

**Item No. 660S  
Biofiltration Medium**

**660S.1 – Description**

This item shall govern mixing and placing medium for a biofiltration basin intended to treat storm runoff. This specification is applicable for projects or work involving either inch-pound or SI units. Within the text inch-pound units are given preference followed by SI units shown within parentheses.

(1) Submittals

The submittal requirements of this specification item include:

- A. A signed statement provided by the Contractor that:
  - 1. A laboratory analysis has been conducted by of the actual mixture being proposed, and has been verified as meeting the specifications below. The date of the laboratory analysis must be no more than six months prior to the date of installation of the biofiltration medium. A copy of the laboratory results must be provided.
  - 2. No "sandy loam" fill material (aka "red death") is included in the mixture.
  - 3. Report the source of organic matter.
- B. Laboratory reports of analyses results documenting that the mixture meets the following specifications:
  - 1. Particle size distribution performed per ASTM D-422:
    - Coarse fragments + sand content of 70 - 90% by weight
    - Clay content of 3 - 10% by weight
    - Silt + clay content  $\leq$  27% by weight
  - 2. Percent organic matter of 0.5 - 5% by weight per ASTM D2974 Method C
- C. Contractor's statement that the biofiltration medium has been tested by a laboratory using approved procedures (copy of lab results provided below) and meets the criteria as noted in Table 1 below:

**Table 1 - Biofiltration Medium Characteristics**

<b>Parameter</b>	<b>Results*</b>	<b>Criteria</b>	<b>Criteria Met?*</b>
Percent Sand + Coarse Fragments (ASTMD-422)		70 - 90%	
Percent Clay (< 0.002 mm)		3 - 10%	
Percent Silt + Clay (< 0.05 mm)		$\leq$ 27%	

Percent Organic Matter (ASTM D-2974)		0.5 - 5%	
Is any "Red Death" included in medium?		None allowed	
Is the mixture free of trash, stones, weeds, or other undesirable material?		None allowed	
Is the medium well-mixed and homogenous?		Must be homogenous	

\* Laboratory Must Fill In These Cells

**Table 2 - Biofiltration Medium Testing and Installation Dates**

Date of Laboratory Analysis (earliest)*	
Date of Medium Installation*	
Time between Dates (months)*	
Criteria for Time Between Dates (months)	6
Is Criteria Met?*	

\* Contractor Must Fill In These Cells

**660S.2 – Materials**

- (1) The following mixture (% by volume) should create an appropriate biofiltration medium, subject to specific characteristics of the topsoil, which may exhibit considerable variability:

70-80% concrete sand per ASTM C33 and/or screened decomposed granite sand  
 20-30% screened bulk topsoil (chocolate loam is also acceptable)

The source materials must be free of stones, roots, or other similar objects larger than two inches. Additionally, it should be free of trash, other undesirable material, and should not contain weeds or weed seeds.

The ingredients shall be well-mixed to create a homogenous medium.

- (2) Unacceptable Materials

A commercially available fill material that should not be used is typically marketed as "sandy loam." This product is often referred to by landscapers as "red death", which refers to the color of the material, and is an infertile fill material that has poor drainage characteristics. All materials shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds, their roots or seeds.

**660S.3 - Construction Methods**

- (1) Erosion Control

Prior to commencing this work, all required erosion control and environmental measures shall be in place as indicated on the approved site plan and/or modified.

- (2) Scheduling, Delivery, Storage and Signage

The biofiltration medium must be delivered to, or mixed at, the site prior to the mid-construction conference. The medium must be certified as meeting the required specifications by the project Engineer, and approved by the City Inspector. The medium must be stored on-site separate from other materials, and covered to prevent erosion of the mixture by rainfall and runoff. The medium must have a prominent tag affixed that reads "BIOFILTRATION MEDIUM FOR WATER QUALITY POND."

(3) Placement

Complete construction and stabilize all areas draining to the biofiltration basin. Permanent controls will be cleaned out and filter medium will be installed after stabilization of the site. Install geotextile fabric per the Biofiltration Bed detail provided in Standard Detail 661-3. Biofiltration medium shall be placed in lifts of 12 to 18 inches without using heavy operating equipment or compaction. Lifts should be lightly watered to encourage soil settling. The final surface must be raked flat. The project Engineer must be notified 24 hours prior to installation of the biofiltration medium and approve and certify the installation.

(4) Shrinkage

Some shrinkage of the medium is to be expected after installation, in the range of 5-15%. As a general recommendation about 20 inches of medium should be installed to achieve a depth of 18 inches.

**660S.4 – Measurement**

Biofiltration medium will be measured by the cubic yard (cubic meters: 1 cubic meter is equal to 1.196 cubic yards) in its final position based upon the average end areas, calculated from pre-construction cross sections and plan grades. The plan quantities for biofiltration medium will be used as the measurement for payment of this item.

**660S.5 – Payment**

All work performed as required herein and measured as provided under "Measurement" will be paid for at the unit bid price. The bid prices shall include full compensation for furnishing all labor; all materials; all royalty and freight involved; all hauling and delivering on the road; and all tools, equipment and incidentals necessary to complete the work. Payment will not be made for unauthorized work.

Payment will be made under the following:

Pay Item No. 660S:	Biofiltration Medium.	Per Cubic Yard.
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**END OF SECTION**

<b><u>SPECIFIC CROSS REFERENCE MATERIALS</u></b>	
<b><u>Specification Biofiltration Medium</u></b>	
City of Austin Environmental Criteria Manual	
<u>Designation</u>	<u>Description</u>
Section 1.6.7.C	Biofiltration

<b><u>RELATED CROSS REFERENCE MATERIALS</u></b>	
<b><u>Specification Biofiltration Medium</u></b>	
City of Austin Environmental Criteria Manual	
<u>Designation</u>	<u>Description</u>
Section 1.6.5.A.4	Sand Filtration Basin Details
City of Austin Standards Details	
<u>Designation</u>	<u>Description</u>
Item No. 661-3	Biofiltration Bed Configurations Using Geomembrane/Clay Liner
City of Austin Standard Specifications	
<u>Designation</u>	<u>Description</u>
Item No. 620S	Filter Fabric