



Clark County 2015 Stormwater Manual Implementation Summary of Procedure

This procedure statement documents discussions and decisions from Community Development, Public Works and Prosecuting Attorney's office. Implementation of new stormwater regulations require staff to work through specific details of the regulations with applicants. The purpose is to ensure consistent application of county requirements. These procedure statements document decisions for future reference and will be kept on the [ClarkNet web page](#).

Procedure statement #2015-007 – May 2016 Roof Drywell Design in Fine Sand and Loam Soils

Problem Statement

The Clark County Stormwater Manual (2015) adheres to the SWMMWW (2014) standards for roof downspout full infiltration feasibly, requiring their use in fine sand- and loam-textured soils. However, the manual does not provide drywell volume sizing for drywells placed in a fine sand- or loam-textured substrate.

A second problem with following the SWMMWW (2014) is its use of the term "loam" creates confusion because the term loam includes materials that are not suitable for drywells because they may contain up to 27 percent clay and 50 percent silt, with only 23 percent sand using the USDA soil texture triangle.

Background Information

The manual does include trench length standards for substrate textures as fine as loam. The standard design figure for an infiltration trench in the SWMMWW shows the trench cross section as 2 feet by 1.5 feet, with the 2-foot side on the bottom. Trench volume for medium sand or coarse sand may be then calculated for a standard length by multiplying the cross sectional area by length. The standard trench volume needed for 1,000 square feet of for coarse sand is 60 cubic feet, and the trench volume for medium sand is 90 cubic feet, These trench volumes are exactly the same as BMP T5.10 drywell volumes for those substrate textures.

Pierce County's stormwater manual addresses the problems with allowing infiltration BMPs in loam soils. The Pierce County Stormwater Manual specifies the allowable range of sandy and loam soils in the USDA soil texture triangle (Figure A-1 of Volume III Appendix A, December 2015). The allowable fine textured soils for full roof downspout infiltration are materials with at least 40 to 50 percent sand and no more than 20 percent clay.

Guidance for Drywell Design Using the Manual Standard Gravel-Filled Sump

Drywell volumes for river rock filled drywells

Based on the SWMMWW (2014) trench lengths, the volumes for drywells in substrates finer than medium sand (USDA defined size range) are:

- Very fine to fine sand: 225 cubic feet per 1,000 square feet of roof area
- Loam (defined as having no more than 20 percent clay and greater than 40 to 50 percent sand): 375 cubic feet per 1,000 square feet of roof area

USDA particle size chart

The table below defines the breaks between coarse, medium and fine sand.

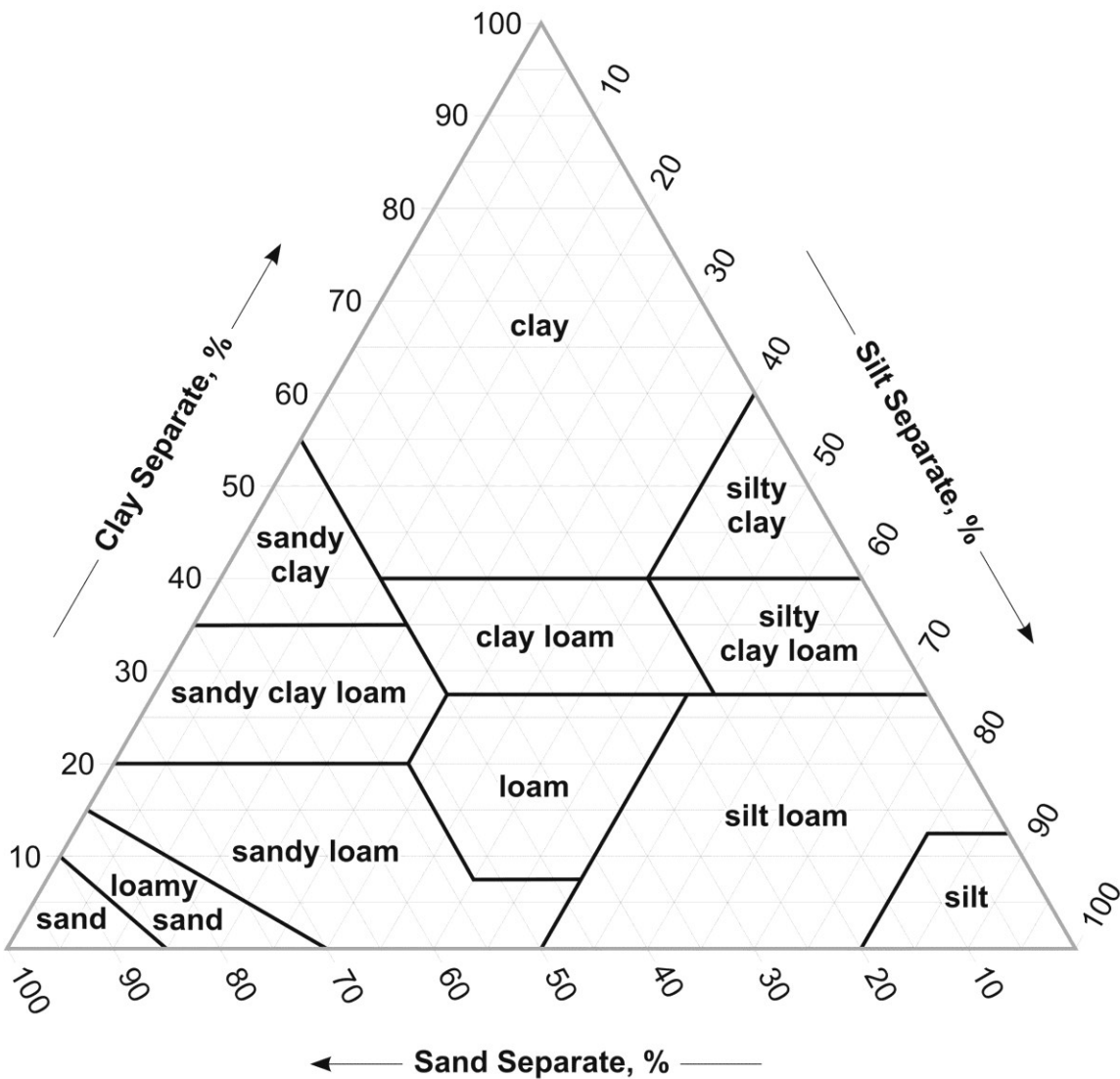
Table 1. USDA soil-separates classifications (Soil Survey Division Staff 1993).

Name of Soil Separate	Diameter Limits (mm)
Very fine sand	0.05-0.10
Fine sand	0.10-0.25
Medium sand	0.25-0.50
Coarse sand	0.50-1.00
Very coarse sand	1.00-2.00

USDA soil texture triangle

The USDA soil texture triangle shows the textures for loam, sand and clay soils. Only substrate materials with 40 percent or greater sand and no more than 20 percent clay are suitable for roof downspout infiltration using drywells and infiltration trenches.

Soil Textural Triangle



Use of modular infiltration galleries

Modular infiltration galleries are becoming more common, replacing rock-filled trenches and drywells. Follow the manufacture guidelines for full infiltration for the site soil texture but consider that infiltration area should be similar to trenches and gallery volume should be at least 1/3 of infiltration trench rock volume.

