



**Metropolitan  
St. Louis Sewer  
District**

2350 Market Street  
St. Louis, MO 63103-2555  
(314) 768-6200

November 8, 2013

Ms. Brenda Guglielmina  
DeepRoot Green Infrastructure, LLC  
P.O. Box 927  
Decatur, GA 30031-0927

RE: Silva Cell System: St. Louis MSD Submission

Dear Ms. Guglielmina:

The Metropolitan St. Louis Sewer District (MSD) has reviewed your application regarding the Silva Cell for use as a Best Management Practice for stormwater management. Silva Cell may be used to supplement permeable pavement as a stand-alone water quality BMP, subject to the following provisions:

- The Silva Cell is approved for use on new development and redevelopment sites of any size (including roadway projects) in which permeable pavement is used.
- The Silva Cell shall be designed and applied in accordance with the details attached to this letter. When supplemented with permeable pavement, the permeable pavement may manage a larger upstream tributary area (up to a ratio of 4:1) as a stand-alone BMP, regardless of the saturated hydraulic conductivity of the underlying soil.
- Channel Protection Volume (CPv) storage may be provided within the void space of the soil media, ponding zone, and within the rock layer of the permeable pavement.
- Project specific design calculations and maintenance plans furnished by DeepRoot LLC must be included within the project's "Stormwater Management Facilities Report" prepared by the consulting engineer.
- The initial installation of the Silva Cell under this design criteria in the MSD shall include the following:
  - 1) A manufacturer's or vendor's representative must be onsite during the proprietary BMP installation to ensure the product's installation requirements are met.
  - 2) Shop drawings indicating elevations of flowlines, weirs, pipe inverts, etc. will be required prior to installation.
  - 3) The manufacturer or vendor must arrange for an as-built survey of the proprietary BMP to be performed by a Missouri-registered Professional Land Surveyor once the device has been installed, and prior to any testing or monitoring.
  - 4) The manufacturer or vendor must perform quarterly inspections of the proprietary BMP during its' first year of operation, which will include visual inspections and quantitative analysis of the service's sediment removal efficiency, especially as compared to its design efficiency. MSD requests to be

invited to these inspections to further enhance familiarity and understanding of the device.

- 5) Formal reports shall be submitted to MSD, including as-builts and at each quarterly inspection. The reports shall include summaries, quantitative analysis mentioned in item 4, photographs of the structure, inlet, internal conditions of the structure, the filters, and outfall conditions, etc. The reports shall also evaluate the performance of the owner's adherence to the approved maintenance program, and offer suggestions for any areas of improvement.

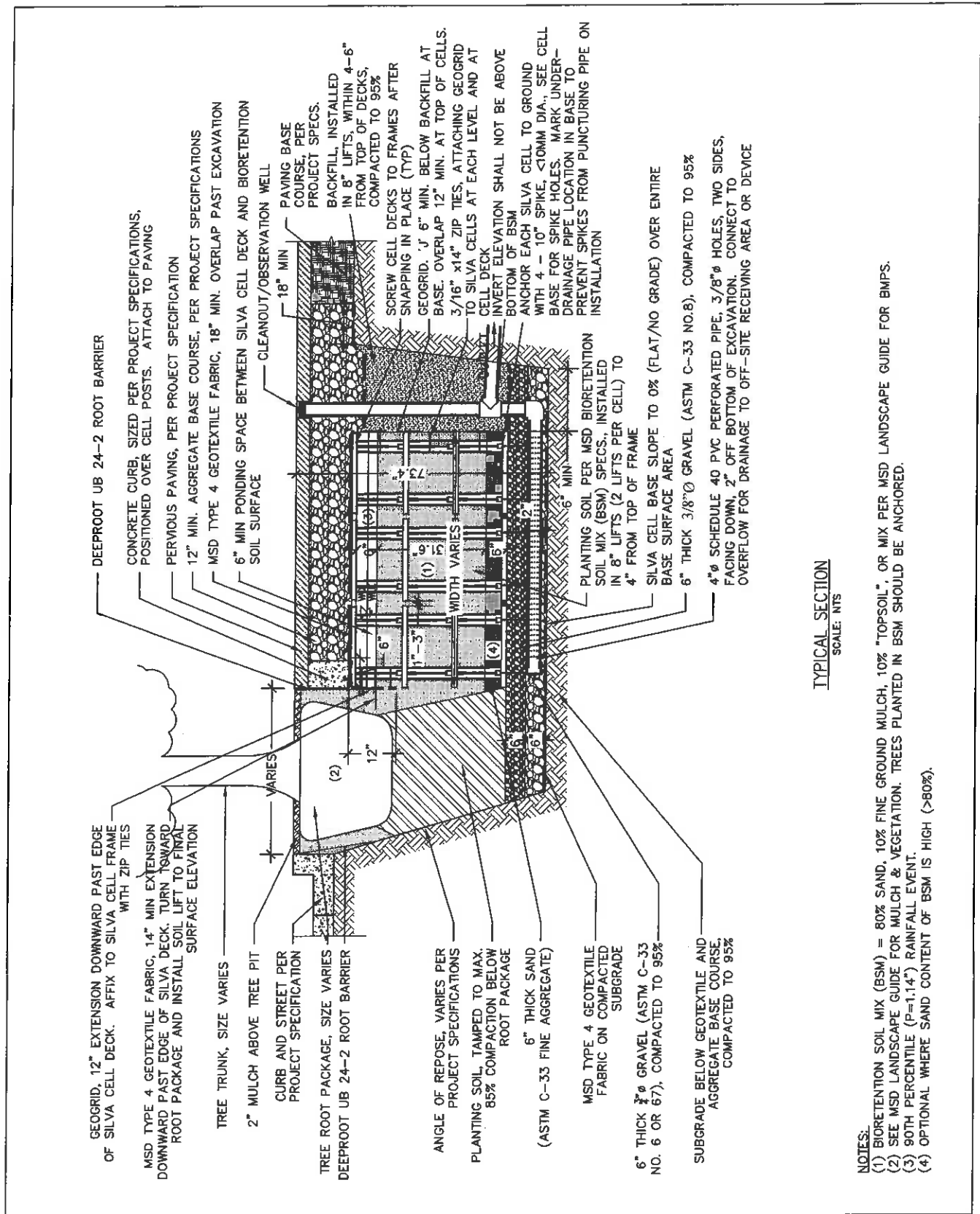
MSD reserves the ability to withdraw or modify this approval based on subsequent information, including information indicating that this BMP does not satisfy MSD rules, requirements, or construction specifications.

Sincerely,



Jason Peterein, P.E.  
Principal Engineer (BMP Committee Chairman)  
Engineering/Planning – Development Review  
Metropolitan St. Louis Sewer District

Pc: Brenda Guglielmina – DeepRoot, LLC  
File



TYPICAL SECTION  
SCALE: NTS

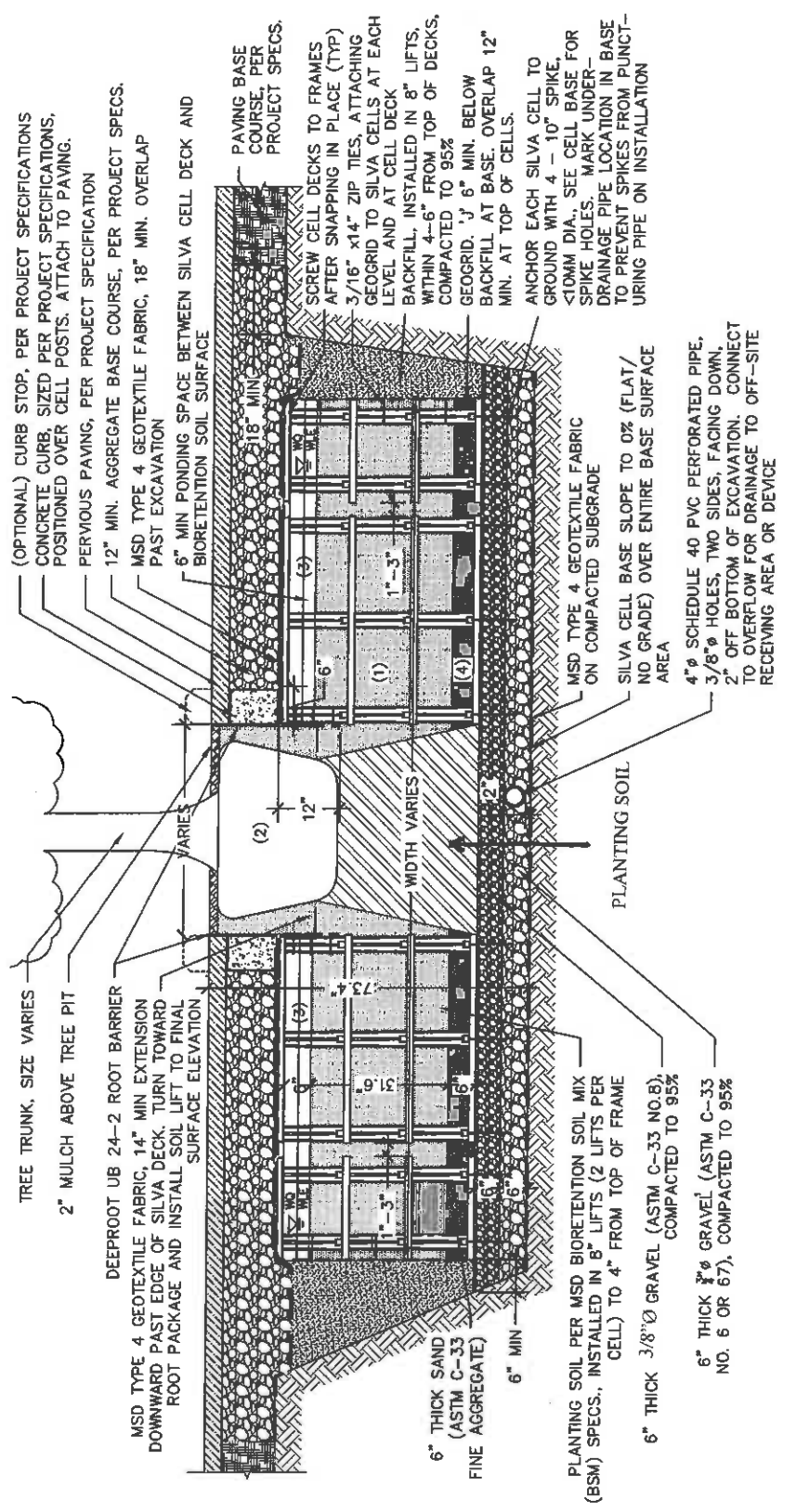
- NOTES:
- (1) BIORETENTION SOIL MIX (BSM) = 80% SAND, 10% FINE GROUND MULCH, 10% "TOPSOIL", OR MIX PER MSD LANDSCAPE GUIDE FOR BMPS.
  - (2) SEE MSD LANDSCAPE GUIDE FOR MULCH & VEGETATION. TREES PLANTED IN BSM SHOULD BE ANCHORED.
  - (3) 90TH PERCENTILE (P=1.14") RAINFALL EVENT.
  - (4) OPTIONAL WHERE SAND CONTENT OF BSM IS HIGH (>80%).

BIORETENTION WITH INTERNAL  
WATER STORAGE IN SOIL CELLS  
FOR RETROFIT  
TYPICAL SECTION

DEEPROOT GREEN INFRASTRUCTURE  
*Non-Standard Details of Sewer Construction*

AUGUST 2013

DETAIL 5A-1



(OPTIONAL) CURB STOP, PER PROJECT SPECIFICATIONS  
 CONCRETE CURB, SIZED PER PROJECT SPECIFICATIONS,  
 POSITIONED OVER CELL POSTS, ATTACH TO PAVING.  
 PERVIOUS PAVING, PER PROJECT SPECIFICATION

12" MIN. AGGREGATE BASE COURSE, PER PROJECT SPECS.  
 MSD TYPE 4 GEOTEXTILE FABRIC, 18" MIN. OVERLAP  
 PAST EXCAVATION

6" MIN. PONDING SPACE BETWEEN SILVA CELL DECK AND  
 BIORETENTION SOIL SURFACE

PAVING BASE COURSE, PER PROJECT SPECS.

SCREW CELL DECKS TO FRAMES AFTER SNAPPING IN PLACE (TYP)  
 3/16" x 14" ZIP TIES, ATTACHING GEOGRID TO SILVA CELLS, AT EACH LEVEL AND AT CELL DECK

BACKFILL, INSTALLED IN 8" LIFTS, WITHIN 4"-6" FROM TOP OF DECKS, COMPACTED TO 95%  
 GEOGRID, 1/2" 6" MIN. BELOW BACKFILL AT BASE. OVERLAP 12" MIN. AT TOP OF CELLS.

ANCHOR EACH SILVA CELL TO GROUND WITH 4" - 10" SPIKE, <10MM DIA., SEE CELL BASE FOR SPIKE HOLES. MARK UNDER-DRAINAGE PIPE LOCATION IN BASE TO PREVENT SPIKES FROM PUNCTURING PIPE ON INSTALLATION

TREE TRUNK, SIZE VARIES  
 2" MULCH ABOVE TREE PIT

DEEPROOT UB 24-2 ROOT BARRIER  
 MSD TYPE 4 GEOTEXTILE FABRIC, 14" MIN EXTENSION DOWNWARD PAST EDGE OF SILVA DECK. TURN TOWARD ROOT PACKAGE AND INSTALL SOIL LIFT TO FINAL SURFACE ELEVATION

VARIES  
 12"

WIDTH VARIES

1"-3"

6"

MSD TYPE 4 GEOTEXTILE FABRIC ON COMPACTED SUBGRADE

SILVA CELL BASE SLOPE TO 0% (FLAT/NO GRADE) OVER ENTIRE BASE SURFACE AREA

4" Ø SCHEDULE 40 PVC PERFORATED PIPE, 3/8" Ø HOLES, TWO SIDES, FACING DOWN, 2" OFF BOTTOM OF EXCAVATION. CONNECT TO OVERFLOW FOR DRAINAGE TO OFF-SITE RECEIVING AREA OR DEVICE

6" THICK SAND (ASTM C-33 FINE AGGREGATE)

6" MIN

PLANTING SOIL PER MSD BIORETENTION SOIL MIX (BSM) SPECS., INSTALLED IN 8" LIFTS (2 LIFTS PER CELL) TO 4" FROM TOP OF FRAME

6" THICK 3/8" Ø GRAVEL (ASTM C-33 NO.8), COMPACTED TO 95%

6" THICK 3/8" Ø GRAVEL (ASTM C-33 NO.8), COMPACTED TO 95%

PLANTING SOIL

NO GRADE

4" Ø SCHEDULE 40 PVC PERFORATED PIPE, 3/8" Ø HOLES, TWO SIDES, FACING DOWN, 2" OFF BOTTOM OF EXCAVATION. CONNECT TO OVERFLOW FOR DRAINAGE TO OFF-SITE RECEIVING AREA OR DEVICE

TYPICAL SECTION  
 SCALE: NTS

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BIORETENTION WITH INTERNAL WATER STORAGE IN SOIL CELLS FOR RETROFIT TYPICAL SECTION	DEEPROOT GREEN INFRASTRUCTURE <i>Non-Standard Details of Sewer Construction</i>	
	AUGUST 2013	DETAIL 5A-2