

THE URBAN WATER RESEARCH PROJECT, LELYSTAD, THE NETHERLANDS

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In Lelystad, a new town about 60 km east of Amsterdam, a research project is carried out, aimed at improving the design, the construction and the maintenance of the urban drainage system, with the emphasis on separate sewer systems. For that purpose the input by rainfall, the outflow of the storm sewer and the reaction of the receiving water - a canal - is measured both in quantitative and qualitative respect in a 4.5 ha experimental basin. Basically, the measurements are executed by a central computer controlled data logging and sampling system. Additional manual sampling is done occasionally after larger storm events and in a regular scheme. The equipment and its purpose is indicated in the subsequent table.

variable	quantity	quality
precipitation	3 ground level raingauges*	closable rainguage** for wet deposition
storm sewer runoff	electro-magnetic flowmeter* + Venturi meter*	24-bottle sampler;** electrodes for O ₂ , temperature and conductivity*; additional manual sampling
reaction canal water	- (discharge at dead end of the canal)	3 sites with monitors containing electrodes for O ₂ , temperature, conductivity and pH*; additional extensive manual sampling
subsurface drainage discharge into canal	manual measurements	occasional manual sampling

* data logging by computer

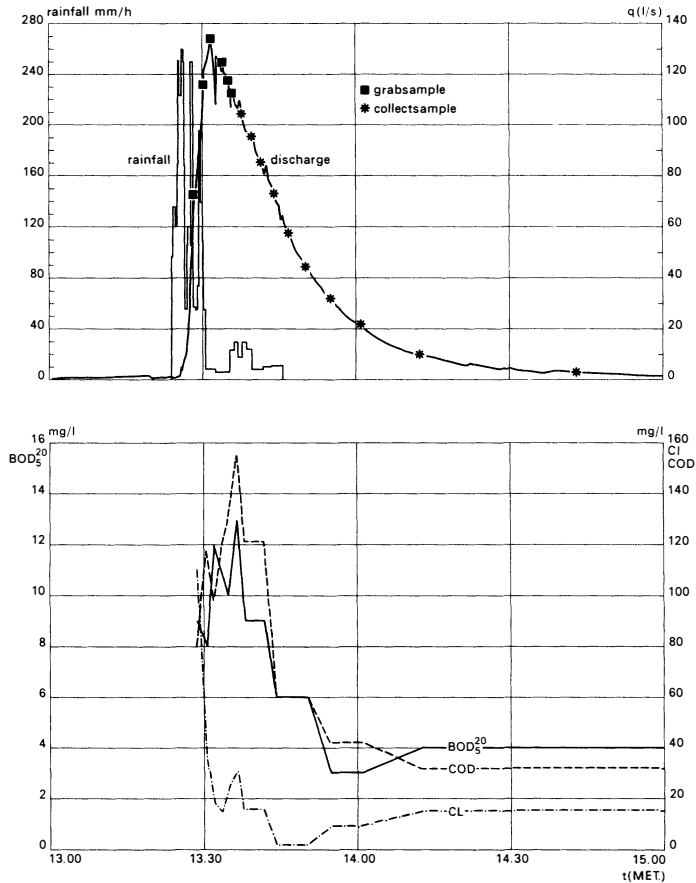
** computer operated (two options: grab samples or collect samples)

The samples are analysed on a wide spectrum of constituents in the fields of:

- microbiology (faecal coliforms, faecal streptococci, salmonellae)
- nutrients (NO_3 , NH_4 , N-Kjeld, P-ortho, P-tot)
- oxygen and oxygen demand (e.g. O_2 , BOD, COD)
- heavy metals (e.g. Zn, Pb, Cu)
- organics (e.g. mineral oil, poly aromatic hydrocarbons).

Moreover, the bottom of the canal and the (hydro)biological situation in the canal at different distances from the outlet are investigated regularly. Additional studies are conducted on the effectiveness of street sweeping and on the accumulation of pollution on (street) surfaces. The sediment and the super natant in gully pots and in the storm sewer are investigated in relation to the duration of dry spells.

On the poster, the experimental basin and the data collection equipment are visualised and a short explanation is given on the way the system operates. An example of the changes of the quality during the event is shown, as well as the loads that were recorded in a certain month of 1983, when the data collection program was carried out continuously. Some results with respect to the improved understanding of the runoff process (including the quality aspects) are presented. An example of the resulting graphs is given below.



Pluviogram, discharge-hydrogram and pollutogram of oxygen demand and chloride.