

Abstract for oral presentation at PARIS5 conference

For theme no 6: (Monitoring) and Mitigation

Title: Implementation of sustainable urban drainage systems to preserve cultural heritage

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Abstract:

The landscape of many cities and the character of their shallow subsurface environments are defined by a legacy of interaction between anthropogenic and geological processes. The shallow subsurface in historic cities often contains extensive archaeological remains, also known as cultural deposits. Modern and historic buildings and monuments are resting on these cultural deposits. Preservation conditions for naturally degradable archaeological remains are strongly dependent on both water quality and the presence or absence of groundwater in particular. Deterioration of archaeological material and context often occurs as a consequence of lowering of the groundwater level. A main goal at such heritage sites is therefore to establish a stable hydrological environment, so the site will be safeguarded for posterity. Green infrastructural solutions such as Sustainable Urban Drainage Systems (SUDS) facilitate restoration and upholding of the water balance, and thus support preservation of cultural. Three Dutch cases are discussed that use the cheap infiltration solutions: Motte of Montferland, City mound of Vlaardingem, Weiwerd in Delfzijl and the Leidse Rijn area. In all cases SUDS as bioswales, IT drainage, permeable pavement and rainwatergardens are planned and constructed to preserve the water balance and thus the cultural heritage. The first monitoring results and evaluation of the processes give valuable lessons learned that are translated into guidelines for design, construction and maintenance. Transnational knowledge exchange is an important element to bring the experiences across boundaries. Visualisation of the performance and maintenance of SUDS by photos, videos, apps and serious gaming seemed very valuable in this process and will be part of this paper and presentation.

Keywords: SUDS, cost effective, monitoring, sustainability, preservation conditions, guidelines for design, construction and maintenance.

Biography (max 50 words/person):

Floris Boogaard is professor Spatial Transformations at the Centre of Applied Research and Innovation on Area Development at the Hanze University of Applied Sciences in Groningen. His research fields include stormwater drainage and infiltration, complex monitoring, design of drainage facilities and urban water management planning.

Michel Vorenhout is an affiliate researcher at the University of Amsterdam (UvA) and specialises on redox processes in soils. He is involved in various archaeological monitoring projects through his company MVH Consult.

Hans de Beer is a hydrogeologist and leader for the Groundwater and Urban Geology group at the Geological Survey of Norway. He has 20 years' of experience in groundwater research, particularly in urban areas. Research on groundwater and in-situ preservation of cultural heritage is a primary focus area since 2005.

Ronald Wentink is a senior consulting who is specialized in design, construction and maintenance on sustainable urban drainage systems. He is involved in various projects as 'The Motte' where implementation of SUDS enables to preserve cultural heritage.

Marika Snoek works as consultant at Rijksdienst voor het Cultureel Erfgoed and is involved in the project 'Weiwerd', which was a village in the Dutch province of Groningen that is now rebuilt. It is a part of the municipality of Delfzijl, and lies about 27 km east of Groningen and has a rich history. For this reason a 'no dig' policy is made and surface SUDS provide the new watermanagement system.