

# Cemeteries, Burials and the Water Environment

A good practice guide for applicants and planning authorities when planning cemetery developments or extensions

Version 1.1 / April 2016

**PRACTICE GUIDE**



*This good practice guide aims to assist applicants and planning authorities achieve a consistent approach when planning cemetery developments or cemetery extension. Its correct application should help applicants and planning authorities identify and satisfy legislative requirements with regard to groundwater protection in development projects.*

*This guide does not attempt to provide a detailed account of the legislation and policy that underpin groundwater protection in Northern Ireland and is not intended to be a source of legal advice. This guide is not intended to replace the need for judgement by planning officers and those making planning applications. Reference should always be made to the relevant legislation and if any discrepancy or conflict exists between the contents of this guide and the relevant legislation, the provisions of the legislation will prevail.*

*Further information can be obtained from the NIEA website **[www.doeni.gov.uk](http://www.doeni.gov.uk)**. Links to external sources of information have also been provided in the text, where appropriate.*

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## Overview

The development of new cemetery sites/graveyards or extensions to such sites has the potential to result in impact on the local water environment and in particular, the groundwater underlying the site. It is important when planning such sites that consideration is given to possible impacts and where appropriate, ensuring that adequate site investigation and risk assessment is undertaken. The extent of site investigation and risk assessment should be proportionate to the size of the proposed development.

This guidance document aims to help developers and their environmental consultants who are responsible for the development of new cemetery sites/graveyards or extensions to such sites. It is strongly recommended that the applicant seeks the professional advice of a hydrogeologist. Hydrogeologists (not hydrologists) can be identified through internet search, Yellow Pages or the Ends Directory ([www.endsdirectory.com](http://www.endsdirectory.com)).

The guidance covers the main areas and issues to be considered when assessing the potential impact on groundwater and provides details of the relevant information required to enable NIEA to provide advice.

## 1. Why is it important to protect groundwater?

1.1 Groundwater has three major uses in Northern Ireland:

- private drinking water supply;
- abstractions for agricultural and industrial purposes, including bottled 'mineral' waters and carbonated drinks; and
- maintenance of flow and water levels in rivers, lakes and wetlands, particularly during times of low rainfall.

1.2 The protection of groundwater from the risk of possible contamination is important because pollutants could cause health problems in human beings, reduce the quality of farming and agricultural products, make the water unsuitable for certain industrial processes and pose a threat to our countryside and environment including their suitability for recreational purposes. In summary, the contamination of groundwater can not only have health and environmental impacts, but also serious economic consequences.

## 2. How can cemeteries contaminate groundwater?

2.1 After a while in the ground a body and its coffin will begin to decay. As this happens fluids can leach out and may eventually work their way down to the groundwater underlying the site. This fluid may contain embalming fluid, pathogens/microbes and nitrogen compounds which could contaminate groundwater. In some cases it may also pose a health risk if it contaminates a groundwater-fed drinking water source

2.2 As groundwater can travel considerable distances underground (and with it any pollutants) it is necessary to consider the possible risk of groundwater contamination when planning new graveyards or cemeteries.

## 3. What information does NIEA require before assessing if a cemetery development/extension will pose a threat to groundwater?

3.1 NIEA will expect information on the following to be provided:

- A desktop study;
- An intrusive site investigation and water features survey;

- A hydrogeological risk assessment; and
- The proposed layout of the site (*this is the final stage as the above tasks will inform the site planning*).

## 4. Desktop study

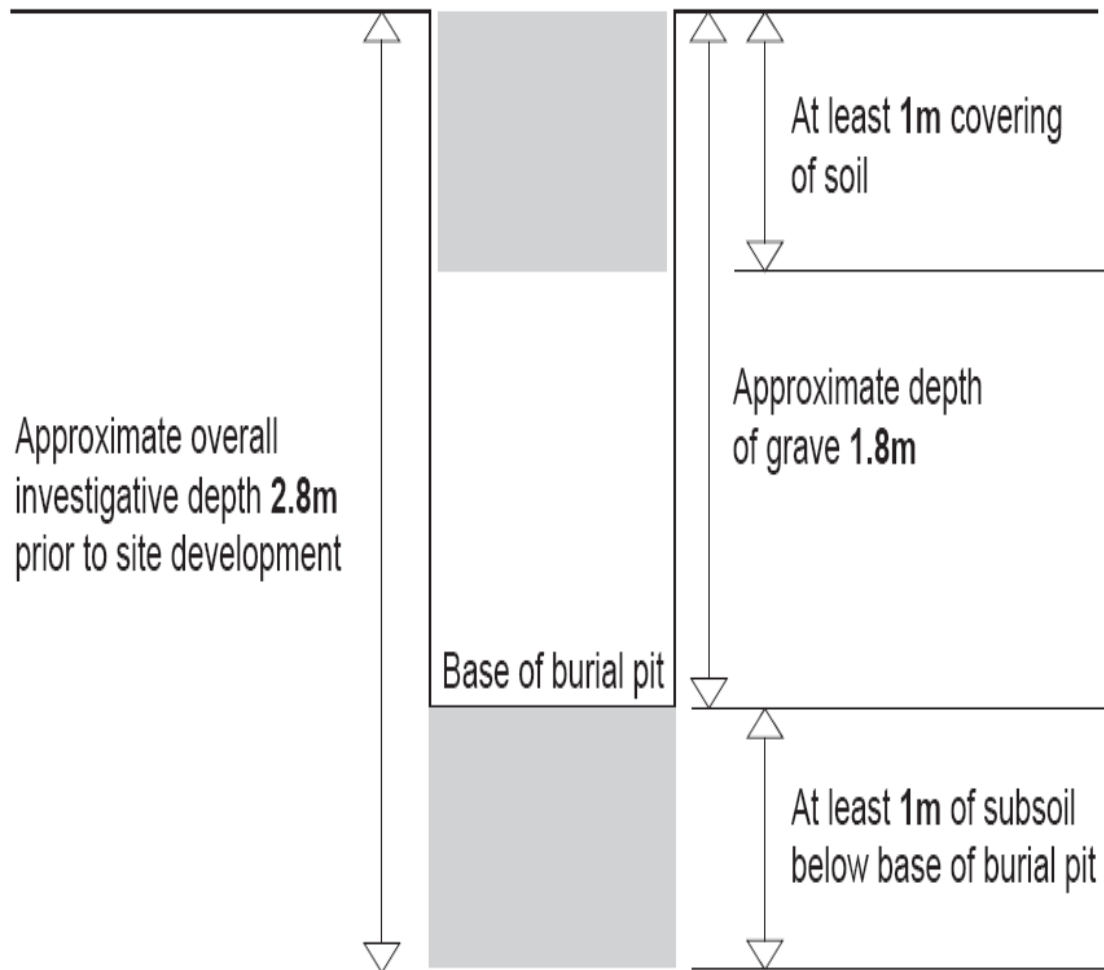
- 4.1 When considering use of land for burial purposes, it is normal practice for an initial desktop assessment to be undertaken using information readily available from a variety of sources (see section 10). This allows for initial consideration of the potential issues and risks associated with the specific site based upon geological setting, water quality, proposed burial rate per annum and total capacity of the cemetery.
- 4.2 For existing sites, important local knowledge about the ground/ geological conditions can be obtained through discussion with the local grave digger.
- 4.3 Based upon this initial consideration, the need for intrusive investigation can be better assessed, taking into account the proposed scale and sensitivity of the site location. Further information regarding this decision process can be found in reference 4 and 5.

## 5. Intrusive site investigation

- 5.1 The site walkover should aim to identify any boreholes, watercourses and sensitive targets in the proximity of the proposed site (see previous section) and determine their distance from or position within the proposed site (please see the practice guide 'Water Features Survey' – reference 3). This will allow features to be mapped for submission along with the report and accompanying planning application.
- 5.2 The absolute minimum requirement for a site investigation should normally consist of a site walkover as described above and the digging of trial pits. The trial pits and any observed water seepages or strikes are required to be logged according to British Standard BS5930:2015. Logs should be appended to any planning application together with a location map of the trial pits. If photographs of trial pits are submitted they should include a visible tape measure confirming the depth of the pit.
- 5.3 The trial pits should be excavated to a depth of 1 metre **below the intended depth of the grave** to assess the site and soil for its suitability as a burial site. The number of trial pits will depend on the size of the site.
- 5.4 Other points for consideration include:
  - Are there any old, metal water mains passing beneath the cemetery whose corrosion could be accelerated?
  - Is there any artificial drainage within the ground, associated with previous/existing land use?

5.5 For certain large scale and/ or sensitive sites there may be a need to undertake further intrusive site investigation using borehole drilling, baseline sampling and other assessment techniques.

5.6 Figure 1: Diagram to illustrate total investigation depth





## 6. Hydrogeological risk assessment

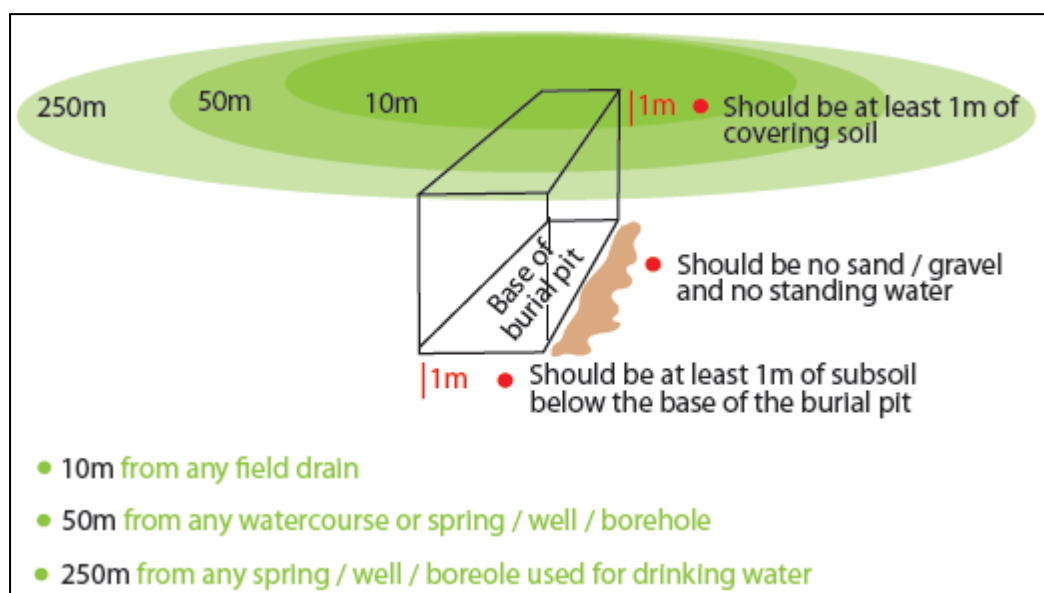
- 6.1 The risk assessment will be based upon data and knowledge gained from the desktop assessment and the intrusive site investigation. The scope of the risk assessment required will be dependent on site specific factors such as intended annual burial rate, the local vulnerability of groundwater and the scale of the site proposed. Further guidance on risk assessment can be found in the 'Pollution Potential of Cemeteries – R&D Technical Report P223' and its amendments (references 4 to 6).

## 7. Guidelines for planning cemeteries

- 7.1 Once you have gathered all the information above, this will allow you to start planning the layout of the proposed burial site. The following should be taken into consideration when doing this:

- Burial plots should be at least 250 m away from a borehole, spring or well used for the supply of drinking water and/ or bottling of mineral water.
- Burial plots should be at least 50 m away from all other boreholes, springs or wells.
- Burial plots should be at least 50 m away from a river, canal, lake, wetland or the coast.
- Burial plots should be at least 10 m away from field drains (this also includes old agricultural drainage systems no longer in use as they can act as preferential pathways).
- If bedrock is encountered in the trial pit, that area of the site should not be used for burials.
- The area of the site is not suitable for burial if there is standing water at the bottom of the burial pit when first dug.

- 7.2 Figure 2: Guidelines for planning cemeteries





- 7.3 The completed written report and accompanying site plan should be submitted to the Planning Authority along with the planning application documentation. Please ensure your submission includes everything mentioned in the checklist in the following section.

## 8. Checklist

<b>Component</b>
<p><b>Desktop study</b> – information should include local geology (bedrock and superficial), groundwater vulnerability rating, soil type, historical land use, locations of nearby water features and drainage features, locations of nearby surface and groundwater abstractions, locations of nearby wells/boreholes used as a drinking water supply, locations of other sensitive receptors in the vicinity (like protected sites). You <b>must</b> include the proposed burial rate per year and number of total burials and an explanation of how you have arrived at this figure. It may also be useful to include knowledge of the site geology by the local gravedigger.</p>
<p><b>Intrusive site investigation</b> – include full description of geology in the trial pits/ boreholes with logs prepared according to British Standard BS5930:2015. Log depth to bedrock and depth of any water strikes. A map showing location of trial pits/ boreholes within the site should be included. The number of trial pits/ boreholes should be proportionate to the size of the proposed development.</p>
<p><b>Map of proposed site layout</b> – this should only be undertaken after consideration of all the information gathered above, in conjunction with recommended cemetery planning guidelines mentioned in previous sections. Note: your site assessment may mean that some areas of your site are unsuitable for graves and should therefore be used for pathways/ car parks/ other features.</p>

## 9. References

Robin, N. S. (1996). *Hydrogeology of Northern Ireland*. London: HMSO for the British Geological Survey.

The following guidance documents are available online:

- 1) [Water Managment Unit. 2011. \*Planning Guidance note: cemeteries\* \[Online\] Northern Ireland Environment Agency. Available at: <https://www.doeni.gov.uk/sites/default/files/publications/doe/water-guidance-planning-guidance-note-cemeteries-2011.pdf> \[Accessed 4 February 2016\]](https://www.doeni.gov.uk/sites/default/files/publications/doe/water-guidance-planning-guidance-note-cemeteries-2011.pdf)
- 2) DOE. 2015. *Required Environmental Information* DOE. Available online: [http://www.planningni.gov.uk/index/advice/northern\\_ireland\\_environment\\_agency\\_guidance/required\\_environmental\\_information.pdf](http://www.planningni.gov.uk/index/advice/northern_ireland_environment_agency_guidance/required_environmental_information.pdf) [Accessed 4 February 2016]
- 3) DOE. 2015. *Water Features Survey*. DOE. Available online: [http://www.planningni.gov.uk/index/advice/northern\\_ireland\\_environment\\_agency\\_guidance/water\\_features\\_surveys.pdf](http://www.planningni.gov.uk/index/advice/northern_ireland_environment_agency_guidance/water_features_surveys.pdf) [Accessed 4 February 2016]
- 4) Young, C.P., Blackmore, K.M., Reynolds, P. and Leavens, A. (2002). *Pollution Potential of Cemeteries – R&D report P223*. Environment Agency England and Wales. Available online: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/290605/str-p223-e-e.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290605/str-p223-e-e.pdf) [Accessed 4 February 2016]
- 5) Young, C.P., Blackmore, K.M., Reynolds, P. and Leavens, A. (2002). *Amendment ‘Pollution Potential of Cemeteries’ – R&D report P223*. Environment Agency England and Wales. Available online: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/290376/sc-ho0205biph-e-e.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290376/sc-ho0205biph-e-e.pdf) [Accessed 4 February 2016]
- 6) Young, C.P., Blackmore, K.M., Leavens, A and Reynolds, P.J. (2002). *Pollution Potential of Cemeteries*. Environment Agency England and Wales. Available online: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/290607/sprp2-024-1-e-e.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290607/sprp2-024-1-e-e.pdf) [Accessed 4 February 2016] – literature review
- 7) Üçisik, A.S. and Rushbrook, P. (1998). *The impact of cemeteries on the environment and public health*. World Health Organization Regional Office for Europe Available online: [http://apps.who.int/iris/bitstream/10665/108132/1/EUR\\_ICP\\_EHNA\\_01\\_04\\_01\(A\).pdf](http://apps.who.int/iris/bitstream/10665/108132/1/EUR_ICP_EHNA_01_04_01(A).pdf) [Accessed 4 February 2016]
- 8) Buckley, C. (2012) *Graveyards and Groundwater*. International Association of Hydrogeologists – Irish Group. Available online: <http://www.iah-ireland.org/conference-proceedings/2012.pdf>. [Accessed 4 February 2016]- see pdf page 143

- 9) Institute of Cemetery & Crematorium Management. 2004 *Policy relating to shallow depth graves*. London: Institute of Cemetery & Crematorium Management. Available online: <http://www.iccm-uk.com/iccm/library/ShallowGraves.pdf> [Accessed 4 February 2016]
- 10) Hart, A. (2005). *Ammonia shadow of my former self: a review of potential groundwater chemical pollution from cemeteries*. Land Contamination & Reclamation 13(3). Available online: <http://www.eppublications.com/home/land-contamination-reclamation/volume-13>

## 10. Information sources

### **Geological Survey of Northern Ireland**

**Tel:** 028 90388462

**Website:** [www.bgs.ac.uk/gsni/](http://www.bgs.ac.uk/gsni/)

**Email:** [gsni@detini.gov.uk](mailto:gsni@detini.gov.uk)

GeolIndex, geological maps, reports and memoirs, borehole and site investigation reports

### **Northern Ireland Environment Agency**

Water Management Unit

**Tel:** 028 92623100

**Website:** [www.doeni.gov.uk](http://www.doeni.gov.uk)

**Email:** [WaterInfo@doeni.gov.uk](mailto:WaterInfo@doeni.gov.uk) or [AIL@doeni.gov.uk](mailto:AIL@doeni.gov.uk) for abstraction licences

River Basin and Protected Areas viewers, surface water and groundwater information, hydrogeological data

### **Ordnance Survey of Northern Ireland**

**Tel:** 0300 200 7804

**Website:** [www.nidirect.gov.uk/osni-mapping-helpdesk](http://www.nidirect.gov.uk/osni-mapping-helpdesk)

<http://www.nidirect.gov.uk/ordnance-survey-of-northern-ireland>

Topographical information, historical maps

### **SpatialNI**

**Website:** [www.spatialni.gov.uk/geoportal/catalog/main/home.page](http://www.spatialni.gov.uk/geoportal/catalog/main/home.page)

Historical land use database

### **Rivers Agency**

**Website:** [www.dardni.gov.uk/topics/rivers-and-flooding.htm](http://www.dardni.gov.uk/topics/rivers-and-flooding.htm)

Flow data, flood risk areas



**DOE**

Department of  
the Environment  
[www.doeni.gov.uk](http://www.doeni.gov.uk)

**NIEA Natural Heritage Division**

**Klondyke Building  
Gasworks Business Park  
Cromac Avenue  
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Malone Lower  
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BT7 2JA**

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