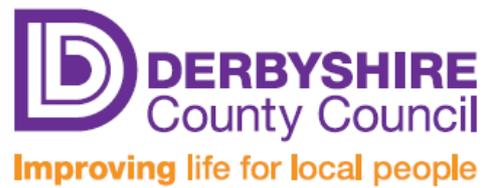


PUBLIC



Derbyshire County Council Economy, Transport and Environment Department

CULVERT POLICY

(Culverting of Ordinary Watercourses)

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FOREWORD

F1 USE OF DOCUMENT

- F1.1 This document may include information on various inter-related topics and aspects of particular issues that may be covered in different places, therefore individual sections should not be read in isolation.
- F1.2 This policy has been adapted from the Environment Agency's 'Culvert Policy' documents and provides Derbyshire County Council's view on applications to culvert ordinary watercourses. This policy is mainly intended for use by planning authorities, landowners and developers.
- F1.3 This document should be read in conjunction with the following, where it is deemed appropriate:
- a) The Flood and Water Management Act 2010 (FWMA)
 - b) Land Drainage Act 1991 (LDA)
 - c) Public Health Act 1936 (PHA)
 - d) Water Framework Directive 2000 (WFD)
 - e) Water Resources Act 1991 (WRA)
 - f) CIRIA Culvert design and operation guide (C689)

F2 ACCESS TO THIS DOCUMENT

- F2.1 This document will be available in EDRM or on the County Council's website and this will be the key medium by which amendments will be released.

F3 MODIFICATIONS, ALTERATIONS OR AMENDMENTS

- F3.1 The procedures and requirements specified within these guidelines may be modified, altered or amended at any time as the County Council deems appropriate.
- F3.2 This is a controlled document and it may be updated as details of legislation, national guidance and resources etc. change.

SECTION 1 – INTRODUCTION

1.1 GENERAL

- 1.1.1 Culverts are artificial water channels that can vary considerably from narrow pipes through to large, square-sided channels. They can be constructed from a range of materials including concrete, plastic, stone, metal etc. Within the historic mining areas of Derbyshire there are known to be extensive networks of soughs (a stone culvert) historically installed to drain water out of mines. Most other culverts are generally constructed in order to enable development above watercourses (houses, factories, roads etc.) or manage flood flows where a natural channel is felt to be inadequate, often beneath the ground.
- 1.1.2 Although often designed to improve local flood risk, culverts can themselves exacerbate flooding. This is because they can restrict water flow and thereby cause ponding of water near the entrance to the culvert or become blocked/partially obstructed by debris that has washed into them. Screens designed to prevent debris entering a culvert, unless well-designed and maintained, can also cause blockages which heighten flood risk. Flood risk issues associated with culverts may become more pronounced if, under climate change, more extreme rainfall events are experienced, and de-culverting may constitute an effective adaptation measure.
- 1.1.3 Many watercourses have been buried below ground for long periods of time (sometimes centuries). The location of such watercourses (sometimes beneath buildings, streets and open space) may become forgotten by the local population or may not have been recorded at the time of implementation. In rural areas riparian landowners are often unaware of their existence within their land and the consequences of alteration to the wider community/catchment.
- 1.1.4 Since the mid-1990s the negative impacts of culverting watercourses on flood risk, ecology and amenity have been more widely acknowledged. The Environment Agency actively discourages culverting and promotes de-culverting of watercourses across England and Wales. The River Restoration Centre, set up in 1994, is a charitable organisation which exists to promote, facilitate and support best practice in river, watercourse and floodplain management and provides expertise relating to river restoration and enhancement.
- 1.1.5 Often, the nature of the development above such culverted watercourses is prohibitive to their restoration. The restoration of navigation on some canals has involved the removal of some culverted lengths of watercourse. Any

works to alter any culvert will require Land Drainage Consent from the County Council as the Consenting Authority for works in or within close proximity to an ordinary watercourse. District/Borough Councils can also control the culverting of watercourses under Section 263 of the PHA.

- 1.1.6 Under the WFD, culverted watercourses can be classified as 'Heavily Modified Water Bodies (HMWB)'.

SECTION 2 – PURPOSE AND LEGISLATIVE FRAMEWORK

2.1 GENERAL

- 2.1.1 Derbyshire County Council, as the Lead Local Flood Authority (LLFA), became responsible for ordinary watercourse consent applications under Section 23 of the LDA on 6th April 2012. Any culverting of an ordinary watercourse or the alteration of an existing culvert in Derbyshire requires the County Council's prior consent.
- 2.1.2 Consenting under Section 23 had previously been dealt with by the Environment Agency; as such they created extensive guidance on culverts. The County Council has therefore adopted many of the principles that the Environment Agency had already been working to, and they are detailed within this document.
- 2.1.3 The following works require ordinary watercourse consent from the Lead Local Flood Authority (the County Council) under Section 23 of the LDA:
- 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.
- 2.1.4 Local Authorities in Derbyshire (District/Borough Councils) may also set their own Byelaws under Section 66 of the LDA. Typical Byelaws will include consent being required for any works within a certain distance from a watercourse, these Byelaws must also be complied with and we would advise you to contact your District or Borough Council for further information.
- 2.1.5 For works affecting **Main Rivers** the prior written consent of the Environment Agency is required under the WRA and Environment Agency Byelaws.

SECTION 3 - ENFORCEMENT ACTION AGAINST UNCONSENTED WORKS

3.1 GENERAL

- 3.1.1 If any of the works described in section 2.1.3 are carried out without consent, the County Council have the power to serve notice on the landowner who carried out the work (if they have the ability to remove the obstruction at the time the notice is served) or the landowner has the ability to remove the obstruction. If the notice is not complied with the person responsible may be enforced against, or the County Council are entitled to carry out the necessary works to remove or alter the work and recover its expenses from the landowner that carried it out. All reasonable steps will be undertaken to ascertain the relevant parties involved in the unconsented activity. In addition, that person may also be liable to prosecution under the local authority Byelaws.
- 3.1.2 The County Council will always take a risk-based approach to enforcement action by taking into account the location and nature of the unconsented works, whether they are likely to increase flood risk or not 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 we are delivering value for money for the people of Derbyshire.

SECTION 4 – POLICY AIMS

4.1 GENERAL

- 4.1.1 The County Council, like the Environment Agency are generally opposed to culverting of a watercourse due to the adverse ecological, flood risk, human safety and aesthetic impacts as well as other effects which are likely to arise as described in this document. The Environment Agency have a duty to implement the objectives of the WFD; the County Council have a responsibility to support the Environment Agency in achieving these objectives.
- 4.1.2 The County Council will consider each application to culvert a watercourse on its own merits but will only approve a culvert if there is no reasonably practicable alternative or if we think the detrimental effects would be so minor that a more costly alternative would not be justified. In all cases where it is appropriate to do so, applicants must provide adequate mitigation measures.

- 4.1.3 Where culverting is proposed as part of a scheme to build over a watercourse, the County Council would generally be opposed to the proposal because of health and safety considerations, increased maintenance costs and because this would likely preclude future options to restore the watercourse.

SECTION 5 – REASONS FOR THIS POLICY

5.1 LOSS OF ENVIRONMENTAL FEATURES AND WILDLIFE HABITATS

- 5.1.1 Installation of a culvert results in complete loss of environmental, geomorphological and habitat features within that section of watercourse. The continuity of the water corridor is broken which affects the landscape and ecological value of the watercourse and in some cases prevents the migration of fish species. Even seasonably dry watercourses provide habitats for many species of amphibians and invertebrates.
- 5.1.2 Should there be no option than to install a culvert, then environmental mitigation measures will be required. Key consideration is given to the aims of the WFD throughout the consenting processes, overall this Directive aims to:
- a) Prevent further deterioration and protect and enhance the status of aquatic ecosystems and associated wetlands;
 - b) Promote sustainable water consumption;
 - c) Progressively reduce or phase out discharges, emissions and losses of priority substances and priority hazardous substances;
 - d) Progressively reduce the pollution of groundwater, and contribute to mitigating the effect of droughts and floods.
- 5.1.3 Suggested/encouraged environmental mitigation for larger culverts (>900mm):
- a) Construct 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.
 - b) Provide ledges running through the culvert (approximately 500 mm wide and 300 mm above normal water level) to allow for the passage of mammals or make provision for appropriately located mammal underpasses close to the culvert.
 - c) Ensure the height of the invert does not pose an obstruction to fish movement.
 - d) Provide structures to encourage bat roosting and bird nesting as appropriate.

5.1.4 Suggested/encouraged environmental mitigation for smaller culverts (<900mm):

- a) 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.
- b) Construct headwalls and wingwalls in 'soft-engineering' or natural materials in keeping with the natural channel.

5.2 INCREASED LIKELIHOOD OF FLOODING DUE TO BLOCKAGES

5.2.1 Compared to an open channel there is an increased risk of a blockage once a culvert is installed. When blockages occur they cannot be easily identified and in many cases only become apparent after heavy rainfall when flooding begins. The blockage can be difficult to locate or remedy at the time particularly if it is not safe to do so or without special equipment.

5.3 INCREASED IMPACT OF FLOODING

5.3.1 The effect of the overland flooding that occurs when the flow in the watercourse exceeds the culvert capacity can be more serious than flooding from an open watercourse. Flooding may also affect sections of a watercourse further upstream from the culvert, which may previously have not been the first location to experience flooding. This is often the case where flooding has occurred because of a blockage.

5.4 LOSS OF FLOODWATER STORAGE AND NATURAL PROCESSES

5.4.1 Open watercourses can provide more storage capacity than a culvert with the impact being greater over longer lengths. They also provide an open area for water to be channelled into during overland flow and allow natural processes such as evaporation, infiltration and groundwater recharge to take place. The natural roughness of the channel bed is also lost through culverting which can increase the speed water travels downstream further exacerbating flooding and/or creating erosion problems.

5.5 INCREASED DIFFICULTIES FOR PROVIDING DRAINAGE CONNECTIONS

5.5.1 Drainage outfalls can be provided more easily with open watercourses where drain connections can be readily made and the performance of drainage systems 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.

5.6 DIFFICULTY IN THE REPAIR, MAINTENANCE, REPLACEMENT AND CONDITION SURVEYS OF CULVERTS

5.6.1 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 runoff from future developments could be impossible or uneconomic due to the cost of replacing or enlarging culverts.

5.6.2 The responsibility for the condition and maintenance of a culvert lies with the landowner or owner of the culvert (riparian landowner) unless other agreements are in place. The responsible party must therefore ensure the culvert remains in good condition and free from obstructions. Failure to do so could result in liability for any damage caused by flooding. Consideration of the anticipated maintenance life cycle of the asset must be evaluated as all infrastructure has a finite life span before capital investment is required to maintain its functionality.

5.6.3 Access to culverts is generally safe, only with the use of special procedures and equipment, making inspection and maintenance both difficult and costly.

5.7 HEALTH AND SAFETY HAZARDS

5.7.1 There are dangers associated with natural open watercourses but culverted watercourses can be equally dangerous, particularly as operatives are likely to be working in a confined space.

5.7.2 Culverting does not remove the risk of drowning or injury. Water levels can rise suddenly and without notice, or there can be a lack of oxygen or build-up of potentially toxic or explosive gases in culverts. These hazards are a danger to the public as well as those who maintain the structure.

5.8 POLLUTION AND EFFECT ON WATER QUALITY

5.8.1 Culverting increases the difficulty in detecting the origins of pollution and in monitoring water quality. There is also a loss of the biological processes which are essential for water purification, and there is normally a reduction in oxygenation of water passing through a culvert.

SECTION 6 – EXCEPTIONS

6.1 GENERAL

- 6.1.1 The County Council recognises that there are situations where culverting may in practice be unavoidable, such as short lengths for access purposes or where Highways cross watercourses.
- 6.1.2 Applicants will be required to demonstrate why culverting is both necessary and the only reasonable practicable alternative. This can include explaining why alternatives are unreasonably costly to install, based upon hydraulics or for any other reasons. The applicant must still provide information to show that it will not have a detrimental effect on flood risk and/or the habitat(s) and species present, or that mitigation measures can be put in place to reduce these effects.
- 6.1.3 The proposal must include an appropriate assessment of flood risk and environmental impact. The applicant should 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.
- 6.1.4 Where culverts are proposed, alternatives should be considered and an explanation as to why they cannot be implemented provided, these alternative include (*the list below is not an exhaustive list*);
- a) Construction of clear open span bridges with banks and beds retained;
 - b) Revision of site layout to incorporate an open watercourse;
 - c) Construction of a ford in small water bodies for non critical infrastructure;
 - d) Diversion of the watercourse in an environmentally sympathetic channel and corridor.

SECTION 7 – THE CONSENTING PROCESS

7.1 GENERAL

- 7.1.1 Landowners and developers should seek the County Councils advice as early as possible on any proposal, allowing sufficient time to resolve any issues before work is to start. Identifying and resolving potential problems before plans reach an advanced stage will minimise costs to all parties and therefore

reduce the time taken for the consent application to be processed when it is received. In addition, opportunities for environmental enhancements can be identified which may not necessarily entail significant additional costs.

- 7.1.2 The consent application forms and details on how to apply and pay the appropriate fee are available on our website www.derbyshire.gov.uk.
- 7.1.3 On receipt of a complete and valid application, the County Council have a period of eight weeks in which to determine it, but will aim to reach a decision as soon as possible within this timeframe. As part of the process we will consult various authorities including the Local Authority, Highways Department, Environment Agency and Natural England where appropriate.
- 7.1.4 Once determined, the County Council will notify you of the approval or refusal in writing along with a written copy of your consent if applicable.
- 7.1.5 Where alternatives to culverting are not possible the County Council strongly advise that the applicant refer to the most up to date industry guidance on designing culverts.

SECTION 8 – DESIGN GUIDANCE

8.1 GENERAL

- 8.1.1 An applicant should demonstrate that they have considered the environmental implications of all options, and preferably settle on the least environmentally damaging solution.
- 8.1.2 If no other alternative is feasible, any proposed culvert length should be as short as possible and the diameter as large as possible, in proportion to the existing profile of the open watercourse. Depending on local circumstances the County Council will look for a minimum internal culvert diameter of 600mm. For box culverts, whether square or rectangular and internal diameter should be a minimum of 1.2m.
- 8.1.3 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. Measures should be put forward to ensure that flows will not affect property or cause unreasonable nuisance or harm. If hydraulic calculations are required to support an application then overland flows should be included within the model outputs.

- 8.1.4 The responsibility for future maintenance and clearance of a culvert must be agreed and details of those responsible submitted with the application for consent. The responsibility for the maintenance of a culvert (riparian landowner) lies with the landowner or the person who owns the culvert unless otherwise arranged.
- 8.1.5 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.
- 8.1.6 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, ideally no greater than 40 metres apart.
- 8.1.7 Inlet screens should not be used unless absolutely necessary. An appropriate risk assessment must be submitted with the application, to demonstrate where a trash screen is necessary. A formal maintenance regime must be agreed prior to approval.
- 8.1.8 Multiple small culvert arrangements are prone to blockage by accumulation of waterborne debris at the inlets. Where multiple culverts are unavoidable, a minimum number of culverts should be used and cutwaters should be provided between pipes at the culverts inlets.
- 8.1.9 Please refer to Appendix A which provides a flow chart for culvert design processing.

SECTION 9 – PLANNING CONSIDERATIONS

9.1 GENERAL

- 9.1.1 The requirement for ordinary watercourse consent is independent of the need for planning permission and the granting of planning permission. Planning Consent/Permission does not imply or guarantee that the County Council will grant Land Drainage Consent.
- 9.1.2 The County Council may, if consulted as part of a planning application, raise objection and refuse ordinary watercourse consent on conservation grounds

for a development which proposes a culvert where there are reasonable alternatives. Such alternative solutions might include a revised site layout or an ecologically acceptable diversion of an open channel.

- 9.1.3 Buildings should not be sited over the top of new or existing culverts. Building regulations set by the relevant District/Borough Council may stipulate the distance which new foundations should be laid to a watercourse or sewer. The County Council are likely to raise objection to a planning application for any building over a culvert, as the culvert may, in the future, need to be repaired, replaced or upgraded if conditions in the catchment change. There is also the need to maintain an overland flow route if the culvert is blocked or its capacity exceeded.
- 9.1.4 Consent is required for development within a specified distance of either side of a **Main River** in accordance with Environment Agency Byelaws. This consent must be obtained from the Environment Agency.

SECTION 10 – DE-CULVERTING OF WATERCOURSE

10.1 GENERAL

- 10.1.1 Section 10 is designed to act as a policy statement to support the approach of de-culverting (or 'daylighting') existing culverted watercourses within a developable area/riparian land ownership. De-culverting would require Land Drainage Consent.
- 10.1.2 There are many good examples of culverted watercourses that have been restored, encouraging access, improving the local quality of life and attracting opportunities for regeneration. Specific benefits include:
- a) Providing valuable wetland / aquatic habitat, aiding fish passage and significantly adding to the visual attractions of an area.
 - b) Offering educational opportunities for children, enhancing pedestrian and cycle routes and giving people a touch of the countryside and its seasons in the town.
 - c) Restoring historic canals for amenity or for navigation by powered and unpowered boats.
 - d) Complementing other urban regeneration initiatives and bringing commercial benefits such as enhanced image for properties.
 - e) Reducing maintenance and construction costs by using natural bio-engineering techniques rather than concrete or similar.

- f) Giving a place a sense of identity, because each combination of landform, waterway, bankside buildings and bridges is unique.

10.1.4 Challenges to successful de-culverting include:

- a) Removing a culvert or other obstructions which previously constrained flows could increase downstream flood risk and may increase localised flood risk. Modelling should therefore be employed to ensure no adverse flood risks ensue.
- b) Securing support for projects may be a lengthy process, especially in urban areas, where people are simply not aware of the existence of a watercourse.
- c) Once covered, the land above culverted watercourses may become heavily developed to the extent that de-culverting is not a realistic option.
- d) New watercourses may attract fly tipping, vandalism and increased deposition of urban trash following floods where re-engineered channels become wide and shallow. Local communities and authorities need to be fully engaged and involved in maintenance.
- e) Some culverts may be formally listed or scheduled for their historic importance. Careful consideration is needed in these cases, and the appropriate formal consents must be secured beforehand.

10.1.5 The County Council's aspirations for appropriate implementation of de-culverting would look to follow informed criteria and will aim to actively encourage this practice when several of the criteria below can be achieved:

- a) Removing a culvert is physically possible within the context of the local physical and built landscape, and would not damage ecological or historical interests.
- b) Flood risk may be reduced by removing a section of culvert and re-establishing a more natural flow regime and watercourse profile, taking account of any impacts on flood risk upstream/downstream and locally.
- c) The local environment would be enhanced significantly by re-establishing a more natural channel profile.

10.1.6 For large culverts with no adjacent development, the aim should be to return the watercourse to a more naturally functioning form. For channel/box culverts with adjacent development, the culvert should be opened and the bed returned to a natural state. Where this is not possible, enhancement or mitigation work should be implemented elsewhere within the watercourse corridor.



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APPENDIX A – FLOW CHART FOR CULVERT DESIGN

