



Green Virginia's Capitol



DEPARTMENT OF
GENERAL SERVICES

Serving Government. Serving Virginians.





National Fish and Wildlife Foundation

Chesapeake Bay

Innovative Nutrient and Sediment Reduction Program

- Seeking projects that aim to achieve “zero runoff”
 - Polluted runoff (quality)
 - Stormwater runoff (quantity)
- Applicant decides how to define

Idea – What If...?

- ... we could demonstrate same LID practices promoted in approved VA SWM regulations?
 - ...a green roof?
 - ...rainwater harvesting?
 - ...permeable pavers?
 - ...rain gardens?

- ...*ON the CAPITOL?*

Partners



- Department of General Services
- Department of Conservation and Recreation
- City of Richmond
 - Dept of Community Development
 - Dept of Public Utilities
- Others
 - Alliance for the Chesapeake Bay
 - EPA

Innovative Partners



- Kevin Robert Perry, ASLA, LEED
 - Nationally recognized for innovative design
 - Specializes in green streets and stormwater design
 - Contracted with TetraTech through EPA to “Green Capitols” nationwide
 - Only for projects meeting certain criteria

Practices





Permeable Brick Pavers



Rain gardens

Rainwater Harvesting

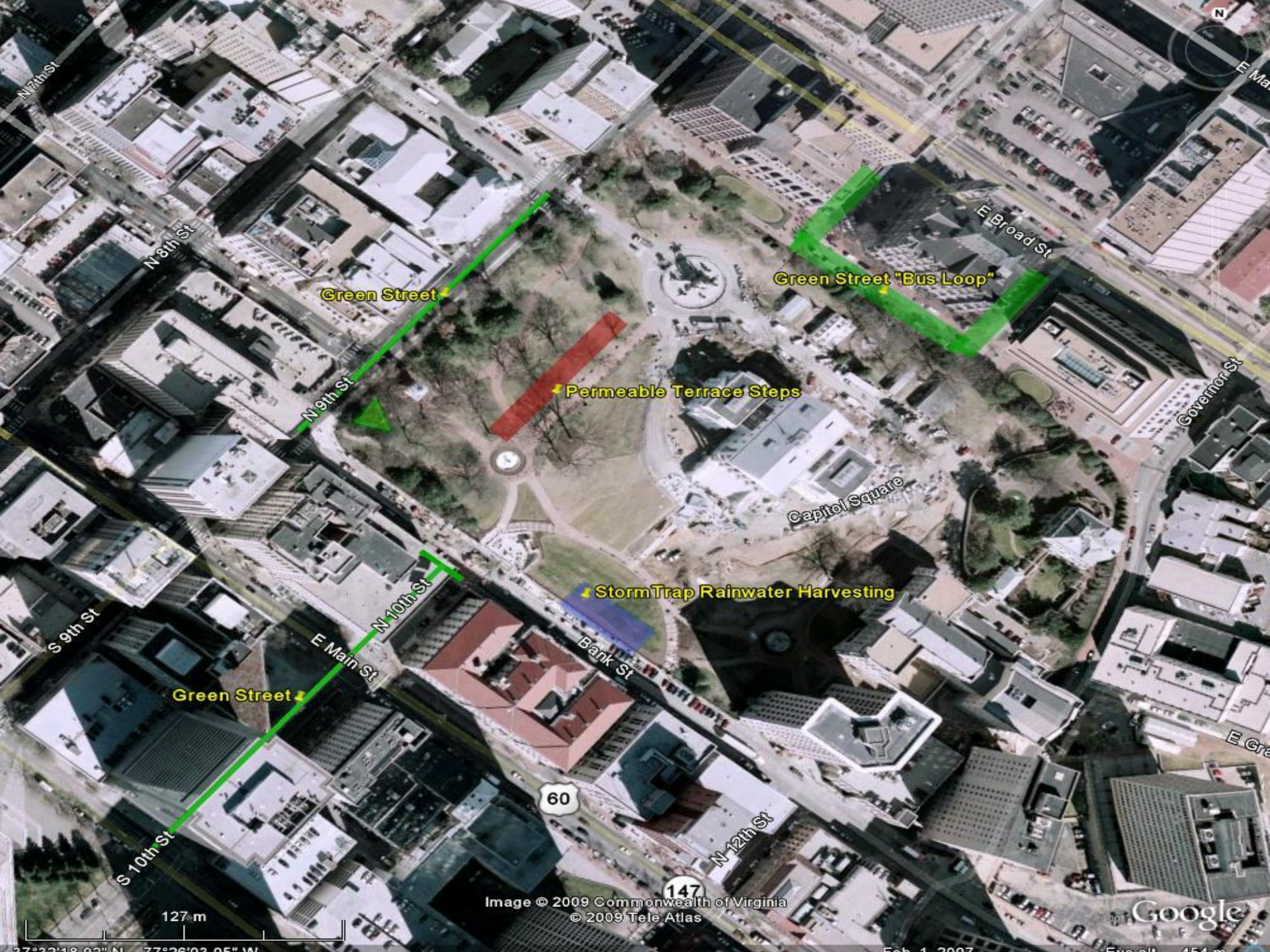




Green Streets



Green Alleys



Green Street

Green Street "Bus Loop"

Permeable Terrace Steps

Capitol Square

StormTrap Rainwater Harvesting

Green Street

Image © 2009 Commonwealth of Virginia
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Google

Feb 1, 2007

Elev: 454 m



Capitol Steps

NOV 3 2008

Bell Tower



Rain Garden



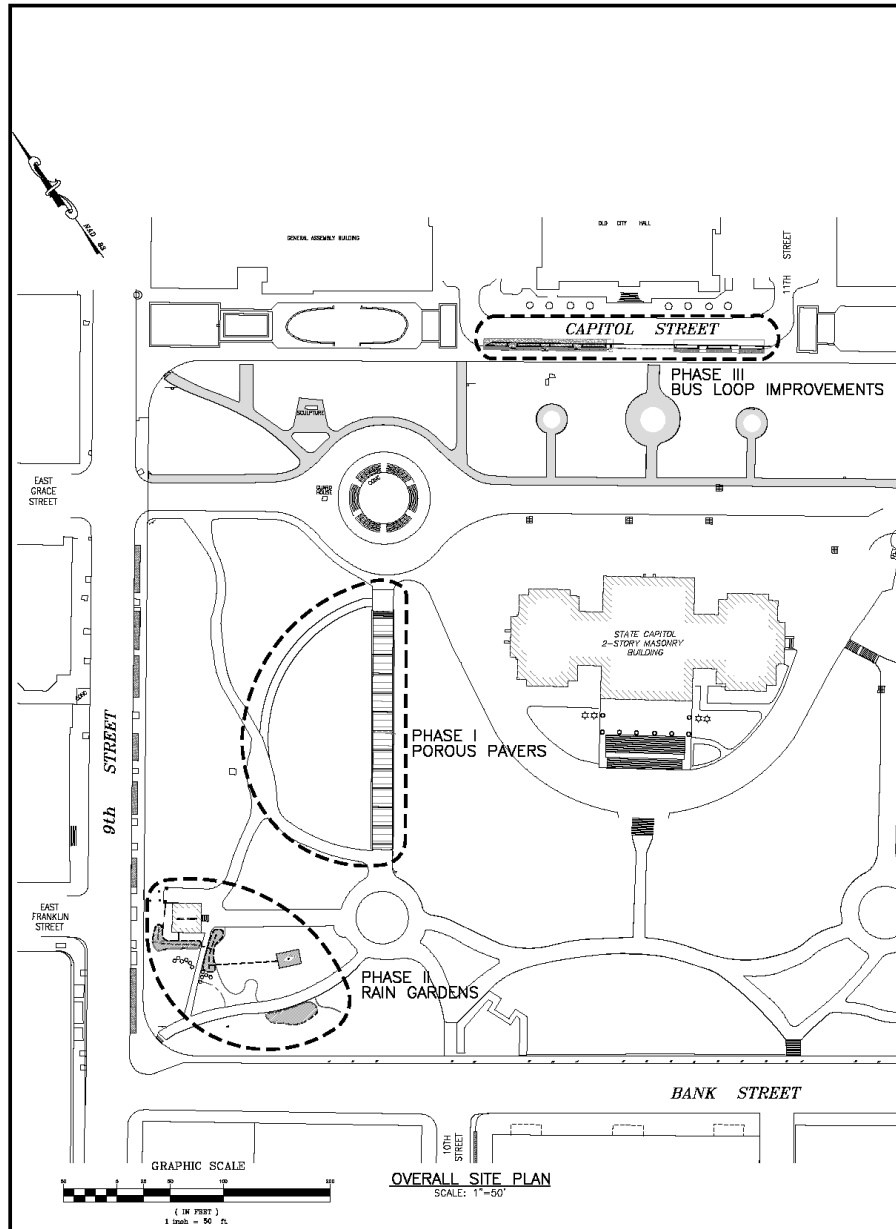


Greening 9th and 10th Streets

*Greening 5th
and 12th
Streets Alleys*



Green Virginia's Capitol: Overall Site Plan



GENERAL NOTES:

- SITE MAPPING DERIVED FROM 1998 SITE SURVEY BY TIMMONS AND 2008 AS-BUILT SITE PLANS BY DRAPER-ADEN ASSOCIATES. NOTE THAT MAPPING OF AREAS OUTSIDE PROPOSED WORK ZONES MAY NOT REFLECT CURRENT SITE CONDITIONS. CONTRACTOR SHALL VERIFY EXISTING CRITICAL SITE DIMENSIONS PRIOR TO BEGINNING WORK.
- TOTAL PROJECT DISTURBED AREA, 0.35 ACRES
- CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR THIS PROJECT FROM THE CITY OF RICHMOND, DEPT. OF CONSERVATION AND RECREATION, BOM, AND OTHERS AS APPLICABLE.
- ANY PERMIT THAT MUST BE OBTAINED SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND AT THE CONTRACTOR'S EXPENSE.
- CONTRACTOR SHALL COORDINATE ALL SITE ACTIVITIES WITH DEPT. OF GENERAL SERVICES (DGS).
- DGS SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES WITHIN THE CAPITOL GROUNDS. CONTRACTOR SHALL PROVIDE DGS MINIMUM OF 48 HOURS NOTIFICATION PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES.
- THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES AND STRUCTURES WITHIN THE WORK AREA ARE NOT NECESSARILY INDICATED ON THE PLANS, AND IF SHOWN ARE ONLY APPROXIMATE. VERIFY LOCATION AND ELEVATION OF ALL EXISTING UTILITIES IN THE WORK AREA PRIOR TO STARTING WORK. CONTACT ENGINEER IMMEDIATELY IF LOCATION OR ELEVATION DIFFERS FROM THOSE SHOWN. IF THERE APPEARS TO BE A CONFLICT, OR UPON DISCOVERY OF ANY UTILITIES NOT SHOWN, FOR AREAS WITHIN THE CITY OF RICHMOND RIGHT-OF-WAY, CONTACT MASS UTILITY (800-352-7001) AT LEAST 72 HOURS PRIOR TO BEGINNING WORK TO HAVE UTILITIES LOCATED.
- ANY DAMAGE TO UTILITIES OR PROPERTY BY THE CONTRACTOR SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS AT NO EXPENSE TO THE OWNER.
- CONTRACTOR SHALL MAINTAIN A SET OF APPROVED CONSTRUCTION DOCUMENTS AT THE SITE AT ALL TIMES. A DESIGNATED RESPONSIBLE REPRESENTATIVE SHALL BE AVAILABLE FOR CONTACT BY CITY OR STATE INSPECTORS.
- PROTECT ALL TREES NOT SPECIFICALLY SHOWN TO BE REMOVED WITH APPROPRIATE MEASURES.

STANDARD LIST OF ABBREVIATIONS

A	AREA
AC	ACRE(S)
AWWA	AMERICAN WATER WORKS ASSOCIATION
CE	CONSTRUCTION ENTRANCE
CF	CUBIC FEET
CG	CURB & GUTTER
CIP	CULVERT INLET PROTECTION
CV	CUBIC YARD
DB	DEED BOOK
DC	DUST CONTROL
DI	DIVERSION DRAIN
DIP	DUCTILE IRON PIPE
DI	DRIP INLET
DM	DRAINAGE
DS	DOWNSPOUT
EA	EACH
EL	ELEVATION
EX	EXISTING
FC	FACE OF CURB
FD	FINISHED FLOOR
FL	FLOW LINE
IN	INVERT
IP	INLET PROTECTION
LA	LATERAL
LF	LINEAR FOOT (FEET)
LID	LOW IMPACT DESIGN
HDPE	HIGH DENSITY POLYETHYLENE
MAX	MAXIMUM
MIN	MINIMUM
OP	OUTLET PROTECTION
PB	PARCEL BOOK
PS	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD DRAIN
R/W	RIGHT-OF-WAY
SA	SANITARY
SF	SQUARE FOOT (FEET)
SF	SILT FENCE
SPEC	SPECIFICATION
SD	STORM DRAIN
ST	SEDIMENT TRAP
STD	STANDARD
SN	SODIUM
SY	SQUARE YARD
TC	TOP OF CURB
TCF	TEMPORARY CONSTRUCTION FENCE
TEMP	TEMPORARY
TP	TREE PROTECTION
TYP	TYPICAL
VDOT	VIRGINIA DEPARTMENT OF TRANSPORTATION
VESCH	VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK
WV	WATER VALVE

CIVIL & ENVIRONMENTAL SERVICES, LLC

BULK PLANNING & DESIGN - ENVIRONMENTAL CONSULTING
1915 LANTANA LANE - THE VINTAGE, VIRGINIA BEACH
757-433-1111
WWW.CIVILSERVICES.COM

BioForm
LANDSCAPE ARCHITECTURE
& ENVIRONMENTAL DESIGN
Richmond, Virginia Roadside-Design
www.bioformva.com

GREENING OF VIRGINIA'S CAPITOL
PHASES I - III
WORKING DRAWINGS
DCS# NPWT-1644-P01 RICHMOND, VIRGINIA

PROGRESS
PRINT
NOT FOR
CONSTRUCTION

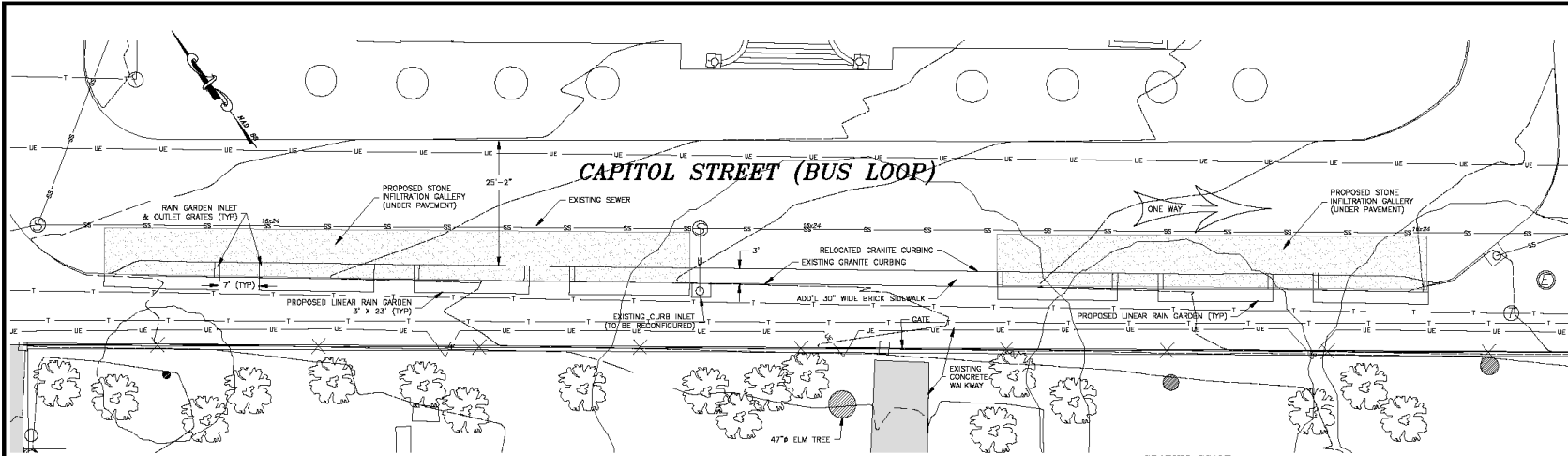
**OVERALL
SITE
PLAN**

DRAWN: C.SONNE
CHECKED: DATE: 3/7/2010
PROJECT: 08008
REVISIONS:

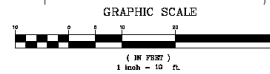
C1

OP:

Green Virginia's Capitol: Bus Loop



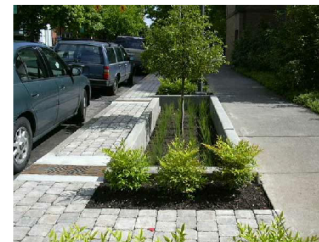
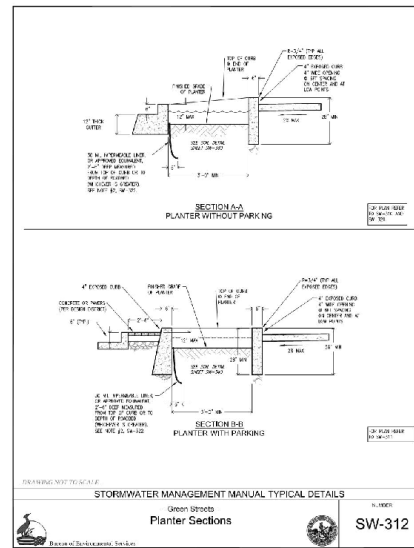
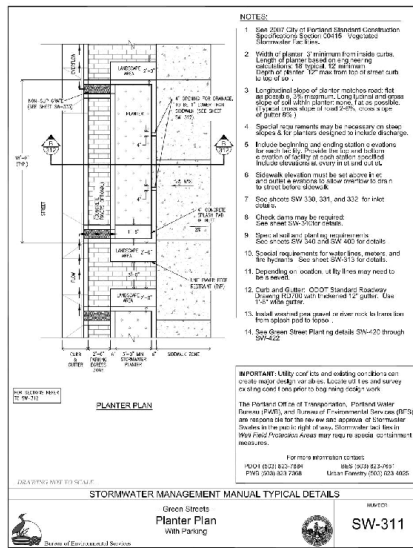
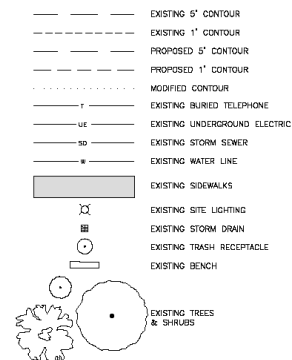
BUS LOOP - PLAN VIEW
SCALE: 1"=10'



NOTES

1. INFILTRATION GALLERY TO BE DESIGNED TO CAPTURE FIRST 1" OF STORM RUNOFF FROM ASSOCIATED DRAINAGE AREA. CONVENTIONAL ASPHALT PAVEMENT SHALL BE INSTALLED OVER STONE SUB-BASE.
2. SUBSURFACE SOILS EVALUATIONS SHALL BE PERFORMED TO DETERMINE IF UNDERDRAINS SHALL BE REQUIRED.
3. IF UNDERDRAINS ARE REQUIRED, PIPING SHALL BE TIED TO EXISTING SEWER LINES, WITH PROVISIONS TO PREVENT BACKFLOW.
4. EXISTING GRANITE CURBING SHALL BE RELOCATED TO PROVIDE ADDITIONAL 36" OF SIDEWALK SPACE TO ACCOMMODATE RAIN GARDENS.

LEGEND



CIVIL & ENVIRONMENTAL SERVICES, LLC
SITE PLANNING & DESIGN • ENVIRONMENTAL CONSULTING
1401 S. BARNES RD. • RICHMOND, VIRGINIA 23220
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GREENING OF VIRGINIA'S CAPITOL
PHASES I - IV
PRELIMINARY DESIGN
DGS# NW-1544-P01 RICHMOND, VIRGINIA

PROGRESS PRINT:
NOT FOR CONSTRUCTION

**PHASE III
BUS LOOP
PLANTERS
PRELIMINARY PLAN**

DRAWN: C. SCONE
DATE: 10/1/2010
PROJECT: REVISIONS:

OF:

Estimated Reductions

- Phosphorus: 69%
- Nitrogen: 70%
- Stormwater Runoff: 64%



Monitoring

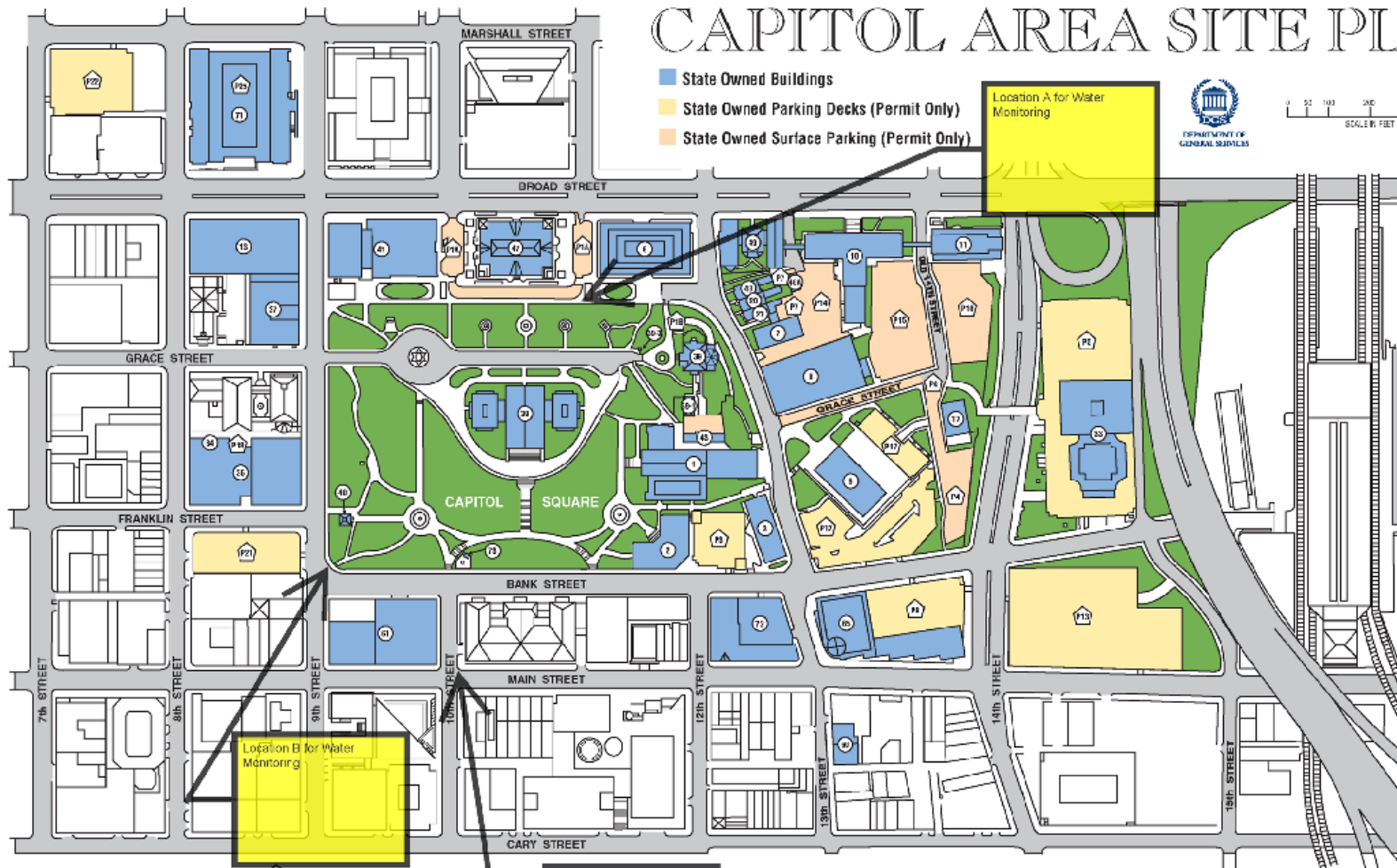
CAPITOL AREA SITE PLAN

- State Owned Buildings
- State Owned Parking Decks (Permit Only)
- State Owned Surface Parking (Permit Only)

Location A for Water Monitoring



0 50 100 200 300
SCALE IN FEET



STATE OWNED PARKING FACILITIES

- | | |
|---|---|
| P1A Garden Memorial Garden Parking | P6 Tyler Building Deck |
| P1B Governor's Mansion Parking | P14 14th and Main Street Deck |
| P3 Bank Street Deck | P14 Fear of 1221 E. Broad Street, West Side |
| P4 Closed Portion of Old 14th and Grace Streets | P15 Old 14th and Grace Streets |
| P5 James Monroe Building Deck | P16 Fear of Transportation Annex |
| P7 Monroe Row Parking | P17 James Madison Building Deck |

Location C for Water Monitoring

- | |
|----------------------------------|
| P18 Supreme Court Building Deck |
| P21 9th and Franklin Street Deck |
| P22 7th and Marshall Street Deck |
| P25 Old City Hall Deck |

STATE OWNED BUILDINGS

- | | | | |
|--|-------------------------------------|-------------------------------------|---------------------------|
| 1 Oliver W. Hill Building | 17 Ferguson Building | 39-3 Governor's Mansion Guest House | 65 Tyler Building |
| 2 Veachman Building | 22 219 Governor Street (Monroe Row) | 40 Old Bell Tower | 71 Library of Virginia |
| 3 Jefferson Building | 28 221 Governor Street (Monroe Row) | 41 General Assembly Building | 72 VHS Building |
| 6 Patrick Henry Building | 33 Monroe Building | 43 Governor's Mansion Cottage House | 73 Capitol Visitor Center |
| 7 Aluminum Building | 34 Rose and Latham Building | 47 Old City Hall | |
| 8 Zinke Building | 36 Supreme Court Building | 48 223 Governor Street (Monroe Row) | |
| 9 Madison Building | 37 Ninth Street Office Building | 48A Garage for 223 Governor Street | |
| 10 Department of Transportation Building | 38 State Capitol Building | 49 Memorial Hospital Building | |
| 11 Department of Transportation Annex | 39 Governor's Mansion | 60 Powers Taylor Building | |
| 13 Proposed Broad Street Building | 39-1 Governor's Mansion Cottage | 61 Pechenette Building | |

Monitoring Equipment

STORMBOX Water Monitoring Equipment Enclosure

THIS...



OR THIS!



STORM BOX FEATURES:

- White fiberglass construction
- Layout configured to contain: Rain Gauge, Flowmeter, Flowlogger, Round Sampler, and Power source
- Protects equipment from weather, vandalism, tampering, animals, etc.
- Padlockable hasp provided
- Four external handles for two man lift loaded or unloaded

ISCO EQUIPMENT LIST:

The standard construction Storm Box is designed to mount the following ISCO equipment:

1. ISCO Samplers
3700 Series
6700 Series
GLS Series
2. ISCO Flowmeters
4200 Series
3. ISCO Flowloggers
2150 Series
4100 Series

4. ISCO Rain Gauges
674 Series
5. Power Supply
Deep Cycle Marine Battery

STORM BOX OPTIONS:

The Storm Box can be built with the following list of standard options if required.

- Rain gauge mounting hardware
- Stainless steel construction
- Oversized feet
- Mounting for ISCO 'C' samplers
- Mounting for ISCO Glacier and Avalanche samplers
- AC power outlet
- AC radiant heater

PHYSICAL CHARACTERISTICS:

Storm Box dimensions:

40 in. wide by 26.5 in. deep by 33.5 in. high

Storm Box weight: 75 lbs. (unloaded)

- Samplers installed in April
- Collect preconstruction data thru summer
- Collect post construction data thru May 2012



Precision Systems

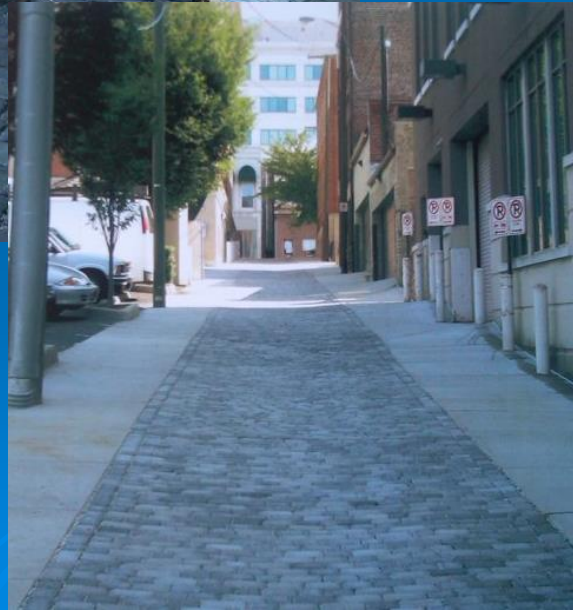
1530 Huntington Drive • Calumet City, Illinois 60409

Phone: 708 / 891-4300 • Fax: 708 / 891-4401 • www.precision-systems.com

Intent

- Educate local/state elected officials
- Demonstrate effectiveness of practices
- Encourage and promote practices
- Long-term implementation of practices city/state wide
- *Above and beyond commonly used practices*
- *Water quality improvement*

Where are we today?



➤ 5th Street
Green
Alley
Unveiled
September
24th, 2010

Where are we today?



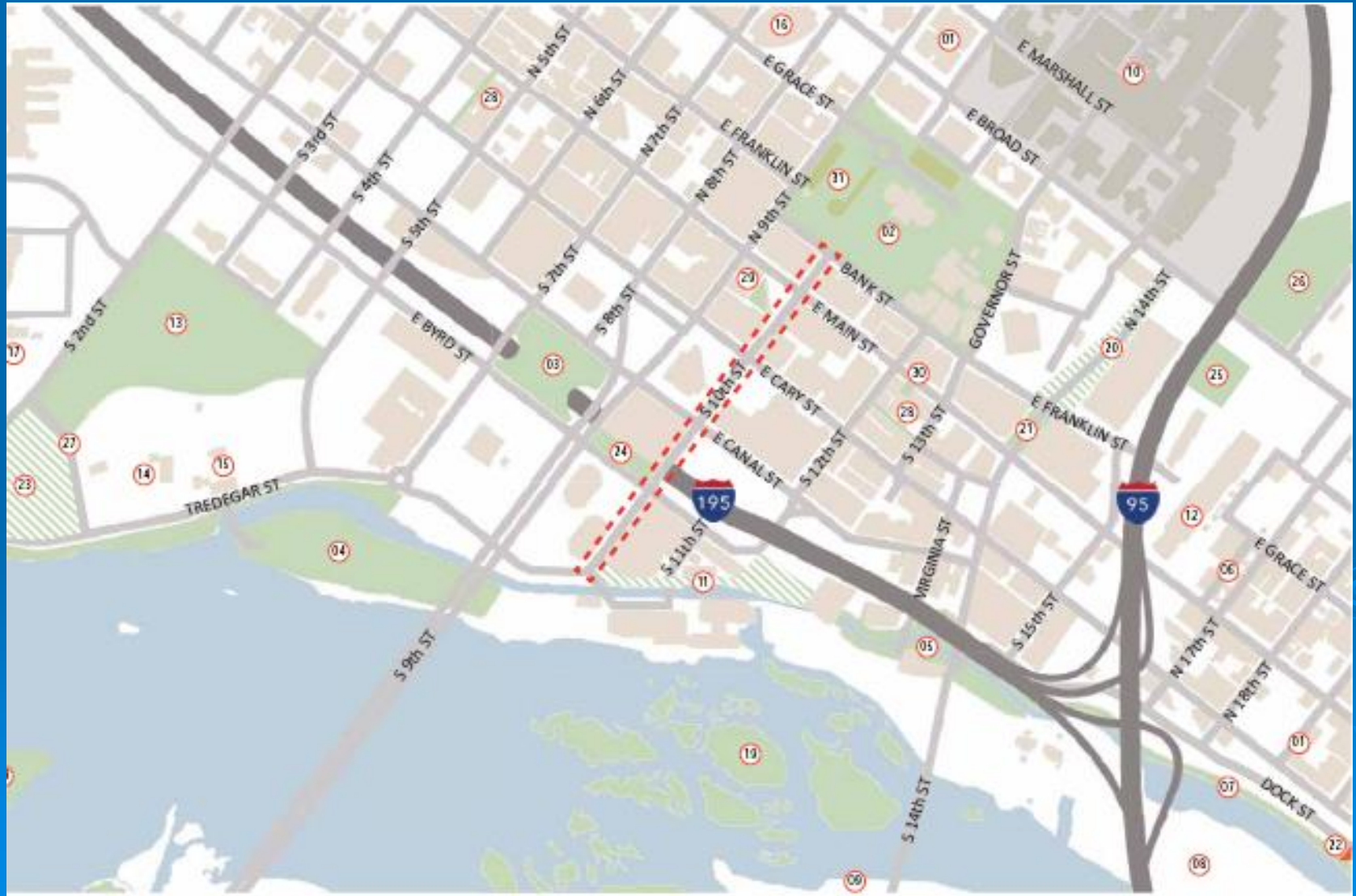
➤ Project Completed September 2012

- Volume reduced 70%
fm 7638cf/yr to
1641cf/yr
- Phosphorus Reduced
86% fm 4.8lbs/yr to
0.66 lbs/yr
- Nitrogen Reduced 90%
fm 34.33 lbs/yr to 3.48
lbs/yr



Where are we today?

The Jefferson Greenway



The Jefferson Greenway



before



after

BANK STREET TO MAIN STREET



before



after

CARY STREET TO CANAL STREET



before



after

MAIN STREET TO CARY STREET



before



after

BYRD STREET TO CANAL WALK



before



after

CANAL STREET TO BYRD STREET



before



after

SUBSTATION @ THE CANAL WALK





STATE C



- 01 STAMPED ASPHALT
- 02 NEW STREET TREES, TYPICAL
- 03 EXISTING GREASE TRAP

- 01 STAMPED ASPHALT CROSSWALKS
- 02 NEW STREET TREES, TYPICAL
- 03 EXISTING GREASE TRAP

01 STAMPED ASPHALT CROSSWALKS

02 NEW STREET TREES, TYPICAL

03 POTENTIAL LID AREA

(IN PARTNERSHIP WITH PROPERTY OWNER)

04 CONCRETE SIDEWALKS WITH BRICK BANDING

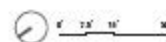
05 ENLARGE EXISTING TREE WELLS

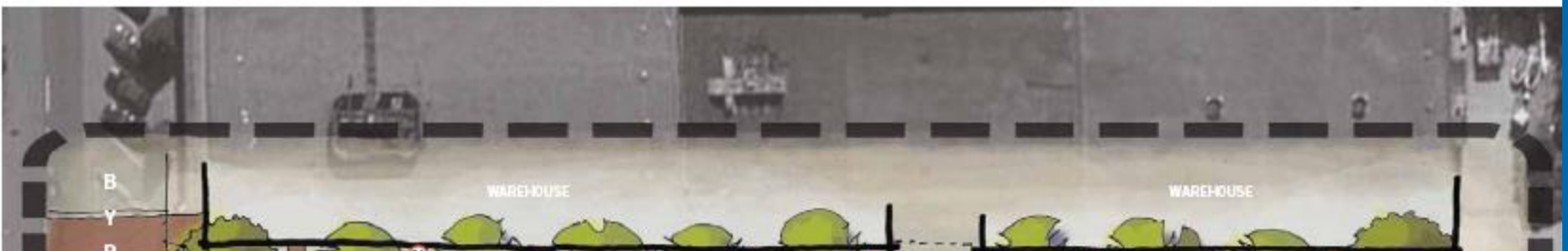
06 BIORETENTION PLANTERS

07 EXISTING CONCRETE PAVERS

08 MAJOR PEDESTRIAN ENTRANCE

09 BRONZE BANDING/INSCRIPTIONS





- 01 STAMPED ASP
- 02 NEW STREET
- 03 POTENTIAL LI
(IN PARTNERS)



- 01 STAMPED
- 02 NEW STRI
- 03 MULTIPLE

01 BRICK PAVERS AROUND TRAFFIC CIRCLE

04 TRAFFIC CIRCLE PLANTER

07 BRONZE BANDING/INSCRIPTIONS

02 NEW STREET TREES, TYPICAL

06 EXISTING TREES ALONG CANAL BANK

03 GREEN SCREENING WALL

06 BIORETENTION PLANTERS

