

Cemeteries, Burials & The Water Environment

Guidance Notes



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Overview

The Northern Ireland Environment Agency (NIEA) has a duty to protect surface water and groundwater quality. The legislative framework for this is detailed in the Water (Northern Ireland) Order 1999 and the Groundwater Regulations (Northern Ireland) 2009. In addition to our own environmental protection work, NIEA also acts as a consultee for Planning Service, responding to and advising on matters relating to environmental protection during development.

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.

Where NIEA are not provided with this information along with a planning application, we will request the work be undertaken and a report submitted before we will make comment. This may hold up the consultation process.

This guidance note is intended to inform those responsible for developing such sites about the issues which should be considered. In addition, further sources of information have been listed.

Why is it important to protect groundwater?

Groundwater has three major uses in Northern Ireland:

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

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.

How can cemeteries contaminate groundwater?

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.

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.

What information do NIEA require before they can assess if a cemetery development/ extension will pose a threat to groundwater?

As said before we will require a site investigation and risk assessment of the site all presented in a written report. This report should contain:

- A desktop study (see information below);
- Intrusive site investigation;
- Risk assessment; and
- The proposed layout of the site (this is the final stage as the above tasks will inform the site planning)

Desktop Study

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 Appendix A). This allows for initial consideration of the potential issues and risks associated with the specific site based upon geological setting, water quality and proposed burial rate per annum.

For existing sites, important local knowledge about the ground/geological conditions can be obtained through discussion with the local grave digger.

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 the Environment Agency for England and Wales (2002) guidance document.

Intrusive Site Investigation

The absolute minimum requirement for a site investigation should normally consist of a site walkover and the digging of trial pits.

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. This will allow features to be mapped for submission along with the report and accompanying planning application.

The trial pits should be excavated to a depth of between 0.5 – 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.

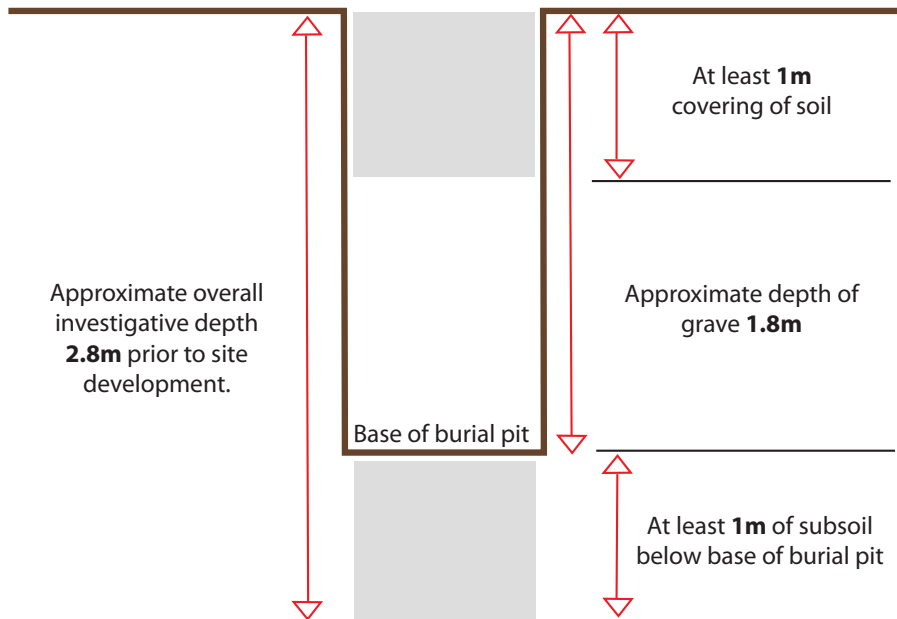
Other points for consideration include:

- 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?

Photographs of the trial pits should be included in the final written report.

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

Diagram to illustrate total investigation depth



Risk Assessment

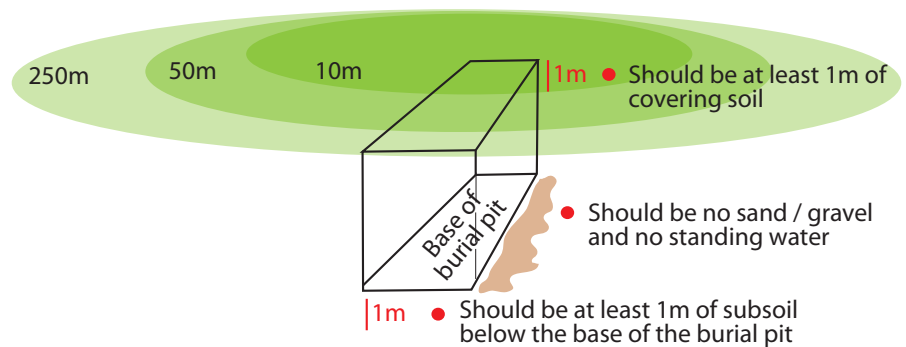
The final risk assessment will be based upon data and knowledge gained from the desktop assessment and the intrusive site investigation. The scope of the risk assessment required will be dependent on site specific factors such as the local vulnerability of groundwater and the scale of the site proposed. Further guidance on risk assessment can be found in the Environment Agency for England and Wales (2002) guidance document.

Guidelines for planning cemeteries

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.

Diagram to illustrate above points



- 10m from any field drain
- 50m from any watercourse or spring / well / borehole
- 250m from any spring / well / borehole used for drinking water

The completed written report and accompanying site plan should be submitted to Planning Service along with the planning application documentation. Please ensure your submission includes everything mentioned in the checklist on the follow page.

Checklist

Component	Tick
<p>Desktop study – 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 must include the proposed burial rate per year 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>Intrusive site investigation – Include full description of geology in the trial pits/boreholes with logs and photographs to prove this. 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>Map of proposed site layout – 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>	

References

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

C P Young, K M Blackmore, P Reynolds and A Leavens (2002) *Pollution Potential of Cemeteries*. R&D Technical Report P223. Environment Agency for England and Wales.

Scottish Environment Protection Agency and Sustainable Development, Scottish Office (1996) *Environmental Policy Number 19 – Groundwater Protection Policy for Scotland, J – Cemetery Development and Green Burial* [Online]. www.sepa.org.uk/pdf/groundwater/policy/19_J.pdf

National Groundwater and Contaminated Land Centre. *'Assessing the groundwater pollution potential of cemeteries (3rd Ed)'*. Environment Agency for England and Wales. Product code: SCHO0404BGLA-E-E

Appendix A –Information Sources

Geological Survey of Northern Ireland

Tel: 028 9038 8462 www.bgs.ac.uk/gsni

Geological maps, reports and memoirs, borehole and site reports database

Northern Ireland Environment Agency, Water Management Unit

Tel: 028 92623100 www.ni-environment.gov.uk

E-mail: waterinfo@doeni.gov.uk

Surface water and groundwater quality information, hydrogeological data

Ordnance Survey of Northern Ireland

Tel: 028 90255755 www.osni.gov.uk/index2.htm

Topographical information, historical maps

Rivers Agency

www.riversagencyni.gov.uk/index.htm

Flow data, flood areas

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