Towards best management of runoff in new developments

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Aim

The purpose of this research is to encourage a move away from traditional urban drainage solutions and promote the use of source and site controls. Specifically, the project will develop a holistic framework which allows SuDS designs to be optimised from the perspective of the key stakeholders: developers, planners, environmental regulators, engineers and homeowners. The Dalmarnock Road area of Glasgow' is being used as a case study to evaluate holistically the benefits of competing SuDS solutions.

Examples of source and site controls

Introduction

Use of Sustainable Drainage Systems (SuDS) has been made compulsory for all new developments(1). However, despite the design guidance(2), systems are often implemented using "end-of-pipe" SuDS. Land take, costs, lack of visibility regarding maintenance and adoption of SuDS are generally seen as barriers for the implementation of source and site controls (3). In the mean time, providing a good quality of life and maintaining biodiversity in urban areas are key drivers for planners. Development of an early surface water management plan would help in satisfying both the management of urban runoff and planning objectives.

Objectives

Short term:

1. Propose different source and site controls for the Dalmarnock Road area taking into account site specifications.
2. Assess the benefits of using source and site controls on the water cycle and on the surroundings.

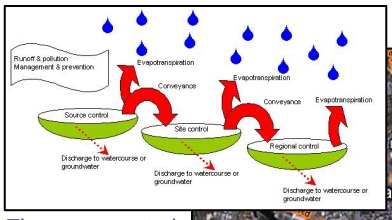
Long term:

Develop a framework for specifying SuDS treatment trains for different development scales and densities.

Case Study

Part of the Clyde Gateway, the Dalmarnock Road area is a 20 hectares development which will comprise 1500 houses. The regional pond, if no source controls are used, will occupy approximately 5000m² to treat runoff to an acceptable level and store water up to a 100 year return period (6).

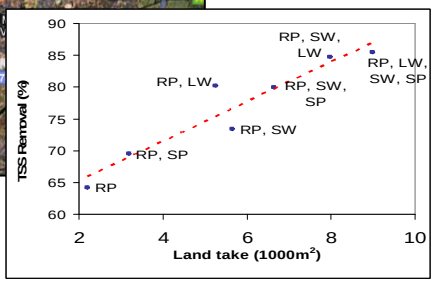
Key question – does an alternative solution exist with a smaller foot print.



The treatment train (2)

Suggested land use for Dalmarnock Road (4)

Effect of urbanisation on hydrology

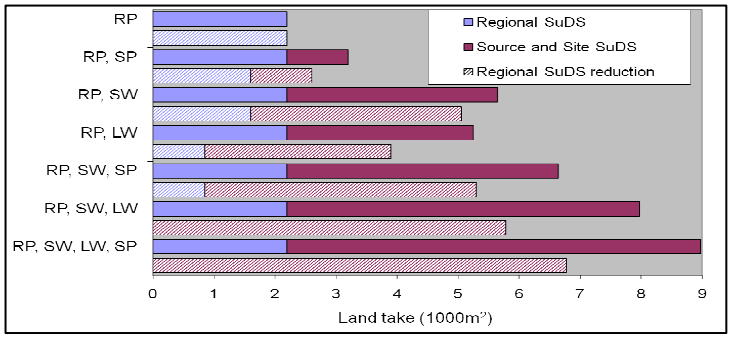


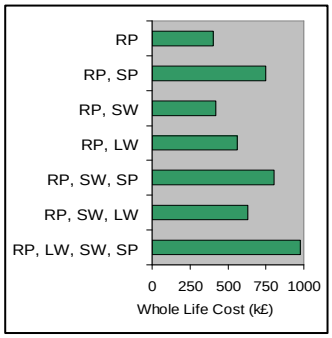
Land take, performances and costs for different SuDS solutions (5)

Methodology

- Determine source and site controls that can be used depending on site characteristics.
- Assess the different SuDS solutions on:
  - ➢Water quality
  - ➢Water quantity
  - ➢Costs: construction and maintenance.
  - ➢Amenity and Biodiversity
  - ➢Flood risks

RP: Regional Pond SP: Site Pond
SW: Swales LW: Linear wetland





Conclusion

The use of SuDS in series can provide significant water quality improvement and water storage that can help to reduce regional control size. Source and site controls can also promote biodiversity and improve amenity in their close proximity, hence satisfying some of the planning objectives. Further work will assess the performances of treatment trains for multiple events.

References

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