Water Engineering

FLOOD RISK ASSESSMENTS

Recent flooding across the country has blighted the lives of thousands. Areas which never flooded have been inundated, and low lying areas have seen some of the worst floods in living memory.

The reasons for this are complex, and include global warming which is affecting the weather patterns that shape our temperate climate. Other reasons are closer to home.

Much of the rainfall in a rural area is lost to evaporation and infiltration. The water that does reach the rivers takes hours or days to get there. Developing a green field site increases the **volume** of storm water runoff at a greater **rate** of flow.

When a site is developed, piped drainage systems will remove rainfall from roofs, roads and hardstandings in minutes. Losses are minimal, and most of the rainfall ends up in the rivers and watercourses.

Development in the flood plain makes things worse. Flood storage is lost and flow along the flood plain is restricted. Flood defence works reduce flooding in one area (that is the whole point) but this often results in lost storage which will increase flooding elsewhere.

Many of the floods have affected modern housing developments which were built in unsuitable areas. A report by the Institution of Civil Engineers concluded, far from protecting these houses from flooding, some modern developments should be demolished and the sites returned to the flood plain

The government has published Planning Policy Guidance Note 25 in relation to flooding and development. This requires planning authorities throughout England to treat flooding as a material planning consideration. Satisfying this requirement requires the submission of a Flood Risk Assessment with the planning application.

The assessment has to consider the risk to the proposed development, and the risk posed by the development to open space and property elsewhere.

These assessments may be straightforward, but it is up to the developer to show his site will not be at risk and will not make flooding worse elsewhere. It is not the duty of either the local authority or the Environment Agency.

Insurance

Flood risk assessments are normally prepared in support of a planning application, but they are also carried out to assess the risk of flooding of an individual property for a purchaser or insurance company

Many sites are not so simple. To consider the impact of the development, most sites require computer simulations of the proposed drainage systems and rainwater storage.

Predicted flood levels for 100 year and 200 year flood events may be available, but many sites also require an assessment of the storm water runoff from the surrounding catchment and computer modelling of watercourses which may affect the site.

Flood Risk Assessments

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Modelling of river systems and piped drainage networks allows simulation of a variety of extreme storm events. A river basin, flood defence scheme or drainage system can be tested without any risk in storm events which may never be seen in a lifetime. Alternative schemes can be simulated on the model before they are constructed.

Typical watercourse study

On-site storage is generally required, and can reduce the rate of runoff but has little impact on the volume of water draining from the site.

Sustainable Drainage Systems (SUDS) can minimise the impact of development on rainfall runoff, but requires a major re-think in the design of developments and serious hurdles remain over long term maintenance.

Fenland Hydrotech

- **Flood risk assessments**
- **River modelling**
- **Drainage system modelling**
- **SUDS design**
- **Hydrology**
- **Insurance risk assessment**

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