

SECTION

TRASH ENCLOSURE ELEVATION

N.T.S.

DESCRIPTION. Bioretention facilities are small landscaped basins intended to provide water pliv management by filtering stormwater runoff before release into stormdrain systems. This work shall consist of installing bioretention facilities as specified in the Contract Documents, including all materials, equipment, labor and services required to perform the drainage areas are stabilized as shown on the Contract Plans and to the satisfaction of

MATERIAL SPECIFICATION No. 57 Aggregate ASTM 633 No. 7 Aggregate ASTM 633 Underdrain and Jutlet Pipe, 6-inch AASHTO M278 Mulch, 2x Shredded Hardwood Bark See below. Plant Mateials See below. Water See below. Limestone ASTM C25Iron Sulfate See below. Magresium Sulfate See below. Potash See below. Bioreention Soil Mixture. The Bioretention Soil Mixture (BSM) is a mixture of planting soil, mulci, and sand consisting of the following:

ITEM COMPOSITION BY VOLUME REFERENCE Planting Soil 30% See below. Shredded 2x Hardwood elevations shown on the Contract Plans. The method of excavation shall minimize the Mulch 20% See below. Sand 50% ASTM C33 Fine Aggregate
The ISDA textural classification of the Planting Soil for the BSM shall be LOAMY SAND OR NEY LOAM. The Planting Soil shall be salvaged or furnished. Additionally, the Planting Sail hall be tested and meet the following criteria:

ITEM PERCENT BY WEIGHTTEST METHOD Sand (2.0 - 0.050 mm)50 - 85% AASHTO T88 Silt (0.05) - 0.002 mm)0 - 50% AASHTO T88Clay (less than 0.002 mm)10 - 20% AASHTO T88)rganic Matter 1.5 - 10% AASHTO T194 The extural analysis for the Planting Sail shall be as follows:

ASTM E11 Sieve Size Minimum PERCENT Possing by Weight 2 in.100 No. 490 No. 1080 At lest 45 days prior to the start of construction of bioretention facilities, the Contractor shall submit the source of the Planting Soil for the BSM to the Engineer for approval. No time extensions will be granted should the proposed Planting Soil fail to meet the minimum requiements stated above. Once a stockpile of the Planting Soil has been sampled, no

The lioretention Soil Mixture (BSM) shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches excluding mulch. No other materials or subsances shall be mixed or dumped within the bioretention area that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations.

The ligretention Soil Mixture shall be tested and meet the following criteria: Item Criteria Test Method Corrected pH5.5 - 7.5ASTM D4972 Magnesium Minimum 32 ppm* hos/horus (Phosphate - P205)Not to exceed 69 ppm*Potassium (K20) Minimum 78 ppm* Solute Salts Not to exceed 500 ppm** Use authorized soil test procedures.

Shoud the pH fall outside of the acceptable range, it may be modified with lime (to raise) or irm sulfate plus sulfur (to lower). The lime or iron sulfate must be mixed uniformly into he BSM prior to use in bioretention facilities.

Shoud the BSM not meet the minimum requirement for magnesium, it may be modified with magnesium sulfate. Likewise, should the BSM not meet the minimum requirement for pota:sium, it may be modified with potash. Magnesium sulfate and potash must be mixed iniformly into the BSM prior to use in bioretention facilities.

Plantng soil and/or BSM that fails to meet the minimum requirements shall be replaced at no additional cost to the Administration. Mixing of the corrective additives to the BSM is incidintal and shall be at no additional cost to the Administration. Mixing of the BSM to a homogeneous consistency shall be done to the satisfaction of the

PLAN MATERIALS. All plants, unless otherwise specifically permitted, shall conform to the stanards of the current edition of American Standard for Nursery Stock as approved by the merican Standards Institute, Inc. All plant grades shall be those established in the current edition of American Standards for Nursery Stock Only one size per grade will be ister rather than a size range. The one size shall mean the minimum size for that grade and shall include plants from that size up to but not including the next larger grade size.

All pant materials shall have normal, well developed branches and a vigorous root system. They shall be healthy plants free from physical defects, plant diseases, and insect pests. Shad and flowering trees shall be symmetrically balanced. Major branches shall not have V shap:d crotches capable of causing structural weakness. Trunks shall be free of unhealed branch removal wounds greater than a 1 in. diameter.

Shad: trees shall have a single main trunk. Trunks shall be free of branches below the

Plant materials shall be able to tolerate saturated soil conditions for the length of time anticpated in the design storm event, as well as snow melt chemicals and other

Wate. Water used in the planting, establishing, or caring for vegetation shall be free from any substance that is injurious to plant life. Lime:tone Limestone shall contain not less than 85 percent calcium and magnesium corbinates. Dolomitic (magnesium) limestone shall contain at least 10 percent magnesium as nagnesium oxide and 85 percent calcium and magnesium carbonates.

Limestone shall conform to the following gradation: SIEVE SIZE MINIMUM PERCENT PASSING BY WEIGHT No. 10100 No. 2098 No. 100Ad50 Iron Sulfate. Iron sulfate shall be a constituent of an approved horticultural product

produced as a fertilizer for supplying iron and as a soil acidifier. Magresium Sulfate. Magnesium sulfate shall be a constituent of an approved horticultural product produced as a fertilizer.

Pota:h. Potash (potassium oxide) shall be a constituent of an approved horticultural Excaration. If the soil is classified as a clay soil (USDA textural classification), the

roto tilling shall not be done where the soil supports the aggregate bed underneath the ndedrain. (See underdrain specifications below.) Clay soils beyond the edge of the aggregate bed shall be first overlain with a BSM layer 3 inches thick, and then rota-tilled to a depth 6 inches below the surface of the BSM layer.

HEAVY DUTY COVER

SOLID FOR CLEANOUT

4" MIN. CONCRETE

ENCASEMENT

-ENCASE IN CONCRETE

THREADED

CLEANOUT

PLUG

-45° BEND

CONSTRUCTION SPECIFICATIONS

N. T. S.

Underdrain. Underdrains shall be autletted into drainage structures whenever possible. Outlets that empty into a drainage structure shall be positioned a minimum of 6 in. above the normal flow level in the structure and shall be constructed of normal underdrain be A minimum of 18 in. of cover over the pipe shall be maintained. When outletted to a slope or ditch, the outlet pipe shall slope a minimum of 0.5% percent unless atherwise directed by the Engineer. CONSTRUCTION. Bioretention facilities shall not be constructed until all contributing

the Engineer. Bioretention facilities shall not be used as sediment control facilities. No

compaction of the bottom of the bioretention facility. Excavators and backhoes, operating

on the ground adjacent to the biaretentian facility, shall be used to excavate the facility if

neavy equipment shall operate within the perimeter of a bioretention facility during

excavation, underdrain placement, backfilling, planting, or mulching of the facility.

possible. Low ground-contact pressure equipment may also be used for excavation.

Excavated materials shall be removed from the bioretention facility site. Excavated

Prior to placing the underdrain and the BSM, the bottom of the excavation shall be

roto-tilled to a minimum depth of 6 inches to alleviate any compaction of the facility

bottom. Any substitute method for roto-tilling must be approved by the Engineer prior t

use. Any ponded water shall be removed from the bottom of the facility and the soil shall

Underdrain. The underdrain system shall be placed on a 3-ft wide bed of No. 57 aggregate.

The minimum thickness of the ASTM No. 57 aggregate shall be 3 inches. Underdrain shall

be covered with 6 inches of No. 57 aggregate and topped with an additional layer of No.

Observation wells/cleanouts of 6-inch non-perforated pipe shall be placed vertically in the

to the perforated underdrain with the appropriate manufactured connections as shown on

the Contract Plans. The wells/cleanouts shall extend 6 inches above the top elevation of

Placement and Compaction of the Bioretention Soil Mixture. The Bioretention Soil Mixture

excavators and/or backhoes operating on the ground adjacent to the bioretention facility. No heavy equipment shall be used within the perimeter of the bioretention facility before,

during, or after the placement of the BSM. The BSM shall be placed in horizontal layers not to exceed 12 inches for the entire area of the bioretentian facility. The BSM shall be

compacted by saturating the entire area of the bioretention facility after each lift of BSM

is placed until water flows from the underdrain. Water for saturation shall be applied by spraying or sprinkling. Saturation of each lift shall be performed in the presence of the

sediment-laden water discharged from the underdrain. If the BSM becomes contaminated

during the construction of the facility, the contaminated material shall be removed and replaced with uncontaminated material at no additional cost to the Administration. Final

grading of the BSM shall be performed after a 24—hour settling period. Final elevations shall be within 2 inches of elevations shown on the Contract Plans.

Facilities shall be planted as specified in the Contract Plans and applicable landscaping

standards with the exception that pesticides, herbicides, and fertilizer shall not be applied during planting under any circumstances. Furthermore, pesticides, fertilizer, and any other

Mulching. Once the plants are in place, the entire bioretention facility shall be mulched to a

uniform thickness of 3 inches. Well aged (minimum age of 6 months) shredded hardwood

MEASUREMENT AND PAYMENT. Bioretention Facilities will not be measured but will be paid

for at the Contract Bid Lump Sum Price. The payment will be full compensation for all

material, removal and disposal of excess and unsuitable material, underdrain, aggregate,

Mulch. Shredded hardwood bark shall consist of the bark from hardwood trees which has

free from sawdust, foreign materials, and any artificially introduced chemical compounds

item specified in the Contract Documents. The payment will be full compensation for all

tools, and incidentals necessary to complete the work. If at any time during the Contract

period any plants become unacceptable, they shall be replaced at no additional cost to the

Additional Watering of Plants. Additional Watering of Plants within bioretention facilities will

be measured and paid for at the Contract unit price per 1000 gallons of water applied to the planting beds. Water will be measured by means of satisfactorily installed meters, or

by measurements of tank capacities, or by acceptable documentation of tanks of

will be allowed for water wasted or excess watering as determined by the Engineer.

6" min.-

EXISTING

GROUND

STABILIZED CONSTRUCTION ENTRANCE

AND TEMP. TRUCK WASHDOWN AREA DETAIL

FILTER CLOTH

predetermined capacity. The Contractor shall furnish the Engineer's representative with

measurement and capacities to provide a complete and accurate record of the quantity of

water furnished and applied. The payment will be full compensation for all water, material,

labor, equipment, tools, and incidentals necessary to complete the work. No compensation

supports, watering during the construction period and for all material, labor, equipment,

been milled and screened to a maximum 4 in, particle size and provide a uniform texture

saturation, grading and slope adjustments, and for all material, labor, equipment, tools, and

Plantings. Plant materials will be measured and paid for at the Contract unit price per each

applicable excavation, sheeting, shoring, de-watering, hauling, storing, re-handling of

underdrain outlet, furnishing, mixing, pH correction, potassium correction, magnesium correction, and placement of the BSM backfill, compaction of the BSM backfill by

gaineer An appropriate sediment control device shall be used to treat any

Plant Installation. Trees, shrubs, and other plant materials specified for Bioretention

sail amendments shall not be applied to the bioretention facility during landscape

(BSM) shall be placed and graded using low ground-contact pressure equipment or by

the bioretentian facility mulch, and shall be capped with a screw cap. The ends of

underdrain pipes not terminating in an observation well/cleanout shall be capped.

bioretention facility as shown on the Contract Plans. The wells/cleanouts shall be connected

aggregate (layer thickness shall be 2 inches, minimum). All aggregate shall be placed

heavy equipment shall be allowed on the bottom of the bioretention facility

materials shall be used or disposed of in conformance with Section 201.

according to dimensions shown on the Contract Plans

construction, plant establishment, or maintenance.

incidentals necessary satisfactorily complete the work.

that would be detrimental to plant or animal life.

bark mulch is the only acceptable mulch.

be friable before roto-tilling.

MAINTENANCE

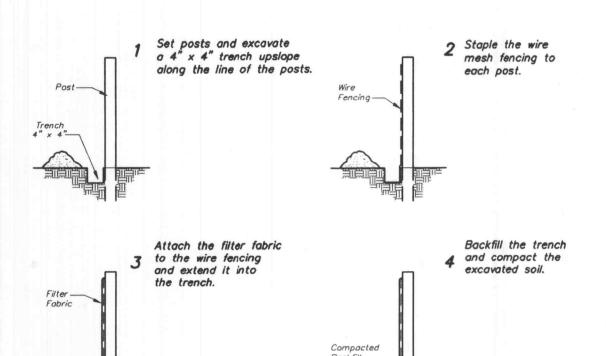
Filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately. Excavation. The bioretention facility shall be excavated to the dimensions, side slopes, and

Should the fabric decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.

Sediment deposits should be removed after each storm event. They must be removed when deposits reach approximately half the height of the barrier.

4. Any sediment deposits remaining in place after the silt fence or filter barrier is no

longer required shall be dressed to conform with the existing grade, prepared and seeded.



Point "A" should be higher

Placement and Construction of a Synthetic Filter Barrier APPENDIX D For Urban Development Sites

> CALLOUT SFB ---- SFB ---- SFB -

ELEVATION

SYNTHETIC FILTER BARRIERS

SITE NOTES

- 1. All dimensions shown are to back of curb unless noted
- 2. DO NOT SCALE DRAWINGS, USE DIMENSIONS AS SHOWN.
- Additional siltation control may be required as directed by the City of O'Fallon.
- Storm sewers are to be private unless otherwise noted.
- Contractor to notify the engineer if discrepancies are found in the field compared to the design plans.
- Reference points, such as survey monuments, bench marks, stakes, etc., shall be preserved, but if disturbed or destroyed, shall be replaced as directed, at the expense of the contractor.

All concrete and asphalt concrete pavement to be removed shall be sawcut on a straight line along the contact line with the existing pavement to remain. Concrete walks and curbs to be removed shall be sawcut at the nearest contraction or expansion joint.

No work shall be done which will affect existing utilities prior to having ascertained that the utilities have been properly capped, plugged, or otherwise abandoned in a manner acceptable to the affected utility company. The appropriate agency shall be notified prior to the commencement of any work which will affect any existing utility. Removals or relocations by utility companies are to be initiated and coordinated by the

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D

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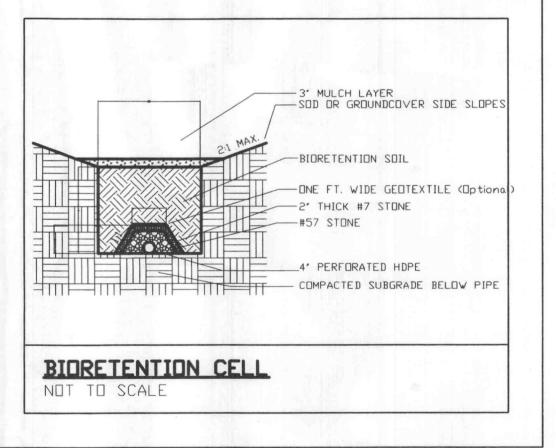
- All site construction and sewer construction to be per City of O'Fallon standards and specifications.
- Building dimensions as shown are to outside face of building and are per architectural plans received during August 2005. See architectural plans for locations of building area walks, walls, etc. If overall building dimensions vary form those shown on these plans, contact the engineer prior to proceeding with site construction.
- 9. Conduct operations to prevent injury to adjacent buildings, structures, other facilities and persons. Signs, lights, and barricades shall be installed at all locations as necessary to guard against accident. Promptly repair damages caused to facilities by operations, as directed by the engineer and at no cost to the Owner.
- 10. New pavement The Contractor shall fine grade and proof roll the subgrade to the elevations as shown. Subgrade shall be compacted to densities noted. The base course and surface course shall be constructed in accordance with St. Louis County Standard Specifications for Highway Construction. The base course shall be Type 1 crushed rock and the compacted thickness shall be as shown on the drawings. Base course shall be compacted to densities noted. The asphalt surface wearing course shall be Type C asphaltic cement, penetration grade 85-100. Final rolled density shall not be below 95% of the average density of Marshall test laboratory specimens. Constructed thickness shall be within 1/4".

Maintenance of finished asphaltic concrete surfacing will be required until acceptance of work by Owner.

- 11. Pavement traffic marking to be one (1) coat of paint, white except as shown, and shall be chlorinated rubber based paint meeting Federal Specifications No. TT-P-115-D, Type III or equal. Application shall be 15 mils thick wet film (320 lin. ft. of 4" stripe per gallon).
- 12. All sign post and backs and bracket arms shall be painted black using Carboline Rustbond Penetrating Sealer SG and Carboline 133 HB paint (or equivalent as approved by City and MODOT). Signs designating street name shall be on the opposite side of the street from traffic control signs.

CASTinTACT™ Warning Panels are the latest innovation in detectable warning systems. A long term solution meeting both state and federal guidelines for handicap detection. CASTinTACT Warning Panels are designed for exterior use at the both

tom of curb ramps and other locations such as depressed corners, raised crosswalks and raised intersections, borders median and islands, at the edge of transit platforms and where railroad tracks cross the sidewalk to warn people with visual pairments of potential hazards. Detectable warnings must be installed across the full width of ramps, and 24" minimum



-MOUNTABLE BERM

(OPTIONAL)

length up the ramp. CASTinTACT Warning Panels are integrally colored to provide visual contrast with the adjacent walking CASTINTACT™ are comentitious based concrete panels with the same co-effecient of expansion as the concrete base. 7/8* thick high strength concrete reinforced with stainless steel prestress strand resulting in a high strength and crack resistant panel. Abrasion resistant truncated domes are achieved with an engineered mix design of grantle and quartz aggregate that the panel of t produces an average compressive strength of 10,000 psi (69 MPa). CASTinTACT are quality controlled manufactured to produce a dense, freeze thaw durable panel. Architectural concrete finished for safe wet and dry slip resistance. Concrete surfaces are easily maintained and cleaned with pressure washing. mericans with Disabilities Act 4.29.2 Standards bine base = 0.9" (23 mm) Panel Thickness = .0875* (22 mm Reinforcement = 304 Stainless Steel 1/16" 2x7 4" OC both directions and faces. Final prestress forces after loss, 300 lbs per tendon, net panel prestress force 172 psi in Slip Resistance = 0.80 ASTM D 2047 Modified 9 SPC'S 0 2.35" - 21.15" WEDGE PANEL 9 SPC'S @ 2.35" = 21.15" 0 6 2 2 0 7 0 0 0 0 0 0000000000 0 0 0 0 0 0 0 0 0 6 5 9 0 0 0 0 0 0 00000000000 0 0 0 0 0 0 0 0 000000000 PANEL SIZES AVAILABLE: Wedge Edge Panel includes 1'x2', 2'x2' 2.5'x2', 3'X2 0 0 0 0 0 0 0 0 0 Square Edge Panel includes 2'x2', 3'x2' and 4'x2' ---ocking colors are yellow, red, black and white. Custom colors special utulit SQUARE PANEL

Seeding Rates: Permanent: Tall Fescue - 30 lbs./ac.

Smooth Brome - 20 lbs./ac. Combined: Fescue @ 15 lbs./ac. and Brome- @ 10 lbs./ac.

Temporary:

Wheat or Rye - 150 lbs./ac. (3.5 lbs. per square foot) - 120 lbs./ac. (2.75 lbs. per square foot)

APPENDIX A

Seeding Periods:

Fescue or Brome - March 1 to June 1 August 1 to October

Wheat or Rye - March 15 to November 1 - March 15 to September 15

Mulch rates: 100 lbs. per 1,000 sq. ft. (4,356 lbs. per acre)

Fertilizer rates: Nitrogen 30 lbs./ac. Phosphate 30 lbs./ac. Potassium 30 lbs./ac. Lime 600 lbs./ac. ENM*

> *ENM = effective neutralizing material as per State evaluation of quarried rock.

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FILE# 9831.43.01.0

DRAWN DATE D.L.S./B.L.F 02-23-06 CHECKED DATE D.BYRD02-23-06 PROJECT # 05258.RINA.OOC TASK # 2 FIELD BOOK

ENGINEERS AUTHENTICATION

and date hereunder attached.

Responsibility is disclaimed for all

other engineering plans involved in

revisions after this date unless

reauthenticated.

this project and specifically excludes

PICKETT, RAY & SILVER, INC

The responsibility for professiona

is hereby limited to the set of plans authenticated by the seal, signature,

engineering liability on this project

GODDARD SCHOOL IMPROVEMENT PLANS CONSTRUCTION DETAILS

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