
Director of Engineering Memorandum
DEM 167/17
DEM TITLE: Highway Drainage Design for Sustainability

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Classification

Level 1 (Title / Key Words)	Road, water, standards, HD45, HD49, HD33, flood
Level 2 : (Directorate/ <u>Owner</u>):	Engineering
Level 3: (RSHQ or HoBU Managed Function):	Network Development
Level 4 : (Work Areas)	Design, Development Control

Purpose

Road drainage standards and advice is provided by the Overseeing Organisations of the UK Highway Authorities via the Design Manual for Roads and Bridges. The relevant road drainage standards are as follows:

- HD45 Road Drainage and the Water Environment (Volume 11) – which deals with obligations under EU and national legislation including the Water Framework Directive and the Floods Directive.
- HD49 Highway Drainage Design Principal Requirements; and,
- HD33 Design of Highway Drainage Systems (Volume 4 Section2) – which establishes the principles of design for sustainability to be followed for highway drainage in the UK.

As well as referencing the above sustainability standards, this Memorandum sets out TransportNI's further commitments in terms of helping deliver the Department for Infrastructure's Long Term Water Strategy for Northern Ireland (2015-2040).

Scope

This Memorandum applies to all TransportNI staff associated with the design, specification, provision, procurement, assessment or approval of new roads infrastructure.

Policy/Guidance

HD49 Highway Drainage Design Principal Requirements⁽²⁾ sets out the main principles of design for sustainability of highway drainage including the importance of drainage of the carriageway, pavement and earthwork

structures; the management of road run-off at source and on the surface where reasonably practical; and the consideration of maintenance, climate change and energy use as design criteria.

HD33 Design of Highway Drainage Systems⁽³⁾ guides the designer in selecting the most appropriate solutions for surface and subsurface drainage of the road network, including the drainage of earthworks associated with highway schemes, and describes the various alternative solutions available to deal with pollution and flood risk.

The Long Term Water Strategy for Northern Ireland⁽⁴⁾ was published by the Department in March 2016. The Strategy presents a framework for action which will facilitate a range of initiatives aimed at delivering a sustainable water sector in Northern Ireland, and sets out the Executive's approach to:

- Drinking Water Supply and Demand;
- Flood Risk Management and Drainage;
- Environmental Protection and Improvement; and,
- Water and Sewerage Services.

The Strategy encourages a more joined-up approach to the delivery of the policies contained within it. TransportNI has an important role to play by where practicable implementing the sustainable drainage principles in HD49 and HD33 in dealing with surface run-off.

Action required

When considering or developing any project, designers should be aware of the design for sustainability principles for highway drainage set out in the above standards.

In particular, designers should take the following specific actions in support of the Department's Long-Term Water Strategy

1. If any project appreciably increases highway run-off, the designer shall investigate the implications as follows
 - i) If the run-off discharges directly or via a field drainage system to a watercourse, the designer must determine whether there is a flood risk area downstream. If there is, the designer must take reasonable steps to attenuate the additional flow. The latest flood hazard information is available via Flood Maps (NI)⁽⁵⁾.
 - ii) If the run-off discharges directly or indirectly to an NIW storm sewer, consent to discharge must be sought from NIW for the additional flow. Where NIW confirm that capacity in the sewer is at or approaching capacity, the designer must take reasonable steps to attenuate the additional flow.

- iii) If the run-off discharges directly or indirectly to an NIW combined sewer, the designer must make every effort to attenuate the flow and indeed to reduce existing flow to the combined system.
2. In any project, whether or not there is any increase in run-off, designers should
 - i) seek to retain natural drainage systems or elements where they exist eg sheughs or other natural open drains/ditches that are acting as swales, soakaways, areas of wetland etc rather than replace them with conventional piped systems.
 - ii) look for low cost/ low problem/ low maintenance opportunities to use natural drainage elements rather than introduce piped systems.
 3. When considering or developing any capital project, designers must assess all new drainage infrastructure 'for exceedance', and incorporate measures that safely channel excess water when the system becomes overwhelmed.
 4. In all capital works schemes where the civil engineering costs are estimated at over £500k, and where the drainage in the area discharges to a combined system, the designer should investigate the possibility of separating all or part of the system as part of the works.

Cost implications must be considered carefully and any sustainable drainage solution must be economically viable within the overall cost of the project.

References and Further Reading

1. HD45 Road Drainage and the Water Environment
<http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3/hd4509.pdf>
2. HD49/16 Highway Drainage Design Principal Requirements
<http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol4/section2/hd4916.pdf>
3. HD 33/16 Surface and Sub-surface Drainage Systems for Highways
<http://www.standardsforhighways.co.uk/dmrb/vol4/section2/hd3316>
4. Sustainable Water - A Long-Term Water Strategy for Northern Ireland (2015-2040)
<https://www.infrastructure-ni.gov.uk/articles/long-term-water-strategy-northern-ireland>
5. Flood Maps (NI) <https://www.infrastructure-ni.gov.uk/articles/what-flood-maps-ni>
6. Guidance on Implementation of Stormwater Separation - currently being drafted by the Department will be made available in due course.

Equality

Equality issues were considered by the lead Overseeing Organisation Highways England in the development of HD49/16 and HD33/16. It was concluded that drainage systems designed in accordance with the standards should be beneficial to all and that any adverse or beneficial impacts resulting from the introduction of the standards were not expected to discriminate against any defined group.

The overarching strategy document '*Sustainable Water - A Long-Term Water Strategy for Northern Ireland (2015-2040)*' was subject of a Section 75 Equality of Opportunity screening analysis and it was considered that a full Equality Impact Assessment of it was not required as all members of society have the potential to benefit from the aims from it. It was also concluded that no section 75 group will be disadvantaged or adversely affected by the aims of the Strategy. The screening form was included in the Department's quarterly consultation exercise with Section 75 consultees on 19 June 2014 and no issues relating to Section 75 groups have been raised as a result.

As the policies contained in this Director of Engineering Memorandum emanate directly from the standards and the Strategy further screening analysis has not been considered necessary.

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