

Chapter 7 Sand filters



Sand filters for detention and filtration of stormwater runoff

7.1 Introduction

Sand filters operate in a similar manner as bioretention systems with the exception that they do not support any vegetation owing to the **filtration media** being too free draining (and therefore dries out too frequently to support vegetation). The use of sand filters in stormwater management is suited to confined spaces and where vegetation cannot be sustained (e.g. underground). They are particularly useful treatment devices in heavily urbanised and built-up areas.

Other filter media, such as peat, mulch or gravel have also been used in filtration systems, however, only sand filters are discussed in this chapter.

Key design considerations include the provision of detention storage to yield a high **hydrologic effectiveness** (i.e. allowing for **extended detention** above the filter media), **discharge** control by proper sizing of the perforated underdrain and overflow pathway for above-design operation.

Sand is the filtration media and its hydraulic conductivity ranges from 1×10^{-4} m/s (360 mm/hr) to 1×10^{-3} m/s (3600 mm/hr).

A sand filter system typically consists of three chambers (Figures 7.1 and 7.2).

Water firstly enters a **sedimentation** chamber where gross pollutants and coarse to medium-sized sediment are retained. **Stormwater** enters this chamber either via a conventional side entry pit or through an underground pipe network. The sedimentation chamber can be designed to have either permanent water between events or to drain between storm events with weep holes. There are advantages and disadvantages with each approach.