

# Sustainable drainage systems in Malmö, Sweden

## New storm water management system in Ekostaden Augustenborg, Malmö

### Background

The Ekostaden project started in March 1998 when funding was granted from the government's local investment programme, local partners within Malmö itself and the MKB housing company. Ekostaden Augustenborg is one of Sweden's largest urban sustainability projects. Its main aim was to make the neighbourhood more socially, economically and environmentally sustainable. The project covered the residential area, the school, the industrial area and local businesses. The initial and vital components of this project were to introduce a new storm water management system which was implemented by the Malmö Department of Water and Waste, waste management and biodiversity.

### History

The residential area of Augustenborg was built between 1948 and 1952. At the beginning of the 1950s families flocked to the big new flats, more development soon followed and by the 1960s bigger flats were constructed. By the 1970s there had been no upgrades to essential amenities and residents began to leave, unemployment rose and the town went into decline. The sewage and water management system was outdated and heavy rain brought about flooding, leading to damage to vehicles and property.

### Funding

The total sum invested in the area is around 200 million SEK (c. £17 million, Feb 2010 exchange rate); around half of this is from the municipal housing company MKB. There are also a further 24 million SEK (c. £2 million) from the government's local investment programme as well as 6 million SEK (c. £0.5 million) from EU LIFE and URBAN funds and a number of other private and public sources.

### Materials and Methods

The new storm water system collects the water runoff from the rooftops and impervious surfaces and is channelled from the gutters through canals, ditches, holding ponds and wetlands before it enters the traditional closed sub-surface storm water system. The sewers were under-dimensioned to take heavy rainfall and so slowing the flow rate and volumes were essential. This system was designed to take the 1 in 15 year rainfall event. There are now 6 km of canals and water channels in

Augustenborg. With the introduction of more greenspaces, areas can now be temporarily flooded which in turn helps slow the water entering the storm water system. All 30 gardens in the district have been renewed under this project.

Green roofs were introduced to Augustenborg and in 2001 the world's first botanical roof garden was opened. Covering 9000 m<sup>2</sup> it had become a demonstration garden and world renowned research facility. Another 2100 m<sup>2</sup> of green roofs were introduced to the MKB residential houses. These green roofs help manage water by absorbing rainfall and therefore reducing and slowing entry into the water system. A variety of different techniques were used including planting sedum and mosses to create lightweight roof coverings. Many scientific papers have been published on green roofs, specifically mentioning and using data from the Augustenborg green roofs project.



(a)



(b)

(a) and (b) Augustenborg's botanical roof garden (courtesy [www.greenroof.se](http://www.greenroof.se)).

## Results

- The open storm water system retains 70% of all rainwater that falls onto the site. Although this system was designed for a 1 in 15 year flood event, during a major flood event in 2007 which equated to a 1 in 50 year event, the system was very resilient and Augustenborg fared much better than other neighbourhoods in Malmö. This open water system, where water is visible, has added a positive aesthetic and ecological contribution to the local community.
- The green roofs installed in the district were a major contribution to decreases in runoff. The plants and substrate alleviate the pressure on the drainage system by absorbing more than 50% of the rain water. There were many other advantages to the green roofs including: enhancing biodiversity, protecting the underlying roof material, appearance, noise reduction and minimising building heat in the summer months.
- The greenspaces that were created have become yet another mechanism for flood control. In major flood events these could be used if the system became overloaded. Generating more greenspace has brought about many benefits including social and ecological. The new public spaces have helped people to become engaged with local activities and, thanks to the networks of ponds and wetlands, biodiversity is increasing.

## Discussion

The benefits of this project have been wide ranging and this can be seen in various statistics. The turnover of housing tenancies has decreased by 20 % and there are no vacant properties in the area. The environmental impacts have also decreased by 20%. Unemployment has decreased and 30% more residents are back in work. In addition, anecdotal evidence has shown that local perceptions of Augustenborg have changed, as it is now perceived in a more positive light than before the regeneration.

## Future plans

- There is ongoing research into exploring the benefits of different types of green roofs, their sustainable construction, aesthetic impact, use of environmentally friendly fertilisers and contribution to biodiversity.
- Work is ongoing in this area thanks to two EU financed projects – GreenCLimeAdapt and GRaBS. These will look at adapting society to climate changes like flood events and drought. They will look at reducing the erosion of the main Riseberg Stream in Malmö and integrating green facades and green roofs. These newly begun projects will continue until December 2013.
- The Ekostaden Augustenborg project has proved to be exemplary and has been implemented in a number of new projects in Malmö and Sweden. The government now has a 'Sustainable regeneration of post- war housing' programme which will focus on a million homes from the 1960s which are in need of regeneration. Some sites are now looking at achieving a 100% storm water neutral system, which as a model could be adopted across other countries which face water shortages.

## Reference

<http://www.cabe.org.uk/case-studies/ekostaden-augustenborg>