



## Bioretention Soil Mix Submittal Checklist

Project Name: \_\_\_\_\_ Project Number: \_\_\_\_\_

Submittal Date: \_\_\_\_\_ Submittal Number: \_\_\_\_\_

Some of the tests required for this material are unique, and BSM shall be considered a long-lead-time item. Under no circumstance shall failure to comply with all specification requirements be an excuse for a delay or for expedient substitution of unacceptable material(s). Submittals referencing Contra Costa C3 Attachment L, San Mateo C3 Appendix K, Alameda C3 Appendix K, or Santa Clara C3 Appendix C will **not** be accepted.

Agencies that perform testing on bioretention materials, including permeability testing, shall be accredited by STA, ASTM, AASHTO, or other designated recognized standards organization. All certifications shall be current. Testing agency shall be capable of performing all tests to the designated and recognized standards specified and shall provide test results with an accompanying Manufacturer's Certificate of Compliance. The laboratory that performs compost testing shall be independent, enrolled in the US Composting Council's (USCC) Compost Analysis Proficiency (CAP) program, and perform testing in accordance with USCC Test Method for The Examination of Composting and Compost (TMECC). The following information shall be provided for all testing laboratories used:

- Name of lab(s) and contact person(s)
- Address(es) and phone number(s)
- Email address(es)
- Qualifications of laboratory and personnel including the date of current certification by STA, ASTM, AASHTO, or approved equal.

All Bioretention Soil Mix submittals must include and/or meet the following requirements:

### **General**

- Two one (1) gallon samples of BSM.
- Source certificates for all BSM materials.
- Sieve analysis of BSM per ASTM D422 performed within **two (2) months** of submittal date.
- Certification from the soil supplier or an accredited testing agency that the BSM, including sand and compost components, conforms to all industry or technical society reference standards specified in spec Sections 2.01.A, 2.01.B, and 2.01C.

- A description of the equipment and methods used to mix the sand and compost.
- Mixture proportions: 30 to 40 percent Compost by volume and 60 to 70 percent Sand by volume.
- Organic content test results of the BSM in the range of 4 to 8 percent, performed in accordance with Testing Methods for the Examination of Compost and Composting (TMECC) 05.07A, "Loss-On-Ignition Organic Matter Method."
- Permeability/Saturated Hydraulic Conductivity: 10 inches per hour (minimum) tested in accordance with ASTM D2434 (Modified). See SFPUC Modified ASTM D2434 Procedures for required modifications to test.

**Sand**

- Sieve analysis of sand per ASTM D422 performed within **two (2) months** of submittal date.
- Sand in the BSM shall conform to the requirements for Sand, Type A specified herein, unless otherwise approved.

Sieve Size <sup>1</sup>	Percent Passing by Weight	
	Type A <sup>2</sup>	Type B (low fines) <sup>3</sup>
<b>3/8 inch</b>	100	100
<b>No. 4</b>	90 to 100	90 to 100
<b>No. 8</b>	70 to 100	70 to 100
<b>No. 16</b>	40 to 95	40 to 85
<b>No. 30</b>	15 to 70	15 to 60
<b>No. 50</b>	5 to 55	8 to 15
<b>No. 100</b>	0 to 15	0 to 4
<b>No. 200</b>	0 to 5	0 to 2

<sup>1</sup> Sieve provided in nominal size square openings or United States Standard Sieve Series sizes.

<sup>2</sup> Sand conforming to ASTM C33 for Fine Aggregate satisfies the requirements of this specification for Sand, Type A.

<sup>3</sup> Type B (low fines) sand gradation pending local availability.

- Coefficient of Uniformity:  $C_u = D_{60}/D_{10}$  : 4 or less for Sand, Type B.
- Effective Particle Size (D10): 0.3 to 0.5 mm for Sand, Type B.
- All aggregate passing the No. 200 sieve shall be non-plastic.

**Compost**

- Quality analysis results for compost performed in accordance with Seal of Testing Assurance (STA) standards, as specified in Section 2.01.C, and performed **within two (2) months** of submittal date.
- Compost in the BSM shall be well decomposed, stable, weed free organic matter sourced from green waste materials **not including biosolids or manure feedstock**.

Compost shall conform to California Code of Regulations Title 14, Division 7, Chapter 3.1 requirements, be certified through the USCC Seal of Testing Assurance (STA) Program, and meeting the following criteria:

- Feedstock: Feedstock materials shall be specified and include one or more of the following: landscape/yard trimmings, grass clippings, food scraps, and agricultural crop residues. **Feedstock shall not include biosolids or manure.**
- Organic Matter Content: 35 to 75 percent by dry weight tested in accordance with TMECC 05.07 A (Loss on Ignition Organic Matter Method).
- Carbon to Nitrogen Ratio: C:N between 15:1 and 25:1 when tested in accordance with TMECC 05.02 A.
- Maturity/Stability - one of the following must be provided:
  - Specific Oxygen Uptake Rate (SOUR): 1.5 milligrams O<sub>2</sub> per gram biodegradable volatile solids per hour (maximum) per TMECC 05.08 A.
  - Carbon Dioxide Evolution Rate: 8 milligrams CO<sub>2</sub> per gram volatile solids per day per TMECC 05.08-B.
  - Dewar Self Heating Test: 20°C temperature rise (maximum) per TMECC 05.08 D (Class IV or V).
  - Solvita®: Index value greater than 6 per TMECC 05.08 E.
- Toxicity: Seed Germination: greater than 80 percent of control AND Vigor: greater than 80 percent of control per TMECC 05.05 A.
- Nutrient Content: provide analysis detailing nutrient content including N P K, Ca, Na, Mg, S, and B.
  - Total Nitrogen: 0.9 percent (minimum).
  - Boron: Total shall be < 80 ppm
- Salinity/Electrical Conductivity: less than 6.0 deciSiemen per meter (dS/m or mmhos/cm) per TMECC 04.10-A (1:5 Slurry Method, Mass Basis).
- pH: 6.5 to 8 per TMECC 04.11-A (1:5 Slurry pH).
- Gradation: Compost for BSM shall meet the following size gradation per TMECC 02.02-B (test shall be run on dry compost sample): Sieve analysis of compost must be performed within **two (2) months** of product delivery to site.

Sieve Size	Percent Passing by Weight	
	<i>Min</i>	<i>Max</i>
1 inch	99	100
1/2 inch	90	100
1/4 inch	40	90
No. 200	1	10

- Bulk density: 500 to 1,100 dry pounds per cubic yard.
- Moisture content: 30 to 55 percent of dry solids.

- Inerts: compost shall be relatively free of inert ingredients, including glass, plastic and paper, less than 1 percent by weight or volume per TMECC 03.08A.
- Weed seed/pathogen destruction: provide proof of process to further reduce pathogens (PFRP). For example, turned windrows must reach minimum 55°C for 15 days with at least 5 turnings during that period.
- Select Pathogens
  - Salmonella: less than 3 Most Probable Number per 4 grams of total solids, dry weight per TMECC 07.02.
  - Coliform Bacteria: fecal coliform less than 1,000 Most Probable Number per gram of total solids, dry weight per TMECC 07.01.
- Trace Contaminants Metals (lead, mercury, etc.): Product must meet US EPA, 40 CFR 503 regulations.