Athens Alley Stormwater Infrastructure Improvements Public Meeting

March 18, 2013

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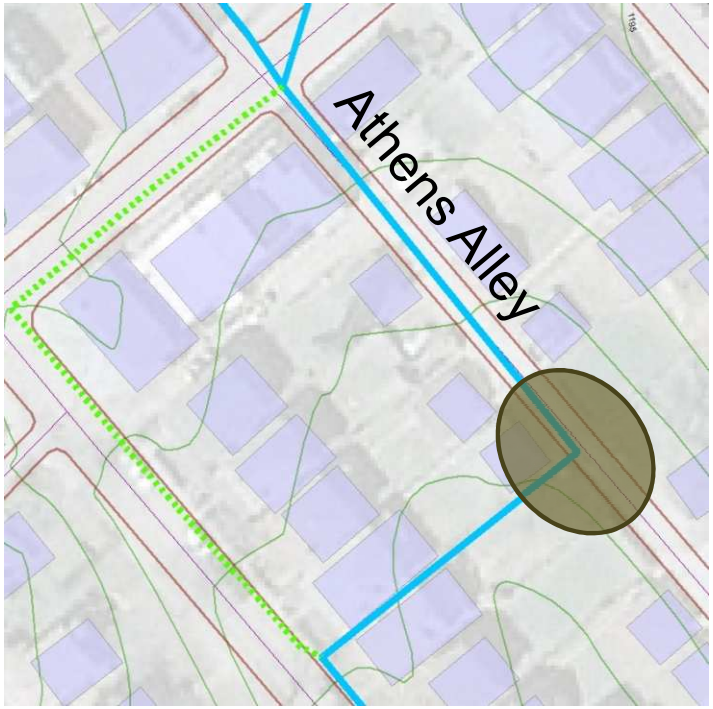
Agenda

- Background
- Alternatives Evaluation
  - Grey Infrastructure Alternatives
  - Green Infrastructure Opportunities
- Downstream Impacts
- Public Involvement
- Next Steps

Background

- Regular flooding occurring
  - Athens Alley between Texas & Annex



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- Leading to property damage

Study Objectives

- Identify potential solutions to reduce or eliminate drainage issues
- Multiple alternatives to be considered
- Council will decide **if** any alternatives are implemented

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Alternatives Evaluation

- Survey
- Grey Alternatives
  - Site Visits
  - H&H Modeling
  - Cost Estimates
- Green Alternatives
  - GIS Review
  - Site Visits

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Drainage Issues

- Existing Inlets Poorly Located
- Too Few Inlets
- Storm Sewer Undersized
- Sewer Between Athens & Kelton Reverse Grade

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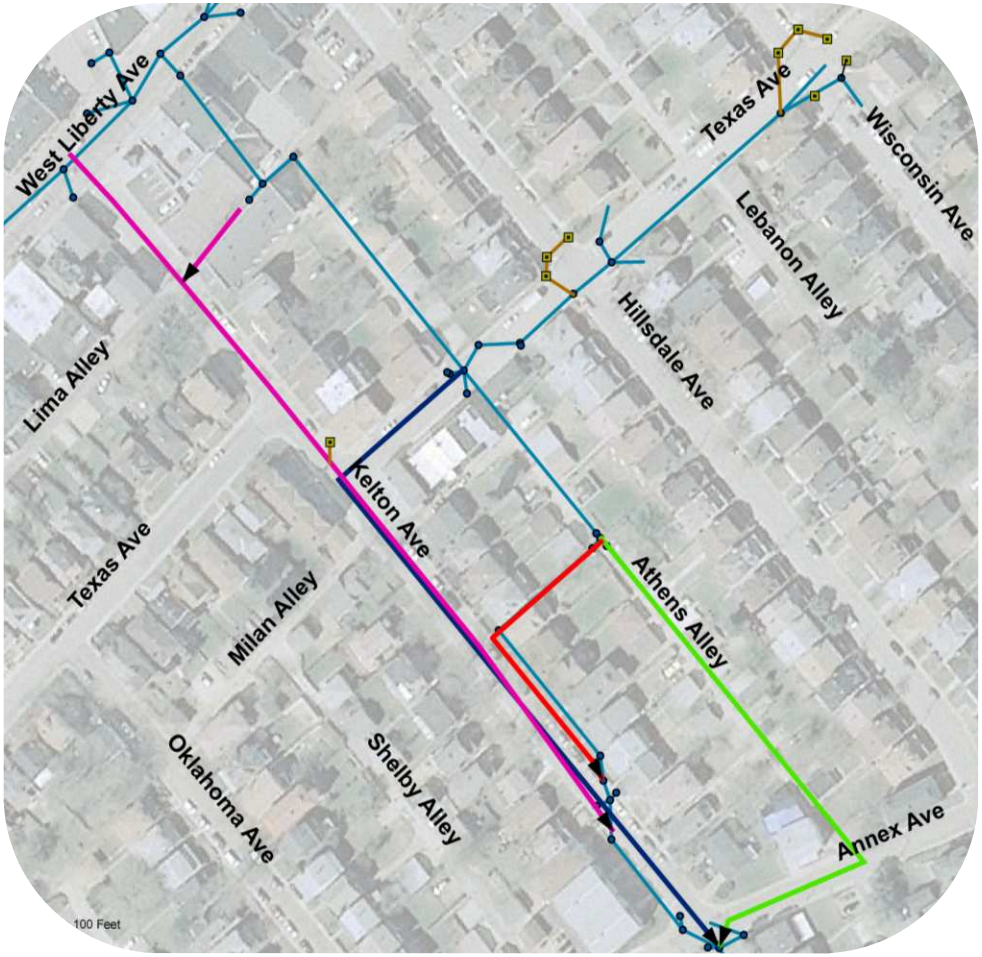
Alternatives

- Developed 4 Alternative Storm Sewer Alignments
- Evaluated Inlet Locations
- Evaluated Source Reduction (GI)



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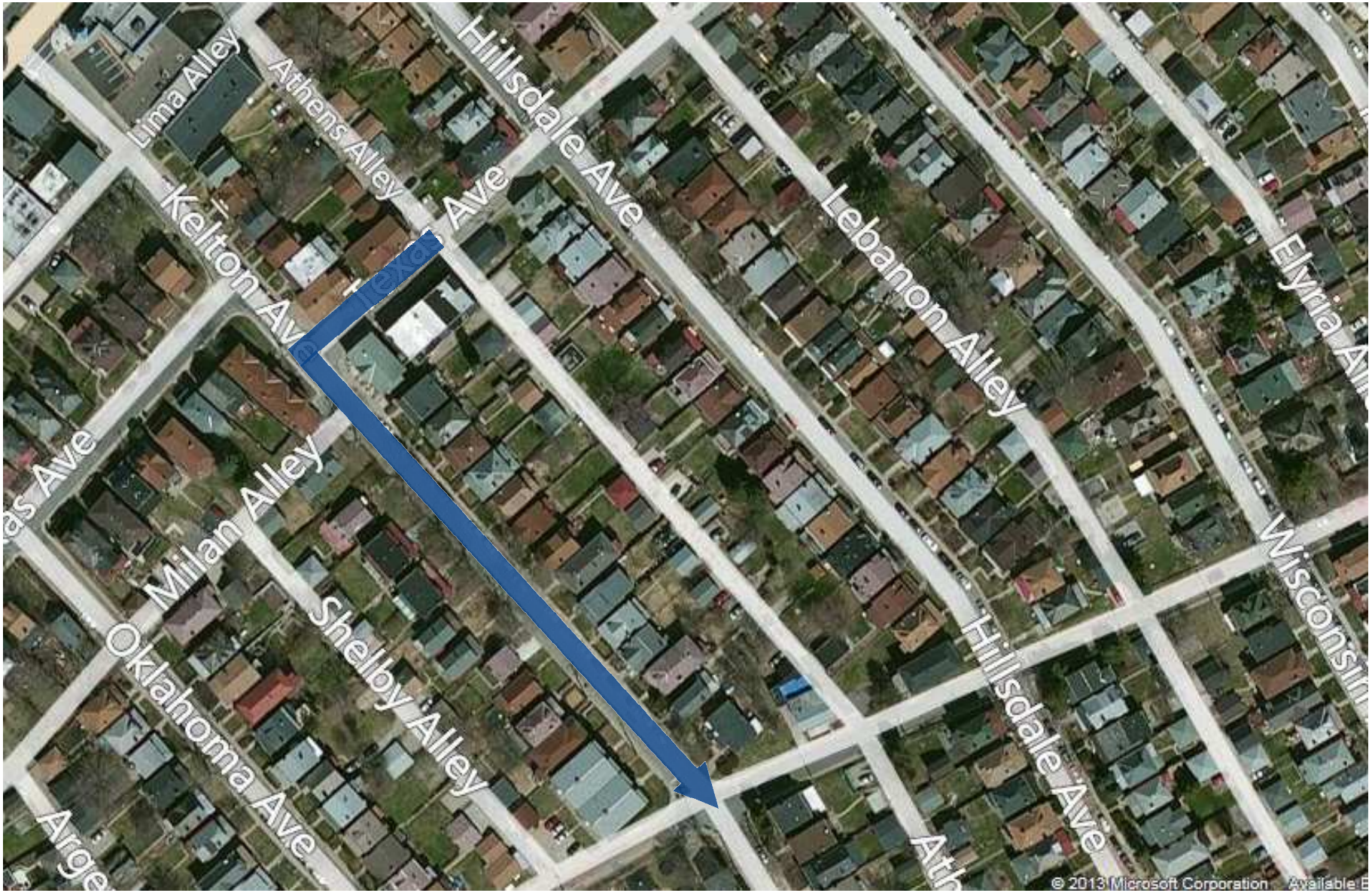
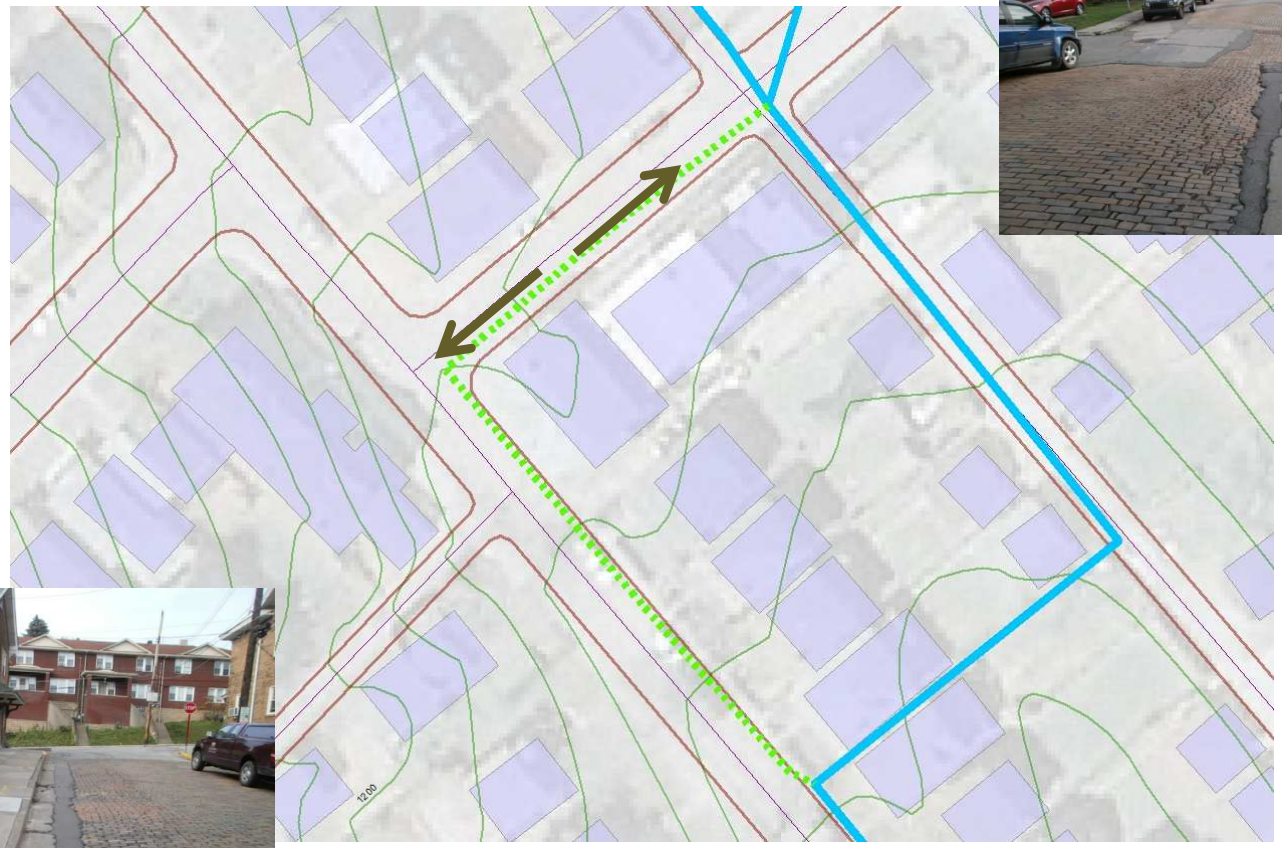
Grey Alternative 1



Constructability Challenges

- Neighborhood Disruption



- Traffic Control

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Constructability Challenges

- Deep Excavation at Kelton & Texas
- Complete Closure of Texas & Kelton Likely
- Street Parking in Area of Construction will be unavailable

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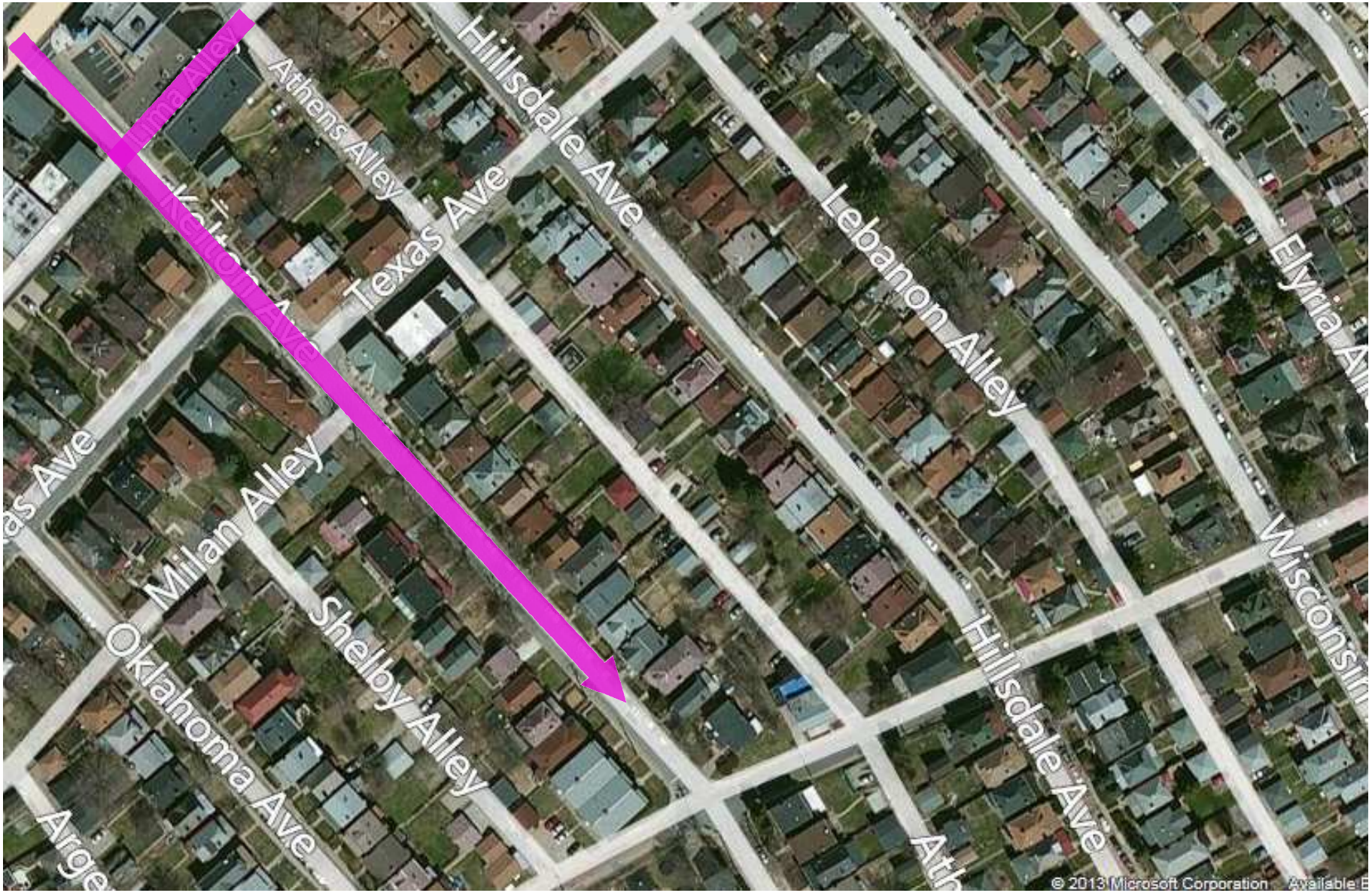
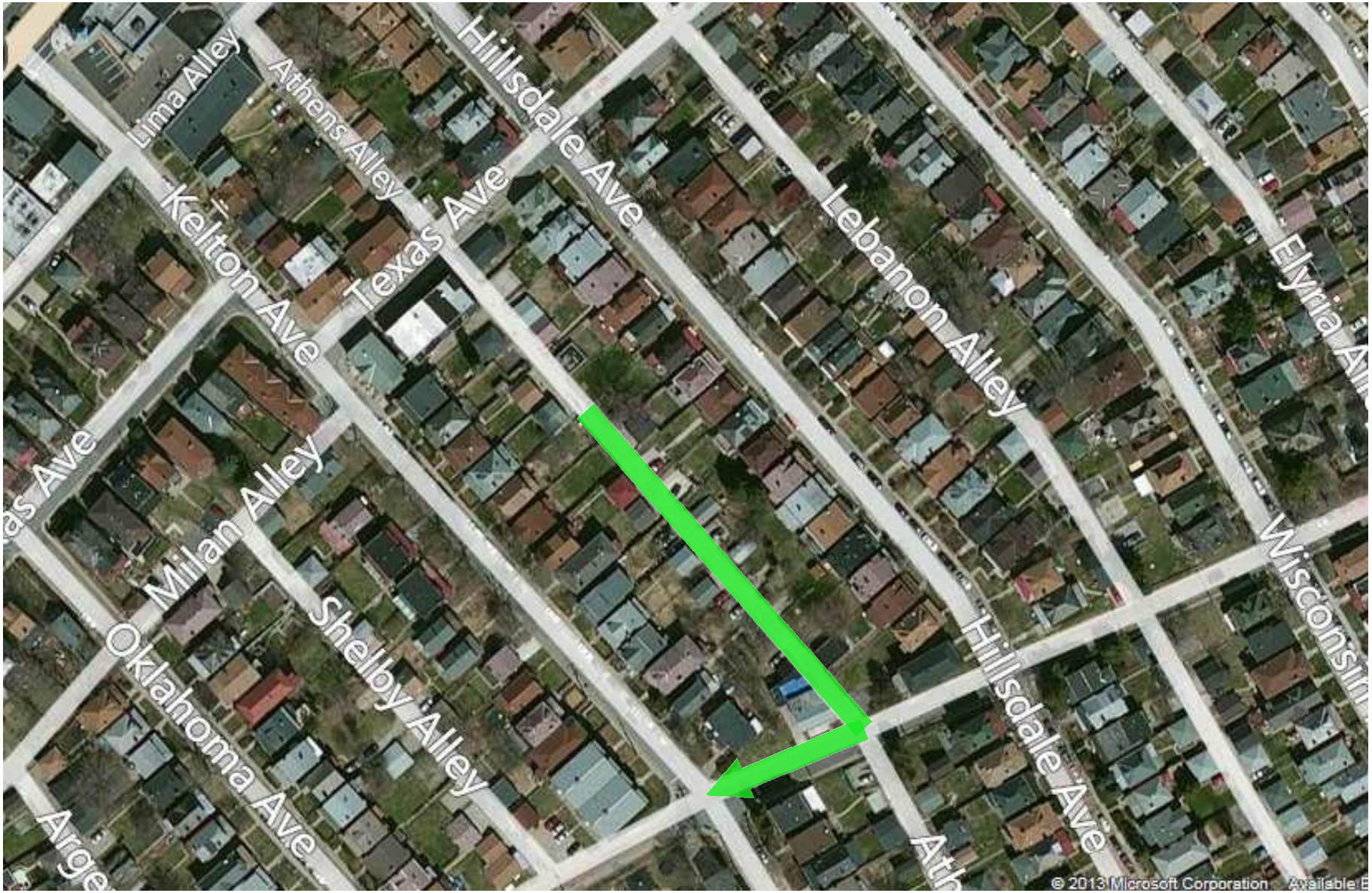
Grey Alternative 2



Constructability Challenges

- N/A

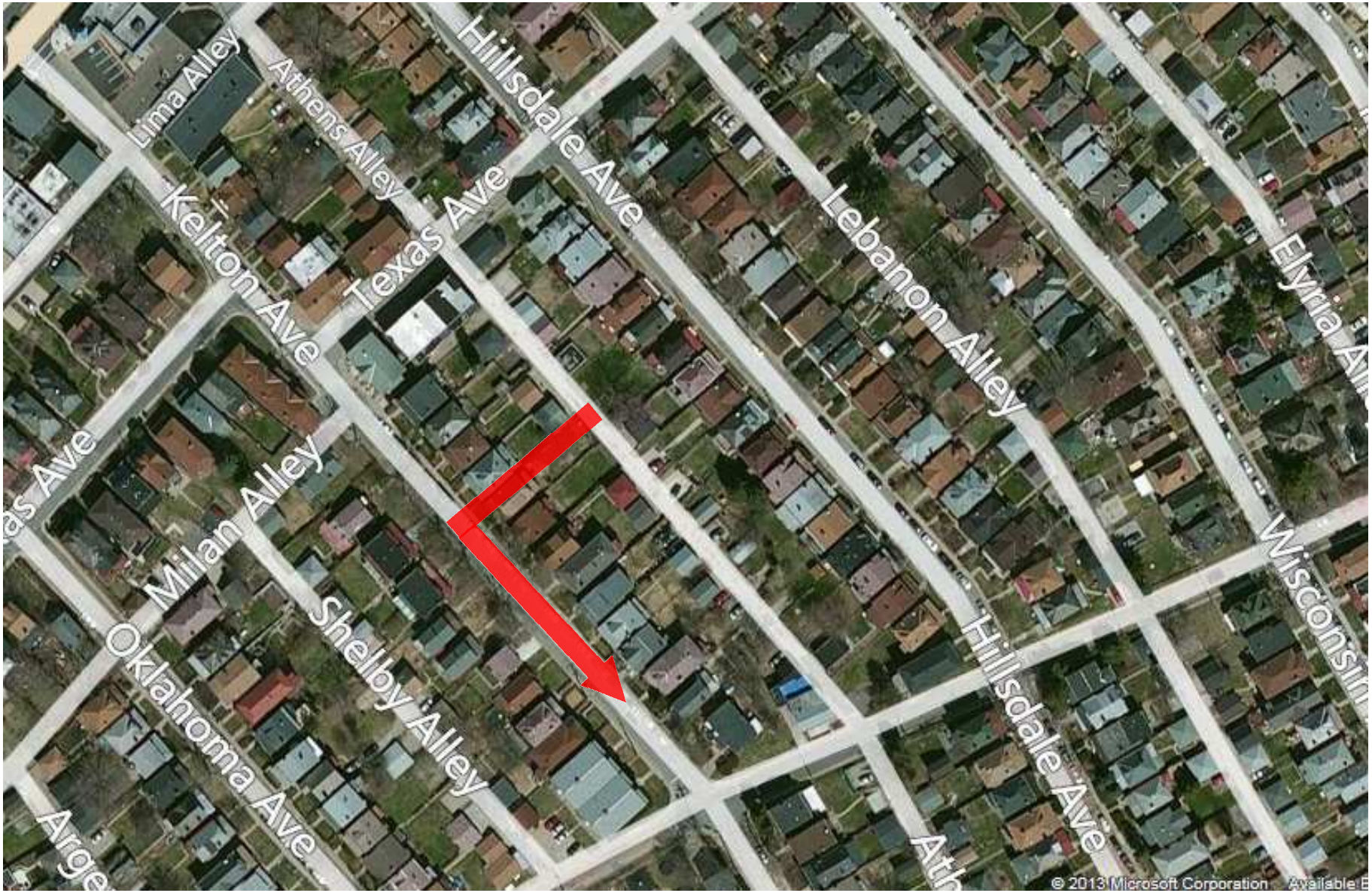
Grey Alternative 3



Constructability Challenges

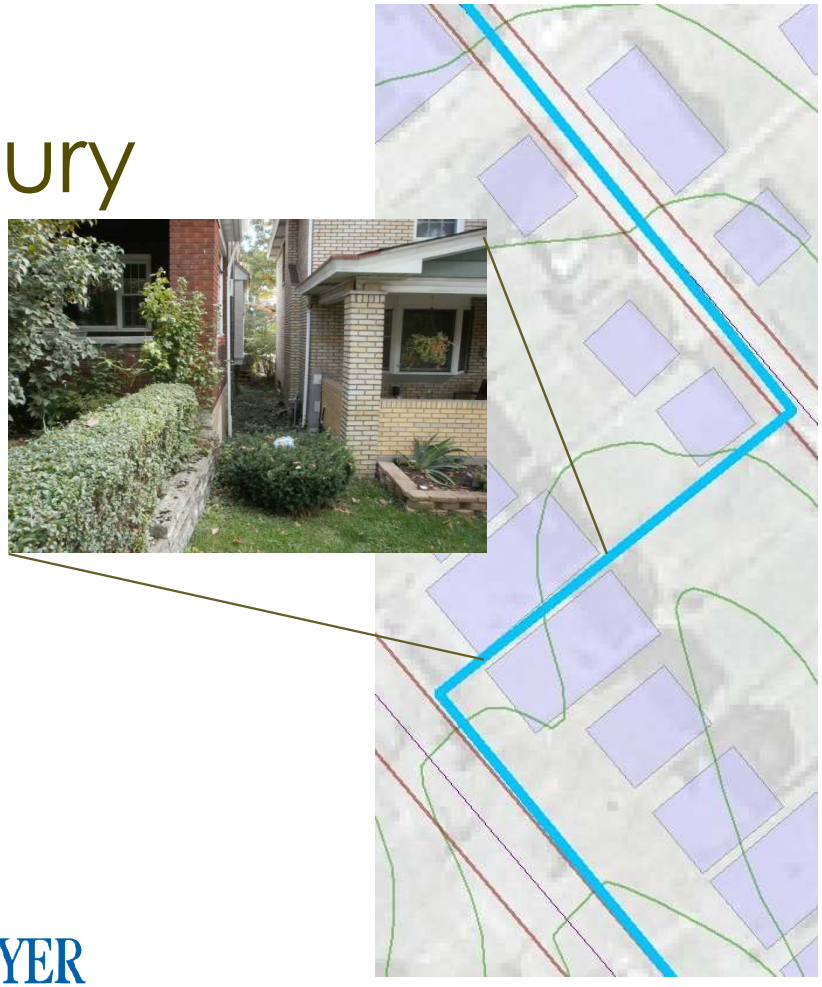
- Deep Excavation at Athens & Annex
- Complete Closure of Athens & Annex Likely
- Access to Garages on Athens Will be Affected for Some Residents
- Utility Protection Will be a Concern

Grey Alternative 4



Constructability Challenges

- Distance Between Houses is Approximately 5-feet
- Cannot Utilize Direct Bury
- Moves Bottleneck Downstream
  - 48-Inch Pipe Required
  - 30-Inch Pipe in Kelton



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Grey Infrastructure Costs

- Prelim. Estimate of Construction Cost

	10-YR	100-YR	2-YR
Alt. 1	$431k	$464k	$412k
Alt. 2	NC	NC	NC
Alt. 3	$303k	$331k	$289k
Alt. 4	$306k	$357k	NC

NC = Not Costed

- Catch Basins & Yard Inlets:
  - Additional $76k

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Downstream impacts

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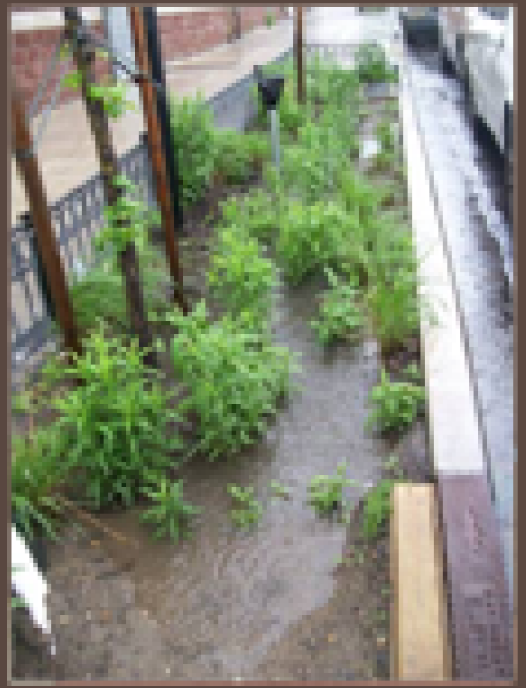
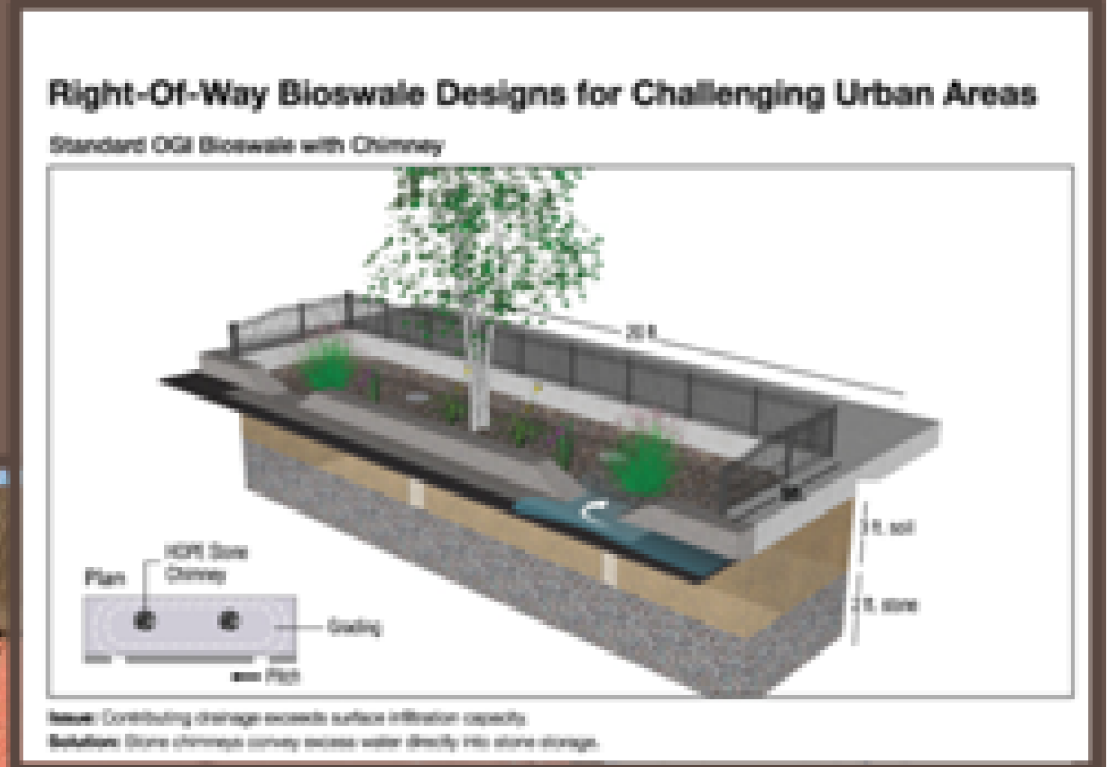
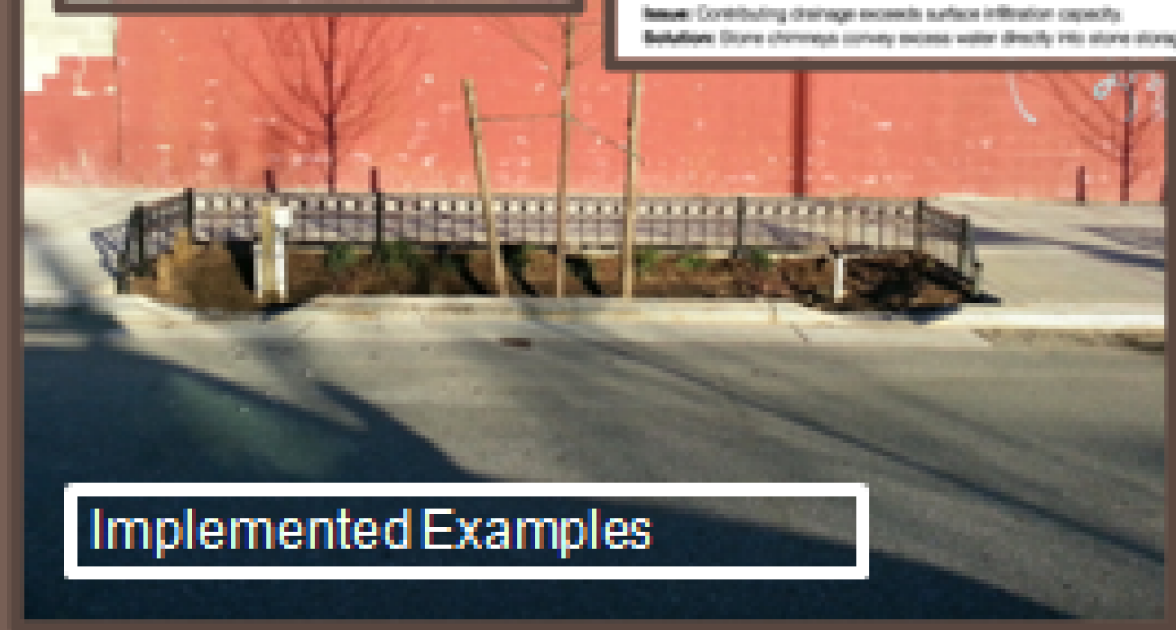
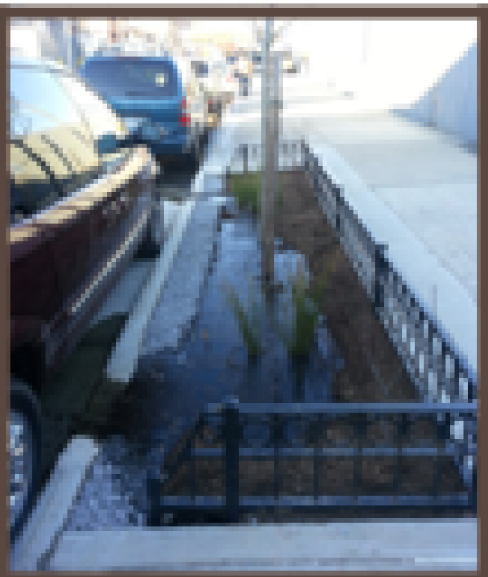
Green Infrastructure Opportunities

- Runoff Reduction (Water Quantity)
  - Particularly Smaller Events
- Water Quality Improvements
  - Saw Mill Run on 303(d) List
- Aesthetic and Environmental Benefits
- Green Infrastructure Funding Ops
- But… Minimal Reduction in Athens Alley Flooding









Implemented Examples

Borough of Dormont, PA

Bioretention:
is the process in which contaminants and sedimentation are removed from stormwater runoff. Stormwater is collected into the treatment area which consists of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. These structures can easily be tied into the existing storm system in several locations within the Athens Alley study area, by installing an underdrain.

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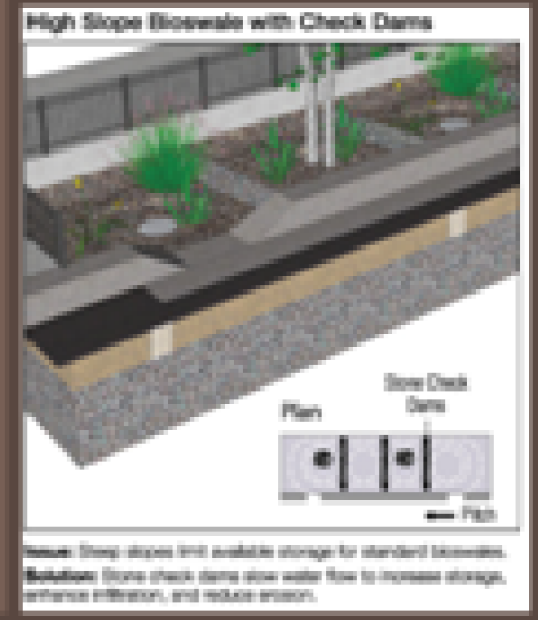
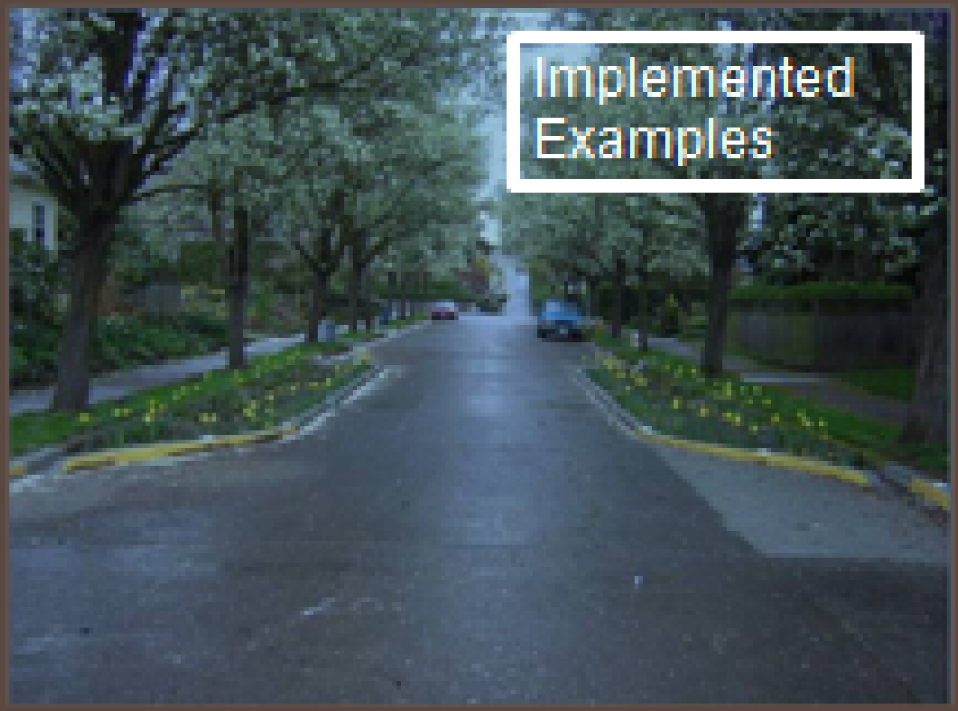
BMP TYPE:
BIORETENTION

Dormont Green Infrastructure Opportunities





Borough of Dormont, PA

Bump Out Retention:
Is more commonly seen in highly urbanized areas where there is limited surface availability due to condensed development of the existing land. In the case of Dormont, there were several recognizable opportunities within the public right of way where a bump out could be beneficial. The bump outs provide opportunity for bio retention, while giving the community an aesthetically pleasing attraction without encroaching on private property. This technique is similar to street side retention seen in the Bioretention fact cards.

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BMP TYPE:
BUMP OUT RETENTION

Dormont Green Infrastructure Opportunities

Design Concept:
While the Country Lane concept is aesthetically pleasing, there are many other types of permeable pavers that can be substituted. Permeable paver blocks/grids can reduce cost, while maintaing the functionality of the roadway and decreasing stormwater runoff entering the sewer system. Effectiveness increases when a suitable permeable sub-layer is provided, and openings in the pervious material used are maximized.

Implemented Examples

Borough of Dormont, PA

Country Lane:
Asphalt lanes are replaced with two concrete or gravel strips surrounded by structural grass (structural grass is supported by a grid and soil structure that prevents soil compaction and root damage). Connections from the county lane to residences are constructed of permeable materials, including paving blocks, broken concrete sections, and structural grass or gravel.

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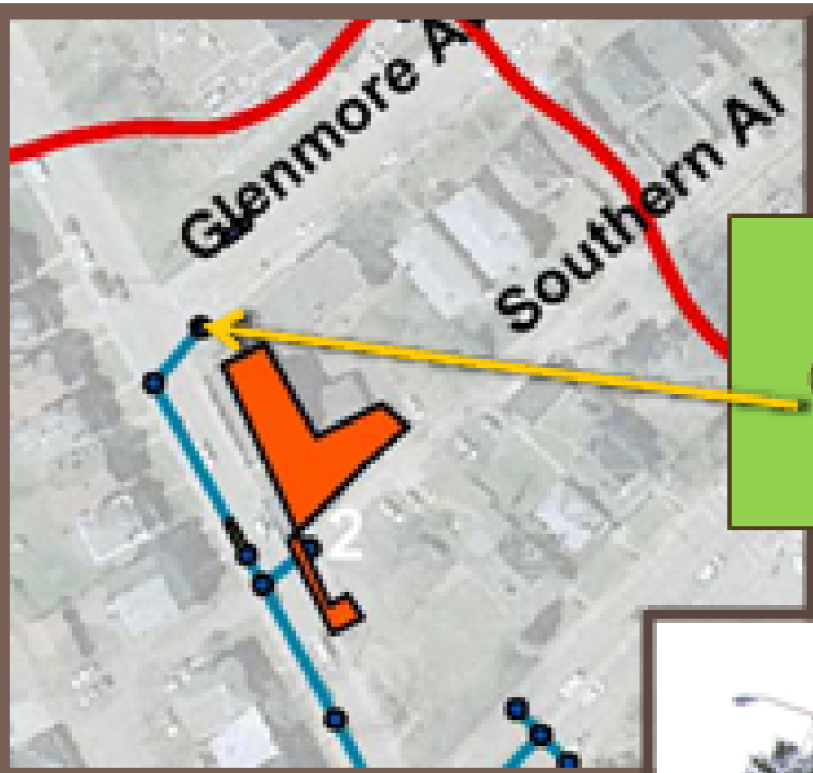
BMP TYPE:
COUNTRY LANE

Dormont Green Infrastructure Opportunities



Tree Box Opportunity

Potential Location: Glenmore Avenue

Implemented Example

Borough of Dormont, PA

Rank - # of Opps

Low – 1

Note: Only opportunities within the "Athens Alley Stormwater Improvements" Watershed have been considered.

Tree Box:
A minor opportunity to provide bio-retention and promote the use of green infrastructure, while providing aesthetic benefit to the community. Sub-drains can be conveniently connected to the storm sewer network beneath.

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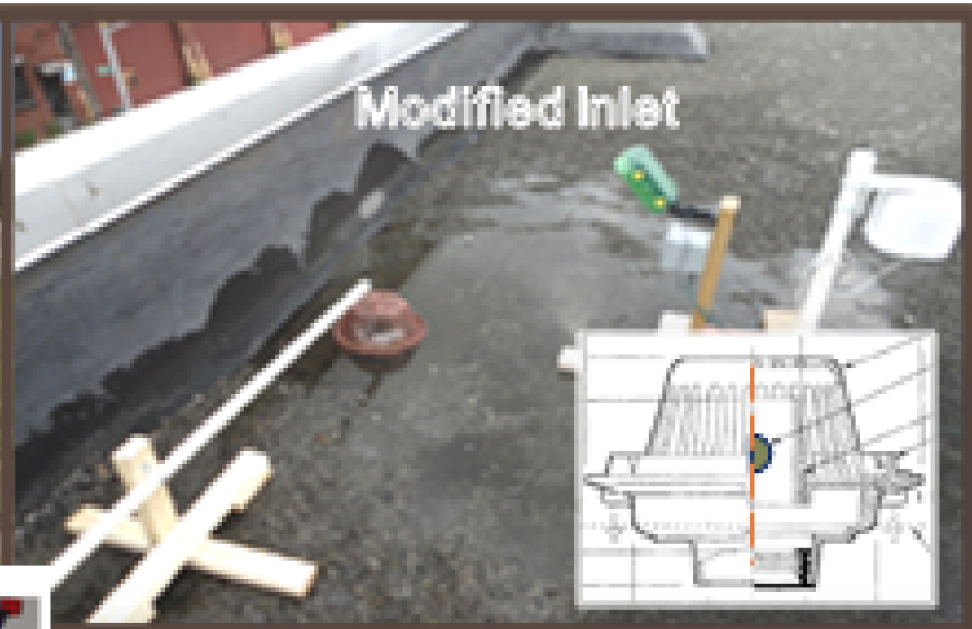
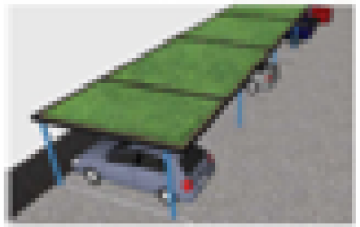
BMP TYPE:
TREE BOX

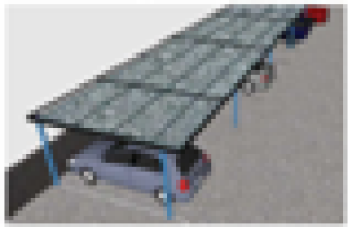
Dormont Green Infrastructure Opportunities

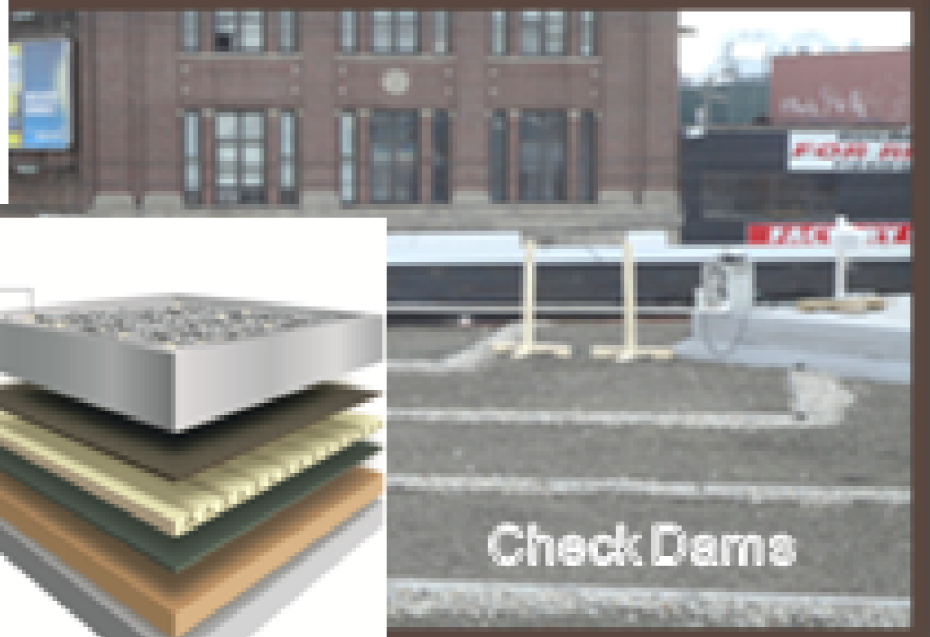


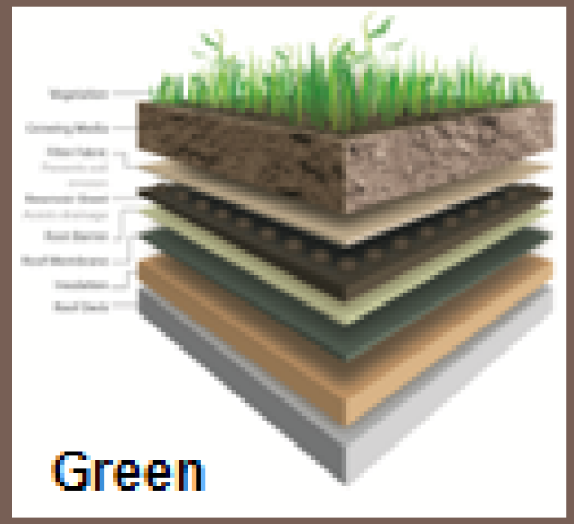
Green Roof Canopy

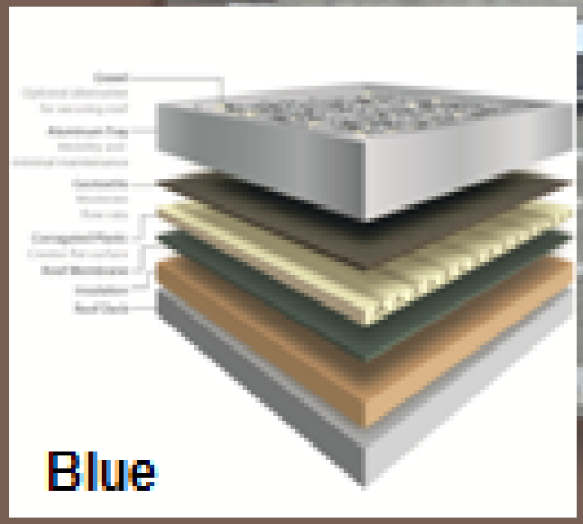


Blue Roof Canopy









Borough of Dormont, PA

Green or Blue Roofs:
Are a method of attenuating peak storm runoff, and in the case of a green roof providing evapotranspiration via growing media from which plants and light vegetation can thrive. Blue roofs can be slightly lighter and require less maintenance, but lack the aesthetic and thermal benefits offered through green roofs. Green roofs also provide added benefits of reducing pollutants in stormwater runoff, and providing a natural habitat for wild life in urban areas.

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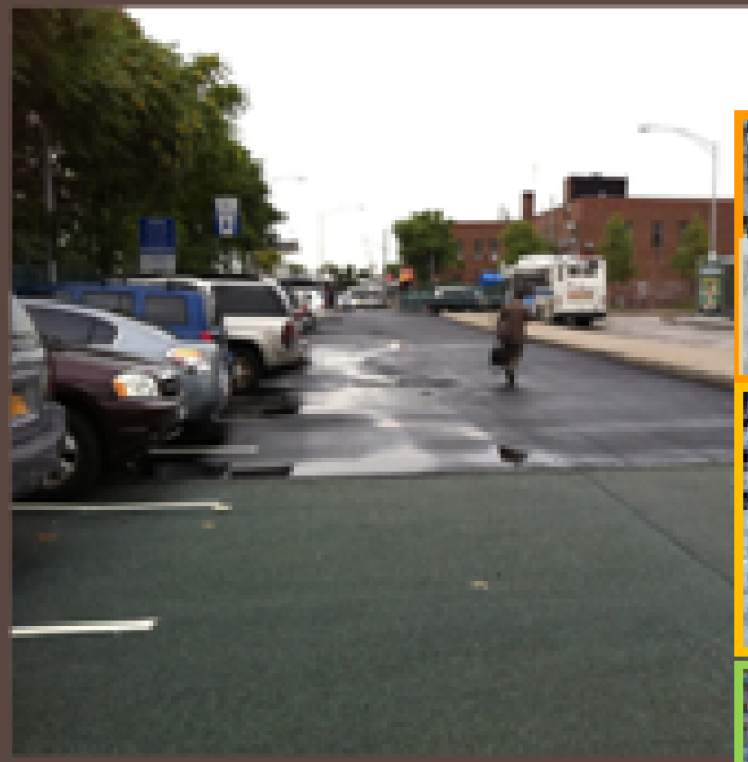
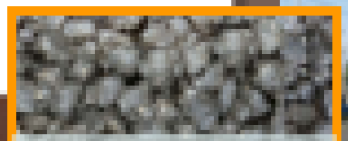
BMP TYPE:
BLUE/GREEN ROOF

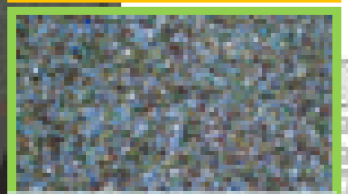
Dormont Green Infrastructure Opportunities





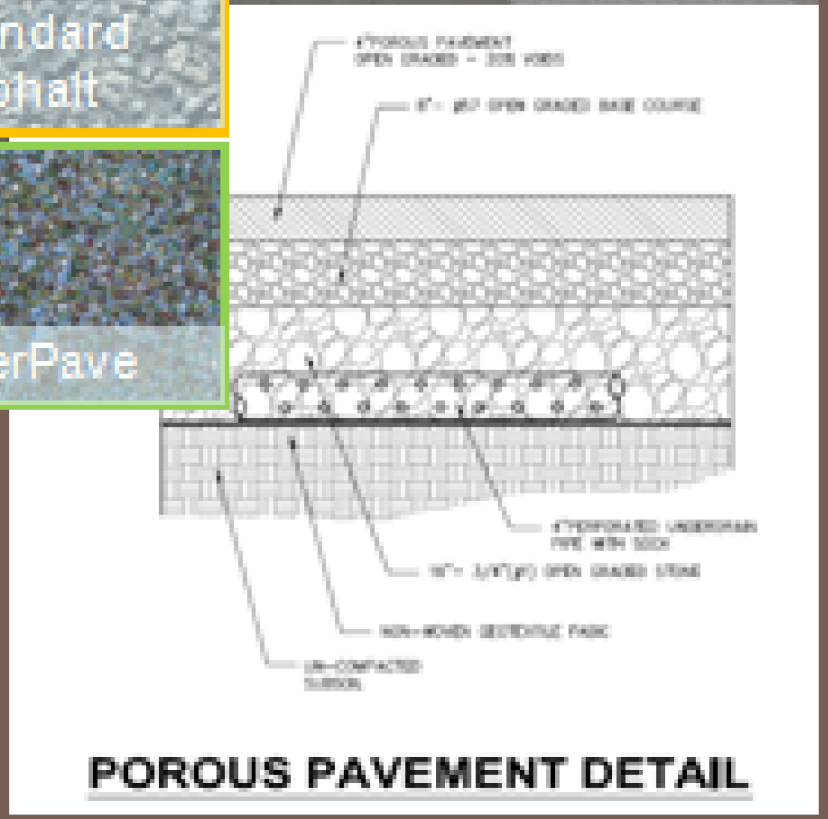
Porous Asphalt

Standard Asphalt



FilterPave

Implemented Examples



Borough of Dormont, PA

Pervious Pavement:
Is a growing method of reducing surface runoff by infiltration of the soils in place beneath paved areas which are otherwise not effectively used in their full capacities when typical paving is in place. By constructing underdrains as illustrated in the detail provided, the pervious pavement systems can be easily connected to adjacent storm sewer catch basins, and thereby maximizing inlet capacity of the existing storm systems in addition to reducing runoff. Several streets within the study area are good candidates, having minimal slopes, recognizably sized contributory areas, and easy connection locations to the existing storm network.

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BMP TYPE:
PERVIOUS PAVEMENT

Dormont Green Infrastructure Opportunities

Implemented Examples

Borough of Dormont, PA

Cistern: is a similar concept to a rain barrel. The installation of a cistern provides benefit by minimizing/eliminating storm water runoff, and allows for water storage until such time that it is needed for irrigation purposes. In the first proposed location, the borough would be able to water the vegetation at the corner parkette at W. Liberty and Hillsdale Avenue, by routing the adjacent roofops from nearby rental properties to a cistern. Similarly, the large surface area covered by the church's roof located on Alabama Avenue would allow for watering of plants/vegetation if a cistern were to be installed.

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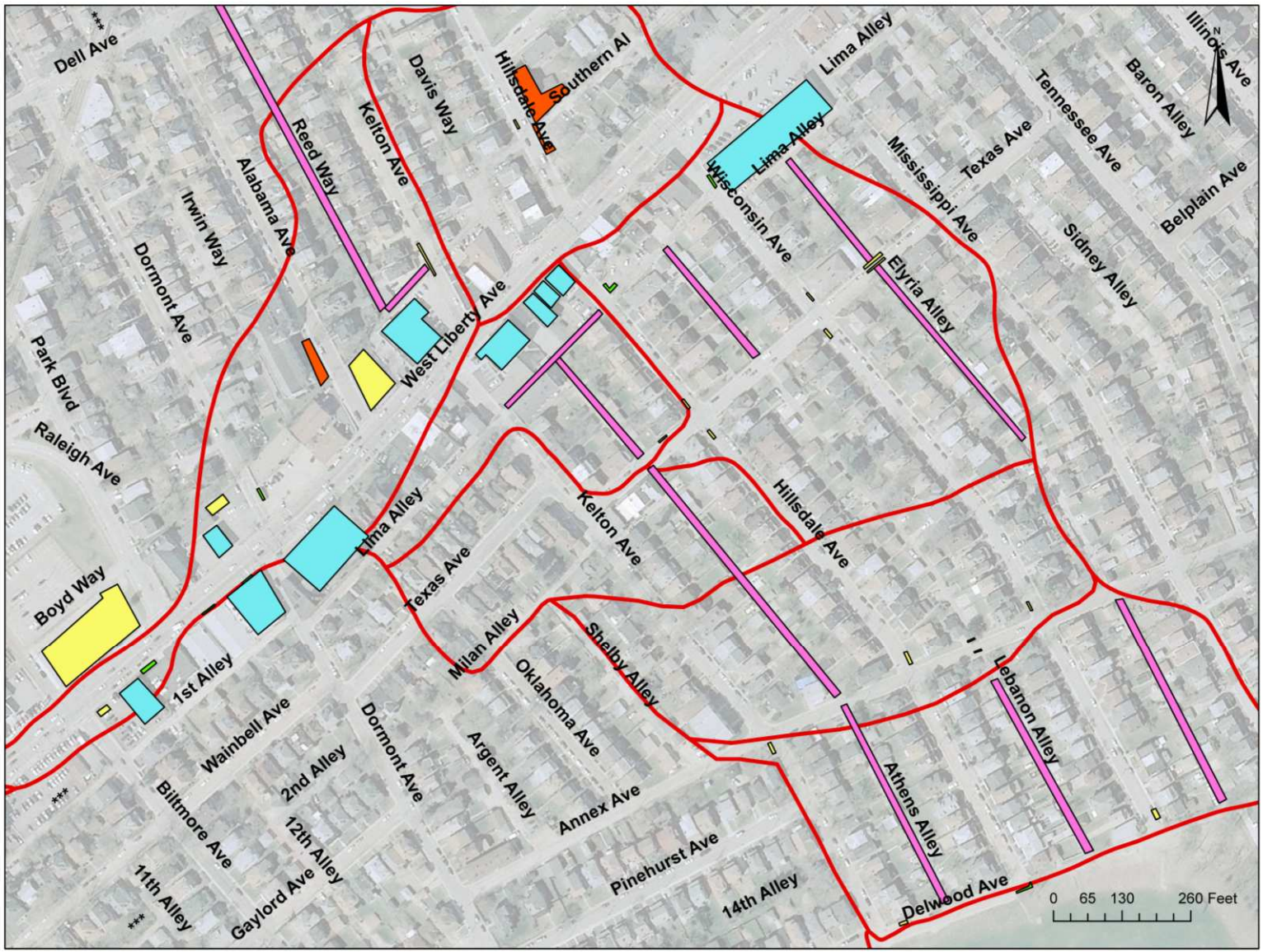
BMP TYPE:
CISTERN

Dormont Green Infrastructure Opportunities

GI Opportunities By Type



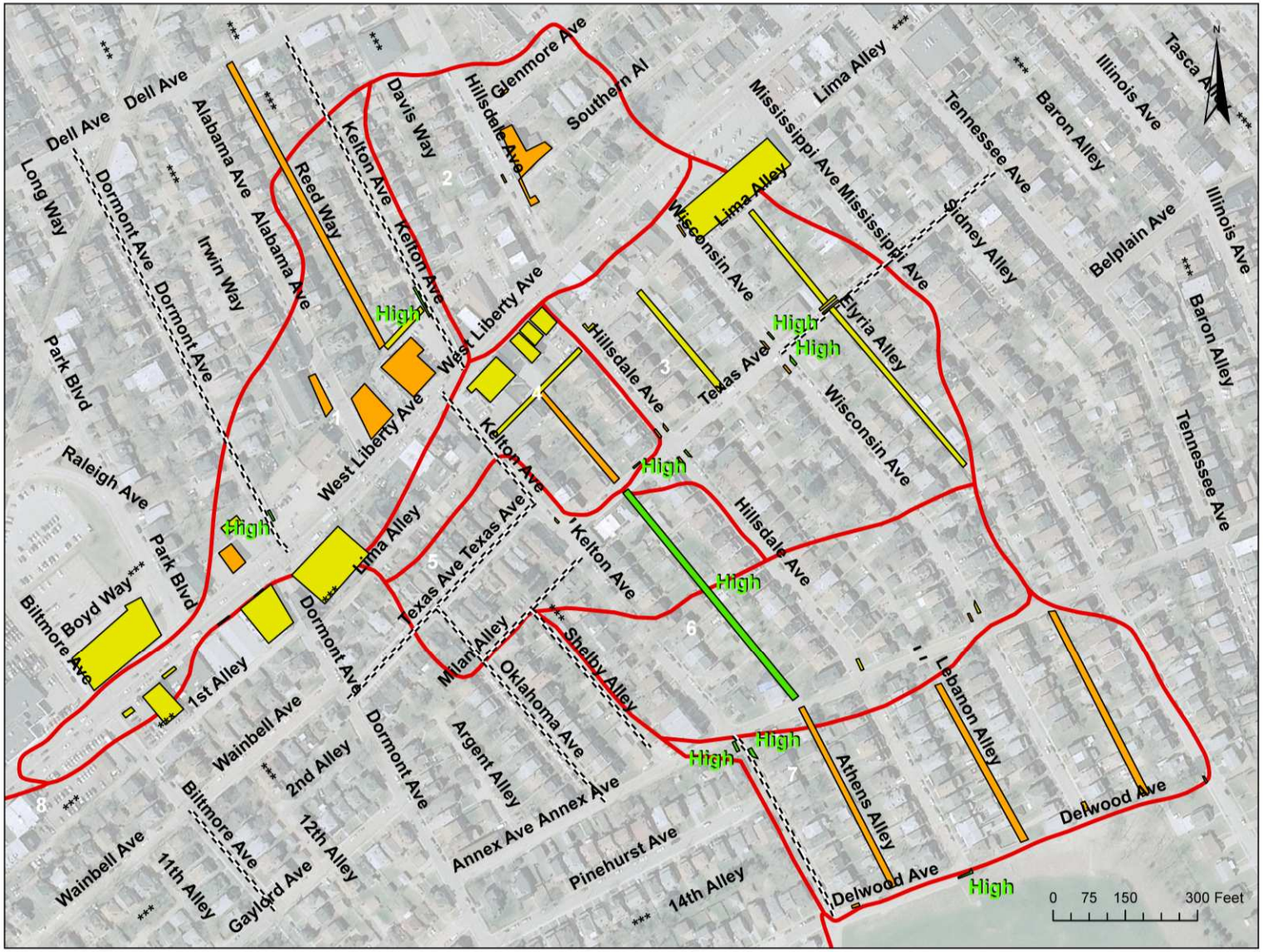
Legend

- Bioretention
- Blue or Green Roof
- Cistern
- Country Lane
- Pervious Pavement
- Pocket Rain Garden (Bump-Out Street Retention)
- Tree Box
- Watershed Sub-Basins
- Storm_Structure
- Storm_Pipe

GI Ranking Factors

- Ease of Implementation
  - Flatter Slopes
  - Proximity to Existing Storm Inlets
  - Size of Contributing Area
- Planned Road Reconstruction
- Direct Impact on Flooding Area

GI Opportunities By Rank



Legend

- High
- Medium
- Low
- Reconstruction
- Watershed Sub-Basins
- Storm_Structure
- Storm_Pipe

GI Opportunities by Type & Rank

Type of Opportunity	Number of Opportunities
Bioretention	7
Blue and/or Green Roofs	10
Cisterns	2
Country Lanes	11
Permeable Pavement	21
Bump-out Street Bioretention (Tiered or Flat)	9
Enhanced Tree Boxes	1

Rank	Number of Opportunities
High	6
Medium	29
Low	26

Green Infrastructure Cost

GI Type\Priority	High	Medium	Low
Bioretention	$12k	$14k	$21k
Blue Roof	N/A	$225k	$1,305k
Cisterns	N/A	$8k	N/A
Country Lane	$328k	$1,227k	$630k
Permeable Pavement	$21k	$229k	$708k
Bump Outs	$17k	$13k	$10k
Enhanced Tree Pit	N/A	N/A	$1k

GI Funding Alternatives

- LGA Community Sustainability Grant
  - $8,500 Received
- ACCD Grant Fund
  - Application Submitted
- The Charrette Program
- CFA Watershed Restoration Protection Program
- Several Others

Discussion

- Grey Alternatives
- Green Alternatives
- Financing

Next Steps

- Finalize Tech Memo to Incorporate Borough and Public Comments
- Present Conclusions and Recommendations to Council on May 6th

Thank You!

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