Retrofitting with LID in the Burnt Mill Creek Watershed Wilmington, NC

Stormwater Engineering

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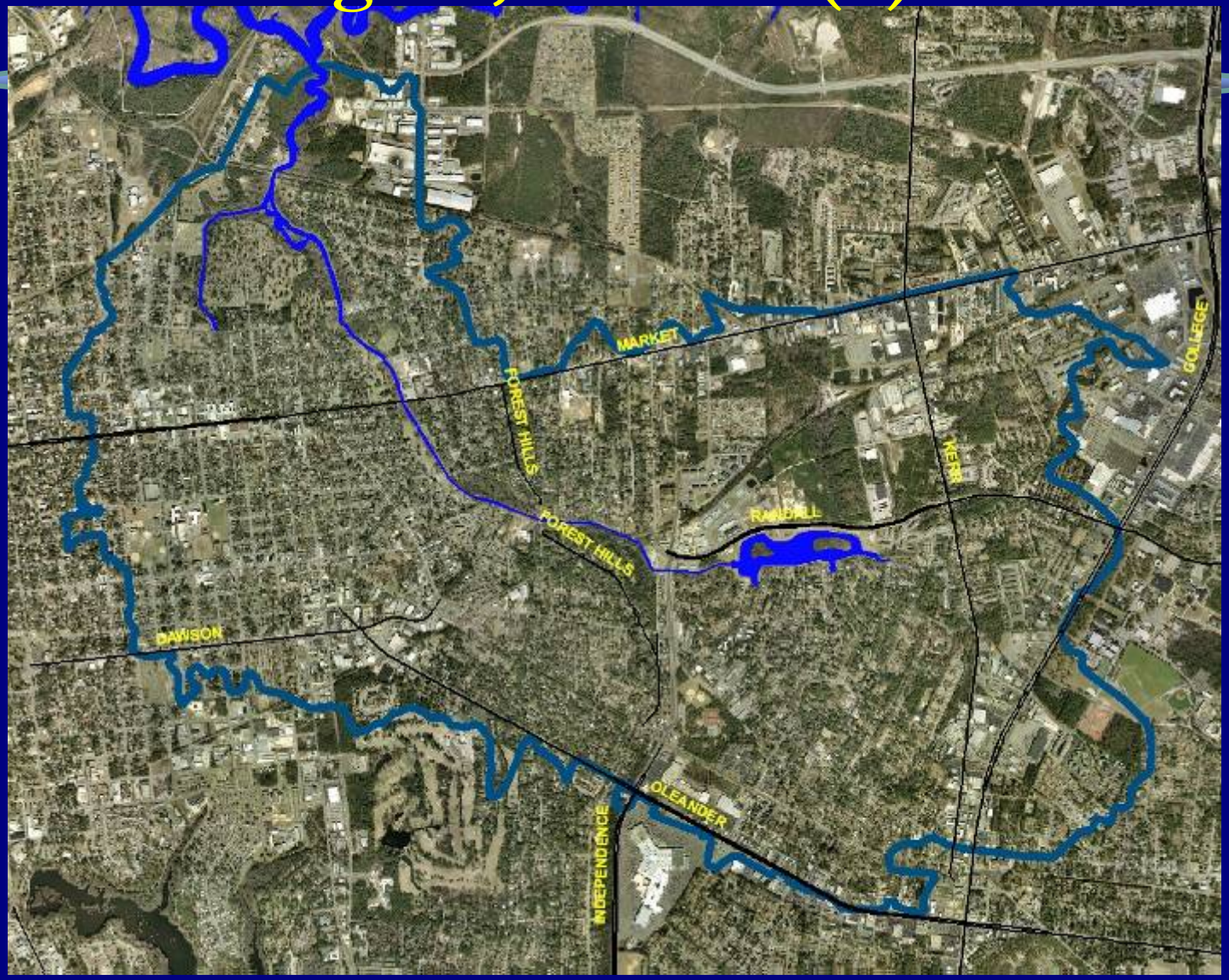
Christy Perrin & Patrick Beggs, Watershed Education for Communities and Local Officials, NCSU

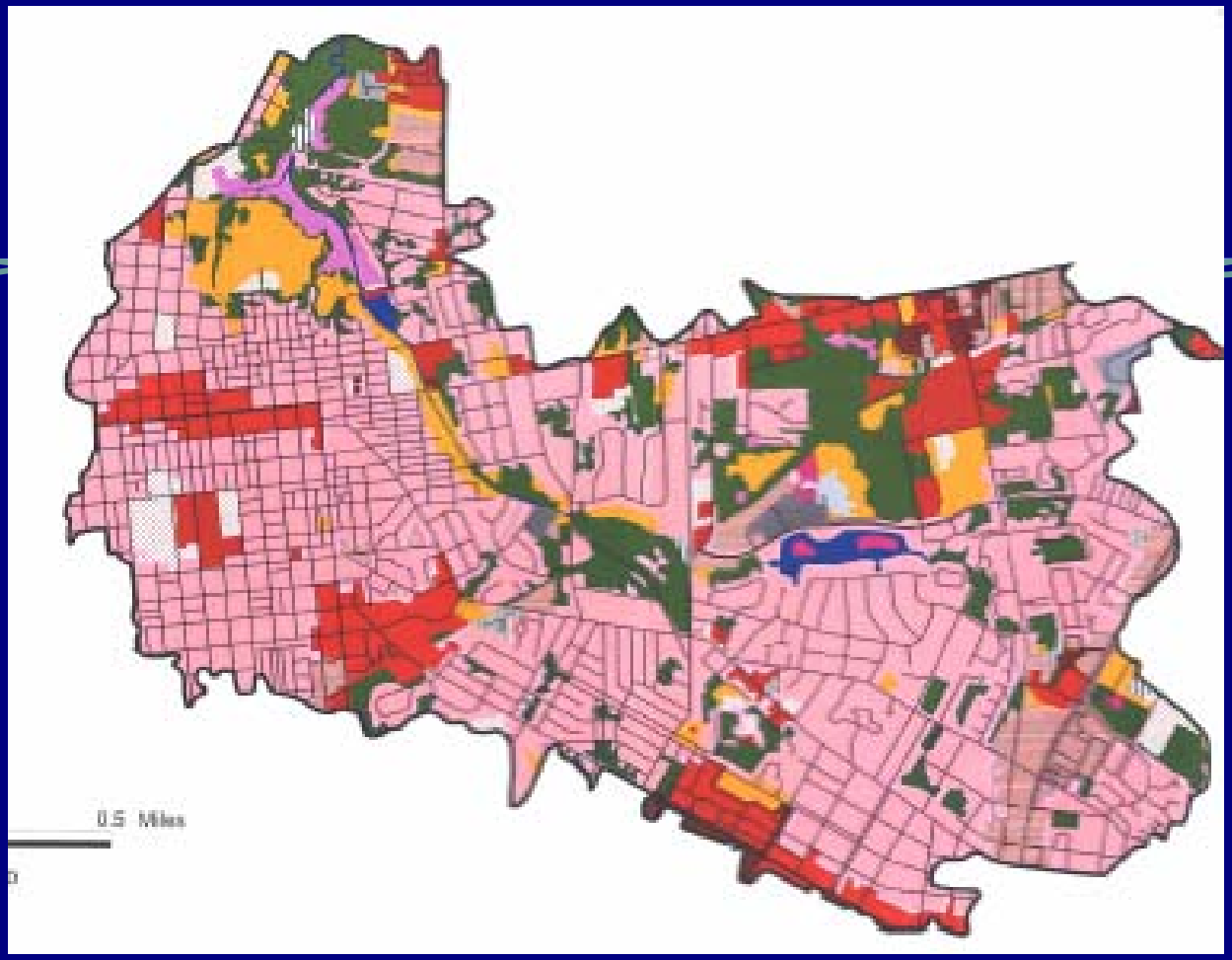
Presentation Includes

- Why Burnt Mill Creek was targeted for improvement
- Background of EPA Grant for Burnt Mill Creek
- Best Management Practices Installed in the Burnt Mill Creek Watershed

Burnt Mill Creek Watershed

Burnt Mill Creek Watershed, Wilmington, NC: 303(d) Stream





Burnt Mill Creek Land Use

- 55% Residential
- 19% Commercial & industrial

- Increased velocity & quantity of stormwater runoff

- Heavily polluted by bacteria and PAHs (toxic organic substances resulting from combustion)

New Hanover Local Watershed Planning

- Sponsored by NC EEP from 2001-2002
- WECO convened local watershed group to guide plan
- Watershed health of Burnt Mill Creek & 2 others was assessed, projects identified

Partnership received EPA 319 Grant for Burnt Mill Creek 2004-2007

1. Design and Construct 6 large BMPs
2. Community Outreach and involvement, resulting in many small backyard BMPs
3. Water quality monitoring

Goals of Current Burnt Mill Creek Project

- Improve water quality in the creek
- Demonstrate specific practices improve water quality in targeted subcatchments
- Determine realistic improvement goals for urban watershed restoration

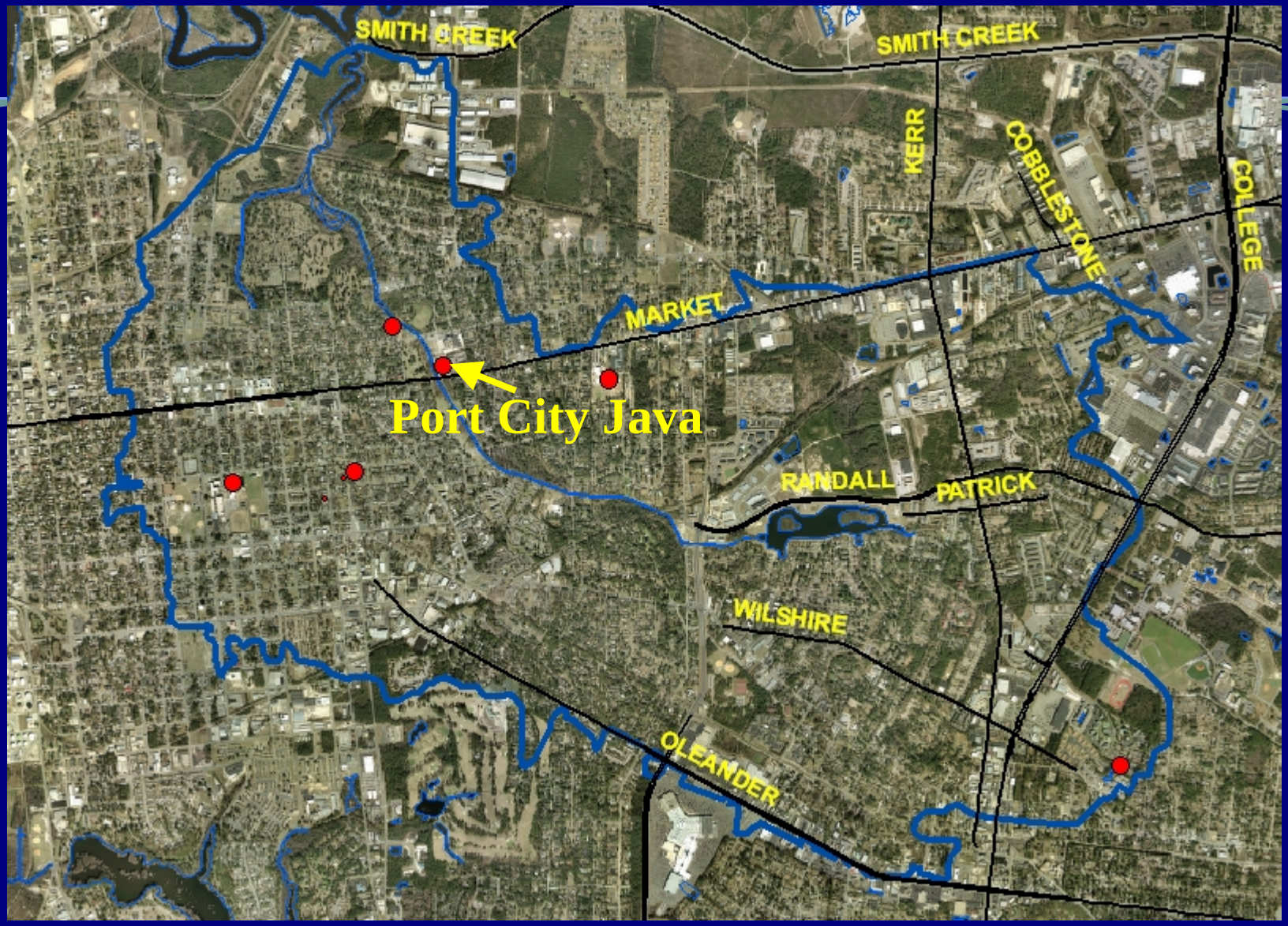
Strategies for Achieving Goals of Burnt Mill Creek Project

- Change the public's behavior through education and involvement
- Install Best Management Practices (BMPs) at large scale and backyard scale
- Monitor results of activities to gauge effectiveness and hone strategy

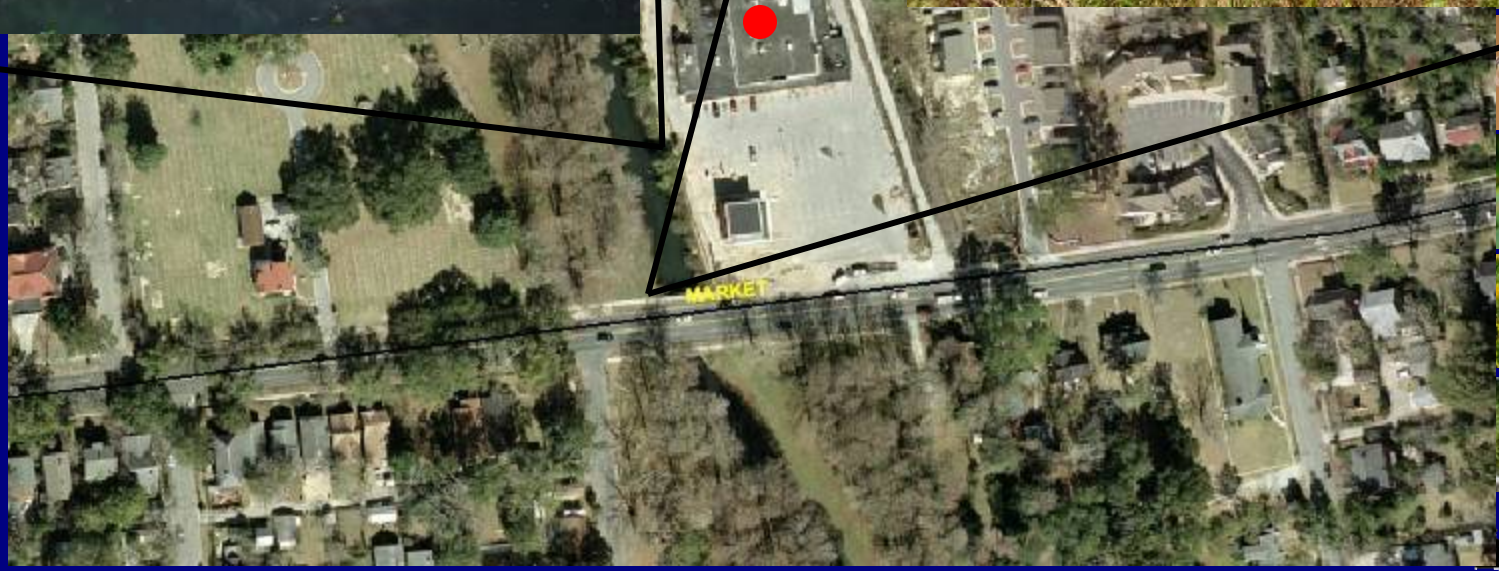
Identifying potential BMP locations

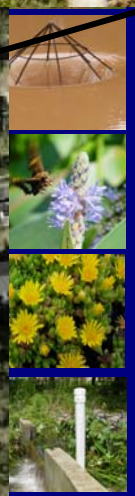
- Some identified in 2002 EEP LWP
- Group brainstorm sessions
- Group windshield surveys (headwaters)
- Friend of a friend…
- Referrals from City Stormwater Services
- Suggestions from partners

Bunt Mill Creek Projects



Burnt Mill Creek/Port City Java

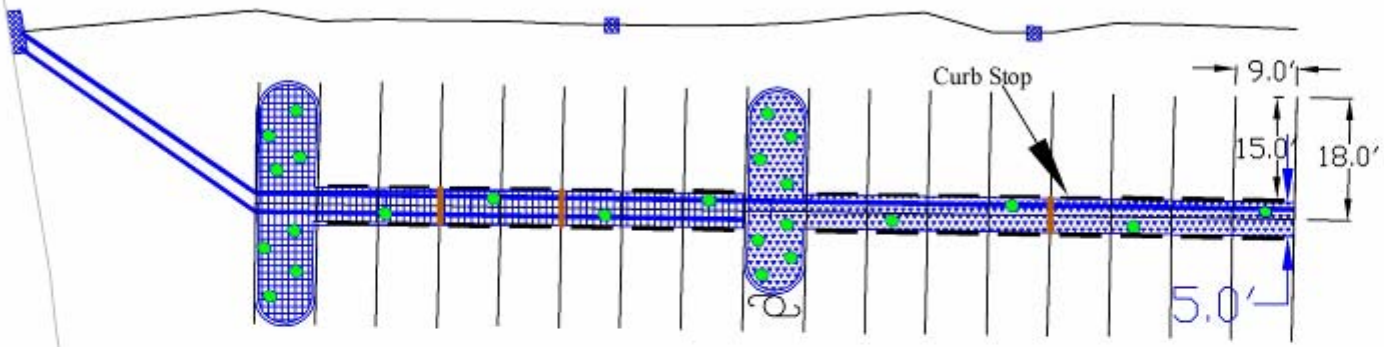


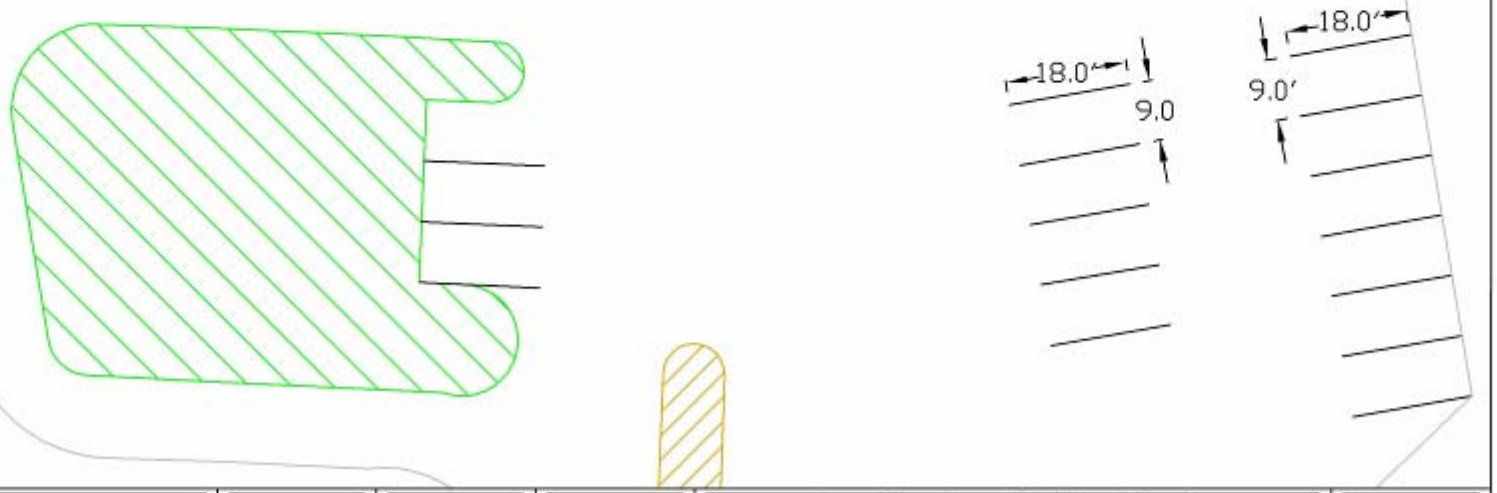


Port City Java

Note:

1. Curb Stops should be 72" by 6"wide by 4" tall and constructed of recycled materials in a grey color.
2. Vegetation should be Virginia Sweetspire (Itea Virginica) or similar shrub approved by the project engineer
3. There should be 12 shrubs per bioretention area.

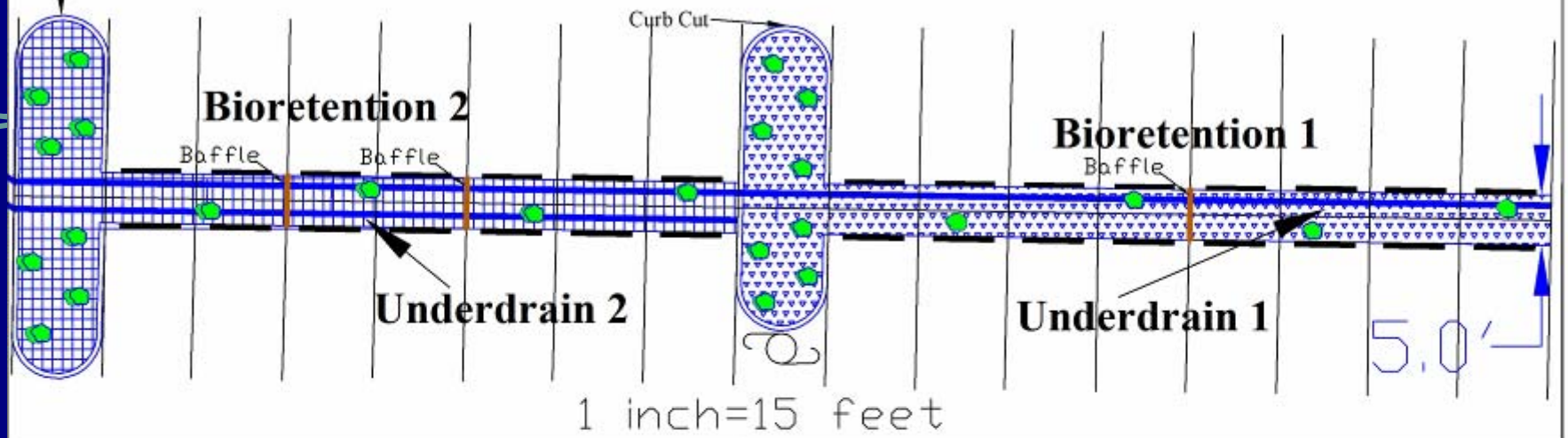


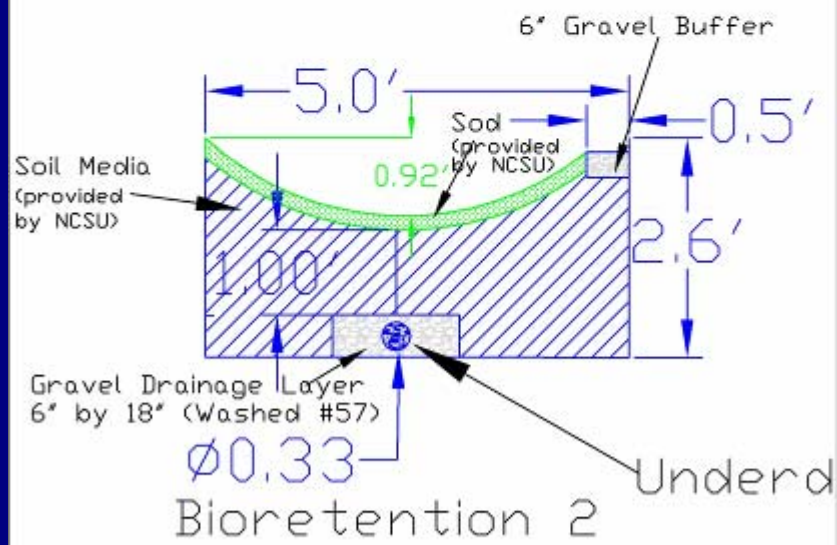


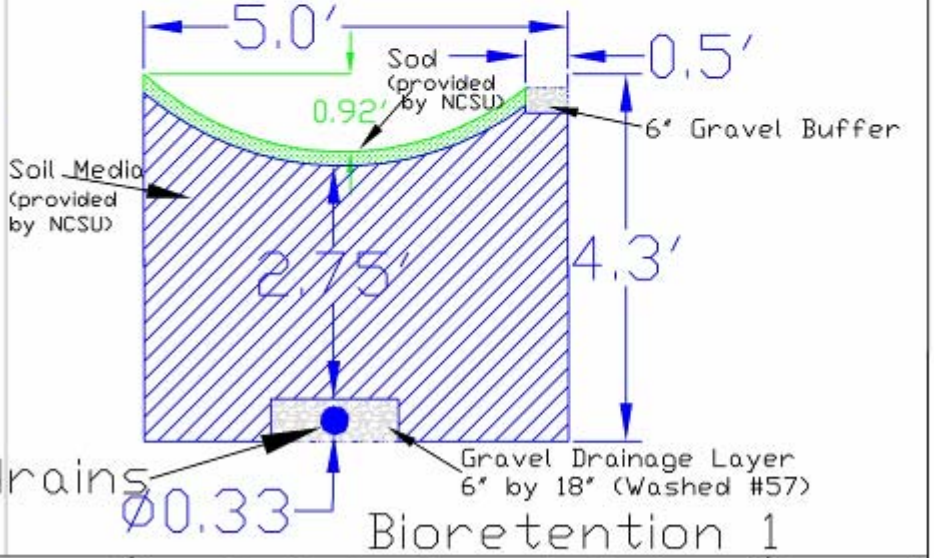
North Carolina State University Biological and Agricultural Engineering NCSU Box 7625 | Raleigh, N.C. 27695		Scale: 1in = 25 ft	Designed: JDW	Port City Java Parking Details Port City Java 2101 Market Street Wilmington, NC 28403	Page Number 8 of 11

Notes:

1. Under drain 1 is only to drain Bioretention 1. It should be 4" smooth core solid non-preforated plastic pipe while under Bioretention 2.
2. Under drain 1 and 2 should both be solid non-perforated plastic pipe from the Bioretention areas to the stormwater drain.
3. There should be a curb cut in each bioretention cell to allow for overflow as indicated. (see details)







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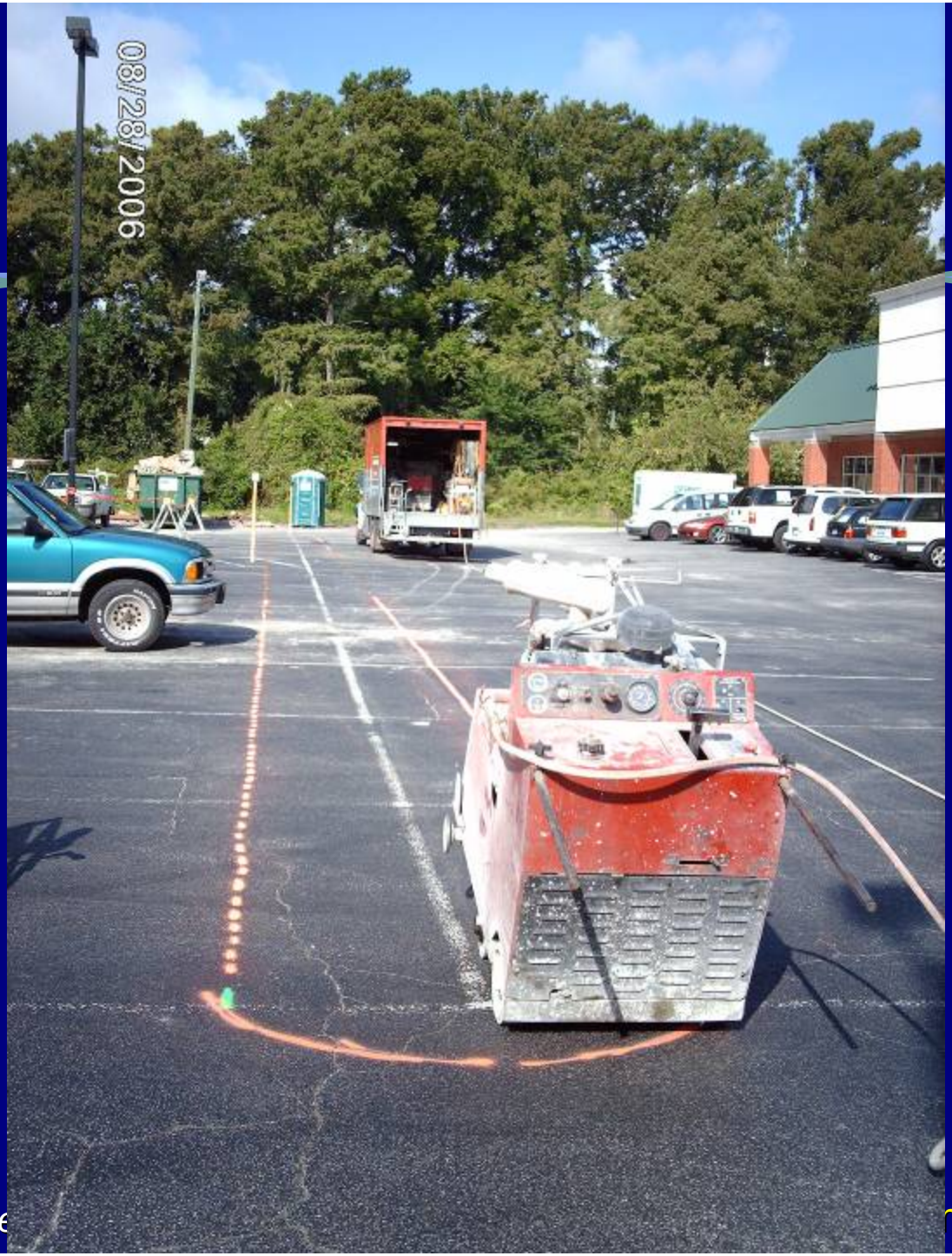

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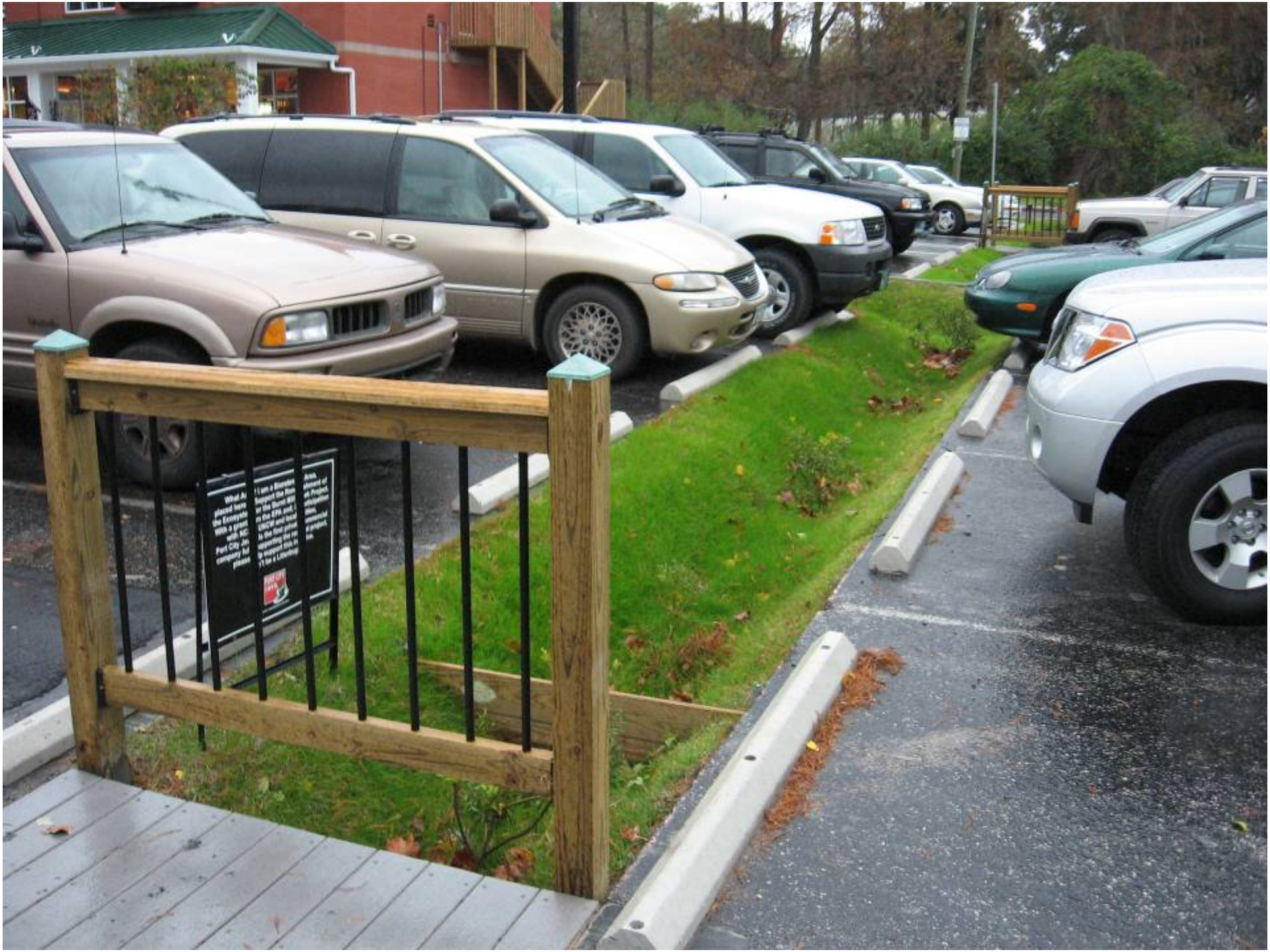
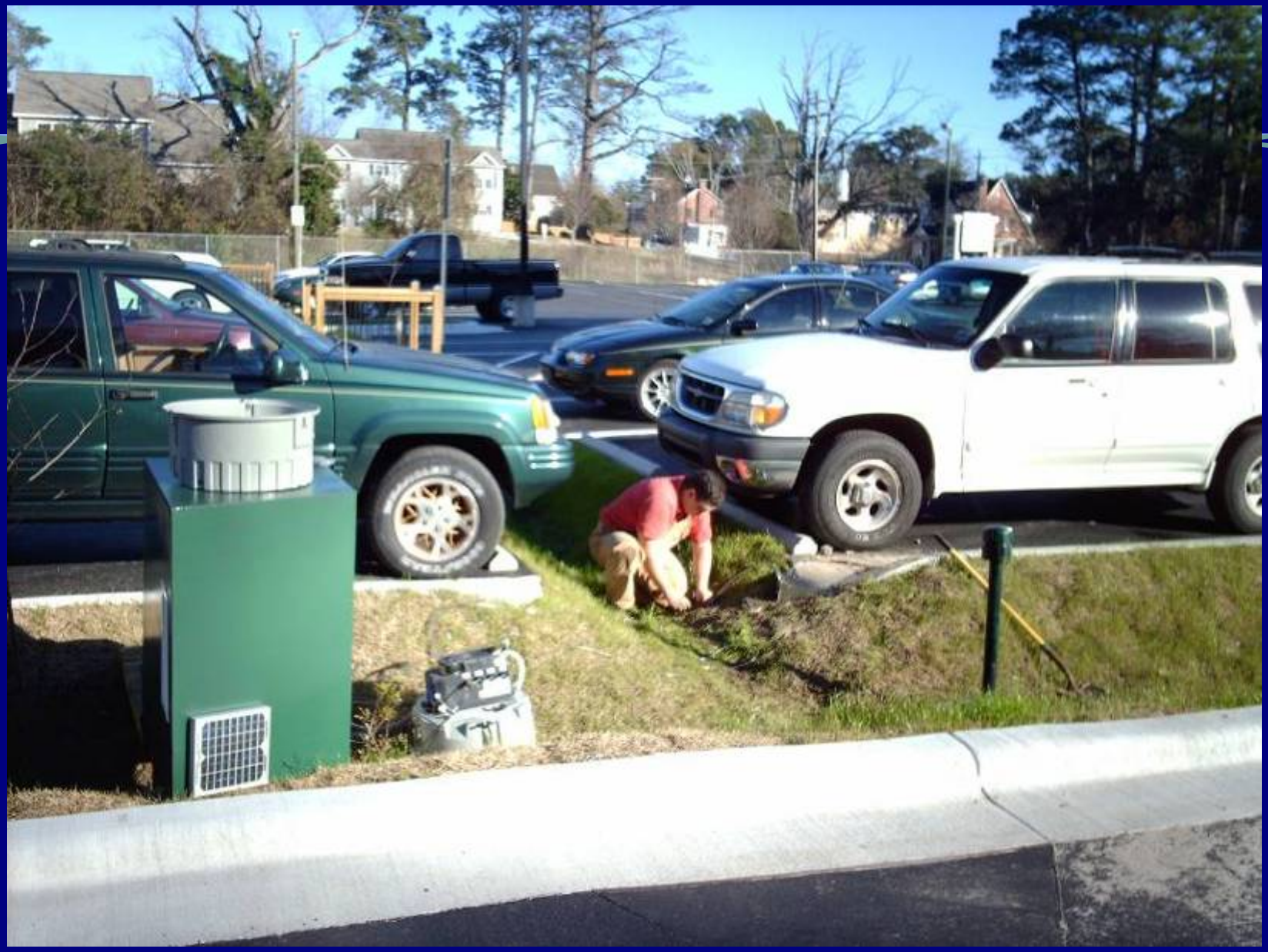


PORT CITY
JAVA

Inlet Sample

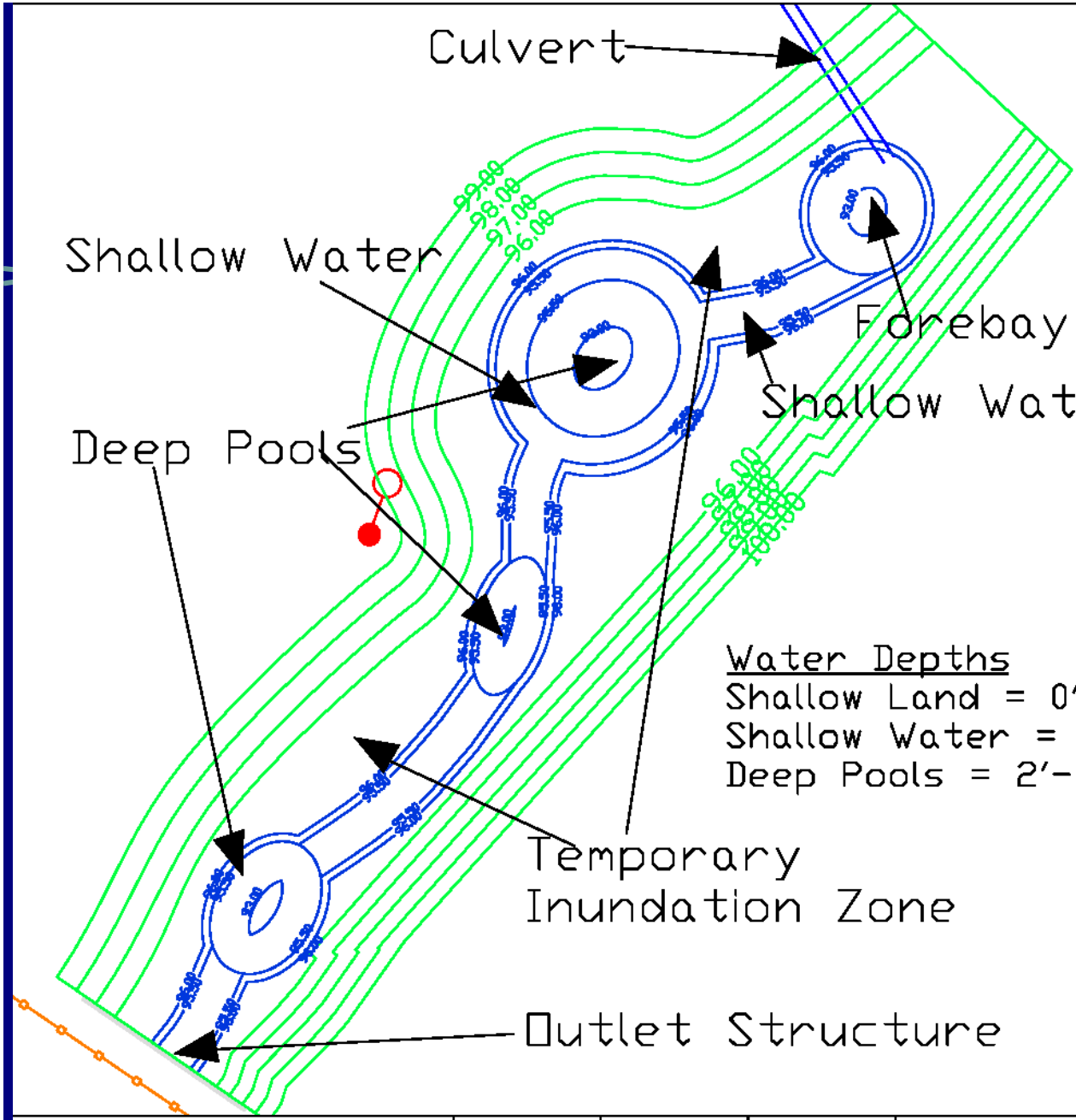


Outlet Sample

Outlet Sample

Stonesthrow Townhomes

Stonesthrow Townhomes



Notes:
1) Stormwater wetland area: 3860 square feet at the base of the slopes.
2) Side slopes should be 3h:1v on the townhomes side and existing grade on the opposite bank.
3) Only trees marked for removal by the project engineer should be removed.
4) Erosion control matting (biodegradable) should be added to all disturbed slopes.
5) All disturbed soil will be seeded with a temporary seed mix.
6) Wetland vegetation will be selected based on expected moisture conditions.

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Date: April 2006
Scale: 1in=20ft
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Checked:

Stormwater Wetland Site Overview

Stonesthrow Townhomes
Wilmington, N.C.

Outlet Structure

Pools, Shallow Water, Shallow Land

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In Stream Stormwater Wetlands

BAE Stormwater Engineering Group

July, 2006

August, 2007

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Monitoring

csu.edu/stormwater

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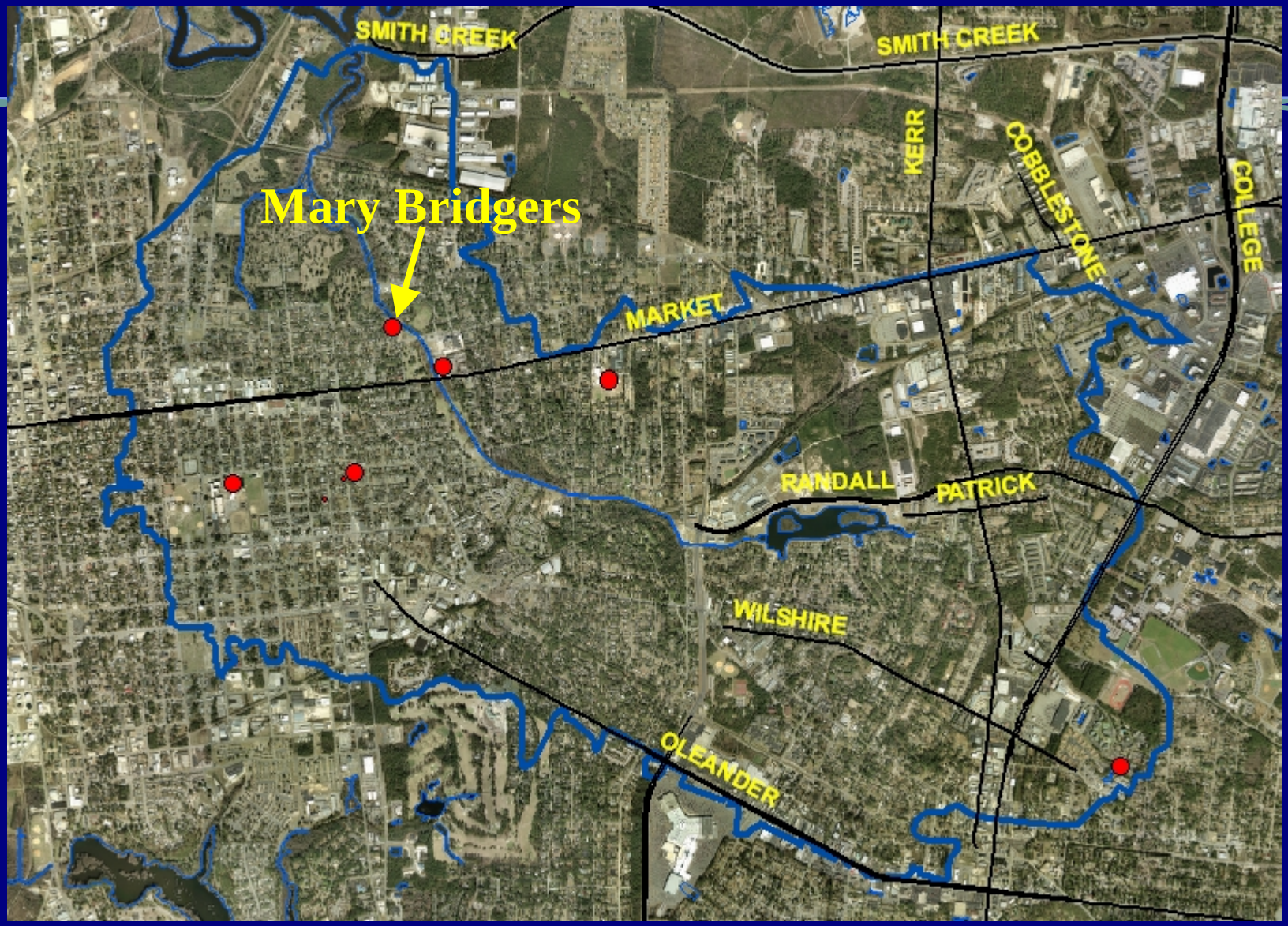
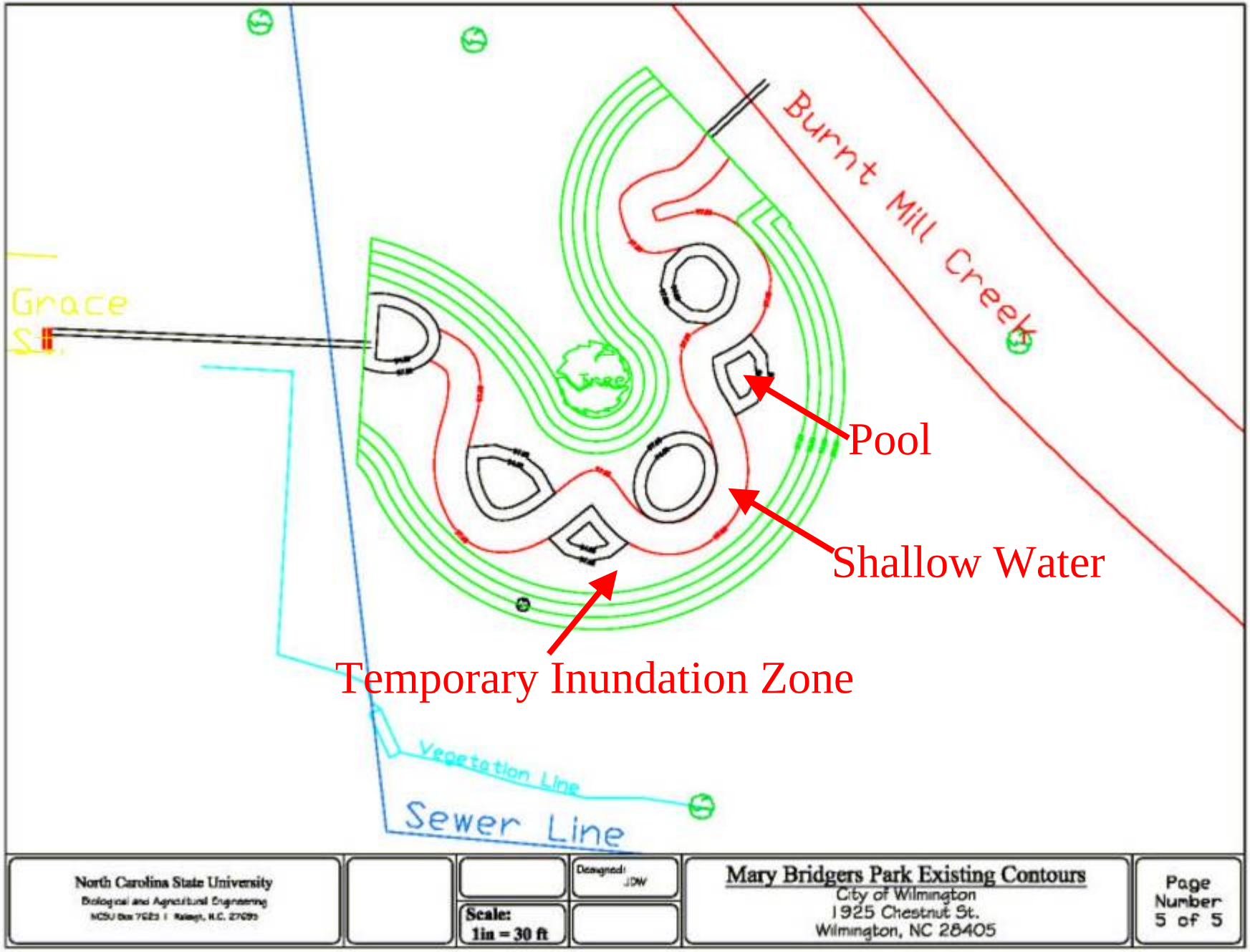
Mary Bridgers Stormwater Wetland



Mary Bridgers Park Wetland


Burnt Mill Creek
Grace St.
Tree
Pool
Shallow Water
Temporary Inundation Zone
Vegetation Line
Sewer Line
North Carolina State University
Biological and Agricultural Engineering
Designed: JDW
Scale: 1in = 30 ft
Mary Bridgers Park Existing Contours
City of Wilmington
1925 Chestnut St.
Wilmington, NC 28405
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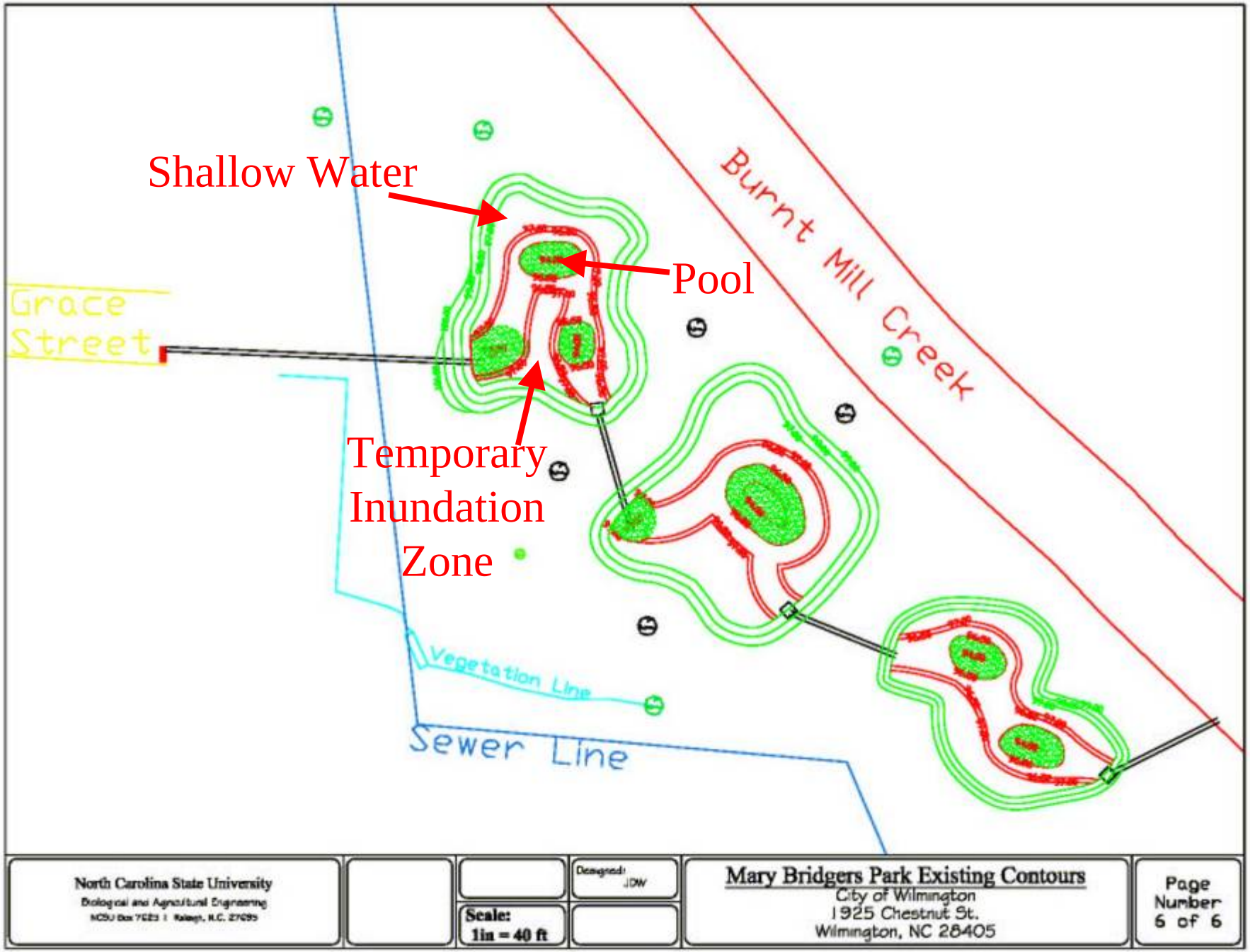
EXIT


Shallow Water
Pool
Temporary Inundation Zone
Grace Street
Burnt Mill Creek
Vegetation Line
Sewer Line
North Carolina State University
Biological and Agricultural Engineering
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Scale: 1in = 40 ft
Mary Bridgers Park Existing Contours
City of Wilmington
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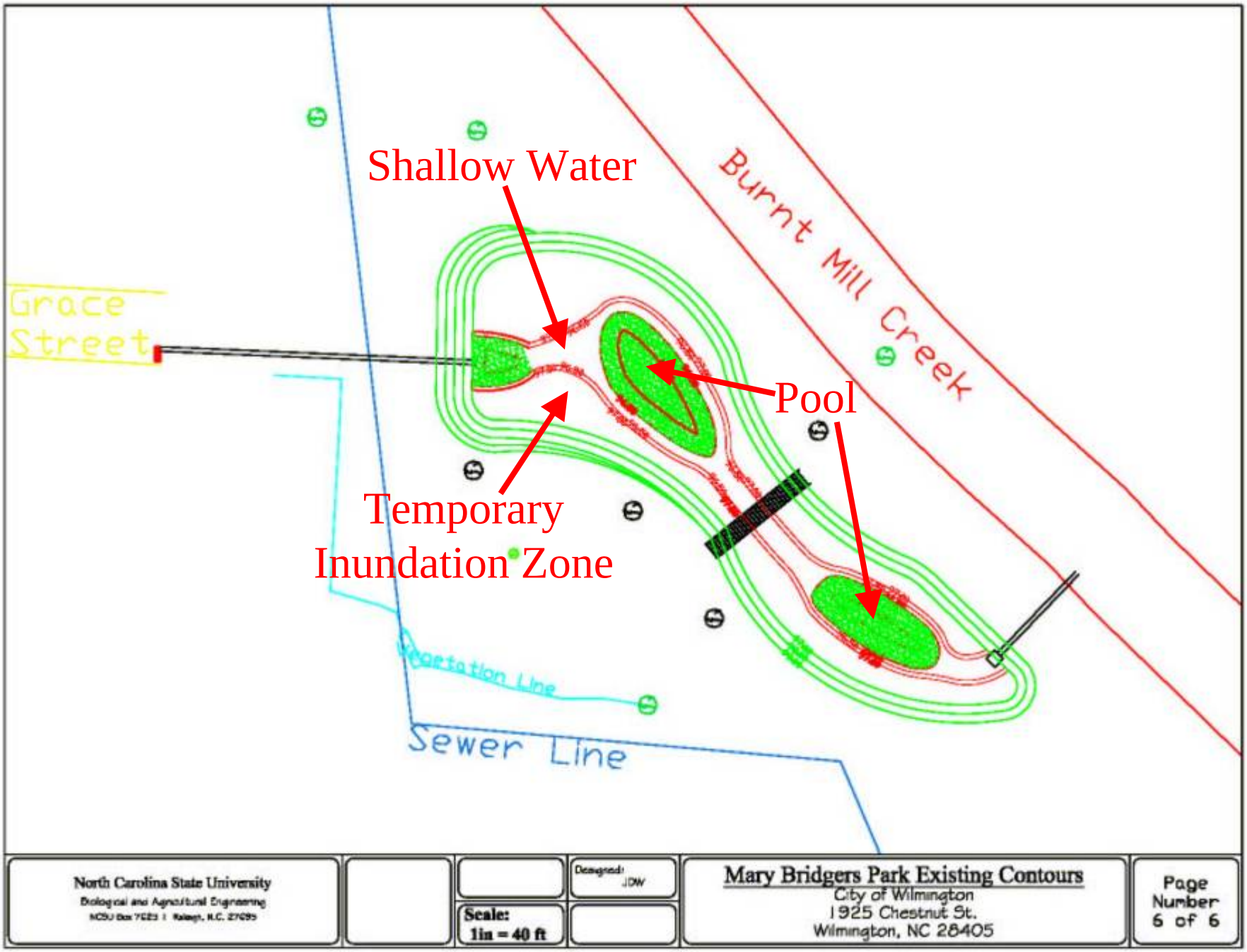
Shallow Water
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Mary Bridgers Park Existing Contours
City of Wilmington
1925 Chestnut St.
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Page Number 6 of 6

view from end of Grace Street, looking down towards Chestnut Street

Stormwater Wetland at Mary Bridgers Park
Wilmington, NC

wetland design: Jason Wright, N.C. State University, Biological and Agricultural Engineering
sketch: Lara Berkley

Cape Fear
Precast, LLC

JOB 2496
OUTLET
STRUCTURE

End of Day 1

End of Day 2

End of Day 3

End of Day 4

End of Day 5

Day 6

End of Day 6

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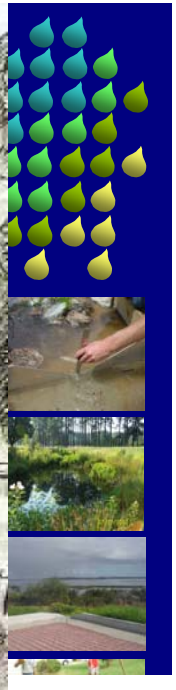
End of Day 7

End of Day 8

End of Day 9

End of Day 9



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Mary Bridgers' Monitoring

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Burnt Mill Creek Data

		Fecal (CFU/100mL)	Enterococcus (MPN)	TKN (mg/L)	NO_3&NO_2 (mg/L)	NH_3-N (mg/L)	TP (mg/L)	Ortho P (mg/L)	TSS (mg/L)	PAH
ST Inlet	31-Jul-07	130000	624	0.89	0.35	0.05	0.12	0.04	29	n/a
ST Outlet	31-Jul-07	2800	783	0.89	0.02	0.09	0.25	0.16	12	n/a
ST Inlet	25-Oct-07	320000	2005	0.92	0.24	0.23	0.61	0.56	14	n/a
ST Outlet	25-Oct-07	0	0	0	0	0	0	0	0	n/a
ST Inlet	27-Nov-07	310000	2005	0.75	0.00	0.02	0.33	0.22	16	n/a
ST Outlet	27-Nov-07	0	0	0	0	0	0	0	0	n/a
ST Inlet	17-Dec-07	18993	2005	0.99	0.27	0.05	0.23	0.15	34	n/a
ST Outlet	17-Dec-07	14500	2005	0.54	0.01	0.03	0.19	0.11	14	n/a
PCJ Inlet	4-Jun-07	3500	5	(NS)	(NS)	(NS)	(NS)	0.00	(NS)	3215.5
PCJ S	4-Jun-07	12	42	0.54	0.52	0.08	0.21	(NS)	11	n/a
PCJ D	4-Jun-07	70	5	0.36	0.38	0.06	0.13	(NS)	(NS)	158.52
PCJ Inlet	31-Jul-07	6	20	1.20	0.62	0.12	0.14	0.01	100	0
PCJ S	31-Jul-07	11000	111	0.32	0.25	0.03	0.13	0.07	14	n/a
PCJ D	31-Jul-07	8500	42	0.24	0.29	0.03	0.12	0.02	9	0
PCJ Inlet	25-Oct-07	24900	1652	0.50	0.04	0.01	0.10	0.01	69	0
PCJ S	25-Oct-07	14100	2005	0.49	0.12	0.04	0.25	0.14	21	0
PCJ D	25-Oct-07	8700	2005	0.53	0.31	0.02	0.18	0.03	15	0
PCJ Inlet	17-Dec-07	10941	164	0.72	0.07	0.02	0.16	0.02	72	0
PCJ S	17-Dec-07	200	164	0.44	0.31	0.04	0.07	0.01	10	0
PCJ D	17-Dec-07	200	5	0.31	0.27	0.04	0.11	0.03	9	0
MB Inlet	13-Sep-07	2700000	2005	5.28	0.66	0.07	0.88	0.31	327	n/a
MB Outlet	25-Oct-07	4600	2005	1.37	0.03	0.08	0.35	(NS)	15	n/a

Main Points

- Increased runoff causes erosion and carries pollutants to Burnt Mill Creek
- BMP's needed to slow runoff and remove pollutants
- Retro-fits are necessary in urban areas, such as Wilmington

Questions?

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