



Department of  
**Enterprise, Trade  
and Investment**  
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# **Geological Survey of Northern Ireland**

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# **Borehole and Water Well Drilling**

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**Including Information for  
Geophysical and Geochemical Surveys**

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# Procedures for the notification and recording of all boreholes and wells to be drilled and constructed within Northern Ireland.

Anyone who intends to drill a borehole or sink a shaft or well more than 15m deep, anywhere in Northern Ireland, is required, by law, both to inform the Geological Survey of Northern Ireland (GSNI) beforehand and keep a record of the borehole/shaft constructed. The requirement to provide such information is based upon provisions contained in the Minerals (Miscellaneous Provisions) Act 1959.

This leaflet outlines the procedure for the notification and recording of all boreholes and wells to be drilled and constructed within Northern Ireland. It explains:

- why it is important to notify the GSNI of intention to drill;
- why it is critical to record borehole details;
- the type of information required and how it can be recorded;
- and the benefits of complying with the requirements.

Similar requirements to provide information apply to anyone carrying out geochemical or geophysical investigations.

The Geological Survey of Northern Ireland is an office within the Department of Enterprise, Trade and Investment (DETI). The GSNI provides an information and advisory service for government, the commercial sector and the general public. The service is based upon the systematic survey and collection of earth science data. The GSNI maintains the largest and most comprehensive collection of earth science information and knowledge in Northern Ireland. The information and advice the GSNI provides assists a wide variety of economic development and environmental protection issues including locating mineral deposits, assessing

hydrogeological conditions, predicting ground conditions at construction sites and determining potential impacts from major infrastructure projects.

The GSNI's advisory service is continuously improved by access to the most recent information available. Boreholes provide key 'ground truth' information on local conditions. This is essential for confirming and improving our understanding of the geology and hydrogeology in any location.

A large database of borehole records has already been established at the GSNI and continues to grow. Both the database and interpretation of data contained within it provide a substantial resource that can be accessed by anyone. It will be of most interest to those working in the civil engineering, mineral exploration, site investigation and water resource development professions. It can also be used to improve estimates of depth of drilling and prediction of ground conditions resulting in more efficient planning and accurate costing of work. To ensure the continuing growth of the database, the GSNI welcomes additional information available from all drilling and related work (irrespective of the depth penetrated).

## **Notification of intention to drill/survey**

For major borehole drilling or geological surveying projects you should inform the GSNI by letter, fax or e-mail (contact details given below) of the nature and location of works at least one week prior to work beginning.

## **Record Keeping**

The type of information that should be recorded when drilling a borehole or waterwell is shown in Table 1. This information should be used as a guide

For major borehole drilling or geological surveying projects you should inform the GSNI by letter, fax or e-mail of the nature and location of works at least one week prior to work beginning.

DATA COLLECTION		
Borehole Drilling	Geochemical Surveys	Geophysical Surveys
Depths and description of the superficial deposits/bedrock types encountered	Date of survey	Date and time of survey
Exact location of borehole	Sample locations	Location data
Details of any lining installed within the borehole	Survey and sampling methods	Geophysical equipment and recording parameters
Water strike, rest levels and water quality observations	Analysts and analytical methods used, including reference materials	Processing parameters
Any fossils or mineral bands encountered	Analytical results	Raw and processed results
Pumping test data		

**Table 1. Data collection Requirements**

and any additional information will be welcomed where available. Completed records (in electronic format where available) should be sent to the GSNI as soon as possible after completion of drilling. If required, upon written request, arrangements can be made to keep information confidential.

### Sample Collection

By law the GSNI is permitted to acquire samples. On certain occasions you may be asked to collect samples on the GSNI's behalf. Arrangements for this will be agreed with you either before or during drilling.

Where boreholes are cored the cores should be contained within core boxes, stored in a regular order and marked at intervals with depth of origin. Gaps, in which cores are absent or imperfect, should be marked with an indication of the extent of missing core, and such fragmentary specimens as have been obtained where the core is imperfect should be retained in place. Cores and specimens should be protected from disintegration.

### Geochemical and Geophysical Surveys

Anyone carrying out a geochemical or geophysical survey is required to notify the GSNI, if possible before the survey begins. For geochemical and geophysical surveys you should submit a report containing the details shown in Table 1.

The information given in Table 1 should be used as a guide and the exact details of the information to be submitted will vary according to the survey type (seismic, gravity, magnetic, VLF, borehole geophysics etc.). Data should be supplied in the industry standard format on both analogue and digital media.

### Contact Details

All correspondence and contact with the GSNI should be addressed in the first instance to:  
 Data Manager  
 Geological Survey of Northern Ireland  
 Colby House, Stranmillis Court, Belfast BT9 5BF  
 Tel: 028 9038 8462; Fax: 028 9038 8461  
 e-mail: [gsni@detini.gov.uk](mailto:gsni@detini.gov.uk)

# Water Supply Borehole Construction and Headworks: Guidance Notes

## OVERVIEW

Construction of a borehole for water supply purposes is a specialised engineering project and, as such, appropriate consideration should be given to both the design and materials to be used. A properly designed and constructed borehole will help ensure both the success of the borehole as an adequate supply of water as well as minimising the risk of local pollution affecting the source. The skills and knowledge of the drillers can be used to advise clients on factors they should consider when commissioning a borehole.

Where a borehole is to be used for human supply and/or as part of any aspect of the food chain (e.g. dairy washing) particular consideration should be given to its location, design and associated well-head protection requirements.

A borehole can act as a rapid pathway between the surface/near surface and groundwater at depth via which pollutants can bypass the protective layers of the natural soils and sub-soil. If polluted surface water drains down the borehole this may jeopardise not only the water supply itself but may also affect nearby wells and other water dependent features. It should be remembered that it is a criminal offence to cause or knowingly permit groundwater to become polluted, with severe penalties (£20,000 maximum fine in a magistrates court and/or imprisonment on indictment). The owner, and potentially the driller, may be liable if groundwater becomes polluted.

The following guidance is given to assist consideration of the requirements for installation of a borehole source. References to other, more comprehensive, guidance are included at the end.

## BOREHOLE LOCATION

Many potentially polluting activities have advisory or legislative constraints with respect to their operation or application within proximity of an existing groundwater source. An example of this is in the Groundwater Regulations (Northern Ireland) 1998 advisory note issued by DoE on Disposal of List I and List II substances to land ([www.ehsni.gov.uk](http://www.ehsni.gov.uk)), which states disposal sites should be at least 50 metres away from any borehole, well or spring. For new boreholes such constraints should be borne in mind and a precautionary approach taken to choosing a borehole location. In general a borehole should be upslope and as remote as possible from any potential source of pollution including:

- Fuel, chemical, slurry or silage tanks or areas where these substances are stored or held;
- Septic tanks and effluent disposal drains;
- Sewers or below-ground fuel pipes;
- Poorly drained areas or areas subject to contaminated drainage run-off.

## BOREHOLE CONSTRUCTION

With respect to protecting groundwater quality at the borehole site, the local geological and hydrogeological conditions encountered will generally dictate the final design of the borehole and how it is constructed. However the design and construction phase should incorporate appropriate elements and practices aimed at protecting the water supply from potential influxes of contaminated water. Key elements of this will be decisions on materials and depth of casing and standard of grouting around the casing.

A properly designed and constructed borehole will help ensure both the success of the borehole as an adequate supply of water as well as minimising the risk of local pollution affecting the source.

#### **HEADWORKS COMPLETION**

For many boreholes constructed, completion below ground, within a manhole chamber is the preferred option for reasons such as land shortage or to avoid visual intrusion. Whilst this may have some limited benefits in physically protecting the well-head from disturbance by surface activity, it can be a poor option from a source protection point of view. Neglect and poor well-head completion can lead to the well head chamber becoming a collection point for surface water drainage with subsequent migration of polluted water down the borehole.

Overall it is considered that, wherever possible, well headworks should be completed above ground level, especially in high risk situations, such as industrial sites and farmyards. In such cases appropriate protective surrounds will be required to protect the borehole headworks against physical disturbance. For situations where below ground completion cannot be avoided, the very highest well-head completion standards should be employed and a maintenance programme recommended.

#### **OTHER GUIDANCE DOCUMENTS**

Environment Agency.

Water supply borehole construction and headworks.  
Guide to good practice.  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Environment Agency.

Decommissioning redundant boreholes and wells.  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Environment and Heritage Service.

Is your private water supply safe?  
[www.ehsni.gov.uk](http://www.ehsni.gov.uk)

Environment and Heritage Service.

Policy and practice for the protection of groundwater in Northern Ireland.  
[www.ehsni.gov.uk](http://www.ehsni.gov.uk)

Scottish Environmental Protection Agency.

Water supply borehole location, construction and headworks.  
Guide to good practice.  
[www.sepa.org.uk](http://www.sepa.org.uk)

# Section 4 of the Minerals (Miscellaneous Provisions) Act (Northern Ireland) 1959 [1959 c. 17] as amended by paragraph 5 of Schedule 3 to the Mineral Development Act (Northern Ireland) [1969 c. 35 (NI)]

## **Section 4 of the Minerals (Miscellaneous Provisions) Act (Northern Ireland) 1959 [1959 c. 17] as amended by paragraph 5 of Schedule 3 to the Mineral Development Act (Northern Ireland) [1969 c. 35 (NI)]**

[1] Where a person propose:

- (a) to undertake mineral prospecting or development work, or
- (b) for any other purpose to sink a shaft, borehole or well or make an excavation intended to reach a depth of more than fifty feet below the surface or to extend any existing shaft, borehole, well or excavation (whether or not it has already reached that depth) to reach any greater depth beyond fifty feet,

he shall before commencing the work or, as the case may be, the sinking, excavation or extension, serve on the Ministry\* at least two weeks notice in writing of his intention to do so or such shorter notice as the Ministry may permit in writing.

[2] A person who undertakes mineral prospecting or development work shall keep a record thereof, and a person who, for any other purpose, sinks a shaft, borehole or well or makes an excavation intended to reach a depth of more than fifty feet below the surface or extends any existing shaft, borehole, well or excavation as aforesaid shall, unless the Ministry in writing otherwise directs, keep a journal thereof, and every such person shall keep for a period of not less than two months or such longer period as the Ministry may so direct:

- (a) such specimens of minerals as may have been obtained in the course of the work, or
- (b) such specimens of the strata passed through as may have been obtained in the course of the sinking or extension of the shaft, borehole or well, or the making or extension of the excavation, either as cores or cuttings, as the Ministry may direct.

[3] An authorised officer shall be entitled at all reasonable times to do all or any of the following things, that is to say:

- (a) have free access to:
  - (i) all parts of the place where any mineral prospecting or development work is being undertaken, or
  - (ii) any shafts, boreholes, wells or excavations such as is mentioned in subsection [1], or
  - (iii) any specimen such as is mentioned in subsection [2];
- (b) inspect and take copies of records of such work or journals of such shafts, boreholes, wells or excavations;
- (c) require the person undertaking any such work or sinking or extending any such shaft, borehole or well, or making or extending any such excavation, to supply such other information (including, where the circumstances permit, information as to the proposed conduct of the operations and as to the grade of deposit, and estimated reserves of minerals) as the authorised officer may consider reasonably necessary;
- (d) inspect all specimens obtained or kept as mentioned in subsection [2];
- (e) take samples of any such specimens.

[4] If any person undertaking any such work or sinking or extending any such shaft, borehole, or well, or making or extending any such excavation as aforesaid serves notice

in writing on the Ministry requesting the Ministry to treat as confidential any copies of records or journals or any specimens of minerals or strata taken by, or any information supplied to, an authorised officer under subsection [3], the Ministry, until the expiration of such period not exceeding five years from the date on which the copies, or as the case may be, the specimens were so taken, or the information was so supplied, as may be specified in the notice, shall not allow the copies or specimens to be shown, or the information to be disclosed, to any person who is not an officer of the Ministry except with the consent of the first- mentioned person.

[5] The period mentioned in subsection [4] may, by notice served as so mentioned before the expiry of that period requesting that the period be extended, be extended for an additional period not exceeding five years, but no further.

[6] If any person undertaking any mineral prospecting or development work or sinking or extending any shaft, borehole, or well, or making or extending any excavation, such as is mentioned in subsection [1]:

- (a) fails to comply with the obligations imposed by or under this section, or
- (b) in any record or journal required to be kept, or in supplying any information, under this section knowingly or recklessly makes any entry or statement which is false in a material particular, or
- (c) wilfully obstructs an authorised officer in the exercise of any of the powers conferred on him by this section, he shall be guilty of an offence and shall be liable on summary conviction to a fine not exceeding fifty pounds.

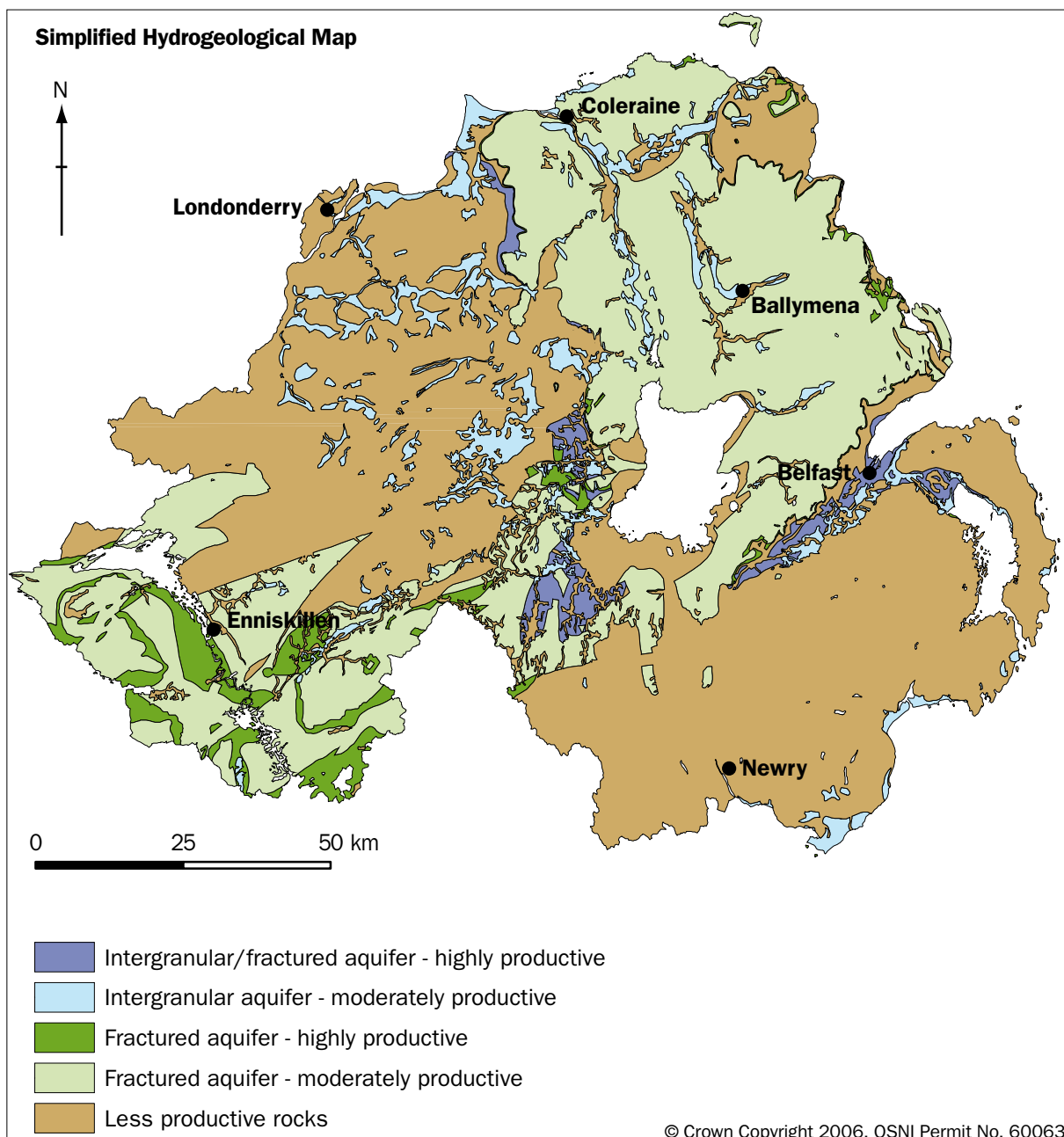
[7] Where any person contracts to undertake on behalf of any other person mineral prospecting or development work or to sink or extend a shaft, borehole or well or make or extend an excavation and the execution of the work is under the control of the contractor, references in this section to a person undertaking the work or sinking or extending the shaft, borehole or well or making or extending the excavation shall, where those references occur in subsection [1], be construed as references to the contractor and, where they occur in other provisions of this section, be construed as including references both to the contractor and that other person.

[8] In this section:

- (a) any reference to mineral prospecting or development work includes a reference to geophysical or geochemical investigations of any kind, whether conducted by means of boring or otherwise howsoever;
- (b) any reference to a record, in relation to mineral prospecting or development work, which includes the sinking or extension of a shaft, borehole or well, or the making or extension of any excavation, intended to reach a depth of more than fifty feet includes a reference to a journal of that sinking or making or extension; and
- (c) "excavation" includes "tunnel".

\* These regulations are now vested with the Department of Enterprise, Trade and Investment

Please remember to notify the GSNI and submit borehole and survey records upon completion.



#### Contact Details

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Your views on this  
document are welcome.

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