Devon County Council

Culvert Policy

May 2014

Contents

1. Introduction

Devon County Council, as the Lead Local Flood Authority, became responsible for ordinary watercourse consent applications under Section 23 of the Land Drainage Act 1991 on 6th April 2012. Prior to this, the Environment Agency was the regulatory authority for ordinary watercourses. Devon County Council has therefore adopted many of the principles and policies that the Environment Agency have worked to over the years. This policy note has been adapted from the Environment Agency's 'Culvert Policy' documents and is intended for use by planning authorities, landowners and developers.

Watercourses are valuable features of the landscape for people and wildlife. Devon County Council has legal duties under the Environment Act 1995 and the Water Framework Directive 2000 to ensure that they are protected and enhanced for the benefit of present and future generations. They provide vital water resources and recreational assets for people, help drain agricultural and urban land and support a diversity of wildlife. They are important features of the landscape and provide habitats for a wide variety of wildlife.

Devon County Council considers it beneficial for watercourses to remain open wherever possible for both flood defence and environmental purposes. Culverting can exacerbate the risk of flooding, increase maintenance requirements and create difficulty in pollution detection. It also destroys wildlife habitats, damages a natural amenity and interrupts the continuity of a watercourse.

For the purposes of this policy, a culvert is defined as "a covered channel or pipe which prevents the obstruction of a watercourse or drainage path by an artificial construction" (Flood and Water Management Act 2010).

Detrimental effects of culverting watercourses are likely to include:

- Increased likelihood of flooding due to obstruction of flow and risk of blockages, and loss of floodwater storage leading to increased impact of flooding;
- Loss of and adverse effects on natural morphology, fisheries and wildlife habitat including substrate;
- The creation of barriers to fish passage through increased water velocities, shallow depths and eroded culvert entrances;
- Increased river bank and bed erosion downstream of culverted sections;
- Greater difficulties in providing for drainage connections;
- Increased liabilities and costs due to the need to maintain, repair and replace culverts;
- Increased health and safety hazards, notably for workers clearing blockages and for children in urban areas;
- Locally reduced groundwater recharge;

- Increased difficulty in detecting the origins of pollution and in monitoring water quality.

In considering any development proposals, Devon County Council's objective is to retain open watercourses with a corridor of open land on both sides. This maintains a flood channel and creates a valuable environmental feature which can enhance the site and be easily maintained. Developers will also be encouraged to incorporate existing open watercourses, or create new ones, within their site design. Such features are of particular importance to wildlife by providing valuable open land in developed areas. Where possible, the removal of culverts will be encouraged to restore a more natural river environment.

Nevertheless, it is understood that there may be cases where culverting is unavoidable. For example, short lengths for access purposes or where highways cross watercourses. In such cases the length involved should be restricted to a minimum, the hydraulic and environmental design assessed, and appropriate mitigating enhancements to the surrounding environment included.

However, culverting will not be considered until other options have been thoroughly explored, for example:

- Clear open span bridges with existing banks and bed retained;
- Revision of site layout to incorporate an open watercourse;
- Diversion of the watercourse in an environmentally sympathetic channel and corridor.

Devon County Council will promote this policy to planners and developers, and use it to inform our response to applications to culvert watercourses. We will encourage and promote the removal of culverts where possible to restore a more natural river environment in both urban and rural settings.

2. Legal Requirements

The following works require ordinary watercourse consent from the Lead Local Flood Authority (Devon County Council) under Section 23 of the Land Drainage Act 1991:

> *a) erect any mill dam, weir or other like obstruction to the flow of any ordinary watercourse or raise or otherwise alter any such obstruction; or*
>
> *b) erect a culvert in an ordinary watercourse, or*
>
> *c) alter a culvert in a manner that would be likely to affect the flow of an ordinary watercourse.*

For works affecting Main Rivers the prior written consent of the Environment Agency is required under the Water Resources Act 1991 and Environment Agency Byelaws.

In an Internal Drainage Board (IDB) district, the consent of the IDB is required under the Land Drainage Act 1991.

Highway authorities are required under Section 339 of the Highways Act 1980 to seek the consent of the drainage authority before carrying out any works affecting a watercourse.

3. Enforcement action against unconsented works

If any of the above works are carried out without consent, Devon County Council has the power to serve notice on the person who carried out the work (if they have the ability to remove the obstruction at the time the notice is served) or the person having ability to remove the obstruction. If the notice is not complied with, the person responsible may be enforced against, or the Council are entitled to carry out the necessary works to remove or alter the work and recover its expenses from the person who carried it the works.

Devon County Council will take a risk-based approach to enforcement action, taking into account the location and nature of the unconsented works, whether they are likely to increase flood risk and what the consequences of any increase in risk may be. The cost-benefit of pursuing an enforcement case will also be investigated to ensure value for money to the tax-payer.

4. Devon County Council Culvert Policy

Devon County Council are generally opposed to the culverting of watercourses because of the adverse ecological, flood risk, human safety and aesthetic impacts and other effects discussed above.

Watercourses are important linear features of the landscape and should be maintained as continuous corridors to maximise their benefits to society.

The Council will consider each application to culvert a watercourse on its own merits and will only approve a culvert if there is no reasonably practicable alternative, or if is thought that the detrimental effects would be so minor that a more costly alternative would not be justified. It is recognised that there are situations where culverting may be unavoidable in practice, such as short lengths for access purposes or where highways cross watercourses. In these cases, open span bridges or diversion of the watercourse must be considered first as alternatives to culverts.

Applicants will be required to prove why culverting is both necessary and the only reasonable and practicable alternative, and to provide information to show that it will not have a detrimental effect on flood risk and the habitat(s) and species present, or that mitigation measures can be put in place to reduce these effects.

In all cases where it is appropriate to do so, applicants must provide adequate mitigation measures and accept sole ownership and responsibility for future maintenance.

Devon County Council will normally object to proposals to build over existing culverts because of health and safety considerations, increased maintenance costs, and because this would preclude future options to restore the watercourse. We will actively pursue the restoration of culverted watercourses to open channels.

Where a culvert is deemed to be acceptable, the design should follow the principles in the associated technical guidance which is available from the Council or the Environment Agency on request.

Any culvert should be restricted to the minimum length necessary to meet the applicant's objective. The proposal must include appropriate assessment of flood risk and environmental impact. The applicant should also take into account the possible effects of climate change and future development in the catchment on the watercourse when calculating the capacity of the culvert. Mitigation measures such as mammal ledges must be incorporated within the design, and the work must be carried out using best working practice to minimise environmental impact.

5. Reasons for the Policy

5.1 Loss of environmental features

Culverting has a detrimental impact on the environment, resulting in a complete loss of features within a watercourse. The continuity of the river corridor is broken, adversely affecting the landscape and ecological value of the watercourse for migrating species. An existing or potential amenity is also lost for present and future generations.

5.2 Increased likelihood of blockages and flooding

Compared with an open channel there is an increased risk of blockage once a culvert is installed. If the blockage occurs within the culvert, there is much greater difficulty in removing it.

It is sometimes argued that culverting will reduce the problem of open channels subject to litter and fly-tipping. Such short-term advantages are outweighed by the overall disadvantages, and alternative means should be pursued to address litter problems.

Flooding is more likely to result from culverts when they become obstructed, and culverted channels also provide less flood storage than open ones. There have also been cases of serious flooding caused by culverts collapsing due to root damage from vegetation or the weight of development above them.

Culverting will create a less permeable bed to a watercourse and often increases the speed of water flow, possibly increasing flood risk downstream and also preventing local recharge of groundwater

5.3 Increased difficulties in providing new drainage connections, and the repair, maintenance and replacement of culverts.

Drain connections are more easily made to open watercourses where the performance of drainage systems can be visually monitored. Outfalls within culverts are prone to blockage or, in the case of flapped outfalls, can seize up. Maintenance of these outfalls is considerably easier in open channels.

Culverts conceal the presence of a watercourse and can lead to development or unacceptable land-use above or near them. In many urban areas buildings have been constructed above or adjacent to culverts. This means that improving standards of flood protection or accommodating run-off from future

developments could be impossible or uneconomic due to the cost of replacing or enlarging existing culverts.

The responsibility for the condition and maintenance of a culvert lies with the landowner or the owner of the culvert unless other agreements are in place. The responsible party must therefore ensure that the culvert remains in good condition and free from obstructions. Failure to do so could result in liability for any damage caused by flooding. Access to culverts is generally safe only with the use of special procedures and equipment, making inspection and maintenance both difficult and costly.

5.4 Health and safety hazards

There are dangers associated with natural open watercourses but culverted watercourses can be equally dangerous. Culverting does not remove the risk of drowning or injury. There have been many cases in past where children have died or suffered injury after entering culverts and they therefore represent a considerable safety hazard. Water levels can rise suddenly and without notice, and there can be a lack of oxygen or build-up of potentially toxic or explosive gases in culverts. All these hazards are a danger both to the public and to operatives when maintenance is required.

5.5 Pollution and effect on water quality

Culverting a watercourse makes the early detection and tracing of pollution sources more difficult, resulting in the adverse impacts being more serious. There is further impact on water quality due to the loss of the biological processes which are essential for river purification, and there is normally a reduction in oxygenation of water passing through a culvert. Culverting may also result in stagnant water problems, particularly if culvert levels are badly planned or constructed.

6. Consent Process

Landowners and developers should seek the Council's advice as early as possible on any proposal, allowing sufficient time before the intended start date. The consent application forms and details on how to apply and pay the appropriate fee are available on the Council's our website at: www.devon.gov.uk/floodrisklanddrainage.

On receipt of a complete and valid application, Devon County Council have a period of two months in which to determine it, but will aim to reach a decision as soon as possible within this timeframe. As part of the process the Council will consult various authorities including the Local Authority, Highways Department, Environment Agency and Natural England where appropriate. Identifying and resolving possible problems before plans reach an advanced stage will minimise costs to all parties and will reduce the time taken to determine the application.

Once determined, you will notified in writing of approval or refusal of the application along with a written copy of your consent if applicable.

7. Other Permissions Considerations

The requirement for ordinary watercourse consent is independent of the need for planning permission and the granting of planning permission does not imply or guarantee that consent will be granted.

Consent is also required for development on an ordinary watercourse within a specified distance of either side of a Main River in accordance with Environment Agency Byelaws.

Works either within or which would affect a designated site (ie, a Site of Special Scientific Interest, SSSI) as a result of changes in flow regimes or water levels also require the approval of the Natural England, as appropriate.

8. Design Guidance

Detailed design plans will need to be submitted with your consent application and also consider the following:

- An applicant should demonstrate that they have considered the environmental implications of all options, and preferably settle on the least environmentally damaging solution.
- If no other alternative is feasible, any proposed culvert length should be as short as possible and the diameter as large as possible.
- Depending on local circumstances Devon County Council will look for a minimum culvert diameter of 600mm.
- All culverts should be designed to safely convey the 1 in 100 year flood event, plus climate change flood discharge or greater where appropriate.
- Wherever possible flood estimation is required to follow the results of the Environment Agency's latest published Devon Hydrology Strategy Update.
- Where possible designs incorporate a specified amount of freeboard to allow for floating debris, minor blockage and variations on the 'design' water surface
- Culverts must be designed so they do not cause a restriction to flow. They must not increase the risk of flooding or prevent maintenance of the adjacent open watercourse. Consideration must also be given to overland flow paths in the event of a culvert becoming obstructed. It should be ensured that flows will not affect property or cause unreasonable nuisance or harm.
- The responsibility for future maintenance and clearance of a culvert must be agreed and details of those responsible submitted with your application for consent. The responsibility for the maintenance of a culvert lies with the landowner or the person who owns the culvert unless otherwise arranged.
- Appropriate inlet and outlet structures should be provided in order to ensure smooth hydraulic transition and avoid erosion. Headwall

arrangements at the upstream and downstream ends of a culvert should be suitably keyed into the bed and banks of the watercourse, and should be appropriate to the local environment.

- Suitable access arrangements for maintenance should be included in the design. Access chambers must be provided at each change of direction if the culverting is not straight. Other access/inspection chambers should be installed at suitable intervals.
- Inlet and outlet screens should not be used unless absolutely necessary. An appropriate risk assessment must be submitted with your application to demonstrate when a trash screen is necessary, and a formal maintenance regime must be agreed prior to approval.
- Where screens are to be adopted, these should be designed to the standards and principles adopted in the Environment Agency's Trash and Security Screen Guide 2009.[1]
- In most situations it is appropriate for the inverts of culverts to be set slightly below the existing bed level to allow for future maintenance or other works on the watercourse. It also aids the provision of a more "natural" bed to the culvert.
- Multiple small culvert arrangements are prone to blockage by accumulation of waterborne debris at the inlet. Where multiple culverts are unavoidable, a minimum number of culverts should be used and cutwaters should be provided between pipes at the culvert inlet.

9. Environmental Considerations

Environmental mitigation measures may be appropriate if any open watercourse is being removed. We must also consider the key aims of the Water Framework Directive throughout the consenting processes, overall this Directive aims to:

- Prevent further deterioration and protect and enhance the status of aquatic ecosystems and associated wetlands;
- Promote sustainable water consumption;
- Progressively reduce or phase out discharges, emissions and losses of priority substances and priority hazardous substances;
- Progressively reduce the pollution of groundwater; and contribute to mitigating the effect of droughts and floods.

Environmental mitigation for larger culverts:

- Make the culvert slightly larger than that needed to accommodate the design flow and then position the invert of the culvert below the natural bed of the watercourse, to enable some more natural bed features to form.
- Provide ledges running through the culvert (approximately 500 mm wide and 300 mm above normal water level) to allow for the passage of

[1] Envirionment Agency Trash Screen and Security Guide 2009 http://cdn.environment-agency.gov.uk/scho1109brhf-e-e.pdf

mammals. Or make provision for appropriately located mammal underpasses close to the culvert.
- The height of the invert should not pose an obstruction to fish movement.
- Provide structures to encourage bat roosting and bird nesting as appropriate.

Environmental mitigation for smaller culverts:

- Propose suitable environmental enhancements, for example opening up a length of previously culverted watercourse elsewhere on the site, enhancing other lengths of the watercourse, creation of a pond/marshy area, scrub/hedge planting.
- Construct headwalls and wingwalls in 'soft-engineering' or natural materials in keeping with the natural channel.

10. Definitions

Ordinary Watercourse:
The term Ordinary Watercourse, as defined in the Land Drainage Act 1991 is a watercourse that does not form part of a main river, and includes all rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows.

Bridge:
An open span structure that carries a road, footpath, railway etc over a watercourse.

Culvert:
A covered channel or pipeline which is used to continue a watercourse or drainage path under an artificial obstruction.

Main River:
Main Rivers are designated as such on maps held by the Department for the Environment, Food and Rural Affairs (DEFRA) and by the Environment Agency.
Works in or near Main Rivers require the consent of the Environment Agency.
More information on main rivers can be obtained from local EA offices.

Sustainable Development:
Development that meets the needs of the present without compromising the ability of future generations to meet their own needs