Team # 1 Rain Garden

Why Build a Rain Garden

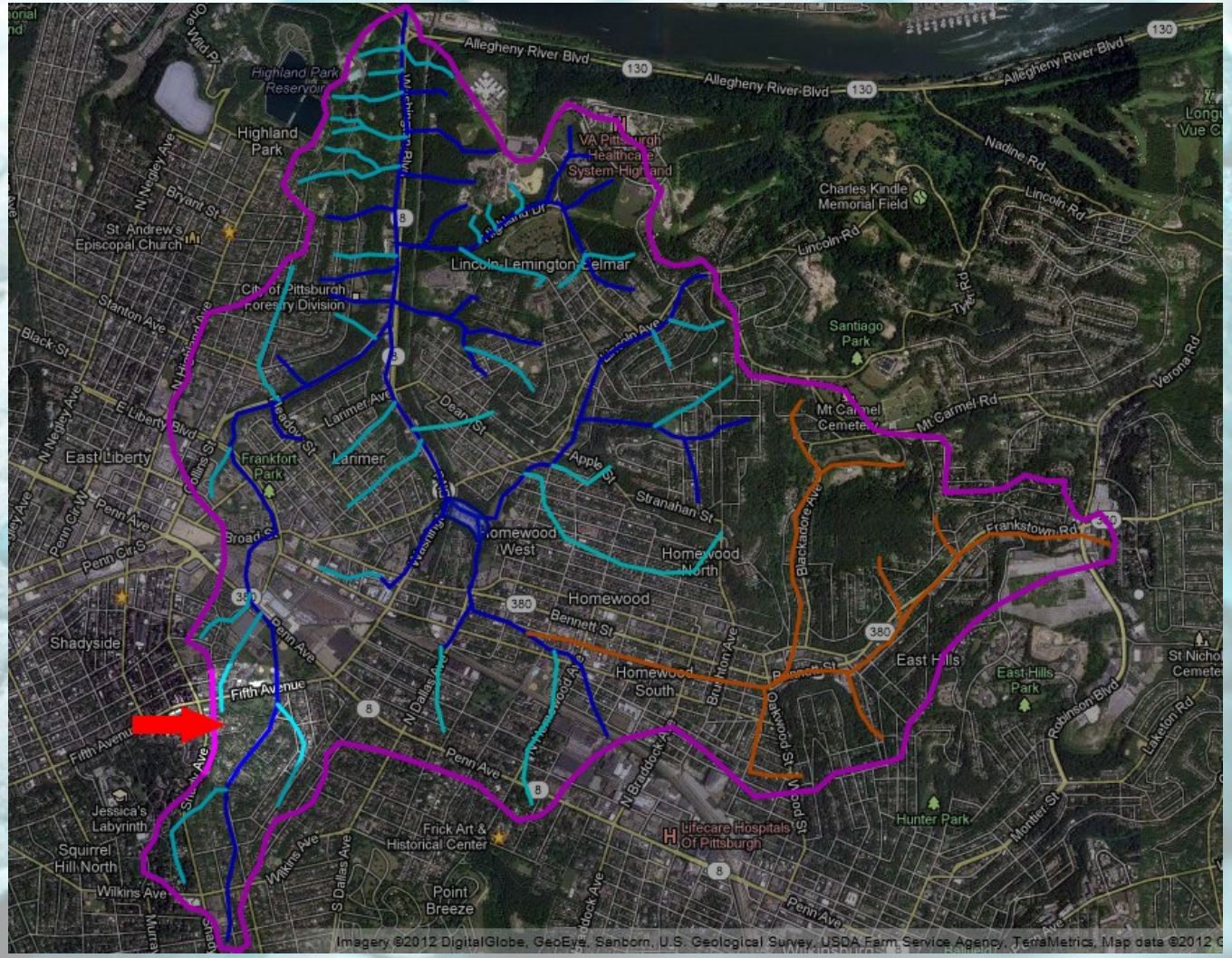
- Aesthetics
- Increase bio-diversity
- Low costs/ Low maintenance
- Educational value
- Reduce flooding & municipal water costs

Why Build a Rain Garden

On August 19th 2011 18 cars were trapped and 4 people died in flooding along Washington Ave.

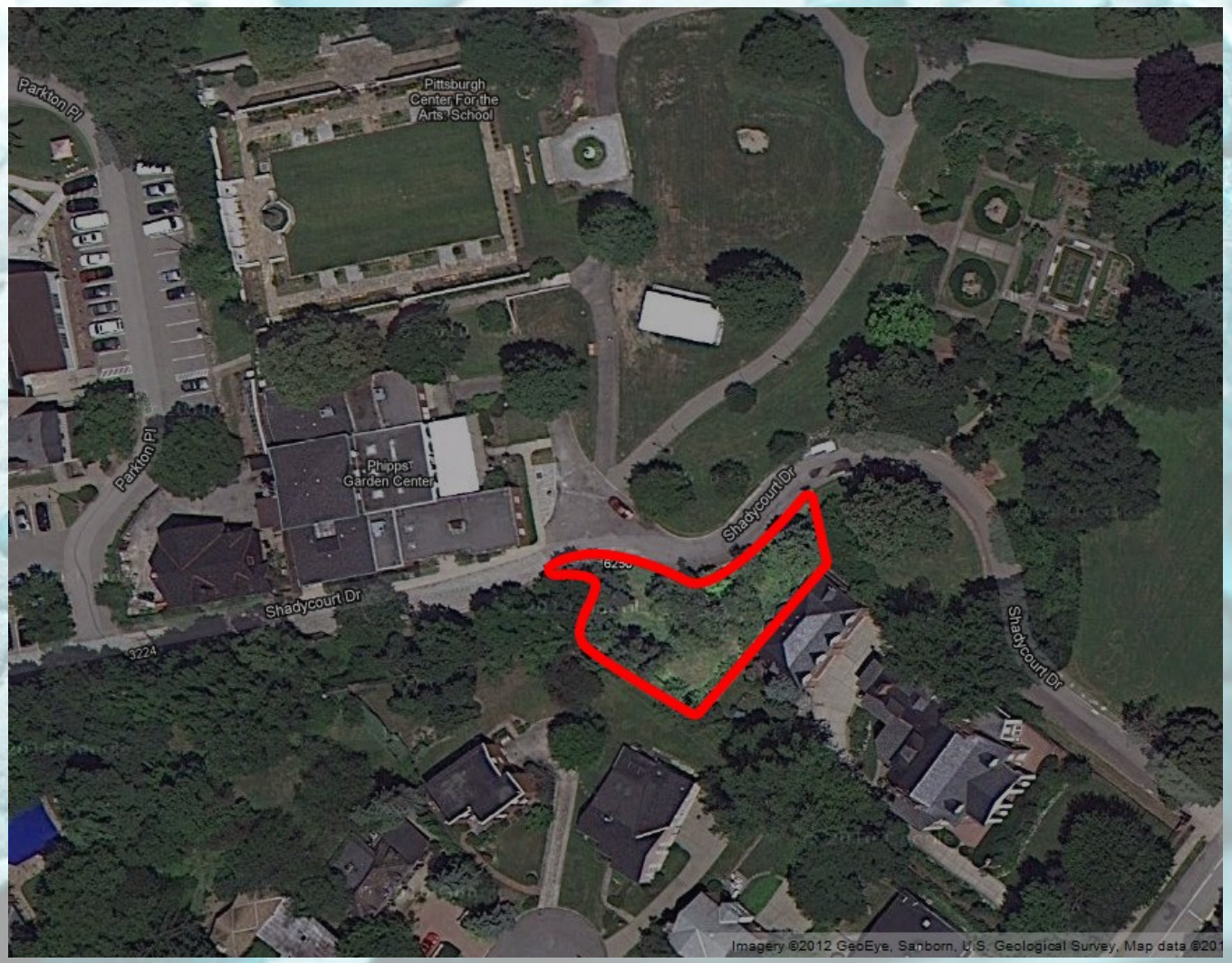
A system of low cost rain gardens prevents such events from occurring.

Why Build a Rain Garden



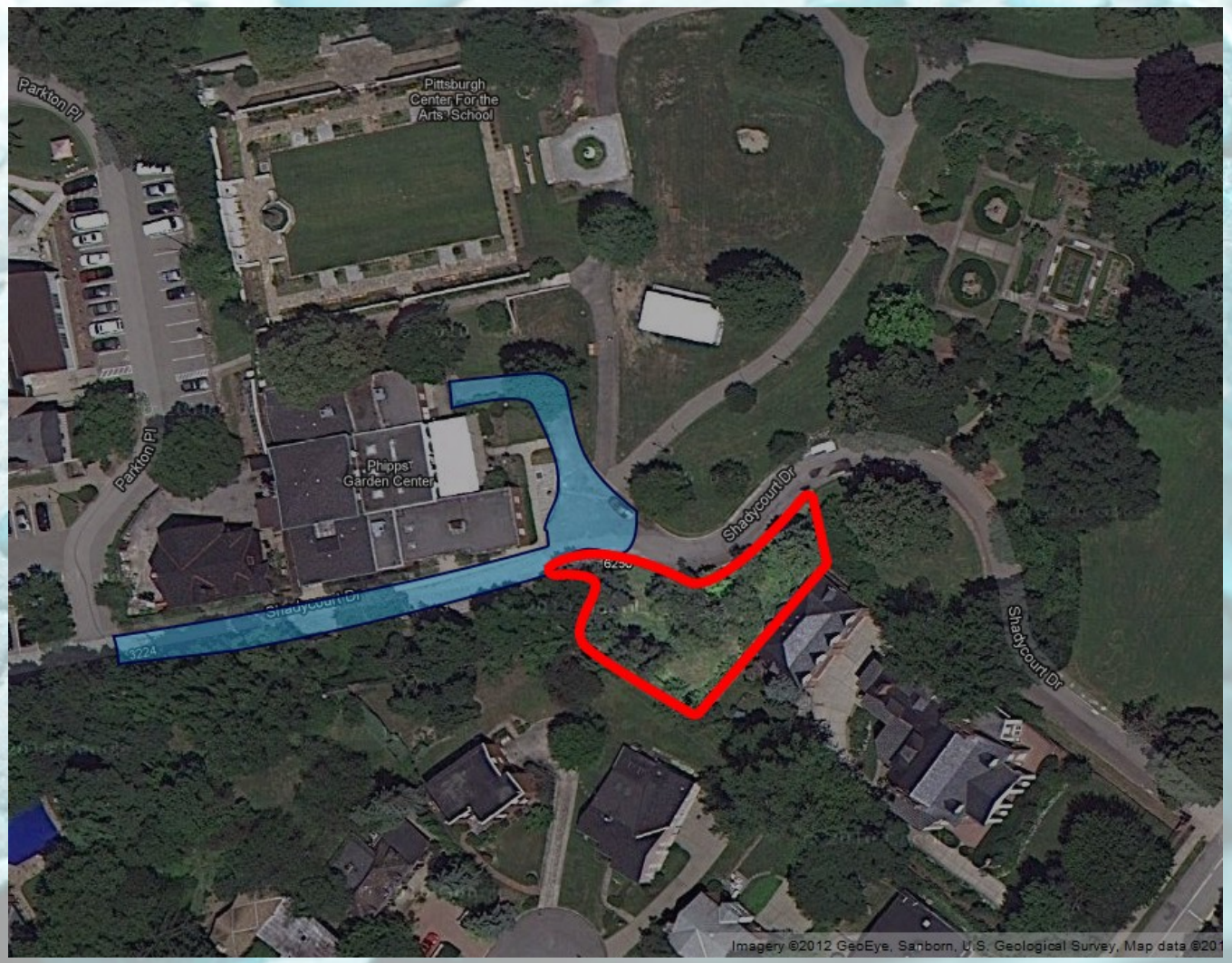
Negley Run Watershed

Rain Garden Location



The garden is located between the rock garden and the dogwood garden to the south east of the garden center.

Rain Garden Drainage Area



The drainage area covers 7,925 square feet.

The View

What park visitors see.

The Marsh

The marsh moves water from the road into the pond.

The marsh has to be set back from the road so as not to block drivers views.

The plants are not only water loving and drought tolerant but also clean the water and look beautiful.

The large stones allow drivers to leave the road to park or to pass.

Just as critically they channel water from the road into the marsh.

The Surface Pond

The surface pond holds 5,527.5 gallons. During a storm the surface pond will handle an additional 830 gallons without flowing over.

French Drain & Fern Bed

A French drain will allow people to walk around the pond. This drain is open in front of the fern and moss garden before returning to a sub-surface flow.

Sub Surface Flow

This sub surface pond demonstrates another way to build a rain garden, provides a second basin for increased capacity, and provides a place for the now cleaner water to help grow edibles.

Guidelines for Rain Garden Plants

- Native
- Zone
- Hardy
- Perennial
- Sun & Shade
- Relationships
- Habitat
- Color

Guidelines (Continued)

- Full growth
  - **Height**
  - **Width**
- Aesthetic
- Multi-functional
  - **Food for fish**
  - **Pollinator**
- Flowering Timeline

Sample Rain Garden Plants

- Dwarf Cattail; *genus - Typha Laxmanii*

- Blue Flag Iris; *genus- Tenax*

- Pickerelweed; *genus - Pontederia*

- Attraction Lily;
  genus - Nymphaea

- Rock Cap Moss; *genus - Polytrichum Commune*

- Ostrich Fern;

  genus - Matteuccia

- Common Yarrow; *genus - Achillea Millefolium*

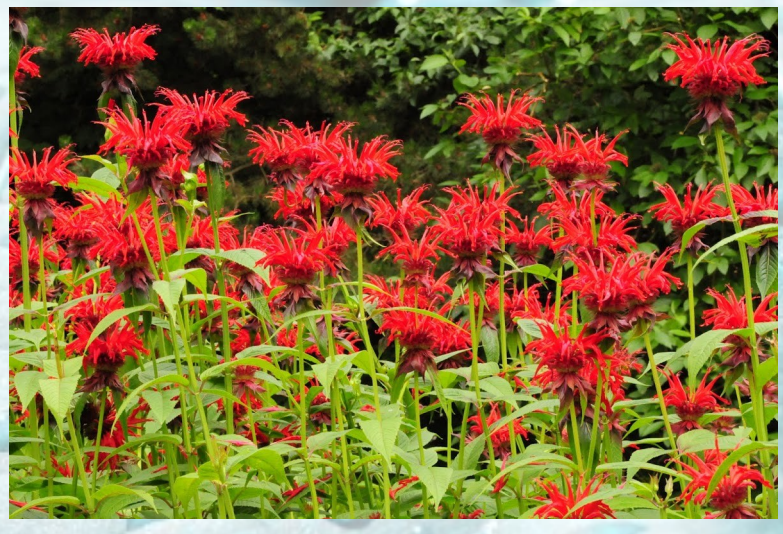
- Wild Geranium; *genus – Geranium Maculatum*

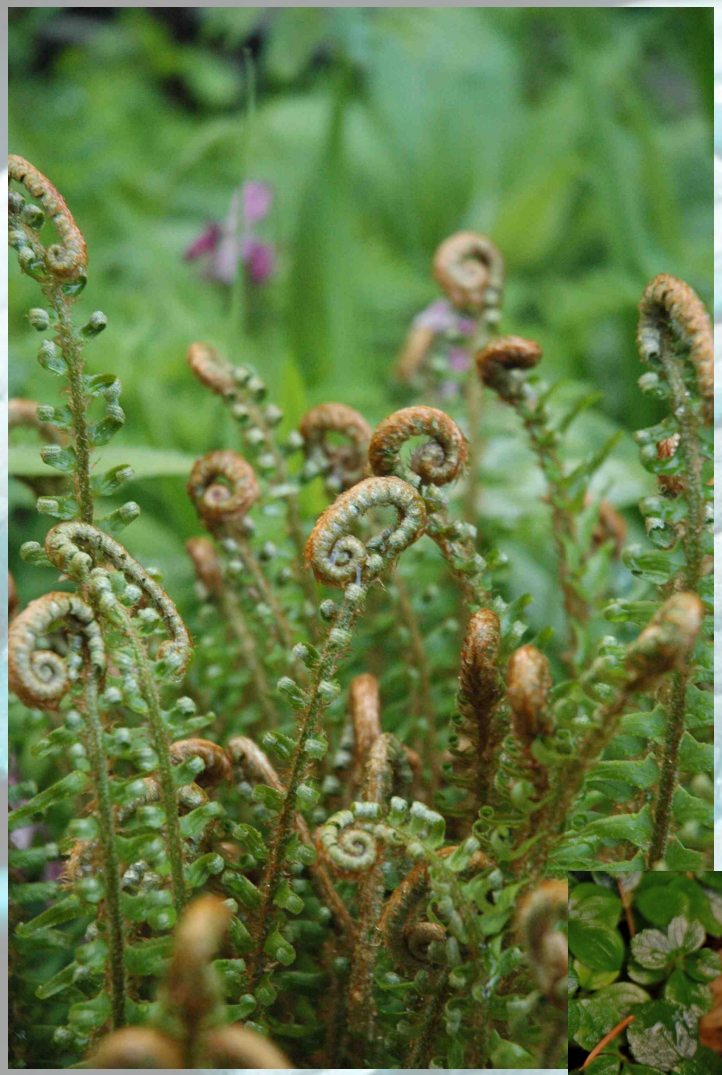
Fish

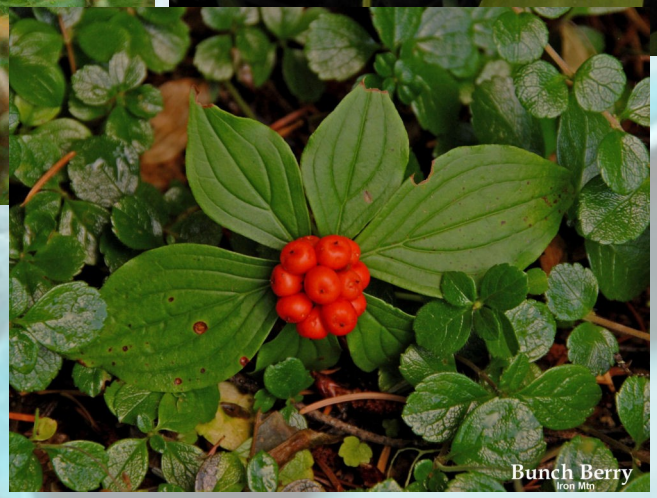
Solar Water Pump

A solar water pump keeps the water moving so that mosquito larva can't survive and oxygenates the water.

Edibles






Bunch Berry
Iron Mtn

Marsh Plant List

***Typha Laxmanii*, Dwarf cattails**
***Tenax*, Blue Flag Iris**
***Iris Fulva*, Red Iris**
***Lindera Benzoin*, Spicebush**
***Eupatorium*, Joe-Pye Weed**
***Asclepias Incarnata*, Swamp Milkweed**
***Phragmites*, Reeds**
***Sagittaria*, Double Flowering Arrowhead**
***Carex Aurea*, Golden Sedge**
***Juncus effuses*, Common Rush**
***Dicranum*, Rock Cap Moss**
***Polytrichum*, Common Haircap Moss**

Surface Pond and Berm

***Typha Laxmanii*, Dwarf cattails**
***Tenax*, Blue Flag Iris**
***Pontederia*, Pickerelweed**
***Nymphaea*, Attraction Lily**
***Nelumbo*, Hardy Water Lotus**
***Eichhornia Kunth*, Water Hyacinth**
***Athyrium*, Lady Fern**
***Dicranum*, Rock Cap Moss**
***Polytrichum*, Common Haircap Moss**

Fern Bed

***Monarda*, Bee Balm**
***Glaberrima Var. Glaberrima*, Phlox**
***Matteuccia*, Ostrich Fern**
***Athyrium*, Lady Fern**
***Achillea Millefolium*, Common Yarrow**
***Geranium Maculatum*, Wild Geranium**
***Anemone Canadensi*, Windflower**
***Heuchera Chocolate Ruffles*, Coral Bells**
***Echinacea purpurea Magnu*, Coneflower**

Sub-surface Edible Basin

***Typha Laxmanii*, Dwarf cattails**
***Athyrium*, Lady Fern**
***Sagittaria*, Double Flowering Arrowhead**
***Eurasian Dwarf Cornels*, Bunchberry**
***Monarda*, White Bergamot**
***Monarda Didyma L.* Scarlet Bee Balm**
***Salvia Lyrata,* Lyre Leaf Safe**
***Zizania*, Indian Wild Rice**
***Allium*, Bear's Garlic**

Summary Report

Goal	Rain gardens in the community watershed increased	established in watershed by 2020 (At least 10)	Community Survey in 2020	
Purpose	Functional example of a sustainable water catchment system that encompasses Phipps' goals and embodies permaculture principles provided	1. 75% of visitors surveyed at the end of project agree that rain garden example is educational 2. Class fees cover maintenance costs by end of project date in 2016	1. 3 random visitors surveys conducted at two midterm points in project (November 2015 and July 2016) and at the end of project (December 2016) 2. Budget report	Assuming visitors and class participants have areas to build rain gardens
Outputs	1. Community education on rain garden construction and water management increased 2. Functional water catchment system constructed 3. Site visits increased	1. Over 75% of class participants indicate increased knowledge by the end of class 2. At least 50% increase over baseline assessment of number of visitors to Phipps Garden Center Park by 2016 3. At least 35% of runoff water is caught and managed by system	1. End of class surveys 2. Baseline survey of foot traffic in rain garden area and end of project survey to compare 3. Water level of surface pond	Assuming community interest remains high
Inputs	1. Procure materials and labor 2. Construct rain gardens 3. Hold classes during development on constructing water catchment systems 4. Hold classes twice yearly on maintaining rain gardens	Budget	Budget Report	Assuming community is interested in rain gardens and classes have high participant rates Assuming resource availability does not fluctuate too greatly

2014	2015	2016
Materials and Labor: $7199	Materials and Labor: $120	Materials and Labor: $120
Teacher fees: $480	Teacher Fees: $1440	Teacher Fees: $1440
Total: $7679	Total: $1560	Total: $1560

Total Budget: $10,799.00

Budget

Materials	2014	2015	2016	
Plants	$500.00	0	0	
Rocks	$600-$100	0	0	
Gravel, 2-3 tons	$100-$150	0	0	
Pond Liner, 45mm thickness, 20x20	$320	0	0	
Backhoe 1-day Rental for curb removal	$50	0	0	
Pipe for french drain, 100 ft	$34	0	0	
Sunjet Solar 150 Pump Water fountain	$50	0	0	
Fish: Gold fish and fat head minows	$50	0	0	
Sod for french drain cover to maintain aesthetics, 50 ft long, 2ft wide (cut in half)	$25	0	0	
Compost, 3 tons	$120	$120	$120	
Recycled barnwood benches, 2	$100	0	0	
Total	$2,399	$120	$120	
Labor	$2,014	2015	2016	
Program Manager Wage at $60 per hour (2 weeks full time)	$4,800	$0	0	
Teachers for classes following construction (8 hr classes, $480 per class)	$480	$1,440	$1,440	
Total	$5,280	$1,440	$1,440	
Total Project Budget	$7,679	$1,560	$1,560	$10,799

Time-line

January 2014: Start of Project; Begin advertising rain garden design and construction class
March 2014: Begin procuring materials for project
April 2014: Take out curb (1 day)
May 2014: Rain Garden Class and project construction
October 2014: Rain Garden Maintenance Class

January 2015: Advertise for 2015 classes
March 2015: Rain Garden Maintenance Class
May 2015: Rain Garden Design class with rain gardens as examples
October 2015: Rain Garden Maintenance Class
November 2015: Community Survey conducted

January 2016: Begin Advertising for 2016 classes
March 2016: Rain Garden Maintenance class
May 2016: Rain Garden Design class with rain gardens as examples
July 2016: Community Survey conducted
October 2016: Rain Garden Maintenance class
December 2016: Final Survey and Evaluation; End of Project