



Drainage

Part 5.2

5.2.1 Highway Drainage

We will ensure that developments that include streets to be adopted as highway provide satisfactory adoptable highway drainage arrangements. This should normally be achieved by one of the following methods:

- All highway water should be drained direct into a piped system vested or to be vested to a water company. This is the method we prefer.
- If the above method is not possible, water should be drained by a piped highway drainage system (minimum pipe size 225mm) running to a public sewer vested in a water company or outfall to a ditch or watercourse agreed by the Lead Local Flood Authority (LLFA), Environment Agency (EA), or Internal Drainage Board (IDB) as appropriate and supported by written evidence accordingly. We will normally insist that the street drainage system is adopted where we are adopting the street.

5.2.2 Easements

All highway drains should be located within land that we are adopting. Only in exceptional circumstances will we permit them in land that is to remain private. You must cover any adoptable highway drain outside the limits of the adoptable highway by an easement. The land must be easily accessible and not be in areas that would cause an unreasonable level of disturbance during maintenance such as private gardens or private driveways.

We will not adopt a street unless its associated drainage is to be adopted either by a water company or by us.

5.2.3 Alternative drainage systems and SUDS

We may consider alternative highway-drainage systems, including infiltration systems, flow attenuation (reduction) or retention systems (including oversized pipes) and so on, on a site-by-site basis provided this would not present us with a significantly increased maintenance liability when compared to a piped system.

Where SUDS techniques are to be deployed, we will require additional measures to ensure the system can be cleaned easily, accessed for maintenance purposes, and can be drained down in the event of a blockage or failure. Such measures may include upstream desilting measures, drain down measures such as penstocks and an emergency overflow to a sewer or other suitable discharge point.

In order to minimise the risk of failure, SUDS features should be distributed across the site. The use of a single feature as an outfall for the entire highway drainage system at the lowest point of the site will not generally be accepted.

All alternative drainage systems will be subject to a commuted sum payment.

5.2.4 Infiltration Systems

Provided there is no reasonable prospect of securing a positive drainage system in the manner described above to be demonstrated by evidence, infiltration may be considered in appropriate ground conditions. That is where adjacent soils have an infiltration rate greater than 10mm/hr and subject to the payment of a commuted sum and where the soakaway can be located at least 1.0m above the highest recorded groundwater level considering seasonal variances.

Infiltration systems must be located outside of the carriageway. Where this is not possible, and only in exceptional circumstances, their location must not prevent or severely restrict passage during maintenance. Structural calculations may be required to show that anticipated loading on the system can be tolerated without detriment.

Infiltration systems should be located a minimum of 5m from buildings. Where they are proposed to be located outside of the highway, they should comply with the easement requirements above. Easements may also be required to ensure that no building is subsequently located within 5m of an existing infiltration system such that the dispersal of water would not impair the stability of the structure.

Infiltration system locations must be considered at planning application stage to ensure there is enough space.

The design and installation of soakaways should be in accordance with Building Research Establishment (BRE) Digest 365 'Soakaway Design' and Construction Industry Research & Information Association (CIRIA) Report 156 'Infiltration Drainage – Manual of Good Practice'. We will require any application for adoption to be accompanied by completed Infiltration assessment which can be found at Appendix B.

Where you are proposing SUDS, you must hold discussions with all relevant parties at an early stage (and certainly before any planning application) to agree ownership and responsibility for the facility.

5.2.6 Private Drainage

We will not accept the drainage of non-adopted assets into a highway drainage system either adopted or to be adopted by us. In general, the drainage of most other areas of a development are matters for water companies. You should normally design these drainage systems in line with the water companies' specifications and requirements (which you may treat as complementary to this document) and they should be adopted by them.

Where necessary private development should provide cut-off drainage often in the form of linear drains or ditches to prevent the unregulated discharge of surface water onto adjacent streets.

5.2.7 Outfall design

Where a piped system discharges into an existing ditch or watercourse, the pipe invert (bottom of the inside of the pipe) must not be lower than the level of the base flow in the ditch or watercourse and it should always be at least 150mm above the ditch or watercourse invert. You must direct the end of the pipe so it discharges at an angle less than 60 degrees to the direction of flow in the ditch or watercourse. The end of the pipe must have a headwall and apron which supports the bank above and adjacent to the pipe and prevents any scouring underneath the pipe. You must protect the banks of the ditch or watercourse from scouring, and you must meet any requirements laid down by the LLFA, EA, and IDB.

If the outfall is to an existing highway drain, you will have to prove its capacity and condition before we can approve the connection. For all works incorporating highway drainage you will need to carry out and provide a copy of a CCTV survey and report. You must carry out any improvement works found necessary, all at your expense.

5.2.8 Existing drainage systems

You must deal with any existing drainage systems within the development site, including any land drains, ditches, watercourses, outfalls or drainage systems from adjacent land, to our satisfaction and that of the LLFA, EA, and IDB as appropriate and the owners of the systems.

You must have consent to pipe an existing ditch or watercourse, in accordance with Section 23 of the Land Drainage Act 1991.

The discharge of adopted highway drainage to privately maintained drainage systems will not be accepted.

5.2.9 The hydraulic design of adoptable highway drains

The hydraulic design of adoptable piped highway drains must meet the requirements of the current edition of 'Sewers for Adoption' published by WRc plc.

You must submit calculations using the specified method of calculation and format. We will accept output from an approved computer programme using the specified method and parameters.

5.2.10 Hydraulic design – protection against flooding

The system must be designed to meet the requirements of the current edition of 'Sewers for Adoption' published by WRc plc.

The system should be designed not to flood any part of the highway or site in a 1 in 30 year return period design storm or any other return period that is set out in any latest version of 'Sewers for Adoption'.

Your design should also show the line and extent of flow paths and the potential effects of flooding if storms are greater than those allowed for by your design.

5.2.11 Minimum pipe size

The minimum pipe diameter for adoptable highway drains, other than gully connections, is 225mm. The minimum size for a road gully connection is 150mm.

5.2.12 Use of combined kerb and drainage systems

You must consider a combined kerb and drainage system where the minimum longitudinal carriageway gradient is less than 1 in 100 for flexible surfaces and less than 1 in 80 for block paved surfaces. We will normally require you to pay a commuted sum to cover any additional maintenance where a combined drainage system is used.

5.2.13 Approving drainage structures

Any drain, pipe or box culvert, sewer or drainage structure that has a clear span or internal diameter of greater than 900mm or any headwall greater than 1.5m retained height, will be classified as a highway structure and be subject to the specific requirements that apply to highway structures.

5.2.14 Catchpits

Unless otherwise specified, you must use catchpits and not manholes on adoptable highway drainage systems. Soakaway structures (typically over-sized chambers and cover slabs which are greater than 1050mm in diameter), even if they are to be adopted by the relevant water company,

must still be designed to the relevant standards for retention within the highway (BS EN 1991-2:2003 Eurocode 1: Actions on structures - Part 2: traffic loads on bridges). You will need to demonstrate to us that this has been achieved.

You must provide a catchpit (an access chamber, with sump, on a drainage system) where there is any discharge into an existing ditch or watercourse.

On all drainage runs we are to adopt where the pipe diameter is 900mm or less, you must provide a catchpit at:

- every change of alignment or gradient;
- the head of all main pipelines;
- every junction of pipelines except for single-gulley connections;
- every change in pipe diameter; and
- a maximum spacing of 90 metres.

5.2.15 Catchpit and manhole positions

You should normally locate catchpits or manholes within the verge, and not the carriageway, on classified roads and other roads with a higher status than a residential street or industrial access road. The outside of catchpits and manholes should be at least 500mm from the kerb line or the edge of the carriageway. Any catchpits or manholes within a carriageway must be located so that they can be accessed while providing the necessary safety zones and without preventing traffic from passing. This will generally mean that you should not site them at or near the centre of the carriageway or within a width restriction. You should also take care when locating catchpits or manholes within junctions or roundabouts, based on the same criteria.

5.2.16 Positioning and alignment of highway drains and storm and foul sewers

Highway drains must be laid:

- in straight lengths;
- to straight grades between catchpits; and
- within the carriageway or verge.

You must not lay drains and sewers and their associated catchpits or manholes in footways as this space is required for other utility apparatus.

5.2.17 Gullies

All gullies should be trapped and the maximum length of gulley connection should not be more than 15m. It will not normally be acceptable to connect one gulley connection directly into another. Gully spacings should be designed in accordance with the requirements of CD526 of the DMRB.

For residential roads with a carriageway of 5.5m or less gully spacings may be calculated using table T5.2.1 below and the accompanying notes:

Table T5.2.1

Carriageway Gradient	1/100	1/80	1/60	≥1/40
Area drained including footways etc.(m ²) assuming 1/40 crossfall	126	141	162	196

- When calculating the areas drained, you must make allowance for all footways, footpaths, paved areas and verges that fall towards the carriageway;

- Gullies must not be spaced more than 40m apart, irrespective of the areas drained, except at summits where the first gully should not be more than 40m from the high point;
- Double gullies must always be provided at sag points and low points and each must have its individual connection to the main sewer or highway drain.

The gully spacings quoted in Table 5.2.1 above are based on an assumed flow width of 0.75m. On higher classifications of road such as Industrial Access Roads and Main Streets (i.e. those with a carriageway width greater than 5.5m), we may require a narrower flow width to be applied and gully spacings to be altered accordingly. These should be agreed with our Engineers on a site by site basis, depending on individual circumstances and geometry.

In footpaths, footways and cycleways separated from carriageways, you must provide gullies or channels connected to the highway drainage system where surface water would otherwise discharge onto adjacent property or cause flooding of footpaths, footways or carriageways.

You should site gullies upstream of the tangent point at road junctions so that surface water in the channel does not flow across the junction. You should take care to avoid ponding near the mid-point of radius kerbs. Where the road is super-elevated, you should site a gully just before the point where the adverse camber is removed to prevent water in the upstream channel flowing across the carriageway.

You should take care to avoid ponding in the transition length, when the longitudinal gradient is flat or where there are traffic islands, central reserves or traffic-calming measures. You must not site gullies within pedestrian crossing points. Where possible, locate them directly upstream of the crossing point.

You should not site gullies where traffic would be prevented from passing while they are being emptied, for example within a carriageway width restriction.

You will need to provide us with a contour plan to show that gullies are located in the correct position as part of your design submission for works under Section 38 or Section 278 agreements.

5.2.18 Providing sub-soil drainage

You should generally construct a system of sub-soil drainage to a suitable outfall all to our satisfaction unless otherwise agreed where:

- the winter height of the water table is within 600mm of formation level; or
- the sub-soil is unstable because of being waterlogged; or
- there is a likelihood of water running from or out of adjacent ground; or
- springs, land drains or watercourses are present; or
- the finished road is below existing ground level, regardless of the water table; or
- the sub-grade is likely to be altered due to groundwater.

5.2.19 Backfilling trenches

You must backfill all drainage, utility and other trenches in the highway for industrial and commercial premises up to formation level with GSB type1 granular sub-base material.

Backfill on residential sites should be a granular material to the approval of the highway authority (acceptable material will typically include GSB type 1 or material graded to 6F1).

[End]