

John Carver

From: Daniel McLeish [REDACTED]
Sent: 18 December 2018 18:13
To: Wealden Agriculture
Cc: John Carver
Subject: RE: GTR - Drainage Proposal - Soakage Report
Attachments: GTR Soakaway Deep 1 in 30.pdf; GTR Soakaway Deep 1 in 100 plus CC.PDF; GTR Soakaway Shallow 1 in 30.pdf; GTR Soakaway Shallow 1 in 100 plus CC.PDF

Rob,

Please find attached the calculations showing the results from the Microdrainage WinDes models. As discussed with John Carver we have looked at two options, one with a shallow depth and one with the smallest footprint, and that you would select the one which best suits the site constraints.

The basis of the design as required by Arun District Council is for a surface water system in accordance with Approved Document H of the Building Regulations, and the recommendations of the SuDs Manual produced by CIRIA. The CIRIA requirements are the more stringent of the two documents, below is an extract of the relevant sections of the SuDs Manual which outlines the design criteria to be used.

CIRIA SuDs Manual 2015

13.4 HYDRAULIC DESIGN

13.4.1 General

Infiltration systems should be designed to manage storms up to the design standard of service required for the contributing catchment area; this could be the 1:10 or 1:30 year storm, or larger. As discharge criteria from a development site are usually based on a 1:100 year event plus an allowance for climate change, the performance of infiltration systems under such conditions needs to be known. For ease of design, and to minimise the occurrence of surface flooding within the development, this may result in the soakaways being designed to manage the 1:100 year event (plus climate change allowance).

► The design of infiltration components should follow the advice in Chapter 25.

The infiltration component should discharge from full to half-full within a reasonable time so that the risk of it not being able to manage a subsequent rainfall event is minimised. Where components are designed to manage the 1:10 year or 1:30 year event, it is usual to specify that half emptying occurs within 24 hours. If components are designed to infiltrate events greater than the 1:30 year event, designing to half empty in 24 hours can result in very large storage requirements and, with agreement from the drainage approving body, it may be appropriate to allow longer half emptying times. This decision should be based on an assessment of the performance of the system and the risk and consequences of consecutive rainfall events occurring.

The soakage rate we have used is 1.02×10^{-2} m/h, the average of the five tests carried out by Southern Testing in November.

The two options we have designed are:

Shallow: 20 x 10m soakaway, 1 crate high, 0.40m deep with an invert of 1.50m below ground level.
Deep: 15 x 10m soakaway, 2 crates high, 0.80m deep with an invert of 1.90m below ground level.

A design was attempted at a 1.20m deep soakaway but the footprint was the same as at 0.80m deep, so there is no advantage in going any deeper.

For both the shallow and deep crate soakaways the model was run for 1 in 30 year and then 1 in 100 year with 40% climate change. For both options, in the 1 in 30 year case the half drain down time is less than 1440 mins (1 day), and the water level stays well within the depth of the crates. In the 1 in 100 year case with climate change, the half drain time exceeds one day, but the crates do not fill up completely so there is additional storage capacity. At no time for any model storm duration does WinDes show a flood risk.

The soakaway should be located so that it is at least 5m away from any building or road, as required by Clause 3.25(a) of the Building Regulations Part H.

In our discussions you indicated that there has previously been testing and monitoring to establish the highest annual/winter ground water levels. A minimum distance of 1m should be maintained between the base of the structure and the highest groundwater level. The main reason for this is to ensure that the soakaway can function as designed with a sufficient depth of unsaturated material.

Below is an extract from the CIRIA SuDs Manual showing the typical arrangement of a crate soakaway. You will note that there is a catchpit required upstream to capture any siltation before it enters the crates.

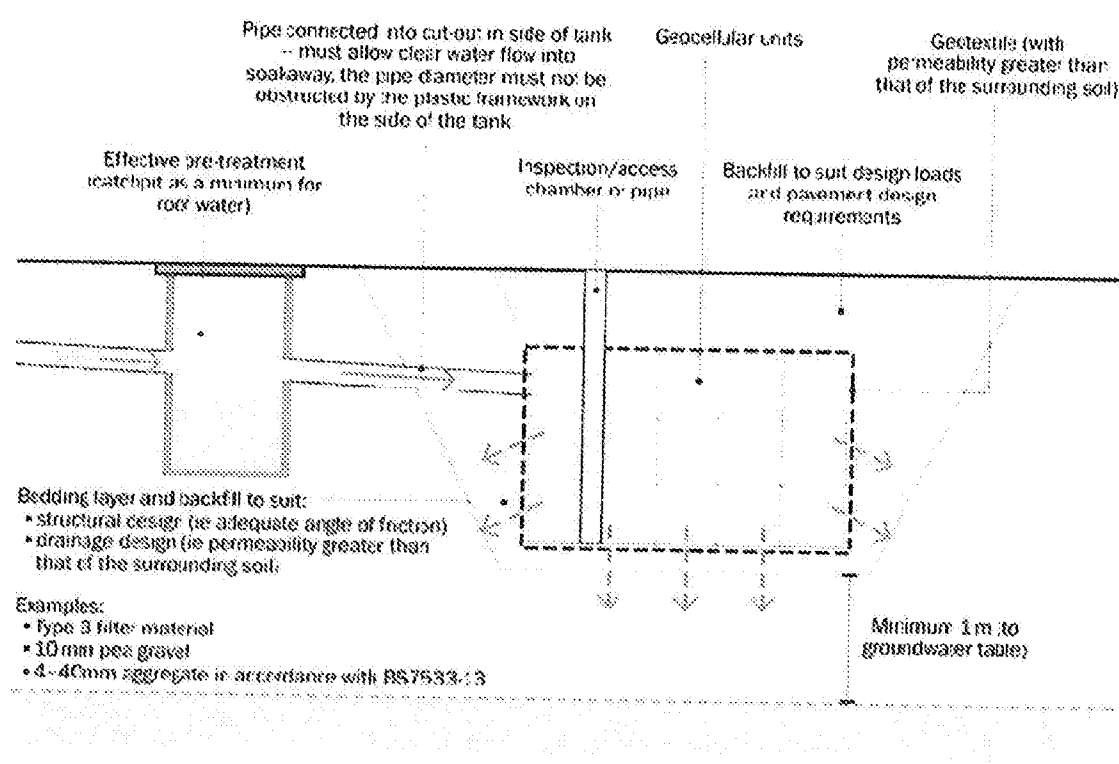


Figure 13.1 Soakaway details (including a pre-treatment system)

You indicated that you have identified a suitable location on site for the soakaway to be constructed. I would expect that the planners will require a sketch showing this to discharge the condition, along with the attached calculations of the selected option.

Please feel free to contact me to discuss if any of this needs further explanation.

Regards

Daniel McLeish BEng CEng MICE DMS PGCE
Associate

