

# Part 5 ▶ Drainage and Flood Risk



## 5.1 Introduction - Statutory Consultee for Major Development

This section of **The Warwickshire Design Guide** describes the processes relating to the design and approval of surface water drainage on major developments and the role of Warwickshire County Council (WCC) as a statutory consultee relating to flood risk and development drainage.

WCC is the Lead Local Flood Authority (LLFA) responsible for the risk of flooding from surface water, groundwater and ordinary watercourses under the Flood and Water Management Act 2010. This role is carried out by the WCC's Flood Risk Management (FRM) Team. In comparison to its role as Highway Authority, the LLFA role is relatively new and the role is still evolving as legislation and national policy are updated and more responsibility is assigned to LLFAs. Therefore, it is recommended that reference is made to the **WCC FRM website** - ([www.warwickshire.gov.uk/flooding](http://www.warwickshire.gov.uk/flooding)) for the most up to date information in this area, or direct contact is made with the team before developers and their designers progress their proposals too far.

At the time of writing, the LLFA's role in relation to the approval of highway drainage designs is limited to its role within the planning process and LLFAs are a statutory consultee for the surface water drainage on major developments.

The LLFA are also responsible for the regulation of Ordinary Watercourses. This section also provides details of the consenting process from the LLFA that will be required under Section 23 of the Land Drainage Act 1991 for any works that will affect the

flows within a watercourse (temporarily or permanently).

Whatever the development and its drainage impact, it is recommended that developers engage with FRM to discuss their proposals at pre-application stage.



## 5.2 Design Principles

New developments must ensure that they do not increase the flood risk elsewhere and this is usually done through Sustainable Drainage Systems (SuDS). Such systems offer multiple benefits in that they can remove pollutants from surface water and provide environmental gains whilst controlling how the water is released from the site.

The discharge rate from the site must be controlled to pre-development (greenfield) rates or lower. It must be discharged to an approved outfall for all rainfall events up to the design event (currently) plus an allowance for climate change and urban creep. WCC will review the assumptions and calculations before providing their response in the planning process and when carrying out Technical Review of surface water drainage proposed as part of a Section 278 application.

The selection of outfall should follow the hierarchy outlined in the Planning Practice Guidance (PPG), with infiltration being the preferred option, followed by a watercourse, and then a surface water sewer. Generally, new developments should not discharge into a combined sewer, and never to a foul sewer.

Where the applicant proposes to discharge into existing highway drainage, the LLFA will undertake further consultation

with WCC Highways and will usually request a survey and the repair of any significant defects before this is considered suitable. Developers should also note that further discussions on maintenance and ownership together with the need for commuted sums are also likely as part of the overall process.



## 5.3 Highway Drainage Considerations

Where the surface water drainage for Section 278 highway works outfall into the development site drainage, this will be included within the planning application and will be assessed by the LLFA in that process. It is essential to demonstrate a viable outfall that does not increase flood risk to or from the highway.

If highway drainage works are separate to the development, the drainage checks will be carried out as part of the highway design approval as outlined in Parts 2 and 3 of this guide, depending on the Road Hierarchy. These checks will include the detailed drainage design, outfall rates, attenuation sizing, treatment of flows and suitability of outfall locations.

The highway drainage system should be discharged via a sustainable drainage system (SuDS) into a suitable watercourse. Where no watercourse is available, then it should be discharged into a public surface water sewer.

Developers should be aware, however, that SuDS created within public open spaces will not normally be adopted by the Highway Authority if they drain into non-highway areas. Further information on SuDS is contained in 5.4 The Use of Sustainable Drainage Systems (SuDS) below.

Roads should be designed with adequate minimum gradients to ensure self-draining will occur. The use of combined kerb/channel blocks will only be considered where standard drainage solutions either cannot be utilised or where methods used

to drain the carriageway have proved to be inadequate.

Positive drainage must be provided for all surfaces forming part of the adoptable highway network including separate footpaths, cycleways and emergency accesses. Positive drainage measures (e.g., channel drainage systems) should also always be provided wherever there is the potential for surface water to run off private drives, forecourts, car parks or other adjacent land onto the highway.

New pipes should be located to avoid any possible interference from root growth, and to ensure excavations for laying them do not damage root systems where these are being retained within a development.

The maximum area of a paved surface draining to a gully should not exceed 150 square metres, but additional gullies are likely to be required at low points and where gradients approach prescribed or optimum minimums. When connecting into an existing drainage system, the number of connections already leading into the system must be checked to ensure that there is adequate capacity to accommodate an additional connection. A CCTV survey of any existing system may be requested where a connection is proposed.

We would recommend following the guidance in the DMRB CG501 regarding the hydraulic design of highway drainage systems.

Gullies must be positioned such that they can be properly accessed for cleansing and where the parking of cleansing vehicles will not create an unreasonable obstruction - e.g., gullies located in the corners of turning areas are often impractical to clean, and if maintenance vehicles must park within narrow carriageways or close to tight bends will usually constitute an unreasonable obstruction. If gullies are located at formal or informal crossing points the impact on pedestrians must be assessed and pedestrian friendly gully lids used if there is a need for them to be installed within desire lines.

All highway drainage pipes should be laid within the highway



## 5.4 The Use of Sustainable Drainage Systems (SuDS)

boundary preferably outside the limits of the carriageway, but always at least 1 metre from any kerb line.

Similarly, where foul sewers are located within the public highway then, wherever it is practicable to do so, they should be laid outside the limits of the carriageway but, in any case, at least 1 metre from any kerb line.

Longitudinal sewer runs should not cross beneath kerb lines.

Manholes are to be provided in accordance with WCC standard details at the head of a line and at all changes in pipe size, direction or gradient and, along straight runs, at intervals of not more than 90 metres. They should be positioned such that when access is required to them, they will not render the highway impassable for vehicles and pedestrians. Manholes should be set outside of vehicle wheel tracking areas where possible. If the positioning is within a wheel tracking area, a material conforming to HA104/09 must be used for installation to accommodate heavy trafficking.

Balancing tanks, other than nominal oversizing of pipes, will not be acceptable beneath any carriageway. A drainage design comprising only gullies being piped directly to a storage feature will result in a significant maintenance liability to regularly de-silt due to an absence of features to capture the silt upstream. Proprietary treatment systems will be required wherever there is a high risk of unsuitable liquids or other materials being directed towards a highway drain.

Road water run-off, pipe design, surface water treatment hazard index (outlined in the SuDS Manual CIRIA C753) and flood storage calculations must be provided with all applications for the adoption of roads.

Consultation should take place with the FRM Team regarding all development which might have implications for land drainage and for connections into Ordinary Watercourses.

National policy states that there is expectation that SuDS will be provided in new developments wherever possible. This is also applicable for new road design, as outlined in the DMRB.

As the use of SuDS features to drain the highway is relatively new in Warwickshire, there will be a bedding in process and all features are not currently accepted for adoption. Developers should discuss proposed SuDS features during pre-application discussions where they will be updated on the current position on both acceptability and adoption of different SuDS features. A commuted sum may be required for adoption of non-standard features.

It is imperative that County Highways are made aware of the proposals to install SuDS features as the earliest opportunity, in order that they can provide comment from a maintenance perspective. This will also enable County Highways to request the appropriate commuted sum for the future maintenance of the scheme.

It should be noted that the designer of any new scheme is responsible for providing a specific SuDS maintenance plan for the scheme, which must be handed over to County Highways as part of the H@S folder.

This is to ensure that the necessary inspections of said feature/s can be undertaken at the predetermined frequencies. The level of inspection and maintenance will vary depending on the type of SuDS component and scheme, the land use, types of plants as well as biodiversity and amenity requirements.

As more features are adopted by the County, additional guidance will be provided as to how they should be detailed. Until that time, the basic principles that should be followed when designing a SuDS drainage system are given below;

- a) The design and layout of the development should utilise

- SuDS features to maximise the amount of surface water being managed as close to source as possible.
- b) Several smaller features closer to source, that are connected in series will reduce the overall size and depth of final stage attenuation features, whilst providing both additional treatment of flows and resilience should any one of those features fail.
  - c) Where possible, the movement of flows between features (conveyance) should be via surface level features such as swales. Such features provide treatment of flows and remove silts, whilst reducing the ongoing maintenance due to a lower risk of blockage and increased surveillance.
  - d) The depths of surface water drainage features should be kept as shallow as possible to allow the use of open features throughout the development. More innovative approaches to draining hard standing areas should be investigated rather than a reliance on traditional gulley and pipe systems.
  - e) Permeable paving or over-the-edge drainage into a roadside swale or filter strip are very good at treating the pollutants associated with carriageways and are a very good first step of a SuDS system.
  - f) Open features are much more effective at removing silts and grits, which is not possible in features such as oversized pipes or storage tanks. These features are not considered as a suitable sustainable drainage system in isolation.
  - g) The ground conditions throughout the County are unsuitable to enable efficient drainage by natural percolation and soakaways are not, therefore, acceptable for public highway drainage. There are areas where infiltration is possible, and if a soakaway is proposed, suitable percolation test results must be provided (to BRE365).
  - h) It is recognised that full SuDS schemes are not possible on all

highway schemes due to land take, levels and ground conditions, however this does not prevent a well-designed scheme.

There are best practice guidance documents available (such as the SuDS Manual CIRIA C753 and Guidance on the construction of SuDS CIRIA C768) which can assist in improving designs and to help provide additional treatment and reduce ongoing maintenance requirements.



## 5.5 Attenuation of Flows

For the most up to date guidance on design events and additional allowances to be applied for climate change and urban creep, refer to WCC FRM Local Guidance for Developers.

Adequate attenuation of flows must be provided for new carriageway areas. Where possible, this should be for the total carriageway area rather than the net increase in carriageway area only. This is particularly important for wholly new sections of carriageway where there will not be as much of a constraint on space available.

Where possible, multiple small outfalls should be consolidated into a single feature to minimise disruption to the accepting watercourse, reduce maintenance requirements, and to maximise the opportunity of further treatment of the flows.

Attenuation of flows during the construction phase is also very important as construction sites, when stripped, can pass on silt laden flows downstream. Guidance for ensuring flood risk is not increased during the construction phase of a project can be found in CIRIA C768 'Guidance on the construction of SuDS'. This guidance also includes silt management on large construction sites, which should be included in any Construction Environmental Management Plan.

It is now possible to restrict outfall discharge rates to below 5.0 l/s in a variety of ways including newer control devices, protected orifices and overall better design. Indeed, in small catchments,

the greenfield discharge may be below 5.0 l/s. Therefore, if developers propose a practical minimum of 5.0 l/s this will be challenged by the LLFA, particularly where the drainage systems are split into multiple small catchments with individual outfalls.

## 5.6 Treatment of Runoff

Due to the pollutants, grit, silt and hydrocarbons usually found on highways, drainage proposals must include adequate treatment of run off before final discharge to ensure no degradation of the quality of accepting watercourses and waterbodies,

This treatment can be done using surface level SuDS features installed in series, but it should be noted that trapped gullies, catch pits, and underground tanks do not provide treatment to the flows and will not be considered as such.

CIRIA C753 The SuDS Manual outlines a hazard index approach that assigns values to drainage features in terms of their ability to treat flows. This can be used to identify the number and combination of source and site control features required.

## 5.7 Flood Risk Considerations and Requirement for Flood Risk Assessment

For the most up to date guidance for the requirements of a Flood Risk Assessment and additional considerations related to flood risk, refer to WCC FRM Local Guidance for Developers.

## 5.8 Ordinary Watercourse Consenting

The LLFA are also responsible for the regulation of Ordinary Watercourses. A consent from the LLFA will be required under Section 23 of the Land Drainage Act 1991 for any works that will affect the flows within a watercourse (temporarily or permanently).

This is a process which is independent to other approvals such as planning permissions or highways design approvals, and the Land Drainage Act gives LLFAs powers to enforce the removal of unconsented works.

There is a minimal application fee (see [www.warwickshire.gov.uk/watercourse](http://www.warwickshire.gov.uk/watercourse)) and a determination period of up to two months.

Works that will require consent include crossing a watercourse for site accesses both temporary and permanent, the construction of outfall structures, or the temporary diversion of flows to make a dry working area. The LLFA cannot give retrospective consent and as such, consent must be applied for prior to any works taking place.

In general, WCC does not support the culverting of watercourses and encourages the removal of existing culverts where possible.

Where culverting is the only option, the length of culvert should be kept to a minimum, with the preferred solution being an oversized box culvert sunk into the channel bed, with measures to aid the re-naturalisation of the bed.

Further information and details of the application process is available on the [WCC FRM website \(www.warwickshire.gov.uk/flooding\)](http://www.warwickshire.gov.uk/flooding) or from the FRM Team.

Additional permissions may be required from the Environment Agency; the FRM Team will be able to advise.



## 5.9 Riparian Responsibilities and Highway Ditches

Although the County Council, through the LLFA has oversight over ordinary watercourses and powers to carry out enforcement, they are not responsible for the ongoing maintenance of them. The ownership of ordinary watercourses and the responsibility for their maintenance lies with the owner of the land through which the watercourse runs.

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Further guidance on owning a watercourse and riparian responsibilities is available online on the Gov.uk website ([www.gov.uk/guidance/owning-a-watercourse](http://www.gov.uk/guidance/owning-a-watercourse)).

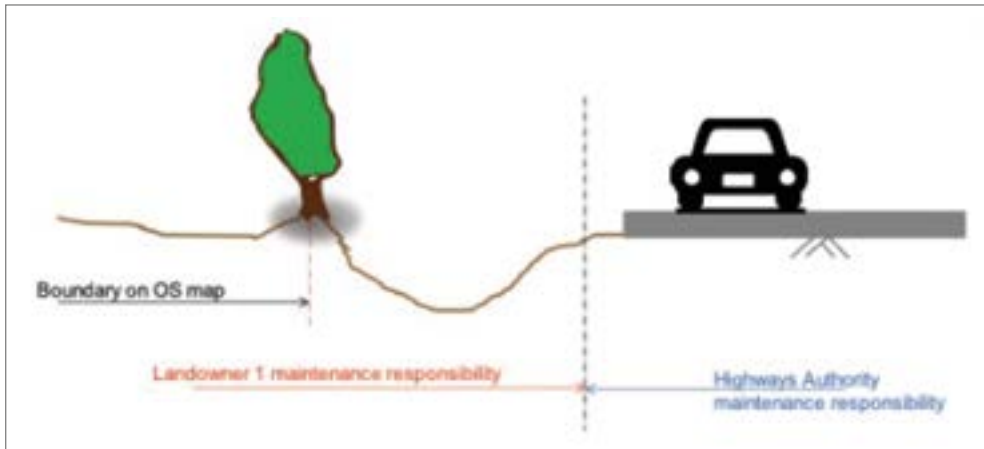


Figure 5.1 – Riparian responsibilities in relation to ditches

Roadside ditches are a specific example of watercourse and, the maintenance of these ditches is the responsibility of the adjacent landowner. The current position of the county is quoted below;

*“Common Law imposes a duty on the occupier of land adjoining highways to maintain roadside ditches which provide natural drainage for both the land and the highway. This will also apply where the watercourse is shown within the highway extents, in these cases county highways are the owners of the watercourse, but the responsibility for maintenance lies with the adjacent landowner.”*

There are several examples where County Highways may have some responsibility for the watercourse, and it will fall to the landowner to provide evidence that any of these apply; a) A documented agreement is in place between County Highways and the landowner

- b) There is highway maintainable asset on both banks of the watercourse (e.g., a footpath separated from the carriageway by the watercourse)
- c) It is clear that the ditch only drains the highway, is not a continuation of an ordinary watercourse and therefore not draining any other land

WCC remains responsible for regular maintenance and cleansing of gullies and grips on the highway which may discharge into these ditches.



## 5.10 Further Information

WCC FRM have a design guidance note and other useful documents available on their webpage [www.warwickshire.gov.uk/flooding](http://www.warwickshire.gov.uk/flooding). These are updated when possible so you may wish to contact the LLFA to ensure that you are working to the most up to date information.

A chargeable pre-application advice service is available amongst other discretionary services. Contact the team for the current arrangements.

For SuDS advice, contact [frmplanning@warwickshire.gov.uk](mailto:frmplanning@warwickshire.gov.uk)