GeoReports

British Geological Survey

Fenny Bentley
Near Ashbourne
Derbyshire
United Kingdom

Landslide Assessment:

This report is for people carrying out preliminary site assessments or who have a general interest in the landslides of a particular area.

The report, prepared by BGS geologists, is based on analysis of:

- Geology maps from the BGS Digital Geological Map of Great Britain
- Records in the BGS National Landslide Database
- Maps and other information held in the National Geoscience Data Centre (NGDC)
- Hazard Potential maps from GeoSure
- Relevant photographs available from the National Archive of Geological Photographs, GeoScenic (http://geoscenic.bgs.ac.uk)
- Relevant published literature

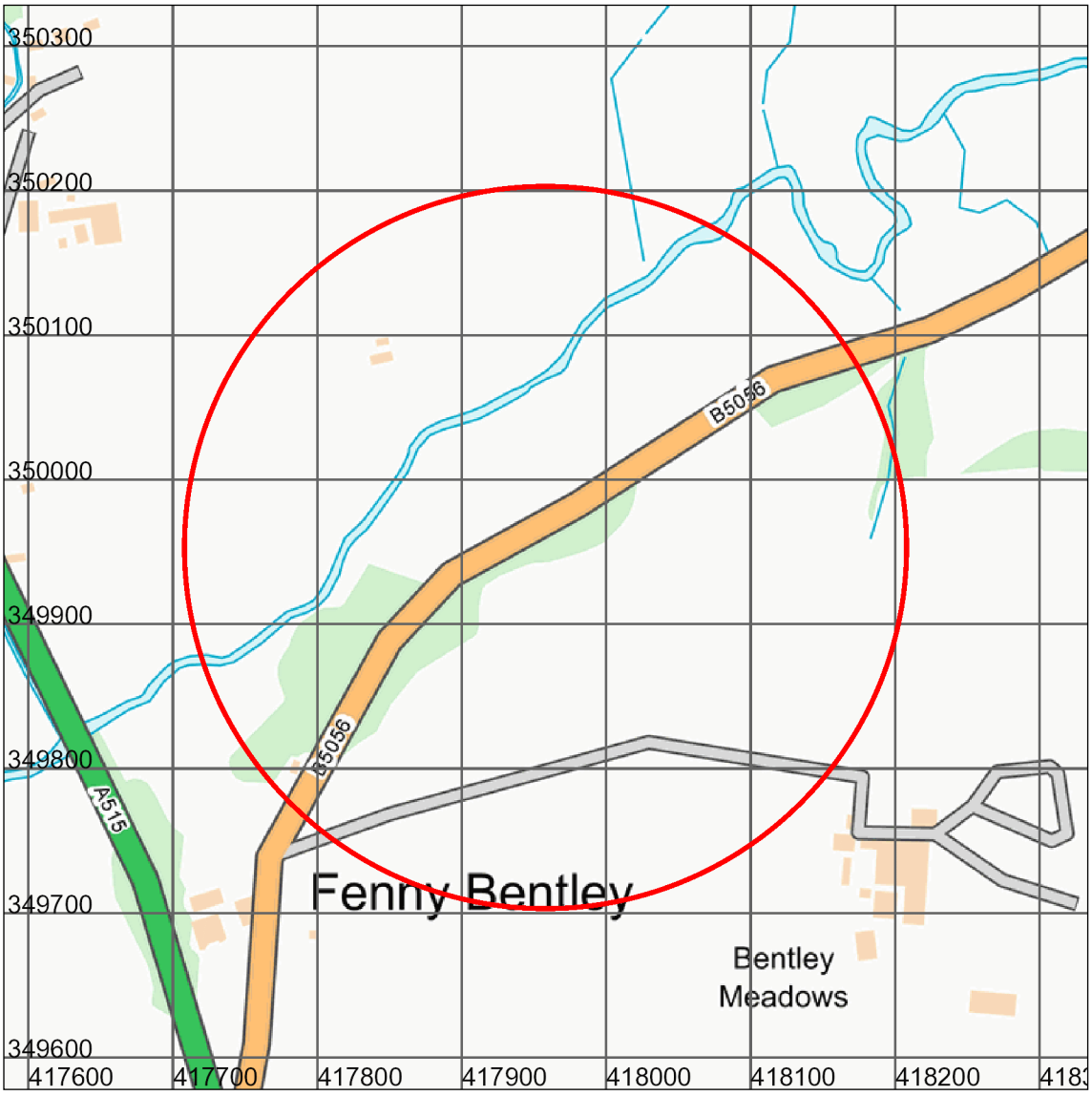
This report describes the rock types that might be encountered at the surface or at 'rockhead' beneath the specified site (meaning the bedrock lying directly beneath the soil layer or beneath superficial or landslide deposits). The report does not, however, consider the hydrogeology at the site: this would be described by other GeoReport modules.

Note that for some sites, the latest available records may be old, and while every effort is made to place the analysis in a modern geological context, it is possible that in some cases the detailed geology or landslide at a site may differ from that described.

Report Id: ***GR_999999/1***

Client reference:

Search location



Search location indicated in red

Site Address:
Fenny Bentley
Near Ashbourne
Derbyshire
UK

Area centred at: 417958,349953
Radius of site area: 250 metres

Landslide Assessment

A landslide is a relatively rapid outward and downward movement of a mass of rock or soil on a slope due to the force of gravity. A slope is under stress due to the force of gravity but will not move if its strength is greater than this stress. If the balance is altered so that the stress exceeds the strength, then movement will occur. The stability of a slope can be reduced by removing ground at the base of the slope, increasing the water content of the materials forming the slope or by placing material on the slope, especially at the top. Property damage by landslides can occur through the removal of supporting ground from under the property or by the movement of material onto the property.

This report describes landslides that occur partly or wholly within the defined search area based on the information available to BGS. The search area is the extent of the location map. Landslides, by definition, are masses of soil, rock or debris that have moved, or are still in the process of moving, down slope. It is therefore possible that the mass may have moved, or the slope may have been remediated, since the survey was carried out and the data were recorded in the National Landslide Database. This is also true for the landslides mapped on BGS paper and digital maps.

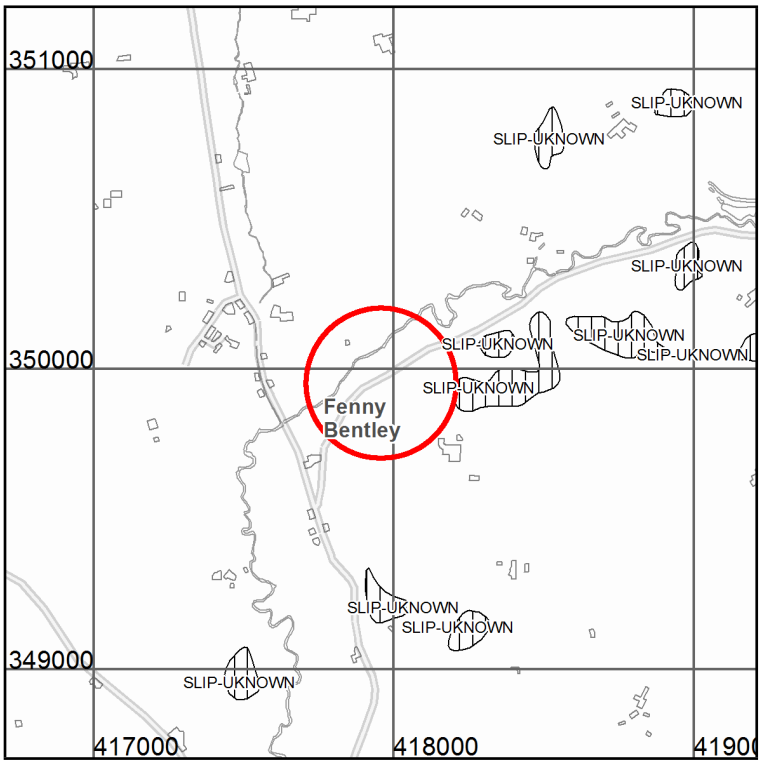
Landslides are named in the National Landslide Database according to the source of information. If the landslide was named by other databases, published work (e.g. journal publication, report), newspaper or other media, then that name has been retained. If the landslide has been taken from British Geological Survey geology maps, the landslide is named according to the nearest available landmark. In some areas, particularly remote locations, this can be for example the name of a woodland, hill, road, settlement, cliff, farm or any other building on the Ordnance Survey map. The landslide names are nominal only and in no way reflect the size, activity or nature of the landslide(s).

The data, information and related records supplied by BGS can only be indicative and should not be taken as a substitute for specialist interpretations, professional advice and/or detailed ground investigations. The data must not be used for insurance purposes. You must seek professional advice before making technical interpretations on the basis of the materials provided.

For more information on landslides see www.bgs.ac.uk/landslides

Landslide Deposits

These include natural deposits formed by sliding and other mass-movement of soils and rocks on hill slopes (landslide deposits are a type of 'Mass Movement Deposits'). An extract of the geology map around your site is provided in this section, taken from the BGS Digital Geological Map of Great Britain at 1:50 000 scale (DiGMapGB-50). The irregular outlines marked 'SLIP' indicate the extent of the landslide deposits (that is, not including the landslide back scarp, if any) observed at the time of the geological survey.



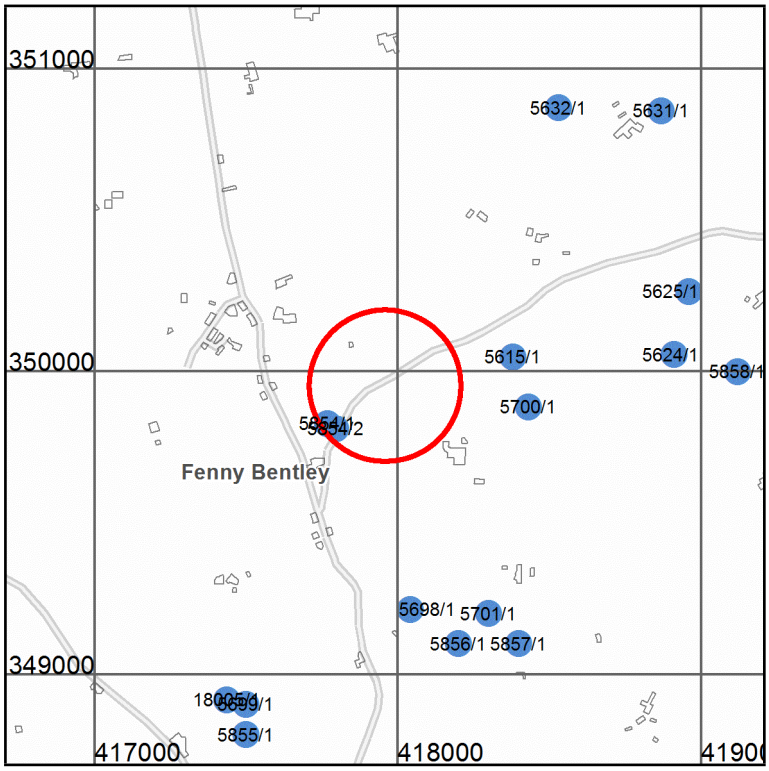
Scale: 1:25 000 (1cm = 250 m)
Search area indicated in red

Key to Landslide deposits:

Map colour	Computer Code	Rock name	Rock type
	SLIP-UKNOWN	LANDSLIDE DEPOSITS	UNKNOWN/UNCLASSIFIED ENTRY

BGS National Landslide Database

The National Landslide Database has been developed by the British Geological Survey. It is the most extensive source of information on landslides in Great Britain with over 17 000 records of landslide events.



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Scale: 1:25 000 (1cm = 250 m)
Search area indicated in red

The point symbols show whether the landslide record has been validated by BGS as follows:

●	Y	The Landslides Team have validated this landslide location to within a range of accuracy
●	N	The Landslides Team is yet to validate this landslide location
○	U	The Landslides Team has tried to find information about this landslide but the original reference material is unavailable

The point numbers refer to the NLD ID combined with the Survey No. in the table overleaf

What do the symbols mean?

Each landslide within the National Landslide Database is identified by a National Landslide Database ID number and a point location, as shown on this map. The National Landslide Database ID number represents an individual survey of a landslide, rather than just the landslide itself. This is because there could be several phases of movement within or extensions to the same landslide, particularly if it is a large and complex one. **Subsequent surveys of the same landslide may be recorded in the database with the same National Landslide Database ID number but with a new Survey number.** The point symbols at the designated location do not reflect the size and shape of the corresponding landslide, but just denote the recorded presence of a landslide within a range of accuracy. Where possible, each point is located at the highest point on the landslide backscarp feature. This is not always possible to locate as, for example, backscarp information is often omitted from older geological maps. In these cases, the highest point on the mapped landslide polygon is used. If this information is not available, the point is located approximately.

In the 1990s, BGS acquired approximately 8 500 landslide records from the then Department of the Environment (DoE). These records had been compiled by Geomorphological Services Limited (GSL) and involved their staff searching through the literature, including BGS maps and reports, to gain as much information as possible about landslides in Great Britain.

The location of each of the landslides in the DoE database was recorded as either a six-figure grid reference (1 km accuracy) or an eight-figure grid reference (100 m accuracy) thereby potentially incorporating a considerable locational inaccuracy. The BGS Landslides Team has been working for several years to re-locate these landslides with more accuracy and to remove duplicates or incorrect entries inherited from the DoE database. This process is still underway and will take several more years to complete. The BGS Landslides Team has also added information on British landslides from other sources, including dedicated field surveys.

Why are there National Landslide Database Points but no landslides on the geological map?

The geological map is just one of the many sources of information that populates the National Landslide Database (see below: Where have the data come from?). The geological maps are a time-stamped interpretation of the ground seen at the time of survey; any landslides that have occurred since that time will not be captured unless a bespoke survey has been commissioned and published on a later version of the digital geological map. The National Landslide Database holds the most up-to-date information on landslides in Great Britain.

National Landslide Database records of landslides

QA Check	NLD ID	Survey No	Name	Location	Easting	Northing	+/-m	References
Y	5615	1	Bradbourne 1	Fenny Bentley, Derbyshire, England	418381	350047	10	British Geological Survey DigMap50. Tile EW124_ashbourne_v4, 4.16. 20/09/2007
Y	5624	1	Bradbourne 2	Nr Fenny Bentley, Derbyshire, England	418912	350055	10	British Geological Survey DigMap50. Tile EW124_ashbourne_v4, 4.16. 20/09/2007
Y	5625	1	Bradbourne 3	Nr Lea Hall, Derbyshire, England	418960	350264	10	British Geological Survey DigMap50. Tile EW124_ashbourne_v4, 4.16. 20/09/2007
Y	5631	1	Choughriddens 2	Nr Lea Hall, Derbyshire, England	418870	350860	10	British Geological Survey, DiGMapGB50, 20008, Tile EW124_ashbourne_v5, v. 5.18, 22/05/2008 1980, British Geological Survey, Sheet SK15SE, 1:10,000
Y	5632	1	Woodeaves	Nr Lea Hall, Derbyshire, England	418530	350870	10	British Geological Survey, DiGMapGB50, 20008, Tile EW124_ashbourne_v5, v. 5.18, 22/05/2008 1980, British Geological Survey, Sheet SK15SE, 1:10,000
Y	5698	1	Fenny Bentley 1	Derbyshire, England	418041	349213	10	British Geological Survey, DiGMapGB50, 20008, Tile EW124_ashbourne_v5, v. 5.18, 22/05/2008 1983 British Geological Survey Sheet 124 Ashbourne 1:50,000 1980, British Geological Survey, Sheet SK14NE, 1:10,000
Y	5699	1	Redhouse	Derbyshire, England	417438	348962	10	1980, British Geological Survey, Sheet SK14NE, 1:10,000 1980, British Geological Survey, Sheet SK14NE, 1:10,000 British Geological Survey, DiGMapGB50, 20008, Tile EW124_ashbourne_v5, v. 5.18, 22/05/2008

QA Check	NLD ID	Survey No	Name	Location	Easting	Northing	+/-m	References
Y	5700	1	Fenny Bentley 5 (previously 2)	Derbyshire, England	418431	349883	10	British Geological Survey DigMap50. Tile EW124_ashbourne_v5, v.5.18.20/05/2008 1983 British Geological Survey Sheet 124 Ashbourne 1:50,000 1980 British Geological Survey Sheet SK14NE 1:10,560
Y	5701	1	Fenny Bentley7 (previously 3)	Derbyshire, England	418311	349290	10	1980, British Geological Survey, Sheet SK14NE, 1:10,000 1983 British Geological Survey Sheet 124 Ashbourne 1:50,000
Y	5854	1	Fenny Bentley 2 (previously 1)	Derbyshire, England	417769	349828	10	British Geological Survey, DiGMapGB50, 20008, Tile EW124_ashbourne_v5, v. 5.18, 22/05/2008 1980, British Geological Survey, Sheet SK14NE, 1:10,000
Y	5854	2	Fenny Bentley 2 (previously 1)	Derbyshire, England	417796	349810	10	http://www.bgs.ac.uk/science/landUseAndDevelopment/landslides/fennyBentley.html 1980, British Geological Survey, Sheet SK14NE, 1:10,000 British Geological Survey, DiGMapGB50, 20008, Tile EW124_ashbourne_v5, v. 5.18, 22/05/2008 http://www.ashbournenewstelegraph.co.uk/ashbournenewstelegraph-news/DisplayArticle.asp?ID=466421
Y	5855	1	Redhouse 3	Derbyshire, England	417436	348791	10	1980, British Geological Survey, Sheet SK14NE, 1:10,000
Y	5856	1	Fenny Bentley 3 (previously 1)	Derbyshire, England	418258	349196	10	British Geological Survey, DiGMapGB50, 20008, Tile EW124_ashbourne_v5, v. 5.18, 22/05/2008 1980, British Geological Survey, Sheet SK14NE, 1:10,000
Y	5857	1	Fenny Bentley 6 (previously 2)	Derbyshire, England	418367	349153	10	1980, British Geological Survey, Sheet SK14NE, 1:10,000

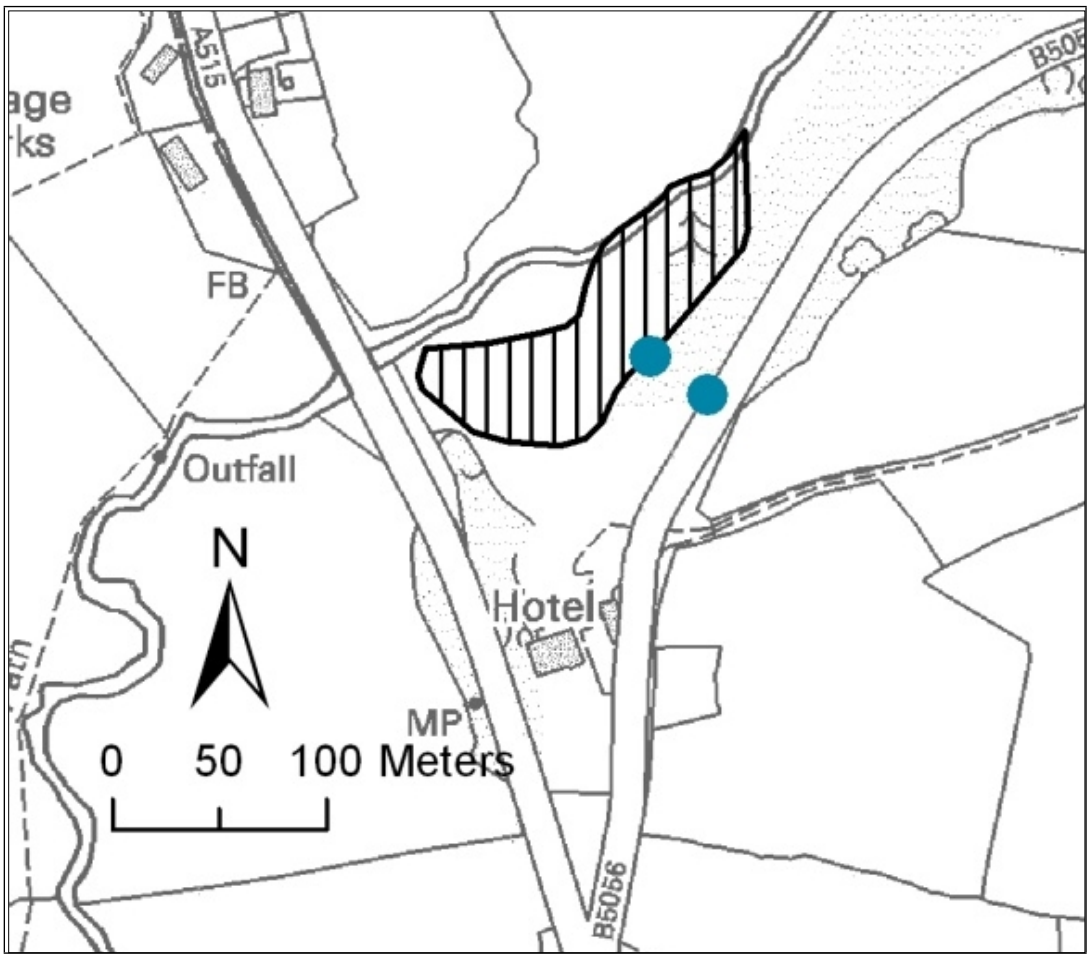
QA Check	NLD ID	Survey No	Name	Location	Easting	Northing	+/-m	References
Y	5858	1	Fenny Bentley 8 (previously 3)	Derbyshire, England	419121	349999	10	1980, British Geological Survey, Sheet SK14NE, 1:10,000
Y	18005	1	Redhouse 1	North of Ashbourne, Debryshire, England	417437	348915	10	British Geological Survey field slip SK14NE

See the map on the previous page for the locations of National Landslide Database ID (NLD ID).

Most of the landslides recorded in the BGS National Landslide Database in this search area were originally mapped by BGS and are shown on our published 1:50 000 scale geological maps extracts from which are presented in the “Landslide Deposits” map on page 4. Some small landslides are not included in this dataset because they are cartographically too small to show at that scale, but they are included in the larger 1:10 000 scale dataset. The following landslide relevant to the search radius is extracted from the 1:10 000 scale data:

5854/1 and 5854/2 ‘Fenny Bentley 2 (previously 1)’
The National Landslide Database contains two surveys of the same landslide. The first survey (5854/1) was carried out at the time of mapping in 1980. The second survey (5854/2) was carried out in 2009 after the upper part of the landslide was reactivated and moved.

This landslide is not included on the 1:50 000 scale map seen on page 4 because it is too small to represent cartographically at this scale. The linework from the 1:10 000 scale map is included below showing the extent of this landslide in 1980; this landslide has now enlarged to include the edge of the road and database point 5854/2.



Location and extent of 5854/1 and 5854/2 'Fenny Bentley 2 (previously 1)' landslide surveys

After a period of wet weather in August 2009, part of this landslide was reactivated and began to move again. It became larger and damaged the B5056 road that runs at top of the landslide. The road is also coincident with the line of a fault in the Bowland Shale Formation and this line of weakness may have contributed to the failure. A walk-over survey was carried out by BGS and fresh landslide features were surveyed. These included mud flows that were mostly seen in the upper part of the slope, below the road. There is a river at the toe of the landslide that is continually removing material from the base of the slope, contributing to the landslide movement. This erosion probably contributed to the reactivation of an older and larger rotational landslide. A brief summary and more photographs of this landslide can be found on the BGS website: www.bgs.ac.uk/landslides/fennyBentley.html

Damage to the B5056 road caused by the reactivation of part of the existing landslide

Where have the data come from?

Most of the landslide data have come from BGS geological maps. Data from various other sources, listed here, have also been included in the database. Bibliographic references to such sources are included in the database, as shown in the table above.

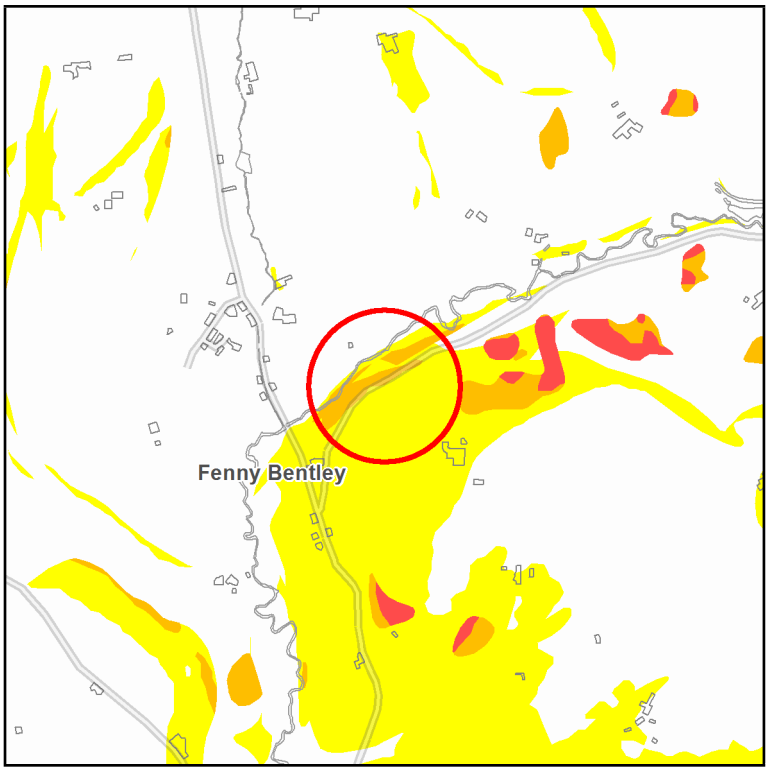
- BGS published paper geological maps
- DiGMapGB-50 and DiGMapGB-10 (BGS digital geological maps)
- BGS memoirs and sheet explanations
- BGS reports
- Journal articles, magazines, etc
- Non-BGS reports
- Local authority records
- Media reports e.g. newspapers, radio, television, web pages
- Inherited databases e.g. DoE database

Where can I obtain the references given in the table?

- BGS cannot provide any of the source references free of charge
- Paper geological maps at 1:50 000 and 1:10 000 scale and the accompanying memoirs or sheet explanations are available to purchase through the BGS Shop. Digital map data are available to purchase through enquiries@bgs.ac.uk, or may be viewed online, free of charge for non-commercial use at http://maps.bgs.ac.uk/geologyviewer.
- BGS memoirs and sheet explanations can be purchased through the BGS Shop, or viewed in the BGS Library.
- Some BGS reports may not be available due to confidentiality
- Journal articles and magazines cannot be provided free of charge but may be obtained through the BGS Library, local libraries, university libraries, online science libraries or the British Library
- Non-BGS reports – BGS cannot provide these without written consent from the authors
- Local authority records cannot be obtained through BGS. Please contact the appropriate local authority.
- Media reports cannot be obtained through BGS. They may still be available online or the publisher or broadcaster can be contacted direct to request the report

Maps of potential for natural landslide

The following map shows where significant natural ground instability due to landsliding could occur. The indicative implications are shown in colour and are described in the key. Please note that a landslide is reported as potentially significant only if it lies at least partly within the search area.The unshaded (white) areas on the map (levels A, B or 'No hazard') represent areas where the conditions that cause natural ground movements due to landslide are considered to be absent or unlikely to be significant. This does not take into account artificial drainage or man made changes to the ground such as buildings or retaining walls.



Search area indicated in red

Key to Landslide Hazard:

Level	Hazard rating	Advice for public	Advice for specialist - compressible
C	Possibility of slope instability problems after major changes in ground conditions.	Ask about implication for stability if large changes to drainage or excavations take place near to buildings.	**New build** – Consider possibility of trench side or slope movement during excavations, or consequence of changes to drainage. Possible increase in construction cost to remove possibility of potential slope stability problems. **Existing property** – No significant increase in insurance risk due to natural slope instability problems.
D	Significant potential for slope instability with relatively small changes in ground conditions.	Avoid large amounts of water entering the ground through pipe leakage or soakaways. Do not undercut or place large amounts of material on slopes without technical advice.	**New build** – Assess slope stability of site and consequences of excavation, loading and water content changes during and after construction. **Existing property** – Probable increase in insurance risk due to natural slope instability after changes to ground conditions such as a very long, excessively wet winter.
E	Very significant potential for slope instability. Active or inactive landslides may be present.	Seek expert advice about stability of the ground and its management to maintain and increase its stability.	**New build** – Slope stability assessment necessary, special design may be necessary, construction may not be possible. **Existing property** – Significant increase in insurance risk in some cases. Site-specific consideration is necessary to separate cases where landslide are stabilised or ancient and stable from those that may be active or may fail.

The assessment of potential landslide hazard refers to the stability of the present land surface. It does not encompass a consideration of the stability of new excavations.

Geological map extracts

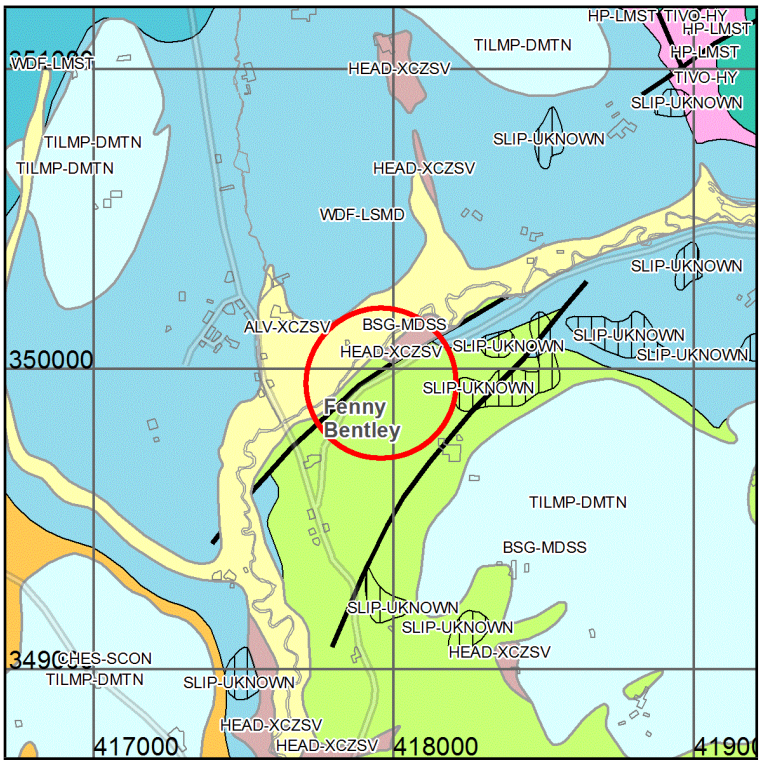
This section provides an extract of the geology map around your site, taken from the BGS Digital Geological Map of Great Britain at 1:50 000 scale (DiGMapGB-50). This map shows the surface elements of the four main layers of geology that may be present in an area – **artificial (man-made) deposits**, **landslide deposits**, **superficial deposits** and **bedrock**.

More information on DigMapGB-50 and how the various rock layers are classified can be found on the BGS website (www.bgs.ac.uk), under the DiGMapGB and BGS Rock Classification Scheme areas. Further descriptions of the rocks listed in the map keys can also be obtained by searching against the Computer Code in the *BGS Lexicon of named Rock Units*, which is also on the BGS Website, by following the 'GeoData' link. The maps are labelled with the Computer Codes, with a dot at the bottom left hand corner of each label. However, please treat these labels with caution in areas of complex geology, where some labels may overlap several geological formations. If in doubt, please contact BGS Enquiries.

The geological formations (and larger subdivisions, such as 'groups') are listed in order of age in the map keys (with the youngest first). However, subdivisions within formations ('members' and 'beds') may not be ordered by age.

Combined 'Surface Geology' Map

This map shows the surface elements of all four geological layers.



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Scale: 1:25 000 (1cm = 250 m)

Search area indicated in red

Key to Artificial ground:

No deposits recorded by BGS in the search area

Key to Landslide deposits:

Map colour	Computer Code	Rock name	Rock type
	SLIP-UKNOWN	LANDSLIDE DEPOSITS	UNKNOWN/UNCLASSIFIED ENTRY

Key to Superficial deposits:

Map colour	Computer Code	Name of geological unit	Composition
	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
	TILMP-DMTN	TILL, MID PLEISTOCENE	DIAMICTON
	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL

Key to Bedrock geology:

Map colour	Computer Code	Name of geological unit	Rock type
	CHES-SCON	CHESTER FORMATION	SANDSTONE AND CONGLOMERATE, INTERBEDDED
	TIVO-HY	TISSINGTON VOLCANIC MEMBER	HYALOCLASTITE
	BSG-MDSS	BOWLAND SHALE FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
	HP-LMST	HOPEDALE LIMESTONE FORMATION	LIMESTONE
	WDF-LSMD	WIDMERPOOL FORMATION	LIMESTONE AND MUDSTONE, INTERBEDDED
	WDF-LMST	WIDMERPOOL FORMATION	LIMESTONE

Fault

Coal, ironstone or other mineral vein

Note: Faults and Coals, ironstone & mineral veins are shown for illustration and to aid interpretation of the map. Not all such features are shown and their absence on the map face does not necessarily mean that none are present

Geological interpretation of landslides
Landslides occur in the valleys of Bradbourne Brook (which the B5056 runs parallel with in this area) and its tributaries where they are underlain by mudstones of the Widmerpool Formation and Bowland Shale Formation.

Artificial Ground:
No artificial ground has been recorded up to the date of map compilation (1974-75).

Superficial Deposits:
Alluvium represents the deposits on present-day floodplains, forming low-lying ground adjacent to the Bradbourne Brook and its tributaries, and is around 1 to 2 m thick in this area. It is likely to be composed of sand, silt and clay in varying proportions, probably overlying gravel. Alluvium may contain lenses of water-saturated sand, which could give rise to unexpected outflows (running conditions) in boreholes or excavations. It may also contain lenses of highly compressible, organic-rich material, such as peat. Alluvium, by definition, may be at risk from flooding.

Head deposits are commonly present on slopes or on the floor of valleys. They formed mainly by gradual down-slope mass-movement (solifluction) under past freeze and thaw cold climate conditions, but can include the products of more recent soil creep or hill wash. Their composition reflects that of the local materials from which they were derived, either the bedrock or other types of superficial deposit, or both in combination. Head deposits are typically poorly stratified, poorly sorted, and can be variable in composition. Some head deposits, especially those composed mainly of clay, may contain gently dipping shear surfaces. These can significantly reduce the strength of the deposit and so constitute a potential hazard. The head deposit in this area is approximately 1 m to 1.5 m thick.

Bedrock Geology:
The **Bowland Shale Formation** (previously known as the Edale Shale Formation) is Namurian in age and is commonly associated with landslides. The formation is at least 200 m thick, but only the lower 10-20 m is present in the area of the landslide. It mainly comprises a ‘weak’ to ‘moderately strong’ laminated mainly dark grey fissile and blocky mudstone that weathers to become very weak. The formation is locally weakly calcareous, and also includes subordinate sequences of interbedded limestone and sandstone plus discrete fossiliferous bands.

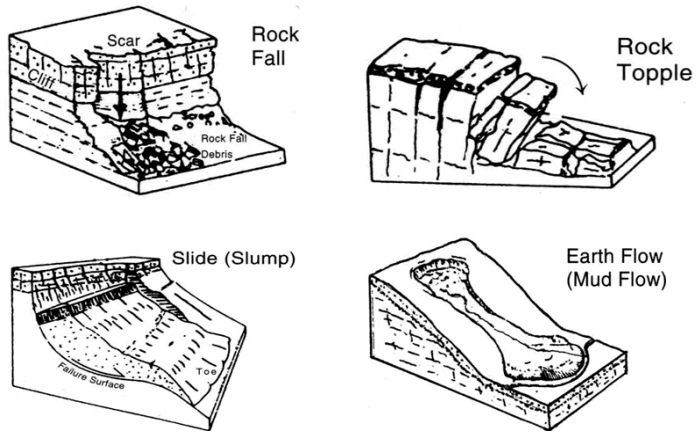
The **Widmerpool Formation** is of Dinantian age and was previously known as the Bull Gap Shales, Hollington End Beds, Mixon Limestone-Shales Formation and the Longstone Mudstone Formation. It comprises a series of mudstones, turbidites (sediment originally deposited by currents that moved down the submarine slope and spread out on the sea floor), limestone, siltstone, sandstone and tuff (volcanic ash fragments); the proportion of limestone to mudstone increases northwards as it passes laterally into the Hopedale Limestone Formation. The limestones within this formation are likely to be ‘strong’ to ‘very strong’; the mudstones are likely to be ‘weak’ to ‘moderately strong’ that may become ‘very weak’ or even ‘stiff’ clay when

fully weathered; it is these mudstones that are likely to be associated with any landsliding in this formation. This formation is at least 230 m thick in this location.

NOTES ON LANDSLIDE HAZARDS

1. What is a landslide?

A landslide is the outward and downward movement of rock or soil on a slope. This takes place by falling, toppling, sliding, or flowing.



A landslide is rarely the consequence of a single type of movement; it is usually the result of a combination of several types, changing in nature with conditions and time.

2. Why do landslides occur?

A slope is under stress due to the force of gravity. It does not move if the shear strength of the material that forms the slope is greater than the stress due to gravity. If the balance is altered so that stress exceeds available strength, movement down slope will occur until a stable slope profile is formed.

3. What problems do landslides cause?

- Many landslides occurred in the past under different climatic conditions to those of the present day and, if left undisturbed, they may remain stable for many years
- Property is damaged if landslides remove ground that is supporting the property
- Property that is built on a landslide may be damaged by stretching or compression as the ground moves
- Property below a landslide may be damaged if material falls onto it from above or slides or flows into it from the side

4. What might I see?

- Piles of debris and fallen material below steep slopes and cliffs
- Hollows in slopes with lobes of material below them
- Bulges in the ground especially at the foot of slopes

- Ridges in the ground, usually along the slope but sometimes down the slope
- Open cracks in the ground
- Scarps or steps in the ground surface
- Patches of very wet soft ground on slopes
- Cracks in walls, paths and roadways
- Tilting of trees, fences, walls or buildings
- Doors or windows that stick

5. What action should I take?

If landsliding appears to be active on or near your property, inform your insurance company, mortgage lender or landlord, as appropriate, or get specialist advice from a suitably qualified expert such as a structural surveyor, geotechnical engineer or chartered engineering geologist.

If landsliding is not active but the area has a potential for landslide activity, take specialist advice before starting major building or drainage work or modifying the ground around your property.

6. DO

- Ensure water supply pipes are in good repair and are not leaking
- Ensure ditches and drains are directed away from potentially unstable ground and are well-maintained
- Maintain gutters and down pipes and direct them to piped drainage systems
- Manage wooded slopes to enhance stability

7. DO NOT

- Remove material from the bottom of slopes
- Place material on, or at the top of, slopes
- Dispose of rainwater or surface water to soakaways on a landslide
- Allow surface drainage to discharge water onto slopes or the ground behind slopes
- Remove vegetation whose roots may be strengthening loose or weak material or which may strengthen the slope by removing soil moisture

For more information on landslides, see www.bgs.ac.uk/landslides

Contact Details

Keyworth Office
British Geological Survey
Environmental Science Centre
Nicker Hill
Keyworth
Nottingham
NG12 5GG
Tel: 0115 9363143
Email: enquiries@bgs.ac.uk

Edinburgh Office
British Geological Survey
Lyell Centre
Research Avenue South
Edinburgh
EH14 4AP
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Email: enquiry@bgs.ac.uk

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Important notes about this Report

- The data, information and related records supplied in this Report by BGS can only be indicative and should not be taken as a substitute for specialist interpretations, professional advice and/or detailed site investigations. You must seek professional advice before making technical interpretations on the basis of the materials provided.
- Geological observations and interpretations are made according to the prevailing understanding of the subject at the time. The quality of such observations and interpretations may be affected by the availability of new data, by subsequent advances in knowledge, improved methods of interpretation, and better access to sampling locations.
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- Although samples and records are maintained with all reasonable care, there may be some deterioration in the long term.
- The most appropriate techniques for copying original records are used, but there may be some loss of detail and dimensional distortion when such records are copied.
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- Note that for some sites, the latest available records may be historical in nature, and while every effort is made to place the analysis in a modern geological context, it is possible in some cases that the detailed geology at a site may differ from that described.

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