

FLOOD RISK

Reference: CS-17

Human induced changes to catchment and river hydrology, such as shifts in catchment land use and management, increased floodplain development and climate change have led to a rise in incidents of river flooding and flood-induced problems. In response to these changes, flood risk assessment, management and mitigation have become essential for sustainable development. GWP Consultants LLP has considerable experience in providing these solutions in the UK and overseas, for flood risk problems on all scales, and to the highest standards.



GWP provides technical, analytical and conceptual solutions for all aspects of flood risk management. This experience ranges from single site, small scale Flood Risk Assessments for UK developments in accordance with PPS25 and other policies, to fully integrated, bespoke hydrological and hydraulic modelling of catchments, and risk analysis.

Related expertise:

- Detailed topographic surveying
- Geographic information systems (GIS)
- Rainfall probability analysis
- Flood Estimation Handbook techniques
- Rainfall runoff modelling
- Hydrological catchment modelling and flood routing
- Hydraulic modelling and flood water elevation prediction
- Flood risk mapping
- Design of hydraulic structures
- Sustainable drainage systems (SUDS) design
- Design of flood water storage facilities
- Geotechnical design of embankments



This work is undertaken by our team of hydrologists and hydrogeologists, backed up by experienced surveyors, GIS specialists and geotechnical engineers. Our multi-disciplinary approach ensures that we can deliver projects from conception to completion, including design of appropriate flood mitigation structures.



Selected projects

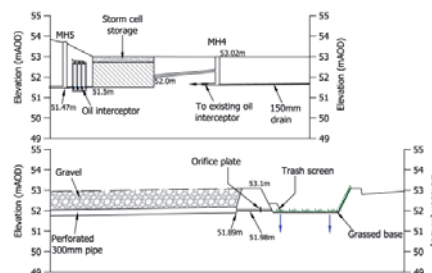
Case Study: Flood Alleviation & Mitigation

Detailed design of flood alleviation and mitigation measures for a limestone quarry and two cement works in Nigeria. The project included rainfall return period probability analysis utilising limited meteorological data sets, catchment characterisation through remote sensing, hydrological rainfall-runoff modelling and flood routing, topographic and hydraulic structure surveying, and flood flow and level prediction via a one-dimensional unsteady-state hydraulic model. The mitigation design included overflow structures, embankments, channel routing and attenuation facility design.



Case Study: SUDS Water Management Scheme

Detailed design of a SUDS water management scheme for a small retail development in Devon, UK. This project involved greenfield runoff calculation and infiltration testing to facilitate the design of a swale, attenuation pond, permeable paving and French drains to cope with a 100 year rainfall event (making allowance for climate change). The design was fully integrated with the current storm water drainage infrastructure.



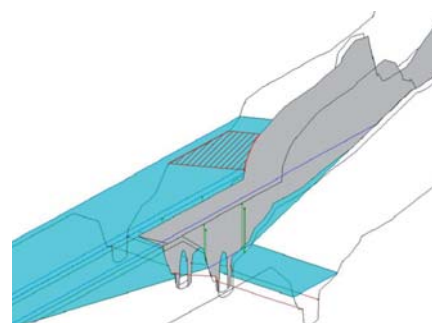
Case Study: Flood Risk Assessment

A preliminary flood risk assessment for a sand and gravel quarry within the River Thames floodplain. Application of PPS25 in evaluating the quarry location with respect to flood risk. Outline design of stock piles and bunds to ensure minimal impact on flood conveyance and increased floodplain storage. Design of restoration features including existing surface water drains and ditches.



Case Study: Flood Flow Modelling

Flood flow modelling for a development master-plan. An unsteady-state 1D hydraulic model was developed to estimate flood water storage and conveyance through a series of restricting culverts across the development site. Initial, conceptual design of level for level flood storage compensation measures with earthworks design accomplished using the LSS 3D modelling and design software. GWP showed how creation of flood storage areas could enable development to encroach onto the floodplain whilst minimising impact to the river corridor.



Case Study: Surface Water Management Scheme

Surface water management scheme to meet the discharge consent for a 20Ha clay quarry in Staffordshire. GWP's design facilitated the attenuation of pollutants and surface water on site to meet strict discharge consent. The scheme included a large sump and necessary pumping specifications, settlement lagoons, an underground storm water attenuation facility, hydrocarbon interceptor and appropriate drainage infrastructure.



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