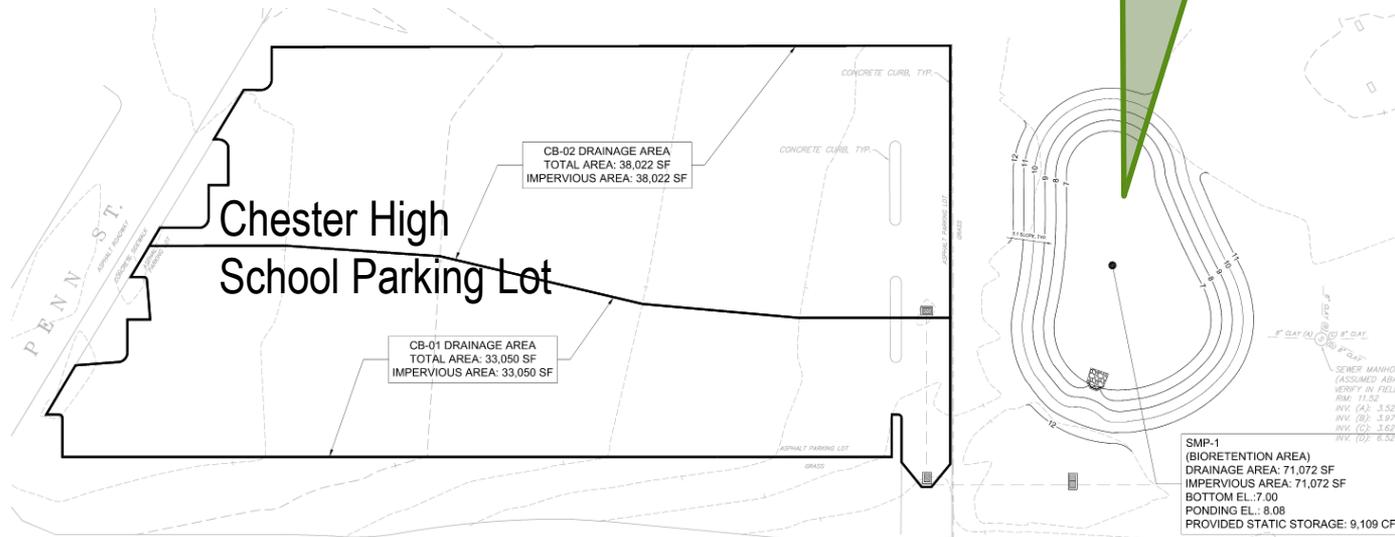
- Permeable pavers in both the east and west parking lots
- Native plantings in the medians
- Subsequent phases will include rain gardens and other surface features



Chester High School & Eyre Park

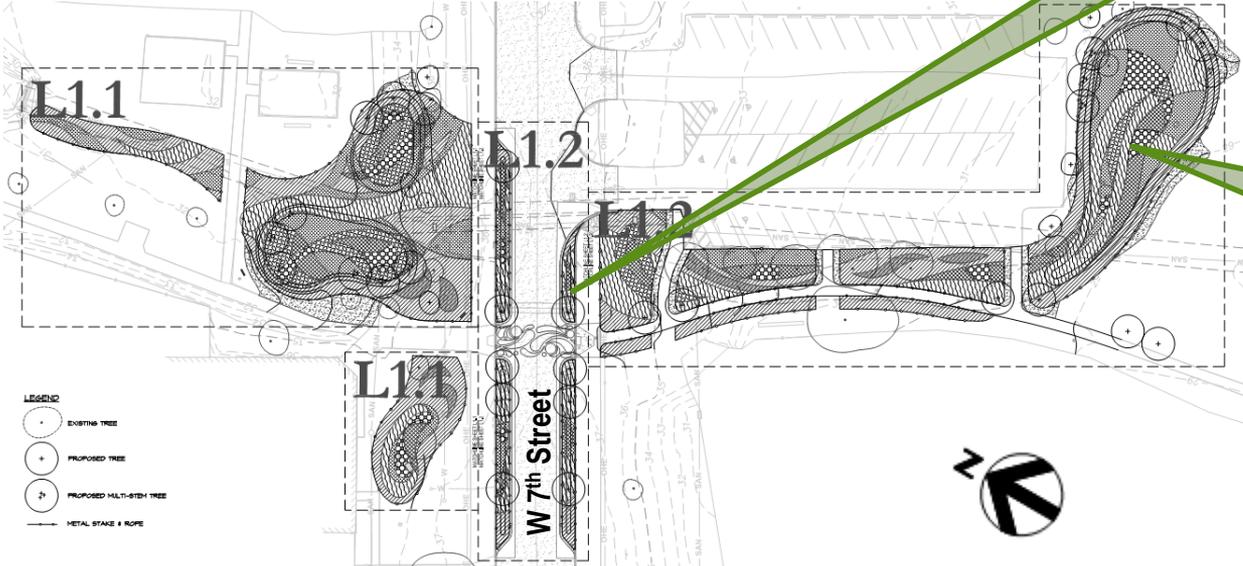
Phase 1 GSI

- Rain garden within Eyre Park to manage runoff from the adjacent parking lot
- Native plantings in the rain garden will manage stormwater and beautify the area



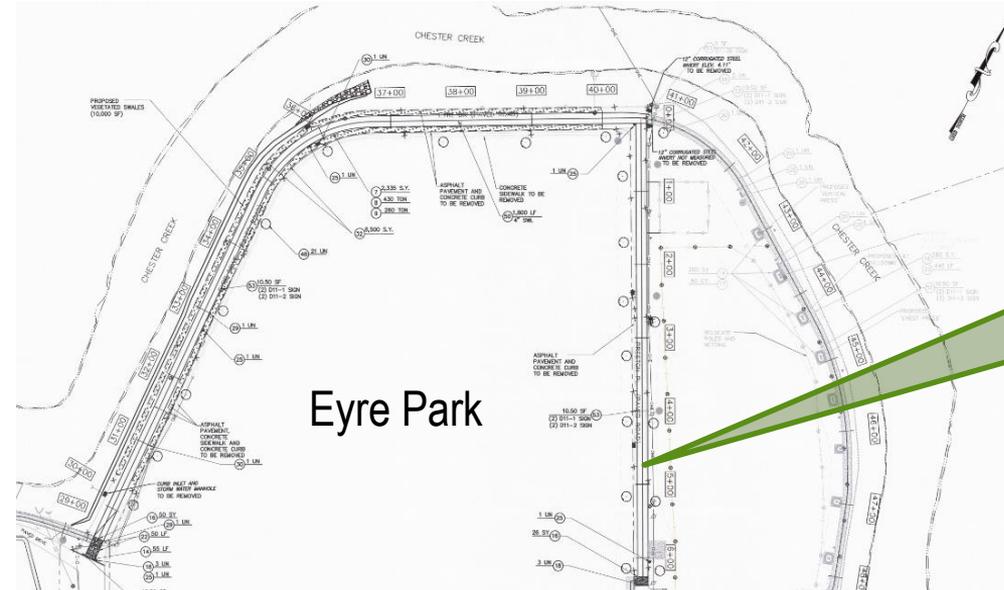
Veterans Memorial Park GSI Project

- Project aims to reduce flooding in the vicinity of Veterans Memorial Park
- Project includes right-of-way bioswales, rain gardens, and native plantings with the park adjacent to W 7th Street



Eyre Park Greenway

- Green walking path for one-third mile within Eyre Park
- Includes vegetated swales and 21 new trees along the path



Eyre Park



Projects Slated For Future Development

Project	Category Scores				Total
	Program Goals	Community Benefits	Project Feasibility	Site Suitability	
	40.0	25.0	20.0	15.0	100.0
Sun Village Park	32.0	21.0	16.8	12.3	82.1
City Hall	29.6	22.5	14.8	13.2	80.1
Triangle Park	29.6	21.0	16.4	12.9	79.9
Edgmont Complete Street	33.6	19.0	13.2	13.8	79.6
Veterans Memorial Park	27.2	20.0	17.6	14.4	79.2
PA 291 Gateway Feature/Complete Street	32.8	20.5	12.0	13.8	79.1
Recreational Park	30.4	19.0	16.8	12.8	79.0
Kerlin Complete Street	32.8	19.0	12.8	14.1	78.7
Chester High School & Eyre Park	30.4	19.0	16.4	12.6	78.4
Widener University Campus	30.4	19.0	15.2	13.5	78.1
Washington Park	31.4	20.0	12.8	13.5	77.7
Talen Stadium & Surrounds	33.6	20.0	10.8	12.9	77.3
Chester Park	28.0	19.5	16.0	13.5	77.0
Providence Complete Street	30.4	19.0	13.2	14.1	76.7
Educational Park (CSO 22 Outfall)	30.4	19.5	17.2	9.4	76.5
E 8th and Potter Intersection & Corner Parks	28.0	20.5	14.0	13.8	76.3
Pulaski Memorial Park	30.4	19.5	15.6	10.2	75.7
E 9th and Morton Intersection	31.2	19.0	14.0	11.3	75.5
Lloyd Complete Street & Pocket Park	26.4	19.5	13.2	13.8	72.9
Chester Community Charter School	28.8	16.5	13.6	12.6	71.5
Parker Manor	28.8	13.5	15.2	13.2	70.7
Showalter STEM High School	25.6	18.0	14.4	12.3	70.3
SAC/DELCORA/Charter School Parking Lots	24.0	16.5	14.4	14.4	69.3
Crozer Medical Center	26.4	17.0	10.8	11.4	65.6
E 7th & Chester PD Parking Lots	23.2	13.0	15.2	12.9	64.3
Crozer Street Bioswales	16.8	15.5	14.4	14.4	61.1

The top sites for green infrastructure projects in Chester have been identified and presented to the stakeholders throughout the City.



Benefits to the Community



Revitalize the community



Create jobs and economic growth



Increase property values



Improve public health and safety



Improve water quality



Mitigate surface flooding



Provide recreational facilities



Create community partnerships



Provide public education opportunities



Preserve historic landmarks

Philadelphia “Clean & Green” Case Study

The Philadelphia LandCare program has created a model of landscape treatment and urban revitalization that addresses the challenges of land vacancy. Much of the work completed in this program falls within the defined scope of the Stormwater Authority of Chester. The program has yielded the following results:

- After a vacant lot is “cleaned and greened,” the value of nearby homes increase nearly 20%
- The “clean and greened” lots have been associated with a marked reduction in gun violence
- Philadelphia invested \$15.3 million in the program and yielded a total housing gain of \$3.5 billion. Therefore, for every dollar spent housing wealth increased by \$224.
- The greening of neighborhoods have been linked to increases exercise and reduced stress
- The program created a re-entry initiative to hire formerly incarcerated individuals

Source: Pennsylvania Horticultural Society

Prince George's County Stormwater CBP3 Case Study

The Community-Based Public-Private Partnership created by Prince George's County and the EPA has implemented a proven model similar to the CBP3 with the Stormwater Authority of Chester:

- Retrofitted 2,000 impervious acres over a three year period for a cost nearly 50% below County estimates
- Created a new industry for local businesses that did not exist in the County prior to the partnership
- Approximately 80% of all work went to small disadvantaged businesses
- Established a mentor protege program that engages and develops local small businesses
- More than half of all hour worked were by County residents to ensure the partnership boosted the local economy
- Implemented programs at more than 30 schools within the County to remediate impervious area, beautify property surrounding schools and educate students on environmental benefits of the partnership