



CASE STUDY NAME: **ODENSE COMMUNE**

LOCATION: **ODENSE, BOLBRO, DENMARK**

SCIENTIFIC PARTNER: **VANDCENTER SYD & UNIVERSITY OF SOUTHERN DENMARK**

LOCAL STAKEHOLDERS: **MINISTRY OF ENVIRONMENT OF DENMARK, ENVIRONMENTAL PROTECTION AGENCY, ODENSE KOMMUNE, ODENSE BOLDKLUB AND LOCAL RESIDENTS**

NATURE BASED SOLUTIONS: **BIORETENTION FACILITIES**

WATER MANAGEMENT SOLUTION: **HYBRID URBAN DRAINAGE SYSTEMS & SENSORS**



ABOUT ODENSE, BOLBRO

The Bolbro area is undergoing a large transformation (i.e. demolition of large industrial areas, construction of dense housing and green infrastructure). The overflow receiving water bodies (Bolbro Rende/Odense Fjord) do not meet the requirements set out by EU Water Framework directive (thus, stormwater outlets are being restricted) and monitoring of the network is limited.

The local recipient is a small creek (Bolbro Rende) in an urban setting. The pollution load on this creek is already in focus, and several initiatives have been made, and are being planned to reduce the pollution load.

There are several nature based solutions already implemented in the area, mainly bio-retention facilities (rain gardens with filter soil) with and without underlying drains. These facilities have different types of catchment-areas, for example a primary road with heavy traffic; a secondary road with less traffic and parking lot.

Some of the nature based solutions already in use in the area have previously been monitored, and the project will be able to utilise established monitoring-facilities. Data from these previously monitored projects can be used in this project if needed.

Residents in the area have been involved in different projects over the last couple of years, many incorporating nature based solutions (NBS). This means that there is already an engaged community that this project is able to tap into.

AIMS & CHALLENGES

The D4RUNOFF project's goal is to create a novel framework for preventing and managing diffuse pollution from urban water runoff. This will be achieved by designing hybrid nature-based solutions (NBS) and a data-driven AI-platform to support policy and decision making.

In this case study, the team are:

- i) Implementing and assessing new NBS: 20-30 rain gardens with filter soil integrated in the roads for collection, filtration, infiltrating, and discharging storm water,
- ii) Carrying out non-target analysis to determine the presence and number of specific contaminants and contaminants of emerging concern (CECs), and tracking their source and fate before the stormwater outlet reaches the receiving water bodies,
- iii) Incorporating new sensors to enable data gathering,
- iv) Developing water sampling techniques in existing ponds and NBS to evaluate its effect on CECs.

The challenge faced is assessing the influence of urban pollution on water quality and how the city can invest in adequate infrastructures for urban development and climate adaptation.



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D4RUNOFF has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101060638.



Filter vegetation and soil implemented at newly constructed housing areas in Bolbro

RESEARCH & OUTPUTS

- Inlet water samples will be collected at different chosen locations within the case study area. Non-target screening (NTS) and concentration of various metals will be analysed, as well as the presence of multi-resistant bacteria,
- Develop high-resolution methods for suspected pollutants and non-target screening for CECs,
- Online sensors for water pollutants,
- Apply multi criteria decision analysis (MCDA) to the dynamic design of hybrid urban drainage solutions,
- Apply decision support systems (DSS) to hybrid urban drainage solutions,
- Develop agent based modelling (ABM) and social network analysis,
- Test and validate the project results in relevant environments,
- Assess the replicability of the project results.

ADDITIONAL INFORMATION

The methods and tools developed in the project (novel measurements methods, online sensors, risk mapping, etc.) will be implemented, tested and validated in three demonstration sites.

The three sites are located in Odense (Denmark), Santander (Spain) and Pontedera (Italy), covering different climate areas.

Replicability will be assessed in five sites: Pisa Sud (Italy), Algeciras (Spain), Ostrava (Czech Republic), Gdansk (Poland) and El Cairo (Egypt).

Contact:

Thor Hougaard (VandCentreSyd) ✉ tzh@vandcenter.dk



Rewilding with native vegetation to better filter runoff



Raingarden with filter soils integrated into the roads and car parks



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