

#4 - 5031 Northeast Lakewood Way/ #5 - 801 Missouri HWY 150 Lee's Summit, Missouri 64082 P: 816-960-1111 F: 816-960-1182

5

## RFI #174: LSFS 5 - Bioretention Basin 4" Perforated Pipe - FOR RECORD

Status	Open		
То	Edgar Flores (GLMV Architecture) Chad Bard (GLMV Architecture)	From	Andrew Calderwood (McCownGordon Construction, LLC) 850 Main Street Kansas City, Missouri 64105
Date Initiated	Dec 21, 2023	Due Date	Dec 26, 2023
Location	Fire Station 5	Project Stage	
Cost Impact		Schedule Impact	
Spec Section		Cost Code	
Drawing Number		Reference	
Linked Drawings	<u>C-401</u>		
Received From	Will Manda (Blue Cedar Landscape)	Sub Job	
Copies To	Andrew Calderwood (McCownGordon Construction, LLC), Nate Henson (McCownGordon Construction, LLC), Chloe Huxol (McCownGordon Construction, LLC), Mike Morgan (McCownGordon Construction, LLC), Zachary Sheffield (McCownGordon Construction, LLC)) Construction, LLC)		
Activity			
Question	Question from Andrew Calderwood McCownGordon Construction, LLC on Thursday, Dec 21, 2023 at 03:30 PM CST         Per the attached email and markup, it is acceptable to switch to (2) runs of 4" perforated pipe in lieu of (1) run of 6" pipe where shown on C-401. Please confirm.         Attachments         RFI-174 - LSFS 5 - Bioretention Basin 4in Perforated Pipe.pdf, LSFS 5 Bioretention Basin 4 inch perf pipe.pdf		

Awaiting an Official Response



## Andrew Calderwood

From: Sent: To: Cc: Subject: Derick Holmes <derick.holmes@glmv.com> Thursday, December 21, 2023 3:13 PM Andrew Calderwood Chad Bard; Chloe Huxol; Edgar Flores; Mike Morgan RE: LSFS 5 Bioretention Basins

Andrew -

Confirmed. You got it.

Derick Holmes, PE Civil Engineer GLMV 9229 Ward Parkway, Suite 210 | Kansas City, MO 64114 Office 816-444-4200

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From: Andrew Calderwood <acalderwood@mccowngordon.com>
Sent: Thursday, December 21, 2023 2:47 PM
To: Derick Holmes <derick.holmes@glmv.com>
Cc: Chad Bard <chad.bard@glmv.com>; Chloe Huxol <chuxol@mccowngordon.com>; Edgar Flores
<edgar.flores@glmv.com>; Mike Morgan <mmorgan@mccowngordon.com>
Subject: LSFS 5 Bioretention Basins

### □ Sent from external sender □

## Derick,

Following up on our phone calls today. Blue Cedar was unable to get 6" schedule 40 perforated pipe, so they will install (2) runs of 4" schedule 40 perforated pipe with cleanouts anywhere a run of 6" is shown. These two runs will combine into one pipe before they enter the nyloplast basins. I've marked up the attached drawing to show their plan. Please confirm this is approved and let me know if I have misunderstood anything.

Thanks,

ANDREW CALDERWOOD Senior Project Engineer

McCOWNGORDON 850 MAIN ST KANSAS CITY, MO 64105 O <u>816.960.1111</u> M <u>816.501.8628</u> 100% EMPLOYEE OWNED



# GENERAL NOTES:

BIORETENTION FACILITIES SHALL NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREAS ARE PERMANENTLY STABILIZED AGAINST EROSION AND SEDIMENTATION. ANY DISCHARGE OF SEDIMENT THAT AFFECTS THE PERFORMANCE OF THE CELL WILL REQUIRE RECONSTRUCTION OF THE CELL TO RESTORE ITS DEFINED PERFORMANCE.

2. NO HEAVY EQUIPMENT SHALL OPERATE WITHIN THE BIORETENTION FACILITY DURING UNDERDRAIN PLACEMENT, BACKFILLING, OR PLANTING OF THE FACILITY.

3. IF THE BIORETENTION FACILITY IS TO BE USED AS A SEDIMENT BASIN. THE BIORETENTION FACILITY SHALL BE EXCAVATED TO THE DIMENSIONS, SIDE SLOPES, AND 1 FOOT ABOVE THE BOTTOM OF THE BIORETENSION SOIL MIXTURE. ANY SEDIMENT FROM CONSTRUCTION OPERATIONS DEPOSITED IN THE BIORETENTION FACILITY SHALL BE COMPLETELY REMOVED FROM THE FACILITY AFTER ALL VEGETATION HAS BEEN ESTABLISHED. THE EXCAVATION LIMITS SHALL THEN BE FINAL GRADED TO THE DIMENSIONS. SIDE SLOPES, AND FINAL ELEVATIONS, LOW GROUND-CONTACT PRESSURE EQUIPMENT IS TO BE USED WHEN CONSTRUCTING THE BIORETENTION FACILITIES TO MINIMIZE DISTURBANCE TO ESTABLISH AREAS AROUND PERIMETER OF CELL, NO HEAVY EQUIPMENT SHALL BE USED WITHIN THE PERIMETER OF THE BIORETENTION FACILITY BEFORE, DURING, OR AFTER THE PLACEMENT OF

4. THE BIORETENTION SOIL MIXTURE (BSM) SHALL BE PLACED IN LAYERS NOT TO EXCEED 12 INCHES. THE BSM SHALL BE SATURATED OVER THE ENTIRE AREA OF THE FACILITY AFTER EACH LIFT OF BSM IS PLACED UNTIL WATER FLOWS FROM THE UNDERDRAIN TO LIGHTLY CONSOLIDATE THE BSM MIXTURE. WATER FOR SATURATION SHALL BE APPLIED BY SPRAYING OR SPRINKLING TO AVOID SEPARATION OF THE BSM COMPONENTS. FINAL GRADING OF THE BSM SHALL BE PERFORMED AFTER A 24-HOUR SETTLING PERIOD. UPON FINAL GRADING THE SURFACE OF THE BSM SHALL BE ROTO-TILLED TO A DEPTH OF 6".

5. SEE DRAWING 1-100 AND 1-101 FOR PLANTING SCHEDULE. PESTICIDES, HERBICIDES, AND FERTILIZER SHALL NOT BE APPLIED DURING PLANTING UNDER ANY CIRCUMSTANCES.

# **BIORETENTION SOIL MIXTURE (BSM) SPECIFICATIONS:**

A. BIORTENTION SOIL MIXUTRE: THE BIORETENTION SOIL MIXTURE (BSM) IS A MIXTURE OF PLANTING SOIL, COMPOST, AND SAND CONSISTING OF THE FOLLOWING:

ITEM	COMPOSITION BY VOLUME	REFERENCE
PLANTING SOIL	30%	SEE BELOW
ORGANIC COMPOST	20%	SEE BELOW
SAND	50%	ASTM C33 FINE AGGREGATE

#### PLANTING SOIL: THE USDA TEXTURAL CLASSIFICATION OF THE PLANTING SOIL FOR THE BSM SHALL BE LOAMY SAND OR SANDY LOAM. THE PLANTING SOIL SHALL BE TESTED AND MEET THE FOLLOWING CRITERIA:

ITEM	PERCENT BY WEIGHT	TEST METHOD	
SAND (2.0 - 0.050 MM)	50-85%	AASHTO T88	
SILT (0.050 - 0.002 MM)	0-50%	AASHTO T88	
CLAY (LESS THAN 0.002 MM)	2-5%	AASHTO T88	
ORGANIC MATTER	3-10%	AASHTO T194	

THE TEXTURAL ANALYSIS OF THE PLANTING SOIL SHALL BE AS FOLLOWS:

ASTM E11 SIEVE SIZE	MINIMUM PERCENT PASSING B WEIGHT
2 IN.	100%
NO. 4	90
NO. 10	80

AT LEAST 45 DAYS PRIOR TO THE START OF CONSTRUCTION OF THE BIORETENTION FACILITIES, THE CONTRACTOR SHALL SUBMIT THE SOURCE AND TESTING RESULTS OF THE PLANTING SOIL FOR THE BSM TO THE ENGINEER FOR APPROVAL.

## C. ORGANIC COMPOST

COMPOST IS DEEMED ACCEPTABLE IF IT MEETS 2 OF THE FOLLOWING REQUIREMENTS:

- 1. C/N RATIO <= 25; 2. OXYGEN UPTAKE RATE <= 150 mg/ O2/kg VOLATILE SOLIDS PER HOUR
- 3. COMPOST MUST NOT CONTAIN MORE THAN 1 PERCENT FOREIGN MATTER. FOREIGN MATTER IS DEFINED AS: "ANY MATTER OVER A 2 MM DIMENSION THAT RESULTS FROM HUMAN INTERVENTION AND HAVING ORGANIC OR INORGANIC CONSTITUENTS SUCH AS METAL, GLASS AND SYNTHETIC POLYMERS (E.G., PLASTIC OR RUBBER) THAT MAY BE PRESENT IN THE COMPOST BUT EXCLUDING MINERAL SOILS, WOODY MATERIAL AND ROCKS."
- 4. FOREIGN MATTER LESS THAN 1 PERCENT BY WEIGHT MUST NOT EXCEED 12.5 MM IN ANY DIMENSION

D. THE BIORETENTION SOIL MIXTURE (BSM) SHALL BE A UNIFORM MIX, FREE OF PLANT RESIDUE, STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES EXCLUDING MULCH. NO OTHER MATERIALS OR SUBSTANCES 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.

1. THE BIORETENTION SOIL MIXTURE SHALL BE TESTED AND MEET THE FOLLOWING CRITERIA:

ITEM	CRITERIA	TEST METHOD
CORRECTED pH	5.5 - 7.5	ASTM D4972
MAGNESIUM	MINIMUM 32 PPM	*
PHOSPHORUS (PHOSPHATE - P <sub>2</sub> O <sub>5</sub> )	NOT TO EXCEED 60 PPM PLANT AVAILABLE PHOSPHORUS	*
POTASSIUM (K <sub>2</sub> O)	MINIMUM 78 PPM	*
SOLUBLE SALTS	NOT TO EXCEED 500 PPM	*

**\*USE AUTHORIZED SOIL TEST PROCEDURES** 

2. SHOULD THE pH FALL OUTSIDE OF THE ACCEPTABLE RANGE, IT MAY BE MODIFIED WITH LIME (TO RAISE) OR AMMONIUM SULFATE (TO LOWER). THE LIME OR AMMONIUM SULFATE MUST BE MIXED UNIFORMLY INTO THE BSM PRIOR TO USE IN BIORETENTION FACILITIES.

3. SHOULD 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 POTASSIUM, IT MAY BE MODIFIED WITH POTASH. MAGNESIUM SULFATE AND POTASH MUST BE MIXED UNIFORMLY INTO THE BSM PRIOR TO USE IN BIORETENTION FACILITIES.

4. PLANTING SOIL AND/OR BSM THAT FAILS TO MEET THE MINIMUM REQUIREMENTS SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. MIXING OF THE CORRECTIVE ADDITIVES TO THE BSM IS INCIDENTAL AND SHALL BE AT THE CONTRACTOR'S EXPENSE.

5. MIXING OF THE BSM TO A HOMOGENOUS CONSISTENCY SHALL BE DONE TO THE SATISFACTION OF THE ENGINEER. UPON APPROVAL OF ALL REQUIREMENTS AND TESTING ABOVE, THE BSM SHALL BE STOCKPILED, AND NO MATERIAL SHALL BE ADDED TO THE BSM IN THE STOCKPILE OR DURING TRANSPORT TO THE BIORETENTION FACILITY.

SUITE # 210 KANSAS CITY, MO 64114 TEL: (816) 444-4200 FAX: (316) 265-5646 www.glmv.com GLMV ARCHITECTURE, INC. MISSOURI STATE CERTIFICATE OF AUTHORITY #000305 CIVIL ENGINEER & LANDSCAPE ARCH. GLMV ARCHITECTURE, INC MISSOURI CIVIL COA #2018033898 MISSOURI LANDSCAPE COA #000008 9229 WARD PARKWAY, SUITE # 210 KANSAS CITY, MO 64114 TEL: (816) 444-4200 STRUCTURAL ENGINEER LEIGH + O'KANE MISSOURI COA #001644 250 NE MURBERRY, SUITE 201 LEE'S SUMMIT, MO, 64086 (816) 444-3144 PHONE MECH., ELEC. & PLUMBING ENGINEERS HOSS & BROWN ENGINEERS MISSOURI COA #01022 15902 MIDLAND DRIVE SHAWNEE, KS 66217 (913) 362-9090 PHONE **SECURITY & IT ENGINEERS** HENDERSON ENGINEERS MISSOURI COA # 000556 1801 MAIN STREET, SUITE 300 KANSAS CITY, MO 64108 (816) 663-8700 PHONE 008 150 64( HWAY 1 SOURI S '**∔**⊢ NO -F S∏ STATIC LEE'S SU  $\pm \geq$ AISSOURI SUMMIT, FIRE CITY OF ى ≤ ΞŪ NO 80 REVISIONS # Description Date ASI 09 06.02.2023 DERICK M. HOLMES NUMBER ) O PE 2022005196 / 年 DERICK HOLMES - CIVIL ENGINEER MO# PE-2022005196 The Professional Engineers seal affixed to this sheet applie only to the material and items shown on this sheet. All trawings, instruments or other documents not exhibiting th seal shall not be considered prepared by this engineer, an is engineer expressly disclaims any and all responsibility uch plan, drawings, or documents not exhibiting this s PROJECT NO: 18225R21001 DATE: 10.26.2022 DRAWN BY: KDW CHK'D BY: DMH © GLMV Architecture, Inc. All work herein is the property of GLMV Architecture. Inc. and is not to be copied or used in any way without the express written consent of GLMV Architecture, Inc. SITE ENLARGEMENTS



