

# urban drainage - our experience



## URBAN DRAINAGE: THE EFFECTS OF FLOODING

Upgrading existing urban areas against future climate change becomes a major challenge for all cities worldwide. One of the solutions: a sustainable urban drainage system (SUDS) taking into consideration the water quantity, water quality and demands from the environment and society.

Starting in the late 1800's, Royal Haskoning was the first consultant in the Netherlands to be involved in the design of dykes and flood retention areas. Throughout the 20th century and onwards we have moved further ahead, providing wide ranging advice to all levels of the public and private sector on construction of waterways, sewage systems and retention areas, as well as surface water run-off modelling and risk mapping.

### Urban drainage: our services

We master the world's most sophisticated mathematical models in the field of hydrological & hydraulic analysis; surface water run-off; sewage and drainage design; surface waterways; and groundwater.

Furthermore, specific products and services are:

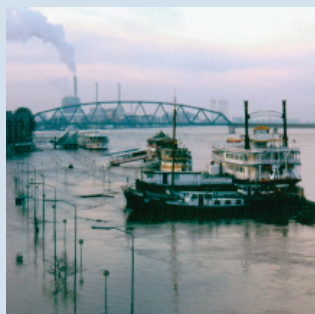
- Design of Structural Measures
- Monitoring and Early Warning Measures
- Geographical Information Systems (GIS)
- 3D visualizations
- Flood Risk Assessments
- Economic & Institutional Analysis
- Environmental & Social Impact Assessments
- Process Management
- Education and Training



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## SUMMARY OF OUR RELEVANT WORLDWIDE EXPERIENCE

- **Drainage Solutions for Union Industrial Estate, Trinidad and Tobago**  
Providing drainage solutions including detailed design of weir, sediment trap, perimeter drains and improving of the river profile for the Union Industrial Estate.
- **Integrated Flood Management for Ho Chi Min City, Vietnam**  
Improvement of flood control through integrated approach of technical designs, institutional strengthening, capacity building and environmental conservation.
- **Development and implementation of Urban Drainage Risk Map, The Netherlands**  
Integration of all aspects of urban drainage: groundwater, surface water and sewage systems. Resulting in a mapping of urban drainage risks and possible solutions.
- **Development and implementation of Digital Water Portal, The Netherlands**  
Residents can use this portal to ask questions and send complaints to local authorities. It has proven to be an effective tool in policymaking and investment planning.
- **Jakarta Flood Management II, Indonesia**  
Reducing flood risks (“water as a guiding principle”) in relation to water infrastructure, spatial planning, land use and building regulations in the city of Jakarta.
- **New Orleans Flood Risk Investigation, United States of America**  
Following the disaster of hurricane Katrina, Royal Haskoning has been appointed by the US Army Corps of Engineers to calculate flooding risks for New Orleans.
- **Emergency Reconstruction Drainage System Banda Aceh Zone 2, Indonesia**  
Consultancy services for the implementation of the rehabilitation of the storm water and marine flood protection systems damaged or destroyed by the tsunami and earthquake.
- **Model analysis of Urban Drainage System of municipality of Roosendaal, The Netherlands**  
Research into inundation events and impact on the drainage system in Roosendaal. Results of the study are used in the new drainage master plan of the municipality.
- **Teleorman Flood Management Project, Romania**  
Romania has been affected by severe river floods. Pilot project for the flood risk assessment and mapping in Teleorman County in Romania.
- **Sanitation of the Industrial Zone of Sotuba, Mali**  
The project covers the supervision of works to terminate the waste water treatment station and the sewerage and drainage network in the industrial zone of Sotuba.
- **Integrated Urban Infrastructure and Sanitation Master Plan for Pekanbaru, Indonesia**  
The scope of the project is to improve the sanitation sector, including waste water, solid waste and flood control, both technical and organisational for the city of Pekanbaru.

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