



**Scottish Water**

**SW1015 - Shieldaig Road, Glasgow**

**Autocode: 5010170000**

**Pond Sizing Technical Summary**

Document Controller					
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HISTORY SHEET



## Background

Incapacity in the sewer network results in internal flooding of some properties in Shialdaig Road, Glasgow. This incapacity is in part caused by a surface water connection from Glentinar Industrial Estate which introduces 6Ha of impermeable area to the already overloaded combined sewer.

## Solution Summary

A solution has been developed to alleviate the internal flooding which involves removal of surface water from the combined sewer. Surface water flows from the Glentinar Industrial Estate will be intercepted and conveyed to a new SUDS pond on Glentinar Road. The Suds pond will attenuate the surface water before discharging to the Forth & Clyde Canal via a swale and outfall.

## Design Criteria of SuDs Pond

Scottish Water and its Alliance Partner have engaged with Scottish Canals throughout the design process to ensure the SUDS scheme complies with requirements for discharging to the canal. Discussions are ongoing with Scottish Canals to reach final agreement on the SUDS pond design and cost contributions for future management and maintenance of the canal.

The design as progressed to date in conjunction with Scottish Canals is summarised here.

Scottish Canals commissioned AECOM to carry out a study detailing the impact of surface water discharge on peak levels in the canal. Discharge rates for design of the SUDS pond were adopted based on recommendations from the AECOM study following discussions with Scottish Canals. The outflow from the SUDS pond should be restricted to 2 x Greenfield Runoff Rate (2xGF) and check made to assess impact if the flow was restricted to 1 x Greenfield Runoff (1xGF). These peak allowable runoff rates were findings from the AECOM study for a 30year return period and were quantified as:

- 1x GF = 60.8l/s
- 2x GF = 121.6l/s

These runoff rates were then used to size the pond using MicroDrainage with initially FEH99 rainfall and 10% allowance for Climate Change. Subsequently the solution was also tested using FEH13 Rainfall with 55% Climate Change applied. It was determined that the SuDS pond would require a total of 1,031m<sup>3</sup> storage volume. The actual excavation volume of the pond (4,812m<sup>3</sup>) is greater than the required storage volume to take account of existing drainage levels and existing topography. The solution was also tested for a 200year return period (FEH13 + 55% Climate Change) using MicroDrainage. The model predicted the pond would not overtop.

A plan showing an outline of the pond design is shown in Figure 1.

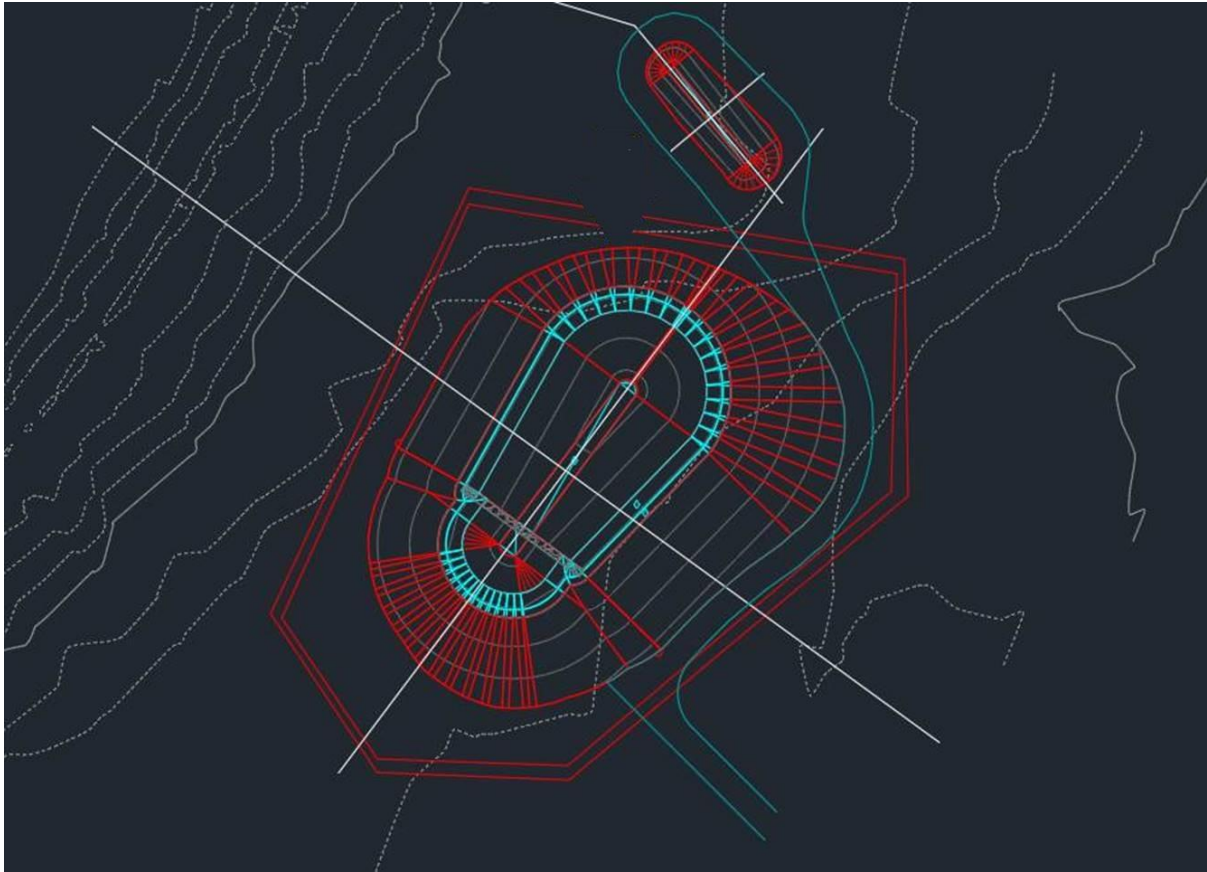


Figure 1 - Plan of SUDS Pond

The model predicted top water levels and peak discharges are summarised in Figure 2.

Return Period	Top Water Level predicted in the pond (mAOD)	Peak discharge from the pond into the canal (l/s)
	2x GF	2x GF
M1	50.767	46.8
M5	50.929	70.7
M10	51.025	87.0
M30	51.200	119.7
M50	51.294	138.5
M100	51.431	167.1
M200	51.590	195.3

Figure 2 – Model Predicted Top Water Levels and Peak Discharges

The area that will drain to the SUDs pond is highlighted green in Figure 3 and annual estimated spill volumes are detailed in Figure 4.



Figure 3 – Area Draining to new SUDs Pond highlighted green

10 Year TSR	Volume discharged into the canal (m <sup>3</sup> )
Annual Average	30,251
Annual Max	35,831
Annual Min	20,245

Figure 4 – Annual Estimated Spill Volumes from SUD pond into canal

**Level of Treatment**

The level of treatment provided by the SuDs Pond is line with the CIRIA SuDS Manual 2015 treatment indices.

**Impact of New SUDS Pond**

Internal sewer flooding risk to properties in Shildaig Road will be reduced by removal of surface water from the combined sewer. This will also reduce external sewer flood risk from the combined sewer.

Flows from the new SUDS pond into the canal will be managed by Scottish Canals using measures being set up as part of the North Glasgow Integrated Water Management System (NGIWMS). The NGIWMS is a drainage partnership set up to manage surface water in the north of Glasgow and allow future development. Development in north Glasgow is currently constrained by capacity of the existing drainage infrastructure. It is a partnership between Scottish Canals, Glasgow City Council, SEPA and Scottish Water. The canal will be utilised as a sustainable surface water drainage tool by using remote sensing to lower the canal level in advance of predicted storm events. This will create spare capacity in the canal system so that it can accept surface water from new development areas in a controlled manner. It also has allowance for taking flows from the proposed new SUDS pond.

## Summary

The new SUDS pond will alleviate internal sewer flooding currently experienced by some properties in Shildaig Road. This will be achieved by intercepting surface water flows from Glentinar Industrial Estate and conveying flow to a new SuDS pond on Glentinar Road. The SUDS pond will attenuate the surface water before discharging to the Forth & Clyde Canal via a swale and outfall. Flows into the canal will be managed by Scottish Canals using measures being set up as part of the North Glasgow Integrated Water Management System.