



DHI CASE STORY

DECREASING HAZARDOUS POLLUTANTS IN WASTEWATER

Using source tracking to regulate industries

Several years ago Gladsaxe Municipality near Copenhagen, Denmark had a number of wastewater pollution hotspots. Knowing the source of the pollution was vital for Gladsaxe Municipality to address the problem. To assist them, we set up monitoring programmes in three industrial areas in the Municipality. This enabled Gladsaxe to identify the responsible industries and regulate them. This in turn led to a reduction in the concentration of most metals as well as hazardous and environmentally harmful substances in the wastewater going into the sewer system.

REGULATION OF AN INDUSTRIAL AREA

Located just north of Copenhagen, Denmark, Gladsaxe Municipality was long ago considered a wastewater pollution and heavy metal hotspot. Facing the environmental risk associated with discharging hazardous substances into the sewer system, the Municipality asked us for help.

In order to take steps to reduce the amount of pollutants in the wastewater, Gladsaxe Municipality first had to figure out the sources. Working in close cooperation with the Municipality, we implemented monitoring programmes in the Municipality's three major industrial areas: Gladsaxe, Bagsværd and Mørkhøj Erhvervsquarter.

Numerous major industrial companies are based in Gladsaxe Municipality. Gladsaxe Erhvervsquarter is home to several companies, including the headquarters of Dyrup A/S (which produces paint and wood staining products) and Ferrosan A/S (a consumer health care company). Bagsværd Erhvervsquarter also has several major industries, including Novo Nordisk A/S (pharmaceuticals) and Novozymes A/S (bio-technology). In order to know the load of heavy metal and harmful substances originating from some of these companies, we conducted monitoring programmes in the industrial areas.



Preparation of sampling and flow measurements in Gladsaxe

SUMMARY

CLIENT

Gladsaxe Municipality

CHALLENGE

- High load of heavy metals and hazardous chemicals in wastewater
- Difficulty determining the source of the wastewater pollution

SOLUTION

Yearly monitoring programme, including flow measurements and flow proportional sampling, to track the sources of the wastewater pollutants

VALUE

- Ability to regulate industries contributing to the pollution
- Decrease in heavy metals and hazardous substances in wastewater

LOCATION / COUNTRY

Copenhagen, Denmark

MONITORING WASTEWATER IN GLADSAXE'S INDUSTRIAL AREAS

We took wastewater measurements in the sewer junction in Gladsaxe Erhvervsquarter and Bagsværd Erhvervsquarter. We used this to document the load of metals as well as hazardous and environmentally harmful substances, including:

- phthalates
- poly aromatic hydrocarbons (PAH)
- nonylphenol ethoxylates (NPE)

This also allowed us to measure the amount of metals and hazardous substances coming from specific major industries.

For Gladsaxe Erhvervsquarter, we compared the measurements with those we took in a sewer junction receiving wastewater from the whole industrial area in 1996 (the baseline). Measurements we took from 2006-2008 showed that the load of heavy metals had dropped significantly to below the standards for discharge to sewers. The heavy metal measurements included cadmium, copper, chrome, mercury, nickel, lead and zinc.

Some of the hazardous and environmentally harmful substances in the samples, however, occurred in concentrations above the standards. These included nonylphenol ethoxylates (NPEs), bisphenol A, and tin compounds.

In Bagsværd Erhvervsquarter, we took measurements in 2001 for the same substances as those detected in Gladsaxe Erhvervsquarter. We specifically looked for:

- heavy metals (copper, chrome, mercury, nickel, lead and zinc)
- Linear alkyl benzene sulphonates (LAS)
- Di (2-ethylhexyl) phthalates (DEHP)
- nonylphenol ethoxylates (NPE)
- poly aromatic hydrocarbon (PAH)
- long-chain nonyl and octylphenol ethoxylates



Equipment for automatic wastewater sampling

Our monitoring programmes identified the main hazardous substances and discharges that needed to be regulated and reduced. We later conducted a monitoring programme in Bagsværd Erhvervsquarter in 2009 to identify changes in the load of harmful substance in the wastewater. The results showed that no follow up was needed due to specific and efficient wastewater regulation being carried out.

We recommended implementing a measurement programme based on the same parameters as the programme in Bagsværd Erhvervsquarter in 2009 for the Mørkhøj industrial area. This enabled Gladsaxe Municipality to get an overview of loads from the major industrial areas in the Municipality.

BENEFICIAL RESULTS

We recommended conducting monitoring programmes for substances that occurred in the highest concentrations and loads. Tailor-made monitoring programmes are important for achieving proper regulation of wastewater discharges.

Changes in production processes in the industries may cause concentrations and loads of hazardous substances to change from year to year. As such, we also recommended that Gladsaxe Municipality focus on:

- continued industrial regulation and implementation of action programmes
- yearly monitoring for harmful substances and heavy metals in a sewer junction
- monitoring upstream near industries for harmful substances and heavy metals

Based on the results of our monitoring programmes, Gladsaxe Municipality has been able to identify the most important sources of the pollutants in the wastewater. This has enabled them to impose regulations on the industries in industrial areas. Since the monitoring programme and subsequent regulations were introduced, Gladsaxe Municipality has seen:

- a continuous decrease in the pollution load measured in a sewer junction receiving wastewater from the industrial area
- an improvement in the wastewater quality discharged to the sewer system and treated at the municipal wastewater treatment plant
- improvement in the water in the environment

Using measurements taken at the large wastewater treatment plant in Copenhagen, we developed a list of focus substances. This list is an important tool for industrial wastewater regulation in Gladsaxe and seven other municipalities in the Copenhagen sewer catchment area.

CLIENT TESTIMONIAL

“ Source tracking investigations provided important knowledge needed for regulation of companies discharging wastewater into the sewer system. The regulation was followed by load reduction of hazardous substances.”
Gladsaxe Municipality

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