

GREEN ROOFS FOR STORMWATER MANAGEMENT IN NORDIC COUNTRIES

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ABSTRACT

Green roofs have in the last decades gained increasing interest as a blue-green stormwater solution that can contribute with multiple benefits to urban environments. The performance of the living infrastructure of a green roof is strongly dependent on the climate. Local performance estimates and design principles are important.

Field studies have been carried out in 4 different Norwegian locations representing a large variation in precipitation amounts, winter and summer temperatures. The results include data from 3-8 years of studies at 16 different small scale plots (8-15 m²) representing different extensive green roof configuration (4-15 cm depths). Green roof performance with respect to retention (volume reduction) and detention (peak flow reduction and delay) of stormwater will be presented and discussed with respect to climatic conditions and green roof configurations.

Resilient stormwater management needs to be based on set of stormwater solutions to answer to the future cities complex challenges. The role of green roofs in such a treatment train will be discussed focusing on which challenges can be addressed with a green roof and which needs to be solved in combination with other stormwater solutions.

There is a need for performance estimates to be able to account for green roofs as a part of the stormwater treatment train and for design purposes. The performance of living infrastructure, like green roofs, will vary from event to event as a result of variations in prior weather conditions and vegetation development. However, these processes are quite complex while most engineers prefer more simplified and schematic design rules. Based on results from field studies and theoretical framework, a method to estimate performance and design extensive green roofs will be presented.

Keywords: Extensive green roofs; Cold climate; Stormwater management