

SMC CLEAN Bioretention Materials & Users Survey

The materials used for construction of LID and GSI including bioretention systems are extremely important and have a significant impact on their performance, however the quality of the materials used for construction may not be known or documented. The SMC CLEAN has developed the SMC CLEAN Bioretention Materials & Users Survey that is intended to provide input as to the quality and protocols being used for assessment of the quality of the materials used in the construction of bioretention systems in California. Please advance the knowledge of bioretention systems in California and fill out this survey. Thank you.

Daniel Apt, SMC CLEAN Project Lead

Contractors

1. Are you in coordination with the Engineer of Record (Design Engineer) in reviewing the bioretention plans and specifications?
 - a. Yes
 - b. No

2. Do the bioretention specifications on jobs you construct require that you submit any of the following regarding the Bioretention Soil Media (BSM) to the Engineer of Record for approval? Select all that apply.
 - a. BSM chain of custody or material receipts
 - b. BSM component source documentation
 - c. BSM samples
 - d. Other (Fill in)

3. Are you mixing the BSM yourself or obtaining a pre-mixed BSM?
 - a. Mixing
 - b. Pre-mixed
 - c. Combination of both

4. Do the bioretention specifications require specific testing or other actions related to the components of bioretention systems (i.e. cleaning of aggregate)?
 - a. Yes
 - b. No

5. If bioretention specifications require testing, are you testing the raw materials for construction of the bioretention system (e.g. aggregate, mulch, BSM elements) when you receive them and if so what type of testing? Select all that apply.
 - a. Infiltration rate testing
 - b. Material composition testing (particle size distribution, nutrient content)
 - c. Other (Fill in)
 - d. Not testing

6. What process do you use to inspect the raw materials for BSM and other elements of a bioretention system? Select all that apply.
 - a. Visual inspection (e.g. visual observation to evaluate materials used)
 - b. Other (Fill in)

7. Where do you obtain your bioretention elements raw materials?
 - a. Wholesaler
 - b. Other (Fill in)

8. Where do you obtain your BSM?
 - a. Wholesaler
 - b. Other (Fill in)

9. If mixing the BSM onsite, how are you ensuring the BSM meets the specification and is homogenous?
 - a. Other (Fill in)
 - b. Not mixing onsite

Wholesalers (Who mix/blend BSM)

1. How and where do you obtain your raw materials or premixed BSM?
 - a. Mulch – Fill in
 - b. BSM Sand – Fill in
 - c. BSM Compost – Fill In
 - d. Aggregate – Fill in
 - e. Pre-mixed - BSM

2. What are your (quality assurance practices) to verify you have received what you ordered? Select all that apply.
 - a. Visual inspection
 - b. Testing
 - c. Other (Fill in)

3. Are you using bioretention specifications to guide mixing of the BSM you sell and if so which specification?
 - a. Yes & (Fill in which specification)
 - b. No

4. What type of documentation do you provide customers of bioretention materials? Select all that apply.
 - a. Manufacturer/supplier documentation
 - b. Inspection documentation
 - c. Testing documentation
 - d. Other (Fill in)

5. If selling a Bioretention Soil Media (BSM) are you obtaining the BSM from a supplier or mixing it yourself?
 - a. Obtaining from a supplier
 - b. Mixing it onsite
 - c. Other (Fill in)
6. If mixing the BSM onsite what are your quality assurance practices to ensure the BSM meets the specification and is consistently mixed?
 - a. Fill in option
7. Are you testing for hydraulic capacity of the BSM and if so which test method are you using?
 - a. Yes & (Fill in which test method)
 - b. No

Design Engineers

1. For bioretention/biofiltration systems you design do you provide construction oversight?
 - a. Yes
 - b. No
 - c. Sometimes
2. For bioretention/biofiltration systems you design what type of contractor submittals are you reviewing and approving for bioretention materials? Select all that apply.
 - a. Bioretention Soil Media (BSM) samples
 - b. BSM test results
 - c. Aggregate
 - d. Mulch
 - e. Plants
 - f. Documentation of material specifications (e.g. invoices, chain of custody)
 - g. Other (Fill in)
 - h. None
3. What type of information is in the submittal by the contractor for a BSM specification?
 - a. Fill in
4. If contracted to inspect bioretention/biofiltration systems, which of the following stages do you perform installation inspections? Select all that apply.
 - a. Excavation
 - b. Placement of aggregate layer
 - c. Placement of BSM
 - d. Placement of plantings
 - e. Placement of mulch
5. What resources are you using to design bioretention systems?? Select all that apply.
 - a. CASQA-LID Standard Bioretention Plans and Specifications

- b. SMC Southern California LID Manual
 - c. Local design manuals
 - d. Other (Fill in)
6. What BSM specification are you using in design of your bioretention systems? If other, identify if the specification has a hydraulic capacity minimum/maximum time.
- a. San Diego
 - b. BASMAA
 - c. Other (Fill in) Does it have a hydraulic capacity minimum/maximum time?
 - i. Yes
 - ii. No
7. Do you modify the standard BSM specifications for site specific requirements? If so where?
- a. No
 - b. Yes. Fill in location
8. What percentage of the time are you contracted to perform a final walk through (commissioning or certificate of occupancy) inspection for the bioretention systems you have designed?
- a. Fill in

Post Construction BMP Inspectors

1. At what stages of construction do you inspect bioretention/biofiltration systems? Select all that apply.
- a. Prior to excavation to ensure area is taped off
 - b. Excavation
 - c. Placement of aggregate layer
 - d. Placement of Bioretention Soil Media (BSM)
 - e. Placement of plantings
 - f. Placement of mulch
2. What bioretention materials do you inspect? Select all that apply.
- a. Aggregate layer
 - b. BSM
 - c. Mulch
 - d. Plants
3. What is involved with your inspection of bioretention systems? Select all that apply.
- a. Visual
 - b. Field testing
 - c. Laboratory testing
4. Do you perform a commissioning or certificate of occupancy inspection (final inspection) of bioretention systems prior to occupancy?
- a. Yes

- b. No
5. If you are performing a commissioning or certificate of occupancy inspection is a performance specification used in the inspection and if so, which are used?
 - a. Hydraulic capacity
 - b. Other (Fill in)
 - c. No
 6. Do you perform follow up inspections for deficiencies previously encountered for bioretention/biofiltration systems?
 - a. Yes
 - b. No
 7. Who are you submitting your bioretention/biofiltration inspection results to?
 - a. Engineer of record
 - b. Permitting authority
 - c. Contractor
 8. Have you received any training for inspecting bioretention/biofiltration BMPs?
 - a. Yes
 - b. No

Regulators

1. Do you require verification that as-built bioretention designs meet approved specifications?
Select all that apply.
 - a. Verification by Engineer of Record
 - b. Verification by Contractor
 - c. Verification by Independent inspector
 - d. Verification by permitting authority
2. Are the following bioretention system specifications retained with Post-Construction BMP tracking records? Select all that apply.
 - a. Design standing water depth
 - b. Design infiltration rate
 - c. Bioretention Soil Media (BSM) bed thickness
 - d. Plant palette
 - e. Mulch specifications
 - f. Overflow or bypass design and location
3. What documentation of ongoing inspection and maintenance is required?
 - a. Inspection records
 - b. Maintenance records
 - c. Photographs of pre and post maintenance condition
 - d. Verification that infiltration rates are at or above design