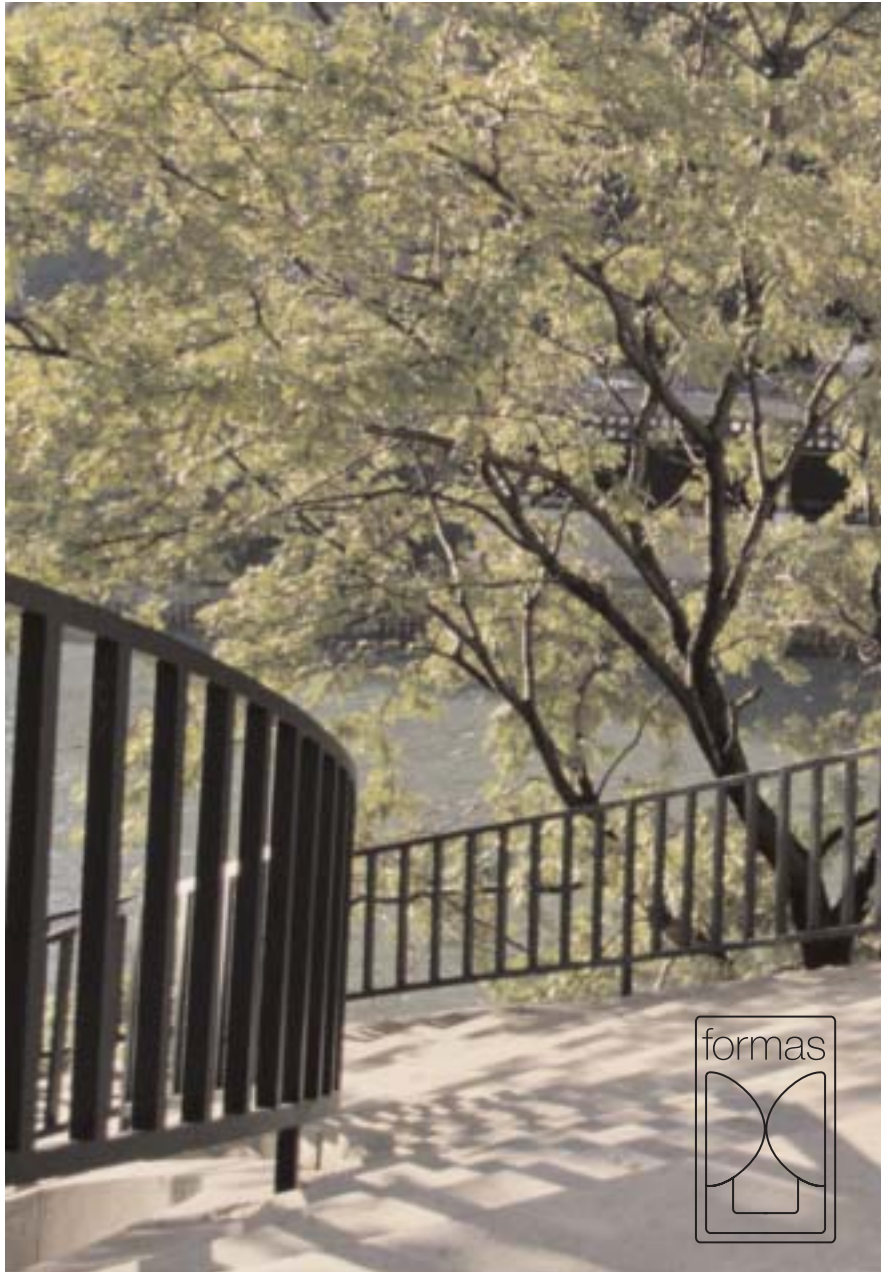


# Land and water in the urban environment

Work on the key action "Land and water in the urban environment" proceeds during the period 2001 - 2003. Eleven projects have been granted a total of MSEK 13.0 by Formas and MSEK 10.0 by other funding organisations. Most of the projects deal with stormwater.



## Land and Water in the urban environment

*The overarching goal of the key action is to enhance, on the basis of a holistic approach and cooperation between different areas of expertise, knowledge of the use of land and water in the urban environment. Projects within the key action shall pay due attention to the needs of society and the demands for efficiency in the use of resources, biological diversity, sustainability, environmental considerations, health, safety and the quality of human life.*

*The programme in 1999 laid down the following possible themes for the projects:*

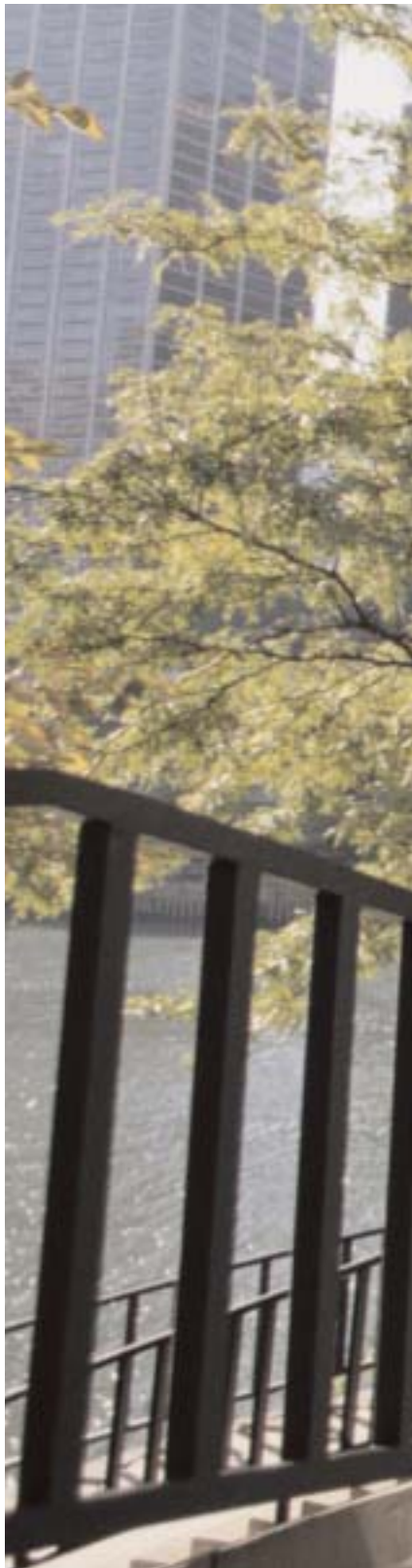
*Solutions (technical, biological, chemical etc) for the preparation, design, provision and re-instatement of land for different purposes, and for the prevention and management of contamination and damage to land and water.*

*Impact assessments - knowledge and methods for the assessment and analysis of the consequences of different types of environmental actions*

*Process management - knowledge of methods, forms and decision bases for the management of issues relating to land and water in the planning, decision making and administration processes.*

*The eleven projects which have been granted funds mainly deal with solutions and impact assessments in the field of stormwater disposal. One of the stormwater projects deals with planning instruments in the long term stormwater management planning of local authorities. Three of the four approved projects relating to Malmö concern the Augustenborg area where stormwater disposal is to be changed. Today, stormwater is disposed of in a combined sewerage system. In the future an open system is to be constructed.*

*Two projects are more directly concerned with land; one deals with natural self cleansing of oil products in the soil and water, and the other with re-use of slag as road construction material.*



### **Open surface water disposal in an established urban area**

The object of this project is to study changes in stormwater disposal in the Augustenborg area of Malmö. In order to reduce and balance stormwater runoff and to a certain extent treat it, several methods will be used. These are green roofs, infiltration areas, small and large channels, ponds, wetlands and overflow areas. Some of these have already been constructed. This is a unique opportunity to study how all these measures can together improve stormwater disposal. It is hoped that stormwater runoff can be reduced by up to two thirds.

*Project budget:* MSEK 1.50

*Project manager:* Peter Lindhqvist, Service Administration, City of Malmö, peter.lindhqvist@malmo.se

### **Ecological stormwater disposal in a built-up central area, with reference to Augustenborg in Malmö**

In this project, the entire system in Augustenborg is analysed so that it can be made to fit in with other areas. A description shall be given of how green-blue belts for the utilisation of stormwater in towns shall be designed with respect to hydraulic function and with due consideration of water quality. A method for balancing calculations for precipitation on green roofs is to be produced. Requirements for the sizes of ponds and sewers will be drawn up with respect to paved surfaces, green roofs and infiltration areas, and also for the way in which circulation in open channels is to be arranged and designed so as to create local infiltration areas.

*Project budget:* MSEK 2.860

*Project manager:* Lars Bengtsson, Water Resources Engineering, Lund Institute of Technology, lars.bengtsson@tvrl.lth.se

### **Green roofs**

It is expected that green roofs will have a considerable role in stormwater disposal by cleansing and detaining stormwater as near the source as possible. It is assumed that up

to 60% of rainwater will be taken up by plants and stored in the substrate. This water need not therefore impose a load on the stormwater system. The green roof is also expected to save energy, especially in summer when transpiration from plants will have a cooling effect. The plants are also expected to prolong the life of the roof by protecting the roof material from degradation due to solar radiation.

*Project budget:* MSEK 1.633

*Project manager:* Kaj Rolf, Agricultural Engineering, SLU, kaj.rolf@lt.slu.se

### **Planning instrument for long term local authority planning**

The object of this project is to produce a practical planning instrument for coordinated local authority water planning, with which it will be possible to overcome the conflicts inherent in today's fragmented spheres of responsibility regarding local authority management of water issues. By means of well structured information management, an endeavour will be made to ensure that information regarding water that is normally dispersed among several local authority administrations is utilised by all.

*Project budget:* MSEK 1.650

*Project manager:* Marianne Beckman, Malmö Water Supply and Sewerage Administration, marianne.beckman@malmo.se

### **The function of stormwater ponds under winter conditions**

This project in the centre of Växjö is the first one in Sweden where the function of stormwater ponds under winter conditions is studied. The physical, chemical and biological processes which evoke interest in stormwater ponds function worst under winter conditions. Biological activity is reduced by temperature and oxygen conditions. Hydraulic function may be disrupted by ice cover, and the discharge caused by snow melt may consist of water of extremely poor quality. It is hoped that the results will enable an improved environmental impact assessment to be drawn up.



*Project budget:* SEK 791,000

*Project manager:* Annette Semadeni-Davies, Water Resources Engineering, Lund Institute of Technology, annette.davies@tvrl.lth.se

### **Open stormwater treatment installations as a landscape element - the significance of treatment by vegetation for biodiversity and recreation**

The object of this project is to enhance knowledge of the function, structure, plant communities, management etc of existing stormwater treatment installations and of their value from the social, cultural and ecological points of view. The method is based on a survey of existing stormwater treatment installations and construction of a data base for the analysis of the relationship between factors such as location, design, discharge, vegetation structure and maintenance data.

*Project budget:* MSEK 1.496

*Project manager:* Märten Hammer, Landscape Planning, SLU, marten.hammer@lpal.slu.se

### **Immobilisation of heavy metals in sand filters for stormwater**

In conjunction with the disposal of stormwater, the water should be treated as near the source as possible so that the metals are concentrated in the upper soil layer from where they can be removed, either with the help of vegetation or by replacement of the soil layer when it has become saturated. The studies are expected to provide an answer to how heavy metals can be bound, the quantity of heavy metals that can be accumulated, and the length of time it takes for the soil layer to become saturated.

*Project budget:* SEK 896,000

*Project manager:* Kaj Rolf, Agricultural Engineering, SLU, kaj.rolf@lt.slu.se

### **Local or central snow disposal sites**

The object of this project is to describe and estimate the advantages and drawbacks of local snow disposal sites. Owing to lack of space, large quantities of snow must be hauled to major snow dumping areas which are

usually located outside the towns. Increased use of smaller local snow disposal sites inside the built-up area would make for more effective utilisation of resources. During the project, a number of different aspects such as environmental impact, utilisation of resources, economy and land use will be studied.

*Project budget:* MSEK 3.383

*Project manager:* Maria Viklander, Sanitary Engineering, Luleå University of Technology, maria.viklander@sb.luth.se

### **Groundwater recharge and water balance in an urban environment**

This project will be based on a process model, and both water balance and energy balance will be quantified for a number of common typical environments. The existing observation network for surface runoff from surface water systems and for groundwater level observations will be used. Investigations will be made of around ten typical environments where existing observation wells will be supplemented with recording equipment so that continuous measurement of variations in the watertable can be made simultaneously for all typical environments. In order that an overall picture of the city's hydrology and groundwater recharge may be provided, these will be coupled up to the ordinary groundwater network, comprising 900 sites, in Stockholm City.

*Project budget:* MSEK 1.902

*Project manager:* Per-Erik Jansson, Civil and Environmental Engineering, KTH, per-erik.jansson@aom.kth.se

### **Slag as road construction material**

The object of this project is to develop the necessary knowledge for safe use in road construction of bottom ash from waste incineration. The focus is placed on studies of me-



thods to predict, reduce and manage environmentally disruptive emissions. The project comprises the design, construction and instrumentation of a 500 m long test road. The results gained from investigations in the field and laboratory will be used in developing new prediction methods and a prototype for an environmental information system.

*Project budget:* MSEK 3.690

*Project manager:* Holger Ecke, Waste Science and Technology, Luleå University of Technology, holger.ecke@sb.luth.se

### **Natural self cleansing of oil products in soil and groundwater - method development for Swedish conditions**

6,000 - 7,000 petrol stations have been closed in Sweden. The soil around a considerable proportion of these stations needs remediation since the soil and in many cases the groundwater also has been contaminated. The method that has been usually employed is to excavate the soil and in some cases pump out the groundwater. Natural self cleansing has not yet been used in Sweden for remediation of oil contaminated areas. The object of this project is to develop a method description of the way in which investigation, modelling and verification of natural self cleansing in contaminated areas can best be carried out in Swedish conditions.

*Project budget:* MSEK 2.890

*Project manager:* Bo Lind, Environmental Engineering, SGI, Chalmers Vasa, bo.lind@swedgeo.se



**G5:2001.** This brochure is also available as pdf-file on Internet ([www.formas.se](http://www.formas.se))

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