

IN ASSOCIATION WITH



Volume 1: Thesis

Socioeconomic Analysis of Urban Water Management Through Separate Sewer Systems



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M.Sc. Environmental & Resource Management

University of Southern Denmark & Aalborg University, Esbjerg 2016

Abstract

In recent years, urban development has affected the adjacent ecosystems as the sewage-capacity became insufficient with increasing effects of climate changes, causing sewer overflows from the underdimensioned combined sewer systems (CSS). Concerning the imminent climate change predictions, it is getting common to adapt separate sewer systems (SSS), introducing the possibility of misconnections; illicit discharges of contaminated water to surface water sewers, presenting a possible immediate impact of the recipient waters.

To accommodate these issues, SSS have been adopted by Danish municipalities, though the socioeconomic welfare changes related to SSS has not been properly assessed, implicating that municipalities adopt policies for SSS projects on a vague and fragile scientific foundation. The purpose of this thesis is therefore to examine the potential socioeconomic cost and benefits

The thesis aims at measuring welfare changes in a societal perspective, as well as establishing recommendation grounds for management processes, and determining the associated risks of the SSS policies and hence projects.

The study found that there is a high risk of pollution related to SSS failures in the case area of Havbakken, Esbjerg, with a significant risk of exposing the recipient to high levels of *E. coli*, and associated pollutants during rainfall.

The biggest risks of project failure were found to be communicational errors and hence mismanagement of crucial processes relevant to project success.

The master thesis concludes that in a socioeconomic perspective of suggested SSS policies, one policy was found to have a negative net present value, and another a positive net present value. The reason for the difference is assumed to be the characteristics of the two project types and the underlying physical impact categories, where different monetary amounts in terms of costs and benefits are present, and accrued to different parties of society.

On the above norms, the master thesis concludes the socioeconomic aspect of the separate sewer system as generally being positive, though this notion is not perceived as unconditional due to various assumptions made throughout the thesis. The subject requires further research, in order to eliminate or reduce uncertainties.