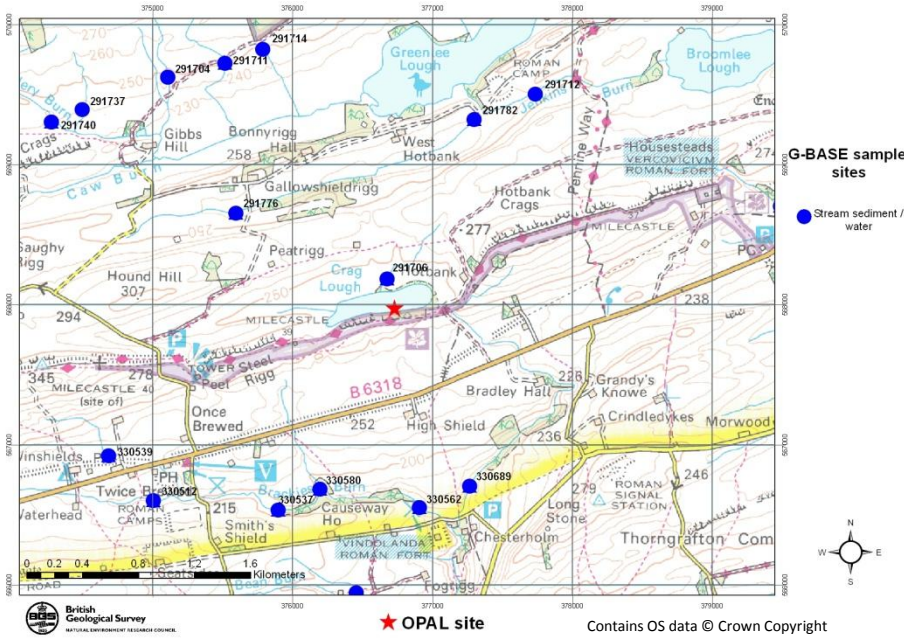
British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report for the OPAL Water Centre; Summary of the Geochemical Baseline Survey of the Environment (G-BASE) data resources relevant to OPAL research

Science Facilities Directorate

Open Report OR/12/086



BRITISH GEOLOGICAL SURVEY

SCIENCE FACILITIES DIRECTORATE

OPEN REPORT OR/12/086

Report for the OPAL Water Centre; Summary of the Geochemical Baseline Survey of the Environment (G-BASE) data resources relevant to OPAL research

J M Bearcock, S E Nice

Contributor

C Scheib

Keywords

G-BASE, Sediment, Water, Soil, OPAL.

Front cover

Example map showing OPAL site Crag Lough with local G-BASE sample sites

Bibliographical reference

BEARCOCK, J. M. AND NICE, S. E.. 2012. Report for the OPAL Water Centre; Summary of the Geochemical Baseline Survey of the Environment (G-BASE) data resources relevant to OPAL research. *British Geological Survey Open Report*, OR/12/086. 126pp.

Keyworth, Nottingham British Geological Survey 2012

BRITISH GEOLOGICAL SURVEY

The full range of our publications is available from BGS shops at Nottingham, Edinburgh, London and Cardiff (Welsh publications only) see contact details below or shop online at www.geologyshop.com

The London Information Office also maintains a reference collection of BGS publications, including maps, for consultation.

We publish an annual catalogue of our maps and other publications; this catalogue is available online or from any of the BGS shops.

The British Geological Survey carries out the geological survey of Great Britain and Northern Ireland (the latter as an agency service for the government of Northern Ireland), and of the surrounding continental shelf, as well as basic research projects. It also undertakes programmes of technical aid in geology in developing countries.

The British Geological Survey is a component body of the Natural Environment Research Council.

British Geological Survey offices

BGS Central Enquiries Desk

Tel 0115 936 3143 Fax 0115 936 3276

email enquiries@bgs.ac.uk

Kingsley Dunham Centre, Keyworth, Nottingham NG12 5GG

Tel 0115 936 3241 Fax 0115 936 3488

email sales@bgs.ac.uk

Murchison House, West Mains Road, Edinburgh EH9 3LA

Tel 0131 667 1000 Fax 0131 668 2683

email scotsales@bgs.ac.uk

Natural History Museum, Cromwell Road, London SW7 5BD

Tel 020 7589 4090 Fax 020 7584 8270

Tel 020 7942 5344/45 email bgslondon@bgs.ac.uk

Columbus House, Greenmeadow Springs, Tongwynlais, Cardiff CF15 7NE

Tel 029 2052 1962 Fax 029 2052 1963

Maclean Building, Crowmarsh Gifford, Wallingford OX10 8BB

Tel 01491 838800 Fax 01491 692345

Geological Survey of Northern Ireland, Colby House, Stranmillis Court, Belfast BT9 5BF

Tel 028 9038 8462 Fax 028 9038 8461

www.bgs.ac.uk/gsni/

Parent Body

Natural Environment Research Council, Polaris House, North Star Avenue, Swindon SN2 1EU

Tel 01793 411500 Fax 01793 411501

www.nerc.ac.uk

Website www.bgs.ac.uk

Shop online at www.geologyshop.com

Foreword

This report presents site information and availability of data from the British Geological Survey's (BGS) Geochemical Baseline Survey of the Environment (G-BASE) project for the OPen Air Laboratory's (OPAL) metal survey calibration sites. Specific data values and interpretation will be made available for OPAL following review of this report by Dr Neil Rose and Dr Simon Tuner of University College London.

Contents

FIGURES

TABLES

1 Introduction

The OPAL project is a partnership initiative designed to encourage the public to become more involved with the natural world. The partnership is funded by the Big Lottery Fund, led by Imperial College London, and is conducted throughout England. The project aims to involve the public in scientific research, resulting in a large volume of data to develop a greater understanding of the England's natural environment. In addition it aims to: encourage participation in outdoor activities; develop educational programmes for people of all ages and abilities; enthuse a new generation of environmentalists; and develop partnerships between the community, voluntary and statutory sectors. OPAL is delivered through nine regional programmes, five thematic Centres, and a Support system. University College London (UCL) leads the OPAL Water Centre, one of the thematic centres, which aims to investigate the condition of lakes and ponds in England with respect to pollution impacts. The research aims to identify the scale of contamination from trace metals and persistent organic pollutants, and the extent to which this pollution affects the freshwater ecosystem (Davies et al., 2011).

This report presents site information that the BGS has provided for the OPAL metal survey sites. This includes identifying where data are available from BGS's G-BASE project in the vicinity of these sites. The following two sections of this report divide the OPAL sites into two groups. In Section 2 are nine sites selected by UCL at the outset of the project (phase 1). These sites were monitored every three months from spring 2008 until spring 2012. In Section 3 sites that were chosen in conjunction with the BGS are presented (phase 2). This latter group of sites comprises a shortlist of 20 lakes chosen to represent a range of geologies, locations, land uses and physical features. Ten sites from this shortlist were selected by UCL to be used as calibration sites; in order to interpret if samples sent in by the public were representative. Of these 10 sites, two sites proved unsuitable once the practicalities of sampling were investigated. This report was updated to present two additional sites, which were local to and provided a replacement for, the rejected sites. The 10 sites selected by UCL were sampled once between June and October 2011.

Further information can be obtained at the G-BASE and OPAL websites at http://www.bgs.ac.uk/gbase/and http://www.opalexplorenature.org/.

1.1 SITE INFORMATION

For each OPAL monitoring site, the BGS has provided:

- A map showing the location of site and approximate size of pond/lake.
- Existing geochemical data for the area from the BGS Geochemistry Database. The data is from the BGS's G-BASE project which systematically collects stream sediment, water and soil samples throughout the UK (G-BASE sampling progress until 2011 is illustrated in Section 4 of this report).
- Parent material maps, showing superficial deposits (where present) and bedrock geology of the area are provided. There is a very brief explanation of each site.
- Aerial photography of the sites.
- A Digital Terrain Model (DTM) of each area. These are included to simply demonstrate the nature of the area. The DTM data itself will be used in the interpretation of the data.

2 Phase 1 Site Descriptions

2.1 WOODTHORPE, YORK.

The site is a small artificial pond to the south east of Woodthorpe, York [457857, 44037]. The approximate size of the pond is 130m x 65m.

2.1.1 G-BASE Site Locations

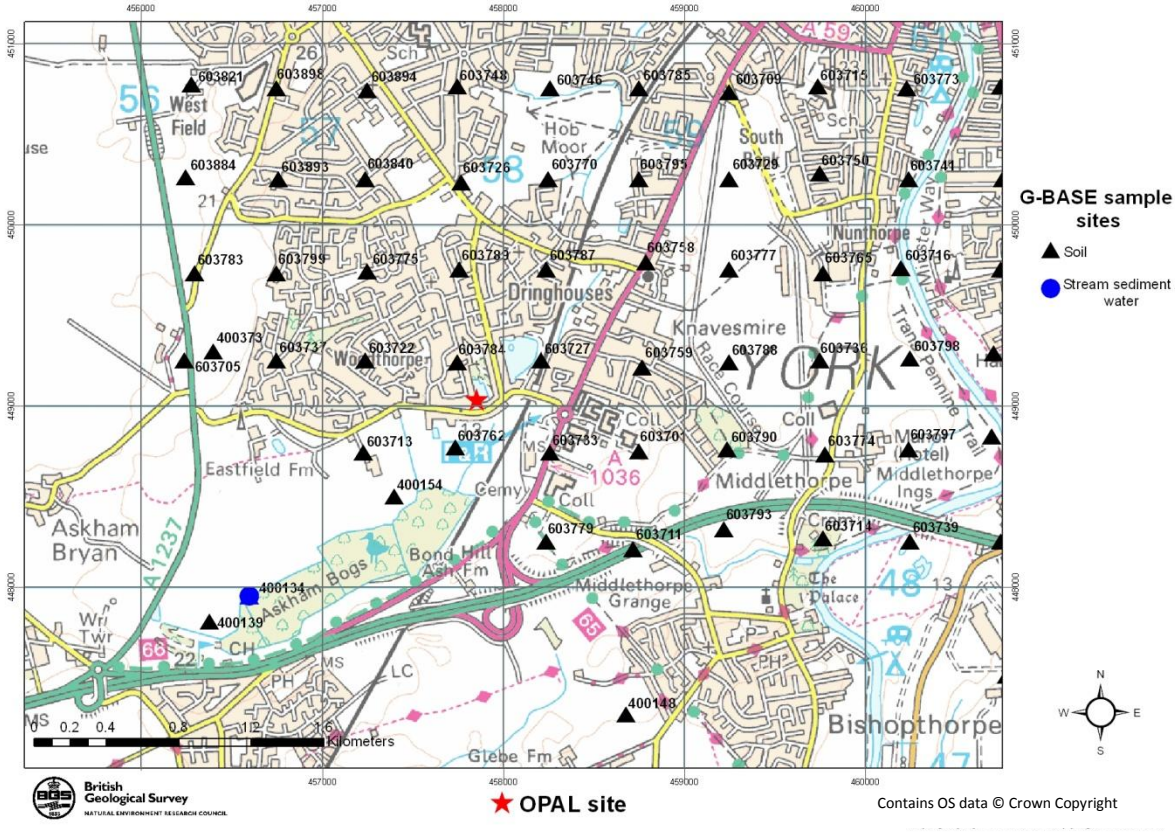


Figure 2.1 G-BASE sample site locations for Woodthorpe, 1:50K

Table 1 G-BASE Sample Locations for Woodthorpe, York

Sample Number	Sample Type	Easting	Northing	Sample Number	Sample Type	Easting	Northing
400134	C+W	456600	447950	603797	S	460240	448760
400139	S	456380	447810	603798	S	460250	449260
400148	S	458680	447300	603705	S	456240	449250
400154	S	457400	448500	603713	S	457230	448740
400373	S	456400	449300	603722	S	457240	449250
603701	S	458750	448750	603726	S	457770	450230
603709	S	459250	450730	603727	S	458210	449250
603711	S	458720	448210	603733	S	458260	448740
603714	S	459770	448270	603737	S	456750	449250
603715	S	459740	450760	603746	S	458260	450750
603716	S	460200	449760	603748	S	457750	450760

603729	S	459250	450250	603762	S	457740	448770
603736	S	459750	449250	603770	S	458250	450250
603739	S	460250	448250	603775	S	457250	449740
603741	S	460240	450250	603779	S	458240	448250
603750	S	459750	450280	603783	S	456300	449730
603758	S	458790	449790	603784	S	457750	449240
603759	S	458770	449210	603787	S	458240	449750
603765	S	459770	449730	603789	S	457760	449750
603773	S	460230	450750	603799	S	456750	449730
603774	S	459780	448730	603821	S	456280	450770
603777	S	459250	449750	603840	S	457240	450250
603785	S	458750	450750	603884	S	456250	450260
603788	S	459250	449240	603893	S	456760	450250
603790	S	459240	448760	603894	S	457250	450740
603793	S	459220	448320	603898	S	456750	450750
603795	S	458750	450250				

Sample type: S= Soil, C= Sediment, W= Water

2.1.2 Parent Material (Bedrock and superficial geology)

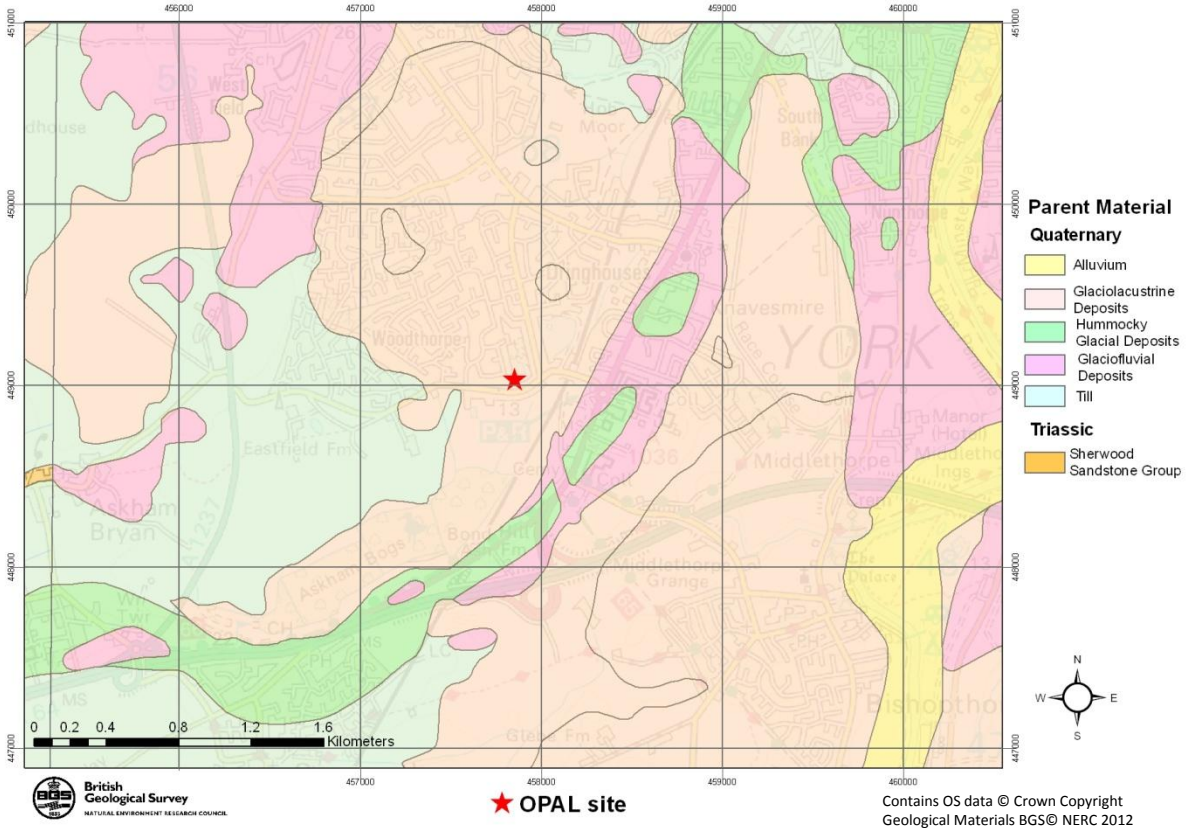


Figure 2.2 Parent Material Map for Woodthorpe

The area is entirely underlain by Triassic deposits of the Sherwood Sandstone Group. The OPAL site is situated on Glaciolacustrine deposits.

2.1.3 Aerial Photographs

Figure 2.3 Aerial photograph of OPAL site, Woodthorpe

Figure 2.4 Zoomed in Aerial Photograph of OPAL site, Woodthorpe

2.1.4 Digital Terrain Model

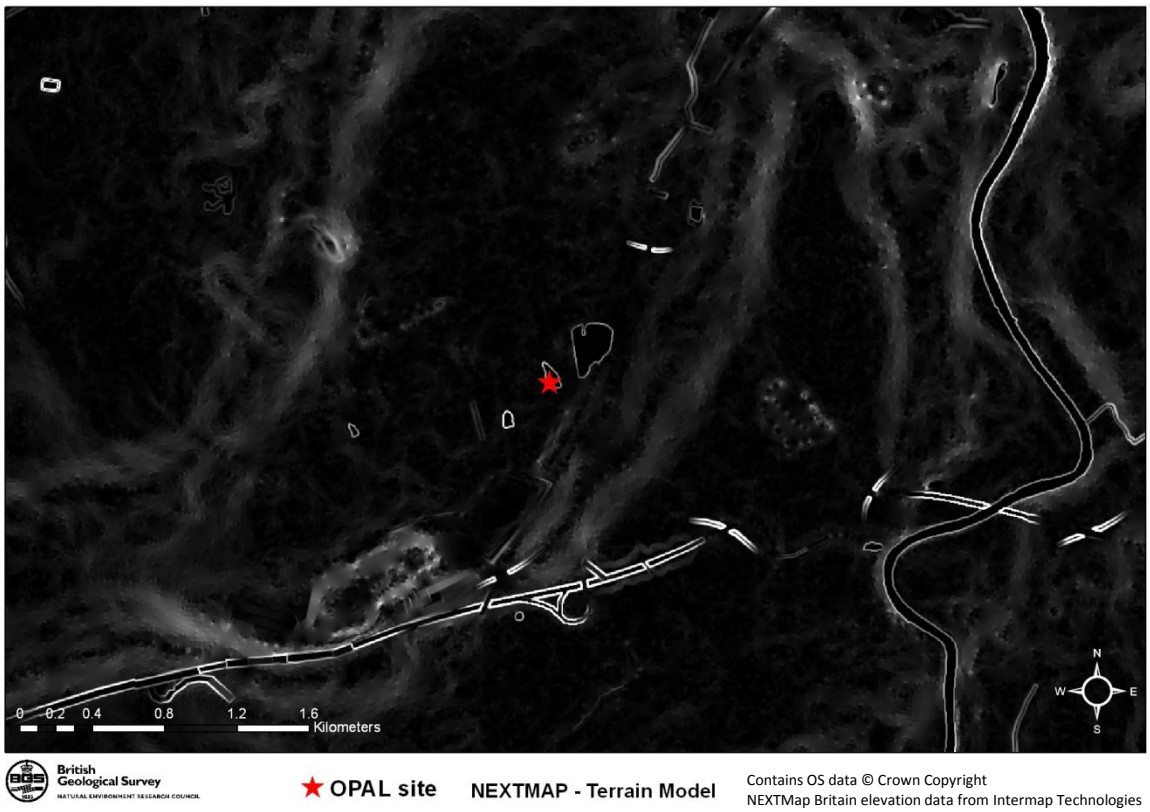


Figure 2.5 DTM of Woodthorpe OPAL site

2.2 CRAG LOUGH, NORTHUMBERLAND NATIONAL PARK

This is an inland lake that is situated on the southern edge of Northumberland National Park [376732, 567979]. The approximate size of the lake is 670m x 140m.

2.2.1 G-BASE Site Locations

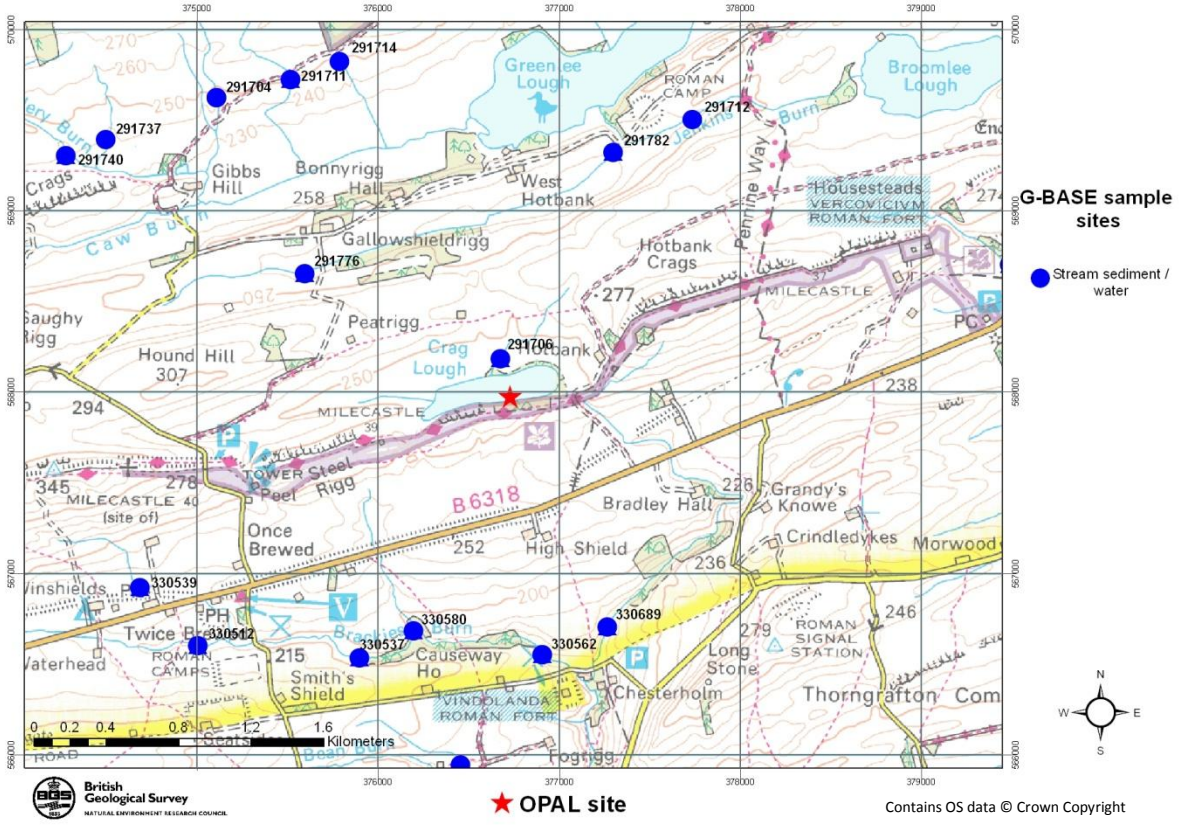


Figure 2.6 G-BASE Sample site locations for Crag Lough, 1:50K

Table 2 G-BASE Sample Locations for Crag Lough

Sample number	Sample Type	Easting	Northing	Sample number	Sample Type	Easting	Northing
291704	C	375110	569620	291796	C+W	375110	569620
291706	C+W	376680	568180	330512	C+W	375010	566600
291711	C+W	375520	569720	330537	C+W	375900	566530
291712	C	377740	569500	330539	C+W	374690	566920
291714	C+W	375790	569820	330562	C+W	376910	566550
291737	C	374500	569390	330580	C+W	376200	566680
291740	C+W	374280	569300	330675	C+W	376460	565940
291776	C+W	375600	568650	330689	C+W	377270	566700
291782	C+W	377300	569320				

Sample type: S= Soil, C= Sediment, W= Water

2.2.2 Bedrock Geology

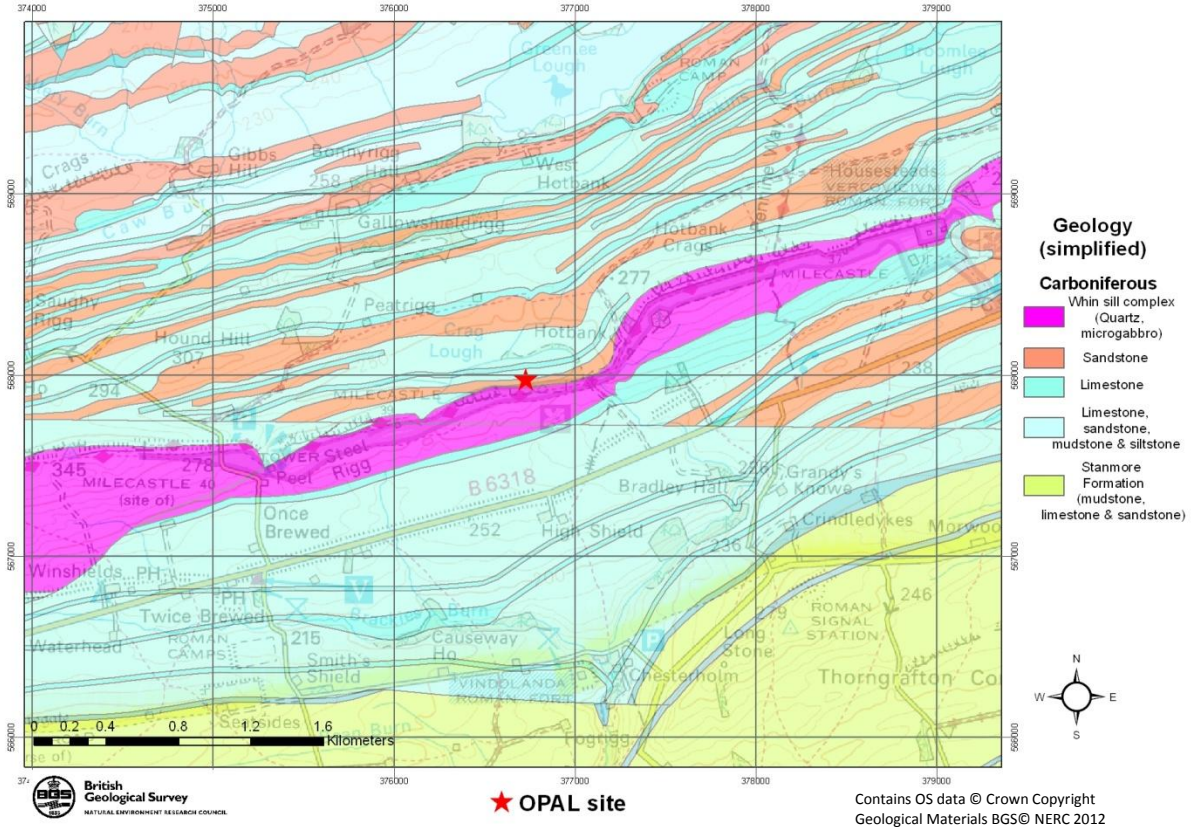


Figure 2.7 Bedrock Geology map for Crag Lough

The area is totally underlain by Carboniferous sandstones, limestone, mudstones and quartz microgabbro from the Whin Sill Complex. The site is situated directly on sandstone, but could be influenced by the quartz microgabbro and limestones.

2.2.3 Quaternary Deposits

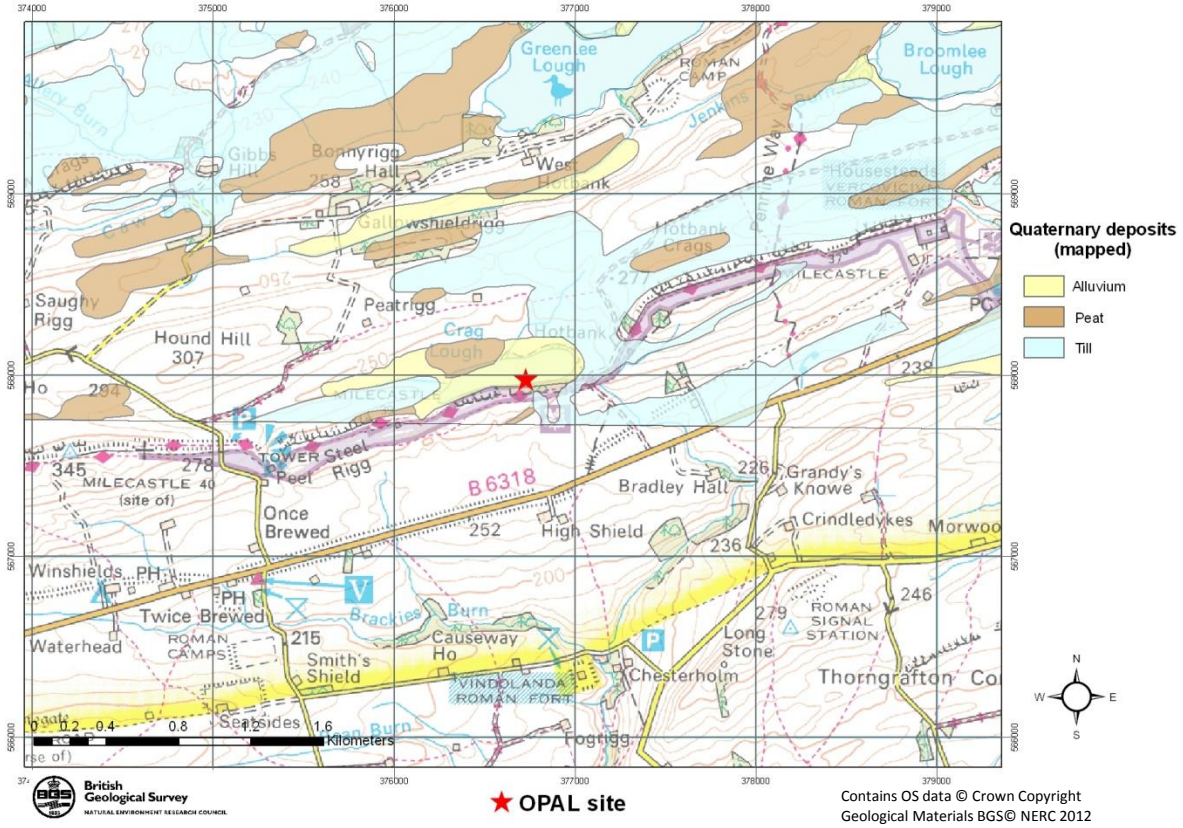


Figure 2.8 Quaternary map for Crag Lough

The OPAL site is situated on alluvial deposits.

2.2.4 Aerial Photograph

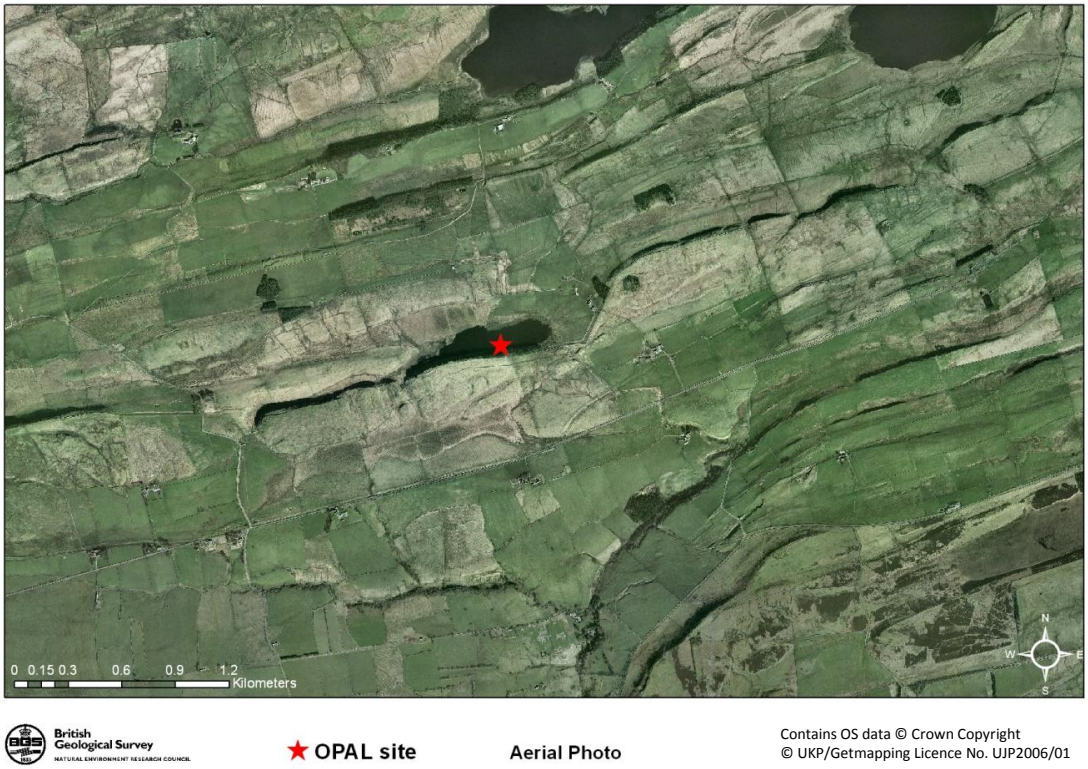


Figure 2.9 Aerial photograph of OPAL site, Crag Lough

2.2.5 Digital Terrain Model

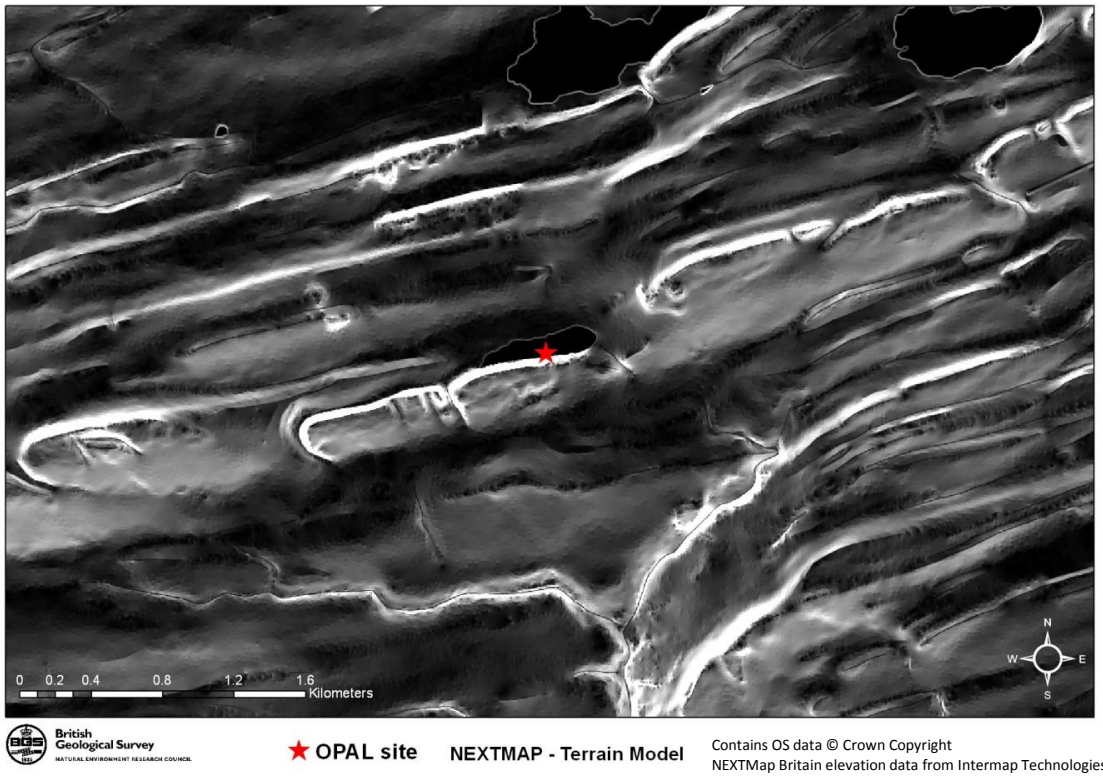


Figure 2.10 DTM of OPAL site, Crag Lough

2.3 MARTON MERE, BLACKPOOL

Marton Mere is a freshwater lake on the outskirts of Blackpool that is believed to occupy a kettle hole. It has been designated as a SSSI [334251, 435247]. It is approximately700m x 240m.

2.3.1 G-BASE Site Locations

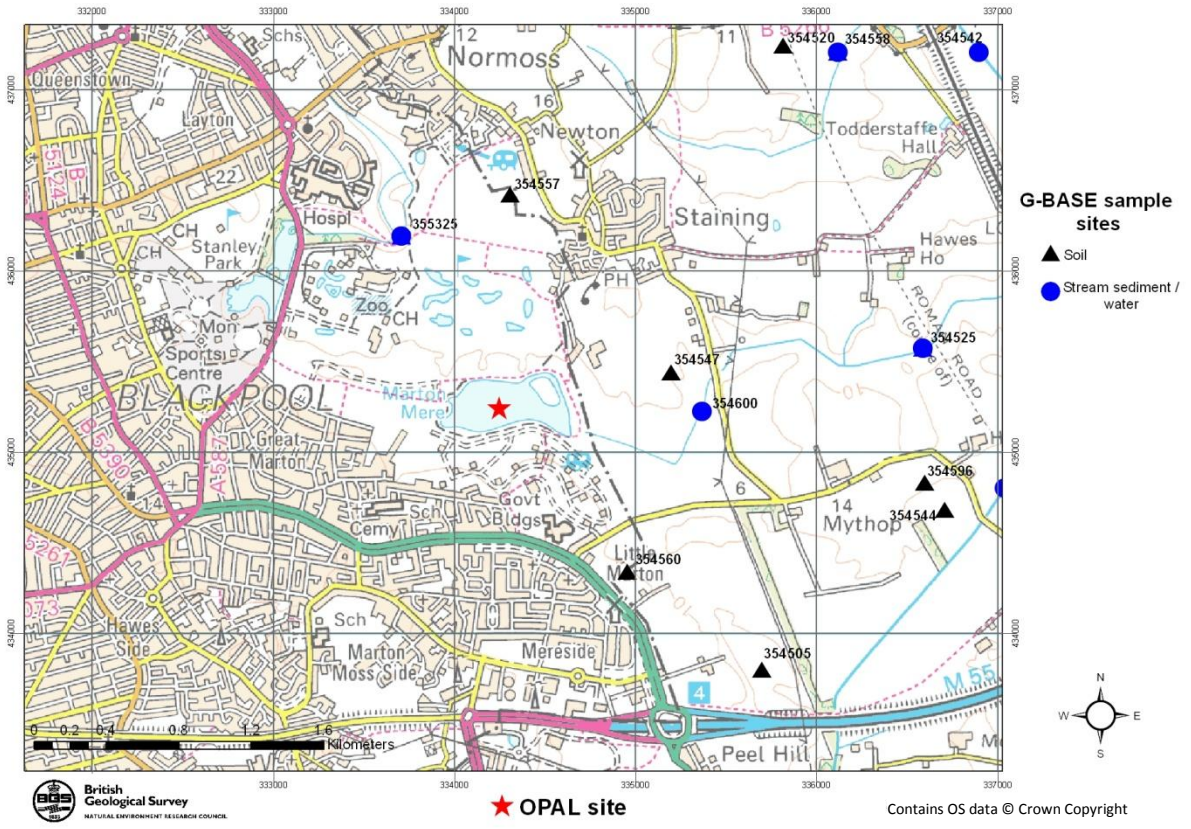


Figure 2.11 G-BASE sample site locations for Marton Mere, 1:50K

Table 3 G-BASE Sample Locations for Marton Mere

Sample Number	Sample Type	Easting	Northing
354505	S	335700	433800
354508	S	336600	434830
354525	C + W	336590	435570
354544	S	336710	434680
354547	S	335200	435440
354557	S	334310	436420
354560	S	334960	434340
354564	C + W	336400	432910
354596	C	337040	434800
354600	C	335370	435220
355325	C	333710	436190

Sample type: S= Soil, C= Sediment, W= Water

2.3.2 Parent Material

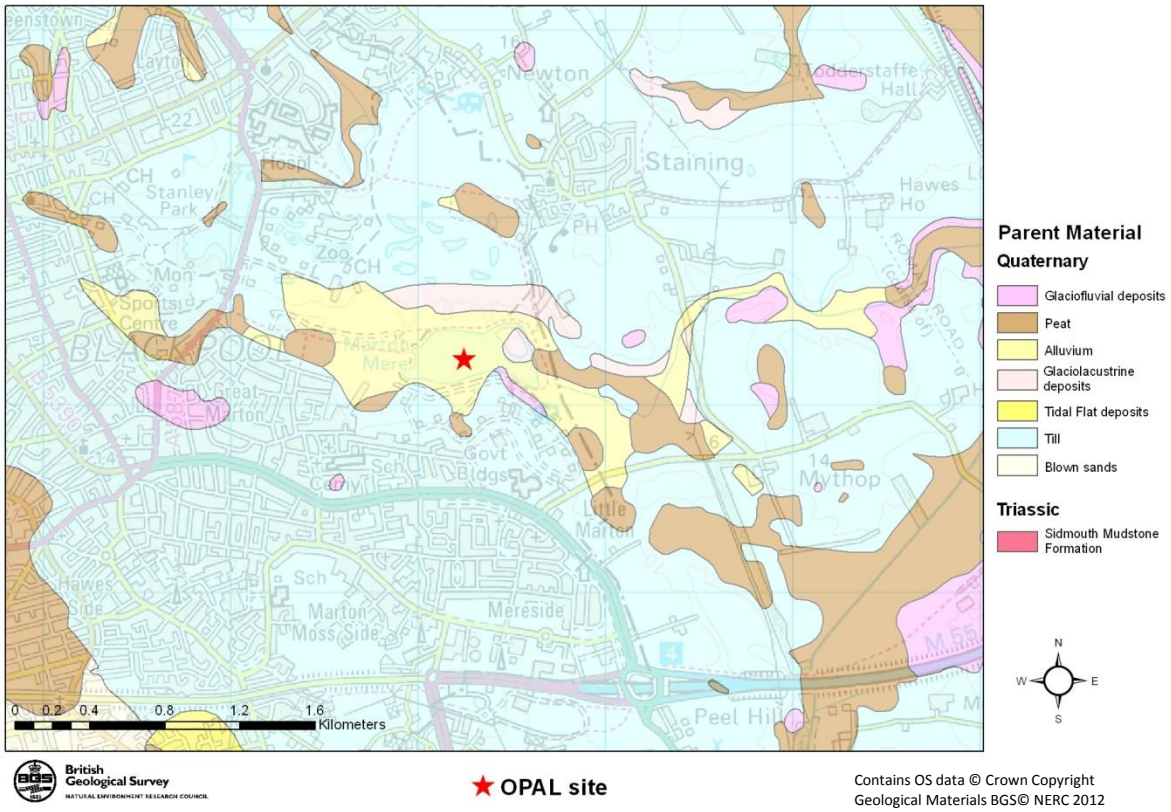


Figure 2.12 Parent Material Map for Marton Mere

The area is entirely underlain by Triassic deposits from the Sidmouth Mudstone Formation which is completed covered by superficial deposits. The OPAL site is situated on the alluvial deposits.

2.3.3 Aerial Photograph

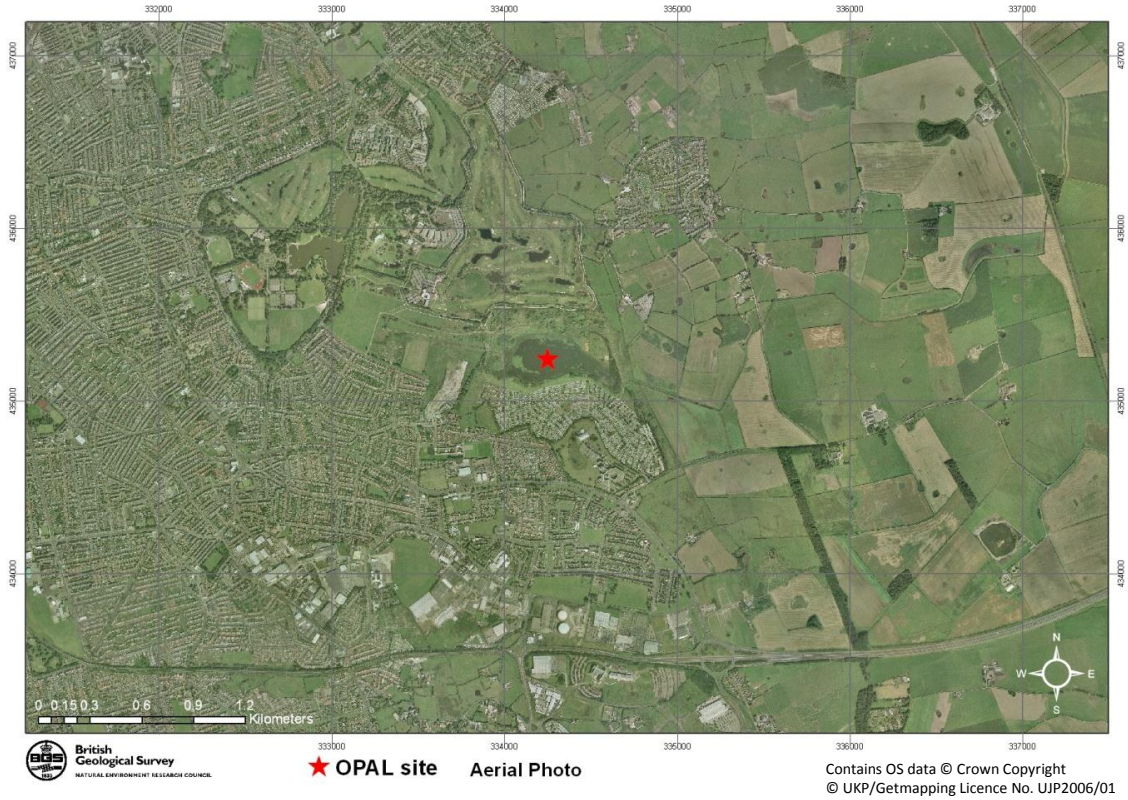


Figure 2.13 Aerial photograph of OPAL site, Marton Mere

2.3.4 Digital Terrain Model

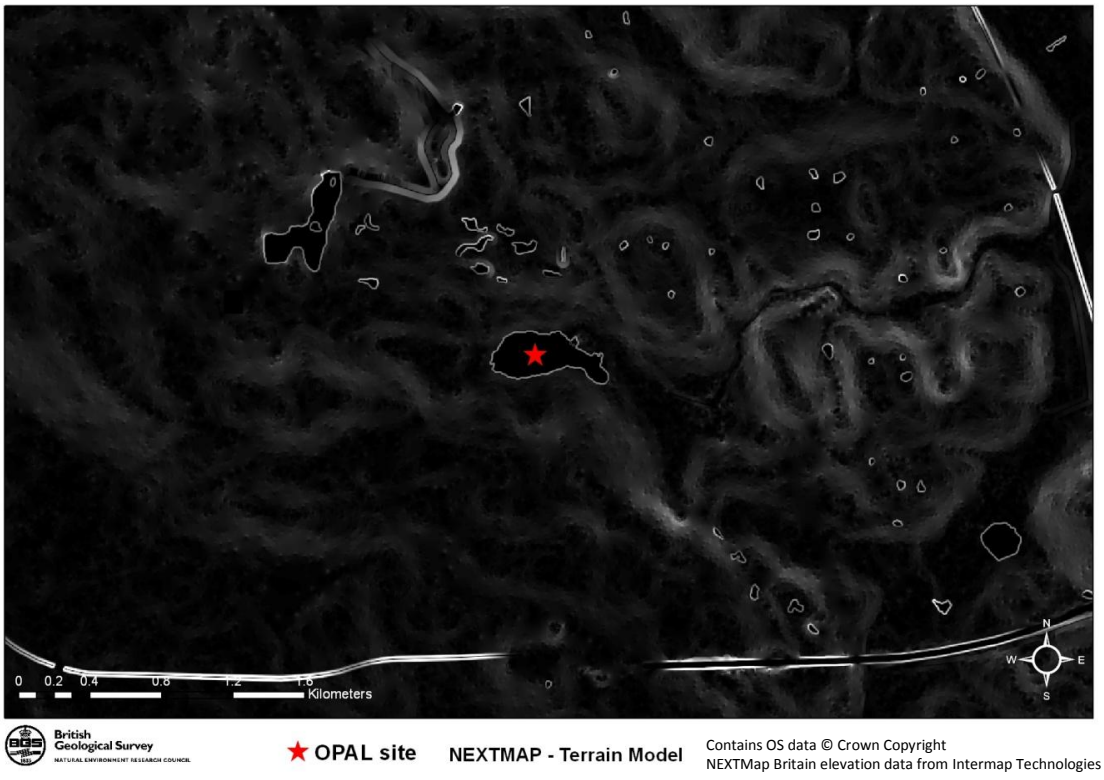


Figure 2.14 DTM of Marton Mere OPAL site

2.4 EDGBASTON POOL, EDGBASTON, BIRMINGHAM

Edgbaston pool is a SSSI, fed by Chad Brook, located in Edgbaston, south west Birmingham. [405480, 284000]. Its approximate size is 400m x 200m.

2.4.1 G-BASE Site Locations

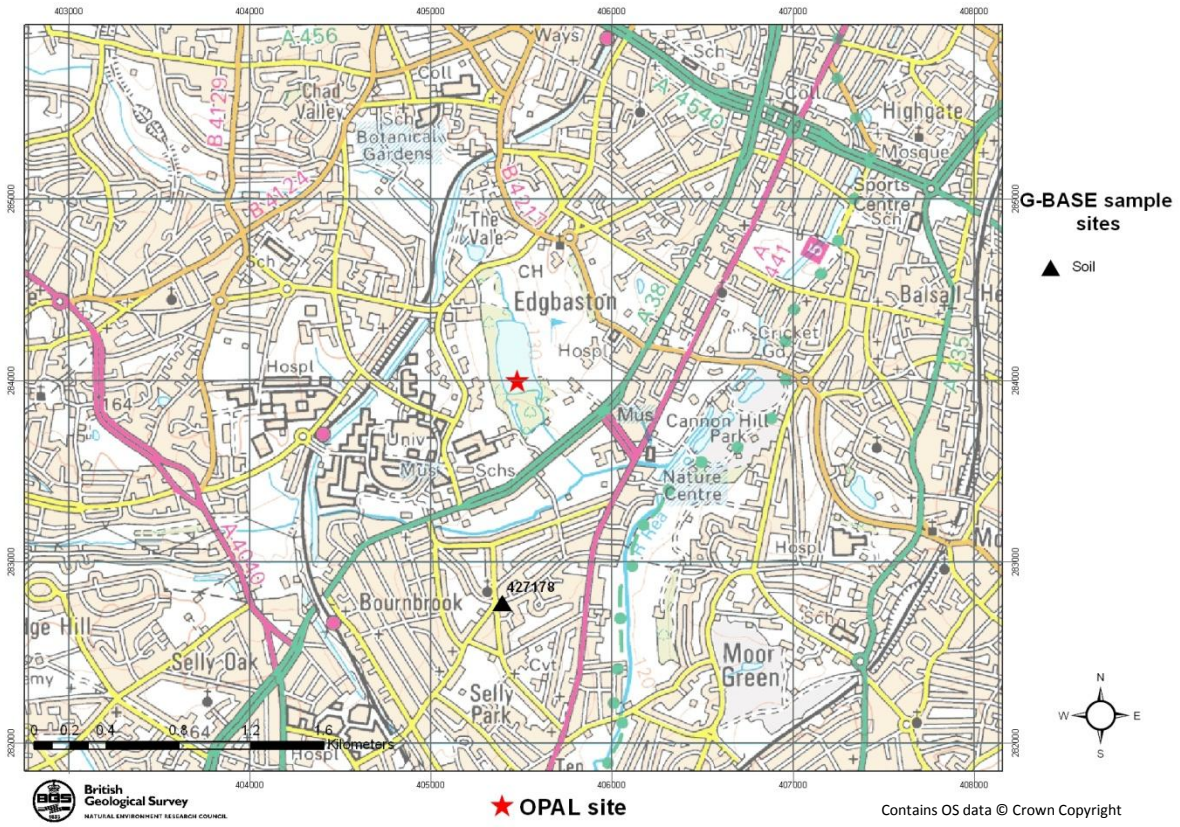


Figure 2.15 G-BASE sample site locations for Edgbaston, 1:50K

Table 4 G-BASE sample locations for Edgbaston

Sample Number	Sample Type	Easting	Northing
427178	S	405400	282770

Sample type: S= Soil

2.4.2 Parent Material

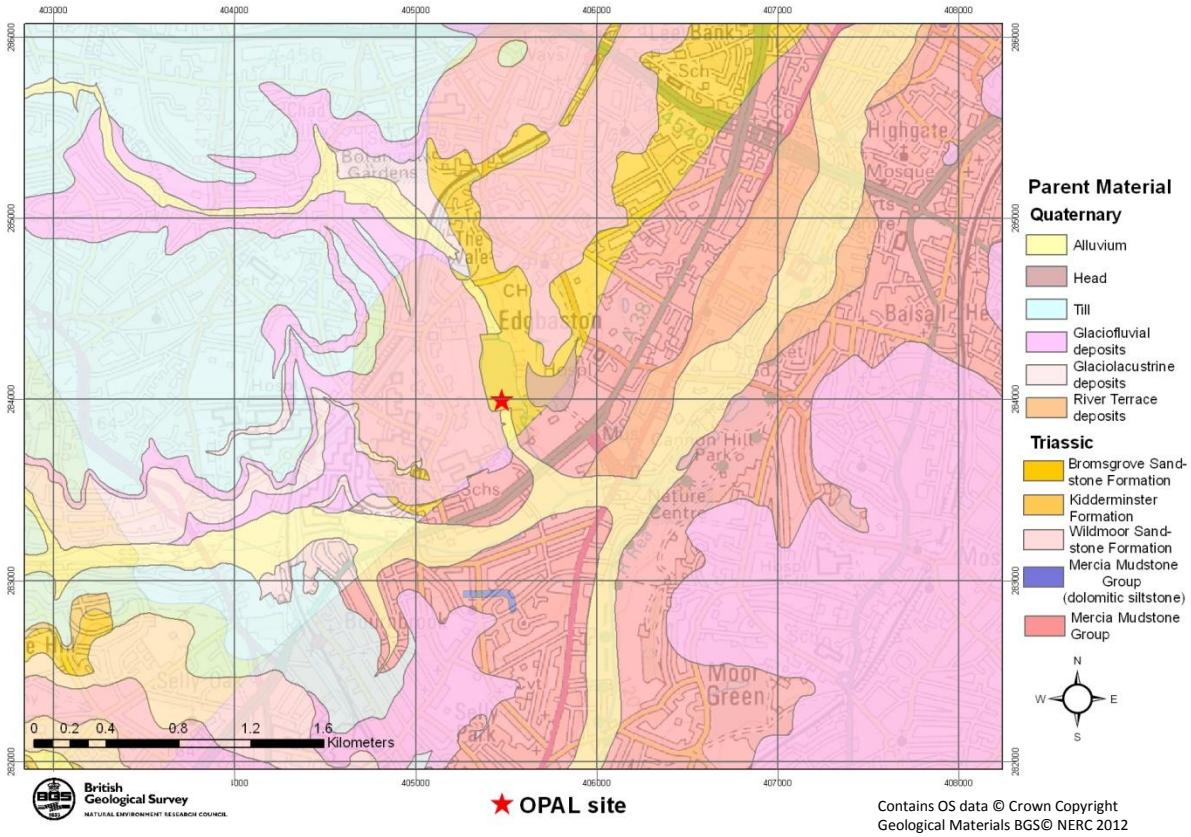


Figure 2.16 Parent Material Map for Edgbaston

The area around Edgbaston is underlain by Triassic sandstones and mudstones; the site is situated on the Bromsgrove Sandstone Formation, but could also be influenced by the surrounding alluvial and head deposits.

2.4.3 Aerial Photograph

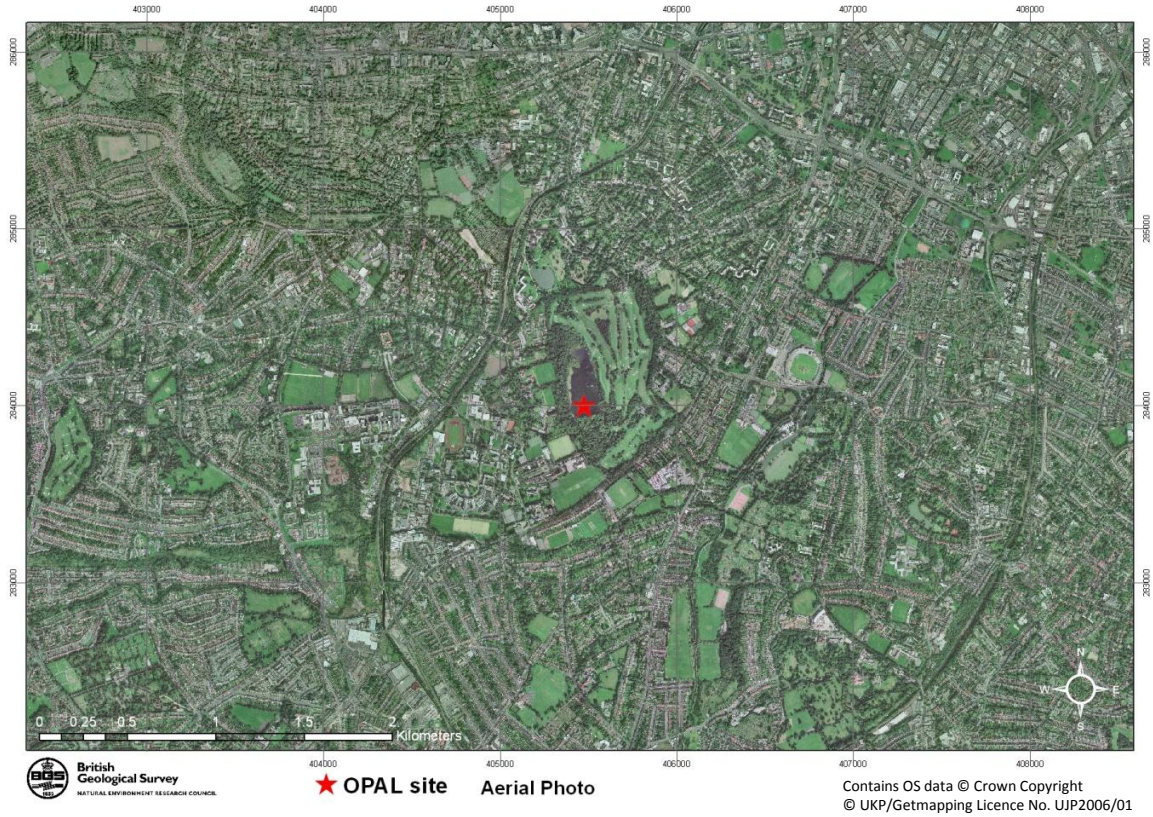


Figure 2.17 Aerial photograph of OPAL site, Edgbaston

Figure 2.18 Zoomed in aerial photograph of OPAL site, Edgbaston

2.4.4 Digital Terrain Model

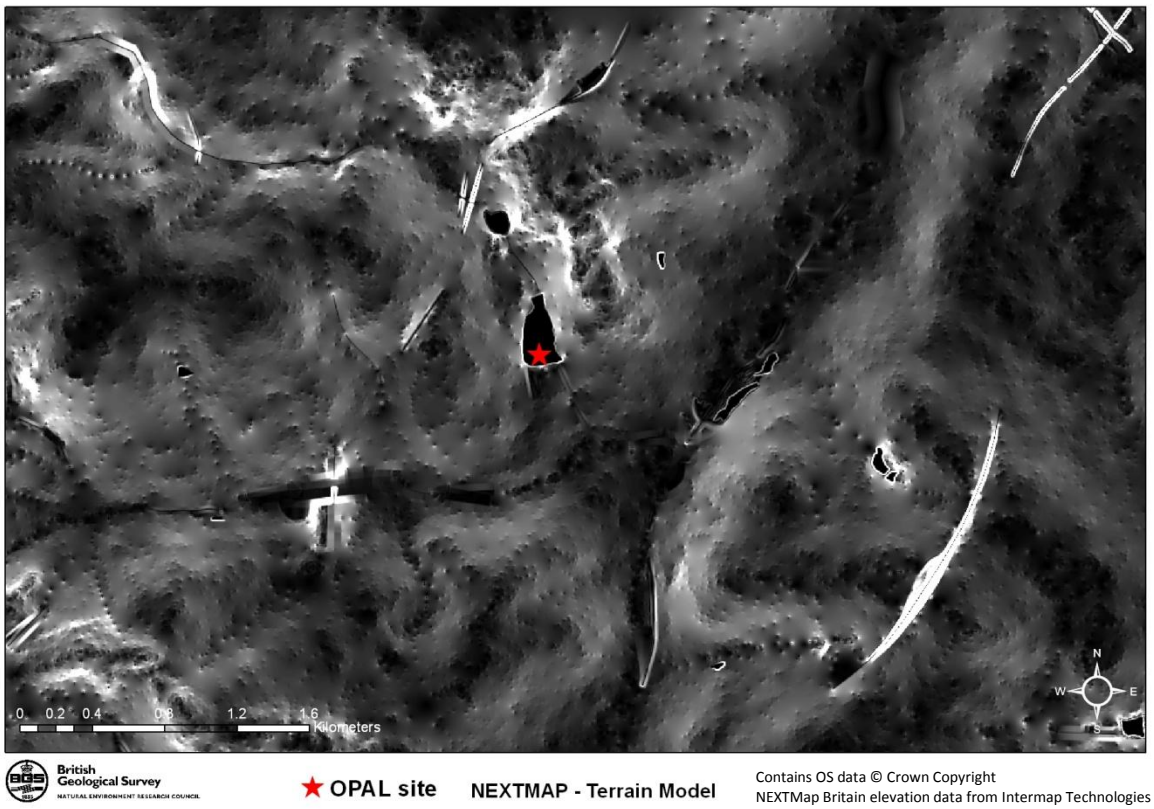


Figure 2.19 DTM of Edgbaston OPAL site

2.5 THORESBY, NOTTINGHAMSHIRE

This is an artificial lake lying in the valley of the River Meden, north Nottinghamshire [462941, 370362]. It is approximately 1500m x 200m. This area has been designated a SSSI.

2.5.1 G-BASE Site Locations

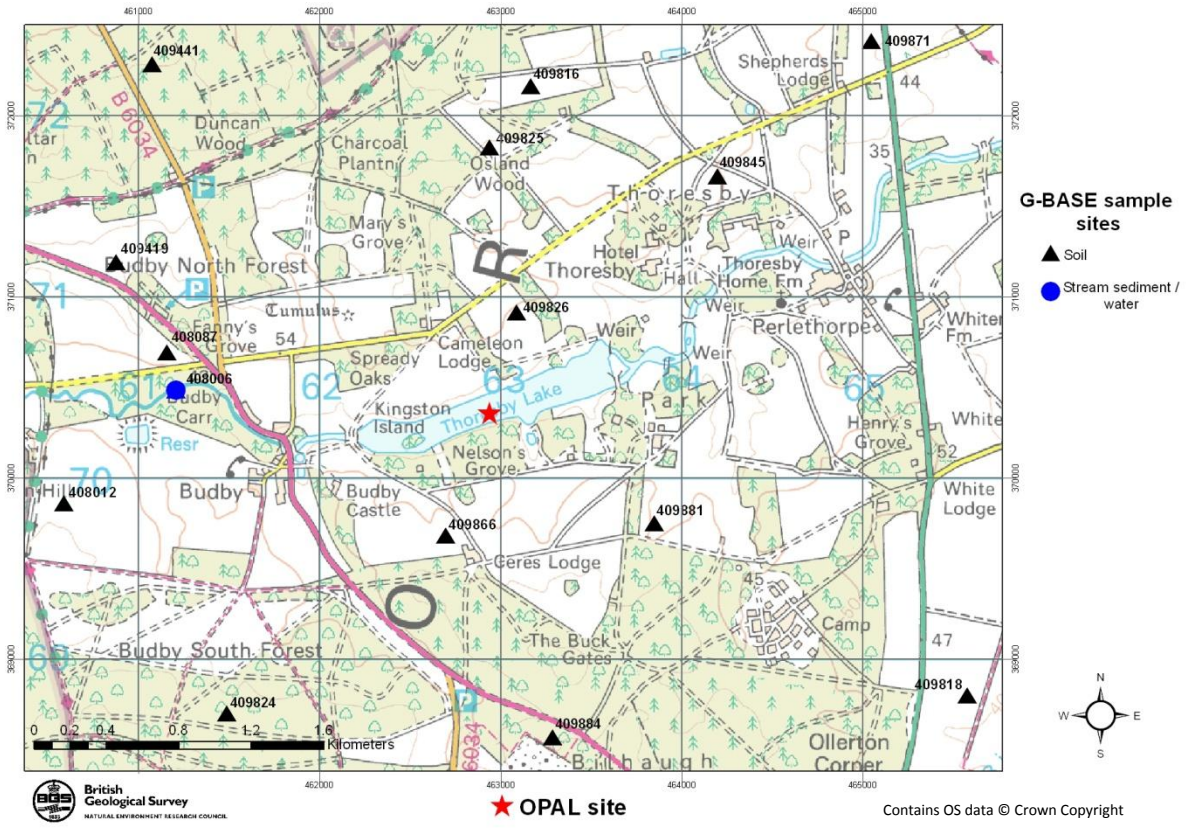


Figure 2.20 G-BASE sample site locations for Thoresby, 1:50K

Table 5 G-BASE sample locations for Thoresby

Sample Number	Sample Type	Easting	Northing	Sample Number	Sample Type	Easting	Northing
408006	C+W	461210	370480	409825	S	462940	371820
408012	S	460590	369860	409826	S	463090	370910
409419	S	460880	371190	409816	S	463170	372160
409441	S	461080	372280	409884	S	463290	368570
408087	S	461160	370690	409881	S	463850	369750
409824	S	461490	368700	409845	S	464200	371660
409866	S	462700	369680	409871	S	465050	372410

Sample type: S= Soil, C= Sediment, W= Water

2.5.2 Parent Material

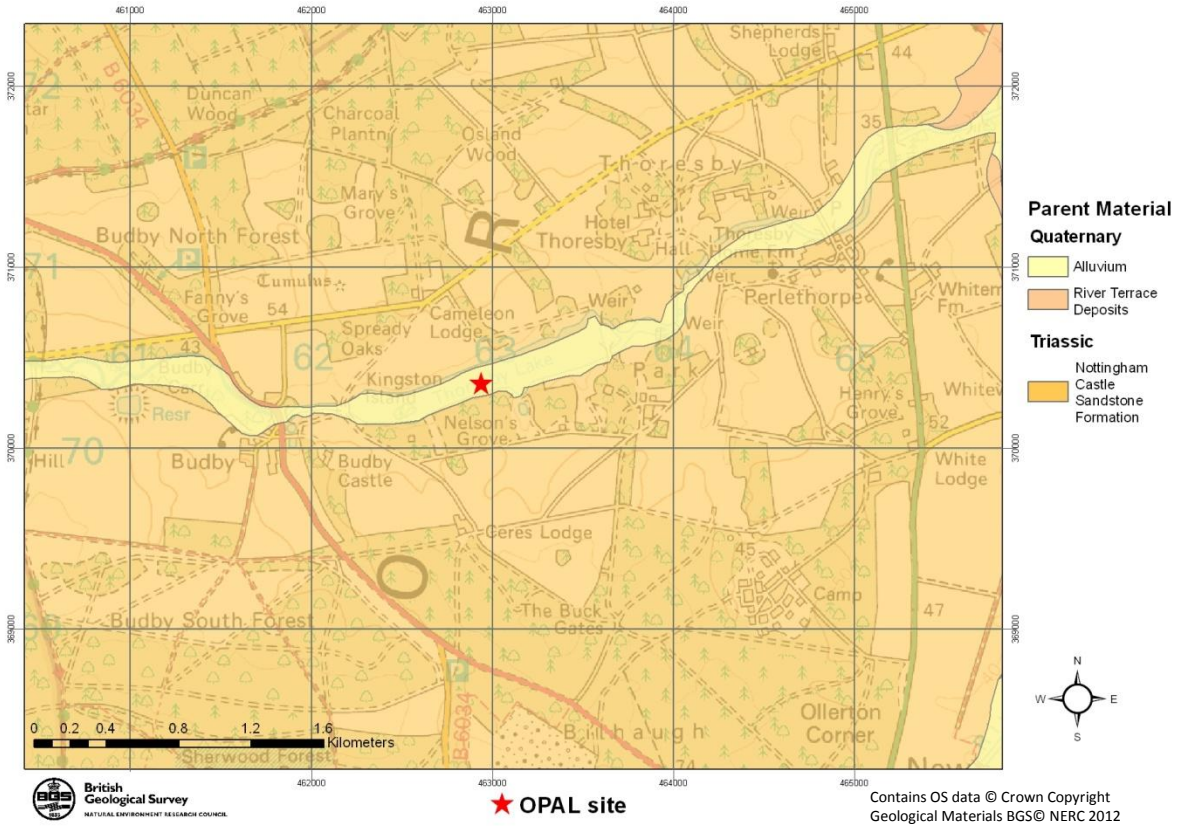


Figure 2.21 Parent Material Map for Thoresby

The area is underlain by the Triassic Nottingham Castle Sandstone Formation. The site is situated on the alluvial deposits of the River Meden.

2.5.3 Aerial Photograph

Figure 2.22 Aerial photograph of OPAL site, Thoresby

2.5.4 Digital Terrain Model

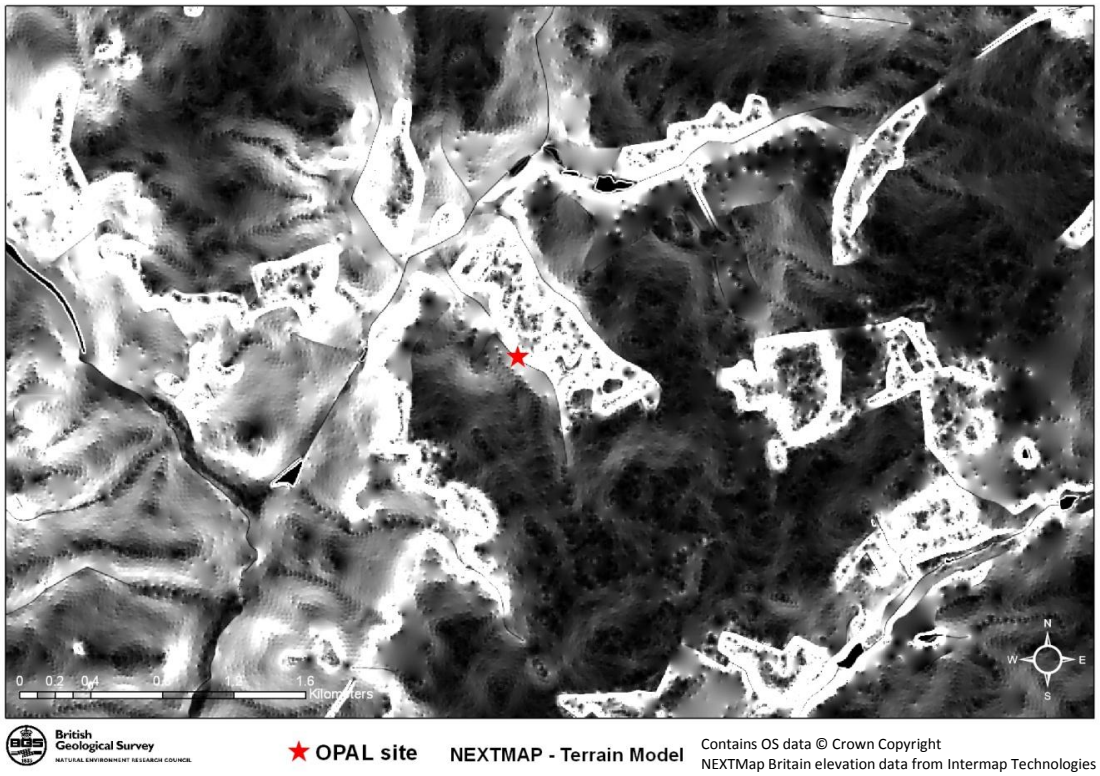


Figure 2.23 DTM of Thoresby OPAL site

2.6 HOLT, NORFOLK

The pond at Holt is not fed; it is situated to the west of Holt Hall, in north Norfolk [607664, 339812]. It is approximately 200m x 50m.

2.6.1 G-BASE Site Locations

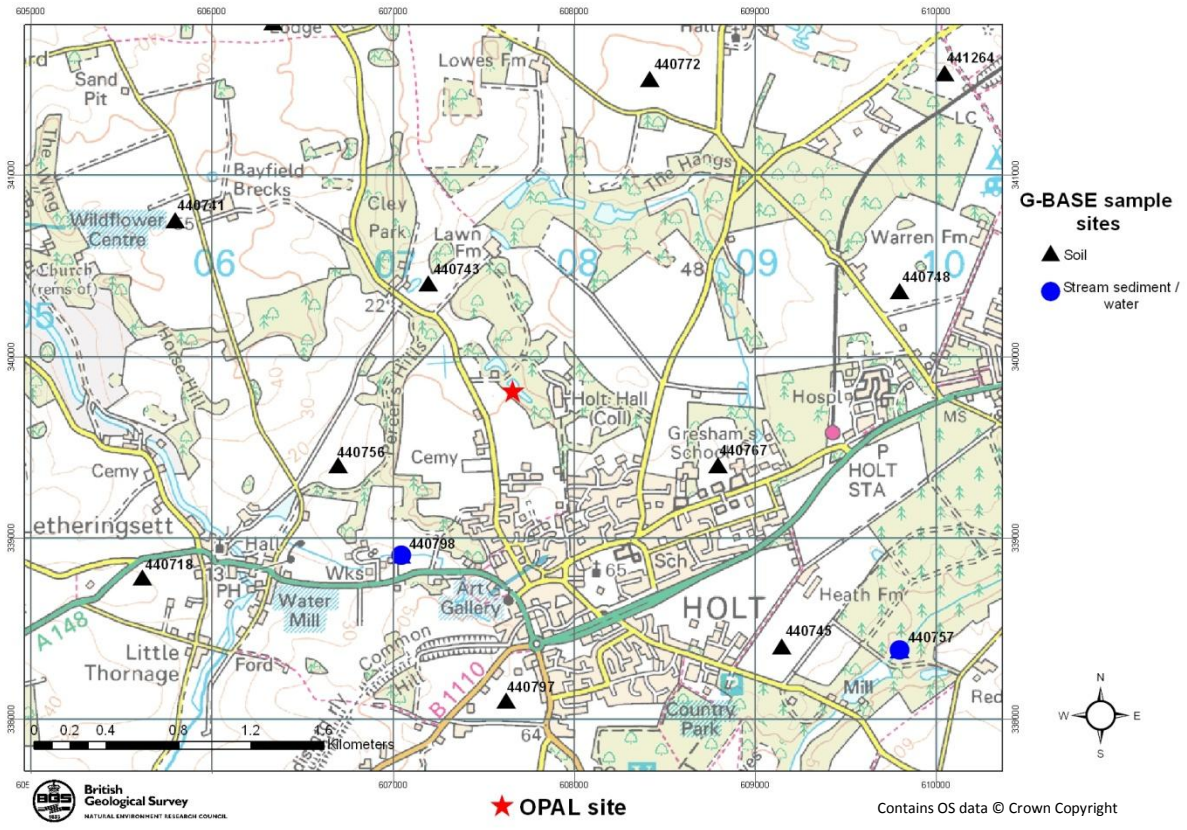


Figure 2.24 G-BASE sample site locations for Holt, 1:50K

Table 6 G-BASE sample locations, Holt

Sample Number	Sample Type	Easting	Northing
440718	S	605620	338780
440741	S	605800	340750
440743	S	607200	340400
440748	S	609800	340360
440756	S	606700	339400
440757	C+W	609800	338380
440767	S	608800	339400
440772	S	608420	341530
440797	S	607630	338100
440798	C+W	607050	338900
441264	S	610050	341560

Sample type: S= Soil, C= Sediment, W= Water

2.6.2 Parent Material

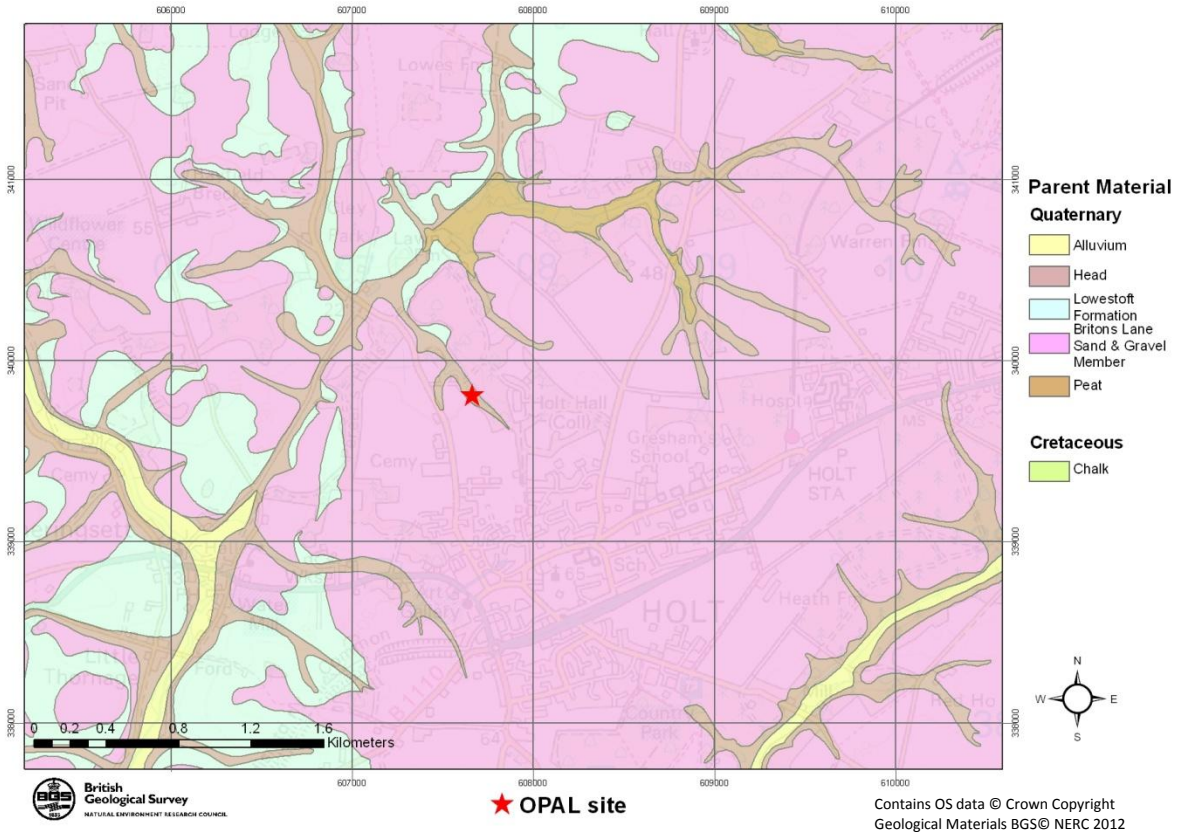


Figure 2.25 Parent material map for Holt

The whole area is underlain by the Cretaceous chalk, which in turn is covered by extensive quaternary deposits of sand and gravel, till, head and alluvium. The OPAL site is situated on head deposits.

2.6.3 Aerial Photograph

Figure 2.26 Aerial photograph of OPAL site, Holt

Figure 2.27 Zoomed in aerial photograph of OPAL site, Holt

2.6.4 Digital Terrain Model

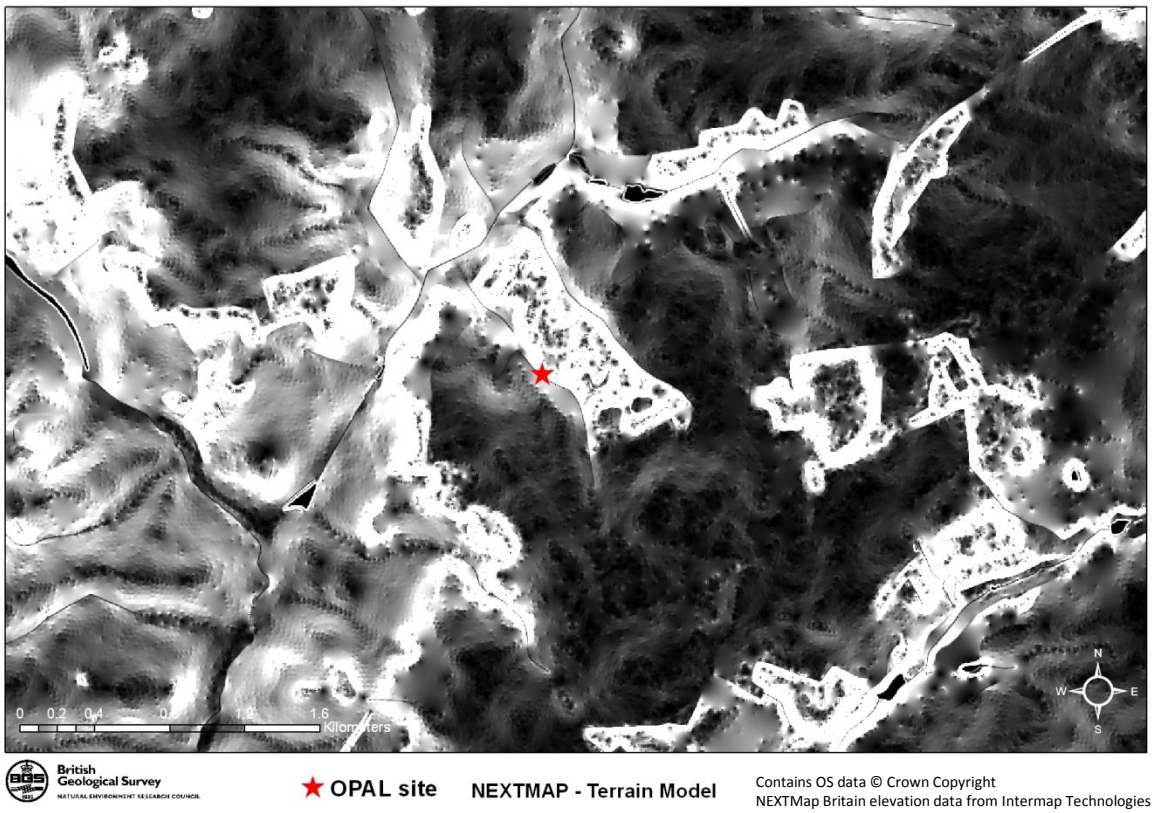


Figure 2.28 DTM of Holt OPAL site

2.7 WAKE VALLEY POND, GREAT MONK WOOD, ESSEX

The Wake Valley pond is manmade and surrounded by woodland. It is located within the M25, south west of Epping, Essex [542069, 198748]. The approximate is size 200m x 75m.

2.7.1 G-BASE Site Locations

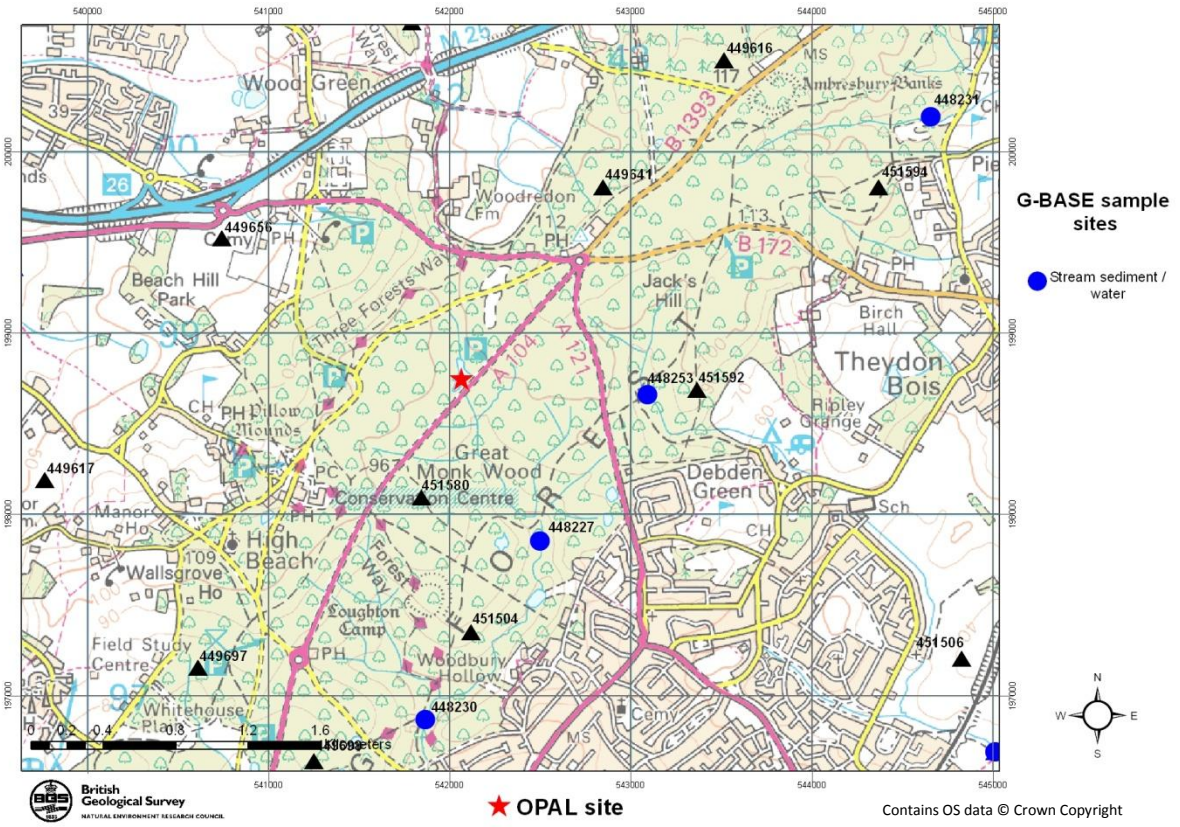


Figure 2.29 G-BASE sample site locations, Wake Valley Pond, 1:50K

Table 7 G-BASE sample locations for Wake Valley Pond

Sample Number	Sample Type	Easting	Northing	Sample Number	Sample Type	Easting	Northing
448227	C+W	542500	197850	449697	S	540614	197153
448230	C+W	541867	196865	449698	S	541253	196638
448231	C+W	544660	200190	451504	S	542120	197350
448253	C+W	543096	198655	451506	S	544829	197204
449616	S	543520	200502	451580	S	541848	198093
449617	S	539769	198189	451592	S	543369	198685
449641	S	542850	199800	451594	S	544372	199800
449656	S	540744	199521				

Sample type: S= Soil, C= Sediment, W= Water

2.7.2 Parent Material

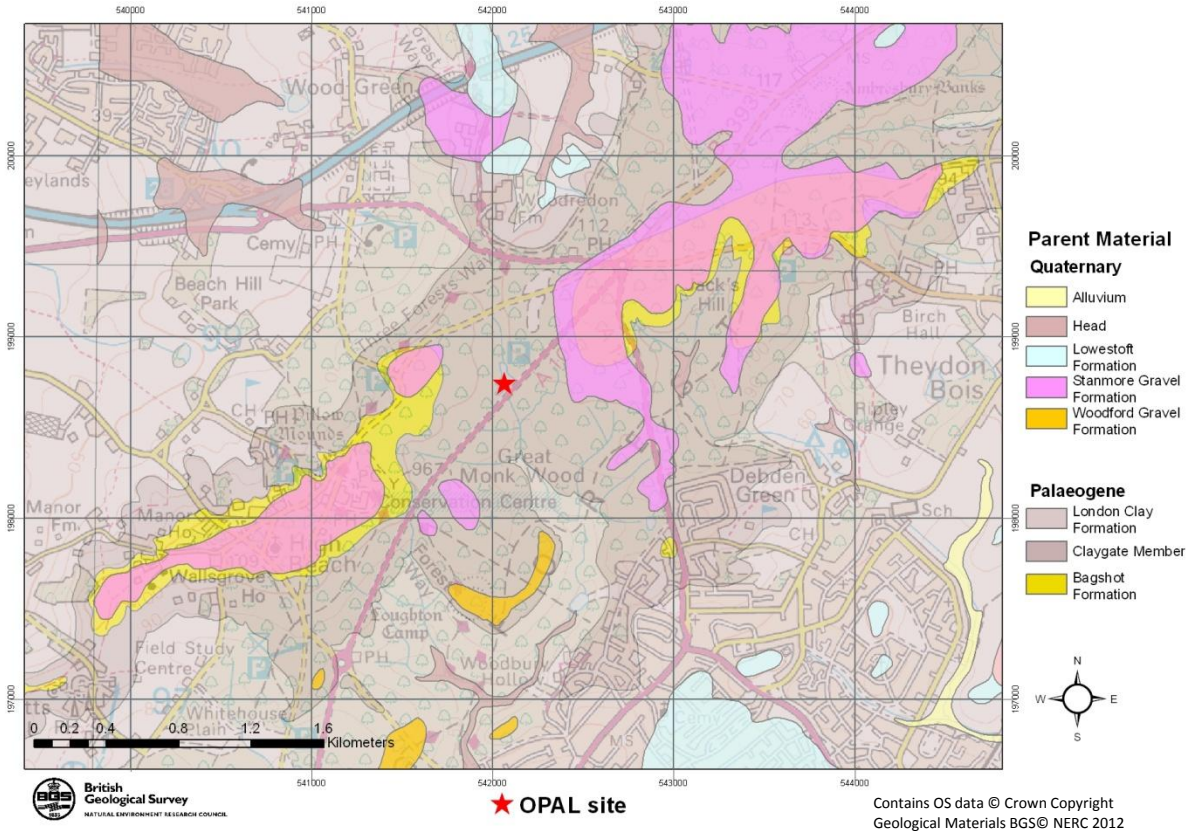


Figure 2.30 Parent material map for Wake Valley Pond.

Wake Valley Pond is situated on the Palaeogene Claygate Member which is the youngest deposit of the London Clay Formation. It forms a transition between the clay and the sandier deposits of the Bagshot formation. Superficial deposits of alluvium and gravel lie to the east and west of the site with till and head deposits to the north and south.

2.7.3 Aerial Photograph

Figure 2.31 Aerial photograph of OPAL site, Wake Valley Pond

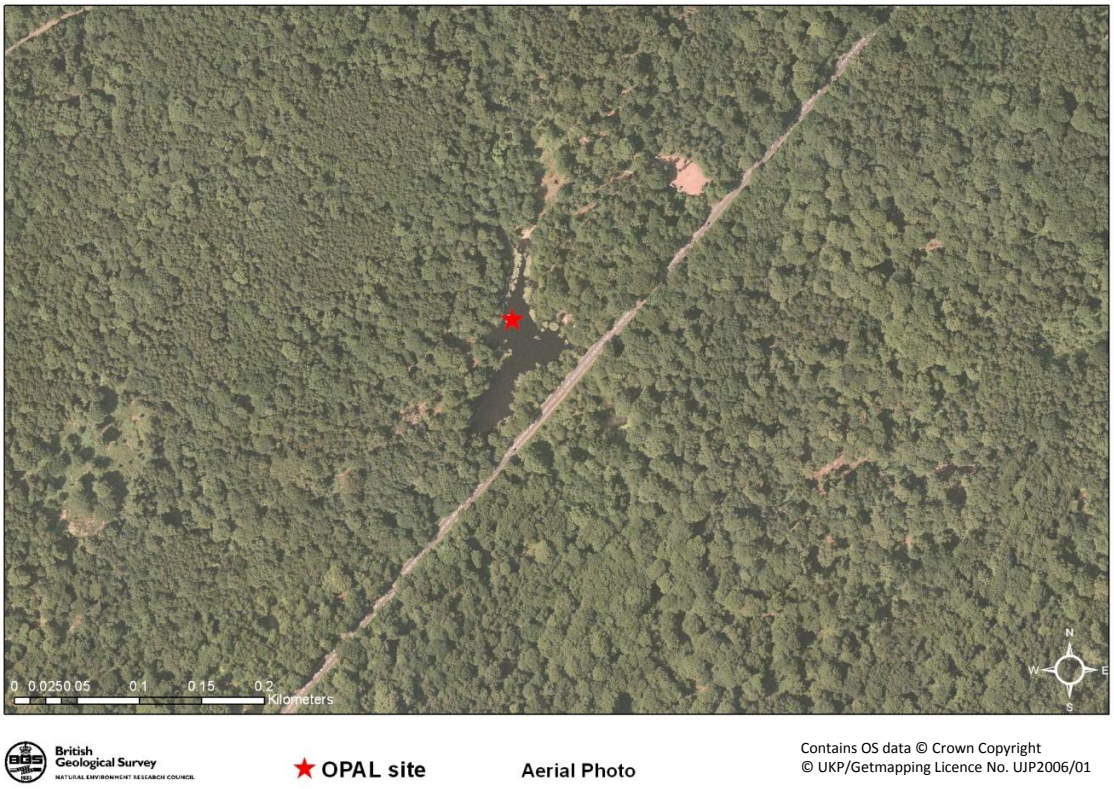


Figure 2.32 Zoomed in aerial photograph Wake Valley Pond OPAL site,

2.7.4 Digital Terrain Model

Figure 2.33 DTM of Wake Valley Pond OPAL site

2.8 SLAPTON LEY, DEVON

Slapton Ley is a lagoon, separated from Start Bay by a shingle beach. It is about 10 km south west of Dartmouth, Devon [282535, 43964] It is the largest freshwater lake in S W England. . The lake is approximately 2400m x 580m. There are currently no G-BASE sample data from this area.

2.8.1 Ordnance Survey Topographic Map 1:50K

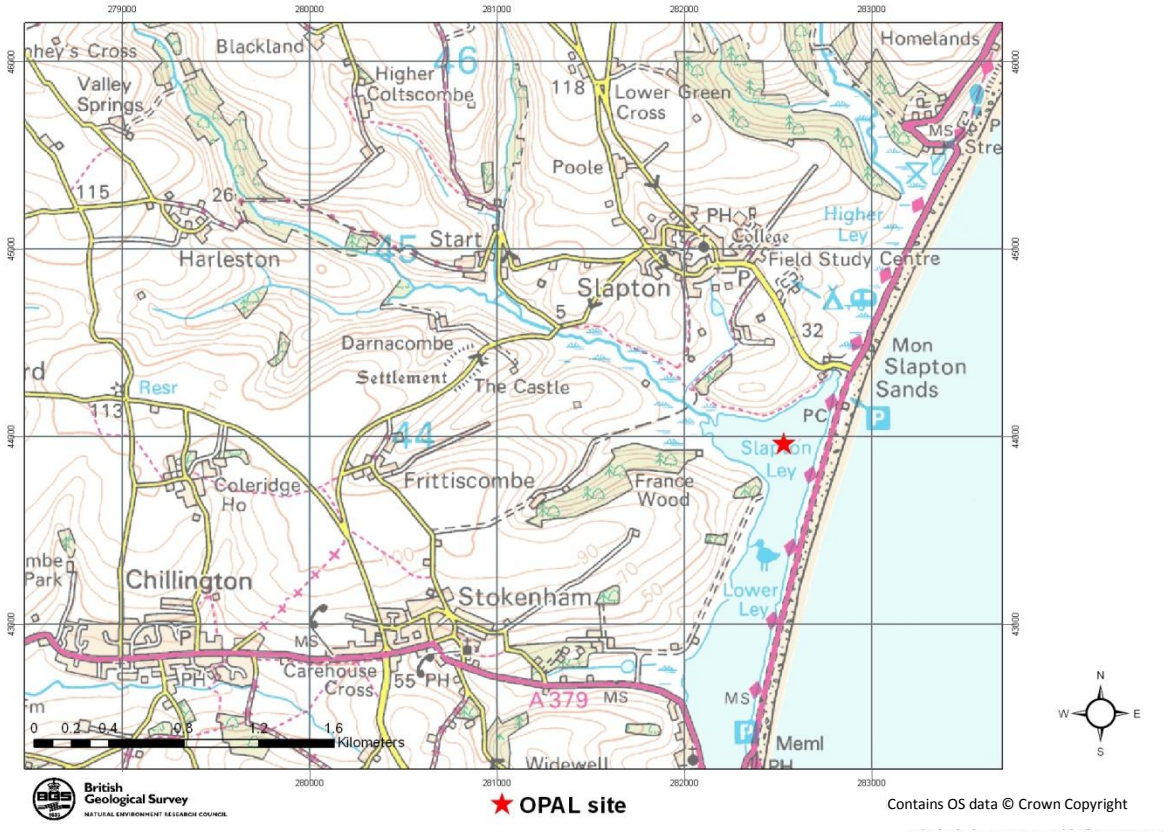


Figure 2.34 1:50K OS topographic map of OPAL site, Slapton Ley

2.8.2 Parent Material

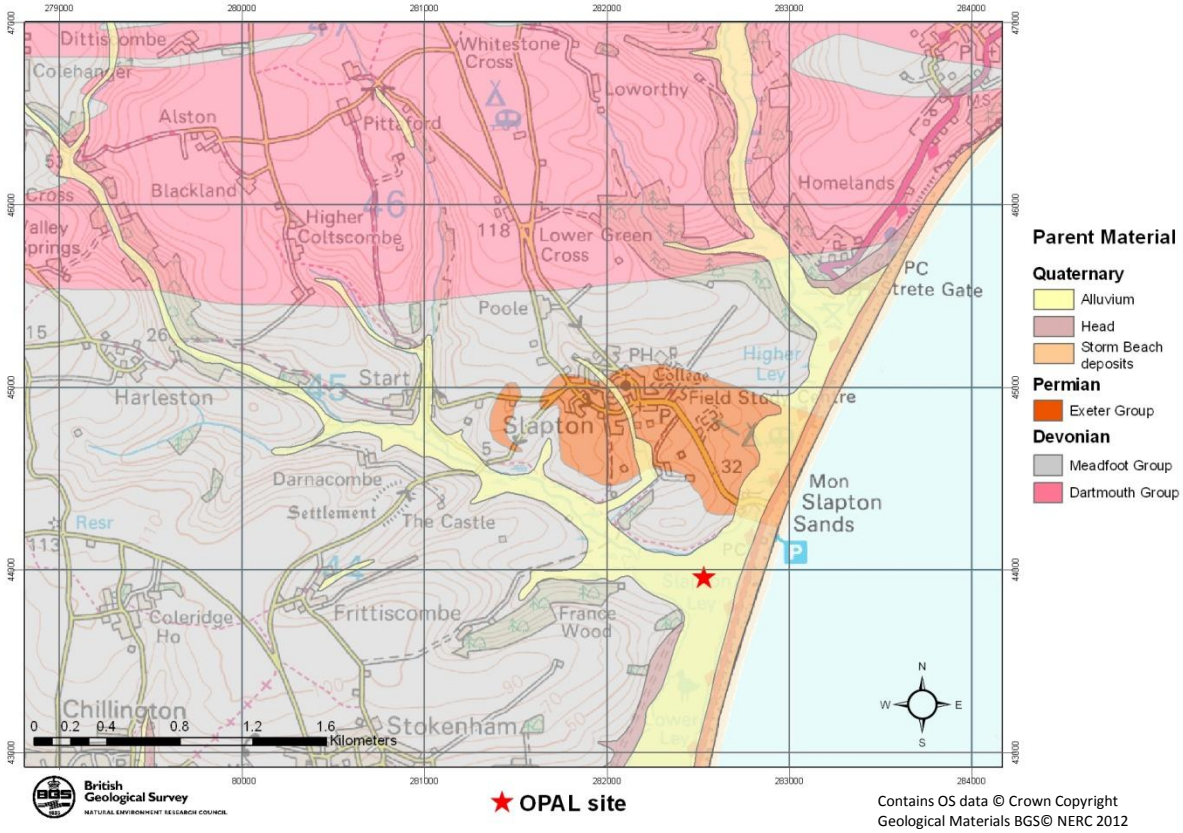


Figure 2.35 Parent Material Map for Slapton Ley

The OPAL sediment site for Slapton Ley is situated on alluvial deposits from the tributary it is fed by. These deposits overlay the Devonian and Permian slates, siltstones and sandstones from the Dartmouth, Meadfoot and Exeter Groups

2.8.3 Aerial Photograph

Figure 2.36 Aerial photograph of OPAL site, Slapton Ley

2.8.4 Digital Terrain Model

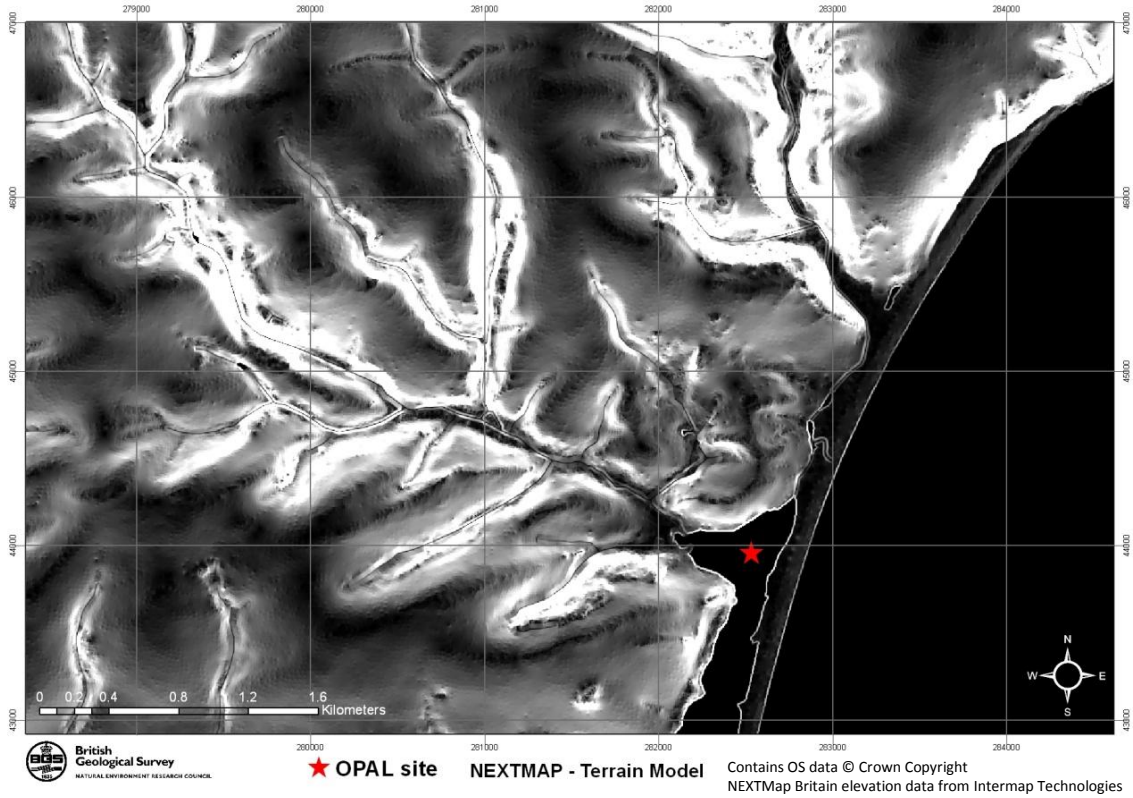


Figure 2.37 DTM of Slapton Ley OPAL site

2.9 FLEET POND, HAMPSHIRE

Fleet Pond in Fleet, Hampshire is a man made pond thought to have been in existence since 1200 [482306, 154921]. It is an SSSI and local nature reserve. It is approximately 500m x 600m. There are no currently no G-BASE data available from this area.

2.9.1 Ordnance Survey Topographic Map 1:50K

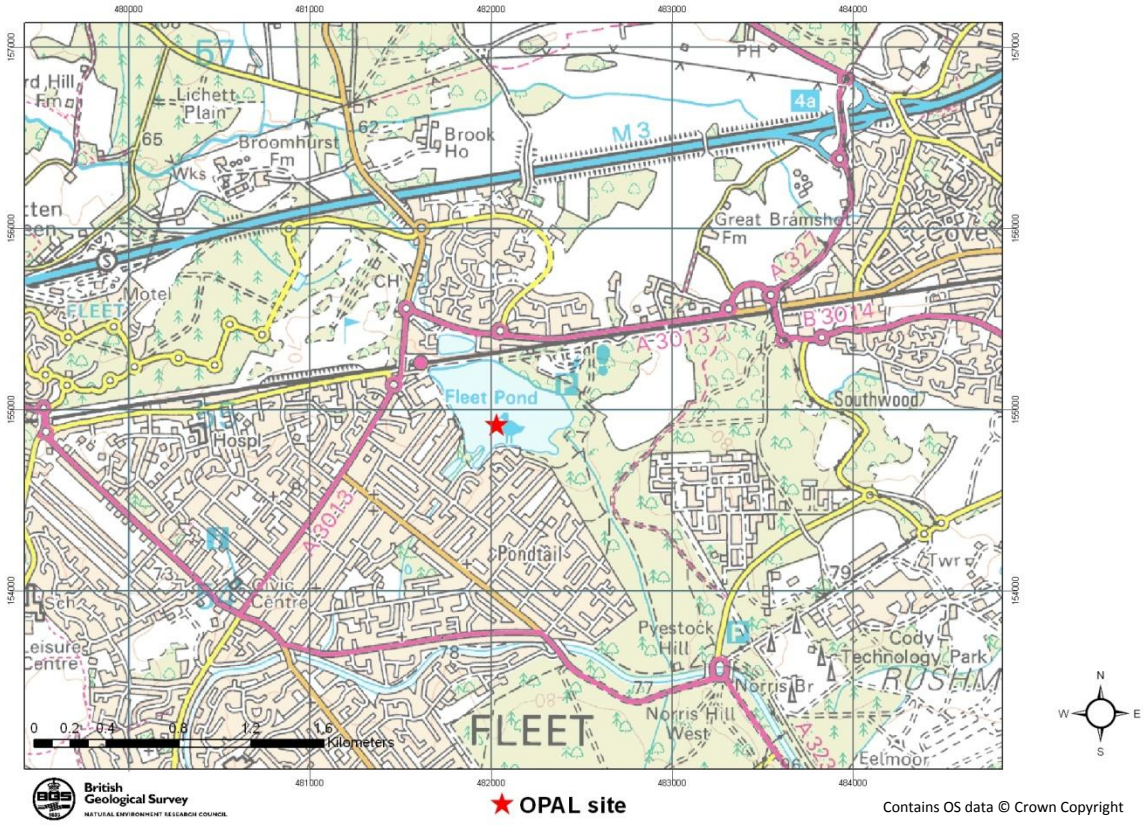


Figure 2.38 1:50K OS topographic map of OPAL site at Fleet Pond

2.9.2 Parent Material

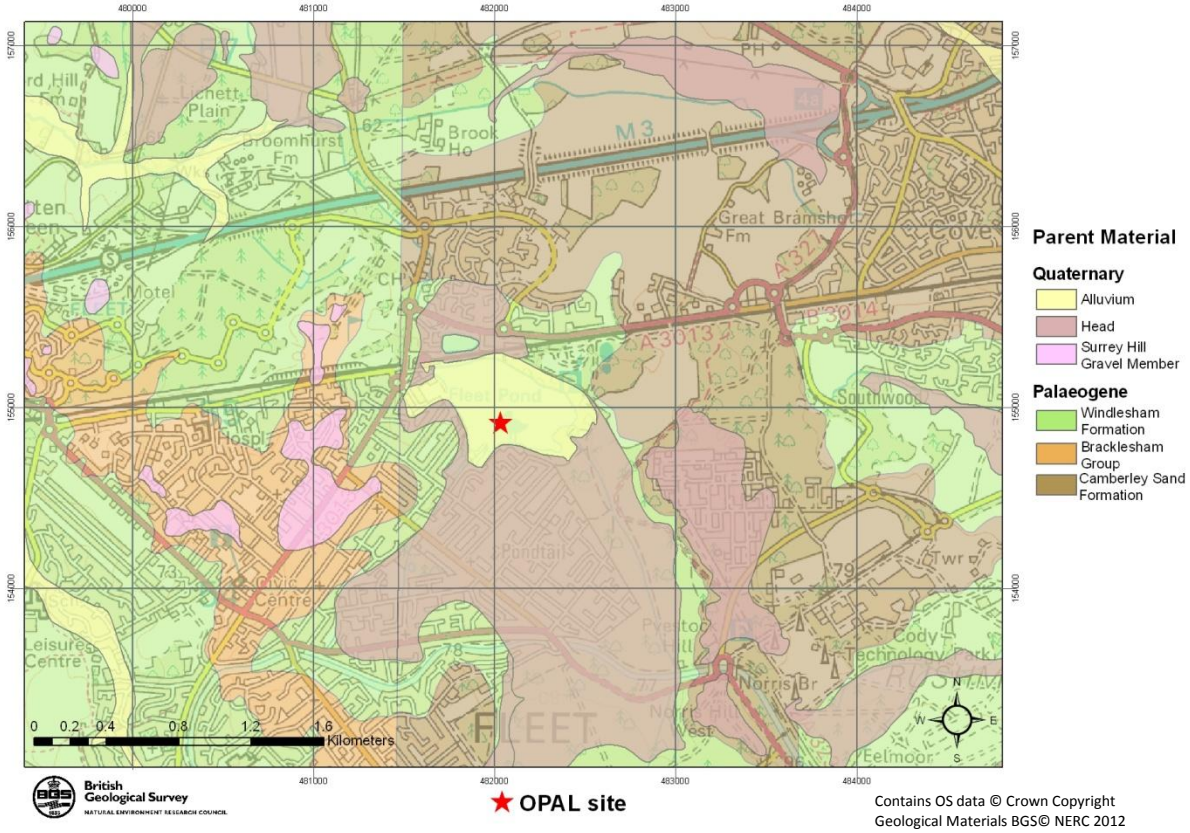


Figure 2.39 Parent Material Map for Fleet Pond

Fleet Pond is situated directly on alluvial deposits that overlay head deposits and ultimately the Palaeogene Windlesham Formation (sand).

2.9.3 Aerial Photograph

Figure 2.40 Aerial photograph of OPAL site, Fleet Pond

2.9.4 Digital Terrain Model

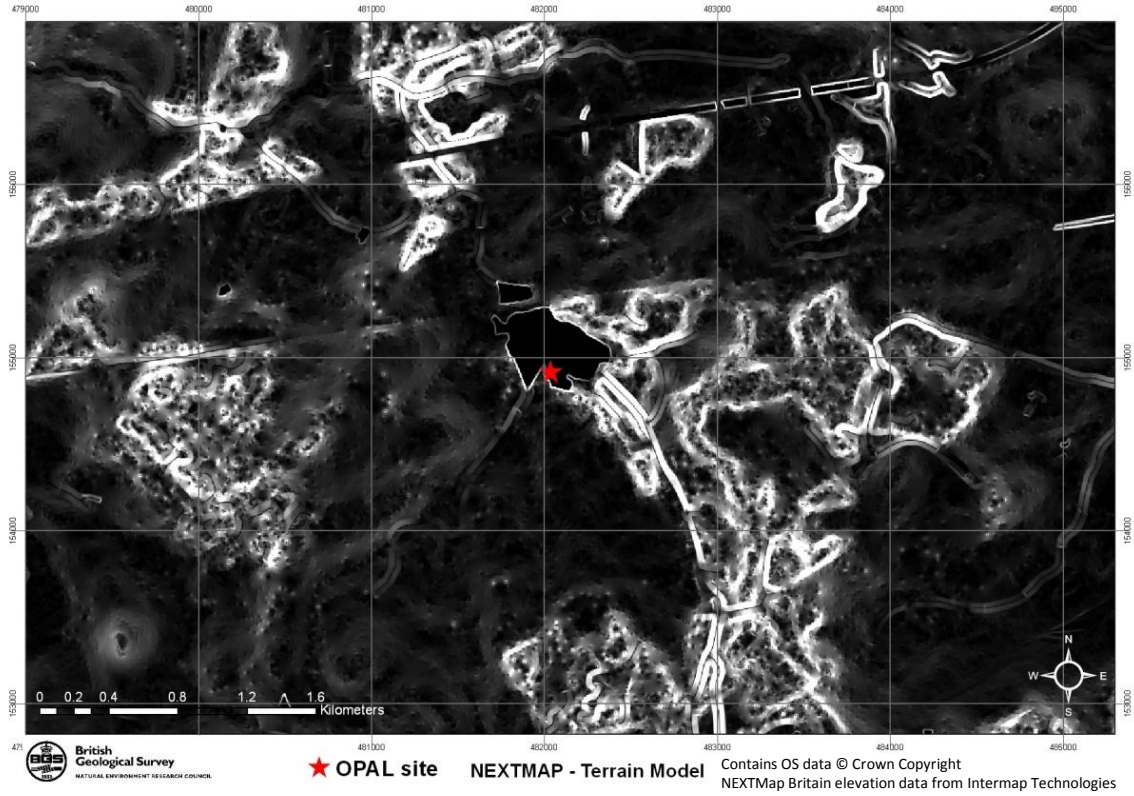


Figure 2.41 DTM Fleet Pond OPAL site

3 Phase 2 Site Descriptions

3.1 ALRESFORD HALL LAKE, ESSEX

The site is a small lake formed within Sixpenny Brook, south of Alresford Hall, east Essex [607202 220124]. It is approximately 165 x 45 m in size.

3.1.1 G-BASE Site Locations

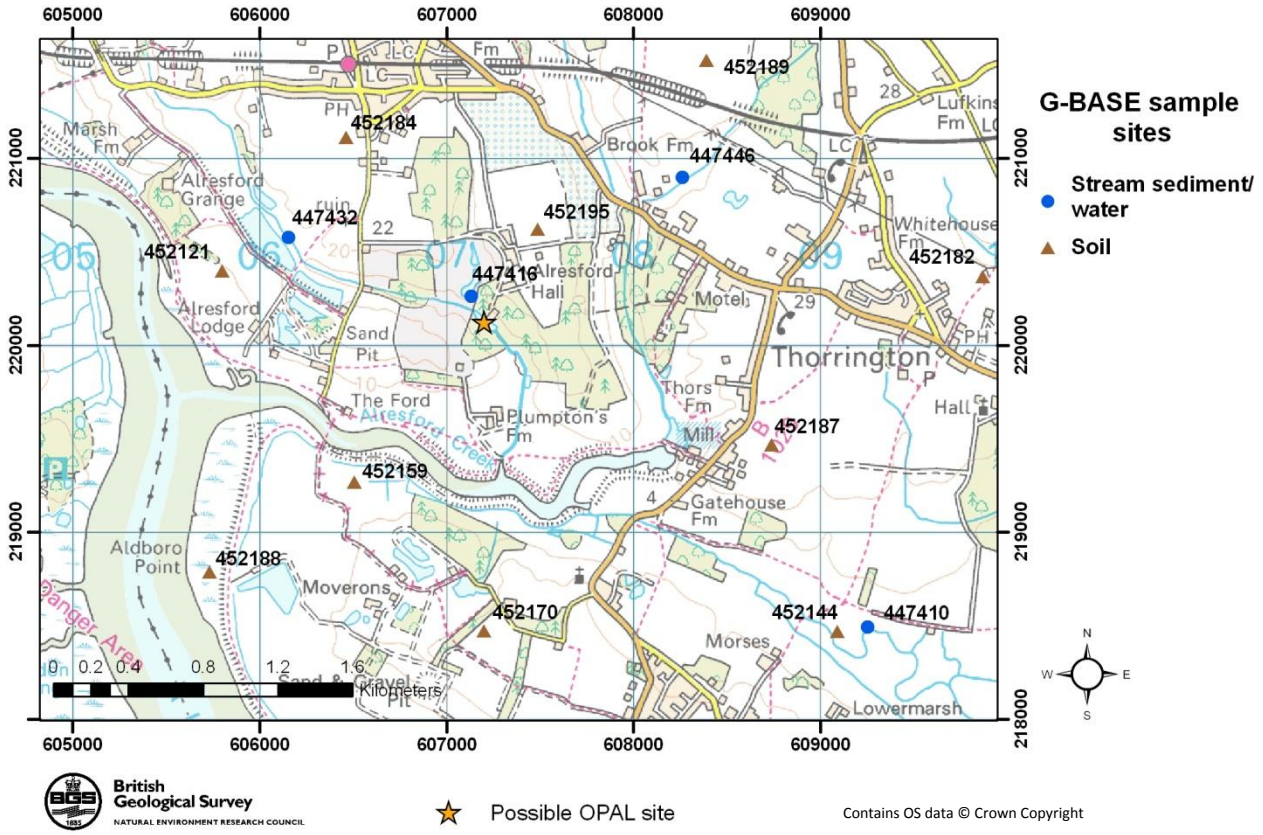


Figure 3.1 G-BASE sample site locations for Alresford Hall lake

Table 8 G-BASE sample locations for Alresford Hall lake

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
447410	C+W	609256	218495	452159	S	606507	219266
447416	C+W	609256	218495	452170	S	607201	218470
447432	C+W	606154	220578	452195	S	607489	220618
447446	C+W	608262	220899	452189	S	608393	221522
452193	S	604774	221435	452187	S	608739	219464
452188	S	605732	218785	452114	S	609092	218466
452121	S	605801	220394	452182	S	609870	220365
452184	S	606464	221110				

Sample type: S= Soil, C= Sediment, W= Water

3.1.2 Parent Material

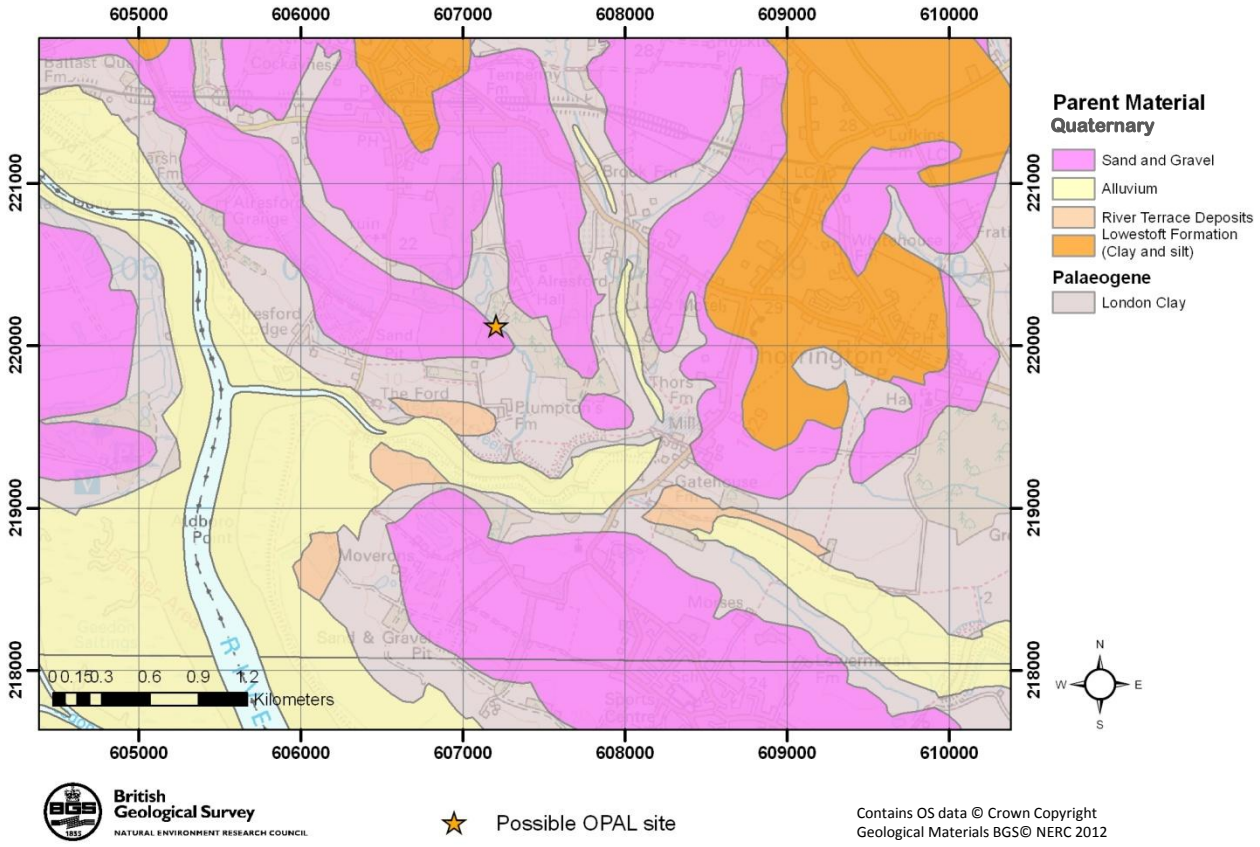


Figure 3.2 Parent Material map for Alresford Hall lake.

The area is completely underlain by Palaeogene deposits of London Clay, which consists of relatively homogenous clay. The lake may be influenced by adjacent sand and gravel deposits

3.1.3 Aerial Photographs

Figure 3.3 Aerial photograph of Alresford Hall lake, near Colchester

Figure 3.4 Zoomed in aerial photograph of Alresford Hall lake, near Colchester

3.1.4 Digital Terrain model

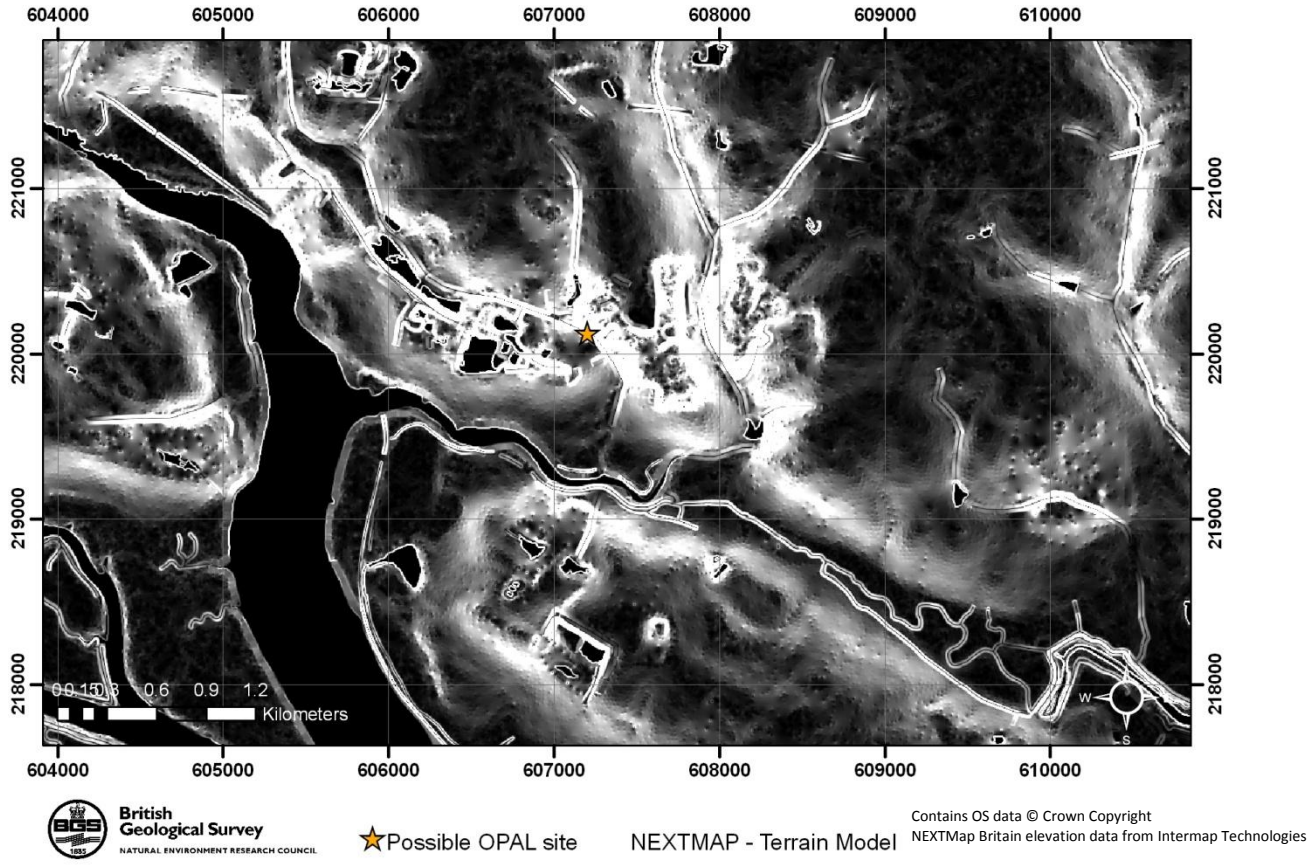


Figure 3.5 DTM of Alresford Hall lake, near Colchester

3.2 BLACKBROOK RESERVOIR, NEAR LOUGHBOROUGH

Blackbrook Reservoir is an artificial lake situated approximately 8 km south west of Loughborough [445881, 317404]. The reservoir is approximately 980 m x 450 m.

3.2.1 G-BASE Site Locations

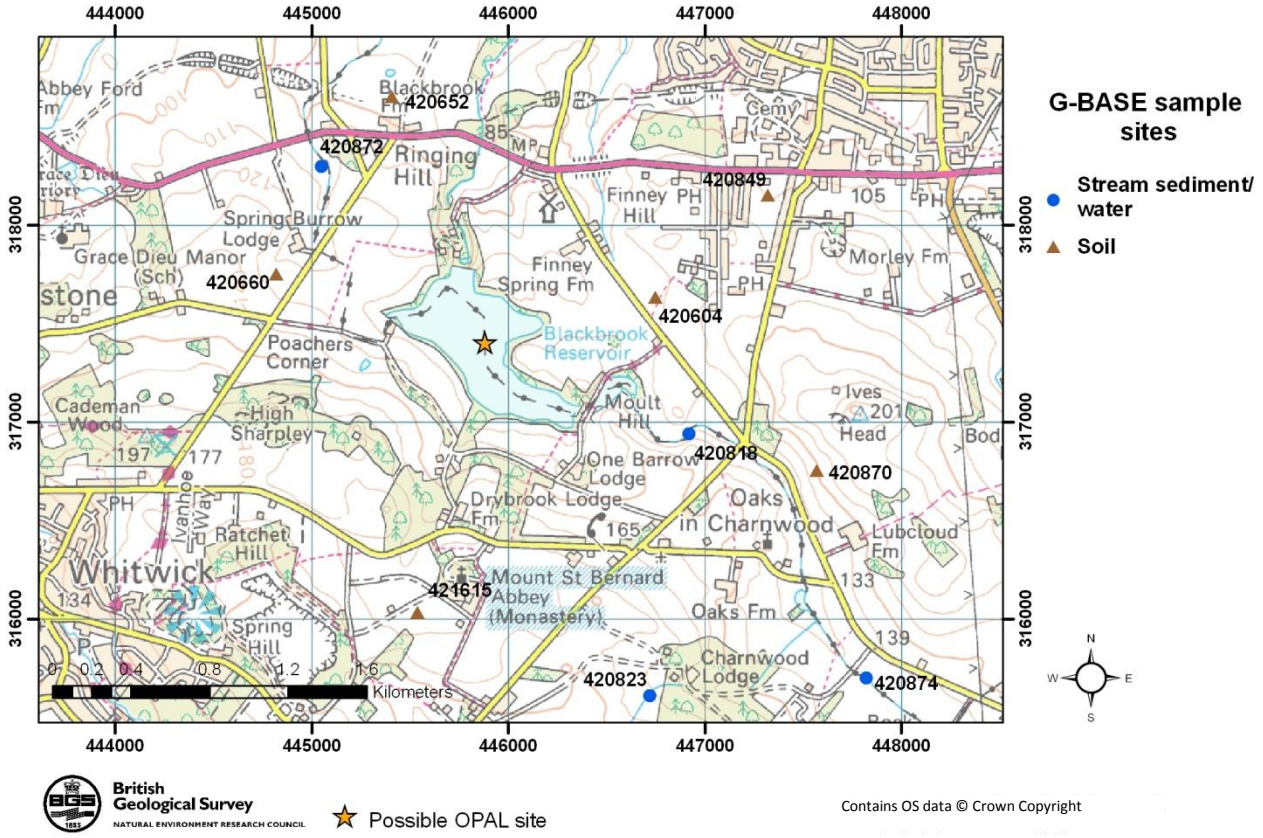


Figure 3.6 G-BASE sample site locations for Blackbrook Reservoir

Table 9 G-BASE sample locations for Blackbrook Reservoir

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
420672	C+W	445050	318300	420604	S	446750	317630
420818	C+W	446920	316940	420652	S	445410	318650
420823	C+W	446720	315610	420660	S	444820	317750
420874	C+W	447820	315700	420849	S	447320	318150
421615	S	445540	316030	420870	S	447570	316750

Sample type: S= Soil, C= Sediment, W= Water

3.2.2 Bedrock Geology

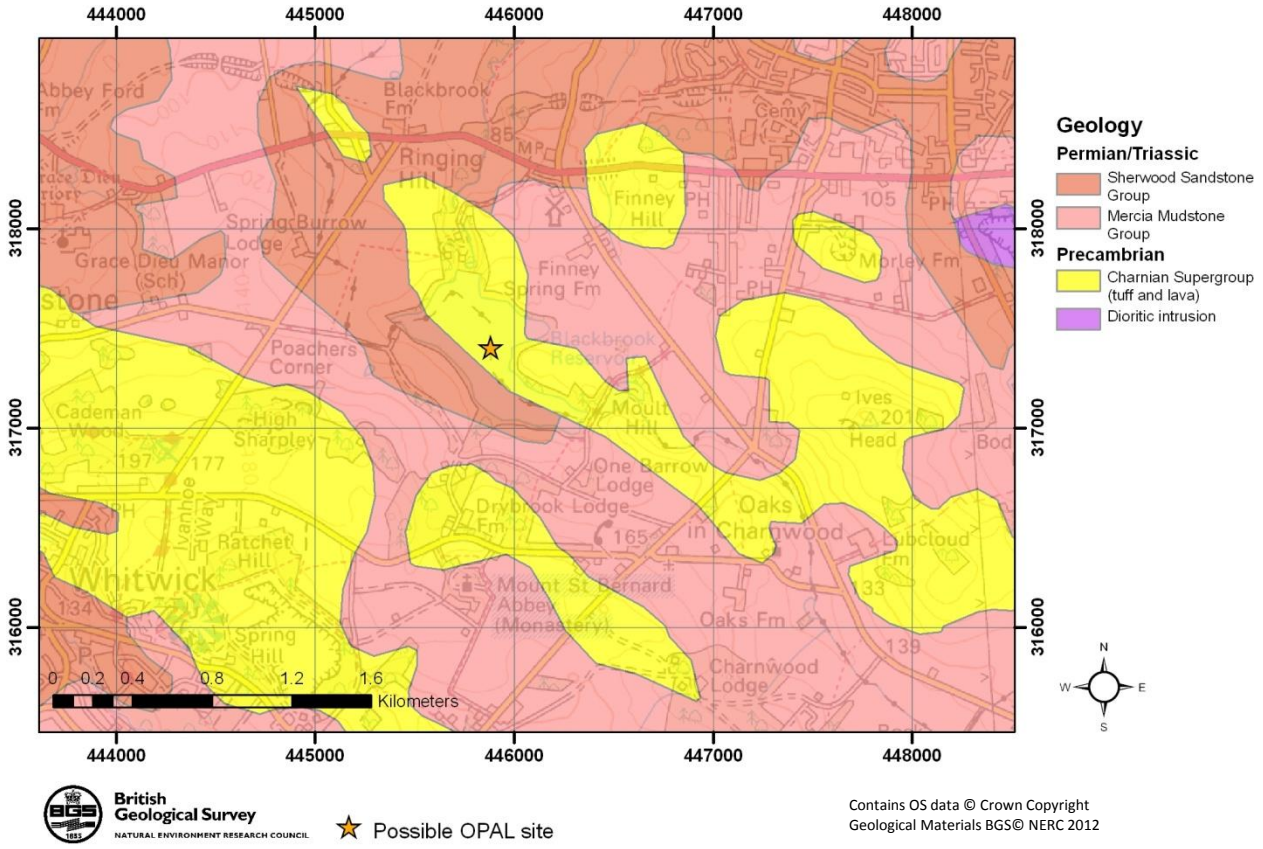


Figure 3.7 Bedrock geology map for Blackbrook Reservoir

The area is underlain by a combination of Permian and Triassic sedimentary rocks and Precambrian igneous rocks. The reservoir is underlain by a combination of Sherwood Sandstone, and tuff and lava. The proximity to Mercia Mudstone Group rocks means that these could also influence the site.

3.2.3 Quaternary Deposits

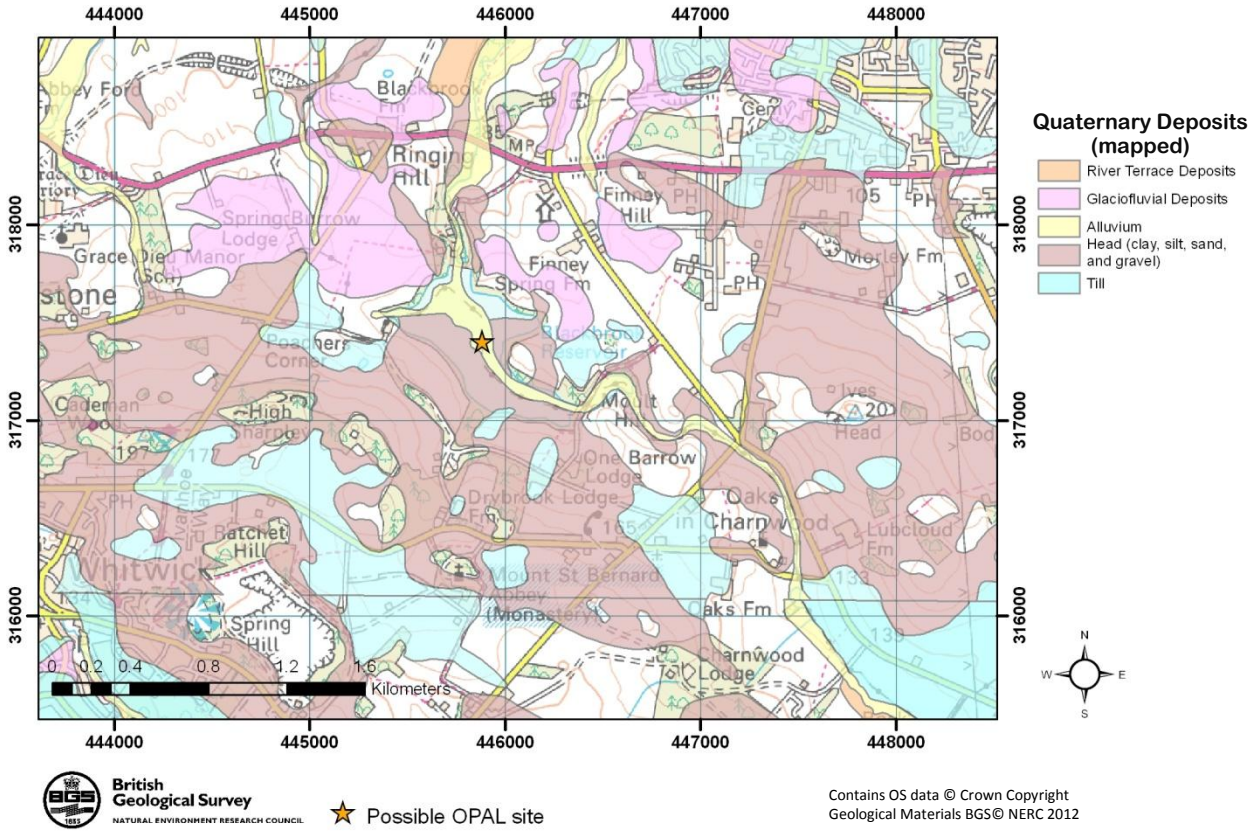


Figure 3.8 Quaternary Map for Blackbrook Reservoir

Blackbrook Reservoir is underlain by head and alluvium, which follows the course of the river, dammed to create Blackbrook Reservoir.

3.2.4 Aerial Photograph

Figure 3.9 Aerial photograph of Blackbrook Reservoir

3.2.5 Digital Terrain Model

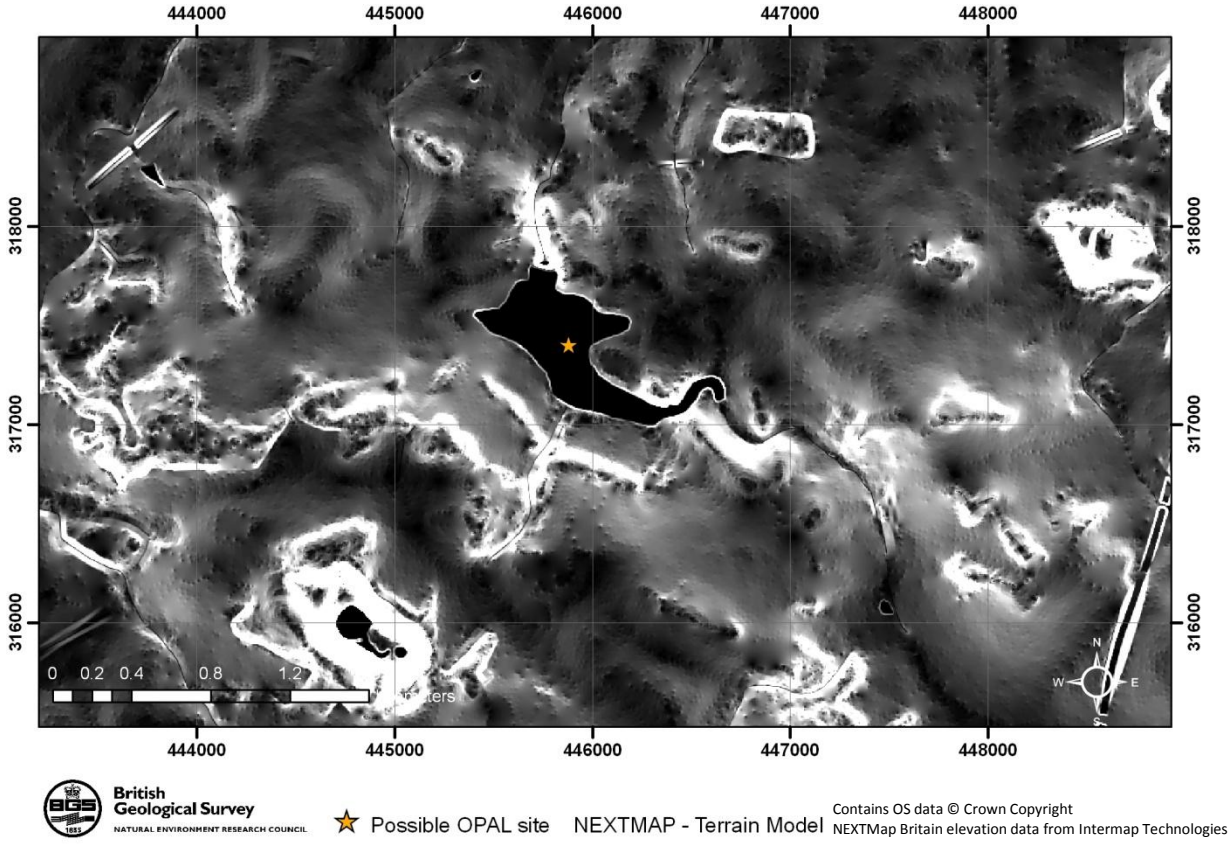


Figure 3.10 DTM of Blackbrook Reservoir

3.3 BLAGDON LAKE, DEVON

Blagdon Lake is a natural lake situated within the Tamar catchment [237499, 96385]. The lake is approximately 260 m x 170 m

3.3.1 G-BASE Site Locations

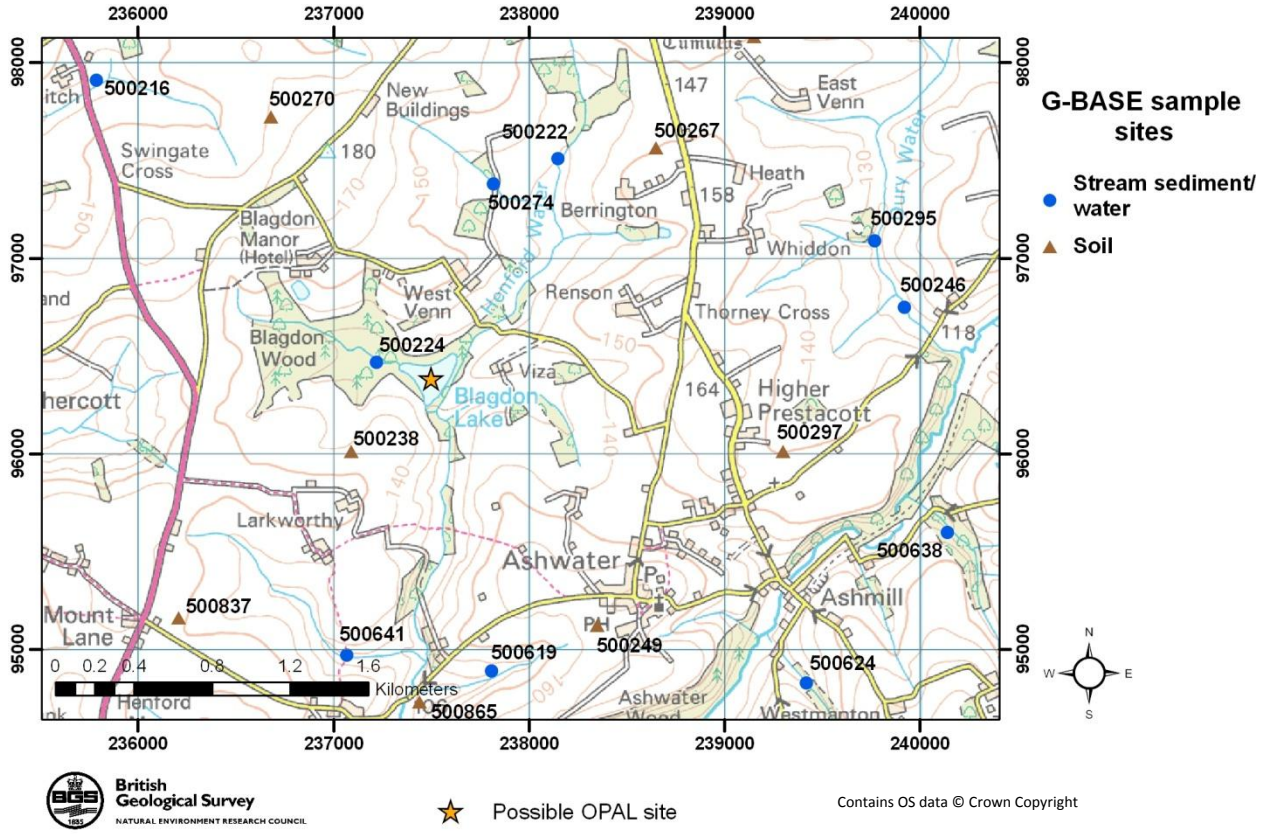


Figure 3.11 G-BASE sample site locations for Blagdon Lake

Table 10 G-BASE sample locations for Blagdon Lake

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
500216	C+W	235790	97910	500641	C+W	237070	94970
500222	C+W	238150	97510	500297	S	239300	96010
500224	C+W	237220	96470	500267	S	238650	97560
500246	C+W	239920	96750	500249	S	238350	95120
500274	C+W	237820	97380	500865	S	237440	94730
500295	C+W	239770	97090	500238	S	237090	96010
500619	C+W	237810	94890	500270	S	236680	97720
500624	C+W	239420	94830	500837	S	236210	95160
500638	C+W	240140	95600				

Sample type: S= Soil, C= Sediment, W= Water

3.3.2 Parent Material

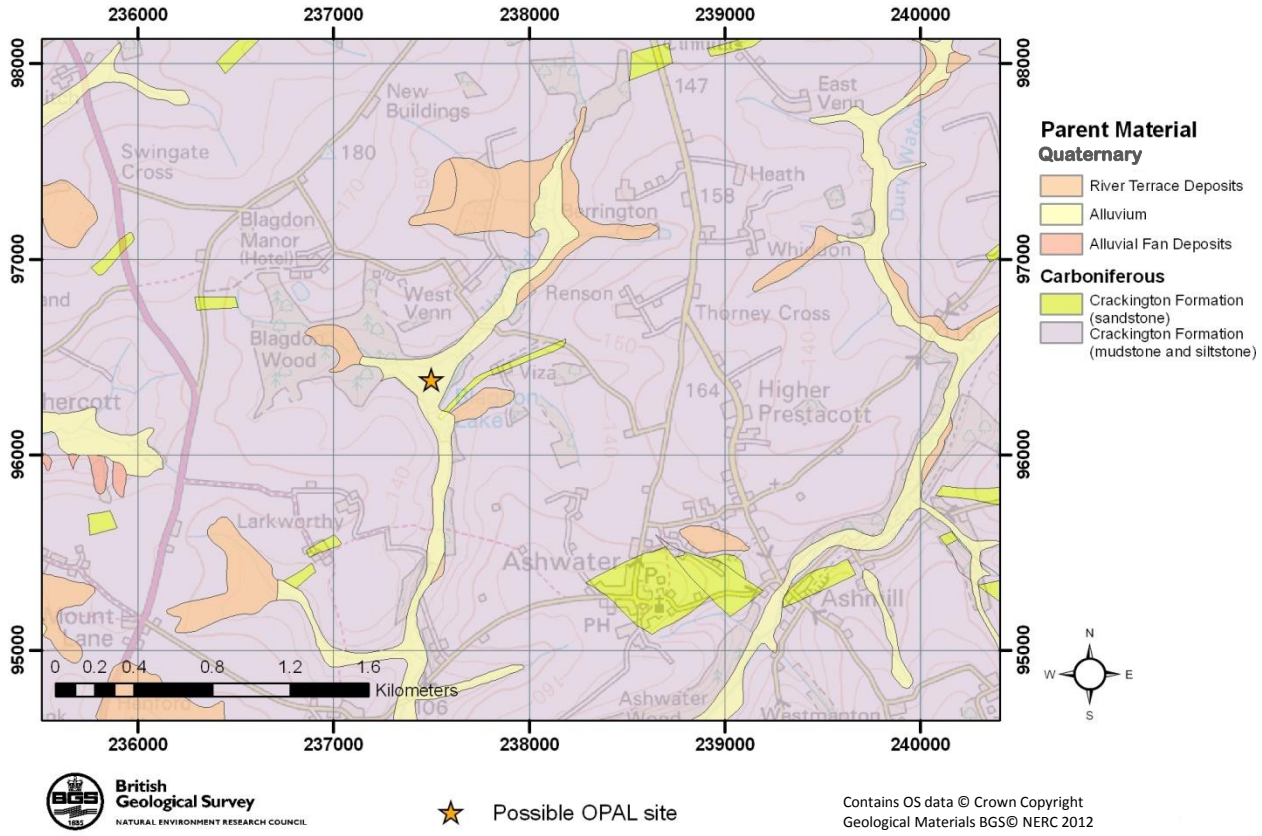


Figure 3.12 Parent material map for Blagdon Lake

The area is completely underlain by Carboniferous sedimentary rocks of the Crackington Formation, mainly comprising mudstone and siltstone. The lake is situated on alluvial deposits.

3.3.3 Aerial Photographs

Figure 3.13 Aerial photograph of Blagdon Lake

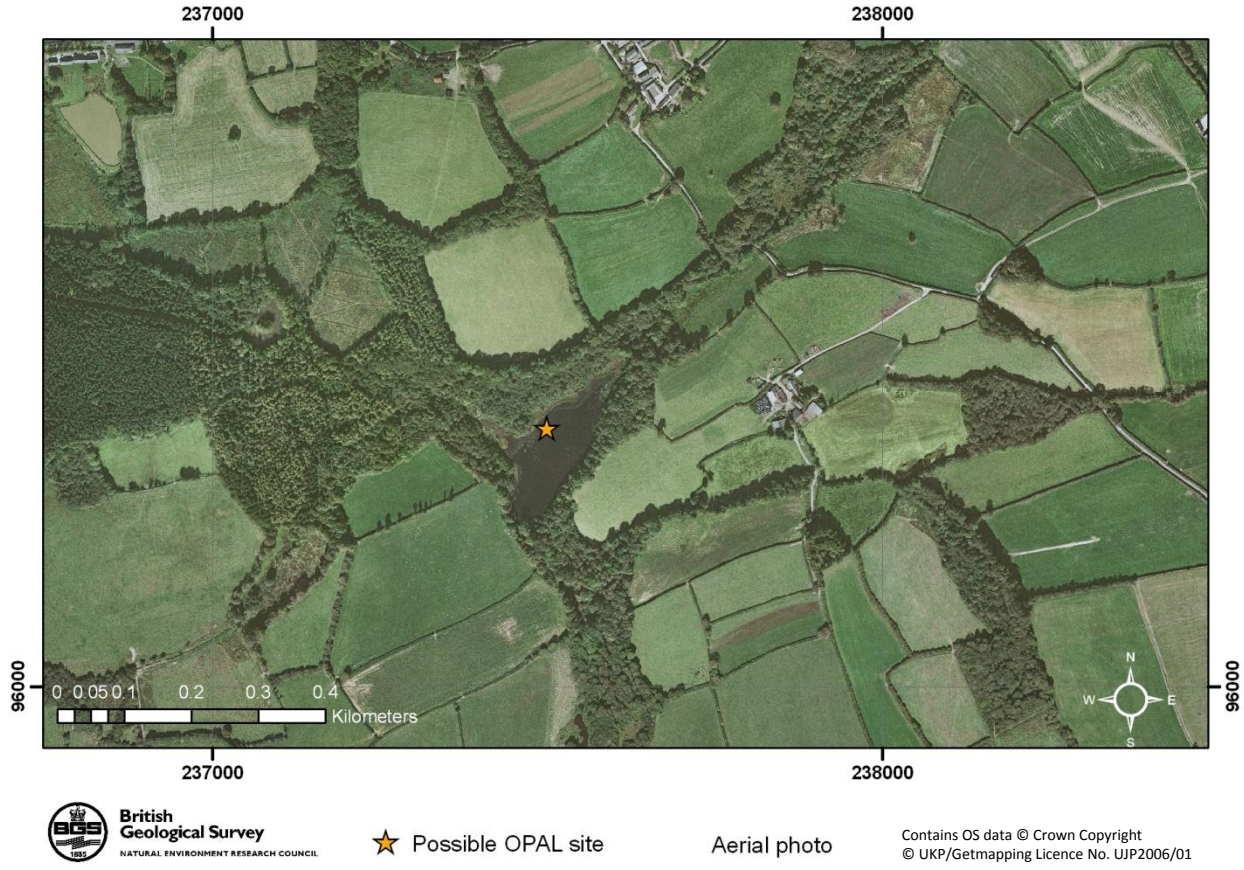


Figure 3.14 Zoomed in aerial photograph of Blagdon Lake

3.3.4 Digital Terrain Model

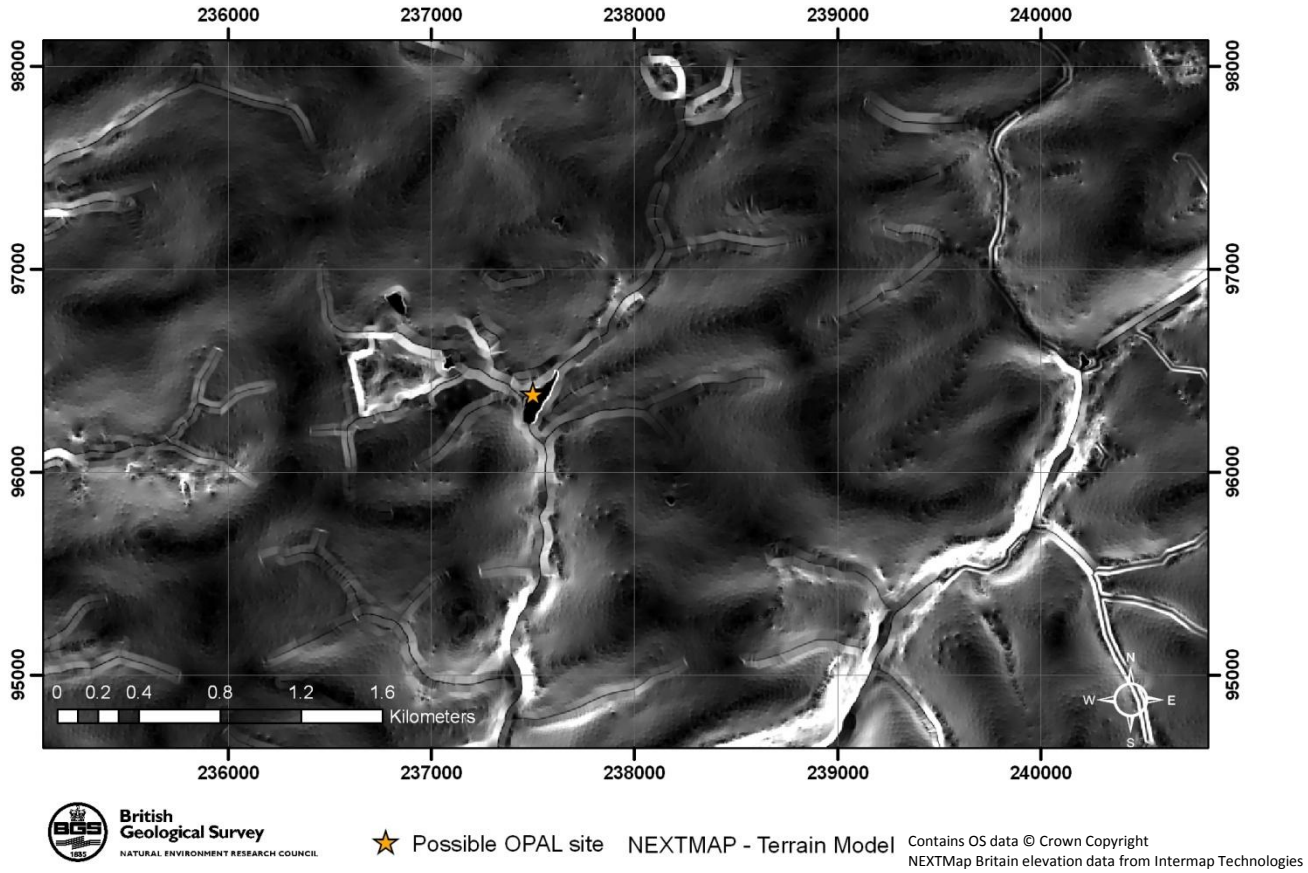


Figure 3.15 DTM of Blagdon Lake

3.4 BLEA TARN, CUMBRIA

Blea tarn is a natural upland tarn situated in the centre of the Lake District [329133, 514092]. It is approximately 530m x 220m. Blea Tarn was selected as one of UCL's calibration sites, and was sampled on 25th June 2011.

3.4.1 G-BASE Site Locations

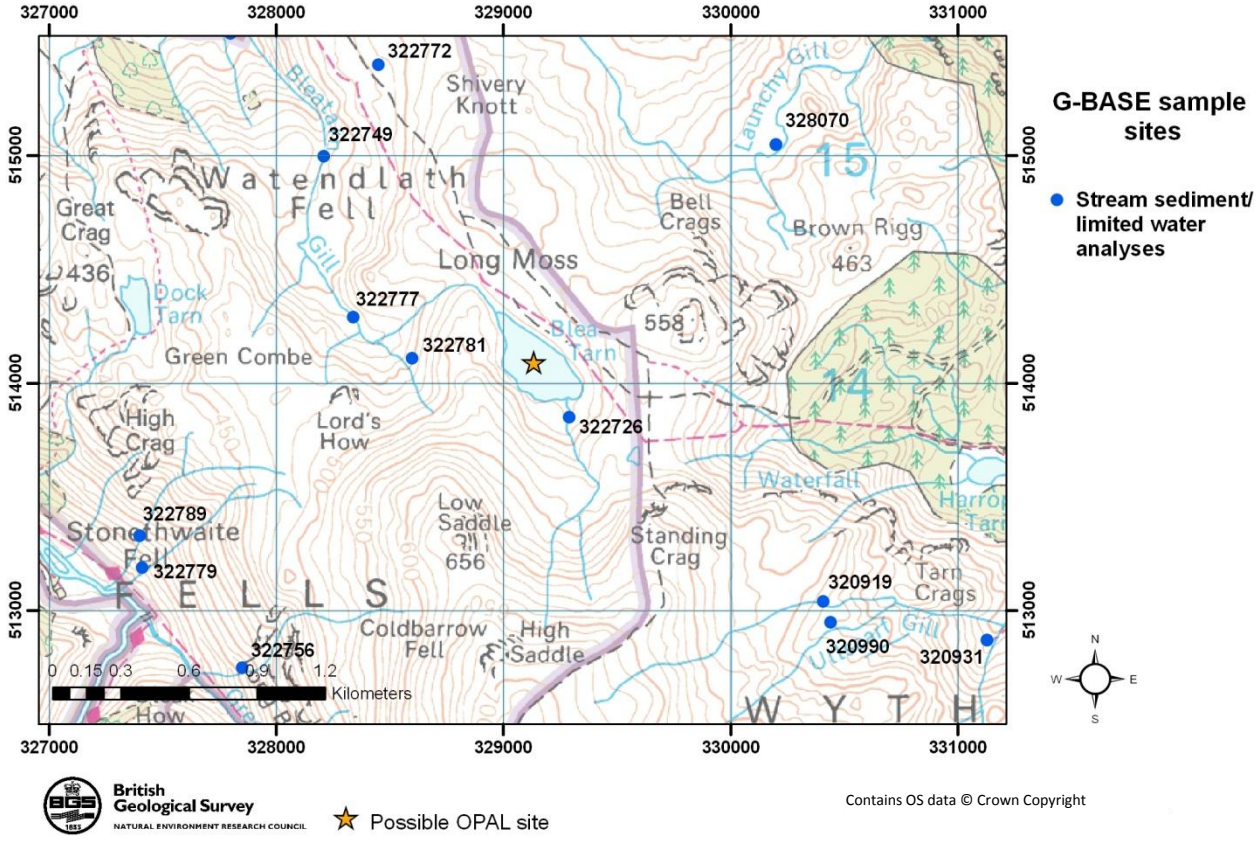


Figure 3.16 G-BASE sample site locations for Blea Tarn

Table 11 G-BASE sample locations for Blea tarn

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
322726	C+(limited)W	329290	513850	322749	C+(limited)W	328210	515000
322779	C+(limited)W	327410	513190	320990	C+(limited)W	330440	512950
322781	C+(limited)W	328600	514110	320919	C+(limited)W	330410	513040
322789	C+(limited)W	327400	513330	320931	C+(limited)W	331130	512870
322772	C+(limited)W	328450	515400	320931	C+(limited)W	331130	512870
322777	C+(limited)W	328340	514290	328070	C+(limited)W	330200	515050
322756	C+(limited)W	327850	512750	328070	C+(limited)W	330200	515050

Sample type: C= Sediment, W= Water

3.4.2 Parent Material

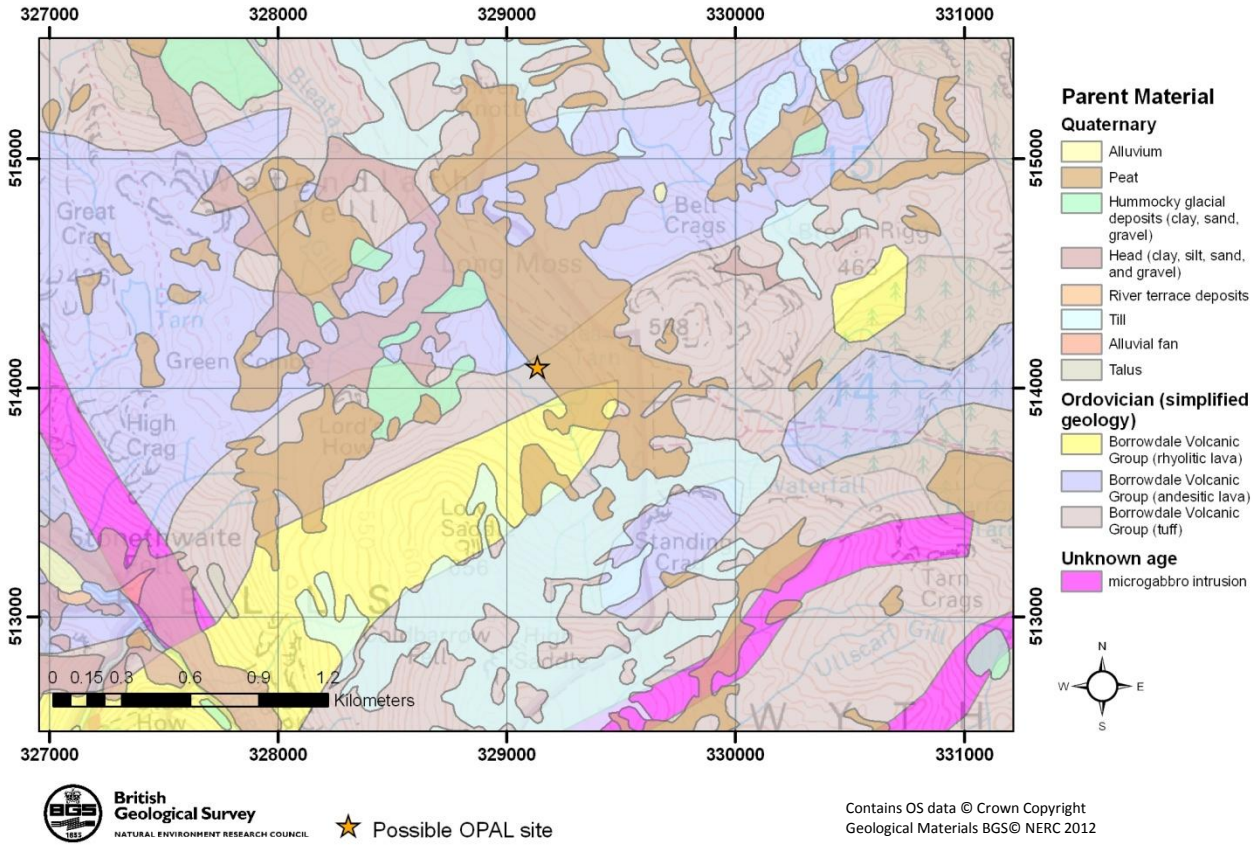


Figure 3.17 Parent material map for Blea Tarn

The area is mainly underlain by the Borrowdale Volcanic Group, and Blea Tarn is underlain by rhyolite, andesite and tuff. About half the lake is situated upon peat deposits.

3.4.3 Aerial Photographs

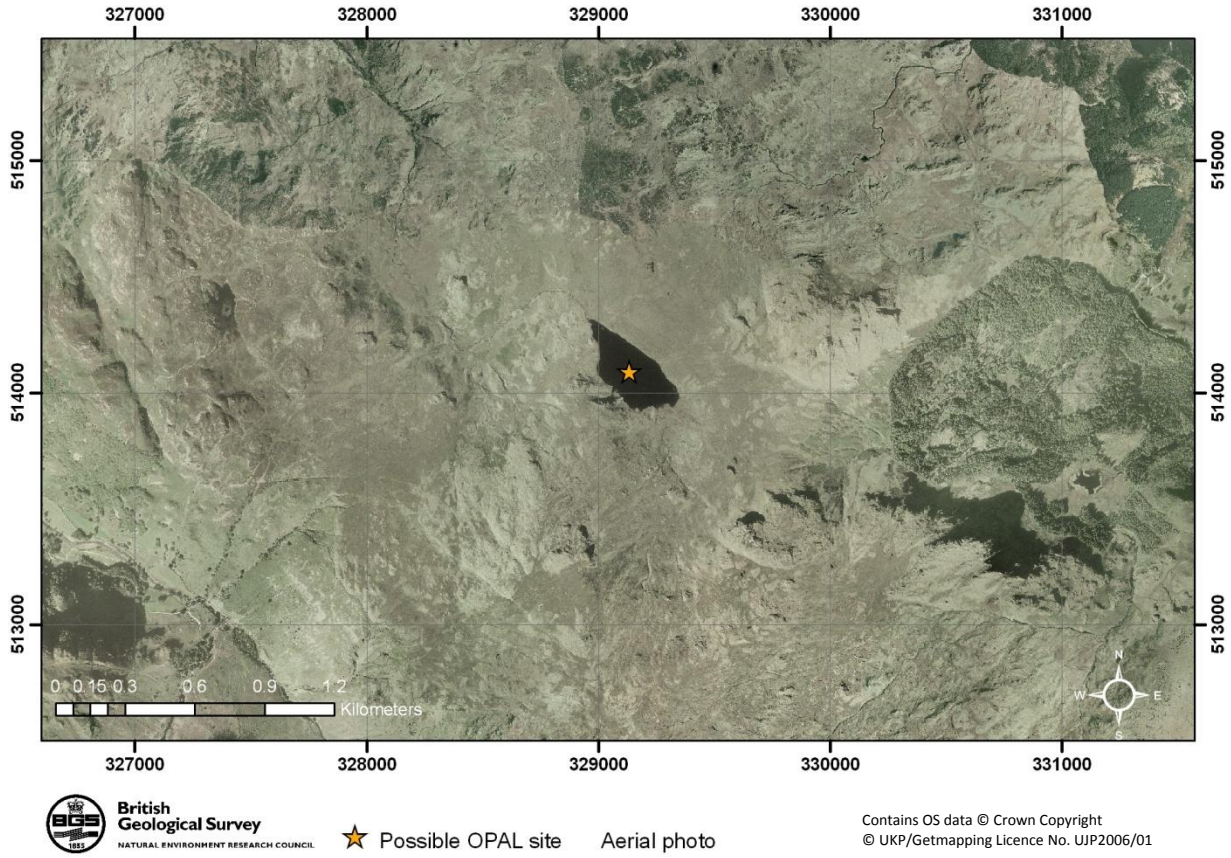


Figure 3.18 Aerial photograph of Blea Tarn

3.4.4 Digital Terrain Model

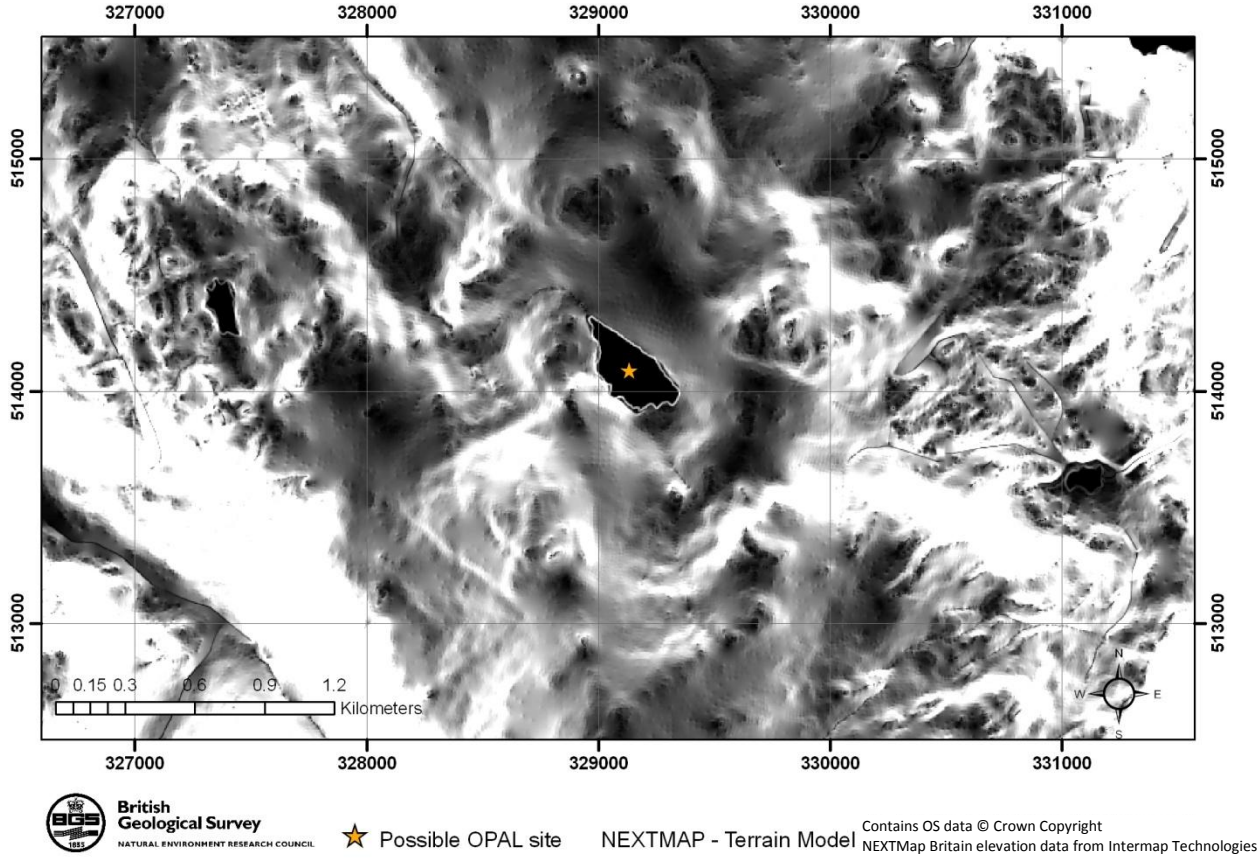


Figure 3.19 DTM of Blea Tarn

3.5 BRENT PELHAM POND, HERTFORDSHIRE

The site is a pond in the village of Brent Pelham in Hertfordshire [543571, 230855]. It is approximately 100 m x 33 m.

3.5.1 G-BASE Site Locations

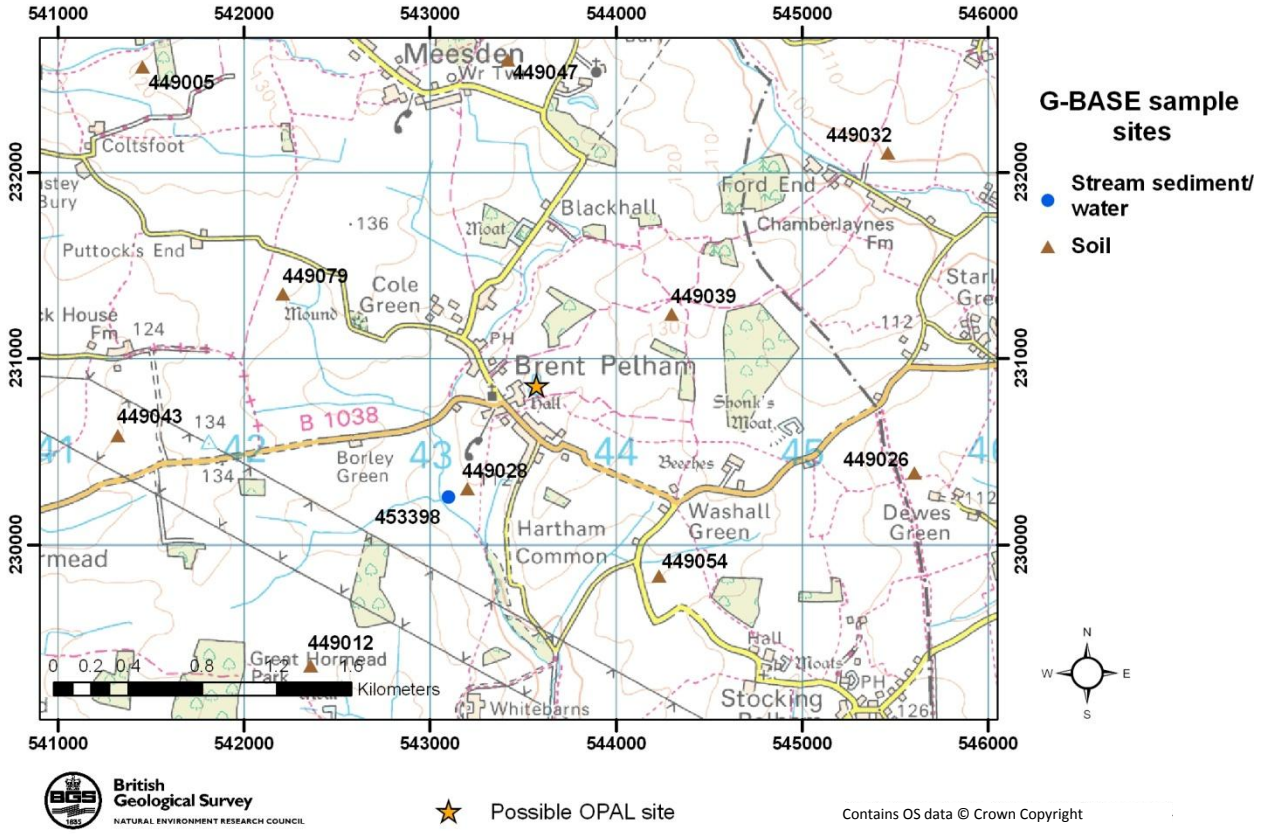


Figure 3.20 G-BASE sample site locations for Brent Pelham pond

Table 12 G-BASE sample locations for Brent Pelham pond

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
453398	C+W	543101	230258	449039	S	544299	231235
449005	S	541454	232563	449043	S	541322	230584
449012	S	542359	229347	449047	S	543419	232603
449026	S	545603	230384	449054	S	544231	229828
449028	S	543201	230299	449079	S	542210	231343
449032	S	545461	232101				

Sample type: S= Soil, C= Sediment, W= Water

3.5.2 Parent Material

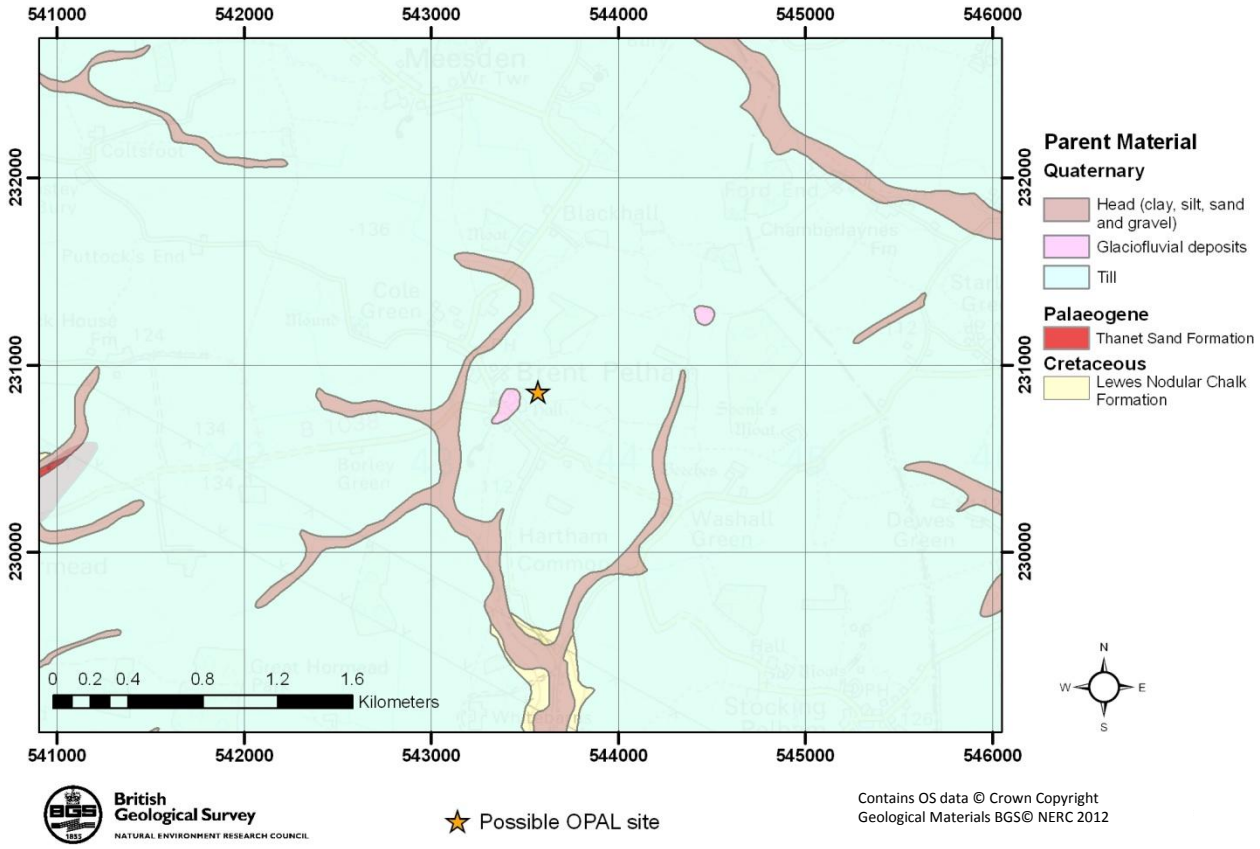


Figure 3.21 Parent material map for Brent Pelham pond

The area surrounding Brent Pelham pond is underlain by the Lewes Nodular Chalk Formation. The site is situated on till deposits.

3.5.3 Aerial Photographs

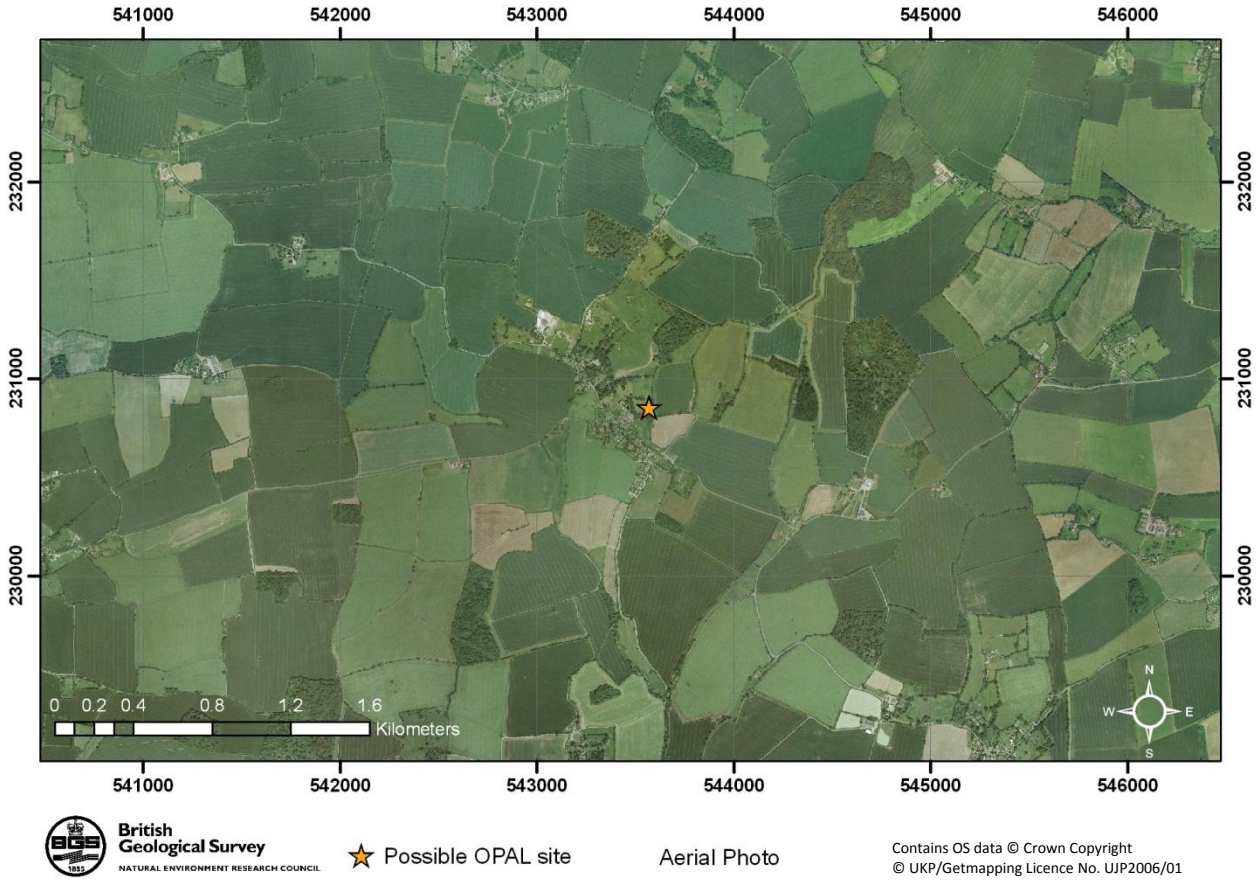


Figure 3.22 Aerial photograph of Brent Pelham pond

Figure 3.23 Zoomed aerial photograph of Brent Pelham pond

3.5.4 Digital Terrain Model

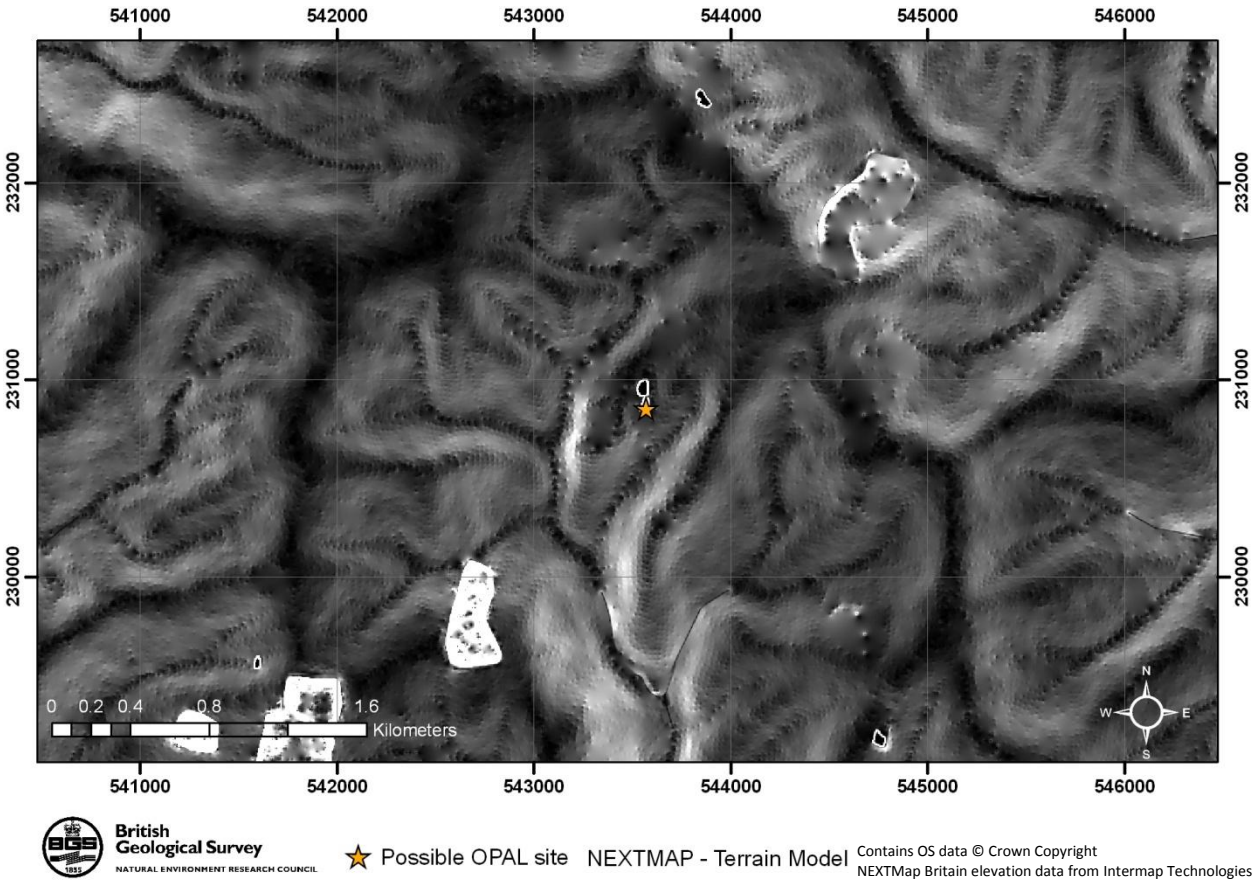


Figure 3.24 DTM of Brent Pelham pond

3.6 BURNMOOR TARN, CUMBRIA

Burnmoor Tarn is a natural upland lake in the west of the Cumbrian Lake District [318384, 504420]. It is approximately 830 m x 420 m. Burnmoor Tarn was selected as one of UCL's calibration sites, and was sampled on 22nd June 2011.

3.6.1 G-BASE Site Locations

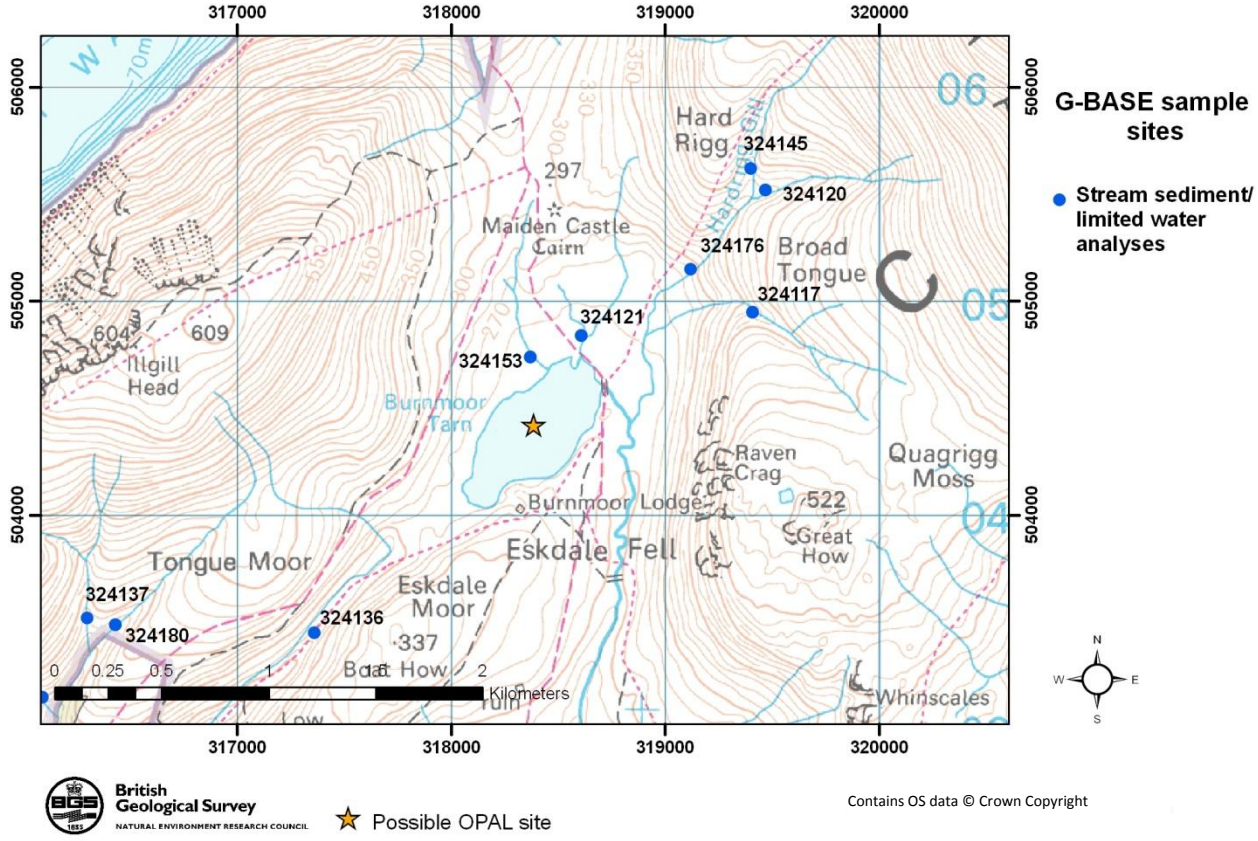


Figure 3.25 G-BASE sample site locations for Burnmoor Tarn

Table 13 G-BASE sample locations for Burnmoor Tarn

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
324180	C+(limited)W	316430	503490	324137	C+(limited)W	316300	503520
324176	C+(limited)W	319120	505150	324136	C+(limited)W	317360	503450
324117	C+(limited)W	319410	504950	324120	C+(limited)W	319470	505520
324145	C+(limited)W	319400	505620	324121	C+(limited)W	318610	504840
324153	C+(limited)W	318370	504740				

Sample type: C= Sediment, W= Water

3.6.2 Bedrock Geology

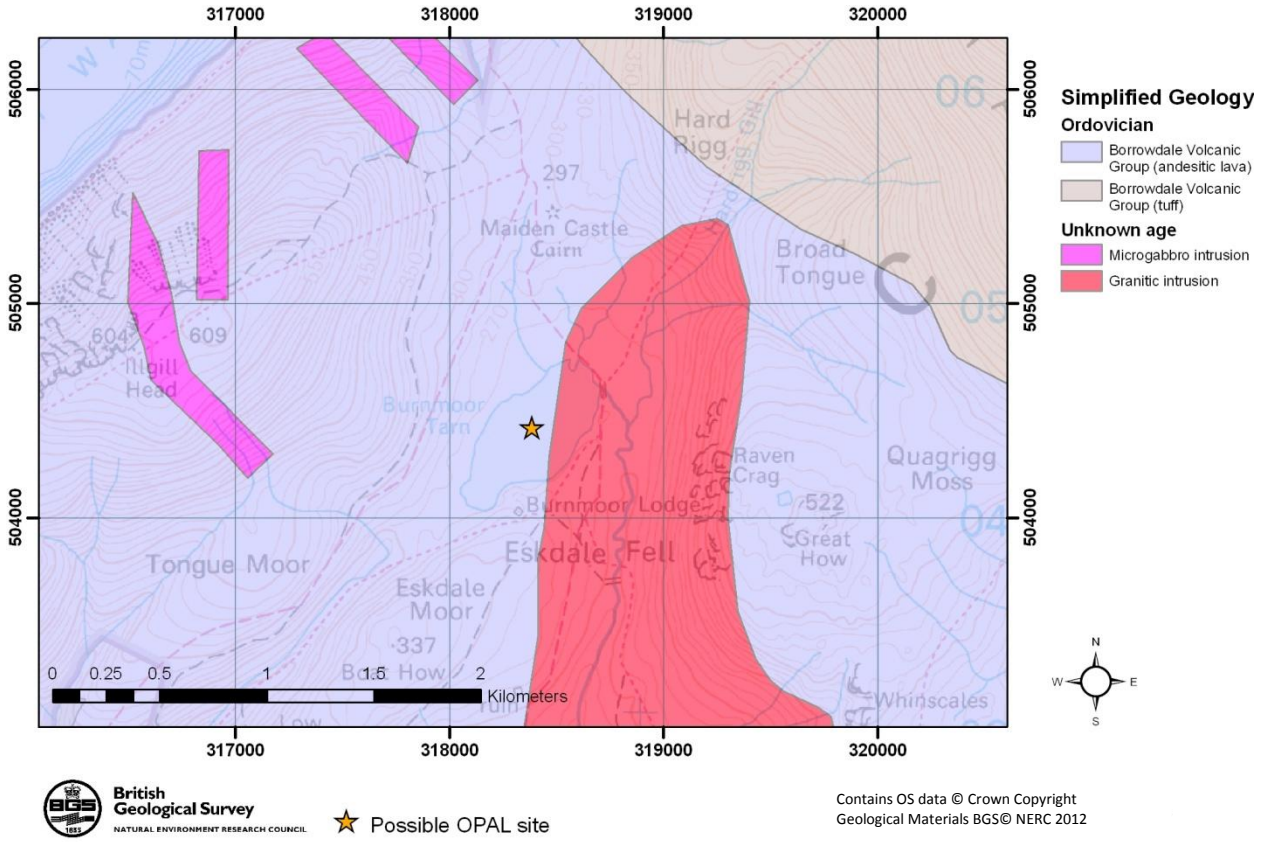


Figure 3.26 Bedrock geology map for Burnmoor Tarn

The area is underlain by rocks of igneous origin. The lake is mainly underlain by andesitic lavas of the Borrowdale Volcanic Group, with a small area underlain by a granitic intrusion.

3.6.3 Quaternary Deposits

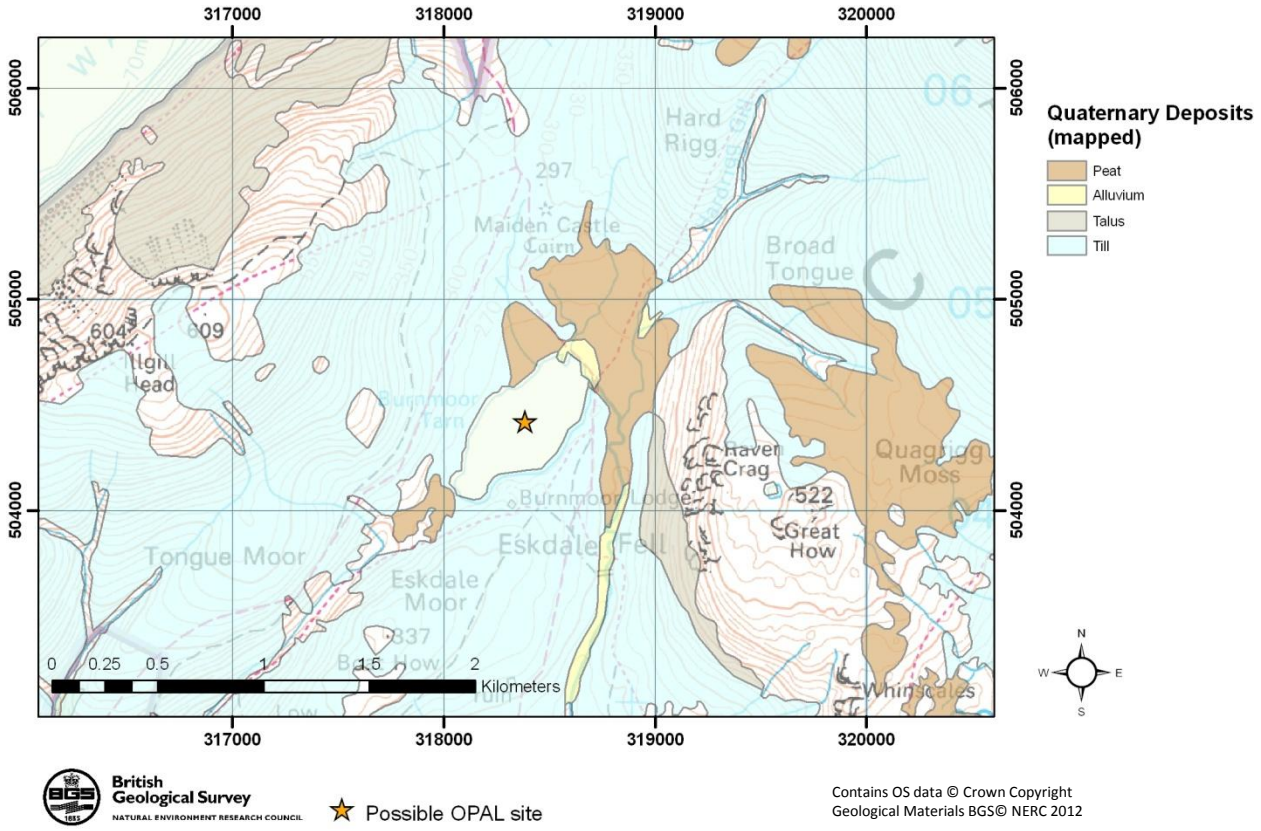


Figure 3.27 Quaternary map for Burnmoor Tarn

The lake is situated on till and peat deposits

3.6.4 Aerial Photographs

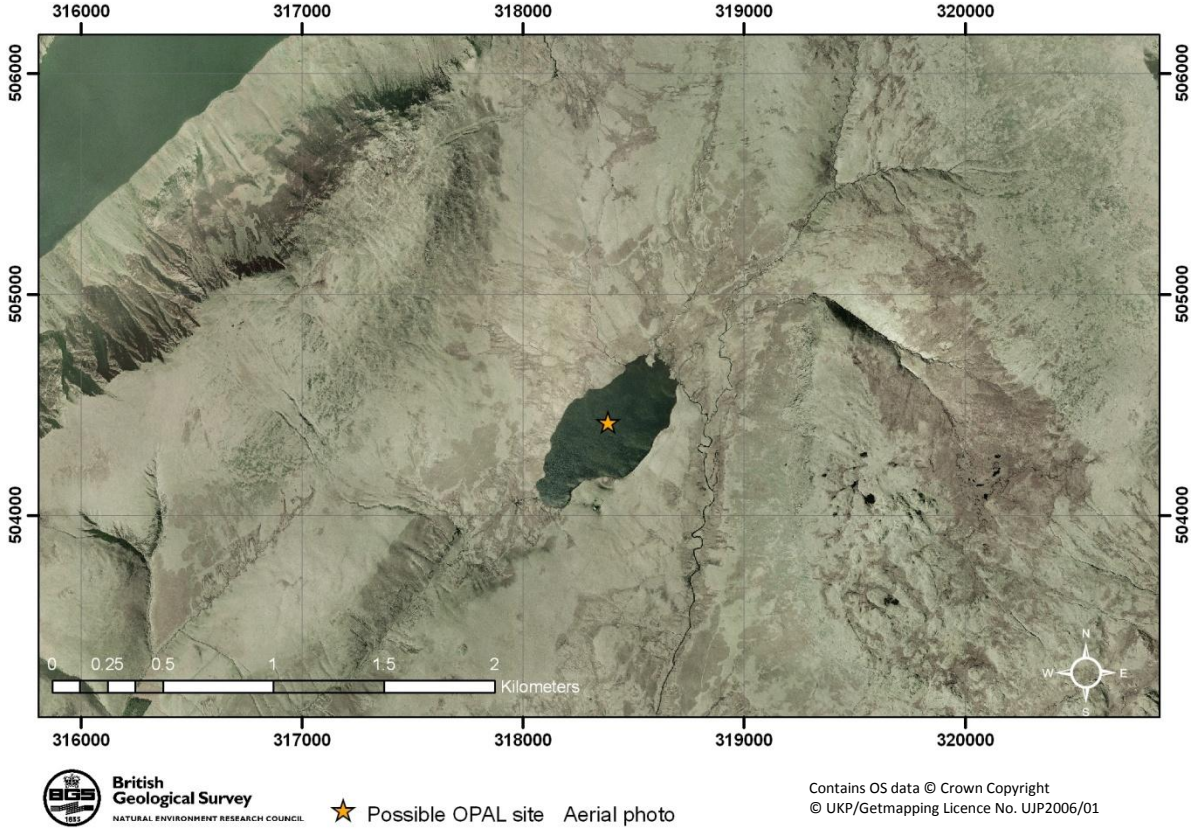


Figure 3.28 Aerial photograph of Burnmoor Tarn

3.6.5 Digital Terrain Model

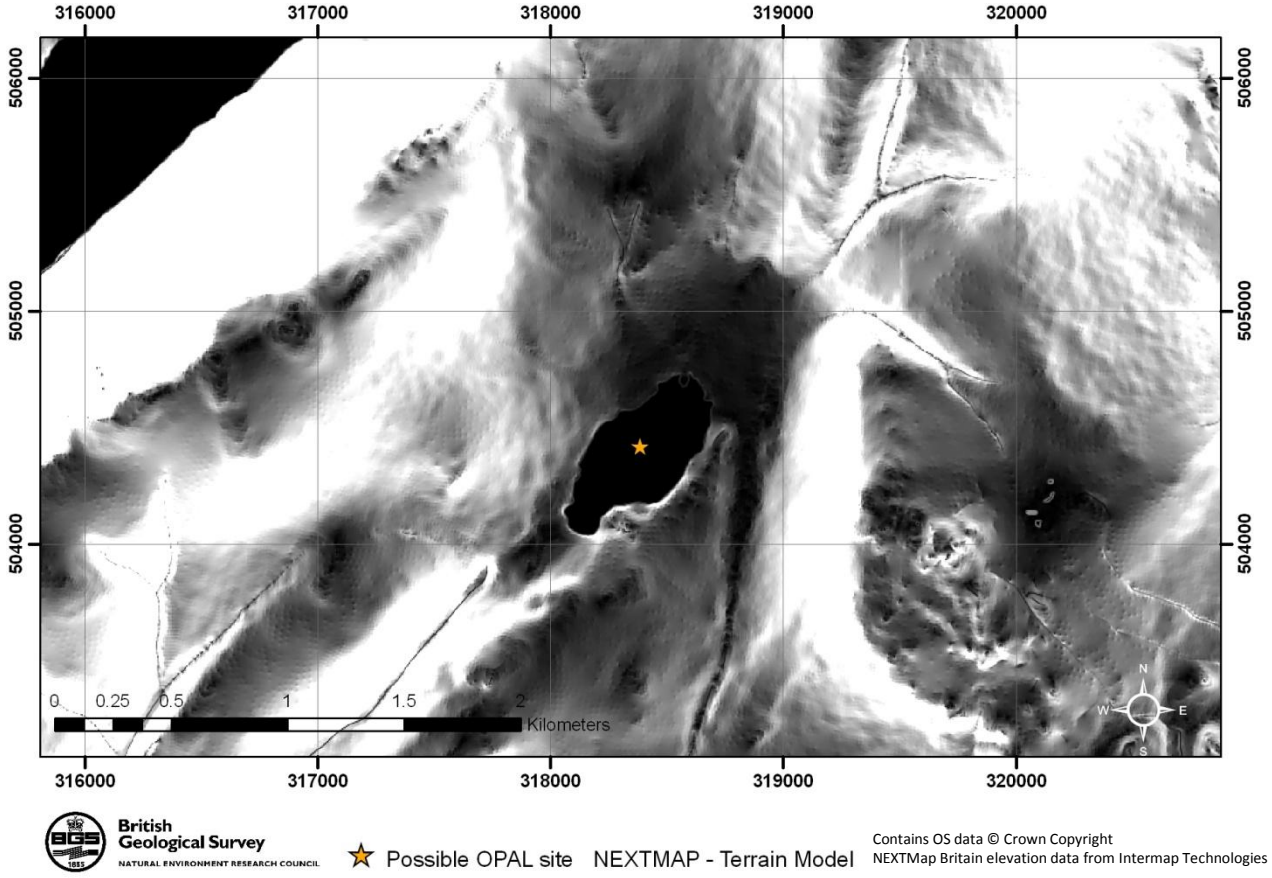


Figure 3.29 DTM of Burnmoor Tarn

3.7 COOMBE POOL, COVENTRY

Coombe pool is a lake situated in Coombe Abbey Country Park, on the outskirts of Coventry [439160, 279380]. It is approximately 2.8 km x 160 m. Coombe Pool was selected as one of UCL's calibration sites, and was sampled on 23rd September 2011.

3.7.1 G-BASE Site Locations

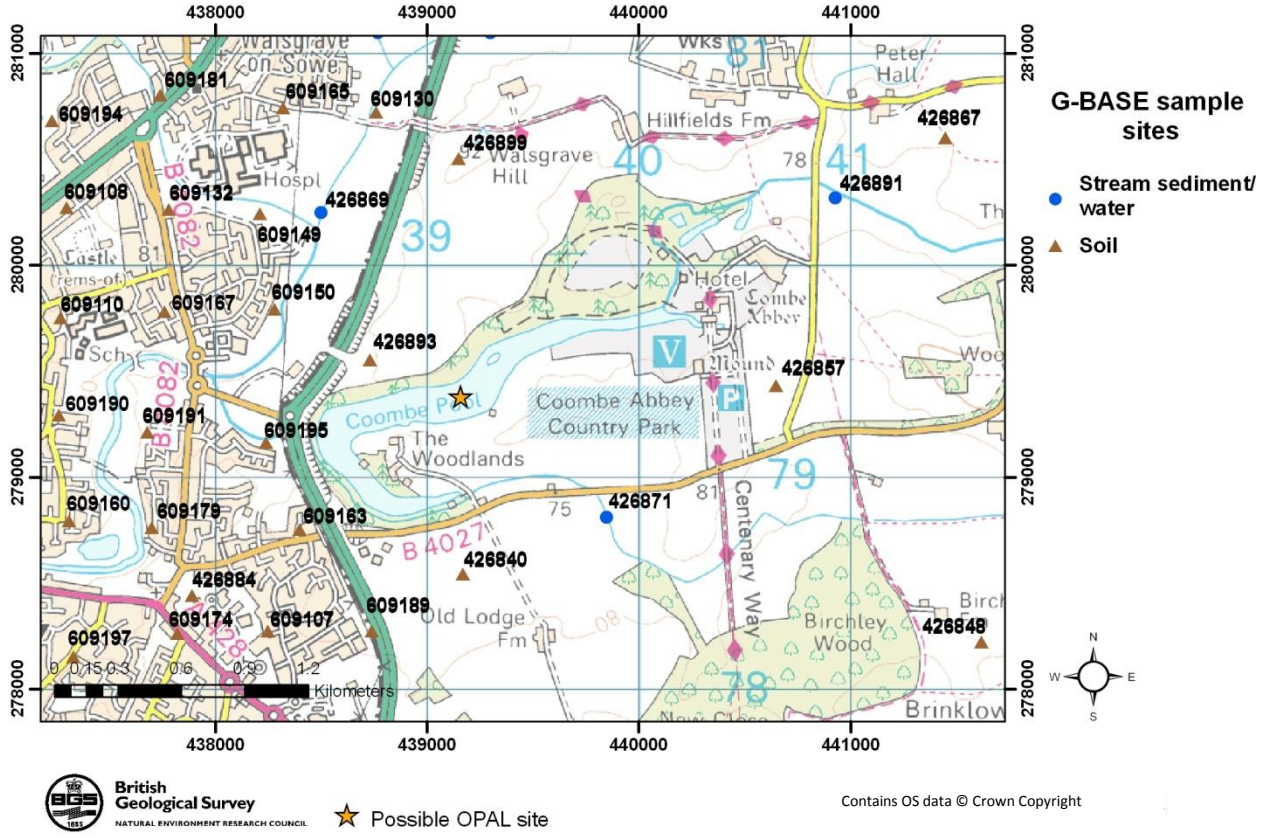


Figure 3.30 G-BASE sample site locations for Coombe Pool

Table 14 G-BASE sample locations for Coombe Pool

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
426869	C+W	438500	280250	609149	S	438210	280240
426871	C+W	439850	278810	609150	S	438280	279790
426891	C+W	440930	280320	609160	S	437310	278790
426840	S	439170	278540	609163	S	438400	278750
426848	S	441620	278220	609165	S	438320	280740
426857	S	440650	279430	609167	S	437760	279780
426867	S	441450	280600	609174	S	437820	278260
426884	S	437890	278440	609179	S	437700	278760
426893	S	438730	279550	609181	S	437740	280800
426899	S	439150	280500	609189	S	438740	278270
609107	S	438250	278270	609190	S	437260	279290
609108	S	437300	280270	609191	S	437680	279210
609110	S	437270	279750	609194	S	437230	280680
609130	S	438760	280720	609195	S	438240	279160
609132	S	437780	280260	609197	S	437330	278150

Sample type: S= Soil, C= Sediment, W= Water

3.7.2 Parent Material

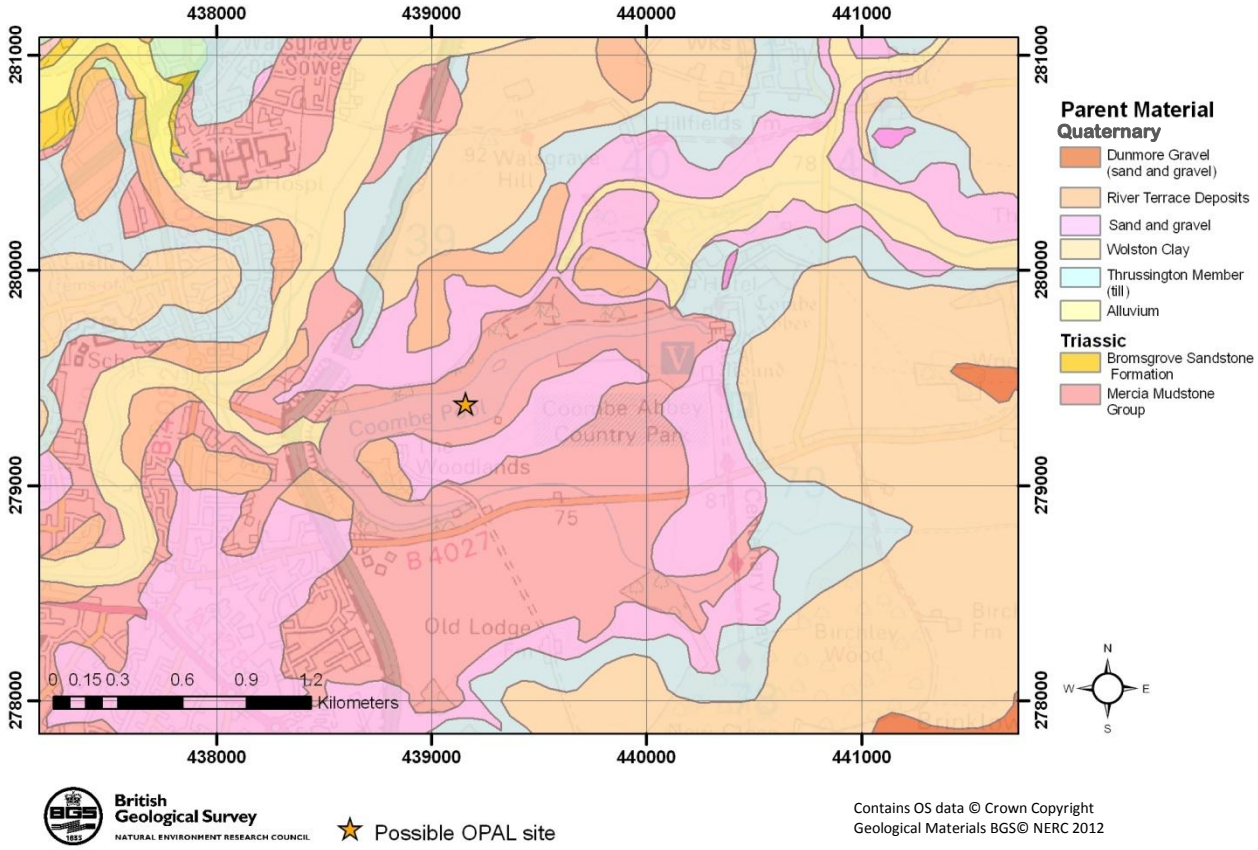


Figure 3.31 Parent material map for Coombe pool

The area is underlain by Triassic deposits of the Mercia Mudstone Group. Adjacent to Coombe Pool are river terrace deposits, sand and gravel, and till.

3.7.3 Aerial Photographs

Figure 3.32 Aerial photograph of Coombe Pool

3.7.4 Digital Terrain Model

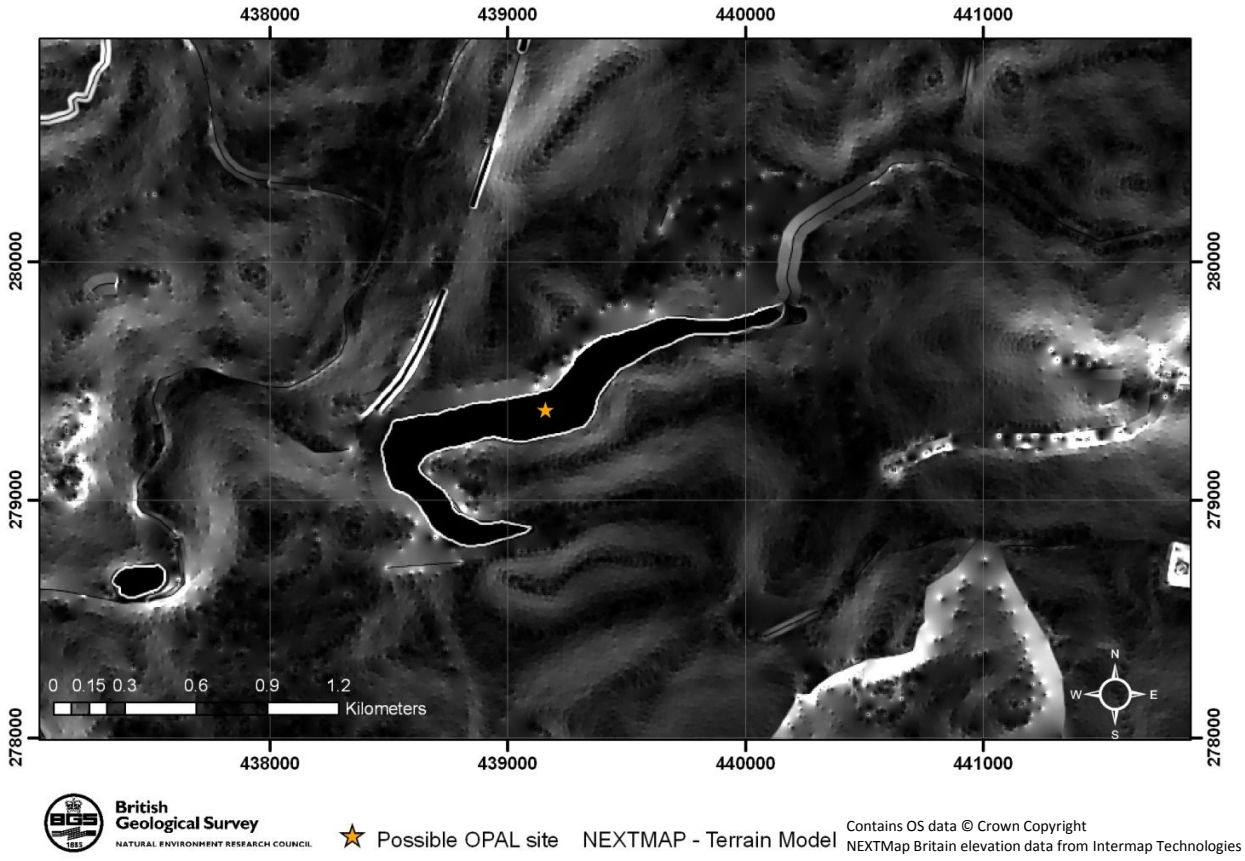


Figure 3.33 DTM of Coombe Pool

3.8 LAKE AT COMPTON VERNEY, WARWICKSHIRE

This is a lake situated in the River Dene catchment [430907, 252551]. It is approximately 10 km east south east of Stratford Upon Avon. The lake is about 1.5 km x 70m. Compton Verney was selected as one of UCL's calibration sites, and was sampled on 24th September 2011.

3.8.1 G-BASE Site Locations

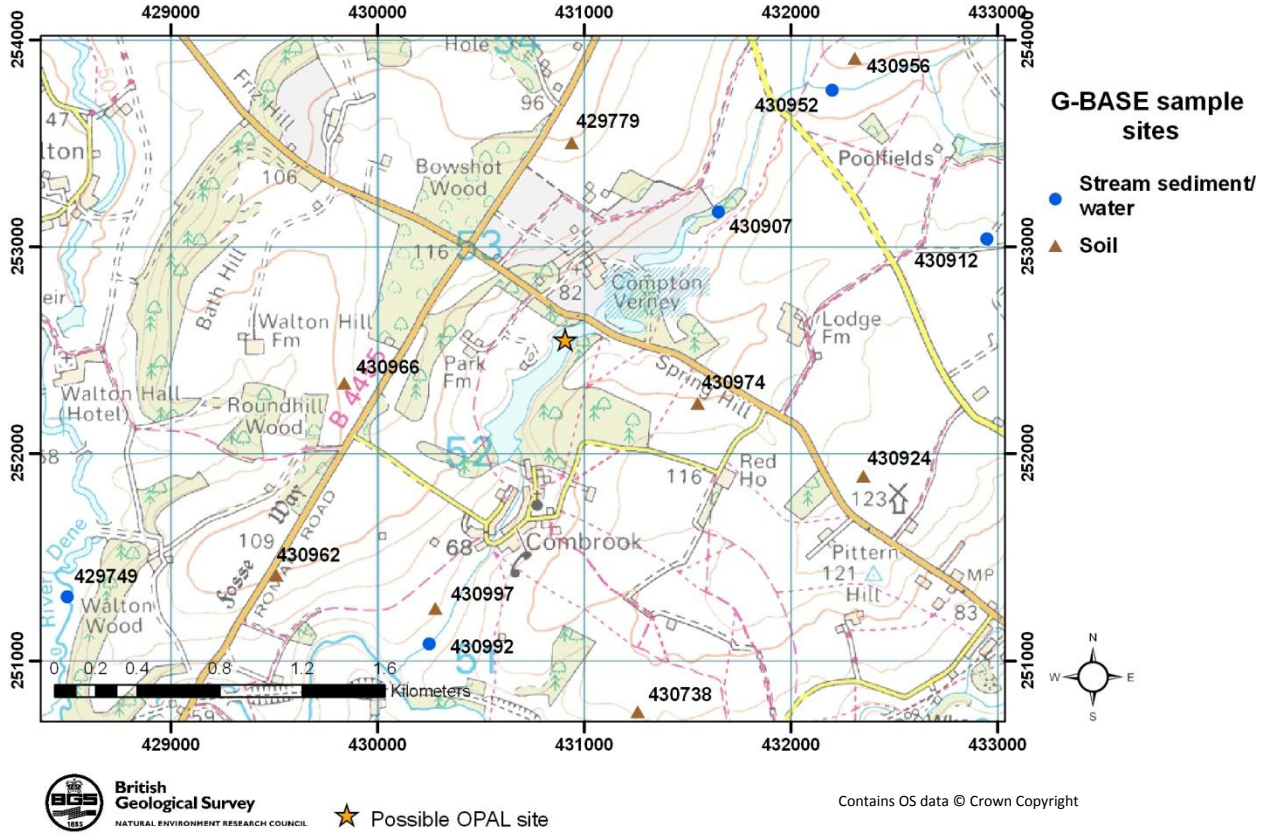


Figure 3.34 G-BASE sample site locations

Table 15 G-BASE sample locations for Compton Verney

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
429749	C+W	428500	251310	430956	S	432310	253910
430907	C+W	431650	253170	430966	S	429840	252340
430912	C+W	432950	253040	430974	S	431550	252240
430952	C+W	432200	253760	430997	S	430280	251250
430992	C+W	430250	251080	430738	S	431260	250750
430924	S	432350	251890	429779	S	430940	253500
430926	S	429510	251410				

Sample type: S= Soil, C= Sediment, W= Water

3.8.2 Bedrock Geology

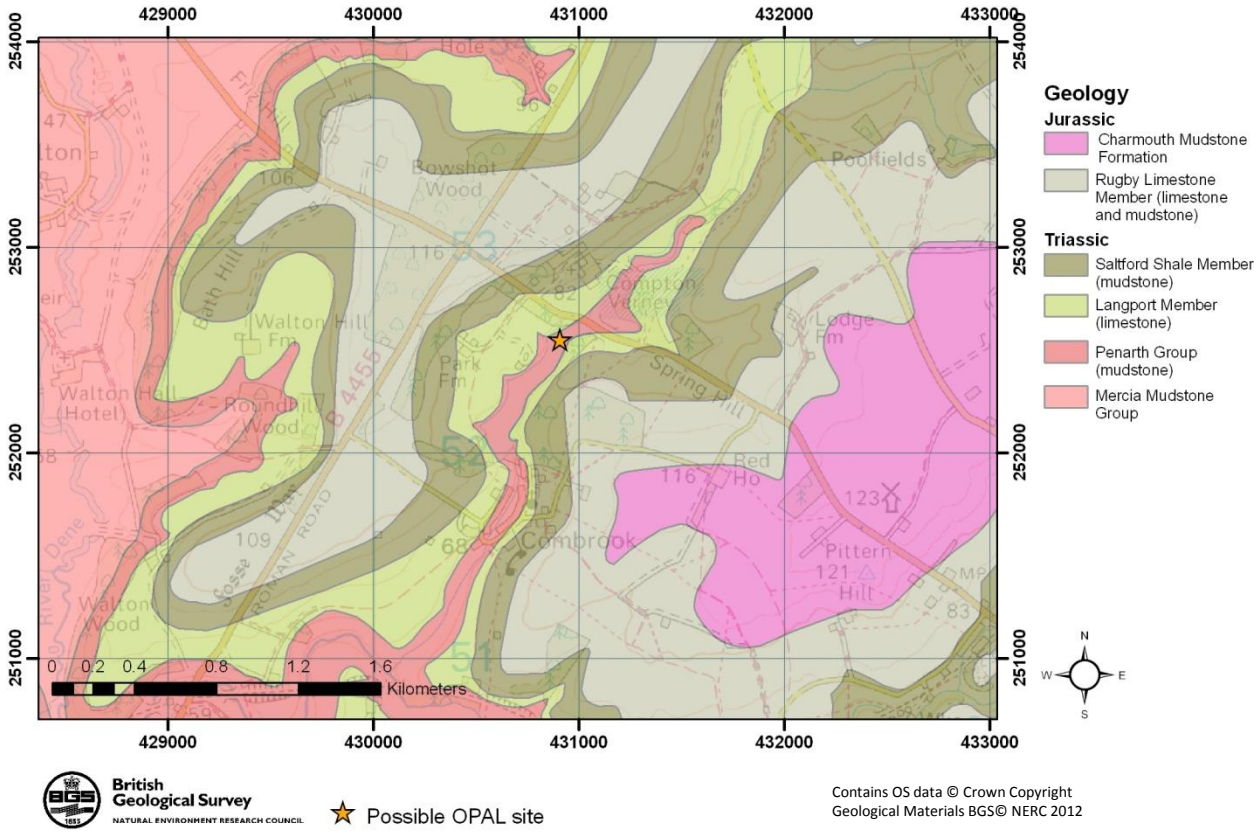


Figure 3.35 Bedrock geology map for Compton Verney

The area is underlain by Triassic and Jurassic sedimentary rocks. The lake itself overlies a narrow band of Penarth group mudstone

3.8.3 Quaternary Deposits

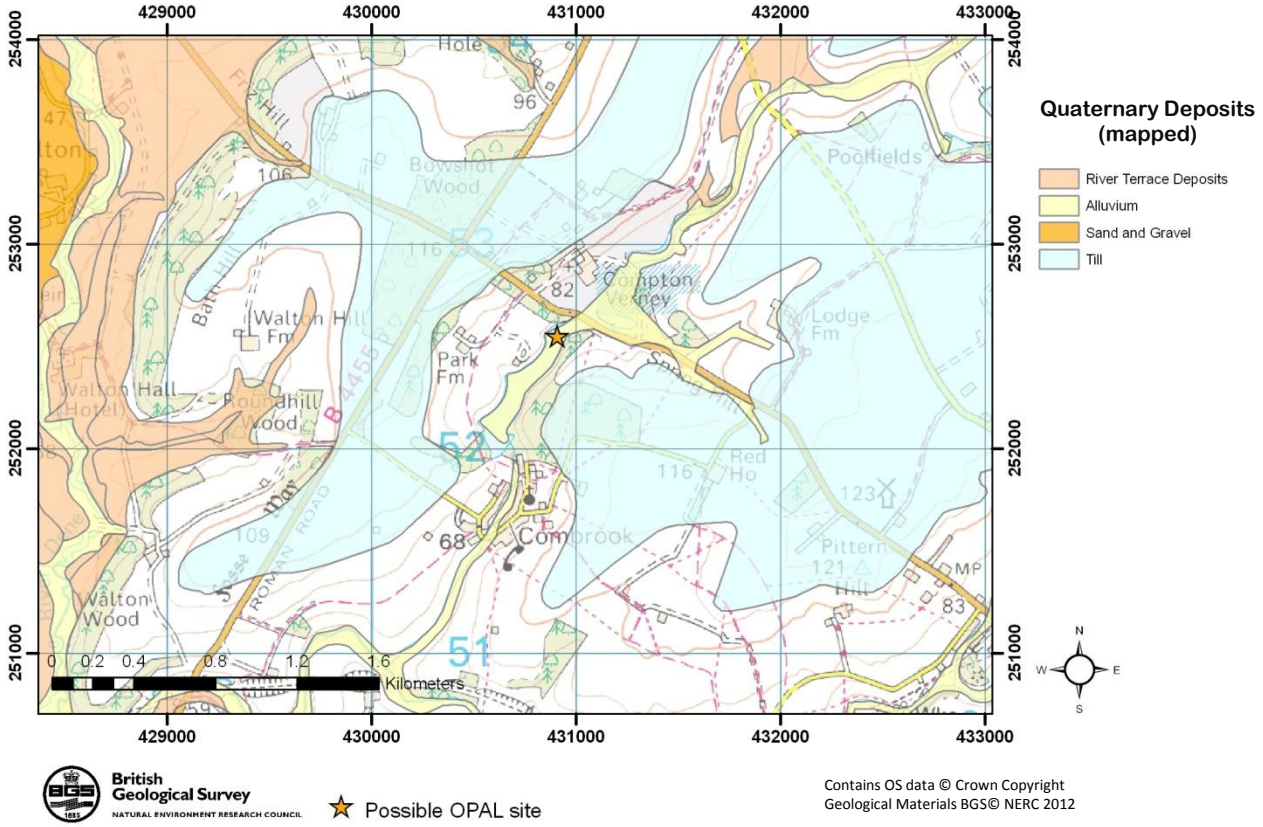


Figure 3.36 Quaternary map for Compton Verney

The lake overlies alluvium deposits.

3.8.4 Aerial Photographs

Figure 3.37 Aerial photograph of Compton Verney

3.8.5 Digital Terrain Model

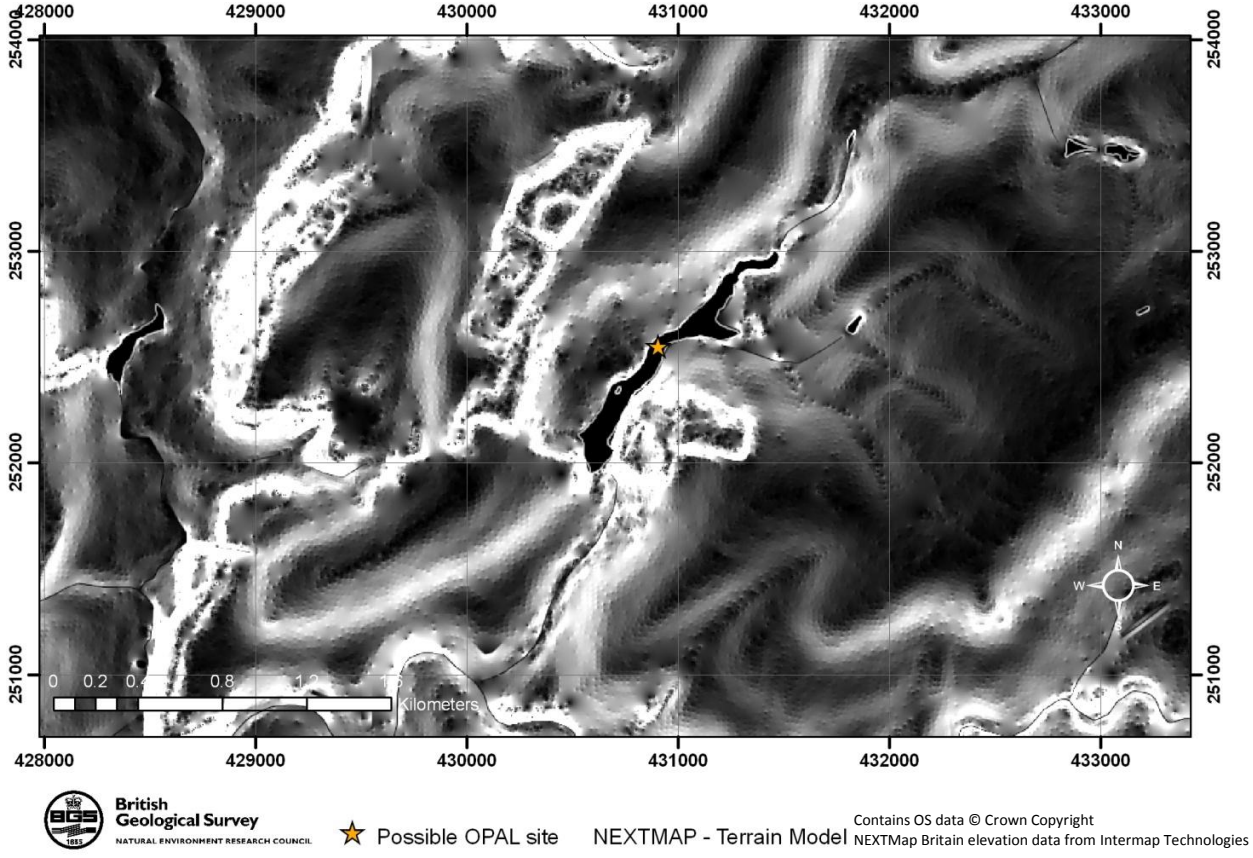


Figure 3.38 DTM of Compton Verney

3.9 GOSFIELD LAKE, ESSEX

Gosfield Lake is situated about 6 km north of Braintree, Essex [577349, 229367]. It is about 900 m x 120m. Gosfield Lake was originally selected as one of UCL's calibration sites, it was later found to be unsuitable, and Prestons Lake was selected as a replacement (see Section 3.22)

3.9.1 G-BASE Site Locations

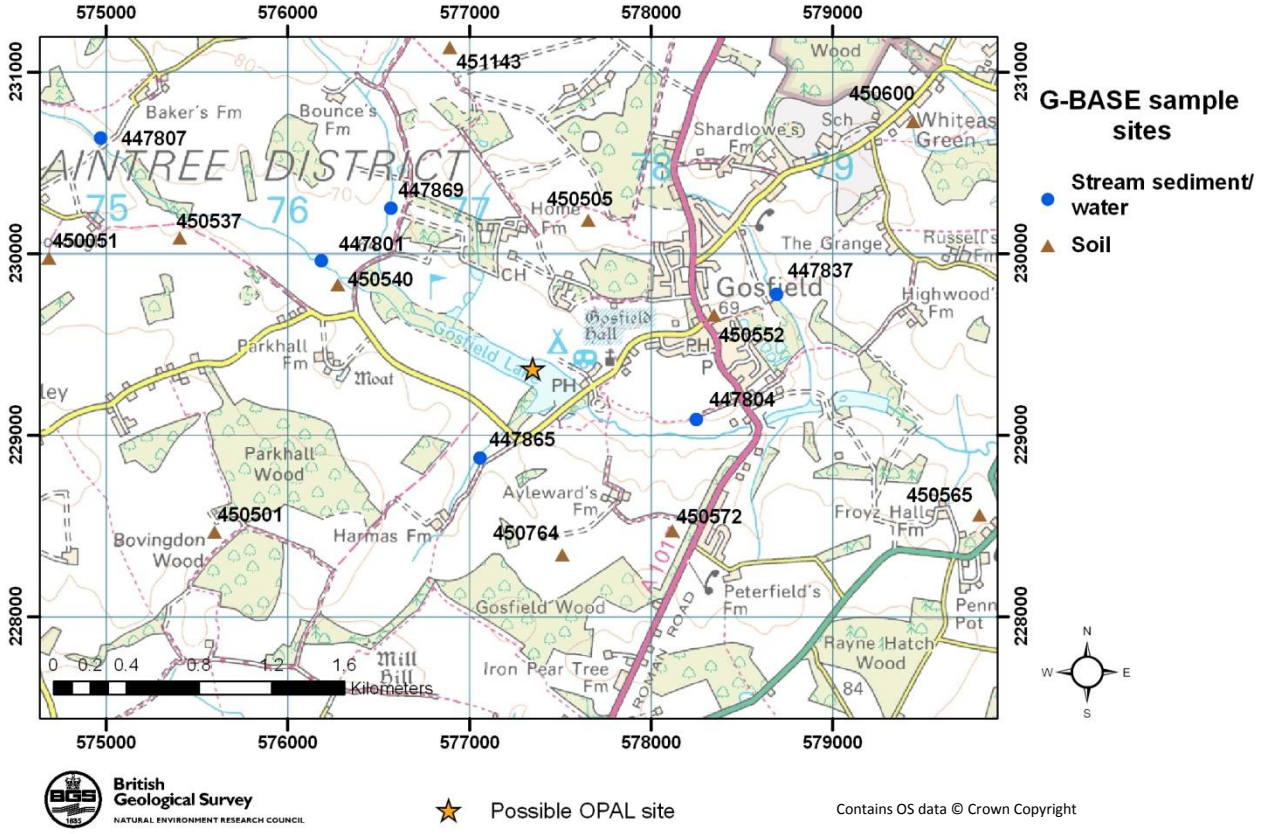


Figure 3.39 G-BASE sample site locations for Gosfield Lake

Table 16 G-BASE sample locations for Gosfield Lake

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
447801	C+W	576185	229962	451143	S	576891	231132
447804	C+W	578250	229087	450764	S	577511	228339
447807	C+W	574971	230635	450505	S	577654	230179
447837	C+W	578692	229775	450572	S	578118	228469
447865	C+W	577058	228873	450552	S	578346	229657
447869	C+W	576567	230249	450600	S	579445	230722
450565	S	579809	228556	450511	S	574686	229970
450501	S	575598	228462	450537	S	575407	230082
450540	S	576275	229826				

Sample type: S= Soil, C= Sediment, W= Water

3.9.2 Parent Material

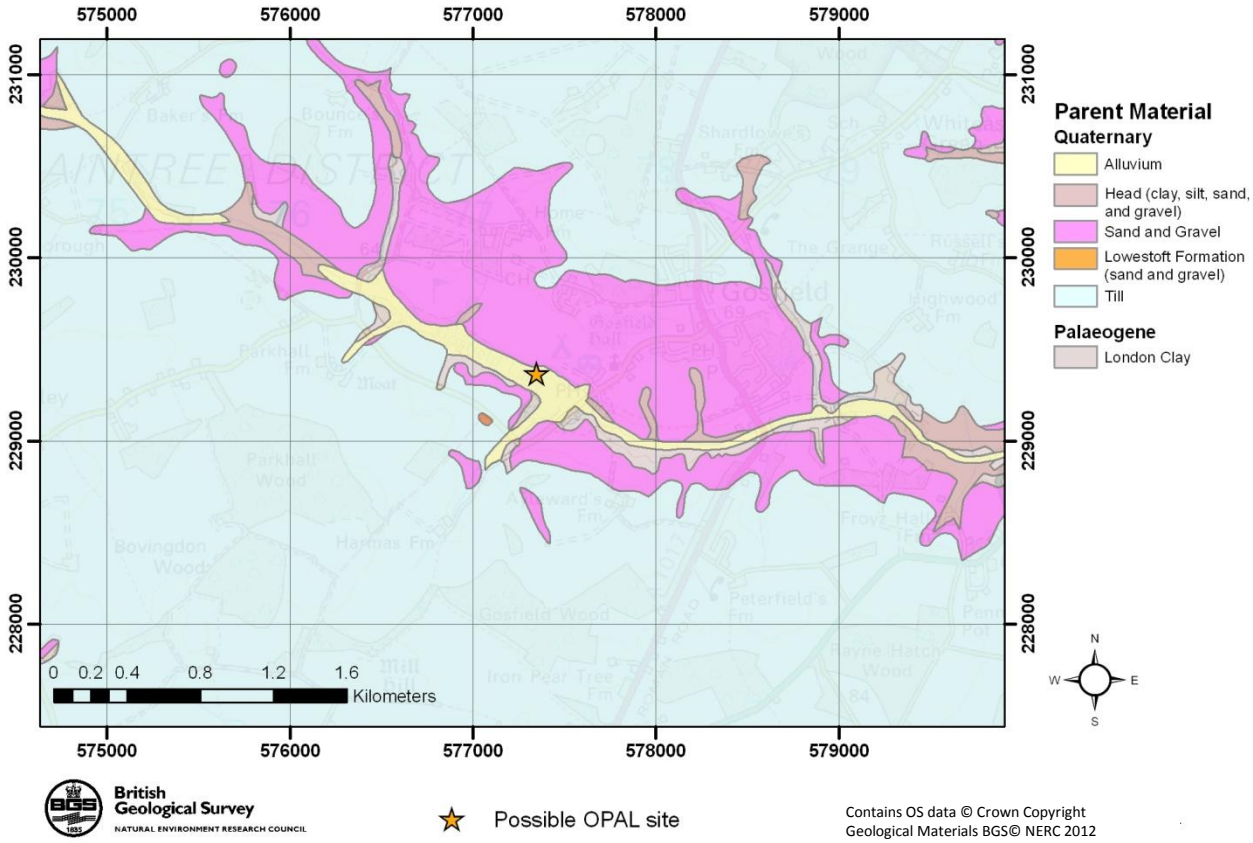


Figure 3.40 Parent material map for Gosfield Lake

The area is entirely underlain by the London Clay Formation, Gosfield Lake is situated over alluvium and sand and gravel.

3.9.3 Aerial Photographs

Figure 3.41 Aerial photograph of Gosfield Lake

3.9.4 Digital Terrain Model

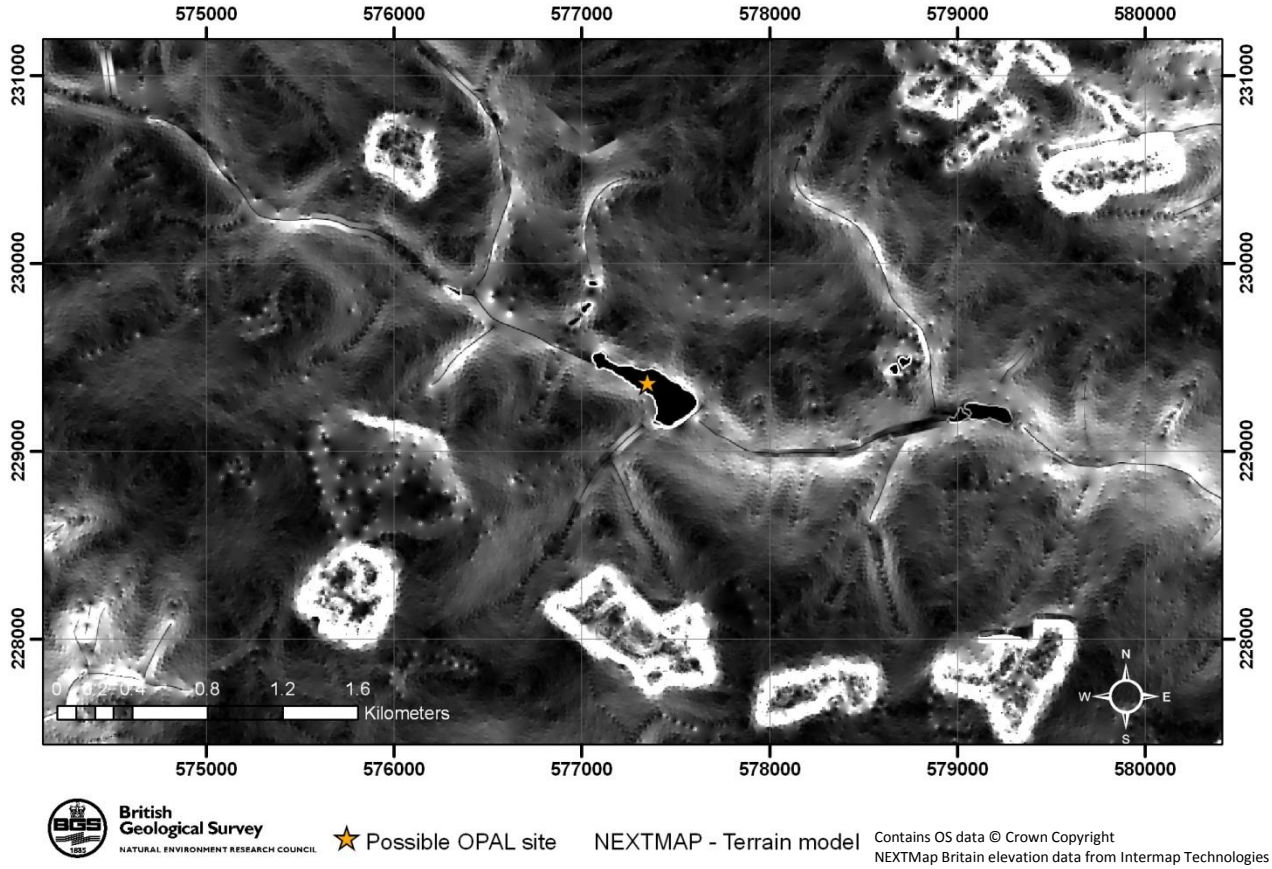


Figure 3.42 DTM of Gosfield Lake

3.10 GRAFHAM WATER, CAMBRIDGESHIRE

Grafham water is a large reservoir near Huntingdon, Cambridgeshire [514938, 268148]. It is approximately 4.1 km x 1.8 km.

3.10.1 G-BASE Site Locations

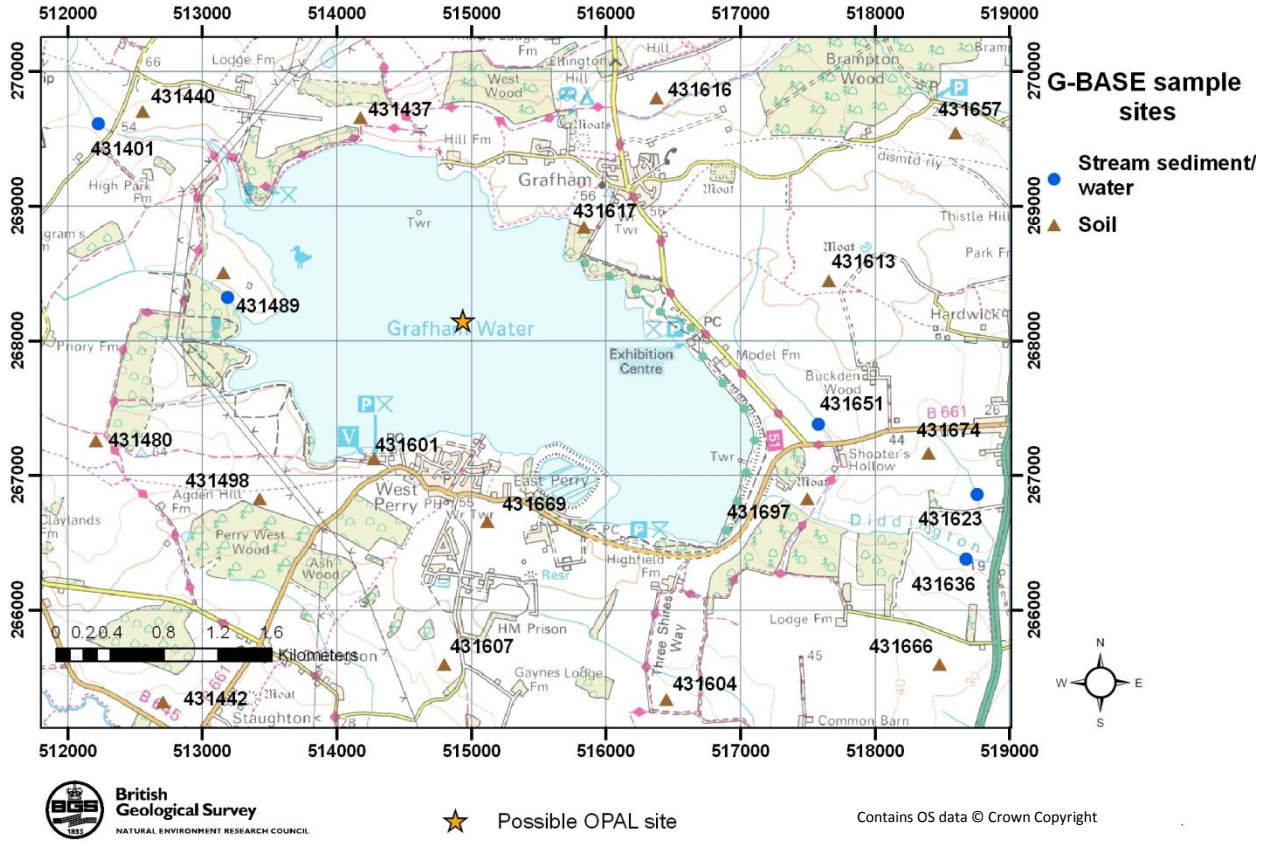


Figure 3.43 G-BASE sample site locations for Grafham water

Table 17 G-BASE sample locations for Grafham water

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
431401	C+W	512230	269610	431657	S	518600	269540
431489	C+W	513190	268320	431666	S	518480	265590
431623	C+W	518760	266860	431669	S	515120	266650
431636	C+W	518680	266380	431674	S	518400	267160
431651	C+W	517580	267380	431697	S	517500	266820
431601	S	514280	267120	431498	S	513430	266820
431604	S	516450	265330	431437	S	514180	269650
431607	S	514800	265590	431440	S	512560	269700
431613	S	517660	268440	431442	S	512710	265310
431616	S	516380	269800	431451	S	513160	268500
431617	S	515840	268840	431480	S	512210	267250

Sample type: S= Soil, C= Sediment, W= Water

3.10.2 Parent Material

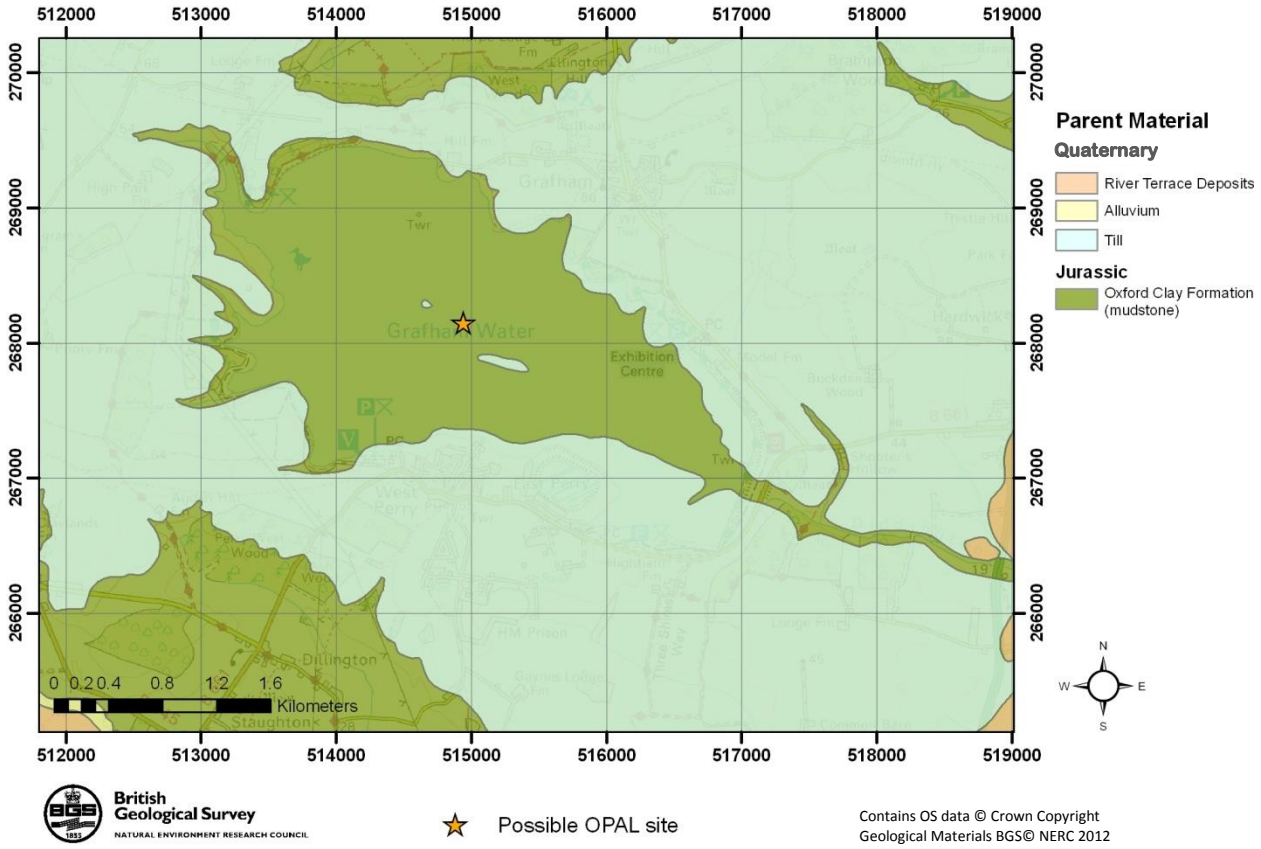


Figure 3.44 Parent material map for Grafham Water

The area is underlain by the Oxford Clay Formation and till deposits.

3.10.3 Aerial Photographs

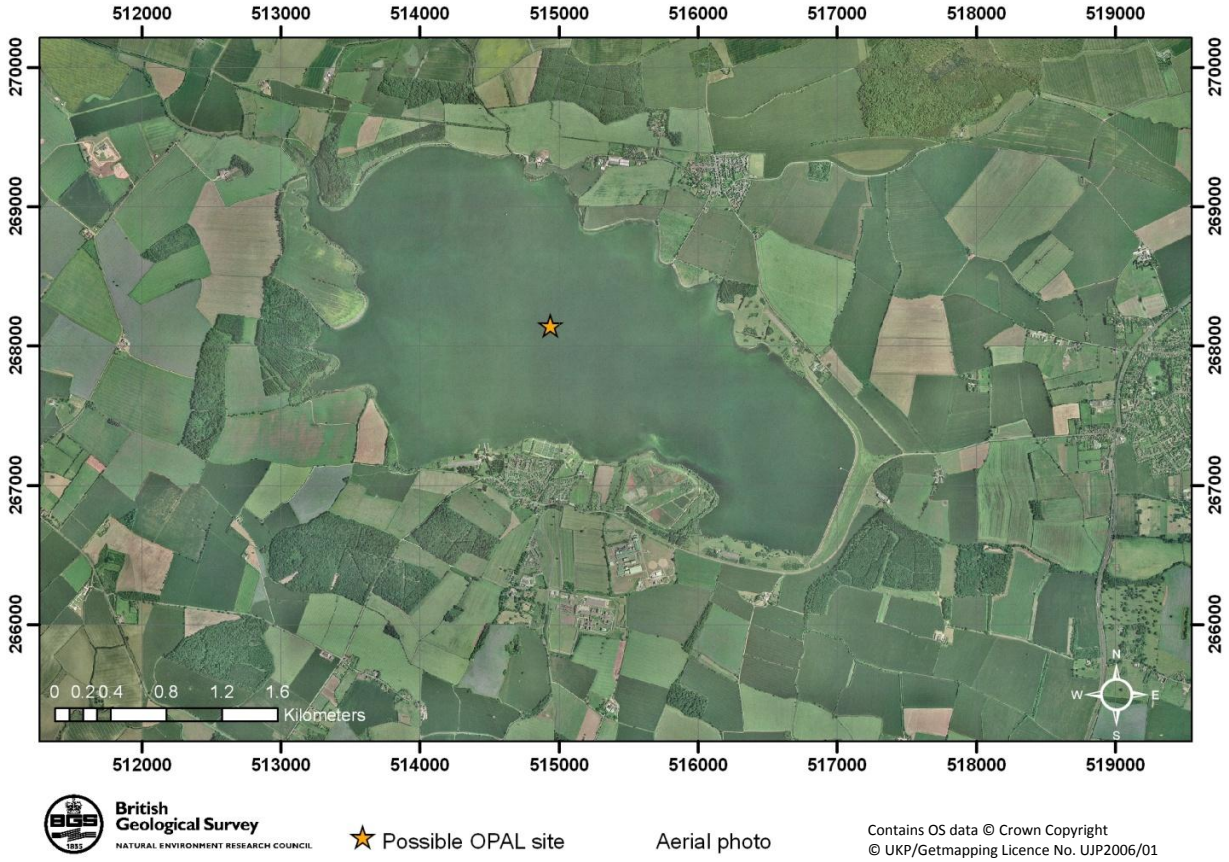


Figure 3.45 Aerial photograph of Grafham Water

3.10.4 Digital Terrain Model

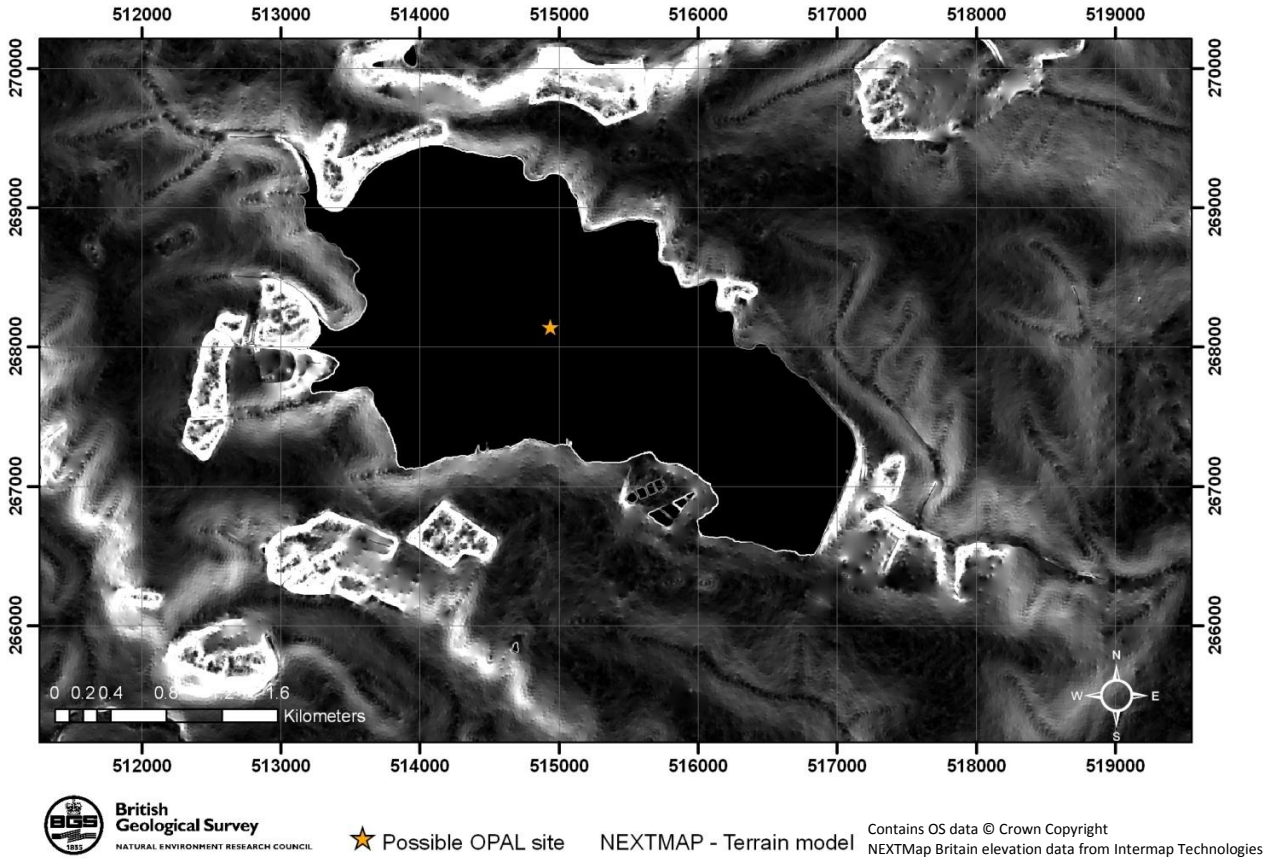


Figure 3.46 DTM of Grafham Water

3.11 GREAT LAKE, NOTTINGHAMSHIRE

Great Lake is an elongate artificial lake occupying the valley of the River Poulter in Nottinghamshire [457411, 373241]. It is approximately 5.6 km x 150 m.

3.11.1 G-BASE Site Locations

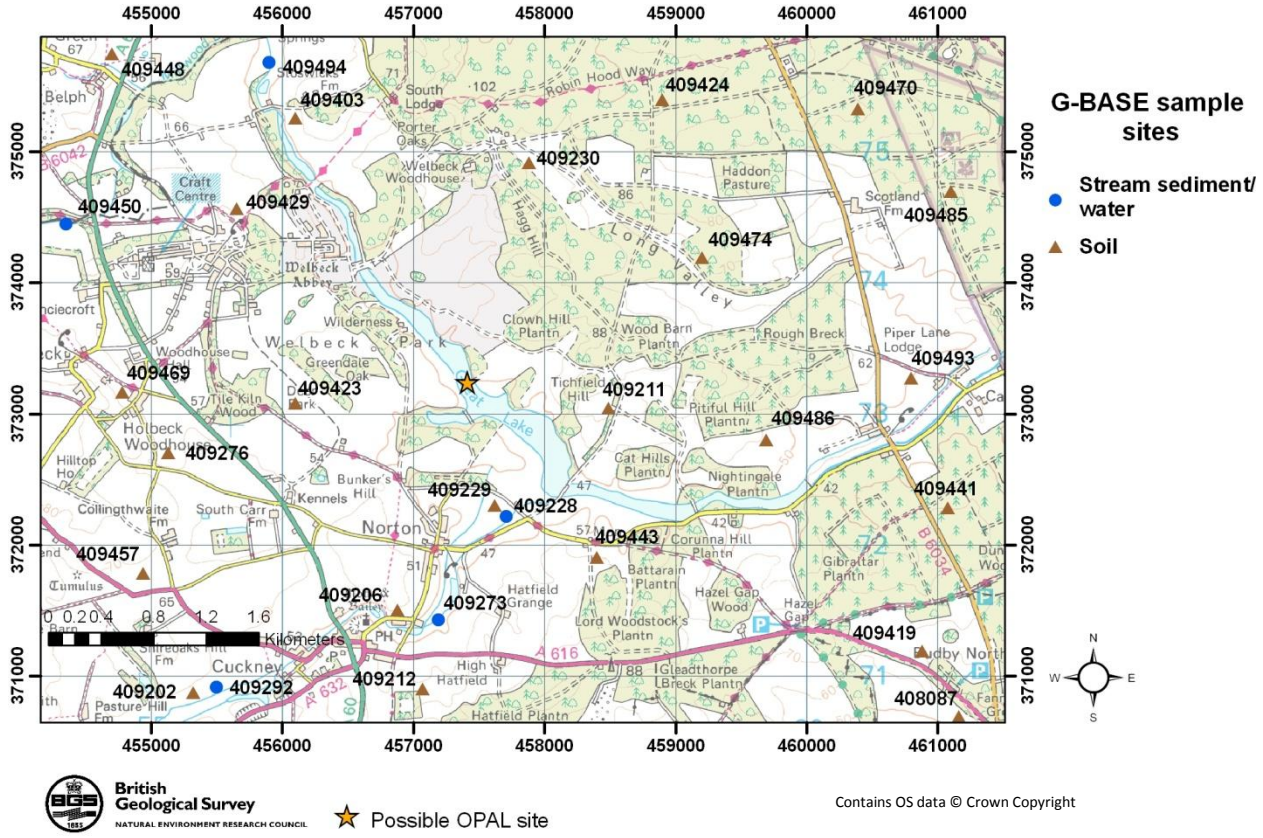


Figure 3.47 G-BASE Sample site locations for Great Lake

Table 18 G-BASE Sample locations for Great Lake

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
409228	C+W	457710	372220	409276	S	455130	372700
409273	C+W	457190	371430	409486	S	459690	372800
409292	C+W	455500	370920	409211	S	458490	373040
409450	C+W	454350	374450	409423	S	456100	373080
409494	C+W	455900	375680	409469	S	454780	373160
408087	S	461160	370690	409493	S	460800	373270
409202	S	455320	370870	409474	S	459200	374190
409212	S	457070	370900	409429	S	455650	374560
409419	S	460880	371190	409485	S	461100	374690
409206	S	456880	371500	409230	S	457880	374910
409457	S	454940	371780	409403	S	456100	375250
409443	S	458400	371900	409470	S	460390	375320
409441	S	461080	372280	409424	S	458900	375390
409229	S	457620	372300	409448	S	454700	375740

Sample type: S= Soil, C= Sediment, W= Water

3.11.2 Parent Material

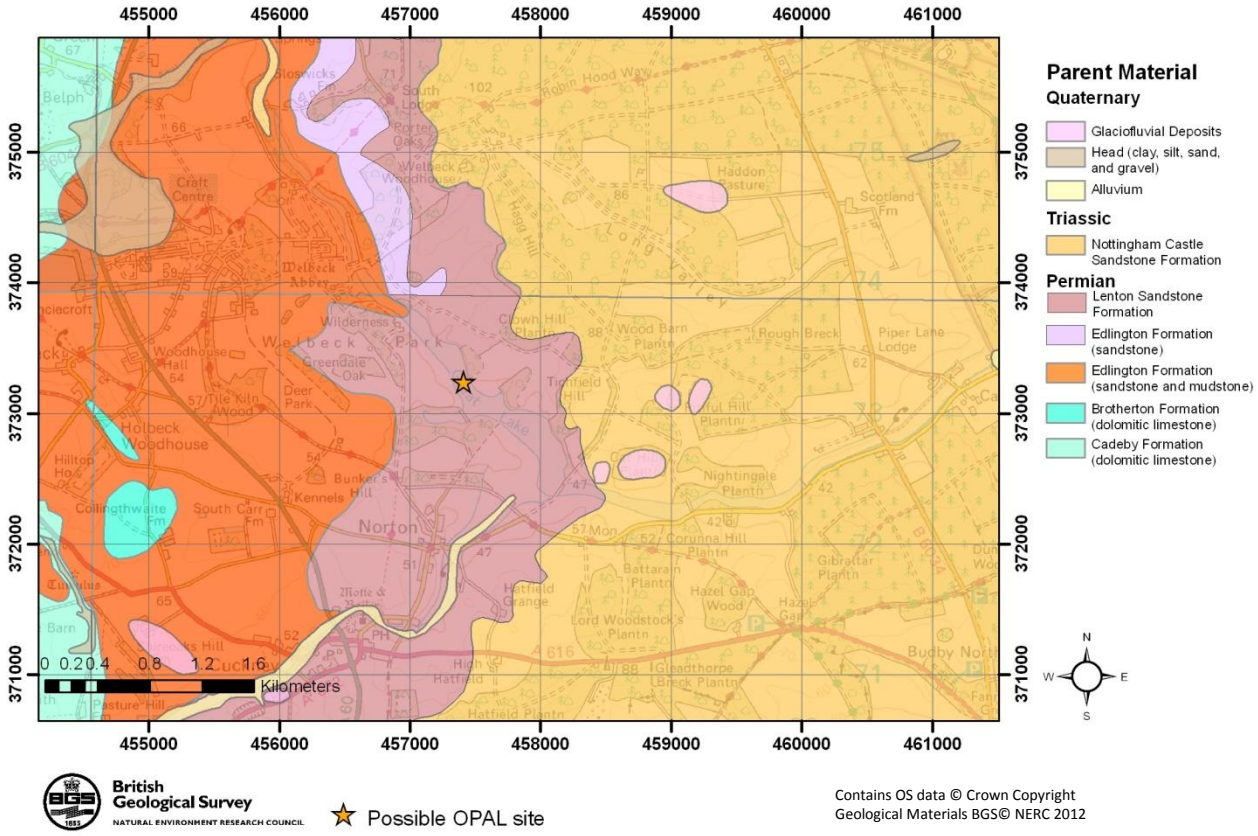


Figure 3.48 Parent material map for Great Lake.

The elongate lake overlies Permian and Triassic sedimentary formations comprising sandstones and mudstones. There is no direct influence from Quaternary deposits, although adjacent alluvium and glaciofluvial deposits may influence the site.

3.11.3 Aerial Photographs

Figure 3.49 Aerial photograph of Great Lake

3.11.4 Digital Terrain Model

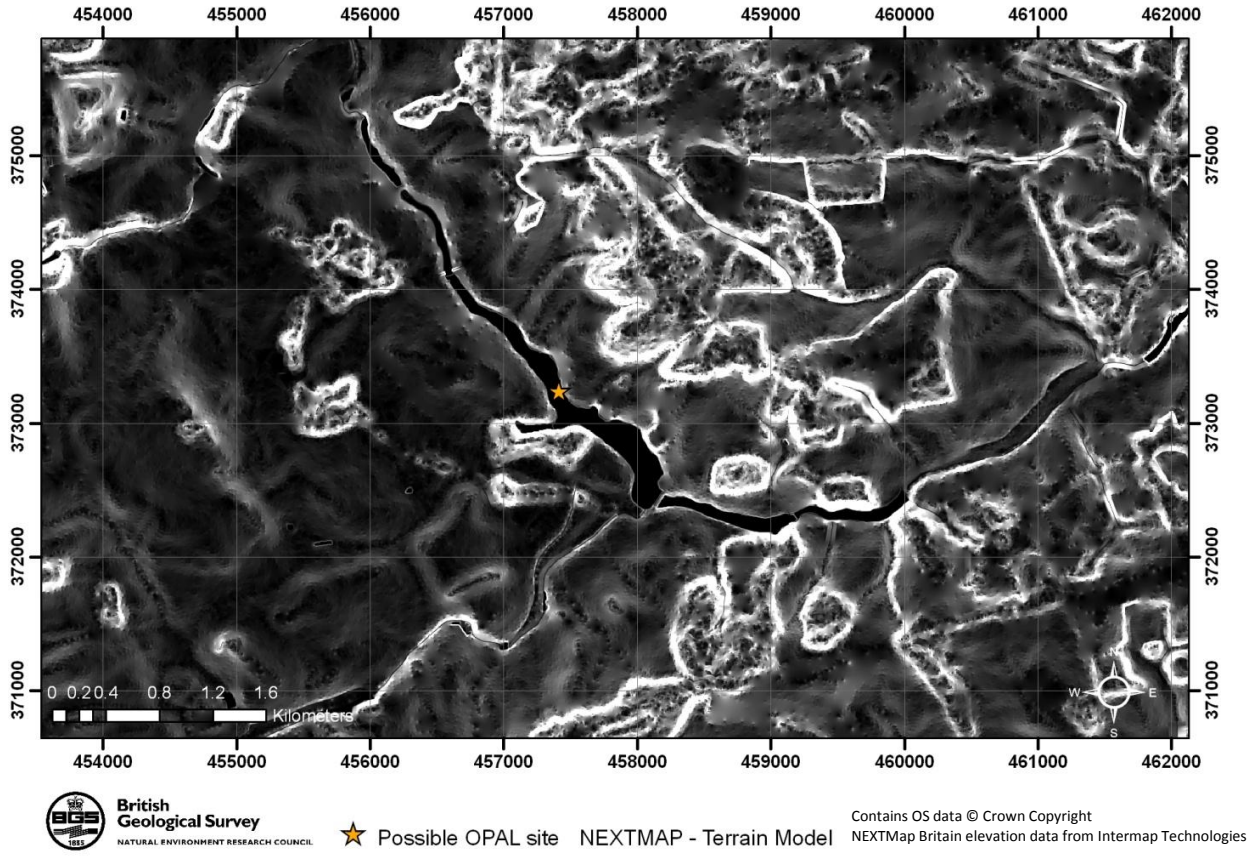


Figure 3.50 DTM of Great Lake

3.12 HYDELANE RESERVOIR, NEAR BUCKINGHAM

Hyde Lane Reservoir is situated about 2 km north east of Buckingham [472552, 235260]. The reservoir is approximately 900 m x 230 m. Hydelane Reservoir was selected as one of UCL's calibration sites, and was sampled on 22nd September 2011.

3.12.1 G-BASE Site Locations

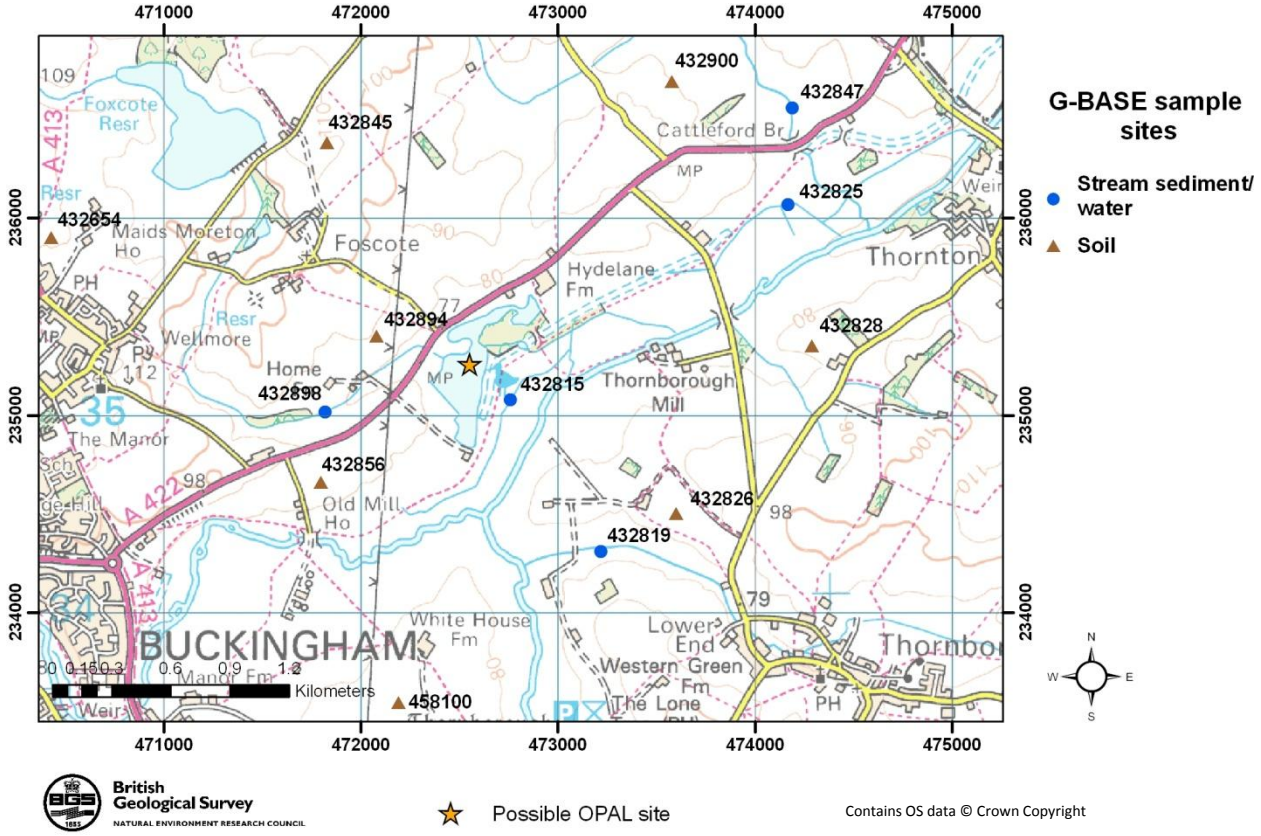


Figure 3.51 G-BASE sample site locations for Hydelane Reservoir

Table 19 G-BASE sample locations for Hydelane Reservoir

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
432815	C+W	472760	235080	432828	S	474290	235350
432819	C+W	473220	234310	432845	S	471830	236380
432825	C+W	474170	236070	432856	S	471800	234660
432847	C+W	474190	236560	432894	S	472080	235400
432898	C+W	471820	235020	432900	S	473580	236690
432654	S	470430	235900	458100	S	472191	233541
432826	S	473600	234500				

Sample type: S= Soil, C= Sediment, W= Water

3.12.2 Bedrock Geology

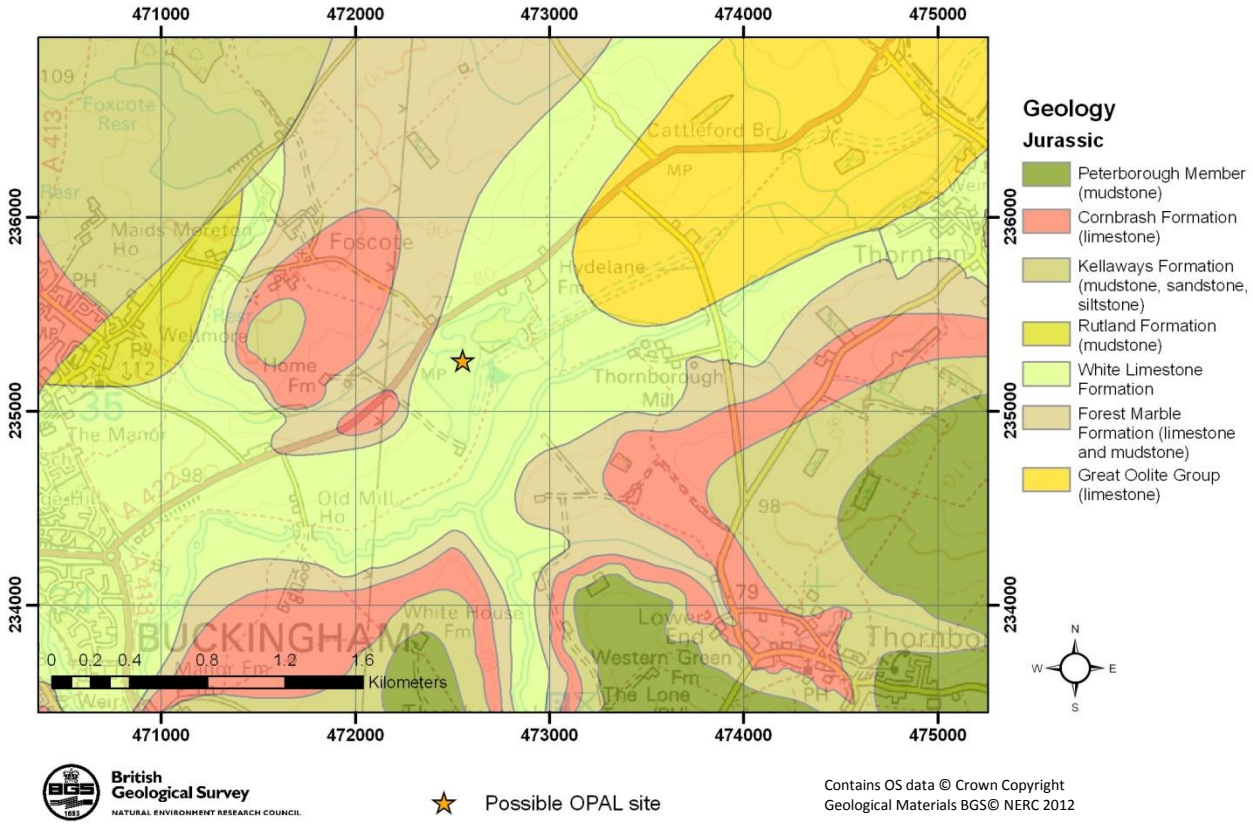


Figure 3.52 Bedrock geology map for Hydelane Reservoir

The area is underlain by limestones and mudstones. The reservoir is situated upon the White Limestone Formation.

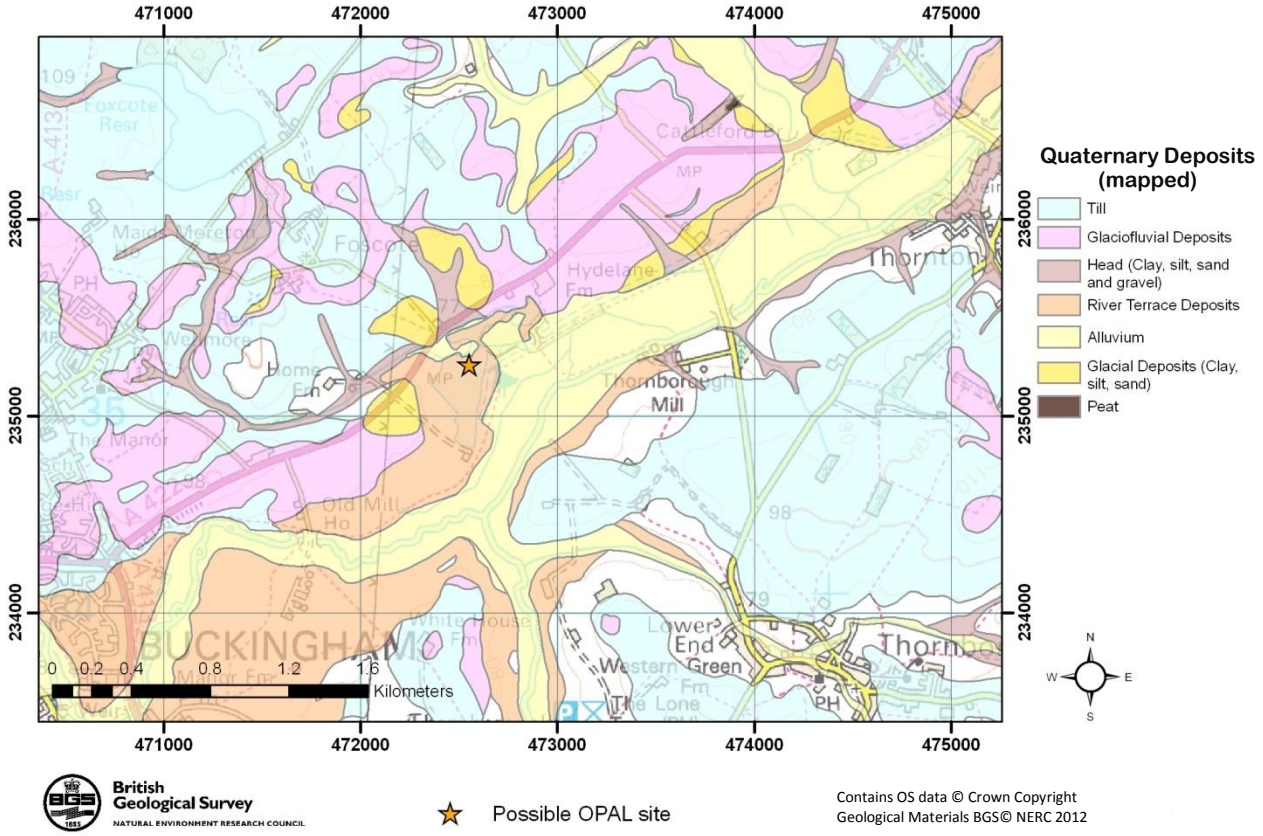


Figure 3.53 Quaternary map for Hydelane Reservoir

There is a variety of superficial deposits in the area around Hydelane Reservoir. The reservoir is situated on alluvium, river terrace deposits, and possibly glacial deposits.

3.12.3 Aerial Photographs

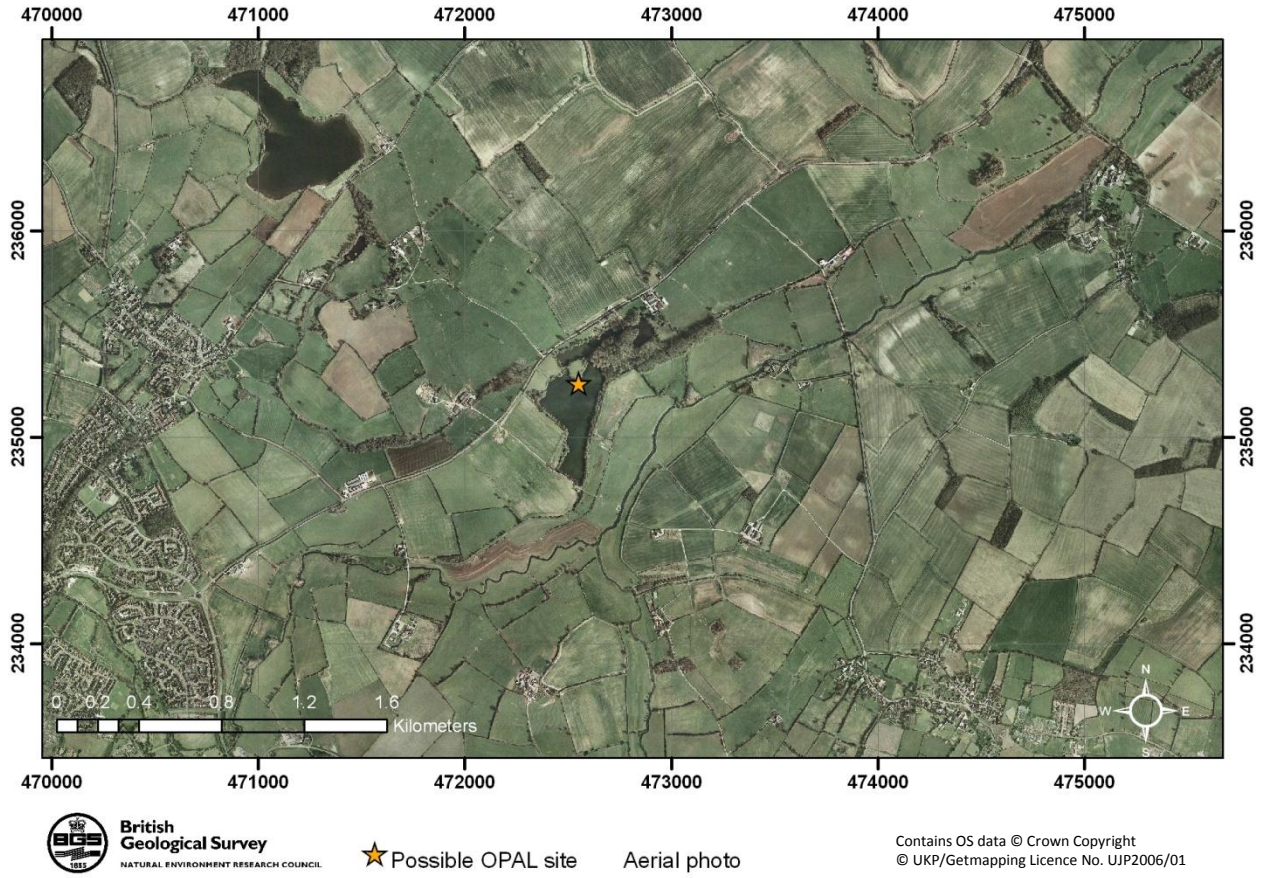


Figure 3.54 Aerial photograph of Hydelane Reservoir

3.12.4 Digital Terrain Model

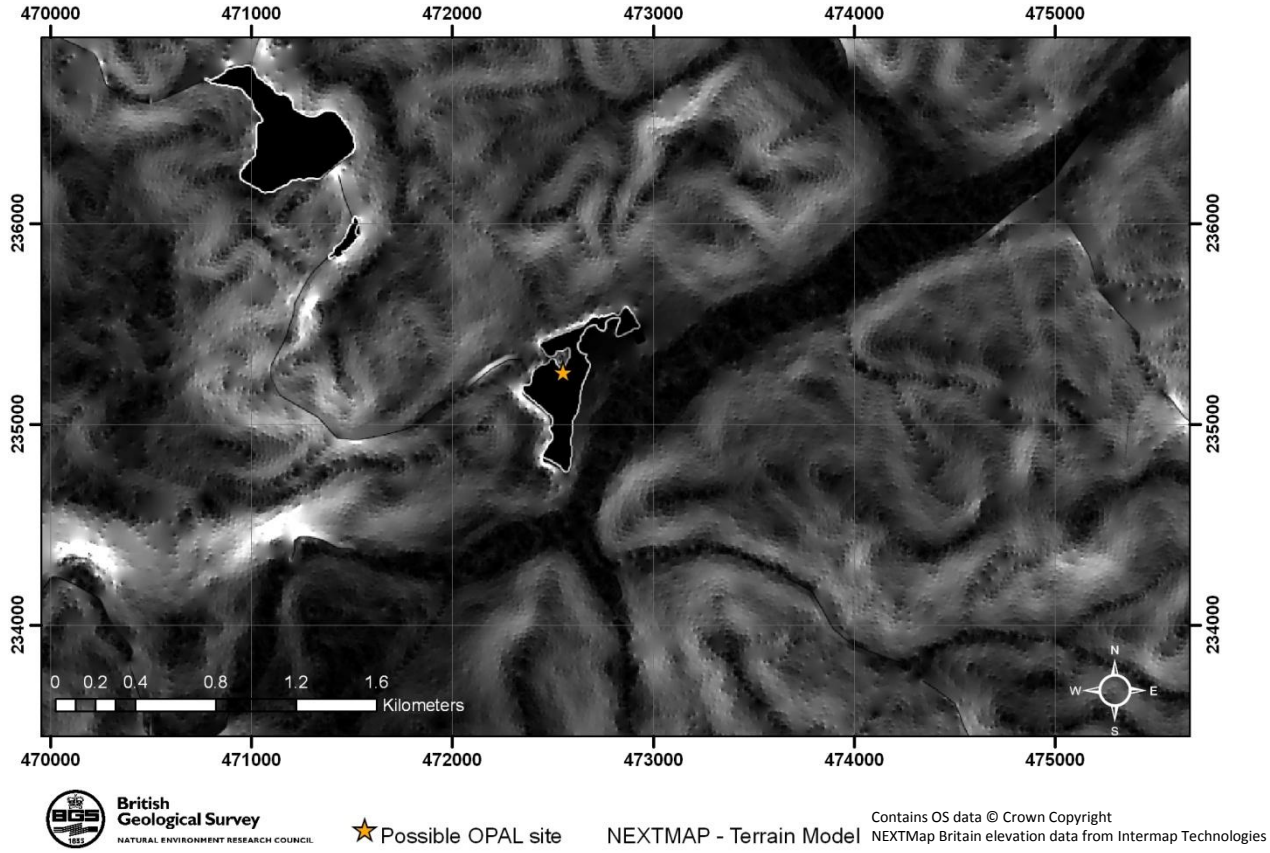


Figure 3.55 DTM of Hydelane Reservoir

3.13 LORD'S WOOD POND, HERTFORDSHIRE

The site is a small pond in the Hertfordshire village of Hunsdonbury [541453, 212260]. It is about 150 m x 60 m. Lord's Wood Pond was originally selected as one of UCL's calibration sites, but was subsequently replaced by Bonnington's Lake (see Section 3.21).

3.13.1 G-BASE Site Locations

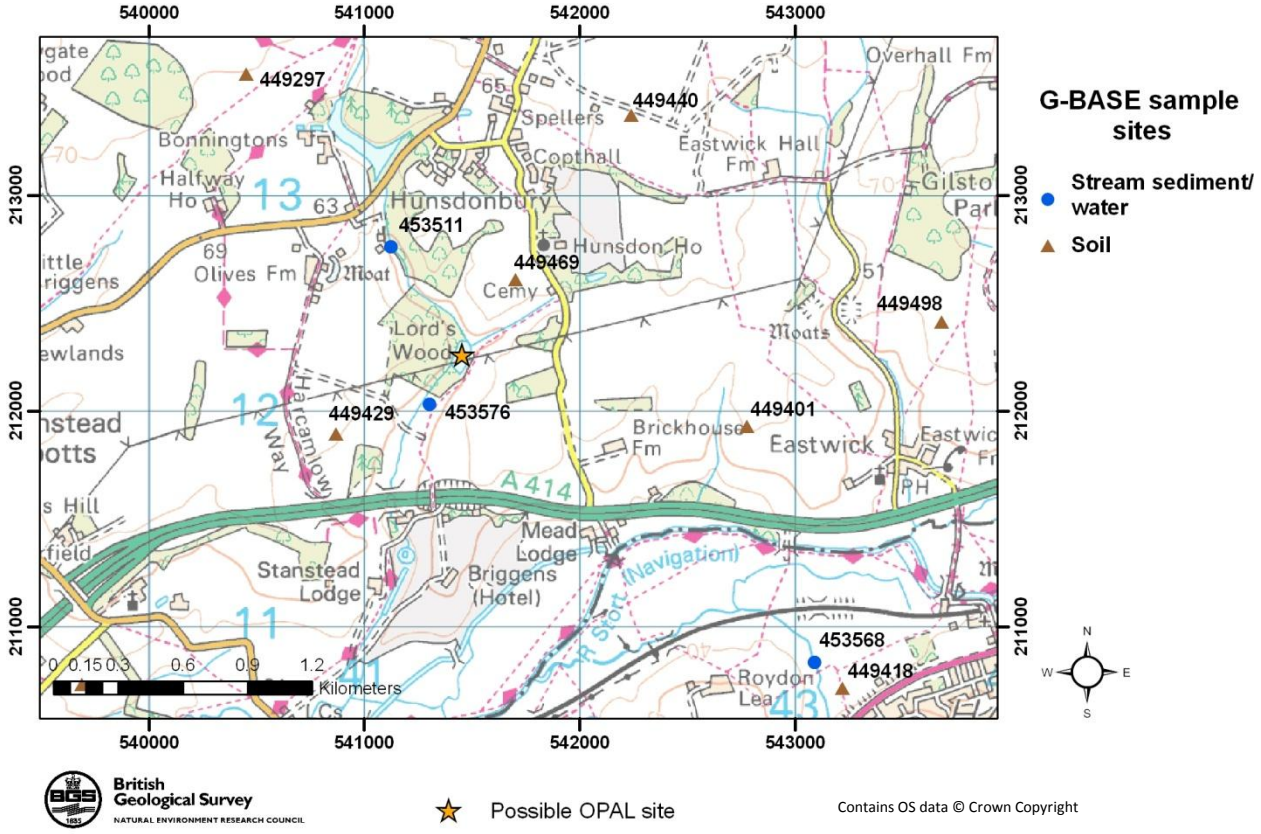


Figure 3.56 G-BASE sample site locations for Lord's Wood Pond

Table 20 G-BASE sample locations for Lord's Wood Pond

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
453511	C+W	541125	212761	449418	S	543220	210711
453568	C+W	543089	210835	449429	S	540869	211891
453576	C+W	541304	212030	449440	S	542241	213370
449297	S	540452	213560	449469	S	541702	212607
449401	S	542776	211927	449498	S	543680	212409
449402	S	539689	210729				

Sample type: S= Soil, C= Sediment, W= Water

3.13.2 Bedrock Geology

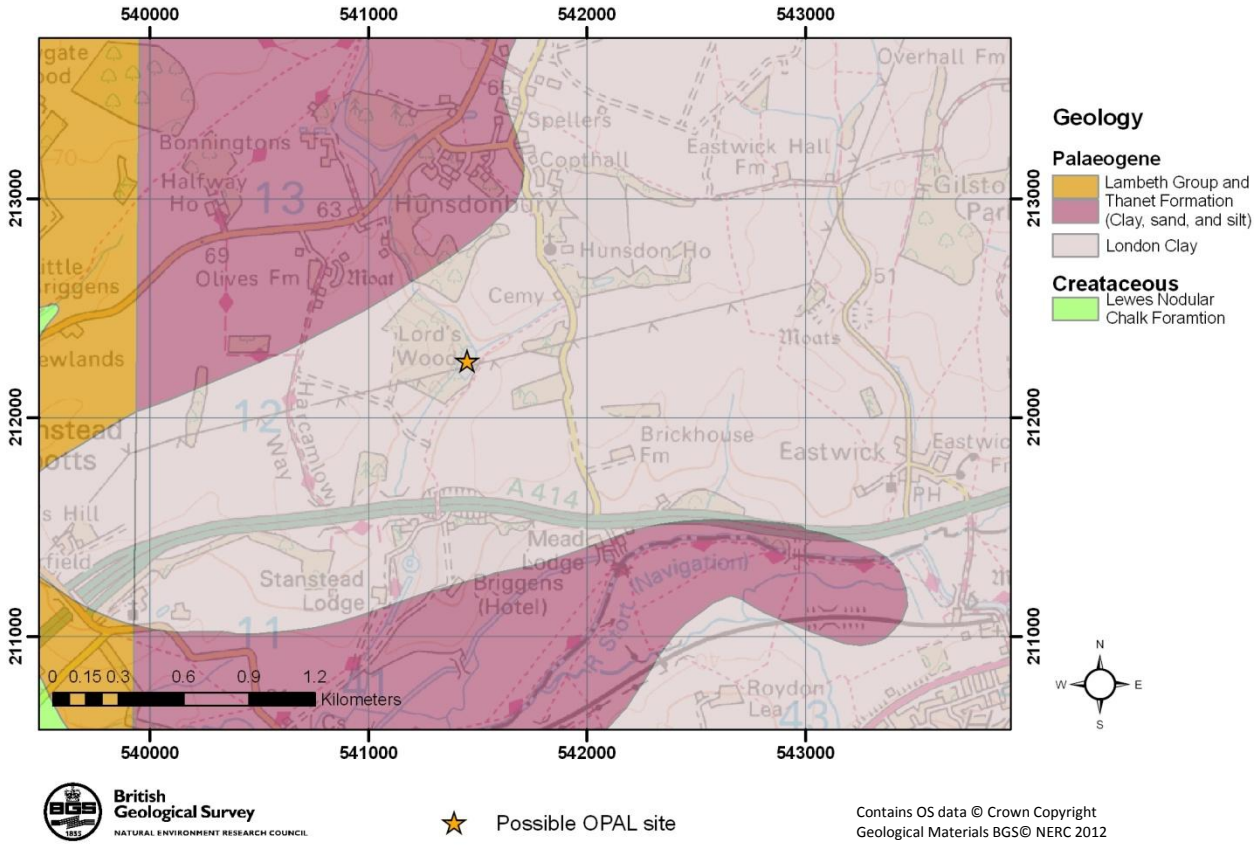


Figure 3.57 Bedrock Geology for Lord's Wood Pond

The area surrounding Lord's Wood Pond is underlain by London Clay, it may also be influenced by the clay, sand and silt of the Lambeth Group and Thanet Formation.

3.13.3 Quaternary Deposits

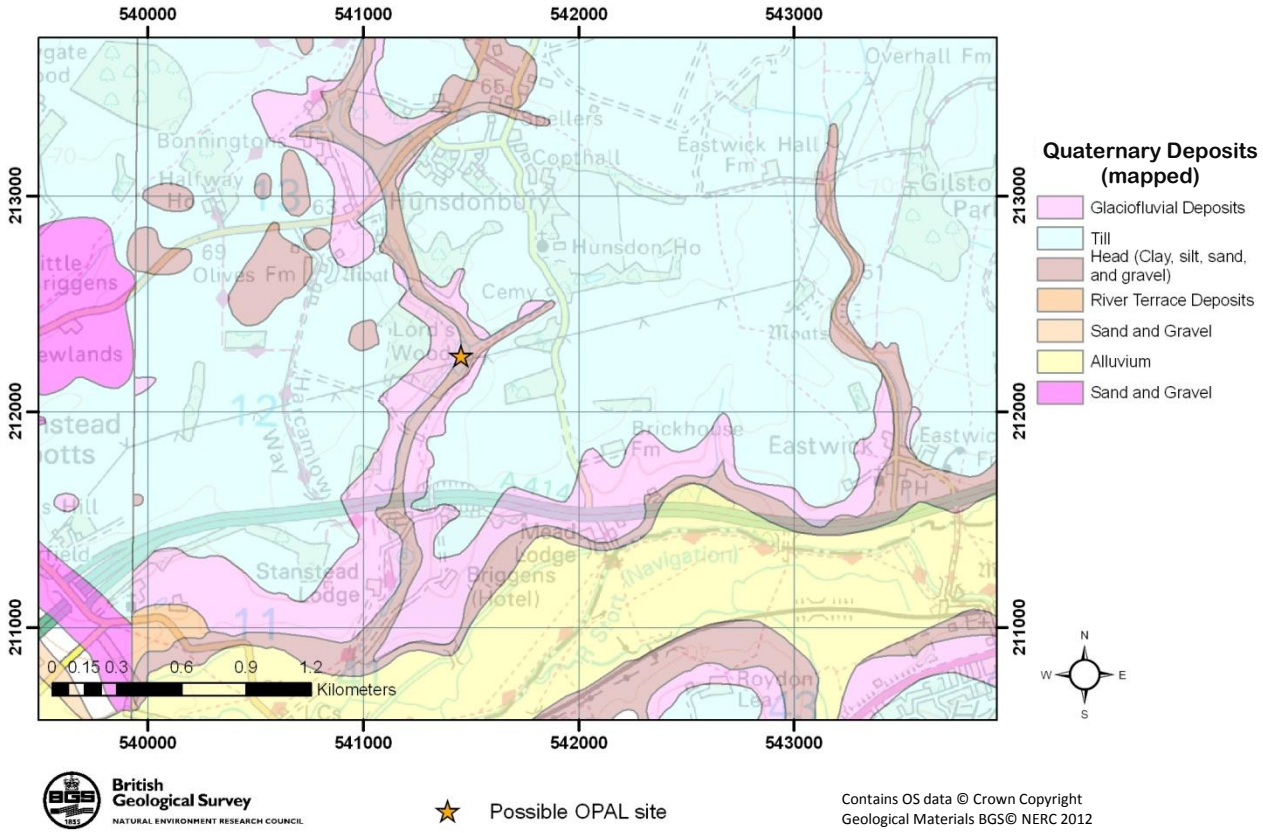


Figure 3.58 Quaternary Deposits Lord's Wood Pond

The pond is situated over head deposits of clay, silt, sand and gravel. It may also be affected by adjacent glaciofluvial deposits.

3.13.4 Aerial Photographs

Figure 3.59 Aerial photograph of Lord's Wood Pond

Figure 3.60 Zoomed aerial photograph of Lord's Wood Pond

3.13.5 Digital Terrain Model

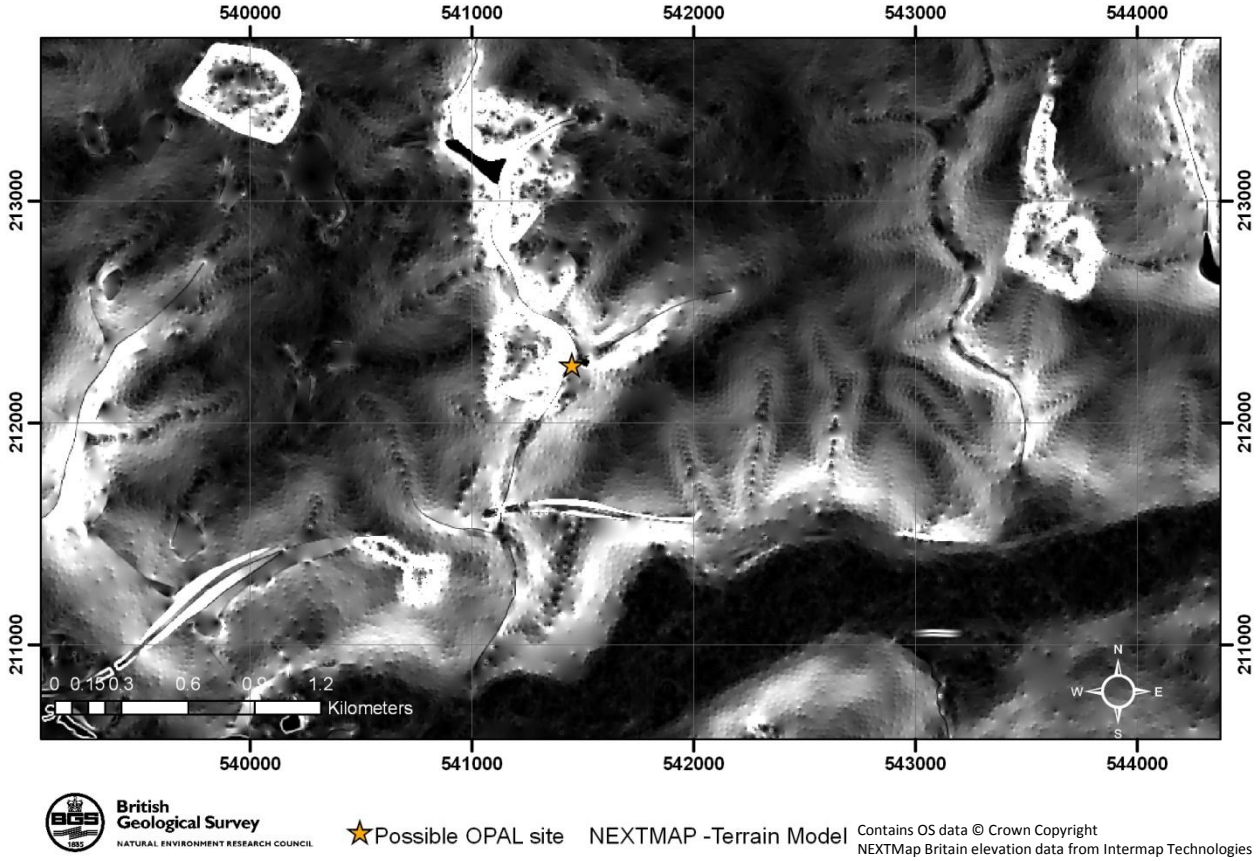


Figure 3.61 DTM of Lord's Wood Pond

3.14 LOWER TAMAR LAKE, DEVON

The Lower Tamar Lake is the lower of two reservoirs in the upper reaches of the Tamar catchment; its western edge provides the border between Devon and Cornwall [229530, 111000]

3.14.1 G-BASE Site Locations

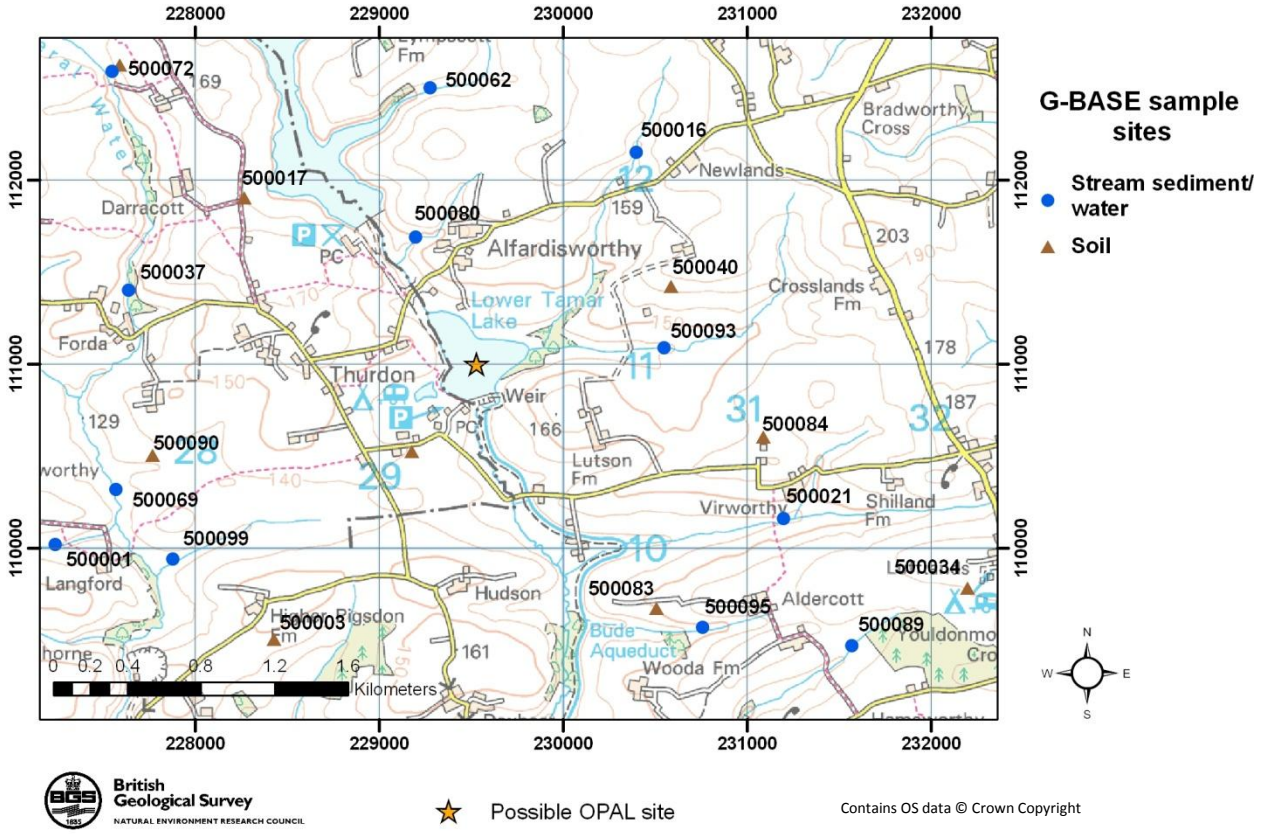


Figure 3.62 G-BASE sample site locations for the Lower Tamar Lake

Table 21 G-BASE sample locations for the lower Tamar Lake

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
500001	C+W	227240	110020	500099	C+W	227880	109940
500016	C+W	230400	112150	500017	S	228270	111900
500021	C+W	231200	110160	500003	S	228430	109500
500037	C+W	227640	111400	500034	S	232200	109780
500062	C+W	229280	112500	500040	S	230590	111420
500069	C+W	227570	110320	500065	S	227590	112620
500072	C+W	227550	112590	500071	S	229180	110520
500080	C+W	229200	111690	500083	S	230510	109670
500089	C+W	231570	109470	500084	S	231090	110600
500093	C+W	230550	111090	500090	S	227770	110500
500095	C+W	230760	109570				

Sample type: S= Soil, C= Sediment, W= Water

3.14.2 Parent Material

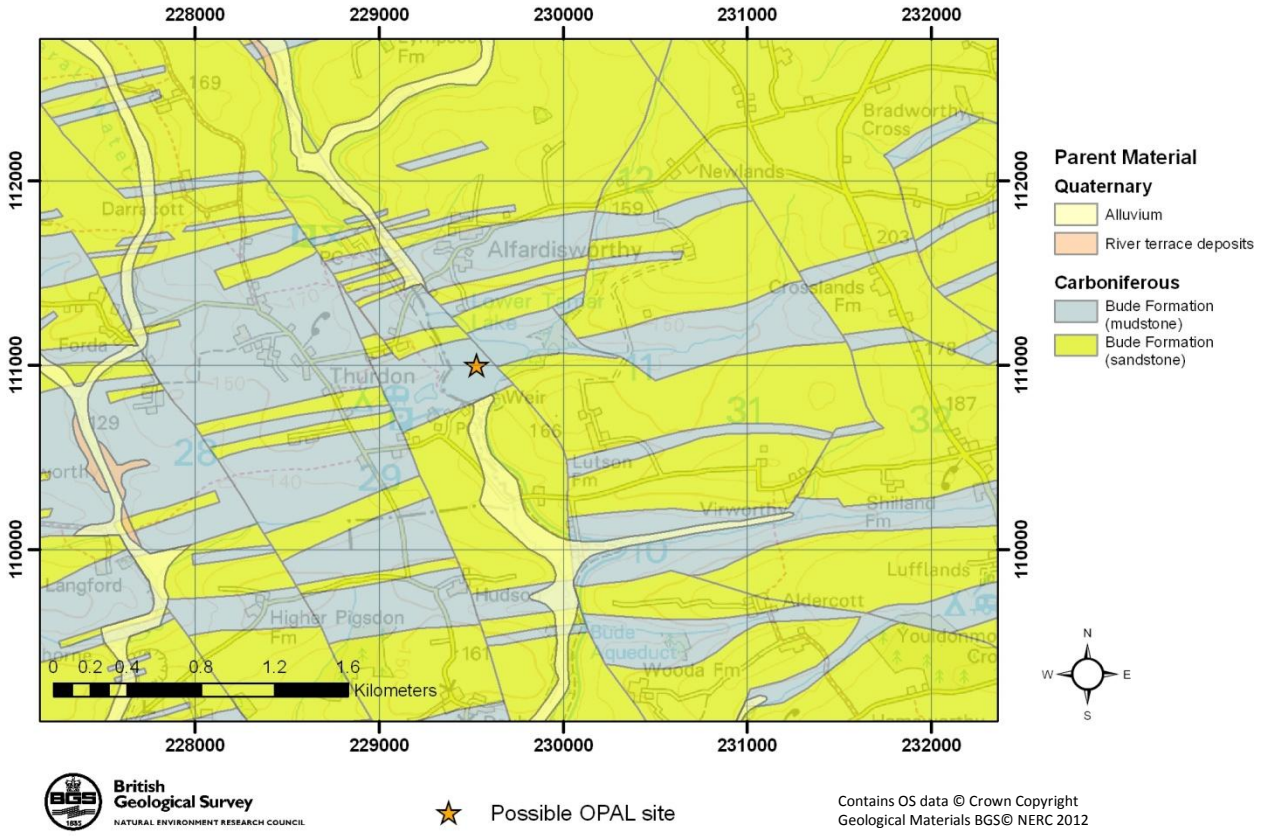


Figure 3.63 Parent material map for the Lower Tamar Lake

The region is totally underlain by Carboniferous mudstones and sandstones from the Bude Formation. The mapped alluvium will likely influence the site.

3.14.3 Aerial Photographs

Figure 3.64 Aerial photograph of the Lower Tamar Lake

3.14.4 Digital Terrain Model

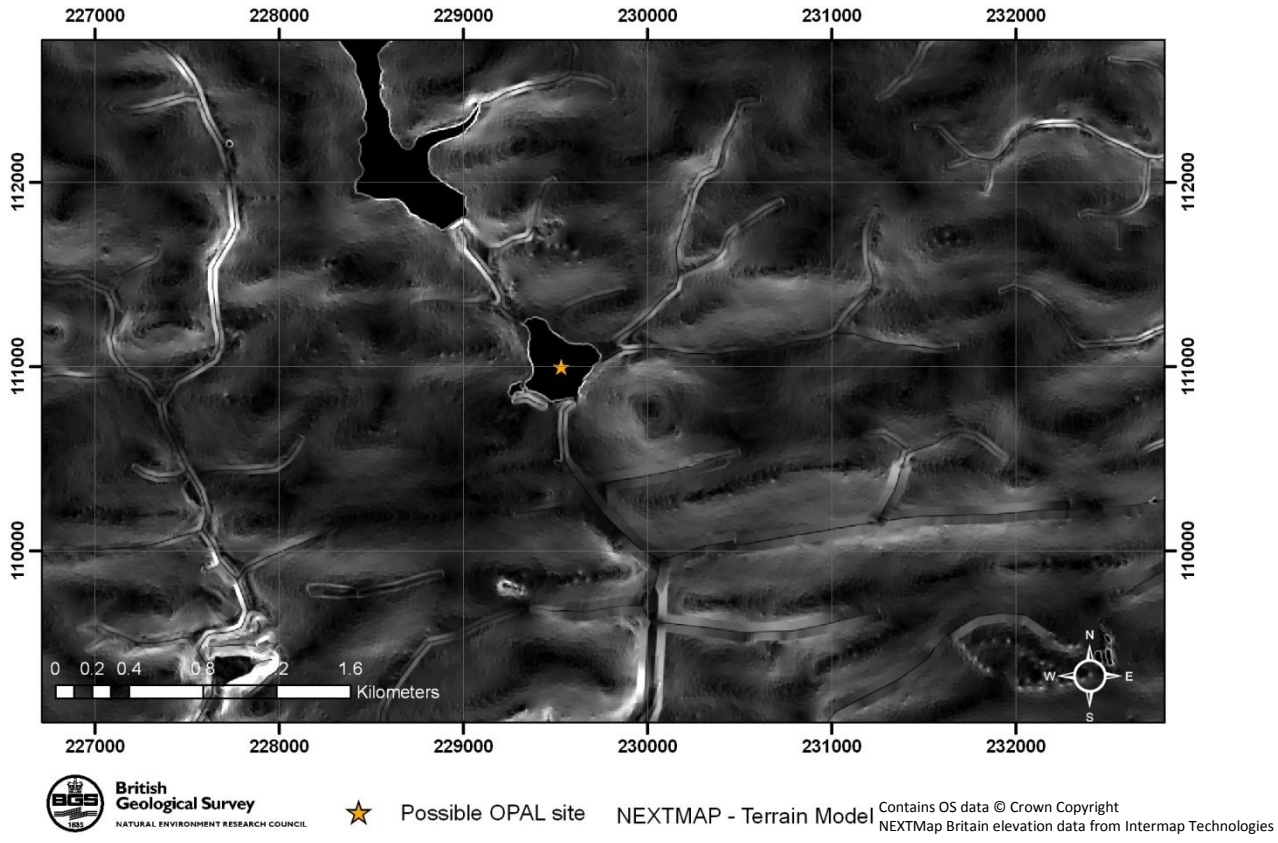


Figure 3.65 DTM of the Lower Tamar Lake

3.15 LOWESWATER, CUMBRIA

Loweswater is a lake in the north west of the Lake District [312421, 521810]. It is approximately 1.5 km x 550 m. Loweswater was selected as one of UCL's calibration sites, and was sampled on 21st June 2011.

3.15.1 G-BASE Site Locations

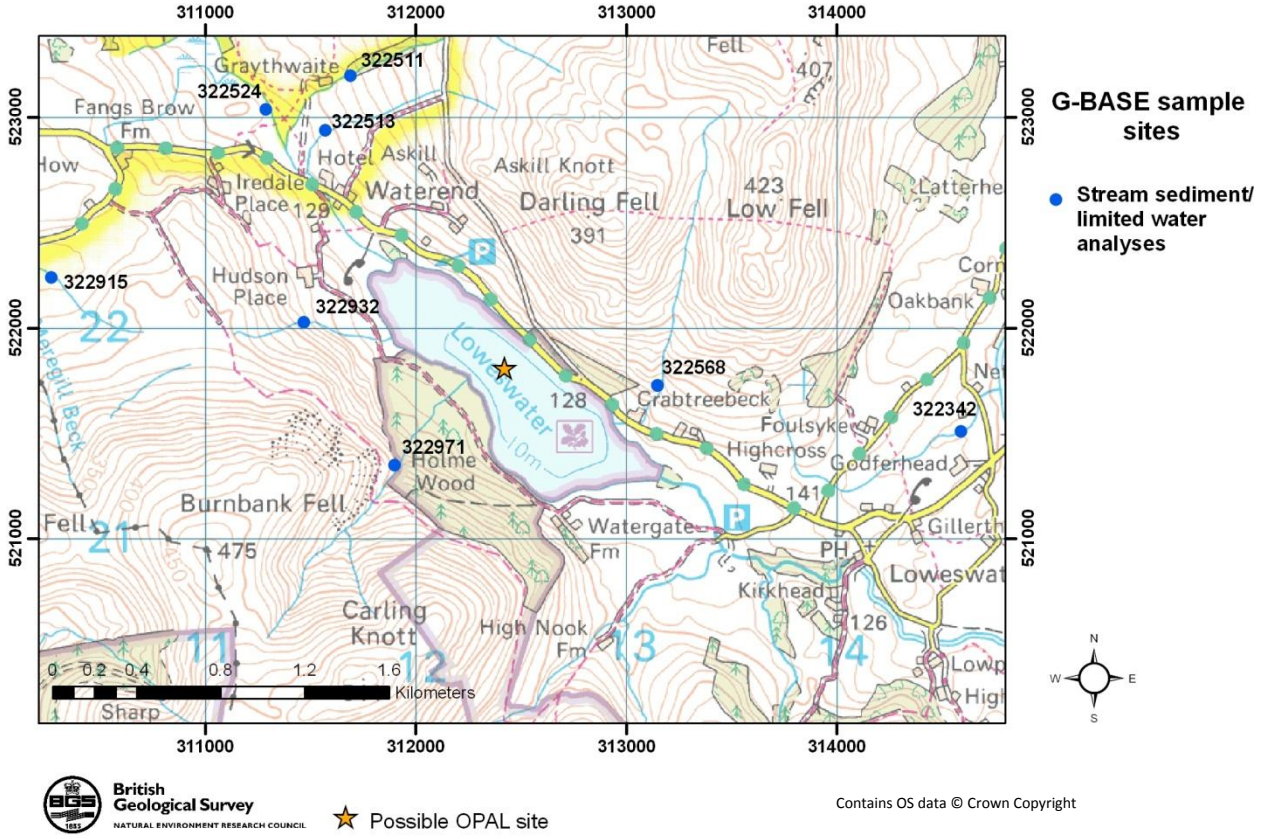


Figure 3.66 G-BASE sample site locations for Loweswater

Table 22 G-BASE sample locations for Loweswater

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
322971	C+(limited)W	311900	521350	322932	C+(limited)W	311470	522030
322568	C+(limited)W	313150	521730	322915	C+(limited)W	310270	522240
322568	C+(limited)W	313150	521730	322511	C+(limited)W	311690	523200
322524	C+(limited)W	311290	523040	322342	C+(limited)W	314590	521510
322513	C+(limited)W	311570	522940				

Sample type: C= Sediment, W= Water

3.15.2 Parent Material

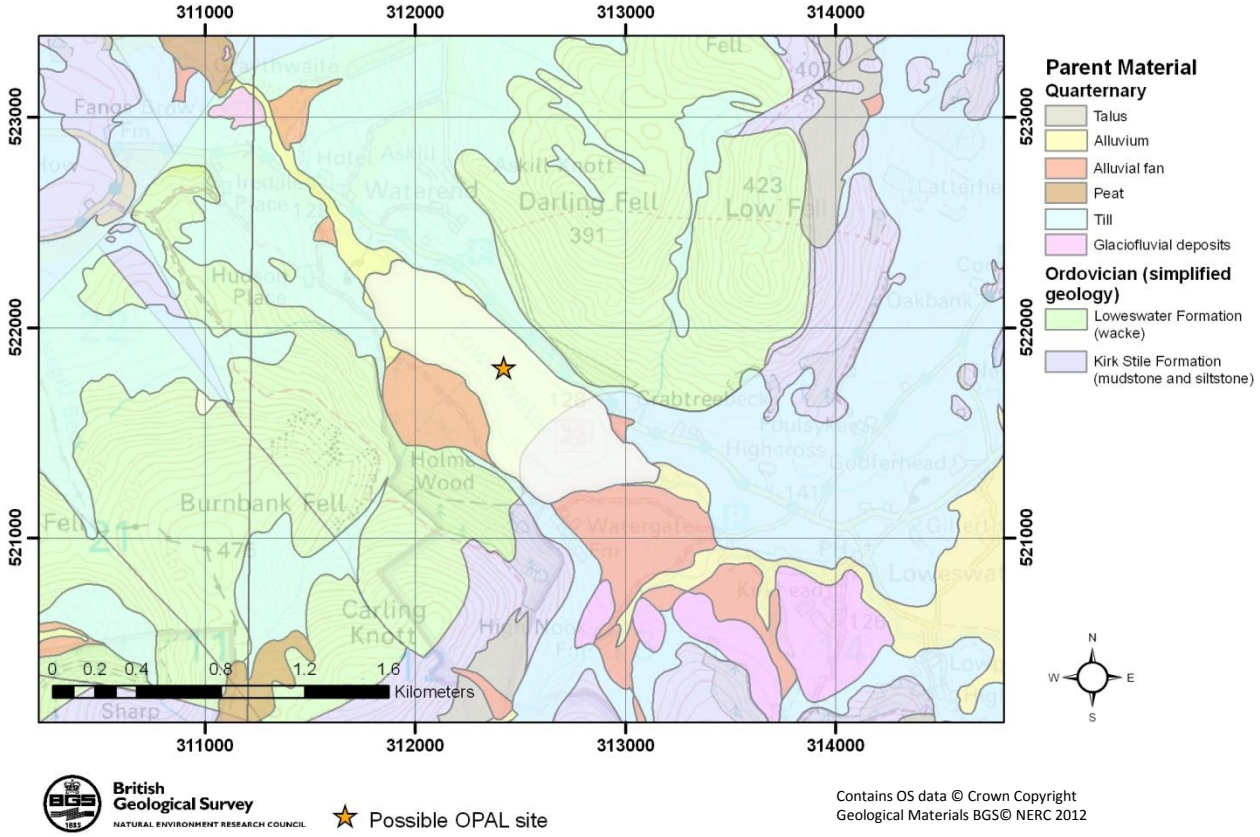


Figure 3.67 Parent material map for Loweswater

The area is underlain by Ordovician sedimentary rocks. The lake is mostly situated upon wackes form the Loweswater formation. The southern third of the lake is underlain by mudstone and siltstone of the Kirk Stile Formation. The site is influenced by alluvium and till.

3.15.3 Aerial Photographs

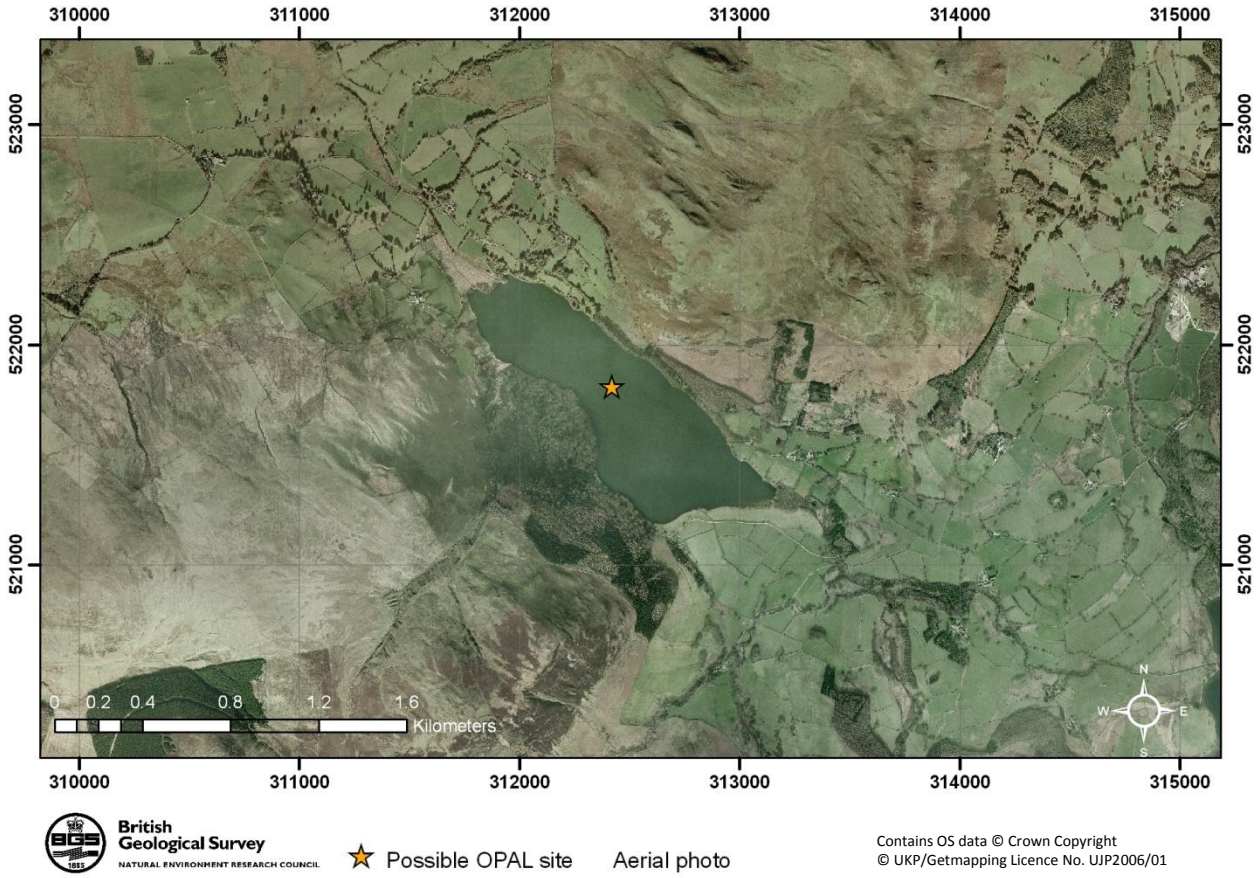


Figure 3.68 Aerial photograph for Loweswater

3.15.4 Digital Terrain Model

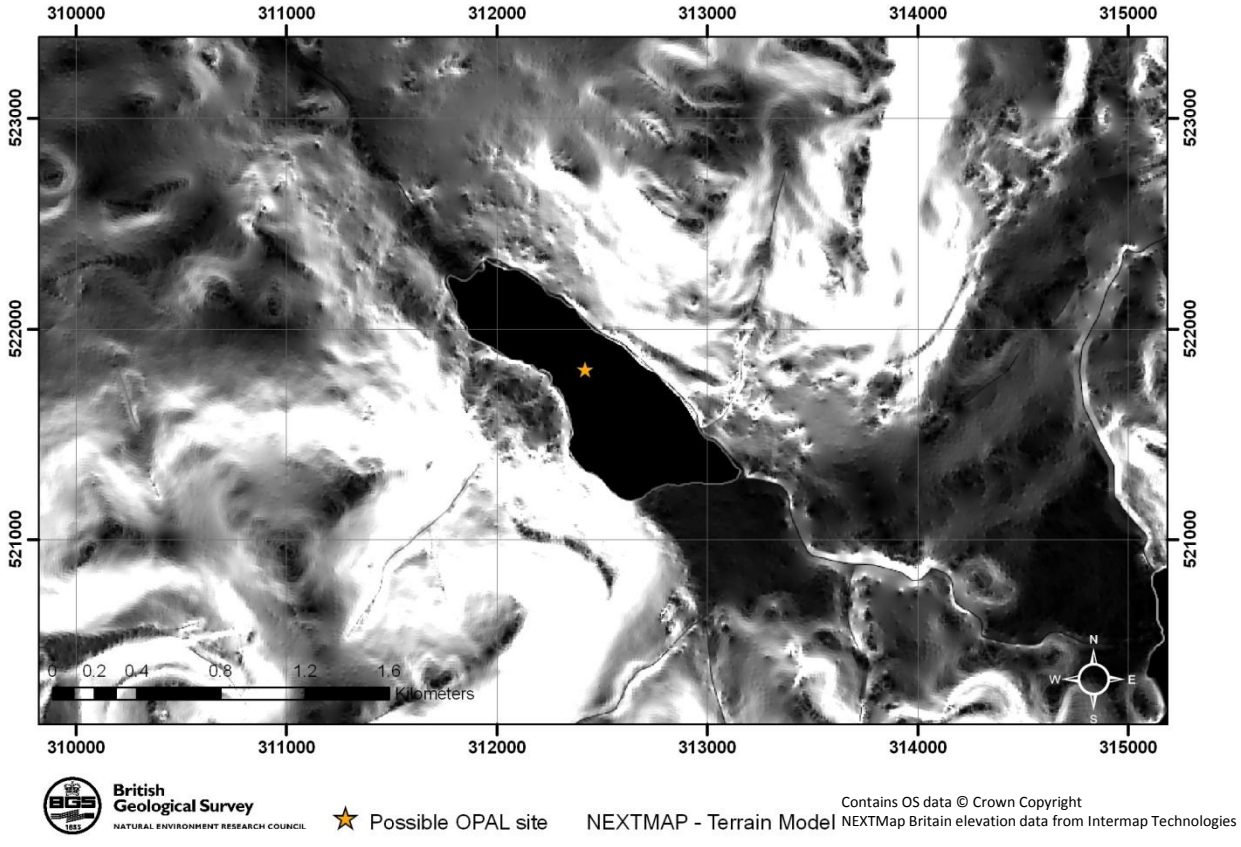


Figure 3.69 DTM for Loweswater

3.16 OGSTON RESERVOIR, DERBYSHIRE

Ogston reservoir is an artificial lake 7.5 km east of Matlock, Derbyshire [437643, 360209]. The reservoir is approximately 1.6 km x 800 m.

3.16.1 G-BASE Site Locations

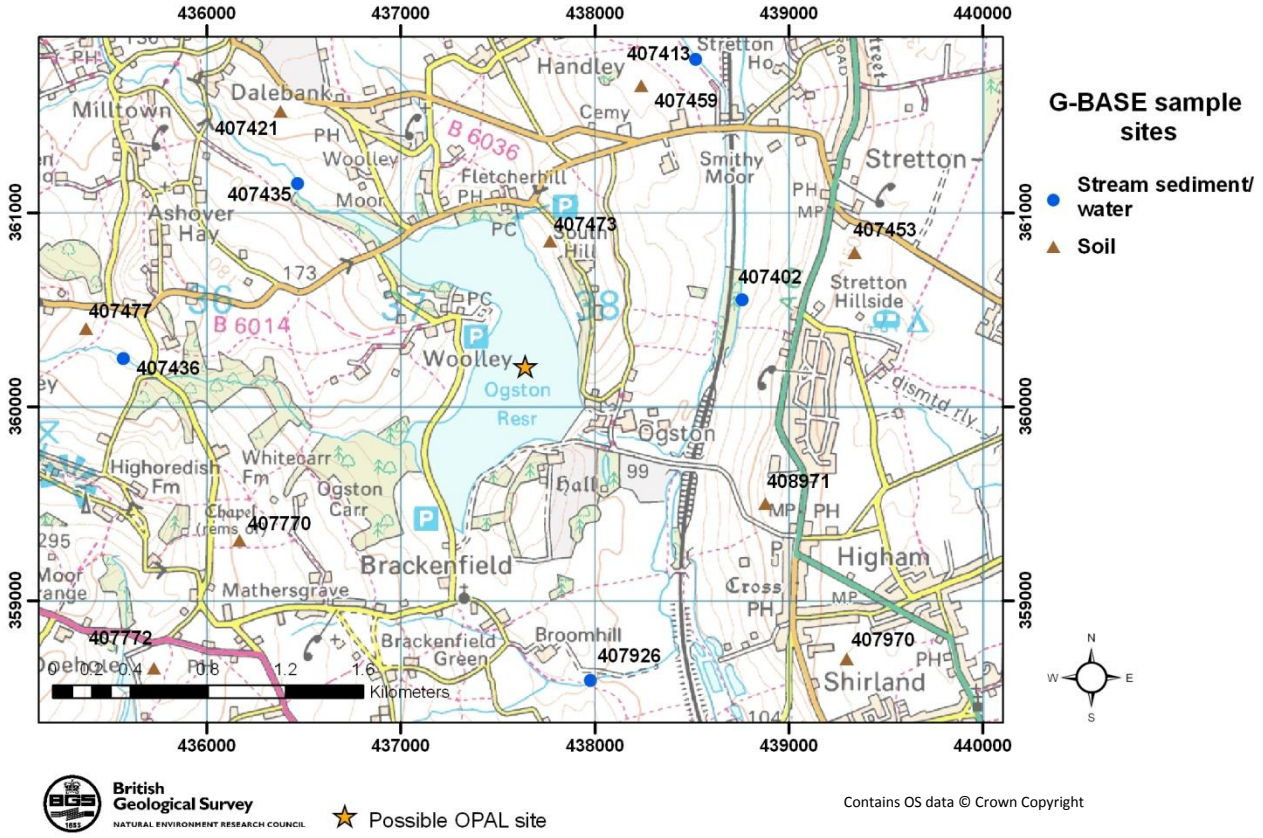


Figure 3.70 G-BASE sample site locations for Ogston Reservoir

Table 23 G-BASE sample locations for Ogston Reservoir

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
407402	C+W	438760	360550	407459	S	438240	361650
407413	C+W	438520	361790	407473	S	437770	360850
407435	C+W	436470	361150	407477	S	435380	360400
407436	C+W	435570	360250	407722	S	435730	358650
407926	C+W	437980	358590	407770	S	436170	359310
407421	S	436380	361520	407970	S	439300	358700
407458	S	439340	360790	408971	S	438880	359500

Sample type: S= Soil, C= Sediment, W= Water

3.16.2 Parent Material

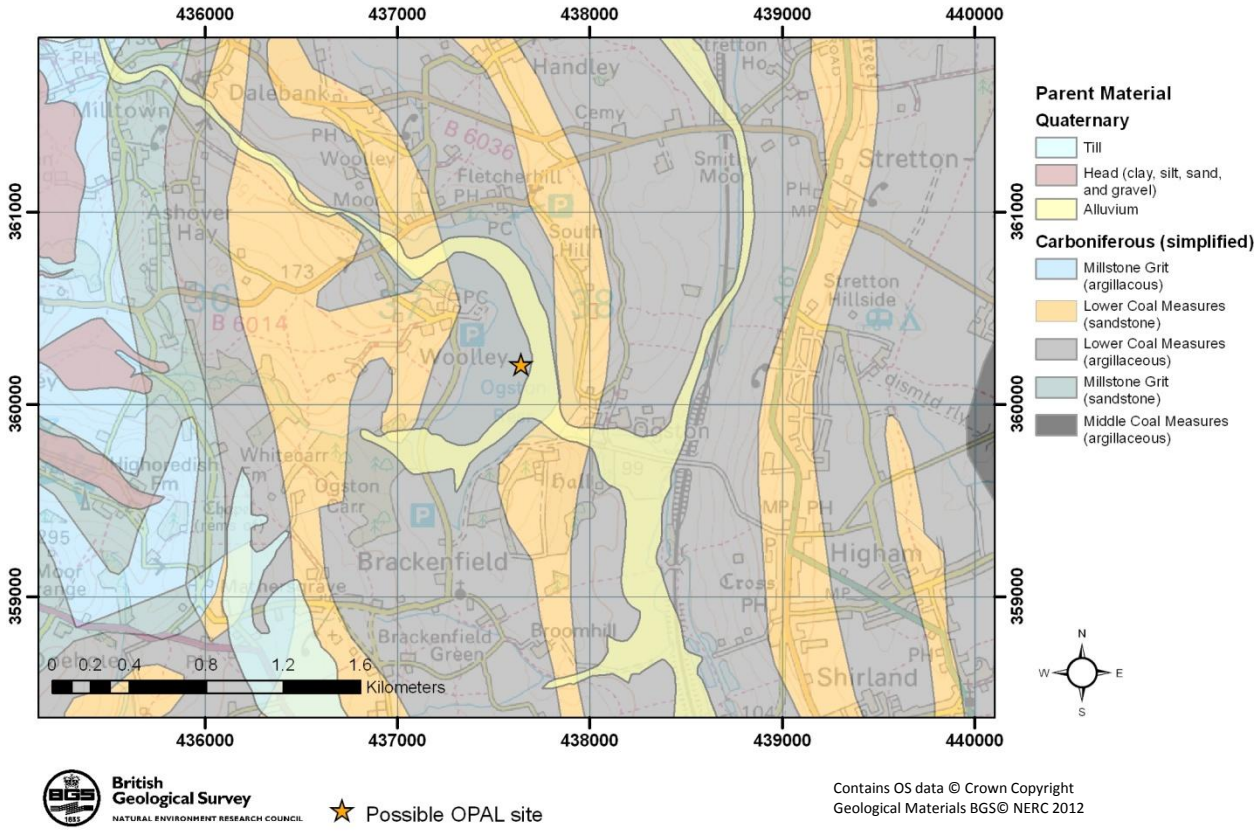


Figure 3.71 Parent material map for Ogston Reservoir

The area is underlain by carboniferous sedimentary rocks. The lake is situated over sandstones and argillaceous rocks of the Lower Coal Measures. The site is situated above alluvium deposits.

3.16.3 Aerial Photographs

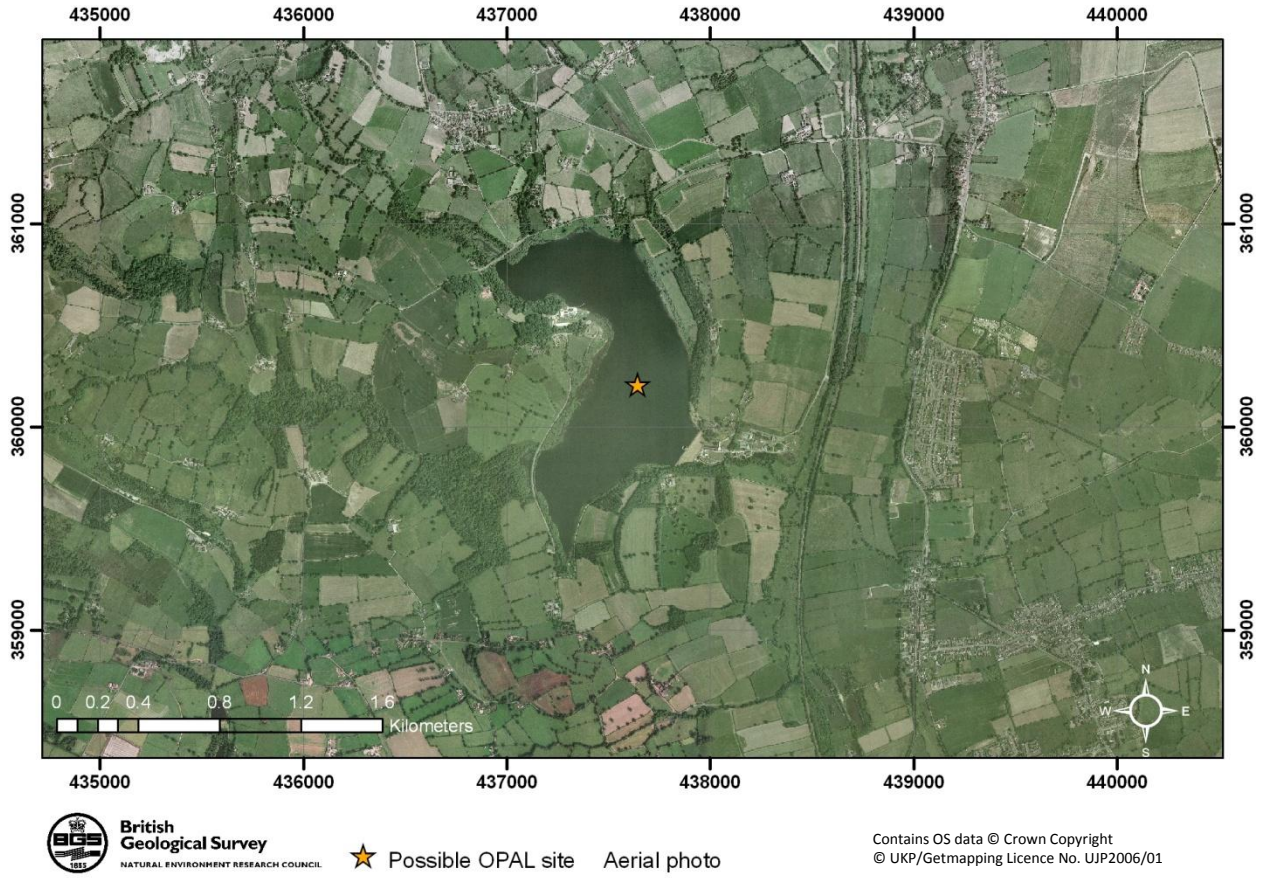


Figure 3.72 Aerial photograph of Ogston Reservoir

3.16.4 Digital Terrain Model

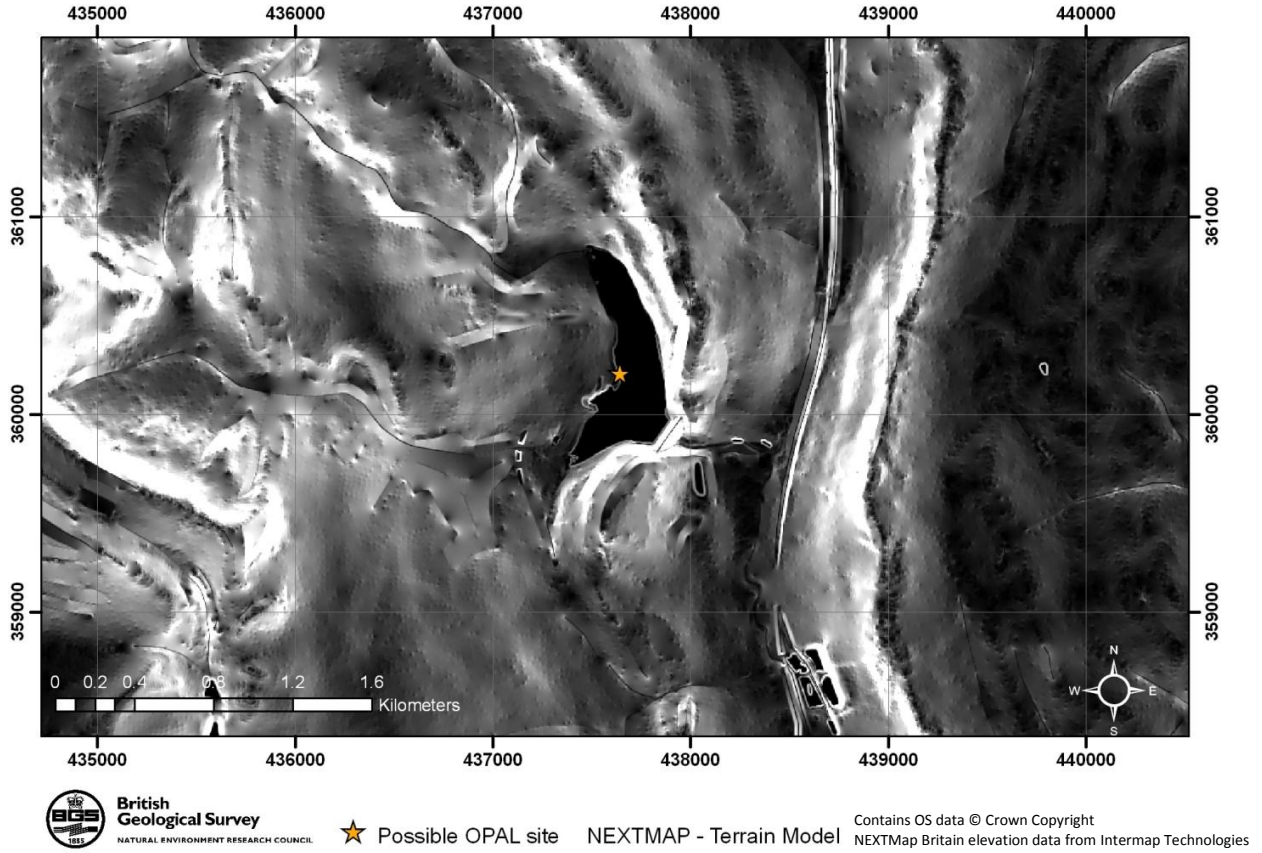


Figure 3.73 DTM of Ogston Reservoir

3.17 PEBLEY RESERVOIR, DERBYSHIRE

The site is a reservoir situated on the border between Derbyshire and South Yorkshire [448814, 379033]. The county border follows the eastern edge of Pebley reservoir, which is approximately 600 m x 300 m.

3.17.1 G-BASE Site Locations

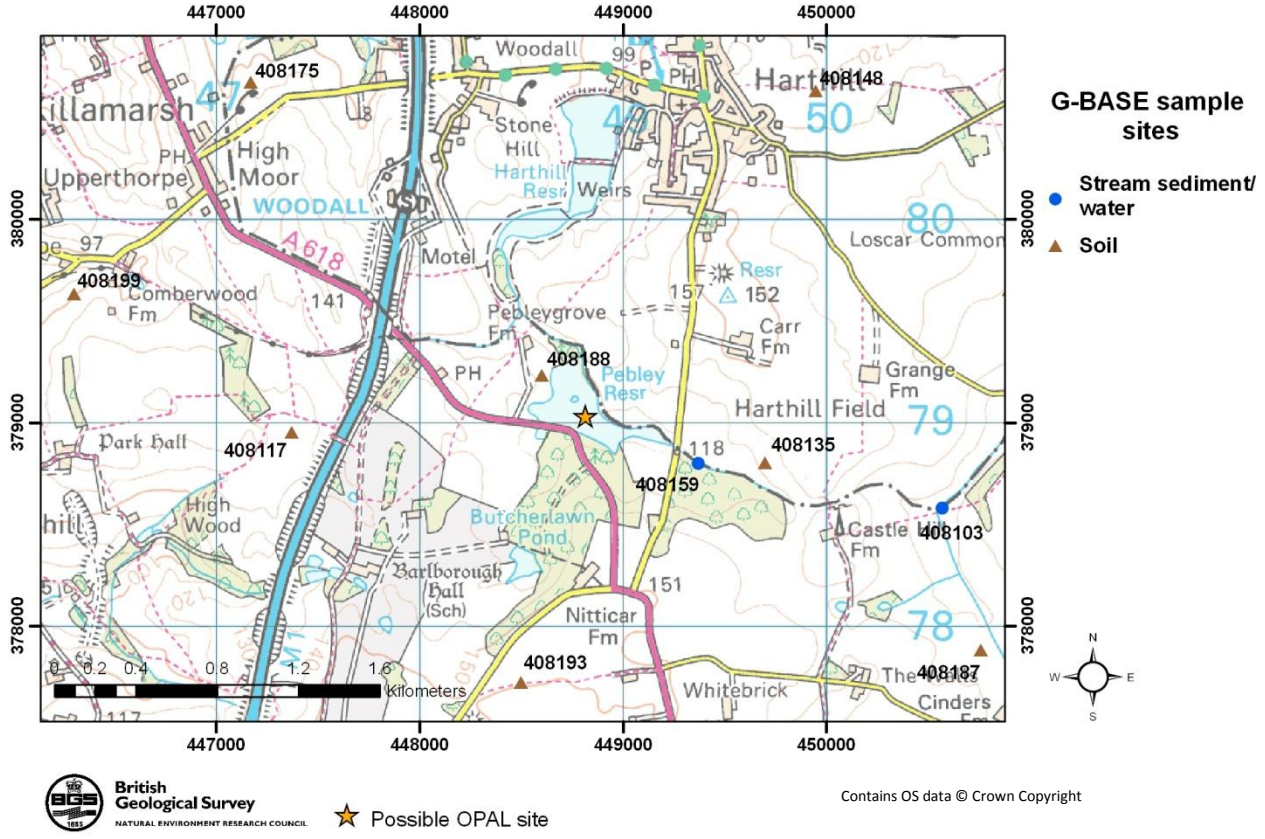


Figure 3.74 G-BASE sample site locations for Pebley Reservoir

Table 24 G-BASE sample locations for Pebley Reservoir

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
408103	C+W	450570	378580	408175	S	447170	380670
408159	C+W	449370	378800	408187	S	450760	377880
408117	S	447370	378950	408188	S	448600	379230
408135	S	449700	378800	408193	S	448500	377720
408148	S	449950	380630	408199	S	446300	379630

Sample type: S= Soil, C= Sediment, W= Water

3.17.2 Parent Material

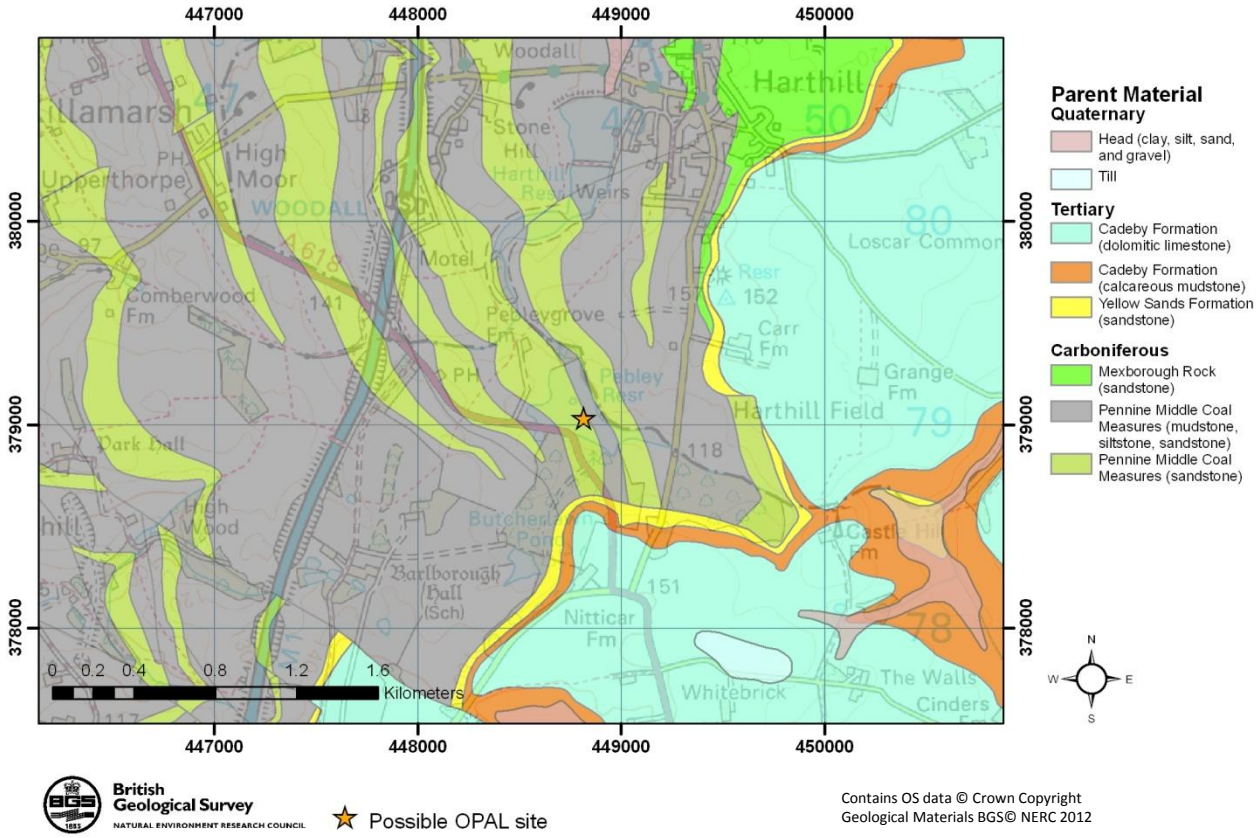


Figure 3.75 Parent material map for Pebley Reservoir

The reservoir overlies an area of Carboniferous mudstones, siltstones and sandstones, it is not affected by any mapped Quaternary deposits.

3.17.3 Aerial Photographs

Figure 3.76 Aerial photograph of Pebley Reservoir

3.17.4 Digital Terrain Model

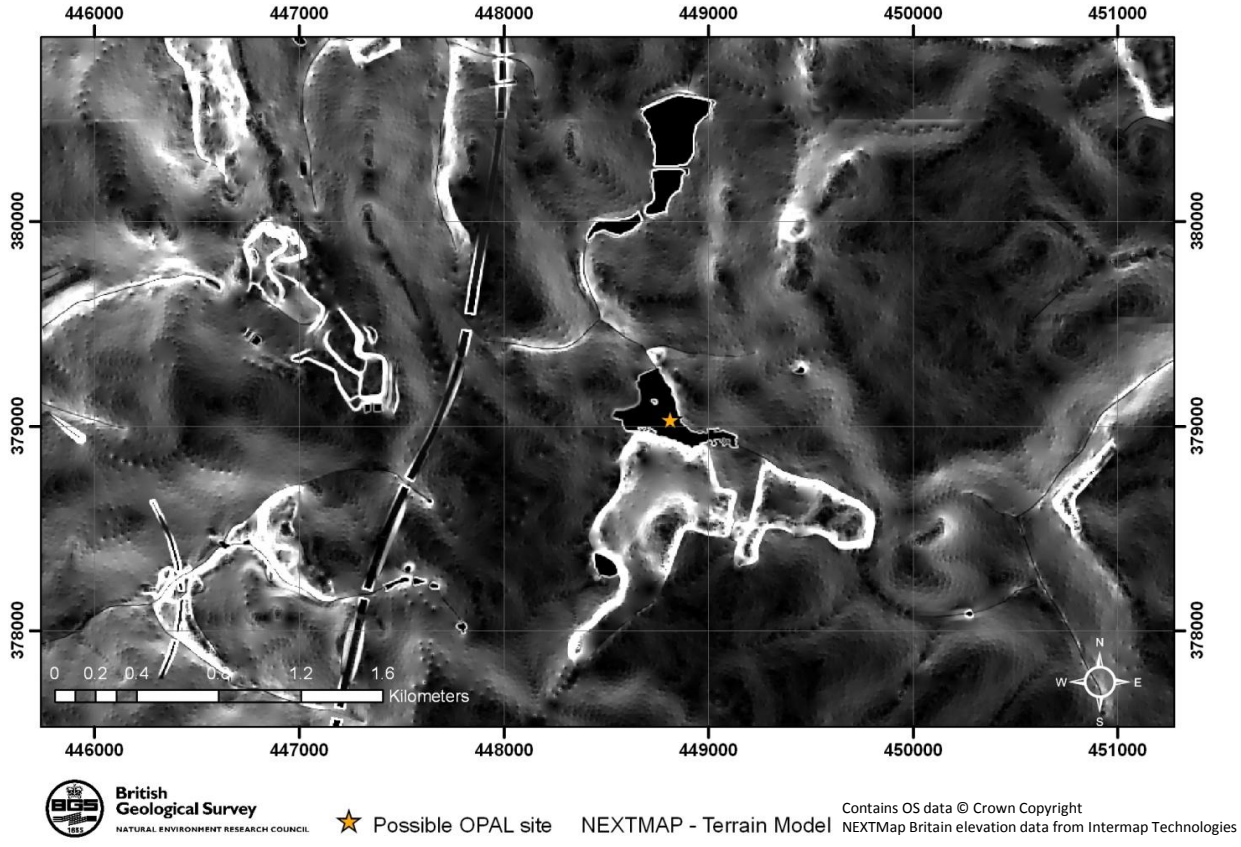


Figure 3.77 DTM of Pebley Reservoir

3.18 SCAMPSTON LAKE, NORTH YORKSHIRE

The lake at Scampston lies in the valley of Scampston Brook, north Yorkshire [486654, 475153]. It is approximately 970 m x 80 m. Scampston Lake was selected as one of UCL's calibration sites, and was sampled on 20th October 2011.

3.18.1 G-BASE Site Locations

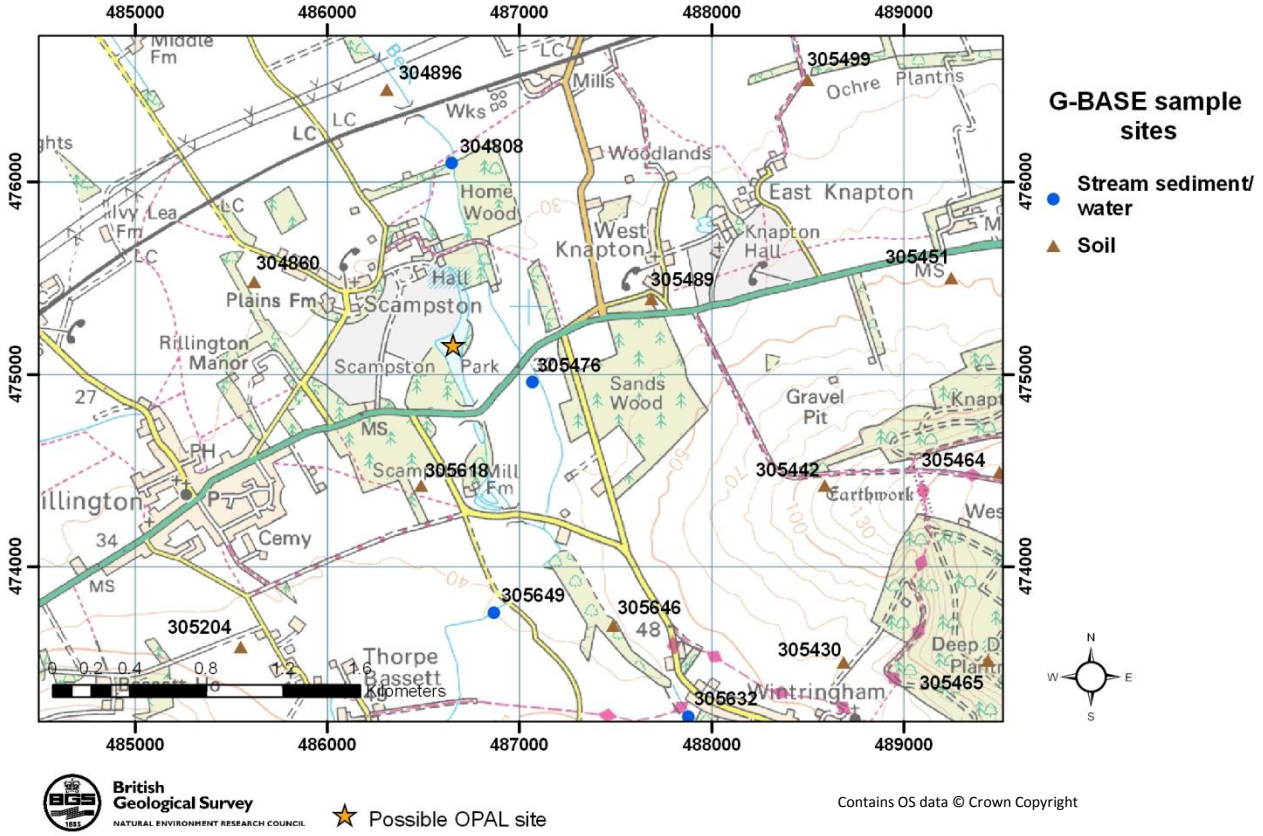


Figure 3.78 G-BASE sample site locations for Scampston Lake

Table 25 G-BASE sample locations for Scampston Lake

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
304808	C+W	486650	476100	305442	S	488590	474420
305476	C+W	487070	474960	305451	S	489250	475500
305632	C+W	487880	473220	305464	S	489500	474490
305649	C+W	486870	473760	305465	S	489440	473510
304860	S	485620	475480	305489	S	487690	475390
304896	S	486310	476480	305499	S	488500	476530
305204	S	485550	473580	305618	S	486490	474420
305430	S	488690	473500	305646	S	487490	473690

Sample type: S= Soil, C= Sediment, W= Water

3.18.2 Parent Material

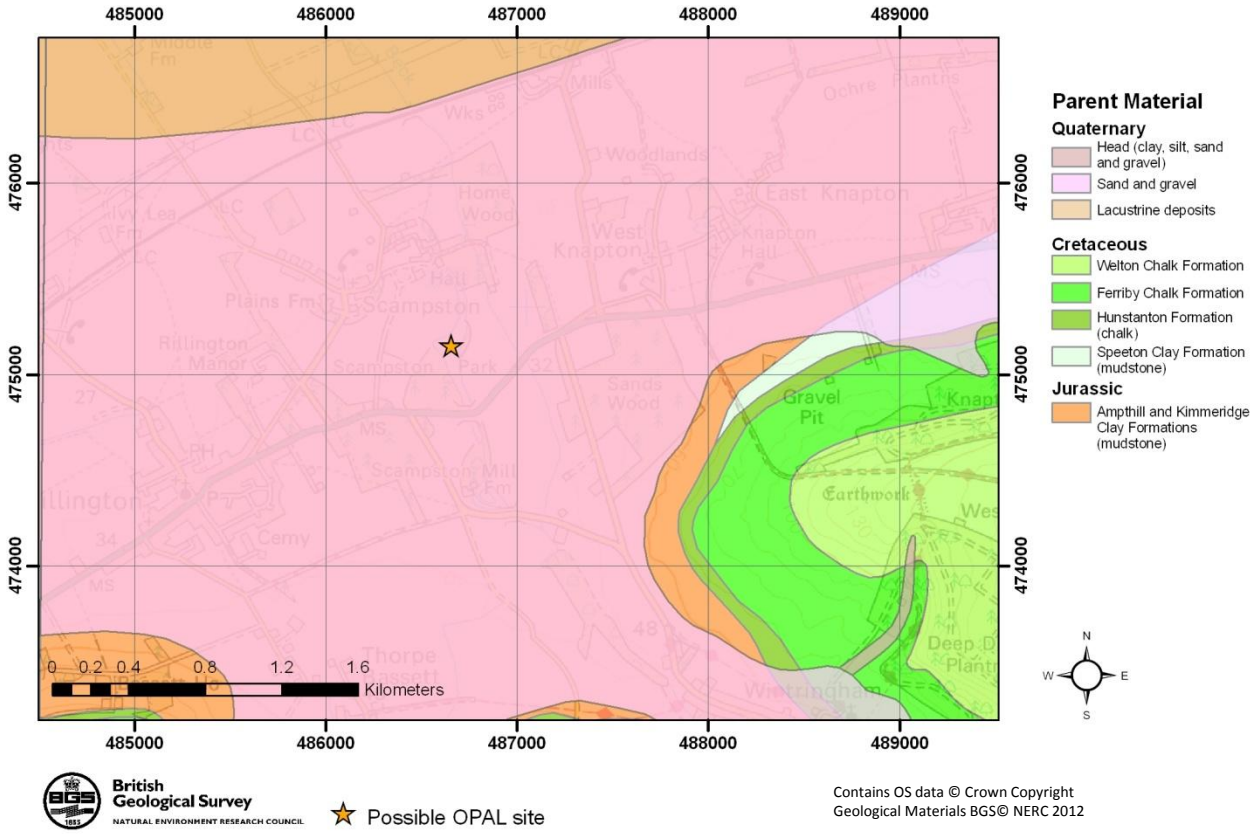


Figure 3.79 Parent material map for Scampston Lake

The lake is situated over Jurassic mudstones of the Amphill and Kimmeridge Clay Formations, which is covered by sand and gravel deposits.

3.18.3 Aerial Photographs

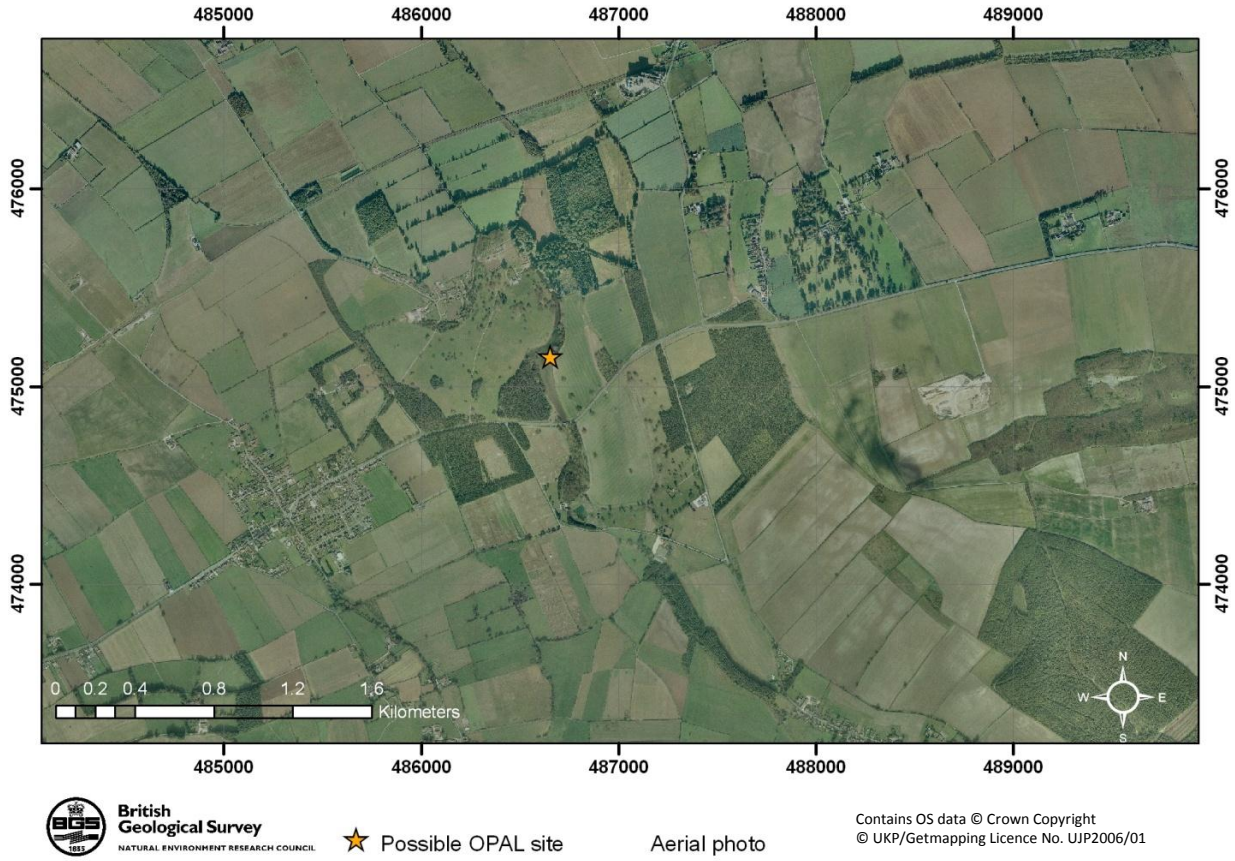


Figure 3.80 Aerial photograph of Scampston Lake

Figure 3.81 Zoomed aerial photograph of Scampston Lake

3.18.4 Digital Terrain Model

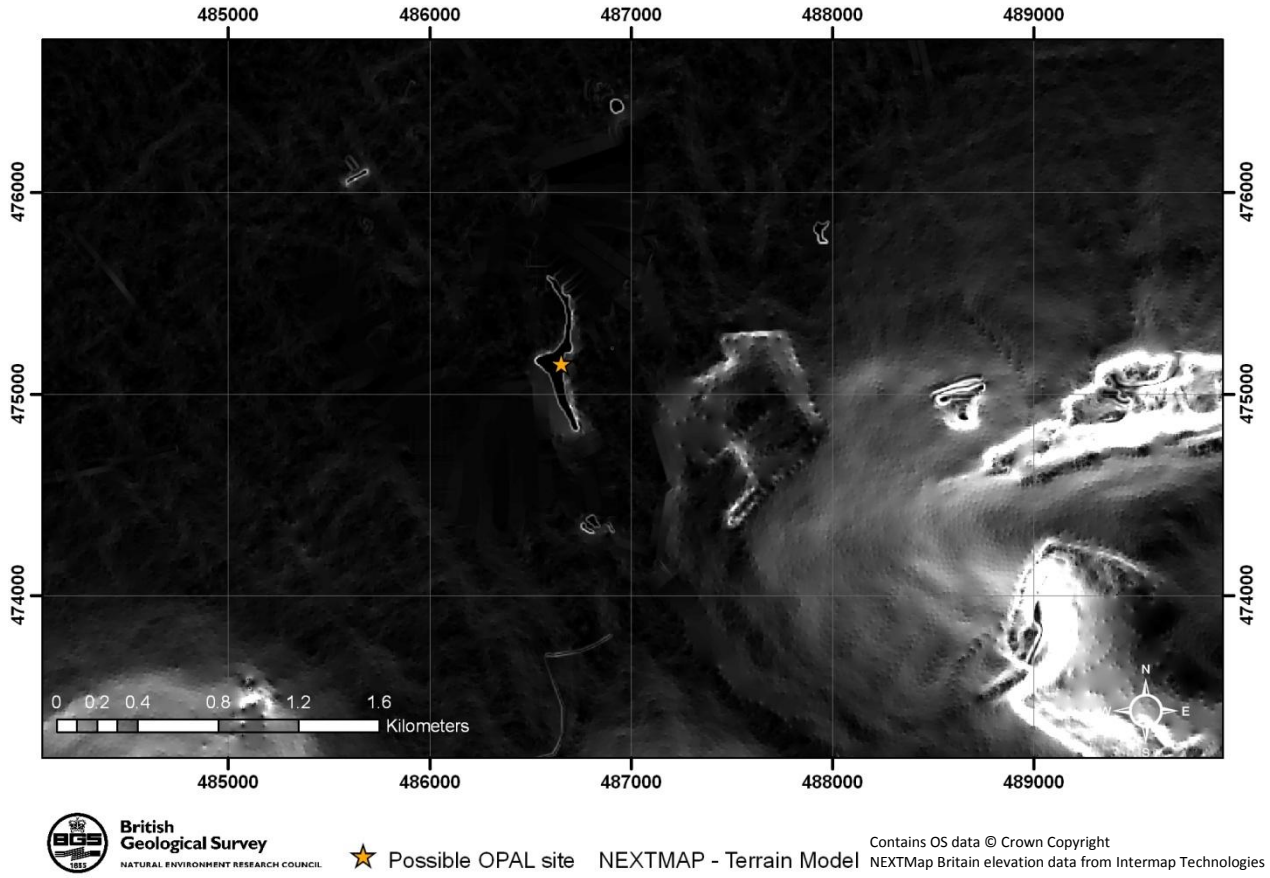


Figure 3.82 DTM for Scampston Lake

3.19 SEATHWAITE TARN, CUMBRIA

Seathwaite tarn is an upland natural lake in the Cumbrian Lake District [325334, 498790]. It is approximately 1.2 km x 270 m.

3.19.1 G-BASE Site Locations

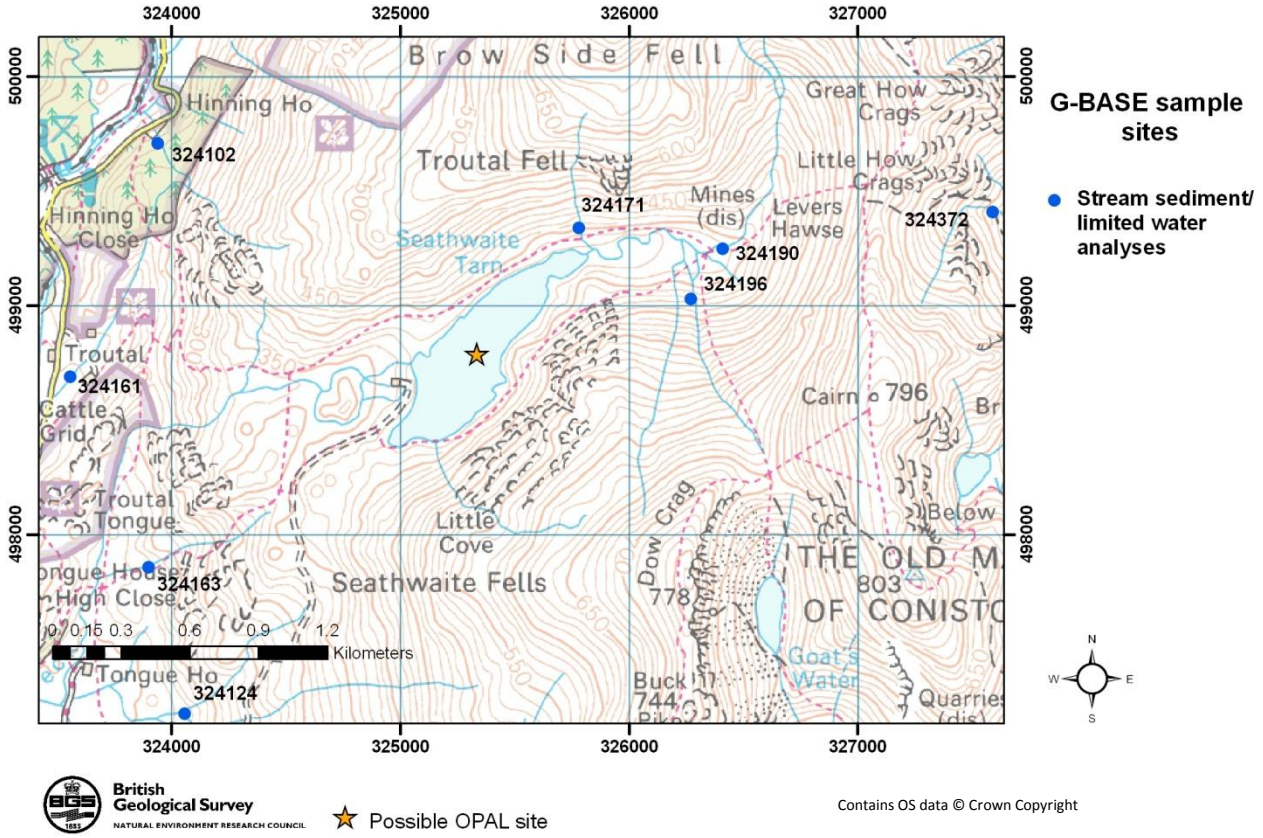


Figure 3.83 G-BASE sample site locations for Seathwaite Tarn

Table 26 G-BASE sample locations for Seathwaite Tarn

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
324372	C+(limited)W	327590	499410	324161	C+(limited)W	323560	498690
324190	C+(limited)W	326410	499250	324163	C+(limited)W	323900	497860
324196	C+(limited)W	326270	499030	324124	C+(limited)W	324060	497220
324171	C+(limited)W	325780	499340	324102	C+(limited)W	323940	499710

Sample type: C= Sediment, W= Water

3.19.2 Parent Material

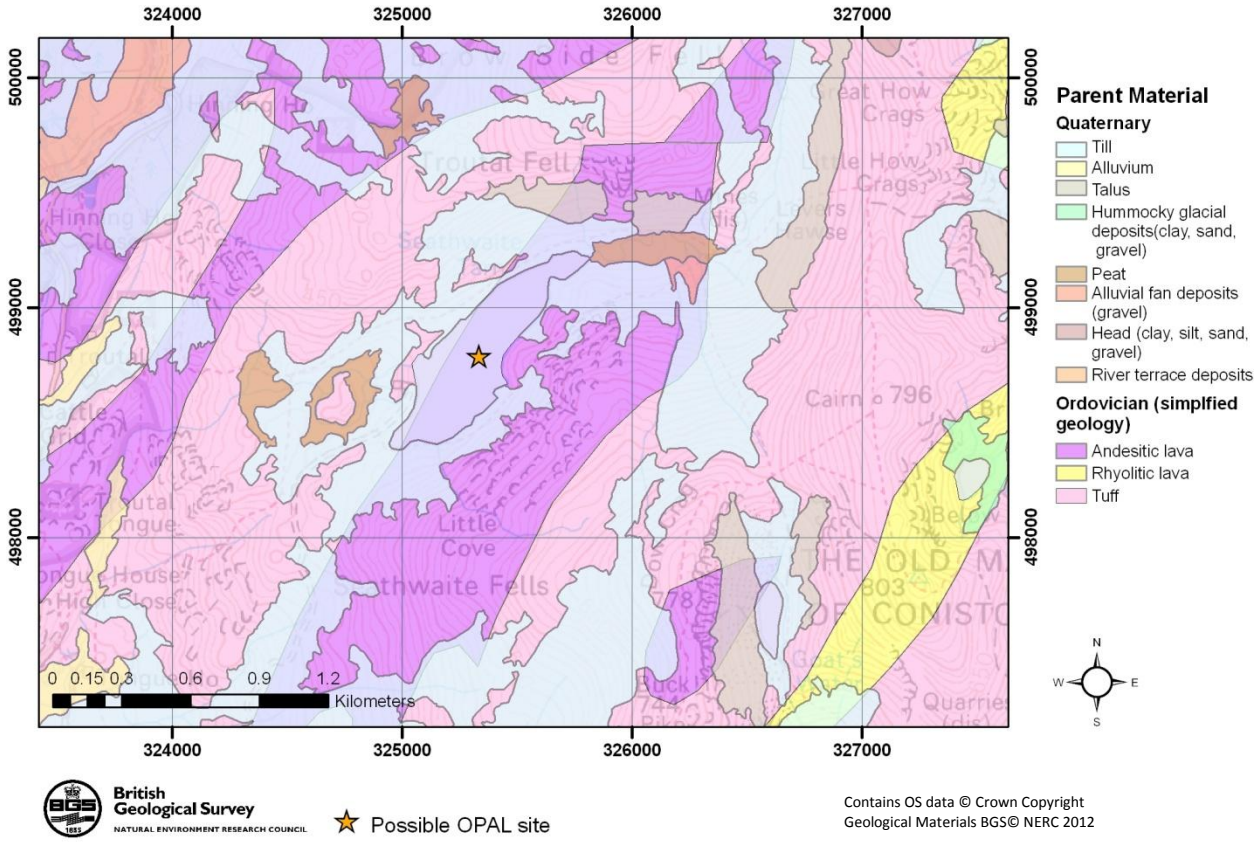


Figure 3.84 Parent material map for Seathwaite Tarn

Seathwaite tarn is underlain by Ordovician volcanic rocks: andesites and tuff. The lake overlies an area of till.

3.19.3 Aerial Photographs

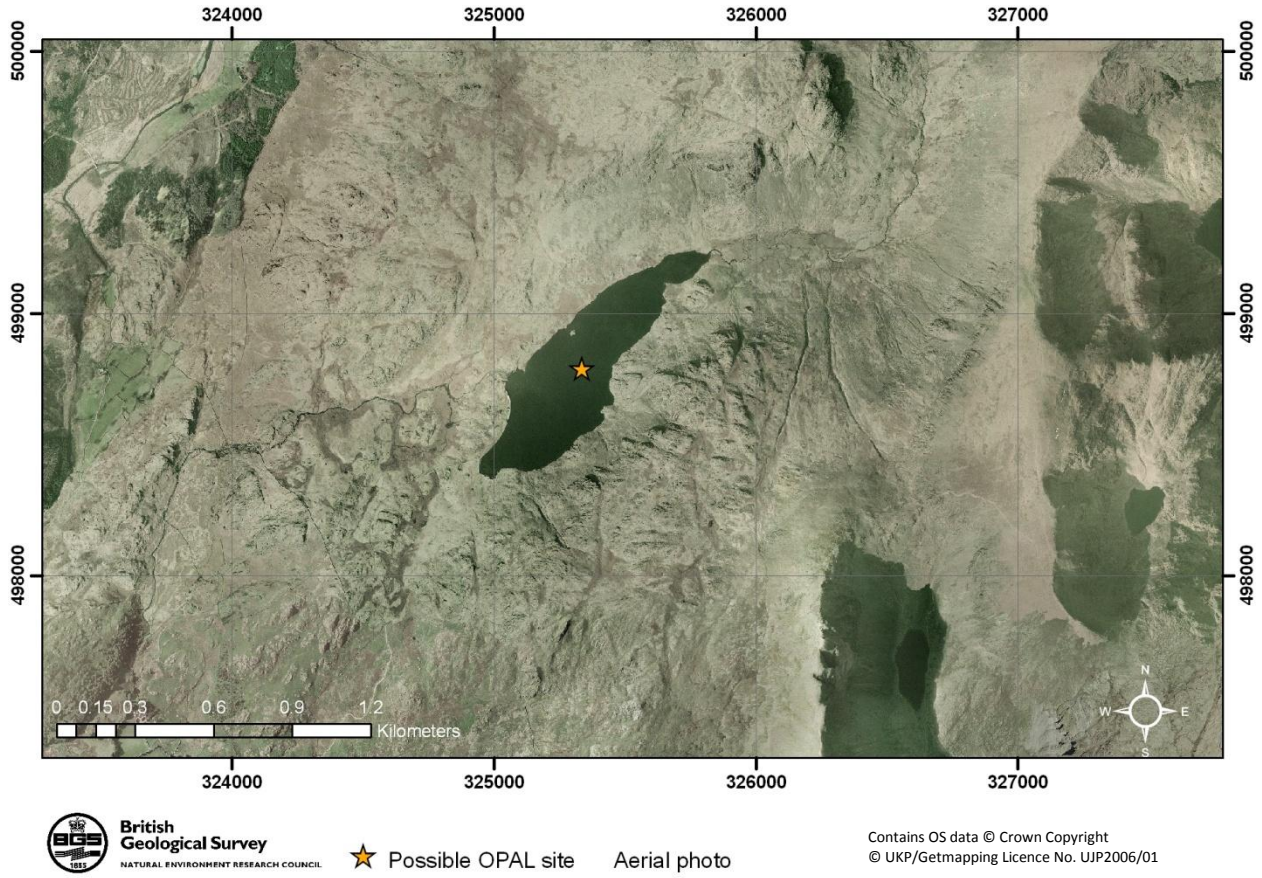


Figure 3.85 Aerial photograph of Seathwaite Tarn

3.19.4 Digital Terrain Model

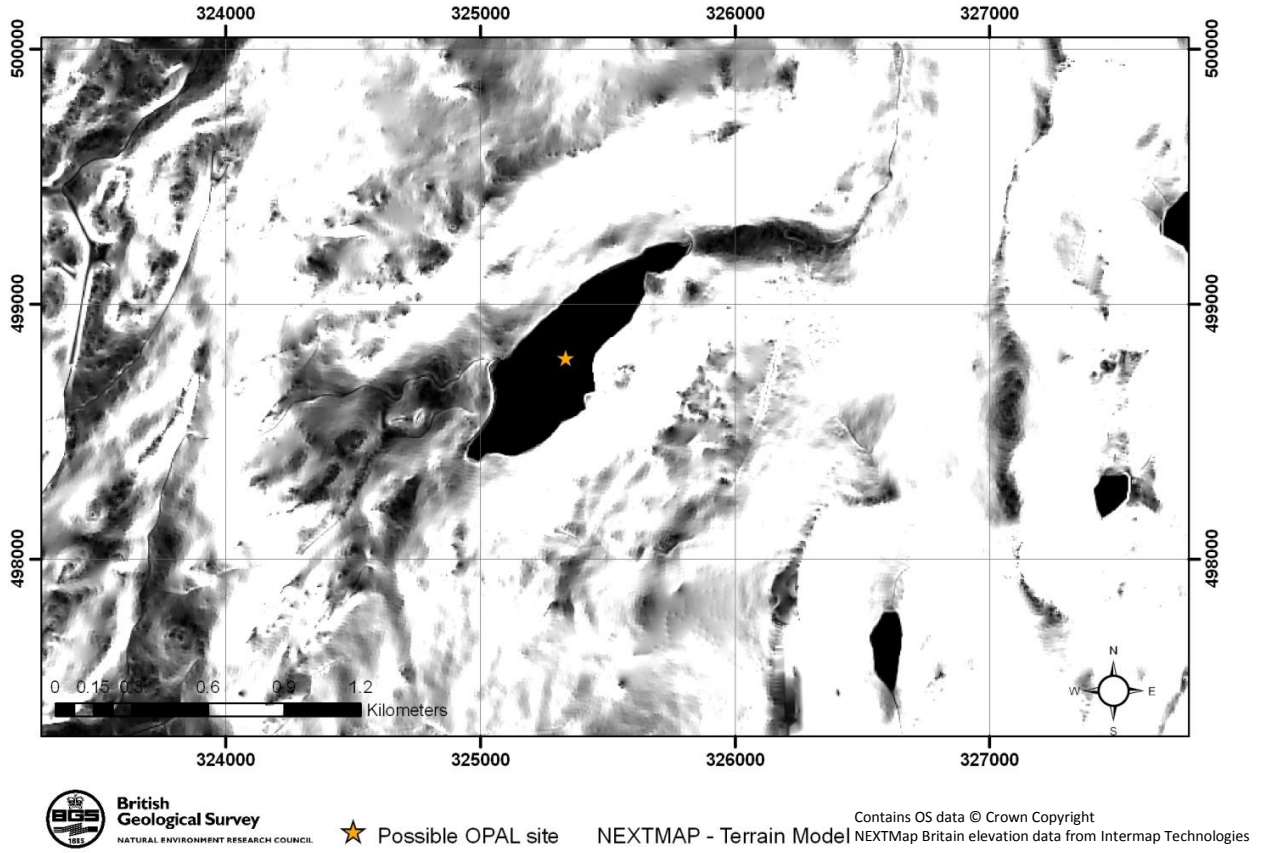


Figure 3.86 DTM of Seathwaite Tarn

3.20 STICKLE TARN, CUMBRIA

This site is a small upland tarn in the Cumbrian, Lake District [328723, 507706]. It is approximately 300 m x 330 m. Stickle Tarn was selected as one of UCL's calibration sites, and was sampled on 23rd June 2011.

3.20.1 G-BASE Site Locations

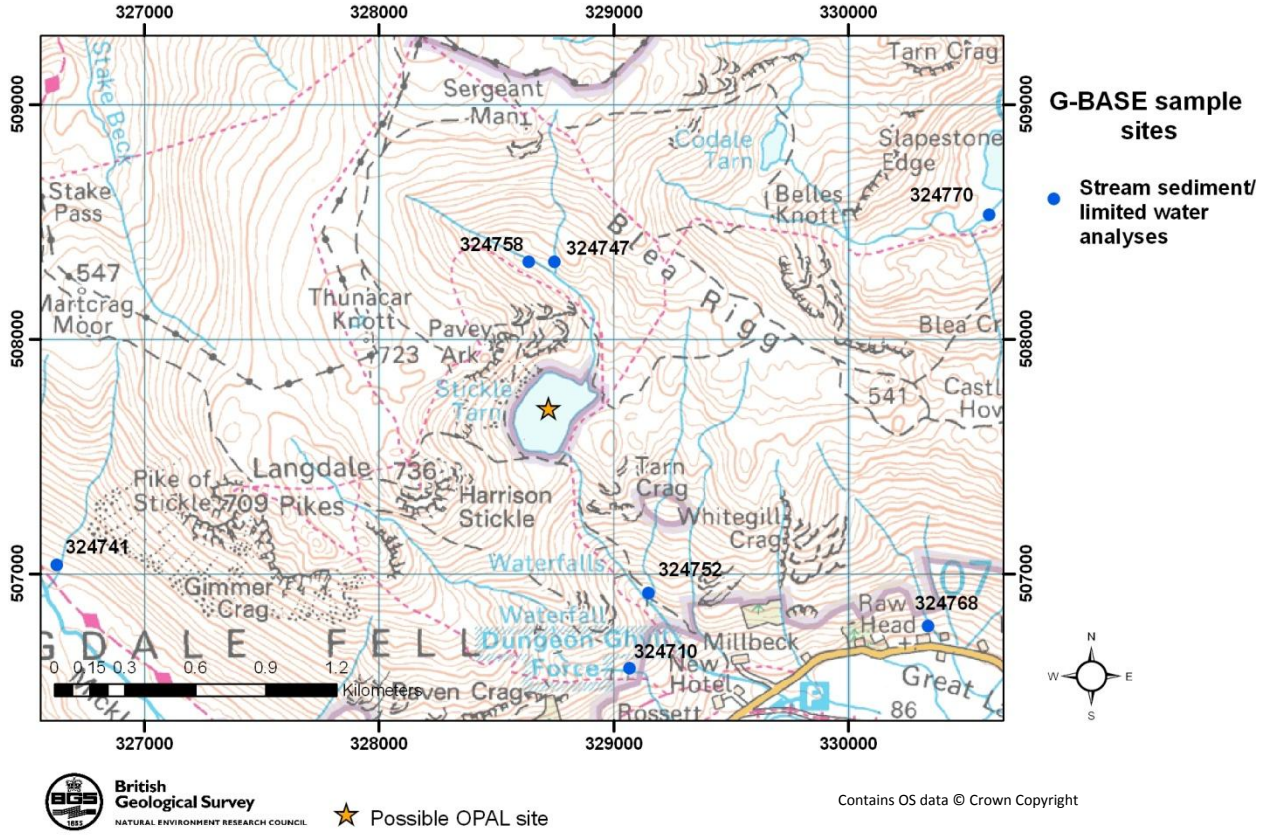


Figure 3.87 G-BASE sample site locations for Stickle Tarn

Table 27 G-BASE sample locations for Stickle Tarn

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
324710	C+(limited)W	329070	506600	324768	C+(limited)W	330340	506780
324770	C+(limited)W	330600	508530	324747	C+(limited)W	328750	508330
324758	C+(limited)W	328640	508330	324741	C+(limited)W	326630	507040
324752	C+(limited)W	329150	506920				

Sample type: C= Sediment, W= Water

3.20.2 Parent Material

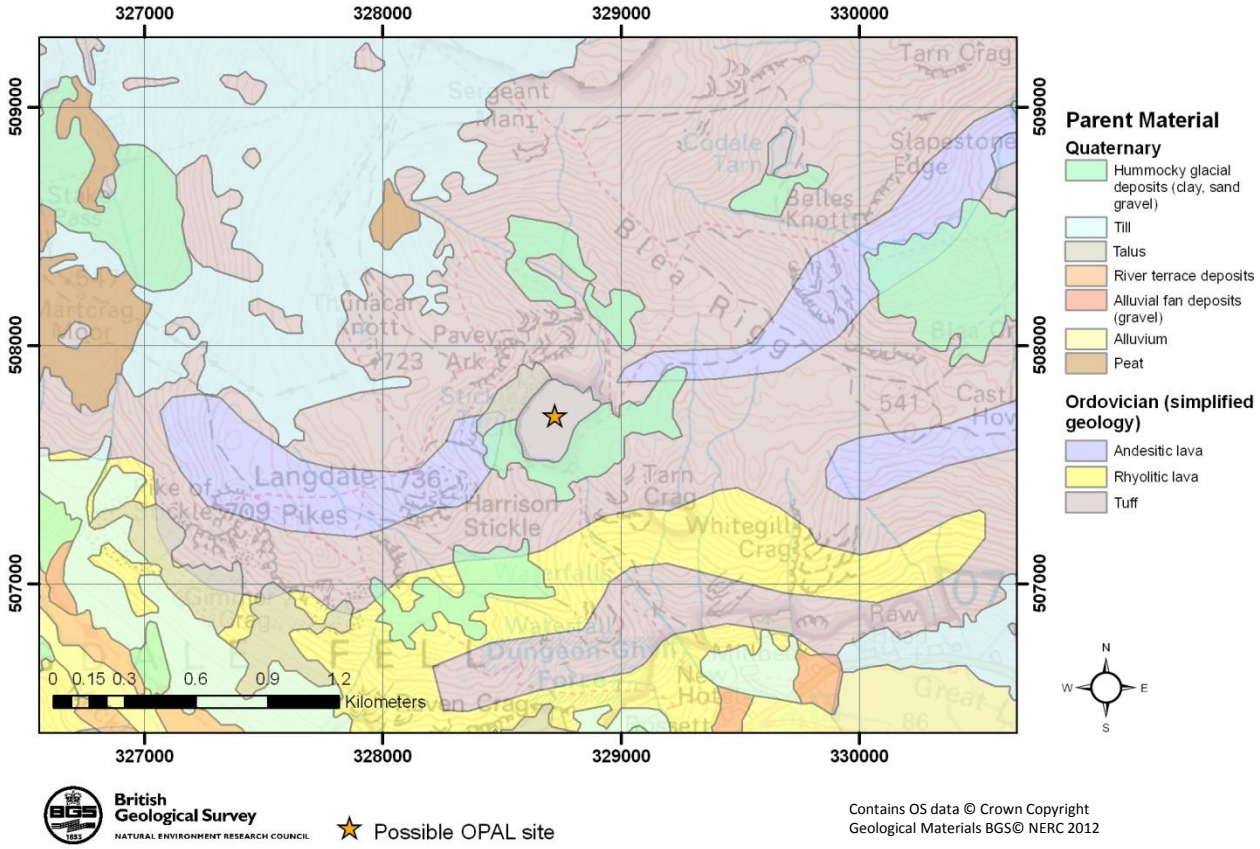


Figure 3.88 parent material map for Stickle Tarn

The tarn overlies Ordovician volcanics, specifically tuff. It is influenced by deposits of hummocky glacial deposits and talus.

3.20.3 Aerial Photographs

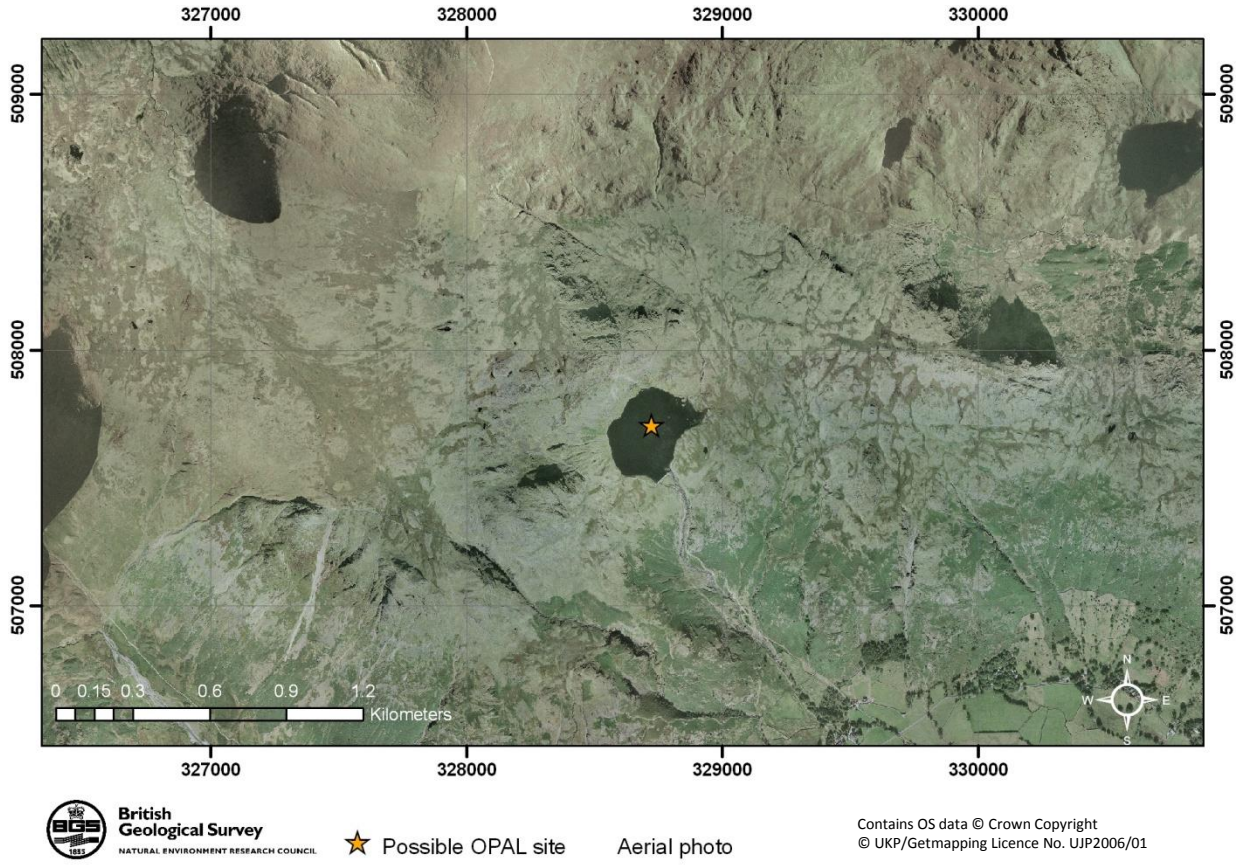


Figure 3.89 Aerial photograph of Stickle Tarn

3.20.4 Digital Terrain Model

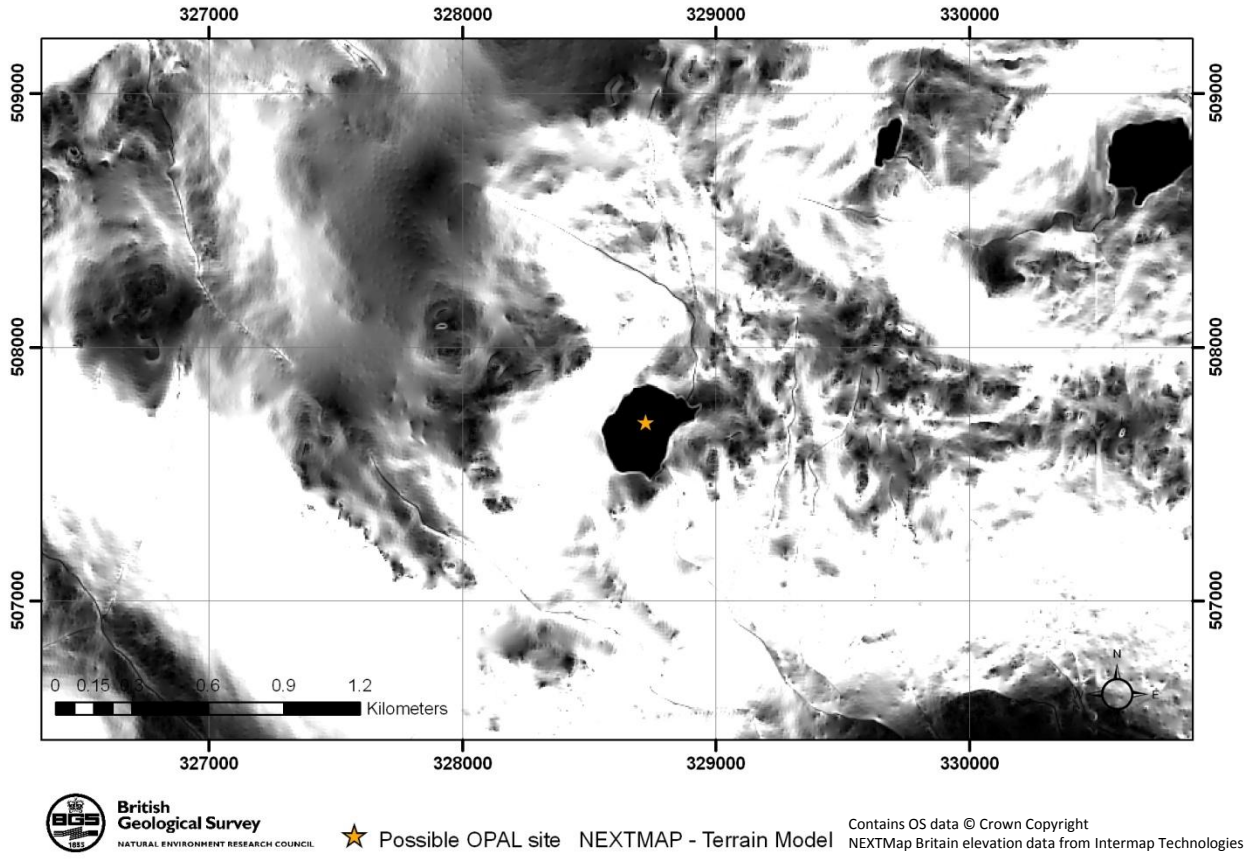


Figure 3.90 DTM for Stickle Tarn

3.21 BONNINGTON'S LAKE

After a reconnaissance to Lord's Wood pond, it was found to have dried up. Bonningtons Lake, 1 km to the north, in Hunsdonbury was selected as an alternative. This lake is about 400 m x 80 m and drains into Lord's Wood pond. Bonnington's Lake was sampled on 10 October 2011.

3.21.1 G-BASE site locations

Bonningtons Lake did not have any G-BASE samples taken from the streams draining into the lake. New sediment and water samples were taken for this purpose Figure 3.91 shows the location of the new and existing G-BASE samples, and the location of Bonningtons Lake in relation to the Lord's Wood pond.

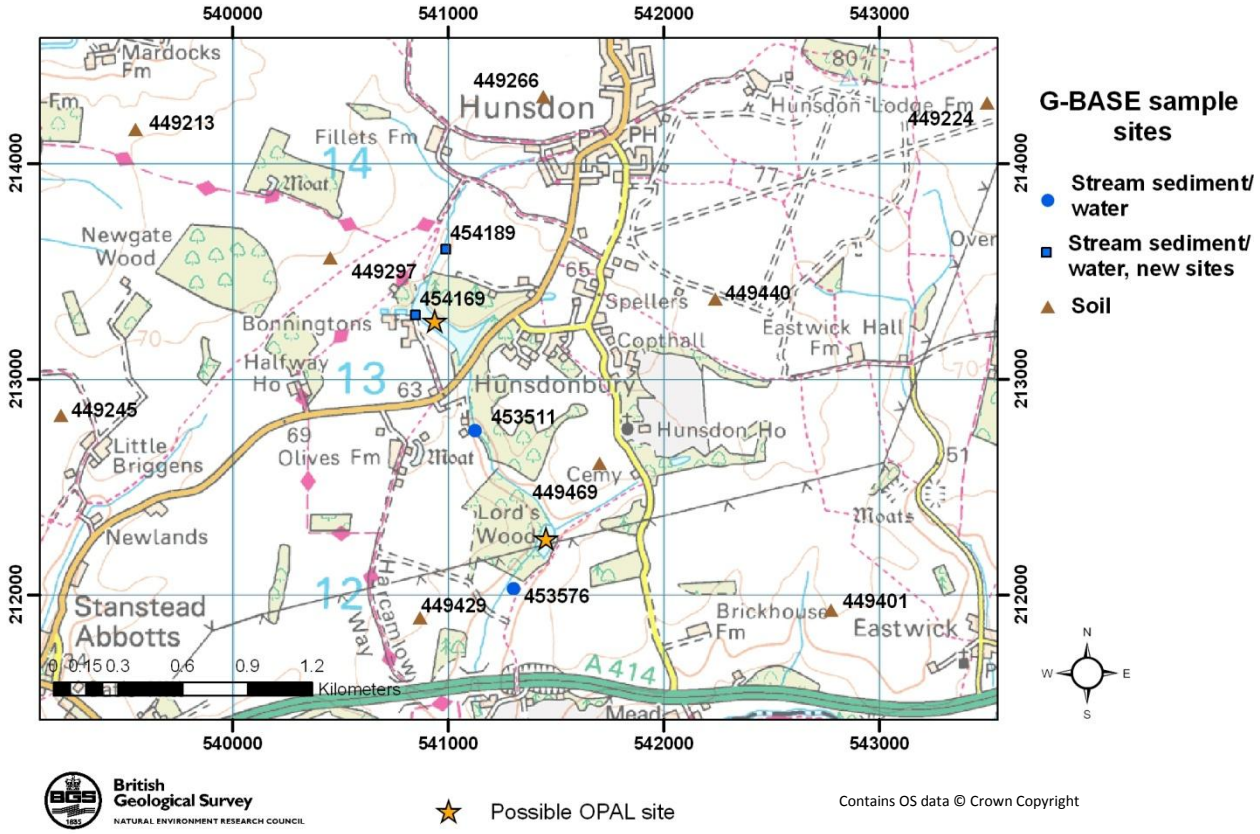


Figure 3.91 G-BASE sample site locations for Bonningtons Lake

Table 28 G-BASE sample locations for Stickle Tarn

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
453511	C+W	541125	212761	449297	S	540452	213560
453576	C+W	541304	212030	449440	S	542241	213370
454189	C+W	540988	213604	449245	S	539203	212829
454169	C+W	540847	213299	449469	S	541702	212607
449213	S	539551	214157	449429	S	540869	211891
449266	S	541441	214307	449401	S	542776	211927
449224	S	543501	214278	449418	S	543220	210711

Sample type: C= Sediment, W= Water

3.21.2 Bedrock Geology

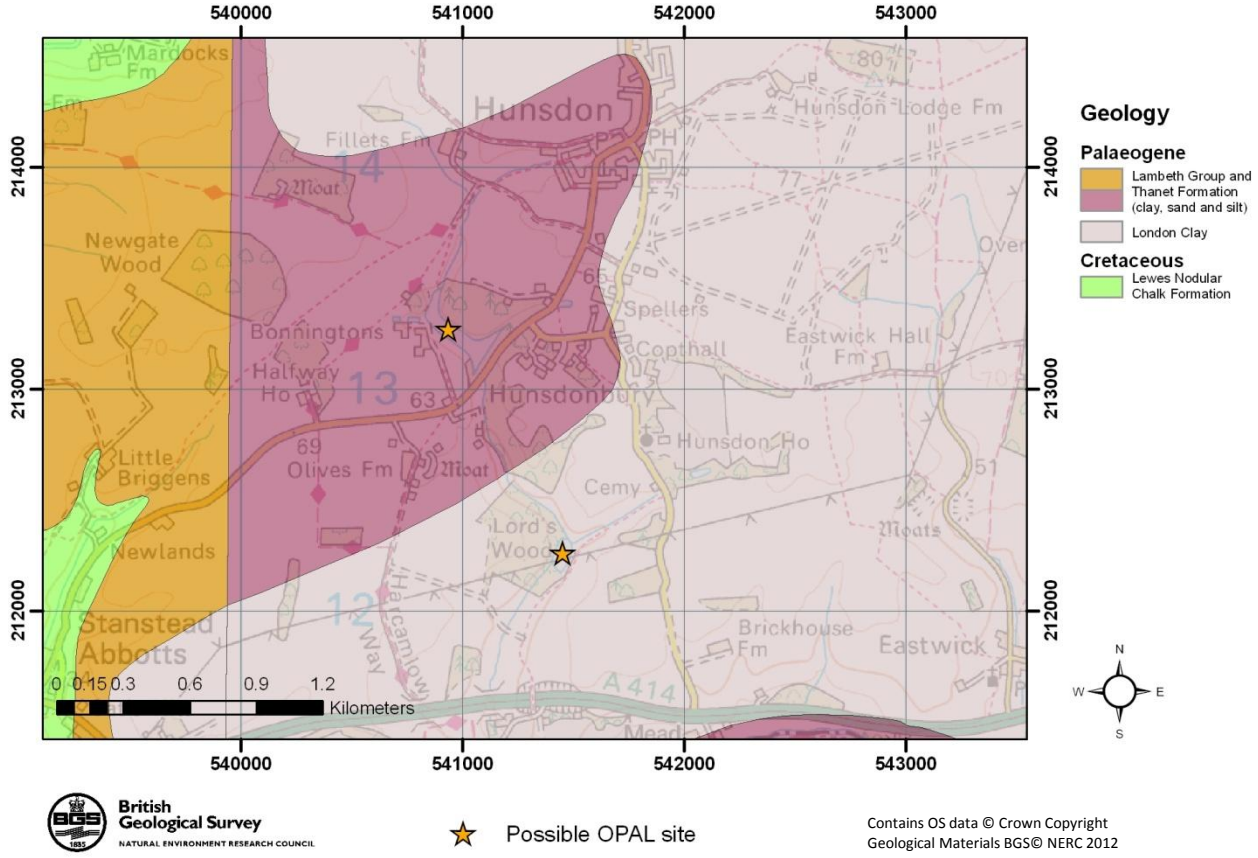


Figure 3.92 Bedrock Geology for Bonningtons Lake

The lake is underlain by clays, sands and silts of the Lambeth Group and Thanet Formation.

3.21.3 Quaternary Deposits

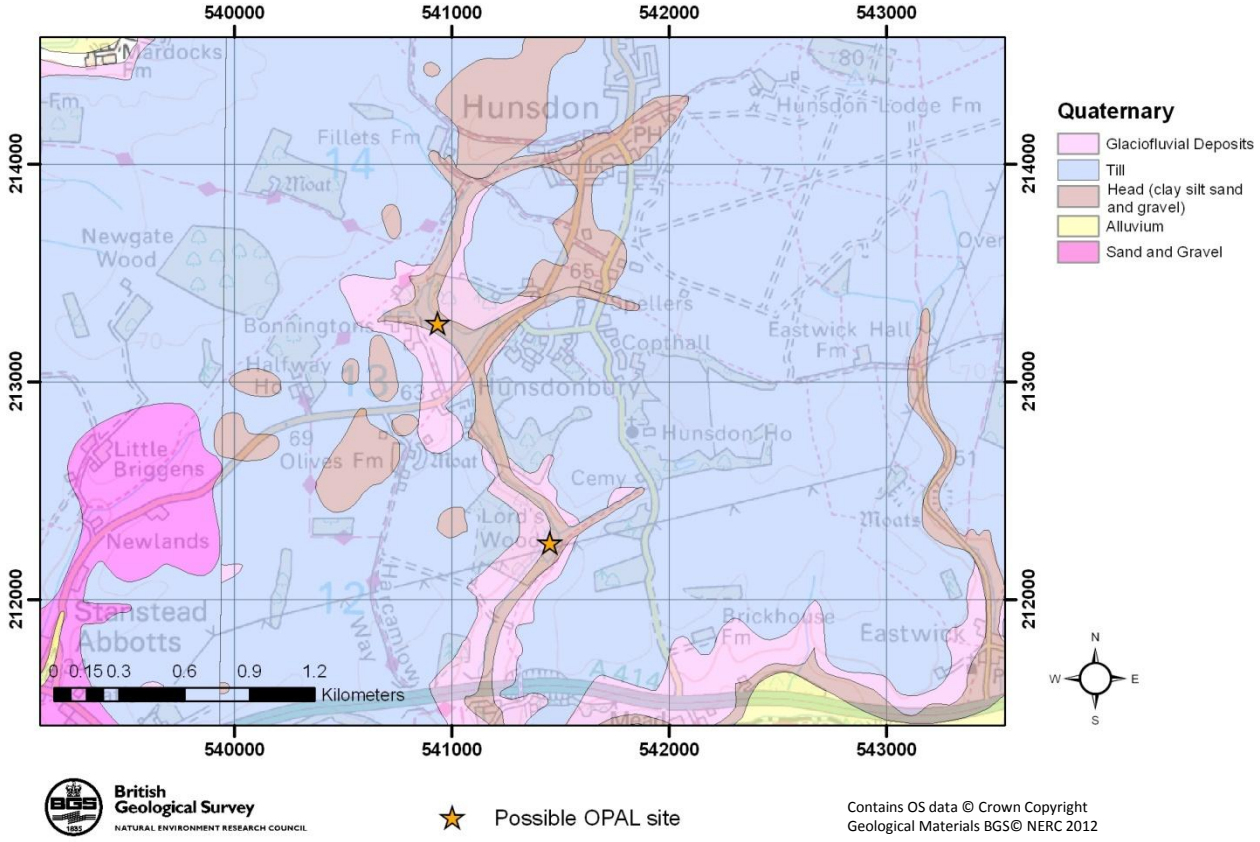


Figure 3.93 Quaternary Deposits underlying Bonningtons Lake

The lake is underlain by head deposits of clay, silt, sand and gravel. It may also be affected by adjacent glaciofluvial deposits.

3.21.4 Aerial Photographs

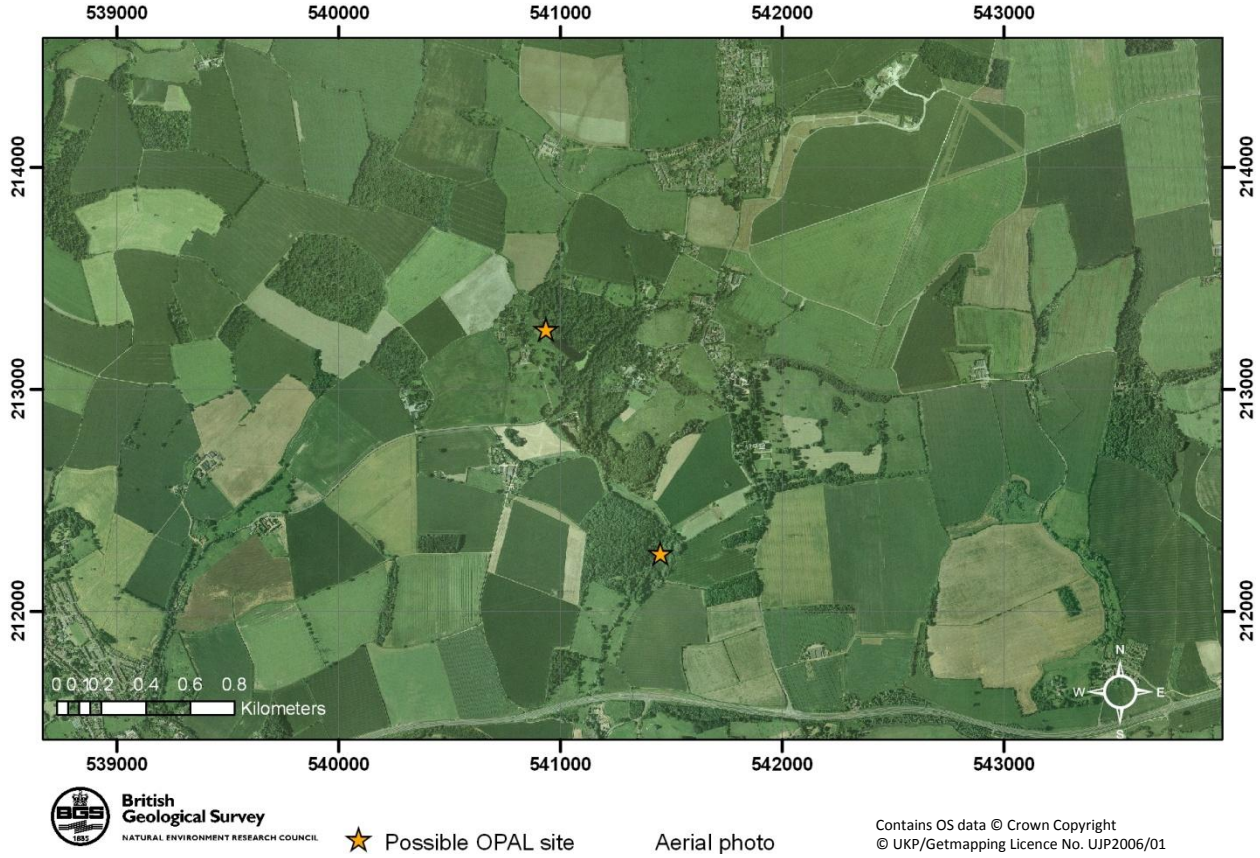


Figure 3.94 Aerial photograph of Bonningtons Lake

Figure 3.95 Zoomed aerial photograph of Bonningtons Lake

3.21.5 Digital Terrain Model

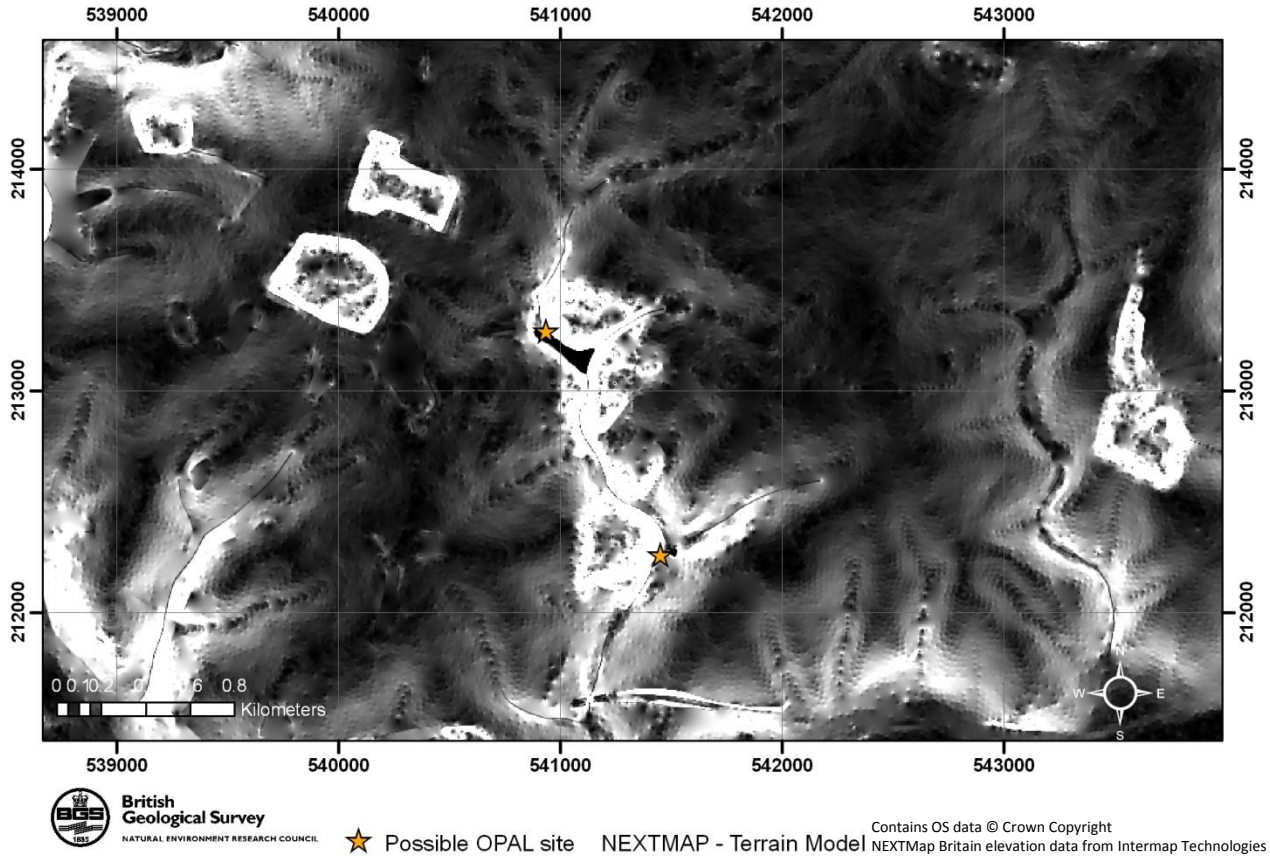


Figure 3.96 DTM of Bonningtons Lake

3.22 PRESTONS LAKE, ESSEX

Preston's Lake was a last-minute addition after Gosfield Lake had proved unsuitable. Preston's Lake is a reservoir on the outskirts of Halstead. It is approximately 700m x 100m. Preston's Lake was sampled on 11th October 2011.

3.22.1 G-BASE Site Locations

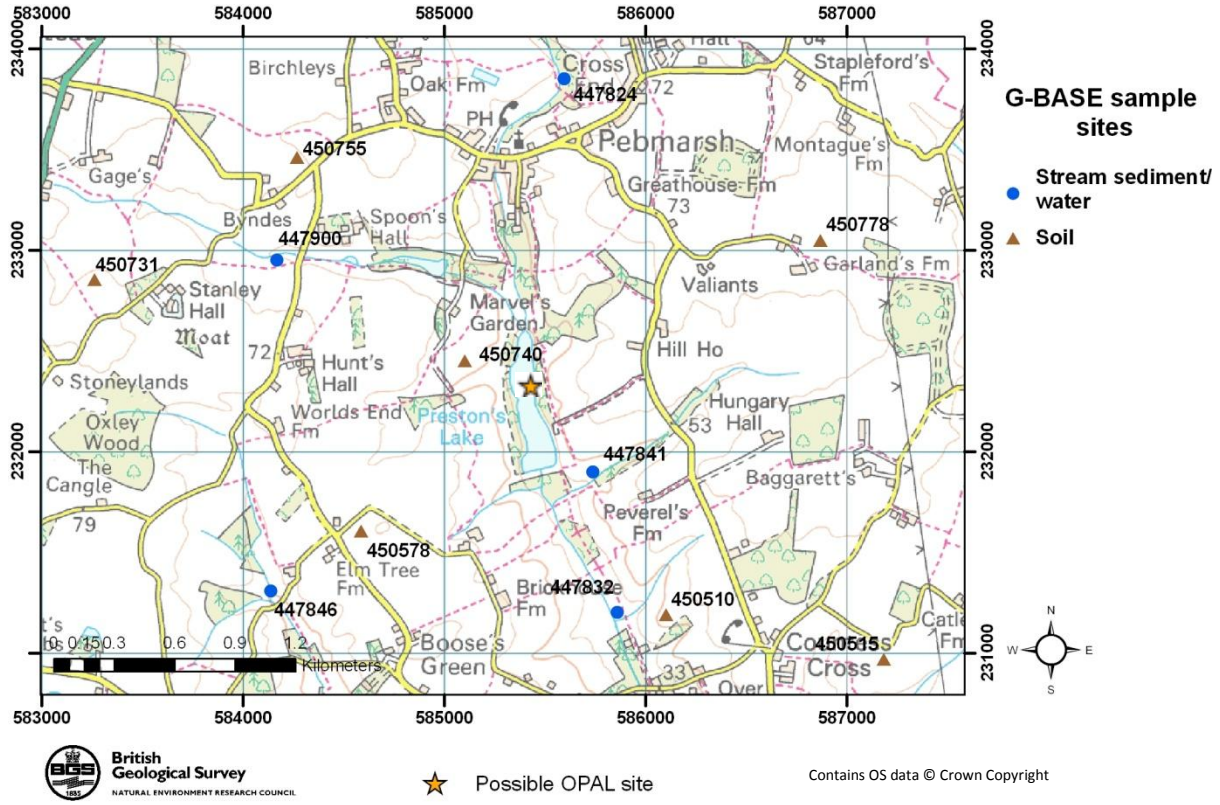


Figure 3.97 G-BASE sample site locations for Preston's Lake

Table 29 G-BASE sample locations for Preston's Lake

Sample Number	Sample type	Easting	Northing	Sample Number	Sample type	Easting	Northing
447900	C+W	584170	232954	450731	S	583263	232851
447846	C+W	584140	231310	450755	S	584270	233458
447824	C+W	585598	233852	450578	S	584587	231603
447841	C+W	585739	231901	450740	S	585102	232450
447832	C+W	585860	231203	450778	S	586869	233047
450515	S	587184	230967	450510	S	586102	231188

Sample type: C= Sediment, W= Water

3.22.2 Parent Material

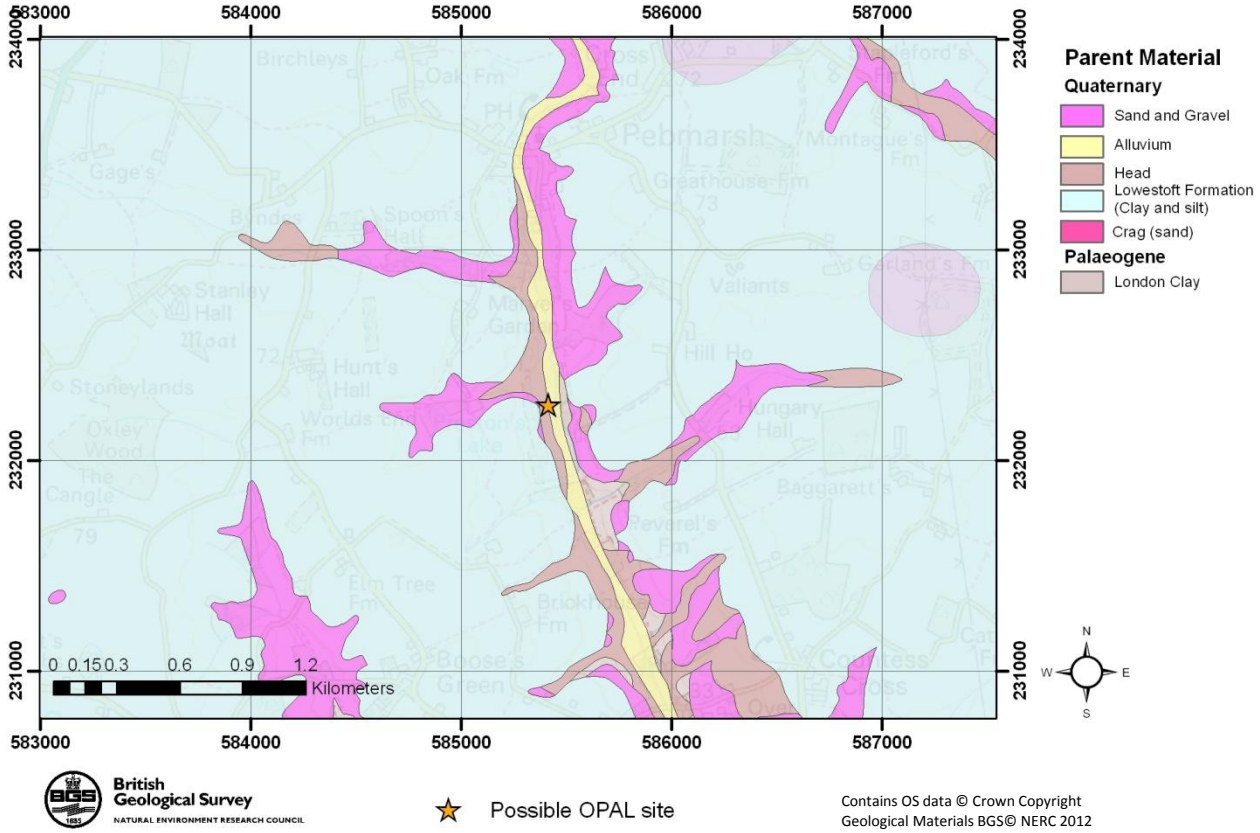


Figure 3.98 Parent material map for Preston's lake

The lake overlies an area where the solid geology almost entirely comprises London Clay, the exception being two small areas of Crag deposits.

3.22.3 Aerial Photographs

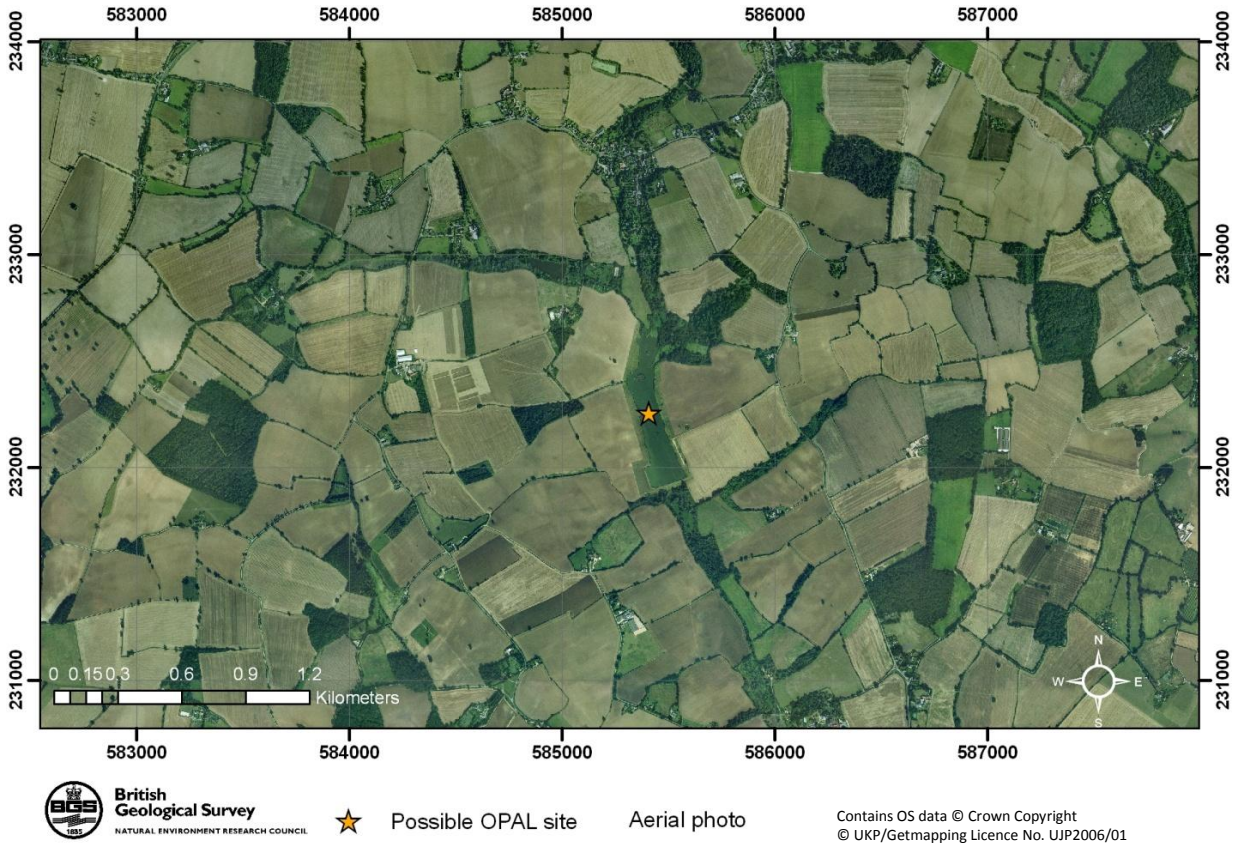


Figure 3.99 Aerial photograph of Preston's Lake

3.22.4 Digital Terrain Model

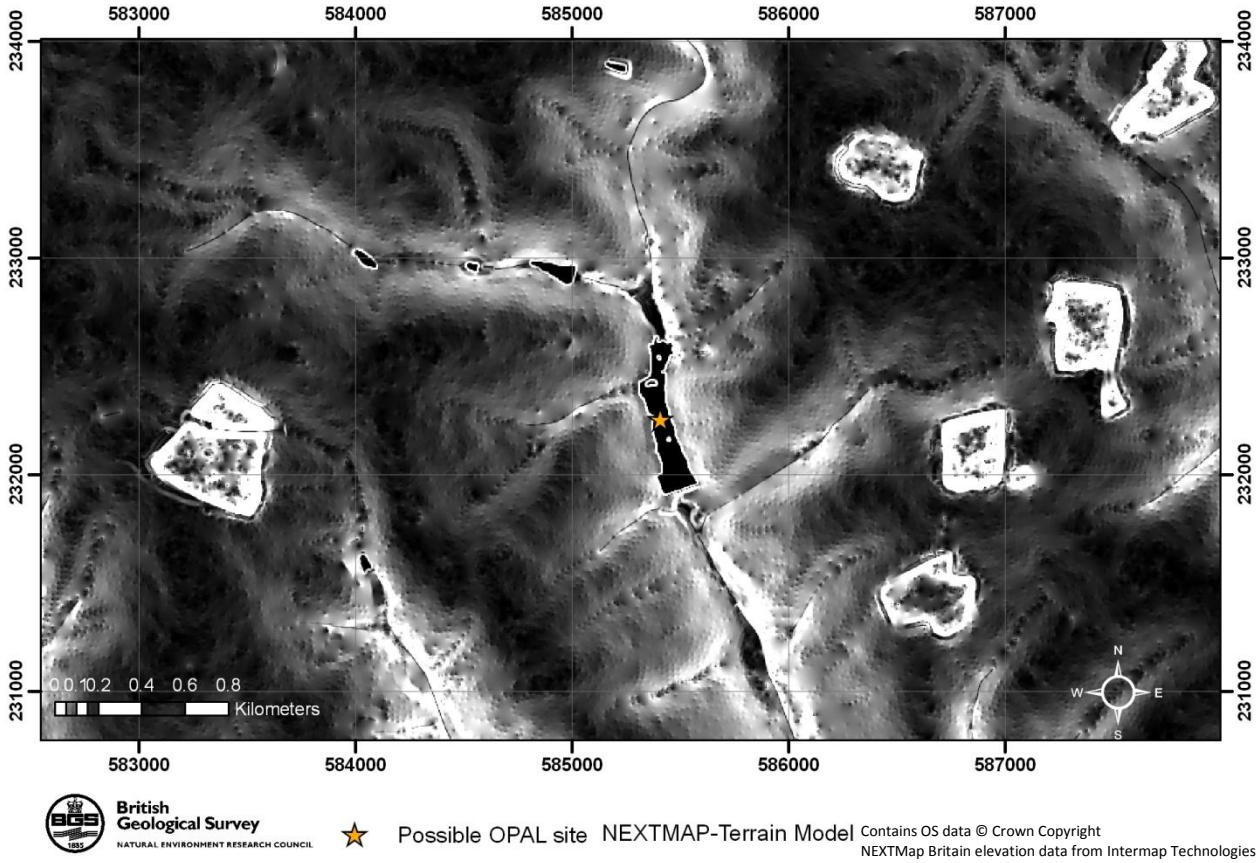


Figure 3.100 DTM for Preston's Lake

4 Maps Showing G-BASE sampling progress

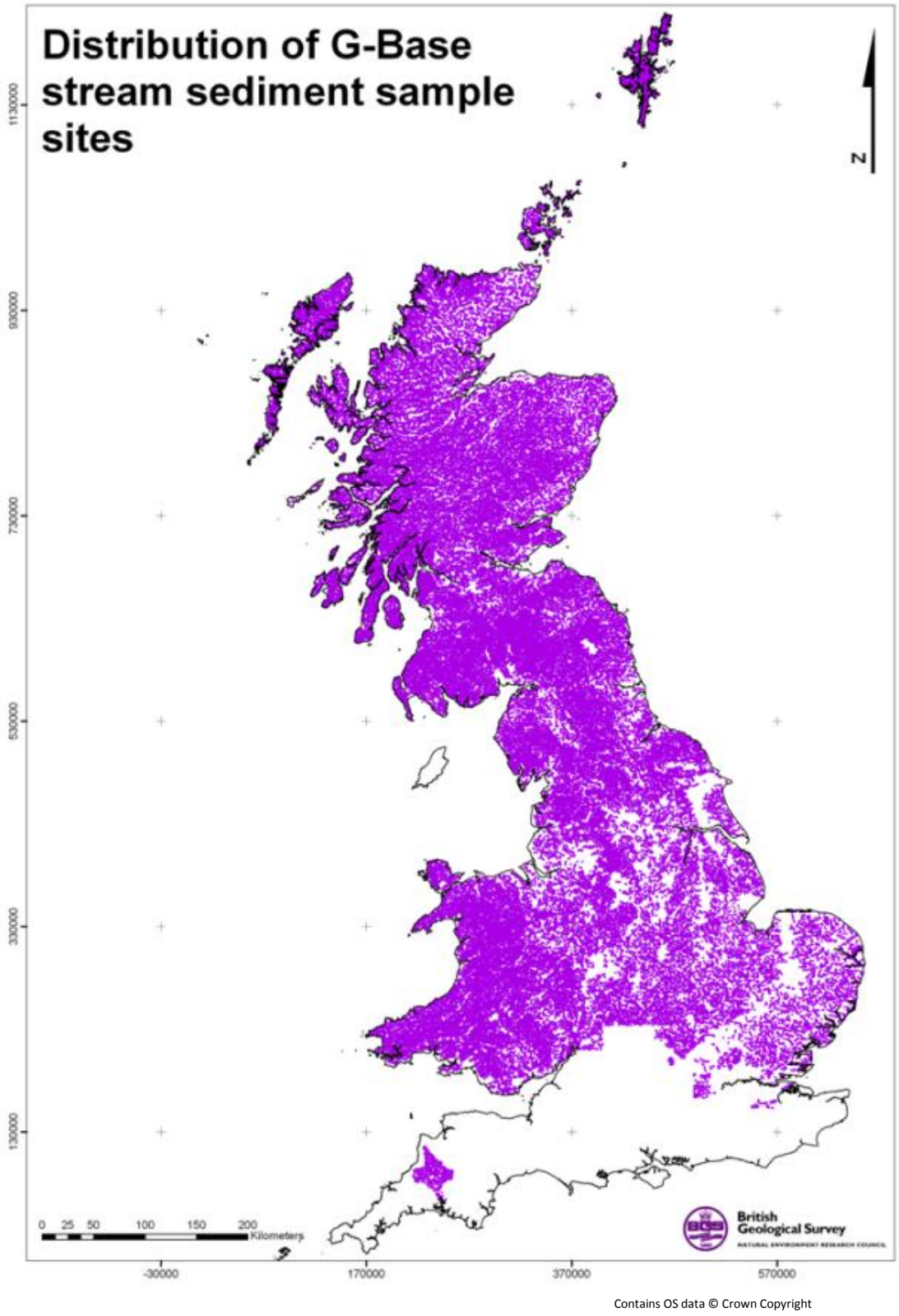
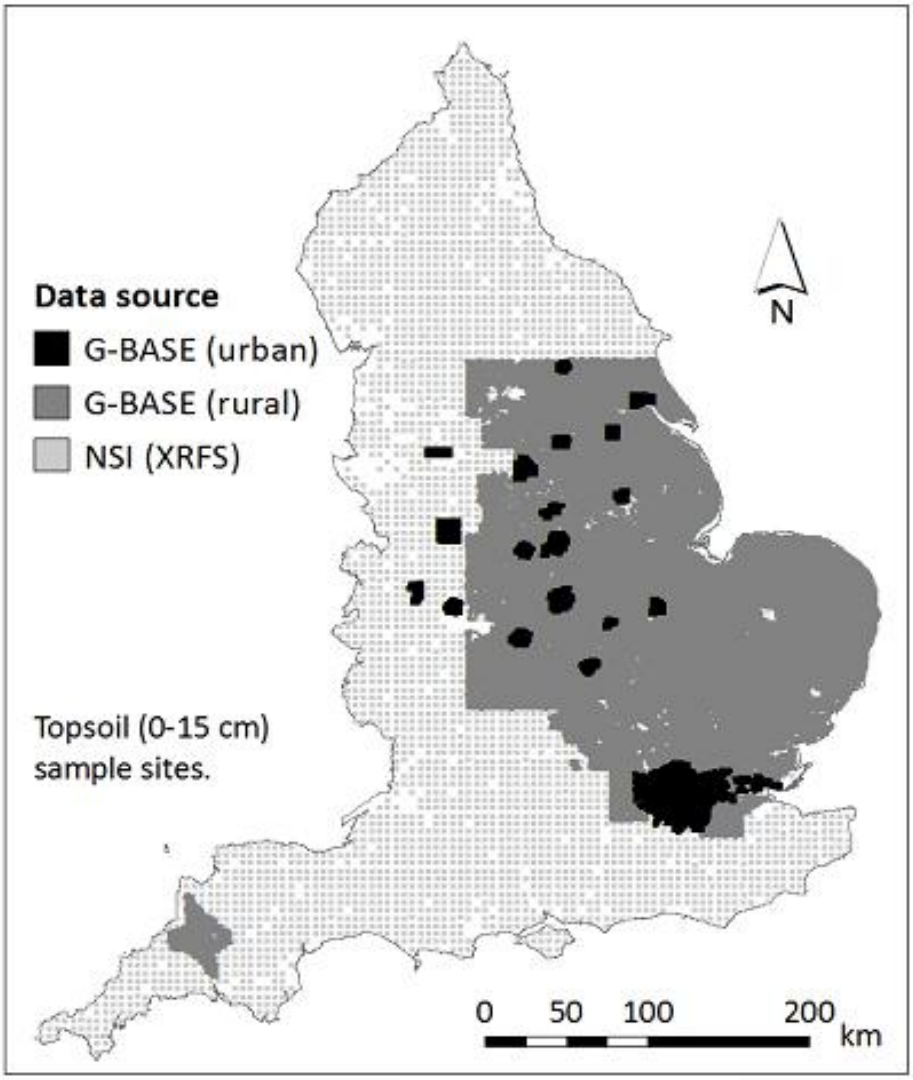


Figure 4.1 G-BASE sediment sample sites (sampled until 2011). The sampling sites can be viewed on the BGS internet GeoIndex page



Contains OS data © Crown Copyright

Figure 4.2 Map showing the extent of soil chemistry data held by BGS for England (sampled until 2011). The National Soil Inventory data (NSI(XRFS)) covers the whole of England at a sample density of 1:25 km^2. G-BASE sampling densities for rural and urban are 1:2 km^2 and 4:1 km^2, respectively. (Source, Johnson et al. 2012). The G-BASE sampling sites can be viewed on the BGS internet GeoIndex page

5 Concluding Remarks

This report presents a record of the OPAL lake sampling sites. It gives a summary of resources available at each site and presents maps and other data that can be used in the interpretation of the OPAL lake survey results. The information provided in this report includes:

- G-BASE sample site information in the area surrounding the OPAL lakes. This information is displayed on both a 1:50k topographic map, and in a summary table.
- Parent material maps, based on the underlying solid geology and superficial materials in the vicinity of the OPAL lake
- Aerial photographs and Digital Terrain Model (DTM) for the region surrounding the OPAL lakes.

All the available geochemical results from the G-BASE project have been provided to the OPAL project to help with the interpretation of the OPAL lake surveys conducted between spring 2008 and spring 2011.

References

DAVIES, L., BELL, J. N. B., BONE, J., HEAD, M., HILL, L., HOWARD, C., HOBBS, S. J., JONES, D. T., POWER, S. A., ROSE, N., RYDER, C., SEED, L., STEVENS, G., TOUMI, R., VOULVOULIS, N. AND WHITE, P.C.L. 2011. Open Air Laboratories (OPAL): A community-driven research programme. *Environmental Pollution*, Vol. 159, 2203-2210.

JOHNSON, C C, ANDER, E L, CAVE, M R, AND PALUMBO-ROE, B. 2012. Normal background concentrations (NBCs) of contaminants in English soils: Final project report. *British Geological Survey Commissioned Report*, CR/12/035. 40pp. (http://nora.nerc.ac.uk/19946).