

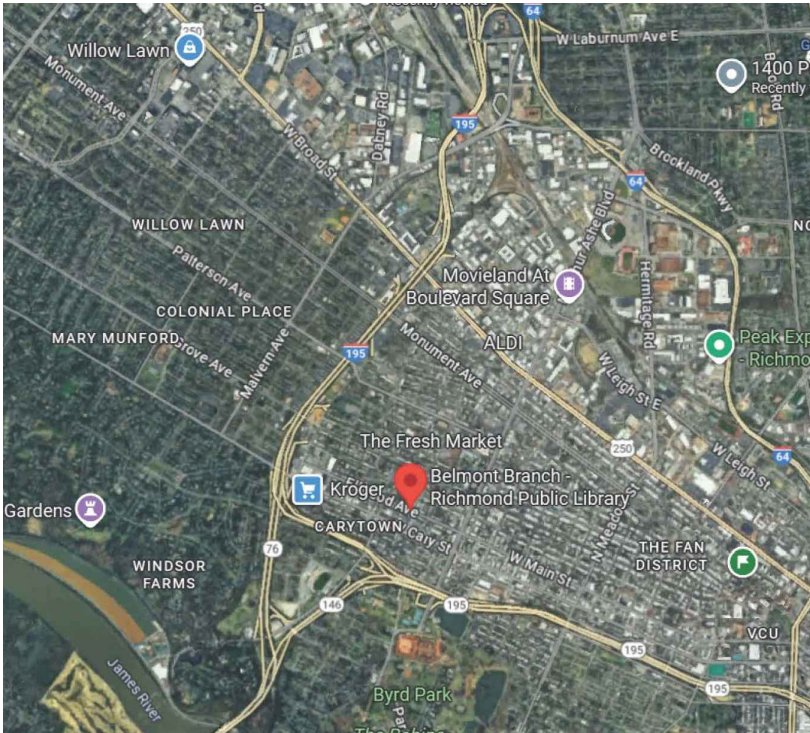
# Greening Richmond Public Libraries

IMPROVING THE HEALTH OF THE JAMES RIVER BY REDUCING STORMWATER POLLUTION

## Belmont Branch Library

3100 Ellwood Avenue, Richmond, 23221

### CITY OF RICHMOND, VIRGINIA 1ST DISTRICT/MUSEUM DISTRICT




#### VICINITY MAP

SCALE: 1"=2000'(+)

E+S STATISTICS						
EROSION + SEDIMENT CONTROL MEASURES				QUANTITY		
CONSTRUCTION ENTRANCE				N/A (SEE NOTE)		
SILT FENCE				205 L.F.		
INLET PROTECTION				2 EACH		
STORM DRAINAGE ITEMS				QUANTITY		
6" HDPE PERF. UNDERDRAIN PIPING				96 L.F.		
6" HDPE OVERFLOW PIPING				80 L.F.		
LOT STATISTICS				SQUARE FEET		
TOTAL LOT AREA				15,682 SF		
AMOUNT OF IMP. SURFACE AREA				13,504 SF		
AMOUNT OF PER. SURFACE				2,178 SF		
AREA AMOUNT OF LAND DISTURBANCE				3,809 SF=0.09 AC		
SEWER DESIGNATION						
M54				YES	X	NO
COMBINED SEWER (CSS)				X	YES	NO
BAY DESIGNATION						
CHESAPEAKE BAY AREA				YES	X	NO
IF YES,				RMA		RPA

I, Claire M. Smith, PE, LEED AP certify that the information above is correct.

Signed:  Date: October 17, 2025

Preparer's Seal/Stamp

NOTE: ALL QUANTITIES LISTED ARE FOR REVIEW PURPOSES ONLY. CONTRACTOR SHALL PERFORM THEIR OWN TAKE OFF FOR CONSTRUCTION PURPOSES

#### SHEET INDEX

#	Sheet Title
0	Cover Sheet
1	Existing Conditions & Demolition Plan
2	Layout Plan
3	Grading Plan
4	Details
5	Planting Plan for Volunteers
6	Notes
7	Additional Notes

#### PROJECT DATA

<b>OWNER:</b> CITY OF RICHMOND PUBLIC WORKS 900 E. BROAD STREET RICHMOND, VA 23219		<b>CITY STANDARD PROJECT NOTES:</b> PROPERTY ADDRESS: 3100 ELWOOD AVENUE ZONING: R-6 MAP REFERENCE #: W0001407034 MASTERPLAN LUD: COMMUNITY MIXED USE CITY COUNCIL DISTRICT: 1 (MUSEUM DISTRICT)	
<b>DEVELOPER</b> JAMES RIVER ASSOCIATION 16 SOUTH 17TH STREET, SUITE 100 RICHMOND, VA 23219 CONTACT: JUSTIN DOYLE PHONE: 804.788.8811 EMAIL: JDOYLE@THEJAMESRIVER.ORG		<b>PROJECT SUMMARY:</b> EXTERIOR LANDSCAPE IMPROVEMENTS EXISTING USE: LIBRARY PROPOSED USE: LIBRARY ACREAGE: 0.36 ACRES BUILDINGS: 1 EXISTING BUILDING PARKING: 9 EXISTING SPACES (NO CHANGES PROPOSED)	
<b>LANDSCAPE ARCHITECT</b> FOUR WINDS DESIGN, LC 705 LIBBIE AVENUE RICHMOND, VA 23226 CONTACT: DREW HARRIGAN PHONE: 804.920.5878 EMAIL: DREW@FOURWINDSDESIGN.COM		<b>HUC CODE:</b> 020802060101 JL01 JAMES RIVER-ALMOND CREEK	
<b>CIVIL ENGINEER</b> GRADIENT, PC 1406 LABURNUM PARK BOULEVARD RICHMOND, VA 23227 CONTACT: CLAIRE SMITH SHIRLEY, PE, LEED AP PHONE: 804.399.0500 EMAIL: CLAIRE@GRADIENTENVIRONMENT.COM			

#### RELATED PERMITS

STORM DRAIN CONNECTION PERMIT  
WORK-IN-STREET PERMIT

NOTE:  
THIS SITE DOES NOT LIE WITHIN A CHESAPEAKE BAY RMA OR RPA. THIS SITE LIES WITHIN THE CITY'S COMBINED SEWER SERVICES AREA.

Stormwater Management Facility Data			Project: Greening Belmont Branch Library					Date: 10/17/2025						
Stormwater Management Facility Type	Stormwater Management Description	Stormwater Management Facility Structure Number	Location		Acres Treated By Facility			Pollutant Removal, lbs			Runoff captured, acre-feet	HUC (6th Order) of Location of Facility	Impaired Water Segment To Which Facility Discharges	Ownership Of Facility (Public/Private)
			Latitude	Longitude	Impervious Acres	Pervious Acres	Total Acres	TP	TN	TSS				
BioRetention Basin	BioRetention Basin	Basin #1	37.5543	-77.4794	0.04	0.01	0.05	0.02	0.22	-	0.003	JL01	James River - Almond Creek	Public
BioRetention Basin	Micro BioRetention Basin	Basin #2	37.5542	-77.4795	0.01	0.00	0.01	0.02	0.29	-	0.001	JL01	James River - Almond Creek	Public
BioRetention Basin	Micro BioRetention Basin	Basin #3	37.5542	-77.4797	0.01	0.02	0.03	0.02	0.22	-	0.001	JL01	James River - Almond Creek	Public
BioRetention Basin	Micro BioRetention Basin	Basin #4	37.5542	-77.4795	0.01	0.00	0.01	0.02	0.22	-	0.001	JL01	James River - Almond Creek	Public



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### LEGEND

GAS METER

GAS VALVE

SIGN

WATER METER

ADA PARKING

ELEC. METER

UTILITY POLE

CLEAN OUT

ELEC. PANEL/BOX

BOLLARD

STORM DRAIN

SILT FENCE  
NO SCALE

U.G. WATER

U.G. GAS

O.H. TELEPHONE

CONCRETE

Downspout locations

Downspout location, goes below ground

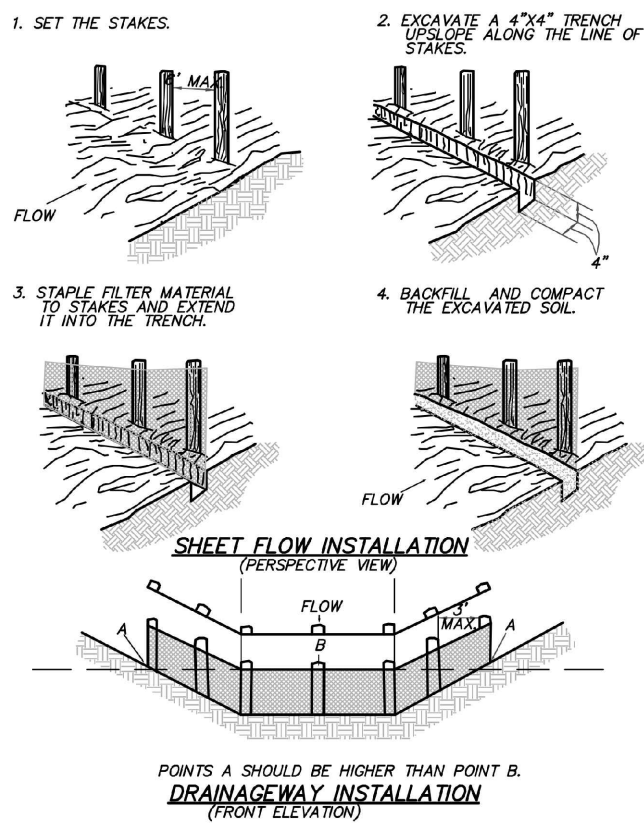
Infiltration Test locations

Existing Trees & Shrubs To Be Preserved:

Existing Trees To Be Removed:

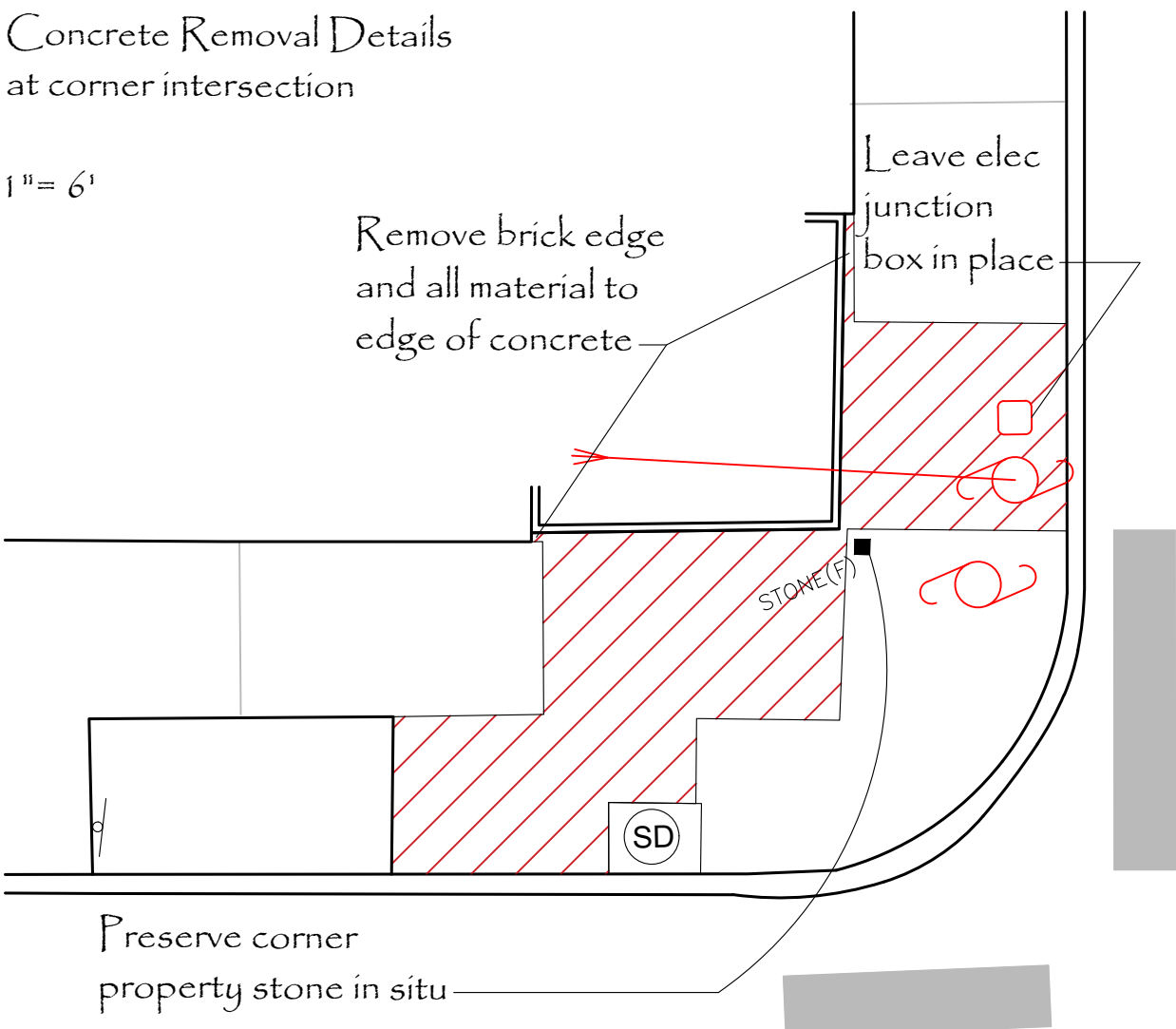
Pavement To Be Removed:

DATUM:  
HORZ.: NAD83  
VERT.: NAVD88



Concrete Removal Details  
at corner intersection

1" = 6'



### NOTES

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CONTRACTOR TO ASSUME ALL RESPONSIBILITY FOR CONSTRUCTION METHODS EMPLOYED AND FIELD VERIFY ALL DIMENSIONS. ISSUES AND CONCERNS SHALL BE REPORTED TO FOUR WINDS.

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CONTRACTOR TO OBTAIN ALL BUILDING PERMITS, SOIL STUDIES, AND STRUCTURAL DETAILS AS REQUIRED BY THE MUNICIPALITY.

PROJECT DISPLAY BOARD INSTALLED BY JRA. CONTRACTOR TO LEAVE BOARD IN PLACE UNTIL FINAL GRADING.

CONTRACTOR TO MAINTAIN LAMINATED TEMPORARY CLOSURE SIGNS THROUGHOUT DURATION OF THE PROJECT.

CONTRACTOR TO DOCUMENT DEPTHS OF BASIN EXCAVATION AND EXPLORATORY EXCAVATION (STORMWATER INFRASTRUCTURE EXPOSURE) WITH PHOTOS IN REAL TIME. UPLOAD TO DROPBOX WITH LINK PROVIDED BY LANDSCAPE ARCHITECT.

STUMPS SHALL BE GROUND TO THE GREATEST EXTENT POSSIBLE INCLUDING SURROUNDING ROOT MASS. REMOVE DEBRIS AND BACKFILL WITH HIGH GRADE TOPSOIL. NOTE TREES TO BE MECHANICALLY REMOVED; ALL CAN BE REMOVED MECHANICALLY IF PREFERABLE.

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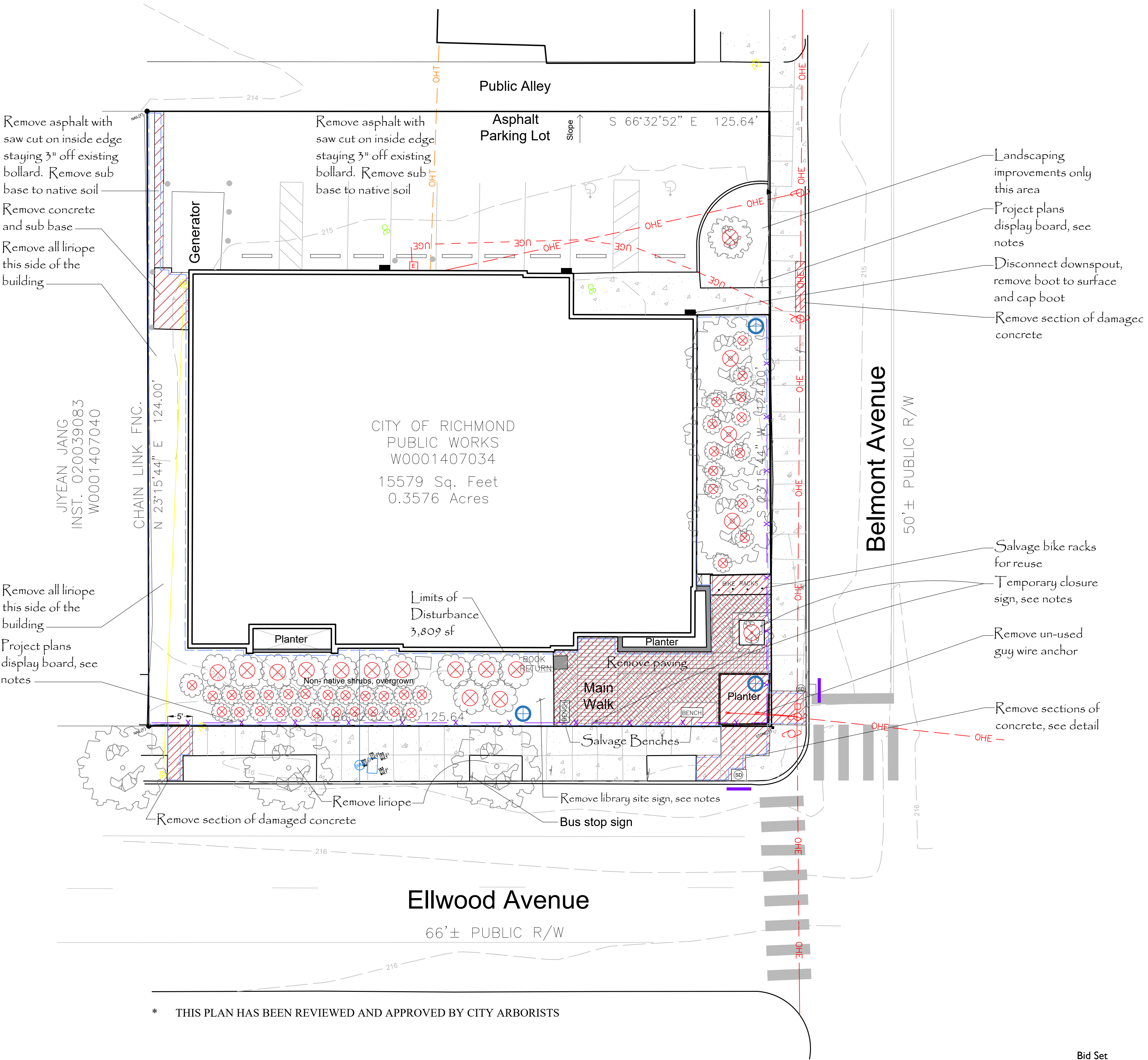
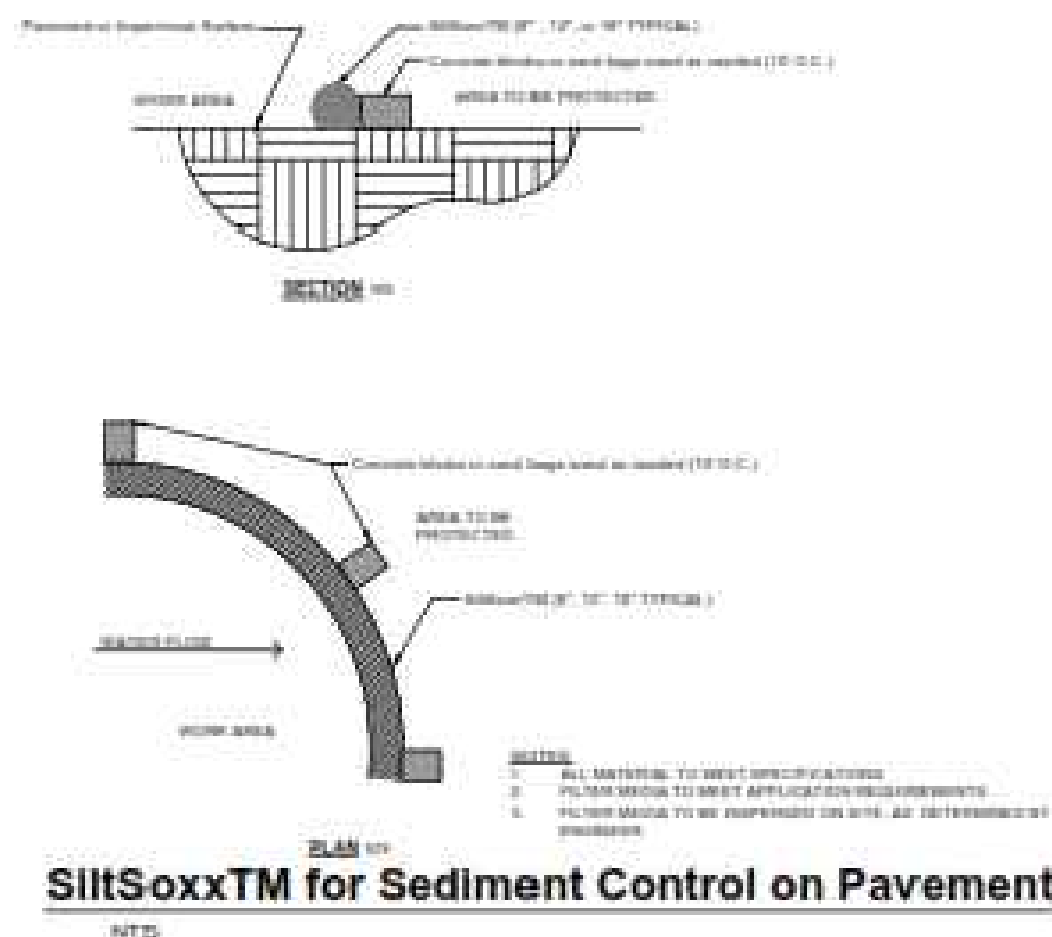
### Erosion & Sediment Control

- Silt Fence, see detail
- 8" Silt Soxx, (2) see detail
- Limits of Disturbance

### Construction Access Notes:

Due to the urban nature and selective demolition of the site, all site access will be from adjacent roadways and alleys.

- Installation of a Construction Entrance is not feasible. Contractor shall minimize sediment runoff from site at all times during construction. Any sedimentation of adjacent sidewalks, curb & gutter and roadways will be cleaned immediately as required by the minimum standards.
- Contractor shall provide all required Work Area Protection signage and necessary road closures shall be coordinated with and permitted by DPW.



\* THIS PLAN HAS BEEN REVIEWED AND APPROVED BY CITY ARBORISTS



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- ELEC. METER
- UTILITY POLE
- CLEAN OUT
- ELEC. PANEL/BOX
- BOLLARD
- STORM DRAIN

- U.G. WATER
- U.G. GAS
- O.H. TELEPHONE
- CONCRETE

- Downspout locations
- Downspout location, goes below ground

### Erosion & Sediment Control

- Silt Fence, see detail
- 8" Silt Sox, (2) see detail
- Limits of Disturbance

Existing Trees & Shrubs To Be Preserved:

### Proposed Elements, see details

- (8) Bee Zone Markers
- Concrete
- Bioretention Basin
- Irrigation conduit: 4" sched 40 PVC

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FINISH GRADE OF ALL PLANTING BEDS SHALL BE LEFT 5" BELOW MASONRY FINISH ELEVATION OF PROPOSED AND EXISTING PAVING EXCEPT WHERE NOTED.

ALL DEBRIS SHALL BE REMOVED FROM THE SOIL IN ALL PLANTING AREAS.

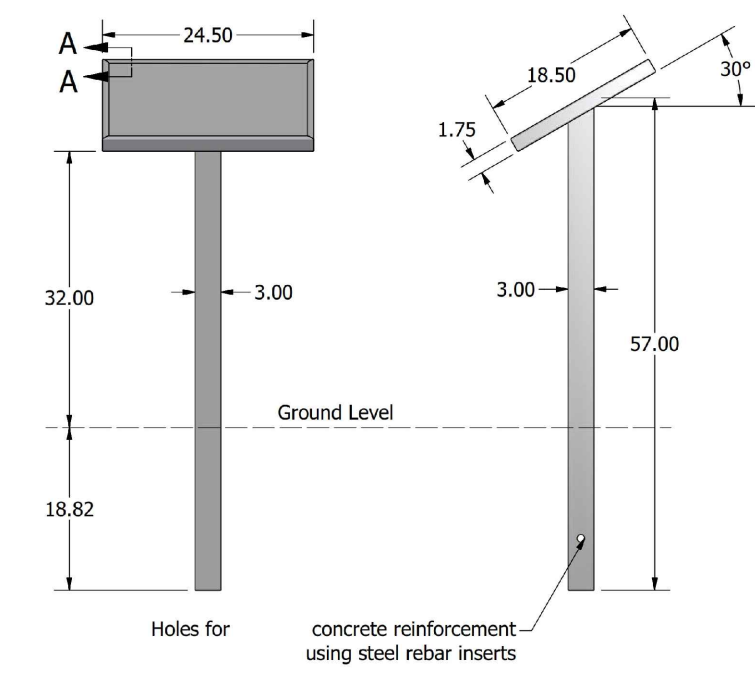
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ADDITIONAL DIMENSIONS AND LAYOUT NOTATION PROVIDED WITH CONSTRUCTION DOCUMENTS.

CONTRACTOR TO SUBMIT SPEC SHEET FOR THE BIORETENTION MEDIA AND PROVIDE A MOCK-UP OF THE CONCRETE FINISHING FOR ALL CONCRETE FINISHING.

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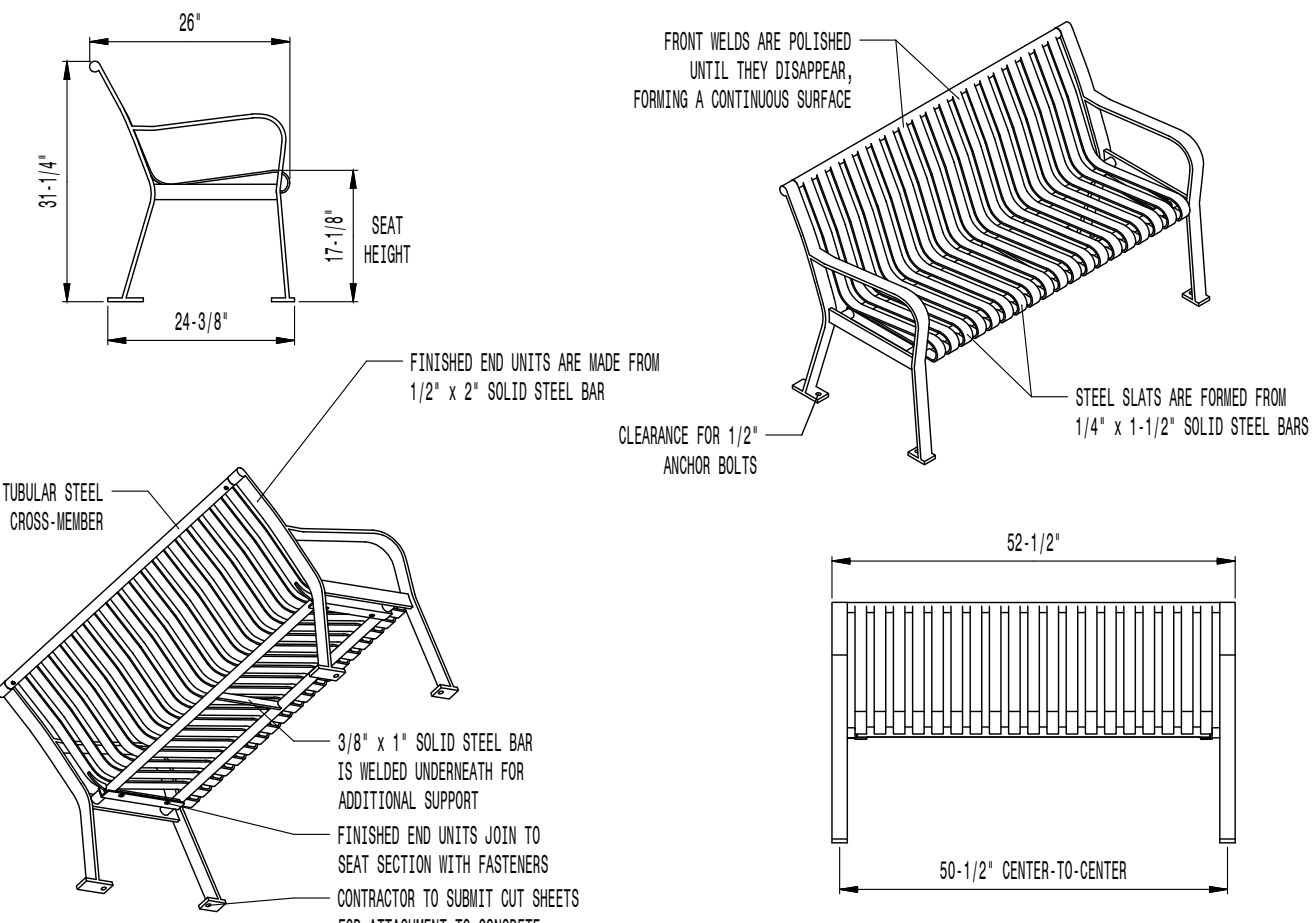


HARDWARE INCLUDED		
Type	QTY	Image
1/4"-20 x 3/8" Stainless Steel Hex Drive Button Head Screws	4 each	
5/32" Hex Key	1 each	
1/4" Aluminum Drive Rivets	2 each	



### INTERPRETIVE SIGN

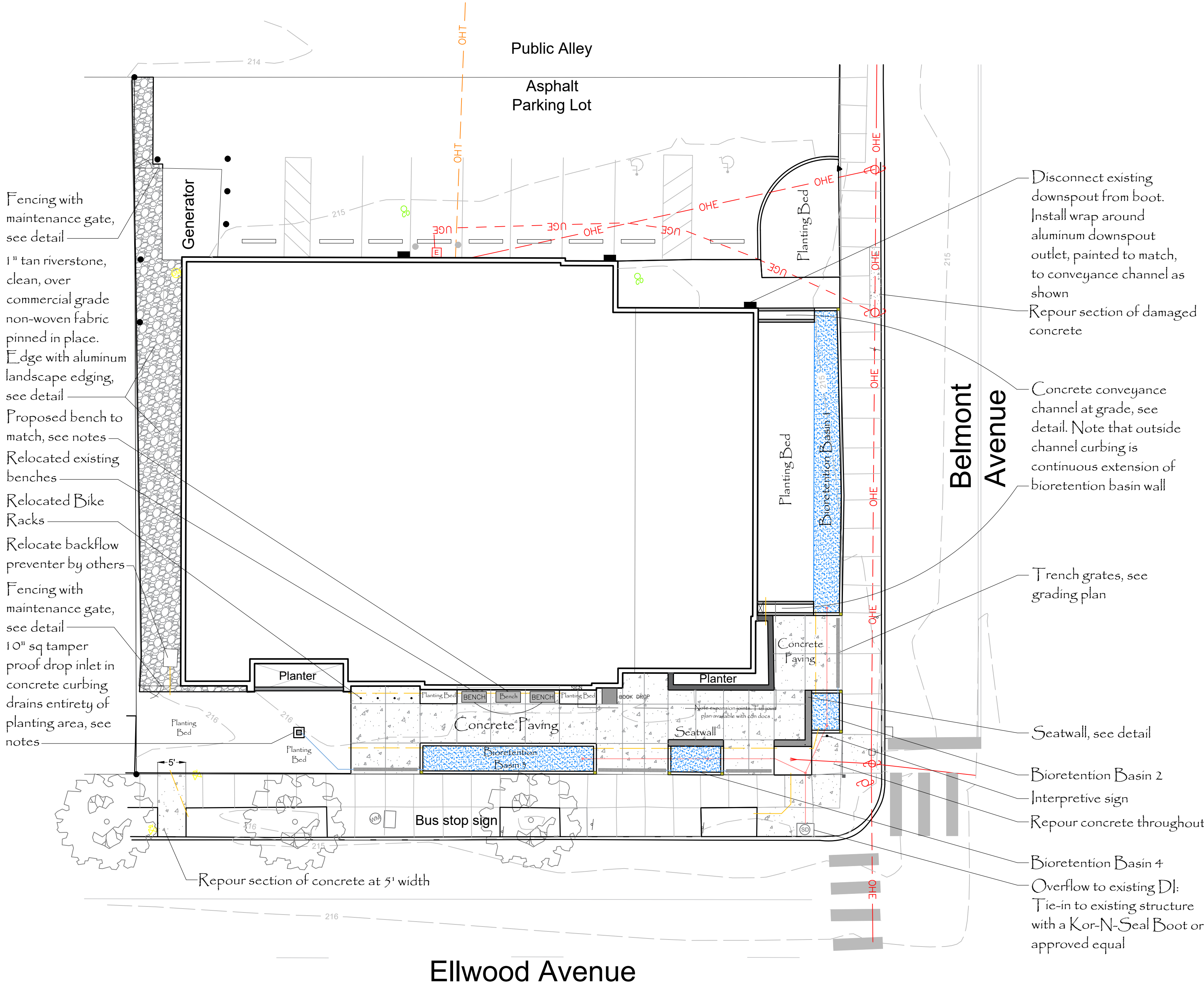
NO SCALE



### BENCHES

RB-28 BENCH BY VICTOR STANLEY IN 6' LENGTH BLACK POWDER COATING

NO SCALE





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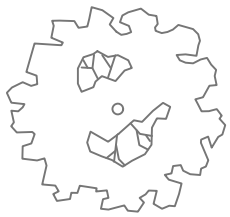
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### Erosion & Sediment Control

Existing Trees & Shrubs To Be Preserved:



- Silt Fence, see detail
- 8" Silt Soxx, (2) see detail
- Limits of Disturbance

### Proposed Elements, see details

- (8) Bee Zone Markers
- Concrete
- Bioretention Basin

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COMPREHENSIVE GRADING PLAN INCLUDING CRITICAL SPOT ELEVATIONS PROVIDED WITH CONSTRUCTION DOCUMENTS.

ALL CONVEYANCE PIPING (OTHER THAN UNDERDRAINS) SHALL BE AT A 2% MINIMUM SLOPE.

TRENCH GRATES SHALL BE 6" x 24" ARGO TRENCH GRATE BY IRON AGE GRATES (AN6-24IO3) IN CAST ALUMINUM. USE TAMPER PROOF SCREWS. USE 6" NDS DURASLOPE HDPE TRENCH DRAIN (NDL150-08) SET IN CONCRETE POUR OR APPROVED EQUAL.

#### STORMWATER MANAGEMENT NARRATIVE

The existing site contains the library building, associated parking, sidewalks, a public benches and landscaping. Drainage generally runs away from the building toward the adjacent roadways. The parking lot drains to the alley, to the adjacent streets, Ellwood Avenue and Belmont Avenue. All drainage from the site and surrounding sidewalks is collected into the City's combined sewer system at the adjacent inlets at the intersection.

The main objective and purpose of this project is to provide improved aesthetics through landscaping enhancements that will reduce runoff, improve stormwater quality and promote infiltration. This will be achieved through the installation of Bio Retention Basins that will collect and treat roof runoff as well as the adjacent on-site concrete areas. While the limits of disturbance is less than 4,000 square feet, for purposes of this project, the entire site will be used to define the disturbed area to illustrate how the proposed improvements affect the stormwater runoff from the site.

#### Stormwater Quality Analysis:

While water quality treatment is not required due to the location in the combined sewer services area, calculations are provided to illustrate the impact of the improvements made on the site. As indicated by the VRRM calculations, if this project were required to meet the water quality standards, the design exceeds the requirements of 9VAC25-875-590 for water quality treatment on a ReDevelopment project. The TP Load Reduction Required is 0.04 lb/yr of Phosphorous. The Target TP Load Reduction is Exceeded by 0.01 lb/yr; a total of 0.05 lb/yr of Phosphorous will be removed from the site after the improvements.

#### Stormwater Quantity Analysis:

While water quantity analysis is not required due to the disturbed area being below the threshold of 4,000 sf, the stormwater quantity analysis is based on Minium Standard 19, which requires that the site be developed such that it will not cause the pre-development peak runoff rate from a ten-year storm to increase when runoff outfalls into a man-made channel, inclusive of sanitary sewer flow. In other words

$$(Q10pre+Qsan\ pre)\geq(Q10post+Qsan\ post).$$

For this project, there is no change to the sanitary sewer discharge, so the requirement is:

$$Q10pre\geq Q10post$$

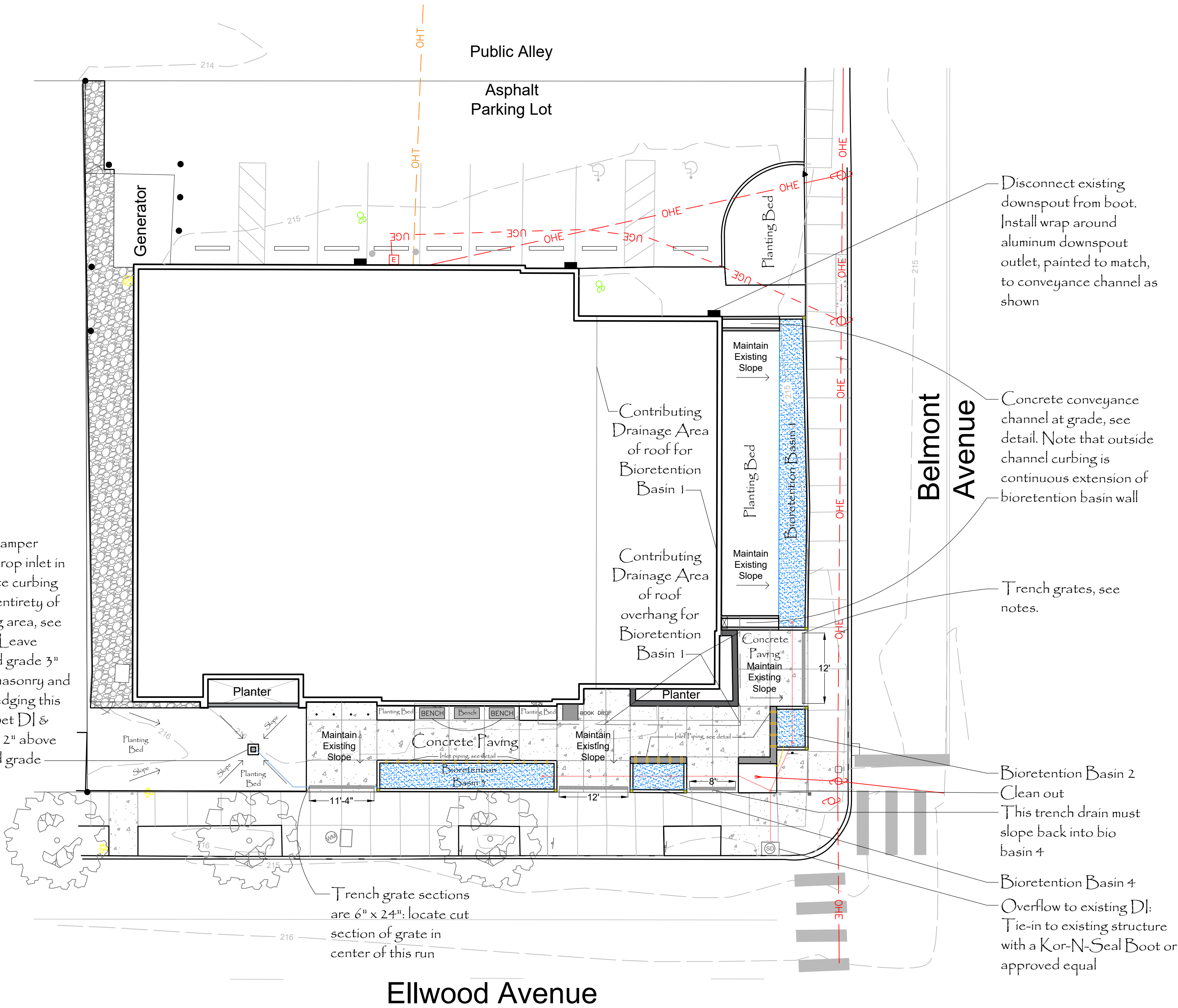
This is achieved through the improvement of the infiltration rates of the pervious areas on site and the treatment of runoff from roof area and adjacent on-site sidewalk areas in Bioretention Basins in the sidewalk.

The resultant calculations show that the design is in compliance with MS-19 requirements:

$$Q10pre=2.04\ cfs\geq\ Q10post=2.04\ cfs$$

10" sq tamper proof drop inlet in concrete curbing drains entirety of planting area, see notes. Leave finished grade 3" below masonry and gravel edging this area. Set DI & curbing 2" above finished grade

Trench grate sections are 6" x 24": locate cut section of grate in center of this run



Ellwood Avenue

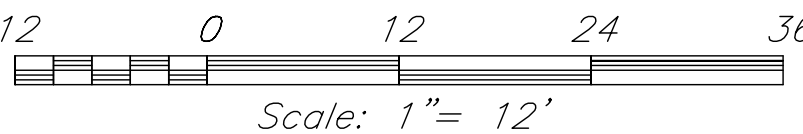
Bid Set	
Revision Block	

Date: 10-22-25  
Sheet 3 of 7



FOUR WINDS DESIGN, LC

Grading Plan  
For construction









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Existing Trees & Shrubs To Be Preserved:

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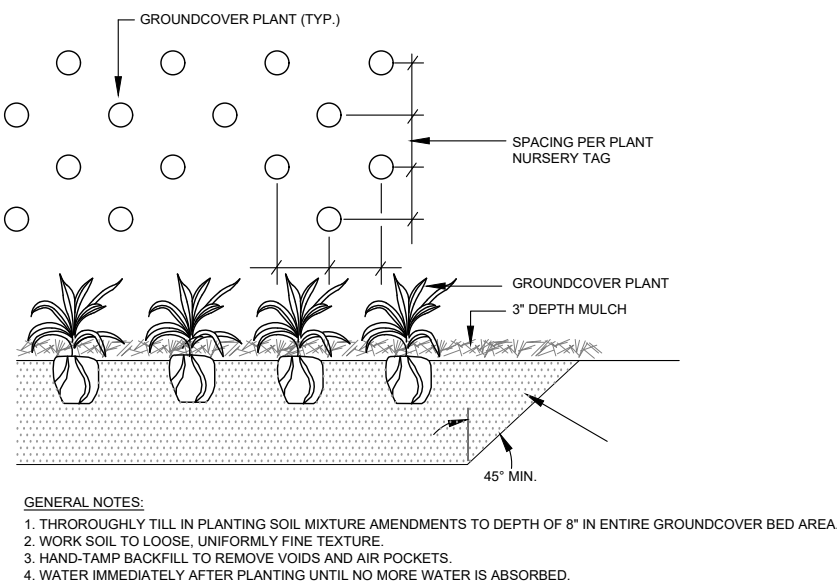
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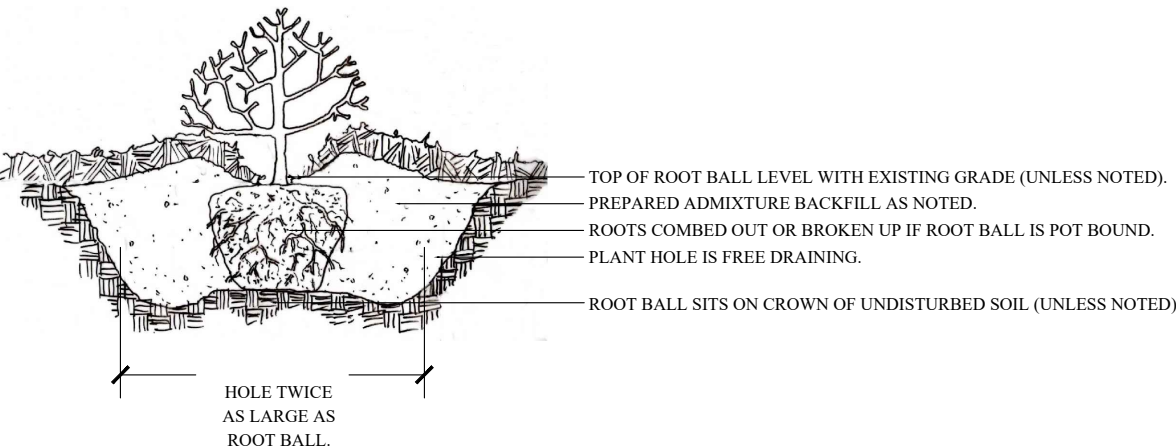
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PLANTS, SOIL AMENDMENTS, AND MULCH WILL BE INSTALLED BY VOLUNTEERS.

Belmont Branch Plant Schedule				
Code	Botanical Name	Common Name	Quantity	Size
AA	Amelanchier laevis	Serviceberry	1	8-10'
AM	Aronia melanocarpa 'Snowfire'	Chokeberry	17	3 Gal
AI	Asclepias incarnata	Swamp Milkweed	20	1 Gal
CC	Cercis canadensis	Redbud	4	8-10'
CV	Chionanthus virginicus 'Spring Fleeing'	Fringetree	3	6-8'
CR	Cimicifuga racemosa 'Chocoholic'	Black Snakeroot	22	1 Gal
CA	Clethra alnifolia	Summersweet	7	3 Gal
DI	Dryopteris intermedia	Fancy Fern	21	1 Gal
IV	Ilex vomitoria 'Bordeaux'	Dwarf Yaupon Holly	13	7 Gal
IC	Iris cristata 'Tennessee White'	Dwarf Crested Iris	96	1 Qt
IT	Itea virginica 'Little Henry'	Sweetspire	6	3 Gal
JH	Juniperus horizontalis 'Mother Lode'	Creeping Juniper	3	1 Gal
PV	Panicum virgatum 'Purple Tears'	Switch Grass	23	1 Gal
SS	Schizachyrium scoparium 'Shining Star'	Little Bluestem	10	1 Gal
TV	Tradescantia virginiana	Spiderwort	95	1 Qt



GENERAL NOTES:  
1. THOROUGHLY TILL IN PLANTING SOIL MIXTURE AMENDMENTS TO DEPTH OF 8" IN ENTIRE GROUND COVER BED AREA.  
2. WORK SOIL TO LOOSE, UNIFORM FINE TEXTURE.  
3. HAND TAMP BACKFILL TO REMOVE VOIDS AND AIR POCKETS.  
4. WATER IMMEDIATELY AFTER PLANTING UNTIL NO MORE WATER IS ABSORBED.

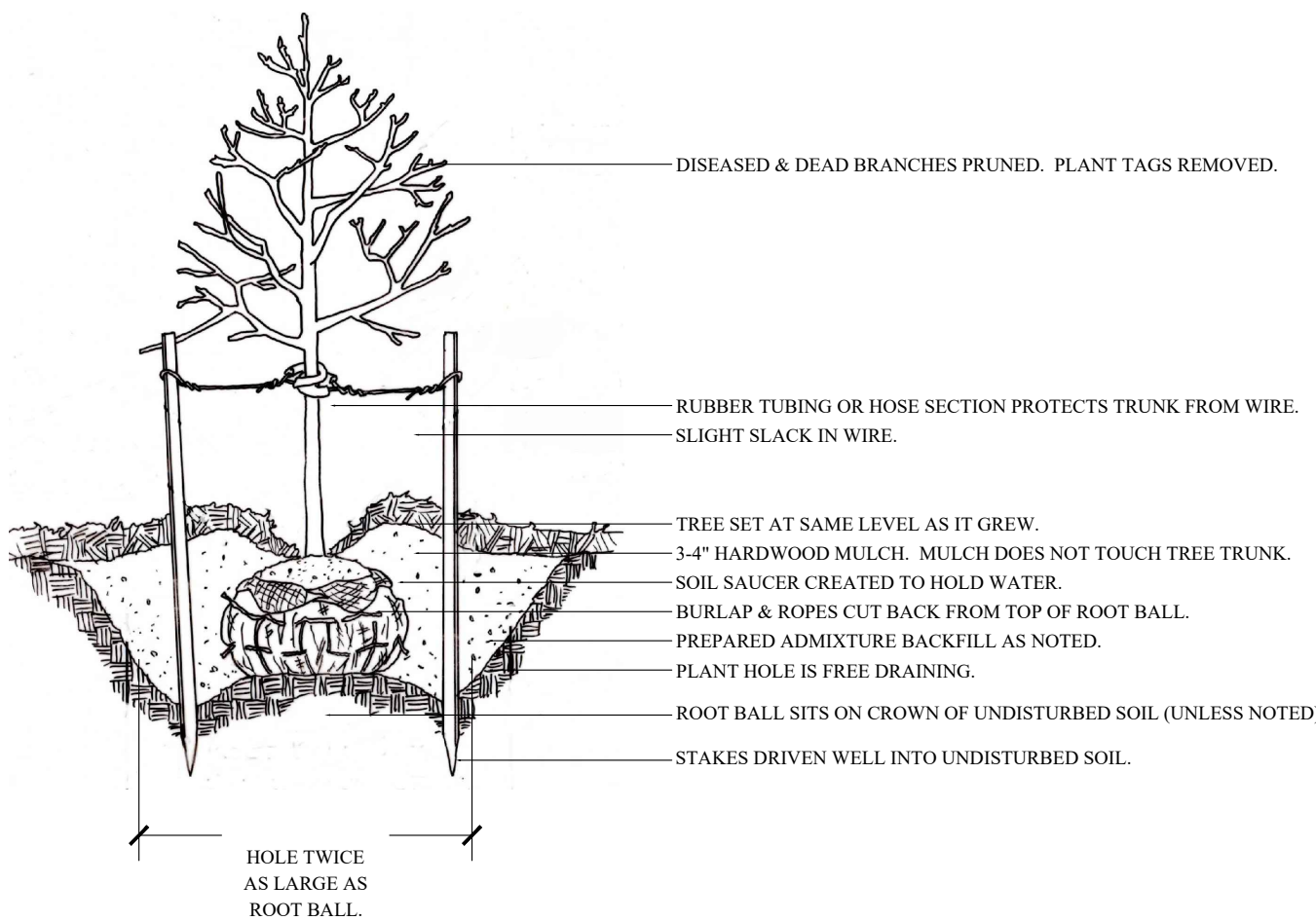


Shrub Planting

Scale: none

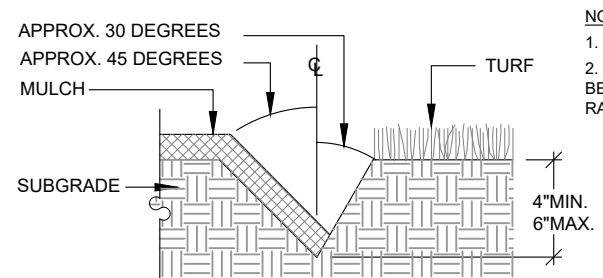
Perennial Planting

Scale: none



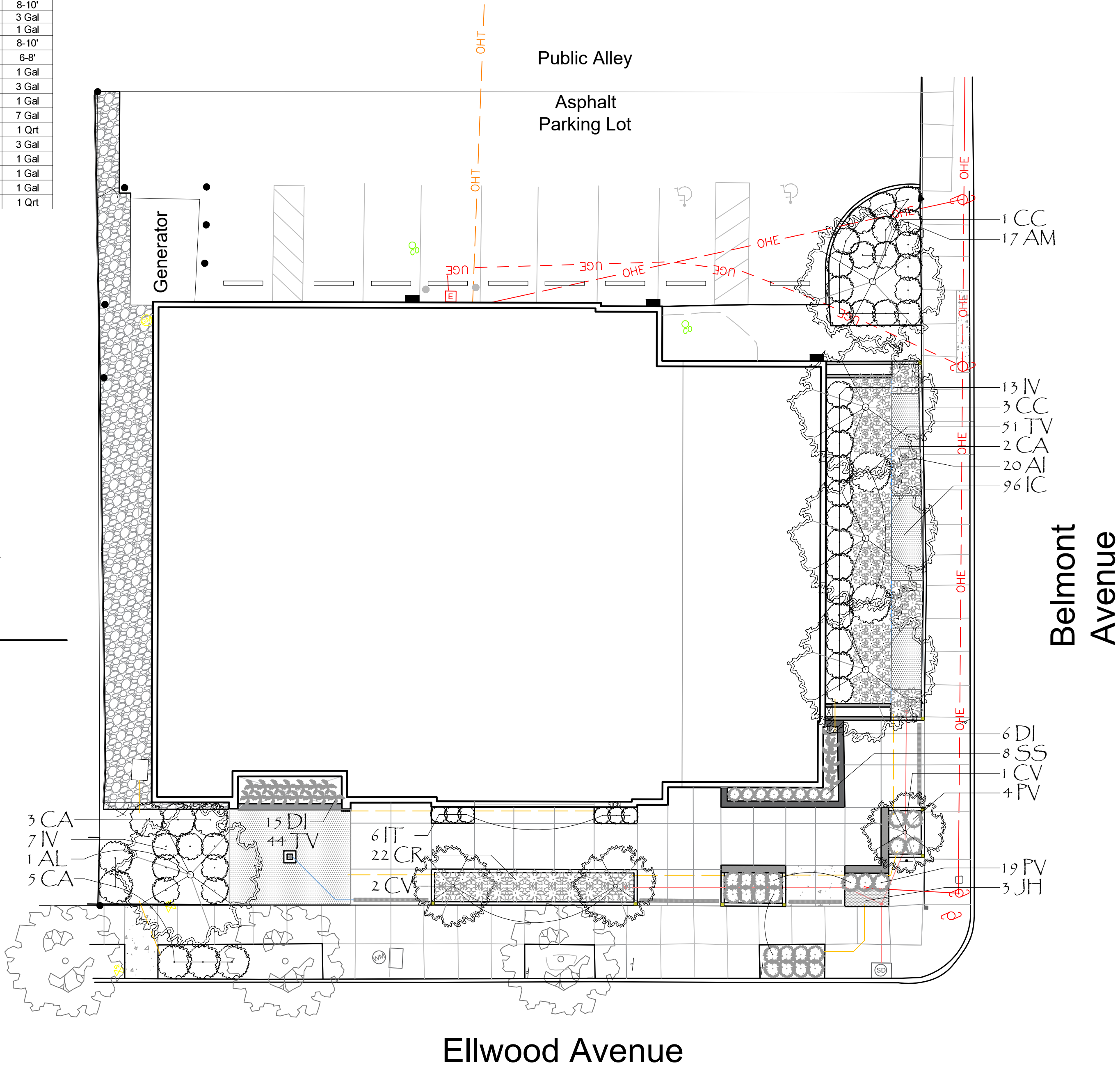
Tree Planting

Scale: none



Planting Bed Edge

Scale: none



Ellwood Avenue

Belmont Avenue



# Greening Richmond Public Libraries

## IMPROVING THE HEALTH OF THE JAMES RIVER BY REDUCING STORMWATER POLLUTION

### Belmont Branch Library

3100 Ellwood Avenue, Richmond, 23221

#### VESCH GENERAL EROSION AND SEDIMENT CONTROL NOTES

ES-1: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS 9VAC25-840.

ES-2: THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE-CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.

ES-3: ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.

ES-4: A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.

ES-5: PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (LANDING, BUT NOT LIMITED TO OFF-SITE BORROW OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.

ES-6: THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.

ES-7: ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.

ES-8: DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.

ES-9: THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

#### RICHMOND STANDARD E&S NOTES

1. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

2. EXCESS EXCAVATION DISPOSED OF OFF THE SITE SHALL BE DISPOSED OF IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

3. EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED IN ACCORDANCE WITH VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND SHALL BE PLACED PRIOR TO OR AS THE FIRST STEP OF THE LAND DISTURBING ACTIVITY.

4. EROSION AND SEDIMENT CONTROLS SHALL BE MAINTAINED SO THAT THE SEDIMENT CARRYING RUNOFF FROM THE SITE WILL NOT ENTER STORM DRAINAGE FACILITIES.

5. EROSION AND SEDIMENT CONTROLS SHALL BE MAINTAINED UNTIL THE DISTURBED AREA IS STABILIZED.

6. PROPERTIES ADJOINING THE SITE SHALL BE KEPT CLEAN OF MUD OR SILT CARRIED FROM THE SITE BY VEHICULAR TRAFFIC OR RUNOFF.

7. THE DISPOSAL OF WASTE MATERIALS REMOVED FROM EROSION AND SEDIMENT CONTROL FACILITIES AND THE DISPOSAL OF THESE FACILITIES SHALL BE IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

8. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.

9. DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE APPLICANT IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.

#### Greening Richmond Public Libraries: DCR Bioretention Design Standards Compliance, Belmont Branch

BMP	DCR Design Standard	Sizing	Ponding Depth	Media Depth	Gravel Sump Depth	Calculated Storage	Depth	Infiltration Rate	Underdrain	Geometry	Pre-treatment	Conveyance	Planting	Setbacks
Basin 1 BioRetention	Table 9-3, Level One	CDA= 1700.4 sq ft impervious, 496.4 pervious 75.9 sq ft required, 124.3 sq ft provided	3"	30"	12"	1.275		< .5"/ hr	6" perf PVC	one cell design SFPH/L ratio 0.3 or greater	Energy Dissipater at downspouts & textured conveyance channels	on-line; downspouts & sheet flow	>75% coverage in 2 yrs	10' from foundation no utilities this area
Basin 2 Micro BioRetention	Table 9-2, Level One	CDA= 224.4 sq ft impervious, 0 pervious 6.73 sq ft required, 32.6 sq ft provided	6"	36"	12"	1.65		< .5"/ hr	6" perf PVC	one cell design SFPH/L ratio 0.3 or greater	Trash screen on weep holes	on-line; sheet flow	>75% coverage in 2 yrs	10' from foundation no utilities this area
Basin 3 Micro BioRetention	Table 9-2, Level One	CDA= 469.3 sq ft impervious, 580.7 pervious 14.08 sq ft required, 126.3 sq ft provided	6"	36"	12"	1.65		< .5"/ hr	6" perf PVC	one cell design SFPH/L ratio 0.3 or greater	Trash screen on weep holes	on-line; sheet flow	>75% coverage in 2 yrs	10' from foundation no utilities this area
Basin 4 Micro BioRetention	Table 9-2, Level One	CDA= 335 sq ft impervious, 0 pervious 10.5 sq ft required, 40.7 sq ft provided	6"	36"	12"	1.65		< .5"/ hr	6" perf PVC	one cell design SFPH/L ratio 0.3 or greater	Trash screen on weep holes	on-line; sheet flow	>75% coverage in 2 yrs	10' from foundation no utilities this area

Runoff coefficients are .95 for impervious roof or pavement and .4 for planting bed or turf

Basin 1	Basin 2	Basin 3	Basin 4
SA = (TV (151.17/ 2 ft) = 75.59 TV impervious = (.95 x 1700.4 sq ft CDA/ 12 =134.62 TV pervious = (.4 x 496.4 sq ft CDA/ 12 = 16.55 Calc. Depth = 3" ponding @100%+2.5@25%+1@40%	SA = 3% CDA = 6.73 TV impervious = (.95 x 224.4 sq ft CDA/ 12 = 17.77 TV pervious = (.4 x 0 sq ft CDA/ 12 = 0 Calc. Depth = 6" ponding @100%+3@25%+1@40%	SA = 3% CDA =14.08 TV impervious = (.95 x 469.3 sq ft CDA/ 12 = 37.15 TV pervious = (.40 x 580.7 sq ft CDA/ 12 = 16.02 Calc. Depth = 6" ponding @100%+3@25%+1@40%	SA = 3% CDA =10.05 TV impervious = (.95 x 335 sq ft CDA/ 12 = 26.52 TV pervious = (.40 x 0 sq ft CDA/ 12 = 0 Calc. Depth = 6" ponding @100%+3@25%+1@40%



#### Landscape Operations & Maintenance Manual

##### Overview & System Functions

The site improvements at the Richmond Public Libraries are designed to be ecologically responsible landscapes that infiltrate stormwater on site, provide habitat and educational value by planting native species, and serve as a model for future development. This commitment to ecosystem services is also reflected in the care and maintenance of the properties to ensure that plants survive, infiltration systems remain in good function, and resources needed for landscape care are minimized.

Each site will be equipped with an operations and maintenance manual that is specific to the plant species and site improvements found there; bound and laminated copies of this manual will be supplied to the third-party contractor responsible for RPL landscape maintenance while a copy of the manual will also reside at each branch in a designated location known to the branch manager. At the date of writing the site-specific manuals are not yet available as the projects have yet to be constructed. Branch managers and contractor will complete an Annual Inspection Checklist jointly at the start of each growing season. This completed checklist will be bound into the library branch copy of the O&M Manual for inspection by city parties as desired. See below for the Annual Inspection Checklist.

This manual is an abbreviated version that has been reviewed and adopted by Richmond City Council

##### Scope of Weekly Services

###### Lawn Mowing

At each visit the entirety of the lawn area shall be mowed with all clippings recycled back into the lawn. Care shall be taken not to blow lawn clippings into planting beds (mow from the perimeter into the interior blowing clippings toward the center). Lawn edges shall be string trimmed.

###### Weeding

At each visit a visual inspection of the planting beds shall be made with all debris and trash removed. Weeds outside of Bee Zones may be treated with herbicides at rates specified on the product used. Weeding within the Bee Zones must be done by hand with care taken not to damage plants. If in doubt as to whether a plant is a weed or not – particularly emerging perennials – consult with fellow workers or wait until the next visit.

##### Irrigation Inspection and Watering

At each visit the site shall be inspected for excessively wet areas that may indicate an irrigation leak or excessively dry areas that may indicate a non-functioning or improperly aimed head. Plant decline is another indicator of improper water amounts but do not assume that browned leaves indicate drought, it is also a sign of root rot due to excessive water. Workers shall report issues to the head of their company.

Bioretention areas will require hand watering once a week over the first summer IF IT DOES NOT RAIN. Check the rain gauge provided at each site (see site specific manuals for locations). On some sites, the bioretention basins are equipped with their own irrigation zone for use in the first year only and in emergency cases thereafter. If this is the case inspect the planting area for irrigation issues as one would any other planting bed.

##### Surface Cleaning/ Blowing

At each visit the site parking lots and sidewalks shall be cleaned of debris. All trash shall be separated from organic matter and disposed of. On some sites, a surface leaf composting area is provided. This is intended to reduce the amount of material that must leave the site and provide compost for future projects. See site specific manuals for pattern of site blow down to move leaves and organic matter to composting areas. Care shall be taken not to blow material into bioretention basins or onto pervious pavers.

##### Bioretention Basin Care

For the first six months following construction the site should be inspected at least twice after storm events in excess of a ½" inch of rainfall. Weekly inspections shall also include:

- Check for sediment buildup or a fine crust at curb cuts, inflow points, gravel diaphragms or pavement edges that prevents flow from getting into the bed and remove any sediment.
- Look for bare soil or sediment sources draining to the bioretention basin and stabilize them immediately. These may include bare or eroding lawn areas that should be spot reseeded. Scarify the soil, apply seed and erosion control elements such as straw or erosion control blanket as necessary. Contractor to collect and quantify materials and labor used in stabilization practices to be billed in the next billing cycle.
- Check the bioretention bed for evidence of mulch flotation, excessive ponding, dead plants or concentrated flows, and take appropriate remedial action. These actions may include replacing dead plants immediately or raking mulch back into place. If dead plants are encountered, remove the dead portion of the plant to the ground for appearance. Do not remove the root ball until the replacement plant is on site. Workers shall report the plant removal or (dead trees they cannot handle) to the head of their company. See below for plant replacement protocol.
- Check for clogged or slow-draining soil media, a crust formed on the top layer, inappropriate soil media, or other causes of insufficient filtering time, and restore proper filtration characteristics.
- If water remains on the surface for more than 48 hours after a storm, adjustments to the grading may be needed or underdrain repairs may be needed. Report ongoing issues to the head of the maintenance company. See scope of biannual services below.

##### Pervious Paver Care

For the first six months following construction the site should be inspected at least twice after storm events in excess of a ½" inch of rainfall. Weekly inspections shall also include:

- Remove all material and sediments from the paver surface.
- Check to make sure aggregate material from between the pavers has not blow up onto the surface. If it has, either remove it or sweep back into the joints with a broom.
- Inspect the condition of the observation well cap to make sure it has not been knocked off.
- Inspect the surface of the permeable pavement for evidence of sediment deposition, organic debris, staining or ponding that may indicate surface clogging. Look for areas of sediment intrusion such as mulch migrating onto the pavers. Remove material and dig a trench edge where the intrusion has occurred. Workers shall report ongoing issues to the head of their company.

##### Scope of Annual Services

###### Annual Inspection

Branch managers and contractor will complete an Annual Inspection Checklist jointly at the start of each growing season. This shall occur after all species have leafed out for the year. This completed checklist will be bound into the library branch copy of the O&M Manual for inspection by city parties as desired. Inspections shall include:

- Note any dead or severely damaged plants and replace with the same species and cultivar or with a species approved by the RPL Maintenance and Operations Facilities Manager. This includes denuded lawn areas that flow into bioretention basins. Expenditures of up \$200 per site per biannual season may be made at the discretion of the contractor and billed to RPL with a PO or invoice from the plant supplier. Expenditures in excess of \$200 per site per season must be approved by the RPL Maintenance and Operations Facilities Manager with a formal estimate. If specific plants have been replaced more than once and continue to die, consult a horticulturalist or landscape architect to identify the issue and provide new species selection. Confirm that 75% to 90% of vegetative cover is maintained in the bioretention basins and add reinforcement plantings to maintain the desired density if needed.

- Inspect the health of all trees on site, noting dead wood to be removed or signs of disease and damage. Note any issues on the annual inspection report. These issues shall be forwarded to the city arborists by the Branch Manager.
- Inspect the entirety of the site per the weekly scope of work.
- Inspect the mulch layer for a maximum of 3" of mulch that doesn't touch the trunks of any trees or shrubs nor be mounded up around perennials. Adjust accordingly. Note that annual re-mulching will occur once a year in the fall.
- Inspect the surface of the permeable pavement for evidence of sediment deposition, organic debris, staining or ponding that may indicate surface clogging. Look for areas of sediment intrusion such as mulch migrating onto the pavers.
- Inspect the structural integrity of the pavement surface, looking for signs of surface deterioration, such as slumping, cracking, spalling or broken pavers. Replace or repair affected areas, as necessary.
- Inspect the condition of the observation well and make sure it is still capped.
- Generally, inspect any contributing drainage area for any controllable sources of sediment or erosion.
- Inspect the surface of the permeable pavement for evidence of sediment deposition, organic debris, staining or ponding that may indicate surface clogging. Then, test sections by pouring water from a five gallon bucket to ensure they work. If any signs of clogging are noted, schedule paver cleaning or system overhaul. Cleaning shall be accomplished with a vacuum machine rated for pervious paver cleaning such as the Typhoon Surface and Joint Cleaner by Pavetech. If a qualified machine is not available the paving system has been built in such a way so that the pavers, 1" fine aggregate setting bed, and fine aggregate joint material can be replaced:
  - Remove all pavers and set aside.
  - Remove all 21A gravel joint and setting bed material. This is contained by mortared edge restraints and separated from lower gravel layers with filter fabric.
  - With fine aggregates removed test the system as noted above. If issues persist contact a civil engineer or landscape architect for further exploration.
  - Clean or replace filter fabric taking care not to allow sediment into lower layers.
  - Replace setting bed, clean and relay pavers, and sweep with joint material.

##### Maintenance Duties

###### Contractor Selection and Contracts

The Director of The Richmond Public Libraries and his staff at his discretion shall select the maintenance contractor to take care of all RPL properties. Contracts shall include the contractor's DPOR license number, a copy of professional insurance, and hourly labor rate and narrative describing standard mark-ups on materials, if applicable. The remainder of the contract should reiterate the above or reference this document.

##### Additional Maintenance

The City of Richmond shall provide ongoing site maintenance for the following:

- Tree removal or tree pruning not accessible from the ground.
- Snow removal and ice treatment. No salt may be used on in areas draining to Bee Zones.
- Maintenance of hardscapes and utilities.
- Dumpster service and maintenance / cleaning of dumpster enclosures and surrounding areas.
- Gutter/ roof cleaning as necessary in areas where downspouts drain to bioretention basins or pervious pavers

Greening Richmond Public Libraries  
Belmont Branch Library  
Pre-Development Runoff Calculations

**Drainage Summary**

C Factor:

Description	Area (ac)	C-factor
Existing Impervious	0.290	0.90
Existing Permeable	0.070	0.40
Total :	0.360	0.80

Tc Calculations:

Tc = 5.00 Min (Minimum)

$$I = \frac{B}{(Tc + D)^E}$$

I<sub>2</sub> = 5.32 IN/Hr  
I<sub>10</sub> = 7.07 IN/Hr  
I<sub>100</sub> = 9.00 IN/Hr

Existing Runoff Conditions:

C-factor	Area	Q <sub>2</sub>	Q <sub>10</sub>	Q <sub>100</sub>
0.80	0.36	1.54	2.04	3.25

Greening Richmond Public Libraries

Belmont Branch Library

Post-Development Runoff Calculations

**Drainage Summary**

C Factor:

Description	Area (ac)	C-factor
Proposed Impervious	0.300	0.90
Proposed Permeable	0.060	0.30
	Note impervious area infiltration rates are improved	
<b>Total :</b>	<b>0.360</b>	<b>0.80</b>

resulting in an improved C factor.

**Tc Calculations:**

Tc = 5.00 Min

$$I = \frac{B}{(Tc + D)^E}$$

I<sub>2</sub> = 5.32 IN/Hr

I<sub>10</sub> = 7.07 IN/Hr

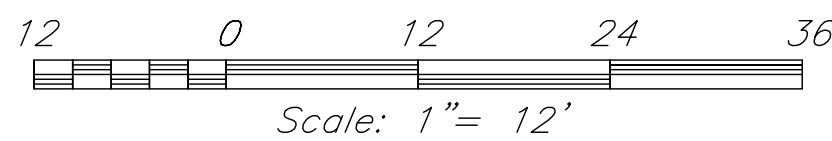
I<sub>100</sub> = 9.00 IN/Hr

**Proposed Runoff Conditions:**

C-factor	Area	Q <sub>2</sub>	Q <sub>10</sub>	Q <sub>100</sub>
0.80	0.36	1.53	2.04	3.24

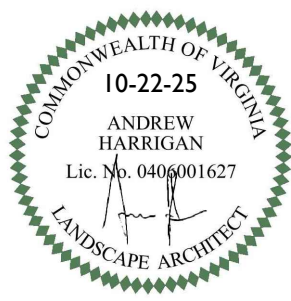
**Bid Co**

Notes  
For construction



Bid Set
Revision Block

Date: 10-22-25  
Sheet 6 of 7





**3100 Ellwood Avenue, Richmond, 23221**

Site Results (Water Quality Compliance) VRRM 4.1, 2024							
Area Checks	D.A.A	D.A.S	D.A.C	D.A.D	D.A.E	AREA CHECK	
<b>FOREST (n)</b>	0.00	0.00	0.00	0.00	0.00	OK	
MIXED OPEN AREA (n)	0.00	0.00	0.00	0.00	0.00	OK	
MIXED OPEN AREA TREATMENT (n)	0.00	0.00	0.00	0.00	0.00	OK	
MANAGED TURF AREA (n)	0.00	0.00	0.00	0.00	0.00	OK	
MANAGED TURF AREA TREATMENT (n)	0.01	0.00	0.01	0.00	0.00	OK	
IMPERVIOUS COVER (n)	0.00	0.01	0.00	0.01	0.00	OK	
IMPERVIOUS COVER TREATMENT (n)	0.00	0.01	0.00	0.01	0.00	OK	
AREA CHECK	OK	OK	OK	OK	OK		
Site Treatment Volume (l/s)							
1.002							
Runoff Reduction Volume and TP By Drainage Area							
D.A.A	D.A.S	D.A.C	D.A.D	D.A.E	TOTAL		
RUNOFF REDUCTION VOLUME ACHIEVED (l/s)	0	7	17	11	0	34	
TP LOAD AVAILABLE FOR REMOVAL (l/s)	0.04	0.00	0.02	0.03	0.00	0.07	
TP LOAD REDUCTION ACHIEVED (l/s)	0.00	0.00	0.00	0.00	0.00	0.00	
TP LOAD REMAINING (l/s)	0.04	0.00	0.02	0.03	0.00	0.07	
NITROGEN LOAD REDUCTION ACHIEVED (l/s)	0.48	0.04	0.13	0.06	0.00	0.71	
<b>Total Phosphorus</b>							
FINAL POST-DEVELOPMENT TP LOAD (l/s)	0.03						
TP LOAD REDUCTION REQUIRED (l/s)	0.04						
TP LOAD REDUCTION ACHIEVED (l/s)	0.00						
TP LOAD REMAINING (l/s)	0.03						
REMAINING TP LOAD REDUCTION REQUIRED (l/s)	0.03						
** TARGET TP REDUCTION EXCEEDED BY 60.1% LOAD **							
<b>Total Nitrogen (For Information Purposes)</b>							
POST-DEVELOPMENT LOAD (l/s)	4.18						
NITROGEN LOAD REDUCTION ACHIEVED (l/s)	0.71						
REMAINING POST-DEVELOPMENT NITROGEN LOAD (l/s)	3.46						

Virginia Runoff Reduction Method Worksheet																	
Site Compliance Summary																	
Maximum % Reduction Required Below Pre-Run Development Load		10%															
Total Runoff Volume Reduction (H <sup>3</sup> )	126																
Total TP Load Reduction Achieved (lb/yr)	0.05																
Total TN Load Reduction Achieved (lb/yr)	0.71																
Remaining Post Development TP Load (lb/yr)	0.26																
Remaining TP Load Reduction (lb/yr) Required	0.00																
** TARGET TP REDUCTION EXCEEDED BY 0.01 LB/YEAR **																	
Virginia Runoff Reduction Method Worksheet																	
Drainage Area Summary																	
	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E	Total											
Forest (acres)	0.00	0.00	0.00	0.00	0.00	0.00											
Mixed Open (acres)	0.00	0.00	0.00	0.00	0.00	0.00											
Managed Turf (acres)	0.01	0.00	0.01	0.00	0.00	0.02											
Impervious Cover (acres)	0.04	0.01	0.01	0.01	0.00	0.06											
Total Area (acres)	0.05	0.01	0.02	0.01	0.00	0.08											
Drainage Area Compliance Summary																	
	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E	Total											
TP Load Reduced (lb/yr)	0.03	0.00	0.01	0.00	0.00	0.05											
TN Load Reduced (lb/yr)	0.48	0.04	0.13	0.06	0.00	0.71											

Virginia Runoff Reduction Method Worksheet						
Runoff Volume and CN Calculations						
	1-year storm	2-year storm	10-year storm			
Target Rainfall Event (in)	2.73	3.31	5.03			
Drainage Areas	RV & CN	Drainage Area A	Drainage Area B	Drainage Area C	Drainage Area D	Drainage Area E
CN	93	98	88	98	0	0
RA (ft <sup>2</sup> )	93	7	17	11	0	0
1-year return period	RV w/ RA (w/o CN)	2.00	2.50	1.41	2.50	0.00
	RV w/ RA (w/o CN)	1.49	2.12	1.20	2.12	0.00
	CN adjusted	87	94	82	94	0
2-year return period	RV w/ RA (w/o CN)	2.55	3.08	1.93	3.08	0.00
	CN adjusted	2.05	2.70	1.70	2.70	0.00
	RV w/ RA (w/o CN)	87	94	82	94	0
10-year return period	RV w/ RA (w/o CN)	4.73	4.70	3.50	4.79	0.00
	RV w/ RA (w/o CN)	3.72	4.43	3.26	4.43	0.00
	CN adjusted	88	95	86	95	0