INTEGRATED SURFACE WATER MANAGEMENT

Reference: CS-35

Surface water management plans are becoming increasingly more commonplace within the UK, predominantly associated with Environmental Planning and Permitting legislation. Surface water management aims to provide an assessment of flood risk and hydrological impact, whilst identifying appropriate mitigation methods, in line with current regulations.

GWP Consultants LLP has wide-ranging experience providing surface water management plans at a range scales within the UK and further afield.

Surface water management often requires an integrated approach, comprising the management and mitigation of off-site flood risk and water quality, whilst the provision of sustainable drainage systems (SUDs), rainwater harvesting (RWH) and waste water reuse are often important considerations.

Within the UK, the predominant objectives of a surface water management scheme are firstly to ensure compliance with the National Planning Policy Framework (NPPF) by reducing surface runoff to below the pre-development condition, and secondly to prevent any deterioration of the flow regime and hydromorphology of an associated waterbody, in accordance with the EU Water Framework Directive (WFD).

GWP's hydrology team is supported by a multi-disciplinary team of hydrogeologists, geotechnical engineers, GIS specialists and surveyors, enabling a composite study to be completed concurrently.

Related expertise:

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

Selected projects

Case Study: Hydrological Environmental Impact Assessment and Surface Water Management Strategy, Coal Colliery

A detailed surface water management strategy forming part of the environmental planning application for a proposed open cast coal colliery in Yorkshire, UK. Based on sustainable drainage principles and utilising drainage software, a drainage scheme including attenuation ponds, ditch designs, settlement lagoons, and hydrocarbon interceptor was designed and specified for construction. A rainwater harvesting system was designed using an hourly water balance model, whilst incorporating greywater re-use to supplement the onsite water supply. The proposed strategy included a foul-water drainage system, comprising the sizing and specification of a septic tank and drainage field.

Case Study: Hydrological Environmental Impact Assessment and Surface Water Management Strategy, Quarry Excavation and Landfill

Detailed surface water management design for the proposed extension of the extraction boundary and landfill of inert waste in Surrey, UK. A qualitative flood risk assessment of all sources, fluvial, pluvial and groundwater was completed, combined with an assessment of potential hydrological impact, in terms of WFD status.

A drainage scheme was specified in accordance with NPPF requirements, ensuring compliance during both the operational and restoration phases of the development.

Case Study: Mountsorrel Surface Water Management Strategy

Characterisation of site micro-catchments and run-off potential for proposed overburden tips, associated with the extension of the mineral extraction area at Mountsorrel quarry, Leicestershire, UK. Based on sustainable drainage principles and utilising drainage software, a drainage scheme including attenuation ponds, ditch designs and settlement lagoons was designed and specified for construction at each overburden site.

Consideration was taken to ensure the drainage features would remain operational through all phases of construction and restoration, mitigating any deterioration of the WFD status within receiving water bodies.

Case Study: Flood mitigation and dewatering feasibility assessment for a limestone quarry

Detailed design of flood alleviation and mitigation measures for a limestone quarry and two cement works as part of a multimillion dollar development in Nigeria. Rigorous hydrological analysis of rainfall events was undertaken within a small ungauged catchment to inform the design of 2 No. dams and 2 No. reservoirs which ensure sufficient storage for all catchment run-off for a specified return period.

Hydrological modelling of the catchment, ditch design and detailed specification of pumps required for dewatering were also completed.

Case Study: Sustainable Drainage Scheme (SUDS)

A surface water management scheme specified for the proposed extension of a sand and gravel quarry, to ensure runoff rates do not exceed the greenfield runoff rate and volume, in line with NPPF guidelines.

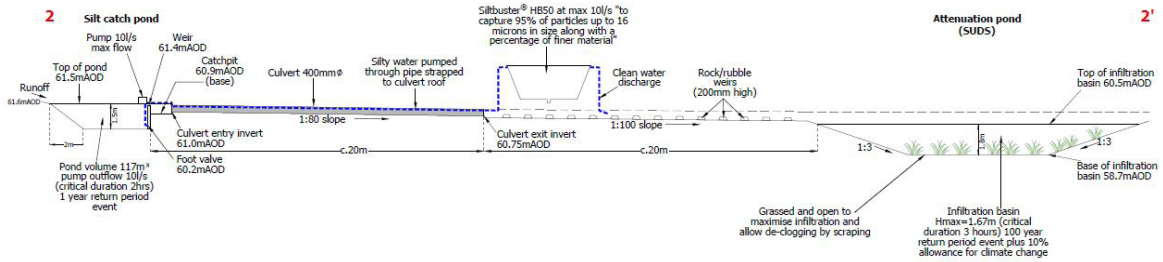
Based on sustainable drainage principles, a soakaway, swale and ditch designs were specified for construction.

The use of infiltration features provided pollutant attenuation, mitigating the proposed impact on water quality from the car park.

Case Study: Sustainable Drainage Scheme (SUDS), Recycling Facility

Sustainable drainage scheme for a proposed development at a recycling facility in Hampshire, UK. All runoff from the eastern site area is designed to infiltrate, due to the permeable chalk bedrock and overlying well-draining soils. An infiltration basin is designed for the 1% probability rainfall event (1 in 100 year return period), whilst water quality is managed through a silt pond and silt management unit (Siltbuster). Silt pond overflow is directed through a swale, designed to enhance infiltration and promote further silt retention.

The western hardstanding areas drain to a rainwater harvesting pond to provide a water supply for firefighting and dust suppression.



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