

Storm water treatment and EU Water Framework Directive Experiences from Hanover, Germany, and Sweden



Source: Google



- 1. EU Water Framework Directive**
2. Situation in Germany
3. Situation in Sweden
4. Hanover Approach

- EU Water Framework Directive adopted in 2000.
- 7 key aims to protect and achieve a good status for all waters.
- 33 priority substances defined not to be exceeded.
- All countries in the European Union are bound to fulfil the demands.



Source:
smyckerian.se

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But how do we do it?

Implementation:

- Differs between the countries.
- Implementation in the city planning process easy.
- Implementation in existing neighbourhoods difficult.

Waste Water services:

“We need pragmatic and sustainable solutions for the existing structure”



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Legislation stature:

- Water framework directive / EU
- German water law
- State laws
- State regulations
- Guidelines

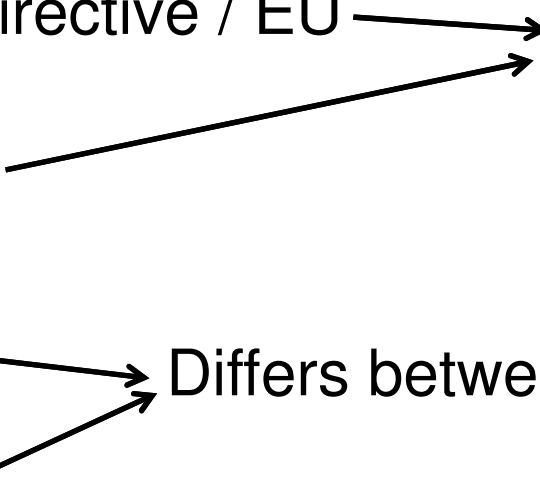


Source: Wikipedia

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- Some authorities are setting high standards, some low
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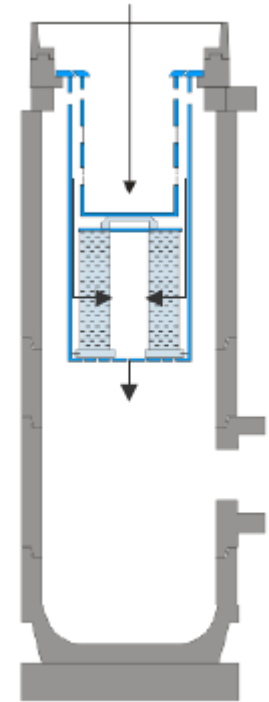
Storm water outflows:

- In general permission for 30 years for the outflow in the watercourse.
- In the application for permission description of quantity and quality data.
- Forerunner states densely populated – regulations based on the guidelines as state of the art.
- Focus on the amount of suspended solids < 63 micrometer retained in the constructions. If more than 50 % approval from authorities as decentralized storm water treatment plant.



Storm water treatment:

- Guidelines describe how to construct storm water treatment plants and which treatment effect the different construction have.
- Treatment effects for newer constructions known from scientific research and approval procedures.
- Treatment effects for existing older constructions are not really known. Estimations based on assumptions and a few analyses. Basic research not really there.



Source: NORISproject SEH

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Legislation stature:

- Water framework directive / EU
- Swedish Environmental Code
- Guidelines



<http://www.ne.se/neimage/2341950.gif>

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Storm water outflows:

- The Environmental Code classifies storm water from urbanized areas as waste water.
- 2009 environmental quality standards for major seas and watercourses. Must be adhered to in city planning - master and local plans.
- Quality and quantity impact and possible treatment valued/described in the environmental impact assessment in the local plan.



- Common with storm water management policies to be regarded in the local plans.
- Focus on the quantity issues. Quality issues just vaguely described.
- Forerunner Göteborg, Malmö and the Stockholm region.
- Stockholm now revises their policy concerning the quality aspects.



Source: <http://www.stockholmvatten.se/vattnets-vag/avloppsvatten/dagvatten/dagvattenstrategi/>

- In 2008 the environmental authority of Göteborg (550.000 citizens) published quality demands for storm water outflow in the sewer net or in the recipient.
- The compliance of the demands is to be proofed by the causer.
- Outflows of new assets are being proofed.
- Uncertainty how to proof the existing outflows.



Source: <http://goteborg.se/wps/portal/foretag/tillstand-och-regler/vatten-och-avlopp/riktvarden-fororenat-vatten/>

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- Hanover (514.000 citizens) is located in Lower Saxony.
- Less stricter regulations regarding storm water than the forerunners like NRW.
- Permissions for storm water outflow are at the moment regulated within the guideline M 153 (simplified method).
- The effects of the storm water treatment plants (ditch infiltration, swales, infiltration basins, catch basins etc.) are described with the non scientific parameter D.



Source: Wikipedia

Implementation of the water framework directive in Lower Saxony



we expect that the authorities will change the regulations, but we don't know how yet



The challenge:

- How can we fulfil new demands on storm water quality in an existing infrastructure with limited space?
- How can we optimize our existing system under the aspects of sustainability and economy?



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Research on existing system –
storm water management plan

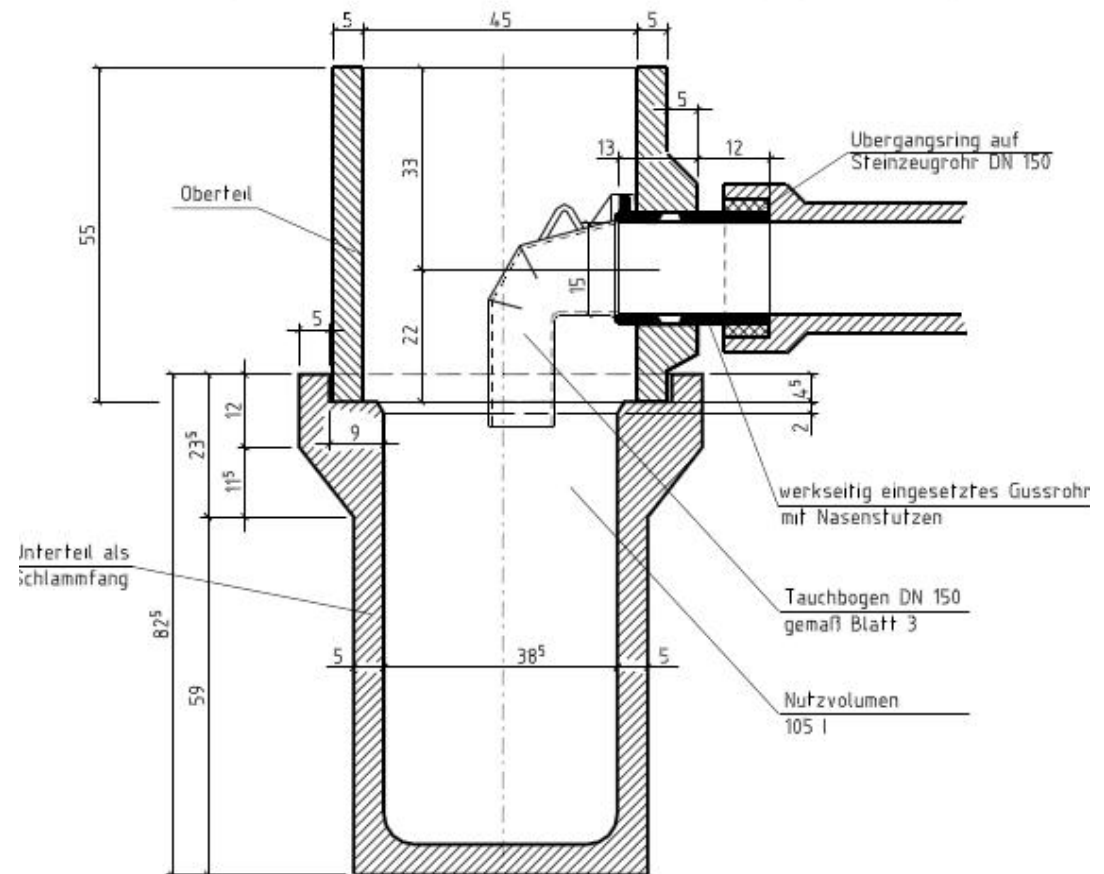
Hanover Waste Water Service:

- 1.400 km storm- and combined sewer net
- 1.100 km waste water sewer net
- 52.000 catch basins “Hanover Style”
- 47 storm water detentions and treatment plants
- 400 storm water out flows
- 2 waste water treatment plants – 500.000 and 750.000 pe



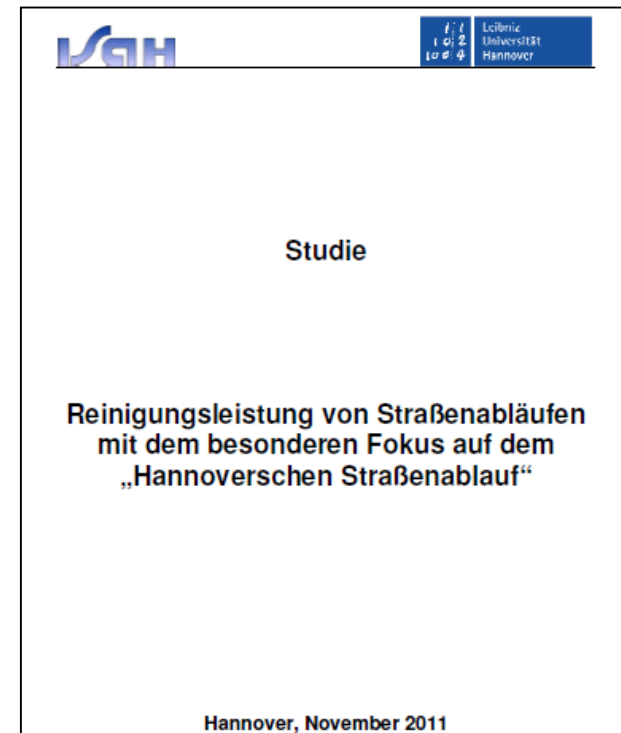
Catch Basin “Hanover Style”:

- Grate inlets with catch basin and an immersed outlet.
- Already in the 50’ designed.
- Catch basin volume 107 litres.
- The catch basins are emptied once a year.



Step 1 (with ISAH 2011):

- Literature review with ISAH, Institute for Sanitary Engineering and Waste Management, University of Hanover.
- Comparison of the effects of our catch basins with existing research.
- The outcome proved that the effect was theoretical better than expected and we decided to take step 2.



Step 2 (with ISAH 2012-2013):

- Analysing the catch basin hydraulic in real.
- Results should be comparable with already done research for certified catch basins and filter inlets.



IKT Laboratory

- Results: catch basin “Hanover Style” restrain about 60 % of the suspended solids < 63 micrometer.

Our catch basin can therefore be classified as a decentralized storm water treatment plant!



Step 3 (with ISAH 2014-2015):

- Analysing catch basin functions with sediment filled basin in the laboratory.
- Need of improving knowledge about sediment grading curves and organics.
- On site research during one year for two different locations.

Source: Google modified



Step 3 (with ISAH 2014-2015):

- Catch basins emptying once a month, sediment and liquid phase analysis.
- Inlets in acrylic glass which will not be emptied. Aim is to see how the layering with organics, sand and sediments will be.
- Main aim: better understanding of the chemical processes, what happens in the catch basin during one year, is it better to empty frequently or not?



The results will be one component in our storm water management plan regarding quality to meet the requirements from the water frame work directive.

Further projects:

In cooperation with ISAH – method for prioritising storm water outflows for treatment. Aspects as quality catchment area, traffic density and the treatment effect existing assets.



Lastly:

- How do other water services cope with the quality aspect?
- Important to also bring in the operational aspect and the life cycle analysis and not being forced to use short perspective solutions.

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