

Green Streets

Environmentally Friendly Landscapes
for Healthy Watersheds

Green Streets in Your Neighborhood



Introduction



What are Green Streets?

Green Streets are roadway Low Impact Development (LID) designs that reduce and filter rainfall and pollutants that wash off surface areas (stormwater runoff), and enter our streams, degrading the water quality of our local streams and rivers. Green Streets is a County initiative that captures stormwater runoff in small landscaped areas that let water soak into the ground while plants and soils filter pollutants. Green Streets practices help to replenish groundwater and baseflows in our streams, rather than sending polluted, heated water through pipes directly into our streams. They also create aesthetically attractive streetscapes, provide natural habitat, and help visually to connect neighborhoods, schools, parks, and business districts.

Green Streets practices are constructed within the street right-of-way. Factors like utilities, existing drainage patterns, soils, tree impacts, the amount of runoff volume, and many other considerations are taken into account in the design of Green Streets.

Stormwater 101

As our neighborhoods were developed, the watersheds that support local streams were greatly altered. Buildings, roads, driveways and lawns have replaced much of the natural vegetation, forest cover, and soils that used to slowly filter rainwater. Development provides us with places to live, work, and play, but its hard surfaces prevent rainwater from soaking back into the ground and allow pollutants to enter local streams more easily. Rainwater falling on hard surfaces is directed to a storm drain where underground pipes transport it to local streams, along with pollutants it picks up along the way. In suburban areas, even lawns can act like a hard surface if they are highly compacted or do not drain well.

How Can I Get Involved

Many of the activities that you do on your property, in your yard, or in your neighborhood may directly affect the water quality of local streams. In addition to the amount of rainwater that may run off of your land, overfertilizing your lawns, improper septic system operation, car washing and car maintenance activities, if not properly done, can pollute runoff that flows to local streams. Preventing pollution at its source is part of the solution to ensuring that the County achieves healthy watersheds.

The County's RainScapes program promotes and implements projects on residential, institutional, and commercial properties to reduce stormwater pollution. The County offers technical and financial assistance (in the form

of rebates) to encourage property owners to implement eligible RainScapes techniques on their property. Visit www.rainscapes.org for more information and to apply online.

Collectively we can help by participating in RainScapes and taking other easy everyday steps to prevent pollution. Go to www.montgomerycountymd.gov/protectyourwatershed for more information about what you can do to protect your watershed.

THE BIG PICTURE...

The County plans to improve stormwater treatment on 4,300 acres of hard surfaces over the next five to ten years. That is a lot of ground to cover, and a variety of approaches are needed to meet this goal, given the extent of development our county.

Just how big is 4,300 acres? 6.7 square miles. That's about three times the size of Takoma Park.

Techniques to Manage Stormwater Runoff

Rain Gardens

- A shallow depression planted with native plants
- Typical profile has a three inch mulch layer, two feet of planting media, followed by one to two feet of gravel
- Collects, stores and allows rainwater from roofs, driveways, patios, or sidewalks to absorb into the ground
- Adds beauty to your street, with maintenance that varies based on the plants you select
- Requires adequate space and well-draining soils



Bioretention Gardens

- Very similar to a Rain Garden - a shallow depression planted with native plants
- Typical profile has a three inch mulch layer, two feet of planting media, followed by one to two feet of gravel
- Gravel layer has an underdrain pipe that is connected to a nearby storm drain to help drain the facility after rain events
- Collects, stores and allows rainwater from roadway to absorb into ground
- Adds beauty to your street with a variety of plants
- Requires adequate space, but does not require well-draining soils because it has an underdrain



Tree Box Filters

- Mini bioretention boxes filled with a soil mixture, a mulch layer, under-drain system and a shrub or tree
- Typically used when space is limited
- Requires proximity to a storm drain system



Pervious Sidewalk, Permeable Pavers & Pavement Removal

- Pervious sidewalk allows water to infiltrate into ground below
- Permeable pavers can be used to create parking pads along the roadway, also allowing water to infiltrate
- Pavement removal may be used in combination with a stormwater management technique depending on site conditions
- Less pavement means less stormwater and pollutants entering local streams



Curb Extensions

- Placed within the road right-of-way between the curb and the sidewalk
- Sometimes curbs are extended into the parking lane and pavement is removed to widen the available footprint and treatable drainage area
- Requires adequate space and minimal impact to parking



Grass swales

- Allow runoff to percolate into the ground, reducing the amount of runoff leaving the roadway
- Check dams can be used within a swale to slow the flow rate, promote infiltration, and create small, temporary ponding areas
- The vegetation covering the side slopes and channel bottom provides a filtration surface for the water and helps to reduce the flow velocity



Green Streets in Your Neighborhood

Frequently Asked Questions (FAQ)

Why are you creating Green Streets in my neighborhood?

This project is part of the County's need to meet Federal and State mandates to control and treat stormwater runoff. The goal of this project is to reduce stormwater runoff, minimize pollution, promote infiltration, and restore stream conditions in the Northwest Branch, the Anacostia River, and the Chesapeake Bay. The Department of Environmental Protection (DEP) is planning Green Streets concurrently with the Department of Transportation's roadway rehabilitation projects so that construction impacts to the neighborhood are minimized. The Franklin Knolls project area is split into four phases. Work will be performed south to north, beginning with the Clifton Park neighborhood as phase 1.



What will the Green Streets practices look like?

There are many different looking Green Streets and LID features. It may be best to view some of the photo examples provided in this brochure. In the case of a rain garden or bioretention, they are typically bowl-shaped, sometimes sodded, and sometimes landscaped with plants and mulch. Tree box filters look smaller, with a square inlet with a tree or small shrub(s) planted inside a filter box filled with a bioretention soil mix. Typically, landscape designers work with the County to develop aesthetically pleasing designs that help connect a neighborhood together and provide a sense of neighborhood identity.

When and where will the Green Streets practices be constructed?

The County is planning construction for Summer/Fall 2013. The project is in the design phase as of February 2013. The Green Streets facilities are typically constructed within the street or within the County right-of-way areas (i.e. the grassy strip between the sidewalk and the curb).

Who is responsible for maintaining the Green Street practices?

DEP is responsible for maintenance of the Green Streets practices. DEP will monitor the practices monthly to make sure they are functioning properly. Our maintenance will ensure the plants are healthy; we will remove dead, diseased, or dying plants, replace plants as needed, replenish the mulch, regularly weed, and remove sediment and trash that accumulates in the facility. We know that the first two years are the most important when establishing the plants. Our plants are under warranty, and we will water and landscape to ensure the plants thrive during this critical time period.

How do the Green Streets LID features work?

It depends on the type of practice, but generally, stormwater runoff from the roadway is diverted into an inlet opening in the curb, and is filtered through a mixture of highly permeable soils (sand, mulch, compost), then stored in an underlying gravel layer before percolating into the groundwater and/or entering into an underdrain that flows to the storm drain system. Runoff has an opportunity to cool down while the plants help absorb nutrients and microbes around the plant roots help break down pollutants. When certain facilities are full after rain events, water may pond up to six inches before draining within 12 to 48 hours, depending on the type of facility and site conditions.

How can I find out more information?

For more information, contact Jennifer St. John at: jennifer.st.john@montgomerycountymd.gov or 240-777-7740. Or visit our project webpage at: www.montgomerycountymd.gov/restorationprojects Click on Northwest Branch, then Franklin Knolls Green Streets.



Working Together - A Neighborhood Process

Project Selection

Project is selected based on priority watersheds identified in Watershed Study Report, or based on the Department of Transportation's roadway rehabilitation schedule, or other priority



Preliminary Design Phase

- Opportunities are identified within the neighborhood based on available information and field visits by the County's project team (May 2011).

Concept Design Phase – 30 - 60%

- Proposed designs are prepared utilizing detailed field survey and geotechnical information
- Public meeting to receive input from the community (July 12, 2012)
- Adjustments are made to design



Design Phase – 60 - 90%

- Further public outreach and design revisions
- Example: neighborhood walk Phase 1 (March 16, 2013)

Final Design and Construction

- Designs are finalized
- Facilities are constructed
- Facilities are planted

Maintenance

- Final inspection
- As-builts drawings are accepted
- Facilities are entered into the MCDEP maintenance system
- Facilities are inspected and maintained monthly



Green Streets in Your Neighborhood

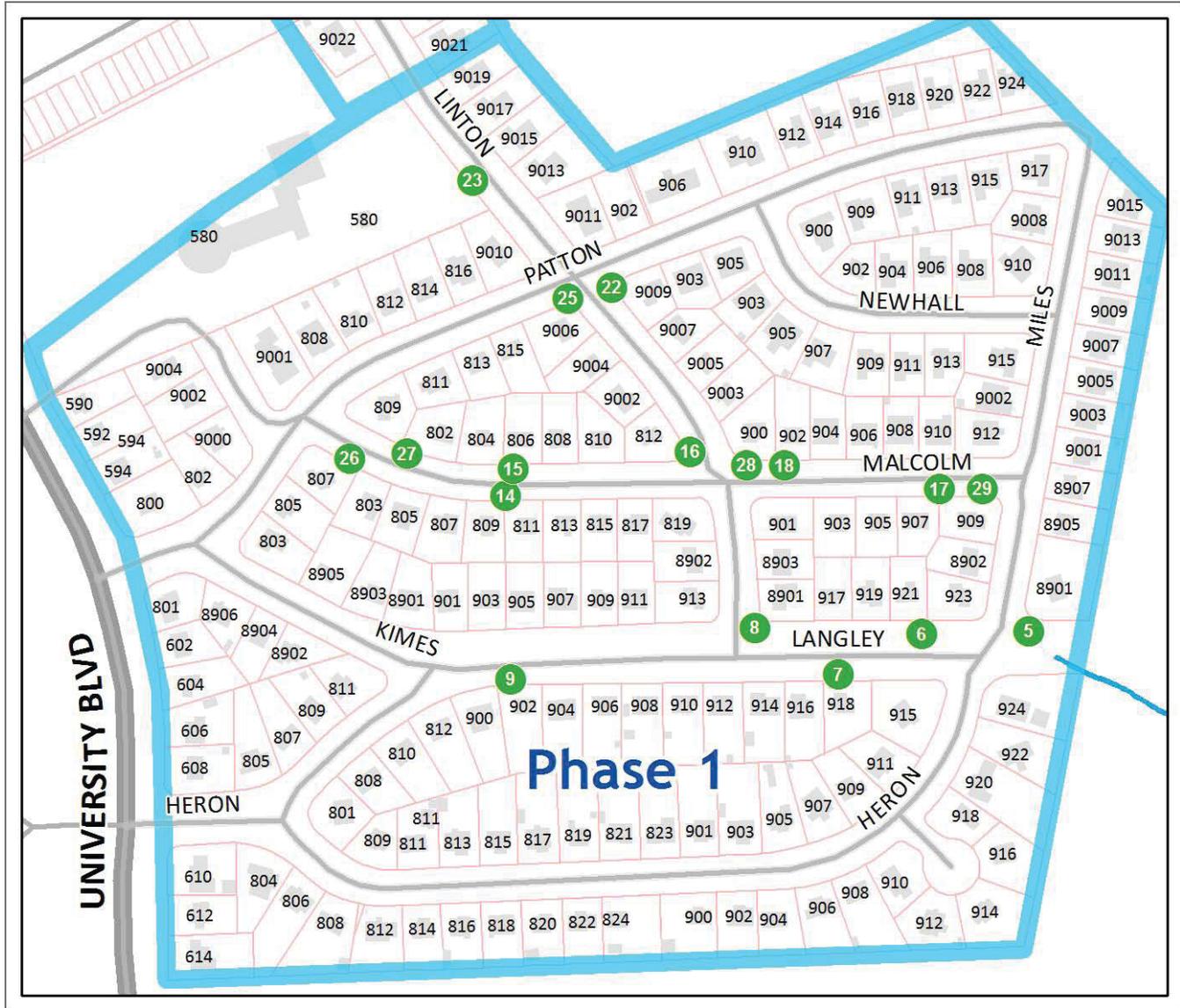
Phase 1 Opportunities - Design Phase

Subject to Change

Last Update 2/2013

**Franklin Knolls
& Clifton Park**

Green Streets Phase 1



Green Streets Phase 1 Feature Types

ID	LID FEATURE TYPE	ID	LID FEATURE TYPE	ID	LID FEATURE TYPE
5	Bioretention & Pavement Removal	15	Rain Garden	25	Rain Garden
6	Bioretention Garden	16	Rain Garden	26	Rain Garden
7	Rain Garden	17	Rain Garden	27	Rain Garden
8	Bioretention Garden	18	Rain Garden	28	Rain Garden
9	Bioretention Garden	22	Rain Garden	29	Rain Garden
14	Rain Garden	23	Rain Garden		

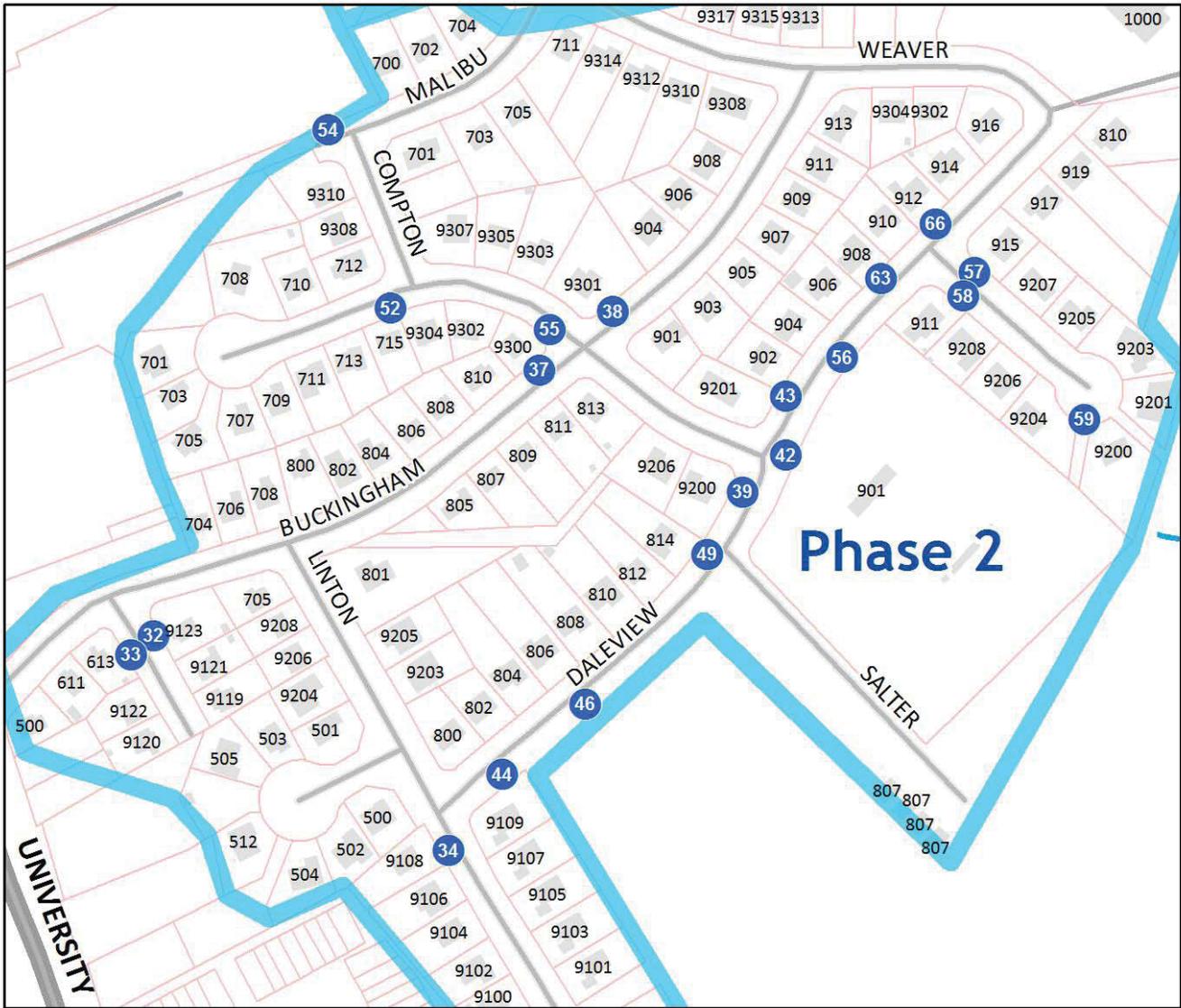
Green Streets in Your Neighborhood

Phase 2 Opportunities - Concept Design Phase

Subject to Change

Last Update 2/2013

Franklin Knolls & Clifton Park **Green Streets** Phase 2



Green Streets Phase 2 Feature Types

ID	LID FEATURE TYPE	ID	LID FEATURE TYPE	ID	LID FEATURE TYPE	ID	LID FEATURE TYPE
32	Rain Garden	39	Bioretention	49	Rain Garden	57	Rain Garden
33	Rain Garden	42	Bioretention	52	Tree Box Filter	58	Rain Garden
34	Tree Box Filter	43	Tree Box Filter	54	Tree Box Filter & Sidewalk Removal	59	Tree Box Filter
37	Tree Box Filter	44	Bioswale	55	Tree Box Filter	63	Rain Garden
38	Tree Box Filter	46	Bioretention	56	Rain Garden	66	Rain Garden

Green Streets in Your Neighborhood

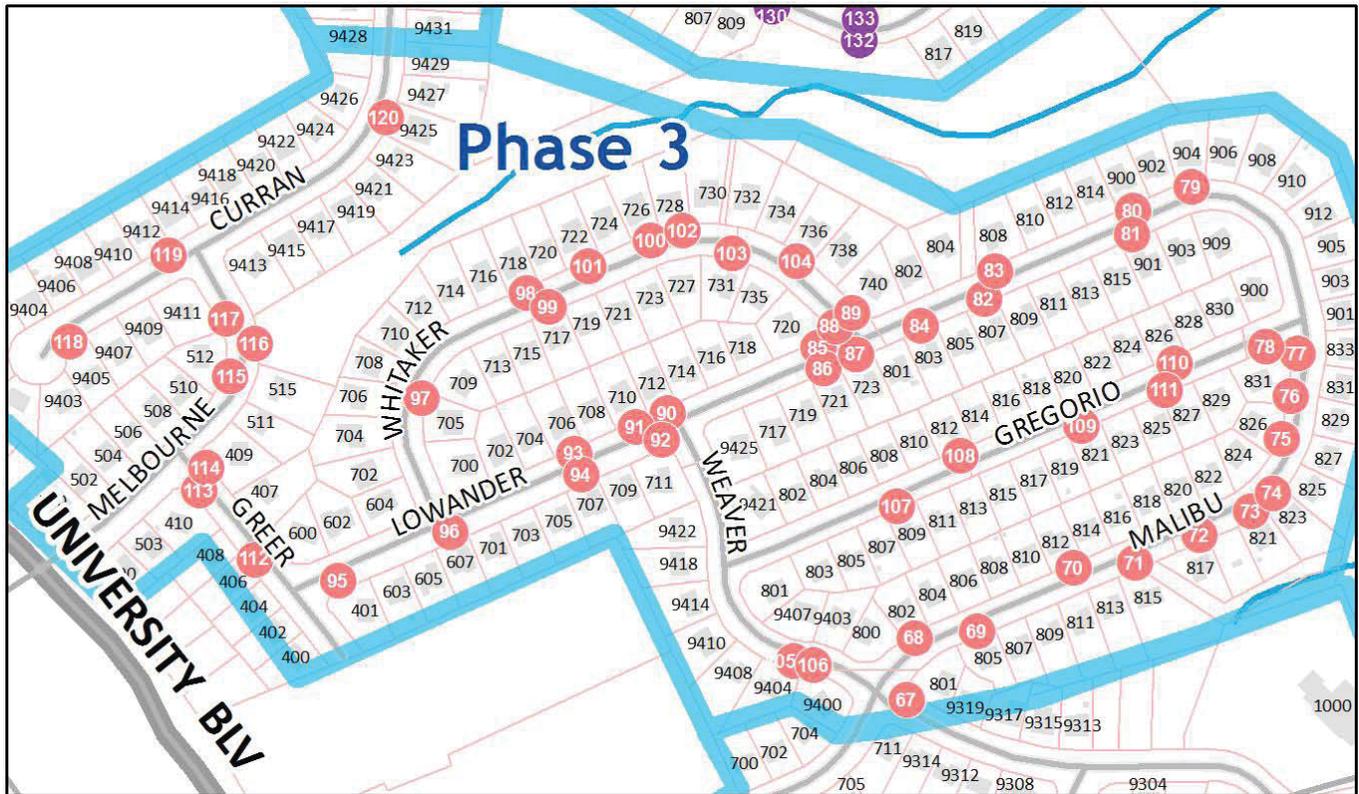
Phase 3 Opportunities - Preliminary Design Phase

Subject to Change
Last Update 2/2013

**Franklin Knolls
& Clifton Park**

Green Streets

Phase 3



Green Streets Phase 3 Feature Types

ID	LID FEATURE TYPE	ID	LID FEATURE TYPE	ID	LID FEATURE TYPE	ID	LID FEATURE TYPE
67	Rain Garden	81	Rain Garden	95	Rain Garden	109	Rain Garden
68	Rain Garden	82	Bioretention or Tree Box Filter	96	Rain Garden	110	Rain Garden
69	Rain Garden	83	Bioretention or Tree Box Filter	97	Rain Garden	111	Rain Garden
70	Rain Garden	84	Rain Garden	98	Rain Garden	112	Rain Garden
71	Bioretention or Tree Box Filter	85	Bioretention or Tree Box Filter	99	Rain Garden	113	Bioretention or Tree Box Filter
72	Rain Garden	86	Bioretention	100	Rain Garden	114	Rain Garden
73	Rain Garden	87	Rain Garden	101	Rain Garden	115	Bioretention or Rain Garden
74	Rain Garden	88	Bioretention	102	Rain Garden	116	Bioretention or Tree Box Filter
75	Tree Box Filter	89	Bioretention or Tree Box Filter	103	Rain Garden	117	Bioretention or Tree Box Filter
76	Rain Garden	90	Rain Garden	104	Rain Garden	118	Rain Garden
77	Rain Garden	91	Rain Garden	105	Rain Garden	119	Rain Garden
78	Bioretention or Tree Box Filter	92	Bioretention or Tree Box Filter	106	Rain Garden	120	Rain Garden
79	Rain Garden	93	Rain Garden	107	Rain Garden		
80	Rain Garden	94	Rain Garden	108	Rain Garden		

Green Streets in Your Neighborhood

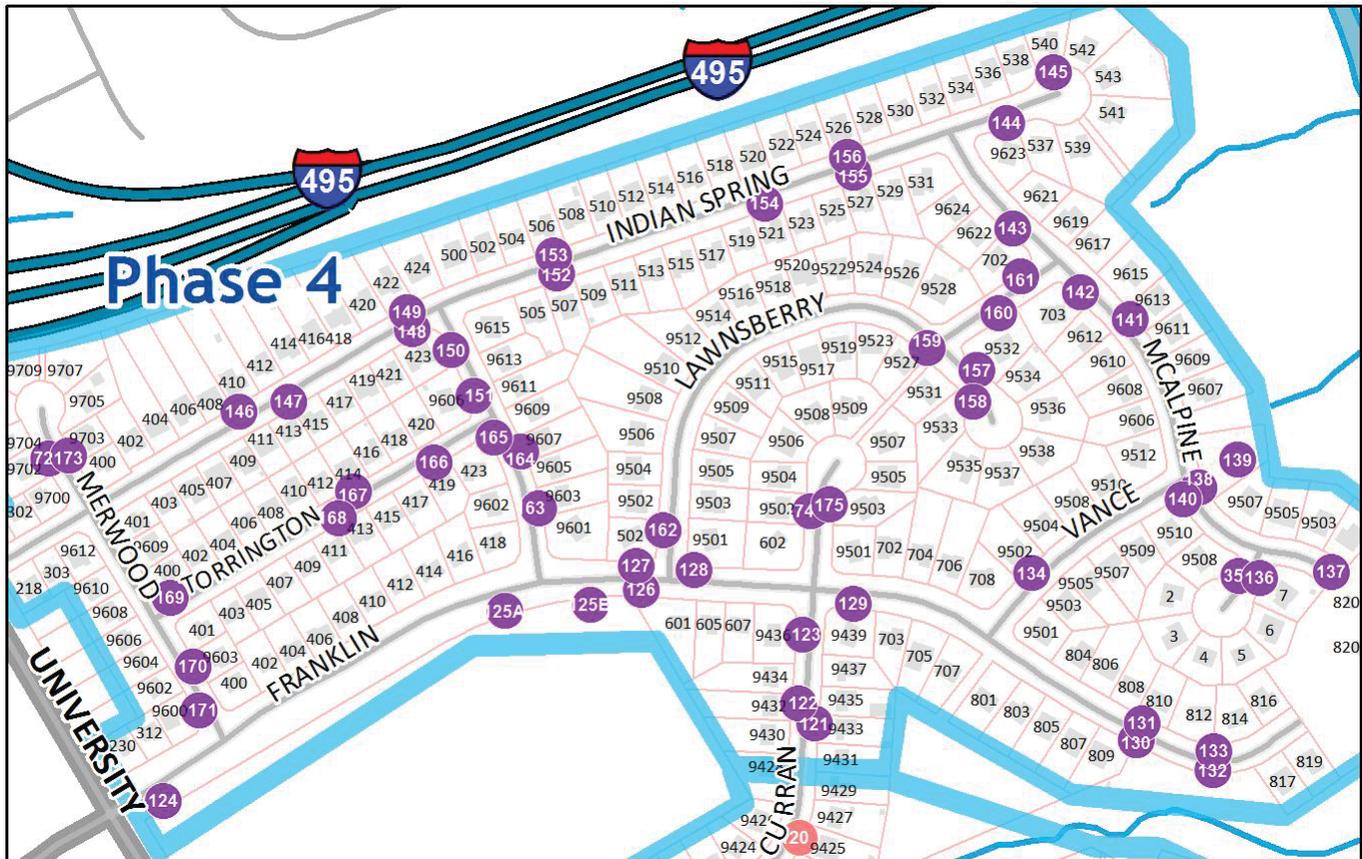
Phase 4 Opportunities - Preliminary Design Phase

Subject to Change
Last Update 2/2013

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Green Streets

Phase 4



Green Streets Phase 4 Feature Types

ID	LID FEATURE TYPE	ID	LID FEATURE TYPE	ID	LID FEATURE TYPE	ID	LID FEATURE TYPE
121	Rain Garden	134	Rain Garden	148	Rain Garden	162	Bioretention or Tree Box Filter
122	Rain Garden	135	Rain Garden	149	Rain Garden	163	Rain Garden
123	Rain Garden	136	Rain Garden	150	Rain Garden	164	Rain Garden
124	Bioretention or Tree Box Filter	137	Rain Garden	151	Bioretention	165	Bioretention or Tree Box Filter
125a	Bioretention or Rain Garden	138	Bioretention or Tree Box Filter	152	Rain Garden	166	Rain Garden
125b	Bioretention	139	Bioretention	153	Rain Garden	167	Rain Garden
126	Tree Box Filter	140	Bioretention	154	Rain Garden	168	Rain Garden
127	Bioretention or Tree Box Filter	141	Rain Garden	155	Rain Garden	169	Rain Garden
128	Rain Garden	142	Bioretention	156	Rain Garden	170	Rain Garden
129	Rain Garden	143	Rain Garden	157	Rain Garden	171	Rain Garden
130	Bioretention or Tree Box Filter	144	Tree Box Filter	158	Rain Garden	172	Rain Garden
131	Rain Garden	145	Rain Garden	159	Bioretention or Tree Box Filter	173	Rain Garden
132	Rain Garden	146	Rain Garden	160	Rain Garden	174	Rain Garden
133	Rain Garden	147	Rain Garden	161	Bioretention or Tree Box Filter	175	Rain Garden