DAVIS & FLOYD

June 22, 2007

RE:
Griffin Park – Phase 1
Rain Garden
Preservation of Trees

Greenville County
Planning Department
Attention: Pat Webb

Dear Mrs. Webb;

Thank you for discussing the variance issues for Griffin Park – Phase 1. As explained to you in our telephone conversation the developer wishes to ask for the following variances in Griffin Park Phase 1. This phase has already been reviewed and permitted by all required regulatory agencies and is currently under construction.

1.) The developer wishes to provide a Rain Garden in the area defined by Nesbit. We have attached a map of the proposed location and literature on the Rain Gardens for your use. Since Phase 1 has already been permitted for water quality, the installation of this Rain Garden is an added environmental benefit to the site.

2.) The developer wishes to preserve the existing trees in the Arnold Mill and Carruth splits. For your review we have included pictures of each area as well as a description of the existing trees. The smaller "scrub" trees will be removed as well as those trees indicated on the attachments.

Please do not hesitate to contact us should you have any questions. Thank you for your assistance.

Sincerely,

Jennifer Wood
Civil Engineering Manager
Davis & Floyd, Inc
864-527-9800

ARNOLD MILL SPLIT –

REMOVE 12" CLUSTER OF BEECH

" 15" WATER OAK

" 10" OAK

ALL OTHERS SHOULD BE CLEAR –

JEFF

N

Arnold Mill Split

1

2

Arnold Mill Split

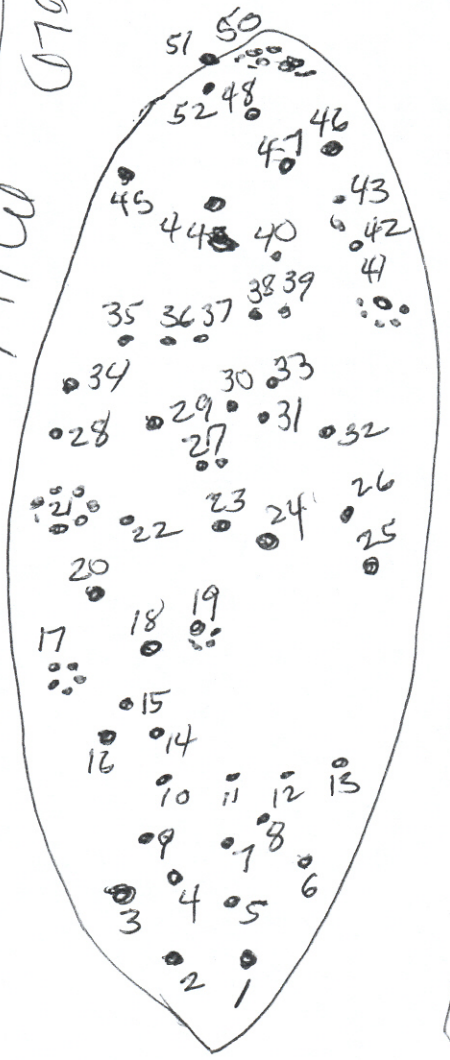
3

4

Arnold Mill Split

5

6



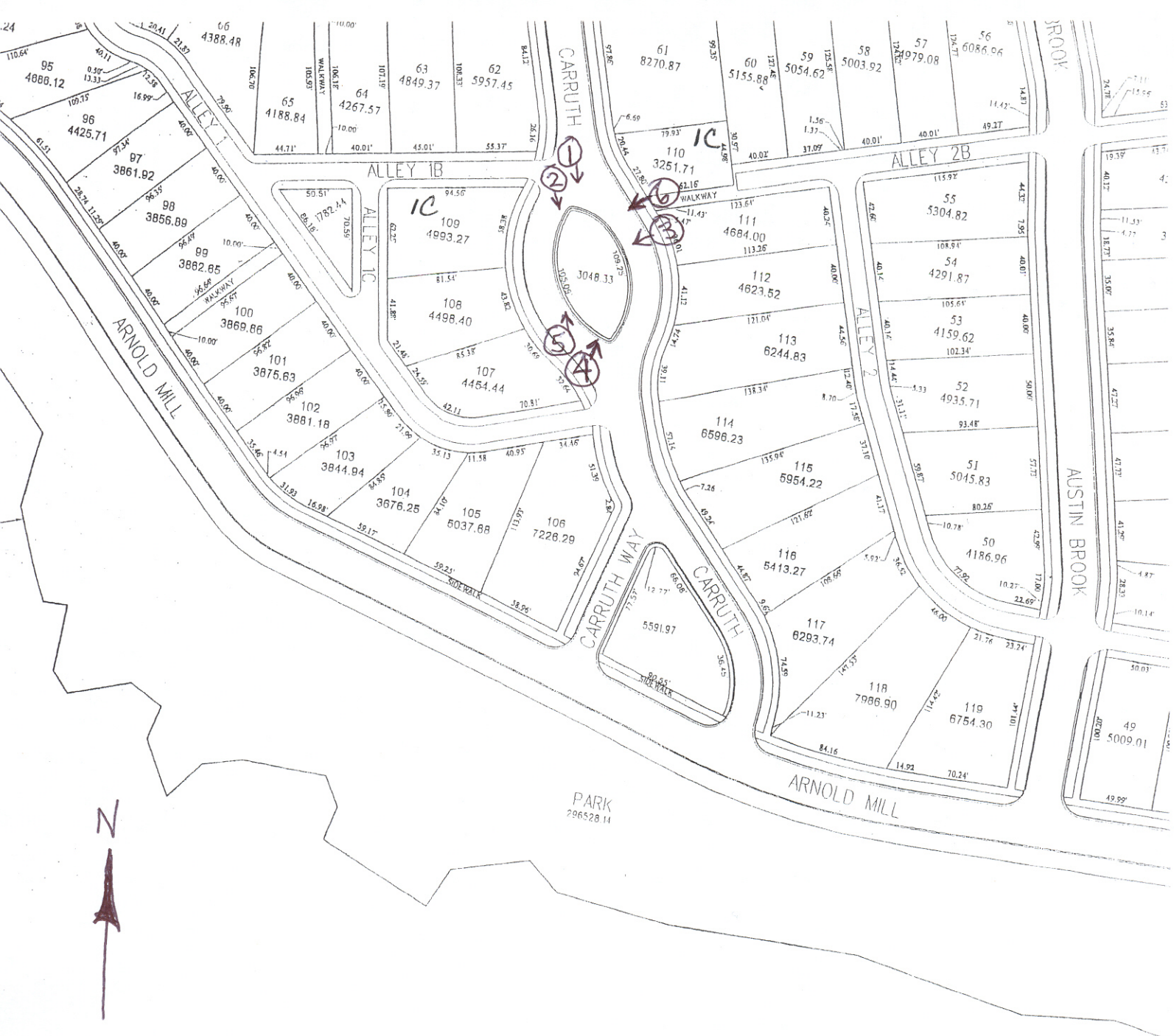
1- Cherry (3")
2- Sweet Gum (3")
3- Water Oak (18")
4. Cedar (3")
5, Pine (3")
6. Sweet Gum (2")
7. Cherry (7")
8, Cedar (2")
9, Cedar (3")
10. Cherry (8")
11, Pine (5")
12 Sweet Gum (1½")
13. Cherry (5")
14, Cedar (3")
15, Water Oak (4")
16. Pine (5")
17, Cedar/Pine Cluster (5" AVG
18, Pine (12")
19. Cedar Cluster (3" AVG)
20. Pine (7")

19. Pine (12")
0. Cluster of Pines (2")
1. Water Oak (2")
2. Sweet Gum (2")

28. Cedar (9")
9. Cedar (8")
3. Cedar (5")
1. Water Oak (5")
2. Water Oak (6")
3. Cherry (9")
34. Water Oak (6")
35. Water Oak (26")
36. Cedar (3")
7. Cedar (3")
8. Cedar (3")
9. Cedar (3")
40. Cherry (5")
41. Cedar Cluster (3" 6")
42 - Beech (12" Forked) ♡ *

43. Water Oak (3")
44. Sweet Gum (15")
45. Cherry (4")
* 46. Water Oak (15")
47. Water Oak (20")
48. Cherry (12")

21. Pine Cluster (8) (3" Avg.)
22. Pine (7")
23. Cedar (6")
24. Cherry (10")
25. Oak (10") *
26. Water Oak (11")
27. Cherry (2@10")



CARRUTH SPLIT –
REMOVE 12" TULIP POPLAR
" 4' WATER OAK

ALL OTHERS SHOULD BE OKAY

JEFF

Carruth Split

1

2

Carruth Split

3

4

Carruth Split

5

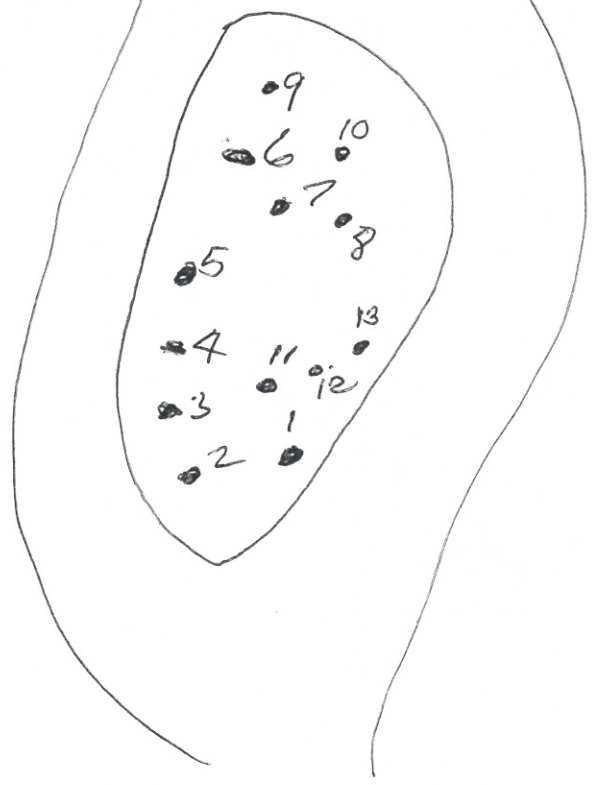
6

Carruth Split

7

0-8ft from eop

Camtls Split



Lot 109

Lot 108

Lot 107

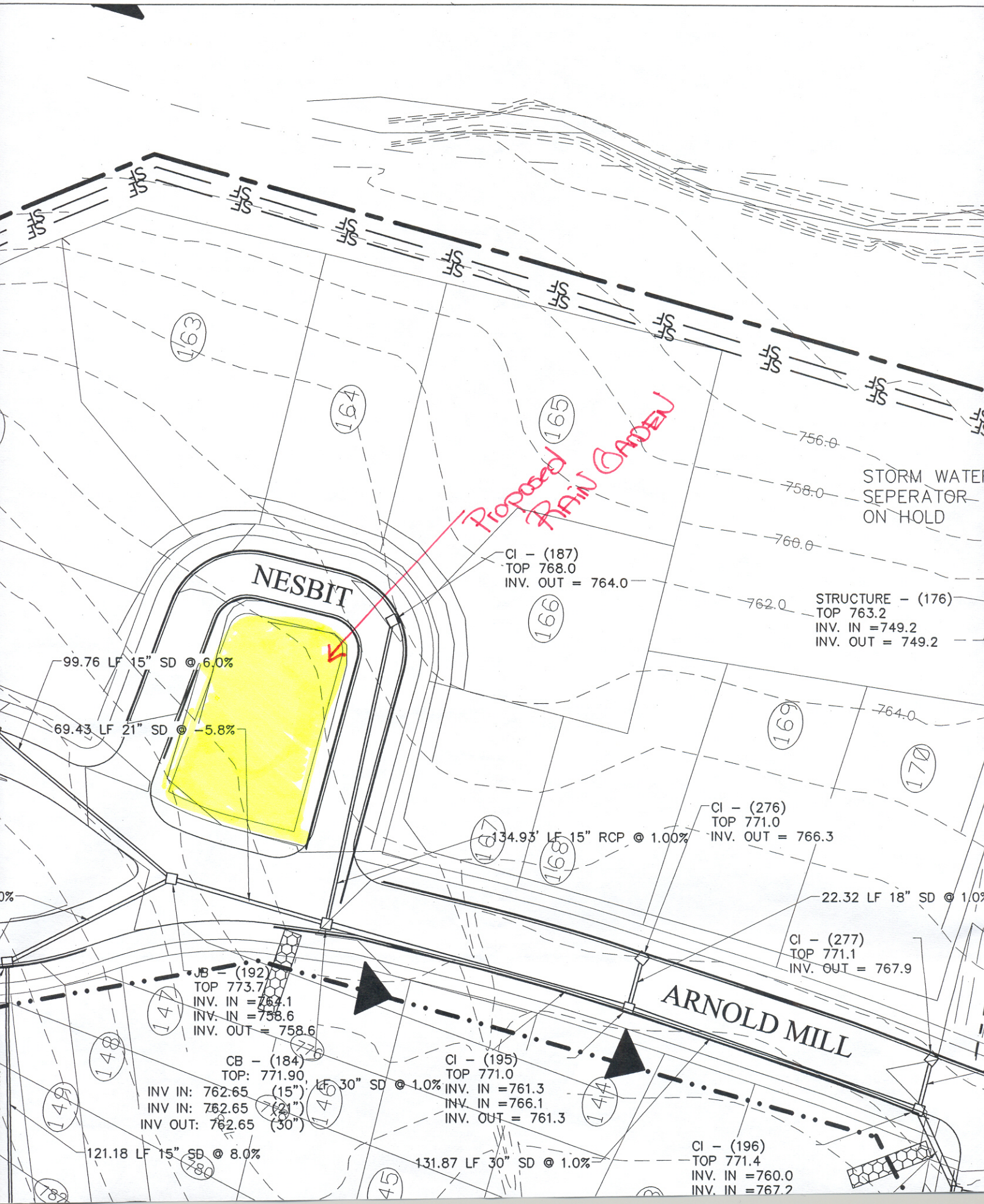
Lot 111

112

113

* 1- Tulip Poplar (12")
2- Oak (22")
3- Water Oak (9")
4- Cherry (3")
5- Oak (28")
6- Oak (22")
7- Holly (4")
8- Maple (3")
9- Water Oak (2")
10- Maple (3")
11- Oak (12")
12 Cherry (10")
*13 Water Oak (4")

RAIN GARDEN


Proposed RAIN GARDEN
NESBIT
ARNOLD MILL
99.76 LF 15" SD @ 6.0%
69.43 LF 21" SD @ -5.8%
CI – (187)
TOP 768.0
INV. OUT = 764.0
STRUCTURE – (176)
TOP 763.2
INV. IN =749.2
INV. OUT = 749.2
STORM WATE
SEPERATOR
ON HOLD
756.0
758.0
760.0
762.0
764.0
CI – (276)
TOP 771.0
INV. OUT = 766.3
134.93' LF 15" RCP @ 1.00%
22.32 LF 18" SD @ 1.0
CI – (277)
TOP 771.1
INV. OUT = 767.9
JB – (192)
TOP 773.7
INV. IN =764.1
INV. IN =758.6
INV. OUT = 758.6
CB – (184)
TOP: 771.90
INV IN: 762.65 (15")
INV IN: 762.65 (21")
INV OUT: 762.65 (30")
LF 30" SD @ 1.0%
CI – (195)
TOP 771.0
INV. IN =761.3
INV. IN =766.1
INV. OUT = 761.3
121.18 LF 15" SD @ 8.0%
131.87 LF 30" SD @ 1.0%
CI – (196)
TOP 771.4
INV. IN =760.0
INV. IN =767.2

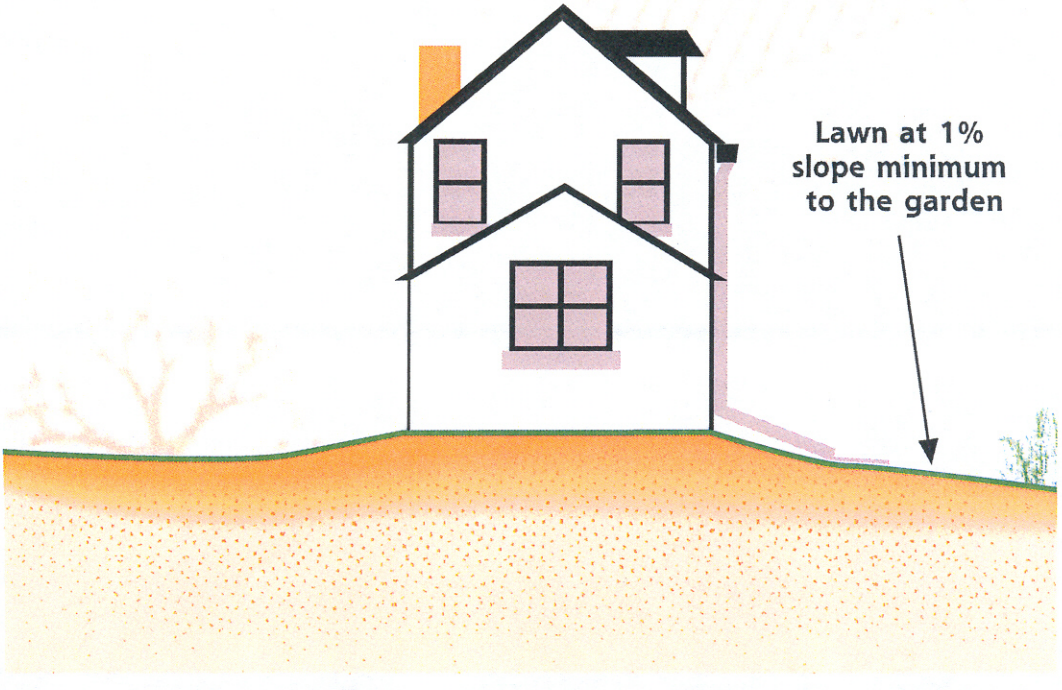
RAIN GARDENS

A household
way
to improve
water quality
in your
community

Rain gardens are just what they sound like – gardens that soak up rain water, mainly from your roof, but also from your driveway and lawn. They are landscaped areas planted to wild flowers and other native vegetation to replace areas of lawn. The gardens fill with a few inches of water and allow the water to slowly filter into the ground rather than running off to storm drains. Compared to a patch of conventional lawn, a rain garden allows about 30 percent more water to soak into the ground.

Holding back the runoff helps prevent pollutants such as fertilizers from washing off your yard, into storm sewers, and eventually into nearby streams and lakes. By reducing the amount of water that enters the local storm drain systems, rain gardens can also reduce the chances for local flooding, as well as bank and shoreline damage where storm drains empty into streams and lakes.

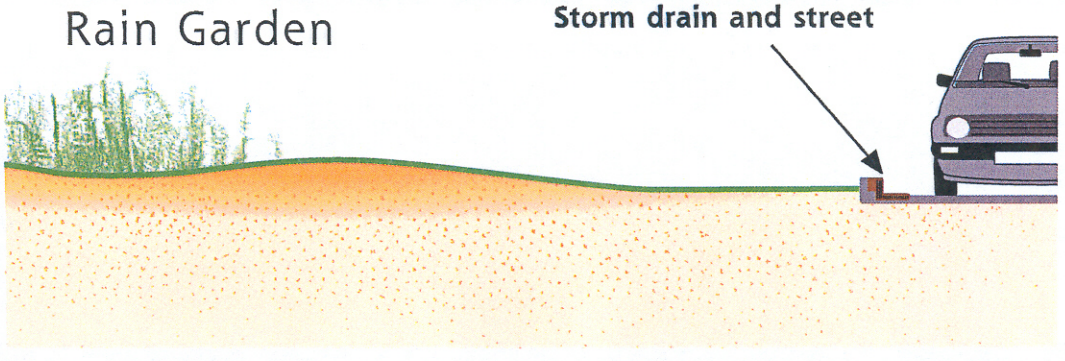
People in many parts of the country are starting to build rain gardens in their yards and promoting their use in other locations, such as neighborhood parks. You can help in your own yard by simply building one or more rain gardens to collect runoff from your roof. Rain water can sometimes be collected from your driveway or lawn by locating a rain garden in a low spot where the water naturally drains.



Tips for a productive rain garden

- Keep in mind that a rain garden is a "garden" not a prairie. The focus is on flowers, although some grasses can be used.
- When planting the rain garden, ask some friends to help. A few people helping for an hour can be fun for all and will allow you to get the planting done in a couple hours.
- In the weeks after planting, you may want to hoe dandelions and other weeds until the mature garden plants crowd them out.
- As the rain garden matures, you will need to thin the population of some plants to allow others to grow.
- Leave the dead or dormant plants standing over the winter. Many of the plants will provide seeds and shelter for birds. In spring cut back or mow the stalks to allow new shoots to emerge.
- Installation of a rain garden is slightly more work than a comparable area of lawn, but maintenance is low once plants mature.

Rain Garden

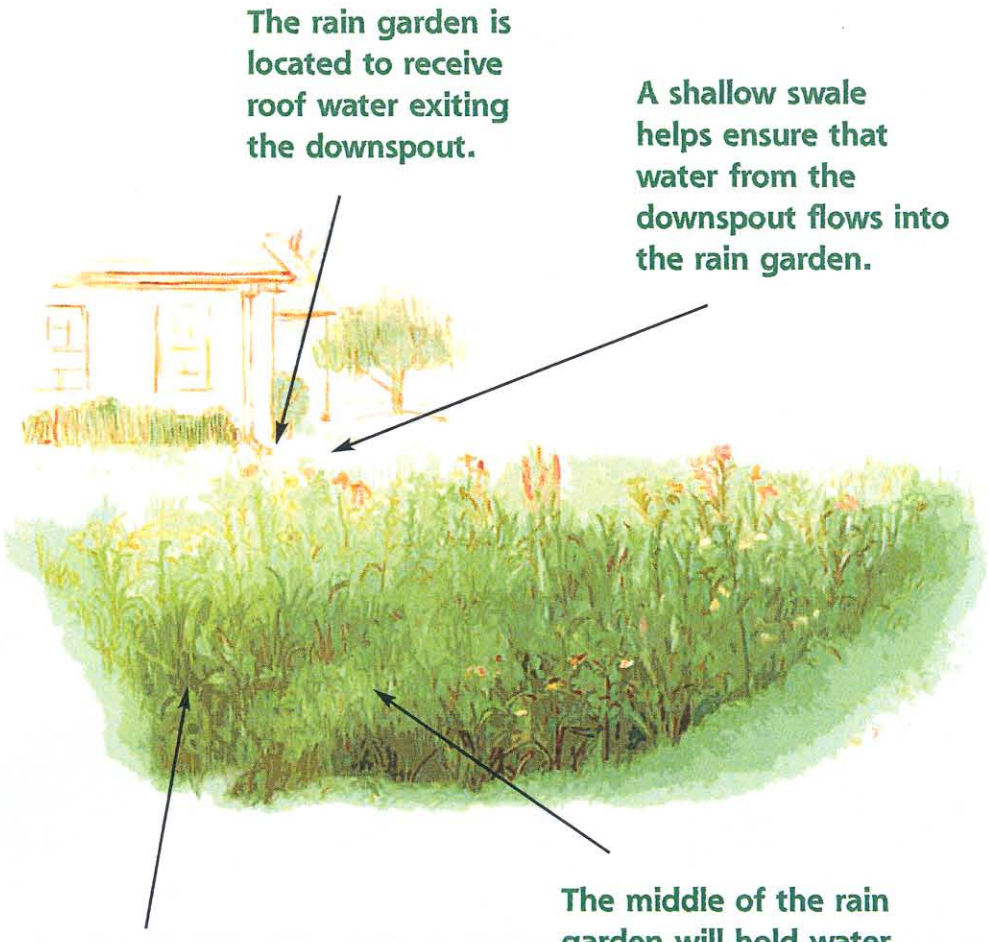


Consider a rain garden for your yard

Rain gardens can be your personal contribution to cleaner water, healthier fish and wildlife populations, and a greatly improved environment for your family and community. Each rain garden may seem small, but collectively they produce substantial neighborhood and regional environmental benefits. Rain gardens work for us in several ways:

- Increasing the amount of water filtering into the ground, which recharges groundwater and helps reduce the amount of pollutants washing off to lakes and streams;
- Helping sustain adequate flows in streams during dry spells;
- Providing valuable wildlife habitat;
- Enhancing the beauty of your yard and the neighborhood;
- Helping protect communities from flooding and drainage problems;
- Helping protect streams and lakes from damaging flows and reducing erosion of the of streambanks and lakeshores;
- Reducing the need for costly municipal storm water treatment structures.

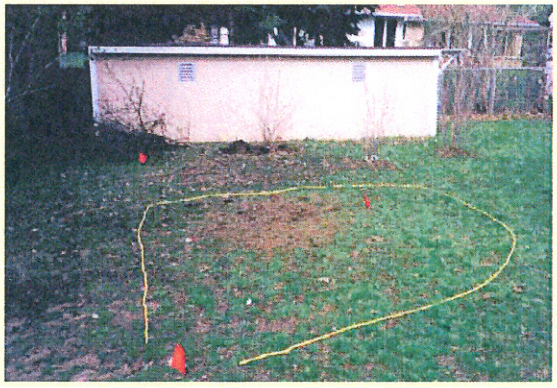
Rain gardens are useful even where little space is available.



Building a rain garden

Key steps in the process include sizing, choosing the appropriate plants, construction, planting, and maintenance. You might decide to do all or some of the steps yourself or you might a select a professional landscaping company to help you. However you decide build your rain garden, try to keep the design simple. This will help make the garden as affordable as possible and increase the chances for you to be involved in all the steps of making one. The photographs from several different rain garden projects show a few of the steps in the process.

1



Rope is used to lay out the boundary of a future rain garden.

2

The rain garden is dug to 3 to 4 inches in depth with care to make the bottom as level as possible. With the lawn sloping gently upward to the house, the garden is positioned to trap water from a downspout.

3

Neighbors planting native plants in zones identified by string laid out on the ground. Planting only takes about 2 hours with a little help.

4

The young native plants begin to flourish. Rain water from the down-spout will flow directly to the rain garden.

5

This rain garden is two year old. Weeds have a hard time growing in a mature rain garden. Old stalks can be cut back or mowed in the spring to give the new growth a good start. Birds and butterflies are regular visitors to the garden.

RAIN GARDENS

A household way to improve water quality in your community

A publication of the University of Wisconsin–Extension and Wisconsin Department of Natural Resources.

Photos by Roger Bannerman, Wisconsin Department of Natural Resources.

Illustrations by Rob Dunlavey.

Layout design/production by Jeffrey Strobel, and editorial assistance by Bruce Webendorfer, University of Wisconsin–Extension Environmental Resources Center.

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UW Extension
University of Wisconsin–Extension

DNR WT 731-2002

Wisconsin Department of Natural Resources

RAIN GARDEN FOR CLAY SOILS AND FULL SUN

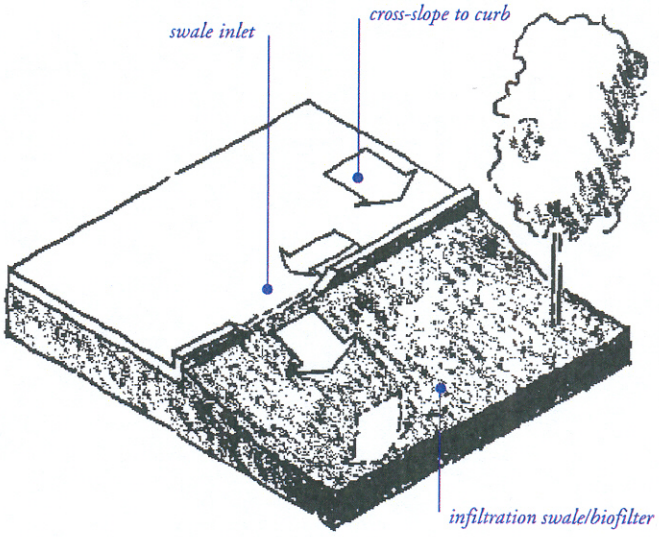
AREA: 192 Square Feet

Designed to thrive through conditions of periodic water infiltrations as well as dry periods
Designed to control 45% of annual runoff from an average sized rooftop (500 to 700 square feet)
Install at least 10' from your foundation, in-line with a down-spout and/or downslope to intercept the rooftop water
Depth of the garden designed to be 3.5" to 4" deep to hold about 200 gallons of water during periods of heavy rainfall

LATIN NAME	COMMON NAME	AMT	BLOOM TIME	BLOOM COLOR	HEIGHT	SPACING
Asclepias incarnata	Red Milkweed	7	early summer	red	3'-5'	1'
Baptisia lactea	White False Indigo	1	early summer	white	3'-5'	2'
Iris versicolor	Blue Flag Iris	7	early summer	blue	2'-3'	1'
Penstemon digitalis	Smooth Penstemon	7	early summer	white	2'-3'	1'
Liatris pycnostachya	Prairie Blazingstar	8	summer	pink	3'-5'	1'
Parthenium integrifolium	Wild Quinine	8	summer	white	3'-5'	1'
Ratibida pinnata	Yellow Coneflower	8	summer	yellow	3'-6'	1'
Boltonia asteroides	False Aster	8	late summer	white/pink	2'-4'	1'
Rudbeckia subtomentosa	Sweet Black-Eyed Susan	2	late summer	yellow	4'-6'	2'
Vernonia fasciculata	Ironweed	8	late summer	magenta	4'-6'	1'
Aster novae-angliae	New England Aster	12	fall	pink/purple	3'-6'	1'
Solidago rigida	Stiff Goldenrod	12	fall	yellow	3'-5'	1'
Carex vulpinoidea	Fox Sedge	96			1'-3'	1'

184 plants

Streets, continued



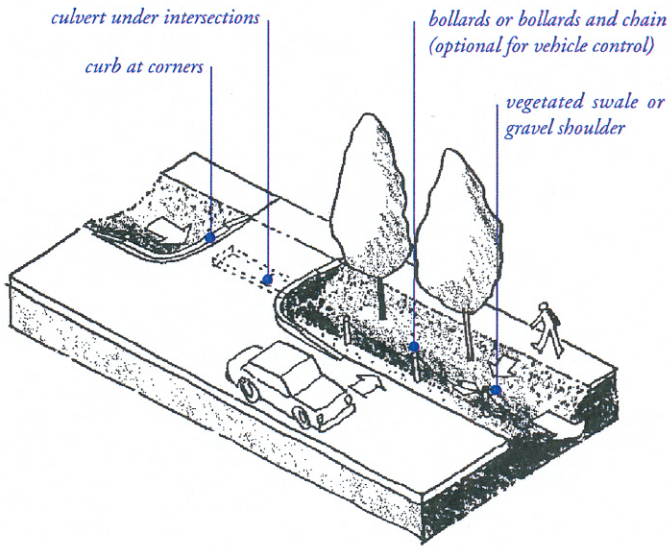
6.2c Urban curb/swale system

more cautious. These neo-traditional streets are designed for traffic speeds between 15 to 25 mph, compared to a design speed of 30 mph for most current municipal standards.[44] This reduced design speed increases safety, particularly for pedestrians. Nevertheless, shared moving space may promote unsafe conditions or high incidences of driver inconvenience if traffic volumes are much above 500-750 ADT. On access streets where bicycle traffic is especially high, such as designated bike routes or in university towns, wider streets may be advisable to provide adequate space.

Emergency service providers often raise objections to reduced street widths. Typical Fire Department standards require greater moving space for emergency access than accommodated by neo-traditional designs. A principal concern is that emergency access may be blocked if a vehicle becomes stalled in the single moving lane. Grid street systems provide multiple alternate emergency access routes to address this concern, though there may be a marginal increase in response times. Documenting the number of instances where delay has occurred in existing pre-war neighborhoods with street widths below current Fire Department standards may be a suitable way to asses the risk of this situation arising in new neighborhoods with neo-traditional street design, and to balance it with the demonstrated increased risk from higher traffic speeds on wider streets.

Inlet detail for urban curb/swale system

Just as a drop inlet collects runoff into an underground pipe system, a swale inlet collects runoff into a surface infiltration system. This swale inlet includes boulders set in soil to dissipate flow velocities and minimize erosion.



6.2d Rural swale system

Emergency service access is one factor of many that form a general assessment of neighborhood safety. One way to balance emergency service access with the benefits of access streets is to allow parking on one side only to preserve a wider moving space.

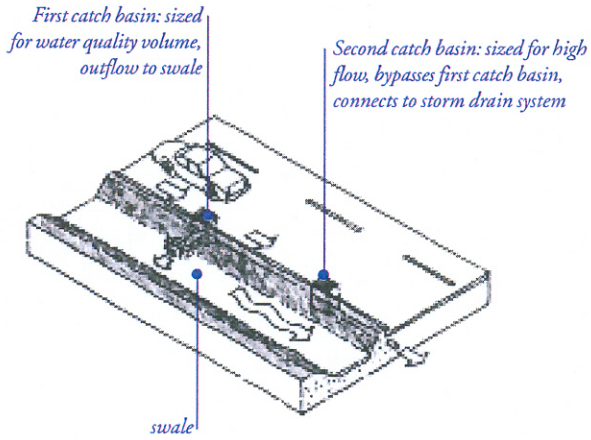
Hillside sites have special access concerns and fire risks. Because of the potential of shared moving lanes to be blocked by a single vehicle, with no comparable alternate route, reduced street widths may not be advisable on long cul-de-sac streets or narrow hillside sites.

Street drainage. Current Bay Area municipal standards generally require concrete curb and gutter along both sides of a residential street, regardless of number of houses served. The curb and gutter serves several purposes: it collects stormwater and directs it to underground conveyance drainage systems, it protects the pavement edge, it prevents vehicle trespass onto the pedestrian space, it provides an edge against which street sweepers can operate, and it helps to organize on-street parking.

Curb and gutter systems provide a directly connected conduit to natural water bodies and may act to collect and concentrate pollutants. There are two alternatives to typical curb and gutter systems that meet functional requirements while lessening the street's impact on stormwater quality.

6.2c Urban curb/swale system. On streets where a more urban character is desired, or where a rigid pavement edge is required, curb and gutter systems can be designed to empty into drainage swales. These swales can run parallel to the street, in the parkway between the curb and the sidewalk, or can intersect the street at cross angles, and run between residences, depending on topography. Runoff travels along the gutter, but instead of being emptied into a catch basin and underground pipe, multiple openings in the curb direct runoff into surface swales or infiltration/detention basins. If planted with turfgrass and gently sloped, these swales function as biofilters (see Drainage systems 5.5c). Because concentration of flow will be highest at the curb opening, erosion control must be provided, which may include a settlement basin for ease of debris removal.

6.2d Rural swale systems. On streets where a more rural character is desired, concrete curb and gutter need not be required. Since there is no hard edge to the street, the pavement margins can be protected by a rigid header of steel, wood or a concrete band poured flush with the street surface. Parking can be permitted on a gravel shoulder. If the street is crowned in the middle, this gravel shoulder also can serve as a linear swale, permitting infiltration of stormwater along its entire length. Because runoff from the street is not concentrated, but dispersed



6.2e Dual drainage system

along its entire length, the buildup of pollutants in the soil is minimized. If parking is not desired on the shoulder, or if it needs to be organized, bollards, trees or groundcovers can be installed along the shoulder to prevent vehicle trespass.

In these ways edge treatments other than continuous concrete curb and gutters with underground drainage systems can be integrated into street design to create a headwaters street system that minimizes impact on stormwater quality and that captures the most attractive elements of traditional neighborhood design.

6.2e Dual drainage system. A dual drainage system is one that captures the first flush of rainfall from the 2-year storm event in a catch basin that outflows to a grass swale with small check dams. Consituents are filtered as water passes through the swale, to the outlet that directs flow back into the main storm drainage system. Runoff in excess of the 2-year storm event is captured by a second catch basin that is directly connected to the storm drain. This system can work effectively at treating the small storms while making provisions for the large storms.

Street drainage considerations. The perception that surface swale systems require a great deal of maintenance is a barrier to their acceptance. In practice, maintenance is required for all drainage systems, and surface systems can require comparable or less maintenance than underground systems. Design factors for low maintenance include:

- erosion control at curb openings
- shallow side slopes and flat bottoms (as opposed to ditches which erode)
- planting with easily maintained groundcover such as turf
- minimizing weeds through proper plant selection or installation of permeable landscape fabric.

Maintenance practices for surface systems are different than most urban Public Works Departments currently practice, and some employee retraining may be required to facilitate maintenance of street systems using surface swales instead of concrete curbs and underground pipes. One advantage of surface drainage systems is that problems, when they occur, are easy to fix because they are visible and on the surface.