



MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Environmental Statement

Volume 3, Annex 1.1: Phase 1 Geo-environmental preliminary risk assessment

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Glossary

Term	Meaning
400 kV grid connection cables	Cables that will connect the proposed onshore substations to the existing National Grid Penwortham substation.
400 kV grid connection cable corridor	The corridor within which the 400 kV grid connection cables will be located.
Groundwater Abstraction License	The authorisation granted by the Environment Agency to allow the removal of groundwater.
Applicants	Morgan Offshore Wind Limited (Morgan OWL) and Morecambe Offshore Windfarm Limited (Morecambe OWL).
Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment (EIA) process.
Groundwater	Water that is contained in underground rocks and sediments below the ground surface.
Groundwater Body Groundwater bodies are the discrete groundwater management defined by the Environment Agency as required under Article 5 Water Framework Directive.	
Landfall	The area in which the offshore export cables make landfall (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Lytham St. Annes between Mean Low Water Springs and the transition joint bay inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
Local Planning Authority	The local government body (e.g., Borough Council, District Council, etc.) responsible for determining planning applications within a specific area.
Morecambe OWL	Morecambe Offshore Windfarm Limited is a joint venture between Zero-E Offshore Wind S.L.U. (Spain) (a Cobra group company) and Flotation Energy Ltd.
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The offshore and onshore infrastructure connecting the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the national grid. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds.
	Also referred to in this report as the Transmission Assets, for ease of reading.
Morgan Offshore Wind Project: Transmission Assets	The offshore export cables, landfall and onshore infrastructure required to connect the Morgan Offshore Wind Project to the National Grid.







Term	Meaning	
Morgan OWL	Morgan Offshore Wind Limited is a joint venture between bp Alternative Energy investments Limited. and Energie Baden-Württemberg AG (EnBW).	
Onshore export cables The cables which would bring electricity from the landfall to the substations.		
Onshore export cable corridor	The corridor within which the onshore export cables will be located.	
Onshore Infrastructure Area	The area within the Transmission Assets Order Limits landward of Mean High Water Springs. Comprising the offshore export cables from Mean High Water Springs to the transition joint bays, onshore export cables, onshore substations and 400 kV grid connection cables , and associated temporary and permanent infrastructure including temporary and permanent compound areas and accesses. Those parts of the Transmission Assets Order Limits proposed only for ecological mitigation/biodiversity benefit are excluded from this area.	
Onshore substations	The onshore substations will include a substation for the Morgan Offsho Wind Project: Transmission Assets and a substation for the Morecambe Offshore Windfarm: Transmission Assets. These will each comprise a compound containing the electrical components for transforming the power supplied from the generation assets to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid.	
Principal Aquifer	A geological unit that yields significant groundwater that support regionally or nationally important supplies and support rivers, lakes and wetlands at a strategic scale.	
Secondary A aquifers	A geological unit that provides modest groundwater that can support local water supplies and may form an important source of water to rivers.	
Secondary B aquifers	A geological unit that is dominated by low permeability layers that may store and yield limited amounts of groundwater.	
Secondary undifferentiated aquifer	Where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type, but generally have only a minor resource value.	
Source Protection Zone	Groundwater catchment areas defined by travel time around important potable groundwater abstraction sites to safeguard drinking water quality. Certain land-uses are controlled or prohibited with certain source protection zone areas.	
Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of electrical transformers.	
Transmission Assets	See Morgan and Morecambe Offshore Wind Farms: Transmission Assets (above).	
Transmission Assets Order Limits	The area within which all components of the Transmission Assets will be located, including areas required on a temporary basis during construction and/or decommissioning.	
Unproductive strata	Geological units that are largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them.	







Acronyms

Acronym	Meaning
BGS	British Geological Survey
BritPits	British Pits
CSM	Conceptual Site Model
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EIA	Environmental Impact Assessment
EnBW	Energie Baden-Württemberg AG
ES	Environmental Statement
GCR	Geological Conservation Review
LGS	Local Geodiversity Site
MLWS	Mean Low Water Springs
MMG	Mercia Mudstone Group
PFAS	Per- and Polyfluorinated Substances
PRA	Preliminary Risk Assessment
SPZ	Source Protection Zone
SSG	Sherwood Sandstone Group
SSSI	Site of Special Scientific Interest
TFD	Tidal Flat Deposits
UK	United Kingdom
UXO	Unexploded Ordnance

Units

Unit	Description	
km	Kilometres	
km²	Kilometres Squared	
kV	Kilovolt	
m	Metre	



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1.1 Introduction

- 1.1.1.1 This document forms Volume 3, Annex 1.1: Phase 1 Geoenvironmental preliminary risk assessment (PRA) of the Environmental Statement (ES) prepared for the Morgan and Morecambe Offshore Wind Farms: Transmission Assets (hereafter referred to as the Transmission Assets).
- 1.1.1.2 The PRA provides an appraisal of potential areas of land contamination likely to be affected by the Transmission Assets, which require characterisation of the geological, hydrogeological and hydrological setting. This document forms the main source of information in defining the baseline environment (Section 1.6 of Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES). This PRA is based solely on a desktop review of available information (e.g. historical maps and regulatory information) to identify potential pollutant linkages.
- 1.1.1.3 This PRA forms the initial step in the assessment of potential land contamination. It precedes, any intrusive investigations and subsequent risk assessment with remedial options appraisals, remediation strategy (implementation and verification) where necessary.

1.2 Objectives

- 1.2.1.1 The principal objectives of this PRA were as follows:
 - to assess potential sources of contamination at the site, associated with historical and current land uses both on site and in the surrounding area;
 - to review the environmental setting to assess the sensitivity of the surrounding area to contamination/pollution;
 - to produce an outline Conceptual Site Model (CSM) detailing how any contamination may impact the identified receptors via pollutant linkages; and
 - to conclude on the likely requirement for further assessment and investigation.

1.3 Study area

1.3.1.1 This section defines the areas within which geology, hydrology and ground conditions receptors may be affected by the Transmission Assets. The study area for this assessment extends to an area of 1 km around those parts of the Transmission Assets Order Limits that fall within the scope of this chapter (landward of Mean Low Water Springs (MLWS)), including the following.





- The Transmission Assets Order Limits: Onshore. The area within which all components of the Transmission Assets landward of Mean High Water Springs will be located, including areas required on a temporary basis during construction and/or decommissioning (such as construction compounds). Also referred to in this report as the Onshore Order Limits, for ease of reading.
- The Intertidal Infrastructure Area. This includes all elements of the Transmission Assets landward of MLWS where construction, operation and maintenance and decommissioning activity will occur.
- 1.3.1.2 The study area of 1 km buffer around these areas is shown on Figure 1.1 (see Volume 3: Figures). This buffer is based on professional judgement and environmental data screening distances.

1.4 Legislation, policy and guidance

- 1.4.1.1 This report has been produced in general accordance with the following legislation, policy and guidance:
 - The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017;
 - Contaminated Land (England) Regulations 2006;
 - Environmental Protection Act 1990 (as amended) specifically Part IIA (Contaminated Land);
 - Environmental Permitting (England and Wales) Regulations 2016;
 - National Planning Policy Framework 2023;
 - Department for Environmental, Food and Rural Affairs (DEFRA) Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance 2012;
 - Environment Agency (2020) Land Contamination Risk Management (LCRM);
 - Construction Industry Research and Information Association (CIRIA) Document C665: Assessing Risks Posed by Hazardous Ground Gases to Buildings (CIRIA, 2007);
 - CIRIA Document C552 Contaminated land risk assessment: A Guide to Good Practice (CIRIA, 2001a);
 - CIRIA Document C532 Control of water pollution from construction sites: Guidance for consultants and contractors (CIRIA, 2001b);
 - Buildings Research Establishment (2023) Radon: Guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects;
 - British Standard requirements for the 'Investigation of potentially contaminated sites - Code of practice' (ref. BS10175:2011+A2:2017);







- British Standard requirements for the 'Code of practice for ground investigations' (ref. BS5930:2015+A1:2020).; and
- British Standard requirements for the 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' (ref BS8485:2015+A1:2019).
- 1.4.1.2 Where appropriate, consideration has also been given to the following in development of the CSM:
 - the potential for environmental liabilities to occur under other associated regimes, for example the Water Resources Act 1991 and the Environmental Damage (Prevention and Remediation) (England) Regulations 2015; and
 - key constraints on site redevelopment.

1.5 Methodology

1.5.1 Desk top data sources

- 1.5.1.1 The data presented in this technical report has been taken from the following sources.
 - Publicly available data sources from the following organisations:
 - British Geological Survey (BGS);
 - The Coal Authority;
 - Department for Environment Food and Rural Affairs (DEFRA);
 - Environment Agency (EA);
 - Joint Nature Conservation Committee;
 - Lancashire County Council;
 - local planning authorities including Fylde Council, Blackpool Council, Preston City Council and South Ribble Borough Council;
 - UK Health Security Agency; and
 - Zetica Unexploded Ordnance (UXO).
 - Information contained in a Groundsure Insights report commissions for the project. That report includes:
 - general information regarding geological, hydrogeological and hydrological setting;
 - groundwater abstraction licences;
 - current and historical landfill sites;
 - current and historical waste sites;
 - pollution incidents;
 - discharge consents;
 - current and historical land-use;







- mining and ground working areas (coal and non-mining); and
- geotechnical constraints.
- Spatial information regarding ground conditions within the geology, hydrogeology and ground conditions study area taken from Groundsure Insights bespoke geographical information systems (GIS) data.
- Historical Ordnance Survey mapping and Getmapping aerial photography.
- 1.5.1.2 Limitations of this type of assessment are described in Appendix A.

1.5.2 Geology

- 1.5.2.1 Information on the geological conditions within the study area has been collated from British Geological Survey (BGS) datasets including 1:50,000 scale geological mapping. Nationally, regionally and locally important geological sites are also presented and, where present, include:
 - Sites of Special Scientific Interest (SSSIs) of geological and geomorphological importance;
 - Geological Conservation Review (GCR) sites as defined by the Joint Nature Conservation Committee; and
 - Local Geodiversity Sites (LGS).

1.5.3 Hydrogeology

- 1.5.3.1 Aquifer units in the bedrock geology and superficial deposits have been determined from the designations provided by the EA.
- 1.5.3.2 Important groundwater receptors have been reviewed and, where present, include the following:
 - licensed groundwater abstractions (active and historical) as presented in the Groundsure Insights report;
 - groundwater Source Protection Zones (SPZs) that have been defined to safeguard drinking water quality around important potable groundwater abstraction sites; and
 - nationally and locally important ecological sites that may have a groundwater dependence.
- 1.5.3.3 Details of Private Water Supply Sources within the study area have been sought from local authorities. No records have been identified – further details are provided in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

1.5.4 Ground conditions

1.5.4.1 The desk study has used datasets taken from the Groundsure Insights report, as summarised in **Table 1.1**.





Title	Extent of data coverage	Contractor	Format	Date
Groundsure Insight PDF	49.37 km ²	Groundsure	Hardcopy report	10/03/2023
Bespoke digital data sets	49.37 km ²	Groundsure	GIS Database	10/03/2023

1.6 Results of desk study

1.6.1 Geology

- 1.6.1.1 The bedrock geology and superficial deposits mapped by the BGS across the study area are presented in **Figure 1.1A-B** and **Figure 1.2A-B** respectively. Those figures also present:
 - the location of designated geological sites; and
 - local geological records by way of borehole logs obtained from the BGS Geoindex onshore platform that are provided in **Appendix B**.
- 1.6.1.2 A summary of the regional geology within the study area is provided in **Table 1.2**.

Table 1.2: Regional geology of the study area

Formation	Description
Superficial Deposits	
Tidal Flat Deposits	Mud flat and sand flat deposits. Unconsolidated sediment, mainly mud and/or sand.
Peat	Anaerobic, waterlogged deposits of organic matter which has been partially carbonised.
Blown Sands	Aeolian deposits of fine to medium grained sands.
Glacial Till (Devensian, diamicton)	Unconsolidated mixed deposit consisting of a clay, sand, gravel, and boulders.
Glaciofluvial Deposits	Unconsolidated material by glacial river waters. Consists of boulders, gravel, sand, silt and clay.
Saltmarsh Deposits	Fine-grained deposits of sand and mud with sporadic shelly layers and rhizoliths.
Alluvium	Sorted/semi-sorted clay, silt, sand and gravel deposited by a river, stream.
Head Deposits	Poorly sorted and poorly stratified, angular rock debris and/or clayey hillwash and soil creep. Can comprise gravel, sand and/or clay.
Tidal River or Creek Deposits	Predominantly silts and clays but may also contain muds, sands, gravels and peat.
Bedrock Geology	







Formation	Description
Sidmouth Mudstone Formation	Breckells Mudstone Member Mudstone, reddish-brown, structureless, commonly brecciated, with
	common halite and gypsum.
	Kirkham Mudstone Member
	(Sidmouth Mudstone Formation: Dominantly red-brown mudstone and siltstone with common grey-green reduction patches and spots).
	Singleton Mudstone Member:
	Halite and mudstone.
Tarporley Siltstone Formation	Interbedded siltstones, mudstones and sandstones in approximately equal proportions.
Sherwood Sandstone Group	Sandstone, red-brown to yellow, generally pebble-free, fine- to medium-grained, cross-stratified.

1.6.1.3 The local geological records provided in **Appendix B** have been used to confirm the expected regional geology and develop the baseline environment relevant to the onshore and intertidal elements of the Transmission Assets. A summary of the geological records is provided in **Table 1.3**.

Table 1.3: Regional geological records of the study area

Location	Key boreholes	Local geological sequence
Landfall: MHWS to A584.	Borehole: SD33SW73 Cross section on BGS Sheet 74 Southport	The surface sequence of superficial deposits comprises blown sand (dunes and littoral sediments) and tidal flat deposits. The depth of these deposits has not been proven. Depth to bedrock is not proven. Bedrock is expected to comprise mudstones of the Mercia Mudstone Group (MMG).
Landfall and onshore export cable corridor: A584 to A583	Boreholes (from west to east): SD33SW73 SD33SW155 SD32NW7/D SD33SW12 SD33SW124 Cross section on BGS Sheet 74 for Southport	 Borehole logs demonstrate a surface sequence of superficial deposits more than 30 m thick. That sequence comprises: 2.5 m to 3.8 m of blown sand deposits. 1.7 m to 1.8 m of peat. 0 m to 2.5 m of boulder clay (glacial till) that is typically a grey clay. 3.7 m to 9.9 m of sand (possibly middle sand) that is thickest near coastline. A lower Boulder Clay (glacial till) of unproven thickness but with a depth that exceeds 5 m to 10.6 m and is typically a reddish-brown clay. The depth to bedrock is not proven, although borehole SD33SW12 suggests mudstones of MMG may be present at a depth of 31.6 m.
Onshore export cable corridor: A583 to Freckleton/Hall Cross onshore export cable corridor	SD33SW124 SD33SE39 (EA Baseline) SD32NE34 SD43SW2	Superficial Deposits Western end More than 30 m of superficial deposits are proven and comprise: 3.5 – 8.8 m surface clay and peat (tidal flat deposits or glacial till).







Location	Key boreholes	Local geological sequence
	SD43SW12 SD42NW49 SD43SW61 SD43SW6 (Deep Log but north).	Up to or greater than 10 m of sand and gravel (middle sand). Brown clay (glacial till). Central and eastern section Proven depth of superficial deposits between 30.5 m to 43.9 m. Sequence dominated by glacial till comprising: 18-22 m of surface boulder clay (glacial till). Thin band of sand (middle sand). Brown boulder clay (glacial till) at depth. Bedrock SD43SW12 (in centre of section) red marls and sandstones of the MMG at 43.9 metres below ground level. SD43SW61 (in east) red sandstones of Sherwood Sandstone Group at 30 metres below ground level.
Freckleton/Hall Cross onshore export cable corridor, onshore substations and 400 kV grid connection cable corridor as A584	Boreholes (from north west to south east): SD42NE6 A, B, C SD43SW61 SD42NW49 SD42NW47	Underlain by a thick sequence of superficial deposits (22.7 m to more than 30.7 m). This sequence typically comprises a surface horizon of sand or gravel deposits (6.1 to 15.1 m), which can be overlain by a thin layer of clay (tidal flat deposits or glacial till). These granular deposits overlay brown, boulder clay (i.e., glacial till) that is typically between 7.5 m and 17 m thick. The superficial deposits conceal red sandstones of Sherwood Sandstone Group bedrock at depth. In the north west the Sherwood Sandstone Group is located at depth of approximately 30 m, decreasing to 22.7 m in the south east toward the River Ribble.
400 kV grid connection cable corridor: A584 to Penwortham	Boreholes north of River Ribble: SD42NE6 A, B, C SD42NE204 SD42NE205 SD42NE150 No boreholes located to the South of River Ribble.	The geological sequence is consistent with that seen for the onshore substations, with a thick sequence of superficial deposits concealing bedrock. Superficial deposit typically include a near surface sand unit (13 m to 18 m) although this can be reduced by surface clays that are presumed to be tidal flat deposits. These deposits are underlain by a thick sequence clay deposits typically referred to as boulder clay (i.e., glacial till). Bedrock is encountered at a depth of between 22.3 m and 41 m. Bedrock comprises red sandstones of the Sherwood Sandstone Group. There is no local geological data available for the study area south of the River Ribble. It is reasonable to assume the geology will be similar to that observed north of the River Ribble given their proximity and similarity of historical depositional environments.

Designated geological sites

1.6.1.4 Geological sites of national or local importance identified within the study area are summarised in **Table 1.4** and shown in **Figure 1.1A-B** and **Figure 1.2A-B**.





Table 1.4:	Designated sites of geological importance
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RPS ID	Site name	Designation	Description and Reason for Notification
PS_01	Lytham St Annes Dunes	SSSI	This is listed as a biological SSSI (it is primarily designated for ecological and habitat interest). It is noted, however, that this site is cited as one of the best examples of a calcareous dune system remaining in Lancashire (as reflected in its local designations below). The designated site extends across the Transmission Assets Order Limits in the landfall area.
LGS_01	Lytham St Annes - Starr Hill Dunes	LGS	Coastal Dunes: Rare dune system. (Covers the same site as Lytham St. Annes Dunes SSSI, although boundary of the LGS is slightly smaller). The designated site extends across the Transmission Assets Order Limits in the landfall area.
GCR_01	Lytham St Annes	Geological Conservation Review (GCR) site	This GCR site is also designated as Lytham Coastal Changes SSSI. The Lytham St Annes GCR site presents an example of coastal Quaternary Geology. It includes a group of four separate sites within the town of Lytham St. Annes (at Fairhaven Dunes, Main Drain and Lytham Dock, Witch Wood and Government Offices) that provide the basic stratigraphical record of coastline changes represented by alternating organic and inorganic deposits.
			Located outside of the Transmission Assets Order Limits.
PS_02	Lytham Coastal Changes	SSSI	Geological SSSI. A group of four separate sites within the town of Lytham St. Annes (at Fairhaven Dunes, Main Drain and Lytham Dock, Witch Wood and Government Offices) that provide the basic stratigraphical record of coastline changes. The geological interest is preserved in sediments beneath the topsoil and sand dunes of the area and provides a record of sea-level changes which occurred during the Holocene. Located outside of the Transmission Assets Order Limits.

- 1.6.1.5 The Lytham St Annes Dunes SSSI has been designated as it is one of the best examples of a calcareous dune system in Lancashire, with rare geomorphological features as well as associated ecological communities. The SSSI is located within the Onshore Order Limits in the landfall area. Lytham St Annes Dunes SSSI contains the Starr Hill Dunes LGS. LGS sites are commonly known as Regionally Important Geological Sites in the majority of England and Wales.
- 1.6.1.6 The Lytham Coastal Changes SSSI, designated on multiple sites as noted in **Table 1.4**, represents important geological outcrops which provide important records of paleo-sea levels. This SSSI lies outside of the Transmission Assets Order Limits. It includes multiple areas, the closest of which is approximately 155 m south of the Transmission Assets Order Limits north east of Lytham. Lytham Coastal Changes is also notified as a GCR site and includes four sites that comprises the Lytham Coastal Changes SSSI, which are situated outside the Transmission Assets Order Limits.



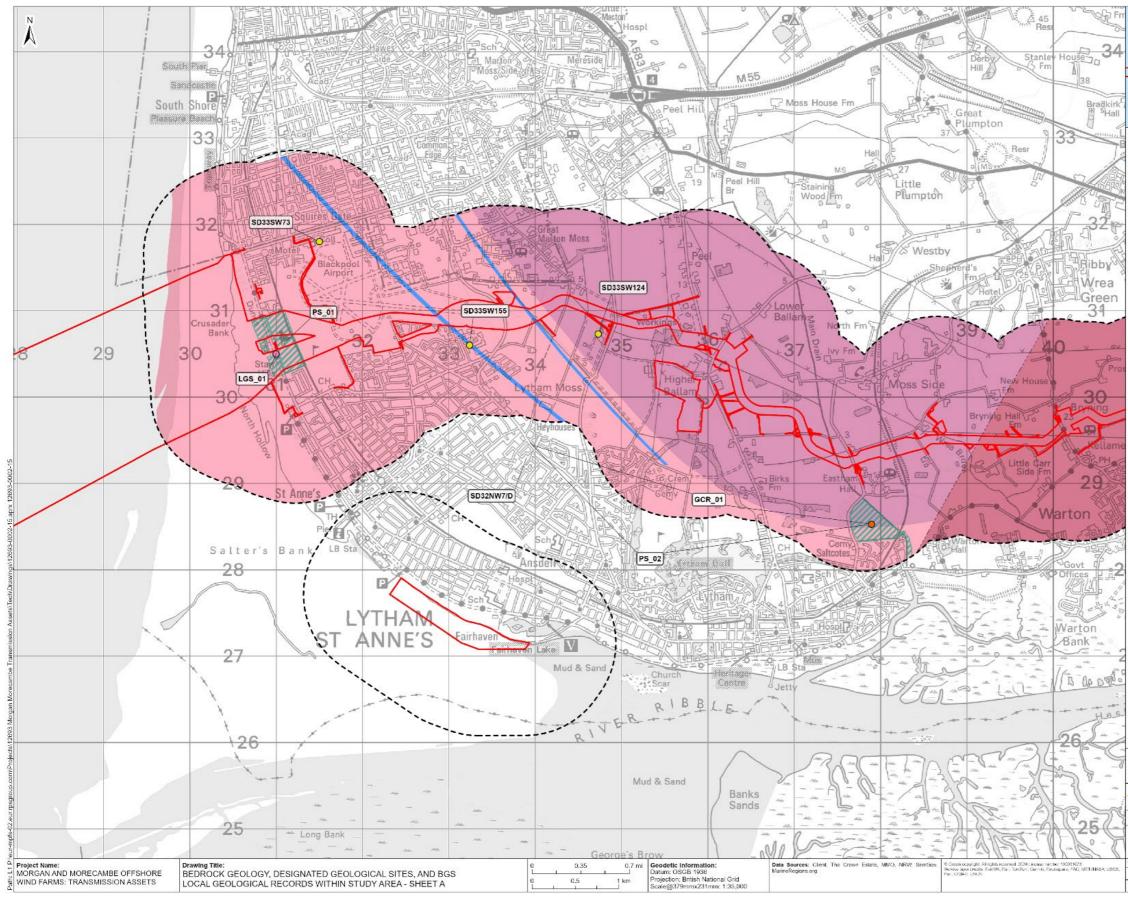


Figure 1.1A: Bedrock geology, designated geological sites and BGS local geological records within the study area – Sheet A









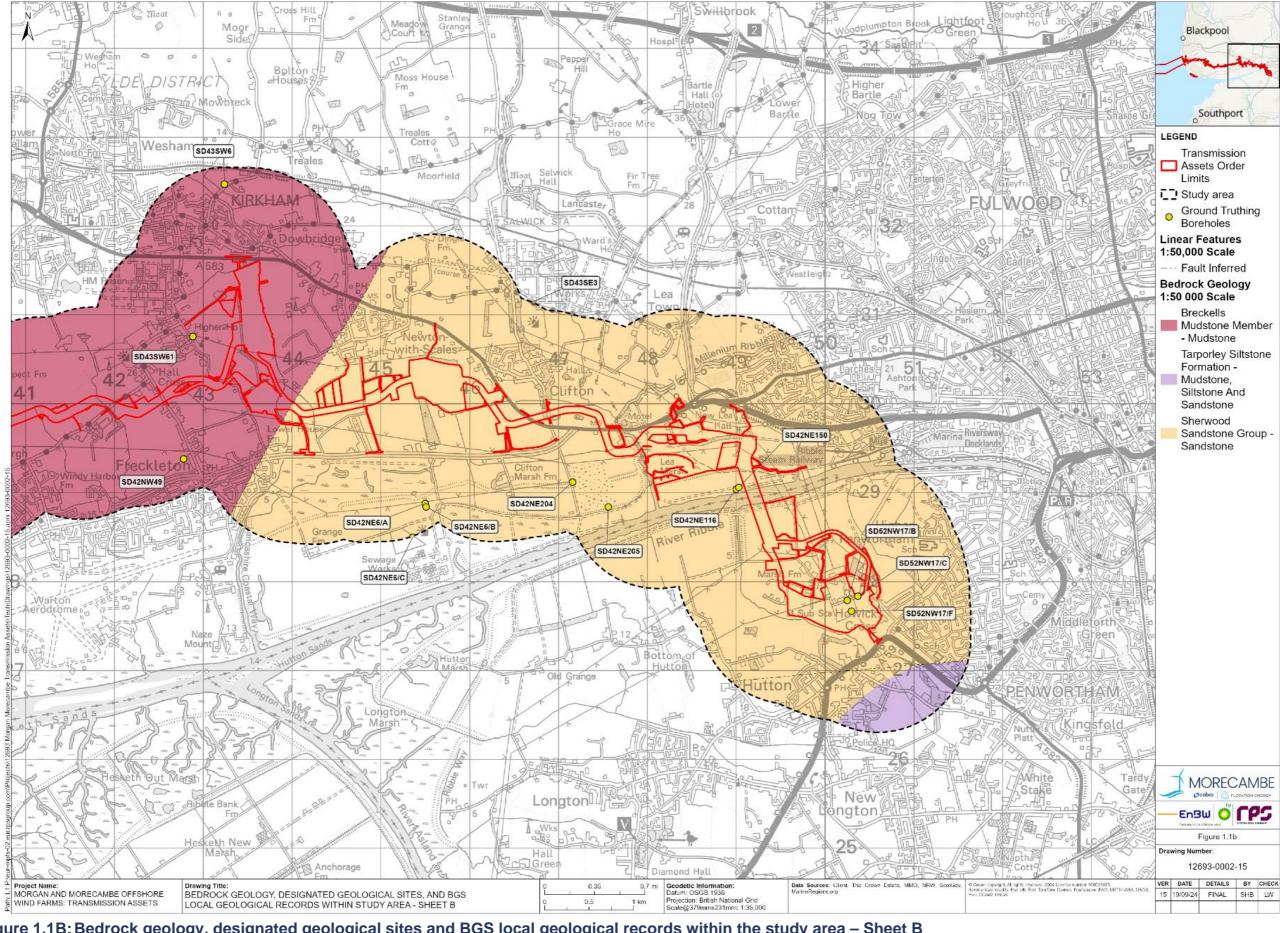


Figure 1.1B: Bedrock geology, designated geological sites and BGS local geological records within the study area – Sheet B







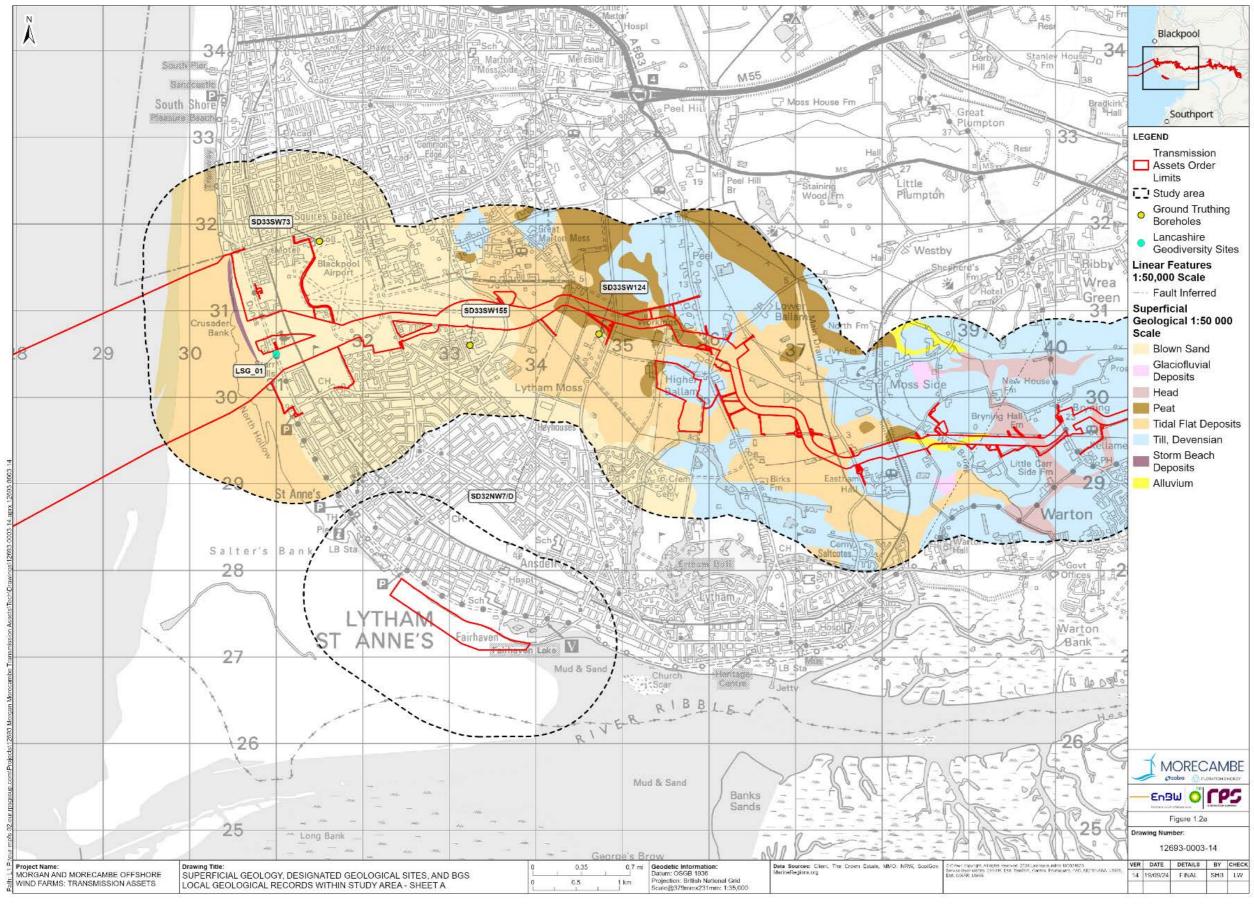


Figure 1.2A: Superficial geology, designated geological sites and BGS local geological records within the study area – Sheet A







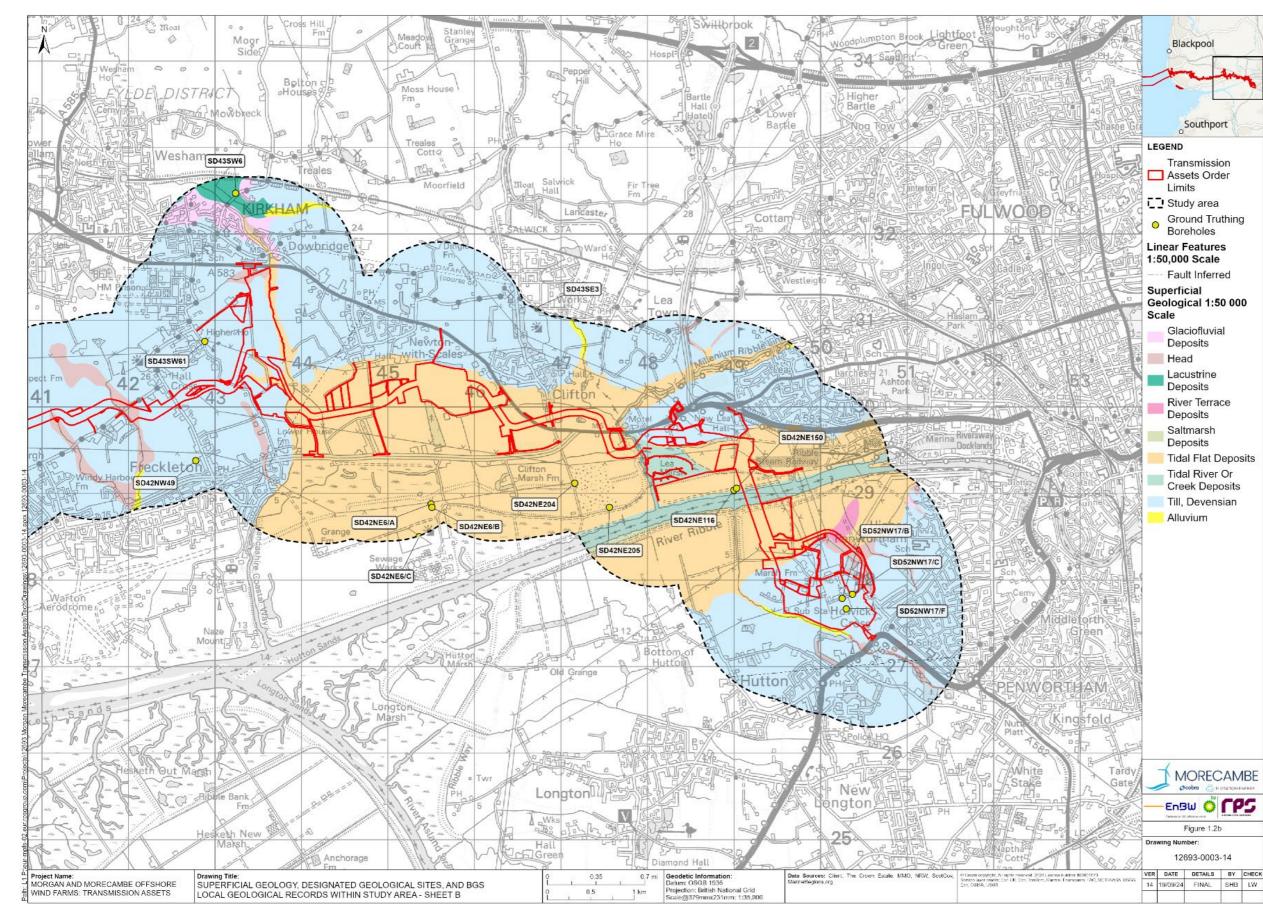


Figure 1.2B: Superficial geology, designated geological sites and BGS local geological records within the study area – Sheet B











1.6.2 Hydrogeology

Groundwater dependent designated sites

- 1.6.2.1 Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES provides details of the ecological sites in the area. These include the following ecological sites of national or local importance located within the study area:
 - Ribble Estuary SSSI;
 - Ribble and Alt Estuary Ramsar site and Special Protection Area;
 - Newton Marsh SSSI;
 - Lytham St Annes Dunes SSSI; and
 - Lytham St Annes Local Nature Reserve.
- 1.6.2.2 These sites are principally designated based on their ecology and are fully assessed in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and Volume 3, Chapter 4: Onshore and intertidal ornithology of the ES. The Lytham St Annes Dunes SSSI citation states that the dunes support a wide range of species which vary according to the depth of water and degree of moisture retention in relation to the water table.

Aquifer designation

- 1.6.2.3 Aquifer designations for the bedrock geology and superficial deposits across the study area are shown in **Figure 1.3A-B** and **Figure 1.4A-B** respectively. The following designations are presented in those drawings.
 - Principal aquifers A geological unit that yields significant groundwater that support regionally or nationally important supplies and support rivers, lakes and wetlands at a strategic scale.
 - Secondary A aquifers A geological unit that provides modest groundwater that can support local water supplies and may form an important source of water to rivers. They support water supplies at a local scale rather than strategic scale (such as for private supplies) and remain important for rivers, wetlands and lakes.
 - **Secondary B aquifers** Dominated by lower permeability layers that may store and yield limited amounts of groundwater.
 - Secondary undifferentiated aquifer Where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type, but generally have only a minor resource value.
 - Unproductive strata Unproductive Strata geological units that have negligible significance for water supply or baseflow to rivers, lakes and wetlands. They consist of bedrock or superficial







deposits with a low permeability that naturally offer protection to any aquifers that may be present beneath.

- 1.6.2.4 The bedrock geology in the west and central parts of the study area is dominated by Secondary B aquifer units of the Triassic Mercia Mudstone Group. The east end of the study area is underlain by the Principal Aquifer of the Sherwood Sandstone Group.
- 1.6.2.5 Superficial deposits form a continuous Secondary A aquifer at the western end of the study area, reflecting the extent of blown sand deposits. Central parts of the study area are predominantly underlain by Secondary undifferentiated or Unproductive strata, reflecting the distribution of glacial till and tidal flat deposits respectively. In the east, the majority of the 400 kV grid connection cable corridor is designated as Unproductive strata of the tidal flat deposits. Across small areas of the 400 kV grid connection cable corridor, glacial till forms a Secondary undifferentiated aquifer unit most notably around the existing Penwortham National Grid substation. Underlying the proposed onshore substation sites are Secondary undifferentiated and Secondary A aquifer units.

Licensed groundwater abstractions

1.6.2.6 A total of three active licensed abstractions have been identified in the study area, all within the Transmission Assets Order Limits. These abstractions are shown in **Figure 1.3A-B** and **Figure 1.4A-B**. and are summarised in **Table 1.5**.

RPS ID	Site name	Distance from	Geology	Licence Number	Description
		Transmission Assets			
GWA_01	The St Annes Old Links Golf Club Limited	0 m (within the Transmission Assets Order Limits)	Blown sand/MMG	2671353002	Spray irrigation
GWA_20	Penwortham Golf Club	980 m north west	Glacial till/ Sherwood Sandstone Group (SSG)	2671346006	Spray irrigation - direct
GWA_24	Penwortham Golf Club Limited	980 m north west	Glacial till/SSG	NW/071/0346/0 01	Spray irrigation - direct

Table 1.5 Licensed groundwater abstractions within the study area

Groundwater Source Protection Zones

- 1.6.2.7 Groundwater supply sources are afforded protection by the EA through the delineation of SPZs. SPZs define the level of risk to the supply source from contamination. Three zones are defined below.
 - Inner protection (SPZ1) 50 day travel time of pollutant to the source of abstraction or a default 50 m minimum radius.







- Outer protection zone (SPZ2) 400 day travel time of pollutant to source of abstraction. This zone has a 250 or 500 m minimum radius around the source depending on the amount of water taken.
- Total catchment (SPZ3) The area around a supply source within which all the groundwater ends up at the abstraction point. This could extend some distance from the source point.
- 1.6.2.8 The groundwater SPZs are shown in **Figure 1.3A-B**. The total catchment area (Zone III) extends into the 400 kV grid connection cable corridor at the eastern end of the study area. The SPZ relates to multiple groundwater abstraction from the Sherwood sandstone group Principal aquifer that are located more than 4 km north east of the study area. The SPZ terminates on the northern bank of the River Ribble. This implies a general groundwater flow direction to the north east in the bedrock aquifer within the study area. The closest protected abstractions are located at Lightfoot Green Farm and the Royal Preston Hospital, approximately 4.8 km and 5.3 km away from the Transmission Assets Order Limits respectively.

1.6.3 Hydrology

1.6.3.1 The study area to the north of the River Ribble is located within the Ribble management catchment, whilst land to the south is located within the Douglas management catchment. Both management catchments are located within the wider north west river basin district.

Main rivers

- 1.6.3.2 The following Main Rivers/designated watercourse features are located within the Transmission Order Limits.
 - Main Drain and associated tributaries, including Branch Drain.
 - Moss Sluice (also known as Liggard Brook downstream of the study area) and associated tributaries.
 - Dow Brook and associated tributary.
 - Middle Pool.
 - Wrea Brook.
 - Pool Stream.
 - Ribble Link/Savick Brook.
 - River Ribble.
 - Mill Brook.

Ordinary watercourses

- 1.6.3.3 The following ordinary watercourse features are located within the Transmission Order Limits.
 - Deepdale Brook.







- Tributaries of Moss Sluice.
- Tributaries of Branch Drain and Main Drain.
- Tributaries of Wrea Brook.
- Tributaries of Pool Stream.
- Tributaries of Middle Pool.
- Tributaries of Mill Brook.
- Tributaries of Dow Brook.

Sea

1.6.3.4 The landfall includes works in the intertidal area, at the coast (east Irish Sea).

Licensed surface water abstractions

1.6.3.5 No active licensed surface water abstractions have been identified in the study area.



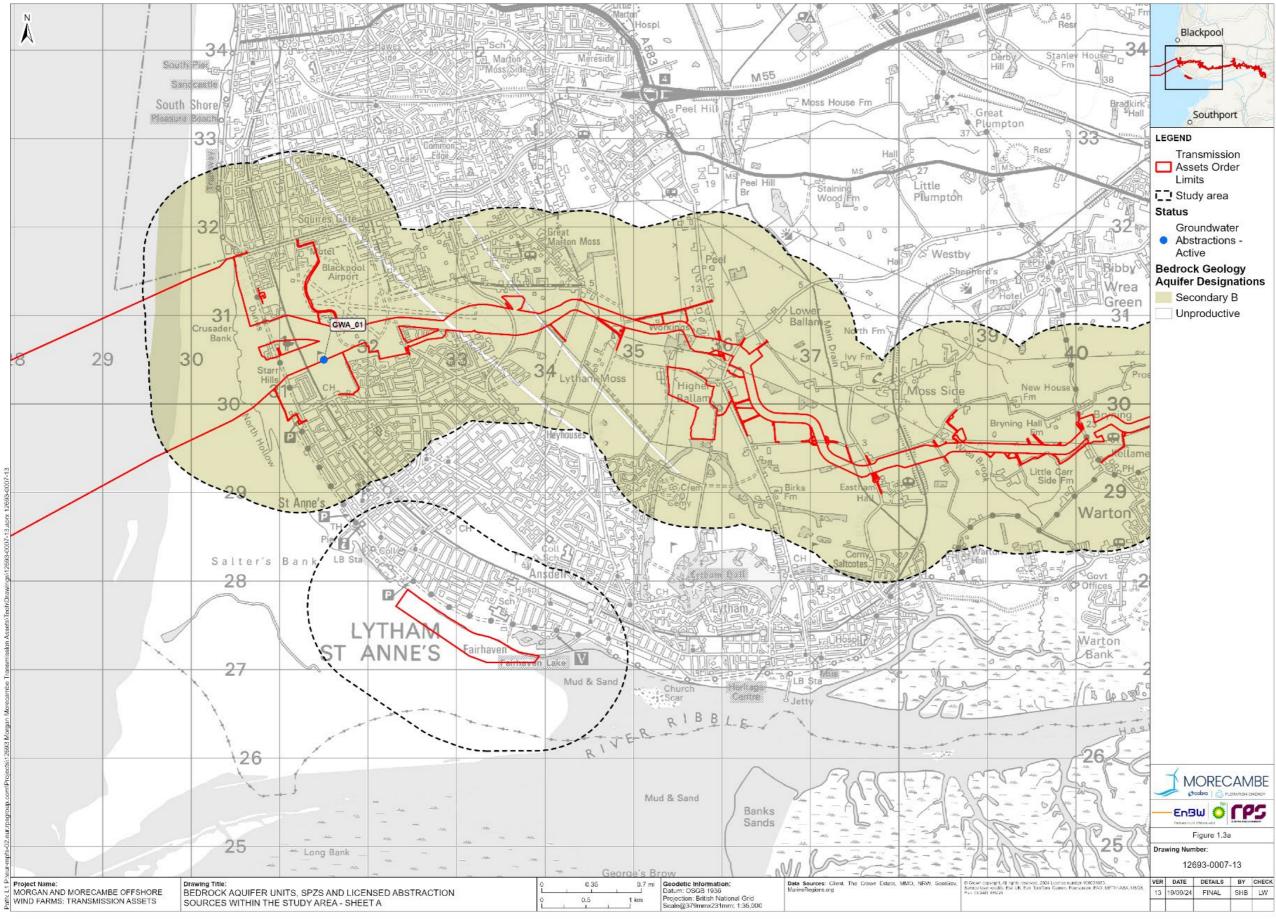


Figure 1.3A: Bedrock aquifer units, SPZs and licensed abstraction sources within the study area – Sheet A







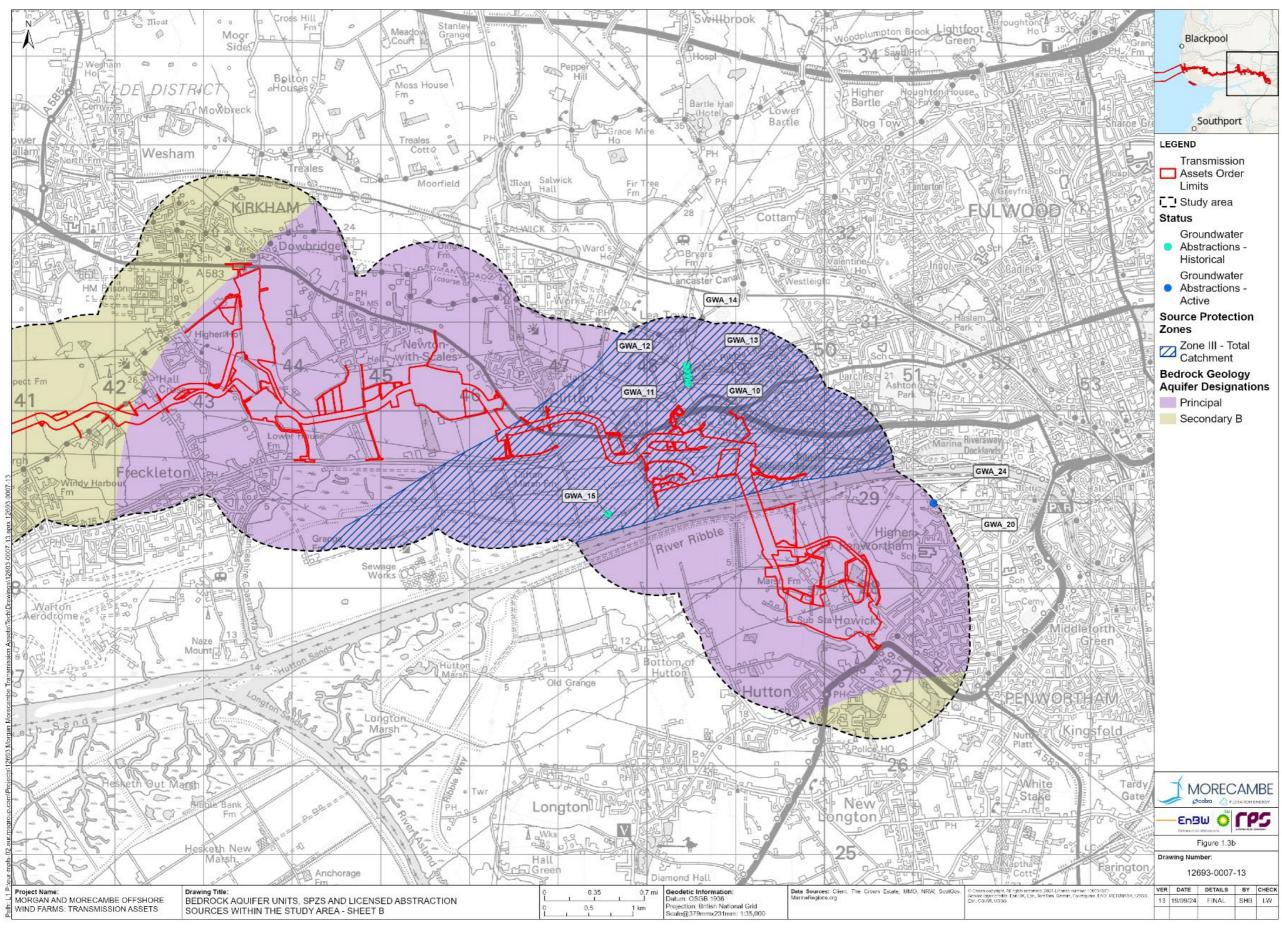


Figure 1.3B: Bedrock aquifer units, SPZs and licensed abstraction sources within the study area – Sheet B









Figure 1.4A: Superficial aquifer units and licensed abstraction sources within the study area – Sheet A





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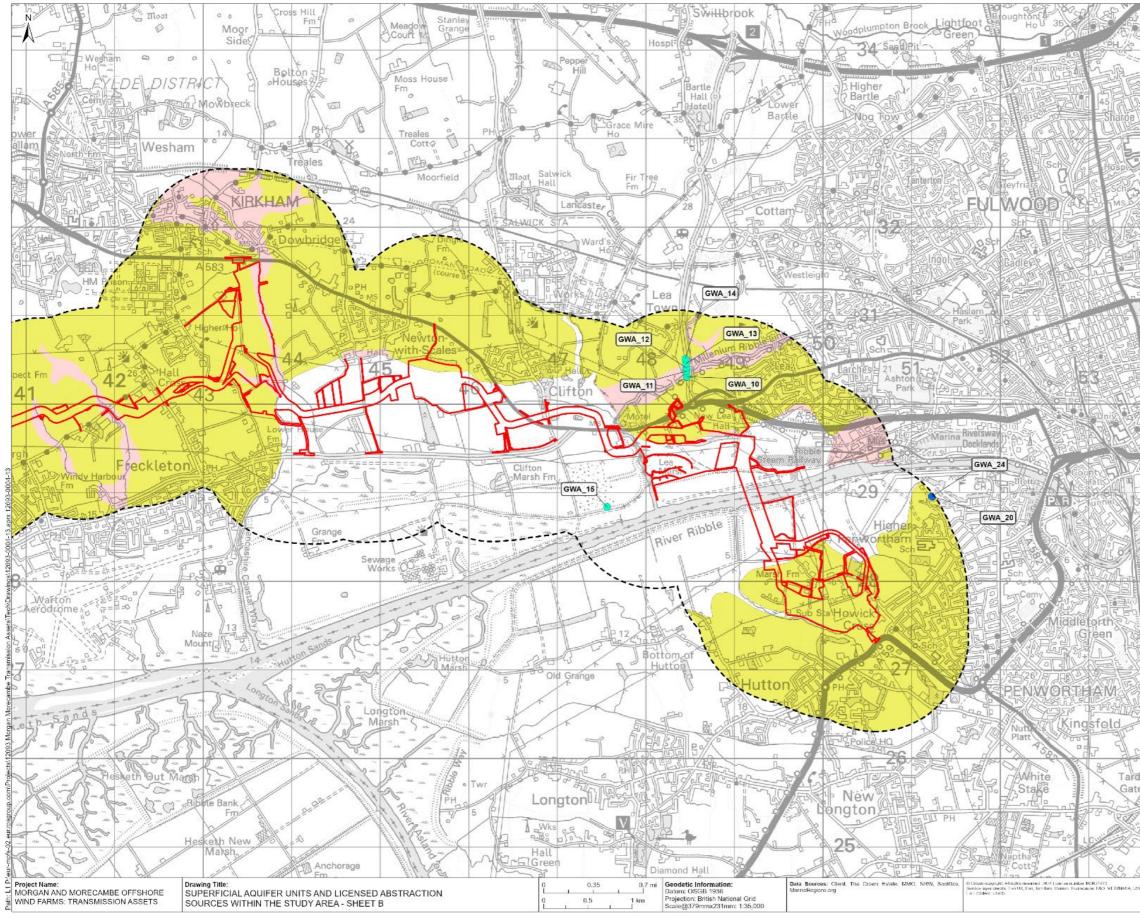
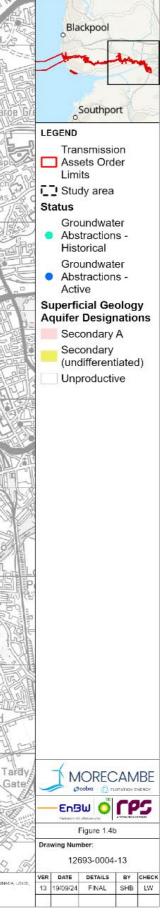


Figure 1.4B: Superficial aquifer units and licensed abstraction sources within the study area – Sheet B













1.6.4 Ground conditions

1.6.4.1 The detailed ground condition constraints maps for the study area are presented in **Figure 1.5A-E**.

Landfill sites

1.6.4.2 Details of the current and historical landfill sites of most concern (based on the nature of waste accepted), as presented in those figures, are summarised in **Table 1.6**.

Table 1.6: Landfill sites (current and historical) within the study area

RPS ID	Site name and status	Waste type accepted	Description
LF_01	Refuse Tip: Historical	Unknown	Unknown waste type but only c. 0.007 km ² and situated adjacent to the Transmission Assets Order Limits and near the landfall.
LF_02	Clifton Drive North, Near Blackpool Airport, Lytham, St. Annes: Historical	Unknown	Unknown waste covering area of c. 0.002 km ² and located within the Transmission Assets Order Limits.
LF_03	Leach Lodge Farm, Leach Lane, Blackpool Road North, St Annes: Historical	Industrial, Commercial	Possible biodegradable waste mass, located across the Transmission Assets Order Limits.
LF_04	Snowdon Road, St Annes, Fylde: Historical	Inert, Commercial, Household	Contains potentially biodegradable 'household' waste. Located within the Transmission Assets Order Limits.
LF_05	Refuse Destructor (B): Historical	Unknown	Unknown waste type but only c. 0.003 km ² and located within the Transmission Assets Order Limits.
LF_06	Blackpool Airport, Common Edge Road, Lytham, Blackpool: Historical	Inert, Household	Contains potentially biodegradable 'household' waste. Located across and adjacent to the Transmission Assets Order Limits.
LF_07	Midgeland Farm, Midgeland Road, Marton, Blackpool, Lancashire: Historical	Inert, Industrial, Commercial, Household	Possible biodegradable waste mass, but historical site situated on mudstone bedrock of the MMG and Glacial Till. Located c. 300 m north of the Transmission Assets Order Limits (north of the onshore export cable corridor).
LF_08	Westby Landfill Site, Annas Road, FY4 5JY: Active or recent	Waste Landfilling Inert, Special, Industrial, Commercial, Household	Active landfill adjacent to the Transmission Assets Order Limits accepting potentially biodegradable household waste.
LF_09	Land off Saltcotes Road, Land off Saltcotes Road, Ballam Road, Lytham, Lancashire - Historical	Inert	Historical landfill located c. 470 m south of the Transmission Assets Order Limits. Only inert waste and measuring c. 0.02 km ² in size.







RPS ID	Site name and status	Waste type accepted	Description
LF_10	Saltcotes, Lytham Hall Park, Saltcoates Road, Lytham, Lancashire: Historical	Inert, Industrial, Commercial, Household, Liquid sludge	Historical landfill located c. 110 m south of the Transmission Assets Order Limits. Contains potentially biodegradable 'household' waste.
LF_11	Lidum Park Industrial Estate, Boundary Road, Lytham, FY8 5LT: Historical	Unknown	Located c. 800 m south of the Transmission Assets Order Limits. Only measuring c. 0.002 km ² in size but unknown waste received.
LF_12	Moss Side Lane, Moss Side: Historical	Inert	Historical landfill located c. 640 m north of the Transmission Assets Order Limits. Very small (c. 0.002 km ²) and receiving inert waste.
LF_14	Grange Farm, Lytham Road, Freckleton: Active or Recent	Co-Disposal Landfill Site	Active landfill located c.790 m south of the Transmission Assets Order Limits.
LF_15	Grange Farm No 2, Freckleton: Historical	Inert, Industrial, Household, Liquid sludge	Historical landfill which accepted biodegradable waste c.620 m south of the Transmission Assets Order Limits.
LF_16	Clifton Marsh Landfill, Preston New Road, Freckleton, Preston, Lancashire, PR4 1HN - Active or recent	Unknown	Large (c. 1.0 km ²), active landfill stretching across northern bank of River Ribble, adjacent to the Transmission Assets Order Limits. Waste type unknown excluding low level radioactive waste declared through radioactive substance authorisation (RS_01).
LF_17	Clifton Marsh Landfill Site, Lytham Road, Clifton: Active or Recent	Co-Disposal Landfill Site. Inert, Industrial, Commercial, Liquid Sludge	As LF_16.
LF_19	Clifton Marsh Landfill Site, Lytham Road, Clifton: Historical	Unknown	Historical landfill only measuring c. 0.002 km ² in size located c. 650 m from the Transmission Assets Order Limits. Waste type unknown.
LF_21	Lea Marsh, Preston: Historical	Inert, Industrial	Sizable (c. 0.26 km ²) historical landfill located across and adjacent to the Transmission Assets Order Limits near the River Ribble.
LF_22	Refuse Tip	Unknown	Unknown waste type but only c. 0.003 km ² and located adjacent to the Transmission Assets Order Limits near River Ribble.
LF_23	Refuse Tip	Unknown	As LF_22.
LF_24	Refuse Tip	Unknown	As LF_22.
LF_25	Refuse Tip	Unknown	As LF_22.
LF_26	Refuse Tip	Unknown	As LF_22.





Licensed waste sites

1.6.4.3 Details of the 20 licensed waste sites identified in the study area, none of which are located within the Transmission Assets Order Limits are summarised in **Table 1.7**. These have been distinguished using the licence number and are shown in **Figure 1.5A-E**.

Table 1.7: Licensed waste sites within the study area

RPS ID	Site name	Licence number	Description
WS_01	Westby Transfer Station, Annas Road, Peel, Blackpool, Lancashire, FY4 5JX	WES001	Associated with Westby landfill site (LF_08) accepting household, commercial and industrial waste.
WS_02	Saltcotes Road, Lytham St. Annes, Lancashire, FY8 4LS	SIT030	Associated with Lytham household waste centre landfill (LF_10) accepting household, commercial and industrial waste.
WS_03	Saltcotes Road, Lytham St Annes, Lancashire, FY8 4LS	LAN017	Associated with Lytham household waste centre landfill (LF_10) accepting household, waste.
WS_04	Waste Transfer Station, Lindum Park Industrial Estate, Off Boundary Road, Lytham St Annes, Lancashire, FY8 15HU	GIL039	Associated with Lindum Park historical landfill (LF_11). Household, Commercial and Industrial Waste Transfer Station.
WS_05	Carr Farm, Lodge Lane, Warton, Preston, Lancashire, FY8 5RP	FAR062	Biological treatment facility at Carr Farm. Located c. 770 m south of the Transmission Assets Order Limits.
WS_06	Freckleton Road, Kirkham, Lancashire, PR4 2RN	REC017	Waste electrical and electronic equipment treatment facility situated c. 600 m to the west of the Transmission Assets Order Limits.
WS_07	Freckleton Road, Kirkham, Lancashire, PR4 2RN	REC346	As WS_06.
WS_09	Lytham Road, Freckleton, Preston, Lancashire, PR4 1TT	LCC001	Associated with co-disposal landfill site (LF_14).
WS_10	Clifton Marsh L F S, Lytham Road, Preston, Lancashire, PR4 0XE	SIT039	Associated with special waste transfer station at Clifton marsh landfill (LF_16).
WS_11	Clifton Marsh L F S, Lytham Road, Preston, Lancashire, PR4 0XE	SIT204	As WS_10.
WS_12	Clifton Marsh Landfill Site, Lytham Road, Freckleton, Lancashire, PR4 0XE	SIT210	As WS_10.
WS_13	Lytham Road, Clifton, Preston, Lancashire, PR4 0XE	SIT037	Associated with composting facility at Clifton Marsh landfill (LF_16).







RPS ID	Site name	Licence number	Description
WS_14	Lytham Road, Clifton, Preston, Lancashire, PR4 0XE	SIT002	Associated co-disposal landfill site at Clifton Marsh landfill (LF_16).
WS_15	Clifton Marsh Composting Facility, Lytham Road, Clifton, Preston, Lancashire, PR4 0XE	SIT049	As WS_13.
WS_16	Lytham Road, Clifton, Preston, Lancashire, PR4 0XE	SIT038	As WS_14.
WS_17	Ratten Lane, Hutton, Preston, Lancashire, PR4 5 ^{⊤H}	TEG001	Composting facility at Sherdley Farm. Located c. 470 m southwest of the Transmission Assets Order Limits. Due to association with established agricultural property and situation above thick layer of glacial till, risk is deemed to be low.
WS_18	Ratten Lane, Hutton, Preston, Lancashire, PR4 5 TH	TEG003	As WS_17.
WS_19	Waste Technology Park, Wallend Road, Preston Docks, Preston, Lancashire, PR2 2HW	LAN020	Associated with HCI and asbestos waste at Preston Docks historical landfill (LF_24).
WS_20	Waste Technology Park, Wallend Road, Preston Docks, Preston, Lancashire, PR2 2HW	NEA057	As WS_19.
WS_21	Acrylan Shed, Wall End Road, Off Riversway, Preston, Lancashire, PR2 2HW	MBM001	Associated with household, commercial and industrial waste transfer station at Preston Waste Transfer Station (LF_25).

Pollution incidents

- 1.6.4.4 Details of the 11 recorded pollution incidents identified in the study area are summarised in **Table 1.8**. Four categories of pollution incident are recorded.
 - Category 1 major, serious and/or extensive impact or effect on the environment, people and/or property.
 - Category 2 significant impact or effect on the environment, people and/or property.
 - Category 3 minor or minimal impact or effect on the environment, people and/or property.
 - Category 4 substantiated incident with no impact.
- 1.6.4.5 Only the Category 1 and 2 pollution incidents that affect land and water within the study area and that have the potential to be significant, have been presented.





Table 1.8: Environmental pollution incidents within the study area

RPS ID	Incident ID	Principal impacted medium (pollutant)	Severity category	Comments
PI_01	115607F	Land (Biodegradable materials and wastes)	2	Notification date 2002, not within the Transmission Assets Order Limits.
PI_02	1222071	Water (Crude Sewage)	2	Notification date 2014, not within the Transmission Assets Order Limits.
PI_03	371393	Water (Pollutant not identified)	2	Notification date 2006, within the Transmission Assets Order Limits.
PI_04	351641	Water (Unidentified Oil)	2	Notified in 2005, within the Transmission Assets Order Limits.
PI_05	96817	Water (Pollutant not identified)	2	Notified in 2002, adjacent to the Transmission Assets Order Limits.
PI_06	599136	Land (Construction and demolition materials and wastes)	2	Notified in 2008, not within the Transmission Assets Order Limits.
PI_07	1332916	Water (Contaminated Water)	2	Notified in 2015, not within the Transmission Assets Order Limits.
PI_08	371181	Land (Agricultural slurry and dilute slurry)	2	Notified in 2006, not situated within Transmission Assets Order Limits.
PI_09	650564	Water (Sludge)	2	Notified in 2009, situated within the Transmission Assets Order Limits.
PI_11	134994	Water (Food and drink)	2	Notified in 2003, situated adjacent to the Transmission Assets Order Limits, situated c. 150 m from National Grid Penwortham substation.

Licensed discharges to groundwater

1.6.4.6 There were 77 licensed discharges to controlled waters reported within the study area. Of these 77 discharges, none were recorded as discharging to ground and subsequently have been scoped out of impact assessments for the study area.





Fuel stations and garages

1.6.4.7 Fuel stations represent a particular risk to land and groundwater quality. The details of the eight current or historical garages identified in the study area are summarised in **Table 1.9**.

Table 1.9:Recent and historical fuel stations and garages within the study
area

RPS ID	Address	Status	Description
FS_01	Midgeland Road, Great Marton Moss, Borough of Blackpool	Open garage	Underlain by alluvium, glacial till and MMG. Located c. 370 m north of the Transmission Assets Order Limits.
FS_02	Co-op Car Park, Lodge Close, Freckleton, Borough of Fylde, Lancashire	Historical garage	Underlain by glacial till and MMG. Located c, 960 m south of the Transmission Assets Order Limits.
FS_03	Landcrest Close, Freckleton, Borough of Fylde, Lancashire	Historical garage	Underlain by glacial till and MMG. Located c. 100 m west of the Transmission Assets Order Limits.
FS_04	Marsh Garage, Preston New Road, Freckleton, Clifton, Borough of Fylde	Open garage	Underlain by alluvium, glacial till and SSG. Located c. 510 m south of the Transmission Assets Order Limits.
FS_05	Motorhome Rent UK, Blackpool Rd, Clifton	Closed garage	Underlain by alluvium, glacial till and sherwood sandstone group. Located adjacent to the Transmission Assets Order Limits.
FS_06	Hallmark Cars, Blackpool Rd, Clifton	Closed service station - now car dealership	Underlain by alluvium, glacial till and sherwood sandstone group. Located adjacent to the Transmission Assets Order Limits.
FS_07	Costa Coffee, Drive Thru, Blackpool Rd, Lea, Preston	Historical garage	Underlain by glacial till and sherwood sandstone group. Located adjacent to the Transmission Assets Order Limits.
FS_08	Wallend Road, Ashton-on-Ribble, Preston, Lancashire	Historical - Now brownfield site	Underlain by alluvium, glacial till (inferred) and SSG. Located adjacent to the Transmission Assets Order Limits.

Radioactive substance authorisations

1.6.4.8 Only one site has been identified within the study area that is licensed for the storage and processing of radioactive substances. That site is summarised in **Table 1.10** and relates to the Clifton Marsh landfill (LF_16). This landfill is located adjacent to the Transmission Assets Order Limits on the northern bank of the River Ribble.





Table 1.10: Radioactive substance authorisations within the study area

RPS ID	Locations	Permission Number	Comments
RS_01	SUEZ Recycling & Recovery (Lancashire) Limited, Clifton Marsh Landfill Site	WB3495DU	Clifton Marsh landfill has an active authorisation to dispose of solid, low level radioactive waste since 2012. Therefore, the mapped landfill can be expected to contain radioactive waste.

Licensed industrial activities

1.6.4.9 Thirty licensed industrial activities are identified with the study area within the Groundsure Insights report. These licensed industrial activities were curated to remove duplicate entries, and activities that were deemed low risk. Licensed industrial activities deemed to be higher risk are presented in **Table 1.11**. These sites are also shown in **Figure 1.5A-E**.

Table 1.11: Licensed industrial activities within the study area

RPS ID	Permit number	Location (Process)	Effective date	Status	Description
IA_01	ZP3637SU	Clifton Marsh Chemical Store (Hazardous waste disposal)	20/06/2006	Supersed ed	Licensed activity has been superseded by more recent license (IA_03).
IA_03	PP3435DD	Clifton Marsh Chemical Store (Temporary storage of hazardous waste)	30/06/2016	Effective	Effective licence on area underlain by thick glacial till. Located c. 900 m southwest of the Transmission Assets Order Limits.
IA_04	LP3132LC	Clifton Marsh Landfill - Phase 4 (Combustion of waste derived fuel)	29/05/2007	Supersed ed	Superseded licence on area underlain by thick glacial till. Located c. 820 m southwest of the Transmission Assets Order Limits.
IA_05	PP3135DN	Clifton Marsh Leachate	30/06/2016	Supersed ed	Superseded licence on area







RPS ID	Permit number	Location (Process)		Effective date	Status	Description
		Treatment Plant (Physico- chemical treatment and disposal of non-hazardous waste)				underlain by thick glacial till. Located c. 740 m south of the Transmission Assets Order Limits.
IA_06	PP3836DX	Marsh Farm Broiler Unit (Intensive farming)	20,	/09/2018	Effective	Effective licence on area underlain by thick Glacial till. Located c. 470 m south of the Transmission Assets Order Limits.

- 1.6.4.10 **Table 1.6** to **Table 1.11** identify those activities and land uses that are considered to represent the highest risk with respect to ground conditions within the study area and potentially the most significant constraints for the construction and the operation and maintenance phase of the Transmission Assets.
- 1.6.4.11 The Groundsure Insights report and associated historical mapping also identifies a wide range of other current, recent or historical activities and land uses from multiple datasets. These features are shown in the constraints mapping in **Figure 1.5 A-E**.

Recent industrial land uses

1.6.4.12 A total of 335 recent industrial land uses were identified in the study area within the Groundsure Insights report. These recent industrial land uses were screened to remove multiple entries assigned from different survey dates and activities that were deemed low risk. Recent industrial land uses deemed to be higher risk are presented in **Table 1.12.** These sites are also shown in **Figure 1.5A-E**.

Table 1.12: Recent Industrial Land Uses within the study area

RPS_ID	Description	Within Transmission Assets Order Limits?
RILU_01	Blackpool Airport - Airports and landing strips	No c. 270 m east
RILU_02	St Annes Radar Station - Telecommunications features	No c. 250 m west
RILU_03	Gas Governor - Gas features	No c. 10 m south
RILU_04	Slurry lagoon - Waste storage, processing and disposal	No c. 50 m north west







RPS_ID	Description	Within Transmission Assets Order Limits?
RILU_05	Slurry bed - Waste storage, processing and disposal	No c. 30 m south east
RILU_06	Water pumping stations	No c. 60 m west
RILU_07	Sewage pumping station - Waste storage, processing and disposal	No c. 60 m west
RILU_08	Sludge pit plantation - Waste storage, processing and disposal	No c. 65 m south
RILU_11	Water pumping stations	No c. 910 m southwest

Historical industrial land uses

1.6.4.13 A total of 514 historical industrial land uses were identified in the study area within the Groundsure Insights report. These historical industrial land uses were screened to remove multiple entries assigned from different survey dates and activities that were deemed lower risk. Historical industrial land uses deemed to be higher risk are presented in **Table 1.13.** These sites are also shown in **Figure 1.5A-E**.





Table 1.13: Historical industrial land uses within the study area

RPS ID	Dates Recorded	Land Use	Within Transmission Assets Order Limits? And Approximate Distance and Direction
HILU_01	1951, 1968, 1981, 1987	Railway sidings	Yes
HILU_02	1951	Refuse heap	No – c. 130 m east
HILU_03	1930, 1938	Miniature rifle range	Yes
HILU_04	1909, 1930, 1938, 1951, 1968	Railway sidings	Yes
HILU_05	1987	Fire station	No – adjacent to boundary
HILU_06	1951, 1968, 1981, 1987	Aerodrome, airport	Yes
HILU_07	1930, 1938	Refuse destructor	Yes
HILU_08	1987	Radar station	No - c. 210 m west
HILU_09	1968	Radar station	No - c. 55 m west
HILU_10	1989	Mortuary	No - c. 610 m south
HILU_11	1846	Brick field	Yes
HILU_12	1909	Old clay pit	No – adjacent to boundary
HILU_13	1909	Old clay pit	No – adjacent to boundary
HILU_14	1951	Gas works	No - c. 210 m east
HILU_15	1909, 1930	Fever hospital	No - c. 510 m north
HILU_16	1930, 1938	Fever hospital	No - c. 510 m north
HILU_17	1909, 1930, 1938	Burial ground	Yes
HILU_18	1846	Refuse heap	No – adjacent to boundary
HILU_20	1951, 1979	Petrol storage tanks, petrol depot	No - c. 35 m north east
HILU_21	1974, 1982, 1990	Petrol depot	No - c. 210 m east
HILU_22	1990	Dock	No - c. 210 m east
HILU_23	1909, 1931	Old clay pit	Yes



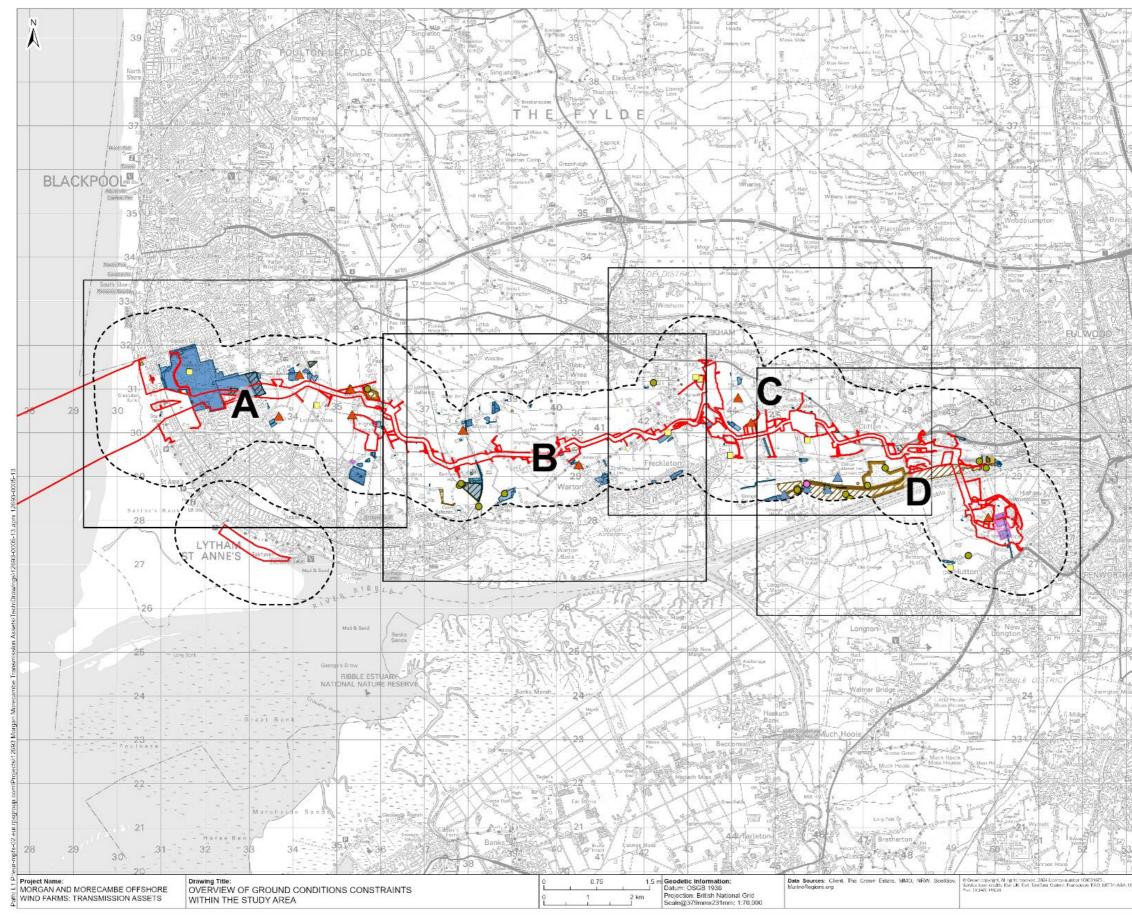


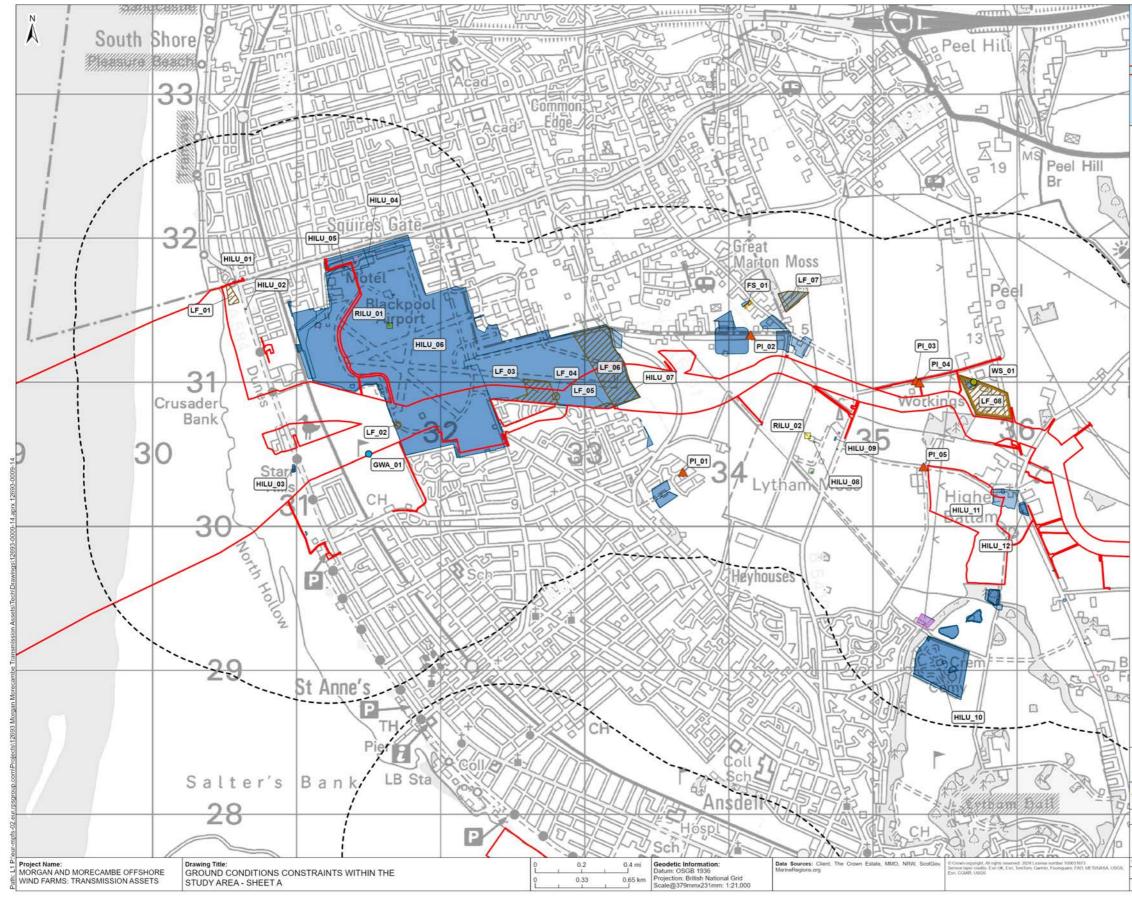
Figure 1.5A: Overview of ground conditions constraints within the study area













Overview of ground conditions constraints within the study area









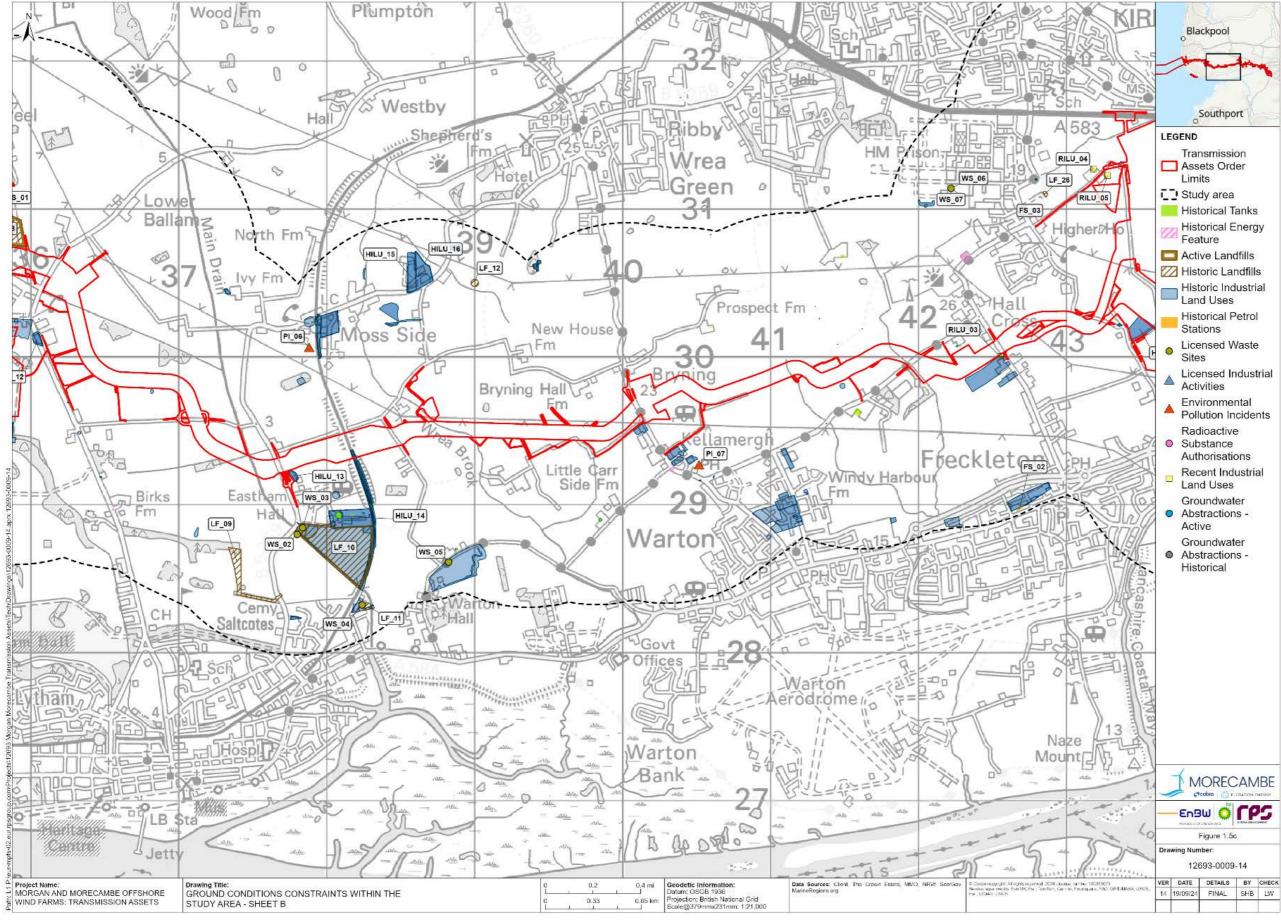


Figure 1.5C: Overview of ground conditions constraints within the study area







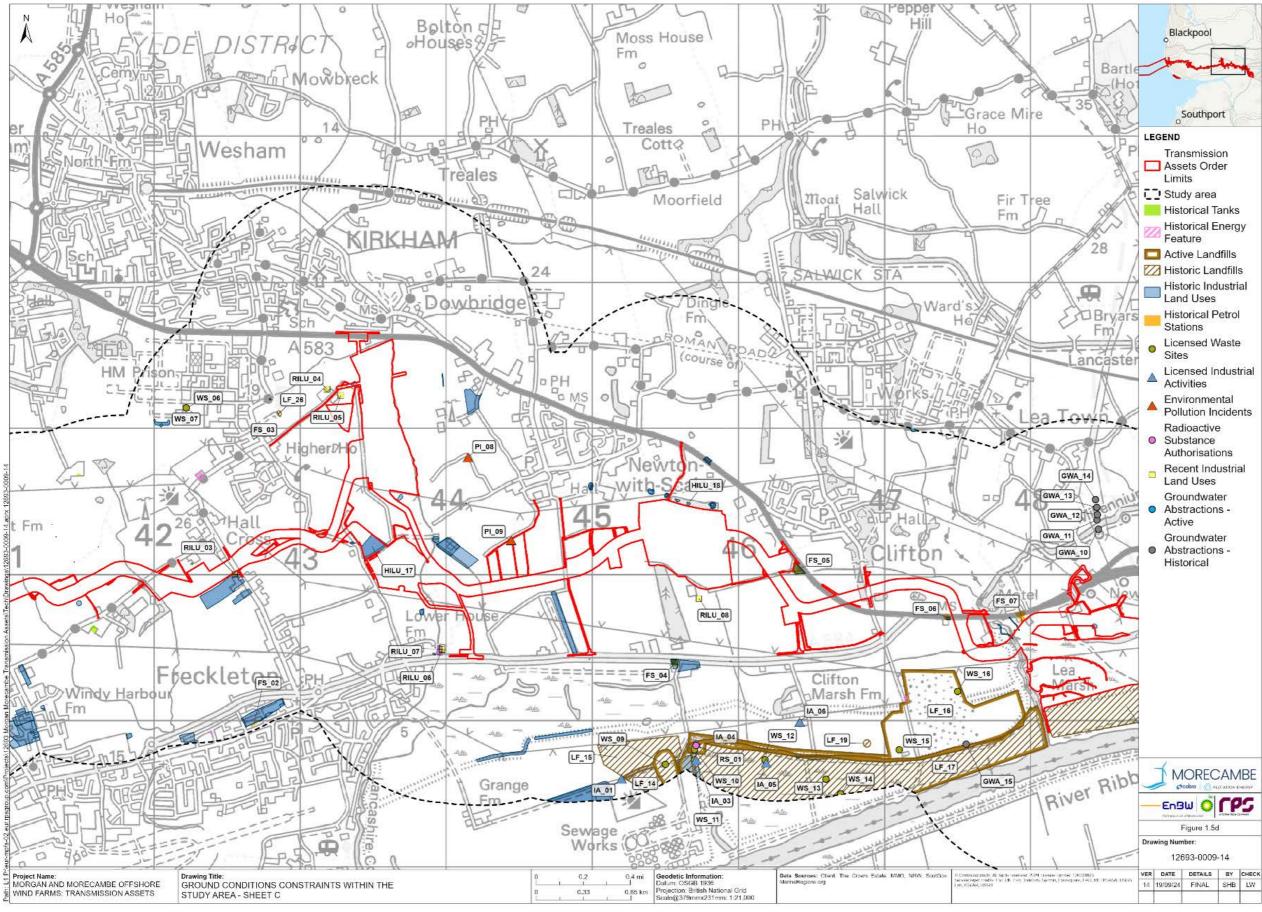


Figure 1.5D: Overview of ground conditions constraints within the study area







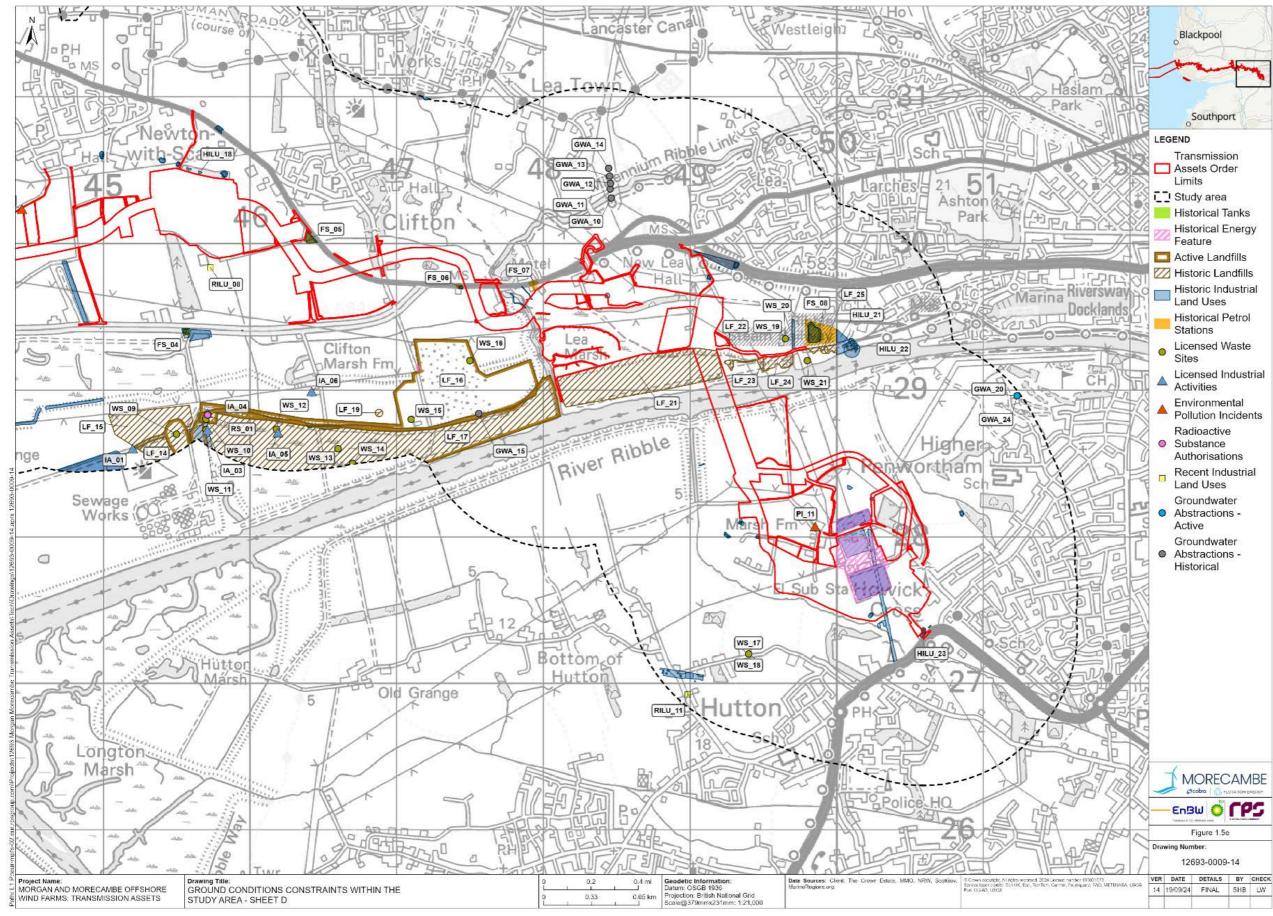


Figure 1.5E: Overview of ground conditions constraints within the study area











Historical mining operations

- 1.6.4.14 The Groundsure Insights report provides multiple datasets that relate to current and historical mining in the study area most notably:
 - surface ground workings from a review of the historical mapping; and
 - location of 'British Pits (BritPits)' which are closed or active surface and underground mineral workings obtained from records of the BGS.
- 1.6.4.15 The digital data for those datasets has been used to produce **Figure 1.6A-B**.
- 1.6.4.16 Several surface ground workings have been identified within the study area, with some located within the Transmission Assets Order Limits. However, these features are typically very small and almost exclusively relate to ponds. Small ponds are a common feature in the undeveloped parts of the study area and reflect the low permeability glacial till that dominate the surface geology.
- 1.6.4.17 There are 19 BritPits identified within the study area. BritPits identified within the Transmission Assets Order Limits are limited to one located within an area proposed for use as onshore biodiversity net gain enhancement and/or mitigation and a second within a former foreshore sand working in the west at Lytham St Annes.
- 1.6.4.18 The BritPits are typically recorded as being former clay or shale workings and they normally correlate with surface ground workings of small spatial extent. Two BritPits relate to sites identified as historical landfills (LF_10 and LF_21 (see **Table 1.6**)) in other datasets reviewed.
- 1.6.4.19 There are no historical mines reported by the BGS or in the Groundsure data within the study area.

Radon

1.6.4.20 According to the Indicative Atlas of Radon in England and Wales published by the Health Protection Agency (part of Public Health England now UK Health Security Agency) and the BGS, the Transmission Assets Order Limits are located in an area at lowest band of radon potential where less than 1% of homes are at or above the Action Level.

Unexploded Ordnance

- 1.6.4.21 The Construction Industry Research and Information Association Report C681 (Stone et al., 2009) outlines recommendations for dealing with the potential risk associated with the legacy of Unexploded Ordnance (UXO) risk, largely relating to Word War Two bombing and military sites.
- 1.6.4.22 Reference to the Zetica Unexploded Bomb Risk mapping indicates that the Transmission Assets is in an area of low potential risk from Unexploded Bombs. As the Transmission Assets is not within an area







of known military history, in general accordance with the CIRIA Report, no further consideration of UXO relating to wartime bombing is considered necessary. However, given the historical presence of a mini rifle range within the area if the landfall, the potential cannot be entirely discounted.



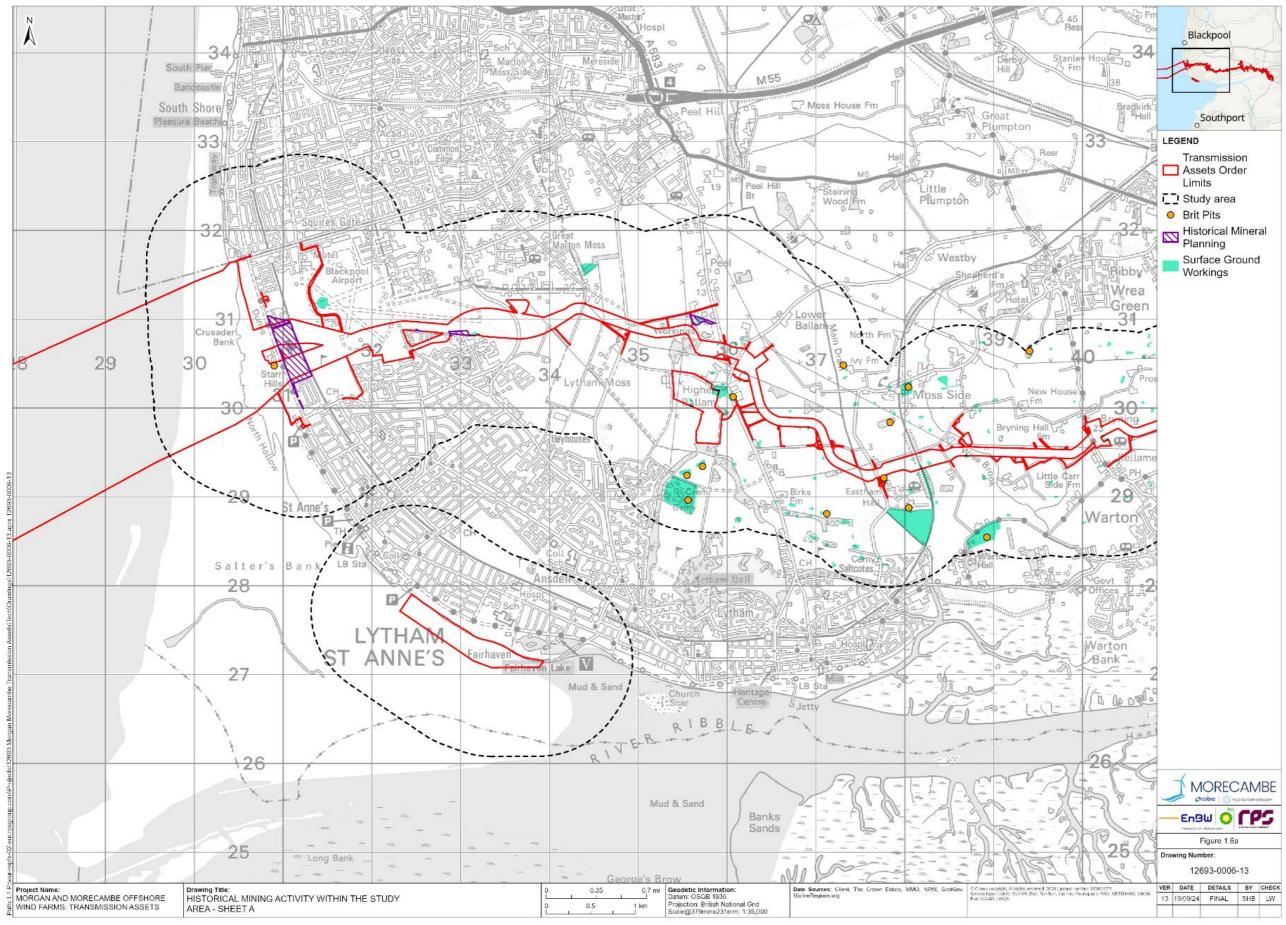


Figure 1.6A: Overview of historical mining activity within the study area – Sheet A







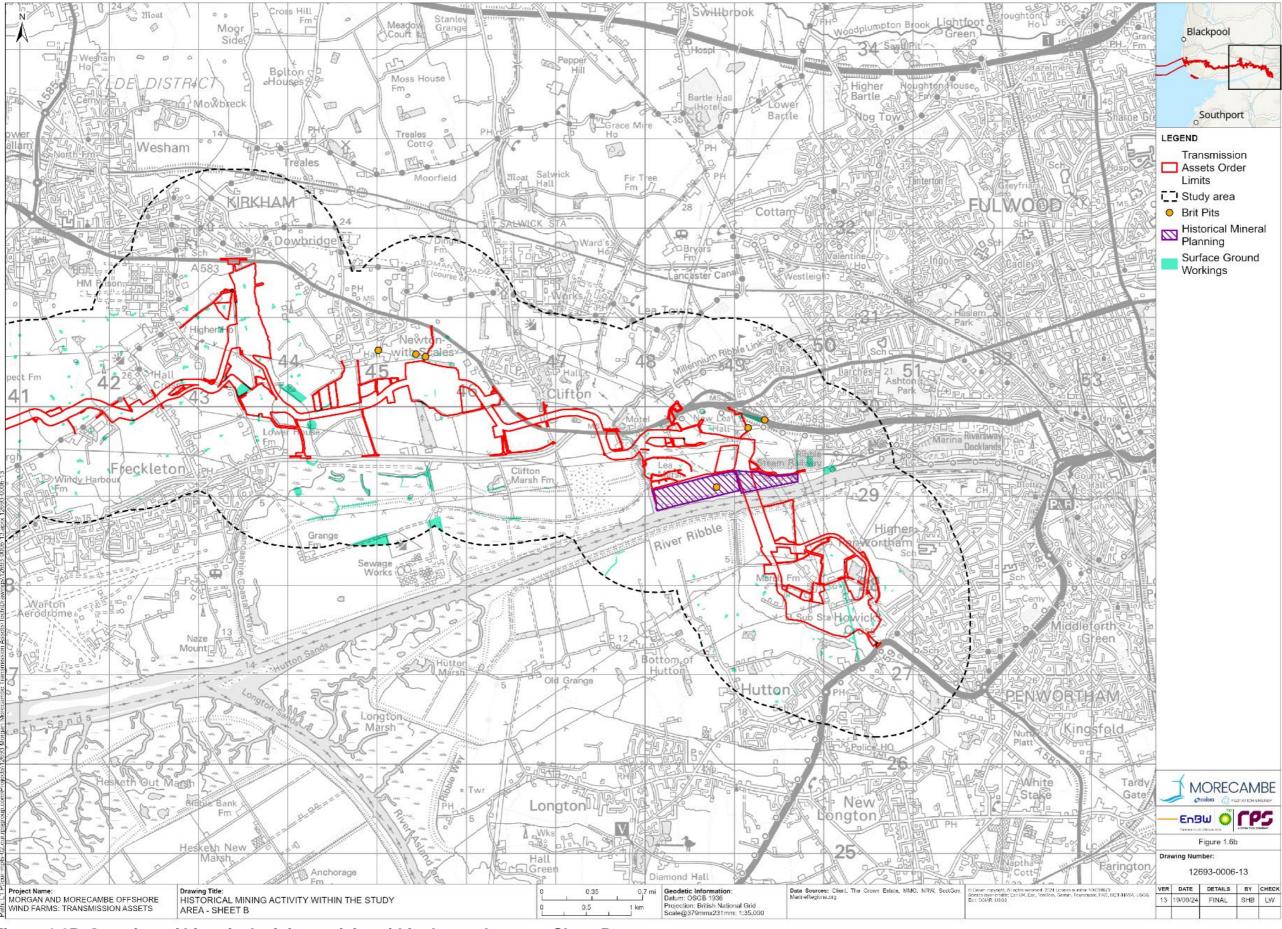


Figure 1.6B: Overview of historical mining activity within the study area – Sheet B









1.7 Outline conceptual site model

1.7.1 Potential pollutant linkages

- 1.7.1.1 An outline CSM consists of an appraisal of the source-pathway-receptor contaminant linkages which is central to the approach used to determine the existence of contaminated land according to the definition set out under Part 2A of the Environmental Protection Act 1990. For a risk to exist (under Part 2A), all three of the following components must be present to facilitate a potential pollutant linkage. The approach involves the development of a conceptual site model to describe sources of contamination, the potential migration and exposure pathways and potential receptors that may exist and subsequently identify the SPR linkage.
 - **Source** referring to the source of contamination (Hazard).
 - **Pathway** for the contaminant to move/migrate to receptor(s).
 - **Receptor** (Target) that could be affected by the contaminant(s).
- 1.7.1.2 Receptors include human health, controlled waters, and buildings/structures.
- 1.7.1.3 As part of the assessment the potential risks to receptors for potential sources is given one of the following classifications.
 - **Low risk** it is considered unlikely that issues within the category will give rise to significant harm to identified receptors.
 - **Moderate risk** it is possible, but not certain that issues within the category will give rise to significant harm to receptors.
 - **High risk** there is a high potential that issues within the category will give rise to significant harm to identified receptors.
- 1.7.1.4 Each stage of the potential pollutant linkage sequence has been assessed individually on the basis of information obtained during the desk study exercise and are discussed in the following section.

1.7.2 Potential contamination sources

1.7.2.1 Potential contamination sources are identified as onsite (within the Transmission Assets Order Limits) or offsite (outside the Transmission Assets Order Limits and within the study area).





Onsite/offsite	Current/historical	Potential contamination sources
Onsite/offsite Onsite	Current Historical	Recent industrial activities (Reference Table 1.12) • Landfall and onshore export cable corridor - Blackpool Airport • Substations - National Grid Penwortham substation. Landfills (Reference Table 1.6) • Landfall and onshore export cable corridor - Refuse tip - Clifton Drive North - Leach Lodge Farm - Snowdon Road - Refuse destructor - Blackpool Airport 400 kV grid connection cable corridor - Lea Marsh Pollution incidents (Reference Table 1.8) • Landfall and onshore export cable corridor - Moto kV grid connection cable corridor - Lea Marsh Pollution incidents (Reference Table 1.8) • Landfall and onshore export cable corridor • 400 kV grid connection cable corridor • 400 kV grid connection cable corridor • Ageotrical land use activities (Reference Table 1.13) • Landfall and onshore export cable corridor - Refuse heap - Refuse heap - Refuse destructor - Brick field • Substations - Burial ground - Dock
		-

Table 1.14: Potential contamination sources







Offsite Current Recent landfills (Reference Table 1.6) • Landfall and onshore export cable corridor - Westby landfill • 400 kV grid connection cable corridor - Grange Farm - Clifton Marsh Radioactive substance authorisation (Reference Table 1.10) • 400 kV grid connection cable corridor Licenced waste sites (Reference Table 1.7) • Landfall and onshore export cable corridor Licenced waste sites (Reference Table 1.7) • Landfall and onshore export cable corridor • 400 kV grid connection cable corridor • Substations Licenced industrial activities (Reference Table 1.11) • 400 kV grid connection cable corridor • Substations - Clifton Marsh - Marsh Farm Broiler Unit Recent industrial activities (Reference Table 1.12) • Landfall and onshore export cable corridor - Reden station - Gas governor • Substations - Sludge pit plantation -	Onsite/offsite	Current/historical	Potential contamination sources
 Westby landfill 400 kV grid connection cable corridor Grange Farm Clifton Marsh Radioactive substance authorisation (Reference Table 1.10) 400 kV grid connection cable corridor Licenced waste sites (Reference Table 1.7) Landfall and onshore export cable corridor 400 kV grid connection cable corridor 400 kV grid connection cable corridor 400 kV grid connection cable corridor Substations Licenced industrial activities (Reference Table 1.11) 400 kV grid connection cable corridor Substations Licenced industrial activities (Reference Table 1.11) 400 kV grid connection cable corridor Clifton Marsh Marsh Farm Broiler Unit Recent industrial activities (Reference Table 1.12) Landfall and onshore export cable corridor Radar station Gas governor Sluty bed/lagoon 400 kV grid connection cable corridor Sluty bed/lagoon 400 kV grid connection cable corridor Sludge pit plantation Water pumping station 	Offsite	Current	Recent landfills (Reference Table 1.6)
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 Sludge pit plantation Water pumping station 			
 Water pumping station 			_
Garages (Reference Table 1.9)			 vvater pumping station
Landfall and onshore export cable corridor			 Landfall and onshore export cable corridor
400 kV grid connection cable corridor			 400 kV grid connection cable corridor







Historical Historical landfills (Reference Table 1.6) • Landfall and onshore export cable corridor - Midgeland Farm - Land off Salcotes Road - Salcotes - Lidium Park Industrial - Moss Side Lane • 400 kV grid connection cable corridor - Grange Farm No. 2 - Refuse tips	Onsite/offsite	Current/historical	Potential contamination sources
Pollution incidents (Reference Table 1.3) • Landfall and onshore export cable corridor • Substations • 400 kV grid connection cable corridor Historical land use activities (Reference Table 1.13) • Landfall and onshore export cable corridor — Fire station — Redus tations — Old clay pits — Gas works — Fever hospital • 400 kV grid connection cable corridor — Petrol storage tanks, depot Fuel stations, depot and garages (Reference Table 1.9) • Landfall and onshore export cable corridor — Old clay pits — Gas works — Fever hospital • 400 kV grid connection cable corridor — Datafall and onshore export cable corridor — Vetrol storage tanks, depot	Onsite/offsite		Historical landfills (Reference Table 1.6) • Landfall and onshore export cable corridor - Midgeland Farm - Land off Salcotes Road - Salcotes - Lidium Park Industrial - Moss Side Lane • 400 kV grid connection cable corridor - Grange Farm No. 2 - Refuse tips Pollution incidents (Reference Table 1.8) • Landfall and onshore export cable corridor • Substations • 400 kV grid connection cable corridor • Substations • 400 kV grid connection cable corridor • Substations • 400 kV grid connection cable corridor • Substations • 400 kV grid connection cable corridor • Fire station - Reduse heap - Old clay pits - Gas works - Fever hospital • 400 kV grid connection cable corridor - Petrol storage tanks, depot • Did clay pits - Gas works - Fever hospital • 400 kV grid connection cable corridor - Petrol storage tanks, depot Eucle stations, depot and garages (Reference Table 1.9) • Landfall and ons

1.7.3 Potential pathways

- 1.7.3.1 The potential pollutant pathways include the following:
 - inhalation, dermal contact and ingestion of soils/soil derived dusts;
 - inhalation, dermal contact and ingestion with contaminants within perched water and shallow groundwater;
 - inhalation of volatile contaminants and/or ground gases arising from soils or groundwater;







- migration of ground gases into buildings through foundations and building infrastructure;
- leaching of mobile contaminants within soils;
- surface water run-off mobilising contaminants within soils;
- vertical and lateral migration of contaminants within groundwater in permeable strata; and
- migration of contaminants via construction techniques including Horizontal Direction Drilling (HDD) and piling.

1.7.4 Potential receptors

- 1.7.4.1 Potential receptors include the following:
 - end users (maintenance workers);
 - adjacent site users (general public);
 - buildings/structures;
 - utility infrastructure;
 - aquifer units;
 - Source Protection Zones;
 - groundwater abstractions;
 - surface waters including the River Ribble; and
 - ecological sites including the Ribble Estuary SSSI and Lytham St. Annes Dunes SSSI and LNR.
- 1.7.4.2 Geological receptors at the location of the landfall namely the Starr Hills Dunes Local Geodiversity Site has been discounted as there will be no open trenching or construction compounds located within the designated sites and the proposed construction technique i.e., use of HDD (or other trenchless techniques), will pass beneath the designated site.
- 1.7.4.3 Construction workers are also discounted as a receptor as risks to this receptor will be appropriately assessed and managed through the application of the Construction, Design and Management Regulations 2015.

1.7.5 Outline conceptual site model

1.7.5.1 An outline CSM has been developed on the basis of the desk study findings. The CSM is used to identify potential sources, pathways, and receptors (i.e., potential pollutant linkages) on site post development and is summarised in the table below. Should the development layout plan vary from that reviewed and included as a part of this PRA or a change of proposed site usage be proposed then the CSM and derived risk ratings should be reviewed accordingly.







- 1.7.5.2 The CSM references the following areas where they are considered beneficial to the assessment:
 - landfall;
 - onshore export cable corridor;
 - 400 kV grid connection cable corridor; and
 - other areas focussing on the onshore substations and existing National Grid Penwortham substation.





Table 1.15: Outline Conceptual Site Model

Potential source	Contaminants of concern	Via		Linkage potentially active?	Receptors	Qualitative risk rating (refer to Section 1.7.1)	Notes
On site – current/historical Industrial activities <i>Landfall and Onshore Export</i> <i>Cable Corridor</i> Includes Blackpool Airport, refuse destructor, railway	Metals, hydrocarbons, PFAS, PCBs, herbicides, pesticides, asbestos		Direct contact/inge stion	~	Future site users	Low	No regular occupation of the Transmission Assets post development. During the operational phase of the project, site operatives have the potential to be exposed to contaminants, if present, during maintenance works.
sidings, refuse heap, historical landfills, agricultural land use 400 kV Grid Connection Cable		Soil	Inhalation of volatiles	~	Future site users	Low	No regular occupation of the Transmission Assets post development.
Corridor Includes historical landfills, pollution incidents, agricultural land use Other Areas			Airborne migration of soil or dust	~	Adjacent site users	Low	Potential sources of contamination have been identified within the Transmission Assets Order Limits. Requirements for dust mitigation during construction are assessed further int the be assessed further and implemented through the Dust Management Plan (Document Reference J1.2).







Potential source	Contaminants of concern	Via		Linkage potentially active?	Receptors	Qualitative risk rating (refer to Section 1.7.1)	Notes
Includes an existing National Grid substation and a burial ground, agricultural land use.			Leaching of mobile contaminant s	✓ 	Superficial deposits aquifers Ecological receptors Utility infrastructure	Moderate to High	Landfall and onshore export cable corridor Construction activities associated with the proposed development include trenching, trenchless technologies including direct pipe, haul roads or compounds have the potential to disturb existing ground/groundwater contamination and/or create preferential pathways which could result in contaminant migration to sensitive water resources.
						Moderate to High	400 kV grid connection cable corridor As above applicable to micro- tunnelling or direct pipe beneath the River Ribble.
						Moderate	Other areas As above applicable to construction of the onshore substations.







Potential source	Contaminants of concern	Via	Potential pathways	Linkage potentially active?	Receptors	Qualitative risk rating (refer to Section 1.7.1)	Notes
 Onsite - current/historical As above. Offsite – current/historical Landfall and onshore export cable corridor Includes Blackpool Airport, historical landfills and waste sites, gas works, pollution incidents, agricultural land use. 400 kV grid connection cable corridor Includes fuel stations, petrol depot, historical landfills and waste sites, sewage works, pollution incidents, agricultural land use. Other Areas Includes sewage works, pollution incidents, agricultural land use. 	Metals, hydrocarbons	Groundwater	Vertical and lateral migration in permeable strata		Superficial deposits aquifers and abstractions Surface water bodies Ecological Receptors Utility infrastructure	High Moderate to High Low	Landfall and onshore export cable corridor Construction activities associated with the proposed development have the potential to disturb existing contamination and/or create preferential pathways which could result in contaminant migration, including that potentially associated with the airport and historical landfills. Possible that the construction could render the abstraction source near Blackpool Airport temporarily unviable. <i>400 kV grid connection cable corridor</i> As above with HDD (or other trenchless techniques) beneath the River Ribble. <i>Other areas</i> Any intrusive groundworks may disturb and/or mobilise potential contamination. Piling may create a new pathway for contamination though high risk areas are generally remote.
			Vertical and lateral migration in	√	Principal aquifer and abstractions	NA	Landfall and onshore export cable corridor No pathways identified.





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Potential source	Contaminants of concern	Via		Linkage potentially active?	Receptors	Qualitative risk rating (refer to Section 1.7.1)	Notes
			permeable strata		SPZ	NA	<i>400 kV grid connection cable corridor</i> No pathways identified.
						Low	Other areas
							Where piling is proposed for the onshore substations, there is potential for new contaminant pathways. However, the clay-rich glacial till (boulder clay) that separates the surface aquifer and bedrock aquifer will afford protection to the bedrock aquifer from shallow surface activities.
On and offsite All areas	Methane/carbon dioxide		Inhalation of ground	\checkmark	Future site users	NA	Landfall and onshore export cable corridor
Made	dioxide		gas/explosiv e risks		Future and		No buildings.
Ground/landfills/peat/Alluvium or TFD containing peat and other organic material.			e fisks		offsite buildings	NA	<i>400 kV grid connection cable corridor</i> No buildings.
						Moderate	Other areas
							Future usage at substations likely to be restricted to routine maintenance checks.

Note: In the event that a Moderate or High Qualitative Risk Rating is identified further assessment is required.





1.8 Conclusions

1.8.1.1 The outline CSM produced upon completion of the desk study assessment has identified a number of potential pollutant linkages that may be active upon the redevelopment of the site. Those that have been identified are considered to represent from low to high risk.

1.9 Recommendations and commitments

- 1.9.1.1 Ground investigations are proposed to obtain further information on the contamination status of the soils and groundwater for moderate or high risk potential pollutant linkages identified within **Table 1.15**.
- 1.9.1.2 Where the results of the ground investigation determine that remediation is required to ensure that the site is suitable for its proposed use, a remediation strategy would be prepared. The strategy would comprise the following:
 - implementation plan setting out the objectives and requirements of the remediation;
 - validation sampling to confirm that remediation objectives have been met; and
 - verification report.
- 1.9.1.3 The scope of the remediation strategy would be agreed with the Environment Agency/relevant local planning authority prior to its implementation. The verification report would also be sent to the Environment Agency/relevant local planning authority for approval. Subject to the scope and results of the Remediation Strategy, the following would be undertaken where appropriate to inform construction activities and the detailed design of buildings:
 - piling risk assessment (in accordance with the Environment Agency guidance (Environment Agency, 2001) including control measures (where appropriate) to mitigate risk to controlled waters during piling installation;
 - detailed ground gas risk assessment and gas control measures during construction and to be incorporated into building design (where appropriate); and
 - groundwater and/or surface water monitoring.
- 1.9.1.4 The Project is committed to ensuring potential linkages are appropriately investigated, assessed and mitigated. Further information in relation to these is provided in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions.

1.10 References

British Geological Survey 1:50,000k Data purchased from Bluesky Mapshop. Accessed July 2023.







Groundsure Insight Report: Morgan, Report Ref. GSIP-2023-13424-13080 (1-16). 10th March 2023.

UK Statutory Instrument No. 51 The Construction (Design and Management) Regulations 2015.

Stone. K, Murray. A, Cooke. S, Foran. J, Gooderham. L (2009). C681 Construction industry guidance about Unexploded Ordnance (UXO) risk – a complete guide to the risk management process [Online]. Available at:







A.1 Appendix A: Assessment Limitations

- 1. A "desk study" means that no site visits have been carried out as any part thereof, unless otherwise specified.
- 2. This report provides available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the Client.
- 3. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.
- 4. The accuracy of maps cannot be guaranteed and it should be recognised that different conditions on site may have existed between and subsequent to the various map surveys.
- 5. No sampling or analysis has been undertaken in relation to this desk study.
- 6. Any borehole data from British Geological Survey sources is included on the basis that: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation".
- 7. Where any data supplied by the Client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.
- 8. This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission.
- 9. The copyright in the written materials shall remain the property of the RPS Company but with a royalty-free perpetual licence to the Client deemed to be granted on payment in full to the RPS Company by the Client of the outstanding amounts.
- 10. The report is provided for sole use by the Client and is confidential to them, their professional advisors, no responsibility whatsoever for the contents of the report will be accepted to any person other than the Client.

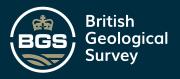


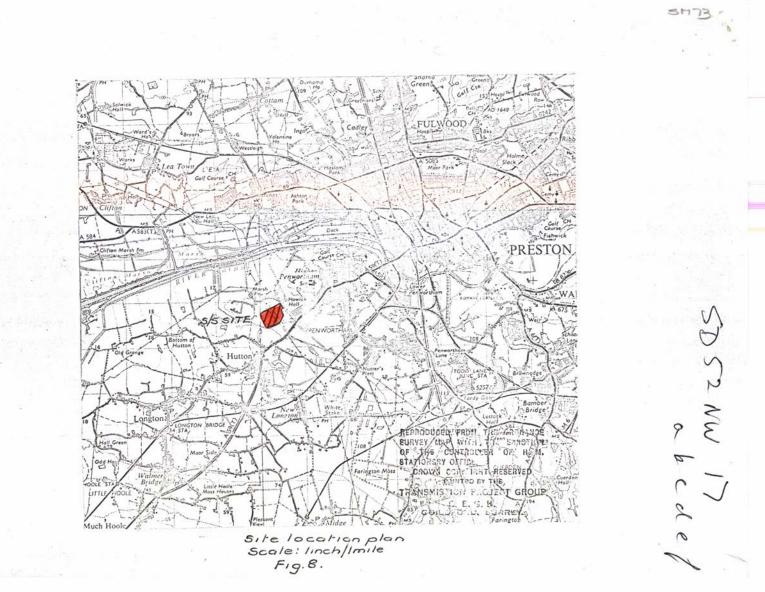


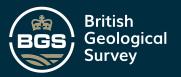


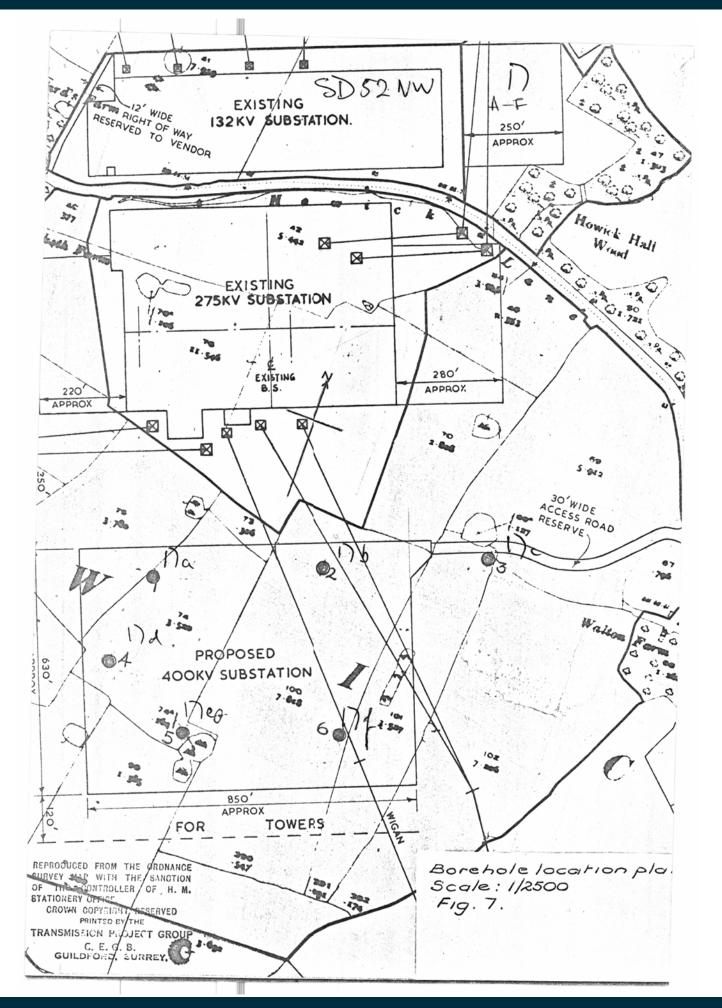
A.2 Appendix B: BGS Borehole Records



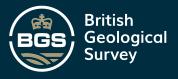








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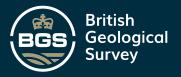
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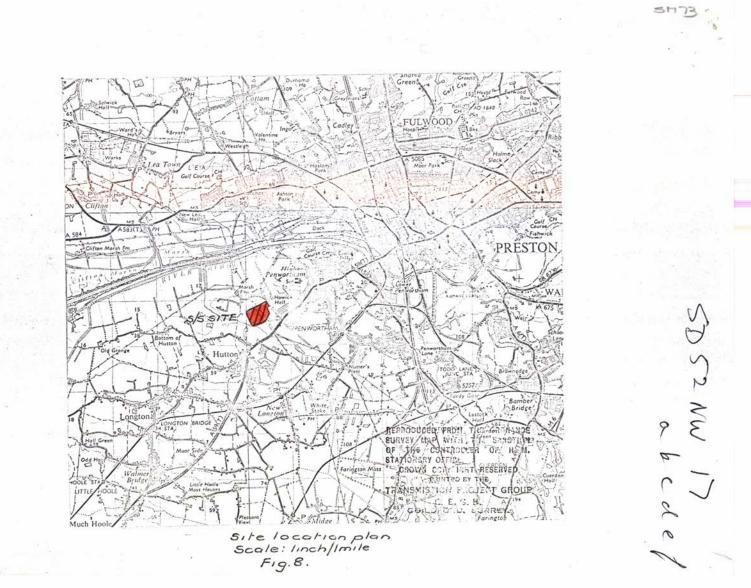
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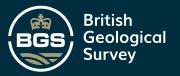
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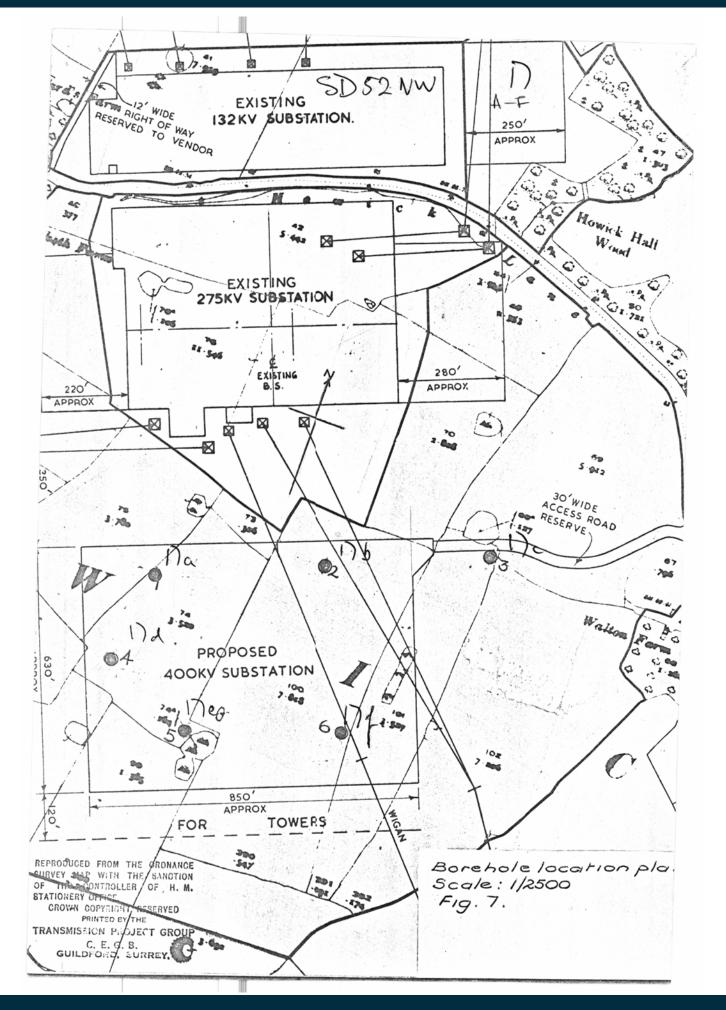
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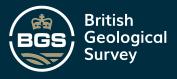
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							to 261 61 271 61	70	
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		<u> </u> N	0 RECOVERY	OF SAMPLE I NR ED SAMPLES DI DISTURBED SAMPLES O WATER S			P. TESTS	<u> </u>	











BOREHOLE LOG

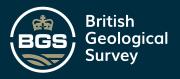
SDS2HW/De

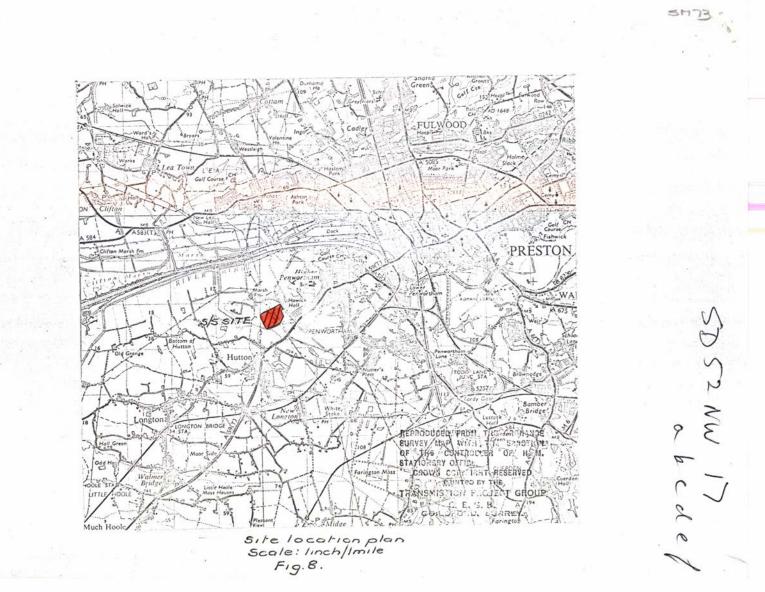
BOREHOLE No. 3 BOREHOLE DIAMETER 6" NGR 5037 2784

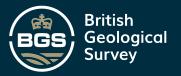
WATER STRUCK AT 28' 0"

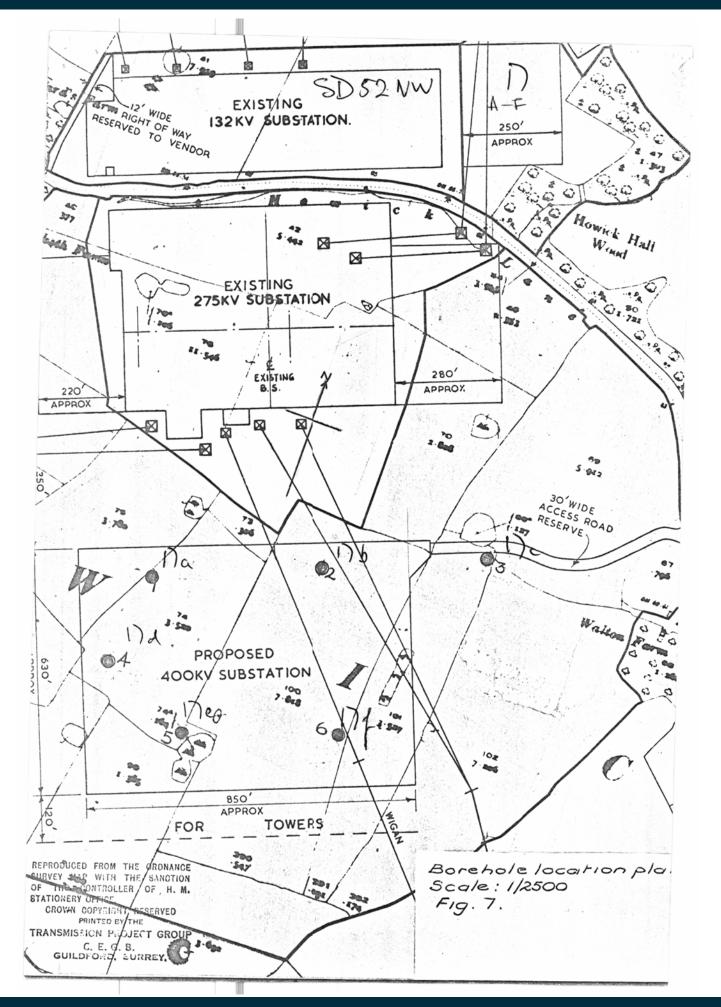
	WATED	DEPTH		S.F.OT.	• O.D.	SA	MPLE DETA	
DATE	WATER LEVEL	DEPTH OF BORING	STRATA DESCRIPTION	DEPTH	LEVEL	LEVEL	NUMBER OF BLOWS	TYPE AND REF.
25.6.65	5		Topsoil and subsoil	1* 6 ^u	69 . 7 68 . 2			
			Reddish brown silty boulder clay	(0.46	m),			
						51 O#		
						+0 61 61	150	ſ
						+0 6'6" 7'0" to 8'0"	64	X
						0.0.		
25.6.65	5 N11 5 Nil	10º 0º	B.05)			101 04 to	111	i
						111 6ª 121 0ª		I
						to 131 6"	52	X
						151 0	450	,
						16 ¹ 6 ¹¹	150	
26.6.65		18' 6"	5,64.)			17" 6" to 18" 6"	68	0 X
27.6.65	5 Nil					201 04		
						to 2116"	90	
						221 6" to	গ	X
						23 1 6¤		
						251 0# to 261 6"	80	
						271 6ª		0
						28 ^{to} 6"	71	X
27.6.65		301 0"	(9.14m).			3010" to	76	
						31 6" 321 6"		
						3216" to 3316"	72	X
						351 0ª	50	
						to 361 61	~	
						371 6" 381 6"	48	x
						то 1010и	42	
			(13.26 m)	(411 6"		
28.6.65	NTI	431 6"	NO. LOWY	(13, 26)	26.2	421 6" to 431 6"	55	x
			OF SAMPLE L	43! 6" Bottom of borehale		" ⁰ "		

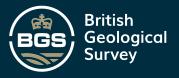






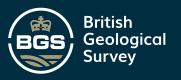






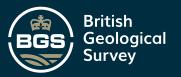
, NGR 5025 2779 BOREHOLE LOG b SDSZNU BOREHOLE No. 2 BOREHOLE DIAMETER 6 WATER STRUCK AT 251 04 * SAMPLE DETAILS DEPTH OF BORING WATER LEVEL O.D. LEVEL NUMBER OF BLOWS DATE STRATA DESCRIPTION DEPTH TYPE AND REF. LEVEL

	29.6.65			Topsoil and subsoi				68,9			
				Reddish brown silty	y boulder clay	(21 01 0.61m	66 . 9			
						(,	51 ()" 50 61 61	140	
3K /S +173									71 6" to 81 6"	71	x
0E/1PG/ABK/SM73									101 01 to 111 61	125	
	29.6.65	NTI	(a	57)					121 6" to 131 6"	37	x
	30.6.65	Nil	151 01	.57m)					151 0" tə 161 6"	113	NR NR
									17º 6º to 18º 6º	48	x
									201 0" to 211 6"	65	
									221 0" to 231 6" 241 0"	134	
									100 2516"	112 60	x
									261 68 to 271 68	00	^
			1			,			30101 to 31161	117	
	30.6.65	Nil	(10. 331 64	21 m)		(10	. 21 11 331 6" Bottom	364 364	321 6" 331 [°] 6"	59	x
							of borehole				
		NO UN	RECOVERY ON NOISTURDE	F SAMPLE NR D SAMPLES	DISTURBED SAMPLES	O WATER SA	AMPLES V	S.	P. TESTS	x	



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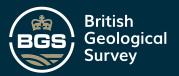
					-	
Name of site CEN	MALLS N	JORTHWEST	έA·	W R B No.		
			75			
FRESHFIEL	lo farm		SD 43/365043/36			
Owner		Licence no.	SD43/SW			
· · · · ·		Appn no. Cancelled		Nat. grid ref. SD 4288	<u> 4 50/5</u>	
Occupie		IGS ref. no.		Status		
Ground level	m QD		ft. OD	Aquifer		
Level of well top	m OD		Code 118.04	,		
Rest water level	m bwt		Summary of geological section	Thickness	Depth	
(Date)	m OD		ft. OĎ			m
Construction: Method	Percuman	Date Jan	'88 [·]	Drift		30.2
Depth Dia.	Linings (below well top)			Red Sarchtone		32.0
bwt Dia.	From T	o Dia.	Туре			
32.00m			1-			
_ Single fu	equinetec mili	thed in re	nelstone			
	Ψ					
Abstraction rates	Type of		<u> </u>			
gph PWL			YESINO			
gpd	Well dri	ler				

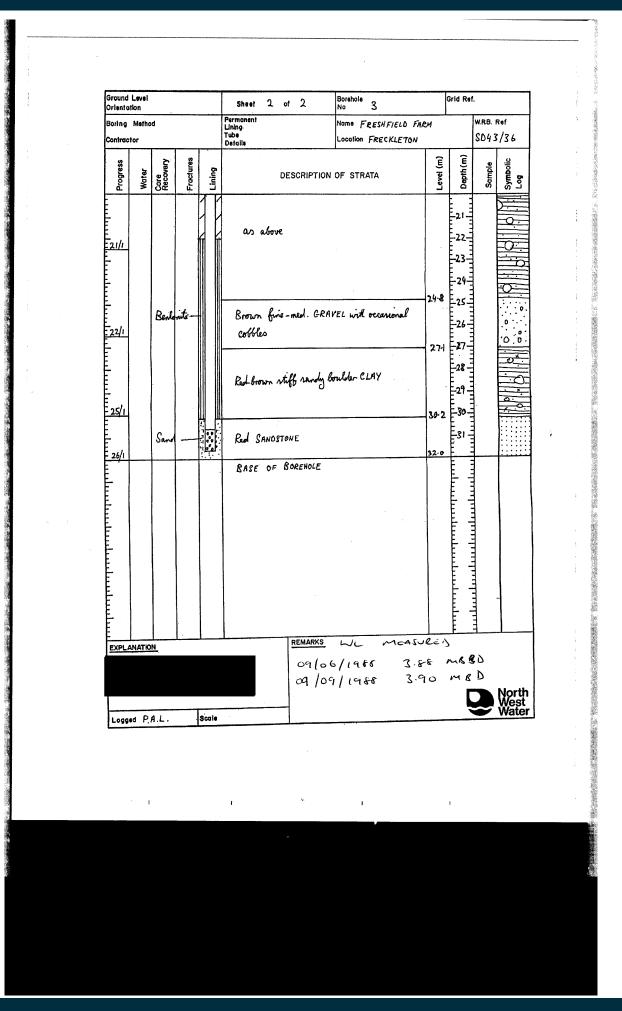


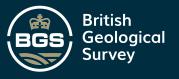
A DESCRIPTION OF A DESC

Boring Method Browning Permanent Paysmetter Name FRESHFIELD FARM WR.B. Ref Contractor Uning wortefled on remunal Location FRECKLETON SD 43/36 Solution Is DESCRIPTION OF STRATA Is Solution Is DESCRIPTION OF STRATA Is All Obs Is Or 2 Is All Obs Is DESCRIPTION OF STRATA Is All Obs Is Or 2 Is All Obs Is DESCRIPTION OF STRATA Is All Obs Is Is Is All Obs Is Is Is	Ground Level	Borehole		3 5 - 6 1 Ref. 6 42884 30757
seeded	Orientation Boring Method Recursion	Permanent Presenter Nome FRESHFIELD	FARM	W.RB. Ref
1022 102 10		DESCRIPTION OF STRATA		Depth (m) Somple Symbolic
REMARKS	18/1 Shail Bron Borehole	Brown frim sendy boulder CLAY Brown SAND and GRAVEL Brown soft SILT Brown firm sandy laminated CLAY Brown firm sandy boulder CLAY Brown firm sandy boulder CLAY Brown firm sandy Soulder CLAY Brown firm sandy SILT Brown firm sandy SILT Brown firm sandy SILT Brown firm sandy SILT		









DATE NAME NAME NARE NARE NARE NARE Status NARE Status Status <tt< th=""><th></th></tt<>	
y at 25 C Temporary as CaCO3 Permanent as CaCO3 pH 4.5 as CaCO3 phrate, reactive as P zive as SiO2 is SO4 as CO3 r h as CO3 y Sample Number re as HCO3 y Sample Number : Nottingham OMF	
DET_SHORT Lead - as Pb poH @ 25C Cadmium - Cd Ammonia(N) Nitrate-N Nitrate-N Nitrate-N Nitrate-N Nitrate-N Nitrate-N Hadness Alky pH 4.5 Chioride Ion Onhophospht SiQ2 RV Fitt SiQ2 RV FITT	
DETUNITS MICROGRAM PER LITRE MICROSIEMENS PER CENTIMETRE MICROSIEMENS PER CENTIMETRE MILLIGRAM PER LITRE MILLIGRAM PER LITRE MICROGRAM PER LITRE	
UNIT_SHORT CUAL RESULT UNIT_SHORT CUAL RESULT PHUNITS 7.254 mg/1 2.000 mg/1 5.000 mg/1 0.150 mg/1 0.151 mg/1 0.151 mg/1 0.151 mg/1 0.151 mg/1 0.151 mg/1 0.151 mg/1 0.151 mg/1 0.151 mg/1 1.0000 ug/1 1400.00 ug/1 10.55 ug/1 10.051 ug/1 10.051 ug/1 10.00 ug/1 10.050 ug/1 10.050 ug/1 10.000 ug/1 10.050 ug/1 10.000 ug/1 10.0000 ug/1 10.000 ug/1 0.000 ug/1 0.000	
4L RESULT 50.00000 14.30.00000 0.20000 327.00000 327.00000 676.00000 676.00000 58.00000 10.50000 1150.00000 1150.00000 1150.00000 1150.00000 110.00000 10.00000 390.00000 390.00000 390.00000 399.00000	

SD 43 SW 12

NOTE ON FIELD SLIP LANCASHIRE 60 NW(W)

British

Survey

Geological

56 = 21

Kirkham and Wesham Room and Power Co LtdBankfield Mill(4179 32387)W.B. bored by J. Thom

Drift to 144: 43.89Red marl and sst alternating bands to 538: 163.95

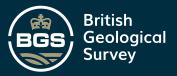
No yield and not now used.

R.C.B.J. 2/40

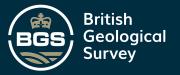
Contact BGS: ngdc@bgs.ac.uk

BGS	British Geological Survey
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		SD 43 Sh	16 43	24 3 24' Survey use	
Carl Martin Carl	GEOLO	GICAL SURVEY OF LOBERT BRITAIN	• .		
	RECORD OF	SHAFT OR BORE FOR MINERALS	o-men wiip	in gibtered	
	Name of Shaft or Bore Kirkham B.H.	given by Geological Survey:			
	Name and Number giv	zen by owner:			1 12 47
			1" N.S.Map No.	1" O.S.Map No.	or not
	Exact site	Attach a tracing from a map, or a sketch- map, if possible.			
					<u> </u>
	Ground Level at bore	Number given by owner: nade North Western Gas Board lage Kirkham County Attach a tracing fr amap, or a sket man prosible. which made Test for underground gas Storage wel at shaft relative to O.D. If not ground level Foraky from SPECIMEN NUMBERS AND ADDITION e samples for G Warrington at (71.48 m) 1111/0 (338.63 m) (92.28 m) 1155/6 (346.10 m) (140.51 m) 1154/5 (351.87 m) (159.56 m) 1176/0 (358.44 m) (122.37 m) 1297/0 (358.62 m) (223.27 m) (223.27 m) (223.27 m) (223.27 m) (224.24 m) (226.24,3 m) (207.09 m) (319.43 m) (220/0 (6.10 m) fine-grained guartz sc ND 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with roeil fragments 60/0 (18.29 m) silty clay with very pebbles 70/0 (21.34 m) fine-grained quartz sc 80/0 (24.38 m) silty clay with sand 50/0 (12.43 m) silty clay with sand 80/0 (24.38 m) silty clay with sand 50/0 (27.43 m) drab clay 100/0 (30.48 m) drab clay 100/0 (30.48 m) drab clay	D.D. of begin	ning or bor	e
	Made by	Foraky	Date of	sinking	1970
	Information from		Date rec	eived	
	Examined by			· · ·	
	17 Spore sample	•••••••••••	OTES		
	· · · · ·	_			
	302/9 (92.28	m) 1135/6 (346.10 m)			
	461/0 (140.5	1 m $1154/5 (351.87 m)$			
	631/0 (192.3	5 m $11/6/0 (358+44 m)3 m) 1199/7 (365+63 \text{ m})$			
	682/0 (207.8	7 m) 1275/0 (388,62 m)			
					-
	1048/0 (319.4	3 m)			
	1070/0 (326.1				
	Name and Number giv For whom made NOX Town or Village Kir Exact site	1	Тніск	NESS	Dвртн
- *		DESCRIPTION OF STRATA	Fт.	IN.	FT. IN.
		Soil	0	9	0 9
			(0	23 m)	(0.23 m)
		Clay		л	ר ר
			(0	.10 m)	(0.33 m)
	PEAT	Dest		e	
					18 6 (5.64 m)
×		Sand and silty clay - samples as follows:			-
	GLACIAL	20/0 (6.10 m) fine-grained quartz sand			
	SANDS AND			THICKNESS Deprind G 9 0 (0.23 m) (0.23 m) (0.23 m) 17 5 18 (5.31 m) (5.6 66 6 85 (20.27 m) (225.	
	SILTS				·····
		iven by Geological Survey: h by owner: h Western Gas Board ham County { Attach a tracing from a map, or a sketch- Test for underground gas \$ron266 Poraky Date of sinking 170. Bore Poraky Date of sinking 1970. Date received A Wilson SPECIMEN NUMBERS AND ADDITIONAL NOTES for G Warrington at n) 1112/6 (358.63 m) n) 1125/6 (346.10 m) n) 1125/6 (346.10 m) n) 1126/0 (358.44 m) n) 11276/0 (358.63 m) n) 11276/0 (358.62 m) n) 11276/0 (368.62 m) n) n) 1275/0 (368.62 m) n) n) DESCRIPTION OF STRATA DESCRIPTION OF STRATA DISCRIPTION OF STRATA SOULL ON STRATA SOULL STRATA SOULL STRATA SOULL STRATA			
			-	·	
	1				
3639		80/0 (24.38 m) silty clay with send grai			
. Ltd. 3639	}		(20,	27 m)	(25.91 m)
N-96	BOULDER CLAY				
04/11		90/0 (27.43 m) drab clay			
, M		100/0 (30.48 m) drab clay			•
01 11		107/0 (32.61 m) reddish-brown compact st	ony		
61 /0		-	-		
i≈ 2		carried forwar	a		85 0
				- B	



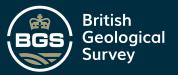
Name and Number Kirkham B.H.	of Shaft or Borehole: National Reference				/ 0
GEOLOGICAL	DESCRIPTION OF STRATA		Тніск	NESS	D
CLASSIFICATION			Fт	IN	Fт
	Brou	ight Forward			8
					(2
	110/0 (33.53 m) pebbles in clay ma				·
	120/0 (36.58 m) pebbles in clay ma	trix	35 (10.	0 67 m)	1
MELCIA MOST GAME	No recovery, marl	· · · · · ·	20	0	עב
KEUPER MARL	······································			09 m)	(4
dip 15°? at	MUDSTONE, reddish-brown, structurel	ess not			
170/0	silty, no gypsum veins		34	6	,ı.
(51.82 m)	MUDSTONE, reddish-brown, with some	greenish	(10.	52)	(5
	grey, structureless		,1	6	<u>1</u> .
	· · · · · · · · · · · · · · · · · · ·		(0.	45 m)	(5.
	MUDSTONE, reddish-brown, structurel		•••••		
	slightly silty, with vague silty b		•••••		
	below 177/11 (54.23 m) (core remov	ed from			
	176/5 - 177/11 - (53.77 - 54.23 m)	7.4		0	1
	MUDSTONE, reddish brown slightly si	· ···	<u>"</u> 2• '	09m)	(55
	brecciated at least in part with s clasts fragments to 2 cm	cattered	-	_	
			5 (1.	5 65 m)	10 (57
	MUDSTONE, with some siltstone, heav	ily		·····.]	•
	brecciated reddish brown with some		•••••		••••••
	clasts to 5 cm long include smashed			•	
	of vein gypsum and siltstone, some				
	latter being buckled		10	9	19
			(3.	28 m)	(60
dip 55 °	MUDSTONE, reddish-brown with some g				
	grey siltstone bands, gypsum veins				
	are somewhat sheared and buckled an	nd in			
0.000000	places heavily fragmented		3	3 99 m)	20 (61
BRECKEUS	MIDSTONE model	·····		,, m,	107
Mussi mes	MUDSTONE, reddish-brown, some gypsum	a veins			
	to 1 cm, core smashed in drilling		2 (0.	6 76 m)	20 (62
	MUDSTONE, reddish-brown well banded	wi+h			
dip 25°	greenish grey siltstone somewhat br				••••••
	in part, low and high angle gypsum				••••••
	5 mm are buckled in places	······································	2	3	
				8 m)	(63
	MUDSTONE, reddish-brown, silty in pa				
	gypsum veins to 1 cm are crumpled i	n places,			
	core broekn downwards				
			(0.92	m \	(64,



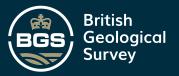
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inger y still A		of Shaft or Borehole:	D4	<u>3</u> <i>S</i> h	1/6	Page
	Kirkham B.H.	National Grid Reference			/	3
	GEOLOGICAL		Тніск	NESS	Dep	TU
	CLASSIFICATION	DESCRIPTION OF STRATA	FT	IN	FT	IN
		Brought Forward			210 (64.0	
		MUDSTONE reddish-brown with reddish-brown and		· · · · · · · · · · · · · · · · · · ·		
		grey fragments, heavily brecciated with			·	
		signs of bedding, smashed in situ, in middle			· · · · · · · · · · · · · · · · · · ·	
	BRECKEUS	portion, low angle gypsum veins to 5 mm,				
	MUDSTONES	some of them smashed	3	0	213	6
	100000000		(0.	91 m)	(64.)	92 n
	din 450	REDDISH brown mudstone, some bedding, seems				
	dip 45 ⁰ (70 ⁰ at top)	brecciated in part		······	076	
		breccrated in part		4. 02 m)	216 (65•	94 1
		MUDSTONE slightly silty, seems brecciated		· · · · · · · · · · · · · [
		in part, no gypsum veins		_	010	
			ر (0,	0 91 m)	219 (66.1	85 r
	· · · · · · · · · · · · · · · · · · ·	MIDSMONE moddiah haven noomla stauthungless			•	
	dip 70° ?	MUDSTONE, reddish brown nearly structureless	······			
		gypsum veins to 4 mm	(1.	О 22 m)	223 (68.0	4 07 1
		No	·	[••••••••••••••••••	
		No recovery	(0.	0 31 m)	224 (68.	4
					(00.	, , , , , , , , , , , , , , , , , , ,
		MUDSTONE, reddish-brown, increasingly well				
	KIRKHAM	banded downwards with 30% greenish grey				
	MUDSTOWER	siltstone bands (dolomatic?) downwards,				ļ
	PHIPSIOND	a few irregular gypsum veins to 1 cm and				
		many 1 mm veins. A few greenish grey				
		reduction spots	6	5	230	2
			(+•	95 m)	(70.)	ם ככ
	Ja Law	MUDSTONE greenish grey with some reddish				<u></u>
	dip 48"	brown banded with greenish-grey siltstone	· · · ·			
		bands up to 6 cm thick, low angled and a				
		few high angled gypsum veins to 1 cm	4	11	235	8
			(1.	50 m)	(71.8	3 m
		MUDSTONE, silty reddish-brown banded with				
		some greenish grey, low angle gypsum veins	3	4 02 m)	239 (72•8	0
			(1.	02 m)	(72.8	5 m
		MUDSTONE, reddish-brown boldly banded with				••••••
		30% greenish-grey siltstone, 5 mm gypsum				•••••
<u>0</u>		veins, rare ripple mark	4	9	243	9
169381/644410 3M 11/70 84M 1,4d. 3639				45 m)	(74-3	0 n
N I I		MUDSTONE, grey, fine-grained		3	244	0
			(0.	3 07 m)	(74•3	-
		SILTSTONE, greenish grey banded with 40%		·····		
2	dif 55°	reddish-brown and greenish-grey mudstone	1	0	0) =	~
1110		BE CONTRACT OF A MARSTONE	(0.		245 (7). 4	0 8)
182		carried forward	``	/~ <u>"</u>	(74•6 245	υ m

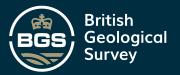
(74•68 m)



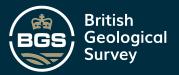
COMMERCI	AL IN CONTRENCE	•	-	. / ,	
	of Shaft or Borehole:	DY	-35	W/b	
Kirkham B.H.	National Grid Reference			1	
GEOLOGICAL	1	Тнісі		Der	- 7
CLASSIFICATION	DESCRIPTION OF STRATA	FT	IN	 Fr	-
	Brought Forward		-	245	
				(74•6	5
dip 50°	MUDSTONE, reddish brown and greenish grey,				•
	boldly colour-banded with 20% (average)	·····			•••
4 - 1	greenish grey siltstone bands, a few gypsum			·····	
	veins to 6 mm	5		250	
		(1.	, оо ш)	(76.2	
	MUDSTONE, reddish-brown with wispy silty				
	banding, gypsum veins to 4 mm	1 (0.	<u>3</u> 38 m)	251 (76.6	
		(**		(70.0	,
	MUDSTONE, reddish-brown with some greenish-				•
	grey, boldly banded with 30% (average -				
dig. 50°	reaching 70% near base) greenish-grey				
	siltstone, mudcracks? cross the banding in	_			
	many places, low angle gypsum veins to 1 cm	(2.	9 36 m)	259 (79.0	;
	MUDSTONE, chiefly reddish brown with scattere				•
	silty beds, dessication cracks? 1 cm wide	CI.		·····	•
	cut silty bands, micro-ripple, salt				
	pseudomorphs in siltstone, 2 mm gypsum veins				
	near top only		-		
-	and a grant	4 (1.	3 29 m)	263 (80•3	
	MUDSTONE, reddish brown, banded with 40%				•
	greenish grey siltstone in bands up to				•
	0.18 m thick, gypsum veins to 5 mm	<u>ь</u>	0	069	,
			9 45 m)	268 (81.7	
	MUDSTONE, greenish-grey banded (rather wispy)				
	with some reddish-brown downwards, convolu-		•		
	tions at 269/0 (81.99 m) a few gypsum veins				
	to 5 mm	5	בנ		1
			81 m)	(83.5	
· · · · · · ·	MUDSTONE, reddish-brown, banded with wispy			•••••••••••••••••••••••••••••••••••••••	The second secon
	siltstone bands coming in downwards (15%),			•••••	
	gypsum nodules to 2 cm at 274/6 (83.07 m).				
dip 50°	gypsum veins up to 1 cm are especially commo	L			
	and ramifying between 274/6-275/6 (83.67-				ĺ
	83.97 m), mudcracks?; convoluted bedding at				Ì
201	286/3 (87.25 m)	12	4	286	ĺ
		(3.7	6 m)	(87.3	Ş
					ĺ
	carried forward				
	<i>,</i>			(87.3	5
					ľ



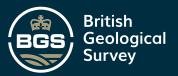
COMMERCIAL IL CONTUNING 6-in Map Registration No. Name and Number of Shaft or Borehole: National Grid Kirkham B.H. Reference GEOLOGICAL THICKNESS Depth DESCRIPTION OF STRATA CLASSIFICATION Fт IN Fτ In 286 6 Brought Forward (87.33 m) MUDSTONE, reddish-brown, structureless, with irregular gypsum veins with knots of gypsum where veins join, perhaps a breccia in part but no fragments seen 290 4 3 (1.30 m) 9 (88.62 m) MUDSTONE, reddish-brown, banded with 10% greenish-grey siltstone, greenish-grey reduction spots, a few irregular gypsum veins to 5 mm, 2 cm gypsum layer at 292/0 (89.00 m associated with gypsum aggregates (nodules?) 9 296 6 (1.75 m) (90.37 m) MUDSTONE, reddish-brown almost structureless with some wispy banding downwards, a few brecciated bands, irregular gypsum veins to 4 mm 3 | 1 (0.94 m) 1 299 (91.31 m) MUDSTONE, reddish-brown with greenish-grey banding, gypsum veins to 4 mm 1 300 8 (0.33 m) (91.64 m) MUDSTONE, greenish-grey, silty in part, well banded with some dark grey fine-textured bands 0 303 8 3 0 (0.92 m) (92.56 m) MUDSTONE reddish-brown, structureless with signs of brecciation near base, a few consistently greenish grey blotches, no gypsum veins steep dips above 308/0 (93.88 m) rare 4 mm veins below 308 (93.88 m) 311 0 4 (2.23 m) (94.79 m) MUDSTONE, reddish-brown with greenish grey siltstone bands, middle beds are richest in siltstone and are buckled and brecciated, gypsum veins rare 0 <u>316 0</u> (96.32 m) 5 0 (1.53 m) MUDSTONE greenish grey, banded, with silty Ltd. 3639 dip 40° layers, a few low angle gypsum veins, a few clots of gypsum where veins meet at 319/9 169581/644410 5M II/70 B&M (97.46 m) 10 320 10 (1.47 m) (97.79 m) carried forward 320 10 (97.79 m)



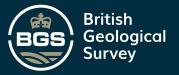
Kirkham B.H.	Nat	Map istration No. S ional Grid erence				6
GEOLOGICAL	DESCRIPTION OF STRA	ТА	Тніск	NESS	Dep	гн
CLASSIFICATION			Fт	IN	FT	In
		Brought Forward	••••••••••••••••••••••••••••••••••••••		320 (97•	10 79 m)
	MUDSTONE, reddish-brown structu	celess,				
	scattered gypsum veins to 1 cm	except at				
	322/6 - 324/0 (98.30 - 98.76 m)	where				
	ramifying veins enclose irregul	lar areas of				
	unveined mudstone		11 (3.	9 58 m)	332 (101	7 37 m
	MUDSTONE, reddish-brown, banded	with 40%				
	greenish-grey siltstone		1	1	333	8
			(0.	33 m)	(101	.70 m
dip 65°	MUDSTONE, greenish-grey with sou brown bands, banded with 30% gr siltstone, some bedding distur	reenish-grey		·····		
	downwards, a few irregular gyp:		11 (3•	0 35 m)	344 (105	8 .05 m
	MUDSTONE, reddish brown streaky	fabric with				••••••
	greenish grey siltstone bands (
dips up to 75	30%, reaching 50% near base) ba	unding				
75°	becoming bolder and finer downw	vards,				
	horizontal shears in middle bed	ls some				
	siltstone bands seem brecciated	1	7 (2.	1 16 m)	351 (107	9 21 m
	MUDSTONE, reddish-brown; greenis	sh grey below				·····
	356/7 (108.69 m) irregularly be	unded with				••••••
- 	15% siltstone, gypsum veins to	5 mm	6 (1.)	0 33 m)	357 (109	9 .04 m
	MUDSTONE reddish brown, with a 1	little				
	greenish grey at top unevenly h	anded with				
	25% greenish-grey siltstone bar	nds, scattered				
dip 35°	short and irregular gypsum veir	ns with a				
	plexus of veins around 361/0 (1	10.03 m)	7 (2•:	0 (4 m)	364 (111	9 18 m
	SAMPLE MISSING		1 (0,4	5 -3 m)	<u>366</u> (111	2 61 m
	MUDSTONE, greenish grey, seems h	eavily				•••••••••
	microbrecoiated with some fragm				•••••••••	
	3 cm		1 (0.1	7. .8 п.)	367 (112	9 .09 m
	carri	.ed forward			367	9



		RCIAL DV COMUDENCE r of Shaft or Borehole: H. H.	SD	<u>} 4</u> ?	351	w/6	Page 7
	GBOLOGICAL	DESCRIPTION OF STRATA		Тніск	NESS	Dei	eth
	CLASSIFICATION	DESCRIPTION OF STRATA		Fт	In	FT	In
		Brought Fo	rward	· · · ·		367 (112.	9 09 m
		MUDSTONE, reddish-brown with some grey					
		around 372/0 (113.39 m), probably brecci	Lated				
		throughout, rich in crystalline gypsum at	11				
		several levels, almost all gypsum from					
		368/6-368/9 (112.32 - 112.40 m)		6			0
				(1.9	91 m)	(114.	,00 m
		MUDSTONE reddish brown, brecciated in par	rt .	••••••			
		with a few irregular greenish-grey silty					••
	34	bands. Crystalline (porphroblast) gypsu		••••••	•••••		
	dip seems c 40	in vaguely banded form with signs of	••••	••••••		••••••••••	
		enterolithic folding	•••••		_	707	
			•••••	7 (2.]	0 3 m)	381 (116.	0 13 m
1.		MUDSTONE, reddish brown, structureless,					
				••••••		·····	
		crudely bands of gypsum crystals (perphr	-0-				
		blasts)		1	4 1 n)	382 (116.	4
				(0+4	~ "	(110+	<u>э</u> 4 щ
		MUDSTONE, reddish-brown seems brecciated					
		c 30% areas of ramifying gypsum, crudely	•				
		banded		3	8	386	0
				(1.1	1 m)	(117.	65 m)
		MUDSTONE, reddish-brown seems brecciated w	with				
	dip 20°	some wispy banding, a few crude beds up	to				
	-	4 cm thick of gypsum aggregates		5	6	391	6
					8 m)	(119.	
	. · · · ·	MUDSTONE, reddish brown streaky fabric with	th a				•
		few irregular bands and areas of greenish					
		grey, 20% siltstone bands at top, signs of			······	••••••	·
		brecciation at top, a few gypsum veins, a	·	·····	······	••••••	•
		few crude beds rich in gypsum aggregates					
		sous rich in gypsum aggregates	••••••	8 (2•6	9 7 m)	400 (122.0	3
		SAMPLE MISSING	•••••			••••••	· [
			•••••••••••••••••••••••••••••••••••••••	1 (0.4	<u>4</u>	401 (122•4	7
				(0.4	<u>, ш</u>	(162.4	<u>(ш</u> о ш)
		MUDSTONE, reddish-brown, rich in ramifying					
	а	masses of gypsum crystals (30% of whole r	ock)	1	5	403	0
3639				(0.4	5 11)	(122.8	3 m)
		MUDSTONE reddish-brown and greenish-grey i					
11/70 B&N Ltd.	dip c 40°	alternation, signs of discordance (slippa	ge)				
B 04/		at one colour junction		2	7	405	7
				(0.75) m)	(123.6	
169581/644410 SM		carried forward		·····	••••		
1044			·····			(123.6	2 m)

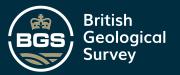


	r of Shaft or Borehole: H	> / 4	<u>. </u>	-w/~	
GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	Тніск	INESS	De	PT
CLASSIFICATION		FT	IN	Fт	
	Brought Forward	I		405 (123.	6
· · ·	MUDSTONE reddish-brown with some greenish				
dip 17 ⁰	grey patches seems brecciated, otherwise				`.
F	structureless, gypsum veins very rare except				
1	for a ramifying plexus around 410/0 (124.97	m) 5	7	411	
,			70 m)		
	MUDSTONE reddish-brown with 40% crystalline				
シ	gypsum in rather irregular masses but with				
	definite signs of bedding	3	h	77	
, ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓		(1.	01 m)	414 (126.)	3
	MUDSTONE, greenish-grey irregularly banded				
	with 13 cm band with 60% irregular crystalli	76			
	gypsum	_	7	170	
		1 (0.	<u> </u>	415 (126.7	7
	MUDSTONE, reddish-brown with some greenish-				
		••			-
	grey, probably brecciated at least in part,				
	scattered levels rich in irregular ramificat	ions			
	of gypsum	12	0	427 (130.3	
			رسر	(1)0.5	
	MUDSTONE, reddish-brown, vague indications of				
LEVEL M What	bedding, irregular bands up to 10 cm thick				
PREESAL SANT	rich in crystalline gypsum, especially abund	mt			
Stowed beens	(80%) from 436/2-436/11 (132.94-133.17 m)	9 (2.7	2 79 m)	436 (133•1	1
	MUDSTONE, reddish-brown, with a few greenish				1
	grey bands heavily microbrecciated, irregular				1
dip 50 ⁰	areas of crystalline gypsum (40%) with vague				1
	indicating banding, some bands soft and				Ť
decreasing gradually to	clayey are possibly residual after halite, a		·		ŀ
gradually to 15° downwards	few small voids could be after halite	13	ı	450	
		(3.99		(137.1	
	MUDSTONE reddish-brown and greenish-grey.				-
	probably brecciated, scattered gypsum				ŀ
	morphroblasts				. .
		1 (0.53	9 ma)	451 (137.69	<u> </u> .
	MIDSTONE moddiah harmaniki			(-)(+0)	1
	MUDSTONE, reddish-brown with some greenish-	-		•••••••	
	grey between 452/9-455/10 (138.00-138.94 m)			••••••	.
1	gypsum rare brecciated, heavily in places,				
dip seems c 20	with semblance of bedding below 457/4				
- 47	(139.40 m)	8	6	460	
		I O Ed	-	110 00	•
		(2.59	ш)	(140,28	P.,

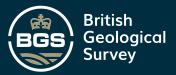


Kirkham B.H.	of Shaft or Borehole: National Grid Reference	D4			9
GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	Тніск	NESS	DEP	н
	· · · · · · · · · · · · · · · · · · ·	Fт	IN	FT	Ir
	Brought Forward	•••••		460 (140.2	3 8 m
	MUDSTONE, greenish-gray, a few low angled				
	gypsum veins to 2 cm	l	5	461	8
		(0.4	4 m)	(140.7	2 п
	MUDSTONE, reddish-brown, structureless, low				
	angle gypsum veins to 1 cm chiefly in			· · · · · · · · · · · · · · · · · · ·	
	upper beds	3	6	465	2
		(1.0	6 m)	(141.78	m)
	MUDSTONE, silty, reddish-brown	2	4. 1 m)	467	6
		(0.7	т ш)	(142.49	m)
	SAMPLE MISSING	(0.2	10	468 (142.75	.4
		(0.2	رسد	(14-2+7)	m)
	MUDSTONE reddish-brown with some greenish-	•••••			
	grey at base, gypsum veins to $1\frac{1}{2}$ cm	(0.5	.10 6 m)	470 (143.31	2
	MUDSTONE, reddish-brown, brecciated,		/	(<u> </u>	
	especially downwards, fragments to 2 cm,		·····		
	irregular gypsum veins to 1 cm	<u>ь</u>			_
		(1.3		474 (144.65	m)
	MUDSTONE, reddish-brown, structureless many				
	gypsum veins to 5 mm, seems disturbed		9	475	<u>)</u> ,
		(0.2		(144.88	m)
	MUDSTONE, greenish-grey and reddish-brown,				
dip c 45 ⁰ except at	banded, somewhat disturbed especially at				
base	base (contact dips at 70°) very many gypsum				. <i>.</i>
	veins to 2 cm	3	2	478	6
		(0.97	(m)	(145.85	m)
	MUDSTONE, greenish-grey banded with siltstone			••••••	••••••
	near top, a few gypsum veins to 1 cm	2 (0.66		480	8
	MIDSTONE meddiah	(0.00	ш)	(146.51	. m
	MUDSTONE reddish-brown structureless, gypsum veins to 1 cm				
			.2. m)	483 1 (147 . 47	.O ,)
	SAMPLES MISSING	••••••			
		2 (0.82	8 m)	486 (148,29	6
	MUDSTONE, reddish-brown, largely structureless			(,
	but sporadically banded, signs of brecciation				
	with irregular masses of gypsum, scattered		·····	••••••	
	gypsum veins throughout	8	, l	1.01	
		(2.46	m)	494 (150.75	
			······································		

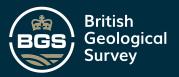
Contact BGS: ngdc@bgs.ac.uk



Name and Number Kirkham B.H.	of Shaft or Borehole: National G Reference	n No. <u>S</u> irid		35	W/6	10
GEOLOGICAL	DESCRIPTION OF STRATA		Тніск	NESS	Dei	ын
CLASSIFICATION			FT	In	FT	IN
	Brough	t Forward			494 (150.	.75
	GYPSUM or anhydrite, pinkish-grey		1			
	irregularly banded			7	495	2
			(0,	18 n		93
	MUDSTONE, reddish-brown, structureler	s with				
	rare greenish-grey bands in above 49					
	(152.35 m), gypsum veins to 1 cm, be					
	abundant and rather irregular (possi					
	brecciation) around 503/0-503/9 (153					
	153.54 m)		9	4		C
	:			84 m		
	MUDSTONE, reddish-brown, banded with	a few				
diup 320	indistinctly defined greenish grey a					
	reddish-brown silty layers, signs of	ł				
	brecciation at 509/0-509/6, (155.14-	11	n)			
	a few low angled gypsum veins to 1 c		1) 6	o	E10	-
	······································			83 m	510) (155.	
	MUDSTONE reddish-brown with some gree	ni ch				
	grey, reddish-brown siltstone bands					
	wards, brecciated in varying degree	P P	_	_		
	and any processes in varying degree		2 (0.		512 (156.	29
	MIDSTONE reddish_brown boldle bould	• • •	<u>, , , , , , , , , , , , , , , , , , , </u>		(1)00	
	MUDSTONE reddish-brown boldly banded					
	50% reddish-brown and greenish grey		le			
Jup 450	bands, a few salt pseudomorphs on be		· · · ·			··
	planes, a few gypsum veins to 1 cm,					
	becoming twisted and fractured (df F	14				
KIRKMAN	Limestone of Durham) below 515/0 (150	5.97 m)	3		516	2
	STIROMONTE	·····	(+• (и п	(157•)	בי בי
MUDSTEMBS	SILTSTONE greenish-grey boldly banded	with				
	30% greenish-grey and reddish-brown				·····	·
	mudstone bands		2	3.	518	.5
	MTTD OR ANT		(0.6	o mj	(158.0	<u>µ</u>
(Mp 450 KIRKHAM MUDSTGMES	MUDSTONE, greenish-grey, with a little				•••••	
	reddish-brown, banded in varying degr		iltstone ling exible .97 m) 3 5 516 2 (1.04 m) (157.33 m rith 2 518 5 (0.58 m) (158.01 m) He, with			
	siltstone bands downwards, small load		3 (1.0	5	521 (159.0	10
•			(1.0	4 m)	(159.0	Бщ
	SILTSTONE greenish grey bodly banded w					
dip 43°	30% greenish-grey mudstone gypsum vei	nsto			••••••••••••	
v	l cm only at top					
			(1.2	7 m)	(160.3	2 m)
	carried forwar	rd			526 (160.32	о п)



E .	of Shaft or Borehole:	n No. S	DL	13	SI	1	Pi
Kirkham B.H.	National C Reference	irid				1	:
GEOLOGICAL			Тніск	NESS		Dei	етн
CLASSIFICATION	DESCRIPTION OF STRATA		Fт	In	-	Fr	
	Brough	t Forward		-		526 (160). 32
	SILTSTONE, greenish grey with reddig	h tinge	······				
	downwards boldly banded with 40% re						1
	brown mudstone ripples?, small faul	ts and	••••••			·····	
	load casts gypsum veins only near h		3	0		529	
				.92			
	SILTSTONE, greenish-grey boldly band	ed					
dip 35°	with individual beds up to 6 in (0.						
urp yy	thick with 40% greenish-grey mudsto						
	reddish brown in part near top, a f						
	angle gypsum veins to 1 cm, load ca					•••••	
	ripples		12	6		541	1
			(3	6 81 1	n)	(165	0
	SILTSTONE, greenish-grey well banded	.with	•••••				
	50% reddish brown and rare dark gre						-
	mudstone partings rare load casts						-
	dessication cracks? rare gypsum vei		*				· ····
	5 mm, a few 1 cm throw faults		2	8		544	
				81 n)	(165	8
	SAMPLE MISSING		 ר	1		545	•
		•••••	(ō,	41)		(166	2
	MUDSTONE reddish-brown structureless	a few					·
	gypsum veins to 5 mm rare fish eyes		 Г	L		5).6	
	by pour veries to y min fare fish eyes	••••	(0	4 •40	m)	546 (166	.6
	SILTSTONE, pale reddish-brown with a	Vovogo					·
	of 40% reddish brown mudstone beds,				 	••••••••••••	·
dig 370	in lower beds a few pinhole voids (·
und or	halite?) a few gypsum veins to 8 mm				 		·
	casts	TORG	 0]		·
			(0	10 •87	m)	549 (167	52
					ļ	••••	
	MUDSTONE, reddish-brown banded with	····· • • • • • • • • • • • • • • • • •					
-	greenish grey and some pale reddish		·····			••••••	
	siltstone bands, mudcracks?, gypsum						
,	rare except near base; with etched	out					
	5 mm halite veins near base		8	4 •54		558 (170	
	7777 77 777	····	\ 4 	• 94	ш) 	(1)0	
Ttru	MUDSTONE, greenish-grey well banded	**** ****************					
N 400	30% greenish-grey siltstone bands at						
å dip 38°	50% downwards, gypsum veins to 1 cm				 		
X,	halite selvage to gypsum, especially						
11 Alip 380	wards, siltstone band at 563/4-563/9)					
9/18	(171.70-171.83 m)		8	9 •67		566 (172 566 (172	



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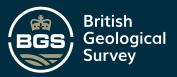
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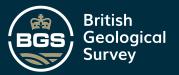
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Name and Numbe Kirkham B.H	er of Shaft or Borehole:	6-in Map Registration No. S National Grid Reference	D 4	35	w/6	Page 12
GEOLOGICAL	DESCRIPTION OF S	TDATA	Тніск	INESS	Dei	тн
CLASSIFICATION	DESCRIPTION OF S		Fт	In	FT	IN
		Brought Forward			566 (172	9 •75 m
	SILTSTONE, greenish-grey, ba bolder near base with 20% g mudstone bands (40% from 56	reenish grey				
	to 10 cm thick, a few load micro-ripplemark below 572/ sheeny mica, a few pinhole	casts, ripplemark 0 (174.35 m) seme		· · · · · · · · · · · · · · · · · · ·		
	halite?) near base, a few l veins becoming very rare do	ow angle gypsum wnwards organic				
	trail at 575/4 (175.36 m), at 575/6 (175.41 m)	plant fragment	9 (2.	2 79 m)	575 (175	11 .54 m)
	MUDSTONE, reddish-brown with	abundant				
	irregularly shaped gypsum no	***************************************	(0.	7 18 m)	576 (175.	6 72 m)
	SILTSTONE, greenish grey, page	ssing down into		.		
	reddish brown, banded with p	***************************************		••••••	•••••	•
	mudstone, gypsum veins chief	ly near top			••••••	
	connect up with the nodules				••••••	
	sheeny mica		3	6	580	0
			(1.	06 m)		78 m)
	MUDSTONE reddish-brown with 2	20% reddish-brown		·····		
	siltstone bands dying out do	wiwards		<u>з</u> 69 m)	582 (177•	3 47 m)
	SILTSTONE pale reddish brown	and reddish-brown	1			
	mudstone, wavy banding, podd	ing and contortic) n .			
	of silt gypsum veins to $1\frac{1}{2}$ c	m		11 28 m)	583 (177.	2 75 m)
	SILTSTONE, greenish grey well					
	20% greenish grey mudstone b					
	pinhele voids, rare gypsum v		2 (0.8	10 6 m)	586 (178.6	0 51 m)
	SILTSTONE, pale reddish-brown	, belding banded				
	with 40% reddish-brown mudst	one numerous				
dip 35°	good ripplemarks. A few gyps	sum veins to				
	l cm and halite veins to 2 mm		2 (0.7	4 1 n)	588 (179.3	4 2 m)
	MUDSTONE, reddish-brown, vague	ly banded with				
	wiltstone, a few gypsum veins	sto 5 man	2 (0.8	8 2 m.)	591 (180.1	0 4 m)
	Carri	ed forward			591 (180.1	

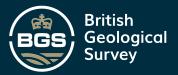
169581/644410 5M 11/70 B&N Ltd. 3639



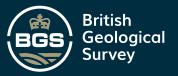
· - :	of Shaft or Borehole: Mational Grid Reference	D43	3 SI	46	Page 13
GEOLOGICAL	DESCRIPTION OF STRATA	Тніск	NESS	Der	тн
CLASSIFICATION	DESCRIPTION OF STRATA	Fr	IN	Fr	In
	Brought Forward			59 1 (180	0 •14 m
	MUDSTONE, reddish-brown, structureless, a				
	few low angle gypsum veins to 1 cm, very				-
	rare 1 mm low angle halite veins (voids),				
	gypsum nodules to 2 cm from 594/9-595/0				
	(181.28-181.36 m)	.4	О 22 m)	595 (181	0
		(1.	22 m)	(181.	.36 m
	SILTSTONE pale reddish-brown, wavily banded				
	with 40% reddish-brown mudstone, a few	*****			
	halite and halite/gypsum veins to 1 cm,				
	small pinhole voids. Nodules? of gypsum				
	associated with plexus of veins and bedding				
	disturbance at 601/4-601/8 (183.29-183.39 m)	8 (2.	0 43 ⊒)	603 (183.	0 79 m
	SILTSTONE, reddish-brown, podded and				1
	irregularly banded with 50% reddish-brown				
	mudstone, many gypsum veins to 1 em	1 (0	2 • 36 m)	604 (184.	2 15 m
	SILTSTONE, greenish-grey, well banded with				
	50% greenish-grey mudstone, showing some				
	pedded fabric. Numerous low angled gypsum			••••••	
	veins to 1 cm, with halite cross connectors	•••••			
	up to 5 mm thick	3	10	608	0
		(1	17 m)	(185.	0 32 m
	MUDSTONE greenish-grey, boldly banded with				
dip 38 [°]	40% greenish-grey siltstone bands, a few	••••••			•
urp jo	load casts and mudcracks? A few gypsum		····· · · · · ·		•••••
	and gypsum/halite veins (halite etched out)	6	6	614	6
			98 m)	(187.	30 m)
	SILTSTONE, reddish brown and greenish-grey			••••••	
	boldly banded with 50% alternating runs of			•••••••	
dip 34 ⁰	reddish-brown and greenish grey mudstone, a				
	few halite veins (voids) to 5 mm, low angled			•••••••••••••••••••••••••••••••••••••••	
	gypsum veins to 1 cm, nodular gypsum at four		····· ···		
	levels between 614/8-617/8 (187.35-188.26 m)	6	2	620	8
	SILTSTONE, greenish-grey boldly banded with	(1.	88 m)	(189.1	18 m)
1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -					
	50% reddish-brown mudstone, muderacks?,			••••••	
	discontinuous gypsum layer 1 cm thick at			••••••	
	621/9 (189.51 m)		··4···	623	0
		(0.	71 m)	(189.8	9 m)
	carried forward			623 (189.8	····A·····



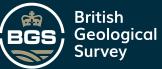
		of Shaft or Borehole:	6-in Map Registration No. S National Grid Reference	DL	13	sv/l	Pag
7 2	GBOLOGICAL	DESCRIPTION OF	STD AT A	Тнісн	INESS	Del	PTH
	CLASSIFICATION	DESCRIPTION OF	SIRAIA	FT	IN	FT	IN
ſ			Brought Forward	(0.71	m¥.	(189.89	m) ⁰
		Mudstone, reddish-brown well	s				
		40% - 50% pale reddish-bro					
		bands.mud.cracks?slight.c					· .
		fewetched outhaliteveir		1			
		a few gypsum veins to 1 cm	/				
		1. cm tonstein-like band at		8	0	631	0
				(2.44	m)	(192.33	
		Mudstone, reddish-brown and	greenish grey.				
		well bedded with 30 - 50%					
		(highest proportion downwa					
х. ¹		angle gypsum veins to 1.5		4	0	635	0
				.(1.22		(193.55	
		Mudstone, reddish-brown, ban	led with reddish				
		brown siltstone, gypsum no		,			
		irregular shape.		1	0	636	0
				(0.30		(193.85	
		Mudstone, reddish-brown with	wisny siltstope			1	
		bands near top, gypsum nod				•••••	
		near bottom		3	2	639	2
				(0.97	m)	(194.82	
		Mudstone, reddish-brown with	moddich hmorem	<u>,,,,,,,,,,</u> ,,,,,,,,,,,,,,,,,,,,,,,,,,	. ### ./	.1,1.24.8.96	
	Ale askin	siltstone bands increasing.				•••••	
	KIRKHAM	downwards. Ripple mark. Gy		•••••		••••••	
	MUDITOND.	veins to 2 cm (halite member				•••••••	•
		Gypsum nodules to 1 cm at 6		2	8	641	10
			##.1 <i>7</i>				10
	dip 40°	Mudstone, reddish-brown, stru	ctureless a few	.0.81	μα.)	.(.1.95.63.	.m.)
	and the	low angle gypsum veins to 4		1	4.	643	2
					 m)	(196.04	••••••
		Mudstone, reddish-brown, becc	mina haldly	(U + 44 1	†	1,190.04	
	а	banded downwards with silts					
		50% downwards ripple mark,					·
						•••••	·
		a few gypsum/halite veins t		-		<u> </u>	
		nodules to 1 cm at 646/0 (1	<u>7070 m)</u>	5	0	648	2
			• • • •	(1.52	m)	(197.56	<u>m)</u>
3639		Mudstone, reddish-brown with				1-0	
. 19		bands, gypsum and gypsum/ha	LITE VEINS to 1 cn		10	650	0
BRA			· · · · · · · · · · · · · · · · · · ·	(0.56	m)	(198.12	m)
04/11		Siltstone greenish grey with					
169581/6444 10 S M	-	brown banded with 30% green		2		•••••	
1119		bands.attaining50% below65				····· •••	
Ξ		Carrie	d forward				.0



	Name and Number	r of Shaft or Borehole:	in Map egistration No. S	<u>)43</u>	Sh	1/6	Pa
		Kirlcham BH	ational Grid eference			7	
			ererence				
t 2	GEOLOGICAL	DESCRIPTION OF STR	A T A	Тніск	NESS	Dept	ГН
	CLASSIFICATION	DESCRIPTION OF STR		Fт	IN	FT	
			Brought Forward			650	
						(198.12	m
		banding bolder downwards, rat	her wispy				
		near top many low angled gyps	um veins to				
		2 cm with rare halite a few s	mall salt				
		pseudomorphs		6	10	656	1
				(2.08	m)	(200.20	m
		Siltstone, greenish-grey boldly	banded with				
х		40% greenish-grey mudstone, m	udcracks, a				
		few low angle gypsum veins		2	2	659	
				(0.66)	h)	(200.86	m
		Siltstone, greenish-grey and read	ddish-brown				
		with 20% mudstone bands, seem	s collapsed,				
× .		with small faults, numerous lo	ow angled				
		gypsum veins to 1 cm		1			-
		-		0.47.1	¢)		.m.)
		Siltstone, greenish-grey well ba	unded with 20%				
		greenish-grey mudstone bands.	Individual				
		siltstone bands to 5 cm. Low	angle gypsum/				
		halite veins. Bedding disturt	oed_and				
		faulted, probably by collapse.	ŧ		11		
				(1.19	m)		.m.)
		Siltstone, well banded with 50%	reddish -				
		brown mudstone bands, attainir	ug 60% below			•	
	dip 40°	666/6 (203.15 m), ripple marks	, a few				
		gypsum/halite veins.					.1.0
		-		(1.02	m)	(203.56	<u>m)</u>
		Mudstone reddish-brown vaguely b	anded with				
		40% wispy siltstone bands			11		9
		Siltstone pale reddish brown wel	l banded with				
	a san a s	reddish-brown mudstone bands,					·····
		678/0 (206.65 m), 50% below 67	1				
		2 cm gypsum nodules at 676/5.					
		<u>(206.17, 206.25, 206.91 m), nu</u>	•	••••••		•••••	
	- -	cracks?, slight convolutions,					
		angle gypsum veins downwards,					
d. 3639		cracks have gypsiferous infill		9	1	680	10
. Ite				(2.77		.(207.52	
# 2		Mudstone, greenish grey boldly b	anded with	.z _e .tim. # .[[,	کالی ۵ <i>ایند مک</i> ور	urf.
. 11 X		40% greenish grey siltstone ba	1				•••••
.by Nes 0/11 M2 014440/18260		a.2. cm layer of gypsum.	-	1	Ę	682	z
1044		Carried					



	RH Natio	Map stration No. <u>S</u> onal Grid rence	D43	<u>5 S</u>	<u>~/b</u>
		rence	ii		1
GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRAT	A	Тніск	NESS]
			<u> </u>	IN	<u> </u>
	I I I I I I I I I I I I I I I I I I I	Brought Forward			68;
		······			(207
	Siltstone, greenish-grey, wispy b				
0	greenish-grey mudstone bands do				
dip 47°	gypsum/halite veins to 2 cm. So				
	convoluted bedding near top of	siltstone.	2	8	
			.(0.81.	m)	(208
	Siltstone, greenish-grey with 50%	-			
	grey mudstone (less near top, m				
	bottom) well banded with crinkly	-	4	7	(0)
	part, a few low angle gypsum ve	LINS.			689
	Siltstone, reddish-brown with 20%	ໜາ່ຊາງນ	.(.1 . 3.0.	m.)	
	reddish-brown mudstone bands, so				••••••
	gypsum nodules above 691/0 (210.				
	no yein gypsum			3	692
			(0.99	1 -	-
	Siltstone pale reddish-brown, wel:	l banded			
	with 20% reddish-brown mudstone		2	7	695
			(0.79	m)	(211,
	Siltstone greenish-grey, well band	led with 40%		ļ	
	greenish-grey_mudstone_with_a	(m. reddish-			
	brown bands slight convolutions	, superb			•••••
	ripplemark, cross lamination and				••••••
	structures at 697/6 (212.60 m) 1	-			
	at 701/10 (213.92 m). Individual				
	bands to 8 cm low angle gypsum y	1			
	with some halite.				
			(2.13	m <u>)</u>	.(.2.13.,
	Siltstone reddish-brown, banded wi				
2 N.W. 1	reddish-brown mudstone layers a bands near base. Superb ripples				
	708/0 (215.80 m), rare below 708				••••••
	(215.80 m), mud-cracks? associat				
	d oning Gypsum nodules to 2 c	-			
н. А.	706/9 (214.63, 215.42 m). Layers				••••
	to 1 cm at 707/0,-707/2 (215.49	8	••••••		
	A few low angle halite veins to	1			709
	Siltstone, greenish-grey with 40%.				
	mudstone bands including some re		-		
	mudstone_below_718/9_(219.08 m),	a.few			
	Carried forwa	1			709



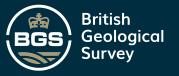
COMMERCIAL IN CONFIDENCE 6-in Map SDL3 Sh Registration No. Name and Number of Shaft or Borehole: National Grid Kirkham BH Reference THICKNESS DEPTH GEOLOGICAL DESCRIPTION OF STRATA CLASSIFICATION Fт In Fт IN Brought Forward 709 .7.... convolutions, thin gypsum bands at 713/4, dip 40° 713/6, (217.42, 217.47 m), gypsum nodules at 711/6, 714/3 (216.87, 217.70 m), some brecciation between 718/9 - 722/8 (219.08-220.27 m) a few gypsum veins to 12 cm.1.3....9... .7.23 (4.19 m) (220.47 m) Mudstone, reddish-brown, faulted at top (possibly tectonic).1.... . 1 7.24 5 (0.33 m) (220.80 m) Mudstone, reddish-brown, structureless with 40% wispy siltstone beds above 725/4 (221.08 m) a few gypsum veins to 5 mm 3 728 .2... (1.15m) (221.95 h) Mudstone, reddish-brown with 20% siltstone bands, faulted base may be collapse, a few 3.... gypsum veins. 2 1 730 (0.63m) (222.58 m) Siltstone greenish-grey with 35% greenish-grey mudstone bands, banding rather indistinct. becoming bold downwards, increasingly collapsed and brecciated downwards, but 3 10 734 1 banding still visible. (1. 7 m) (223.75 m) Siltstone greenish-grey with 50% greenish-gre mudstone bands, with a little reddish-brown mudstone disturbed as if by penecontempordip 30° aneous faulting at two levels, brecciation associated in one instance with 4 cm gypsum 8 9 vein, rare low angle halite veins to 5 mm. 3 737 (1019m) (224.87 m) Siltstone, greenish-grey, banded with 20% greenish-grey mudstone passing down into reddish-brown mudstone, more or less brecciated, especially near base, low angle gypsum veins to 5 mm. 738 10 1 1 [0.33m) (225.20 m) 3639 Mudstone, reddish-brown, brecciated, angular Ľù. BBN fragments to 3 cm. 0 .739 10 (_225.50 m) . (0.030.m).

> Siltstone greenish-grey, with 40% greenishgrey mudstone bands above 742/4 (226.26 m)

> > Carried forward

169581/644410 5M 11/70 88N Ltu

7.3.9.....



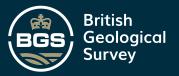
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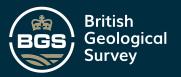
Name and Number of Shaft or Borehole: . Kirkham BH

6-in Map Registration No. SD 43 SW/6	Page
National Grid Reference	

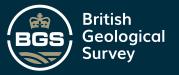
GEOLOGICAL	DESCRIPTION OF STRATA	Тніск	NESS	Dep	гн
CLASSIFICATION		Fr	IN	FT	In
	Brought Forward			739	10
				(225.50	m)
	and below 744/2 (226.82 m), brecciation-in-				
	situ (with plastic distortion of fragments)				
	above 742/4 (226.26 m). This breccia				
	intrudes downwards into the bed below.				
	Rare gypsum veins to 1 cm.	5	0	744	10
				(227.03	
	Mudstone, greenish-grey and reddish-brown,				
Vague dip 70°	brecciated.	1	2	746	0
urp /0		(0.35		(227.38	
	Mudstone, reddish-brown and greenish-grey				
	banded.	2	0	748	0
	Vallusu		1	(227.99	
		(0,61	.[#X.)	1221.99	<u>, m</u>
	Mudstone, reddish-brown with some greenish-	·····			
	grey, brecciated, with signs of disturbed	•••••	.		
	bedding in parts, breccia fragments 1 mm -				
	4 cm, a few gypsum veins to 1 cm.	1	10		10
		(0.56	m)	(228.55	<u>m)</u>
	Mudstone, reddish-brown, almost structureless	, 			••••••
	with a little wispy silt, bedding vague and				•••••
	possibly disturbed, a few gypsum veins				
	to 1	2			2
		(0.71	m)		.m)
	Sample missing	. 1			-
		(0.48	m)	(229.74	-
	Mudstone, reddish-brown with greenish-grey			•	
	silty blotches, brecciated, fragments to 4er	5	3	759	0
		(1.60	m)	(231.34	••••••
	Mudstone, reddish-brown, a few greenish-grey			····	
	blotches, structureless, A few gypsum			•••••	••••••
	veins to 2 cm.	2	8		8
				.(232.16	
		<u></u>	ш <i>ј</i>		m.)
	Siltstone, pale reddish-brown with 40%			•••••	
		••••••			••••••
· .	fabric with breccia fragments to 2 cm,	•••••••			
	vague signs of bedding, becoming better				
	defined below 768/02, (234.40 m) 4 cm low				
	angle vein of fibrous gypsum at 767/11 -			·····	
	468/0 ¹ /(234.06 - 234.10 m).		10		6
		(2,38	m)	(234.54	m)
	Carried forward				
				(234.54	m)



Name and Number	of Shaft or Borehole:	fap tration No. S nal Grid	D 43	<u>5</u> 5	w/6
K	Irkham BH Refer				
			Тніск	TEE	Dav
GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	A		1	DEP
			<u> </u>	<u>In</u>	FT
	B	rought Forward		•••••	769
					(234.51
	Mudstone, reddish-brown, structure		·····		
	few greenish-grey blotches, a fe				
	veins to 5 mm.		2	0	
		~		.m.)	(235.1
	Siltstone.pale greenish-grey and p		•••••		
	reddish-brown with 50% reddish-t				
	mudstone; brecciated and disturb				
· ·	signs of bedding, irregular gyp:				
	becoming more common downwards.		5 (1.58		
	Siltatopo monial and barded			.## <i>.J</i>	(236.7
	Siltstone, greenish-grey, banded			8	
	greenish-grey mudstone.		10 00		777 (236.9
	Mudatana maddiah-hmanna atmuatuma]	000 0	-	ш.ј	
	Mudstone, reddish-brown structurel	-		5	781
	Lew gypsum verits to i cm.				(238.2
	Mudstone, silty, reddish-brown, wi				
	some breccia fragments visible,				
	irregular gypsum veins to 2 cm.		4	3	786
			(1.29		(239.5
	Mudstone, reddish-brown, structure			.*** 4	
	a few greenish-grey patches and				
	brecciation below 790/5 (240.92	-			
	gypsum veins to 3 cm.		8	8	794
			(2.64		(242.21
	Siltstone, greenish-grey, banded w	ith reddish			
dip 35 ⁰	brown mudstone, some brecciated				
	few irregular gypsum veins to 5.	cm.	1	6	796
,	· · · · · ·		(0.46	<u>m)</u>	(242.67
	Mudstone, reddish-brown, structure	less, a			
	few irregular gypsum veins to 1	cm, a few			
	silty bands below 804/10 (245.31		10	4	806
			(3.15	.m)	(245.8
	Mudstone. reddish-brown well bande	d with 30%			
	greenish-grey and reddish-brown.				••••••
	bands.		1		
			.(.0.43.	m)	
	Mudstone, reddish-brown with a few	wispy			
1	greenish-grey and reddish-brown.	siltstone			······ ····
	Carried fo	rward			



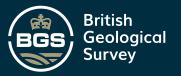
COMMERCIAL IN CONFIDENCE 6-in Map Page Registration No. SD 43 SW Name and Number of Shaft or Borehole: National Grid Kirkham BH Reference DEPTH THICKNESS GEOLOGICAL DESCRIPTION OF STRATA CLASSIFICATION Fτ Fr ĪΝ ĪN 807 Brought Forward 11 (246.25 m) 809 1 1 2 bands, a few gypsum veins to 5 mm. (0.36 m) (246.61 m) Mudstone, reddish-brown wispy texture, a few 3 0 812 1 irregular gypsum veins to 2 cm. (0.91 m) (247.52 m) Siltstone, reddish-brown well banded with 50% reddish-brown mudstone, slight brecciation 2 5 814 6 or mud crack, irregular gypsum veins to 5mm. (0.74 m) (248.26 m)ludstone, reddish-brown silty, banded with disturbed bedding and brecciation of siltstone bands into 4 cm fragments 10 817 irregular gypsum veins to 5 mm. 2 4 (0.86 m) (249.12 m) Mudstone, reddish-brown banded with 30% dip 20° greenish-grey siltstone, a few gypsum veins 1 ...6... 10 ...to 5 mm (0.46 m) (249.58 m) Mudstone, reddish-brown, nearly structureless, 822 10 traces of hedding, a few gypsum veins to 1 cm 4 <u>0</u> (1.22 m) (250.80 m) Mudstone, reddish-brown with greenish-grey and reddish-brown siltstone bands with some brecciated patches below 824/0 (251.16 m) 2 a few gypsum veins to 3 cm. 3 826 4 (1.02 m) (251.82 m) Mudstone, reddish-brown, with a few greenishgrey blotches, structureless, a few gypsum 10 .832... 0 5.... veins to 1 cm. (1.77.m) (253.59 m) dip 40° Mudstone, reddish-brown, banded with reddishbrown and greenish-grey silty bands, bedding broken near middle a few gypsum veins to 4m 8 835 8 3 (1.12 m) (254.71 m) Mudstone, reddish-brown, vaguely banded, high 3639 dip 70° dins_probably_due_to_collapse. 2 10 .838... 6 Ľtď. BBN (0.86 m) (255.57 m)..... 169581/644410 5M 11/70 Siltstone, reddish-brown with 50% reddishdip c 40° brown mudstone bands, a few low angle 2 3 8 842 gypsum veins. Carried forward (1.12 m) (256.69 m)



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	of Shaft or Borehole: rkham BH Registration No. S National Grid Reference	<u>v 4.</u>		1-	
GEOLOGICAL		Тніск	NESS	Dep	ты
CLASSIFICATION	DESCRIPTION OF STRATA	FT	In	Fr	In
	Brought Forward			842 (256.69	2 m)
	Mudstone, reddish-brown with greenish-grey siltstone bands, chiefly near top, rare	· · · · · · · · · · · · · · · · · · ·			
	below 845/0 (257.56 m) a few gypsum veins			· · ·	
	to 1 cm.	5	8	847	10
		(1.73	m)	(258.42	<u>m)</u>
	Siltstone, reddish-brown banded with 20%				
· ,	reddish-brown mudstone, incipient				
	brecciation-in-situ, bedding twisted,	1		010	
	gypsum veins to 5 mm.		1	848 (258.75	11
	18 Julius	.(0.33.		1.429.*1.2.	
	Mudstone, reddish-brown rather silty	1	2	850	1
				(259.11	
	Mudstone, silty, reddish-brown, banded with				
	signs of collapse, a few gypsum veins to 4m	n L.	3	854	4
				(260.40	m)
	Siltstone, reddish-brown, with some greenish-				
	grey upwards banded with reddish-brown				
dip 35 ⁰	mudstone 50%, falling to 20% downwards,				
	probable ripple mark, a few low angle				
	gypsum veins.	3	10	858	2
		(1.17	m)	(261.57	_m)
	Mudstone, reddish-brown, faintly banded, a				•
	few gypsum veins to 2 cm.	1	1		
		. (.0 . 81	m.)	.(.262.38	.m)
dip 25°	Siltstone, greenish-grey, banded with 20%			••••••	·[
ve	greenish-grey mudstone, low angle gypsum			0/7	·
	veins to 1 cm.	2	1		1
	Siltstone, reddish-brown and mudstone, seems	<u> </u>	.m.)	.1,4.92.0.1.4	<u>, m.)</u>
	brecciated with signs of bedding, irregular			••••••••••••••••••••••••••••••••••••••	·
	gypsum veins to $1\frac{1}{2}$ cm.		1	864	8
	5 Potan + 02200 00 12 0000			.(263.55	
	Siltstone, pale reddish-brown, Matchy stainin	H		1	1
		Г		(264.19	
	Mudstone, reddish-brown, structureless except			(
	for some silty banding above 867/10				
	(264.52 m) signs of incipient breccietion-				
	in-situ a few irregular gypsum veins to 3cm				Q.
	······	(2.21	m)		m.)
	Carried forward	1			

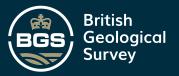


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	of Shaft or Borehole: Kirkham BH Registration No. S National Grid Reference	V 43	5	V/ 6	
GEOLOGICAL		Тніск	NESS	DEP	гн
CLASSIFICATION	DESCRIPTION OF STRATA	FT	IN	Fr	IN
	Brought Forward			874	0
				(266.40	(m)
	Mudstone, reddish-brown, poorly banded with				
	several concentrations of greenish-grey and				
	reddish-brown siltstone bands, one 4 cm				
	gypsum vein.	4	6	878	1
			1	(267.77	
	Mudstone, reddish-brown with wispy silt bands				
		•••••			
	near middle and base, fabric disturbed in				
	places (buckling) and also some brecciation	li i		001	1
	irregular gypsum veins to 2 cm.	i)			1
				(268.68	<u>m)</u>
	Mudstone, reddish-brown, structureless,				
	irregular gypsum veins to 1 cm, some of				
	which are faulted up to 2 cm.			1	
		.(.1.+4.5.)	. (270.13	.m.).
	Mudstone, reddish-brown, rather silty,				
	structureless except for a few irregular				
	bands of greenish-grey siltstone above				
	892/0 (271.88 m); one such siltstone band				
	4 cm thick is broken into fragments up to				
	6 cm long a few gypsum veins to 5 mm.	9	9	896	0
				(273.10	
dip 65°	Mudstone, reddish-brown faintly banded 25%				
some bedding	reddish-brown siltstone bands a few gypsum				
listurbance	veins to 5 mm.	3	1	899	.1
nereabouts.	VCIII CO _ mile	(0.94		(274.04	
		19.024	111		
	Mudstone, reddish-brown, faintly handed,			••••••	
SINGLETEN	wispy siltstone bands below 903/0 (275.23 m	l.s			
MUDSTONB.	signs of brecciation from 899/1 - 903/0			•••••	
	(274.04 - 275.23 m), brecciated with			·····	
	fragments to 4 cm from 906/0 - 907/2				
	(276.15 - 276.50 m).	8	11	908	0
		(2.72	m)	(276.76	[m)
	Mudstone, reddish-brown, somewhat silty,				
. •	structureless, a few gypsum veins to 2 cm.	2	4	910	4
		(0.71	m)	(277.47	m)
	Siltstone, with mudstone bands, banded				
	reddish-brown and greenish-grey.		8		0
		(0.20		(277.67	
	Wilstein und die hamme staristican Jose		,		·····/
	Mudstone, reddish-brown, structureless core				
	Q.F.	ŀ		·····	ŀ



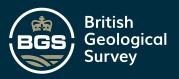
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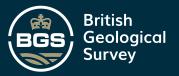
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	kham BH	istration No. S ional Grid erence			7		
GEOLOGICAL	DESCRIPTION OF STRA	TA	THICKNESS		Dept	тн	
CLASSIFICATION			FT	In	Fr	In	
		Brought Forward			911	0	
					(277.67	m)	
	to 1 cm in lower beds.		2	10	913	10	
	· · · · · · · · · · · · · · · · · · ·		(0.86	_m)	(278.54	<u>m)</u>	
	Mudstone, reddish-brown and silts	tone reddish-					
	brown, all more or less breccia	ted,					
	especially downwards, fragments	to 4 cm, a					
	few irregular gypsum veins to 1	cm.		2	917	0	
			(0.97	.m)	(279.50	<u>m)</u>	
	Mudstone, reddish-brown, structur	eless, a few	•••••				
	gypsum veins to 5 mm.			4	920	4	
			(1.02	.m.)	(280.52	m)	
	Siltstone, reddish-brown and gree						
	(downwards) banded with mudston	e, reddish-					
	brown, brecciated and collapsed	with bedding					
	twisted in all directions, base	l contact					
	irregular, a few gypsum veins t	0.3 cm.	4	8		0	
			(1.42	.m)	(281.94	m)	
	Siltstone, greenish-grey well bar	ded with 30%					
	greenish-grey_mudstone_bands,s				·····		
	bedding and flame! structures,						
	minor collapse in bedding, a fe	w gypsum					
	veins up to 4 cm, granular band						
	present between 925/0 - 925/6 (281.94-282.09	m) <u>1</u>	8	926	8	
			(0.51	.m)	(282.45	m.).	
0	Mudstone, reddish-brown with 20%						
dip 50°	brown siltstone bands, well ban						
	929/0.(283.16.m), but more wisp	y and			••••••		
	indistinct below 929/0 (283.16				••••••	í	
	gypsum veins to 3 cm, ripple ma	rk in lower h				<u>, 0</u>	
			(2.84)	(285.29	<u>m)</u> .	
• • • • • •	Siltstone, reddish-brown and 50%				••••••		
	mudstone, brecciated, gypsum ve	in.	1		937		
			0.5	4.m	(285.83	<u>m)</u>	
	Mudstone, reddish-brown, structur	eless,					
	gypsum veins to 1 cm chiefly ne	ar base.	1	5	939	2	
			6.41	5.m)	(28626	m)	
	Siltstone, reddish-brown and redd:						
	mudstone wispy texture with some	brecciation					
	downwards.		1	1		3	
			(0.33	т)	(286.59	<u>m)</u>	
	Mudstone, reddish-brown with much	greenish-					
	Carried f	orward			940	3	



		of Shaft or Borehole: kham BH Registration 1 National Gri Reference		/ 4.		<u> </u>	
•	GEOLOGICAL	DESCRIPTION OF STRATA	,	Тніскі	NESS	Dep	тн
	CLASSIFICATION			Fт	IN	FT	IN
		Brought	Forward			940 (286•59	3 m)
		grey siltstone (80% between 944/3 - 9	45/6 -				
4 - 444 A		287.81 - 288.19 m), brecciated with s					
Station -		of bedding, angular fragments 1 - 10					
7		few irregular gypsum veins chiefly in					
1 - 1 - 1 		half and some interstitial gypsum in		. 8		948	8
				(2.56	m)	(289.15	m)
en e		Siltstone, greenish-grey banded with 20	%				
	and the second second second second	greenish-grey mudstone, some crinkly		. 1		950	0
			1.1		m)	(289.56	1
	· Sector	Siltstone, greenish-grey with 40% reddi		1			100.00
and the second		brown mudstone bands, signs of buckli					1
		collapse, rare gypsum veins.		1	8	951	l a
et a ser				(0.51	-	(290.07	
		Mudatone, reddish-brown, structureless,	ດ່ຽວຫ				
94	De la Contrata de Maria de Maria de Contra	greenish-grey blotches, some in situ		•••••			
		breccietion downwards, no gypsum vein		2	0	953	8
		Dreccration downwards, no gypsum vern	P. •	(0.61		(290,68	
		6.71) · · · · · · · · · · · · · · · · · ·	• • •	(0.01	ω χ	(290,60	<u>, m</u>
		Siltstone, greenish-grey boldly banded					•
		40% reddish-brown mudstone partings,					
		local brecciation, ripple mark, false				000	
		bedding, poor salt pseudomorphs no gy			2	958	10
1			2	(1.57)	n)	(292,25	m
		Mudstone, reddish-brown and 40% reddish-					· [
.		siltstone heavily brecciated (fragment		·····			
		4 cm) above 959/9 (292.53 m)no gypsum	veins.		5	961	
				(0.74	_m)	(292.99	(.m)
		Mudstone, reddish-brown with irregular					·
		greenish-grey silty blotches, incipier		ļ			
		actual brecciation especially in lower	half				
,		no gypsum veins.		6	9		
×				(2,06	<u>m)</u>	(295.05	_m)
		Mudstone, reddish-brown slightly silty					
	dip 50°	brecciated throughout (fragments to 8	<u>cm),</u>				ļ
	а. — н	greenish-grey siltstone fragments abur	ndant				
3639		in parts of core, traces of bedding wi					
		steep dips and overturning no gypsum v		5	Ó	973	С
				(1.52	m)	(296.57	m)
20 8		Mudstone, reddish-brown, slightly silty,					
169381/644410 3M 11/70 8&N L(d.		largely structureless, bending visible					
10 31	× .	between 975/0 - 976/0 (297.18 - 297.48	1	8	0	981	С
3		Carried forward		(2.44		(299.01	

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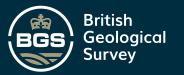
6-in Map Registration No.	SD 43	Sw/L
National Grid		
Reference		

GEOLOGICAL	DESCRIPTION OF STRATA	Тніск	NESS	Depth	
CLASSIFICATION		Fт	In	Fт	IN
	Brought Forward			981	0
				(299.01	m)
	Mudstone, greenish-grey, possibly breccia,				
	broken by drilling.		8	981	8
		(0.20	_m)	(299.21	m)
	Mudstone, reddish-brown with traces of			•	
	greenish-grey, breccia, with angular				
	fragments to 4 cm.	3	10	985	6
		(1.17	<u>m)</u>	(300,38	
	Mudstone, reddish-brown, structureless.	1	1	986	
		(0.33	m)	(300.71	_m)
	Mudstone, reddish-brown with 30% greenish-gre	1			
	indistinct siltstone bands.	1	7	988	2
	×	(0.48	.m.)	(301.19	<u>m)</u>
	Mudstone, reddish-brown with subsidiary	Contract of the second s			
	greenish-grey, streaky texture throughout,	•			
	more or less brecciated, fragments tend to		-		
	be pod shaped.		1		1
	Mudstone, reddish-brown, seems structureless	(.1.88	m)	(.30307.	m.)
	except for a few wispy siltstone bands				
	downwards.	3	0	000	
		(1.12			
	Siltstone, chiefly greenish-grey boldly banded	11	+++ <i>j</i>		
dip 17 ⁰	with 50% greenish-grey and reddish-brown	1		·····	•••••
	mudstone, ripple marks, false bedding.	4	7	1.002	
		•		(305.59	
	Mudstone, reddish-brown, slightly silty, almos				
	structureless mud cracks at 1007/6 (307.09 m	1	5	1009	0
		(1.95		(307.54	
	Mudstone, reddish-brown, microbreccia	3	2	1012	
1 m 2		1		(308.51	
	Mudstone, reddish-brown alternating with runs				
dip 18 ⁰	of greenish-grey; boldly banded with 30%				
	greenish-grey siltstone, false bedding,				
	ripple mark.		8	1019	10
		(2.34	.m)	(310.8	5 m)
	Mudstone, reddish-brown almost structureless				
	with rare silty bands, greenish-grey blotche	s.4			5
				(312.2	+ m)
	Mudstone, reddish-brown well bended becoming.				••••••
	indistinctdownwardswith.40%reddish-brown				

Carried forward

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1.024

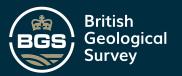


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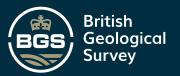
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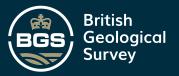
Windshow DU		istration No. S ional Grid erence			70	
GEOLOGICAL	DESCRIPTION OF STRA			NESS	ss Depti	
CLASSIFICATION	DESCRIPTION OF STRATA		Fr	IN	Fr	I
		Brought Forward	•••••••		1024 (312.22	
	siltstone bands, ripple marks,	load casts:			()12.024	<u>+</u> !!
	'birdseye' in 1 cm siltstone.				1027	9
			(1.02		(313.26	
	Mudstone, reddish-brown slightly	silty				
	structureless, no gypsum.				1031	<u></u>
			(.0.99.	.m.)	(314-25	5m
	Mudstone, reddish-brown banded, :	some				
	brecciation at top, ripple mark	, 'birdseye'	•••••			
	in siltstone.		2	0	1.033	1
0			.0.61.	m.)	(314-86	5m
dip 25°	Mudstone, reddish-brown, indistin					
	with 40% siltstone, false beddi	.ng_mudcrack				
	Mudetona raddiah-brown atrustur		(0.91	.m.)	(315.77	lm
	Mudstone, reddish-brown, structur	-	3	9	1039	
	EX Form x Stills .		(1.15		(316.92	
	Mudstone, reddish-brown, bracciat		A.I. & I.J.	н», ј		ui,
	fragments to 2 cm throughout no					
	veins, one undisturbed silty ba					
	false bedding.		5	.7	1045	
			(1.70	m)	(318.62	m
	Siltstone, reddish-brown banded w	ith 50%				
	reddish-brown mudstone.			8	1046	(
.0			(0.20	m)	(318.82	m
dip 16°	Mudstone, greenish-grey well band					
	greenish-grey siltstone, false	bedding, a				
	few salt pseudomorphs.	•••••••••••••••••••••••••••••••••••••••	2	6	1048	
			(0.76	n)	(319.58	m
	Mudstone, reddish-brown, nearly s	-				•••••
	near top, no gypsum veins.	T.M. Dennrug	3	3	1051	
	· · · · · · · · · · · · · · · · · · ·	••••••		n)	(320-57	 m)
	Mudstone, reddish-brown with 40%	indistinct		· * · · · · · ·		
	reddish-brown siltstone bands.		1	9	1053	6
			(0.54)		(321.11	•••••
	Mudstone, somewhat silty reddish-					
	structureless, no.gypsum.veins.		7	.8	1.061	2
			(.2.33)	n)	(32344	.m)
	Siltstone pale reddish-brown well	.and closely.				
	banded with 30% reddish-brown H	1				
	Carried f	orward				



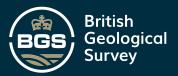
COMMERCIAL EF CÓNTERMOS ۰**.**. 6-in Map Registration No. SD 43 SW Name and Number of Shaft or Borehole: National Grid Kirkham BH Reference THICKNESS DEPTH GEOLOGICAL DESCRIPTION OF STRATA CLASSIFICATION Fт Fт In IN 1061 2 Brought Forward (323.44 m) partings, attaining 60% near base some streaky texture; pellet conglomerate at 1061/4 (323.49 m), ripple marks, mud cracks? no gypsum veins.7 1065 9 (324.84 m) (1.40 m) Mudstone, greenish-grey with a run of reddishdip 12° brown, well and closely banded with 40% greenish-grey siltstone, a few ripple marks, a few salt pseudomorphs, cross lamination, mud cracks. ...8 1073 5 7 (2.34 m) (327.18 m) Mudstone, reddish-brown with 10% streaky siltstone bands, boldly convoluted near 1 0 1074 5 middle. mud crack? (0.30 m) (327.48 m) Siltstone, greenish-grey with 40% reddish-brown and greenish-grey mudstone partings, false bedding. 1074 9 L (0.10m)(327.58 m) Mudstone silty reddish-brown almost structureless, a few wispy siltstone bands. 1076 1 4 1 (0.41 m) (327.99 m) Mudstone, reddish-brown well banded with 40% pale reddish-brown siltstone, ripple mark, 8 9 mud crack? 1 1077 (0.51 m) (328.50 m) Mudstone, greenish-grey (near grey) well banded with variable amounts of siltstone, averaging dip 13⁰ 40%, ripple mark, load cast, salt pseudomorphs possible etched out halite vein at 1080/9 (329.41 m). 6 1.083 .5.... .3..... (1.67 m) (330,17 m) ludstone, reddish-brown, almost structureless with 10% siltstone in faint bands. 1.084 .7..... 1 (0.41 m) (330.58 m) 3639 ludstone, reddish-brown, finely banded with Ľd. BAN some blotchy grennish-grey layers, fabric 69581/644410 5M 11/70 podded on a small scale in two runs 6 cm thick 3 6 1088 1 (1.07 m) . (331.65 m) Siltstone, reddish-brown with 40% reddish-Carried forward 1088 1



1 . . COMMERCIAL RECONFIDENCE 6-in Map 6-in Map Registration No. **SD43SW/4** Name and Number of Shaft or Borehole: National Grid Kirkham BH Reference THICKNESS DEPTH GEOLOGICAL DESCRIPTION OF STRATA CLASSIFICATION Fτ Fr IN IN 1088 1 Brought Forward (331.65 m) brown mudstone bands attaining 60% at top. a few individual siltstone bands attain 8cm but average 1 cm, abundant ripple mark, false bedding (small scale) cut and fill mud crack. 5 3 1093 4 (1.60 m) (333.25 m) Mudstone, reddish-brown with c. 20% (30% downwards) thin pale reddish-brown siltstone bands, rather streaky fabric in middle position 0 1097 4 4 (1.22 m) (334.47 m) Mudstone, greenish-grey with a little reddishdip 13° brown near top, boldly banded with 30% greenish-grey siltstone, cut and fill, rare ripples, giant salt pseudomorph; Euestheria 5 at 1099/8 (335.18 m) 3 1 1100 (0.94 m)(335.41 m) 8 1 3 1101 Sample missing (0.38 m) (335.79 m) Mudstone greenish-grey, boldly banded with 30% greenish-grey siltstone, mud crack. 1 2 1102 10 (0.35 m) (336.14 m) Siltstone pale reddish-brown with a little greenish-grey boldly banded with 50% reddishbrown mudstone, probable mud cracks especially common downwards, mica quite common in the 1 - 2 cm siltstone bands. 4 8 1107 6 (1.43 m)(337.57 m) Mudstone greenish-grey (near grey) boldly banded with 30% greenish-grey siltstone. with 22 cm of reddish-brown mudstone near middle; ripple mark. 8 2 3 1111 (1.11 h)(338.68 m) Mudstone, reddish-brown banded with 20% reddish-brown siltstone bands, rupple mark. 0 3 1114 2 3639 (0.92 n) (339.60 m) Ltd. Siltstone, greenish-grey and pale reddish-BALN brown well banded with 50% mudstone in 02/11 MS 0144410 5M 11/70 similar colours, much ripple mark, a few calcite veins with vugs. 1117 10 Carried forward (1.12 m) (340.72 m)



	of Shaft or Borehole: Registration No. S National Grid Reference	<u>`D4</u>	35	<u>w/6</u>	
Geological	DESCRIPTION OF STRATA	THICKNESS		Der	тн
CLASSIFICATION		FT	IN	FT	In
,	Brought Forward				
	Siltstone, greenish-grey closely banded with			(340.	.72
dip 10°	50% greenish-grey mudstone bands ripple mark				•
<u> </u>	a few 1 mm calcite veins downwards.	5	1	1122	1
	In the second	(1.55		(342.	
	Mudstone, greenish-grey banded with 20%				
	greenish-grey siltstone, soft with closely				••••••••
	spaced joints, disturbed bedding might be		•		
	faulting or due to pencontemporaneous				
	disturbance.	1	z	1124	
		(0.38	 	(342.	
	Siltstone, greenish-grey boldly banded with			1444	1 20
dip 17°	50% greenish-grey (near grey) mudstone				·· ···· ·
	ripple mark, calcite veins to 2 mm and	•••••			
	calcite films on bedding.			4400	-
		4.00	0	1128	
	Siltatone amonich anou o for mutatour	(1.22	<u>m</u> j	(343.8	971
	Siltstone, greenish-grey, a few mudstone				·
	partings, mudstone flake conglomerate shards to 2 cm long.				
	Starus to z chi tong.	1	0	1129	
		(0.30	m)	(344.*	1. <u>/</u>
	Mudstone, greenish-grey with wispy siltstone				•
	bands, cross bedding, mice.	3			
ļ	Judstong group (faint groupich times) her tot	(1.09	m)	(345.	2 <u>6</u> I
	Mudstone, grey (faint greenish tinge) banded	······································	······		· ·····
	with 20% greenish-grey siltstone, mud cracks			••••••	·
	mudstone flake breccie layers, salt				
	pseudomorphs_common, irregular_calcite_veins		-		
	to 2 mm.		4	1138	1
		1.63 n	ł.)	(346.8	12. д
	Siltstone, grey, boldly banded with 40% grey	••••••			·
	mudstone, a few siltstones to 8 cm but much.		·		
dip 12 ⁰	of banding is very fine, cross lamination		······		
urp iz	ripple mark clay flake conglomerate some mic				
	rare possible mud cracks, a few calcite vein		11	1143	<u> </u>
		(1.50	m) .	(348•3	9 m
ł	diltstone, greenish-grey and reddish-brown				
	banded with 50% mudstone in similar colours,				
	ripple.mark, mudstone.flake.conglomerate,				
	2 mm calcite vein.	. 1		1144	5
	·	(0.43	m)	(348.8	2. m
	Mudstone, greenish-grey becoming grey below				



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169581/644410 5M 11/70 84M Ltd. 3639

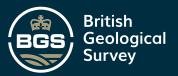
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Name and Number of Shaft or Borehole: Kirkham BH

6-in Map Registration No. SD 43 S National Grid Reference

Page

GEOLOGICAL	DESCRIPTION OF STRATA	Тнісі	KNESS	Depth		
CLASSIFICATION		FT	In	FT	In	
	Brought Forward	I		1144	E	
				(348.8	2 m)	
	1149/0 (350.22 m) well banded with 20%					
	greenish-grey siltstone, (40% between 1147/	6				
dip 12°	1148/6.349.76-350.06 m) salt pseudomorphs,					
	rare load casts, calcite veins throughout.			1160		
		(4.75	m)	(353.5	- · ·	
	Siltstone, grey with mudstone bands, mudstone	2				
	flake breccia layers.	. 1	o	1161	0	
		(0.30	m)	(353.87		
	Mudstone, grey, banded with thin highly porou					
	calcitic fine grained sandstone layers,					
	excellent salt pseudomorphs to 2 cm wide,					
	ripple mark, load casts, abundant calcite y	eins 2	6	1163	6	
		.(0.76		-		
	Sandstone, fine-grained calcitic, highly		Ĺ	100.10.10		
	porous, with 50% grey mudstone bands, clay					
	flake in one sandstone band calcite veins.	2	6	1166	. (
TAMBLETW		(0.77	m)	(355.4	Om	
MILOSTOMES	Mudstone grey with calcitic sandstone, distur					
	fabric with high dips and injected sediment.		4	1168)	
		(0.71	1	(356.1	1 m	
	Mudstone, grey, with a few silty bands calcit	1	·····		******	
	veins.		11	1169		
		(0.28		(356.3	9 m)	
	Mudstone, grey with 40% porous calcitic fine-			ر المراقع المراجع المي الي يوا		
	grained sandstone bands.		5	1169	 S	
		10.12		(356.	s 54 m	
	Mudstone grey well and closely banded with			وەربىلار كۈچە	<i></i>	
	30% siltstone partings, a few bands of					
	calcitic fine-grained sandstone, a few salt		••••••		·····	
	pseudomorphs, calcite veins.),	1173	Ċ	
ps up to 50°	Mudstone, grey, with siltstone, chiefly as a	4	**••		daddd	
	matrix, appears to be injected in places,		•••••••••		••••••	
	bedding buckled and disturbed, perhaps a	••••••		•••••••••••••••••••••••••••••••••••••••	••••••	
	seismite.			4170		
		(1.04)	- 1		-	
	Mudstone, grey banded with 20% greenish-grey	λI. Φ. 944/	H.J		m	
dip 60° at	siltstone, bedding slightly buckled		·····			
1179/9	(steepening_downwards), some calcite veins.		7	4400	~~~	
(359.59 m)			• 1			
1	Carried forward	(]Q.9	1.)		6m.	



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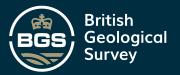
21

COMMERCIAL IN CONFIDENCE

Name and Number of Shaft or Borehole: Kirkham BH 6-in Map Registration No. **SD 43 SI** National Grid Reference

Page

GEOLOGICAL	DESCRIPTION OF STRATA	Тнісі	KNESS	ss Depth		
CLASSIFICATION			IN	FT	In	
	Brought Forward			1180	0	
				(359.6	6 m)	
	Mudstone, grey with some siltstone, boldly					
	banded, broken bedding with plastic					
	deformation of fragments, possible seismite	4		1184	4	
		(1.32)	(360.9	8.m)	
	Mudstone, grey with a few siltstone bands					
	chiefly near top, one 5 cm siltstone band i	s				
	highly micaceous.		8	1187		
	0171	(0.82	.m.)	(3618	0_m)	
	Siltstone, grey, well but not very regularly					
dip 22°	banded with 20% grey mudstone bands, ripple					
	mark, mudstone flake breccia.		5	1190	5	
		(1.04	m)	(362.	34. m)	
	Siltstone grey and pale reddish-brown boldly					
	and rather irregularly banded with 40%					
	reddish-brown mudstone, ripple mark, cross				•••••	
	bedding.	. 1	1		6	
		(.0.33	n.)	(363.)	17.m)	
	Sandstone, fine-grained, banded, pale grey					
	with pink tinge.	1	11	1192	5	
	e:]	(0 . 28	n)	(363.4	,5 m)	
	Siltstone, reddish-brown with some greenish- grey boldly bended with 50% reddish-brown					
	mudstone bands, some siltstone bands are			······		
	nearly sandstone, specimen missing between					
	1195/1 - 1196/0 (364.26 - 364.54 m)				 	
	······································	5 (1.60	3		8	
	Mudstone, greenish-grey banded with a few	∖ ¢Ω <u>∪</u>	ш <i>і</i>	(365.0	(<u>m</u>	
	siltstone bands near base, possible dolomite	••••••		•••••••••••••••••••••••••••••••••••••••		
	band at 1199/7 - 1199/8 (365.63-365.66 m)	2	0	1199	8	
		(0.61		(365.6		
	Sandstone, fine-grained greenish-grey,		6	1	2	
		(0.15	n)	(365.8		
	Mudstone, greenish-grey with irregular reddish		···			
·	brown streaky banding.	1	0	1201	2	
		(0.30		(366.1		
-	Mudstone, reddish-brown.	9.0.15 of 19.11	3	1201		
		(0.08.0		(366.1		
	Sandstone, fine-grained pale reddish-brown,	2. m. # . w . d 6	-,	·······		
	heavy mesh of calcite veins.	4	5	1205	10	
		1.35		(367.51		
	Carried forward		-		10	



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COMMERCIAL IN CONFIDENCE

Name and Number of Shaft or Borehole: Kirkham BH

. 6-in Map Registration No. SDV National Grid Reference

43	SW/6	Page

GEOLOGICAL	DESCRIPTION OF STRATA	Тніс	KNESS	Depth	
CLASSIFICATION	15	Fr	IN	FT	IN
	Brought Forward	L		1205	10
				(367.	54 m
	Sandstone, fine-grained pale reddish-brown				
	with some grey near top.	- 2	2	1208	0
		(0.6		(368.	
	Sandstone, medium-grained reddish-brown and				n nm.
	grey sandstone with blotchy colouration,				
	some millet seed grains.			1.214	6
		(1.98	1	(370.1	1
	Sandstone, fine-grained, fine-to-medium				
	grained below 1222/0 (372.17 m), deep		-		
	reddish-brown with a few large grey blotche	· ·			
	silty banding at 1221/0-1221/2 (372.16 -				
	372.21 m) indications of current bedding,				
	some milletseed grains below 1234/0				
	(376.12 m)	29	6	1.244	
				(379.1	
	Sandstone, fine to medium-grained, traces of			····· \}_~.4.4.4.1.	f
apparent Lip 24 ⁰	faint banding reddish-brown with four				
	banded grey bands up to 6 cm thick and one				•
	18 cm thick.	7	9	1251	
		(2.36		(381.5	
	Sandstone, fine-grained deep reddish-brown,				P <u>41</u> .
	even grain size, one grey blotch.		0	4050	
	с				
SHERWOOD	Sendstone, fine to medium-grained deep	11 -	<i>j</i>		fm.)
SST	reddish-brown poorly sorted, some grey				••••••
Comb.	blotches, signs of false bedding, podded				
	fabric at 1275/0 (388.62) may be	·····		·····	
	biological in origin.	17	7	1276	
		(5.26			2
	Sandstone fine to medium-grained deep reddish	15	₩.J	(388.98	<u>m)</u>
parent	brown, well banded with some podded fabric,		······		•••••
pparent ip 20	poorly sorted.	6	0	1282	
			m)		2
	Sandstone fine-grained with mudstone flake	(1+02	<u>m)</u>	(390,80)
				4000	
	breccia, a few pebbles.	10.11	6	1282	8
	Sondatana fina ta mili a mili a	(0.16	<u>m)</u>	<u>(390,96</u>	m)
	Sandstone fine to medium-grained reddish-				
-	mudstone flakes, some milletseed grains,			·····.	
	false bedding.			4004	
	TATOR DEMOTING	8	8	1291	4

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m)

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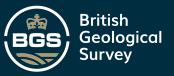
23

3

3

(415.21 m)

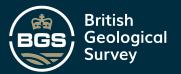
1362



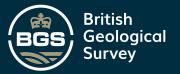
COMMERCIAL IN COMPIDENCE 6-in Map 50 4351 Registration No. Name and Number of Shaft or Borehole: National Grid Kirkham BH Reference GEOLOGICAL THICKNESS DEPTH DESCRIPTION OF STRATA CLASSIFICATION FT Fт IN Brought Forward 1291 (393.60 m) Sandstone, medium-grained, reddish-brown scattered milletseed grains. 12 8 1304 (3.86 m) (397.46 m) apparent dip 23 Sandstone, fine-grained, reddish-brown, some milletseed grains. 11 10 1315 (3.61 m) (4.01.07 Sandstone, greenish-grey with layers of greenish-grey mudstone. ..1.±. 1315 .(0.03...m). (401.10 m) Sandstone, medium-grained, deep reddish-brown good milletseed grains. ...63. 1320 4 (1.39 m) (402.49 m) Sandstone fine to medium grained reddish-brow ...3... 1323 .(0.99.m). (403.48 m) Sandstone fine-grained greenish-grey and pale reddish-brown banded. 8 1324 (0.20 m)(403.68 m) Mudstone, reddish-brown, structureless, listric 2 1 1326 (0.64 m) (404.32 m) Sandstone very fine grained, deep reddishbrown two 2 cm silty beds near top. 9.... 1334 (2.36 m) (406.68 m) Sandstone fine to medium-grained, deep reddish-brown, poorly cemented becoming tougher downwards with some banding. 12 1346 4 (3.76 m) (410.44 m) Sandstone fine and medium-grained false-bedde a little mica. 9 10 1356 (3.00 m) (413.44 m) Sandstone fine-grained grey, micaceous compar .3. 1356 (0.07 .m.) (413.51 m) Sandstone, medium grained, gradually becoming fine grained downwards, reddish-.brown. 5. 6 1362 (1.68 .m) (415.19 m) 3639 Mudstone, reddish-brown. 1 ĽĠ. 1362 8.ALN (0.01 m) (415.20 m) Sandstone, medium-grained with mudstone flake conglomerate. 12 1362 (0,01 <u>m)</u>

Carried forward

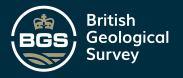
12/11 WE 0144410 5M 11/70



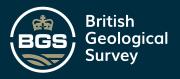
COMMERCIAL IN COMFIDENCE 6-in Map 50435W/ Registration No. Name and Number of Shaft or Borehole: National Grid Kirkham BH Reference THICKNESS DEPTH GEOLOGICAL DESCRIPTION OF STRATA CLASSIFICATION Fτ Fτ IN IN 1362 Brought Forward 3 (415.21 m) apparent dip 20 Mudstone, reddish-brown, very finely micaceou 1362 1 4 (0.03 m) (415.24 m) Sandstone, medium-grained, milletseed grains, particularly well seen near top. ..8. 1367 .4... 0 (1.42 m) (416.65 m) Mudstone, reddish-brown, silty with siltstone bands near top and base, listric. .3 3 . 1 1368 (0.38 m) (417.04 m) Sandstone, fine to medium-grained deep reddish-brown with rare greenish-grey bands to 5 cm thick, deep reddish-brown muddy clots from 1372/0 - 1374/8 (418.19 -419.00 m) some milletseed below 1377/9 (419.94 m), felse bedding common below 1376/0 (419.40 m). 17 2 1385 5 (5.24 m) (422.28 m) Sandstone, medium-grained reddish-brown. several bands rich in 'milletseed' grains mudstone pebbles to 6 cm wide at 1389/0 (423.37 m). 6 0 1391 5 (1.82 m) (424.10 m) apparent Sandstone, fine-grained reddish-brown dip 20 finely laminated micaceous, compact. 9 1392 2.... (0.23 m) (424.33 m) Sandstone, medium-grained, reddish-brown false bedded, some milletseed grains, 11 3 14.03 5 (3.43 m) (427.76 m) Sandstone medium-grained reddish-brown several bands rich in milletseed grains. 2 6 14,09 7 : (1.88 m) (429.6 m). Mudstone silty micaceous reddish-brown and greenish-grey. 1409 8 1 (0.03 m) (429.67 m) Sandstone fine to medium-grained, with micaceous reddish-brown mudstone plane 3639 2 mm thick. .7. 1410 3. (0.17 m) (429.8 .m) Sandstone fine to medium-grained some milletseed, becoming abundant downwards. mudstone pebbles around 4447/6 (432.05 m) g, -1419... .1.0. Carried forward (2.93 m) (432.7 m)



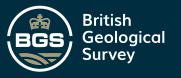
Name and Number	r of Shalt or Borehole:	ration No. S	S D U3.		Sh/6	
GEOLOGICAL	DESCRIPTION OF STRATA		THICKNESS		Depth	
CLASSIFICATION		·	FT	In	Fт	In
	Br	ought Forward			1419 (432.	
	Siltstone, greenish-grey micaceous	and	······			<i>t</i> <i>t</i> .:.щ,
	reddish-brown fine grained mudsto	one.	·····	2	1420	0
			(0.05	.m)	(432.)	82 m)
	Sandstone, fine to medium-grained of	-				
	reddish-brown, milletseed grains.	•		4	1428	1
	Sandstone, fine-grained pale reddi:	-h-h-moren	(2.54	m.)	(435.	36 m)
	tough micaceous.		2	0	1430	4
			(0.61		(435.)	
	Sandstone fine to medium grained, w	vith				
	milletseed grains.			.11	1434	3
		·	(1.19		(437.1	1 <u>6 m</u>)
apparent dip 20	Sandstone, fine-grained, reddish-br	-			·····	
	banded with a few small mudstone near base, a few mica flakes, tou	- 1	2	9	1437	
		*6 + 4. 4	(0 . 84		(438.)	
	Sandstone, medium-grained, deep. red	ldish-brown,				
	soft with abundant excellent mill					
	grains core sample missing 1442/6					•
	(439.67-440.11 m).			1		1
	Sandstone, fine-grained grev, with		(2.16		(440.1	6 m)
	grains.	and the second		3	11.1.1.	
			(0.07		(440.2	3 m)
	Sandstone, medium-grained, deep red	dish-brown,				
	soft with milletseed grains, espe	-				
	abundant and of excellent shape d		. 15		1459	.9
	bottom of h	01e	(4.70	.m.)	<u>(1111-9</u>	<u>3 m)</u>
					······	
					·····	
				·····		••••••
					····	



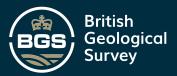
Kirkhan B.H. (summary log)	i anto	43/20	
North Western Gas Board Kirkham SD 4324 3217 570 yd E by N of St. Michael's Church			
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A A Wilson			
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Silty Clay		0 65	0
and a standard stand Standard standard stan	20	0 85	0
Stoney clay	35	0 120	
Mudstone, not corel Mudstone, reddish-brown, str	20 Intimelans from	0 140	0
of gypsum veins	42	10 182	10
Mulstone, reddish-brown, bre	 A second s	andra an an Angelana an Angelana Angelana an Angelana an Ang	
several levels; breccia fr			
include smashed gypsum vei		6 219	4
dip about 45°, Mudstone, reddish-brown with		ta da Antonio I. Alter	
locally steeper runs of greenish-grey muds siltstone bands common at			
and a few breecia horizons		8 365	0
Mudstone, reddish-brown, bre			
several levels; gypsum por	phroblasts		
common	95	3 460	3
Hudstone, reddish-brown with		11 516	9
dip about 30 runs of greenish-grey; gyp locally steeper Mudstone, greenish-grey and		1010 1	
in alternate runs 5-25 ft			
contain thin siltstone ban	and the second	alaan ah ah ah ah ah Ah ah	
in dominant amounts, chief			
grey and sometimes reddisc	brown;		r ser grad de la composition de la com Composition de la composition de la comp



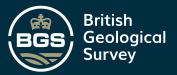
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			and the second second	•			J = 1.00	
a fferfan de blander Stander fan de blander	dip Joan 35°			d-oracks, gypsus	an an Araba An Araba			
	n an 1999 - Anna Anna Anna Anna Anna Anna		un noù-les at 1 47 at str/l isi	lant fragment at				
a da ang sa sa sa sa sa sa sa Sa sa		575/6	waa tala 999 tay ya	rent versinger on	228	10	745	0
			dish-brown with	i sose runs	4.684-1.5	• •*		
	din about 35		siltstone; sea				n an	
			horizons, gyps		161	0	906	0
				h several brece-				a an
		iated horiz	ions up to 9 ft	thick; gypsum		е 1944 1945 г. г.		
			951/8 only		88	0	994	0
		Mudstone, red	dish-brown, ch	iefly structure-				
	dip 15°	less with m	inor thin runs	of greenish-grey				
		mudstone, s	cattored silts	tone bands; no			1070	6
and		gypsum veir	15		76	6	1555-	- \$
		Mudstone, red	dish-brown and	greenish-grey, in	an an the second se			
	dip about 12°	alternating	runs 5-10 ft t	hick, with silt-				
		stone bands	, ripple marks,	, mau-cracks, free				
		of gypsun v	eins, <u>Buestheri</u>	ia at 1099/8	47	4	1117	10/28
a da anti-barante Alta ang				reen tinge near				
	dip about 12"		and the second secon	iltstone and fine-				
		The second second		me; salt pseudo-	re.		at at 000 vit	
and and a start of the second s		Let a set the set of t	cite veining		د د	/	1173	0.0
			y with many sil	1			الا الم ما المالين	
		state	and deiormed wi	ilst in a plastic	11-1	4	1184	1.
	n an		y with siltstor	in hende	6	•	1191	0
				1 some greenish	Ū			
			silatone bands		8	8	1199	8
	dip seems			medium-grained,	V			
a tangga sa gita ta Sangtan sa sa sa sa sa Sangtan sa sa	about 20°		1	rey bands; close be	nding			
				me 'milletseod'			a de la composición d	
		grains			96	6	1296	2
an a	a de la composición d La composición de la c			an an an Araba an Araba. An an Araba an Araba an Araba an Araba				
	de para de presenta de la composición de la composición de la composición de la composición de la composición La composición de la c		drilling co	mtinues				
			2 Providence in the second					



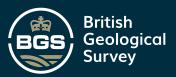
RECORD O	TOGICAL SURVEY OF GREAT BRITAIN F SHAFT OR BORE FOR MINERALS are given by Geological Survey: 50 43/15	6-inch Maj	o Registe	ered No.	
Kirkhein B.H. Name and Number g	ziven by owner:	Nat. Grid		1 .	
For whom made No	orth Western Gas Board	SO H	524	/ 52	-
Town or Village Ki	rkhem	1" N.S.Map No.	1 ° O.S. No.		
	Attach a tracing from a map, or a sketch- map, if possible. ade_Test for underground gas storage		19 7040 7720		
	aft relative to O.D If not ground level give	O.D. of beginned by Date of	nning of	shaft bore	-
	<u>a an an</u>				
Examined by					
682/0 (207. 732/6 (223. 861/0 (262. 1007/6 (307. 1048/0 (319.)	27 m) 43 m) 09 m)				
1070/0 (326.					
1070/0 (326. (For Survey use only) Geological		Тніск	1	Derr	
(For Survey use only)	Li, m) DESCRIPTION OF STRATA	Thick Fr.	INESS	Derr Fr.	
1070/0 (326. (For Survey use only) Geological	14 m)	Fr.	IN.	Fr. 0	-
1070/0 (326. (For Survey use only) Geological	Li, m) DESCRIPTION OF STRATA Soil	Fr.	IN.	Fr.	-
1070/0 (326. (For Survey use only) Geological	Li, m) DESCRIPTION OF STRATA	Pr. (0	IN.	Fr. 0	
1070/0 (326. (For Survey use only) Geological	Li, m) DESCRIPTION OF STRATA Soil	Pr. (0	IN. 9 •23 m) -4 •10 m)	Fr. (0. 1 (0.	
1070/0 (326. (For Survey use only) Geological Classification	Li, m) DESCRIPTION OF STRATA Soil Clay	Fr. 0 (0 (0 	IN. 9 •23 m) -4 •10 m)	Fr. 0 (0,	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows:	Fr. 0 (0 (0 	IN. 9.23 m) 4. 10 m) 5.	Fr. 0 (0, 1 (0, 18	
1070/0 (326. (For Survey use only) Geological Classification PEAT PEAT	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand	Fr. 0 (0 (0 	IN. 9.23 m) 4. 10 m) 5.	Fr. 0 (0, 1 (0, 18	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT PEAT GLACIAL SANDS AND	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay	Fr. 0 (0 (0 	IN. 9.23 m) 4. 10 m) 5.	Fr. 0 (0, 1 (0, 18	
1070/0 (326. (For Survey use only) Geological Classification PEAT PEAT	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand	Fr. 0 (0 (0 	IN. 9.23 m) 4. 10 m) 5.	Fr. 0 (0, 1 (0, 18	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT PEAT GLACIAL SANDS AND	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay	Fr. 0 (0 (0 	IN. 9.23 m) 4. 10 m) 5.	Fr. 0 (0, 1 (0, 18	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT PEAT GLACIAL SANDS AND	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with rock	Fr. (0) (0) (17) (5)	IN. 9.23 m) 4. 10 m) 5.	Fr. 0 (0, 1 (0, 18	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT PEAT GLACIAL SANDS AND	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with rock fragments 60/0 (18.29 m) silty clay with very smal: pebbles	Fr. (0) (0) (17) (5)	IN. 9.23 m) 4. 10 m) 5.	Fr. 0 (0, 1 (0, 18	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT PEAT GLACIAL SANDS AND	DESCRIPTION OF STRATA Soil Clay Peat Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with rook fragments 60/0 (18.29 m) silty clay with very small pebbles 70/0 (21.34 m) fine-grained quartz sand	Fr. (0) (0) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	IN. 9.23 m) 4. 10 m) 5.	Fr. 0 (0, 1 (0, 18	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT PEAT GLACIAL SANDS AND	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with rock fragments 60/0 (18.29 m) silty clay with very smal: pebbles	Fr. (0) (0) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	IN. 9.23 m) 4. 10 m) 5.	Fr. 0 (0, 1 (0, 18	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT PEAT GLACIAL SANDS AND	DESCRIPTION OF STRATA Soil Clay Peat Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with rock fragments 60/0 (18.29 m) silty clay with very small pebbles 70/0 (21.34 m) fine-grained quartz sand 80/0 (24.38 m) silty clay with sand grain	Fr. 0 (0 (0 17 (5) 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	IN. 9.23 m) 14. 10 m) 5. 31 m)	Fr. (0. (1. (1. (0. (1. (0.	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT PEAT GLACIAL SANDS AND	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with rock fragments 60/0 (18.29 m) silty clay with very small pebbles 70/0 (21.34 m) fine-grained quartz sand 80/0 (24.38 m) silty clay with sand grain Boulder clay - samples as follows:	Fr. 0 (0 (0 17 (5) 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	IN. 9.23 m) 14. 10 m) 5. 31 m)	Fr. 0 (0. 1 (0. 18 (5.	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT GLACTAL SANDS: AND SILTS	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with rock fragments 60/0 (18.29 m) silty clay with very small pebbles 70/0 (21.34 m) fine-grained quartz sand 80/0 (24.38 m) silty clay with sand grain Boulder clay - samples as follows: 90/0 (27.43 m) drab clay	Fr. 0 (0 (0 17 (5) 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	IN. 9.23 m) 14. 10 m) 5. 31 m)	Fr. 0 (0. 1 (0. 18 (5.	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT GLACTAL SANDS: AND SILTS	DESCRIPTION OF STRATA Soil Clay Peat Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with rook fragments 60/0 (18.29 m) silty clay with very small pebbles 70/0 (21.34 m) fine-grained quartz sand 80/0 (24.38 m) silty clay with sand grain Boulder clay - samples as follows: 90/0 (27.43 m) drab clay 100/0 (39.48 m) drab clay	Fr. (0) (0) (17) (5) (5) (17) (5) (17) (5) (17) (5) (17) (17) (17) (17) (17) (17) (17) (17	IN. 9.23 m) 14. 10 m) 5. 31 m)	Fr. 0 (0. 1 (0. 18 (5.	
1070/0 (326. (For Survey use only) GEOLOGICAL CLASSIFICATION PEAT GLACTAL SANDS: AND SILTS	DESCRIPTION OF STRATA Soil Clay Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with rock fragments 60/0 (18.29 m) silty clay with very small pebbles 70/0 (21.34 m) fine-grained quartz sand 80/0 (24.38 m) silty clay with sand grain Boulder clay - samples as follows: 90/0 (27.43 m) drab clay 100/0 (30.48 m) drab clay	Fr. (0) (0) (17) (5) (5) (17) (5) (17) (5) (17) (5) (17) (17) (17) (17) (17) (17) (17) (17	IN. 9.23 m) 14. 10 m) 5. 31 m)	Fr. 0 (0. 1 (0. 18 (5.	
1070/0 (326. (For Survey use only) CEOLOGICAL CLASSIFICATION PEAT GLACTAL SANDS AND SILTS	DESCRIPTION OF STRATA Soil Clay Peat Peat Sand and silty clay - samples as follows: 20/0 (6.10 m) fine-grained quartz sand 30/0 (9.14 m) probably sandy clay 40/0 (12.10 m) fine-grained sand 50/0 (15.24 m) coarse sand with rook fragments 60/0 (18.29 m) silty clay with very small pebbles 70/0 (21.34 m) fine-grained quartz sand 80/0 (24.38 m) silty clay with sand grain Boulder clay - samples as follows: 90/0 (27.43 m) drab clay 100/0 (39.48 m) drab clay	Fr. (0) (0) (17) (5) (5) (17) (5) (17) (5) (17) (5) (17) (17) (17) (17) (17) (17) (17) (17	IN. 9.23 m) 14. 10 m) 5. 31 m)	Fr. 0 (0. 1 (0. (3. (5. (5. (5. (5.)))))))))))))))))))))))	



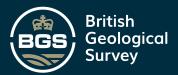
Kirkham D.H.	5043 R 50435W	16 so	943/20
			85
	110/0 (33.53 m) pobbles in olay metrix		(25.91
	120/0 (36.58 a) peobles in elay matrix	35 0 (10,67 m)	120. (36.58
KEUPER MARL	No recovery, marl	20 0 (6.09 m)	140 (42.6)
dip 15 ⁰ ? st	NUDSTONN, reddish-brown, structureless not		
170/0 (51.82 m)	ailty, no gypsum veins MULETONE, reddish-brown, with some greenish	(10,52) 6	,174 (53 . 19
	grey, structurelegs	1 6 (0.45 m)	176 (53.64
	AUDETONN, reldish-brown, structureless slightly silty, with vague silty banding below 177/11 (54.23 m) (sore removed from		
	176/5-177/11 - (53.77 - 54.23 m)	60	102
	MUDETONE, reddish brown slightly silty, brecolated at least in part with southered	(2.09m)	(55.71
	docts fragments to 2 cm	5 5 (1.65 n)	188 (57•38
	MUDETONE, with some siltstone, heavily brecolated reddich brown with some grey, clasts to 5 on long include samshed sections of veln gypsum and siltstone, some of the latter being buckled		
	warest new and and that	10 9 (3.28 a)	199 (60,66
diy 55 °	MUDETONN, reddish-brown with some greenish- gray silistone bands, gypsum veins to 1 cm are somewhat sheared and buckled and in		
	places heavily fregmented	3 3 (0.99 m)	202 (61,65
	MURSTONE, reddish-brown, some gypsum veins to 1 cm, core smashed in drilling		
	······································	(0.76 m)	204 (62 . 41
dip 25 ⁰	MUDETONE, reddisb-brown well banded with greeniah grey siltstone somewhat brecolated in part, low and high angle gypsum veins to		
	5 cm are buckled in places	(0.68 m)	207 (63.09
	NUDSTORE, reddish-brown, silty in part, sypsum veins to 1 cm are orumpled in places,		
	core broekn downwards	3 0 (0.92 m)	210 (64.01
THE HERE AND			



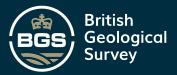
	5 D 43	Sw/6	, 710
Ririhan B.N.	SD43		
	~ 6 406 1009	SD4:	5/20
	RECEIVED		
			210 0 (64.01 x
	Whendows reddle -brown with reddleh-brown and grey fragments, heavily breeclated with signs of bedding, sumshed in situ, in middle portion, low angle gypsum voins to 5 nm, need of them smashed	3_0.	213 0 (64.92 n
at_ 1:0		(0 . 91 m)	(64 . 92 s
dip 45° (70° at top)	NEDDING troug mulatone, some bedding, seens brecelated in part	3 4 (1.02 p)	216 <i>1</i> (65 . 94 1
	annerous slightly silty, seems breesisted in part, no gypsum veins	(0,91 m)	219 4 (66 . 85 1
dig. 70°	MULETONS, reddish brown nearly structureless gypewn veins to 4 mm	ě ů (1.22 n)	223 4 (68 . 07 2
	Ro recovery	1 0 (0 . 31 n)	224 4 (68,38)
	MURCIONE, reddish-brown, increasingly well banded downwards with 30 greenish grey siltstone bands (dolomatic?) downwards, a few irregular gypsum velns to 1 on and many 1 am veins. A few greenish grey reduction spots	6 5 (1.95 n)	230 9 (70-33 a
dah 48°	MIDDITUNE greenish grey with some reddigh brown banded with greenish-grey siltatone bands up to 6 on thick, low angled and a		
	fer high angled gypsum veins to 1 on	4 11 (1.50 m)	235 8 (71.83 n
	MUDEFICHE, silty reddiah-brown banded with some greenish grey, low angle gypous velns	(1.02 m)	239 0 (72.85 m
	200270hE, reddiah-brown boldly bended with 30E greeniah-grey ailtatone, 5 am gypsom veins, rare ripple samt		
		(1.45 a)	243 9 (74•30 n
	HUDSTONS, grey, fine-greined	(0.07 m)	244 0 (74•37 a
dig 550	SILFETORE, greenish grey banded with 40% reddish-brown and greenish-grey audstone	1 0 (0,31 m)	215 0 (7) 69 -
	carried forward	~~	(74.68 m) 245 0 (74.68 m)
			11.000



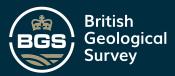
•	5	N/	1.//_
Kirkhon B.T.	DECLASSIFIED SD4	SDI	· 6 6 .
ALTRIBLE Delle	- 6 AUG 1999	SDI	+3/20
	- 6 Ada 1558		
L.	REGEIVED		
			245 0 (74,68 a)
dip 90 ⁸	MUDETONS, reddiah brown and greenish gray, boldly colour-banded with 20% (average)		
	greenish grey ciltatone bands, a fer gypeum		
	veins to 6 m	5 3 (1.60 m)	250 3 (76.28 m)
	NUCEPONE, reddish-brown with wisny cilty		
	banding, gypsum veins to 4 mm	1) (0.38 a)	251 6 (76.66 m)
dip 55°	storestern, reddish-brown with some greenish- grey, boldly banded with 30% (average - resching 70% near base) greenish-grey siltatone, andernous? cross the banding in		
	samy places, los angle gypsum vains to 1 am	(2.36 m)	259 3 (79.02 s)
	MUDETINE, chiefly reddish brown with southered silty beds, dessiontion cracks? 1 on wide out silty bands, micro-ripple, salt pseudomorphs in siltstone, 2 mm gypoun veins		
	near top only	(1.29 n)	263 6 (80.31 a)
	MENEROSE, reddiah brown, banded with 40% greenish grey siltatone in bands up to		
	0.18 m thick, gypsum veins to 5 mm	(1.45 B)	268 3 (81.76 a)
	with some reddish-brown commards, convolu- tions at 269/0 (01.99 m) a few gypum veins		
	to 5 m	5 11 (1.81 n)	274 2 (83.57 m)
dlp 50 ⁹	ELECTORE, reddish-brown, banded with wispy siltatone bands coming in dommards (15), gypsum modules to 2 cm at 274/6 (83.07 m), gypsum value up to 1 cm are especially common and ramifying between 274/6-275/6 (83.67-		
	83.97 m), muderacks?; convoluted bedding at		
	286/3 (87 . 25 B)	12 4 (3•76 b)	286 6 (67.33 z)
	carried forward		286 6



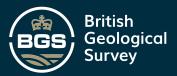
Rinches S.H.	5 D 43	SDI	9 13/20 ⁵
			286 6 (87,33 m)
	MUDER NE, reddish-brown, structureless, with irregular gypsum veins with mots of gypsum where veins join, perhaps a breechs in part but no fragments seen	4 3 (1,50 m)	290 9 (08,62 m)
	HUDFFORE, reddish-brown, banded with 10% greenish-grey siltatone, greenish-grey reduction spots, a few irregular grpsum veins to 5 mm, 2 cm grpsum layer at 292/0 (69.00 m)		
	associated with gyps a aggregates (notales?) autorous, roddish-brown almost structureless with some wisny banaing dominards, a few breaslated bands, irregular gypsom veins to	(1.75 m)	296 6 (90.37 m)
	λ ma	(0.94 m)	299 7 (91.31 m)
	MUDETONE, reddich-brown with greenish-grey banding, sypsum veine to 4 mm	1 1 (0.33 m)	300 8 (91,64 a)
	MUDETONE, greateh-grey, silty in part, well banded with some dark grey fine-textured		
	bends EUDETORE reddish-brown, structureless with	(0.92 m)	503 8 (92,56 a)
ommisterily steep dips	olgna of breccistion near base, a few gruenish grey blotches, no gyrsum veins shore 308/0 (93.88 m) rare & nm veins below 309 (93.88 m)	,	111 0
	EUDeront, reddict-brean with greenish grey cillatone bands, middle beds are rishest in cillatone and are buckled and breasisted,	(2.13 m)	311 0 (96-79 m)
	Cypous veins rare	5 0 (1.93 m)	316 0 (96.32 n)
dip 40°	AUDOTONN greenish grey, banded, sith silty layers, a few low angle gypsum velne, a few clots of gypsum where velne meet at 319/9 (97.46 m)	4 30	
	Garried forward	(1.47 m)	320 10 (97.79 m) 320 10



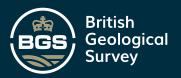
Kirkhen B.H.	SDL	13 SW/	6
		SDI	13/20
			520 10 (97•79 a)
	MUDSTORE, reddish-brown structureless.		
	southered gypsum weins to 1 on except at		
	322/6 - 324/0 (98.30 - 98.76 m) where		
	ramifying veins enclose irregular areas of		
	unveined audstone	11 9 (3.58 m)	332 7 (101.37)
	MUDETONE, reddigh-brown, banded with 40%		
	greenish-grey siltatone	1 1	333 8
		1 1 (0.33 m)	(101.70)
	MUDSTONE, greenish-grey with some reddish-		
dip 65°	brown bands, banded with 30% greenish-grey		
	eiltatone, some bedding disturbance doenwards, a few irregelar gypsum veins	11 A	*11 Q
	noutmetrid, e ros trreforut Chhora actus	11 0 (3.35 m)	(105.05)
	MUDETORE, reddleh brown streaky fabric with		
	greenish grey siltatone bands (averaging		
dips up to 75	30%, reaching 50% near base) banding		
	becoming bolder and finer downwards,		
	horisontal shears in middle beds some siltatone bands sees brecciated	7 1	151 Q
		(2.16 n)	(107.21 1
	MUDSTONE, reddish-brown; greenish grey below		
	356/7 (108.69 m) irregularly banded with		
	15% siltatone, gypsum veins to 5 mm	6 0 (1.83 m)	357 9 (109.04 2
	MUDSTONR reddiah brown, with a little		
	greenish grey at top unevenly banded with		
	25% greenish-grey alltstone bands, scattered		
dip 35°	short and irregular gypsus veins with a		
	plexus of veins around 361/0 (110.03 m)	7 0 (2.14 a)	364 9 (111,18 s
	CAMPLE MISSING	1 5 (0.43 ≲)	366 2 (111.61 m
	MUDSTONE, greenish grey, seems heavily		
	microbrecolated with some fragments up to		
	3 cm	1 7	367 9
		(0.48 m)	(112.09 m
	carried forward		367 9
		UN ANGUS	(112.09 m



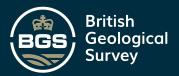
	SDI	43 SW	16
Kirk <i>ap</i> a	в.я. S D ч		5043/20
			367 9
	EUDSTORE, reddish-brown with some grey		(112.09
	around 372/0 (113.39 m), probably breasisted throughout rich in crystalline sypsus at several levels, almost all gypsus from		
	368/6-368/9 (112.32 - 112.40 m)	63 (1.91 s)	374 0 (114,00
din seema	NUDSTORE reddish brown, brecciated in part with a few inregular greenish-grey silty bands. Crystalline (porphroblast) gypsum		
dip seems o 40 ⁹	in vaguely banded form with signs of enterolithic folding	7 0 (2.13 m)	381 0 (116,13 1
	MUDSTORN, redaich brown, structureless,	(2 .1 3 m)	(116.13)
	crudely bands of gypsum crystals (perphro-		
	dlasts)	1 4 (0.41 n)	382 & (116.54 1
	MUDSTORE, reddish-brown scene breecisted with c 30% creas of ramifying gypsus, orudely		
	bunded	3 8 (1.11 m)	386 0 (117.65 s
	MUDDITORE, reddish-brown seems breesiated with	• • • • • • • • • • • • • • • • • • •	7
dip 20 ⁰	some wispy banding, a few crude beds up to 4 on thick of gypsum aggregates	5 6 (1.68 a)	391 6 (119.35 m
	MUDSTONE, reddich brown streaky fabric with a		
	fem irregular bands and areas of greenish- grey 20% siltstone bands at top, signs of		
	brecolation at top, a few gypsum velne, a		
	fer crude beds rich in gypsum aggregates	8 9 (2.67 a)	μοο 3 (122.0 m)
	SAMPLE AISSING	1 & (0.40 m)	401 7 (122,40 m)
	suberons, reddish-brown, rich in realfying		
	masses of gypsum orystals (30% of whole rook)	1 9 (0.43 m)	403 0 (122.83 n)
	SUDETONE reddish-brown and greenish-grey in		
dip e 40°	alternation, signs of discordance (slippage) at one colour junction	2 7 (0.79 m)	405 7 (123.62 m)
	carried forward	~ ~**	405 7 (123.62 m)



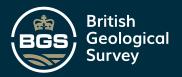
	50	5 D 43 SW		
Kirkhem B.H.		SD43/20		
			405 7 (123.62 m)	
dip 17 ⁰	MUDSTONE reddish-brown with some greenish grey patches seems breeciated, otherwise			
1	structureless, gypsum veins very rare except for a ramifying plexus around 410/0 (124.97 m)	5 7 (1.70 m)	411 2 (125.32 m)	
 →	MUDSTORS reddish-brown with 40% crystalline gypsum in rather irregular masses but with			
	definite signs of bedding MUDSTONE, greenish-grey irregularly banded	(1.01 [*] m)	414 6 (126.34 m)	
	with 13 on band with 60% irregular orystalline gypsum		415 9 (126.72 m)	
	NURSTONE, reddish-brown with some greenish- grey, probably breccisted at least in part,	(0.00 B)	(120+/2 0)	
	scattered levels rich in irregular remification of gypsum	ns 12 0 (5.66 n)	427 9 (130.38 m)	
	MUDETCER, reddish-brown, wague indications of bedding, irregular bands up to 10 cm thick			
	rich in crystalline gypsum, especially abundan (80%) from 436/2-436/11 (132.94-133.17 m)		436 11 (133.17 m)	
	EUDSTONE, reddish-brown, with a few greenish grey bands heavily microbreccisted, inregular areas of crystalline gypsum (40%) with vague			
dip 50 ⁰ decreasing gradually to	indicating banding, some bands soft and alayey are possibly residual after halite, a			
15° downwards		13 1 (3.99 a)	450 0 (137.16 m)	
	EUDSTONE reddish-brown and greenish-grey, probably brecciated, scattered gypsus sorphroblasts			
	MDETONE, reddish-brown with some greenish-	1 9 (0.53 n)	451 9 (137.69 m)	
	grey between 452/9-455/10 (138.00-138.94 m) gypsum rare breediated, heavily in places,			
dip geems c 20	with semblance of bedding below 457/4 (139.40 m)	8 6 (2.59 m)	460 3 (140.28 m)	
	Carried forward		460 3	



Kirkham D.H.	SDV	43 SW 3	/6 043/20
			- 1-1
			0.60) (11.0,28 p)
	MIDSTORE, greenish-grey, a for low angled gypeum veine to 2 cm	1 5 (0.55 m)	461 8 (140 - 72 s)
	MINETONE, reddish-brown, structureless, los engle gypour veins to 1 as chiefly in		
	upper beds	3 6 (1.06 m)	465 2 (ULL-70 m)
	MUDETONE, silty, reddish-brown	(0.71 m)	467 6 (142.49 m)
	EARDLE BITERING	10 (0.26 n)	(112.75 a)
	successing reddict-brown with some greenish- gray at base, gypsum veins to 11 om	1 10 (0.56 n)	470 2 (143•31 a)
	MUNETONS, reddiab-brown, breechated, especially downwards, fragments to 2 cm, irregular gypsum veins to 1 cm		1.73 . 79
		(2.54 m)	(144,65 a)
	AUDOTONS, reddiab-brown, structureless many cypsum voins to 5 mm, seems disturbed	(0.23 m)	475 4 (144,88 a)
dip c 45° except at base	MUDETONS, greenich-grey and reddish-brown, banded, somewhat disturbed especially at base (contact dips at 70°) very many gypsum		
	veina to 2 ca	3 2 (0.97 m)	478 6 (145.85 n)
	MUDETONE, greeniab-grey banded with allistone near top, a few gypsum veins to 1 cm	2 2 (0.66 B)	480 8 (11,6,51 m)
	NUMETONE reddish-brown structureless, gypsum velos to 1 on	(0.96 m)	483 10 (147,47 p)
	SAULAS MISSING		186 6 (118,29 m)
	MERCICIE, reddish-brown, largely structureless but sporadically banded, signs of breediation with irreg lar masses of gypsum, contered	•	
	gypeum veins throughout	0 1 (2.45 m)	194 7 (150 ,7 5 m
	carried forward		(150.75 m)

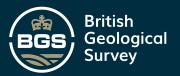


	S D I	43 S W	//6
Kirkhon B.H.		43 S N	10 5D43/20
			12 _ 1
			(150.75':
	GYPELLE or anhydrite, pinkish-gray		
	irregularly bunded	(0.18 m)	(150.93 n
	MUSICAN, reddish-brown, structureless with		
	rare greenish-grey bands in above 499/10 (152.35 m), gypsum veins to 1 cm, becoming abundant and rother inregular (possibly breedistion) around 503/0-503/9 (153.31-		
	153.54 a)	9 4 (2.84 m)	505 6 (253.77 s
	MEDITORN, reddieb-brown, banded with a few		
1 1 225	indistinctly defined greenish grey and		
dup 320	reddian-brown ailty layers, signs of		
	brecalation at 509/0-509/6, (155.14-155.30 m)		
	a few low angled gypeum velna to 1 ca	6 0 (1.83 p)	510 6 (155,60 a)
	NUMERONN reddish-brown with some greenish		
	groy, reldish-brown siltatone bands down-		
	wards, breeslated in verying degree	2.3	512 9 (156,29 m)
	SUBSTONE reddian-brown boldly banded with		1.4.2.4.4.2.3.44
	50% reddish-brown and greenish gray siltstone		
dup.45°	bands, a few salt pseudonorphs on badding		
an the second	planes, a few gypeum veins to 1 cm,		
	becoming twisted and fractured (If Flexible		
	Linestone of Durham) below 515/0 (156.97 m)	2.5.	916 2 (157 . 33 n)
		(1.04 8)	(357 . 33 n)
	SILFOTONN greenish-grey boldly banded with		
	30% greenish-gray and reddish-brown sudstone bands		1777
	ANALO MANY ANALON	(0.66 m)	518 5 (158.01 s)
	EDETORE, groeniab-grey, with a little		
	reddish-brown, banded in varying degree, with		
	silisione bende dommarde, scall lost casts	3.05 (1.03, 11)	521 10 (159.05 d)
	CILTETENE greenish grey bodly bended with 30% greenish-grey mulstone gypaum veins to		
d1p 43°			co(
		(1.27 n)	526 0 (160.32 m)
	carriel forward		526 0 (160,32 m)

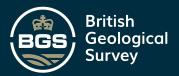


	S	D 43 SI	MP
Eirithen	D.R.	ک 43 ک ا ک	043/20 ²¹
			526 0 (160,32 a
	SILFEFORE, greenish grey with reddish tinge downsards boldly banded with 40% reddish brown mudstone ripples?, small faults and load casts gypeum veins only near base	3 0	529 0
817 33 ⁰	ALLEVENE, greeniab-grey boldly bonded with individual bods up to 6 in (0.15 m) thick with 40% grooniab-grey mulstone, reddlah brown in part near top, a fow low angle gypcum weins to 1 ou, load orats,	(u- 36 m)	(161.24 n
	ripples	12 6 (3.81 a)	543 6 (165.05 n
	SIMENENT, greenisb-grey well banded with 50% reddish brown and rure dark grey mudstone partings rure load casts rure decelection procks? rure gypsum volues to		
	5 m, e far 1 es tiror failte	2 0 (0.81 n)	514 2 (165 . 86 a
	SAUPLE RISSING	1 4 (0.42)	9.5 6 (166 . 27 a)
	HUDETONE roldich-brown structureless a few gypeun veine to 5 mm rere fish eyes	1 4 (0.40 z)	546 10 (166,67 n)
diy 37	SILFETORE, pale reddish-brown with average of 40% reddish brown mulstone beds, chiefly in lower beds a few pinhole voids (after halite?) a few gypsum veins to 8 mm load		
	oasta	2 10 (0.87 s)	559 8 (167,54 a)
	MARETONE, reddlab-broom banded with 40% greenish grey and some pale reddlab-broom siltstone bands, muderacks?, gypeum veins rare except near base; with stohed out		
	5 mm halite velns near base	8 4 (2.54 n)	558 0 (170,08 m)
dip 32	MUDETOND, greenish-grey well banded with 50% greenish-grey siltstone bands attaining 50% downwards, gypsum veins to 1 cm with halite selvage to gypsum, especially down-		
	wards, siltstone band at 563/4-563/9 (171.70-171.83 m) carried forward	6 9 (2.67 n)	566 9 (172.75 a)

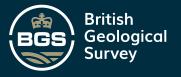
Contact BGS: ngdc@bgs.ac.uk



	٢	D 43 s	sw/6
Kirkhan B.H	•		5043/20 5043/20
			566 9 (172.75 m)
	SIMPETONE, groenish-groy, banded becoming bolder near base with 20% greenish grey mudstone bands (40% from 566/9-568/6) up to 10 cm thick, a few load costs, ripplemark, micro-ripplemark below 572/0 (174.35 m) some sheeny mics, a few pinhole voids (after balite?) near base, a few low angle gypsum		
	veins becoming very rare downwards organic trail at 575/4 (175.36 m), plant fragment		
	at 575/6 (175.41 m)	9 2 (2.79 m)	575 11 (175.54 18)
	MUDETONN, reddish-brown with abundant irregularly shaped gypsum nodules to 5 cm	(0.18 m)	576 6 (175.72 m)
•	SILTETONE, greenish grey, passing down into reddish brown, banded with reddish-brown mudstone, gypsum veins chiefly near top connect up with the modules above, some		
	sheeny nice	3 6 (1.06 m)	580 0 (176,78 m)
	MUDETONE reddish-brown with 20% reddish-brown siltstone bands dying out downwards	2 3 (0.69 m)	582 3 (177.47 2)
	SILTETONE pale reddish brown and reddish-brown mulstone, wavy banding, possing and contortion of silt grown veins to $1\frac{1}{2}$ on		20 1 A
	Eliferone, greenish grey well banded with	(0.28 m)	583 2 (177.75 m)
	20% greenish grey mudstone bands, a few pinhole voids, rare gypsum veins to 1 cm	2 10 (0.86 m)	586 0 (178.61 m)
dip 35 ⁰	SILESTONE, pale reddish-brown, bolding banded with 40% reddish-brown mudstone numerous good ripplemarks. A few gypsum weins to		
***	1 on and halite veins to 2 mm (etched out)	2 4 (0.71 m)	588 4 (179.32 m)
	MUDETONE, reddich-brown, vaguely banded with wiltstone, a few gypsum veins to 5 mm	2 8 (0.82 m)	591 0 (180.14 m)
	Carried forward	• • • •	591 0 (180,14 a)

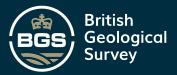


		5 D 43 S	sw/b
Kirkham B	•8.	S	043/20 23
			591 0 (180,14 s
	HUDSTONE, reddish-brown, structureless, a few low angle gypsum veins to 1 cm, very rare 1 mm low angle halite veins (voids), gypsum modules to 2 cm from 594/9-595/0 (161.28-181.36 m)	4 0 (1.22 m)	595 0 (181.36 m
	SILTETONE pale reddish-brown, wavily banded with 40% reddish-brown mudstone, a few halite and halite/gypsum veins to 1 cm, small pinhole voids. Nodules? of gypsum associated with plexus of veins and bedding disturbance at 601/4-601/8 (183.29-183.37 m)	8 0	601 0
	SILTETONE, reddish-brown, posded and	(2.43 m)	603 0 (183.79 a)
	irregularly banded with 50% reddieb-brown mudstone, many gypsum veins to 1 cm	1 2 (0.36 n)	604, 2 (184.15 b)
	SILTETONE, greenish-grey, well banded with 50% greenish-grey mudstone, showing some podded fabric. Numerous low angled gypsum veins to 1 cm, with halite cross connectors up to 5 mm thick	3 10 (1.17 m)	608 0 (185.32 m)
diy 38 ⁰	MUDSTONE greenish-grey, boldly banded with 40% greenish-grey siltstone bands, a few load casts and muddracks? A few gypsum	(191 / 2)	(10)•32 BJ
	and gypsum/halite veins (halite stohed out)	6 6 (1.98 B)	614 6 (187.30 m)
97b X ₀	SILTETONS, reddish brown and greenish-grey boldly banded with 50% alternating runs of reddish-brown and greenish grey modetone, a few halite veins (voids) to 5 mm, low angled gypsum veins to 1 cm, nodular gypsum at four		
	levels between 614/8-617/8 (187.35-188.26 m) SILTETONE, greenisb-grey boldly banded with	6 2 (1.88 m)	620 8 (189.18 m)
	50% reddish-brown sudstone, sudcreeks?, discontinuous gypsum layer 1 on thick at		
	621/9 (189.51 m)	2 4 (0.71 m)	623 0 (189.89 m)
	Carried forward		623 0 (189.89 m)

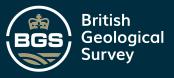


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CENTRAL WATER FLAN WELL RECORD	INING UNIT			REF. NO. 5	D43	2	0
I. WELL IDENTITY	NATIONAL GRID REFERENC	r 4			8		
well at Kirklam	BRI.	I.G.S.	REF. NO.,	••••••			
Town County Owner of well		HYDROM Sub-ca	ETRIC AREA				•••••
Well made by		Da	te of sinH	(Ing ,			·····
ADDITIONAL NOTES:					<u> </u>		
Ob: Bhl.			•				
é				ş			
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r F					÷	•	



		SD435W/ SD43/20		35W/6
1.1.11	1911			5643/20
		(0. ? 1	m)	(189 .3 9 n)
	<pre>Nudstone, reddish-brown well banded with 40 - 50 pale reddish-brown siltstone bands mud ermoks? slight convolutions, a few etched out bality voins in unner balf a few gypour voins to 1 cm in lower balf, 1 cm tonstein-like band at 627/6 (191.26m)</pre>	8 (244	o m)	631 (192.33 1
	Mudstone, reddish-brown and greenish grey, well bedded with 30 - 50% siltstone bands			
	(highest propertion downwards) a few low angle gypsum veins to 1.5 cm.	4 (1.22	9 I.	635 (193 . 55 s
	Mudstone, reddish-brown, banded with reddish brown siltstone, gypsum nodules to 2 cm of	· · · · · · · · · · · · · · · · · · ·		
	irregular shape.	1 (0 . 30	0 n)	636 (193.85 1
	Mudstone, reddish-brown with wisny alltstone bands near top, gypsum nodules to 2 cm near bottom	3	2	639
	Mulstone, reddish-brown with reddish brown siltstone bands increasing to 70% downwards. Ripple mark. Gypsum/halite weins to 2 cm (halite member to 5 mm) Gypsum modules to 1 cm at 641/3 (195.45 m)	(0.97 2 (0.81	8	(194.82 r 641 1 (195.63 r
81p 40 ⁰	Mudstone, reddish-brown, structureless, a few low angle gypsum veins to 4 mm	1	4	643
	Mudstone, reddish-brown, becoming boldly banded downwards with siltstone attaining 50% downwards ripple mark, and cracks? a few gypsum/halite veins to 1 cm, gypsum nodules to 1 cm at 646/0 (196.90 m)	(0.24 5		(196.04 1 648
	Mudstone, reddish-brown with wispy siltstone	(1.52	m)	(197.56 1
	bands, gypsum and gypsum/halite veins to 1 c	n 1 (0 . 56	10 m)	690 (198 . 12 :
	Siltstone greenish grey with a little reddish brown banded with 30% greenish grey mudston band attaining 50% below 655/4 (199.75 m),			
	Carried forward			650 (198 . 12)



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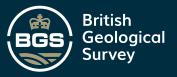
SD 43 SW/6 SD 43/20

Kirkhun Dii

		650 0
		(19 9.1 2 a)
bonding bolder downwords, rather wispy		
near top many los angled gypsus voins to		
2 on with more balite a few small salt		
pseudozorplus	6 10	and the state of t
	(2.08 m)	(200 . 20 m)
Siltstone, greenish grey boldly banded with	X	
40° greentsbegrey substane, substane, a		dan a
for los angle gypen veine	2 2	
	(0.66 ¤)	(200 . 85 n)
ilitations, graeniab-gray and reddiah-brown		
with 20% mulstone bands, neems collapsed,	•	
with coall foults, numerous los angled		
Copeum veins to 1 es	1 7	660 7
	(0.4.7 m)	(201 .3 5 a)
Miltatone, groenish-grey well banded with 2		
greeniab-grey muistone bands. Individual		
siltstone bends to 5 cm. Low angle gypeu	R/	
halite voins. Bedding disturbed and		
faulted, probably by collapse.	3 11	6 0. 6
	(1.19 a)	(202 . 5% a)
biltstone, well banded with 50% reddieb-		
brown mulstone bands, attaining 60% below	r	
666/6 (203.15 m), ripple marks, a fea		
gypour/halite voine.	4 (1.02 m)	667 10
	(1446 12)	(203 . 56 m)
udatone reddiab-brown seguely bended with	~ 44	tera a
436 vicy siltatone bonis	3 11	671 9
iltotone pale roldich brown well banded wi	th	
reddish-brown muistane bands, 60% above		
672/0 (206.65 m), 50% balon 673/0 (206.65	m).	
2 ca gypsus nodules at 676/5, 676/8, 678/	+ •	
(206.17, 206.25, 206.91 m), cornerous mud		
cracks?, alight convolutions, a few low		
angle gypann velna čomanula, somo mul		
ometa have gypaiferous infillioga.	9 1	600 10
	(2.77 m)	(207 . 52 a)
		يلايين يتسريهان فالترا
udstone, greenish grey boldly basded with		
Mistone, greenish grey boldly bandod with 40% groonish grey miltstone bands, include	00	
and the second se	ee 15	682 3



dip 40°



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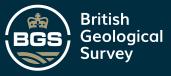
SD435W/6 SD43/20

Kirkhan BR

819 47⁰

		6%2 3
		(207.95 a)
Siltstone, greenish-grey, wisny banding, 10	,	
greenish-grey substone bonks dosmards		
gynaus/halite veins to 2 cm. Some		
convoluted bedding near top of siltstone.	2 8	604 11
7 -	(0.81 m)	(208 .7 6 s)
Siltatone, greenial-grey with 50% greeniab-		
grey substane (less near top, sore near		
botton) well banded with orinkly banding i	n	
part, a few low angle gypsum voins.	4 3	(6) 2
	(1 . 30 m)	(210 . 06 n)
Siltatone, roddish-brown with 20% wiepy		
reddiah-brown muistony bonds, scattered 20	m	
gypaum modules above 691/0 (210.62 m),		
ao voin gypaus	3 3	692 5
	(0 . 99 n)	(211.05 a)
Siltatom pele reffish-broan, well banded		
with 20% reddiet-brown mulstone.	2 7	
		(211 . 8, 8)
Siltatane greeniah-gray, well banded with 40		
groundsh-grey substand with a a reldich	**	
brown bands alight convolutions, superb		
ripplemark, cross lamination and outed fi structures at 697/6 (212.60 m) birds-eye?	11	
et 701/10 (213.92 m). Individual siltstone		
bands to 8 os los angle gypsum weins to 50	z ,	
with some helite.	7 0	702
	(2 .1 3 n)	(213 . 97 d)
Siltatone reddiab-brown, banded with 40%		
reddiek-broen zudatesse leyers a fær grey		
bands near base. Saperb ripplomaris above 703/0 (215.80 m), rure balow 708/0)	
(215.80 m), mul-ernche? associated with up	-	
dening Sypsus adules to 2 on at 701/2		
706/9 (21163, 215.42 m). Layers of gypaus		
to 1 an at 707/0,-707/2 (215.19 - 215.54 a		
\wedge for low angle balite value to 5 mm.	7 7	709
	(2 . 31 n)	(216 . 20 m)
Ciltotomo, gromish-gray with 40% groeniah-g	· .	
suistone bands including some roldiab-brow	n	
mulatons below 718/9 (219.08 m), a few		
Corried forward		709 1

-:-%



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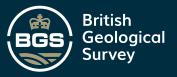
SD43 SW/6 SD43/20

Kirkhan III

				709	7
2	convolutions, this gypsus bands at 715/4,				
819 40 ⁰	713/6, (217.42, 217.47 m), gypsum nodules				
	at 711/6, 714/3 (216.27, 217.70 m), some				
	breecistion between 718/9 - 722/8 (219.08-				
	220.27 m) a few gypsus veins to the ca.	13	9	723	4
		(4-19	m)	(220.47	m)
	Mudstone, redaish-brown, faulted at top				
	(possibly tectonic).	1	1	724	5
		(0.33	@)	(220.80	a)
	Mulstone, reddish-brown, structureless with				
	40% wispy eiltstone beds abovo 725/4				
	(221.08 a) a fer gypten veins to 5 m	3	9	*	2
		(1-15,	n)	(221.95	m)
	Mudstone, roädish-brown with 20% siltatone				
	bands, faulted base may be collapse, a few				-1-
	gypsus veins.	2	1	730	3
	49 - 49		كعقر	(222.58	B)
	Siltstone greenish-grey with 35% greenish-grey	r			
	maistone bands, banding rather indistinct,				
	becauing bold downwards, increasingly				
	collapsed and brecciated downwards, but				
	banding still visible.	3 /	10		1
	the the second		(سر	(223.75	m)
	Siltstone greenish-grey with 50% greenish-grey	,			
	mulstone bands, with a little reddish-brown				
ar 300	mudstone disturbed as if by penecontempor- encous faulting at two levels, preciation				
orb ≥					
	associated in one instance with 4 on gypour	3	8	-12-1	9
	vein, rare low angle halite veins to 5 mm.			737	*
	Siltatone, greenish-gray, banded with 205	1 1 1 1 2	(m	(224.87	w)
	greenish-grey muistone passing down into				
	redish-brown mudstone, more or less				
	brecciated, especially near base, low angle				
	avpsus veins to 5 mm.	*			10
	Expansivering to 3 mer-	- (°∂3	¶ ∕m}	73 8 (225 . 20	10 `
	Mudstone, reddish-brown, breecisted, angular	((22)•20	a)
	frements to 3 ca.	*	4	-	20
		4 1	9	739 (225 . 50	10
	Siltstone greenish-grey, with 40% greenish-	10-50	'~)	225.50	m)
	grey audstone bands above 742/4 (226.26 m)				
	Carried forward			720	**
	na na transforma a na na transforma a na na transforma a na			739	10



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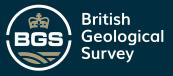
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SD43 SW/6 SD43/20

Kirkhan Bil

				739 10
				(225 . 50 b)
	and below 744/2 (226.82 m), preconstion-in-			
	situ (with plastic distortion of fregments)	}		
	above 742/4 (226.26 m). This breecia			
	intrudes downwords into the bed below.			
	Bare gypsus veins to 1 en.	5	0	724 10
				(227.03 m)
Varue	Mudstone, greenish-grey and reddish-brown,			
asp 70°	brecciated.	1	2	71,6 0
		(0.35	i n)	(227 . 38 n)
	Muistone, reddish-brown and greenish-gray			
	banded.	2	0	71,8 0
		(0.61	m)	(227 . 99 n)
	Mudstone, roddish-brown with some greenish-			
	grey, breeclated, with signs of disturbed			
	bolding in parts, broocia fragments 1 mm -			
	4 on, a few gypeun voins to 1 cm.	4	10	749 10
		(0.56	in)	(228.55 a)
	Muistone, reddieb-brown, almost structureless	3		
	with a little wispy silt, bodding vegue and	Ł		
	possibly disturbed, a few gypsum veins			
	to t on.	2	4	752 2
		(0.71	m)	(229.26 m)
	Sample missing	1	7	753 9
		(0.48	a)	(229.74 m)
	Nuistone, reddish-brown with greenish-grey			
	silty blotches, brecciated, fragments to 40	B 5	3	759 0
		(1.60	m)	(231.34 B)
	Mulstone, roddish-brown, a fow greenish-grey			
	blotches, structureless. A fes gypsum			
	veins to 2 cm.	2	8	761 8
		(0.82	m)	(232.16 m)
	Siltstone, pale reddish-brown with 40%			, , , , , , , , , , , , , , , , , , ,
	reddish-brown silty sudstone, streeky			
	fabric with breecie fragments to 2 cm,			
	vague signs of bolding, becoming better			
	defined below 760/01, (234.40 m) 4 on low			
	angle vain of fibrous gypsum at 767/11 -			
	468/02 (234.06 - 234.10 m).	7	10	769 6
		(2.38	m)	(2 34.5 4 m)
	Carried forward			769 6
				(234-54 n)

12



SD435W/6 SD43/20

Siziona BH

		769 6 (234 .5 4 a)
Mudstono, roddish-brown, structureless, a		farfaring and mil
for greenlab-grey blotches, a for gypour		
veias to 5 m.	2 () 771 G
An	(0.61 a)	(235.15 m)
Siltatone, pale greanish-gray and pale		
reddish-brown with 50% reddish-brown		
nudstone; preceisted and disturbed, vague		
signs of boilding, irregular gypsus veins,		
becoming more common downwards.	<u> </u>	2 776 B
	(1.50 a)	(236.73 m)
Siltstone, greenish-grey, banded with		
greenish-grey mulstone.	(3 777 4
	(0.20 m)	(236 . 93 m)
Muletono, reddiah-brom structuroless, s		
for groups voins to t on.	4	5 781 9
	(1.35 m)	(233.28 a)
Hudstone, silty, reddish-brown, with blotche of groenish-grey, disturbed febric with	10	
sono brecala fragmente visible, a for		
irregular gypeun voins to 2 cm.	-	3 786 0
	(1.29 m)	(239.57 n)
Mudstone, roddish-brown, structureless with		
a for greenish-grey patches and signs of breecistion below 790/5 (240.92 m) a for		
gypours volue to 3 on.	8 6	794 8
	(2.64 m)	(242.21 n)
Siltstone, greenish-grey, banded with reddie	th-	
brown mudatone, come breeckated patchee, a	t.	
for irregular grasus vains to 5 cm.	1 6	5 796 2
	(0.46 m)	(242.67 m)
Nuistone, roddish-brown, structureless, a		
for inregular gypour vains to 1 ca, a few		
silty bands below 804/10 (255.31 m)	10 4	806 6
	(3.15 m)	(245.82 m)
Audetone, refélek-brown wall bended with 305	5	
greenieb-gray and reddiab-bross elitatons		
benda.	1 5	807 11
	(0.13 m)	(246.25 m)
iulstone, reddiah-brown with a few wispy		
groonish-grey and roddish-brown siltstone		
Carried forward		807 11 (226-25 p)



61p 35°

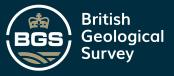
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S D 43 SW/6 S043/20

Kirkhaa 🕅

			S07 11
			(245.25 m)
	bands, a for gypous veins to 5 m.	1 2	
	Actively a rai Calimon Aurred an A mus		(246.61 m)
	Robstons, reddish-brom slopy texture, a for		
	integriler gypun reins to 2 cn.	3 0	812 1
	energe and house and the first and a second so a second so a second		(247.92 m)
	Siltatono, reddish-brown well banded with 50		
	redateb-brown mulatone, slight breeclotion		
	or mi crock, irregular grown voins to 5m	. 2 5	812 C
	· 🎢 🐨 """ · .		(22.0.26 m)
	Nuistone, reddieb-brown cilty, bandod with		
	disturbed bedding and brecclotion of		
	siltatone bands into 4 en fregments		
	irregular gypeur veins to 5 mm.	2 10	817 4
		(0 . 86 n)	(249 . 12 n)
	Nudetone, reddlet-brown bended with 30%		
d1 y 20 ⁰	greenish-gray siltatone, a few gypaum veine	•	
	to 5 m.	16	
		(0.46 m)	(249 . 58 m)
	Mulstone, reddish-brown, rearly structureless	3,	
	traces of bedding, a fer grown veins to it	r. 4 0	822 10
		(1.22 m)	(250.90 m)
	Naistone, reddiak-brown with grownish-grey ar	nđ.	
	rollinb-broom siltatone bands with some		
	broceisted patches delow 322/0 (251.16 m)		
	a few synams voine to 3 cm.	3 4	
		(1.02 5)	(031 . 82 a)
	Mudstone, reddish-brown, with a few greenish-	•	
	grey blotches, structureless, a for gypeon	يتور مقد المدار	
	velue to 1 cm.	5 10	6 3 2 0
a1p 40°	Bullahara walabah kumu kucana wasa	(1 .7 7 n)	(253 . 59 m)
art an	Mudatone, reddish-brown, bonded with reddish		
	brown and greenish-grey silty bends, beidi		
	broken near middle a few gypeun veine to b		
	10 A A A A A A A A A A A A A A A A A A A	(1.12 m)	(254.71 a)
aa	Nulstone, reddish-brown, vaguely banded, hig		
819 70°	dips probably due to collepse.	2 10	
	attenden	(0 . 86 m)	(255 . 57 a)
00	Siltstone, reddish-brown with 50% reddish-		
dip c 40°	brown mulatone bands, a few low angle		A
	gypaun vains.	3 8	
	Carried forward	(1.12 m)	(256.69 3)



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SD 43 SW/6 SD43/20

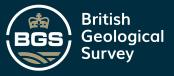
K**irkho**m DH

		84,2 2 (256.69 m)
Mudstone, reddish-brown with greenish-grey		
siltstone bands, chiefly near top, mare		
below 84.5/0 (257.56 m) a few gypsum veins		
to 1 cm.	58	817 10
	(1.73 m)	(258.42 m)
Siltstone, reddish-brown banded with 20%	,	- · · · •
reddish-brown sudstone, incipient		
brecciation-in-situ, bodding twisted,		
gypsum voins to 5 mm.	1 1	848 11
	(0.33 m)	(258 .75 m)
Mudstone, reddish-brown rether silty		
structureless.	1 2	
	(0 . 36 m)	(259.11 m)
Mulstone, ailty, reddiah-brown, dended with		
signs of collepse, a few gypsus veins to 4		
8273-3		(260 . 40 m)
Siltatone, reddish-brown, with some greenish		
groy upwards banded with reddiah-brown mulatone 50%, falling to 20% downwards,		
probable ripple mark, a few low angle	20 2 - 20	da wata wa
gypsus voins.	3 10	
	(1.17 m)	(261 . 57 B)
Mudstone, reddish-brown, faintly baaded, a	2 8	040 40
for gypsun veins to 2 cm.		
Siltstone, gromish-grey, banded with 20%	(V.01 B)	(262 ,38 m)
greenish-grey sudstone, low angle gypsum		
voins to 1 cm.	26	853 L
	(0.76 m)	(263.14 m)
Siltatone, reddish-brown and sudstone, seems		· · · · ·
breeciated with signs of bedding, irregular	r	
gypsus voins to the cm.	1 4	864 8
	(0.41 m)	(263.55 m)
Siltstone, pale reddish-brown, botchy staining	ng 2 1	866 9
		(264 .1 9 m)
Mudstone, reddish-brown, structureless encept	b -	
for some silty banding above 867/10		
(264.52 m) signs of incipient breecistion-	. 	-
in-situ a few irregular gypsum veins to 3cm		874 0
19 an anna 19 an 19 a	(2 . 21 m)	(266.40 m)
Carried forward		874 0

dip 350

alp 25°

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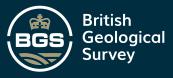
dip 65⁰ some bedding disturbance harombouts.

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SD435W/6 S043/20

Kirkhan BH

		874 0 (266-ы0 в)
Mudstone, reddish-brown, poorly banded with		Strate and the state
several concentrations of greenish-grey en	a	
roddish-brown siltstone bands, one & ca		
gypsun vein.	L 6	878 6
		(267.77 m)
Mudstone, roddish-brown with wispy ailt band	8	
near siddle and base, febric disturbed in		
places (buckling) and also some breadstip	D ,	
irregular gypsum veins to 2 cm.	30	881 6
	(0.91 m)	(268 .68 a)
Muistone, reidish-brown, structureless,		
irregular gypaus veins to 1 ca, some of		
which are faults a up to 2 on.	4 9	
	(1.45 B)	(270 .1 3 m)
Mudstone, reddish-brown, rether silty,		
structureless except for a few irregular		
banás of greanish-gray siltstone above 892/0 (271.88 m); one such siltstone band		
4 on thick is broken into fragments up to		
6 as long a few gypous veins to 5 mm.	99	896 0
	(2 . 37 m)	(273 . 10 m)
Muistone, reddish-brown faintly banded 25%		
reddiah-brown siltstone bands a few gypaus		illi se an
voins to 5 mm.	3 1	
1986 - 18 - 18 - 18 - 18 - 18 - 18 - 18 -	(0,% 3)	(274 .04 B)
Muistone, roddish-brown, faintly banded,		
wispy siltstone bands below 903/0 (275.23 m	N,,	
signs of breediation from 899/1 - 903/0		
(274.04 - 275.23 m), breecisted with		
fragments to 4 cm from 906/0 - 907/2 (276.15 - 276.50 m).	8 11	908 0
antana an indiana ang a		(276.76 n)
Nudstone, reddish-brown, semenhat silty.	(cele m)	(510010 8)
structureless, a few gypsum veins to 2 cm.	5 7	910 6
an na an a		(277.47 m)
Siltstone, with mudstone bands, banded	(fertinets mit
roddish-brown and greenish-grey.	R	911 0
		(277.67 m)
Mudstone, reddiah-brown, structureless core broken and listric downwards, gypour veina	Index, 1933	/~!!ea! m}
Carried forward		911 0



Kirkhen Eli

SD 43 5W/6 SD43/20

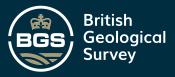
911 0 (277**.**67 m) to i on in lower bods. 2 913 10 10 (0.86 m) (278.54 m) Mudstone, reddish-brown and siltstone reddiebbrown, all more or less breedated, especially doomends, fragments to & ca, a for irrogular gypsus veins to 1 on. 2 3 917 Ó (0.97 m) (279.50 m) Muistone, reliish-brown, structurelass, a fee gyptum veins to 5 mm. 3 920 (4.02 m) (280.52 a) Siltatona, roddiab-brown and greeniab-gray (dommards) banded with undetone, reddishbrown, breechted and collapsed with bedding twisted in all directions, basal contact irregular, a few gypsum voins to 3 cm. 裔 925 Ł 0 (1.42 a) (281.94, m) Silistano, groculai-gray wall bonded with 30% groenish-gray sudstone bands, some wispy bodding and 'flame' structures, signs of minor collepse in bedding, a few gypsum veins up to 4 cm, granular banded gypsum present between 925/0 - 925/6 (231.94-232.99m) 1 岛 926 角 (282.45 m) (0.51 m) Mudstone, roddish-brown with 20% reddishbrown siltstone bands, wall banded above 929/0 (285.16 m), but some slapy and indistinct below 929/0 (283.16 m), rure Sypsum voine to 5 cm, ripple mark in lower half. 9 & 936 0 (2.84m) (285.29 n) Siltatone, refdish-brown and 50% reddish-brown mulstone, proceisted, gypsus vein. 9 増 957 9 (0.54m) (205.63 m) Muistone, reddish-brown, structureless, sypsum veins to 1 on chiefly near base. 4 5 939 2 (0.43mj (286.26 m) Siltstone, reddish-brown and reddish-brown suistone wispy texture with some breceistion dommarda. 940 4 3 (0.33 m) (286.59 m) Mudstone, reddish-brown with such greenish-

Carried forward

etp 50°

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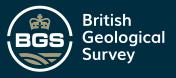


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SD43 SW/6 SD43/20

Kirkham Mi

				940	3
				(286.59	n)
	grey ailtstone (90% between 944/3 - 945/6 -				
	287.91 - 298.19 m), arecolated with signs				
	of bodding, angular frag asa ta 1 - 10 ca, a				
	for irregular gypour voins chiefly in upper				
	balf and some interstitial gypour in braceis.	8	A	948	8
		(2,36	i a)	(239.15	m)
	Siltstone, greenish-grey banded with 20%				
	groonish-grey substone, axes crinkly belding.	1	4	950	0
	(0.41	a)	(299.56	m)
	Siltstone, greenish-gray with 40% reddish-				
	brown sudstone bands, signs of buckling and				
	collepse, rare gypsus veins.	1	8	951	8
		(0.51	m)	(290.0	7 m)
	Hudstone, reddish-brown, structureless, a for				
	greeniab-grey blotches, some in aitu				
	breadistion downwords, no gypsus vains.	2	0	953	8
	(0.61	n)	(290.61	3 a)
	Siltstone, greenish-grey boldly bended with				
	105 reldish-brown mulatone partings, some				
	local braccistion, ripple mark, false				
	bedding, poor salt pseudozorphs no gypsum vein	aa 5	2	958	10
	(1	1.57	m)	(292.25	; m)
	Nulstons, reddish-brown and 40% reddish-brown				
	ailtatone heavily breecisted (fragments to				
	4 cm) above 959/9 (292.53 m)no gypsum veins.	2	5	961	3
	(0.74	s)	(292.99) m)
	Nudstone, reddish-brown with irrogular				
	greenich-grey silty blotches, incipient and				
	actual brecciation especially in lover half				
	no gypsus veine.	6	9	968	0
		2.06	m)	(295.05	i m)
	Mudstone, reddieb-brown alightly silty				
di p 50 ⁰	breccisted throughout (frequents to 8 cm),				
	greenish-grey siltstone fragments abundant				
	in parts of core, traces of bedding with				
	steep dips and overturning no gypsus veins.	5	Ø	973	0
	(1.52	m)	(296.57	' m)
	Mudstone, reddish-brown, slightly silty,				
	largely structureless, banding visible				
	between 975/0 - 976/0 (297.18 - 297.48 m)	8	0	981	0
	Carried forward (2.44	m)	(299.01	m)
			-		

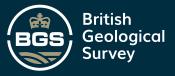


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SD4350/6 SD43/20

Kirkhag III

				981	ø	
				(299.01		
	Muistons, greenich-gray, possibly brecais,			2	and y	
	broken by Arilling.		3	981	8	
		(0.20	(a ((299.21	m)	
	laistons, reliatebran with traces of					
	groenish-grey, breedin, with angular					
	fregments to 4 cm.	Э	† 0	985	6	
		(1.17	' m)	(300.38	a)	
	Hudatone, reddiah-brown, etcretareless.	1	1	906	7	
		(0.33	m)	(300.71	<u>m)</u>	
	Nudatone, reddish-brown with 30% greenish-gr	wy				
	indictinat ciltatone bends.	4	7	988	2	
		(0.48	m)	(301.19	m)	
	Sudetone, reddieb-brown with subsidiery					
	greenish-grey, streaky texture throughout,					
	more or less breecketed, fragments tend to					
	be poil chaped.	6	2	99 2 4	4	
	AT A A A	(1.93	n)	(303.07	n)	
	Mudstone, reddish-brown, scons structureless					
	except for a for winny siltetone bands					
	dommarde.	3	8	998	0	
	013	(1.12	m)	(304.19	m)	
đip 170	Siltstone, chiefly greenish-groy boldly bande	ni -				
ap it	with 90% groundah-gray and reddich-brown					
	audebane, ripple marks, false beiding.	4	7	1002	7	
	Mudstone, reddish-brown, slightly silty, almo	(1.40	D)	(305-59	a)	
	structureless and cracks at 1007/7 (307.09)		***			
	and a concercite max status as tout// (DULOY)		5	1009	ò	
	Nuistane, raddial-brown, microbreccia	(1.95		(307.54		
		3	2	1012	8	
	Muistone, reddish-brown altomating with runs	(0.97	m)	(308.51	B)	
di y 18 ⁰	of greenish-grey; boldly banked with 30%					
	gremisb-grey alltstone, false bedding,					
	ripple part.	7	8	4040	40	
	an ei fe fei	(2.34	-		10	
	Mudstone, reddish-brown almost structureless	\ \$\$74	45/	(310.89	1932.)	
	with more silty bands, groenish-grey blotche	un t.	*9	to Maria	*	
	Concerning Concerning Concerning		7 ~``	1024 (312 . 24	. 5 \	
	Nuistone, reddish-brown well banded becoming	* •37	515 J	(376624	mj	
	indistinct downwards with 205 reddish-brown	1				
	Carried forward	6		4000	*	
	ann a na n			1024	5	

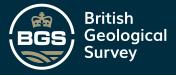


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SD 435W/6 SD43/20

Kinkhen NB

				1024	5
				(312.21	, ø)
	siltatone banks, sipple marks, load easts;				
	"birdseys' is i as eiltstesse.	3	Åş.	1027	9
		(1.0	2 m)	(313.20	5 m)
	Nudstone, reddish-brown slightly silty				
	structureless, no gypsus.	3	3	1031	0
		(0.%) n)	(314-25	5 m)
	Huistone, reddiel-moon banded, come				
	broadstion et top, rigile cent, "Lindceyo	8			
	in eiltotone.	2	0	1033	0
		(0.61	(m)	(314.86	5 m)
dlp 25°	Nudstone, roddish-brows, indistinctly bonded				
	with LOS silestons, felse bolding and ered	er 3	0	1036	0
		(0.91	m)	(315.77	' ¤)
	Nuistone, reddish-brown, structuralass, po				
	gypaun voina.	3	9	1039	9
		(1.19	(m)	(316.92	(a)
	Hudstone, reddish-brown, brecciated 'in situ'				
	fragments to 2 on throughout no groun				
	voins, one undistanted stilty band seen with	ŀ			
	false badding.	5	7	1025	4
		(1.70	(m)	(318.62	m)
	Siltstone, reddish-brown banded with 50%				
	rodish-brow meletone.		8	1046	0
		(0.20	m)	(318.82	m)
di y 16 ⁰	Huistone, greenish-grey well bonded with 40%				
	grospish-grey alltatons, false balding, a				
	fow salt pseudomorphs.	8	6	1048	6
		(0.76	m)	(319.58	m)
	Mudstone, reddish-brown, nearly structureless				
	alightly silty with a little silty bunding				
	near top, no gypsus veins.	3	3	1051	9
		(0.99	s)	(320.57	s)
	Nulstone, reddieb-brown with 60% indictinet				
	roddish-brown siltstone bands.	4	9	1053	6
		(0.54	m)	(321.11	m)
	Mudstone, somewhat ailty reddiah-brown				
	structureless, no gypsus veins.	7	8	1061	2
	· · · · · · · · · · · · · · · · · · ·	(2.33	n)	(323.44	a)
	Siltatone pale reddish-brown well and alosely		. 2	ಕನ್ ನ್ಯಾರ್ಥ್	· #
	banded with 30% reddish-brown mudstone				
	Carried forward			1061	2
				a na managementa da series de la companya de la com	n én



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SD435w/6 SD43/20

Rickhon BR

				1061	2
				(323.44	. m)
	partings, staining 60% near base some				
	streeky texture; pellet conglomer to at				
	1061/4 (323.49 m), ripple marks, and cracks	7.			
	no gypaum veina.	4	7	1065	9
		(1.40	m)	(324.84	. m)
	Huistone, greenish-grey with a run of reddiab	•			
61p 12 ⁰	brown, well and closely banded with 40%				
	greenish-grey siltstone, a for ripple marked)			
	a for malt perudomorphs, cross lemination,				
	mui creche.	7	8	1073	5
		(2.34	m)	(327.18	a)
	Mudstana, roddiah-brown with 10% streeky				
	siltatone bands, boldly convoluted near				
	midfilo, mil andi?	ŧ	0	1074	5
		(0.30	m)	(327.48	B)
	Siltatone, groeniab-groy with 40% reddiab-brow	m	7.		
	and greenish-grey sudstone partings, false				
	bedding.		L.	1074	9
	els. Provide and State	(0.10		(327.58	m)
	Mudstone allty reddiab-brown elmost	7 mili - m	.	1000	
	structureless, a few wingy siltatone banda.	4	A	1076	4
	 	(0.41			
	Mulstone, roddish-brown woll banded with 40%	10000		2004 4 77	••• <i>y</i>
	pale reddish-brown siltstone, ripple mark,				
	mul artok?	4	8	1077	9
	and party of the standard of	(0 . 51		(328.90	· _
	Mulstone, greenish-grey (near grey) well bande		199. j	(360.630	- 167
	with variable abounts of siltstone, averagin				
dip 130	· · · · · · · · · · · · · · · · · · ·	45			
و، ومه	40%, ripple mark, load cast, salt pasudomorphs possible stohed out halite veir				
	at 1080/9 (329-41 m).				-
	ac 1000/ 9 (329-41 B).	-	6		3
	****	(1.67	n)	(330.17	a)
	Muistone, reddish-brown, almost structureless				
	with 10% siltstone in faint bands.	1	4	1084	7
		(0.4st	m)	(330.58	s)
	Nuistone, reddiah-brown, finely bended with				
	some blotchy greanish-grey layers, fabric		<i>it</i>		
	podded on a small seale in two runs 5 on thi		6	1038	4
		(1.07	m)	(331.65	a)
	Siltstone, reddiab-brown with 40% reddiab-				
	Carried forward			1088	t er (12)

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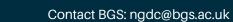
Zinkhan 22

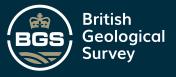
SD435W/6 SD43/20

			1088	1
			(331.65	n)
treat moletone basic extensions for at tap,				
a fee individual siltstone bands attain Som				
but average 1 cs, shundast slyple surk,				
felce bedding (could ocole) out and fill				
and grack.		3	1093	4
	(1.60	(a	(333.25	m)
Nulstone, reddich-brum with a. 20% (50%				
demoards) this pals reddish-brew atltetone				
bands, rother strenky febric is givele positi		•	1	
	1.22	0 	1097	4 • _ `
uistone, greenish-gray with a little reddick-	1.22	B)	(334.4)	(
brown near boy, boldly benici with 30%				
greenisb-grey alltstone, out and that, same		· · ·		
ripples, giant solt psoudosorph; Mestheria				
at 1099/3 (335.18 a)	3	1	1100	5
	, 0.94	•	(335.44	· ·
Stople missing	4	<i>,</i> 3	1101	8
	6.33		(335.79	
Mudatune groupish-grey, boldly banded with	****		\ <i></i>	
30% groenish-grey siltstone, mul crook.	4	2	1102	10
(0.35	m)	(336.14	. m)
Siltetone pale roddiah-brown with a little				
groonish-grey boldly banded with 50% reddieb-	•			
brown mudatone, probable and proces				
especially comes connecte, nice guite				
common in the $1 \sim 2$ or siltatons bands.	4	8	1107	6
	1.43	a)	(337.57	' n)
Muistone greenish-grey (near grey) beldly				
banded with 30% groonish-gray silteroner with 22 on of roddish-brown mulatone near				
middle; ripple mark.	3	8	1111	2
(1		a)	(338.68	m)
Mudstone, reddish-brown banded with 20%				
reddiab-brown alltations bands, rupple mark.	3	0	1114	2
(0	.92 :	z)	(339.60	m)
Siltatone, greenish-grey and pale reddish-				
brown well banded with 50% mudstone in				
station astronomy				
mu ch ripple mark, a for				
similar colours, much ripple mark, a few calcite voins with vugs.	3	8	1117	10







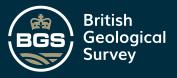


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SD435W/6 SD43/20

K**irkh**an BK

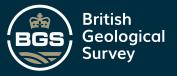
			1117 10 (340.72 m)
~	Siltatone, greenish-grey closely banded with		
01 q ib	50% greenish-grey suistons bands ripple set	rk,	
	a fow i mn calcite veins downwards.	5 1	1122 11
		(1.55 m)	(342.27 n)
	Hudstone, greenish-gray banded with 20% greenish-grey siltstone, soft with closely spaced joints, disturbed bedding might be		
	faulting or due to penecontemporencous		and and a second
	disturbance.	1 3	1124 2
		(0.38 m)	(342.65 a)
61p 17°	Siltstone, greenish-grey boldly banded with		
	50% groonish-grey (near grey) muistene		
	ripple mark, calcite voins to 2 mm and		
	calcite films on bedding.	4 0	1128 2
	74479 • · · · · · · · · · · · · · · · · · ·	(1.22 m)	(343.87 m)
	Siltstone, greenish-grey, a few muistone		
	partings, sudatone flake conglemerate	. .	
	skards to 2 cs long.	1 0	1129 2
	44. M	(0.50 m)	(344 . 17 m)
	Muistone, greenish-grey with wispy siltstone		
	bands, cross bedding, nica.	3 7	1132 9
		(1.09 m)	(345.26 m)
	Mudstone, gray (faint groenish tinge) banded		
	with 20% greenish-grey siltstone, and creck	8,	
	mulatone flake broccie layers, salt		
	peculomorphs common, irregular calcite vein	5	
	to 2 m.	5 4	1138 1
	57 * 70 .	(1.65 m)	(346.89 m)
đip 12 ⁰	Silisions, grey, boldly banded with 40% grey mudstone, a few silisiones to 3 on but much of banding is very fine, cross lamination		
up 12	ripple mark clay fiske conglowerate some mi		
	rare possible and cracks, a few calcute yei		1 143 0
		(1.50 n)	(348.39 m)
	Siltatone, greenish-grey and reddich-brown		
	banded with 50% mudstone in similar colours,	*	
	ripple mark, suistone flake conglossrate,		
	2 mm calaite vain.	1 5	1144 5
	*	(0 .43 m)	(348.82 m)
	Mudstone, greeniab-grey becoming grey below		
	Carried forward		1144 5



SD 43 5W/6 SD43/20

Kirkhan BH

			1144 5 (348.82 m)
	1149/0 (350.22 m) well burded with 200		
	greenish-grey siltstone, (40% botween 1147/	¹ 6-	
di p 12 ⁰	1142/6 349.76-350.06 m) salt paradomorphs.		
	rare losé essts, caldite voins throughout.	15 (4•75 m)	7 1160 0) (353.57 m)
	Siltatone, grey with mudstone bands, mudston		
	flake breecia layers.	1 () 1161 0
		(0.30 m)	
	Mulstone, gray, bended with this highly poro		
	coloitic fine grained analstene layers,		
	excellent self pseudocorphe to 2 cm wide,		
	ripple mark, load casts, abundant calcite	voins 2 (5 1163 6
		(0.76 m)	- Andrew - A
	Sandstone, fine-grained caleitic, highly	* ·*· · ·**	
	porous, with 50% groy sudstone bands, clay		
	flake in one sandstone band caloite veing.	2 (5 1166 0
		(0 .77 m)	(355 .4 0 m)
	Mudstone gray with calcitie sandstone, distur	bed	
	fabric with high dips and injected sediment	. 2 4	, 1168 4
		(0 .71 m)	(356.11 m)
	Mudstone, grey, with a for silty bands calcit	9	
	veins.	11	1169 3
		(0.28 m)	(356.39 m)
	Mudstone, grey with 40% porous calcitic fine-		
	grained sendstone bends.	9	1169 8
		(0 . 12 m)	(356.51 m)
	Hudstone gray woll and closely banded with		
	30% siltatone partings, a fee banks of		
	calcitic fine-grained candstone, a few calt		
	pseudomorphs, calcite veins.	34	1173 0
		(1.02 m)	(357-53 m)
aips up to 50°	Mulatons, gray, with siltatons, chiefly as a		
	matrix, appears to be injected in places,		
	bedding buckled and disturbed, perhaps a		
	seisnite.	35	1176 5
		(1.04. 5)	(358.57 m)
arp or st	Mudstone, grey banded with 20% greenish-grey		
1179/9	siltstone, bedding slightly buckled		
(359•59 m)	(steepening downwards), some calcite veins. Carried forward	37 (9.09 m)	1180 0 (359.66 m)

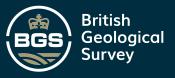


SD 43 SW/6 SD43/20

K**irkin**a M

81.p 22⁰

		1180 0
un de la compañsión de la compañsión		(359 . 66 a)
Mudstone, gray with some siltatone, boldly		
banded, broken bedding with plastic		
deformation of frequente, possible seleni		1184 4
	(1.32 m)	(360 . 98 m)
Wuistons, grey with a few alltatone bands		
chiefly mear top, one 5 on siltatone band	19	
highly microsous.	2 8	1187 0
	(0.82 s)	(361 . 80 s)
Siltstone, gray, well but not very regularly		
bonded with 20% grey mudstone bands, rippl	lo	
mark, muistone flake broccia.	3 5	1190 5
	(1.0% m)	(3@ . 84 n)
ilitations grey and pale reddish-brown boldly	r	
and rather irregularly banded with 40%		
reddian-brown sudstone, ripple sark, cross	3	
bedding.	. 1 1	1191 6
	(0 . 35 a)	(363.17 p)
andetene, fine-grained, banded, pals gray		anda, parte a pride
with pink tings.	41	1192 5
····> wer-·· ·· · · · · · · · · · · · · · · · ·	(0 . 28 n)	(363 -45 n)
Altatone, reddish-brown with some greenish- grey boldly handed with 50% reddish-brown		ڪ جب بيدا يلا
muistone bands, some siltstone bands are		
mearly mediatons, specison missing botween	\$	
1195/1 - 1196/0 (361,26 - 361,51, a)	<u> </u>	1197 8
	(1.60 m)	(363 . 95 a)
Huistone, greenish-grey banded with a few		
siltatone bonds near beso, possible doloni	ite	
band at 1199/7 - 1199/8 (365.63-365.66 m)	2 0	1199 8
	(0.61 m)	(365.66 n)
andstone, fine-grained groenish-gray,	6	1200 2
an a	(0 . 15 m)	(365.81 n)
luistone, groenish-grey with irregular reddi		and and and and and and a
brom straty bending.	1 0	1201 2
ere a se a construction and a construction of a	(0.30 m)	(366.11 m)
and a second at the second		
iulstone, reddiah-brown.	3 (a aa	1201 5
and the second	(0.08 n)	(366 . 19 m)
andstone, fine-grained pale reddish-brown,	a aia	****
berry such of calcite vains.	4 5	1205 10
	(1.35 m)	(367.54 =)
Carried forward		1205 10



50435Wb SD43/20

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(8.99 a)

6

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(1.90 m)

(0**.**66 n)

2

6

1205

1208

1211

1254

1251

1250

1276

1282

1282

(388.98 n)

(390.80 n)

(390.96 m)

(379.17 a)

(391.53 n)

(383.72 m)

(367.54 m)

(368.20 m)

(370.10 m)

10

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Sendstone, fine-grained pale reddieb-brown with some groy near top. Sendstone, modius-grained reddiah-brown and grey sandstone with blotchy colouration. come millet easd grains.

(376.12 a)

18 on thick.

Kirithes M

C.30	are	ġ,
epp dip	22	p.
. Ale and the second second	nomiti	

apperent

(i) 20

(2.36 n) Sanistono, fine-grained deep reddish-brown, oven grain also, one grey blotch. 7 (2.19 a) Sandatone. Mine to medium-grained deep roddian-brown poorly sorted, some groy blotches, signs of false bodding, podded febric at 1275/0 (388.62) may be biological in origin. 17 3 (5.26 m) Sendstone fine to medium-grained deep reddiabbrown, well bunded with some podded fabric, poorly sorted. 6 Ó (1.82 m) Senistone fine-grained with sudetone floke broccia, a few pobbles. 6 (0.16 m) Senistone fine to podium-grained reddieh-

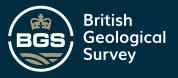
Sondstone, fine-prained, fine-to-pedium grained below 1222/0 (372.67 m), deep

roldiab-brown with a fow large grey blotches, silty bonding at 1221/0-1221/2 (572.16 -372.21 m) indications of express bedding, some milleteend grains below 1231/0

Sonistone, fine to medium-grained, traces of faint bonding roddish-brown with four banded grey bands up to 6 on thick and one

brown with a few paler blotches a few mulatono flokes, some milletseed grains, falso bodding. 鱻 ð 1291 Carried forward (2.64 m) (393.60 m)

Contact BGS: ngdc@bgs.ac.uk

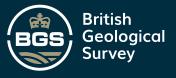


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SD 43 SW/6 SD43/20

Cirkhon BH

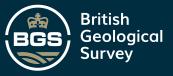
				1291	ě,
				(393.60	a)
	Sanistone, medius-grained, reddiab-brown				
	sosttored zillotaced grains.	12	8	1302	0
	اه (به مست ، میگیند. با بایا بیست با این در بایا بیست با این در این	(3.8	(m)	(397.46	s)
crossent	Sandstone, fine-grained, reddish-brown, some	20.000 · · · · · · · ·	e anis fi	1949 m. 18 - 19 - 19 - 19 - 19 - 19 - 19 - 19 -	
dip 230	milletsood greins.	11	10	1315	10
	கையன் வகையான், மற்றுமைற்றும் கூடல் இதுகை வகைகுகள்கள் து	(3.61	10 100		2
	Sandstone, greenish-grey with layers of	(36 91	, 284 <i>2</i>	/cbn+ent	ilit j
				ar allo a cal	a 2 k
	gromish-grey audatone.	An area	1	1315	112
	17	(0.03	(m)	(4CM . 10	a)
	Sandetono, modium-grained, deep roddish-brown,	ř			
	good milletsoed grains.	la.	62	1320	6
		(1.35) m)	(402.49	m)
	Sendatona fine to medium grained reddiah-brown	3	3	1325	9
		(0.99	(m ((403.40	m)
	Sendstone fine-grained graenish-gray and pale				
	reddish-brown banded.		0	1324,	5
		(0.20	(a f	(403.60	s)
	Mulstone, reláisis-brow, sirroturaless, listri	e 2	4	1326	6
	n na na sana sa na na na na na na na sana na sana na sa sa sa sa sa sa sa s	(0.6)	~	(404.32	1.14
	Sandstone very fine groined, deep reddieb-	s na b anai	* ***7	£sisse t e∰αC	103 J
	brom two 2 cs silty bels seen top.	-	18	at the terms	-356
	All and the second s	7 1	9 	1335	3
	Sandstone fine to solim-grained, doep	(2.36	m)	(406+68	a)
	reddish-brown, poorly commissi becoming				
	tougher downwards with cose bending.	12	la.	1346	7
		(3.76	a)	(130.14	. a)
	Sandstone fine and medium-grained felse-bedded	*			
	a little nice.	9	10	1356	5
		(3.00	m)	(413.44	. m)
	Sandatone fino-grained gray, adeaceous compare		3	1396	8
	· · · · · · · · · · · · · · · · · · ·			(413.51	
	Sandstone, modius grained, gradually	a, r. 700. a,	are the	1997 BALL BALL BALL	and the
	becoming fine grained downseria, reddieb-				
	brom.	5	6	1362	2
	alina a societa	1.1.		(415 . 19	
	Sudstone, reddish-brom.	(1900			
	and the second of the second	tn ma	ż.	1362	28
		(0.01	Ø)	(415.20	n)
	Sandatono, medium-grained with mulstone floke conglowerate.		2	مت الفر عول الله	-
	a more a second s	Mar		1362	3
		(0.01	n)	(415.21	m)
	Carriel forward			1362	3



SD435W/6 SD43/20

Kirkhon M

				1362	3
				(445.21	m)
amaragt	Nudstone, rollin-brown, very finely miceceou	3	1	1362	į.
dip 20 ⁸	വക്കില്ക്കും അതിക്ക് മതായത്തെ അതാനം തായ്യ നിന്നത്. ഇതായത് നെന്നത് പ്രവസംഗം നിന്നത്തില് പ്രവസംഗംഗം തുട നിന്നത്തില് പ്രസംഗംഗം തുട്ട് മതായത്തില് പ്രസംഗം നിന്നത്തില് പ്രസംഗം നിന്നത്തില് നിന്നത്തില് പ്രസംഗംഗം തുടെ പ്രസം	(0.03	m)	(415.24	a)
	Sandstone, medium-grained, milletsoed grains,	ч у . – ан			
	particularly well seen near top.	Ł.	ð	1367	0
	ೆ. ಕೊಡಿಸಲಾದು ಕಾರ್ಯದಲ್ಲು ಕೊಡಿ ಎಂದು ಅದು ಬೈದು ನ ರಾಜು ಬಿ ಕೊಡಿಸಿದು .	(1.42	a)	(416.66	m)
	Sudatone, reddish-brown, silty with siltatone				
	bends nonr top and base, listric.	1	1	1368	3
		(0.38	m)	(417.0).	a)
	Scaletone, fine to mains-grained deep				
	rollish-brow with rore greenish-gray bands				
	to 5 on thick, deep reddiab-brown maddy				
	elots from 1372/0 - 1376/8 (418.19 -				
	419.00 m) some milletseed below 1377/9				
	(119.94 m), false bedding common below	1.10		1	
	1376/0 (419.40 m).	17	2	1385	<i>\$</i>
		(5.2)	m)	(4,22.28	18)
	Sendstone, medius-grained reddish-brown,				
	several bands rich in 'milletseed' grains				
	maistone pobbles to 6 on wide at 1389/0	200		an side care as	-24
	(423•37 »).	6	0	1391	2
	Program the state of the state	(1,82	a)	(\$26.10	賤)
apparant âip 20	Candistone, fine-grained reddiah-brown		-attic		-14
~	finaly lambated alcoscous, compact.	(0.25	9	1392 (424 - 33	2
	Sandstone, addize-grained, raddish-brown	\ \\$\$ 63	-ca.j	(*90\$} \$])	594.)
	false beided, some milletseed greins.	11	3	14.05	æ
	anana alianta'i dana mperiodoka Salinte	(3-43	(a)	(427.76	5
	Sandstone medium-grained reddieh-brown	\ 2 \$%2	B)	\92/ • /9	m)
	several bands rich in silletseed grains.	6	2	12.09	-
	an la a deservatione and second and a second and a second second second second second second and a second second	(1.08		(1.29.61.	÷ د س
	Mulstone silty microscous reddiab-brown and	<i>₹</i> * ₩₩	*85 J	(ACA CONT	<i>wi j</i>
	gromish-grov.		ŧ	1609	8
	and a second	(0.03		(1.29.67	
	Sendstone fine to medium-grained, with	al an		sama kuk	1007
	micaccous reddish-brown sudstone plane				
	2 mm thick.		7	1410	3
		(0.17	-		
	Sandstone fine to medium-grained some	A		al an an air an	ġ.
	milletseed, becoming abundant downards,				
	mulstone pebbles around 1647/6 (632.05 m)	9	7	12,19	10
	Carried forward	9 (2 . 93	n)	1249 (432 . 77	m)

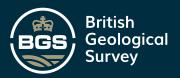


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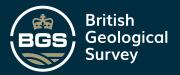
oppa**rogt** dip 20 SD43 SW/6 SD43/20

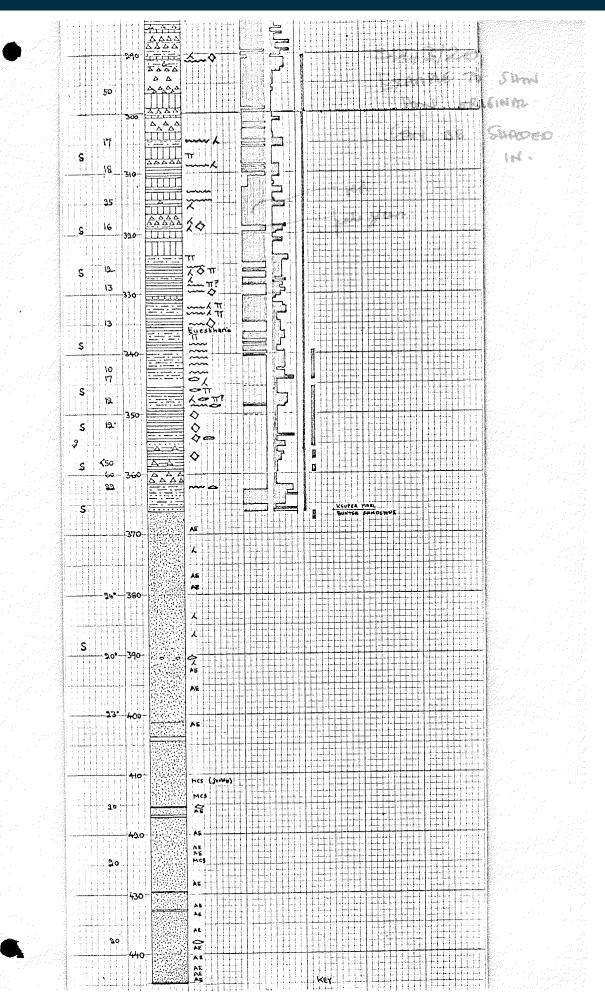
Kirkhan DR

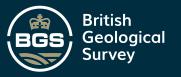
			1419	10
			(432.77	13)
Siltaione, greenish-gray micaceous and				
reddich-brown fine grained substane.		2	1420	0
	(0.05	m)	(432.82	n)
Semistone, fine to modium-grained deep				
reddich-brown, milletseed grains.	8	êş.	1428	4
	(2.94	m)	(435.36	(11)
Sendstone, fine-grained pale roldich-brown				
tough michosous.	2	0	14,30	4
· • •	(0.61	m)	(4.35.97	m)
Sendstone fine to medium grained, with				
milletsood grains.	3	11	14.34	*
	(1.19	$m\rangle$	(437.16	m)
Sendstone, fine-grained, raddisb-brown,				
banied with a few small sudstone pobbles				
near base, a few mice flakes, tough.	2	9	14.37	0
	(0.81	m)	(438.00	a)
Sandstone, medium-grained, deep reddish-brown,				
soft with abundant excellent milletzeed				
grains core scuple missing 1442/6-1443/11				
(439.67-440.11 m).	7	1	1444	1
	(2.16	m)	(440.16	m)
Sendstone, fine-grained grey, with milletseed				
grains.		3	1 dydyda	Ls.
	(0.07	m)	(440.23	a)
Sandstone, medium-grained, deep roddish-brown,				
soft with milletseed grains, especially				
abundant and of excellent shape downwards.	15	5	14,59	9
botton of hole	(4.70	$\langle m \rangle$	(444.93	a)



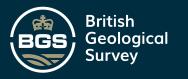
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140 141 141 141 141 141 141 141 141 141	SD43/20
y, creat here a braue We without a We wit	nd - Anti III prosecutions - Anti- -
ti di ang ti di	and party lawards and and a general scholar a gen
	e e e e e e e e e e e e e e e e e e e







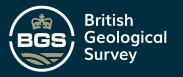
le l	le record an SD + 8/20
WATER RESOURCES BOARD	W.R.B. REF. No. 59 13/20
WELL RECORD SHEET 1	3/ 20/20
	R.A. LICENCE NO.
I. WELL IDENTITY NATIONAL GRID REFERENCE S.D.	4327 3248
well at KIRKHAM B/H. I.G.S.	REF. NO. 75]-
	AUTHORITY Lancanshine
	ETRIC AREA
County SUB-CA	
Owner of well	
Information from hankans hime a siver Autorities	
2. WELL DESCRIPTION	
OD of mensuring pt. 10.37 m. If well to	
-	rel how far belowft.
Shaft	at bottom
Bore deep; Diameter at top	2:3 Cms m
Details of headings	
	·····
DETAILS OF PERMANENT LINING TUBES	
Length ; Diam. mm Slotted ft.	am
Length ; Diam. , Diam. ; Diam.	am
Plain	t. below surrace
Length m., Diam mm. Length m., Di Plain	am
Details of well screen	
DETAILS OF REST WATER LEVELS DURING CONSTRUCTI	ON
water struck at depths of	below well top
Rest level of water	re deep. Date
Rest level of waterft.	re deep. Date
Rest level of waterm, on completion of	m
Method of drilling	
Brief details of well development e.g. acid treatment etc	
delete as applicable	(18127/:



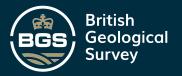
					· · · · · · · · · · · · · · · · · · ·
DETAILS OF PUMPING TEST		h	SP	43/20	1/s
water level depressed fromft. below well	top toft	below well	top, pumping at	1997 - 1997 -	galls/hr.
Water level	top to	below well	top, pumping at	·····	
Water level	top to	below well	top, pumping at	·····	(1) (1) (2) (3)
Suction atft. below well top.	Capacity of pump	<u>]/s</u> galls/hr.	Test from/	/19 to	./ /19
DETAILS OF PERMANENT PUMPING EQ	UIPMENT				
Make and/or type			ower	· · · · · · · · · · · · · · · · · · ·	•••••
	at be	low well top.			
Amount pumped	nping for	hrs./day.			
	3,			_3	/year*_
Estimated consumption	_ <u>m^/week*</u> galls/week		······	gal	is/year
3. WELL DATA			<u></u> *		
WELL USE. Abstraction . , Recharge		_			
WATER USE. Public Supply . Industrial	, Irrigation	, Agriculture	Domestic	, Unused,	Misc.
WATER LEVEL OBSERVATIONS		•			
Rest Water Level Pumping	Water Level	epression	Rate of Pu	umping	Date
0.D.	0.D.	m. ft.			
Image: Constraint of the second sec	ft	ft.			•••••
(3) 0.D.	0.D.	m.		1/ 5	
ft.		ft.			
(A) 0.D.	0.D.	m. ft.	•••••		
GEOPHYSICAL DATA AVAILABLE		· .			
Resistivity Conductivity T	emperature	iny other logs)		
PARTIAL ANALYSIS DETAILS in mi	ligrams per li	tre			
Date TDS Tot H Ca	rb H Non-Carb H	Alk	S04	C1	E.C.
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· 4.



WATER RESOURCES BOARD	W. R. B. REF NO. 50 434
WELL RECORD	ORD SHEET 2 R.A. LICENCE No. ITE , Flat surface , Hill top , Hillside , Valley bottom , Terrace $PERMO_TRLAS_SANDSTONE_Lithology Lithology $
4. HYDROGEOLOGY	non LICENCE NO.
Topography AT WELL SITE	
Local depression 🔲 , Flat surface 🗌 , I	ELL RECORD SHEET 2 R.A. LICENCE NO. GEOLOGY AT WELL SITE ession \Box , Flat surface \Box , Hill top \Box , Hillside \Box , Valley bottom \Box , Terrace \Box FER <i>PERMO</i> . TRLAS. SANDSTONE. Lithology op of aquifer m. ft. Thickness penetrated ifer m. ADD* t of storage Transmissivity op of aquifer m. ft. Thickness penetrated ifer m. ADD* t of storage Transmissivity op of aquifer m. ft. Thickness of aquifer m. t. t of storage Transmissivity ft. m. t of storage Transmissivity m. m. t of storage Transmissivity mainsisivity m. ft. ft. t of storage Transmissivity mainsisivity m. mainsisivity m. galls/day/ft. galls/day/ft. NOTES: NOTES:
MAJOR AQUIFER PERMO TRIAS	SANDSTONE Lithology
Depth to top of aquifer	Thickness penetrated
Top of aquifer AX	WELL RECORD SHEET 2 R.A. LICENCE NO. DROGEOLOGY aphy AT WELL SITE R.A. LICENCE NO. depression \Box , Flat surface \Box , Hill top \Box , Hillside \Box , Valley bottom \Box , Terrace \Box AQUIFER AQUIFER PERMO TRLAS SAMDSTONE Lithology to top of aquifer m. ft. Thickness penetrated aquifer m. AQOP ft. BDD to top of aquifer Transmissivity galis/day/ft. MOUFER Lithology Ithology to top of aquifer m. ft. Transmissivity galis/day/ft. MOUFER Lithology m. to top of aquifer m. ft. Thickness penetrated main m. ft. Thickness of aquifer ft. m. aquifer m. ft. BDD tot op of aquifer m. ft. Transmissivity galis/day/ft. m. cond of storage Transmissivity galis/day/ft
WELL RECORD SHEET 2 R.A. LICENCE NO. 4. HYDROGEOLOGY R.A. LICENCE NO. Topography AT WELL SITE Local depression , Flat surface , Hill top , Hillside , Valley bottom , Terrace MAJOR AQUIFER PERMO Top of aquifer m. Top of aquifer m. Top of aquifer m. Top of aquifer Transmissivity MINOR AQUIFER MINOR AQUIFER Lithology m. Top of aquifer m. Top of aquifer Transmissivity MINOR AQUIFER Lithology Depth to top of aquifer Transmissivity Transmissivity m. Depth to top of aquifer m. Transmissivity m. Depth to top of aquifer m. Thickness penetrated m. Thickness penetrated m. Thickness penetrated m. Thickness penetrated m. Thickness of aquifer m. Top of aquifer m. Thickness of aquifer m. Top of aquifer m. Total thickness of aquife	
MINOR AQUIFER	Lithology
bepth to top of adulter	Thickness penetrated
Top of aquifer Au	Total thickness of aquifer
Coefficient of storage	Transmissivity
	ef Lanconshire River Authority My.
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	ef Lancanshire River Authority My.



5. STRATA DEPTH DEPTH THICKNESS GEOLOGICAL CLASSIFICATION NATURE OF STRATA METRES FEET IN METRES

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British Geological Survey

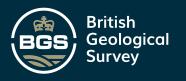
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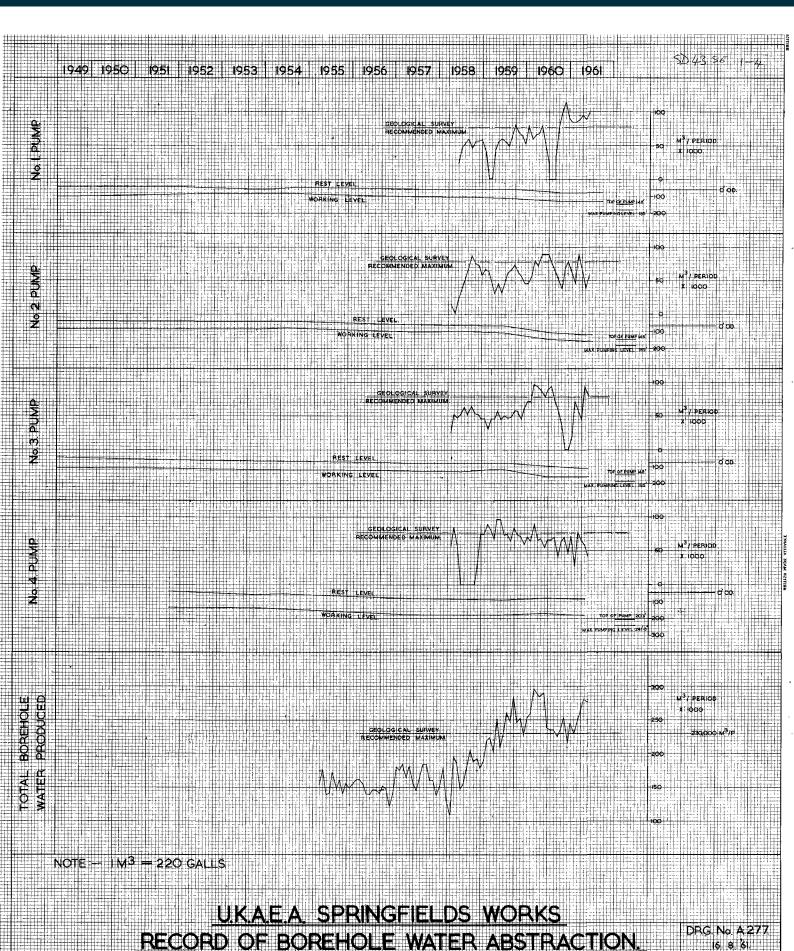
	PERT ESQ		Grid Ref	- 89 75/:	51. 1				
	AIBBY CountyLANCASHIRE	J. Six-inch o	narter el	neet 50	PANEU				
	FARM, BIBBY, KIRKHAM or PRESTOR			-					
	in parish of		lora	tracino	from				
	rface above sea-level (O.D.)ft. If well starts below groun			-					
	iameterft. Bore84ft. Diameter of bore : at top								
	nt lining tubes (internal diameters preferred)								
Water struck at de	pths of (feet)								
Rest-level of wate	below top of wellfeet. Suction atfeet	. Yield	l on	ho da	urs, test				
	per(with pump of capacityg.p.h.); depre			<i>al</i>		-			-
	e of recoveryhrs. Amount normally pumped daily. by of analysis if available)			Children		0		0.17	
	Datthewsfor Mr				,,,,.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	32	43.	SW/2	1
		Date o	or well	930		Record Sector Contractor			
				11 11					
For Survey use only). GEOLOGICAL	NATURE OF STRATA (and any additional remarks).		KNESS	, in the second se	PTH	- 			
CLASSIFICATION.	(מונע מוזי מטוונוטותו זכווומוגא).	Feet.	Inches.	Feet.	Inches.	-			
	Boulder clay	51	8	51	8	15	75	15	-
	Boulder clay Sandy mart & gravel Boulder	3	0	11	8	0	91	16	
	Brulder	8			0	1	01	17	1
	Sardy mart	3	0		0	0	92	18	
	Brown Band	-	10	IF.	10	0	26	18	5
	Small gravel	4	2		0	1	27	20	
	Sardy marl a gravel	8	0	74	0	2	44	22	
	Sand a gravel	10	0	84	0	3	04	25	
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GEOLOGICAL SUR	TEY AND MUSEUM, Date G.S.M. Office Site marked INSINGTON. received File No. on 1" map.								

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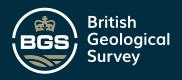
RE	CORD OF WELL (SHAFT OR BORE)			s. 75 s. 89	n
	SD4354 412 31		Ref	ד5/	
Town or Village	AIBBY County LANCASHIRE	Six-inch o	quarter s	heet 5	<u>6 r</u>
	in parish of		} or a	rough sk a tracing b is very	e f
Level of ground su	face above sea-level (O.D.)ft. If well starts below ground	surface, s	state how	v far	
	iameterft. Bore874ft. Diameter of bore : at top nt lining tubes (internal diameters preferred)	11/ <u>2</u> in	s.; at bo	ottom	
Water struck at de	pths of (feet)				
Rest-level of water	above top of wellfeet. Suction atfeet.	Yield	l on	h	our: ays
	per(with pump of capacityg.p.h.); depres e of recoveryhrs. Amount normally pumped daily				
Quality (attach cor	y of analysis if available)				
Sunk by Thos. C Information from	for Mr.	Date c	f well	-1936	
(For Survey use only). GEOLOGICAL	NATURE OF STRATA	THIC	KNESS	DE	PT
CLASSIFICATION.	(and any additional remarks).	Feet.	Inches.	Feet.	I
	Boulder clay	_		চ	
No En	Sandy mart a gravel			54	
JBOULDER CLAY	Boulde			-58	
+	Bandy mark			61	
GLACIAL	Broall gravel			61	•
SAWD +	surdy harf a gravel			74	
GRAVEL	sand a gravel			84	
			· · · · · · · · · · · · · · · · · · ·		•
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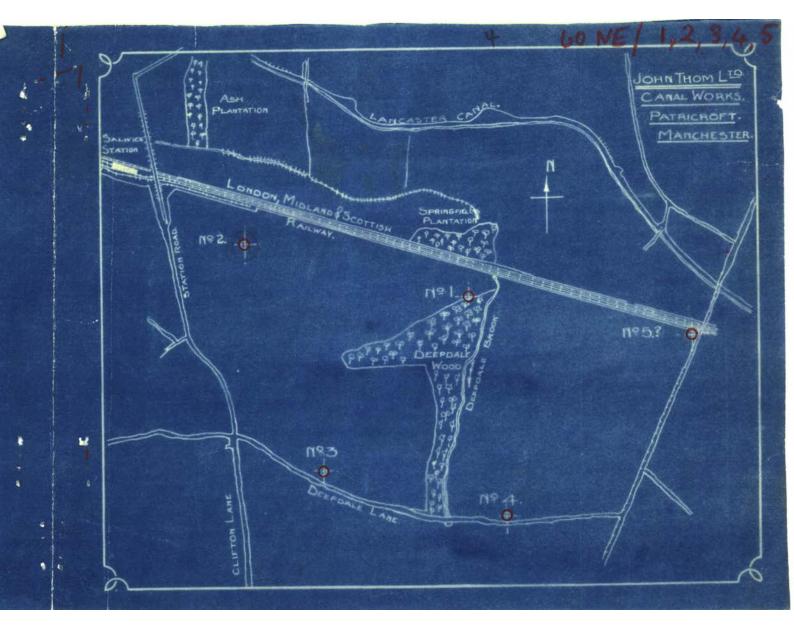


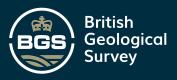




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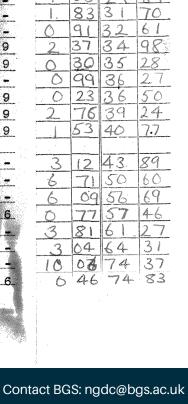
	SILED 438E STAFT OR BORE	V 2	1″ O.S Grid Ref	G.Sr	1. 3.	Co	unty	
At Messrs.	I.C.I. Castner-Kellner Alkeli Co. Ltd./	<u> </u>		6(NE	- :	· .	
Town or Village	Springfields County Lancashire	Six-inch q	uarter sh	ieetQ	toh man	6"	Quarte	r Sheet
Exact site			} or a	. tracing	from a			1
	in parish of Preston.) map			ICKNES	ckness	
	rface above sea-level (O.D.)ft. If well starts below ground					me	inic	~~~
	liameterft. Boreft. Diameter of bore : at top		.; at bo	ttom	ins.			
Details of permane	nt lining tubes (internal diameters preferred) (See below	.)				, pi		
	pths of (feet)			ho	1176			
Rest-level of wate:	r_{above}^{below} top of well $26\frac{1}{2}$ feet. Suction at feet.	Yield	on	da da	urs' test	8		
gallons	perg.p.h.); depres	sing water	level to		feet			
below top. Tim	e of recovery	g	.p.h. for		hours.		-	
Quality (attach co	by of analysis if available)					Sener bilant - Lep or sen		1
Sunk by John	Thom Ltd. for Mr.	Date of	f well	1941.	<u> </u>			
Information from.	Messrs. John Thom Ltd., Canal Works,	Patric	roft.					
(For Survey use only).	NATURE OF STRATA	THIC	KNESS	DEI	PTH			
GEOLÓGICAL CLASSIFICATION.	(and any additional remarks).	Feet.	Inches.	Feet.	Inches.			
		_	6			\sim	46	0
	Surface Soil		6	1	6	0	61	. 1
	Yellowish Clay	2	-	3		3	20	à
	Hard Brown Clay and Stones	10	6	14			35	7
	Softer Brown Clay and Stones		-	25	1	1	52	9
	Harder Brown Clay and Stones	5	-	<u> </u>		Ô	92	10
	Very Hard Clay and Stones			39		1	83	
	Hard Brown Clay and Stones		-	1	28	1	52	13
	Softer Brown Clay and Stones		-	44 47	5 M.	0	92	14
	Very Hard Clay and Stones		6	49	1.19	0	7.6	15
	Very Hard Sand and Gravel		9	50	32	0	23	15
	Soft very sandy Clay Very Hard Sand and Gravel	2	9	53	20080X.51-	0	83	16
	Sand	39	6	92	A State of	12	04	28
	Hard Very Sandy Clay with a lot of							
	Stones	5	6	96	3 -		68	
	Sand and Gravel	6	-	104			83	
	Sand and Gravel (with a little clay)	3	_	107		0	91	32
	Gravel	7	9	114		2	37	34
	Sandstone	1	-	115		0	30	35
	Red Sandstone (no core)	3	3	115		0		
	Red Sandstone		9	118	million	0		and another succession of
	Red Sandstone (coring)	9	-	128	2 1	2	76	
	Red Sandstone with Grey Bands (coring)	5		133	5 9	<u> </u>	53	40
	Red Sandstone with thin bands of marl							10
	through it	10	3	144	·	3		
	Red Sandstone with Grey Bands	22	-	166	102.0	6	-71	
	Red Sandstone	20	-	180		6	00	A. canta manine
	Red Sandstone and Marl	2		188	1 2000 AND AND A	0	77	
	Red Sandstone	12	1	201	2 · · · · · · · · · · · · · · · · · · ·	3	81	
	Red Sandstone with Grey Bands	10	-	21		3	Andiates	name and a second
	Red Sandstone	33	-	244		10	A 11	74

Geological Survey and Museum, South Kensington, London, S.W.7.

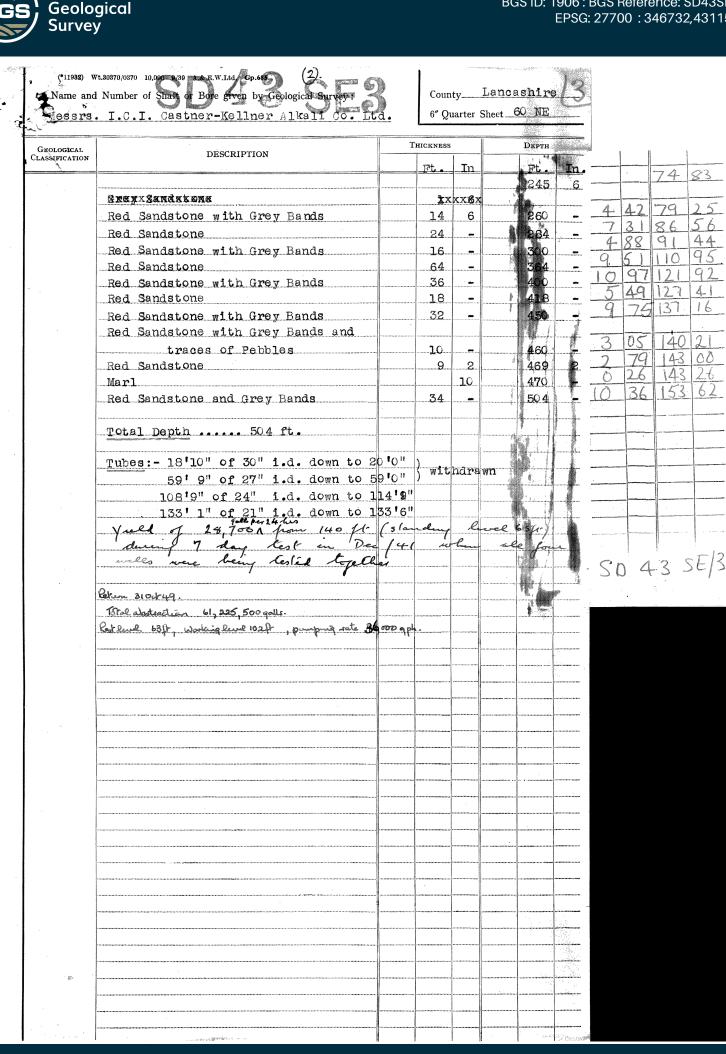
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Site marked on 1″ map (use symbol)

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JOURNAL OF NO. 3. BOREHOLE PUT DOWN PATHEMECK STRE. SPRINGPERIOS. MN. PRESTON. 11 007 MESSRS 1.0.1. CASTMER KELLMEN, ALLALL CO. LTD. 11 007 Very Hard Clay and Stones. 14 007 10 007 Very Hard Clay and Stones. 14 007 10 007 Very Hard Clay and Stones. 10 007 Very Hard Sand and Gravel. 10 007 Very Hard Sand and Gravel. 10 007 Very Hard Sand Gravel. 10 007 Very Hard Sand and Gravel. 10 007 Very Hard Sand Stones. 10 007 Very Hard Sand Stone Stones. 10 007 Fed Sandstone. 10 007 Fed Sandstone. 10 007 Fed Sandstone with Grey Bands. 10 007 Fed Sandstone. 10 007 Fed		1100 SA35"E of Solutich	Shi	
POR MESSRES I.C.I. CASTNER KELINER ALTALI CO. LTD. AT SALWICK SITE. SPRINGPIELDS. NR. PRESTON. 1: 6" Surface Soll. 1: 6" 2: 0" Yellowish Clay. 1: 6" 1: 0" Softer Brown Clay and Stones. 1: 0" 5: 0" Harder Brown Clay and Stones. 2: 0" 6: 0" Harder Brown Clay and Stones. 2: 0" 6: 0" Harder Brown Clay and Stones. 4: 0" 7: 0" Very Hard Clay and Stones. 4: 0" 7: 0" Very Hard Stand and Gravel. 40: 0" 7: 0" Very Hard Stone Standstones. 4: 0" 7: 0" Very Hard Stone Standstones. 4: 0" 7: 0" Softer Prown Clay and Stones. 9: 0" 7: 0" Softer Very sandy Clay. 5: 0" 7: 0" Softer Yeary and Yeary Standy Clay. 5: 0" 8: 0" Sand and Gravel. 10: 0" 7: 0" Sandstone. 11: 0" 7: 0" Sandstone. 11: 0" 8: 0" Hard Sandstone. 11: 0" 9" 0" Fed Sandstone. 12: 0" 9" 0" Fed Sandstone. 12: 0" </th <th>-</th> <th>TOURNAL OF NO. 3. BOREHOLE PUT DOWN</th> <th></th> <th>1</th>	-	TOURNAL OF NO. 3. BOREHOLE PUT DOWN		1
AT SALWICK SITE. SPRINGFIELDS. N.R. PRESTON. 1 6" Surface Soll. 1 6" 2 0" Verlowish Clay. 3 500 3 0" Herde Brown Clay and Stones. 25 0" 3 0" Very Hard Clay and Stones. 30 0" 3 0" Very Hard Clay and Stones. 30 0" 3 0" Very Hard Clay and Stones. 30 0" 3 0" Very Hard Clay and Stones. 40 0" 3 0" Very Hard Sand and Gravel. 50 0" 3 0" Very Hard Sand and Gravel. 100 3 0" Very Hard Sandstones. 100 0" 3 0" Sand and gravel (with a little clay) 107 0" 3 0" Red Sandstone (no core) 119 0" 9 0" Hed Sandstone (coring) 120 9" 9 0" Hed Sandstone (coring) 120 9" 9 0" Hed Sandstone (coring) 120 9" 10 0" Hed Sandstone Mith Grey Bands. 166' 0" 2 0" Hed Sandstone with Grey Bands. 166' 0" 3 0" Hed Sandstone with Grey Bands. 160' 0" 3 0" Hed Sands			LTD.	-
2: 0" Yellewish Clay. 3: 6" 10: 6" Hard Brown Clay and Stones. 14: 0" 5: 0" Softer Brown Clay and Stones. 25: 0" 5: 0" Nerry Hard Clay and Stones. 35: 0" 6: 0" Hard Brown Clay and Stones. 35: 0" 7: 0" Very Hard Clay and Stones. 44: 0" 7: 0" Very Hard Clay and Stones. 44: 0" 9" Softer Brown Clay and Stones. 44: 0" 9" Soft very sandy Clay. 50: 3" 5: 0" Softer Brown Clay and Stones. 44: 0" 9" Soft very sandy Clay. 50: 3" 5: 0" Sand and Gravel. 53: 0" 5: 0" Sand and Gravel. 53: 0" 5: 0" Sand and Gravel. 104: 0" 7: 0" Sand and Gravel. 104: 0" 7: 0" Sand and Gravel. 104: 0" 9" Sand and Gravel. 104: 0" 7: 0" Sand and Gravel. 104: 0" 7: 0" Sand and Gravel. 104: 0" 9" Sand softer (or core) 104: 0" 9" Sand softer (or ing) 105: 9" 10: 3" Red Sandstone (or ore) 105: 9" 10: 3" Red Sandstone (or ing) 128: 9" 10: 4" Red Sandstone (or ing) 128: 9" 10: 4" Red Sandstone and Marl. 166: 0" 10: 0" Red Sandstone. 166: 0" 11: 0" Red Sandstone. 166: 0" 12: 0" Red Sandstone. 166: 0" 13: 0" Red Sandstone. 166: 0" 14: 0" 14: 0" Sand sone. 166: 0" 15: 0" Red Sandstone. 166: 0" 16: 0" Red Sandstone. 16: 0" 17: 0" Red Sandstone. 16: 0" 16: 0" Red Sandstone and Merl. 16: 0" 16: 0" Red Sandstone and Merl. 16: 0"				
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<pre>10. c" Hard Brown Clay and Stones. 25. 0" 11. 0" Softer Brown Clay and Stones. 25. 0" 31. 0" Very Hard Clay and Stones. 33. 0" 32. 0" Very Hard Clay and Stones. 35. 0" 33. 0" Very Hard Clay and Stones. 35. 0" 34. 0" Very Hard Clay and Stones. 44. 0" 35. 0" Very Hard Clay and Stones. 44. 0" 37. 0" Very Hard Clay and Cravel. 55. 0" 39. 6" Hard Very sandy Clay with a lot of Stones. 60. 0" 30. 0" Sand and Cravel. 104. 0" 31. 0" Sand and gravel (with a little clay) 107. 0" 32. 0" Sand and gravel (with a little clay) 107. 0" 33. 0" Sand and gravel (with a little clay) 107. 0" 34. 0" Sand and gravel (no core) 119. 0" 35. 0" Red Sandstone (no core) 119. 0" 35. 0" Red Sandstone with Grey Bands (coring) 123. 9" 35. 0" Red Sandstone with Grey Bands. 166. 0" 32. 0" Red Sandstone with Grey Bands. 166. 0" 33. 0" Red Sandstone. 166. 0" 34. 0" Red Sandstone. 244. 0" 35. 0" Red Sandstone. 244. 0" 36. 0" Red Sandstone. 244. 0" 37. 0" Red Sandstone. 244. 0" 37. 0" Red Sandstone. 244. 0" 37. 0" Red Sandstone with Grey Bands. 300. 0" 37. 0" Red Sandstone with Grey Bands. 300. 0" 37. 0" Red Sandstone with Grey Bands. 504. 0" 37. 0" Red Sandstone and Orey Bands. 504. 0" 37. 0" Red Sandstone and Orey Bands. 504. 0" 37. 0" Red Sandstone and Orey Bands. 50</pre>				
<pre>11: 0" Softer Brown Clay and Stones. 20: 0" 5: 0" Hard Brown Clay and Stones. 30: 0" 6: 0" Hard Brown Clay and Stones. 30: 0" 7: 0" Very Hard Clay and Stones. 30: 0" 7: 0" Softer Brown Clay and Stones. 40: 0" 7: 0" Very Hard Clay and Stones. 40: 0" 9" Soft very sandy Clay. 50: 3" 9" Very Hard Sand and Gravel. 40: 6" 9" Soft very sandy Clay. 50: 0" 5: 0" Eand. 50: 0" 7: 9" Sand and Gravel. 50: 0" 7: 9" Gravel. 10: 0: 0: 0: 0: 0: 0: 0: 0" 9" Sand and Gravel. 10: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0</pre>			14' 0"	
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<pre>6: 0" Hard Errown Clay and Stones. 39: 0" 5: 0" Softer Brown Clay and Stones. 47: 0" 2: 0" Very Hard Clay and Stones. 47: 0" 2: 0" Very Hard Sand and Gravel. 50: 0" 3: 0" Very Hard Sand and Gravel. 50: 0" 5: 0" Sand and Gravel. 50: 0" 5: 0" Sand and Gravel. 50: 0" 5: 0" Sand and Gravel. 92: 0" 5: 0" Sand and Gravel. 10: 0''' 7: 0" Sand soften or core) 119: 0" 7: 0" Sand soften or core) 119: 0" 7: 0" Red Sandstone. 119: 0" 7: 0" Red Sandstone (no core) 128: 9" 5: 0" Hed Sandstone (coring) 128: 9" 5: 0" Hed Sandstone with Crey Bands (coring) 133: 9" 10' 3" Red Sandstone and Marl. 188: 0" 20: 0" Red Sandstone. 116: 0" 10: 0" Red Sandstone. 116: 0" 12: 0" Red Sandstone. 126: 0" 12: 0" Red Sandstone. 244: 0" 14: 0" 15: 0" Red Sandstone. 12: 24: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 14: 0" 15: 0" 14: 0" 14: 0" 14: 0" 15: 0 15:</pre>				
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3: 0" Very Hard Clay and Stones. 47: 0" 2' 6" Very Hard Sand and Gravel. 50: 5" 9" Soft very sandy Clay. 50: 5" 9" Yery Hard Sand and Gravel. 50: 5" 9" Yery Hard Sand and Gravel. 50: 5" 9" Yery Hard Sand and Gravel. 50: 5" 9" Hard Very Sandy Clay with a lot of Stones. 92: 6" 5' 6" Hard Mary Sandy Clay with a lot of Stones. 92: 6" 9" Sand and gravel (with a little clay) 104: 0" 10" Sandstone. 119: 0" 9" Red Sandstone (no core) 119: 0" 9" Red Sandstone with Grey Bands (coring) 133: 9" 10' 3" Red Sandstone with Grey Bands. 166: 0" 20: 0" Red Sandstone and Marl. 188' 6" 21: 0" Red Sandstone. 241: 0" 10' 0" Red Sandstone with Grey Bands. 260: 0" 21: 6" Red Sandstone. 244: 0" 12: 6" Red Sandstone. 244: 0" 10' 0" Red Sandstone. 260: 0" 12: 6" Red Sandstone. 260: 0"<				
2' 6" Very Hard Sand and Gravel. 9" Soft very sandy Clay. 1' Very Hard Sand and Gravel. 5' 6" Sand. 5' 6" Sand. 5' 6" Sand and Gravel. 5' 7" Sand and gravel. 5' 7" Red Sandstone (no core) 5' 7" Red Sandstone (no core) 5' 7" Red Sandstone (coring) 5' 7" Red Sandstone (coring) 5' 7" Red Sandstone with Grey Bands (coring) 5' 7" Red Sandstone. 5' 7" Red Sandstone. 5' 7" Red Sandstone with Grey Bands. 5' 7" Red Sandstone. 5'		Very Hard Clay and Stones.	471 011	
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5' 6" Herd Very Sandy Clay with a lot of Stones. 98: 0" 6' 0" Sand and Gravel. 104: 0" 7' 9" Gravel. 104: 0" 7' 9" Gravel. 114: 9" 1' 0" Sandstone. 116: 9" 1' 0" Sandstone. 116: 9" 1' 0" Sandstone. 119: 9" 9" Red Sandstone (no core) 128: 9" 6' Ked Sandstone (coring) 123: 9" 10' 5" Red Sandstone with Grey Bands (coring) 133: 9" 10' 5" Red Sandstone with Grey Bands. 166: 0" 22' 0" Red Sandstone. 186: 0" 22' 0" Red Sandstone. 186: 0" 22' 0" Red Sandstone. 186: 0" 20' 0" Red Sandstone. 201: 0" 10' 0" Red Sandstone. 201: 0" 35' 0" Red Sandstone. 201: 0" 10' 0" Red Sandstone. 201: 0" 35' 0" Red Sandstone. 244: 0" 1' 6" Grey Sandstone. 244: 0" 1' 6" Grey Sandstone. 244: 0" 1' 6" Grey Sandstone. 244: 0" 16' 0" Red Sandstone. 244: 0" 16' 0" Red Sandstone. 260: 0" 24' 0" Red Sandstone. 260: 0" 36' 0" Red Sandstone. 260: 0" 24' 0" Red Sandstone. 418: 0" 22' 0" Red Sandstone. 418: 0" 36' 0" Red Sandstone. 418: 0" 36' 0" Red Sandstone. 460: 0" 36' 0" Red Sandstone. 460: 0" 36' 0" Red Sandstone. 504' 0" Marl. 470' 0" 34' 0" Red Sandstone and Grey Bands. 504' 0" MEST WATER LEVEL 26' 6" TUBES:- 18'10" of 30" 1.d. down to 20' 0" Mithdrawn. 105' 9" of 27" 1.d. down to 114' 9" 133' 1" of 21" 1.d. down to 133' <u>6</u> "				
6: 0" Sami and Gravel. 104:0" 3: 0" Samd and gravel (with a little clay) 107:0" 7: 9" Gravel. 114:9" 1: 0" Sandstore. 115:0" 3: 3" Red Sandstore. 115:0" 9" Red Sandstore. 119:9" 9: 0" Hed Sandstore. 119:9" 9: 0" Hed Sandstore. 128:9" 5: 0" Hed Sandstore (coring) 128:9" 10: 5" Red Sandstore with Crey Bands (coring) 133:9" 10: 5" Red Sandstore. 166:0" 20: 0" Red Sandstore. 186!0" 21: 6" Red Sandstore. 186!0" 22: 6" Red Sandstore. 244:0" 24: 6" Red Sandstore. 244:0" 16: 6" Red Sandstore. 244:0" 24: 0" Red Sandstore. 460:0" 36: 0" Red San				
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9' 2" Red Sandstone. 469' 2" 10" Marl. 470' 0" 34' 0" Red Sandstone and Grey Bands. 504' 0" TOTAL DEPTH	TO: 0"		460' 0"	
10" Marl. 470' 0" 34' 0" Red Sandstone and Gray Bands. 504' 0" TOTAL DEPTH	91 21		469' 2"	
<u>TOTAL DEPTH.</u>		Marl.		
REST WATER LEVEL 26' 6" <u>TUBES:</u> - 18'10" of 30" i.d. down to 20' 0")Withdrawn. 59'9" of 27" i.d. down to 59' 0")Withdrawn. 108' 9" of 24" i.d. down to 114' 9" 133' 1" of 21" i.d. down to 133' <u>6</u> "	34' 0"	Red Sandstone and Gray Bands.	504' 0"	
TUBES:- 18'10" of 30" i.d. down to 20' 0")Withdrawn. 59'9" of 27" i.d. down to 59' 0")Withdrawn. 108' 9" of 24" i.d. down to 114' 9" 133' 1" of 21" i.d. down to 133' <u>6</u> "		TOTAL DEPTH 504' O"		
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59'9" of 27" i.d. down to 59' 0")"Indiatant 108' 9" of 24" i.d. down to 114' 9" 133' 1" of 21" i.d. down to 133' <u>6</u> "		TUBES:- 18'10" of 30" i.d. down to 20' 0") With drawn	
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BGS	British Geological Survey
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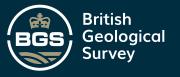
NGR 4729	SORD OF WELL SHAFT OR BORE		1″ O.S.		SD 43	3 SE
Sec.	A No		Grid	G.SM. Af	County	
At Messrs. I	.C.I. Cestner-Kellner Alkali Co. I.td., No				- '	
Town or Village	Springfields County Lancashire Six	-inch qu	artersh	eet <u>ou we</u>	6" Quarter	Sheet
	50 yds. E. 43° S of Salwick Station.					
	in parish of Preston.		\dots map	is very desirable)	HICKNESS	1
Level of ground sur	face above sea-level (O.D.)ft. If well starts below ground su	rface, st	ate how	farft.	metric	me
Shaft ft d	iameter ft. Boreft. Diameter of bore: at top	ins.	; at bot	tomins.		
Details of permanent	nt lining tubes (internal diameters preferred) (See below)					
-						
Water struck at de	pths of (feet)					
Rest-level of water	below top of wellfeet. Suction atfeet.	Yield	on	hours' test		
				5		
gallons	per(with pump of capacityg.p.h.); depressin	g water	n h for	- hours		
	e of recoveryhrs. Amount normally pumped daily		.p.n. 101	inours.	-	
Quality (attach con	by of analysis if available) Thom Ltdfor Mr	Data of	woll	1941.		
Sunk by John	Messrs. John Thom Ltd., Canal Works, P	atric	roft.	399.022		
Information from.	Messis. John Them Bett, John Willie			2225	*	
(For Survey use only). GEOLÓGICAL	NATURE OF STRATA		KNESS	DEPTH	N	
CLASSIFICATION.	(and any additional remarks).	Feet.	Inches.	Feet. Inches.		
		1	_	1 -	0 30	0
	Surface Soil	7	-	8 -	2 14	2
	Hard Clay and Stones	13		21 -	396	6
	Softer Brown Clay and Stones	18	-	39 -	5 49	((
	Brown Clay and Stones	2		41 -	061	12
	Sand	4	_	45 -	1 22	13
	Brown Clay and Stones	20	9	65 9	6 32	2Ò
	Very Hard Sand	11	3	77 -	3 4 3	23
	Hard Sand Clay with a lot of Stones	2		79 9	0 84	24
		2		82 -	0 68	24
	Red Sandstone	11		93 6	3 51	2.8
	Red Sandstone (No Core)	4		97 6	1 22	29
	Red Sandstone (Coring)	3	1	100 6	0 91	30
	Red Sandstone (No Core)	9		110 4	3 00	33
	Red Sandstone (Coring) Red Sandstone	38		148 9	1171	45
	Grey Sandstone	4		152 9	122	46
	Red Sandstone	1	3	154 -	0 38	46
	Red Sandstone with Grey Bands	13	-	167 -	3 96	50
	Red Sandstone	1		168 -	0 31	51
	Grey Sandstone	3	9	171 9	114	62
	Red Sandstone	7	9	179 6	2 3.6	54
	Red Sandstone with Grey Bands	8	6	188 0	2 39	57
	Brown and Grey Sandstone	3	6	191 6	1:07	5.8
	Red Sandstone	7	6	199 -	229	60
	Red Sandstone with Grey Bands	10	-	209 -	3 0.4	63
·	Red Sandstone	2	6	211 6	0 77	64
	Brown Sandstone	4	9	216 3	144	65
· · · · · · · · · · · · · · · · · · ·	Red Sandstone	3	9	220 -	1.15	67
	Brown and Grey Sandstone (Badly Broken)	E	5 -	225 -	1:52	68
	Red Sandstone			227 9	084	. 69
	Red Sandstone (No Core)	7	' 3	235 -	221	7.1
		10) -	245 -	factorial and a second second second	

For Survey use only Site marked on 1° map (use symbol) G.S.M. Office File No. Date received

GEOLOGICAL SURVEY AND MUSEUM. South Kensington. London, S.W.7.

(*11815) Wt.29051/O.369 10,000 9/39 A.& E.W.Ltd, **Gp.686**

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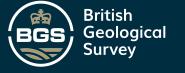
	Centra	r N Y	w.regia	m					
Name of sit						W R B No.			
WAR	eten E	BANK.				SD 42/10	7 50421	14/5	
Owner				Licence no. Appn no.		Nat. grid ref. 50 4043	2794		-
Occupier				Cancelled GS ref. no.		Status frilled for th	ater investigation	n borchold 1. sector	
Ground leve	et	r	n OD		ft. OD	Aquifer			
Level of we	li top	r	n OD		ft. OD	Code			
Rest water	ievel	r	n bwt		ft. bwt	Summary of geological section	Thickness	Depth	_
(Date)	r	n OD		ft. OD			m	
Constructio	on: Method	Perumo	🗕 Da	ite Jan	88	Drift	-	20.4	B.Clay
Depth	Dia.	Linings (belo	w weil top)			Moria Muditines		26.0	
bwt		From	То	Dia.	Туре				-
			ļ 						_
									-
				+					~-
									- .
Abstraction	rat es	1	Type of pum	. 	. I			-	-
	gph PWL	• (Chem./bact.	anal. Y	'ES/NO				
	gpd	١	Vell driller						_
If insufficie	nt space has l	peen allowed, co	ontinue in 'N	lotes' overleaf			1/5/7	9/207	

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* Mencia Muchelenes' and indicated appear 250 m to SE of boundary docum on 1982 edition. They may be post of transition from Shewood Bit. to Mercia Mudat.?

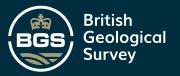


Contact BGS: ngdc@bgs.ac.uk



1/	Ground					SD 42 NW /S						
	Orientat Boring Contract	Metho				Sheet 1 of 2. Permanent Lining-Backfulled Tube Backfulled Details	No 4 Nome WARTON BANK Location WARTON		SD 4	043 W.RB. 1 504	Ref	
	Progress	Water	Core Recovery	Fractures	Lining	DESCRIPTION	OF STRATA	Level (m)	Depth (m)	Sample	k Symbolic Log	
)	2/2					Brown firm/stiff rendy be Brown firm leminated ran Brown to Red-brown firm/M boulder CLAY with rand lemes	dy CLAY					Β.c
	EXPLAN		Gen	eral k	(ey						North West Water	
	Logged	° P.A	. L . (4)		Scale]					Water	
	•	L .	15 M	•			na Istan	.1				

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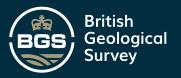
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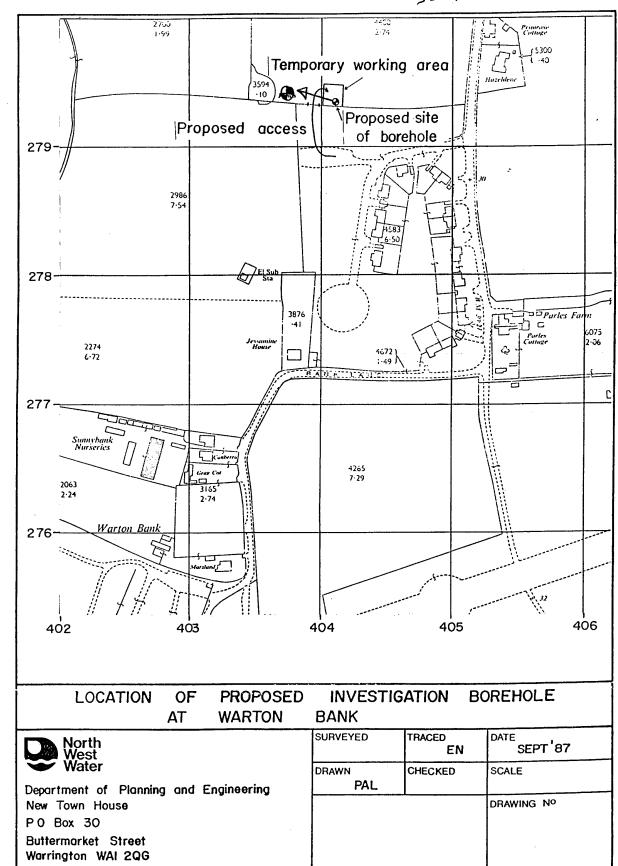
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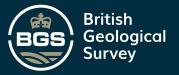
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Ground	Level				Sheet	2	of 2		Borehole No		4		Grid Re	· · · · ·		1
Orienta Boring Contrac	Metho	d			Permonent Lining- Tube Details	2 	of 2		No Name W Location J	ARTON				W.R.B.	Ref 2/19	
Progress	Water	Core Recovery	Fractures	Lining			DESCRIF	TION	OF STRA	ΓA		Level (m)	Depth (m)	Sample	Symbolic Log	
3/2					As a Red-l trace		weather gupsn	ned M	UOSTONE	with		20-4	-21 -22 -23 -24 -24			Men mud Y.C 26
- 4/2 					Başe	OF	BOREHO	LE	10		•	26.0	· · · · · · · · · · · · · · · · · · ·		-	
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	Se	e Gen	val 1	Key					*						North West Water	





50 42 NW 5



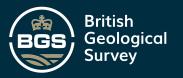
Central N.w. region

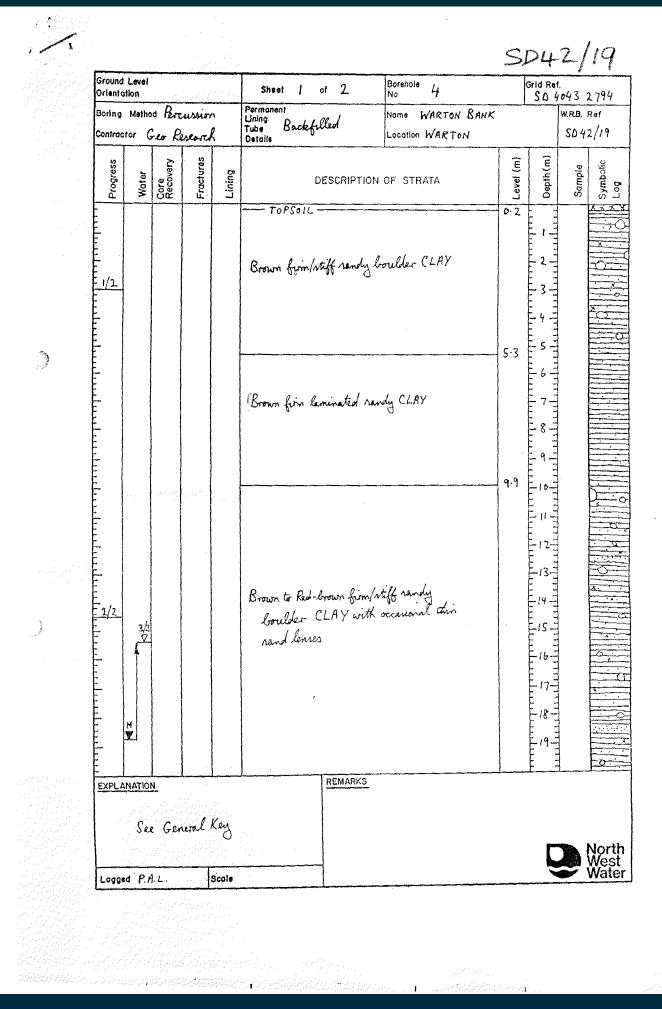
Name of sit	te					SD42/19 75 5042/19					
WAR	ETON B	SANK.									
Owner			· · · [,	Licence no. Appn no.		Nat. grid ref. 50 4043	2794				
Occupier				Cancelled IGS ref. no.		North West We Status frilled for the	2.7994 ter investigation 6. W. + 5. W	section			
Ground lev	el	п	1 OD		ft. OD	Aquifer					
Level of we	ell top	п	1 OD		ft. OD	Code					
Rest water	level	n	1 bwt		ft. bwt	Summary of geological section	Thickness	Depth			
(Date)	n	n OD		ft. OD			m			
Constructio	on: Method	Erumo	_ D	ate Jan	88	Drift		20.4			
Depth	1	Linings (belo	w well top)		Meria Muditores		26 C			
bwt	Dia.	From	То	Dia.	Туре						
		1									
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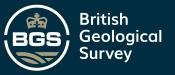
If insufficient space has been allowed, continue in 'Notes' overleaf.

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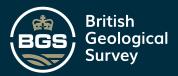






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Boring Mathod Contractor Cont	RB. Ref 50 42/19	SD 4 (E)	(iii) (iiii) (iiiii) (iiiiii) (iiiii) (iii	ame WARTON BANK ocation WARTON F STRATA DSTONE with	Lining Tube Details DESCRIPTIO As above		Fractures		Method or	Boring Contract
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Red-brown weathered MUDSTONE with traces of guydmin -22- -23- -24-		-22	-22 -23 -24 -25		Red-brown weathered traces of gupsum					
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Owner				cence no. opn no.		Nat. grid ref. S	<u>5047</u> 047562334	<u>ne</u>
Occupier			C	ancelled S ref. no.		Status ALL	4 30 2001	
Ground Level		m C	D	····	ft. OD	Aquifer		
Level of well to	φ.	m O	D		ft. OD	Code		
Rest water leve	1.90	m b	wt		ft. bwt	Summary of geologic	al section Thickness	Depth
(Date 3/4/じ	(8)	m O	D		ft. OD			
Construction:	vethod			Date	4/02	Drift	410	4 m
Depth	Dia.	Linings (below	v well top)		.,	Sandstore	ll m	520
bwt		From	То	Dia.	Туре			
52m						Full log in BI	Flog	
						file		
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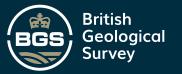
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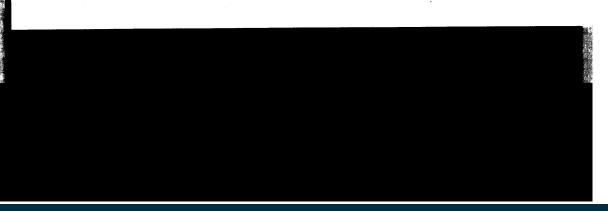
Contact BGS: ngdc@bgs.ac.uk

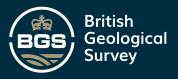
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PORM WR-38 Water Resources Act 1991 Socion 32 Consent No:	Weiter Resources Act 1991 Section 32 Consent No: BOREHOLE RECORD A. 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Location: $S(TA NO 2) CLIFTON MAR2N LANDFUL SITE, FRECKLETON NGR (6 fig): SO 4756 - 2.833 4756 2084 Please attach alle planGround Level (if known): x 3.80 - 0DDrilling Company: RAAR WATER LEEL DRILLING Date drilling Commenced: 31/03/04 Completed: 03/04/08B. CONSTRUCTION DETAILSBorehole datum (if not ground level(which do which all measurements of equilibrium grings, equilibrium, etc.)Borehole datum (if not ground level(which do which all measurements of equilibrium grings, equilibrium, etc.)Borehole datum (if not ground level(in disancter 1800$	Location: $S(TA NO 2: CL(FTON MAR2H ZAADFUL SITE, FRECULETON NGR (8 fig): SD 4256 - 2.8.33 4756 2084 Please attach alle planGround Level (if known): \pm 3.60 \times ODDrilling Company: RLA(R WATER LAEL DR(LLNAG)Date drilling Commenced: S(1/03/04) Completed: 0.3/04/08B. 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NOR (6 fig): \$\begin{aligned}{llllllllllllllllllllllllllllllllllll	NGR (6 fig): SD 4255 - 2833 4756 2884 Pieces attach site plan Ground Level (if known): A 3.80 A OD Delling Company: RcA1A MATERE LATEL BRICLING Date drilling Commenced: 31 / 03 / 04 Completed: 03 / 04 / 08 B. CONSTRUCTION DETAILS Borehole datum (if not ground level for the site of the group, captor Cambe, co) Borehole datum (if not ground level for the site of the group, captor Cambe, co) Borehole datum (if not ground level for the site of the group, captor Cambe, co) Borehole datum (if not ground level for the site of the group, captor Cambe, co) Borehole datum (if not ground level for the site of the group, captor Cambe, co) Borehole datum (if not ground level for the site of the group, captor Cambe, co) Borehole datum (if not ground level for the site of the sit	NGR (6 fig): SO 4756 283 4756 2884 Please stach site plan Ground Level (if known): x 2.60 ~ OD Drilling Company: R.A1.2 WATERE WEEL D.R.(LLING Date drilling Commenced: 51 / 03 / 04 Completed: 03 / 04 / 08 B. CONSTRUCTION DETAILS Borchole drilled diameter diameter 280	NGR (6 fig): SO: 44754 2.832 4756 2.834 Please stach siz plan Ground Lovel (if known): A 3.50 A OD Delling Company: B.A12 WATCHE LATCL DRICLING Data delling Commenced: 3 / 0 4 / 08 B. CONSTRUCTION DETAILS Borchole datum (if not ground love (point from which all measurements of depth and and group, the totamber, so) Borchole datum (if not ground love (datameter 1800)	NGR (6 fig): SD 4756 283 4756 284 Pieses stach size plan Ground Lovel (if known): A 3. 50 A OD Delling Company: BcA1A MATCR LATCL DACICINAS Data delling Commenced: 3 () 03 / 04 / 08 B. CONSTRUCTION DETAILS B. CONSTRUCTION DETAILS Borchole datum (if not ground love (is not or visit all measurements of deal for latin g may, report commence, so) Borchole datum (if not ground love (is not or visit all measurements of deal for latin g may, report commence, so) Borchole datum (if not ground love (is not or visit all measurements of deal for latin g may, report commence, so) Borchole datum (if not ground love (is not or visit all measurements of deal for latin g may, report commence, so) Borchole datum (if not ground love (is not ground love) (deal data data data data data) (is not ground love) (data data data) (is not ground love) (data data) (is not ground love) (data) (is not ground love) (data data) (is not ground love) (data) (is	NOR (6 fig): SD: 4254 283 4756 2084 Please statch site plan Ground Level (if known): x 2.80 ~ OD Defiling Company: ReAn NATE & LATE &	NOR (6 fig): SD: 4254 283 4756 2084 Please statch site plan Ground Level (if known): x 2.60 ~ OD Defiling Company: RcAta NATER LATER LATER LATER DELCLING Date drilling Commenced: St / 03/04 Completed: 03/04/08 B. CONSTRUCTION DETAILS Borehole datum (if not pround level to a first	NGR (6 fig): SD 4256 283 4756 2834 Please attach site plan Ground Lovel (if known): & 3.80 ~ 0D Datiling Company: BcAta WATEre Lottice Balance B. CONSTRUCTION DETAILS Borchole datum (if not ground lovel to a grange age of tambe, and Borchole datum (if not ground lovel to a grange age of tambe, and Borchole datum (if not ground lovel to a grange age of tambe, and Borchole datum (if not ground lovel to a grange age of tambe, and Borchole datum (if not ground lovel to a grange age of tambe, and Borchole datum (if not ground lovel to a grange age of tambe, and Borchole datum (if not ground lovel to a grange age of tambe, and Borchole datum (if not ground lovel to a grange age of tambe, and Borchole datum (if not ground lovel to a grange age of tambe, and Borchole datum (if not ground lovel to a grange age of tambe, and Borchole datum (if not ground lovel to a grange age of tamber age of tamber age of tamber and tamber age of tage of tamber age of tage of tamber age of tamber age of tamber age	NGR (6 fig): SD 4=3.54 2=3.84 Piesses attach site plan Ground Level (if known): $x \leq 3.60 \times OD$ Piesses attach site plan Datiding Company: $B_{cA1/2}$ NATER: LATE: $B_{c1/c2}(1/4)$ Date drilling Commenced: $51 / 03 / 04$ Completed: $03 / 04 / 08$ B. CONSTRUCTION DETAILS Borchole datum (if not ground level for an attern of the start of the s					
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goods from which all measurements of depth is table of the good of callabe, etc) Borchole drilled diameter	goodst Soon which all measurements of depth Willing Charge, eagle of Callaber, edg) Borchole drilled diameter	goodst from which all measurements of depth all depth which all measurements of depth all depth all depth which all measurements of depth all d	goods from which all measurements of depth in theme (1990), to 18, 900 m/depth Borchole drilled diameter	goods from which all measurements of depth is table of the good of callabe, etc) Borchole drilled diameter	goodst from which all measurements of depth all depth which all measurements of depth all depth all depth which all measurements of depth all d	goodst from which all measurements of depth all details on Porms Web all all measurements of depth which all measurements of depth which all measurements of depth which all measurements of the measurements o	goodst from which all measurements of depth all deph all deph all depth all depth all depth all depth a	goodst from which all measurements of depth which all measurements of depth mining the state of the stat	B. CONSTRUCTION DETA			· · · · · · · · · · · · · · · · · · ·	
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diameter / 8 ° O mm from (200. to .5.200 ° m/depth Casing material and type (applicated, plastic stoted)	diameter / 8 ° ° mm from / 8 ° ° m/depth Casing material and type (ap plata sted, plastic stotted) mm fromto	diameter / 8 ° ° mm from 1000 10 52.00 m/depth Casing material and type (ap plata sted, plastic slotted) mm fromto		diameter / 8 ° O mm from (200. to .5.200 ° m/depth Casing material and type (applicated, plastic stoted)	diameter / 8 ° ° mm from 1000 10 52.00 m/depth Casing material and type (ap plata sted, plastic slotted) mm fromto	diameter / 8 O mm from 18.00. to .52.00 m/depth Casing material and type (ap plan stel, planto slotted) mm fromto	diameter / 8 ° ° mm from 100 10 52.00 m/depth Casing material and type (ap plata sted, plastic slotted) mm fromto	diameter / 8 ° ° mm from 1000 10 52.00 m/depth Casing material and type (ap plata sted, plastic slotted) mm fromto	Borehole drilled diameter	tionenter 68.0		.00 m/denth	
Casing material and type (ag plain steel, plastic slotted)	Casing material and type (ar plant steel, plastic slotted)	Casing material and type (ar plant steel, plantic stoted)	Casing material and type (ag plan seel, plantic dotted)	Casing material and type (ag plain steel, plastic slotted)	Casing material and type (ar plant steel, plantic stoted)	Casing material and type (ar plant steel, plants about) P(a.h. Steel	Casing material and type (ag plain steel, plastic stoted)	Casing material and type (ar plant steel, plantic stoted)		diameter 180	, mm from 18.00 to .57	n/depth	
P(a, in Steel) diameter 200 mm from 2:02	P(a, in Steel) diameter 200 mm from 2:00. to1.2.00 m/depth Plant Steel diameter 150 mm from 18:00. to1.00 m/depth diameter	P(a, i, Steel	P(a,h, Steel diameter 200 mm from 2:32to1220 m/depth P(a,h, Steel diameter 150 mm from 18:22.to .4.120 m/depth diameter 150 mm from 18:22.to .4.120 m/depth diameter	P(a, in Steel) diameter 200 mm from 2:02	P(a, i, Steel	P(a, i, Steel	P(a, i, Steel	P(a, i, Steel	•	diameter	. mm fromto	m/depth	
P (a. A. Stade) diameter (S)	Plan Size2	Plan Scal diameter 150 mm from (R, 19, 20, 5, 43, 50, 5, 53, 50, 50, 54, 50, 50, 54, 50, 50, 54, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50	P (a. b. SCall diameter 150 mm from (B, 192, to .45, 100 m/depth diameter mm fromto	P (a. A. Stade) diameter (S)	Plan Scal diameter 150 mm from (R, 19, 20, 5, 43, 50, 5, 53, 50, 50, 54, 50, 50, 54, 50, 50, 54, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50	Plan Scal diameter 150 mm from (R192.to .453.td) or m/depth diameter mm from	Plan Scall diameter 150 mm from (R1.9.2.to .45.1.0.5) m/depth diameter	Plan Scal diameter 150 mm from (R, 19, 20, 5, 43, 50, 5, 53, 50, 50, 54, 50, 50, 54, 50, 50, 54, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50	Casing material and type (or pla	n steel, plastic slotted) diameter 2,510	mm fmm 0.00 to 1	r.co m/denth	. •
Grouting details:	diameter	diameter	Grouting details:	Grouting details:	diameter	diameter	diameter	diameter	Plain Stell	diameter /50	. mm from 19.99. to .4.	m/depth	· [
Water struck at:	Water struck at:	Water struck at: M_2 : S_2^0 .m (depth below datum - mbd) Rest water leyel on completion M_2^0 .m (depth below datum - mbd) Rest water leyel on completion M_2^0 .m (depth below datum - mbd) C. TEST FUMPING SUMMARY (Please sepping fail details on Porm WR-39) Test Pumping Datum G_1^0 m (depth below datum - mbd) (if different from borehole datum) G_1^0 m (depth below datum - mbd) Pump Suction Depth S_0 .0 Qmbd Water Level (Start of Test) $1 \cdot 910$ mbd Water Level (End of Test) $14 \cdot 734$ mbd Pumping rate $22 \cdot 2.6 \text{ s///r}$ for	Water struck at:	Water struck at:	Water struck at: M_2 : S_2^0 .m (depth below datum - mbd) Rest water leyel on completion M_2^0 .m (depth below datum - mbd) Rest water leyel on completion M_2^0 .m (depth below datum - mbd) C. TEST FUMPING SUMMARY (Please sepping fail details on Porm WR-39) Test Pumping Datum G_1^0 m (depth below datum - mbd) (if different from borehole datum) G_1^0 m (depth below datum - mbd) Pump Suction Depth S_0 .0 Qmbd Water Level (Start of Test) $1 \cdot 910$ mbd Water Level (End of Test) $14 \cdot 734$ mbd Pumping rate $22 \cdot 2.6 \text{ s///r}$ for	Water struck at:	Water struck at: f_2 : S_2 m (depth below datum - mbd) State of the second structure of th	Water struck at: M_2 : S_2^0 .m (depth below datum - mbd) Rest water leyel on completion M_2^0 .m (depth below datum - mbd) Rest water leyel on completion M_2^0 .m (depth below datum - mbd) C. TEST FUMPING SUMMARY (Please sepping fail details on Porm WR-39) Test Pumping Datum G_1^0 m (depth below datum - mbd) (if different from borehole datum) G_1^0 m (depth below datum - mbd) Pump Suction Depth S_0 .0 Qmbd Water Level (Start of Test) $1 \cdot 910$ mbd Water Level (End of Test) $14 \cdot 734$ mbd Pumping rate $22 \cdot 2.6 \text{ s///r}$ for				·····	
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Rest water level on completion	Rest water level on completion	Rest water level on completion	Rest water loyel on completion	Rest water level on completion	Rest water level on completion	Rest water level on completion	Rest water level on completion	Rest water level on completion	-	57 (1) (1) (1)			
Rest water level on completion	Rest water level on completion	Rest water level on completion	Rest water loyel on completion	Rest water level on completion	Rest water level on completion	Rest water level on completion	Rest water level on completion	Rest water level on completion	Water struck at: 57		- mod) - mbd)		
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Pumping rate 22.26 m//r.for	Pumping rate 22.26 m//r.for	Pumping rate 22.26 m//r.for	Pumping rate 22.26 alth.for	Pumping rate 22.26 m//r.for	Pumping rate 22.26 m//r.for	Pumping rate 22.26 m//r.for	Pumping rate 22.26 m//r.for	Pumping rate 22.26 m//r.for	Water I avel (End of Test)		14	. 73%mbd	
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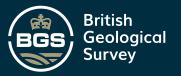
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D. STRATA LOG			
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	Sand	3.00	3.00
	Wet Sand	11.50	14.50
	a 1 st heter	2,50	17.00
	Class	15.00	32.00
	Clay Crowd with Water	2.50	34.50
	C/S	6.50	41.00
			52.00
	Sudstone with water		
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·· .	Other Comments (eg gas encountered, saline water i	ntercepted, en	
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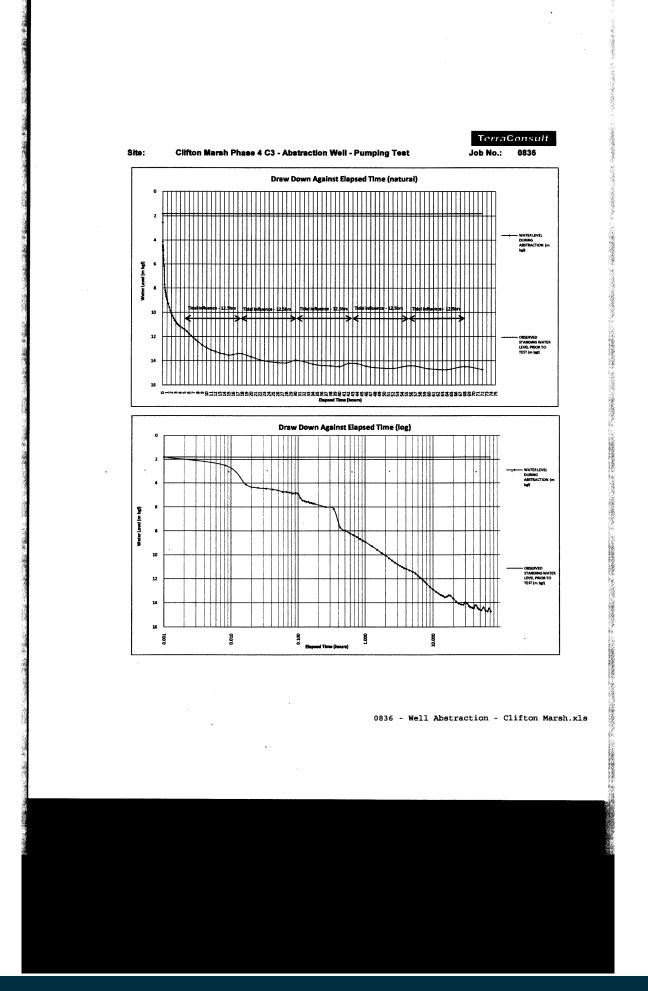


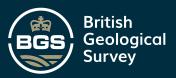


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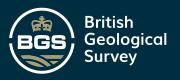


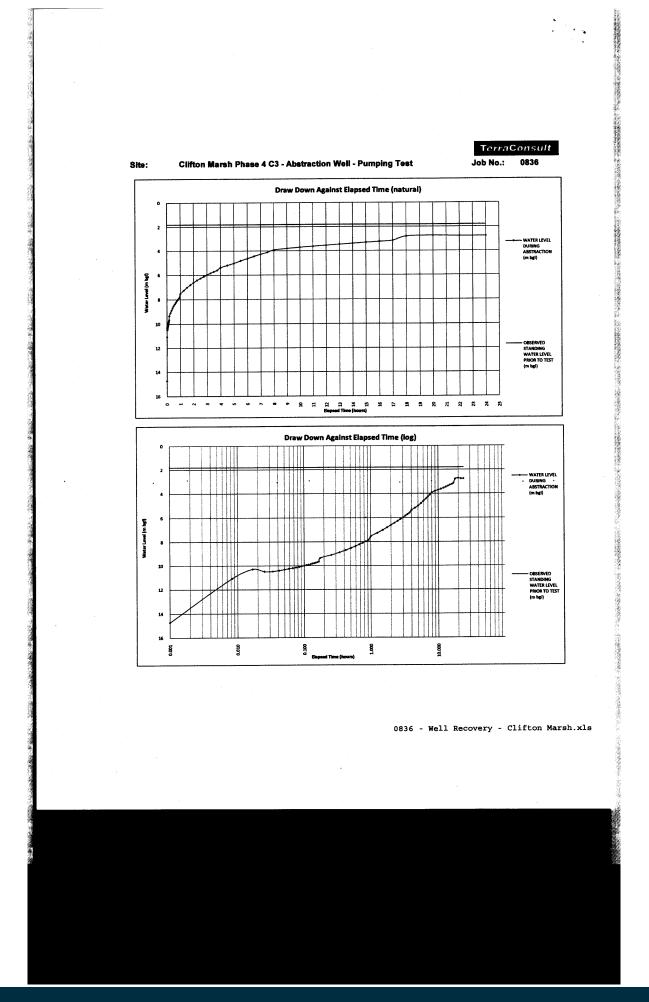


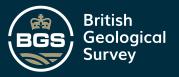


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1405-2008 1435-30 1405-2008 1635-30 2775 0836 - Well Recovery - Clifton Marsh.xls	1405-2008 1435-30 1405-2008 1635-30 2775 0836 - Well Recovery - Clifton Marsh.xls		14/05/2008 07:30:00 3.234 14/05/2008 08:30:00 3.140 14/05/2008 10:30:00 2.805	
0836 - Well Recovery - Clifton Marsh.xls	0836 - Well Recovery - Clifton Marsh.xls		14/05/2008 14:30:00 2.778	
0836 - Well Recovery - Clifton Marsh.xls	0836 - Well Recovery - Clifton Marsh.xls			
0836 - Well Recovery - Clifton Marsh.xls	0836 - Well Recovery - Clifton Marsh.xls			
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				0836 - Well Recovery - Clifton Marsh.xls

Contact BGS: ngdc@bgs.ac.uk







I WAITIE OF SILE		~~ 4107				W R B No.		
Clif.	to Ma	rsh La	J.J.:11	ALL	. 75	5042/	36 5042n	E)
Owner			A	cence no. ppn no.		Nat. grid ref. SD 471		-/
Occupier				ancelled SS ref. no.			andoned	
Ground Level		m (DD		ft. OD	Aquifer Superficiely		·
Level of well t	ор	m (DD		ft. OD	Code //1		
Rest water lev	el	mb	owt		ft. bwt	Summary of geological section	Thickness	Depth
(Date)	m (DD		ft. OD	Borehole logt		
Construction:	Method			Date	3/03	caring details		
Depth	Dia,	Linings (below	w well top)			in BH loy File		
bwt		From	То	Dia.	Туре	- 12 0 1 10g 1. 10		
61m								
Abstraction ra	tes		Type of pum					
gph			Chem./bact.		YES/NO			
gph gph					Drilling			<u>-</u>
f insufficient spa	ce has been all	owed, continue ir			<u> </u>	••••••••••••••••••••••••••••••••••••••	L	

Lockie 162

Contact BGS: ngdc@bgs.ac.uk

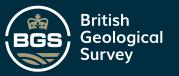
RECEIVED FROM - 4 JUN 2008 Environ Agency

•			5042/
FORM WR -38 Water Resources Act 1991 1	Section 32		Environme Agency
Consent No: 155	7		
BOREHOLE	RECORD		
A. SITE DETAILS			
Borehole drilled for:	SITA		
Location: SITA No I	CLIFTON MARSH LA		
NGR (8 fig):	SD 4718 2910 4716	2912 Please atta	ch site plan
Ground Level (if know	vn): 4.60~0D		
Drilling Company:	BLAIR WATER WE		
Date drilling Commenced:		mpleted: 27/c	
B. CONSTRUCTION D	ETAILS.		
Borehole drilled diameter	diameter 180 mm fro) 0000 <u>44. to</u>	m/depth m/depth m/depth
Casing material and type (diameter IPO num fire diameter num fire (cg plain steel, plastic slotted) (eq., diameter num fire (c4, diameter num fire (c4, diameter num fire	om	m/depth m/depth m/depth
Casing material and type (diameter IPO num fire diameter mm fire (cg plain steel, plastic slotted) Vacq diameter mm fire (ca.,	om	m/depth m/depth m/depth m/depth m/depth m/depth
Casing material and type (Placia S Placia S Grouting details:	(og plein stoci, plestio stotud) 	om 44. to 27.00 om 87.99.to 88.90 om 44. to 27.00 om 27.9.to 81.90 om 27.9.to 81.90 om	m/depth m/depth m/depth m/depth m/depth m/depth
Casing material and type (Placia S Placia S Grouting details:	diameter IPO num from from from from from from from fro	от_44_to_27.00 om 87.199.to .88.20 mto	m/depth m/depth m/depth m/depth m/depth m/depth m/depth abandonad at due to
Casing material and type (Place S Place S Grouting details: Water struck at: Rest water level on compl	diameter IPO num from from from from from from from fro	am	m/depth m/depth m/depth m/depth m/depth m/depth m/depth abandoned at due to the to the form
Casing material and type (Plain S Plain S Grouting details: Water struck at: Rest water lovel on compl C. TEST PUMPING SI	diameter IPO rum fro diameter rum fro diameter rum fro diameter	от <u>44</u> . to <u>27.00</u> om <u>87.99.</u> to <u>88.90</u> om <u>87.90</u> to <u>88.90</u> om <u>27.90</u> to <u>88.90</u> om <u>27.90</u> k. <u>89.90</u> om <u>100</u> to <u>81.00</u> <u>8.39</u> <u>65.00</u> <u>65.00</u> <u>65.00</u> <u>65.00</u> <u>65.00</u> <u>65.00</u> <u>65.00</u>	m/depth m/depth m/depth m/depth m/depth m/depth m/depth abandonad at due to
Casing material and type (Placin S Placin S Grouting details: Water struck at: Rest water level on compl	diameter IPO nm from the second se	om	m/depth m/depth m/depth m/depth m/depth m/depth m/depth abandoned at due to the to the former to pressed
Casing material and type (Placin S Placin S Grouting details: Water struck at: Rest water level on compl C. TEST PUMPING SI Test Pumping Datum (if different from borehold	diameter IPO	om	m/depth m/depth m/depth m/depth m/depth m/depth m/depth abandonad at due to to program ste function ste function mbd
Casing material and type (Plain S Plain S Crouting details: Water struck at: Rest water lovel on compl C. TEST PUMPING SI Test Pumping Datum (if different from borehol Pump Suction Depth	diameter IPO rum from the second s	om	m/depth m/depth m/depth m/depth m/depth m/depth m/depth m/depth due to chue to
Casing material and type (Placia S Placia S Placia S Grouting details: Water struck at: Rest water lovel on compl C. TEST PUMPING SI Test Pumping Datum (if different from borehol Pump Suction Depth Water Level (Start of Test	diameter IPO rum from the second s	om	m/depth m/depth m/depth m/depth m/depth m/depth m/depth abandonad at due to to program ste function ste function mbd

British Geological Survey

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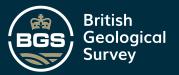
Geological Classification	Description of Strata	Thickness	Depth
• (BGS only)		m	m
	Sand	3.00	3.00
	Wat Sund	6.50	9.50
· •	Grey Sand & Gravel	4.00	13.50
. •	Clay	23.50	37.00
	Clay Running Sand Clay Running Sand Grand Rebble Beds	3.00	40.00
	C1.3	3.00	48.00
	Ranning Sand	11,00	59.00
	Gravel	1.00	60,00
۱	Rebble Beds	1.00	61.00
			•
	[continue on separate page if necessary]		
·· .	Other Comments (eggss encountered, saline water Saline Water encountered a		
			•
FOR OFFICIAL USE O	NLY		

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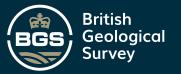
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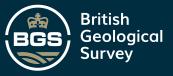




LAI	NCASH	HIRE COUN	ТУ СО	UN	ICIL					JOB No	, 473
BOF	REHOLE	E DATA SHEE	T No1.		OF	2				B.H. No	D
CHEME PRESTO	N VESTE	RLY BY-PASS								DEPTH	41 . 1m
OCATION RIBBLE	CROSSI	NG (N. SIDE) F	RELIMINA	RY B	OREHO	LE				GROUI	ND LEVEL9.5m
Description (ofStratu	m	Depth		mple	м.с	:	LL/PL/PI Core Rec'y	Class'n	N Value	Water & Casing Details
FILL				123	3 Key			COLE HEC Y			
Loose					SP	10	•0			N = 8 ,	Started 23.1.76 200mm Casing.
nid brown						20	.6		SU/F		·
fine SAND					1		•	<u>. </u>			<u></u>
FILL			1.5								
Loose to medium dens	e				SP					N = 11	
dark grey-black organic											
silty fine SAND					1				SF/F		
						32	3.7		51/1		
											Slight WE. 3.2m
FILL			3.4		SP					N = 10	
Loose to medium dens	3 e										
dark grey-black									SU/F	-	
medium SAND with f		medium									
gravel and pockets of TOPSOIL	и стай	<u></u>	4.9		SP	26	5 <u>.</u> 8			N = 20	1
Medium dense			- 5.2							N = 20	23.1.76 pm. 'Dry'
light brown						29	ə. 3				Casing to 4.8m 26.1.76 am. 'Wet'
silty fine SAND										<u> </u>	
(with occasional ban	nds of										
grey sandy silt)					SP	1	7.8	Grading	SF	N = 21	80
Medium dense		<u> </u>	7.0								<u></u>
brown fine to medium	m SAND				-						
(with occasional bas	nds of								SU		
grey sandy silt)			8,2					·····			Slight WE. 8.25m
Medium dense					SF					N = 11	
brown				Π					SU		26.1.76 pm. SWL 7.7m
medium SAND with occasional find		i									Casing to 8.25m 27.1.76 am. SWL. 7.5m
with occasional line	e Brever	•									Sand level 7.9m WE 9.75m rose to 8.1m in 5min/8.0m in 10
											8.1m in 5min/8.0m in 10
STRENGTH TEST									· · · · ·		
epth of Sample Bulk I (kg/r	Dens'y n3)	Dry Dens'y (kg/m3)	M.C. (%)	C	omp.S (kN/m	tress 2)	Cc (k	hesion N/m²)	Ø		Remarks
											<u></u>
	•										
				1							
				1			· · · ·	i më tira ingi na		<u></u>	an a
				1	<u></u>						n an
				-	;				<u>├</u>		<u></u>
				<u> </u>				<u>.</u>	-		an a
·····											
		li di seconda di second		L	An dan dar	uria di mandi	L			<u>terien en in et de la seconda de la second</u>	
COMPACTION AN	ND OT			ſS			·	····	<u>,</u>		
epth of Sample Com	paction	Dry Dens'y (kg/m3)	M.C. (%)	s	5.G.	Air Voids	С.В.	R. SO3 gm/litr	рН	Re	emarks or other tests
		-									
	· · · · · · · · · · · · · · · · · · ·										
				1			<u> </u>				
GENERAL REMA	BKC			<u>.</u>	1		L		<u>In an an</u>		C87A L6272 TayPig
	a uno										



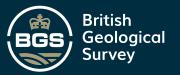
			HIRE COUN									473 R1
			E DATA SHEE									
			TERLY BY-PASS									ND LEVEL
LOCATIO	÷	ription of Stratu	SING (N. SIDE)	Denth	Sarr	ple	Тмс		L/PL/PI	Class'n		Water & Casing Details
	Desci			Deptil	123	Key		· Co	re Rec'y			
	,			10.5		SP				No.	N = 10	
Medium d	ense					Jar				-		-
grey silty fi	ne S	AND										
-		fine gravel								SF		14
 (occasion silty or 	-											
SILUY OI	Cray	- 37										
-						SP		_			N = 15	·
							1000				200	~
			. · · · · · · · · · · · · · · · · · · ·	13.7								
- Dense												
mid-brow medium						SP		Gr	ading	Gp	N = 45	27.1.76 pm. SWL 9.4m
with fir	e to	coarse GRAVEI										Casing to 14.4m 28.1.76 am. SWL 7.5m
and occa becoming		l bands of sil	t.									28.1.76 am. SWL 7.5m S. and G. level 12.6m
SAND and												
-							1					
						SP		Gr	ading	Gw		28.1.76 pm. SWL. 8.3m Casing to 16.0m 29.1.76 am. SWL 7.6m
-		-										29.1.76 am. SWL 7.6m S. and C. level 15.8m
												to the total ly of
Stiff mi	d_bro	wn sandy		18.0		SP					<u>N = 15</u>	29.1.76 pm. SWL 8.7m Casing to 17.7m
		with fine to						-				30.1.76 am. SWL 7.6m
medium g	ravel	sized stones				U4	17	.2				
•			<u></u>	19.4				.4				30.1.76 pm. SWL 8.3m Casing to 18.5m
See Shee	t No.	3						•				2.2.76 am. SWL 7.9m
STREN	GTH	TEST RESU	JLTS	<u>منتخبة الم</u>			<u> </u>	<u>نو او ا</u>	iq:iq:situ t	ini ang ng n		<u>, in the second s</u>
Depth of Sa		Bulk Dens'y (kg/m3)	Dry Dens'y (kg/m3)	M.C. (%)	Cor	np. S N/m	tress	Coh (kN/	esion m2)	Ø		Remarks
18.5 - 19.	0	2180	1860	17.2	1	168		84		-	100mm U.C.	Τ.
												· · · · · · · · · · · · · · · · · · ·
					<u> </u>	<u></u>						
 بايندست در بري موجد برسيد.		 		·····	<u> </u>			. <u></u>				ine Lesson de standard october de la companya de la com
ting in the start of												
·····	and a strength of the strength	3	HER TEST F		1		Air		1 80-	<u></u>		
Depth of Sa	mple	Compaction	Dry Dens'y (kg/m3)	M.C. (%)	s.c	\$. 	Air Voids	C.B.R.	SO3 gm/litre	рH	R	emarks or other tests
					1		-					uda urbanasa ing ng n
.,,									1			tana manana ina mpinakan ginadapat dapingingin minangin
									1			an in the state of t
GENER							1 mar 1		-		p casing	C87A L6272 TayPtg



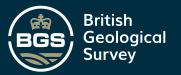
SCHEME	BOREHOLE	HRE COUNT DATA SHEET STERLY, BY-PASS	No3	OF	5				B.H. No DEPTH	473 R1 41, 1r
LOCATION	RIBBLE CRO	SSING (N. SIDE)	PRELIMI	NARY BO	REHOLE				GROUN	ID LEVEL
Desci	iption of Stratu	n	Depth	Sample			/PL/PI re Rec'y	Class'n	N Value	Water & Casing Detail
Firm to stiff brown smooth - laminated silt CLAY with occasions of brown sandy	l bands			U4	26, 20, 19,	.6 .9 .4				Change to 150mm Casing 2.2,76 pm. SWL. 8.4m Casing to 19.2m 3.2,76 am. SWL. 8.3m 3.2,76 pm. SWL. 13.7m 4.2,76 pm. SWL. 7.3m 4.2,76 pm. SWL. 9.0m 5.2,76 am. SWL 7.8m
boulder clay					25.	,0 46/2	22/24	CI		· · · · · · · · · · · · · · · · · · ·
Very stiff _ red brown			23.3	U,	4 8.'					
very sandy CI with gravel si stones and bar of sand and gr	.zed ids			S				CL/SC	N = 53	5.2.76 pm. SWL. 9.9m Casing to 23.3 6.2.76 am. SWL. 8.0m Sand level to 22.1m
				s	P				N = 69	6.2.76 pm. SWL. 12.8 Casing to 24.5 9.2.76 am. SWL 8.2m
			- 27.1	S					N = 97	9.2.76 pm. SWL. 11.8 Casing to 26.0m
Soft, very brown very red brown very weathered fine SANDSTONE with of harder this	grained th bands				r.			Sa	For 150mm	11.2.76 am. SWL 7.0 Sand level 25.0m 11.2.76 pm. SWL 9.9 BH. to 27.5m 13.2.76 am. SWL 7.8m Sand level 26.4m
sand stone				S	P				N = 103 For 75mm	13.2.76 pm. SWL. 9.3 Casing to 28.6m 16.2.76 am. SWL. 7.0 Sand level 27.1m
STRENGTH	TECT DECI		L		<u>i i i i i i i i i i i i i i i i i i i </u>				1	
Depth of Sample	Bulk Dens'y	Dry Dens'y	M.C.	Comp	Stress	Cohe	sion	ø		Remarks
20.2 - 20.6	(kg/m3) 2040	(kg/m3) 1640	(%) 24.4	(kŇ) 16		(kN/i 84	<u>n2)</u>	-	100mm U.C.	
21.8 - 22.2	2030	1600	26.5	14	<u> </u>	72		_	100mm U.C.	
23.3 - 23.8	2370	2180	8.7	111		59		-	100mm U.C.	
					······					
	3	HER TEST R		1	1 1.1-		802			
Depth of Sample	Compaction	Dry Dens'y (kg/m3)	M.C. (%)	S.G.	Air Voids	C.B.R.	SO3 gm/litre	рН	Re	marks or other tests
GENERAL F	REMARKS	Slow progres	ss due t	o water	in bor	ehole, t	mable t	o seal o	off water. 5.8 to 27.1m	C87A 16272 T

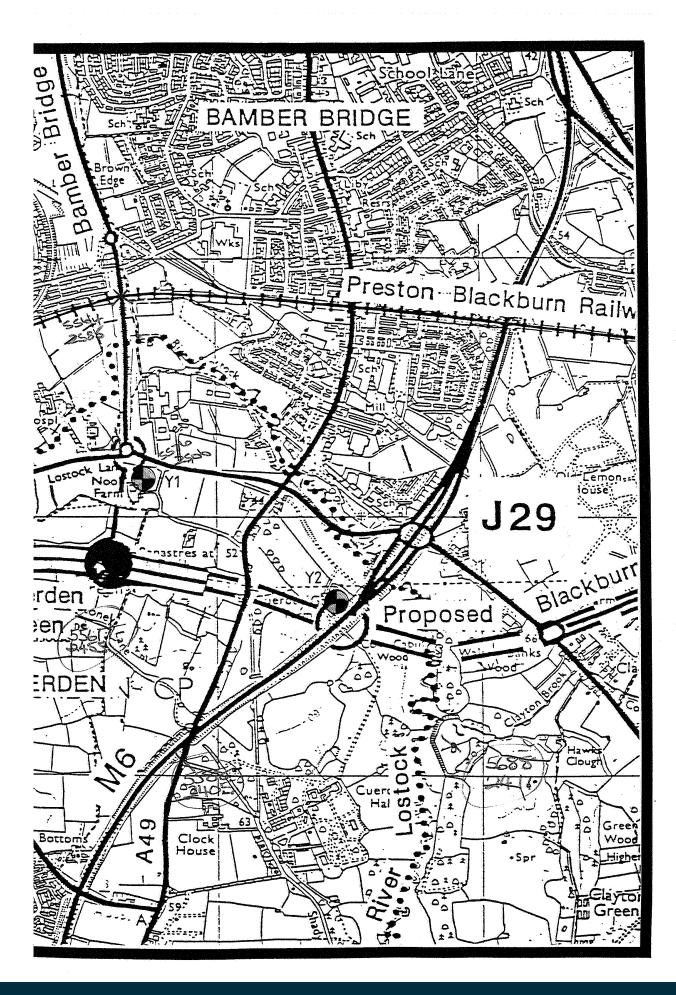


BOREHOLE DATA SHEET No. 4 OF	;	LANCAS	HIRE COUN	тү со	UNCIL						473
LOCATION RIBLE CROSSING (N. SUR) PRELIMITARY ROBINE GROUND LEVEL				T No4.	OF	.5					
Description of Stratum Depth Sample Service M.C. LUPPL/FI Core Rec/ Description (Clear's Rec/) Description (Clear's R	SCHEME										
See Sheet No. 3 31.3 See Sheet No. 3 755 Hard, fairly massive, red mover fine to seling grained summons 1005 Stamptone 1005 </td <td></td> <td></td> <td></td> <td>1 1</td> <td></td> <td>- A COLORING</td> <td>1</td> <td>1 /D1 /DI</td> <td></td> <td>CORE</td> <td></td>				1 1		- A COLORING	1	1 /D1 /DI		CORE	
31 31.3 1005 32 Feed brown films to medium grained Substrome with partial graps to to films are light graps very weakly commited soft as sine light graps very weakly commited substrome and constromal mediate and constromal substrome and constromal red brown thisly partied (55m) weakly commited films and stone with hands of marl substrome and constromal substrome and constromal red brown thisly partied (55m) weakly commited films and stone with hands of marl substrome films graps red brown thisly partied (55m) weakly commited films and stone with hands of sample substrome films graps red brown thisly partied (55m) weakly commited films and stone with hands of sample substrome films graps red brown thisly partied (55m) weakly commited films and stone with hands of sample substrome films graps red brown thisly partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (55m) weakly commited films and stone with hands of sample substrome films partied (iption of Stratu	m	Depth	123 Key	M.Q		ore Rec'y	Class'n	RECOVERY	Water & Casing Details
31.3 31.3 1005 32 red brown fine to medium grained SAUDOTONE with partings up to 150m and hand of soft analyse light grey very weakly esemated andstome at 32.2 - 32.4 1005 33 Soft, very broken, very weakly esemated andstome at 32.2 - 32.4 1005 34 Borisontally bedded 1005 35 Soft, very broken, very weakly esemated andstome at 32.2 - 32.4 1005 36 Soft, very broken, very broken, very weakly esemated final of barder massive andstome and cocasional bands of marl 36.0 1005 37 grained SANDYONE with bands of barder massive andstome and cocasional bands of marl 36.0 1005 37 Tree brown thinky parted (Sem) weakly cocanted fine to medium difference and fine and store with bands of marl 36.0 1005 38 STRENGTH TEST RESULTS Compact Compact Mark Remarks 0 STRENGTH TEST RESULTS Compact Compact Mark 0 0 STRENGTH TEST RESULTS Compact Compact Mark 0 0 Image: Compact Compact Mark Image: Compact Mark Image: Compact Mark 0 Image: Compact Mark Image: Compact Mark Image: Compact Mark 1005 Image: Compact Mark Image: Compact Mark Image: Compact Mark 10 Image: Compact Mark Image: Compact Mark Image: Compact Mark <td></td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>75% [·]</td> <td>Air Flush Water not sealed off</td>		3								75% [·]	Air Flush Water not sealed off
Bird, fairly massive, ge red brown fine to medium grained SUBSTORS with markings up to iffigment is light gray weakly cenented androme at 32.2 - 32.4 Horisontally badded Soft, very broken, weakbred red-brown thinks of hards massive mainting by deed fine Soft, very broken, weakbred red-brown thinks of bards massive mainting by deed fine Soft, wery working weakbred red-brown thinks of bards massive mainting by deed fine Soft, wery soft light gray, unceasted fine to medium SMDSTONE and StrEENGTH TEST RESULTS StrENGTH TEST RESULTS Depth of Sample ^{Sub_COSY} Dight of Sample ^{Sub_COSY} Massion Massion Massion Streenge to the substome		anania manan silana wasan w		31.3				····		100%	
Selfus grained SMDSTORE SMDSTORE SMDSTORE SUBSTORE SUBSTORE SUBSTORE SUBSTORE Soft, very broken, vectaved red-trown thinly beddef fine grained SMDSTORE vith bands of barder massive sandstone and occasional bands of marl Statistic and the sandstone vith bands of marl STRENGTH TEST RESULTS Depth of Sample Substring Substring Vector STRENGTH TEST RESULTS Depth of Sample Substring Vector STRENGTH TEST RESULTS COMPACTION AND OTHER TEST RESULTS COMPACTION AND OTHER TEST RESULTS											
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24 andstone at 30,2 - 32,4 Horizontally bedded 1004 35 Soft, very broken, vesthered red-brown vesthered red-brown vesthered red-brown thinly bedded fine grained SMDSTORE and store and sconional hands of marl 36,0 37 red brown thinly parted (50m) veskly cesented fine to medius SMDSTORE and red brown thinly parted (50m) veskly cesented fine and store vith bands of anrl 39,0 38 STRENGTH TEST RESULTS 1005 Depth of Sample Bulk Dere Y (kg/m3) (Ks/m2) 40 STRENGTH TEST RESULTS Comp.Stress Cohesion 0 Image: Cohesion in thinly parted (kg/m3) Image: Cohesion in thinly parted in the same intervence in the same intervence										100%	~
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38 sandstone and occasional bands of marl 39,0 39,0 100% 38 Alternate, very soft light grey, unessented fine to medium SANDSTONE and - red brown thinly parted (25mm) weakly cenented fine sandstone with bands of marl 100% 100% 39 - red brown thinly parted (25mm) weakly cenented fine sandstone with bands of marl 100% 100% 40 STRENGTH TEST RESULTS	grained SAND.		re .								
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39 red brown thinly parted (25mm) weakly cemented fine sandstone with bands of marl 1 40 STRENGTH TEST RESULTS Depth of Sample Bulk Dens'y (kg/m3) M.C. (ks/m3) Comp. Stress (kN/m2) Cohesion (kN/m2) 0 Remarks 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1<	light grey, w		to medium							100%	
vith bands of marl STRENGTH TEST RESULTS Depth of Sample Bulk Dens'y Dry Dens'y M.C. Comp. Stress Cohesion Ø Remarks Image: Stress of the stress o	20	ly parted				-	·		<u> </u>		1
STRENGTH TEST RESULTS Depth of Sample Bulk Dens'y (kg/m3) Dry Dens'y (kg/m3) M.C. (%) Comp. Stress (kN/m2) Ø Remarks Image: Stress of the	- · · ·		sandstone								
COMPACTION AND OTHER TEST RESULTS	STRENGTH	when the star of the star is		M.C.	Comp.	Stress	Coh	iesion			
COMPACTION AND OTHER TEST RESULTS	Dépth of Sample	(kg/m3)	(kg/m3)	(%)	(kŇ/i	n2)	(kN	/m2)	<i>w</i>		Remarks
Devide a strain Dry Dens'y M.C. S.C. Air C.P.P. SO3 and Remarks or other tests		•								······································	
Device the company Dry Dens'y M.C. S.C. Air C.P.P. SO3 and Remarks or other tests		· · · · · · · · ·		.,,,, ,						<u></u>	
Dente (County Dry Dens'y M.C. S.C. Air C.P.P. SO3 DH Remarks or other tests	······										
Device the company Dry Dens'y M.C. S.C. Air C.P.P. SO3 and Remarks or other tests						·····					
Depth of Sample Compaction (kg/m3) (%) S.G. Voids C.B.R. gm/litre pH Remarks or other tests	COMPACTIC	N AND OT			1	<u> </u>	<u> </u>		1	<u></u>	
	Depth of Sample	Compaction	(kg/m3)	(%)	S.G.		C.B.R	gm/litre	рH	Re	emarks or other tests
	the second s	· · · · · · · · · · · · · · · · · · ·									

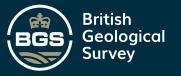


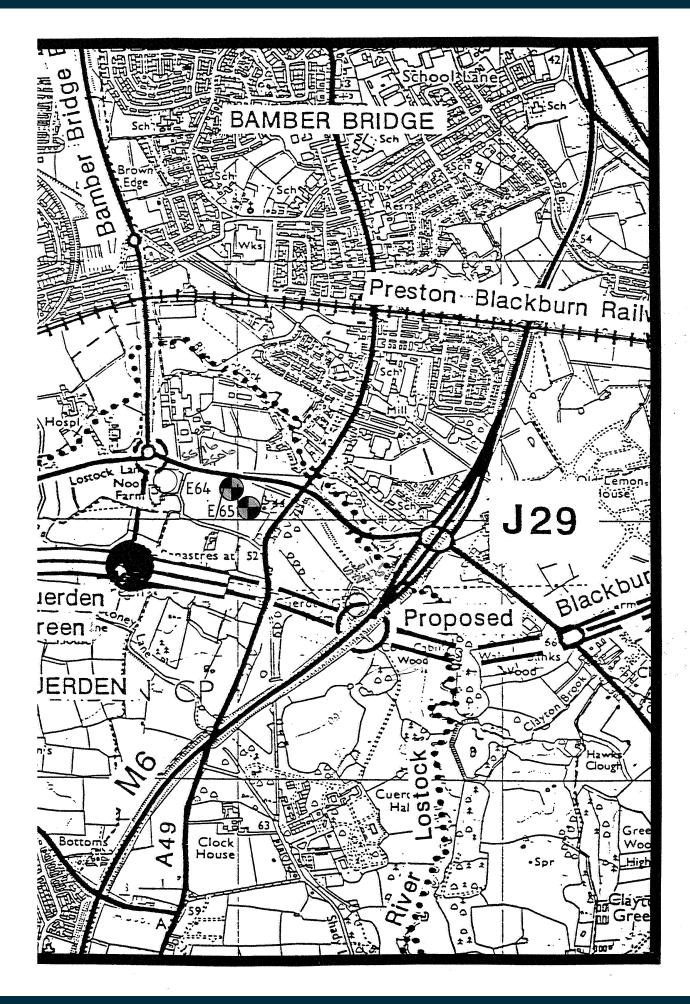
	PRESTON WESTER	E DATA SHEE RLY BY-PASS	T No	∑ OF	•••••				B.H. No DEPTH	473
LOCATION	RIBBLE CROSSI	NG (N. SIDE) F	RELTATINA				/PL/PI	1		ND LEVEL
Desci	iption of Stratu	m	Depth	Sample 123 Key	M.C	· Coi	re Rec'y	Class'n	CORE RECOVERY	Water & Casing Details
See Sheet	; No. 4								100% '	· · · · · · · · · · · · · · · · · · ·
		<u>, 1998 (1999) (19977) (19977) (19977) (19977) (19977) (19977) (19977) (19977) </u>	41.1							B.H. Complete
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STRENGTH			M.C.	Comp. 1 (kN/r	Stress	Cohe (kN/	sion	Ø	·····	Remarks
Depth of Sample	Bulk Dens'y (kg/m3)	Dry Dens'γ (kg/m3)	M.C. (%)	(kŅ/r	n2)	(kN/	<u>m2)</u>			Remarks
	•		<u>. 4</u>							
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										<u> </u>
										and and a stand of the stand of
COMPACTIO			RESUL M.C.		Air		SO3			
Depth of Sample	Compaction	Dry Dens'y (kg/m3)	(%)	S.G.	Voids	C.B.R.	gm/litre	рН	R	emarks or other tests
Terretor de la construction de la co El construction de la construction d			<u></u>							
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GENERAL	REMARKS									C87A L6272 TayPi

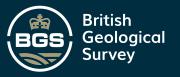


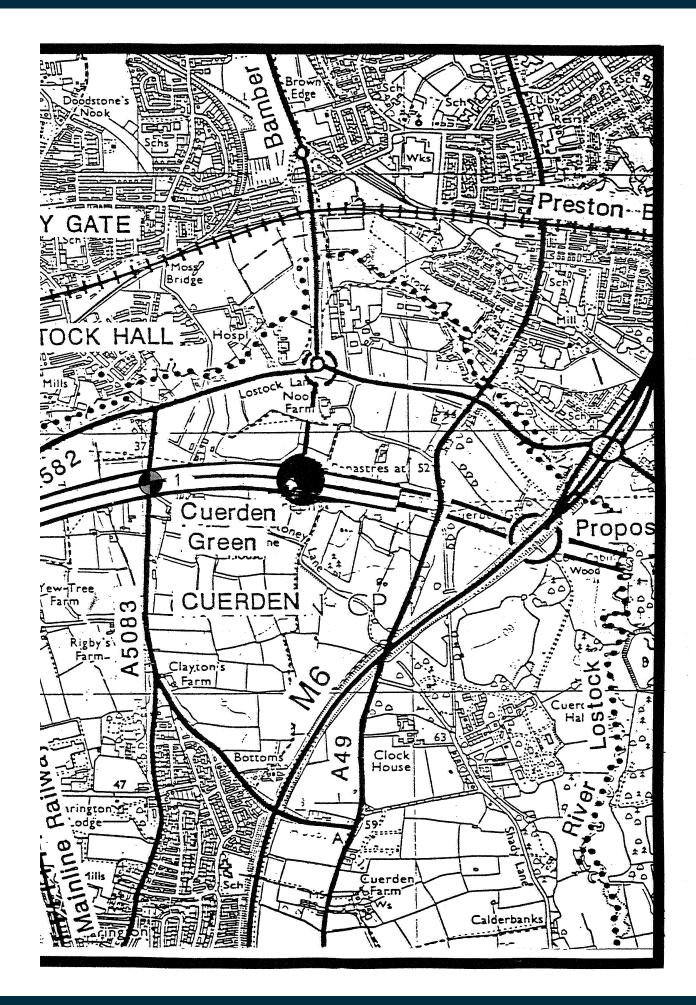


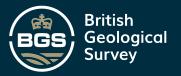


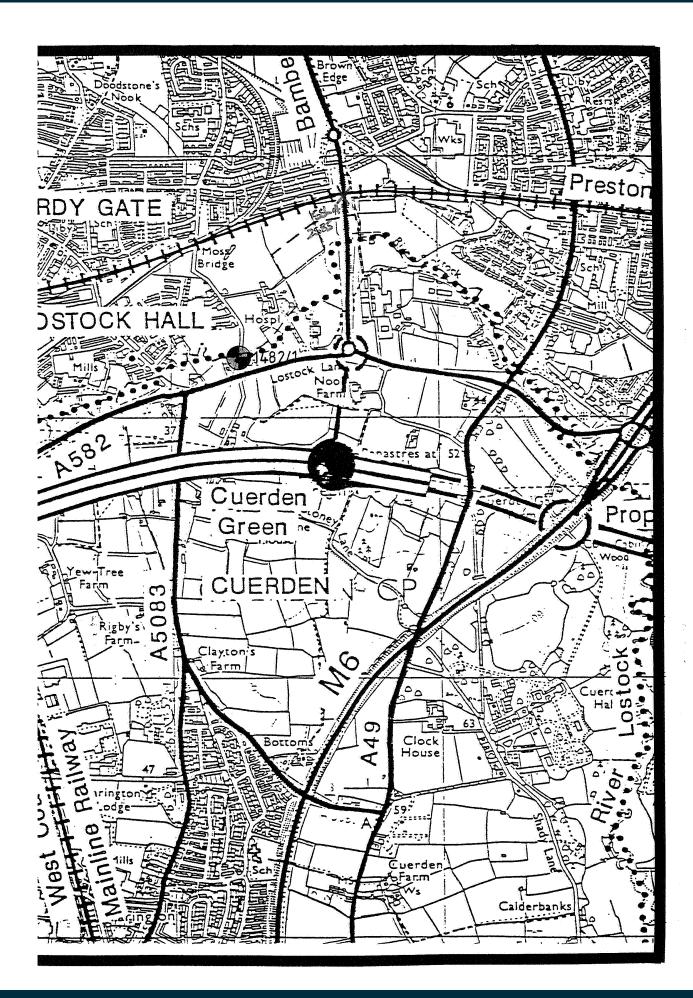


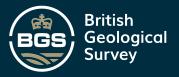


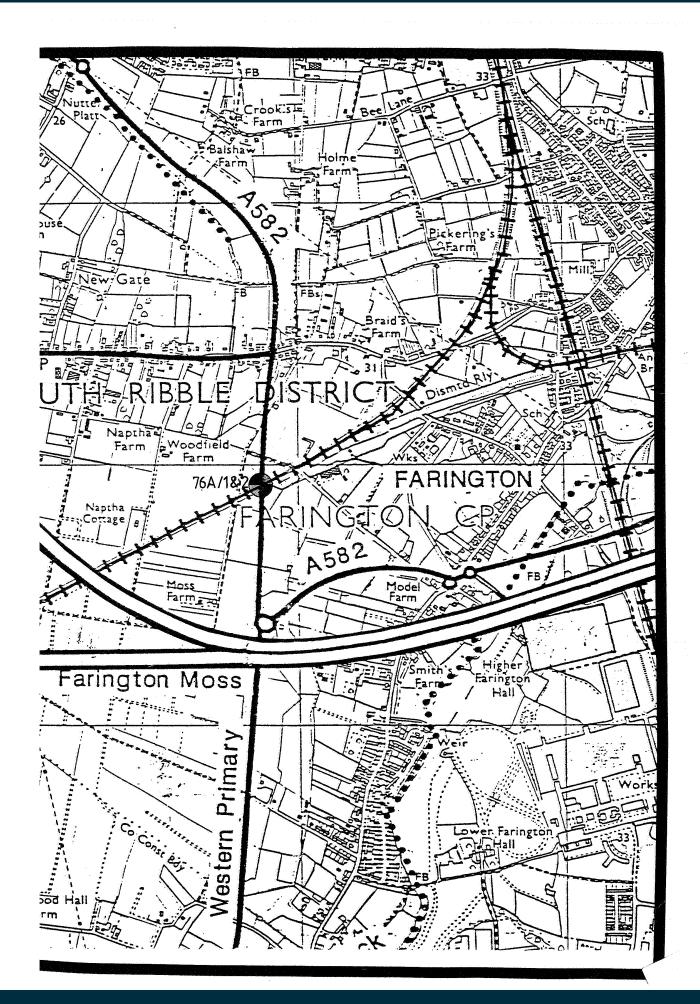


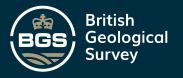


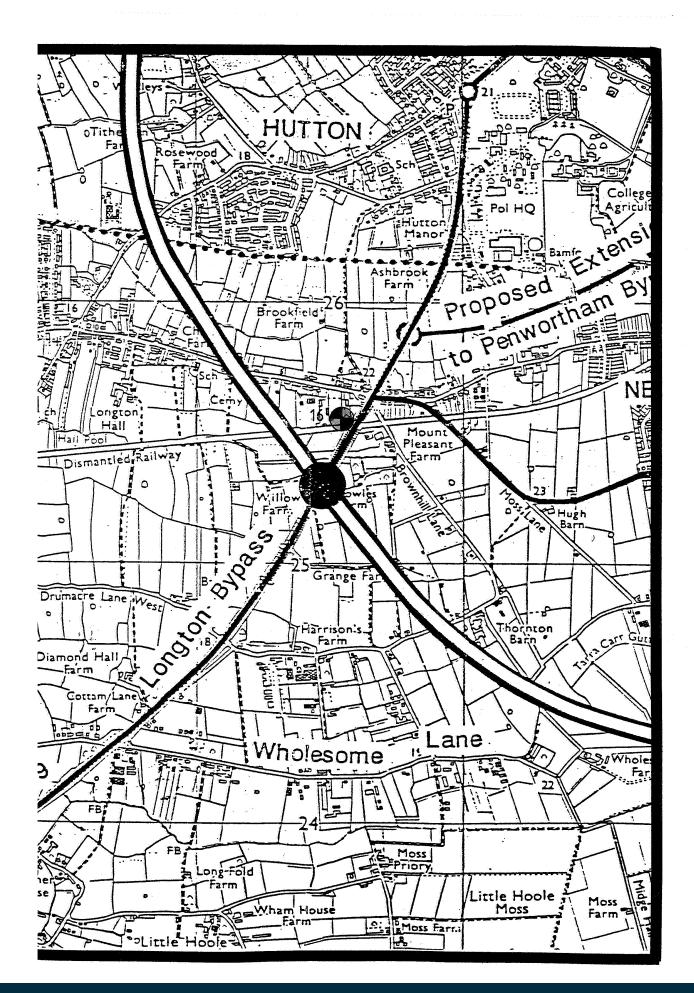


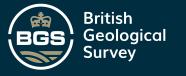


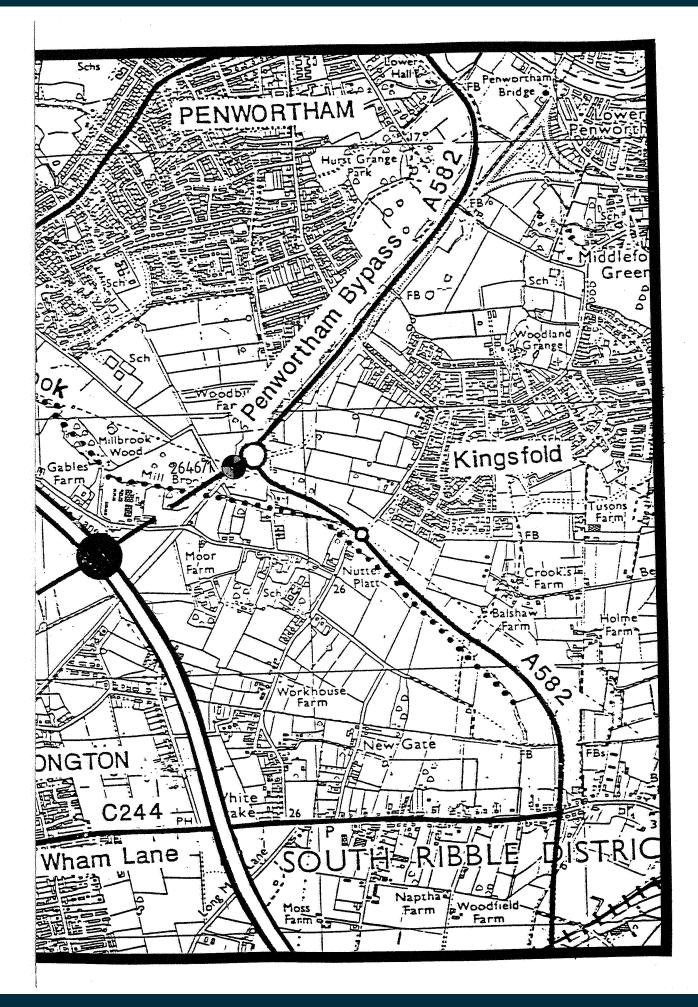


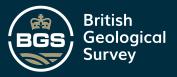


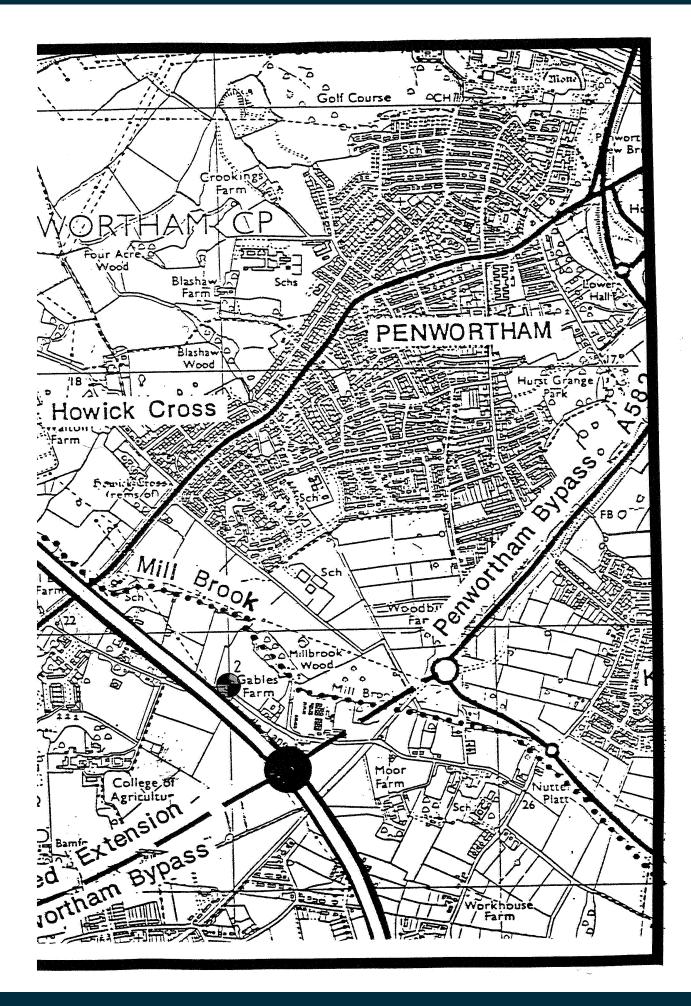


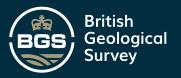


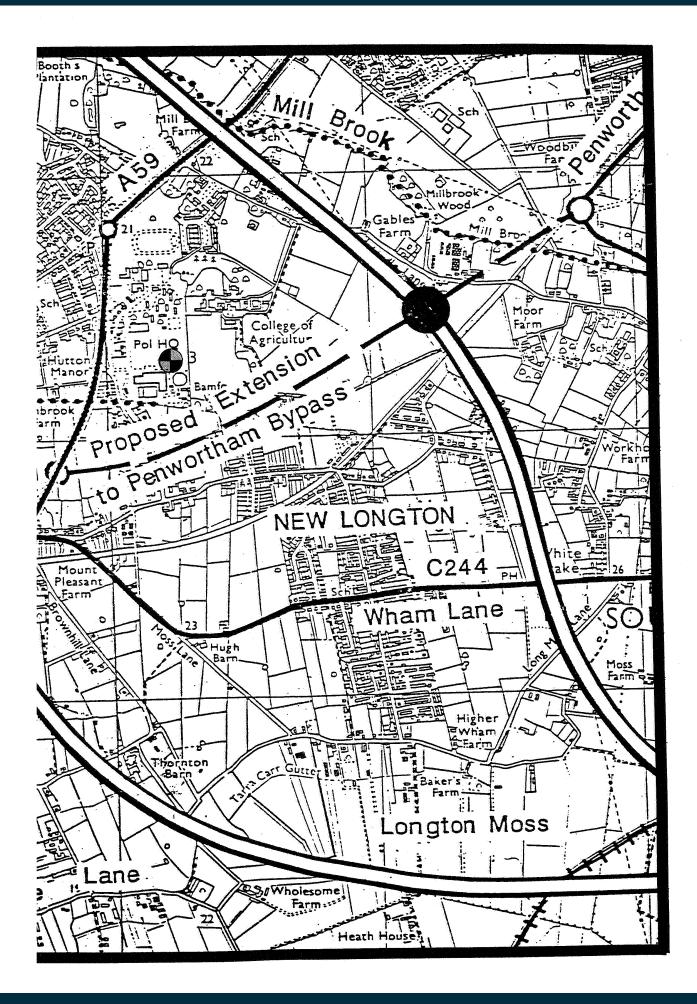


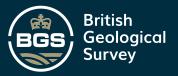


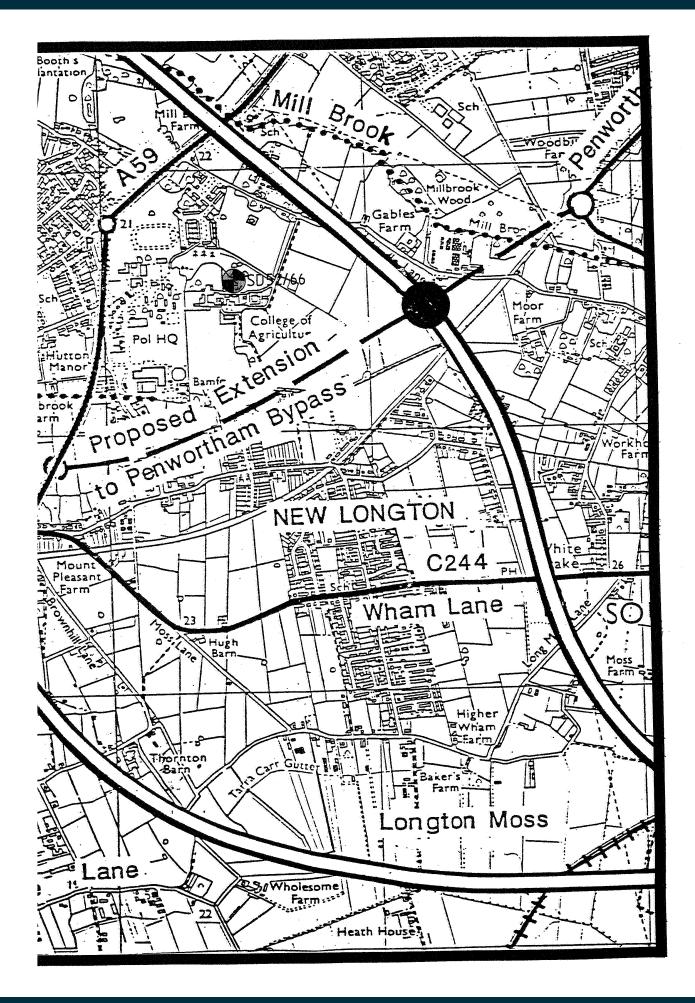


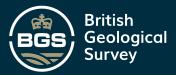


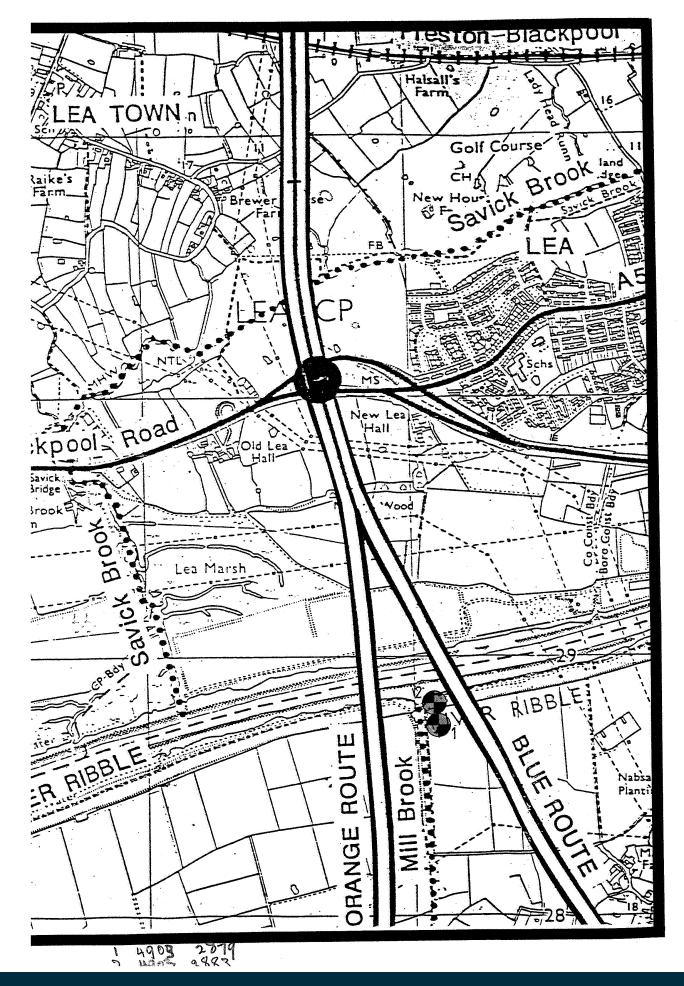


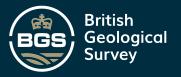


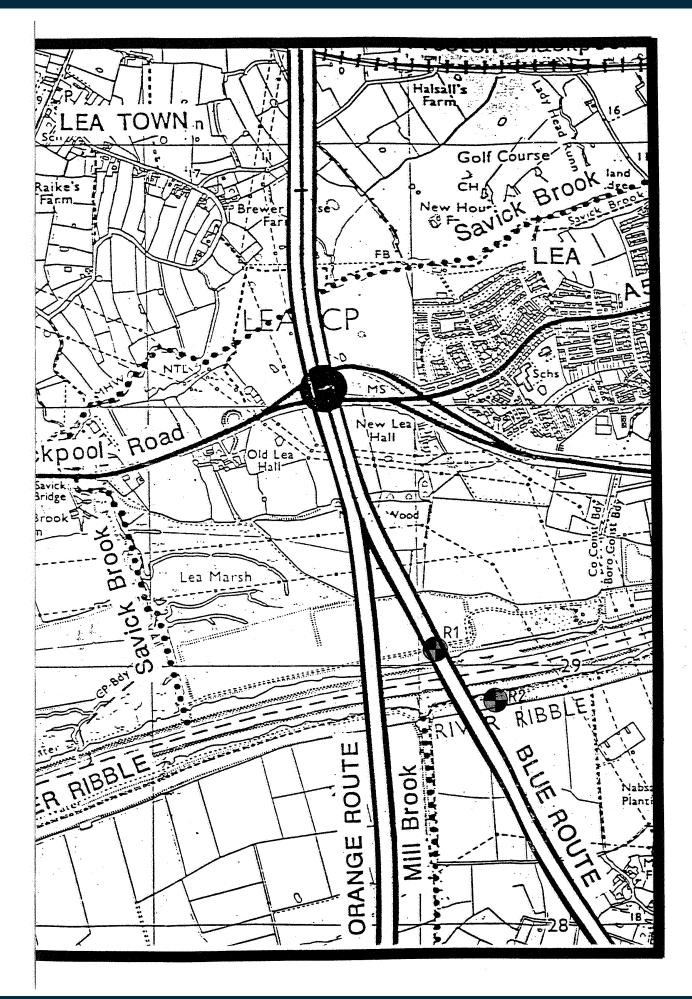


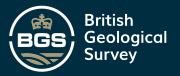


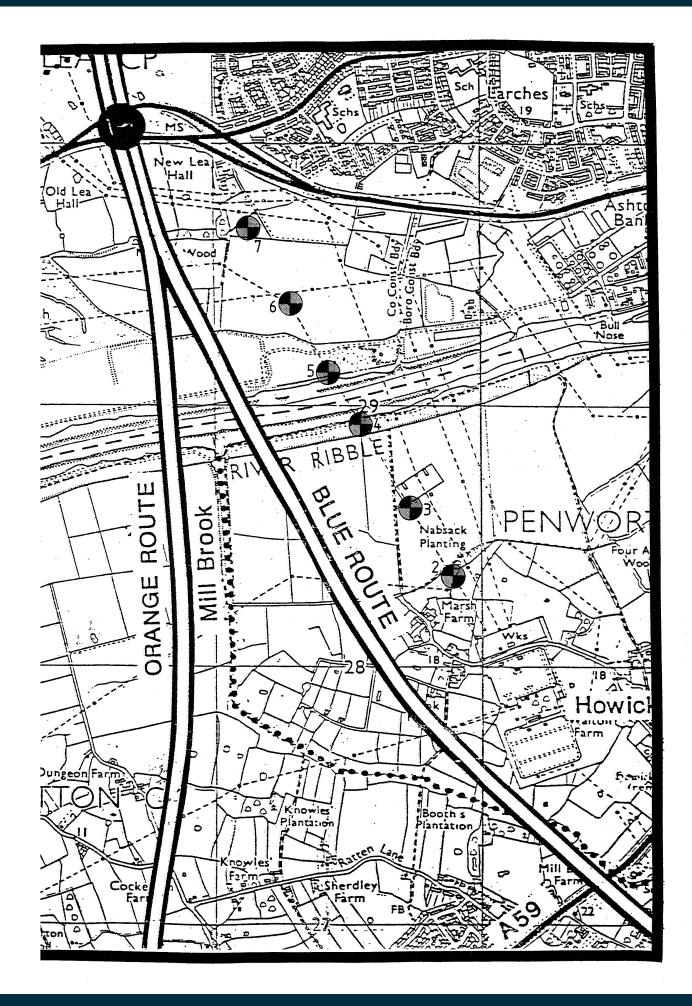


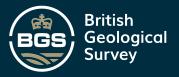


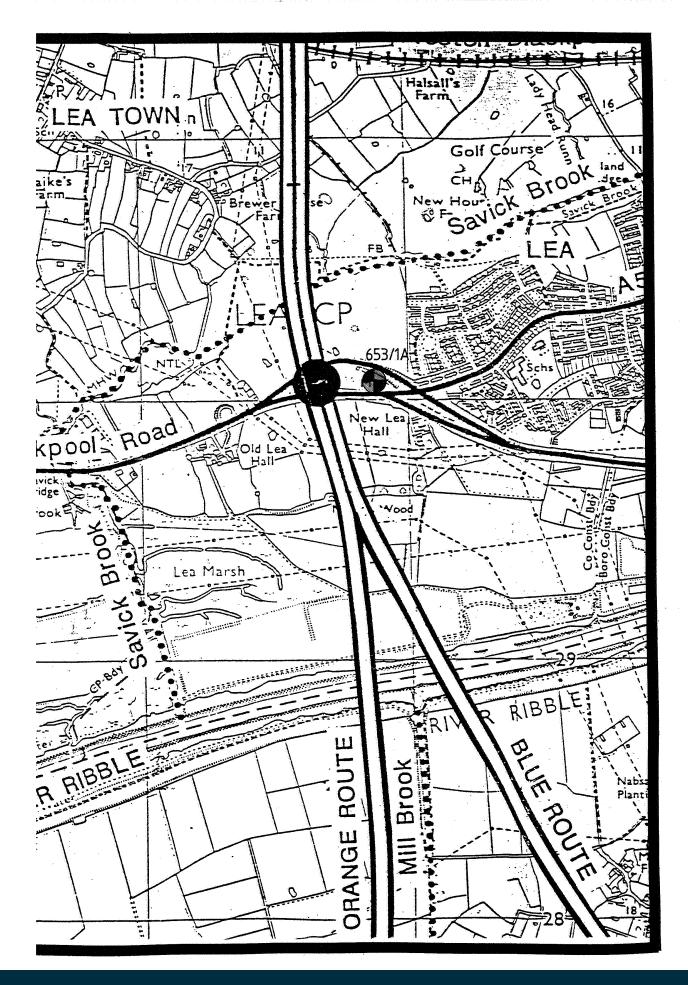


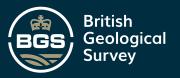


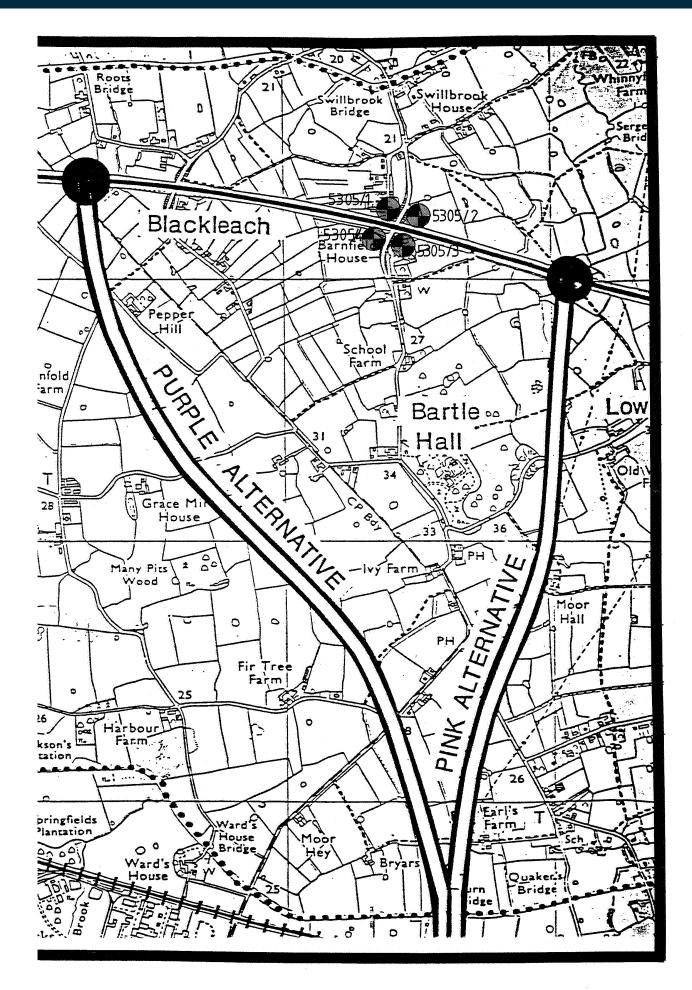


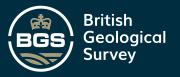


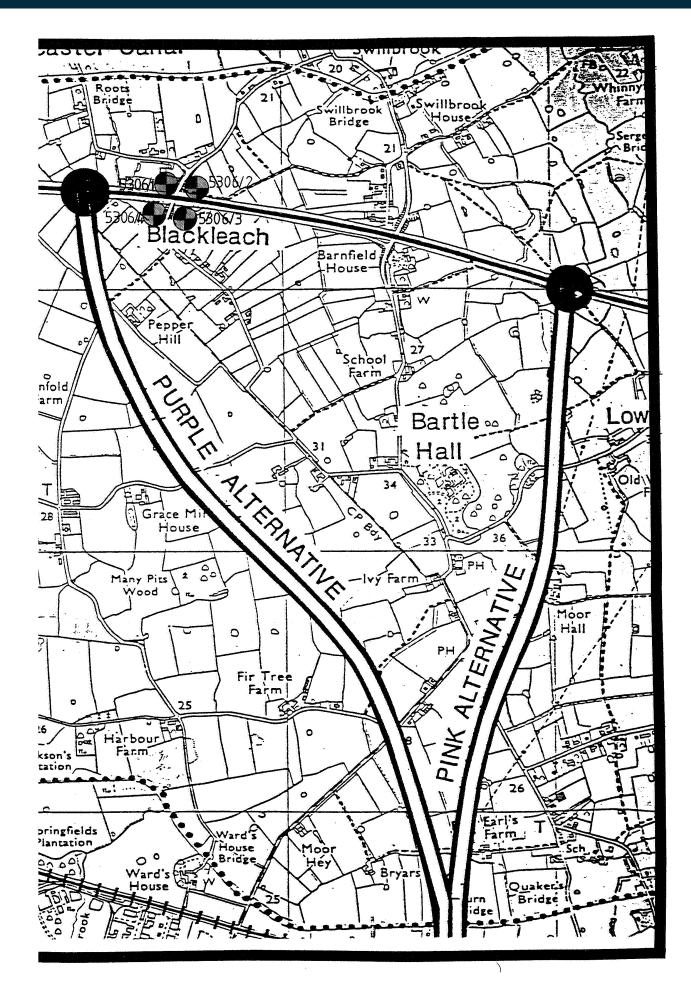


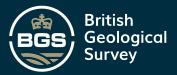


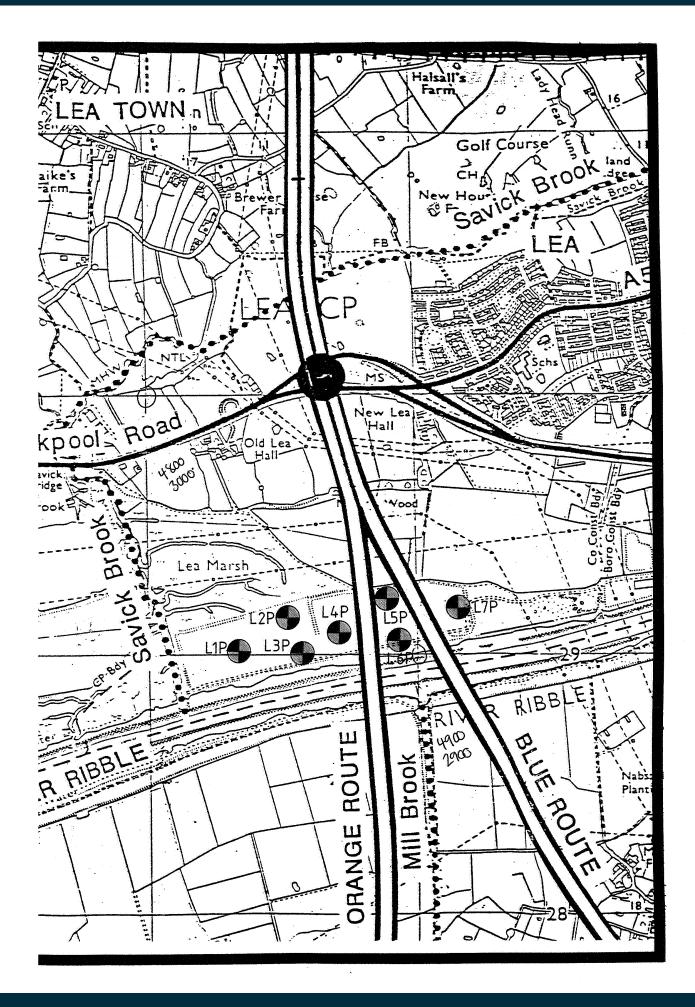


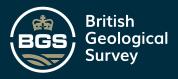








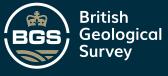




Name of si		VESTER		SY-PAS	<u> </u>	W R B No.	···· · · · · · · · · · · · · · · · · ·		
	OREH		e]		2	504	+2/8	3	
Owner				Licence no. Appn no.		Nat. grid ref. 🔊	4400	2904	
Occupier				Cancelled IGS ref. no.	<u></u>	Status			
Ground lev	el		m OD		ft. OD	Aquifer		, 16 8 B	
Level of we	ell top		m OD		ft. OD	Code			····- - ·
Rest water	level	r	m bwt		ft. bwt	Summary of geological	section	Thickness	Depth
(Date)		m OD		ft. OD			1	41.1m
Constructio	on: Method			Date 1971	, ,				
Depth	Dia.	Linings (belo	ow well to			b/h log			
bwt	Dia.	From	То	Dia,	Туре	available			
		-				enclo	sed rec	eived from	n N.W
						Regia	5-3	90	
						V			
<u> </u>		l							
Abstraction	rates	T	Гуре of pu	imp					
	gph PWL		Chem./bac	t.anal. Y	ES/NO				
	gpd	V	Vell driller			1			
lf insufficier	nt space has t	een allowed, co	ontinue in	'Notes' overleaf				ـــــــــــــــــــــــــــــــــــــ	9/207

SCHEME	PRESTON WEST	E DATA SHEI ERLY BY-PASS							DEPTH	o
LOCATION	RIBBLE CROSS	ING (N. SIDE)								ND LEVEL
	ription of Strate		Depth	Samp 123 K	le M	.c.	LL/PL/PI Core Rec'y	, Class'n	1	Water & Casin
0 FILL Loose						0.0			N = 8	Started 23.1.7 200mm Casing.
nid brown fine SAND					2	0.6		su/r		····
Loose to medi		-	- 1.5		SP				N = 11	
2 dark grey-bla organic	ck									
silty fine S	AND					33.7		SF/F		
3					-					Slight WE, 3.2
FILL			3.4		SP				N = 10	
4 Loose to medi		•			.			SU/F	· · ·	· · · · ·
dark grey-bla medium SAND	with fine to									
gravel and po	ckets of clay		- 4.9		SP 2	6.8				
Medium dense			5.2						N = 20	23,1.76 pm. 1
light brown					2	29.3				Casing to 4.8m 26.1.76 mm. 'W
6 silty fine S (with occasio									1	
grey sandy si	1t)				SP 1	7.8	Grading	SF	N = 21	
7 Medium dense		· · ·	7.0							
brown fine to (with occasio		•							-	· ·
8 _ grey sandy si							· , •	SU		Slight WE, 8,2
Medium dense			8.2		SP				N = 11	
9 brown										26.1.76 pm. 5
with occasion	al fine grave	1								Casing to 8.25 27.1.76 am. Si Sand level 7.5
10										VE 9.75: ron 8.1: in 5:1:1/2
) STRENGTH								<u>-</u>		
Depth of Sample	Bulk Dens'y (kg/m3)	Dry Dens'y (kg/m3)	M.C. (%)	(kN/	Stress m2)	Co (ki	hesion N/m2)	Ø		Remarks
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	<u> </u>					ļ			•	
				<u> </u>		<u> </u>				
COMPACTIC	N AND OT	HER TEST F	RESULT	<u> </u> `S		1				
Depth of Sample	Compaction	Dry Dens'y (kg/m3)	M.C. (%)	5.G.	Air Voids	C.B.F	SO3	рН	Re	marks or other tests
										· · · · · · · · · · · · · · · · · · ·
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•	BO	REHOLE DAT	A SHEET	vo	01			-			•	ПСРТН	R1
SCHEME												GROUN	ND LEVEL
LOCATIO		BLE CROSSING		Durah	San	npie_	.м.		LL/PL/P	Cla	ss'n	N Value	Water & Casing Detail
	Description	of Stratum			123	Key	┨╴		.012 1100	· ·			
				10.5		SP						N = 10	· · · · · · · · · · · · · · · · · · ·
_ Medium d				•		i					st		
with tr	ine SAND aces of fin	e gravel								_+-			
	onally more r clayey)	3							·			N = 15	
						S	▫┝	+		-+		N - 17	
			:	 	,								
- Dense			·				┟	 					27.1.76 pm. SwL 9.4
mid-br medium	SAND						SP	<u>_</u>	Gradin	B	Gp	N = 45	27.1.76 pm. SwL 7. Casing to 14.4m 28.1.76 mm. SwL 7. S. and G. level 12.
and oc	casional b	rse GRAVEL					ſ						S, and G, level 12.
SAND a	ing well ground GRAVEL	eded.							<u> </u>		<u> </u>		
F							SP	,	Gradi	reg	Gw		28.1.76 pm. SWL. 8 Casing to 16.0m 29.1.76 am. SWL 7.
									<u> </u>		<u> </u>	 	S. and G. level 15
ł			••					۰. ۱				N = 15	29,1,76 pa. Swit 8
	mid-brown	sandv	·	- 18.	.0		SP		<u> </u>				Casing to 17.7m 30.1.76 am, SWL 7
silt	CLAY WI	th fine to nized stones					U4	17.:	2				
	 			19	.4			21.	4				30.1.76 pm. SWL 8 Casing to 18.5m 2.2.76 mm. SWL 7.
See	Sheet No.	3											
STR	ENGTH	EST RESUL		M.C	. 1	Con	np.St N/m	ress	Cohesi (kN/m	<u></u>	Ø	T	Remarks
	of Sample		Dry Dens'y (kg/m3) 1860	(%)	7.2		<u>:N/m</u> : 168	2)	(KN/m-	- 1	÷	100208	J. C. T.
18_5 -	19.0	2180						·		<u> </u>		<u> </u>	
						┣					`		
						╞			1				
				+		$\frac{1}{2}$							
											<u> </u>		
		ON AND OT	HER TES Dry Dens') (kg/m3)	TRES	SUL 1.C. %)	15 S	.G.	Air Void <u>s</u>	C.B.R.	SO3 gm/litr	e pH		Remarks or other tests
Dept	h of Sample	Competion	(kg/m3)	<u> </u>		1							
										<u> </u>	$\frac{1}{1}$		
	NERAL							<u> </u>				ng up casi	C87A 1

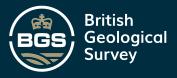
m 1:	• •		DATA SHEET							B.H. No	RI
5	SCHEME										
*		RIBELE CROS	SING (N. SIDE)	PRELIMI	NARY BO	REHOLE	;				ND LEVEL
⊢	LOCATION	iption of Stratur		Depth	Sample	ем.	c.	LL/PL/PI Core Rec'y	Class'n	T	Water & Casing D
20-					23 Ke			Core nec y			Change to 150mm Casing
1	Firm to stiff				U 04		.4		1		2.2.76 pm. SWL. 8
	brown smooth					26	5.6				Casing to 19.2m 3.2.76 am. SWL 8
21	- laminated silt;	4				20	5.9				3.2.76 pm. SWL. 1
ł	CLAY										4.2.76 am. SWL. 7
- [with occasional	l bands					9.4			·	4.2.76 pm. SWL 9 5.2.76 am. SWL 7.
22	of brown sandy	silty			1 0	4 24	5.5	<u>.</u>			·····
t	boulder clay										
F						2	5.0	46/22/24	CI		
23	_									<u> </u>	
ł	· · · · · · · · · · · · · · · · · · ·			23.3		. .					
ł	Very stiff				U D	4 8.	.7				
24	red brown										· · · · · · · · · · · · · · · · · · ·
t	very sandy CL					9	•7				5.2.76 mm SVI.
	with gravel si stones and ban	-			s III s	P 1	0.2		CL/S	¥ = 53	5.2.76 pm. SWL. 9 Daring to 23.3 6.2.76 am. SWL. 8
5	of sand and gr				┥╽╴╴	·					Sand level to 22.
						ł					6.2.76 pm. SWL. 1
E											Casing to 24.5
26						-					9.2.76 am. SWL 8.
ļ	•				S	P				N = 69	
ŀ	-										9.2.76 pm. SWL 1
27	·			27.1							Casing to 26.0m
	Soft, very bro	ken,			S	P		i i		For 150mm	11.2.76 mm. SWL Sand level 25.0m
t	red brown very								. sa	•	11.2.76 pm. SWL. BH. to 27.5m
28	weathered fine SANDSTONE wit	÷				\vdash			- 34		13.2.76 am. SWL
	of harder thin							-			Sand level 26.4m
	sandstone					iP				N = 103 For 75mm	13.2.76 pm, SWL.
29										-	Casing to 28.6m
											16.2.76 am. SWL. Sand level 27.1m
)°	STRENGTH	TEST RESU	JLTS								<u></u>
9	Depth of Sample	Bulk Dens'y (kg/m3)	Dry Dens'y (kg/m3)	M.C. (%)	Comp	. Štrest /m²)	Τ	Cohesion (kN/m²)	ø		Remarks
-	20.2 - 20.6	2040	1640	24.4	16		1	84	-	100mm U.C.	Τ.
	21.8 - 22.2	2030	1600	26.5	14	4	1	72		100mm U.C.	T.
					1	,	-+-			100mm. U. C.	
	23.3 - 23.8	2370	2180	8,7	11	0	+	59	-		
				<u> </u>					┨╶╌┥		
	· · · · · · · · · · · · · · · · · · ·					<u> </u>	+	·	╂		
				v	ļ		<u> </u>				
					<u> </u>						
											······
	COMPACTIC	N AND OT	HER TEST F	ESULT	S				<u></u>		
	Depth of Sample	Compaction	Dry Dens'y (kg/m3)	M.C. (%)	s.g.	Air Void	ς C.	B.R. SO3	рН	Re	emarks or other tests
			1.1.21.1.1.1			1					,
						+	+		†		
	1				ł	1			I		
									1 1		

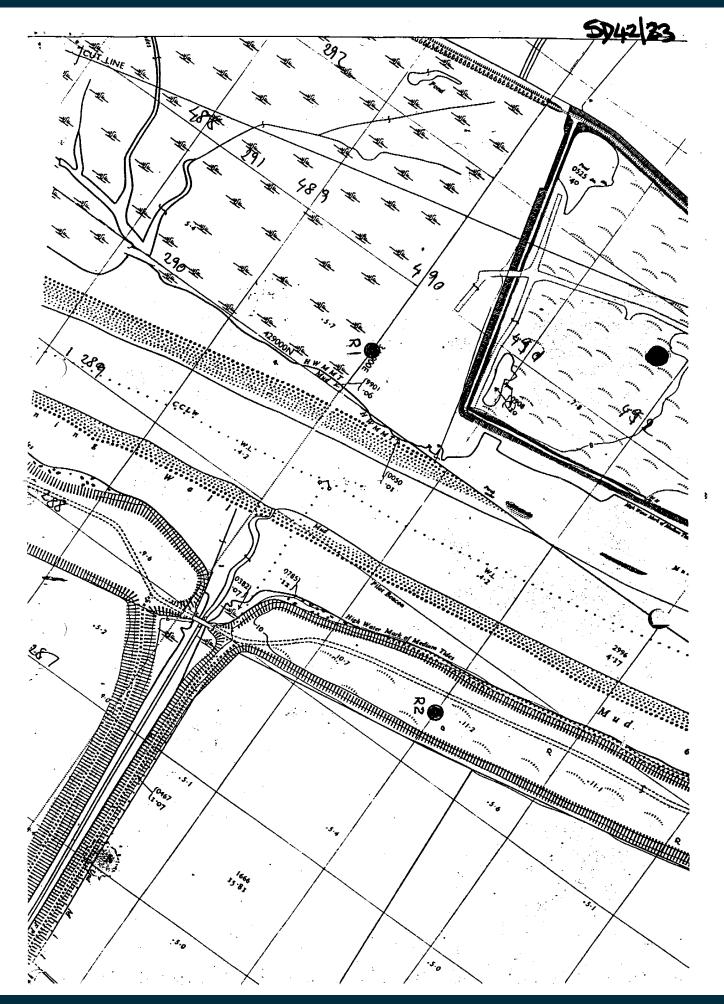
SCHE	EME		ERLY BY-PASS				•••••••	••••••			
LOC	ATION	RIBBLE CROSS	ING (N. SIDE)	1	1	-	· · ·	1 /01 /04		1 11/10/1	ND LEVEL
30	Desc	ription of Stratu	m	Depth	Sample			L/PL/Pi ore Rec'y	Class'n	RECOVERT	Water & Casing [
. [Sheet No.	3						** <u>-</u>	- ¹	75%	Air Flush Water not scale
31				- 31.3					1		
r	, fairly m brown fine	•								100%	
SAND	um grained STONE								•		
221-	partings										
		light grey								100%	
	weakly ce	owented 32.2 - 32.4									
34 - sand	20016 at .	2.2 - 2.7	•								
Bori	sontally 1	bedded						• ·		100%	
										100%	
36				- 36.0				<u> </u>	<u> </u>		
veat	, wery bro hered red-	-brown								100%	· .
371	ly bedded ned SAND:								<u> </u>		
1 -		barder massiv	e .						ł	ŀ	
- L	•	occasional									
~	s of sarl mate, ver	w soft		- 38.0		-	+				
	•	cemented fine	to medium							100\$	
39	STONE and										
- red		ily parted cemented fine	sandstone								
F	bands of	marl									
) ⁰ STR		TEST RESI									
Depth	of Sample	Bulk Dens'y (kg/m3)	Dry Dens'y (kg/m3)	M.C. (%)	Comp. 1 (kN/r	n2)	Coh (kN)	esion /m²)	0		Remarks
											· · · · ·
											· · · · · · · · · · · · · · · · · · ·
	* i										
					1		[
					1		1			2	
·							t				
											· · · · · ·
CON	PACTIC	N AND OT	HER TEST F		rs		<u></u>	<u>+</u>			
Depth	of Sample	Compaction	Dry Dens'y (kg/m3)	M.C. (%)	\$.G.	Air Voids	C.B.R.	SO3 gm/litre	pН	Re	marks or other tests
							ļ	\downarrow			
1											

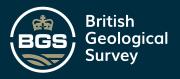
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с _/	SCHEME	BOREHOLI PRESTON WESTE	HIRE COUN E DATA SHEE RLY BY-PASS NG (N. SIDE) F	T No	OF	.5				B.H. No DEPTH	473 SPI2 2
	Desc	ription of Stratu	m	Depth	Sampl 123 Ke	M.C	. L Co	L/PL/PI pre Rec'y	Class'n	RECOVERY	Water & Casing Details
40 41	See Sheet	t No. 4						•.		100\$	
				41.1							B.H. Complete
42	 										
	- - -										
	-		• .	-							
)	- -										
	-										
								<u> </u>			
)	STRENGTH	TEST RESU	JLTS				<u> </u>				
	Depth of Sample	Bulk Dens'y (kg/m3)	Dry Dens'y (kg/m3)	M.C. (%)	Comp. (kN/	Stress m²)	Cohi (kN/	esion m2)	Ø		Remarks
					<u> </u>						
	·				 					 	· · · · · · · · · · · · · · · · · · ·
	COMPACTIC		HER TEST F	RESULT	-s						
	Depth of Sample	Compaction	Dry Dens'y (kg/m3)	M.C. (%)	s.G.	Air Voids	C.B.R.	SO3 gm/litre	pH	Re	marks or other tests
		· ·			+	t		1 1			

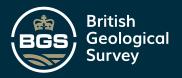
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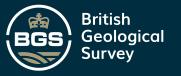
Name of site			· .			SO C	+ Z W R B No.	NE/ba		
	CL	iPTON I Bł	мдеs 7 З	<i>#</i> +	(ERA	VOE AN)		NE/60 SD42/	15 C	
Owner				Licent	ce no.	N/A.	Nat. grid r	et. \$D 4536	2850	
Occupier				IGS re	ef. no.	,	Status	Hesewation ,	· Site	moetica
Ground leve		m				ft. OD	Aquifer	Super	icid De	write
Level of wel		m	1 OD			ft. OD	Jode		<u>u</u>	
Rest water i		155 m	n bwt			ft. bwt	Summary	of geological section	Thickness	Depth
(Date 10/			n OD			ft. OD		Sands		9.00
Constructio	1	able lesse	sur a	Date	May	1980	Sa	us with bornvel		12.80
		Linings (belo)	0		1	Roulder clay		30.70
Depth bwt	Dia.	From	То		Dia.	Туре		6		
30.70	8"+ 130	EL	13.50		2"	Plastic				<u> </u>
<u> </u>	64 6 307	Perfor	nted	10 5	-13:5					ļ
						· · · · ·				
										ļ
							<u> </u>			ļ
Abstraction	n rates	•	Type of pu	mp					ļ	<u> </u>
	gph PWL		Chem./bac			ES/NO				<u> </u>
	gpd	1	Well drille	r Si	ub Soil	Sumars			I	<u> </u>



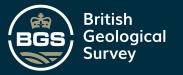
Site Plan

SD 42 NE/6C Boschole drilled as part of SI for proposed trying by NWWA. Standpipe installed with uncrite slubs and steel oversleave with bolted flange with dig plug. Chemical data evailable for waters environtered during dritting .

See l'404/02/01 2 Wenter Gudits + HAR Nº 58

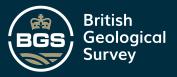


4	
	SO 42 NE/be 75/12/1C
	WATER RESOURCES BOARD W.R.B. REF. NO. SD 42/15 C
· ·	WELL RECORD
	R.A. LICENCE NO.
	1. WELL IDENTITY NATIONAL GRID REFERENCE 4536 2850
	well at Grange Farm No. 3 I.G.S. REF. NO.
	RIVER AUTHORITY
	TOWN. HYDROMETRIC AREA 71
	County
	Owner of well
	well made by but burneys Date of sinking 5/1980
	Information from
	2. WELL DESCRIPTION
	Level of ground surface
	above sea level (0.D.)
	Shaft ft, in
	30.70 m. 200 mm. 150 mm. 150 mm.
	Details of headings
	DETAILS OF PERMANENT LINING TUBES
	13:50 m. 50 mm Length m. biss
	Length ; Diam. 50 mm Length m Diam. 70 mm above surf
	Length
	Plain ft. to the ft. to below surf
	Length m. Diam. i. Slotted ft. in. ft. below surf
	Plain ft. in. ft. below corr
	Details of well screen plastic lucin, puforntul 10.5 95 13.5 m.
	DETAILS OF REST WATER LEVELS DURING CONSTRUCTION
	Water struck at depths of
	Rest level of water
	Rest level of water deep. Date deep. Date tt.
	Rest level of water
	Cast laval of water $h/(5) = -20.70$
	on completion of events of the second deep. Date 10.0.00
	Hathod of stilling Perducing



					504	2NE/6	C		2
٠.	DETAILS	OF PUMPII						751	11240
	Water leve depressed	el from	m. a ft. B	bove well	top to	ft.	well top, pump	ing at)/ galls
	water leve depressed	el from	m. ît.	bove" well	top to	m. below s	well top, pumpl	ng at	1/ galls
	Water leve depressed	from	ñt. ⁶	elow well	top to	m. below v	rell top, pumpi	ng at	1/: galls
	Suction at	t	ft. below	well top.	Capacity of	pumpgalls	Test from	1//19	to/./1
	DETAILS	OF PERMA	NENT PU	MPING EQ	JIPMENT				
	Make and/o	or type			•••••	Motiv	ve Power		
	Capacity		1/s galls/hr.	Suction	at f		iop.		
	Amount pun	nped		av' Pum Toay.			lay.		
	Estimated	consumption			<u>m³/week'</u> galls/week				m ³ /year galls/yea
	3. WELL	DATA			an da a da ana ang ang ang ang ang ang ang ang an	97 - 26 - C C C C C C C C C C C C C C C C C C	ananden an en an	an star har harne në kentar fi bindh yëtin me sqe	n gulin culturad da miliji sing anta cigan ja bakan ana
	WELL USE.	Abstractio	on [],	Recharge], Observatio	on X, Disuse	d 🗌 , Filled	-in	
	WATER USE.	Public Sug	oply□,	Industrial[], Irrigation	, Agricult	ure . Domesti	c, Unused	X, Misc.
	WATER LE	EVEL OBSER	RVATION	S		nine ander that the amount the anaptable of a sequence of angels	88-9 Augu - 14 Januar - 14 Martin, 74 Jan B ^a August Jan Jan Harris, 4 Mar		atan tana da ana ang tipatan da kana ayan
		est Water Lev	1		Water Leve)	Depression	Rate	of Pumping	Da
			m.				n.		s
		t	0.D. t.		0.D. ft.	f	t.	galls/	hr.
	2		m. 0.D.		0.0.		π.		5
)			t.	••••		f		galls/	hr.
/	3	······ '	m. 0.D.		m. 0.D. ft.	f	n.		
			m.		m.	· · · · · · · · · · · · · · · · · · ·	n.		
	(J)	f	0.D.		0.D. ft.			galls/	
	GEOPHYSI	CAL DATA	AVALLA	BLE					l
	Resistivit	y 🗌 Con	ductlvity	Ter	perature	Any other 1	ogs		
	PARTIAL	ANALYSIS	DETAIL	S In mili	igrams per	lltre	ter men direkt gen gelig ante entre gen sit plan die men oppige helle week gen		
	Date	TDS	То: н	Carb	H Non-Car	Alk H G	SOli	C1	ε.c.
			ę	4		1		1	

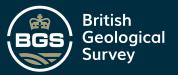
BGS ID: 4266 : BGS Reference: SD42NE6/C EPSG: 27700 : 345360,428500



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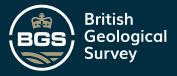
	5	D 42	NE/6	С	75/121
WATER RESOURCES BOARD	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -			W.R.B. REF NO.	5D 42/15
WELL RECORD			SHEET 2	R.A. LICENCE N	0.
4. HYDROGEOLOGY		9 - 9 - 7		}	ﻣﯘﻣﺪﻩ, ﺑﻪﺩﻩ, ﺑﻪﺩﻩ, ﺑﻪﺷﺪﻩ, ﺑﻪﺩﻩ, ﺑﻪﺩﻩ, ﺑﻪﺩﻩ, ﺑﻪﺩﻩ, ﺑﻪﺩﻩ, ﺑﻪﺩﻩ, ﺑﻪﺩﻩ, ﺑﻪﺭﻩ, ﺑﻪﺭﻩ, ﺑﻪﺩﻩ, ﺑﻪﺩﻩ, ﺑﻪﺩﻩ, ﺑ
Topography AT HELL SITE					
Local depression [], Flat surfa	ace], нітт	top 🗌 , H	illside 🗌 .	valley bottom . Te
MAJOR AQUIFER Superficial	clef	Serits		Lithology	
Depth to top of aquifer	mi. ft.		Thickness p	enetrated	
Top of aquifer		AQD BOD	Total thick	ness of aquifer	
Coefficient of storage		Trans	missivity		galls/day'ft.
MINOR AQUIFER				Lithold	9y
Depth to top of aquifer			Thickness p	enetrated	
Top of aquifer		<u>AOD</u> * BOD	Total thick:	ness of aquifer	
Coefficient of storage			Transmissiv	ity	m²/day* galls/day/ft.

ADDITIONAL NOTES:

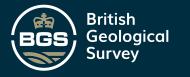


	14			/		
· · · ·	5. STRATA	SD 42	- NE	/6C		15/124
	GEOLOGICAL CLASSIFICATION	NATURE OF STRATA		THICKNESS	DEPTH	JEPTH
				METRES	METRES	FEET IN
	Ext AU. GLAC. SHG BCI	Sands with growned Baulden clay		9.00	9.00	
	2 GLAC.SIG	Sareh with growel		3.80	12.80	
	R DU	Saulden clay	-	17.90	30.70	
			Andre 400 - 212 - 50 - 600 - 600			
		ana an' amin'ny faritr'o amin'ny fanisana amin'ny fanisana amin'ny fanisana amin'ny fanisana amin'ny fanisana a				
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		Als for a general second s				
)				1917 W. P. 199		
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				ander Aller of Angeleral Society States (Sales or Angelera) A		
		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				

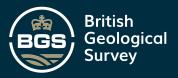


	5542/15 C
ATER RESOURCES BO	ARD W.R.B. REF. No. 50 42/15 C
WELL RECORD	
SD	42 NE 60 R.A. LICENCE NO.
. WELL IDENTITY	NATIONAL GRID REFERENCE 4536 2850
ell at Guenna Far	M No. 3 I.G.S. REF. NO. 75/124 C
0	RIVER AUTHORITY
QWN .	· · · · · · · · · · · · · · · · · · ·
	SUB-CATCHMENT.
wher of well	
	Lurrys
nformation from	Date received
• WELL DESCRIPTION	
evel of ground surface	m. If well top is not at above*m.
bove sea level (0.D.)	ft. ground level how far below
naft ft.	deep; Diameter at top ; at bottom in.
30 · 70 m.	deep; Dlameter at top ; at bottom
ft.	in. in.
etails of headings	
	50 mm Length m. Diam. mm Top mabove surfat
	50 mm Length m. Diam. mm Top mabove surfat
	50 mm. Length m. Diam. mm. Top m. above surfax in. ft. in. in. ft. ft. ft. ft. ft. ft. surfax mm. Slotted m. piam. in. in. ft. f
	52 mm. Length m. Diam. mm. Top m. above surface in. ft. in. ft. ft.
	52 mm. Length m; Diam. mm.; Top m. above surface in. ft. in. ft. ft. in. Slotted m.; Diam. mm.; Top m. above surface in.
./3:570 m	52 mm. Length m. Diam. mm. Top m. above surface in. ft. in. ft. ft.
	52 mm. Length m; Diam. mm.; Top m. above surface in. ft. in. ft. ft. in. Slotted m.; Diam. mm.; Top m. above surface in.
./3:572.m. ength ; Diam. ength ; Diam. lain ft. ength ; Diam. lain ft. ength	52 mm. Length m; Diam. mm.; Top m. above surface in. ft. in. ft. ft. in. Slotted m.; Diam. mm.; Top m. above surface in.
	50 mm. Length m; Diam. mm; Top m. above surface in. ft. in. ft. ft. in. Slotted m.; Diam. mm; Top m. above surface
	Imm. Length m; Diam. mm; Top m. above surface in. ft. in. ft. ft. In. Slotted m.; Diam. mm; Top m. above surface in. ft. in. ft. ft. ft. In. ft. in. ft. ft. ft. in. ft. in. ft. ft. ft. in. ft. ft. in. ft. ft. plantic ft. ft. ft. ft. ft. plantic ft. ft. ft. ft. ft. in. ft. ft. ft. ft. ft. plantic ft. ft. ft. ft. ft. in. ft. ft. ft. ft. ft. plantic
	Imm. Length m; Diam. mm; Top m. above surfaction surfactit surfactit surfactit surfaction surfaction surfaction surfaction
	Imm. Length in. m; Diam. mm, Top in. m. above surfaction surfaction in. in. ft. in. ft. in. ft. in. Slotted in. ft. in. ft. in. in. Slotted in. ft. in. ft. in. ft. in. in. m. above surfaction in. surfaction in. ft. in. m. above surfaction in. ft. in. ft. in. ft. in. ft. in. ft. in. ft. below surfaction in. ft. ft. ft. below in. ft. <
	50 mm, Length m; Diam, mm; Top m. above surfaction s
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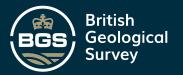


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DETAILS OF PUMPING TES	r					
Water level m. depressed from ft.	above [*] well top to below		below well	top, pumping	at .	1/s galls/hr.
water level	<u>above</u> * well top to below	n	below well	top, pumping	at	1/s galls/hr.
						-
water level						
Suction atft. belo	w well top. Capac	ity of pump	<u>l/s</u> galls/hr.	Test from	/ to	
DETAILS OF PERMANENT P	UMPING EQUIPMEN	١T				
Make and/or type	·····	· · · · · · · · · · · · · · · · · · ·	Motive P	ower	·····	
Capacity	- -	m.				
		ft.	ow well top.			н. - С
Amount pumped	day* s/day. Pumping fo	o r	hrs./day.			
Estimated consumption		veek*			ā	m ³ /year* alls/year
3. WELL DATA	garra	WCCK			9	
		<u> </u>			. []	
	Recharge , Obs			,		
WATER USE. Public Supply	, Industrial, (ri	rigation 🛄,	Agriculture	Domestic	Unused 🖄	(, Misc.
WATER LEVEL OBSERVATIO	NS		· · ·			
Rest Water Level	Pumping Water L	evel D	epression	Rate of	f Pumping	Date
		m	m.			
(1) 0.D.	f	0.D.		· · · · · · · · · · · · · · · · · · ·		r.
m.		m	m.		1/s	
0.D.	f	0.D. 't	ft.		galls/h	r.
m.		m				
(3)		0.0.	ft.		galls/h	r.
m.			m.		1/s	
(4) 0.D.	·	0.D.	ft.		galls/h	r.
GEOPHYSICAL DATA AVAIL	ABLE	.		······································		
	<u> </u>	ا مسلم				
Resistivity Conductiv	ity Temperatu	ure 🗌 A	ny other logs	ŝ		
PARTIAL ANALYSIS DETAI	LS in milligra	ms pe r li	tre			
Date TDS Tot	H Carb H	Non-Carb H	Alk	S04	C1	E.C.
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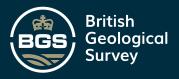


		5D42/15 C	,
WATER RESOURCES		W.R.B. REF NO	· 5D 42/15 C
WELL RECORD	5 D 42 NE6		NO.
4. HYDROGEOLOGY			
Topography AT WELL SITE			
Local depression .	lat surface 🗌 , H	111 top 🗌 , Hillside 🔲 ,	Valley bottom
MAJOR AQUIFER	nficial deposit	Litholog	/
Depth to top of aquifer	M.	Thickness penetrated	m.
Top of acuifer	m. <u>AOD</u> BOD	Total thickness of aquife	M.
Coefficient of storage	۲ _۲	ansmissivity	$\frac{m^2/day^{\bullet}}{galls/day/ft}$
	······	Lithol	······································
· · · · · · · · · · · · · · · · · · ·			m.
Depth to top of aquifer		Thickness penetrated	ft.
Top of aguiter		Total thickness of aquifer	m.
		JULAI LITICKNESS OF AQUITER	ft. m2/day*
coefficient of storage		Transmissivity	galls/day/ft.
ADDITIONAL NOTES:			
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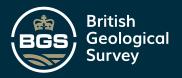


5. STRATA		SDL	2/15	6	
GEOLOGICAL	NATURE OF STRATA	THICKNESS	2/15 DEPTH	DEPT	'H
GEOLOGICAL CLASSIFICATION		METRES	METRES	FEET	1
Est. Allurian	Sands Sands with gravel Boulder clay	9.00	9.00		
Est. Allurian Slasial se q.gr.	lands with annul	3.80	12.80		
flocial BCL	Building	17.90	30.70		
	Towell chy	17.70	30.70		-
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RR 18127/1/2173 5m 5/71 TP



Name of sit	CLIFT	DN MAR BH Z	s# (2	GRANG	-PARA)	W R B No	Ne/6 SU42/		
Owner				Licence no. Appn no.	N/+	Nat. grid i	ref. SD455	1 288	24.
Occupier				IGS ref. no		Status	Observation e	Site I	wortigat
Ground lev	rel	, T	OD		ft. OD	Aquifer	Superficial	Dennito	
Level of w	ell top	ព	OD		ft. OD	Jode	<u> </u>		
Rest water	level 1.	3 3 m	n bwt		ft. bwt	Summary	of geologicel section	Thickness	Depth
(Date 10	6/801	n	OD		ft. OD	5	ands		15.00
Constructi	on: Method	alde Peren	sinà 1	Date Ma	1980	San	is int brand		16-40
Depth	Dia.	Linings (belo	w well top	op)			wouldo Clay		30.50
bwt		From	То	Dia	. Туре	 			
30.50		66	17.0 m	1 24	Plastie				ļ
	6 10 30 50	Perfor	ted	<u>14 -17 m</u>	. Comtest				
Abstractio	n rates	т	ype of pu	Imp					
	gph PWL	C	hem./bac	t. anal.	YES/NO				
	gpd	٧	Vell driller	Sub	Soil Surve	41			
If insuffici	ent space has be	en allowed, co	ntinue in	'Notes' over	leaf.			1/5/7	9/207



an Ner

Si

Site Plan

Notes SD 42 NE/6B Roschole dutted as part of SI for proposed typing by NWWA.

Standpripe in stalled with concrete state and steel overdeere with holded flange with dip plucy.

Chemical data available for water carountered during duiting.

Sue Ryoy/or/or a Wuter + H/R N 58

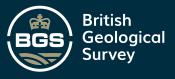
BGS; G	ritish eological urvey
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WATER RESOURCES	S BOARD	W.R.B. 1	REF. NO. 5D4	2/15 7
WELL RECON	20	SHEET 1		1
		R.A. LI	CENCE NO.	
I. WELL IDENTITY	NATIONAL GRID REFEREN	CE 4-551	2884	
well at Gurman	Farm No. 2	1.G.S. REF. NO.		
8		RIVER AUTHORITY-	NWWA	
Town		HYDROMETRIC AREA		
vall and by during d	oil Surveys	Data of sink	5/1980	
	NWWA.			
		Date receive	.d	
2. WELL DESCRIPT	ION			
Level of ground surface		If well top is not	at above*	
above sea level (0.D.)	ft.	ground level how fa	r below	
Shaft	m. deep; Diameter at to	D	mm. ; at pottom	
SDATT	veep, promotor at to	P	,	
	ft.			
30.50 Bore	ft. m. deep; Diameter at to		; at bottom . in.	150
30.50 Bore Details of headings DETAILS OF PERMAN	m. deep; Diameter at to ft. ENT LINING TUBES	p	; at bottom . in.	
30.50 Bore Details of headings DETAILS OF PERMAN	m. deep; Diameter at to ft. ft. ENT LINING TUBES 50 mm. Length Slotted in.	p	; at bottom . in.	
30.50 Bore Details of headings DETAILS OF PERMANI Length Plain m.	m. deep; Diameter at to ft. ft. ft. ft. ft. ft. ft. ft. ft. ft.	p 	; at bottom . in. 	t. m. aboys. rt. fellor m. aboys.
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30.50 Bore Details of headings DETAILS OF PERMANI Length : Dia Plain ft.	m. deep; Diameter at to ft. ENT LINING TUBES 50 mm. Length Slotted in. Length Slotted. mm. Slotted. in.	p m. Diam. ft. 	; at bottom . in. 	m. aboye r:. felox m. aboye r:. ^{Delox}
30.50 Bore Details of headings DETAILS OF PERMAN Length 17.0 m. Dia Plain ft.	m. deep: Diameter at to ft. ENT LINING TUBES 	p m Diam ft ft ft ft ft	; at bottom . in. 	m. aboye t:. below m. aboye rt. below rt. below ft. below
30.50 Bore Details of headings DETAILS OF PERMAN Length 17.0 m. Dia Plain ft.	m. deep; Diameter at to ft. ENT LINING TUBES 50 mm. Length Slotted in. Length Slotted. mm. Slotted. in.	p m Diam ft ft ft ft ft	; at bottom . in. 	m. aboye t:. below m. aboye rt. below rt. below ft. below
30.50 Bore Details of headings DETAILS OF PERMAN Length 17.0 m. Dia Plain ft.	m. deep: Diameter at to ft. ENT LINING TUBES 	p m. Diam. ft. Diam. 	; at bottom in. in. in. in. in. in. in. in. in. in.	m. above r:. 5210* m. above rz. belo* m. above rz. belo* tz. belo*
30.50 Bore Details of headings DETAILS OF PERMANI Length 1.7.0 m. Dia Plain ft. Length 1. Dia Plain ft. Length 1. Dia Plain ft. Details of well screen.	m. deep; Diameter at to ft. deep; Diameter at to ft. ENT LINING TUBES 50 mm. Length slotted in. Length slotted in. Slotted in. Slotted in. Slotted in. Slotted	p m. Diam. ft. m. Diam. ft. m. Diam. ft. I. Iwodsk 14 - 17 ~	; at bottom in. in. in. in. in. in. in. in. in. in.	m. above r:. 5210* m. above rz. belo* m. above rz. belo* tz. belo*
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30.50 Bore Details of headings DETAILS OF PERMANI Length 17.0 m. Dia Plain ft. Length ft. Details of well screen DETAILS OF REST W Water struck at depths	m. deep: Diameter at to ft. deep: Diameter at to ft. ENT LINING TUBES 50 mm. Length slotted mm. Slotted am. in. mm. Length slotted in. plastic function ATER LEVELS DURING COM of	p m. Diam. ft. ft. Diam. ft. Istruction	; at bottom . in. 	t: m. aboye t: felow t: below t: below t: below
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30.50 Bore Details of headings DETAILS OF PERMANI Length 1. Dia Plain	m. deep: Diameter at to ft. deep: Diameter at to ft. ft. ENT LINING TUBES 50 mm Length slotted in. Length am. in. Length am. in. Slotted in. Slotted in. ft. fmir. prod ATER LEVELS DURING CON of in. above: 0.0. below well to ft. below well to	p m. Diam. ft. Diam. ft. Diam. ft. Diam	; at bottom in. 	m. above t:. felow m. above t:. below t:. below ti. below ti. below d. below well ate

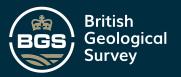


DETAILS OF	PUMPING TEST	T	42 NE/6	1000 - 10000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1	15/12	21.1
Water level depressed from		above [*] well top to	below wel	1 top, pumping	; at	
Water level depressed from						gal
		above" well top to				
Water level depressed from	m. 	above [*] well top to	m. below wel ft.	l top, pumping	at	gal
Suction at	ft. below	w well top. Capacity o	f pumpgalls/hr	Test from		
DETAILS OF	PERMANENT PU	JMPING EQUIPMENT			n tala alia da disederi alemana a la disederata da sar ya	
Make and/or typ	pe		Motive	Power		
		Suction at	.m. below well top			
Amount pumped	m ³ /c galls	Jay* S/day, Pumping for	lt. hrs./day			
		m ³ /week* galis/week			r.	³ /yea
3. WELL DAT		galis/week	1764-764-9641-14-876-476-189-48-49-44-8818-18-19-48-48-		ga	ITs/,
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WATER USE. Pub	olic Supply .	Industrial, Irrigatio	on . Agriculture	Domestic	, Unu sed 🔀	. Misi
WATER USE. Pub WATER LEVEL Rest Wa	OBSERVATION	Industrial, Irrigation IS Pumping Water Level 	Depression	Domestic	, Unu sed 🔀 Pumping 1/s	1
WATER USE. Pub WATER LEVEL Rest Wa	OBSERVATION ter Levei 	Industrial, irrigation IS Pumping Water Level 	Depression	Domestic	, Unu sed 🔀 . Pumping	1
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WATER USE. Pub	Dic Supply, OBSERVATION eter Levei 	Industrial, irrigation Pumping Water Level 	Depression 	Domestic	, Unu sed X Pumping 1/s galls/nr. galls/nr. 	1
WATER USE. Pub	Dic Supply, OBSERVATION eter Level 	Industrial, irrigation Pumping Water Level 	Depression 	Domestic	, Unu sed X. Pumping 1/s galls/nr. 1/s galls/nr. 1/s galls/nr. 1/s	. M
WATER USE. Pub	Dic Supply , OBSERVATION eter Level 	Industrial, irrigation Pumping Water Level 	Depression 	Domestic	, Unused X Pumping 1/s galls/nr. 1/s galls/nr. 1/s galls/nr.	Mis
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WATER USE. Pub WATER LEVEL Rest wa 1 2 3 3 4 4 9 4 9 4 9 4 9 4 9 4 9 4 9 4 9 4	Diic Supply , OBSERVATION eter Level 	Industrial, irrigation Pumping Water Level 	Depression Depression m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. m. ft. ft. m. ft. ft. m. ft. ft. m. ft. ft. ft. ft. ft. ft. ft. ft	Rate of	, Unu sed X. Pumping 1/s galls/nr. 1/s galls/nr. 1/s galls/nr. 1/s	1
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WATER USE. Pub	Diic Supply . OBSERVATION eter Level 	Industrial, irrigation Pumping Water Level 	Depression Depression m. ft. ft. m. ft. ft. m. ft. ft. m. ft. ft. m. ft. ft. m. ft. ft. m. ft. ft. m. ft. ft. m. ft. ft. ft. m. ft. ft. ft. ft. ft. ft. ft. ft	Domestic	, Unu sed X Pumping 1/s galls/nr. 1/s galls/nr. 1/s galls/nr. 1/s galls/nr.	

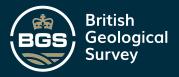
British Geological Survey



 SD 42NE/6	B 75/1241
WATER RESOURCES BOARD WELL RECORD	M.R.B. REF NO. 5D 42/15 SHEET 2 R.A. LICENCE NO.
4. HYDROGEOLOGY Topography AT WELL SITE Local depression . Flat surface . Hill to	
MAJOR AQUIFER Superficial deposito	Lithology
Top of aquifer Top of aquifer Tt.	otal thickness of aquifer
Coefficient of storage	ssivity
Depin to top of scuiter ft.	(nickness penetrated
ft. ====	Total inickness of aquiferfi

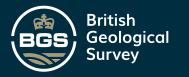


		SD 42 NE/6B			1	
5.	STRATA	7		15	1124	+B
GE	DLOGICAL	NATURE OF STRATA	THICKNESS	DEPTH	DEP	Тн
CLAS			METRES	METRES	FEET	IN
	stAU.	Sande with grand Bundder clay	15.00	15.00		
	Seg	Sand's with gravel	1.40	16.40		
	BCI	Builder clay	14.10	30.50		
		<i>v</i>				+
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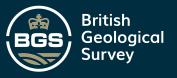
WATER RESOURCES BO	DARD	OUFET 4	W.R.B. REF. No.	5042/15	B
WELL RECORD	42 NE	SHEET 1 6 B	R.A. LICENCE NO.		
. WELL IDENTITY			4551 288	4	
vell at Grange Form					
-		RIVER A	UTHOR I TY	ιωωΑ	
ſown	· ·····		TRIC AREA		
County		SUB-CAT	CHMEN T		
Owner of well			•••••		
well made by July Lori					
Information from	WA	Dat	e received	19 · 7 · 80	
2. WELL DESCRIPTION					
evel of ground surface	- 	m. If well to	p is not at above"		M.
above sea level (0.D.)	f	t. ground lev	el how far below		ft.
Shaft fi	n. deep; Diameter	at top	mm. ; at	bottom	
			in.	••••••	·····in.
30 · 50 n	n. deep; Diameter a	at top	70	bottom /.S	🦉
etails of headings					
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<u>.</u>					
DETAILS OF PERMANENT					
				· · · · ·	
	50 mm. Length Slotted	m. Di	am,in,	Top ft.	bove surfa
Length	Length				
17:0 m. Length ; Diam. Plain	Length				
ength ; Diam. Plainft.	Length mm. Slotted. in.	•••••; Di	amin.	Top m. a	bove [*] surfa
ength ; Diam. Plain ft. Length , Diam. Plain , ft.	Length Slotted. in. mm. Length Slotted	^{.m.} , Di ft. 	am	Top m. a ft. b Top ft. b	bove [*] surfa bove [*] surfa bove [*] surfa
ength ; Diam. Plain ft. Length m. Plain ft.	Length Slotted. in. mm. Length Slotted	^{.m.} , Di ft. 	am	Top m. a ft. b Top ft. b	bove [*] surfa bove [*] surfa bove [*] surfa
ength , Diam. Plain , ft. ength , Diam. Plain , ft. Plain , ft. Plain , ft.	Length Slotied. in. mm. Length Slotied in. plante	m. Di ft. rt. penformted N	am	Top m. a ft. b Top ft. b	bove [*] surfa bove [*] surfa bove [*] surfa
Length	Length Slotied. in. mm. Length Slotied in. plante	m. Di ft. penjmetel	am	Top	<u>bove</u> surfa elow surfa <u>bove</u> surfa
Length ", Diam. Plain ft. Details of well screen DETAILS OF REST WATER Water struck at depths of	Length Slotied. in. mm. Length Slotied in. plante: Amin R LEVELS DURING	m. Di ft. ft. penjonated construction	am	Top	<u>bove</u> surfa elow surfa <u>bove</u> surfa
Length m.; Diam. Plain ft. Details of well screen. DETAILS OF REST WATER Water struck at depths of Rest level of water	Length Slotied. in. Slotied in. Slotied in. plante A LEVELS DURING	m. Di ft. ft. penjonated construction	am	Top	<u>bove</u> surfa elow surfa <u>bove</u> surfa
Length m.; Diam. Plain ft. Details of well screen DETAILS OF REST WATER Water struck at depths of Rest level of water	Length in. mm. Length. Slotted in. plaster R LEVELS DURING M. above* or bove we ft.		am	Top ft. b	<u>bove</u> surfa elow surfa <u>bove</u> surfa
Length m.; Diam. Plain ft. Details of well screen DETAILS OF REST WATER Water struck at depths of Rest level of water Rest level of water	Length 		am	Top ft. b	<u>bove</u> surfa elow surfa <u>bove</u> surfa
Length m.; Diam. Plain ft. Details of well screen DETAILS OF REST WATER Water struck at depths of Rest level of water Rest level of water /·3	mm. Slotied. in. mm. Length. Slotied in. plante: flate: flate: ft. above o below we ft.	. D . Di . Di	am	Top m. a tt. b Top ft. b m. a ft. b ft. b bel deep. Date deep. Date	bove [*] surfa ielow [*] surfa ielow [*] surfa
Length m. ; Diam. Plain ft. ; Diam. Plain ft. ; Diam. Details of well screen ; ; Diam. Details of well screen ; ; Diam. DETAILS OF REST WATER ; ; Mater Rest level of water ; Mater ; Mater ; Rest level of water ; Mater ; Mater ; Diam. ; Mater ; Mater ; Mater ; Mater ; Mater <	mm. Slotied. in. mm. Length. Slotied in. Slotied in. Plate: Amin R LEVELS DURING M. above* O below we ft. 3	. D . Di . Di	am	Top ft. b Top ft. b nul. peched bel deep. Date	bove [*] surfa bove [*] surfa lelow surfa
Length	mm. Length in. mm. Length. Slotted in. Slotted in. Plante: finin M. above* O below we ft. M. above* O below we ft.	m. Di ft. ft. penjonated CONSTRUCTIO	am	Top m. a tt. b Top ft. b m. a ft. b m. a ft. b m. a ft. b bel deep. Date deep. Date deep. Date	bove [*] surfa bove [*] surfa lelow surfa
Length ", Diam. Plain ft. Length m. Plain ft. Details of well screen DETAILS OF REST WATEF Water struck at depths of Rest level of water	mm. Length in. mm. Length. Slotted in. plaste fin. R LEVELS DURING M. above O below we ft. M. above O below we ft. Character we ft. Comments of the filler Slotted in. Slotted M. Slotted in. Slotted in. Slotted in. Slotted M. Sl	m. Di ft. perjorated CONSTRUCTI CONSTRUCTI	am	Top m. a tt. b Top ft. b m. a ft. b m. a ft. b m. a ft. b bel deep. Date deep. Date deep. Date	bove [*] surfa ielow [*] surfa ielow [*] surfa
Length m.; Diam. Plain ft. Length m.; Diam. Plain ft. Details of well screen DETAILS OF REST WATER Water struck at depths of Rest level of water Rest level of water	mm. Length in. mm. Length. Slotted in. plaste fin. R LEVELS DURING M. above O below we ft. M. above O below we ft. Character we ft. Comments of the filler Slotted in. Slotted M. Slotted in. Slotted in. Slotted in. Slotted M. Sl	m. Di ft. penjorated CONSTRUCTION CONSTRUCTI	am	Top ft. b Top ft. b m. g ft. b m. g ft. b m. g ft. b bel deep. Date deep. Date deep. Date	bove [*] surfa ielow [*] surfa ielow [*] surfa

SD 42/15 B

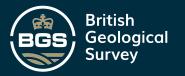


Weiter lawel depressed from	Witer level depressed from m. above* ft. below well top, pumping at ft. below well top, pumping at galls/hr. 1/s galls/hr. Water level depressed from m. above* ft. below m. below well top, pumping at galls/hr. 1/s galls/hr. Water level depressed from m. above* ft. below m. below well top, pumping at galls/hr. 1/s galls/hr. Suction at m. below m. below well top, pumping at galls/hr. 1/s galls/hr. Suction at ft. below well top. Capacity of pump	DETAILS OF PUMPING TES	Τ				
Water level depressed from m. above ft. below well top to ft. below well top to galls/hr. 1/s ft. below well top, capacity of pump	water level depressed from	Water level m. depressed fromft.	<u>above</u> well top to		top, pumping a	L	
Water level depressed from m. above' ft. below well top to ft. below well top, capacity of pump	water level depressed from	Water level	above [*] well top to	m. below well	top, pumping a	t	
DETAILS OF PERMANENT PUMPING EQUIPMENT Make and/or type 1/s Capacity galls/hr. Suction at tt. Amount pumped $\frac{m^2}{galls/day}$. Pumping for hrs./day. Estimated consumption $\frac{m^2}{galls/day}$. WELL DATA galls/s/week WELL USE. Abstraction [], Recharge [], Observation [X], Disused [], Filled-in [] WATER USE. Public Supply [], Industriat [], Irrigation [], Agriculture []. Domestic [], Unused [X], Misc. [] WATER USE. Public Supply [], Industriat [], Irrigation [], Agriculture []. Domestic [], Unused [X], Misc. [] WATER LEVEL OBSERVATIONS m. Rest Water Level Pumping Water Level Depression Rate of Pumping Date ①	DETAILS OF PERMANENT PUMPING EQUIPMENT Make and/or type Make and/or type			m. below well ft.	top, pumping a	t	
Make and/or type Motive Power Capacity galls/hr. Suction at me Amount pumped $\frac{m^2}{galls/day^a}$ Pumping for hrs./day. Estimated consumption $\frac{m^2}{galls/week}^a$ $\frac{m^2}{galls/year^a}$ 3. WELL DATA WELL USE. Abstraction \Box , Recharge \Box , Observation X , Disused \Box , Filled-in \Box WATER USE. Public Supply \Box , Industriat \Box , Irrigation \Box , Agriculture \Box Domestic \Box , Unused X , Misc. \Box WATER LEVEL OBSERVATIONS me \odot , \circ	Make and/or type Motive Power	Suction atft. belo					. / /19
1/s	1/s	DETAILS OF PERMANENT P	UMPING EQUIPMENT				
tt.	tt.	Make and/or type	·····	Motive F	ower		
Estimated consumption m ² /week* galls/week m ² /year* galls/year 3. WELL DATA	m ³ /wegk* galls/week galls/week 3. WELL DATA WELL USE. Abstraction [], Recharge [], Observation [X], Disused [], Filled-in [] WATER USE. Public Supply [], Industriat [], Irrigation [], Agriculture []. Domestic [], Unused [X], Misc. [] WATER LEVEL OBSERVATIONS Mage: mail of the supply [], Industriat [], Irrigation [], Agriculture []. Domestic [], Unused [X], Misc. [] WATER LEVEL OBSERVATIONS m. 0.D. m. 0.D			below well top.			
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WELL USE. Abstraction [], Recharge [], Observation X], Disused [], Filled-in [] WATER USE. Public Supply [], Industriat], Irrigation], Agriculture]. Domestic], Unused X, Misc. [] WATER LEVEL OBSERVATIONS Rest water Level Pumping Water Level Depression Rate of Pumping Date (1) m. 0.D. m. 0.D. (2) m. 0.D. ft. (3) m. 0.D. m. 0.D. (4) m. 0.D. m. 0.D. (5) m. 0.D. m. 0.D. (6) m. 0.D. m. 0.D. (7) m. 0.D. m. 0.D. (2) m. 0.D. m. 0.D. (3) m. 0.D. m. 0.D. (4) m. 0.D. m. 0.D. (5) m. 0.D. m. 0.D. (6) m. 0.D. ft. (7) m. 0.D. m. 0.D. (7) m. 0.D. m. 0.D. (2) m. 0.D. m. 0.D. (3) m. 0.D. m. 0.D. (4) m. 0.D. m. 0.D. (5) m. 0.D. m. 0.D. (6) m. 0.D. ft. (7) <td>WELL USE. Abstraction [], Recharge [], Observation X, Disused [], Filled-in [] WATER USE. Public Supply [], Industrial], Irrigation [], Agriculture []. Domestic], Unused X, Misc. [] WATER LEVEL OBSERVATIONS Rest Water Level Pumping Water Level Depression Rate of Pumping Date (1) m. 1/s (2) m. 0.D. (3) m. 0.D. (4) m. 0.D. (7) m. 1/s (8) m. 0.D. (9) m. 0.D. (17) m. 1/s (2) m. 0.D. (17) m. 1/s (17) m. 1/s (2) m. 0.D. (17) m. 1/s (17) m. 1/s (17) m. 1/s (2) m. 0.D. (3) m. 0.D. (17) m. 1/s (2) m. 0.D. (3) m. 1/s (4) m. 0.D. <</td> <td>Estimated consumption</td> <td><u>m³/week*</u> galis/week</td> <td></td> <td></td> <td></td> <td>/year• Ts/year</td>	WELL USE. Abstraction [], Recharge [], Observation X, Disused [], Filled-in [] WATER USE. Public Supply [], Industrial], Irrigation [], Agriculture []. Domestic], Unused X, Misc. [] WATER LEVEL OBSERVATIONS Rest Water Level Pumping Water Level Depression Rate of Pumping Date (1) m. 1/s (2) m. 0.D. (3) m. 0.D. (4) m. 0.D. (7) m. 1/s (8) m. 0.D. (9) m. 0.D. (17) m. 1/s (2) m. 0.D. (17) m. 1/s (17) m. 1/s (2) m. 0.D. (17) m. 1/s (17) m. 1/s (17) m. 1/s (2) m. 0.D. (3) m. 0.D. (17) m. 1/s (2) m. 0.D. (3) m. 1/s (4) m. 0.D. <	Estimated consumption	<u>m³/week*</u> galis/week				/year• Ts/year
WATER USE. Public Supply , Industrial, Irrigation, Agriculture, Domestic, Unused, Misc. WATER LEVEL OBSERVATIONS Rest Water Level Pumping Water Level Depression Rate of Pumping Date 1	WATER USE. Public Supply , Industriat , Irrigation , Agriculture . Domestic , Unused , Misc. WATER LEVEL OBSERVATIONS Rest water Level Pumping water Level Depression Rate of Pumping Date 1 m. n. 1/s	3. WELL DATA					
WATER LEVEL OBSERVATIONS Rest Water Level Pumping Water Level Depression Rate of Pumping Date 1	WATER LEVEL OBSERVATIONS Rest Water Level Pumping Water Level Depression Rate of Pumping Date 1	WELL USE. Abstraction \Box ,	Recharge 🗌 , Observatio	n 🔀 , Disused	, Filled—in		
Rest Water Level Pumping Water Level Depression Rate of Pumping Date 1	Rest Water Level Pumping Water Level Depression Rate of Pumping Date ①	WATER USE. Public Supply	, Industrial, Irrigation	, Agriculture	Domestic	, Unused 🗶 ,	Misc.
Image: Conductivity Image: Conductivity<	1 m. 0. D. m. 0. D. m. 1/s 1 ft. ft. ft. ft. ft. ft. 1 m. 0. D. m. ft. ft. ft. 1 m. 0. D. m. ft. ft. ft. 1 m. 0. D. m. ft. galls/hr. 1 m. o. D. m. ft. galls/hr. 1 m. o. D. m. ft. galls/hr. 1 m. m. ft. ft. galls/hr. 1 m. m. ft. galls/hr. ft. 1 m. m. ft. galls/hr. ft. galls/hr. 1 m. m. ft. ft. galls/hr. ft. 1 galls/hr. m. ft. galls/hr. ft. 1 galls/hr. m. ft. galls/hr. ft. 1 galls/hr. ft. ft. ft. galls/hr.	WATER LEVEL OBSERVATIO	INS				
1	1	Rest Water Level					Date
?	2	0.D.	0.D.				· · · · · · · · · · · · · · · · · · ·
3 0.D. 0.D. ft. ft. galls/hr. 4 m. 0.D. m. 1/s GEOPHYSICAL DATA AVAILABLE rt. ft. galls/hr. Resistivity Conductivity Temperature 'Any other logs	3 0.D. 0.D. 0.D. # m. ft. ft. galls/hr. 0.D. m. m. 1/s 0.D. ft. 0.D. m. 1/s GEOPHYSICAL DATA AVAILABLE rt. ft. galls/hr. Resistivity Conductivity Temperature 'Any other logs	(2) 0.D.		m.			
(a)	Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductivity Image: Conductiv	(3) 0.D.	0.D.			1/3	
Image: Conductivity in the image: Conductivi	(a) 0.D. 0.D. galls/hr. (b) ft. ft. galls/hr. (c) (c) ft. ft. (c) (c) ft. ft. (c) (c) (c) ft. (c) (c) (c) (c) (c) <td> ft.</td> <td>•</td> <td></td> <td></td> <td></td> <td></td>	ft.	•				
Resistivity Conductivity Temperature Any other logs	Resistivity Conductivity Temperature 'Any other logs PARTIAL ANALYSIS DETAILS in milligrams per litre	(4) 0.D.	0.D.				
PARTIAL ANALYSIS DETAILS in milligrams per litre	PARTIAL ANALYSIS DETAILS in milligrams per litre	GEOPHYSICAL DATA AVAIL	ABLE				
		Resistivity Conductiv	ity 🔲 Temperature	Any other log	5		
I Date I TDS I TOTH I Carb H I NOD-Carb HI Alk I SOU I CI I E.C.	Date TDS Tot H Carb H Non-Carb H A1k S04 C1 E.C.						
		Date TDS Tot	H Carb H Non-Cal	DH Alk	S04	C1	E.C.
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			,				
	Site marked on: 1 inch (print), 1 inch (master), 2± inch	Site marked on: 1 inch (print), 1 inch	(master)	, 2½ in (use symbol	ch and give dat	a)

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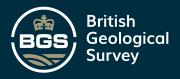


WATER RESOURCES BOARD	W.R.B. REF NO.	D 42/15 B
WELL RECORD	SHEFT 2	D 42 /15 _B
SD 42 NE	B R.A. LICENCE NO.	
4. HYDROGEOLOGY		
Topography AT WELL SITE		
Local depression, Flat surface, Hi	11 top, Hillside, Vall	ey bottom, Terrace
MAJOR AQUIFER Superficial deposite	Lithology	
Depth to top of aquifer ft.	Thickness penetrated	m. ft.
Top of aquifer	Total thickness of aquifer	m.
Coefficient of storage	ansmissivity	m2/day* galls/day/ft.
MINOR AQUIFER	Lithology	
Depth to top of aquifer	Thickness penetrated	m.
Top of aquifer	Total thickness of aquifer	m.
coefficient of storage	Transmissivity	m²/day* galls/day/ft.
ADDITIONAL NOTES:	· · · · · · · · · · · · · · · · · · ·	
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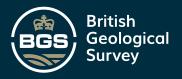


5. STRATA	the second s	SD	42/15	8	_
GEOLOGICAL	NATURE OF STRATA	THICKNESS	DEPTH	DEPT	Ή
GEOLOGICAL CLASSIFICATION		METRES	METRES	FEET	1
Est. Allurium	Sands	15.00	15.00	1	
Stacial Segan.	lands with gravel	1.40	16.40		
Est. Allewinen Skeciil Seogn. Shecial BCL	Builder clay	14.10	30.50	·	
·	Sands with gravel Bunden clay				
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RR 18127/1/2173 5m 5/71 TP



Name of site CLIPTON MARCH (GRANGE FARM) BH 1							5042	15 A	
Owner Licence no. Appn no.						Nat. grid ref	SD 4850	2888	
Occupier			1	GS ref. no.	· · · · · · · · · · · · · · · · · · ·	Status	Observation		wester at
Ground lev	el	,	m OD		ft. OD	Aquifer	Popus-Trie		
Level of w	ell top	1	m OD		ft. OD	Code	118-04	- 2354	
Rest water		.180 1	m bwt		ft. bwt	Summary of	geological section	Thickness	Depth 73
(Date 10	6/80 1	1	m OD		ft. OD	1	Fands		11.00
Constructi	on: Method (attle leve	ussion Da	te May 1	490		" with Gorand		
Depth	Dia.		low well top)		Ro	Alder ille	f	15.10	
bwt		From	То	Dia. Type		+ sand layers		22.30	
25.50	8 to 14.2	62	25.5	2"	Austie	R	ed sand		27.00
			ed into 5	sth 28.3.	-25.5	la	1 Sanditine		25.50
Abstraction	rates	T	ype of pum;	-)	L	†			
gph PWL Chem./bact. anal. YES/Net					<u> </u>				
god Well driller Sule Soil Surveys.						 -			

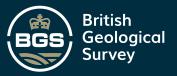


Site Plan

SD42NE/6a Boxchole dutted as part of SI for proposed typing by NWWA. Standysize in stalled which concrete slaps and steel over classe + bolked flange with dip plug. Chemical date available for water currentered driving duthing See \$404/02/01 & Wester

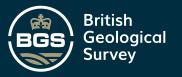
+ H/R N°58

BGS ID: 4264 : BGS Reference: SD42NE6/A EPSG: 27700 : 345500,428880



WELL RECORD I. WELL IDENTITY NATIONAL GRID REFERENCE 4550 Well at Grange Farm I.G.S. REF. NO.	лишА 4
R.A. LIG 1. WELL IDENTITY NATIONAL GRID REFERENCE 4550 Well at Grange Farm I.G.S. REF. NO. RIVER AUTHORITY TOWN. HYDROMETRIC AREA County. SUB-CATCHMENT.	2888 NWWA A 71
Well at Grange Farm I.G.S. REF. NO. RIVER AUTHORITY TOWN	лишА 4
RIVER AUTHORITY Town	люшА
RIVER AUTHORITY Town	люшА
Town	a
County	
Uwiter Of well	
Well made by helt Soid terrings	5/1980
Information from	30
2. WELL DESCRIPTION	
Level of ground surface	at above*
above sea level (0.0.)	ar below
Shaftft.	nan
25.50 m. Bore deep; Diameter at top	mm. 15 ⁻ 0 mm
Bore deep; Diameter at top ft.	; at bottom
Details of headings	
DETAILS OF PERMANENT LINING TUBES	, after
Length	Top Bolow Surf
Lonath	
Length : Diam	Top maboye surf
Length m, plam. nm, Length m. Diam. Diam. Plain ft.	Top ". above" surf
Details of well screen plastic line	
Details of well screen	
DETAILS OF REST WATER LEVELS DURING CONSTRUCTION	a Mananan dan perlamakan perlaman perlamakan dari kerangkan perlamakan perlamakan perlamakan perlamakan perlama
	به العب سماعم
water struck at depths of	DELOW WELL R
	[7]
Rest level of water	
Rest level of water	deep. Date ft.
Rest level of water Rest level of Rest l	n. deep. Date ft.
Rest level of water Rest level of water Rest level of water Rest level of water Rest level of water	deep. Date ft.
Rest level of water Rest level of water	m. deep. Date ft. m. deep. Date tt.



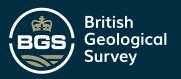


30		5042N	IE/6a	15	11247	
DETAMLS	OF PUMPING TEST				, ,	
Water leve depressed	from	bove' well top to	m. below well ft.	top, pumping a		
Water leve depressed	el	bove well top to	m. below well ft.	top, pumping a	at	
Water lev depressed	el	bove' well top to	m. below well ft.	top, pumping a	at	
Suction a	tft, belo	well top. Capacity of p	umpgalls/hr.	Test from	// 19 to	1. /19
DETAILS	OF PERMANENT PL	IMPING EQUIPMENT				
Make and/	or type		Motive P	ower		
Amount pu	mped gall	day* s/day. Pumping for	hrs./day.			
Estimated	consumption				_m ³ gai	/year• Ts/year
3. WEL	L DATA	U Lander Freihumsselferster andere ander an einer an einer ander einer andere soner an einer andere andere andere	ĸĸŦĸĹġĊġĸĸŎĬŦŎŢĊŎĬĊĬĸŢŎĿĊĬĬŎŎĔĸĸĬĸĸĸŎĸŎġĸŎĠĸŎĸŎĸŎĸŎĸŎĸŎŎŎŎĸĸĸŎŎŎĸŎĸĸŎŎŎŎĸĸĸŎŎŎĸŎĸĸŎŎŎŎ	*****	งคร.ขึ้นสาม 955ไล้การค์, สามสัญญาสินสารทางใช้เหลือม	ay - 712 - 7 72 - 7 82 - 7 82
		Recharge . Observatio				мisc.[
WATER US	E. Public Supply	, Industrial , Irrigation		. Domestic	, Unused 🔀 ,	міsc.[Dat
WATER US	E. Public Supply	, Industrial , Errigation NS Pumping Water Level m.	Depression m.	. Domestic	, Unused 🔀 ,	Dat
WATER US	E. Public Supply	. Industrial, Errigation NS Pumping Water Level	Depression m.	Domestic), Unu sed 🔀 , Pumping	1
WATER US	E. Public Supply	, Industrial , Irrigation NS Pumping Water Level m. 0.D. ft. 0.D.	Depression 	Domestic	Pumping 1/s galls/hr.	Dat
WATER US	E. Public Supply	, Industrial , Irrigation NS Pumping Water Level m. 0.D. ft. 0.D.	Depression 	Domestic	Pumping 1/s galls/hr. galls/hr.	Dat
WATER US	E. Public Supply	, Industrial , Irrigation NS Pumping Water Level m. 0.D. ft. 0.D.	Depression 	Domestic	Pumping 1/s galls/hr.	Dat
WATER USI WATER I 1 2 3 	E. Public Supply	, Industrial , Irrigation NS Pumping Water Level 	Depression m. ft. m. ft. m.	Domestic	yunused ≥, Pumping 1/s galls/hr. 1/s galls/hr. 1/s galls/hr. 1/s	Dat
WATER USI WATER I 1 2 3 4	E. Public Supply LEVEL OBSERVATIO Rest water Level 	. Industrial . Irrigation NS Pumping Water Level 	Depression 	Domestic	Pumping 1/s galls/hr. galls/hr. 1/s galls/hr.	Dat
WATER USI WATER I 1 2 3 4 4	E. Public Supply	. Industrial . Irrigation NS Pumping Water Level	Depression m. ft. m. ft. m. ft. m. ft. ft. ft. ft.	Rate of	yunused ≥, Pumping 1/s galls/hr. 1/s galls/hr. 1/s galls/hr. 1/s	Dat
WATER USI WATER I 1 2 3 4 4	E. Public Supply	. Industrial , Irrigation NS Pumping Water Level 	Depression m. ft. m. ft. m. ft. m. ft. ft. ft. ft.	Rate of	yunused ≥, Pumping 1/s galls/hr. 1/s galls/hr. 1/s galls/hr. 1/s	Dat
WATER USI WATER I WATER I GEOPHY Resistiv	E. Public Supply	. Industrial . Irrigation NS Pumping Water Level	Depression 	Rate of	, Unused Pumping 1/s galls/hr. 1/s galls/hr. 1/s galls/hr. 1/s galls/hr.	Dat
WATER USI WATER I WATER I GEOPHY Resistiv	E. Public Supply	, Industrial , Irrigation NS Pumping Water Level m. 0.D. ft. 0.D.	Depression m. ft.	Rate of	yunused ≥, Pumping 1/s galls/hr. 1/s galls/hr. 1/s galls/hr. 1/s	Dat
WATER USI WATER I WATER I (1) (2) (3) (4) GEOPHY Resistin PARTIA	E. Public Supply	, Industrial , Irrigation NS Pumping Water Level m. 0.D. ft. 0.D.	Depression m. ft.	Rate of	, Unused Pumping 1/s galls/hr. 1/s galls/hr. 1/s galls/hr. 1/s galls/hr.	Dat
WATER USI WATER I WATER I (1) (2) (3) (4) GEOPHY Resistin PARTIA	E. Public Supply	, Industrial , Irrigation NS Pumping Water Level m. 0.D. ft. 0.D.	Depression m. ft.	Rate of	, Unused Pumping 1/s galls/hr. 1/s galls/hr. 1/s galls/hr. 1/s galls/hr.	Dat
WATER USI WATER I (1) (2) (3) (4) GEOPHY Resistin PARTIA	E. Public Supply	, Industrial , Irrigation NS Pumping Water Level m. 0.D. ft. 0.D.	Depression m. ft.	Rate of	, Unused Pumping 1/s galls/hr. 1/s galls/hr. 1/s galls/hr. 1/s galls/hr.	Dat

BGS ID: 4264 : BGS Reference: SD42NE6/A EPSG: 27700 : 345500,428880

BGS	British Geological Survey
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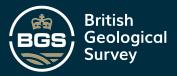
Y	
	SD 42NE/6a 73/124A
e	WATER RESOURCES BOARD
	WATER RESOURCES BOARD WELL RECORD SHEET 2 W. R.B. REF NO. 5D 42/15 A
	R.A. LICENCE KO.
	U. HYDROGEOLOGY
	Topography AT WELL SITE
	Local depression, Flat surface, Hill top, Hillside, valley bottom, Terrace
	MAJOR AQUIFER PromoTriancic new dations Lithology
	Depth to top of aquifer Thickness penetrated Thickness penetrated Thickness penetrated
	Top of aquifer
	Coefficient of storage Transmissivity
	MINOR AQUIFER Lithology
	Depth to top of aquifer
	Top of aquifer
	Coefficient of storage
	ADDITIONAL NOTES:
	lite instruction for proposed tipping.
	Site investigation for proposed tipping. Boredoles Nos. 8 & 10 were never dvilled in this service.
	Bonderles Nos. 8 & 10 war have been and the



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V

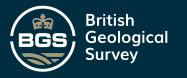
		<u>A</u>				
1.	5. STRATA	SD 42 NE/6	a	-75	1124A	
	GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS	DEPTH	DEPTH	1
			METRES	ME TRE S	FEET	11
	à Est AU.	Sands Sands with gravel Boulder day with sand layars Red rand	11.00	11.00		
	A Glac. S&G	Sunsh with gravel	4.10	15.10		
	Glac. S&G	Boulder day with sand layers	7.20	22.30		
	I Weath. S8T	Red read	0.70	23.00		tagning, tellpring, tellpring, tellpring, tellpring, tellpring, tellpring, tellpring, tellpring, tellpring, tel
	Sherwood Sat Group.	Red soudstine	2.50	25.50		ur 1999) 400
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						and the second
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5D112/15 A

WATER RESOURCES BOARD	W.R.B. REF. No. 5D42/15 A
WELL RECORD	1
SD42NE 6A	R.A. LICENCE NO.
I. WELL IDENTITY NATIONAL GRID REFERENCE	
Well at Grange Farm I.G	.s. REF. NO. 75/124 A
RIV	ER AUTHORITY
Town.,HYD	ROMETRIC AREA
County	-CATCHMENT
Owner of well	
Well made by Sut Soil Junyy	Date of sinking. 5/1980
Information from	Date received 29.7.80
2. WELL DESCRIPTION	
Level of ground surface m. If wel	1 top is not at above"m.
above sea level (0.D.)	level how far below
Shaft deep; Diameter at top	
	in.
Bore deep; Diameter at top	2.00 mm. /50 mm.
	in in.
Details of headings	
DETAILS OF PERMANENT LINING TUBES	ander ander en der het der eine einen eine der eine der der eine der Bertreten der Bertreten eine der Bertreten
Length ; Diam. TO Inn. Mail Plain	Diam
Length ; Diam. ; ; ; ; Plain ft. in.	Diam
Length m. Lengthm. K. Slotted ; Plain ft. in. ft.	Diam
Details of well screen	
DETAILS OF REST WATER LEVELS DURING CONSTRUCT	CTION
	below well top
Rest level of water	bore deep, Date
Pest level of water	
Rest level of water	data Bata
Rest level of water 2.18 m.	25.50 m
on completion of above <u>above</u> <u>above</u> below well too when	bore deep. Date /0.8.80
	ft.
Brief details of well development e.g. acid treatment etc	
delete as applicable	(18127/1

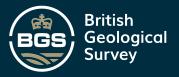
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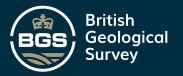
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DET	AILS C	F PUMPING	TEST	· · · · · · · · · · · · · · · · · · ·								
Wate depr	er level ressed f					m. ft.	below well	top, pumpin	g at			
Wate	er level ressed f	rom	ft. bel	ove [*] well top	to	m.	below well	top, pumping	~ ^+			
										galls/hr.		
Suct	Suction atft. below well top. Capacity of pumpgalls/hr. Test from//19 to/. /19											
Cap	acity	ga	alls/hr.	Suction at	ft.	belo	ow well top.					
Amo	unt pump	ed		day. Pumping	for	••••••	hrs./day.					
Est	imated c	consumption		<u>n</u> ga	³ /week• 11s/week				ģ	<u>m³/year*</u> jalls/year		
3.	WELL	DATA										
WEL	L USE.	Abstractio	n 🗌 , R	echarge 🗌 ,	Observation		, Disused	, Filled-	in 🗌			
WAT	ER USE.	Public Sup	p1y 🗌 , I	ndustria10,	Irrigation		Agriculture	Domestic	: 🗌, Unused 🖄	(, Misc.		
WA					. 1					1		
	Ře:					De				Date		
1	ft. ft. ft. galls/hr.											
2			0.D.		0.D.					r.		
3		· · ·	· ·		m .	,						
			•	·····			ft.			ir.		
9			0.D.		0.D.	,				ı r.		
GE	OPHYSI	CAL DATA	AVAILAE	BLE								
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		100			- NOT-CUT							
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			(F. 110).		, ((use symb	ol and give o	lata)		

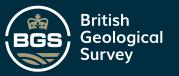
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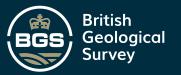
WATER RESOURCES B	OARD	W.R.R. REF NO.	
WELL DECODD		SHEET 2	5042/15 A
	SD 42 NELL	R.A. LICENCE NO).
4. HYDROGEOLOGY			
Topography AT WELL SITE			
Local depression . Fi	at surface 🗌 , Hil	1 top 🗌 , Hillside 🗌 , V	alley bottom, Terrace[
MAJOR AQUIFER PART	innic on woten	Lithology	
Depth to top of aquifer		Thickness penetrated	1.50 m.
Top of aquifer		Total thickness of aquifer	m.
Coefficient of storage	Tran	nsmissivity	<u>m²/day*</u> galis/day/ft.
MINOR AQUIFER	· · · · · · · · · · · · · · · · · · ·	Litholo	9y
Depth to top of aquifer	m.	Thickness penetrated	m.
Too of aguifer	m. <u>AOD</u> * ft. BOD	Total thickness of aquifer	m.
Coefficient of storage		Transmissivity	m2/day* galls/day/ft.
ADDITIONAL NOTES: Site investigation	for proposed .	tipping . were drilled in this sur	<i>й</i> .
	for proposed. E 10 were n	tipping . une drilled sin this sur	ά.
	fa proposed . E 10 were r	tipping . une drilled sie this sur	<i>й</i> .
	far proposed . E. 10 were r	tipping . were dvilled in this sur	<i>ù</i> .
	fa proposed. E 10 were r	tipping . never drilled in this ser	ὐ .
	fa proposed. E. 10 were r	tipping . nor dritted in this sur	ė .
	far proposed . E. 10 were r	tipping . wer dvilled sin this ser	ΰ .
	far proposed . Ef 10 were r	tipping . were drilled in this sur	ΰ .
	far proposed . & 10 were r	tipping . were drilled in this sur	ΰ .
	far proposed . E. 10 were r	tipping . were drilled sin this sur	Ϋ́.
	for proposed. E. 10 were r	tipping . were dritted in this sur	
	for proposed. & 10 were r	tipping . we drilled in this sur	
	for proposed. E 10 were r	tipping . were dritted in this sur	



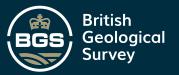
5. STRATA		SI	×+2//	5A
GEOLOGICAL	NATURE OF STRATA	THICKNESS	DEPTH	DEPTH
GEOLOGICAL CLASSIFICATION	INATURE OF STRATA	METRES	METRES	FEET I
Ent. All.	Sands	11.00	11.00	
Slavin St & Gr	Sands with gravel	4.10	15.10	
Shaid BCL	Boulder day with sand lawars	7.20	22.30	
Ireath Set.	banks with gravel Boulder day with sand layers Red sand	0.70	23.00	
	Red sampletine			
•	rea samplicate	2.50	25.50	
				:
	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	
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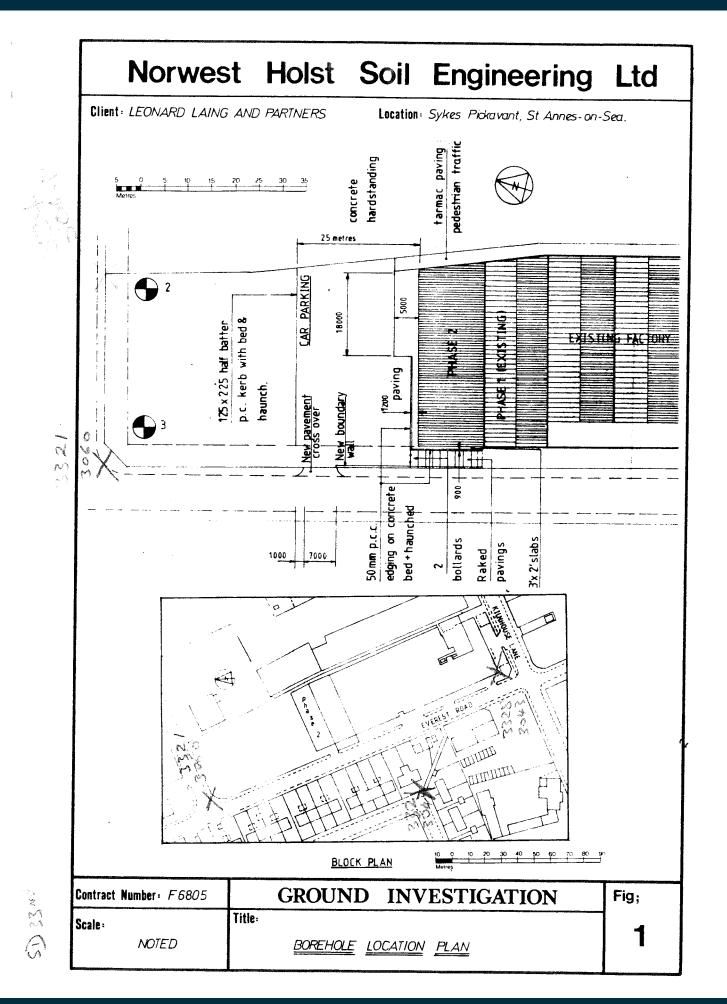


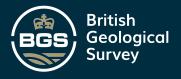
	vest Holst S		-		= IIII C	j L T a .		2
Contract No. F6805 Location St, Annes	on Sea	REHO)G		1 o f2	L	
Client Leonard La						e		
Method of Boring					Date	Level 2473786 → 25	/3/86	4.0.D.
		1	Depth	0.D.	Casing	Sampling		Dail
Description	n of Strata	Legend	Below G.L.(m)	Level (m)	Depth at Sampling	and	R.O.D.%	
TOPSOIL: Oark Dro	wn organic silty sand		0,30					
	Г.А.,					M		
Loose yellow brown SAND	fine to mealum							
0/11/0								
						of 1,25	'6']
						s	0	
							1	
						2.50		
							' 5'	
			3.00		-			
Very soft dark bro		NUG 1000				3.00		
some fibrous veget	ation	1110 1110				(10) 9		
		1100 AV12						
		N12 N12						
		····/ <u>-</u>				4,25		
	01111011111111111111111111111111111111	21117 1117. 1117-	4,70					
Light brown fine to	o medium SAND					þ		
			5.30			A 5.30		
					-	(20)		
Soft light grey and fine sandy, clayey		× × × ×			1			
rine Sundy, Cidyey	JILI	× × × × × × ×						
		×. × × × × × ×						
		× × × ×				6.50		
		× × × × ×				(20)		
		*****				q		
		× × × * * * * * * * * * * * * * * * * *						
	1991 (1991 1994) waa ahaa ahaa ahaa ahaa ahaa ahaa ahaa	× × × ×	7,70	·····	1	7.70	*	
Loose grey silty f	ine to medium ŠAND	×						
Loose grey strey (THE CO MEDIUM ONNO					8.30	*	
							'9'	
								ĺ
		×					1	
					1	9,50		
					150mm			
					10,00			
	Remarks (Observations of (Ground Wa	eter etc.))0. Blow			
Type of Sample	24/3/86 1300 hrs	Slight	inflo				der the	eir
- срт Писекки	at 3.10m 1320 brs	Standi	ng lev	own e≹≉⊃⊡	weight	t.to 8.30m Rods sank u	nder ++	no i m
S.P.T. Undisturbed	at 3.00m		₅ 100			tibo 10,00m,	HUEL LI	CTI.
c. C.P.T. XVane	Sealed by	y borin	g to	•	<i>.</i>	•		
) Jar ∆ Water	3,20m 25/3/86 Standpips	a ineta]]eđ +	Π				
Bulk Piezometer	9.00m			-				
	Water levels are subject to seas	onal or tida	l variations	and show	ud not be t	taken as constant		



F6805 E Contract No. 51, Annes. on. Sea Client. Leonard Laing & Partners Method of Boring. Percussion Diameter of Borehole. 150mm		Sheet	2 2	2 5/3/86			
Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	""N"/ R.Q.D.%	Daily Progress
Loose brown and grey silty fine S/	AND X	11,70		-		181	24/3
Stiff red brown and grey fissured sandy silty CLAY with occasional fine to medium gravel				c	12,00		
				c	13,25 (50)		-
				150mm to 15.00mmc	14,50 (60)		
		17.00			16,50 (70)		25/3
Remarks (Observations Type of Sample 24/3/86 15.30 h 1550 St		inflow	w at 3	3.30m	<u> </u>	1	<u> </u>
S.P.T. Undisturbed 25/3/86 0800hrs							
Jar Δ Water Bulk Piezometer		9					







4**3**



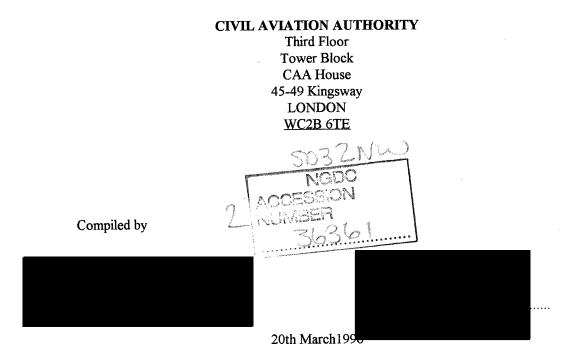
SD33SW 123-124 36361

REPORT NO. 8619

(Contract No. 8D/Q/121)

ST. ANNES REPLACEMENT RADAR

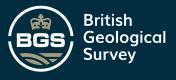
for



Strata House, Holmes Chapel Road, Middlewich, Cheshire. CW10 0JB Tel 01606 834637 Fax 01606 836657



	ST ST	RATA			ion St	t Annes	Repla	JSSION RECORD SHEET acement Radar nuthority Project Ref.:	Bore Shee	hole No tt 1 of	.ВНі ғз.	
Job No.: 8619				Casing		r (mm) 21	Cable Percussion Drilled by Ground lev	rrilled by C.B iround level m AOD ico-ordinates E N				
casing Depth	H DEPTH Field Records		xde			es / tests	SPT N	Description	10 01	Depth Thickness	Reduced	
(m)	(m) AM	0.00	19-02	from	h (m) to	SAMPLE Type & No	Value	TOPSOL		(m)	Level (m AOD)	Leg
NIL	NIL	0.00	20-05	0.50	0.95	U 1		Soft grey CLAY with a little fine to medium		- (0,30) - 0.30		×
								gravel and some organic matter		 (0.90)		
	. AM	1.00	17-02							- - - 1.20		[-
1.50	VET			1.50 1.50	1.95 1.95	B 1 S 1	2.0	Very loose to loose grey clayey SILT		-		×××
	PM	00.5	19-02									×××
	PM PM	2.00	19-02 20-02							-		× × ×
2.50	VET			2.50 2.50	2,95 2,95	B 2	4,0					* *
	T1 AM	20 mins 3.00 3.00	16-02									×××
									ŀ	(3.90)		××
3.50	M1 PM	3.50 3.50 -(16-02)-	16-02 16-02	3.50 3.50	3.95 3.95	E B E Z	4.0					×
	PM	4.00	17-02						ļ			×××
	PN	4.50	19-02						Ē			× × ×
		1.20							ļ	-		× ` ×
		20 mins 5.00	17-02	5.20	5.20	נת		D		5.10		×××
5.30	NIL			5.20 5.30	5.20 5.75	0 1 U 2	25	Brown amorphous PEAT Soft to firm dark brown CLAY with a little		(0.20) 5.30		¥.
								fine gravel and occasional shell fragments (Boulder Clay)	Ē			
				6.00	6.00	DS			Ē	-		
5.00	NIL			6.50	6.95	UЗ			Ē	-		
									Ę			
									F	- (3.50)		
				7.50	7.50	DЗ			Ē	-		
5.00	VET			8.00	8.45	U 4	65		Ę	-	ŀ	_
											-	
	M2	8.60 1	17-02	8.80	8.80	V 1			F	8.80	F	
0.00	5.00			9.00 9.00	9.45 9.45	85 25	17	Medium dense brown clayey very silty fine to medium grained SAND with occasional fine to medium gravel and occasional shell	F			
								fragments	Ē	.		
								(Continued)	Ę			
2) Gr	rehole	wet below 1 ater struck	at 3.5	50m risioc	1 to 3.01)m ofter	20 mine			G.L	1	Jate 5/03
3) W(4) W(5) Bo	ater l ater l prehol	evel 3.50m pr evel 1.00m am e drv at 5.3i	n 16-02 17-02, Om.	-					Check	ed by		
6) Gr	roundw	ater struck evel 4.00m pm	at 8.8	30m rising	to 5.00)m after	20 mins.		Appro	ved by		
Scale	1:50)							FIG I	No.		



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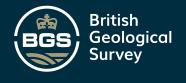
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	ST STD	RATA	C Locati	ABL on St	E PE	Repla	JSSION REC acement Radar	CORD	SHEE	Г	Bore	hole No	.BH2	
	U	VED	Client:				uthority	Project	Ref.:		Shee	t 2 of	FЗ,	
	AN.	the 1	Equipme	ent and	methods	Light	Cable Percussion			Drilled by	C.B			
Joh	Not	8619	Casing	Diameter	r (mm) 20	00				Ground leve			m AOD	
300	140.1	0019	Casing	Depth (I	m)					Co-ordinate Date	на н 16-08	۸ 2-96	1	
CASING	WATER	T	1				T						[<u> </u>
DEPTH	1	Gold Beenade	Depth		ES / TESTS	SPT N Value	- De	escription				Depth Thickness	Reduced	Stro
(m)	(m)		from	to	SAMPLE Type & No	Value Cu						(m)	Level (m AOD)	Lege
							(cont.)					Ē		
			10.50	10.95	B 6							-		
					· ·							-		
												-		
												_		
												= .		
											ł	_		
												-		
			13.00	13.00	D 4							-		
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											ŀ	-		
											ļ	:		
											Ē	-		
											ļ			
			1								Ē	-		
											F			
			15.00	15.00	DS						Ē	-	l	
		-(17-02)-	1								E	:		
											F	(13.5)		
											Ē	:	ł	
											F	-	i.	
											Ē			
											þ	-		
			17.00	17.00	De						E			
			17.00	17.00	20						F	-		
											Ę			
											Ē			
											þ			
			1		[Ē	-	ĺ	
			1								F			
											Ē	-		
			19.00	19.00	ס ד						F	_	Į.	
											Ē	-	Į.	
											F	_		
											F	-		
											Ē	.		
		Barana ayo daha bahay ing kana ana ayo ya	<u>L</u>	l							<u> </u>	ed by	<u>[</u>	
Remo	orks 'ater i	evel 3.00m cm & 4.	50m pm 18-	-02.						•	- mgge	ed by G.L		lote i/03
9) So 17.00r	and blo m.	owing too much to	take SPT:	s belaw	17.00m -	water	added to assist drilli	ng below			Chec	ked by		
10) W 11) W	ater ater	level 0.00m am & 2. level 0.00m am & 2.	.00m pm 19- .00m pm 20-	-02. -02.							Appro	wed by	· -	
Scale	. 1.50	1									FIG	No.		
9) So 17.00r 10) ₩ 11) ₩	and bli m. Vater	owing too much to level 0.00m am & 2. level 0.00m am & 2.	take SPT: .00m pm 19·	s below -02.	17.00m -	water	added to assist drilli	ng below		·	Appro	ked by wed by	1	1 1

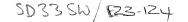


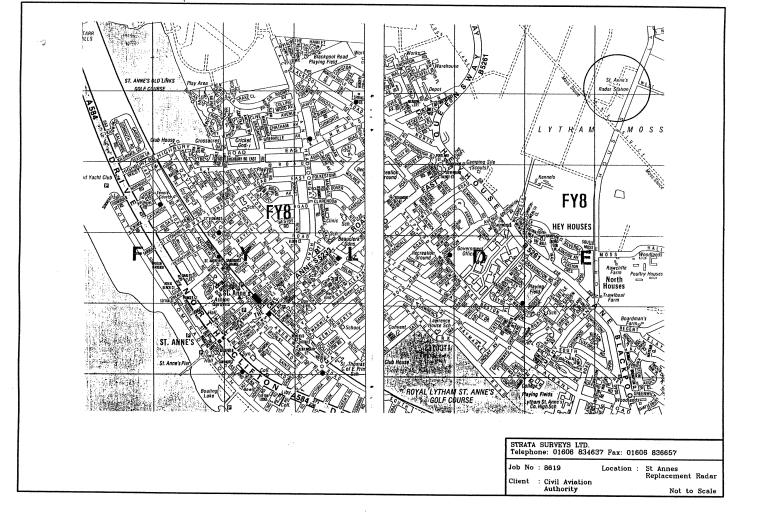
BGS	British Geological Survey
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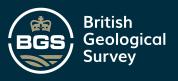
	ST	RATA	Locat			Repla	SSION RECORD SHEET	Borehole N	BH2
	U	VED	Client:				uthority Project Ref.:	Sheet 3 d	of 3.
	N.	Шr.	Equipm	ent and	methods	Light C	Cable Percussion Drilled by	C.B	
lah	Nov	8619	Casing	Diameter	r (mm) 20	00	Ground leve Co-ordinate		m AOD N
000	140	0017	Casing	Depth (i	m)		Dote	16-02-96	n
CASING		Field Records			es / tests			Depth	Reduced
DEPTH (m)	DEPTH (m)		Dept from	h (m) to	SAMPLE Type & No	SPT N Value Cu	Description	Thickness (m)	Level (m AOD)
		-(18-02)	21.00	21.00	D 8		Medium dense brown clayey very silty fine to medium grained SAND with occasional fine to medium gravel and occasional shell fragments		
22.50	0.00		22.50	22.95	υ 5	118	Stiff to very stiff dark brown slightly sandy CLAY with a little fine to medium gravel (Boulder Clay)	- 22.30	
22,50	2.00		23.50	23.95	U 6				
			24.20	24.20	D 9			Ę	
22.50	2.00		24.50	24.95	U 7	101		Ę	
								F	
								Ē	
								È	
			25.50	25.50	D 10			È.	
23.00	2.00		26.00	26.45	UB			Ē	
	2.00		20,00	20,40				(7.70)	
								E	
		-{19-02}-						F	
								Ē	
								Ę	
23.00	1.00		27.50	27.95	U 9	176		F	
								Ē	
								Ē	
23.00	1.50		28.50	28.95	U 10			Ē	
								E	
								F	
								Ę	ŀ
23.00	2.00		29.50	29.95	υn	161		F	ŀ
		-(20-02)-						Ę	ļ
		-{20-02}-	1		<u> </u>	t	Borehole Complete		ł
Rem	arks							Logged by G	L 1
								Checked by	- 1
							···· .	Approved by	

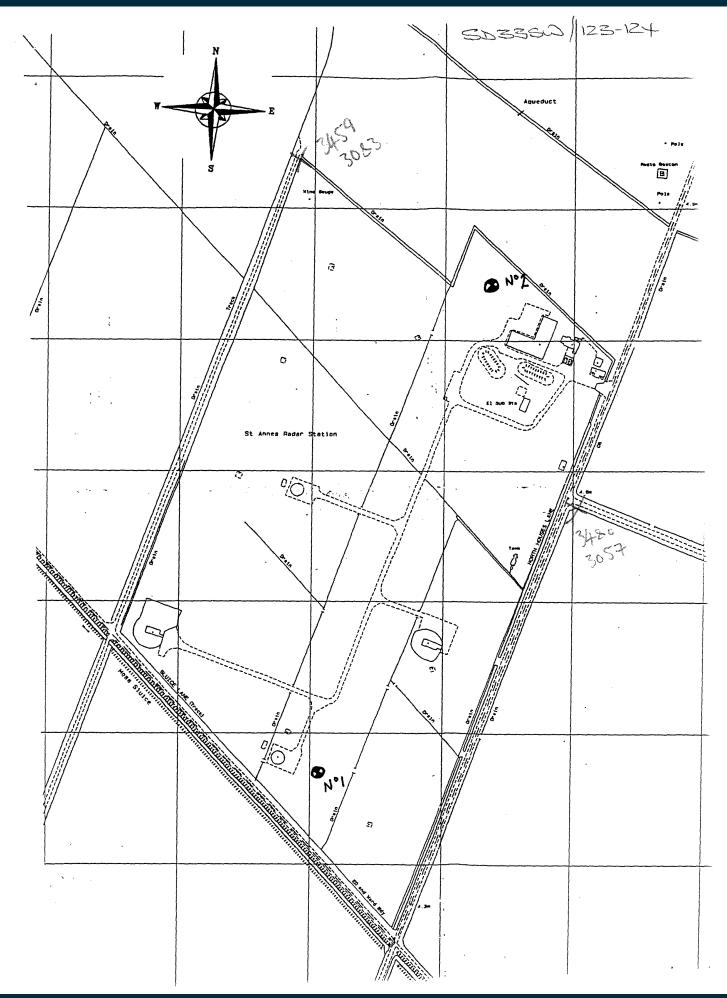


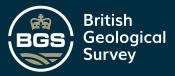
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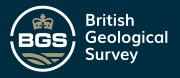
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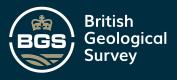
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						HOLELC
	FUGI	RO - M	cCLEI	LLAN	D LIMITED Borehol	e 1
			LER.		Sheel	t 1 of 3
Hethod		Date	7.04.00		Site	
Diamm	ell & Auger.	<u>_</u>	3/01/92 - 3	\$1/01/92	Blackpool Airport Geotechnical Investigat	tion
		E 1159.0N	Level m.00	8.58	PSA Specialist Services	
Soi	Samples/Tests	Hater &	00 Level	Depth	·	T
Type/Test	Depth m.	Progress	M.	Π.	Description of Strata	Leç
1	0.40	23/01/92	8.43	0.15	MADE GROUND (Topsoil) (0.15)	~~~
12 53 (7)	0.80	STRIKE at	7.98	0.60 1.00	MADE GROUND (Very dark brown silty fine to	ool ⊳o₁
3 (7)	1.00 - 1.45	1.00m moderate	1.50	Ē	coarse sand with a little gravel (sandstone, brick & black ash)) (0.45)	
4 (5)	2.00 - 2.45	rose to 1.00m sealed			Dark brown with occasional light brown patches, slightly silty fine to coarse SAND with occasional black ash (0.40)	
		out at 3.80m			Loose light brown fine to coarse SAND.becoming	<u> </u> ::::
5 (4)	3.00 - 3.45		5.58	- 3.00	slightly silty from 2.00m (2.00)	d
6 (10)	4.00 - 4.45		4.78	3.80	Very loose grey slightly silty fine to medium SAND (0.80)	(, , ,x, , ,
7	4.50 - 5.00		4.70		Very soft black slightly sandy slightly clayey	1
8 (10)	5.00 - 5.45			E	fibrous PEAT (1.60)	
0	E /0		3.18 2.88	- 5.40 - 5.70		
9 10 11 (7)	5.60 6.00 6.00 - 6.45		2.88	5.70	Very soft grey CLAY with pockets of black fibrous peat and abundant fine orange root veins (0.30)	
12(10)	7 00 7 /5					ŀ.;
12(10)	7.00 - 7.45			-	Loose dark grey very sandy fine to coarse GRAVEL with occasional shells and shell fragments (2.80)	
3 (10)	8.00 - 8.45			-		
13 (10) 14	8.00		0.08	8.50	·	<u>,</u> ,
5 (34)	9.00 - 9.45				Dense grey fine to medium SAND (6.90)	î
6	10.00		t t			<u> </u>
7 (58)	10.00 - 10.45		Ē		becoming very dense from 10.30m	
8	11.00			•	becoming very dense from 10.50m	::::
9 (78)	11.50 - 11.95		E	- -		
			Ę		becoming medium dense from 13.00m	
			F			
0 (20)	13.00 - 13.45		È	-	· · · ·	
			-			
			Ē		becoming slightly gravelly at 14.40m	
21 2 (26)	14.50 - 15.00		Ę			
2 (26)	14.50 - 14.95		. F			
l			-6.82	15.40		::::
3	16.00 - 16.45		F		Firm to stiff reddish brown-grey CLAY with	j::•o
4	16.45 - 16.60		Ē		pockets of dark brown fine to medium sand and occasional fine rounded gravel (7.40)	.•x.
			Ę			°x°.)
5 (38)	17.50 - 17.95		F			•x
			Ę			0°°,
			Ē	-		°x °x°.x
5	19.00 - 19.45		.F		harming stiff as well that a set	D ° • •
7	19.45 - 19.60		E		becoming stiff to very stiff from 19.00m	° X°
			Ę			:•.*×
emarks		<u>L</u>	<u></u>	_		"×°.×
1. 53 . r	ods sank under ow covery for U29. ng sand from 8.50	n weight to 3	3.30m		Logged by Scale End Casing Depth . JJ 1:100 ^{M.} 26.00	
5. Blowi	ng sand from 8.50	to 15.40			Sample/Test key: Penetration Tests	922531
					U () U100 sample (blows) S () Standard (N vi	
					D Disturbed sample C () Cone (N value	special diffe



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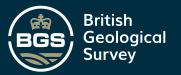
	isto - Malana		<u> kan d</u>			Shee	t 2 of
Method	nell & Auger.	Date	23/01/92 -	71 /01 /02	Site		
Dia mm	Coord		Ground		Client	Airport Geotechnical Investiga	tion
)/150 2314.0F il Samples/Tests	1159.0N	Level m.O	1 8.30	PSA Spe	cialist Services	
Type/Test	Depth m.	Progress	OD Level m.	Depth m.		Description of Strata	
					See previous sho		
S28 (30)	20.50 - 20.95			Ę	previous and		
				F			
U29 830	22.00 - 22.45 22.00 - 22.50			Ę	with a slightly	mevally your pook atta hand	ł
830	22.00 - 22.50			F	at 22.00m	gravelly very sandy silt band	
			-14.22	22.80	Drawn dine to a		
S31 (38)	23.50 - 23.95		-15.12	23.70	gravel (0.90)	barse SAND with some fine	ŀ
\$32 (42)	24.50 - 24.95			F	Very stiff reddi sand and fine gr	ish brown CLAY with pockets of avel (2.30)	į
\$32 (42) 833	23.00		• .	Ę			
				Ē			
		31/01/92	-17.42	26.00			
				Ē	End of Borehole	at 26.00m	ſ
				F	-		
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				, ,			
Pore de		l				· · · · · · · · · · · · · · · · · · ·	
Remarks 1. s3,	rods sank under ow	n weight to	3.30m		Logged by	Scale End Casing Depth	lob No.
2. No r	rods sank under ow ecovery for U29. ing sand from 8.50		- • • • • •		JJ	1:100 ^{m.} 26.00	92253



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#	` **	

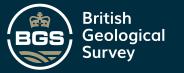
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Dia mm	Shell & Auger. 23		23/01/92 - 3 Ground	51/01/92	Site Blackpool Airport Geotechnical II	Sheet 3 of	
200/ Soil	150 2314.0E Samples/Tests	1159.0N	Level m.QD	8.58	PSA Specialist Services		
Type/Test	Depth m.	liater & Progress	OD Level m.	Depth m.	Description of Strata		
	•				i. Install piezometer from 5.80 to 6. size 0.03.	.00 celi	
					S12e 0.03.		
				-			
				-			
		· ·			· · ·		
				<u>.</u> ;			
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			E E				
Remarks	ds sank under our	uniche ++ *	70-		.ogged by Scale End Casin	ng Depth Job No.	
2. No rec 3. Blowing	ds sank under own overy for U29. g sand from 8.50	weight to 3 to 15.40	.JUM		JJ 1:100 ^{m.} 26.00	92253	
				l.	Sample/Test key: Penetratic U () UIOD sample (blows) S () Stan	on Tests dard (N value)	



BORE or SHAF Bank Dale, Midgeland Re	6-in. Map 59.	GS	3M	
Harton.				
Surface level about 20 O.D.				
Communicated 1937 by			· .	
Date of sinking /937 Borer &				
Specimens				
Description,	THICK Feet.	NESS.	DE:	PTH.
SD33SW/D Noil	1		1	
Upper Backen Chang Borlows Clay	43		44	19
74/3 Hillian Clay sprard (no water)	42		86	
59NW 9. Menpes Mal	12		116	
Nez.				
19 Test Hole.				
Lupper B.C. & Boneses Cany	36		37	
14/4 (Junty Clay	1		38	112
59 N.W/ 13 Miner Sus { fand, clay sport	3		51	60
Ar Boundary Bonto colay	7		58.	
hout. Hole. No.3.			1	
12 (forie				
LO upper Bick Bone Develoy	-1		1	
14/5 fring clay	36	6	37	
59 NW 14 Hicele San Jon prove	-2 9		39	611
(fridy clay	. 2	6	49 51	Ľ
heber Borlows day oppose	7		578.	
		14-1 -		1
i d				
	1.194			

Contact BGS: ngdc@bgs.ac.uk

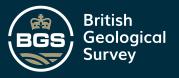


C) SD 3346 BORE of SHAF BankBale, Mail	County Lanco 6-in. Map 57. Non Agelanale	Du Mire dije. Sek y 12 mag
Surface level <i>showt</i> 2-0 O.D. Communicated <u>1937</u> by Date of sinking <u>1937</u> Borer Specimens	One-inch Map. 74	
Description. A Social piers 74/B CHAT, Upper Balandary Social Social piers 74/B CHAT, Millione Clay oppond CIPANE Company Clay oppond SINN/Y TRIASSIC MERCIA HUDGITONE GROUP Nez.	THICKNESS. Feet, Inc 1 1 43 1 1 1 1 1 1 1 1 1 1 1	DEPTH. hes. Feet. Inche 444 86 164 116
B BOULDER Up AC. { Brits Foil BOULDER Up AC. { Brits Foil Foil Fai	- 36 1 7 10 7	37 38 41 54 58
BOULDER HAVER SAND & CLAY TA/ CLAY EISTOCENE 59NW/14 Mixeline GAACIAL SAND & GRAVEL BOULDER AVEL CLAY Frit BOULDER Avid CLAY Frit Boulderely Frit Frit Boulderely Frit Boulderely Frit Boulderely Frit Boulderely Frit Frit Boulderely Frit Boulderely Frit Boulderely Frit Boulderely Frit Boulderely Frit Boulderely Frit Boulderely Frit Boulderely Frit Boulderely Frit Boulderely Frit Boulderely Frit Frit Boulderely Frit Fr		39 6 49 6 57 58
28/6/79.		



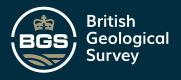
BGS	British Geological Survey
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the second second			06/6	In the Ho. 10. Rep.	ŀ
. GEOLOGICAL SURVEY AND MUSEUR	M. BOREHOLE	S AND SHAP	TS.	In Ta No.10.	T
CD 22C1A/		. 1.		Ke.B.	12.37.
JU JUJYY	10 ⁻⁴ /10	inty Law		1	
BORE OF SHAFT Black port Gas Co. Ho	Ø-11	n. Map 59	NWE	6	
Marton			G	SM	
Black	. 1		1		No. of Concession, Name
	pour			10	
Surface level	One-ine	ch Map_6	6		
Communicated 1937 b					
Date of sinking 1937. I					
Specimens				a surger and	0.0
Description,			ANESS.	_	PTH.
		Feet.	Inches.	Feet.	Inch
Upper B.a. Sod Toil		1	6	1	6
in frag trag		4	2	5	8
(Brown Clay		20	4	26	0
Heavy grand Fine Bonn Fond		7	2	33	2
Boaldwely smod		-1		1.	4
Coffles, have sign		23	4 8	67 91	-
A fand + coved		6		97	
6 brown Frity clay		3	6	100	6
" alles, End open	l	18	6	119	
I fand & good		7		126	
& Brown Find		2		128	
x fand opport		15		143	
1 doscotte	0	6	6	149	6
y fait goard		7		15-6	6
is fring clay		3	6	160	
- Find prod restric		10	//	170	11
? LBCC. Frind chy ogran	٤	12	2	183	
Possible Kouran March Brown Sondy clay		4	3	187	5
Visited - site obtained from plan of Gas 1	Into				
0.D. 27'	·····	1.1.1			
Box made in 1938. R.W.L. 23'				1.00	
R.W.L. 23					-
P.W.L. 72'				-	
Yield 4,200 g.p.h. continuously. Rom + kuchet method & punping.			7.000		
And wind method & punpap.	· · · · · · · · · · · · · · · · · · ·				
HTNalyris:-	to per mill			77758	
Tamp. hardness	350	m		1.000	-
Kern. hardness	330			No. C.	
Total All.	350				
Sulphates	450	and the second			
Chlorides	1800	EURO-11-	HURIDE IS	30 ppm	him .
Dissolved Orygen	-	and all	10 1	Joe an	- my
Dissolved solids	7.3	1997			
Divide and efficient	2600.	N. Salar		Dat	-1
				+.P. 26.	+ .26
				+.r. 26.	4.26



	5033/1	6	5
	GEOLOGICAL SURVEY AND MUSEUM.	BOREHOLES AND SHAFTS.	- 17:00
	3449 3368	County Lance	E.S.
BORE - SHAP	E Black port Guo G. 150 Marton Blackp	6-in. Map 59NW2	GSM
Surface level	32 0.D 941		
Communicated	937		. / A 5 10.100 B V ¹⁰
Date of sinking	<u>1937.</u> в		~ / /
Specimens	•		
	Description.	THICKNESS.	DEPTH.

upensite (Sint residence) The constraint of the second of		Same a construction			
цинова (1) 1000 (1)		Feet.	Inches.	Feet.	Inches
цинба (1) 100 (1) 10	(Sont Tail	,	4		6
(brin Chy Henry Print Finite Front Fried Ancerces Third Ancerces Third Ancerces Third Ancerces Third Ancerces Third Ancerces Third Ancerces Third Ancerces Third Ancerces Third Ancerces Third Ancerces Ancerces Third Ancerces Ancere	When Bee	4	2	2	2
A Hang grund true A Hang grund true Brite Brite Brit		20	4	~ ~	0
C Brittinely trand C Cittles, his trand C	Heavy grand	7	2	, i	2
Chiles, historgand Junit organit Chiles, historgand Chiles, faire opene Chiles, faire Chiles,	X Fine Borner Frank	27	10	60	New York
Line prod 23 8 97 24 27 24 27 24 27 27 22 28 2 27 22 29 27 20 20 20 2	V Bouldwely ogmod	7	4	67	4
2 dial oprid 3 di Grind This chez prine 4 di oprid 5 di compare 5 di	Labores, fand "Fyrand	2'3	8		
A CHILO, tare opine HI And opine S American S A A		6			
W H H H H H H H H H H H H H	and the same the same	n	4	1	6
C Lie Trand Ling well to the Ling mel to the Ling mel to the Ling mel to the Ling mel to the Ling of th	Cones and opping	18	6		
C Lie Trand Ling well to the Ling mel to the Ling mel to the Ling mel to the Ling mel to the Ling of th	a man from the found of frond in	7			
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Bore næde in 1935. R. W.L. 23' P. W.L. 72'. Yield 4,200 g.ph. continuandy. Ram - bardeet method & pumping. Analysis. Temp. hardness July hardness Total Ath Unplates Uloridos Dissofwed Oxygen. PH. Dissofwed oblide 7.3 (H.P. 26 4.56	G.D. 27'	N 47	and a server \$1		
R. W. L. 23' P. W. L. 72' Yield 4,200 g.ph. continuation. Ram & buchet I not of provide por million Analysis Temp. hartness Perul hardness Tobe Ath Lulplates Culorido Disorloved Oxygen PH: 2600. M.H.P. 264-56					·
Vield 4,200 g.ph. continuardy. Ram - burdet 1 g. pumping. Analysis. Ferre hartness Ferre Ath Unglatus Unglatus Dissolved Oxygen 2400 - 7.3 Dissolved oblids 2600. M.H.P. 264-56	R. N.L. 23				
Rome buchet method of pumping. Analysis Fein hardness Fein hardness Total Ath Unplates Unplates Dissolved oxygen PH. Dissolved oxygen 7.3 Dissolved oxide 7.3	P. W. L. 72'				
Fill hardnes Fred Ath Enliphates Gelorido Disoolved Oxygen PH. Disoolved oxido 7.3 Disoolved oxido 7.3 N.H.P. 264-56	Yield 4,200 gph continuation !!				
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Total Alk Soo Alorido Scioolved Oxygen PH. Dissorved orde 7.3 Dissorved orde 7.3 N.H.P. 264-56	Jemp. hargness				
Dissofved skile 2600. 1.4.P. 26.4.56	TEA ALL	350		1	
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п.н.Р. 26-4-56 Сталания Алистикания Алист	Diasteral atile				
	a second to the second a second	• 5 446, :		H & P ni	$A_{\rm el}$, $C_{\rm el}$
		1		?∎*f\$ø\$ 5 æbe®\$; `.	4.30
	Autor and the second	0 [*]			
(B12268) Wt. 13119-0014 500) 9/27 Gp. 169 O.A.				4	



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WR38: Borehole record form

Borehole record form







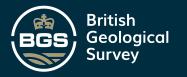
Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details Borehole drilled for Basline Monitoring Water Borehole 2	
Location Preston New Road Exploration Site, Preston New Road, Flyde, Lancashire, PR4 3PJ	
NGR (ten digits)337322, 432742	Please attach site plan
Ground level (if known) 11.35 Drilling company GEOTRON UK	netres Above Ordnance Datum
Date drilling commenced 04/07/2016 (DD/MM/YYYY) Completed 13/07/2016	

B Construction details

Dorenote dritted	aumeter					in/deptit
		1	50 mm from L	7	_ to <u></u>	m/depth
		L	mm from L		」 to	m/depth
		L	mm from L		_ to	m/depth
	ample, if plain steel, plastic					
	l					
Casing material	L	_) diameter ∟	mm from L		to	m/depth
Casing material	L	💷 diameter 🗀	mm from L		」to	m/depth
Grouting details	L					
Water struck at	1. L ^{6.0}	i m (de	- pth below datum – mbd)	2. 7.0		m (mbd)
	3	m (mt	od)	4. ∟		m (mbd)
C Test pun	nping summary (Pleas		ll details on form WR3	-	3 ar halaw 🗖	

Test pumping datum	L	m. Please tick if this is above 📋 or below 🔲 ground level.
(if different from borehole datum)		
Pump suction depth	L	mbd
Water level (start of test)	L	mbd
Water level (end of test)		mbd
Type of test (for example, bailer, step, c NA		
Pumping rate	L	m³/hour □ or litres/second □. Please tick as appropriate.
	for L	days, i hours, i mins
Recovery to L (from end of pumping)	_ mbd in (days, L hours, L mins
Date(s) of measurements Pum	o started ∟	(DD/MM/YYYY)
Pum	stopped L	(DD/MM/YYYY)
Please supply chemical analysis if avail	able. If you have includ	led this please tick this box \square



D

WR38: Borehole record form

Strata log Geological Description of strata Thickness Depth classification (BGS only) (to base m of strata) m Topsoil 0.4 0.4 Stiff light brown CLAY with some small cobbles 5.6 6.0 Coarse brown SAND with fine angular gravel 1 7.0 Slightly clayey coarse SANDS and GRAVELS (rounded) 8.0 1 Coarse SAND with occasional cobbles and occasional clay 1.2 9.2 Sand with fine angular GRAVEL with slightly clayey bands 7.8 17.0 Soft CLAY lenses within finer sands and small cobbles 0.4 17.4 Dense coarse brown very gravelly SAND with occasional small to medium cobbles 1.5 18.9 Dense fine brown SAND with fine coal fragments 7.1 26.0 Dense very silty red/slightly brown SAND 30.0 4 (continue on separate page if necessary) Other comments (for example, gas encountered, saline water intercepted)

Ε **Completing this form**

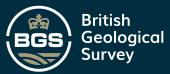
How long did it take you to fill in this form? 1

For Official use only

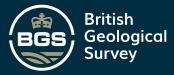
Date received (DD/MM/YYYY)	File	Consent number	BGS reference number
Accession number	LJ Wellmaster number	LI SOBI number	LI NGR
LIC NO	Purpose	L]	EA reference number
Copy number	Entered by		

WR38 Version 2, February 2011

page 2 of 3



	RIS - CESCO LTI SITE INVESTIGATION		J				LE No			NW 7/
•			• • • • • • • • • •		-	EPORT			:082	
LOCATION	WADDINGTON ESTATE, LYTH	AM ST. AI	NNES		G	round/Be	d Level	N/A		
Client	FYLDE BOROUGH COUNCIL				<u>с</u>	ordinate	S	N/A	L	
Method/Diame	ter Rotary Auger 300mm, dia Shell and Auger 150mm.					oth		ig Comme ig Comple		/6/82
Ground Water observations are given at end of log	Remarks Penetration force for p	iston sa	mpler 1	ecord	lec	i in kl				, , , , , , , , , , , , , , , , , , , ,
			Scale 1:5	0			Samp	les/Coring	Record	
	Description of Strata	Depth (m)	Reduced	Legend		Ref. No.	Туре	Depth From	(m) To	N blows/0.
TOPSOIL.		-			Ŧ					
Very loos	e orange f.m. SAND.	0.40		****	• • • • • • 	1	S/D	0.80	1.25	4
		2,50			****					
Soft black	k sandy amorphous PEAT.	2.50		*	+++++++++++++++++++++++++++++++++++++++	• •				
				* *	****	2	P	2.80	3.55	41kN
		4.30	•	* *						
sional ro	silty CLAY with occa- tted organic materials,			1 × 1	+	3	U	4.60	5.05	(9)
pecoming	more silty with depth.					4	D	5.10		
				1,1,1,1						
					****	5	D	6.00		
					***	6	D	7.00		
Loose gre	y f. sandy SILT.	8.00		1×1× ×	+++++++++++++++++++++++++++++++++++++++	7	D	8.00		
	-			× 	+++++++++++++++++++++++++++++++++++++++	8	D	9.00		

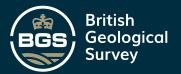


2 ÷

. 0 5		SITE	INVEST	IGATION D	VISION	N	1		~!mij/	· S!	- 10	-	
~~~*	~~1	<u></u>			- <u></u>		]	4			heet No.		
LOCAT	ION	WADDINGT	ON ESTAD	TE, LYTHAN		Scale 1: 5	<u>_</u>	<b>⊢</b>			···/Cori	D8208	
	t	Description o	of Strata			1		1 '		T	nples/Corin Depth	ng Record	1
					Depth (m)	Reduced level	Legend	Ľ'	Ref. No.	. Type	From	n (m) To	N blows/0.3
(As abo							<'.'	Ŧ			· · ·		
Loose (	grey 1	f. sandy S	SILT.		,		× ]	1	1		! '		
								[]	9	D	10.00		
							× ż	P	- '	-	10.00	1	
b	n g	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	10.50		X:/x	冄'	10	D	10.50	1	
Firm bi silty w			I, becom	ming very	)		돌	lŧ!	'		!		
		-		,	'			P	'		+		
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				· •	!		× 	即	13	S/D	13.50	l	\$*35. O
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				1	1 1	1	121	巾	1 1	`~ *	)	1	
					14.50	<b> </b> '		申	14	D	14.60	1	
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gravel.		385104-	- يوسعه لالنا 5	itar m. j		1 /		巾	1 1	'		1	
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				,	15.95	1 '	-80-	<b>[</b> ]	15	U	15.50	15.95	(250)
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				1	1	'		申	1 1	1 '		<b>i</b> '	1
		779.06		!	1 1	!	1 1	11	( )	1 '		i '	1
Inflow obs	served	D WATER OB: Visual rate	e Water	r sealed off by	1 1	'		巾	( )	'		1	1
<u>at (m</u> 1.2)		of inflow Seepage		2.50		!	1	Ð	[ ]	1 '		1 '	
*•		DECLAP.	e	<b>2.</b> 30		1 !		Ð		Í ľ		1 '	
Date	Time	Hole Depth (	Casing Depti	H Water Level				i‡	1	1 /		1 2	l
Date 1 4/6/82		(m) 5.10	(m) 5.10	(m) 5.10	1 1	1	ľ	削	1	1 /		1 '	l
	1930 0730		5.10	5.10		1 1		山	( )	1 '		1 '	1
1.2.0.00	1 -	1 .	· · ·		1	1 '	1 1	山	( )	1 1	1 1	1	1
1.7900			•	1	1	'	· ·	՝ Ելլ	` )	· ·	· )		•

**SAMPLES: U=Undisturbed. B=Bulk Disturbed. D=Disturbed. P=Piston. W=Water. STANDARD PENETRATION TEST: S=Hollow shoe. C=Cone point. R=Refer to text or explanatory data sheet.** ( ) No. of blows to drive U sample. f = fine. m = medium. c = coarse.

. [



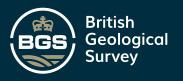
## ENGINEERING GEOLOGICAL SYMBOLS

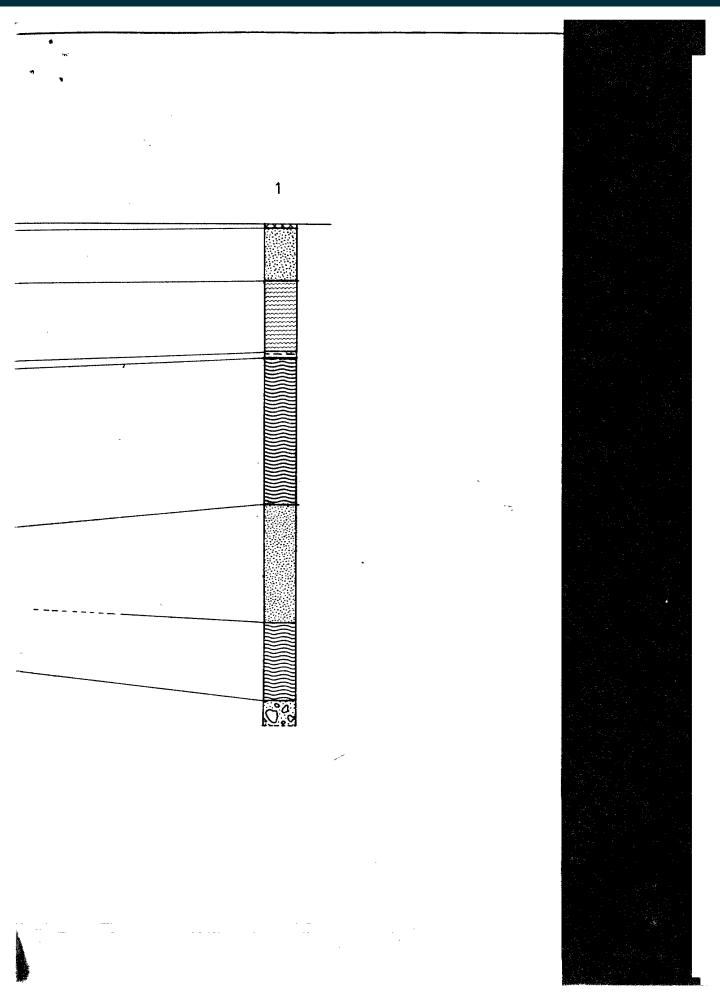
## - <u>SEDIMENTARY ROCK TYPES</u>

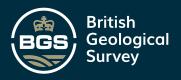
0000	CONGLOMERATE	X X Y Y	Silty SANDSTONE	
4 4 4 4 4 4 4 4	BRECCIA	• • •	Gravelly SANDSTONE	
	SANDSTONE	622	Clayey SANDSTONE	
X XX XX X X X X X X X X X X X X X X	SILTSTONE	X X X XX X X X X X X X X	Sandy SILTSTONE-	
	MUDSTONE	X X X X X X X X X X X X X X X X X X X X X X	Clayey SILTSTONE	
	SHALE		Silty MUDSTONE	
-0-0-	GYPSUM		Sandy MUDSTONE	
	CHALK		LIMESTONE	к ^а .
	COAL , LIGNITE		Argillaceous LIMESTONE	\$7.4. \$

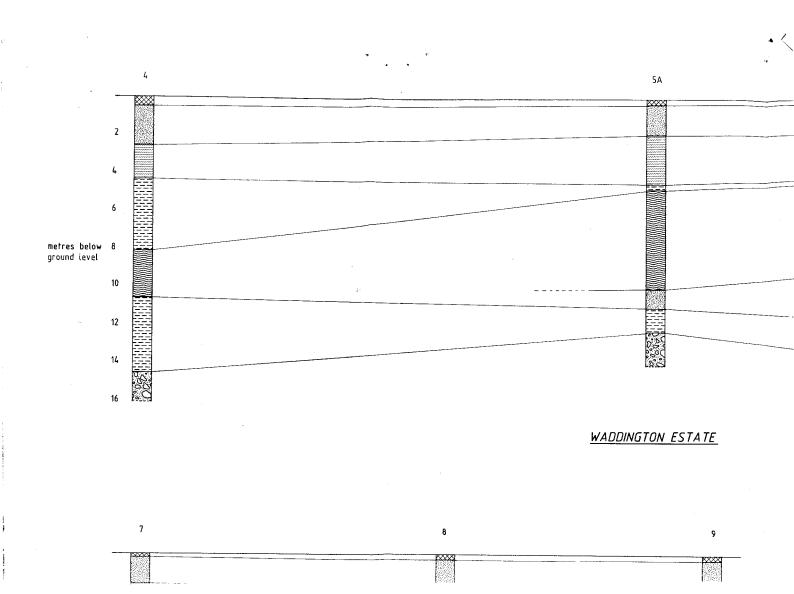
SOIL TYPES

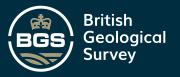
8-0-0-	GRAVEL	<b>%</b> %			
	SAND		Gravelly		
××× ×××	CH <b>T</b>		Sandy		
	SILT	××	Silty		
	ELAY		-		ĺ
0.08			Clayey		
	BOULDERS, COBBLES	0:	Bouldery		
	SHELLS		•		
¥ ¥	PEAT	• 50	Shelly		
		¥ ¥	Peaty		
XXXXX XXXXX	Shelly SILT		-		
20	Bouldery CLAY	<u>×</u>	Silty SAND		ĺ
	bollocity cent	<b>X</b> -X- -×-	Silty CLAY		
°	Sandy GRAVEL	× v×	-		
	FILL.	₩×₩/	Silty PEAT		
	······································			ref: BS 5930:1981	











1-YTH	AM GRE	EN IR	IVE G	N.Wes	ABH.	1	с 132/14 A	20-4-	Ч°**,
						74		SDZ	ZNE
Owner				Licence no. Appn no. C8: Cancelled	582,	Nat. grid	ref. SD3698	- 2820	CNE
Occupier				IGS ref. no.		Status A		IRRIGATI	
Ground Let			m OD		ft. 0D	Aquifer	SUPERFICIAL		
Level of we			m OD		ft. CD	Code	III BD S		15.
Rest water	level		m bwt		ft. bwt	Summary	of geological section	Thickness	Depth
(Date	)	r	n OD		ft. CD	BOREA	IOLE LOG &		Copin
Constructio	n: Method			Date		1	DETAILS		
Depth bwt	Dia.	Linings (bel	ow well to	(p)			LABLE		
		From	То	Dia.	Гуре				
					and the second second			<u>Line or an </u>	
									-
Abstraction	rates	T	ype of pu	mp					
	gph PWL		hem./bact	. anal. Y	ES/N0				
	gpd	v	Vell driller	POWFIT DR					

Site Plan 370 nOn 4 9 4 Green Drive Golf Cou 132/14 A - ABH Playing Fields Lytham

SI 32/14-A LYTHAM GREEN DRIVE GOLF CUBA

Drilled under consent Nº 920 by Powerfit Drilling Services Ltd. Register & V.I. completed - DCP. While card Bh log + P.T. data sent to BGS. Oct 96.

See Report QC.57/96.

	5532442 34
•	
FORM WR-38	National Rivers Authority
	Region
(Please type)	BOREHOLE RECORD
A. SITE DETAILS	
Borehole drilled for	Green Drive Golf Club ABH SD 32/14A.
Location	BALLAM ROCAD, LYTHAM, LANCS,
NGR (8 fig.) Ground Level (If known)	SD_370_282Please attach site plan
Drilling Company	Powerfit Drilling Services Ltd
Date of drilling	Commenced: 22. 4.96 Completed: 24. 4.96
B. CONSTRUCTION DET	TAILS
	d level) <u>Ground Level</u> m below GL of depth are taken eg flange, edge of chamber, etc)
	mm from tom/depth
	mm from tom/depth
Casing material	dlameter 127 mm from to 22m/depth
	diameter <u>127</u> mm from <u>GL</u> to <u>7.0</u> m/depth
3	diameter <u>127</u> mm from <u>7.0</u> to <u>17.0</u> depth
	dlameter <u>127</u> mm from <u>17.0</u> to <u>22.0</u> m/depth
3	5m -BG-L - to-1m -B.G.L
Water struck at	
	m (depth below datum - mbd)
Rest water Level on comp	letion <u>1.25m</u> mbd
	MARY (Please supply full details on Forme WR-39)
Test Pumping Datum (If different from borehole datum)	<u>ADOVO</u> <u>ADOVO</u> M below borehole datum (mbd
Pump Suction Depth	mbd
	) mbd
Water Level (End of Test)	mbd
Pumping rate	, , , m³/d : l/s
· ·	for days/hours
Recovery to (from end of pumping)	<u>mbd in</u> mins : hrs : days
Date(s) of measurements	GROUNDWATER
Please Supply Chemical A	Analysis if Available DATERECEIVED 24.5-
1	

British Geological Survey

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British Geological Survey

SD 32NE 34

No.

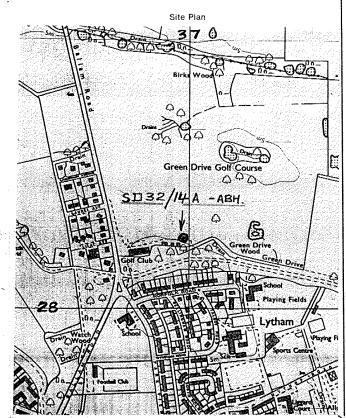
FORM WR-38 (cont.)

(Please type)

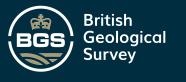
GREEN DRIVE GOLF CLUB ABH LYTHAM. D. STRATALOG Geological Description of strata Classification Thickness Depth m m (BGS only) Mar-mada 0.1 Hardcore G.L. deposits 0.1 0.4 Grey Sandy Clayand Brick Fill 0.5 0.5 Grey/Brown Sandy Clay Maria 1.0 0.25 Stiff L/Grey Clay and 0.25 1.25 Estuarie Peat 1:50 1.50 Brown/Grey Clay becoming stiff Allurian 3.0 Soft Brown Sandy Silty Wet Clay 0.5 3.5 6.5 Soft Brown SiltySand 10.0 4.0 Brown Sand andGravel 4.0 14.0 Grey Sand and Gravel 7.0 18.0 Brown Clay (Boulder Clay?) [continue on separate page if necessary] Other Comments (eg gas encountered, staline water intercepted, eco) GROUNDWATER  $\Delta S_{\rm e}$ DATERECEIVED 24 . 5 . 9L

BGS	British Geological Survey
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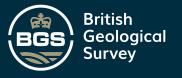
1_YTHAI	M GRE	that ht EN IRIV	E Gol	F CLUI	з Авн.	74	5032/14A	5032	NE/
Owner				Licence no. Appn no. C Cancelled	8582.	Nat, grid	ref. SD3698 -	- 2820	1
Occupier				GS ref. no.		Status ABH SPRAY IRRIGATION.			
Ground Leve	ł	m (	OD		ft. OD	Aquifer	SUPERFICIAL	DEPOSIT	s.
Level of well top m OD					ft. OD	Code	III BD S	Z.Z.	
Rest water le	evel	m bwt ft. bwt			ft. bwt	Summary	of geological section	Thickness	Depth
(Date	)	m (	DD		ft. OD	BORE	HOLE LOG &		1
Construction	: Method			Date			3 DETAILS		
Depth Dia.	Linings (below	v well top)			-	LABLE			
bwt		From	То	Dia.	Туре				
				<u> </u>					
							· · · · ·		i 20
					1				
Abstraction r	ates	Tyı	pe of pump	) )					
	gph PWL	Ch	iem./bact. a	inal.	YES/NO				
ç	pd	We	ell driller 1	DIA/EIT	DRILLING LT				



5132/14A LYTHAM. GREEN DRIVE GOLF GUBY Drilled under consent Nº 920 by Powerfit Drilling Services Ltd. Register & V.I. completed - DCP. white card Bh log + P.T. data sent to BGS. Oct 96. See Report GC. 57/96.



•	
FORM WR-38	National Rivers Authority
(Рівазе туре)	
A. SITE DETAILS	
Borehole drilled for	Green Drive Golf Club ABH SD 32/14A.
Location	
NGR (8 fig.) Ground Level (If known)	SD_370_282Please attach site plan
Drilling Company	Powerfit Drilling Services Ltd
Date of drilling	Commenced: 22. 4.96 Completed: 24. 4.96
B. CONSTRUCTION DET	
Borehole datum (if not ground (point from which all measurements of	level) <u>Ground Level</u> m below GL I depth are taken eg flange, edge of chamber, etc)
Borehole drilled diameter	
	mm_fromtom/depth
	mm from tom/depth
Casing material <u>PVC</u> and type (eg plain steel, plastic sk	dlameter <u>127</u> mm from <u>GL</u> to <u>22</u> m/depth
Casing	dlameter <u>127 mm from G</u> to <u>7.0 m</u> /depth
Screen	diameter <u>127</u> mm from <u>7.0</u> to <u>17.0</u> m/depth
	diameter <u>127 mm from 17.0</u> to <u>22.0</u> m/depth
Grouting details	5m-BG.Lto 1m-B.G.L
Water struck at	·· 3.5m m (depth below datum - mbd)
	m (depth below datum - mbd)
Rest water Level on complet	lon <u>1.25m</u> mbd
C. TEST PUMPING SUMM	ARY (Please supply full details on Forms WR-39)
Test Pumping Datum (If different from borehole datum)	<u>above</u> m below borehole datum (mbd)
Pump Suction Depth	mbd
	mbd
	mbd
Pumping rate	m³/d : l/s
	for
(nom end of pariphily)	mbd in mins : hrs : days
Date(s) of measurements	GROUNDWATER
Please Supply Chemical Ana	lysis If Available DATE RECEIVED 24 - 5 - 94
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### FORM WR-38 (cont.)

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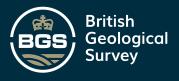
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D. STRATA LOO	G GREEN DRIVE GOLF CLUB ABH LY	THAM.	·
Geological	Decodation of state		
Classification	Description of strata	Thickness	Depth
(BGS only)	·	m	m
MAN-MADE DEPOSITS	Hardcore Grey Sandy Clayand Brick Fill	0.1	G.L. 0.1
MARINE	Grey/Brown Sandy Clay	0.5	0.5
AND	Stiff L/Grey Clay	0.25	1.0
ESTUARINE			
ALLUVIUM	Peat	0.25	1.25
	Brown/Grey Clay becoming stiff	1.50	1.50
	Soft Brown Sandy Silty Wet Clay	0.5	3.0
TILL	Soft Brown SiltySand	6.5	3.5
	Brown Sand andGravel	4.0	10.0
	Grey Sand and Gravel	4.0	14.0
	Brown Clay (Boulder Clay?)	7.0	18.0
1/12/97			
	[continue on separate page if necessary]		_
-			<del></del>
	Other Comments (eg gas encountered, statistic water intercepted, etc)		]
	GROUND	WATER	ф.
	DATE RECEIVED	4 . 5 . 4	76
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• FORM WR-39/2

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GROUNDWATER

DATE RECEIVED 11. 6.96

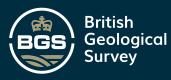
ENVIRONMENT AGENCY

## PUMPING TEST DATA

		Elapsee Minutes 0 1 2 3 4 5 6 7 8 9 10 15 20 25	Ś.D.	$\begin{array}{c} Cnrn O2.vc\\ \hline 3698 & 2\\ \hline 3698 & 2\\ \hline 3698 & 2\\ \hline 3698 & 2\\ \hline \\ \hline \\ 1evel below \\ datum (metres)\\ \hline \\ \hline \\ 8.05 \\ \hline \\ 4.91 \\ \hline \\ 3.61 \\ \hline \\ 2.94 \\ \hline \\ 3.05 \\ \hline \\ 2.94 \\ \hline \\ 2.92 \\ \hline \\ 2.73 \\ \hline \end{array}$	820 Drawdown (metres)	FINAL METER	nergr level	ription of datum poin which measuremost nt above ground ? (metres): Comments
Observation NGR Date T	Time	Elapsec Minutes 0 1 2 3 4 5 6 7 8 9 10 15 20 25	d time	Depth of water level below datum (metres) 8.05 4.91 3.61 3.24 3.15 3.09 3.05 3.01 2.99 2.96 2.94 2.94 2.82 2.73	Drawdown (metres)	METER READING	level	l (metres):
NGR Date T	Time	Elapsec Minutes 0 1 2 3 4 5 6 7 8 9 10 15 20 25	Y	$   \begin{array}{r}     level below \\     datum (metres) \\     \hline                               $	(metres)	METER READING	level	l (metres):
Date T		Hinutes 0 1 2 3 4 5 6 7 8 9 10 15 20 25	Y	$   \begin{array}{r}     level below \\     datum (metres) \\     \hline                               $	(metres)	METER READING	level	l (metres):
		Hinutes 0 1 2 3 4 5 6 7 8 9 10 15 20 25	Y	$   \begin{array}{r}     level below \\     datum (metres) \\     \hline                               $	(metres)	METER READING	· · · · · · · · · · · · · · · · · · ·	Comments
31 5 10		1 2 3 4 5 6 7 8 9 10 15 20 25		8.05 $4.91$ $3.61$ $3.24$ $3.15$ $3.09$ $3.05$ $3.01$ $2.99$ $2.96$ $2.94$ $2.82$ $2.73$	}		· · · · · · · · · · · · · · · · · · ·	
		2 3 4 5 6 7 8 9 10 15 20 25		4.91 3.61 3.24 3.15 3.09 3.05 3.05 3.01 2.99 2.96 2.94 2.94 2.82 2.73				
		3 4 5 6 7 8 9 10 15 20 25		3.61 $3.24$ $3.15$ $3.07$ $3.05$ $3.01$ $2.99$ $2.96$ $2.94$ $2.82$ $2.73$				
		4 5 6 7 8 9 10 15 20 25		3.24 3.15 3.09 3.05 3.01 2.99 2.96 2.94 2.82 2.82 2.73				
		5 6 7 8 9 10 15 20 25		3.15 3.07 3.05 3.01 2.99 2.96 2.94 2.82 2.82 2.73				
		6 7 8 9 10 15 20 25		3.09 3.05 3.01 2.99 2.96 2.94 2.82 2.82 2.73				
		7 8 9 10 15 20 25		3.05 3.01 2.99 2.96 2.94 2.82 2.73				
		8 9 10 15 20 25		2.99 2.96 2.94 2.82 2.73				
		9 10 15 20 25		2.96 2.94 2.82 2.73				
		10 15 20 25		2 · 94 2 . 82 2 · 73				
		15 20 25		2.82 2.73				
		20 25		2-73	· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·
		25						
				015				
		I		2.65				
		30		2-58				
		35		2.51				
		40		2.46				
		45		2.43				
		50		2.40				
		55		2.37				· · · · · · · · · · · · · · · · · · ·
		60	1	2-33				· · · · · · · · · · · · · · · · · · ·
·····		70		2-29				· · · · · · · · · · · · · · · · · · ·
		80		2.24				
		90		2-19				
		100		2.15				
		120	2	2.10				
		150		2.04				
		180	3	2.00				
	ļ	210		1.96				27 12
		240	4	1.95		]		······

Use continuation sheet (WR-39/4) if necessary

Forms/96



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FORM WR-39/4



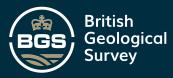
GROUNDWATER

DATE RECEIVED 11 - 6 - 96

## **PUMPING TEST DATA**

ONSENT	NO.			920	Description of datum poin				
Pumping test at LYT		THAM	GREER Driv	n Cour	32/14A.	from which measurements were made (eg ground leve flange, dip tube/other):			
GR							flange, dip tube/otner):		
bserva	tions from	n							
GR				· · · · · · · · · · · · · · · · · · ·		····	Height above ground level (metres):		
Date Time		Elapsed	l time	time Depth of water Drawdo level below			Comments		
		Hours	Days	datum (metres)	(metres)		Connerts		
6	06.00			1.72					
<b>.</b>	12.00			1.71	 				
16	09.00			1.69					
1	16.00			1.66					
16	06			1.65		<u>.</u>			
516	67.00			1.58	·		·		
		,							
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		Altanta							
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ENVIRONMENT AGENCY



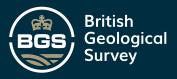
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- FORM WR39/1 (A)

### PUMPING TEST DATA

WR-39/1 (a) - Nwversion1/Jan'95/DCP

				CONSTANT RA	TE PUMPI	NG TEST			
CONSENT	NO.		920	······································	SD 32	114 A .	Description of datum point		
Pumping	test at	LY	THAM	GREAN DRIVE COLF CLUB			from which measurements were made (eg ground level, flange, dip tube/other):		
NGR				3698 . 23			riange, orp tube/other):		
Observa	tions from	" Pres		(SOM REST)	PiE20 2		Height above ground		
NGR							level (metres):		
Date	Time	Elapsec Hinutes		Depth of water level below datum (metres)	Drawdown (metres)	Meter readin (m ³ ) or Discharge ra (m ⁷ /hr)	ngs Comments (eg pump started, ate pumping rate changed, pump stopped)		
2515		DAY (		1.38			reading/flow measurement required		
26/5		DAY (		1.38					
27/5		DAY (		1.39			CALLART TOT		
28/5.	10.45	0		1.50			CALIBRATICST .		
~012 .	10.	1		4.68		ļ			
		2		5.74					
		3	<b></b>	6.18					
		4		6.10		007	DUNDWATER		
		5		6.53		<u> </u>	11-6-96		
		6		6.58		DATE RECEI	VED		
		7		6.62					
		8		6.65					
		9		6.62					
2815.	10.55	10		6.60.					
		15		6.60		* 2.97 -	2/1m		
		20		6.61					
		25		6.83					
		30		6.96	-	+ 2.97.	2/in .		
		35		6.99					
		40		7.05			-		
		45		7.16					
	1	50		7.24					
		55		7.38					
28 5.	11.45	60		7.44		+ 2.89-	°/102.		
		70		7.54	<u> </u>				
		80		7.60	<u> </u>				
	<b>_</b>	90		7.65		+ 2.89 .	·/In.		
	· -	100		7.69			· · · · · · · · · · · · · · · · · · ·		
28/5.	12.45	120	2	7.72	· · · · · · · · · · · · · · · · · · ·	+ 2.89			
		150	· _	7.87		2.89			
	13.45	180	3	7.89	ļ	+ 2.89			
		210		7.91			······		
	14.45	240	4	7.92		2.89			
·	15.45	300	<b>.</b> 5	7.97		2.89			



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**FORM WR-39/4** 

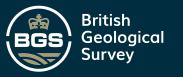


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PUMPING TEST DATA

				CONTINU			- <u>1</u>	
CONSENT		- I	9	Cross Dr.v	Description from which	on of datum point n measurements		
Pumping	test at					Cius.	were made	(eg ground level, p tube/other):
NGR			<u>&gt;D 3</u>	698 28	20.			
Observat	ions from	1		······			- Height abo	ve ground
NGR							res):	
Date	Time	Elapse Hours	d time Days	Depth of water level below datum (metres)	Drawdown (metres)			Comments
29/5	06.30			8.12		2.89 A?	lin	
	08.30			8.11		u		
	12.00			8.08		~		
	14.00			8.05		, m 1		
30/5	06.00			7.89	1	~		
	09.00			7.91		<u>ب</u>		
	12.00			7.91		u		
	14.30			7.93	- 676	~		-
sile.	08.00					ĸ		
	10.45	• .		8.03				
		-						
								<u></u>
								· · · · · · · · · · · · · · · · · · ·
						······································		
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	and a second					n de la constante Notas de la constante		



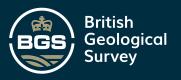


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			SD32	/4A	•
ORM WR-38 (cor	rt.)	NRA No.			
Please type)		حميا مىشىرى م	<u></u>		
D. <u>STRATA LOG</u>	GREEN DRIVE GOLF CLUB AB	ЗН <u>1</u> УТ	HAM.		
Geological	Description of strata				
Classification			Thickness M	Depth M	িত্রগাঁ দিন্
(BGS only)				++r	÷
MAN-MADE	Hardcore		0.1	G.L.	к. з
DEPROSITS	Grey Sandy Clayand Brick Fill		0.4	0.1	τ. 3
MARINE	Grey/Brown Sandy Clay		0.5	0.5	5 G.
ANIS	Stiff L/Grey Clay		0.25	1.0	1.7.3
ESTUARINE	Peat		0.25	1.25	195
ALLUVIUM	Brown/Grey Clay becoming stiff		1,50	1.50	\$ 'e
	Soft Brown Sandy Silty Wet Clay		0.5	3.0	S - 3
	Soft Brown SiltySand		6.5	3.5	i no
TILL	Brown Sand andGravel		4.0	10.0	14-1
	Grey Sand and Gravel		4.0	14.0	187 - 3
	Brown Clay (Boulder Clay?)		7.0	18.0	25
A nowari)					
1/12/97					
	(continue on separate page If necessary)				
	Other Comments (eg gas encountered <b>realitie water star</b>				
		OUNDV		*	
	DATERECI	EIVED _2	4 . 5 .	96	
FOR OFFICIAL					
	USE ONLY BG	S REE NO	h		•
orms/85					

Contact BGS: ngdc@bgs.ac.uk



ORM WR-38 (con	rL)		5D32	/4A	••• ]
Please type)		No.	E BY		J
D. STRATA LOG					
Geological Classification	Description of strate		Thickness	Depth	Death
(BGS only)			m	m	, m
MAN-MADE	Hardcore		0.1	++p	t= bay 0.1
DEPOSITS	Grey Sandy Clayand Brick Fill		0.4	0.1	05
MARINE	Grey/Brown Sandy Clay		0.5	0.5	1.0
AND	Stiff L/Grey Clay		0.25	1.0	1.25
ESTUALINE	Peat		0.25	1.25	1.5
ALLUNUM	Brown/Grey Clay becoming stiff		1,50	1.50	3.0
	Soft Brown Sandy Silty Wet Clay		0.5	3.0	3.2
TILL	Soft Brown SiltySand		6.5	3.5	10.0
	Brown Sand andGravel		4.0	10.0	14.0
	Grey Sand and Gravel		4.0	14.0	18.0
	Brown Clay (Boulder Clay?)		7.0	18.0	25.0
A navaris 1112197					
	(continue on separate page if necessary)				
ŀ					
	Other Comments (og gas encountered <b>Faiths water Exercispise, at</b> GROUN	DW		*	
	DATE RECEIVED.	24	. 5.4	76	
	SE ONLY 				-

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