

INTRODUCED: February 22, 2021

AN ORDINANCE No. 2021-039

To authorize the Chief Administrative Officer, for and on behalf of the City of Richmond, to execute a City of Richmond Grant Contract between the City of Richmond and the James River Association to provide funding for the implementation of a green street, installation of green infrastructure, and performance of related activities along a section of Minefee Street between its intersection with Harwood Street and its intersection with Gunn Street in the city of Richmond.

Patron – Mayor Stoney, Vice President Roberson, Mr. Jones and Mr. Addison

Approved as to form and legality
by the City Attorney

PUBLIC HEARING: MAR 22 2021 AT 6 P.M.

THE CITY OF RICHMOND HEREBY ORDAINS:

§ 1. That the Chief Administrative Officer, for and on behalf of the City of Richmond, be and is hereby authorized to execute a City of Richmond Grant Contract between the City of Richmond and the James River Association to provide funding for the implementation of a green street, installation of green infrastructure, and performance of related activities along a section of Minefee Street between its intersection with Harwood Street and its intersection with Gunn Street in the city of Richmond. The City of Richmond Grant Contract shall be approved as to

AYES: 9 NOES: 0 ABSTAIN: _____

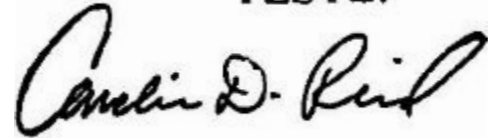
ADOPTED: MAR 22 2021 REJECTED: _____ STRICKEN: _____

form by the City Attorney and shall be substantially in the form of the document attached to this ordinance.

§ 2. This ordinance shall be in force and effect upon adoption.

A TRUE COPY:

TESTE:

A handwritten signature in black ink, appearing to read "Amelia D. Reed". The signature is written in a cursive style with a large initial 'A'.

City Clerk



CITY OF RICHMOND

INTRACITY CORRESPONDENCE

O&R REQUEST

DATE: January 27, 2021 **EDITION:** 1

TO: The Honorable Members of City Council

THROUGH: The Honorable Levar M. Stoney, Mayor *L.M.S.*

THROUGH: J.E. Lincoln Saunders, Acting Chief Administrative Officer *JELS*

THROUGH: Robert C. Steidel, Deputy City Administrator, Operations *ACS*

THROUGH: Calvin D. Farr, Jr., Director, Department of Public Utilities *CFJ*

THROUGH: Pat Bradley, Deputy Director, Department of Public Utilities *PB*

FROM: Grace A. LeRose, Program Manager, Department of Public Utilities *gal*

RE: Grant Contract in the amount of \$50,000.00 to further the Bellemeade Green Street project.

ORD. OR RES. No.:

PURPOSE: This O&R request is to authorize the Chief Administrative Officer to execute, for and on behalf of the City of Richmond, a \$50,000.00 grant contract by and between the City of Richmond and the James River Association for the purposes of implementing a green street, installing green infrastructure, and performing related activities in the City right-of-way of the approximately four-tenths (0.4) of a mile stretch of Minefee Street between Harwood Street and Gunn Street in the Bellemeade community of southside Richmond (the "Project"). The entire \$50,000.00 grant contract amount will be paid from the Stormwater O&M Fund. James River Association has secured \$266,115.00 in funding from non-City organizations for the Project.

REASON: The City and James River Association collaboratively designed, with community stakeholder engagement, the Project as detailed in Exhibit A (the "Urban Design Review Committee Presentation Final Review Bellemeade Green Street") of the attached grant contract. In order to further the Project, the Department of Public Utilities desires to contribute \$50,000.00. The grant contract, in pertinent part, requires James River Association to: 1) install certain stormwater bioretention facilities, 2) plant trees to increase bioretention of stormwater, and 3) maintain the stormwater bioretention facilities for five years.

RECOMMENDATION: The Administration recommends approval.

BACKGROUND: The Urban Design Committee recommended the Project for approval with conditions on February 7, 2019 and the Planning Commission approved the Project location, character, and extent on February 19, 2019. The Project will improve water quality and create a walkable watershed to integrate the flow of people and stormwater. The grant contract is conditioned on, among other things that James River Association complying with all applicable City requirements to work and install facilities within the public right-of-way by obtaining an encroachment permit and the associated Work In Street Permit from the Department of Public Works.

FISCAL IMPACT / COST: \$50,000.00

FISCAL IMPLICATIONS: none

BUDGET AMENDMENT NECESSARY: none

REVENUE TO CITY: none

DESIRED EFFECTIVE DATE: March 8, 2021

REQUESTED INTRODUCTION DATE: February 22, 2021

CITY COUNCIL PUBLIC HEARING DATE: March 8, 2021

REQUESTED AGENDA: Consent

RECOMMENDED COUNCIL COMMITTEE: Land Use & Planning

CONSIDERATION BY OTHER GOVERNMENTAL ENTITIES: None

AFFECTED AGENCIES: Department of Public Utilities; Department of Public Works

RELATIONSHIP TO EXISTING ORD. OR RES.: none

REQUIRED CHANGES TO WORK PROGRAM(S): none

ATTACHMENTS: Grant Contract

STAFF: Grace A. LeRose, Program Manager, DPU, 646-0033

**CITY OF RICHMOND
GRANT CONTRACT**

THIS GRANT CONTRACT (this “Contract”) is made and entered into on this ____ day of _____, 2021 by and between the City of Richmond, Virginia (the “City”), a municipal corporation and political subdivision of the Commonwealth of Virginia, and the James River Association, a Virginia non-stock corporation (the “the Recipient”).

RECITALS

WHEREAS, Section 15.2-953(B)(vi) of the Code of Virginia authorizes the City to make gifts and donations to non-profit associations “furnishing services to beautify and maintain communities or to prevent neighborhood deterioration;”

WHEREAS, the City desires a walkable watershed to integrate the flow of people and stormwater by implementing a green street, installing green infrastructure, and performing related activities (the “Project”) in the City right-of-way of the approximately four-tenths (0.4) of a mile stretch of Minefee Street between Harwood Street and Gunn Street in the Bellemeade community of southside Richmond, Virginia (the “Project Area”);

WHEREAS, the City has undertaken activities in furtherance of the Project;

WHEREAS, the Recipient has formed a partnership with the City and other organizations and has secured \$266,115.00 in funding from non-City organizations for the Project; and

WHEREAS, the City desires to donate \$50,000.00 (the “Grant Funds”) to the Recipient to undertake the activities contained herein in furtherance of the Project.

NOW, THEREFORE, the City and Recipient, intending to be legally bound, agree as follows:

I. Contact Information.

A. The City's point of contact for purposes of the Contract is:

Grace LeRose
Program Manager Department of Public Utilities
1801 Commerce Rd.
Richmond, Virginia 23284
(804) 646-0033
Grace.LeRose@richmondgov.com

This point of contact is responsible for the City's monitoring of the Recipient's compliance with the Contract.

B. The Recipient's point of contact for purposes of the Contract is:

Justin Doyle
Community Conservation Manager
James River Association
211 Rocketts Way, Suite 200
Richmond, VA 23231

- C. The Recipient represents and warrants that it has duly authorized its point of contact to act on its behalf for purposes of this Contract.
 - D. Either party may change the contact information set forth in this section by submitting a written statement that the party is making such a change and setting forth the contact information of the party's new point of contact to the other party's point of contact.
2. **Payment of Grant Funds.**
- A. The City shall pay the Grant Funds to the Recipient promptly following full execution of this Contract.
 - B. The Recipient shall return to the City all of the Grant Funds received by the Recipient if the requirements set forth in section 3 below are not fulfilled. Upon return of the Grant Funds as provided in this section 2(B), all obligations of Recipient undertaken in this Contract will terminate.
3. **Scope of Services.** In consideration of the City's grant of the Grant Funds to the Recipient, and in conformance with the "Urban Design Review Committee Presentation Final Review Bellemeade Green Street," dated January 2019, which is attached here to and incorporated herein as Exhibit A; the "Project Specifications for Bellemeade Green Street Improvements Project No. 39986," dated February 2020, which is attached hereto and incorporated herein as Exhibit B; the "Operation & Maintenance (OM) Manual v01" for Filterra® bioretention systems, which is attached hereto and incorporated herein as Exhibit C; the "Bioretention Filter and Planter Bed Maintenance Specifications," which is attached hereto and incorporated herein as Exhibit D; and the "Bellemeade Green Street Improvements," dated October 18, 2019 and revised January 10, 2020, which is attached hereto and incorporated herein as Exhibit E, the Recipient shall:
- A. **Construction.** Perform or have performed, no later than September 30, 2021 and no later than 90 days after initiation of construction under this section 3(A), all construction activities necessary to install one (1) bioretention filter, eight (8) planter beds, two (2) Filterra® bioretention systems (collectively, the "Project Facilities" and each, a "Project Facility"), including but not limited to furnishing all materials, as well as replacing or relocating any utilities as necessary to install the Project Facilities. For City-owned utilities, the City's Department of Public Utilities (DPU) shall determine what replacements and relocations are necessary, and such relocations and replacements shall be performed to meet all applicable DPU specifications.

- B. **Plantings.** Plant 417 native plants in the Project Facilities, as well as 21 trees throughout the Project Area, as more specifically detailed in Exhibit A.
 - C. **Project Facilities Maintenance.** Maintain or have maintained the installed Project Facilities from installation until September 30, 2024.
 - D. **Encroachment Permit.** Obtain, prior to Project Facilities construction initiation, and maintain, for so long as Recipient owns the Project Facilities pursuant to section 5 of this Contract and at least through September 30, 2024, a City encroachment permit for the Project Facilities. Such encroachment permit shall be subject to, without limitation, Recipient providing a removal bond and a maintenance bond.
 - E. **Work in Streets Permit.** Obtain, prior to Project Facilities construction initiation, a Work in Streets permit from the City's Department of Public Works, for the installation of the Project Facilities.
4. **Performance Measures.** The City shall use the following performance measures, expressed in the form of questions to be answered in the affirmative, to evaluate whether the Recipient has performed the services required by this Contract in a manner that achieves the City's purpose in providing the Grant Funds to the Recipient:
- A. Has the Recipient performed all construction activities, as detailed in section 3(A) of this Contract?
 - B. Has the Recipient performed all planting services, as detailed in section 3(B) of this Contract?
 - C. Has the Recipient performed all maintenance services, as detailed in section 3(C) of this Contract?
 - D. Has the Recipient obtained and maintained a City encroachment permit for the Project Facilities, as detailed in section 3(D) of this Contract?
 - E. Has the Recipient obtained, prior to Project Facilities construction initiation, a Work in Streets permit from the City's Department of Public Works, for the installation of the Project Facilities?
5. **Ownership of Project Facilities.** Recipient shall own the Project Facilities, but shall, upon written request by the City, take all steps necessary to dedicate the Project Facilities, or any Project Facility, to the City through an instrument or instruments approved as to form by the City Attorney or to remove the Project Facilities, or any Project Facility.
6. **Reporting.** The Recipient shall furnish the City's point of contact with the following in a written form acceptable to the City's point of contact: A monthly report itemizing payments made

by Recipient to its contractors and suppliers, including copies of invoices from those contractors and suppliers.

7. **Compliance Monitoring.** The City's point of contact shall monitor the Recipient's compliance with this Contract. In addition to the reports required by Section 6, the Recipient shall furnish the City's point of contact with any information reasonably requested by the City's point of contact in order to enable the City's point of contact to determine whether the Recipient is meeting the performance measures set forth in the Contract.

8. **Recipient's Representations and Warranties.** The Recipient represents and warrants as follows:

- A. The Recipient is and will be for the duration of this Contract a non-profit organization within the meaning of Section 15.2-953(B) of the Code of Virginia.
- B. The Recipient's signatory is duly authorized by the Recipient to enter into the Contract and thereby to bind the Recipient to the Contract's terms and conditions.

9. **Audit.** Pursuant to Section 2-187 of the Code of the City of Richmond, the Recipient shall, as a condition of receiving monies from the City, be subject to periodic audits of its finances and expenditures of such City monies by the City Auditor on demand and without notice.

10. **No Third-Party Beneficiaries.** Notwithstanding any other provision of this Contract, the City and the Recipient hereby agree that: (i) no individual or entity shall be considered, deemed or otherwise recognized to be a third-party beneficiary of this Contract; (ii) the provisions of this Contract are not intended to be for the benefit of any individual or entity other than the City or the Recipient; (iii) no individual or entity shall obtain any right to make any claim against the City or the Recipient under the provisions of this Contract; and no provision of this Contract shall be construed or interpreted to confer third-party beneficiary status on any individual or entity. For purposes of this section, the phrase "individual or entity" means any individual or entity, including, but not limited to, individuals, contractors, subcontractors, vendors, sub-vendors, assignees, licensors and sub-licensors, regardless of whether such individual or entity is named in this Contract.

11. **No Joint Venture.** The terms and conditions of this Contract shall not be construed or interpreted in any manner as creating or constituting the City as a partner or joint venture participant with the Recipient or as making the City liable for the debts, defaults, obligations or lawsuits of the Recipient or its contractors or subcontractors.

SIGNATURES ON THE FOLLOWING PAGE

Effective as of the date first written above.

RECIPIENT:

By: _____
William H. Street
Chief Executive Officer
James River Association

CITY:

By: _____
Lincoln Saunders
Acting Chief Administrative Officer
Authorized by Ord. No. _____
Adopted _____

APPROVED AS TO TERMS:

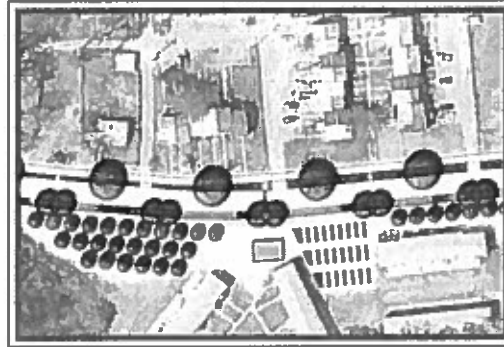
Calvin D. Farr, Jr.
Director of Public Utilities

APPROVED AS TO FORM:



A. Ross Phillips
Assistant City Attorney

Exhibit A



URBAN DESIGN COMMITTEE PRESENTATION
FINAL REVIEW

BELLEMEADE GREEN STREET
RICHMOND, VIRGINIA



JANUARY 2010

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PROJECT OVERVIEW

This project builds upon the work of the Bellemeade Walkable Watershed Plan, completed in 2012. The plan worked towards integrating the flow of people and stormwater, calling for environments that are safe and inviting for people as well as ecologically functional and sustainable. Minefee Street was identified as an opportunity for implementing a Green Street, connecting Hillside Court with Goodes Creek. The James River Association (JRA) funded the design of this project with various grants and corporate donations. Once the design is approved by the UDC and CPC the JRA will move forward with soliciting funds for implementation and construction. Construction timing will be dependent on when funding becomes available. The JRA is also partnering with Groundwork RVA on future landscape maintenance of the streetscape with their GreenTeam program. There is already a GreenTeam that works in the Oakgrove-Bellemeade Elementary School area.

The green street proposal calls for a range of sustainable stormwater practices to be implemented along Minefee Street. These practices slow stormwater, allow it to naturally infiltrate back into the ground, and keep it from flowing directly into the storm drains and Goodes Creek. Ultimately, these practices help to create a healthier watershed and a healthier Chesapeake Bay. Alongside the environmental elements, streetscape improvements aim to create a more inviting, safe, educational, and beautiful neighborhood. A bicycle/pedestrian pathway connects to the Bellemeade Community Center and the Oak Grove-Bellemeade Elementary School, this serves as a safe route for community members and students to cross over Goodes Creek to these destinations. Future interpretive elements along this pathway will explain the natural processes of the new Green Street. Together, these environmental and infrastructural improvements work together to make a healthier and more connected neighborhood.

The project team has had multiple meetings with the two neighborhood civic associations (Bellemeade and Hillside Court) where the project has received support. We have also met with various City departments to review the design including DPU, Transportation, and Parks.

EXISTING CONDITIONS AERIAL



0 37.5' 75' 150'

Preliminary research included an inventory of existing conditions using aerial photography, City of Richmond GIS data, and site visits to photograph streetscape character and verify storm drain locations, bus stops, and right-of-way widths. This inventory was used to further analyze the site and create a basemap for stakeholder activities.

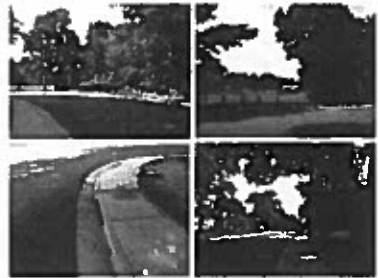
The Minefee Street corridor was broken into four sections based on block structure and streetscape character: Harwood to the edge of the woods near Hillside Court (A), edge of woods to Chambers Street (B), Chambers Street to Presson Boulevard (C), and Presson Boulevard to Gunn Street (D) which terminates at the new trail connector to the Bellemeade Community Center.

▲ 3NORTH

BELLEMEADE GREEN STREET

EXISTING CONDITIONS AERIAL

EXISTING CONDITIONS PHOTOS



GUNN STREET ←--- PRESSON AVENUE **D**

PRESSON AVENUE ←--- CHAMBERS STREET **C**

CHAMBERS STREET ←--- EDGE OF WOODS **B**

EDGE OF WOODS ←--- HARWOOD STREET **A**

STAKEHOLDER ENGAGEMENT



STAKEHOLDER ENGAGEMENT

3north partnered with JRA, Groundwork RVA's Green Team, and local students to identify opportunities for innovation, community enhancement, and streetscape improvements along the Minefee corridor. Components and amenities were divided into 5 key categories that correlate with the goals established in the Bellemeade Neighborhood Walkable Watershed Plan, which include:





The first team identified strategies along the full length of the Minefee Street corridor. Signage identifies the new bike lane upon turning onto Minefee. A community garden and orchard is located at Hillside Court, as well as a dog pick-up station for the pet owners who walk along Minefee.

Moving down the street, rain gardens with native plantings help manage stormwater runoff. Offset curb extensions provide traffic calming, while crosswalks are designed to incorporate artistic elements.

Street trees line the entire corridor, leading toward a park at the terminus of Minefee Street, where a trailhead leads to the Bellemead Community Center. A bus stop and a range of park amenities are located here.

CONNECTIVITY				SAFETY				WATER + ENVIRONMENT				GREEN SPACE & COMMUNITY				EDUCATION + AWARENESS		
BUS STOP	PAINTED BIKE LANE	BIKE ROUTE	BIKE LANE	CROSSWALK ART	OFFSET CURB EXTENSION	CURB EXTENSION PLANTER	BIKE LANE	PERMEABLE PAVING	RAIN GARDEN	NATIVE PLANTS	FRUIT TREES	DOG PICK-UP STATION	EDIBLE PLANTS	FRUIT TREES	STREET TREES	BMP SIGNAGE	CROSSWALK ART	STORM DRAIN ART
								EDIBLE PLANTS	PERMEABLE PARKING			WATER FOUNTAINS	BIKE RACKS	RECYCLING RECEPTACLES	TRASH RECEPTACLES			



Team two started their bike lane on Harwood Street. Tree islands divide this street, slowing traffic and creating an urban tree canopy. Upon entering Minefee Street signage and a speed hump slows traffic. Bioswales line the trees, adjacent to a painted bike lane. Trees are planted within the bioswales, continuing the tree canopy down Mindee.

Crosswalk art is located at street intersections, along with pedestrian crossing signals. Interpretive signage explains stormwater management practices for pedestrians walking alongside the bioswales.

Permeable pavers are used in parallel parking areas. A park is located at the bottom of the hill, with a trail connecting to the Bellemeade Community Center.

CONNECTIVITY				SAFETY				WATER + ENVIRONMENT				GREEN SPACE & COMMUNITY				STORMWATER MANAGEMENT			
BUS STOP	PAINTED BIKE LANE	BIKE ROUTE	BIKE LANE	SAFETY SIGNAGE	SPEED HUMP	PAINTED BIKE LANE	CROSSWALK LIGHTING	ARTFUL BIO-RETENTION	TREE ISLANDS	STREET TREES	PERMEABLE PAVING	TREE CANOPY	MODERN FURNISHINGS	WATER FOUNTAINS	TRASH RECEPTACLES	BMP SIGNAGE	FRUIT TREES	ARTFUL BIORETENTION	INTERACTIVE BIOSWALE
CROSSWALK ART	PEDESTRIAN SIGNAL	RAISED CROSSWALK	STREET LIGHTS	BIOSWALE	INTERACTIVE BIOSWALE	BIO-RETENTION	FRUIT TREES	DOG PICK-UP STATION	RECYCLING RECEPTACLES	STORMDRAIN ART	CROSSWALK ART								

CONCEPTUAL DESIGN

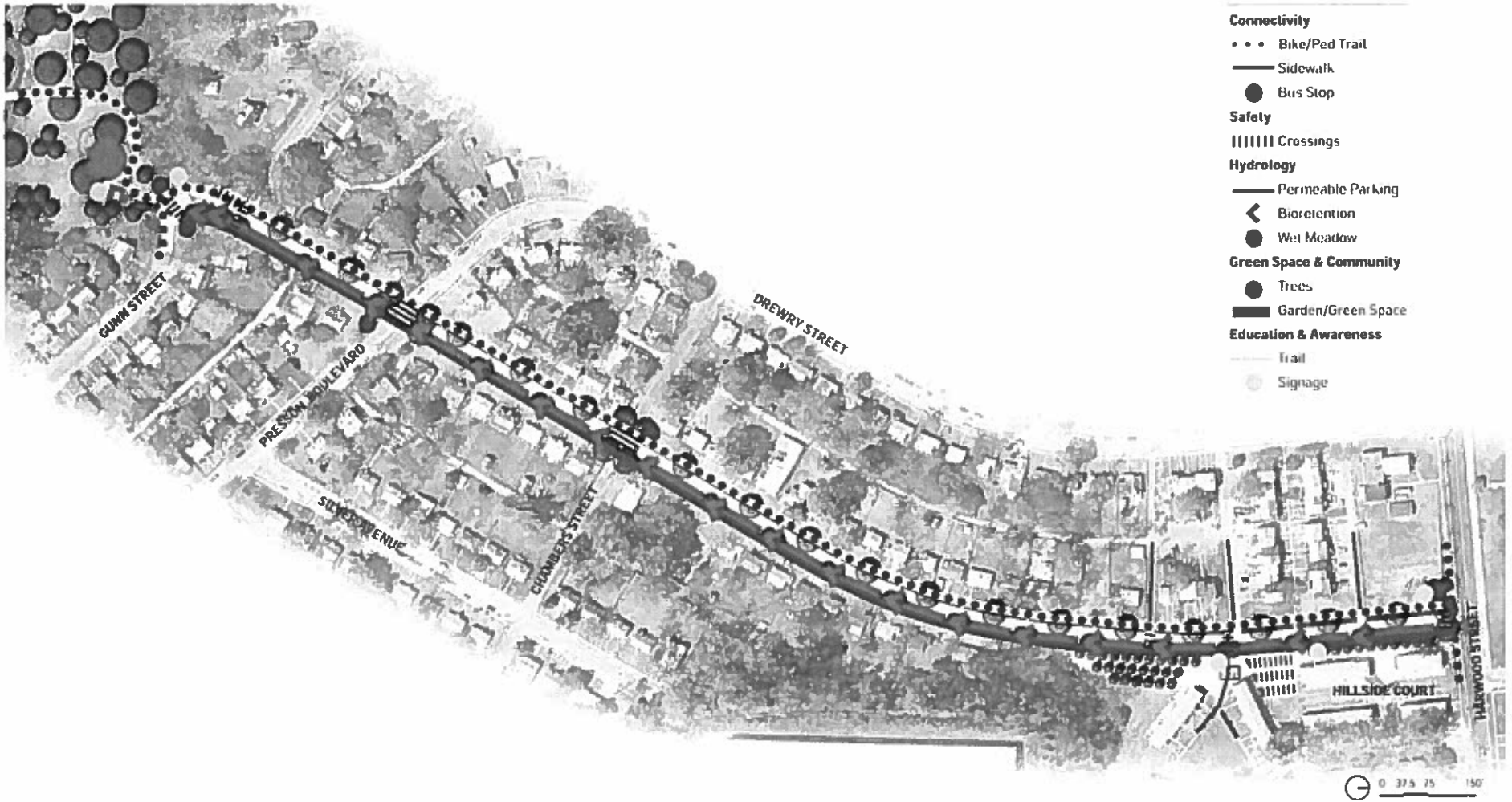
CONCEPTUAL DESIGN

The design for Minefee Street incorporates a range of design strategies that create a more sustainable and enjoyable streetscape. Overall, the design creates connections from the Harwood/Minefee Street intersections down to Goodes Creek and, ultimately, Bellemeade Community Center and Oak Grove-Bellemeade Elementary School. Sustainable stormwater practices are integrated throughout the corridor, including permeable parallel parking spaces, a pervious concrete bicycle/pedestrian pathway, bioretention planters along the streetscape, a bioswale that runs alongside the pathway, and a wet meadow that captures excess stormwater runoff.

Safety is a critical element of the design; the pathway is separated from the road by a planted bioswale, and raised crosswalks/intersections serve to slow traffic. Art/murals are incorporated into these crosswalks. The urban tree canopy is greatly enhanced along Minefee Street, while plantings within the bioretention basins and bioswales utilize native plantings. Natives provide habitat for insects, animals, and pollinators, and also often require less maintenance than traditional plantings. Maintenance of these plantings will be provided by the Groundworks RVA Green Team. The design also includes a wide range of community-focused features, including a community garden with raised beds and an orchard adjacent to Hillside Court, a community pavilion within the community garden, interpretive signage along Minefee Street, recycling and trash receptacles, and new park features alongside Goode Creek. This park will contain a water bottle filling station, a dog walking station, and a trailhead to the Bellemeade Community Center and Oak Grove-Bellemeade Elementary School.



MINEFEE STREET CONCEPT DIAGRAM



▲ 3NORTH

BELLEMEADE GREEN STREET
STREETSCAPE DIAGRAM

MINEFEE STREET CONCEPTUAL PLAN



NOTES

- A Hillside Court
- B Community Garden
- C Garden Pavilion
- D Orchard/food Forest
- E Permeable Paving Parallel Parking
- F Permeable Paving Bicycle Lane
- G Bioretention Planter
- H Crosswalk Art
- I Bus Shelter
- J Park
- K Wet Meadow
- L Trail to Oak Grove - Bellemeade Elementary School

▲ 3NORTH

BELLEMEADE GREEN STREET
STREETSLAPE PLAN



PERMEABLE PARKING

Permeable pavers are used within parallel parking areas. This allows water to infiltrate back into the ground instead of flowing into the storm drain.



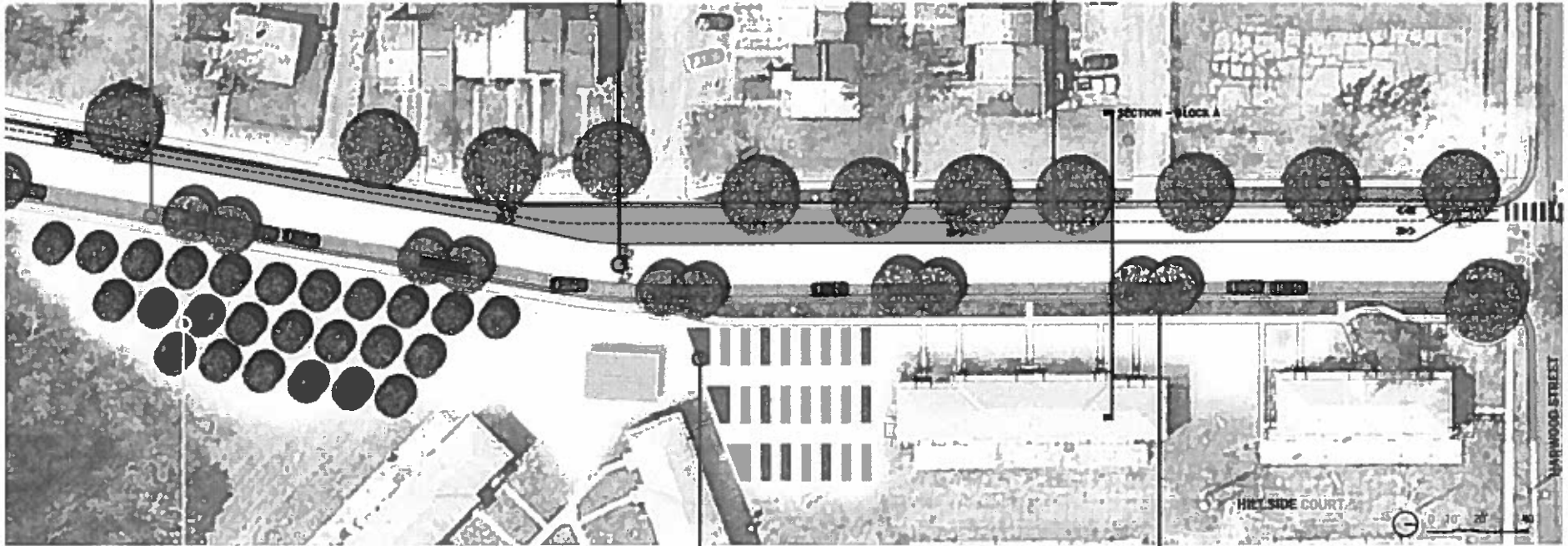
RAISED CROSSWALK

This raised crosswalk serves as both a crossing from the bike/ped pathway to the community garden as well as a traffic calming measure, reducing vehicular speed along this straight stretch of Minefee Street.



BIKE PATH

A permeable asphalt bike lane, striped for two-way bike traffic is separated from the existing Minefee Street sidewalk by a planted strip. This bike lanes runs the entire length of Minefee Street, beginning with a bus stop at Harwood and connecting to a path that leads to the Bellemeade Community Center.



FOOD FOREST / ORCHARD

Fruit trees provide fresh fruit to the residents of Minefee Street and Hillside Court, and the food forest utilizes edible woodland species. Both provide educational opportunities on food production and sustainable agriculture



COMMUNITY GARDEN

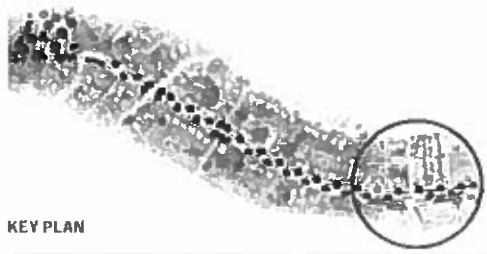
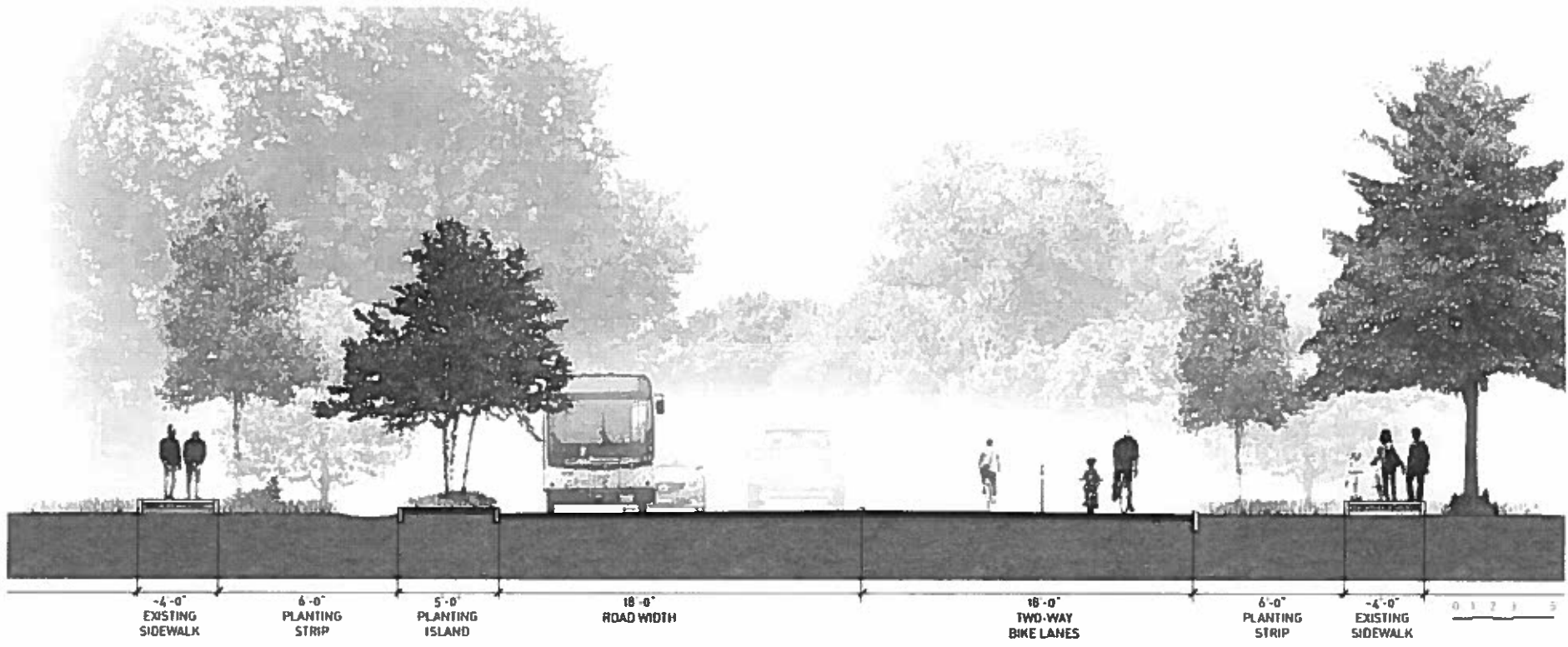
Garden plots provide neighborhood residents with space to grow fresh vegetables. A garden pavilion anchors the garden, serving as a space for education as well as community gatherings.



PLANTED DIVIDER STRIP

A planted strip separates the parallel parking areas from the existing sidewalk. Trees and seasonally interesting landscape plantings create an attractive linear garden environment that helps slow stormwater and allows it to infiltrate into the ground.

STREETSCAPE SECTION - BLOCK A



KEY PLAN

COMMUNITY HUB

This block adjacent to Hillside Court serves as a community hub. A range of activities, from classes to socials to picnics, can take place within the community pavilion at the community garden. The garden and food forest becomes a central space where neighbors can congregate while enjoying and working in the garden. Food grown here provides fresh, organic options to community members and enhances the menu at Oak Grove-Bellemeade Elementary School nearby. The start of the bicycle and trail begins on this block and moves down towards Goodes Creek, where it eventually connects to a trail system going to the Bellemeade Community Center. A bus stop is positioned nearby, allowing for connections to be made throughout Richmond.



COMPOST & RECYCLING

Visible and accessible trash, recycling, and pet clean-up receptacles are incorporated into the new community food production & green spaces. A dedicated composting area near the garden beds minimizes household waste while providing fertilizer for garden plots.



BELLEMEADE GREEN STREET
BLOCK A - HAWWOOD TO EDGE OF WOODS



CROSSWALK ART

Crosswalks incorporate murals and artistic elements, creating inviting and engaging intersections.



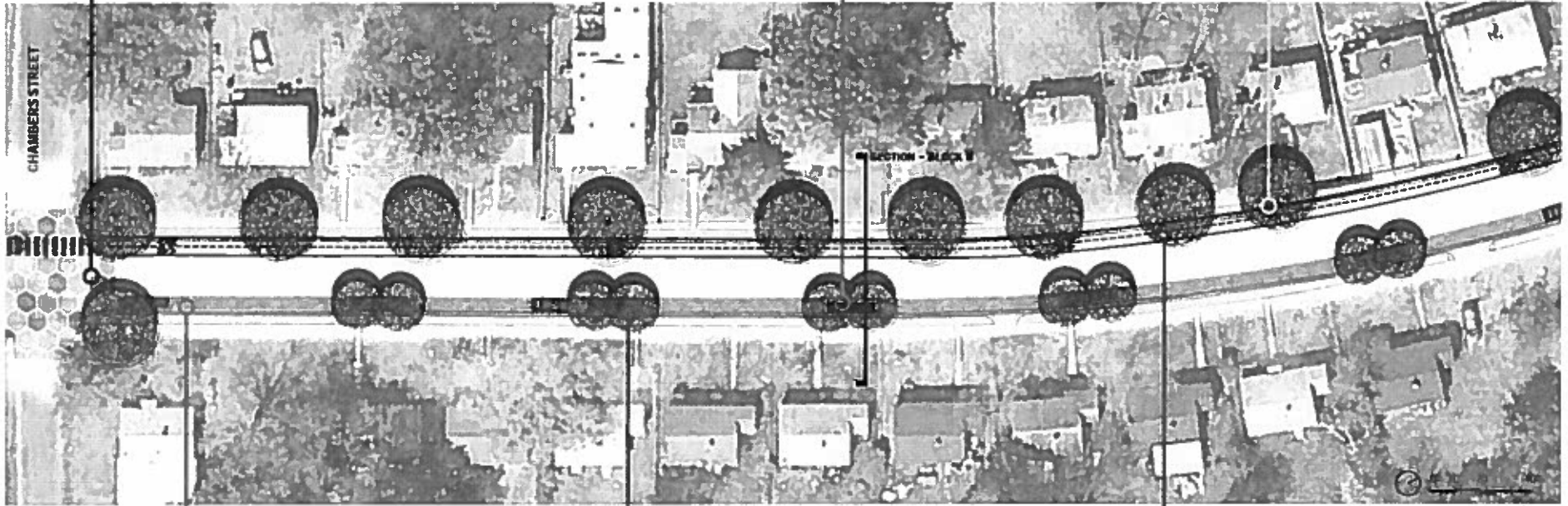
BIORETENTION

Bioretention planters collect runoff from Minefee Street, allowing it to infiltrate back into the ground or into an underdrain system. These areas utilize native plants, and provide habitat.



EDUCATION TRAIL

Along the new pedestrian and cycling trail, icons representing birds, insects, plants, and aquatic wildlife teach students about water, soil, plants, and habitat as they walk to and from school. Signage and graphics along the path provide educational activities.



PERMEABLE PARKING

Permeable paving is used within parallel parking areas. This allows water to infiltrate back into the ground instead of flowing into the storm drain.



PLANTED ISLAND

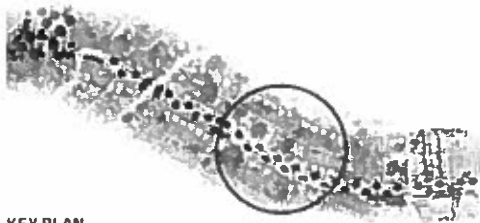
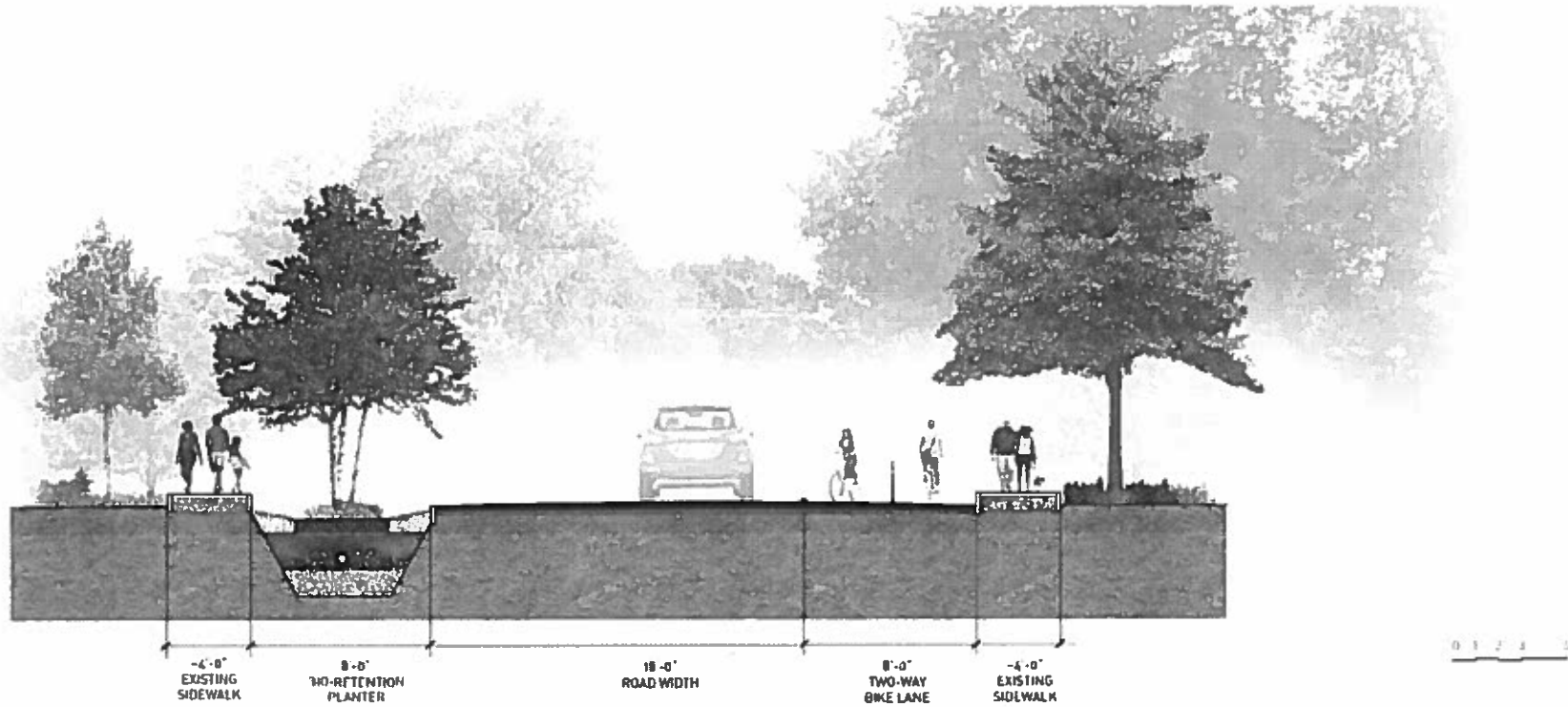
Planted islands provide additional greenspace along the parallel parking areas and match the scale and rhythm of the bioretention planters. These islands provide more planting space for shrubs and smaller trees and create an attractive linear garden with seasonal interest.



BIKE PATH

A permeable asphalt bike lane, striped for two-way bike traffic is separated from the existing Minefee Street sidewalk by a planted strip. This bike lanes runs the entire length of Minefee Street, beginning with a bus stop at Harwood and connecting to a path that leads to the Bellemeade Community Center.

STREETSCAPE SECTION - BLOCK B



KEY PLAN

GREEN STREET ELEMENTS

The typical streetscape along the Bellemeade Green Street is composed of an 8' wide two-way bike lane, ~18' vehicular travel lane, an 8' parallel parking lane alternating with bioretention planters (4 total), planting islands, and the existing City sidewalks. Street trees will augment the existing canopy along Minefee and native plants will be incorporated into new bioswale planting strips along the corridor. Environmental graphics including educational signage, art, and playful, engaging paving patterns will increase awareness of sustainable technologies and create an educational trail along the length of Minefee.



STRUCTURAL SOIL

Structural soil will be used in the planting areas along the green street in order to ensure the health of newly planted street trees and to protect sidewalks and paths. Structural soil will also increase the infiltration of water in the planting strips, slowing runoff.

▲ 3 NORTH

BELLEMEADE GREEN STREET

BLOCK B - EDGE OF WOODS TO CHAMBERS

FINAL DESIGN

The final design for Minefee Street incorporates many of the elements of the conceptual design but focuses in on a base scheme that addresses the two biggest design goals: stormwater treatment and bicycle safety. As additional funding becomes available in the future more of the design elements from the conceptual plan will be incorporated such as interpretive signage and public art.

Sustainable stormwater practices are integrated throughout the corridor using live bioretention planters along the streetscape, and by adding new street trees along the west side of Minefee St. Bicycle safety is accomplished by removing parallel parking along the west side of Minefee Street and replacing it with a two-way bike lane separated from cars with flexible bollards.



PLANTING DESIGN

With the objective of bringing beauty and interest throughout the seasons, the east side of the street's planting strategy is divided into three different planting palettes according to planter (A,B and C). The west side is comprised of attractive native large tree species.

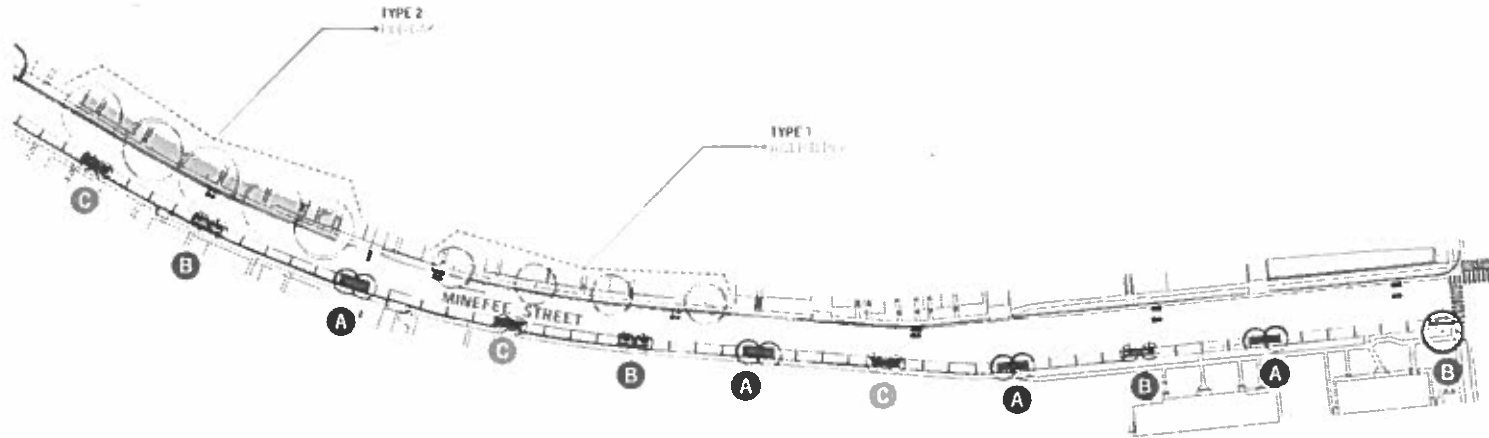
The three types of planters on the east side, include a combination of a medium ornamental trees, shrubs with seasonal interest and perennials or grasses. The plant palette for the Bioretention planters would alternate between two types of shrub species with a consistent tree selection. Plant species were selected for ease of maintenance and are intended to gradually fill in and secure the soil of the bioretention planters

The two street tree selections for the west side of the street are River Birches and Northern Red Oaks, which alternate down the street according to the scale of the existing streetscape elements.

PLANTING PLAN

NOTES

- A Planter Type A
- B Planter Type B
- C Bio-Retention Planters



PLANTING STRATEGY

With the objective of bringing beauty and interest throughout the seasons, the east side of the street's planting strategy is divided into three different planting palettes according to planter (A, B and C). The west side is comprised of attractive native large tree species.

The three types of planters on the east side, include a combination of a medium ornamental trees, shrubs with seasonal interest and perennials or grasses.

The plant palette for the Bio-retention planters would alternate between two types of shrub species with a consistent tree selection. Plant species were selected for ease of maintenance and are intended to gradually fill in and secure the soil of the bio-retention planters.

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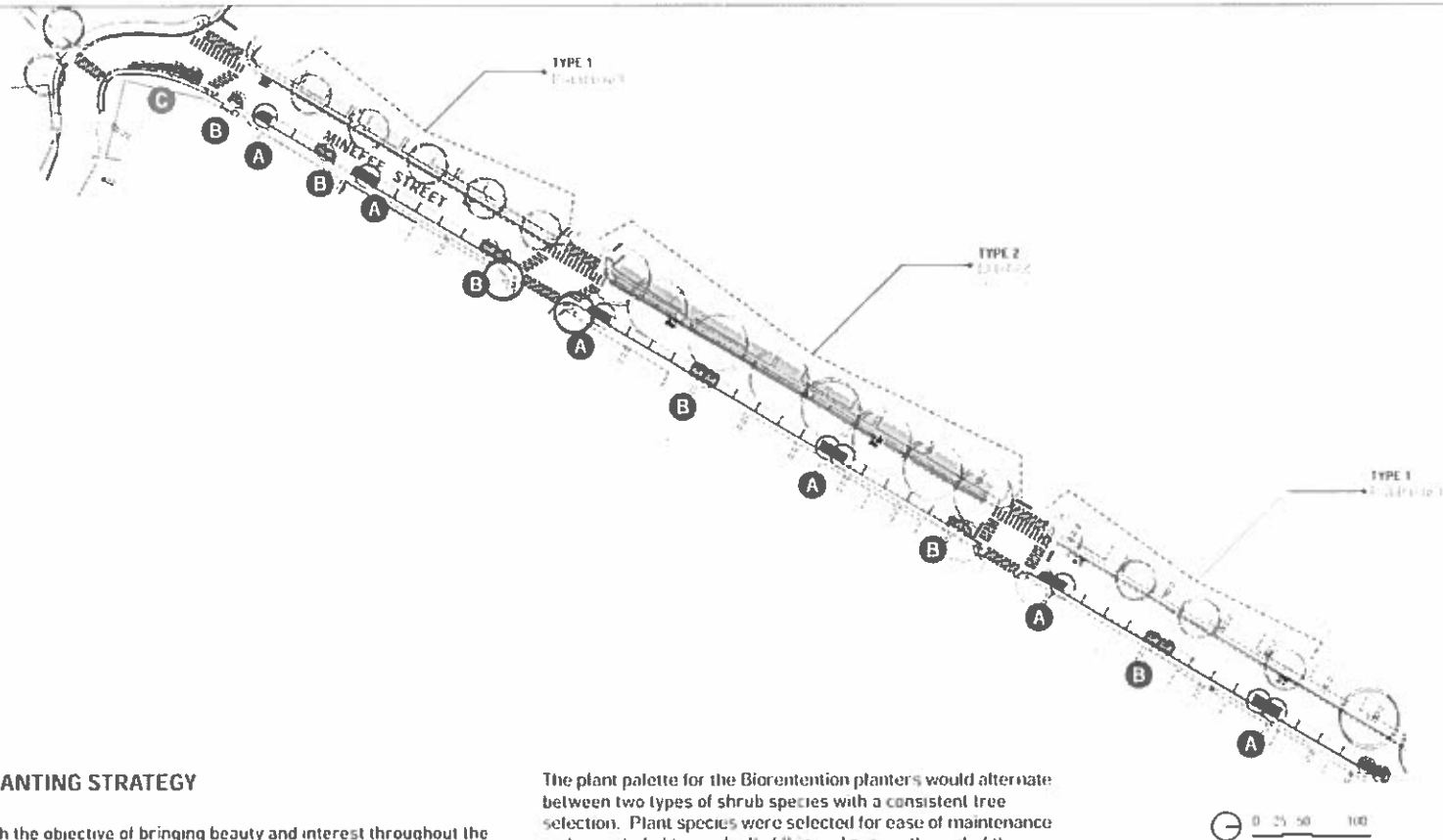
KEY PLAN



▲ 3 NORTH

BELLEMEADE GREEN STREET

PLANTING PLAN



NOTES

- A Planter Type A
- B Planter Type B
- C Bio-Retention Planters

PLANTING STRATEGY

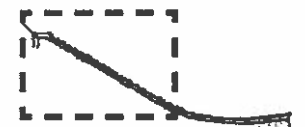
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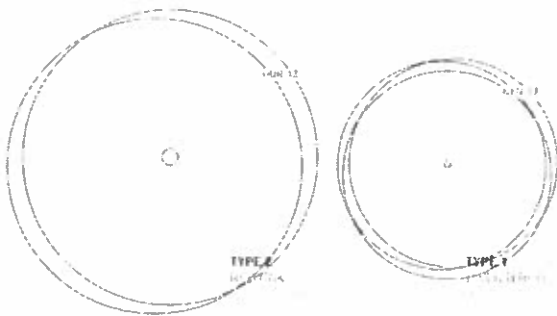
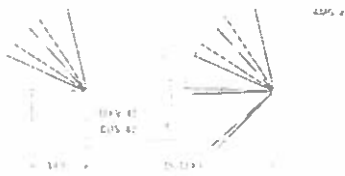
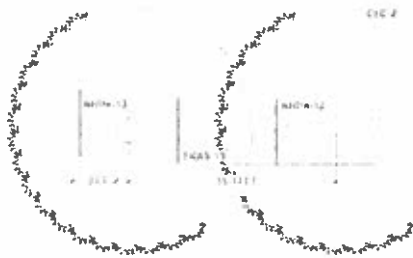
The two street tree selections for the west side of the street are River Birches and Northern Red Oaks, which alternate down the street according to the scale of the existing streetscape elements.

KEY PLAN



BELLEMEADE GREEN STREET

PLANTING PALETTE



PLANTER TYPE A

- 'Gro-Lo' Sumac - 12' H x 18' W
(Rhus aromatica)
- Purple Love Grass - 3 Gal
(Eragrostis spectabilis)
- Eastern Redbud -
(Cercis canadensis)

PLANTER TYPE B

- Purple Coneflower - 1 Gal
(Echinacea Purpurea)
- Amsonia - 3 Gal
(Amsonia hubrichtii)
- Winter King Hawthorn - 12 H
(Crataegus phaenopyrum)

PLANTER TYPE C

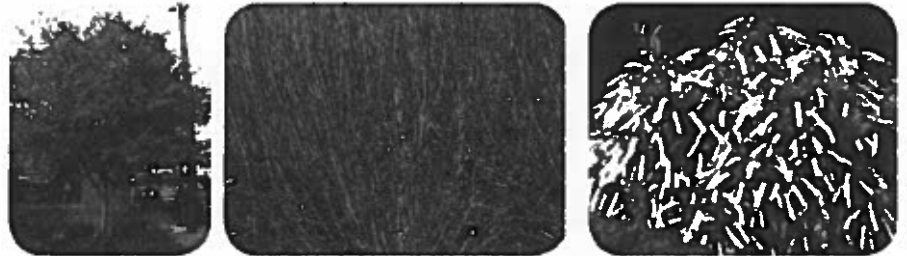
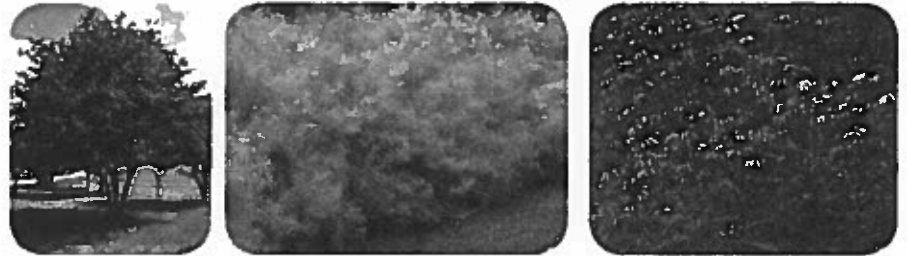
Bio-Retention Planters:

- Shrub 1:
Arctic Fire Dwarf Dogwood - 18' H x 18' W
(Cornus sericea)
- Shrub 2:
Little Henry Sweetspire - 18' H x 18' W
(Itea virginica)
- Autumn Brilliance Serviceberry - 12 H
(Amelanchier x grandiflora)

WEST STREET TREES

- Type 1:
River Birch 3" Cal.
(Betula nigra)
- Type 2:
Northern Red Oak - 3" Cal.
(Quercus rubra)

*Sizes listed are at installation



REVISED BIKE LANE DESIGN

The design of the bike lane was modified to meet the concerns and comments brought up by DPW

There is not enough space within the confines of the existing road section [34' face of curb to face of curb] to properly design a two-way cycle track and have enough space for dedicated on-street parking and lane widths for the design vehicle (transit/school buses), therefore, we have come up with the proposed 6' protected bicycle lane, which at its narrowest sections include the existing gutter pan and the 2-foot painted buffer.

This proposed section allows us to accomplish the desired goal of providing a protected bike lane for elementary students and recreation center travelers during peak hours in the a.m while allowing us to maximize parking space, "green" tree well and bioretention features (8' wide), and provide 10' travel lanes.

10' is below the required threshold for transit; however, DPW was willing to allow the concession based on the low volume of the road, the existing condition (parking on both sides), and the relative infrequency of bus transit.

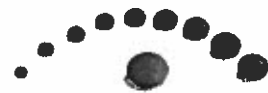
All bike lane infrastructure fits between existing curb lines of the street. No modifications to existing curb line location is proposed.



**PROJECT SPECIFICATIONS
FOR
BELLEMEADE GREEN STREET IMPROVEMENTS**

PROJECT NO. 39986

February 2020



TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

1001 Boulders Parkway, Suite 300

Richmond, VA 23225

804-200-6500

Contact: Aislinn Creel, PE, LEED AP

**BELLEMEADE GREEN STREET IMPROVEMENTS
MINEFEE STREET RIGHT-OF-WAY
RICHMOND, VIRGINIA**

PROJECT NO.: 39986

TABLE OF CONTENTS

Unit Bid Form

Specifications – Bioretention Filter

Specifications – Filterra

**Bellemeade Green Street Improvements
Unit Bid Form**

Item	Approx. Quantity	Unit	Unit Price	Extended Price
7'x13' Filterra	3	EA		
Site Preparation and Regular Excavation	344	CY		
Curbs	882	LF		
Storm sewers (6" Perforated PVC)	121	LF		
Storm sewers (6" PVC)	6	LF		
21A/B Stone	50	TON		
Bioretention Media	90	CY		
Geotech. Fabric	694	SY		
#57 Stone	54	TON		
Sand	7	CY		
#8 Washed Choker Stone	7	CY		
#3 Washed Stone (gravel diaphragm)	11	CY		
Cleanouts	5	EA		
Mulch	7	CY		
Landscape Timbers (3"x4"x6')	16	EA		
Planter Topsoil/media	120	CY		
Silt Fence	57	LF		
Inlet Protection	17	EA		
CCTV of SSWR in bioretention filter (pre and post)	1	LS		
Total			\$	-

BIORETENTION FILTER PROJECT SPECIFICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the Contract Documents apply to the work of this Section.
- B. This specification was adapted from the Virginia DCR Stormwater Design Specification No. 9, Version 2.0 (January 1, 2013) and Appendix B.3 of the Maryland Department of the Environment Construction Specifications for Sand Filters, Bioretention, and Open Channels.

1.2 SUMMARY

- A. This Section includes the sequence of construction and installation for the bioretention filter.
- B. This Section also includes bioretention materials specifications.

1.3 SUBMITTALS

- A. Bioretention Media Product Certification: Supplier shall provide the following certification:
 - 1. Statement of conformance with Part 2 of this specification.
 - 2. Description of the method of proportioning and blending the raw ingredients.
- B. Delivery tickets for media and stone.

1.4 SEQUENCING AND SCHEDULING

- A. Contractor to attend a pre-construction meeting as described in the plans, Sheet C1.0.
- B. Provide a detailed schedule and sequence of construction per Demolition and Construction Sequence Notes, Sheet C1.0 of the plans.
- C. All temporary erosion and sediment controls must be installed prior to beginning any work on the bioretention filter.
- D. Ensure contributing drainage area is stabilized to the maximum extent practical and redirect storm water runoff away from bioretention filter surface area during construction. Do not direct surface flow to bioretention filter area until the filter is properly stabilized with pre-treatment (gravel diaphragms) and level spreaders (landscape ties) are securely in place.
- E. Avoid damage to underdrain system and compaction of bioretention filter media, stone, and mulch by prohibiting the use of heavy equipment in the bioretention filter area.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials used for construction of the bioretention filter shall comply with the requirements listed in Table 9.7 of the Virginia Stormwater BMP Clearinghouse Design Specification 9: Bioretention.

Table 9.7. Bioretention Material Specifications

Material	Specification	Notes
Filter Media Composition	Filter Media to contain: <ul style="list-style-type: none"> • 80% - 90% sand • 10%-20% soil fines • 3%-5% organic matter 	The volume of filter media based on 110% of the plan volume, to account for settling or compaction.
Filter Media Testing	Available P between L+ and M per DCR 2005 Nutrient Management Criteria.	The media should be certified by the supplier.
Mulch Layer	Use aged, shredded hardwood bark mulch or stable coarse compost.	Lay a 2 to 3 inch layer on the surface of the filter bed.
Alternative Surface Cover	Use river stone or pea gravel, coir and jute matting, or turf cover.	Lay a 2 to 3 inch layer of to suppress weed growth.
Top Soil For Turf Cover	Loamy sand or sandy loam texture, with less than 5% clay content, pH corrected to between 6 and 7, and an organic matter content of at least 2%.	3 inch surface depth.
Geotextile/Liner	Use a non-woven geotextile fabric with a flow rate of > 110 gal./min./sq. ft. (e.g., Geotex 351 or equivalent)	Apply only to the sides and directly above the underdrain. For hotspots and certain karst sites only, use an appropriate liner on bottom.
Choking Layer	Lay a 2 to 4 inch layer of sand over a 2 inch layer of choker stone (typically #8 or #89 washed gravel), which is laid over the underdrain stone.	
Stone Jacket for Underdrain and/or Storage Layer	1 inch stone should be double-washed and clean and free of all fines (e.g., VDOT #57 stone).	12 inches for the underdrain; 12 to 18 inches for the stone storage layer, if needed
Underdrains, Cleanouts, and Observation Wells	Use 6 inch rigid schedule 40 PVC pipe (or equivalent corrugated HDPE for micro-bioretention), with 3/8-inch perforations at 6 inches on center; position each underdrain on a 1% or 2% slope located no more than 20 feet from the next pipe.	Lay the perforated pipe under the length of the bioretention cell, and install non-perforated pipe as needed to connect with the storm drain system. Install T's and Y's as needed, depending on the underdrain configuration. Extend cleanout pipes to the surface with vented caps at the Ts and Ys.
Plant Materials	Plant one tree per 250 square feet (15 feet on-center, minimum 1 inch caliper). Shrubs a minimum of 30 inches high planted a minimum of 10 feet on-center. Plant ground cover plugs at 12 to 18 inches on-center; Plant container-grown plants at 18 to 24 inches on-center, depending on the initial plant size and how large it will grow.	Establish plant materials as specified in the landscaping plan and the recommended plant list. In general, plant spacing must be sufficient to ensure the plant material achieves 80% cover in the proposed planting areas within a 3-year period. If seed mixes are used, they should be from a qualified supplier, should be appropriate for stormwater basin applications, and should consist of native species (unless the seeding is to establish maintained turf).

- B. Bioretention Filter Media Product Data: Supplier shall submit the following test results from a professional laboratory following the prescribed standard testing protocols listed herein:
1. Sand, silt, and clay percent by weight (texture) of the Mineral Fraction (as defined below) either prior to the addition of compost or after the compost is removed, as determined by AASHTO T 88. Particle Size Analysis of Soils.
 2. Organic Matter (OM) percent by weight of the total sample, based on ASTM D 2974 Method C.
 3. Extractable Phosphorus, ppm, as determined by Mehlich III Extraction Procedure.
 4. Cation Exchange Capacity (CEC), meq/100g, as determined by the Ammonium Acetate CEC Method (Chapman, 1965).
 5. Mean Overall Infiltration Rate, in/hr, as determined by using a simulated standard installation following the *Mesocosm Testing Protocol for Bioretention Soil Media Testing* by Wetland Studies and Solutions, Inc., Gainesville, VA.
 6. Descriptions of proportioning and blending methods used in production.
 7. Descriptions of test method used for each test conducted and in conformance with these specifications.

2.2 MATERIALS

A. Components:

1. Fine Aggregate shall consist of clean, inert grains of durable minerals free from surface coatings or other deleterious materials.
2. Screened Soil shall have 100% passing the ½ inch sieve.
3. Mineral Fraction shall be a combination of the Fine Aggregate and Screened Soil and shall have a texture defined by the percentage of sand, silt, and clay particles within the ranges listed below.
4. Organic Matter added to the mineral fraction shall consist of compost derived from plant material. The compost shall be the result of biological degradation and transformation of plant derived materials under conditions that promote anaerobic decomposition. The material shall be well composted, free of viable weed seeds, and stable with regard to oxygen consumption and carbon dioxide generation.

B. Production:

1. Raw Materials shall be proportioned using a continuous flow delivery method to maintain accurate proportions prior to being mechanically blended. Material feed bins set over a variable speed conveyor system feeding into a pug mill shall be used. Proportioning by bucket of earth moving machinery like loaders, excavators, *etc.*, is not acceptable.

C. Properties:

1. The bioretention filter media shall have the following properties, verified by the indicated test method and submitted as described in section 1.3 above:

a. Mineral Fraction Texture:

Component	% by Weight of Total Mineral Fraction
Sand	80 – 90 %
Silt + Clay	10 – 20 %
Clay	0 – 10 %

b. Organic Matter: 3-5% by weight of total sample.

c. Extractable phosphorus: 10-40 ppm

d. Cation exchange capacity (CEC): >5 meq/100g

e. Mean overall infiltration rate: > 1 in/hr

PART 3 - EXECUTION

3.1 GENERAL

- A. The bioretention filter shall be constructed in accordance with the design plans and details.
- B. Bioretention filter area should be fully protected by silt fence or construction fencing during construction to prohibit fines from un-stabilized areas in the drainage area from clogging the media prior to final walk-through.
- C. Prevent excessive soil compaction, filter media compaction, and mulch compaction by prohibiting the use of heavy equipment within the footprint of the bioretention filter.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by installation operations.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 COMPACTION

- A. Minimize compaction of both the base of the bioretention area and required backfill. When possible, use excavation hoes to remove original soil. If bioretention areas are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.
- B. Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the 12-inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.
- C. Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the washed #57 stone. Pump any ponded water before preparing (rototilling) base.

- D. When backfilling the bioretention filter media over the sand layer, first place 3 to 4 inches of media over the sand, then rototill the sand/media to create a gradation zone. Backfill the remainder of the topsoil to final grade.
- E. When backfilling the bioretention facility, place media in lifts 8" to 12". Do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks

3.4 INSTALLATION OF BIORETENTION

- A. Construction of the bioretention area may only begin after the entire contributing drainage area has been stabilized. It may be necessary to block certain curb or other inlets while the bioretention area is being constructed. The proposed site should be checked for existing utilities prior to any excavation. Note the crossing of the existing sanitary sewer as shown on the plans.
- B. The designer and the installer should have a preconstruction meeting, checking the boundaries of the contributing drainage area and the actual inlet elevations to ensure they conform to original design. Since other contractors may be responsible for constructing portions of the site, it is quite common to find subtle differences in site grading, drainage and paving elevations that can produce hydraulically important differences for the proposed bioretention area. The designer should clearly communicate, in writing, any project changes determined during the preconstruction meeting to the installer and the plan review/inspection authority.
- C. Temporary E&S controls are needed during construction of the bioretention area to divert stormwater away from the bioretention area until it is completed. Special protection measures such as erosion control fabrics may be needed to protect vulnerable side slopes from erosion during the construction process.
- D. Any pre-treatment cells should be excavated first and then sealed to trap sediments.
- E. Excavators or backhoes should work from the sides to excavate the bioretention area to its appropriate design depth and dimensions. Excavating equipment should have scoops with adequate reach so they do not have to sit inside the footprint of the bioretention area. Contractors should use a cell construction approach in larger bioretention basins, whereby the basin is split into 500 to 1,000 sq. ft. temporary cells with a 10-15 foot earth bridge in between, so that cells can be excavated from the side.
- F. It may be necessary to rip the bottom soils to a depth of 6 to 12 inches to promote greater infiltration.
- G. Call the engineer or site inspector to observe the construction prior to initiating H below so they can properly certify the install of the bioretention filter.
- H. Place geotextile fabric on the sides of the bioretention area with a 6-inch overlap on the sides. If a stone storage layer will be used, place the appropriate depth of #57 stone on the bottom, install the perforated underdrain pipe, pack #57 stone to 3 inches above the underdrain pipe, and add approximately 3 inches of choker stone/pea gravel and 3" of manufactured or washed stone as a filter between the underdrain and the soil media layer.
- I. Deliver the soil media from an approved vendor (refer to certifications and submittals above) and store it on an adjacent impervious area or plastic sheeting. Apply the media in 8- to 12-inch lifts until the desired top elevation of the bioretention area is achieved. Wait a few days to check for settlement, and add additional media, as needed, to achieve the design elevation.

- J. Place the surface cover in both cells (mulch, river stone), depending on the design.
- K. Plants will be installed by others.
- L. Conduct the final construction inspection (see Section 9.2). Then log the GPS coordinates for each bioretention facility and submit them for entry into the local maintenance tracking database.

PART 4 – QUALITY ASSURANCE

4.1 GENERAL

- A. The Contractor shall provide the testing necessary to determine conformance with these specification and quality assurance for proper handling, storage, and installation.
- B. Any material that does not meet the entirety of the specifications herein, shall be rejected by the Engineer and a suitable alternative must be provided by the Contractor.

END OF SECTION

FILTERRA PROJECT SPECIFICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY

- A. This Section includes the sequence of construction and installation for the Filterras®.
- B. This Section also includes Filterra® Vault Configuration Bioretention System Standard Specification.

1.3 SUBMITTALS

- A. Delivery ticket for Filterra® Vaults.

1.4 SEQUENCING AND SCHEDULING

- A. Contractor to attend a pre-construction meeting as described in the plans, Sheet C1.0.
- B. Provide a detailed schedule and sequence of construction per Demolition and Construction Sequence Notes, Sheet C1.0 of the plans.
- C. All temporary erosion and sediment controls must be installed prior to beginning any work to install the Filterra® Vaults.
- D. Ensure contributing drainage area is stabilized to the maximum extent practical and redirect storm water runoff away from Filterra® Vault installation areas during construction. Do not direct surface flow to the Filterras® until they are completely installed.
- E. If water table is encountered during construction, notify engineer immediately to confirm buoyancy calculations.

PART 2 – PRODUCTS (FILTERRA® VAULT CONFIGURATION BIORETENTION SYSTEM STANDARD SPECIFICATION)

2.1 GENERAL

- A. This item shall govern the furnishing and installation of the Filterra® bioretention system by Contech Engineered Solutions, LLC, complete and operable as shown and as specified herein, in accordance with the requirements of the plans and contract documents.
- B. Contractor shall furnish all labor, materials, equipment and incidentals necessary to install the bioretention system, appurtenances and incidentals in accordance with the drawings and as specified herein.

- C. Bioretention system shall utilize the physical, chemical and biological mechanisms of an engineered biofiltration media, plant and microbe complex to remove pollutants typically found in urban stormwater runoff. The treatment system shall be a fully equipped, pre-constructed, drop-in-place unit designed for applications in the urban landscape to treat contaminated runoff from impervious surfaces.
- D. Bioretention system shall be capable of stand-alone stormwater treatment. No pretreatment to biofiltration media shall be required.
- E. The bioretention system shall be of a type that has been installed and in use for a minimum of five (5) consecutive years preceding the date of installation of the system. The manufacturer shall have been, during the same consecutive five (5) year period, engaged in the engineering design and production of systems deployed for the treatment of storm water runoff and which have a history of successful production, acceptable to the engineer of record and/or the approving jurisdiction. The manufacturer of the Filterra® bioretention system shall be, without exception:
- Contech Engineered Solutions, LLC
9025 Centre Pointe Drive, West
Chester, OH 45069
1 800 338 1122
- F. Applicable provisions of any division shall govern work in this section.
- G. American society for testing and materials (ASTM) reference specifications:
1. ASTM C857: standard practice for minimum structural design loading for underground precast concrete utility structures
 2. ASTM C858: standard specification of underground precast concrete utility structures
 3. ASTM C990: standard specification for joints for precast box sections using preformed flexible joint sealants
 4. ASTM C109: standard test method for compressive strength of hydraulic cement mortars
- H. Manufacturer or authorized supplier to submit shop drawings for bioretention system with the vault, engineered biofiltration media and accessory equipment. Drawings shall include principal dimensions, engineered biofiltration media placement, location of piping and unit foundation.
1. Manufacturer or authorized supplier shall submit installation instructions to the contractor.
 2. Manufacturer or authorized supplier shall submit operations and maintenance manual to the contractor.
 3. Before installation of the bioretention system, contractor shall obtain the written approval of the engineer of record for the system drawings.

1. No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the engineer of record. Submissions for substitutions require review and approval by the engineer of record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the engineer of record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

2.2 MATERIALS

- A. All internal components including engineered biofiltration media, underdrain stone, PVC underdrain piping, mulch, dissipation stone, and vegetation must be included as part of the bioretention system and shall be provided by Contech Engineered Solutions LLC.
 1. Engineered biofiltration media shall consist of both organic and inorganic components. Stormwater shall be directed to flow vertically through the media profile, saturating the full media profile without downstream flow control.
 2. Underdrain stone shall be of size and shape to provide adequate bridging between the media and stone for the prevention of migration of fine particles. Underdrain stone must also be able to convey the design flow rate of the system without restriction and be approved for use in the Filterra® bioretention system by Contech Engineered Solutions LLC.
 3. PVC underdrain piping shall be SDR35 with perforation pattern designed to convey system design flow rate without restriction.
 4. Mulch shall be double shredded wood or bark mulch approved for use with the Filterra® bioretention system by Contech Engineered Solutions LLC.
 5. Vegetation shall comply with the type and size required by the approved drawings and shall be alive and free of obvious signs of disease.
 6. Dissipation stone shall be 3"-6" diameter washed stones or cobbles.
- B. Precast concrete vault shall be provided by manufacturer or authorized supplier according to ASTM C857 and C858.
 1. Vault joint sealant shall be Con Seal CS-101 or approved equal. Joints shall be sealed with preformed joint sealing compound conforming to ASTM C 990.
 2. If interior concrete baffle walls are provided, baffle walls shall be cast-in or sealed to the interior vault walls and floor with a polyurethane construction sealant rated for use below the waterline, Sikaflex 1A or equal. Contractor to provide sealant material and installation unless completed prior to shipment.

- C. Tree grates and access covers shall be cast iron. Tree grate frames shall be galvanized steel.
- D. Curb nosing (where applicable) shall be galvanized steel and where specified shall be cast into a top slab designed to support AASHTO HS-20 loading at the curb.
- E. All Contractor-provided components shall meet the requirements of this section, the plans specifications and contract documents. In the case of conflict, the more stringent specification shall apply.
 - 1. Crushed rock base material shall be six-inch minimum layer of ¾-inch minus rock.
 - 2. Compact undisturbed sub-grade materials to 95% of maximum density at +/-2% of optimum moisture content. Unsuitable material below sub-grade shall be replaced to engineer's approval.
 - 3. Concrete shall have an unconfined compressive strength at 28 days of at least 3000 psi, with ¾-inch round rock, a 4-inch slump maximum, and shall be placed within 90 minutes of initial mixing.
 - 4. Silicone sealant shall be pure RTV silicone conforming to federal specification number TT S001543A or TT S00230C or engineer approved.
 - 5. Grout shall be non-shrink grout meeting the requirements of Corps of Engineers CRD-C588. Specimens molded, cured and tested in accordance with ASTM C-109 shall have minimum compressive strength of 6,200 PSI. Grout shall not exhibit visible bleeding.
 - 6. Backfill material shall be ¾-inch minus crushed rock or approved equal.

2.3 PERFORMANCE

- A. Treatment capabilities shall be verified via third-party reports following tape or tarp protocols.
 - 1. Engineered biofiltration media flow rate shall be verified via third-party report following tape or tarp protocols. The minimum treatment flow rate based on target pollutant shall be as follows:

TSS: 100"/hr
Phosphorus: 100"/hr
oil/grease: 50"/hr
metals: 35"/hr

The system shall be designed to ensure that high flow events shall bypass the engineered biofiltration media preventing erosion and resuspension of pollutants.

- 2. The system shall remove a minimum of 86% total suspended solids (TSS) based on aggregated data from at least four third party field studies following tape or tarp protocols. Aggregated median effluent concentration shall be less than 3.3 mg/l.

3. The system shall remove a minimum of 70% total phosphorus (TP) based on aggregated data from at least two third party field studies following tape protocols. Aggregated median effluent concentration shall be less than 0.05 mg/l.
 4. The system shall remove a minimum of 34% total nitrogen (TN) based on aggregated data from at least one third party field study following tape or tarp protocols. Aggregated median effluent concentration shall be less than 0.54 mg/l.
 5. The system shall remove a minimum of 55% total copper based on aggregated data from at least two third party field studies following tape or tarp protocols. Aggregated median effluent concentration shall be less than 0.004 mg/l.
 6. The system shall remove a minimum of 43% dissolved copper based on aggregated data from at least one third party field study following tape or tarp protocols. Aggregated median effluent concentration shall be less than 0.003 mg/l.
 7. The system shall remove a minimum of 56% total zinc based on aggregated data from at least three third party field studies following tape or tarp protocols. Aggregated median effluent concentration shall be less than 0.04 mg/l.
 8. The system shall remove a minimum of 54% dissolved zinc based on aggregated data from at least one third party field study following tape or tarp protocols. Aggregated median effluent concentration shall be less than 0.003 mg/l.
 9. The system shall remove a minimum of 87% total petroleum hydrocarbons based on aggregated data from at least one third party field study following tape or tarp protocols. Aggregated median effluent concentration shall be less than 0.71 mg/l.
- B. The system shall have general use level designation from Washington Department of Ecology for Basic (TSS), phosphorus, enhanced (metals), and oil/grease and have certification by New Jersey Department of Environment.
- C. Quality assurance and quality control procedures shall be followed for all batches of engineered biofiltration media produced. Engineered biofiltration media shall be certified by the manufacturer for performance and composition.
1. Media particle size distribution and composition shall be verified as per relevant ASTM standards.
 2. Media pollutant removal performance shall be verified as per relevant ASTM standards as well as a minimum of one scientific method approved by the USEPA.
 3. Media hydraulic performance shall be verified as per relevant ASTM standards.
 4. Media fertility shall be verified as per a minimum of one published scientific method.
- D. The manufacturer shall ensure through third-party full-scale field testing of installed units that the design flow rate of the system is not reduced over time. Studies shall be performed on a minimum of 10 systems of various ages, maintenance frequencies, and land uses. At least 80% of the tested systems shall have been installed 2.5 or more years. At least 50% of the systems

shall have previous maintenance intervals greater than 2 times the manufacturer's recommendation.

PART 3 - EXECUTION

3.1 GENERAL

- A. Set precast vault on crushed rock base material that has been placed in maximum 6-inch lifts, loose thickness, and compacted to at least 95-percent of the maximum dry density as determined by the standard proctor compaction test, ASTM D698, at moisture content of +/- 2% of optimum water content.
- B. Inlet and outlet pipes shall be attached to provided couplers or grouted in and connected to precast concrete vault according to engineer's requirements and specifications. All connections to be water-tight.
- C. All throat and grate protection covers shall remain in place until the system is activated.
- D. Contractor to cast-in-place throat inlet to convey stormwater into bioretention system according to engineer's requirements and specifications.
- E. Engineered biofiltration media shall be delivered installed in the vault, unless otherwise agreed upon with the manufacturer. Contractor shall take appropriate action to protect the media from sediment and other debris during construction. The method ultimately selected shall be at contractor's discretion and contractor's risk.
 1. If media is shipped separately from vault, manufacturer or a manufacturer's certified representative shall install media into the vault or be present to supervise installation in order to ensure proper installation.
- F. The bioretention system shall not be placed in operation (activated) until the project site is clean and stabilized (construction erosion control measures no longer required). The project site includes any surface that contributes storm drainage to the system. All impermeable surfaces shall be clean and free of dirt and debris. All catch basins, manholes and pipes shall be free of dirt and sediment. Activation shall be provided by manufacturer or authorized supplier.
- G. Each correctly installed system shall be maintained by manufacturer or authorized supplier for a minimum period of one year. The cost of this service shall be included in the price of the system.
 1. Annual maintenance consists of a maximum of two [2] scheduled visits.
 2. Each routine maintenance visit shall consist of only the following items: system inspection; removal of foreign debris, silt, loose plant material and trash; mulch removal; engineered biofiltration media evaluation; plant health evaluation and pruning; replacement of mulch; disposal of all maintenance refuse items; and updating of maintenance records

PART 4 – QUALITY ASSURANCE

4.1 GENERAL

- A. To ensure long term performance of the bioretention system, continuing annual maintenance programs should be performed or purchased by the owner per the latest Filterra® bioretention system operation and maintenance manual.

END OF SECTION

Operation & Maintenance (OM) Manual v01



filterterra[®]
Bioretention Systems

C NTECH[™]
ENGINEERED SOLUTIONS



Table of Contents

Overview

- Filterra® General Description
- Filterra® Schematic
- Basic Operations
- Design

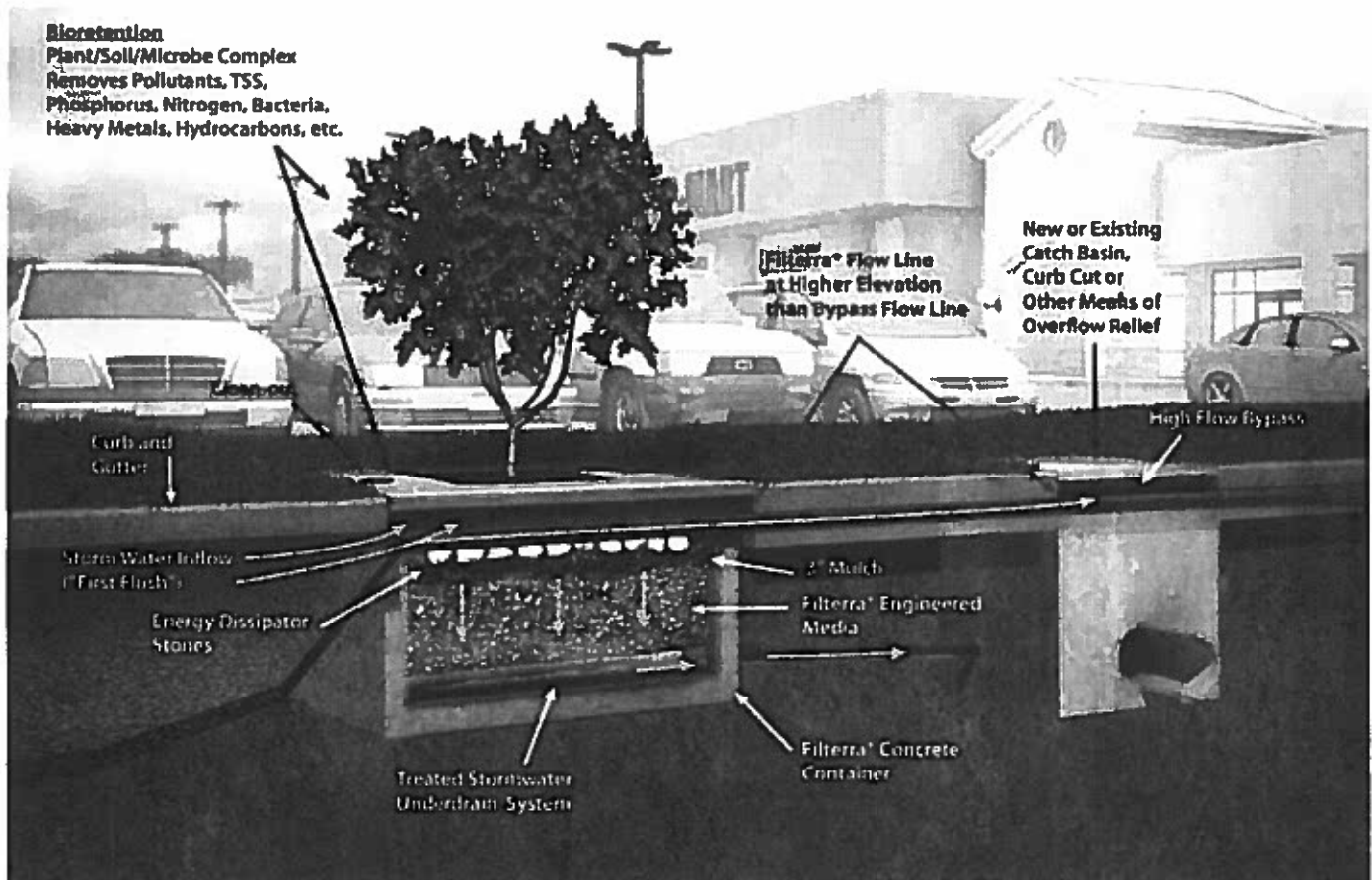
Maintenance

- Maintenance Overview
 - » Why Maintain?
 - » When to Maintain?
- Exclusion of Services
- Maintenance Visit Summary
- Maintenance Tools, Safety Equipment and Supplies
- Maintenance Visit Procedure
- Maintenance Checklist



General Description

The following general specifications describe the general operations and maintenance requirements for the Contech Engineered Solutions LLC stormwater bioretention filtration system, the Filterra®. The system utilizes physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban stormwater runoff. The treatment system is a fully equipped, pre-constructed drop-in place unit designed for applications in the urban landscape to treat contaminated runoff.



Stormwater flows through a specially designed filter media mixture contained in a landscaped concrete container. The mixture immobilizes pollutants which are then decomposed, volatilized and incorporated into the biomass of the Filterra® system's micro/macro fauna and flora. Stormwater runoff flows through the media and into an underdrain system at the bottom of the container, where the treated water is discharged. Higher flows bypass the Filterra® to a downstream inlet or outfall. Maintenance is a simple, inexpensive and safe operation that does not require confined space access, pumping or vacuum equipment or specialized tools. Properly trained landscape personnel can effectively maintain Filterra® Stormwater systems by following instructions in this manual.

Basic Operations

Filterra® is a bioretention system in a concrete box. Contaminated stormwater runoff enters the filter box through the curb inlet spreading over the 3-inch layer of mulch on the surface of the filter media. As the water passes through the mulch layer, most of the larger sediment particles and heavy metals are removed through sedimentation and chemical reactions with the organic material in the mulch. Water passes through the soil media where the finer particles are removed and other chemical reactions take place to immobilize and capture pollutants in the soil media. The cleansed water passes into an underdrain and flows to a pipe system or other appropriate discharge point. Once the pollutants are in the soil, the bacteria begin to break down and metabolize the materials and the plants begin to uptake and metabolize the pollutants. Some pollutants such as heavy metals, which are chemically bound to organic particles in the mulch, are released over time as the organic matter decomposes to release the metals to the feeder roots of the plants and the cells of the bacteria in the soil where they remain and are recycled. Other pollutants such as phosphorus are chemically bound to the soil particles and released slowly back to the plants and bacteria and used in their metabolic processes. Nitrogen goes through a very complex variety of biochemical processes where it can ultimately end up in the plant/bacteria biomass, turned to nitrogen gas or dissolves back into the water column as nitrates depending on soil temperature, pH and the availability of oxygen. The pollutants ultimately are retained in the mulch, soil and biomass with some passing out of the system into the air or back into the water.

Design and Installation

Each project presents different scopes for the use of Filterra® systems. To ensure the safe and specified function of the stormwater BMP, Contech reviews each application before supply. Information and help may be provided to the design engineer during the planning process. Correct Filterra® box sizing (by rainfall region) is essential to predict pollutant removal rates for a given area. The engineer shall submit calculations for approval by the local jurisdiction. The contractor is responsible for the correct installation of Filterra units as shown in approved plans. A comprehensive installation manual is available at www.conteches.com.

Maintenance

Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement.

- Avoid legal challenges from your jurisdiction's maintenance enforcement program.
- Prolong the expected lifespan of your Filterra media.

- Avoid more costly media replacement.
- Help reduce pollutant loads leaving your property.

Simple maintenance of the Filterra® is required to continue effective pollutant removal from stormwater runoff before discharge into downstream waters. This procedure will also extend the longevity of the living biofilter system. The unit will recycle and accumulate pollutants within the biomass, but is also subjected to other materials entering the throat. This may include trash, silt and leaves etc. which will be contained within the void below the top grate and above the mulch layer. Too much silt may inhibit the Filterra's® flow rate, which is the reason for site stabilization before activation. Regular replacement of the mulch stops accumulation of such sediment.

When to Maintain?

Contech includes a 1-year maintenance plan with each system purchase. Annual included maintenance consists of a maximum of two (2) scheduled visits. Additional maintenance may be necessary depending on sediment and trash loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated for full operation. Full operation is defined as the unit installed, curb and gutter and transitions in place and activation (by Supplier) when mulch and plant are added and temporary throat protection removed.

Activation cannot be carried out until the site is fully stabilized (full landscaping, grass cover, final paving and street sweeping completed). Maintenance visits are scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands while the fall visit helps the system by removing excessive leaf litter.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally required; regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency; e.g. some fast food restaurants require more frequent trash removal. Contributing drainage areas which are subject to new development wherein the recommended erosion and sediment control measures have not been implemented may require additional maintenance visits.

Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the Supplier and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the (maintenance) Supplier of any damage to the plant(s), which constitute(s) an integral part of the bioretention technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance to the Supplier (i.e. no pruning or fertilizing).

Exclusion of Services

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant of the Filterra® system.

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the Supplier maintenance contract. Should a major contamination event occur the Owner must block off the outlet pipe of the Filterra® (where the cleaned runoff drains to, such as drop inlet) and block off the throat of the Filterra®. The Supplier should be informed immediately.

Maintenance Visit Summary

Each maintenance visit consists of the following simple tasks (detailed instructions below).

1. Inspection of Filterra® and surrounding area
2. Removal of tree grate and erosion control stones
3. Removal of debris, trash and mulch
4. Mulch replacement
5. Plant health evaluation and pruning or replacement as necessary
6. Clean area around Filterra®
7. Complete paperwork

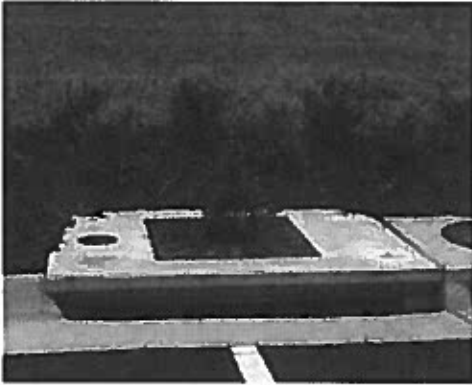
Maintenance Tools, Safety Equipment and Supplies

Ideal tools include: camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing and barricades when working in close proximity to traffic and also safety hats and shoes. A T-Bar or crowbar should be used for moving the tree grates (up to 170 lbs ea.). Most visits require minor trash removal and a full replacement of mulch. See below for actual number of bagged mulch that is required in each unit size. Mulch should be a double shredded, hardwood variety; do not use colored or dyed mulch. Some visits may require additional Filterra® engineered soil media available from the Supplier.

Box Length	Box Width	Filter Surface Area (ft ²)	Volume at 3" (ft ³)	# of 2 ft ³ Mulch Bags
4	4	16	4	2
6	4	24	6	3
8	4	32	8	4
6	6	36	9	5
8	6	48	12	6
10	6	60	15	8
12	6	72	18	9
13	7	91	23	12

Maintenance Visit Procedure

Keep sufficient documentation of maintenance actions to predict location specific maintenance frequencies and needs. An example Maintenance Report is included in this manual.



1. Inspection of Filterra® and surrounding area

- Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

Record on Maintenance Report the following:

Standing Water	yes		no
Damage to Box Structure	yes		no
Damage to Grate	yes		no
Is Bypass Clear	yes		no

If yes answered to any of these observations, record with close-up photograph (numbered).



2. Removal of tree grate and erosion control stones

- Remove cast iron grates for access into Filterra® box.
- Dig out silt (if any) and mulch and remove trash & foreign items.

Record on Maintenance Report the following:

Silt/Clay	yes		no
Cups/ Bags	yes		no
Leaves	yes		no
# of Buckets Removed			_____



3. Removal of debris, trash and mulch

- After removal of mulch and debris, measure distance from the top of the Filterra® engineered media soil to the bottom of the top slab. If this distance is greater than 12", add Filterra® media (not top soil or other) to recharge to a 9" distance

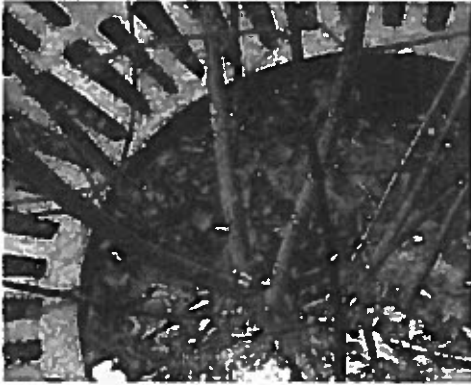
Record on Maintenance Report the following:

Distance of Bottom of Top Slab (inches)	_____
# of Buckets of Media Added	_____



4. Mulch replacement

- Please see mulch specifications.
- Add double shredded mulch evenly across the entire unit to a depth of 3".
- Ensure correct repositioning of erosion control stones by the Filterra® inlet to allow for entry of trash during a storm event.
- Replace Filterra® grates correctly using appropriate lifting or moving tools, taking care not to damage the plant.



5. Plant health evaluation and pruning or replacement as necessary

- Examine the plant's health and replace if dead.
- Prune as necessary to encourage growth in the correct directions

Record on Maintenance Report the following:

Height above Grate	_____	(ft)
Width at Widest Point	_____	(ft)
Health		alive dead
Damage to Plant		yes no
Plant Replaced		yes no



6. Clean area around Filterra®

- Clean area around unit and remove all refuse to be disposed of appropriately.



7. Complete paperwork

- Deliver Maintenance Report and photographs to appropriate location (normally Contech during maintenance contract period).
- Some jurisdictions may require submission of maintenance reports in accordance with approvals. It is the responsibility of the Owner to comply with local regulations.

Maintenance Checklist

Drainage System Failure	Problem	Conditions to Check	Condition that Should Exist	Actions
Inlet	Excessive sediment or trash accumulation.	Accumulated sediments or trash impair free flow of water into Filterra.	Inlet should be free of obstructions allowing free distributed flow of water into Filterra.	Sediments and/or trash should be removed.
Mulch Cover	Trash and floatable debris accumulation.	Excessive trash and/or debris accumulation.	Minimal trash or other debris on mulch cover.	Trash and debris should be removed and mulch cover raked level. Ensure bark nugget mulch is not used.
Mulch Cover	"Ponding" of water on mulch cover.	"Ponding" in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils.	Stormwater should drain freely and evenly through mulch cover.	Recommend contact manufacturer and replace mulch as a minimum.
Vegetation	Plants not growing or in poor condition.	Soil/mulch too wet, evidence of spill. Incorrect plant selection. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Contact manufacturer for advice.
Vegetation	Plant growth excessive.	Plants should be appropriate to the species and location of Filterra.		Trim/prune plants in accordance with typical landscaping and safety needs.
Structure	Structure has visible cracks.	Cracks wider than 1/2 inch or evidence of soil particles entering the structure through the cracks.		Vault should be repaired.

Maintenance is ideally to be performed twice annually.



Exhibit D

Bioretention Filter and Planter Bed Maintenance Specifications

Maintenance of the Bioretention Filter

First Year Maintenance Operations: Successful establishment of bioretention areas requires that the following tasks be undertaken in the first year following installation:

- **Initial inspections:** For the first 6 months following construction, the site should be inspected at least twice after storm events that exceed 1/2 inch of rainfall.
- **Spot Reseeding:** Inspectors should look for bare or eroding areas in the contributing drainage area or around the bioretention area, and make sure they are immediately stabilized with grass cover.
- **Fertilization:** One-time, spot fertilization may be needed for initial plantings.
- **Watering:** Watering is needed once a week during the first 2 months, and then as needed during the first growing season (April-October), depending on rainfall.
- **Remove and replace dead plants:** Since up to 10% of the plant stock may die off in the first year, construction contracts should include a care and replacement warranty to ensure that vegetation is properly established and survives during the first growing season following construction. The typical thresholds below which replacement is required are 85% survival of plant material and 100% survival of trees.

Long-Term Maintenance Operations: Maintenance of bioretention areas should be integrated into routine landscape maintenance tasks. Long-term maintenance tasks and their respective frequencies can be found below.

- **As Needed:**
 - **Reinforcement Planting:** In the event the vegetation density in the bioretention basin deteriorates, additional plantings that correspond with those listed on the original design plans should be replanted. This maintenance task should be completed as needed.
 - **Weeding:** If invasive species or weeds are found in the bioretention basin, they should be removed. This maintenance task should be completed as needed but it is recommended that it occur at least twice during the regional growing season.
 - **Erosion Repair:** If areas of minor erosion are found in the bioretention basin, they should be stabilized with the appropriate cover material. This maintenance task should be completed as needed but it is recommended that it occur twice during the regional growing season.

- **Trash Removal:** If trash is found in the basin it should be removed. This maintenance task should be completed as needed but it is recommended that it occur annually.
- **Mulch Raking:** In the event mulch has been displaced, it should be raked to the appropriate cover depth (3'). This maintenance task should be completed as needed but it is recommended that it occur at least twice during the regional growing season (April-October).
- **Annually:**
 - **Mulch Supplements:** The mulch layer should be supplemented annually to maintain a 3' layer.
 - **Vegetative Pruning:** Trees and shrubs within the bioretention basin should be pruned annually.
 - **Inspections:** An annual inspection of the bioretention basin should be completed during the Spring. Please refer to the Maintenance Inspection Checklist located in the Maintenance Plan.

Maintenance of the Planter Beds

First Year Maintenance Operations: Successful establishment of vegetation and street trees require that the following tasks be undertaken in the first year following installation:

- **Initial inspections:** Inspect vegetation and street trees at least twice for the first 6 months following construction. This should coincide with the Bioretention Basin inspections if possible.
- **Spot Reseeding:** Inspectors should look for bare or eroding areas within the planters and make sure they are immediately stabilized with topsoil and mulch consistent with the original design plans.
- **Fertilization:** One-time, spot fertilization may be needed for initial plantings.
- **Watering:** Watering is needed once a week during the first 2 months, and then as needed during first growing season (April-October), depending on rainfall.
- **Remove and replace dead plants:** Since up to 10% of the plant stock may die off in the first year, construction contracts should include a care and replacement warranty to ensure that vegetation is properly established and survives during the first growing season following construction.

Long-Term Maintenance Operations: Maintenance of planters and street trees should be integrated into routine landscape maintenance tasks. The recommended long-term maintenance tasks and their respective frequencies can be found below.

- **As Needed:**
 - **Reinforcement Planting:** In the event the vegetation in the planters deteriorates, additional plantings that correspond with those listed on the

original design plans should be replanted. This maintenance task should be completed as needed but is recommended that it occur twice during the regional growing season.

- **Weeding:** If invasive species or weeds are found in the planters, they should be removed. This maintenance task should be completed as needed but it is recommended that it occur twice during the regional growing season.
 - **Erosion Repair:** If areas of minor erosion are found in the planters, they should be stabilized with topsoil and mulch in accordance with the original design plans. This maintenance task should be completed as needed but it is recommended that it occur twice during the regional growing season.
 - **Trash Removal:** If trash is found in the planters it should be removed. This maintenance task should be completed as needed but it is recommended that it occur annually.
 - **Topsoil & Mulch Raking:** In the event topsoil or mulch has been displaced, it should be raked to the appropriate cover depth listed on the original design plans. This maintenance task should be completed as needed but it is recommended that it occur twice during the regional growing season.
- **Annually:**
 - **Vegetative Pruning:** Trees and shrubs should be pruned annually.
 - **Inspections:** Annual inspections of the planters and street trees are not required but are recommended and if performed, should be completed during the Spring. Please refer to the Maintenance Inspection Checklist located in the Maintenance Plan.
 - **Every 2-3 Years:**
 - **Sediment & Debris Removal:** Sediment and excessive vegetative debris (leaves, twigs, grass clippings, etc.) should be removed once every 2-3 years from the planters to prevent vegetative die-off.

Exhibit E

Bellemeade Green Street Improvements

SITE DATA

DRAWN: JAMES FINN ASSOCIATES
 211 ROCKETTS WAY, SUITE 200
 RICHMOND VA 23271
 CONTACT NUMBER 804.676.6514
 PHONE 804.788-8913
 EMAIL: JFINN@JFAA.COM

INTEGRITY: TRINACRO GROUP
 1300 BUCKLE UP DRIVE, SUITE 300
 MEADOWS VA 23125
 CONTACT ANDREW LABEL
 PHONE 804.320-6651
 EMAIL: ANDREW@TRINACRO.COM

ARCHITECT: INCRTH
 201 WEST FIFTH STREET
 RICHMOND VA 23220
 CONTACT ANDREA ALMOND
 PHONE 804.322-6800
 EMAIL: ANDREA@INCRTH.COM

SCIENCE TEST:
 50 FEET HEIGHT OF MAT: 0.14 ACRES @ 145.6 SF
 50 FEET ON PAVED AREA
 TOTAL SQ FOOTAGE: 0.14 ACRES @ 145.6 SF

UTILITIES:
 CITY WATER: YES NO
 CITY SEWER: [] []
 OTHER: [] []

FLOOD PLAIN INFORMATION:
 500 YEAR FLOODPLAIN: YES NO
 FLOOD ZONE: [] []
 FIRM MAP #:
 DATE: 08-19-2014

TRAINING IN THE AREA:
 SURVEYED BY: MARC C. SHACKER, L.S.
 DATE OF SURVEY: 08-19-17
 DATE: 08-19-2017

TRANSITS STUDY NO.: YES NO
 [] []

ZONING:
 PARCEL ID: 144
 ZONING: R-10
 EXISTING USE: RESIDENTIAL
 PROPOSED USE: COMMERCIAL

ADDRESS: 500 WEST STREET # 400 - 402
 STREET TO JUMP STREET IN VIRGINIA
 VA 23244

NEIGHBORHOOD: ALMAHIN STREETS PERMIT RAMP
 PERMIT

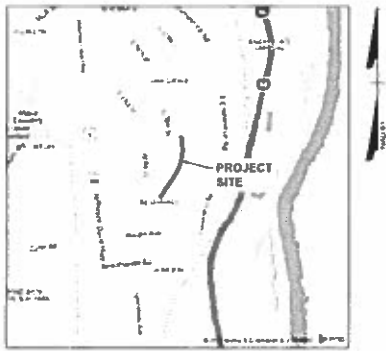
SEC: R-10 ZONING, APPROVED 08/19/2016
 FEBRUARY 11, 2019

DEC: APPROVED FEBRUARY 19, 2019

CITY OF RICHMOND, VIRGINIA
DEPARTMENT OF PUBLIC UTILITIES



PROPOSED IMPROVEMENTS IN THE CITY OF RICHMOND
BELLEMEADE GREEN STREET IMPROVEMENTS



SHEET INDEX

SHEET NUMBER	SHEET TITLE
C05	CLEAR SHEET
C06	CONSTRUCTION NOTES & DETAILS
C11	CONSTRUCTION NOTES & DETAILS
C12	CONSTRUCTION NOTES & DETAILS
C13	CONSTRUCTION NOTES & DETAILS
C14	CONSTRUCTION NOTES & DETAILS
C15	CONSTRUCTION NOTES & DETAILS
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C68	CONSTRUCTION NOTES & DETAILS
C69	CONSTRUCTION NOTES & DETAILS
C70	CONSTRUCTION NOTES & DETAILS

STONE QUANTITY

DESCRIPTION	QUANTITY	UNIT
1/2" - 1" GRANITE CURB	117	LF
1/2" - 1" GRANITE CURB	117	LF
1/2" - 1" GRANITE CURB	117	LF
1/2" - 1" GRANITE CURB	117	LF
1/2" - 1" GRANITE CURB	117	LF
1/2" - 1" GRANITE CURB	117	LF
1/2" - 1" GRANITE CURB	117	LF
1/2" - 1" GRANITE CURB	117	LF
1/2" - 1" GRANITE CURB	117	LF
1/2" - 1" GRANITE CURB	117	LF

EROSION AND SEDIMENT CONTROL QUANTITIES

LABEL	SYMBOL	STD NAME	SPEC #	QUANTITY
SF	(Symbol)	SALT FENCE	305	51 LF
P	(Symbol)	PAET PROJECT	307	11 EA

STORMWATER MANAGEMENT FACILITY DATA

Stormwater Management Facility Name	Stormwater Management Facility Location	Location	Area Treated by Facility	Stormwater Treatment Facility	Inlet	Outlet	Flowrate	Flowrate	Flowrate	Flowrate	Flowrate	Flowrate	Flowrate	Flowrate	Flowrate	Flowrate
Manufactured Treatment Wetland	Richmond	77 03%	0.21	0.00	0.00	262	421	James Booth	Public							
Detention Pond	Richmond	77 03%	0.13	0.04	0.63	817	883	James Booth	Public							
Retention Pond	Richmond	77 03%	0.50	0.17	0.47	3000	883	James Booth	Public							
Retention Pond	Richmond	77 03%	1.05	1.11	2.17	2855	883	James Booth	Public							

CITY OF RICHMOND IMPROVEMENTS

DATE	APPROVED FOR CONSTRUCTION
DATE	CHEF OF CONSTRUCTION & BCW
DATE	PARKING MANAGER
DATE	CITY TRAFFIC ENGINEER
DATE	SURVEY SUPERVISOR
DATE	GPU GAS
DATE	GPU STREETLIGHTS
DATE	GPU STORMWATER
DATE	GPU WATER
DATE	GPU WASTE WATER
DATE	GPU URBAN FORESTRY

TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
 BELLEMEADE DISTRICT - RICHMOND - VIRGINIA

COVER SHEET

JOB NO. 19986
SHEET NO. C0.0

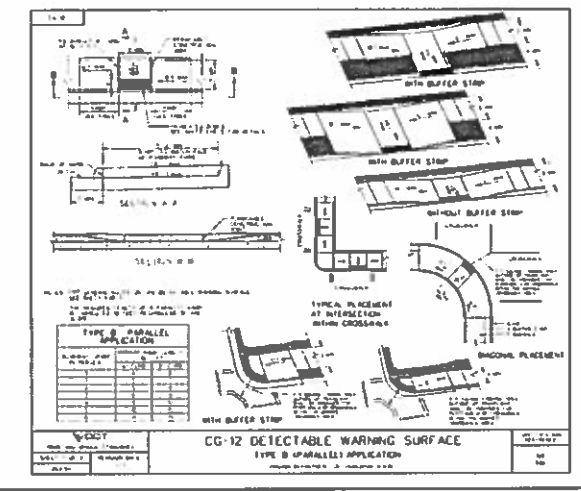
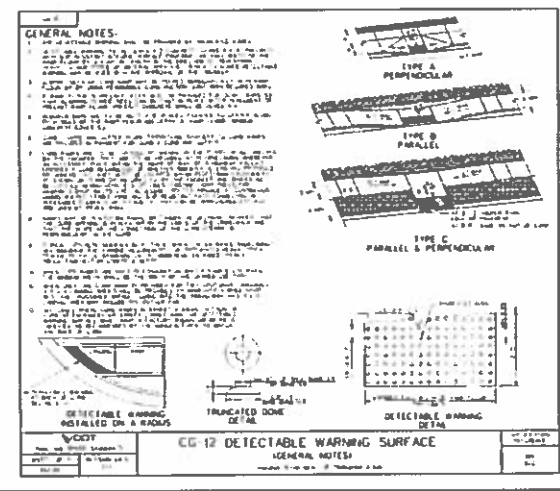
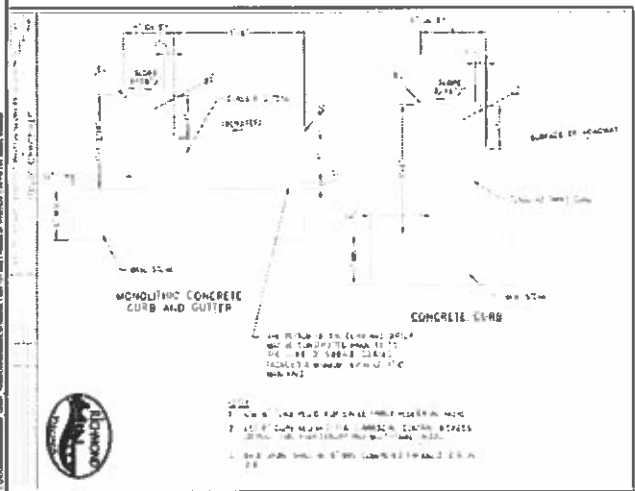
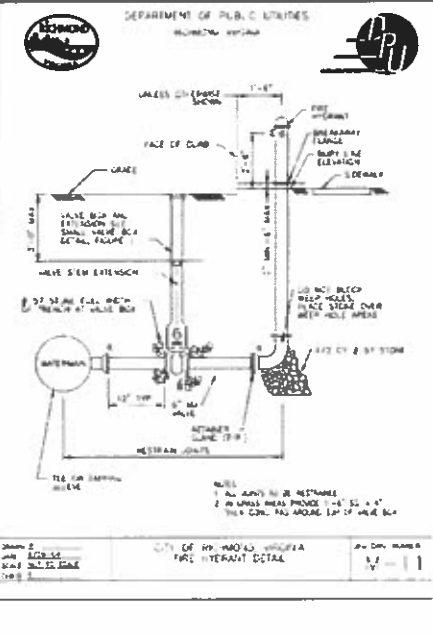
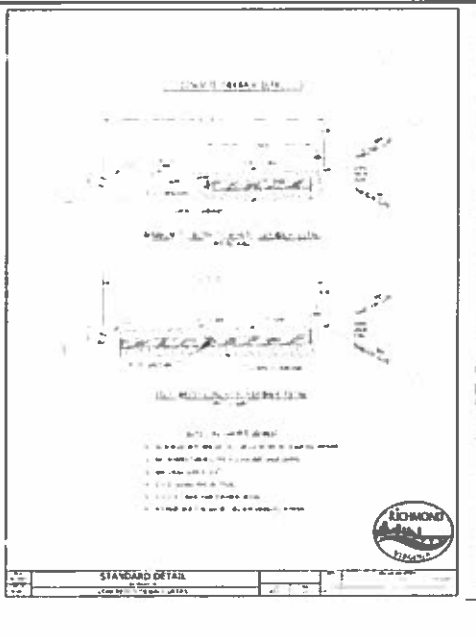
DATE: 2-15-2019
 DRAWN BY: JAMES FINN
 CHECKED BY: JAMES FINN
 DATE: 2-15-2019
 SCALE: AS SHOWN

- GENERAL NOTES**
- THIS PROJECT IS PROPOSED BY JAMES RIVER ASSOCIATION, 215 RICHMOND BLVD, SUITE 200, RICHMOND, VA 23221. CONTACT: JAMES ELLIS, PHONE: (800) 768-8511, EMAIL: JELLS@JRAV.COM.
 - ENGINEER OF RECORD: TIMMONS GROUP, 1001 BOULDER PARKWAY, RICHMOND, VA 23229. CONTACT: ANDREW CRESK, PHONE: (800) 300-4442, EMAIL: ANDREW@TIMMONSGROUP.COM.
 - NUMBER OF LOTS AFFECTED BY THIS PROJECT: 5.
 - LIMITS OF DISTURBANCE: 8' x 14'.
 - WETLAND IMPACTS: NONE.
 - TAX PARCEL NUMBER: SEE PLAN SHEETS.
 - EXISTING USE OF PROPERTY THROUGHOUT PROJECT IS PROPOSED SINGLE FAMILY RESIDENTIAL AND RESIDENTIAL TOURISM.
 - DRP INFRASTRUCTURE THAT REQUIRES GRADE ADJUSTMENTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR WITH DRP INSPECTOR APPROVAL.
 - CONSTRUCT THIS PROJECT IN ACCORDANCE WITH THE MOST RECENT CITY OF RICHMOND BUDGET OF ROAD EXCAVATION AND RESTORATION MANUAL. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM WITH THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS DATED 2018 AND ROAD AND BRIDGE STANDARDS DATED 2018 AS AMENDED BY CONTRACT PROVISIONS AND SPECIAL NOTES. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM WITH CITY OF RICHMOND STANDARDS AND SPECIFICATIONS IF MORE STRINGENT.
 - PROPOSED IMPROVEMENTS SHALL CONFORM WITH THE AMERICAN WITH DISABILITIES ACT INCLUDING ALL APPLICABLE CODES AND STANDARDS.
 - ALL DRIVEWAYS, STREET SIGNS AND SIGNS AS SPECIFIED ARE TO BE RESTORED TO ORIGINAL CONDITION AS DIRECTED BY CITY OF RICHMOND DEPARTMENT OF PUBLIC UTILITIES.
 - STREET SIGNS AND MARKINGS SHALL BE REPLACED IMMEDIATELY AFTER AREA IS BACKFILLED AND NO LATER THAN THE CLOSE OF EACH WORK DAY. EVEN IF REPLACEMENT IS ONLY TEMPORARY.
 - SAFE PEDESTRIAN AND VEHICULAR ACCESS TO HOMES SHALL BE PROVIDED AT ALL TIMES.
 - SURVEY NOTES:
 - 11.1 HORIZONTAL DATUM IS BASED ON NAD 83. VERTICAL DATUM IS BASED ON NAVD 83. VIRGINIA STATE GRID SOUTH ZONE. THE DATUM WAS ESTABLISHED THROUGH A GPS CONTROL STATION. THE DATA WAS OBTAINED BETWEEN 07/17/17 AND 07/21/17.
 - 11.2 UNDERGROUND UTILITIES WERE MARKED BY TIMMONS GROUP AND COMPLETED ON/ABOUT IMPACTANT NOTE. THERE MAY BE ADDITIONAL GAS, WATER AND SEWER LINES ON SITE THAT COULD NOT BE LOCATED.

LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
1	EXISTING DRIVE	2	PROPOSED DRIVE
3	EXISTING SIDEWALK	4	PROPOSED SIDEWALK
5	EXISTING CURB	6	PROPOSED CURB
7	EXISTING UTILITY	8	PROPOSED UTILITY
9	EXISTING SIGN	10	PROPOSED SIGN
11	EXISTING MARKING	12	PROPOSED MARKING
13	EXISTING STRUCTURE	14	PROPOSED STRUCTURE
15	EXISTING FENCE	16	PROPOSED FENCE
17	EXISTING WALL	18	PROPOSED WALL
19	EXISTING POLE	20	PROPOSED POLE
21	EXISTING TRUNK	22	PROPOSED TRUNK
23	EXISTING TIE	24	PROPOSED TIE
25	EXISTING MANHOLE	26	PROPOSED MANHOLE
27	EXISTING VALVE	28	PROPOSED VALVE
29	EXISTING BOX	30	PROPOSED BOX
31	EXISTING CHUTE	32	PROPOSED CHUTE
33	EXISTING RAMP	34	PROPOSED RAMP
35	EXISTING CURB CUT	36	PROPOSED CURB CUT
37	EXISTING DRIVEWAY	38	PROPOSED DRIVEWAY
39	EXISTING SIDEWALK CUT	40	PROPOSED SIDEWALK CUT
41	EXISTING SIDEWALK PATCH	42	PROPOSED SIDEWALK PATCH
43	EXISTING SIDEWALK CUT	44	PROPOSED SIDEWALK CUT
45	EXISTING SIDEWALK PATCH	46	PROPOSED SIDEWALK PATCH
47	EXISTING SIDEWALK CUT	48	PROPOSED SIDEWALK CUT
49	EXISTING SIDEWALK PATCH	50	PROPOSED SIDEWALK PATCH

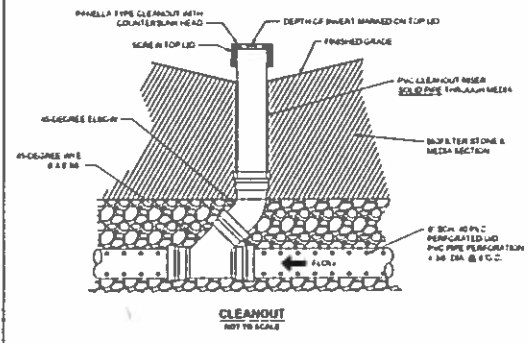
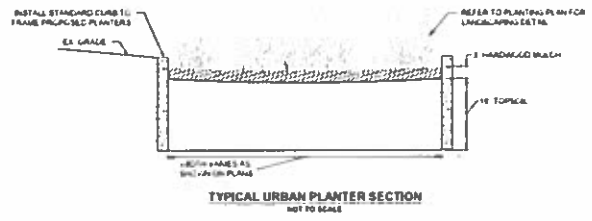
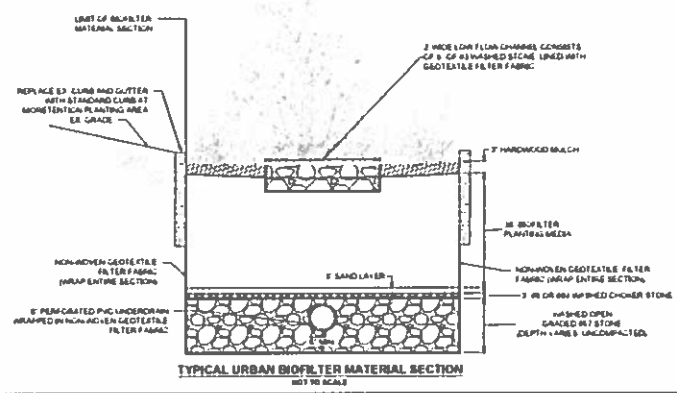
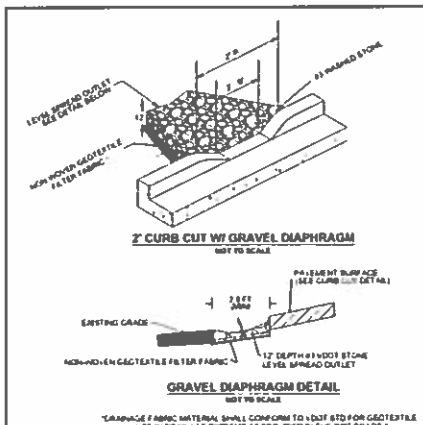
- DEMOLITION & CONSTRUCTION SEQUENCE**
- ALL WORK ON ACTIVE WAYS INCLUDING THE RELOCATION OF THE FIRE HYDRANT MUST OCCUR BY DRP PRIOR TO CONSTRUCTION.
 - ACQUIRE ALL PERMITS PRIOR TO CONSTRUCTION. ALL FEES ASSOCIATED WITH PERMITS SHALL BE PAID BY THE CONTRACTOR UNLESS OTHERWISE SPECIFIED.
 - A PRE-CONSTRUCTION MEETING WITH THE CONTRACTOR, CITY OF RICHMOND DRP & OPEN HOUSE REVIEW ASSOCIATION (OH) MUST BE HELD AND THE ENGINEER IS REQUIRED AT LEAST 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
 - THE CONTRACTOR MUST VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION. NOTIFY THE UTILITY AS APPROPRIATE AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITIES. CONTACT THE ENGINEER IMMEDIATELY IF LOCATION OR DEPTH INFORMATION IS DIFFERENT FROM THAT SHOWN ON THE PLAN OR IF THERE APPEARS TO BE A CLASH. CONTACT THE UTILITY IMMEDIATELY IF ANY UTILITY IS NOT SHOWN ON THE PLAN.
 - NO LAND DISTURBANCES OUTSIDE THE LIMITS OF CONSTRUCTION TO TAKE PLACE UNLESS AUTHORIZED BY THE CONSTRUCTION INSPECTOR.
 - CONTRACTOR TO COORDINATE ALL WORK AROUND EXISTING UTILITIES WITH THE UTILITIES. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. MAINTAIN UNINTERRUPTED UTILITY SERVICE TO ALL ADJACENT PROPERTIES AT ALL TIMES DURING CONSTRUCTION.
 - CONTRACTOR SHALL FENCE SPECIAL CAME WHEN WORKING AROUND SEWERS THAT ARE TO REMAIN TO AVOID DAMAGE BY THE UTILITY. CITY OF RICHMOND 10' DIA - 30" DIA HOLE STA 21108 BEFORE AND AFTER CONSTRUCTION.
 - IF A SERVICE LATERAL IS ENCOUNTERED NOTIFY ENGINEER IMMEDIATELY TO DETERMINE APPROPRIATE FIELD CHANGE (E.G. SLEEPING, REDUCING, RELOCATION) AND/OR ADJUSTMENTS TO THE PLAN.
 - EXISTING FEATURES TO REMAIN THAT ARE DAMAGED BY THE CONTRACTOR MUST BE RESTORED/REPLACED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
 - PROVIDE A DETAILED SCHEDULE AND SEQUENCE OF CONSTRUCTION TO THE OWNER AND ENGINEER PRIOR TO CONSTRUCTION. CONSTRUCTION SEQUENCE CANNOT BE PERFORMED BY A GENERAL LICENSED SURVEYOR.
 - PERFORM CONSTRUCTION SURVEY STAKEOUT FOR PROPOSED IMPROVEMENTS AND CONSTRUCTION LIMITS. ALL SURVEYING OPERATIONS MUST BE PERFORMED BY A VIRGINIA LICENSED SURVEYOR.
 - INSTALL THE ORIGINAL SEWER CONTROL MEASURES BEFORE CELEBRATING ANY LAND DISTURBING ACTIVITIES. REFER TO SHEET C02 FOR EROSION CONTROL AND SLOPE CONTROL PLAN.
 - MARKET EACH PILE AND REMOVE MATERIAL FROM AREAS AS SHOWN ON THE DEMO PLAN TO PREPARE FOR PLANTERS AND SIGNAGE. REMOVE MATERIALS FROM CURBS, RETAINERS, FENCES AND INSTALL PROPOSED CURBS AND SIDEWALKS AS SHOWN. BACKFILL PLANTER AREAS WITH CLEAN FILL TO PROPOSED GRADE. PROVIDE TYPICAL AND DETAIL AS SPECIFIED.
 - MARKET EACH PILE AND REMOVE MATERIAL FROM AREAS AS SHOWN ON PLANS FOR INSTALLATION OF FILTERS. INSTALL DRAINAGE PIPING ON ALL FILTERS UNLESS AS SPECIFIED.
 - DEMOLISH EXISTING FEATURES AS SHOWN FOR REMOVAL. INSTALL FILTERS PER THE PLAN AND SPECIFICATIONS.
 - MAINTAIN ALL EROSION CONTROL DEVICES DURING CONSTRUCTION AND REMOVE ONCE THE DISTURBED AREAS HAVE BEEN STABILIZED AND RELEASED BY THE CITY INSPECTOR.



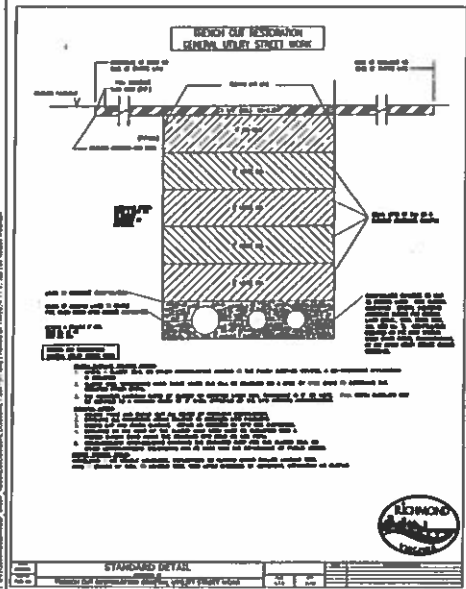
TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
BELLMEADE DISTRICT - RICHMOND, VIRGINIA
CONSTRUCTION NOTES & DETAILS

DATE: 12/16/2019
DRAWN BY: M. HANNAH
CHECKED BY: M. HANNAH
SCALE: AS SHOWN
PROJECT NO: 39986
SHEET NO: C1.0



- CONSTRUCTION NOTES TO FOLLOW THE SCHEDULES**
- FOR AN UNDERGROUND FLOW MOUNTED OBSERVATION WELL, CLEANOUT PROVIDE A TUBE MADE OF NON-CORROSIVE MATERIAL, SCHEDULE AS OR EQUAL, AT LEAST THREE FEET LONG WITH AN INSIDE DIAMETER OF AT LEAST 8 INCHES.
 - THE TUBE SHALL HAVE A FACTORY ATTACHED 1/2" (MIN OR HIGH IMPACT) PLASTIC COLLAR WITH HOLES TO PERMIT ROOTS TO GROW THROUGH. THE SCALE AT TOP LID SHALL BE CAST IRON OR HIGH IMPACT PLASTIC THAT WILL WITHSTAND TRAFFIC LOADS.
 - THE DEPTH OF INVERT SHALL BE MARKED ON CAP.
 - ALL FITTINGS SHALL BE WASTED.
 - CLEANOUTS TO BE SAME DIAMETER AS UNDERDRAINS.



THIS DRAWING IS PART OF THE
CONSTRUCTION SERVICES FOR THE
BELLEMEADE GREEN STREET IMPROVEMENTS
PROJECT, BELLEMEADE DISTRICT, RICHMOND, VIRGINIA.
DATE: 12/18/2010

DATE	REVISION
12/18/2010	ISSUED FOR PERMIT

DATE	12/18/2010
ISSUED BY	MM
DESIGNED BY	MM
CHECKED BY	A. CADEL
SCALE	AS SHOWN

TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
BELLEMEADE DISTRICT - RICHMOND - VIRGINIA
CONSTRUCTION NOTES & DETAILS

JOB NO: 39986
SHEET NO: C1.1

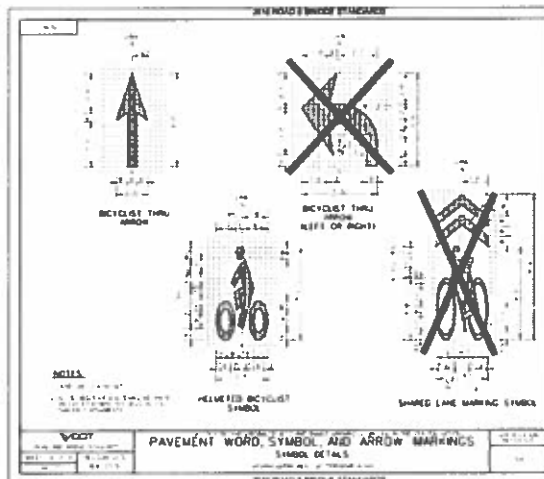
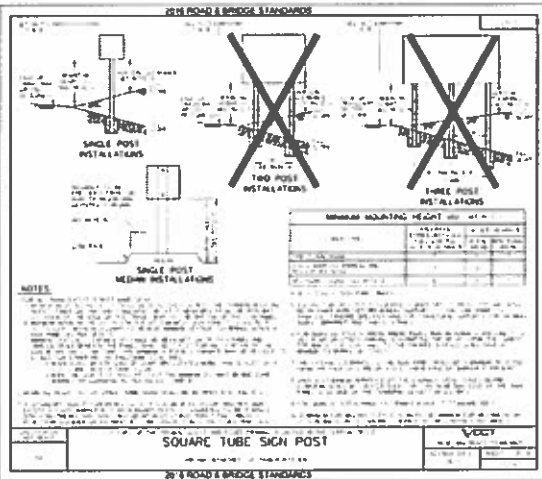


TABLE 2
FOR BRISTOL, SALEM, TYNARING, POUNDING,
FREDERICKSBURG, CLAYTON, STANTON AND NORTHERN
SPRINGA DISTRICTS (SEE NOTE 3)

MARKING	DESCRIPTION	INSTALLATION	REMOVAL
1	BIKEWAY THROUGH	1.00	1.00
2	BIKEWAY THROUGH (LEFT OR RIGHT)	1.00	1.00
3	BIKEWAY WITH SHARED LANE MARKING SYMBOL	1.00	1.00
4	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT)	1.00	1.00
5	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL	1.00	1.00
6	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT)	1.00	1.00
7	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL	1.00	1.00
8	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT)	1.00	1.00
9	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT)	1.00	1.00
10	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT)	1.00	1.00

NOTES:
1. ALL MARKINGS SHALL BE PLACED BEHIND THE CURB OR GUTTER.
2. ALL MARKINGS SHALL BE PLACED BEHIND THE CURB OR GUTTER.
3. ALL MARKINGS SHALL BE PLACED BEHIND THE CURB OR GUTTER.

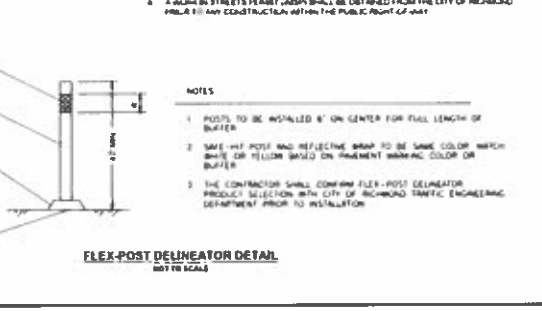
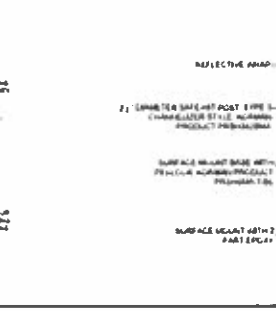
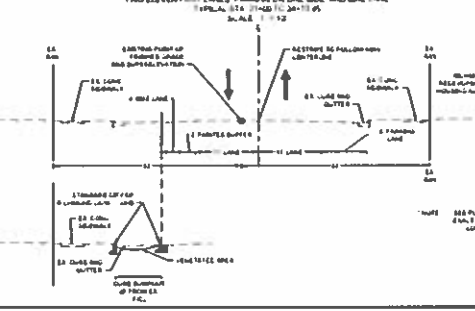
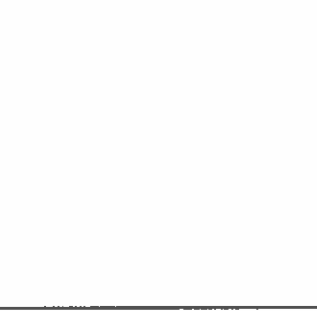
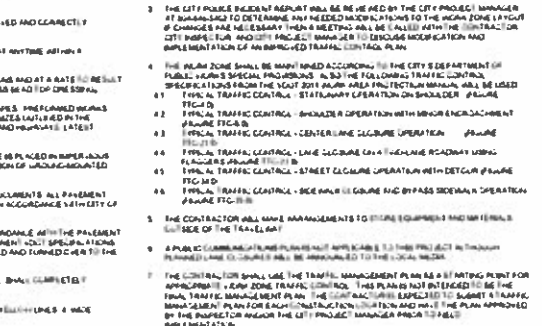
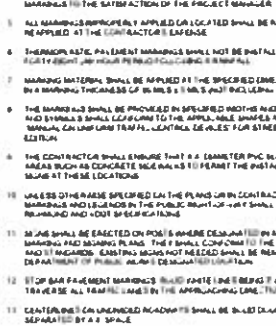
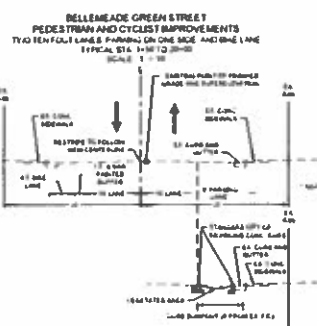
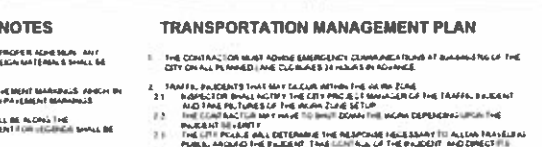


PAVEMENT WORD, SYMBOL AND ARROW MARKINGS

MARKING CODE	DESCRIPTION	INSTALLATION	REMOVAL
1	BIKEWAY THROUGH	1.00	1.00
2	BIKEWAY THROUGH (LEFT OR RIGHT)	1.00	1.00
3	BIKEWAY WITH SHARED LANE MARKING SYMBOL	1.00	1.00
4	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT)	1.00	1.00
5	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL	1.00	1.00
6	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT)	1.00	1.00
7	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL	1.00	1.00
8	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT)	1.00	1.00
9	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT)	1.00	1.00
10	BIKEWAY WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT) WITH SHARED LANE MARKING SYMBOL (LEFT OR RIGHT)	1.00	1.00

PAVEMENT MARKING AND SIGNING NOTES

1. THE CONTRACTOR SHALL PREPARE THE PAVEMENT SURFACE FOR PROPER SIGNING. ANY SLOTTING OR REMOVAL OF EXCESS GRAVEL OR ST. OR OTHER FOREIGN MATERIALS SHALL BE CONSIDERED AS INCIDENTAL TO THE INSTALLATION.
2. THE CONTRACTOR SHALL REMOVE COMPLETELY ALL PREVIOUS PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH THE NEW PAVEMENT MARKINGS.
3. UNLESS OTHERWISE SPECIFIED, THE BASIS OF MEASUREMENT SHALL BE ALONG THE LONGITUDINAL CENTERLINE OF PAVEMENT MARKINGS. MEASUREMENT FROM CURBS SHALL BE PER MESSAGE COMPLETE AND IN PLACE.
4. PRIOR TO APPLICATION, THE CONTRACTOR SHALL FIELD CHECK AND LOCATE ALL PAVEMENT MARKINGS TO THE SATISFACTION OF THE PROJECT MANAGER.
5. ALL MARKINGS APPROPRIATELY APPLIED OR LOCATED SHALL BE REPAIRED AND COMPLETELY REAPPLIED AT THE CONTRACTOR'S EXPENSE.
6. THERMOPLASTIC PAVEMENT MARKINGS SHALL NOT BE INSTALLED AT ANY TIME WITHIN A FIVE (5) FOOT BUFFER FROM THE CURB OR GUTTER.
7. MARKING MATERIALS SHALL BE APPLIED AT THE SPECIFIED DIMENSIONS AND AT A RATE TO RESULT IN A MARKING THICKNESS OF 1/16" TO 1/8" AND INCLUDE A LAYER OF ONE (1) COAT OF PRIMER.
8. THE MARKINGS SHALL BE PROVIDED IN SPECIFIED WIDTHS AND SHAPES. PRE-PLANNED MARKINGS AND SYMBOLS SHALL BE APPLIED TO THE APPROPRIATE DIMENSIONS AND SIZES LISTED IN THE MANUAL. CALL OUT LINES TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS LATEST EDITION.
9. THE CONTRACTOR SHALL ENSURE THAT A 1/2" DIAMETER PVC PIPE IS PLACED IN IMPERVIOUS AREAS SUCH AS CONCRETE SIDEWALKS TO PERMIT THE INSTALLATION OF WADING-MOUNTED SIGNS AT THESE LOCATIONS.
10. UNLESS OTHERWISE SPECIFIED IN THE PLANS OR IN CONTRACT DOCUMENTS, ALL PAVEMENT MARKINGS AND DEVICES IN THE PUBLIC RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH THE CITY OF RICHMOND AND VDOT SPECIFICATIONS.
11. SIGNAGE SHALL BE ERECTED ON POSTS AND WHERE DESIGNATED IN ACCORDANCE WITH THE PAVEMENT MARKING AND SIGNING PLANS. THE SIGNAGE SHALL BE IN ACCORDANCE WITH THE CITY OF RICHMOND AND VDOT SPECIFICATIONS.
12. STOP BAR PAVEMENT MARKINGS (ROAD WHITE LINE) BEING 1" WIDE SHALL BE COMPLETED 100 FEET BEFORE ALL TRAFFIC LANE IN THE APPROACHING LANE.
13. CENTER LINE OR UNPAVED ROADWAYS SHALL BE DOUBLE YELLOW LINES 4" WIDE SEPARATED BY A 2" SPACE.



REVISION DESCRIPTION

NO.	DATE	DESCRIPTION
1	10/18/2019	ISSUED FOR PERMIT
2	10/18/2019	ISSUED FOR PERMIT
3	10/18/2019	ISSUED FOR PERMIT
4	10/18/2019	ISSUED FOR PERMIT
5	10/18/2019	ISSUED FOR PERMIT
6	10/18/2019	ISSUED FOR PERMIT
7	10/18/2019	ISSUED FOR PERMIT
8	10/18/2019	ISSUED FOR PERMIT
9	10/18/2019	ISSUED FOR PERMIT
10	10/18/2019	ISSUED FOR PERMIT

TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
BELLEMEADE DISTRICT - RICHMOND - VIRGINIA
CONSTRUCTION NOTES & DETAILS

DATE: 10/18/2019
DRAWN BY: M. HARRIS
CHECKED BY: M. HARRIS
SCALE: AS SHOWN

REV NO: 19996
SHEET NO: C1.2

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PLAN VIEW

SECTION B-B

SECTION A-A

SECTION C-C

CURB INLET DETAIL

NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMIT	11/11/2015
2	ISSUED FOR PERMIT	11/11/2015
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CONTECH
FATIMA ISIT, ARCHITECT
BELLEMEADE GREEN STREET
BELLHEARD DISTRICT - RICHMOND, VIRGINIA
NO SYSTEM E&C (SYSTEM 01)

PROPOSAL

PLAN VIEW

SECTION B-B

SECTION A-A

SECTION C-C

CURB INLET DETAIL

NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMIT	11/11/2015
2	ISSUED FOR PERMIT	11/11/2015
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CONTECH
FATIMA ISIT, ARCHITECT
BELLEMEADE GREEN STREET
BELLHEARD DISTRICT - RICHMOND, VIRGINIA
NO SYSTEM E&C (SYSTEM 01)

PROPOSAL

PLAN VIEW

SECTION B-B

SECTION A-A

SECTION C-C

EXTENDED FLANGE CURB INLET DETAIL

NO.	DESCRIPTION	DATE
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2	ISSUED FOR PERMIT	11/11/2015
3	ISSUED FOR PERMIT	11/11/2015
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20	ISSUED FOR PERMIT	11/11/2015

CONTECH
FATIMA ISIT, ARCHITECT
BELLEMEADE GREEN STREET
BELLHEARD DISTRICT - RICHMOND, VIRGINIA
NO SYSTEM E&C (SYSTEM 01)

PROPOSAL

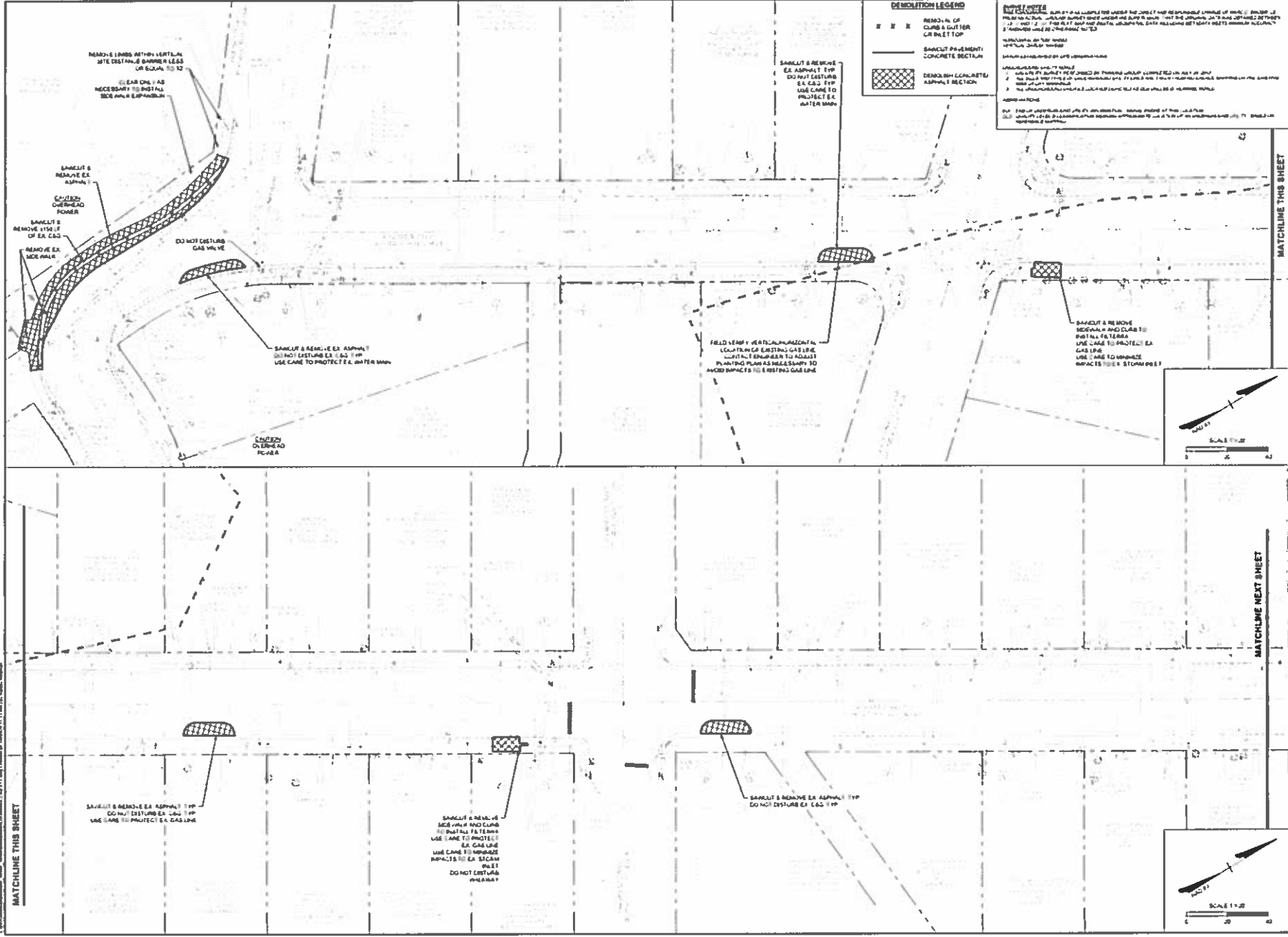


DATE	REVISION DESCRIPTION
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11/11/2015	ISSUED FOR PERMIT

TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
BELLHEARD DISTRICT - RICHMOND, VIRGINIA
CONSTRUCTION NOTES & DETAILS

NO. 10
39986
SHEET NO.
C1.3

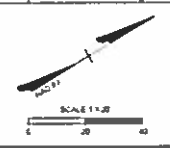
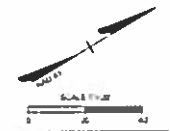


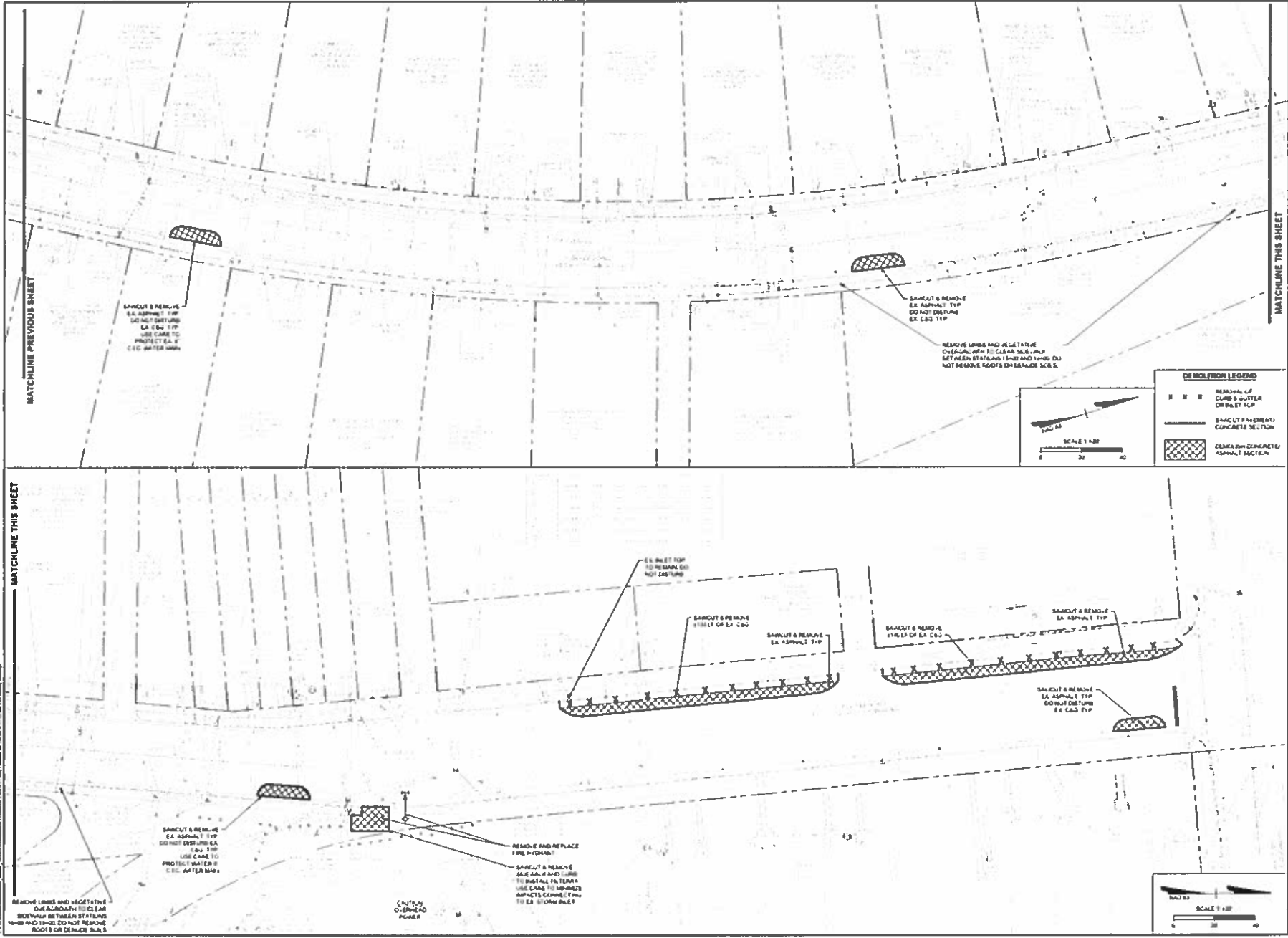
THIS DRAWING IS THE PROPERTY OF TIMMONS GROUP AND SHALL REMAIN THE PROPERTY OF TIMMONS GROUP	
DATE	1.4.18.2019
LAYOUT BY	W. MATHIAS
DESIGNED BY	W. MATHIAS
CHECKED BY	A. CAZEL
SCALE	1" = 20'

TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
BELLEMEADE DISTRICT - RICHMOND - VIRGINIA
EXISTING CONDITIONS & DEMOLITION PLAN

39986
C2.0





THIS DRAWING PREPARED BY THE CONSULTING ENGINEER
 1001 Mountain Parkway, Suite 100, Alexandria, VA 22304
 Tel: 703.296.6000 Fax: 703.296.6001 www.timmonsgrp.com

YOUR DESIGN (4/16/15) THROUGH (04/15)

REVISION DESCRIPTION	DATE

DATE	JUL 18, 2019
DESIGNED BY	H. HADDEN
DRAWN BY	H. HADDEN
CHECKED BY	A. CAPELL
SCALE	1" = 20'

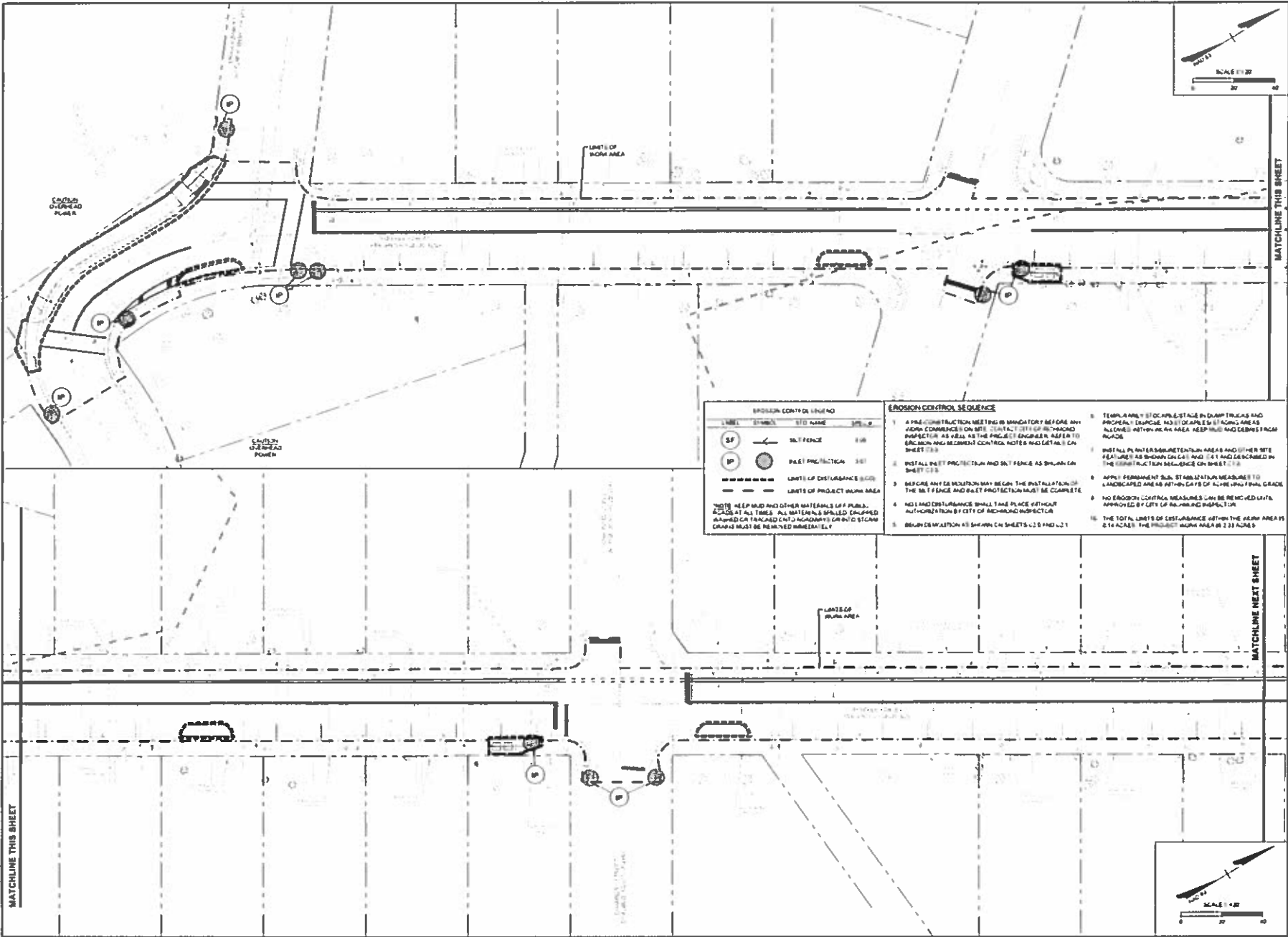
TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
 BELLEMEADE DISTRICT, RICHMOND, VIRGINIA

EXISTING CONDITIONS & DEMOLITION PLAN

JOB NO. J9986
 SHEET NO. C2.1

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DATE: 10/16/2018

DESIGNED BY: A. CALE

CHECKED BY: J. J.

SCALE: 1" = 20'

PROJECT NO: 39986

SHEET NO: C.3.1

SYMBOL	ITEM NAME	ITEM NO.
(SF)	SALT FENCE	101
(PT)	PALETT PROTECTION	102

--- LIMITS OF DISTURBANCE (LSD)
 - - - - - LIMITS OF PROJECT WORK AREA

NOTE: KEEP HAND AND OTHER MATERIALS OFF PUBLIC ROADS AT ALL TIMES. ALL MATERIALS SPILLED OR DAMAGED OR TRACKED ON TO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY.

- EROSION CONTROL SEQUENCE**
- A PRE-CONSTRUCTION MEETING IS MANDATORY BEFORE ANY WORK COMMENCES ON SITE. CONTACT CITY OF RICHMOND INSPECTOR AS WELL AS THE PROJECT ENGINEER REFER TO EROSION AND SEDIMENT CONTROL NOTES AND DETAILS ON SHEET C.3.1.
 - INSTALL SALT PROTECTION AND SALT FENCE AS SHOWN ON SHEET C.3.1.
 - BEFORE ANY EXCAVATION MAY BEGIN THE INSTALLATION OF THE SALT FENCE AND SALT PROTECTION MUST BE COMPLETE.
 - NO LAND DISTURBANCE SHALL TAKE PLACE WITHOUT AUTHORIZATION BY CITY OF RICHMOND INSPECTOR.
 - BELOW DISTURBANCE AS SHOWN ON SHEETS C.3.0 AND C.3.1.
 - TEMPORARILY OCCUPY STAGE BY EXCAVATION TRUCKS AND PROPERLY EQUIPPED AND STABILIZED STAGING AREAS ALLOWED WITHIN WORK AREA. KEEP TRUCKS AND DEBRIS FROM PUBLIC.
 - INSTALL PALLET PROTECTION IN AREAS AND OTHER SITE FEATURES AS SHOWN ON C.3.1 AND DESCRIBED BY THE CONSTRUCTION SEQUENCE ON SHEET C.3.1.
 - APPLY PERMANENT SOIL STABILIZATION MEASURES TO LANDSCAPED AREAS WITHIN 14 DAYS OF FINAL GRADE.
 - NO EROSION CONTROL MEASURES CAN BE REMOVED UNTIL APPROVED BY CITY OF RICHMOND INSPECTOR.
 - THE TOTAL LIMITS OF DISTURBANCE WITHIN THE WORK AREA IS 0.16 ACRES. THE PROJECT WORK AREA IS 2.33 ACRES.

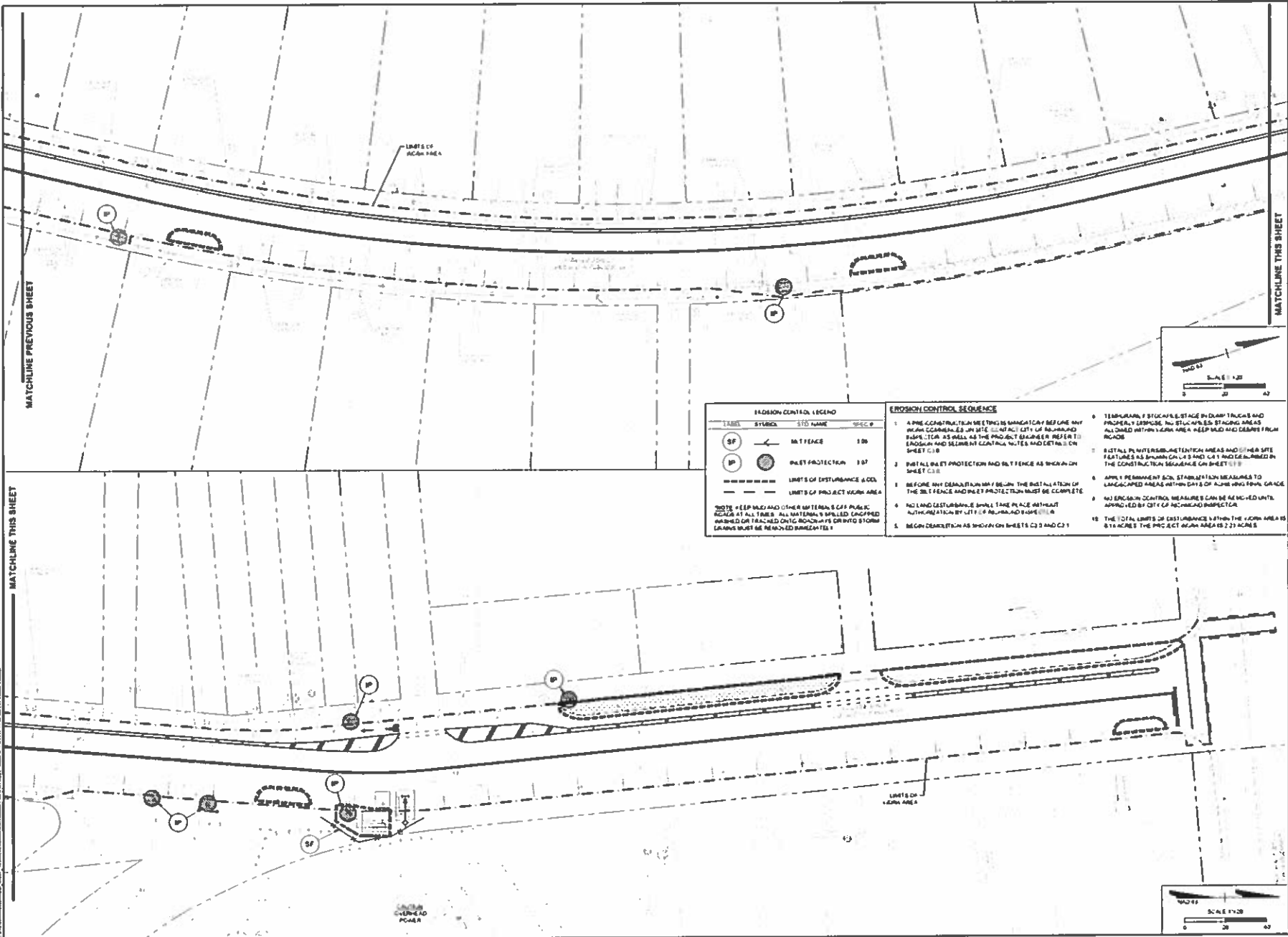
TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
 BELLEMEADE DISTRICT, RICHMOND, VIRGINIA
EROSION & SEDIMENT CONTROL PLAN

DATE: 10/16/2018

PROJECT NO: 39986

SHEET NO: C.3.1



EROSION CONTROL LEGEND

SYMBOL	STD NAME	SPEC #
SP	SILT FENCE	100
BP	SILT PIT	101
SB	SEDIMENT BASIN	102

--- LIMITS OF DISTURBANCE & COLL
 - - - - - LIMITS OF PROJECT WORK AREA

NOTE: KEEP PILES AND OTHER MATERIALS OFF PUBLIC RIGHTS AT ALL TIMES. ALL MATERIALS SPILLED OR CARRIED AWAY OR TRACKED ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY.

- EROSION CONTROL SEQUENCE**
1. AT THE CONSTRUCTION MEETING, DISCUSS AND CONFIRM THE LOCATION AND TYPE OF EROSION CONTROL MEASURES TO BE INSTALLED WITHIN THE WORK AREA. REFER TO THE EROSION CONTROL PLAN AND DETAILS ON SHEET C-1.0.
 2. INSTALL SILT PROTECTION AND SILT FENCE AS SHOWN ON SHEET C-1.0.
 3. BEFORE ANY DEMOLITION MAY BEGIN, THE INSTALLATION OF THE SILT FENCE AND SILT PROTECTION MUST BE COMPLETE.
 4. NO LAND DISTURBANCE SHALL TAKE PLACE WITHOUT AUTHORIZATION BY THE CITY OF RICHMOND.
 5. BEGIN DEMOLITION AS SHOWN ON SHEETS C-2.0 AND C-2.1.
 6. TEMPORARY STOCKPILE STORAGE IN DRAP TRUCKS AND PRINCIPALLY PURPOSE, NO STOCKPILING STAGING AREAS ALLOWED WITHIN WORK AREA - KEEP SAID AND CLEAR FROM ROAD.
 7. INSTALL INTERLOCKING TENTH AREAS AND OTHER SITE FEATURES AS SHOWN ON C-1.0 AND C-2.1 AND DETERMINED BY THE CONSTRUCTION SEQUENCE ON SHEET C-1.0.
 8. APPLY PERMANENT EROSION STABILIZATION MEASURES TO UNCOVERED AREAS WITHIN 24 HOURS OF EXPOSURE.
 9. NO EROSION CONTROL MEASURES CAN BE REMOVED UNTIL APPROVED BY CITY OF RICHMOND INSPECTOR.
 10. THE TOTAL LIMITS OF DISTURBANCE WITHIN THE WORK AREA IS 0.14 ACRES. THE PROJECT WORK AREA IS 2.27 ACRES.

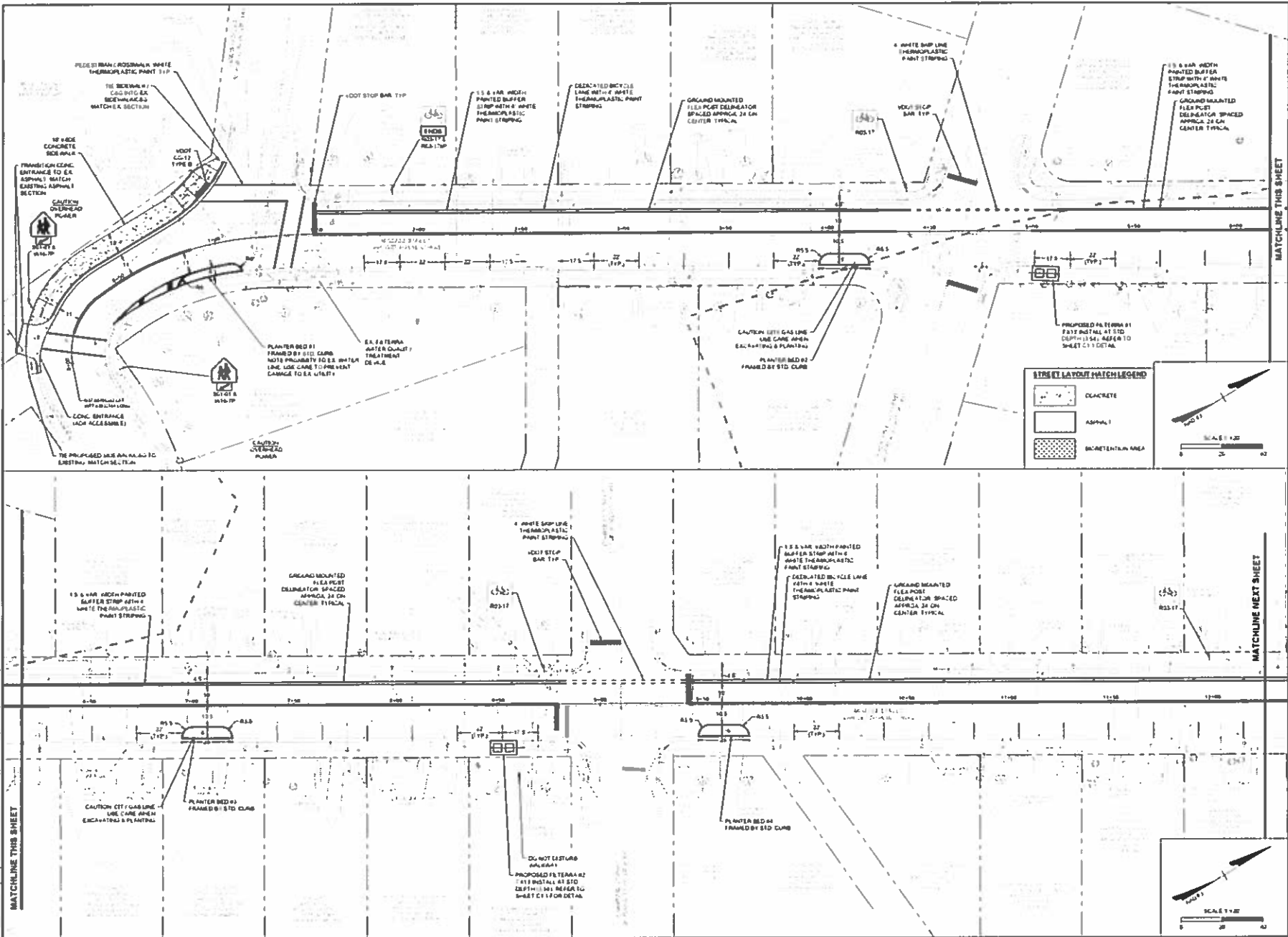


THIS DRAWING PREPARED BY THE CONSULTING ENGINEER'S OFFICE
 1800 BELLEMEADE GREEN STREET, SUITE 200
 RICHMOND, VIRGINIA 23220
 TEL: (804) 781-1111 FAX: (804) 781-1112

DATE	BY	DESCRIPTION
1/1/14	J. W. TIMMONS	PROJECT START
1/1/14	J. W. TIMMONS	PROJECT COMPLETE

TIMMONS GROUP
 BELLEMEADE GREEN STREET IMPROVEMENTS
 BELLEMEADE DISTRICT - RICHMOND - VIRGINIA
 EROSION & SEDIMENT CONTROL PLAN

JOB NO.	39986
SHEET NO.	C-2.2

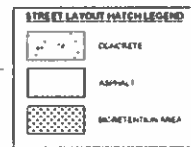


DATE: 1/16/18, VJ:EP

DESIGNED BY: M. HANSEN, P.E.

CHECKED BY: A. CAHILL

SCALE: 1" = 20'



TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
 BELLEMEADE DISTRICT - RICHMOND - VIRGINIA
STREET LAYOUT PLAN

JOB NO: 39986

DATE: 1/16/18

SCALE: 1" = 20'

MATCHLINE THIS SHEET

MATCHLINE THIS SHEET

MATCHLINE NEXT SHEET



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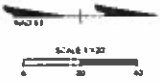
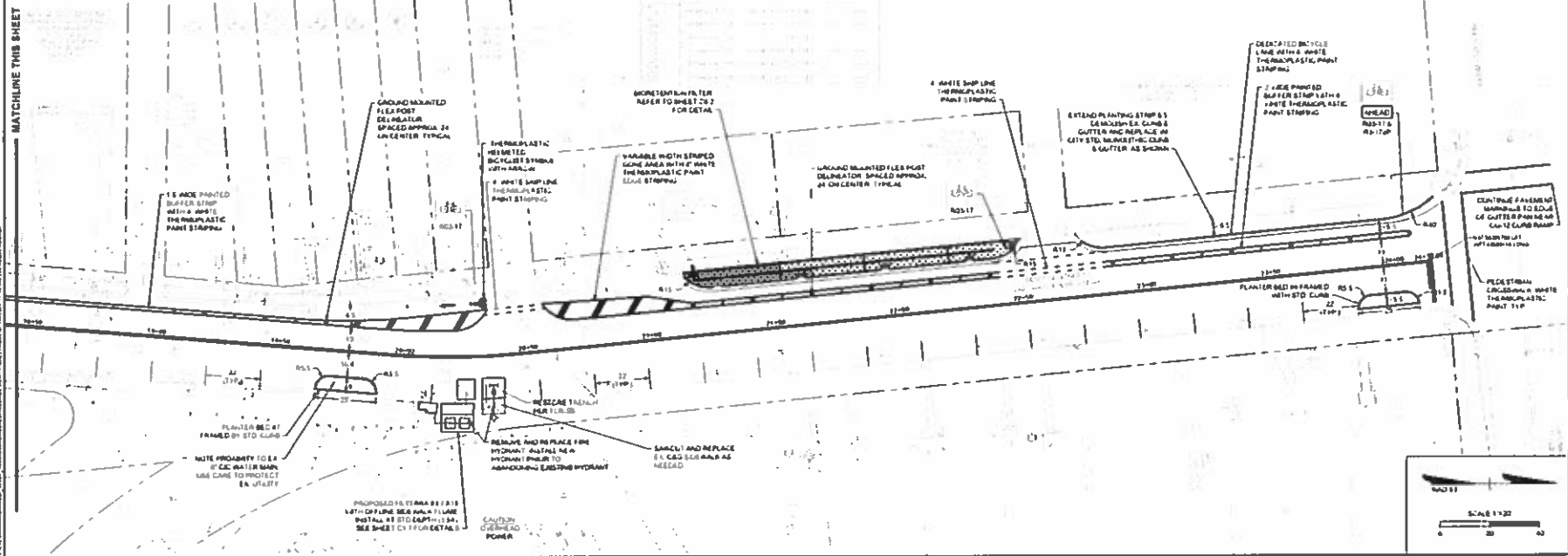
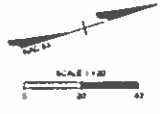
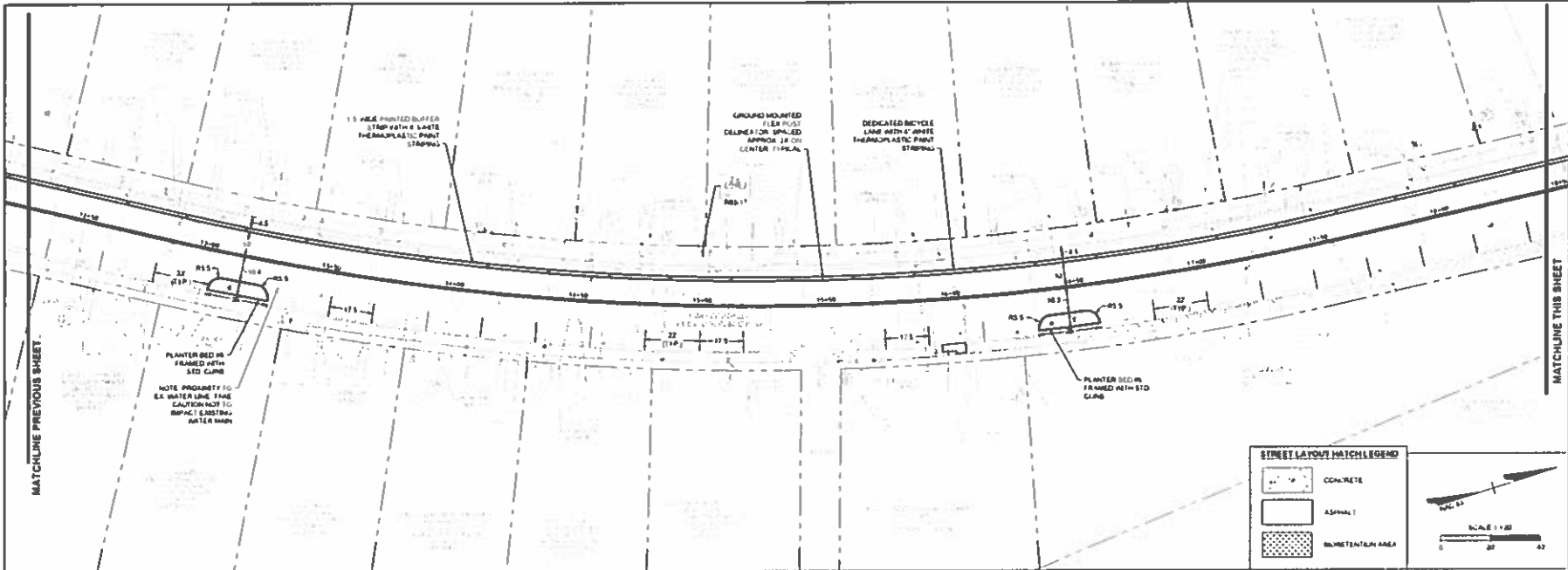
YOUR DESIGNER: TIMMONS GROUP, INC.
 PROJECT NO.: 14-28-219
 SHEET NO.: C-1

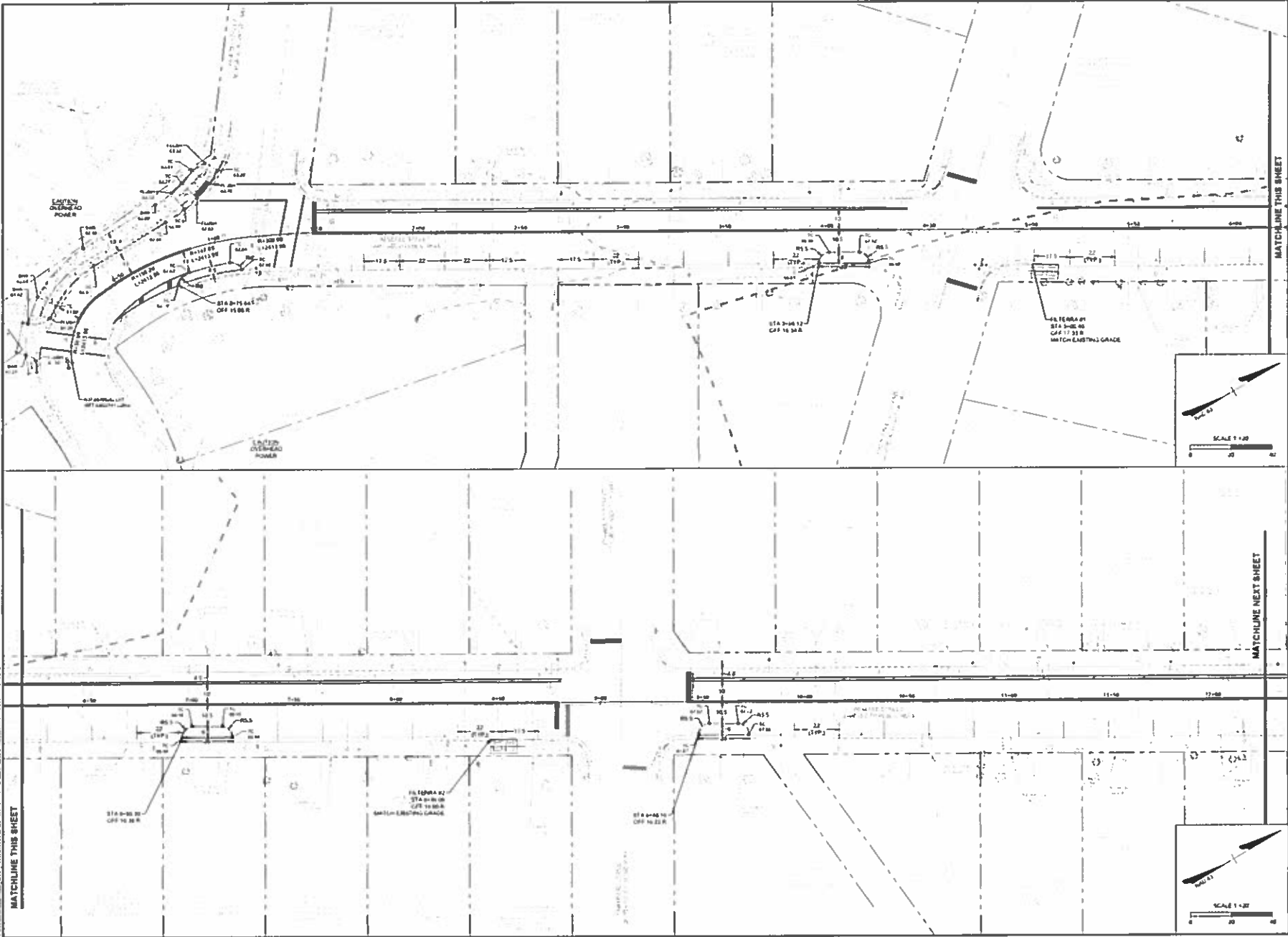
DATE	EXTENSION DESCRIPTION

TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS BELLEMEADE DISTRICT - RICHMOND, VIRGINIA STREET LAYOUT PLAN

DATE: 3/9/2016
 SHEET NO.: C-1



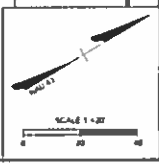
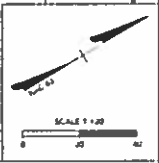


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DATE	12/11/2018
DRAWN BY	H. HARRIS
CHECKED BY	A. CAHILL
SCALE	1" = 20'

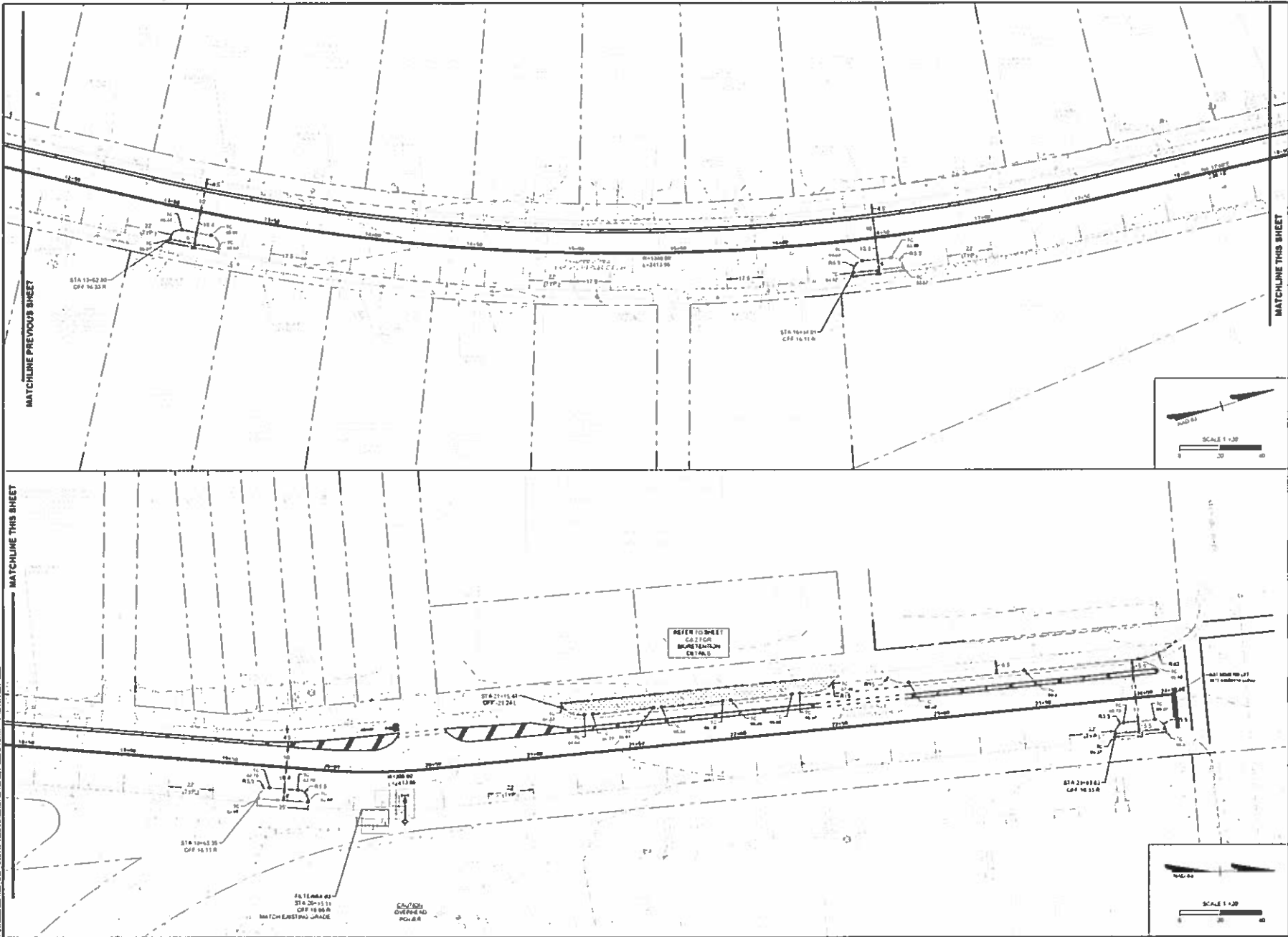
MATCHLINE THIS SHEET
 MATCHLINE NEXT SHEET

TIMMONS GROUP
 BELLEMEADE GREEN STREET IMPROVEMENTS
 BELLEMEADE DISTRICT - RICHMOND - VIRGINIA
 GRADING PLAN

JOB NO. 39986
 SHEET NO. C5.0



10/1/2018 10:00 AM C:\Users\harrish\OneDrive\Documents\39986\Grading\Bellemeade Green Street Improvements\Grading Plan\C5.0.dwg



THIS DRAWING PREPARED BY THE
ENGINEER EMPLOYED BY
 1000 Lakeside Parkway, Suite 2112
 Fairfax, VA 22033-3802 TEL: 703.746.1148 www.timmons.com

YOUR DESIGN (Client/Project/Contract)

SECTION DESCRIPTION

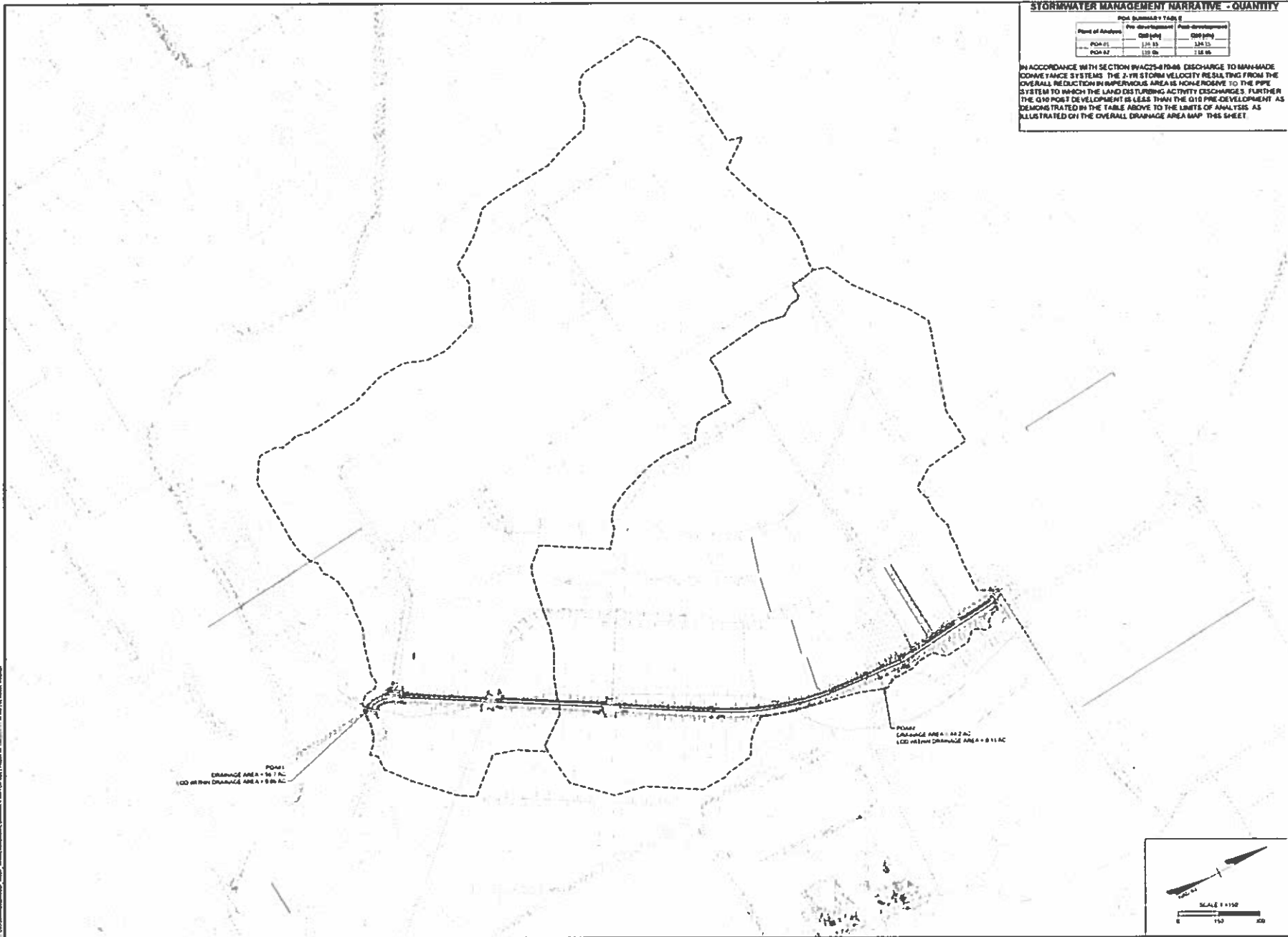
DATE	REVISION
12/16/2010	

DATE: 12/16/2010
 DRAWN BY: M. HANSEN
 CHECKED BY: M. HANSEN
 APPROVED BY: A. EADES
 SCALE: 1" = 20'

TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
 BELLEMEADE DISTRICT - RICHMOND - VIRGINIA
 GRADING PLAN

JOB NO: 39986
 SHEET NO: CS-1



STORMWATER MANAGEMENT NARRATIVE - QUANTITY

Point of Analysis	Peak Runoff (1 Year)	
	Pre-development	Post-development
POA 01	0.00 (cfs)	0.00 (cfs)
POA 02	1.15 (cfs)	1.14 (cfs)
POA 03	1.15 (cfs)	1.14 (cfs)

IN ACCORDANCE WITH SECTION 9VAC25-8 FROM DISCHARGE TO MAN-MADE DRAINAGE SYSTEMS THE 2-YR STORM VELOCITY RESULTING FROM THE OVERALL REDUCTION IN IMPERVIOUS AREA IS NO HIGHER TO THE PIPE SYSTEM TO WHICH THE LAND DISTURBING ACTIVITY DISCHARGES. FURTHER THE Q10 POST DEVELOPMENT IS LESS THAN THE Q10 PRE-DEVELOPMENT AS DEMONSTRATED IN THE TABLE ABOVE TO THE LIMITS OF ANALYSIS AS ILLUSTRATED ON THE OVERALL DRAINAGE AREA MAP THIS SHEET.



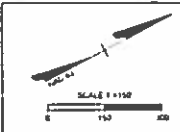
THIS DRAWING IS PART OF THE "BELLEMEADE GREEN STREET IMPROVEMENTS" PROJECT. THE DATE OF THIS DRAWING IS 10/1/15. THE DATE OF THE PREVIOUS EDITION IS 10/1/14.

YOUR VISION. OUR PASSION. THROUGH DESIGN.

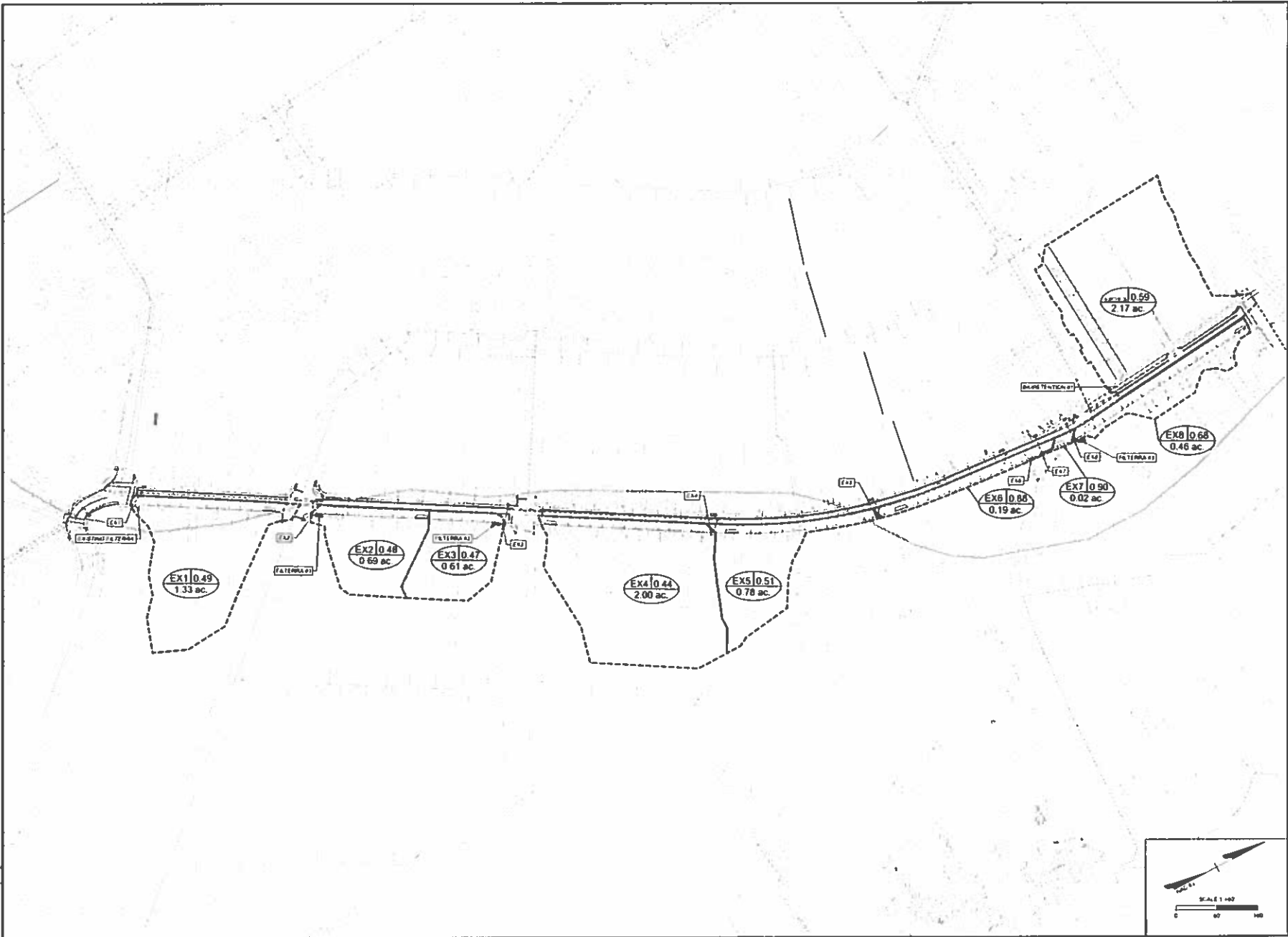
DATE: 10/15/2015
 DRAWN BY: H. HARRIS
 CHECKED BY: A. C. CREECH
 SCALE: 1" = 250'

TIMMONS GROUP
 BELLEMEADE GREEN STREET IMPROVEMENTS
 BELLEMEADE DISTRICT - RICHMOND - VIRGINIA
 OVERALL DRAINAGE AREA MAP

JOB NO. 39986
 SHEET NO. C6.0



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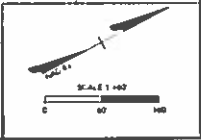


THIS DRAWING IS PART OF THE
 COMPLETE SET OF
 DRAWINGS FOR THE PROJECT
 BELLEMEADE GREEN STREET IMPROVEMENTS
 BELLEMEADE DISTRICT, RICHMOND, VIRGINIA

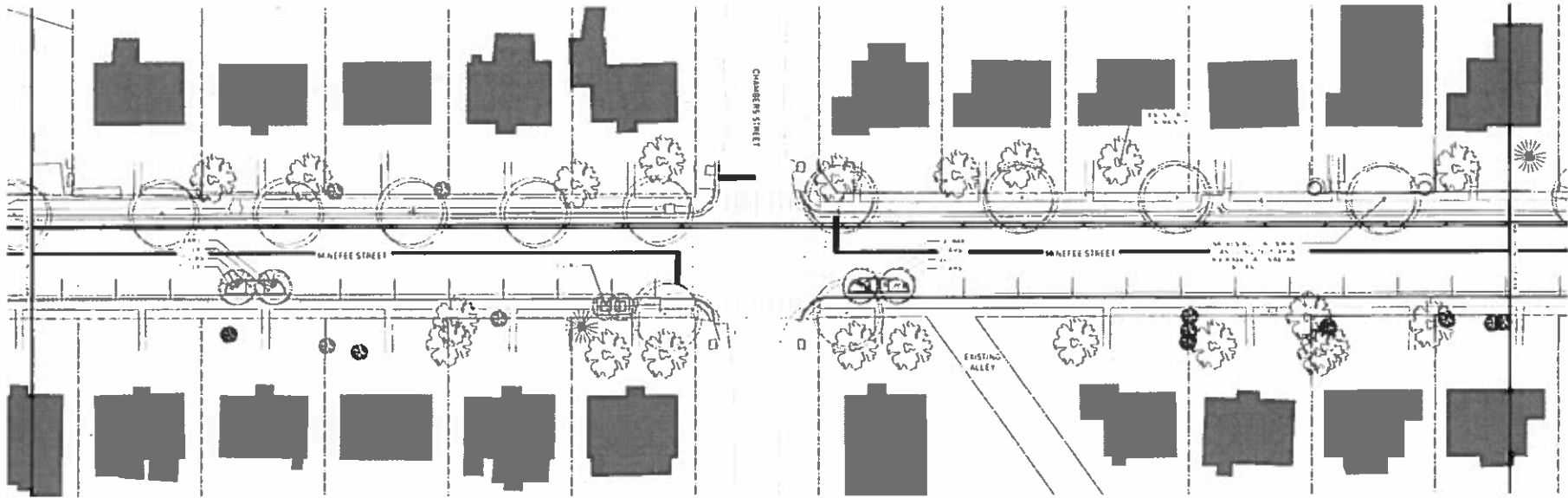
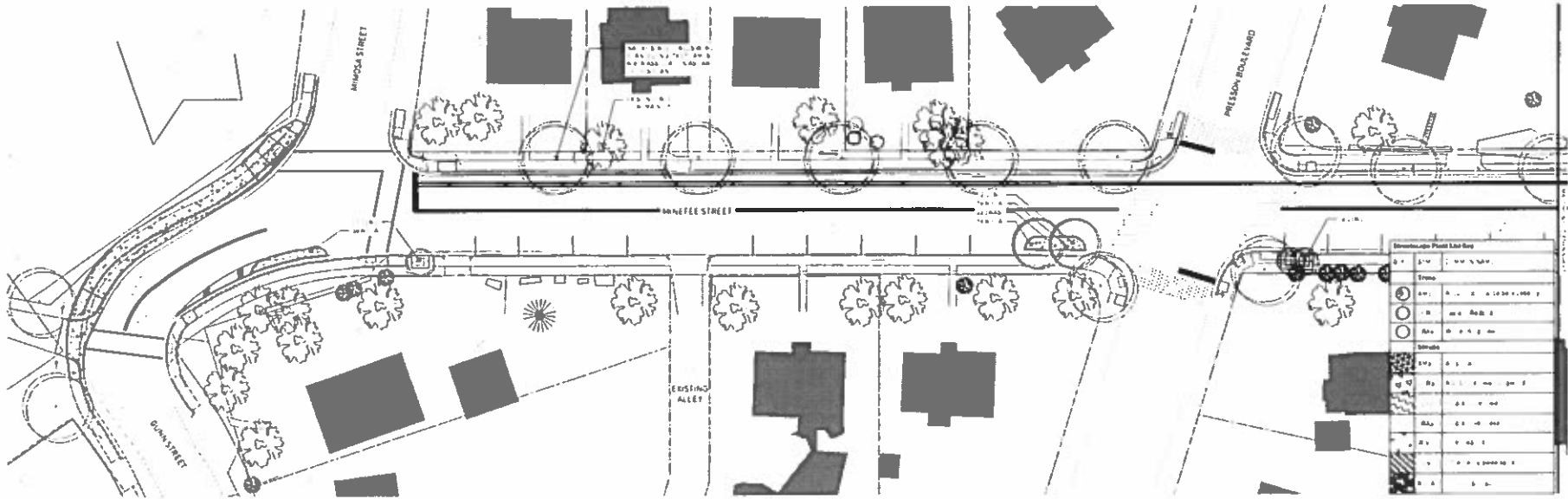
DATE: 1-16-19
 DRAWN BY: M. HARRIS
 CHECKED BY: A. CASSEL

TIMMONS GROUP

BELLEMEADE GREEN STREET IMPROVEMENTS
 BELLEMEADE DISTRICT, RICHMOND, VIRGINIA
 BMP AND EXISTING INLET DRAINAGE AREA MAP



1. I:\Projects\Bellemeade Green Street Improvements\BMP and Existing Inlet Drainage Area Map.dwg (1/16/19) 11:51 AM

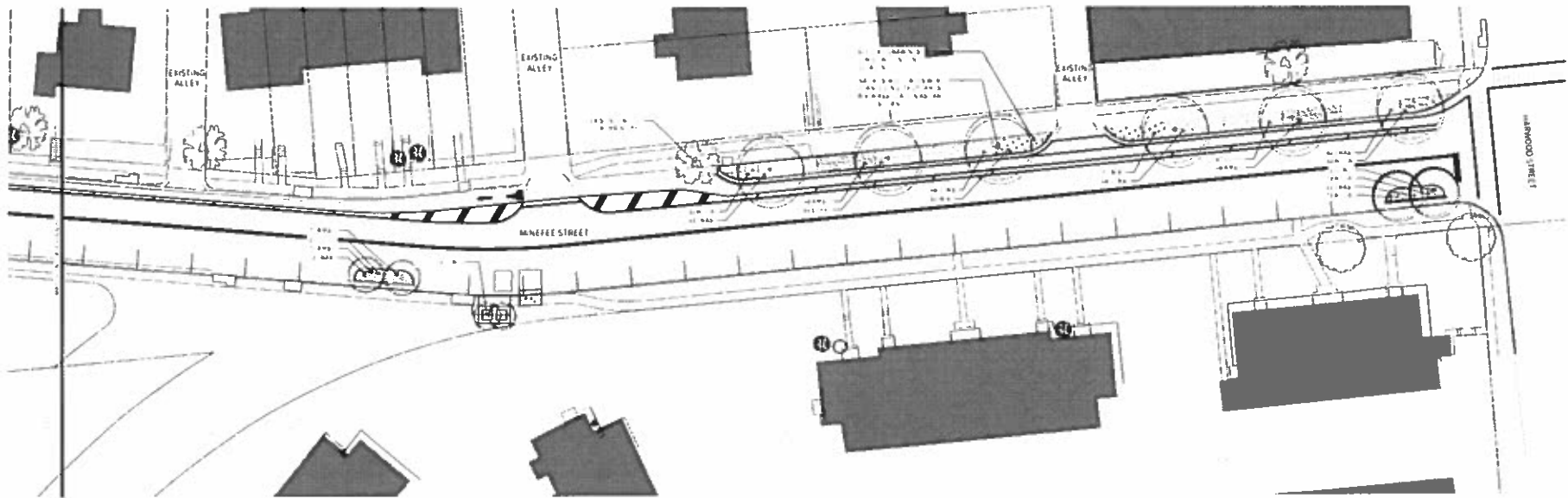
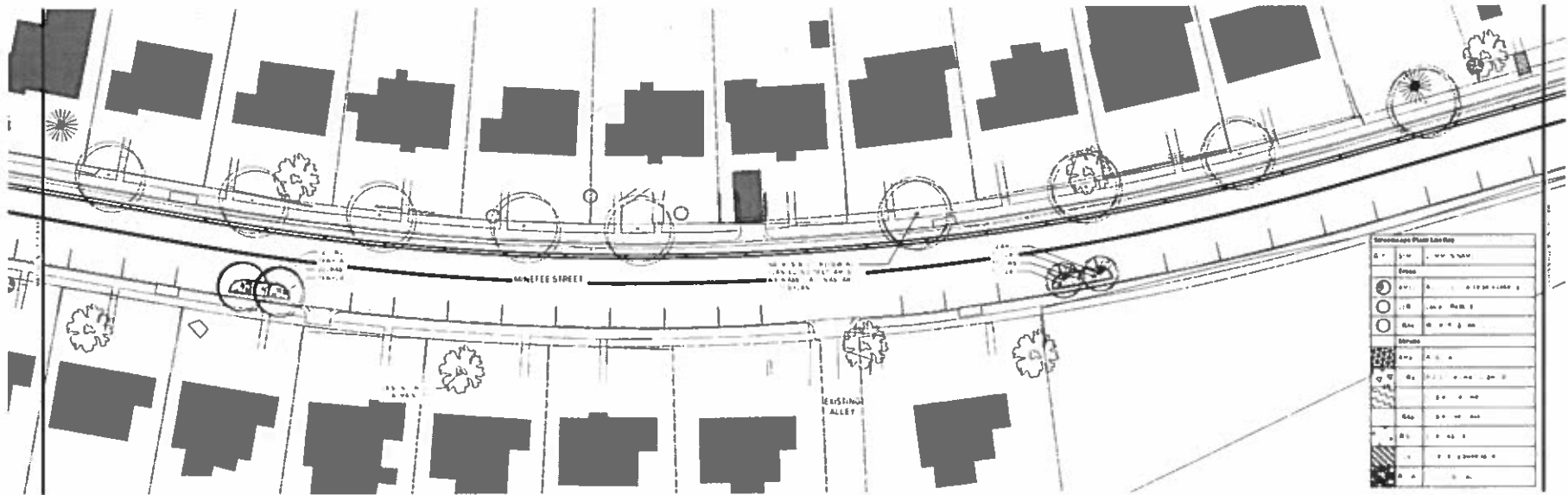


BELLEMEADE GREEN STREET
PLANTING PLAN
RICHMOND, VIRGINIA 23224

20 DECEMBER 2019



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BELLE MEADE GREEN STREET
 PLANTING PLAN
 RICHMOND, VIRGINIA 23224

20 DECEMBER 2019



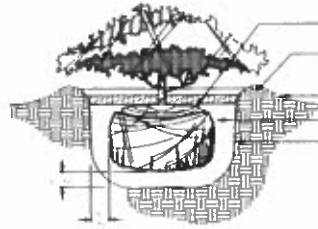
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 804.232.8100

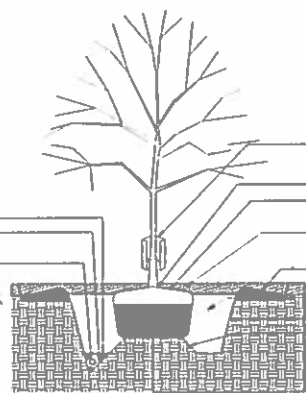
Plant Code	Plant Name	Plant Size	Plant Spacing	Plant Quantity	Plant Notes
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PLANTING NOTES

1. ALL PLANTS TO BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING NOTES.
2. ALL PLANTS TO BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING NOTES.
3. ALL PLANTS TO BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING NOTES.
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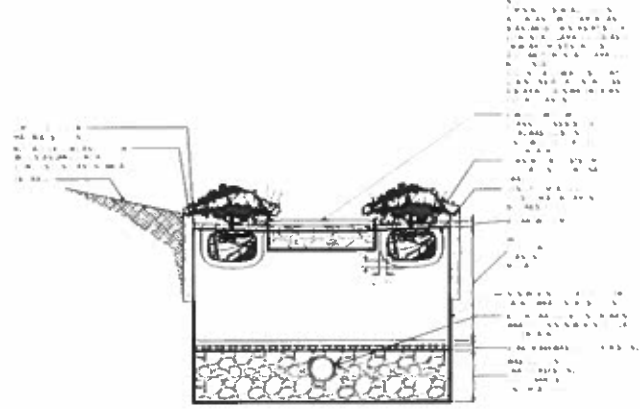
C TYP SHRUB PLANTING



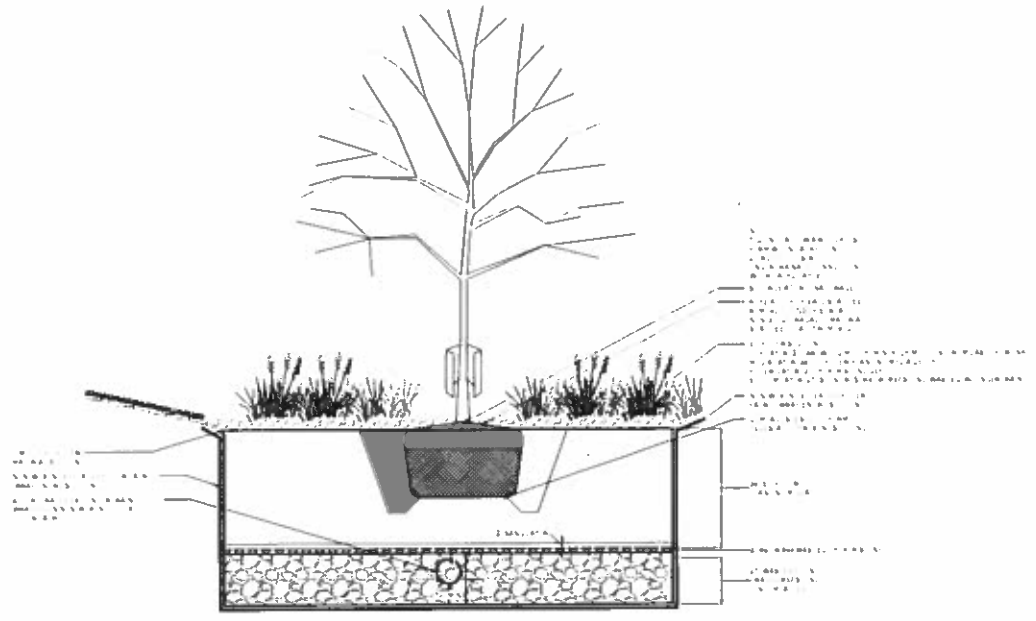
D TYP TREE PLANTING (1\"/>



E KEY MAP



B SHRUB BIORETENTION PLANTING



A TREE BIORETENTION PLANTING (1\"/>

NOTE: PLANTS AS SPECIFIED INCLUDE MORE THAN 80% NATIVE, NON-INVASIVE SPECIES CONSISTENT WITH THE CHESAPEAKE BAY PRESERVATION ACT

BELLEMEADE GREEN STREET
 PLANTING PLAN
 RICHMOND, VIRGINIA 23224

20 DECEMBER 2019



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