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Geological Map Database

A Practitioners Guide to delivering the Information

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 Keyworth
 Nottingham NG12 5GG
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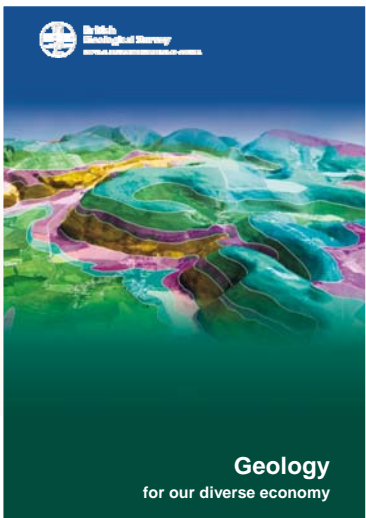




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GEOLOGICAL MAPPING


- Key strategic aims:
 - Deliver high quality detailed **information** on the solid and superficial geology
 - Provide increased **information** on Quaternary and other superficial deposits
 - Provide increase **understanding** of the three-dimensional structure and process



Geology
 for our diverse economy

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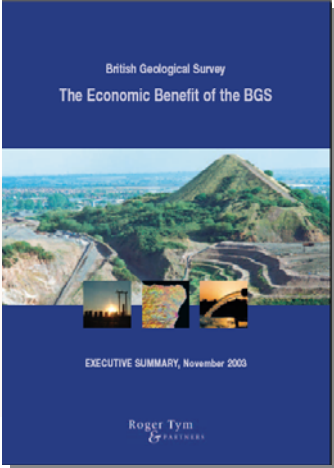
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WEALTH CREATION

- “The total value added of national output to which BGS contributes for 2001 lies in the range of **£34 billion - £61 billion** (**\$63 billion - \$113 billion**), representing around 5%-8% of total UK output (GVA). This is of course orders of magnitude greater than BGS’s annual turnover of approximately **£40 million** (**\$74 million**).”




British Geological Survey
The Economic Benefit of the BGS


EXECUTIVE SUMMARY, November 2003

Roger Tym
PARTNERS

<http://www.bgs.ac.uk/about/economicbenefits.html>

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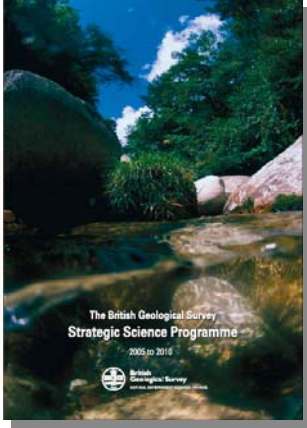
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THE MISSION

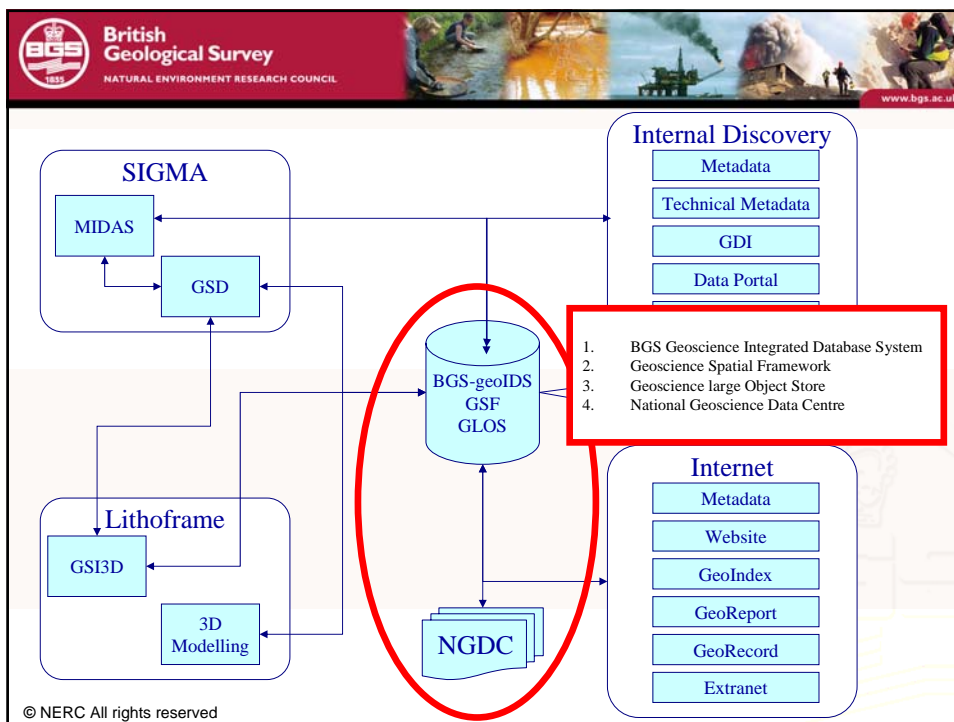
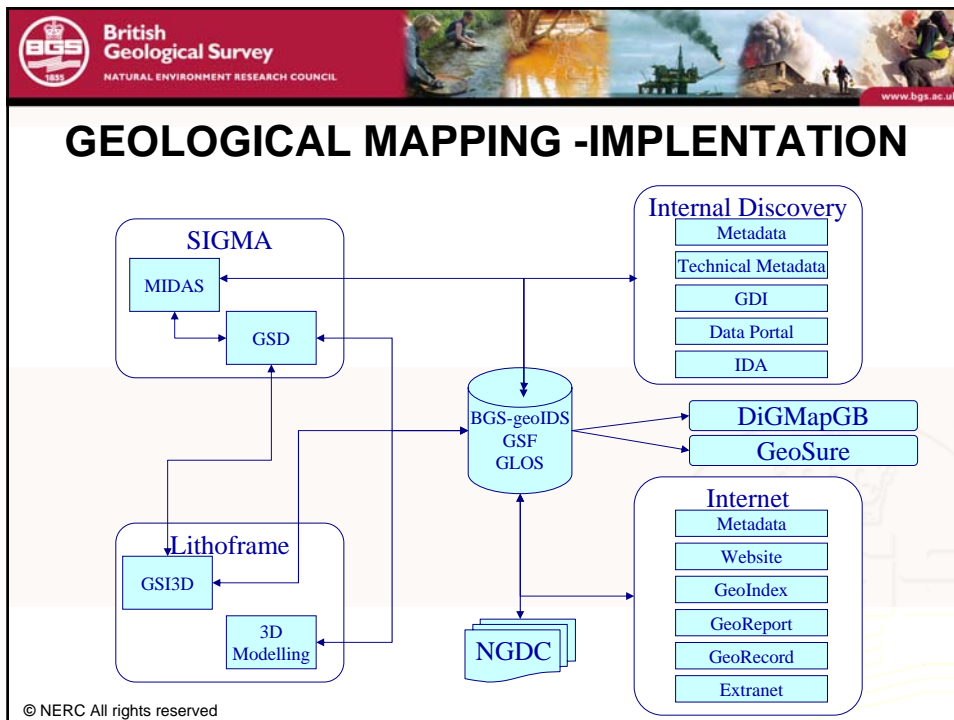
- To advance geoscientific **knowledge** of the UK landmass and continental shelf
- To provide comprehensive, objective, impartial and up-to-date geoscientific **information**
- To disseminate **information** in the community



The British Geological Survey
Strategic Science Programme
2005 to 2016

<http://www.bgs.ac.uk/about/strategic.html>

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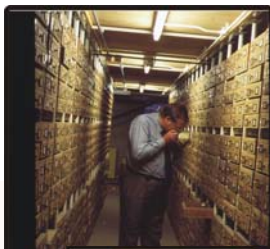


BGS-geoIDS

- During 1997 the BGS-geoIDS Scoping Study Report was prepared for the BGS Directorate
- The key findings were that:
 - BGS has a wealth of data
 - Islands of excellence but many problems
 - Little interoperability between databases
 - Few Corporate Standards for data or data management
 - No up to date inventory of the datasets
 - No application standards



DRIVERS



- to reduce staff effort in finding data;
- to make quality data available to staff and customers;
- to facilitate collaboration across BGS;
- to improve access to the unique BGS information;
- to keep BGS at the fore-front of the development of digital geoscience systems;
- to inform management decisions; and
- to allow Corporate implementation of standards and establish best practice



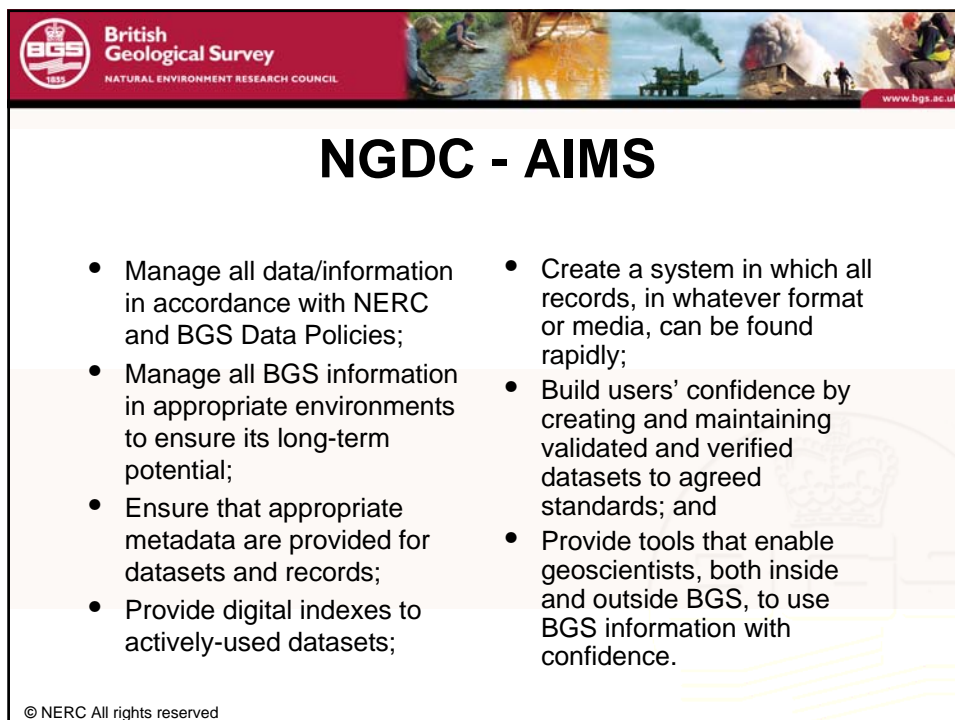
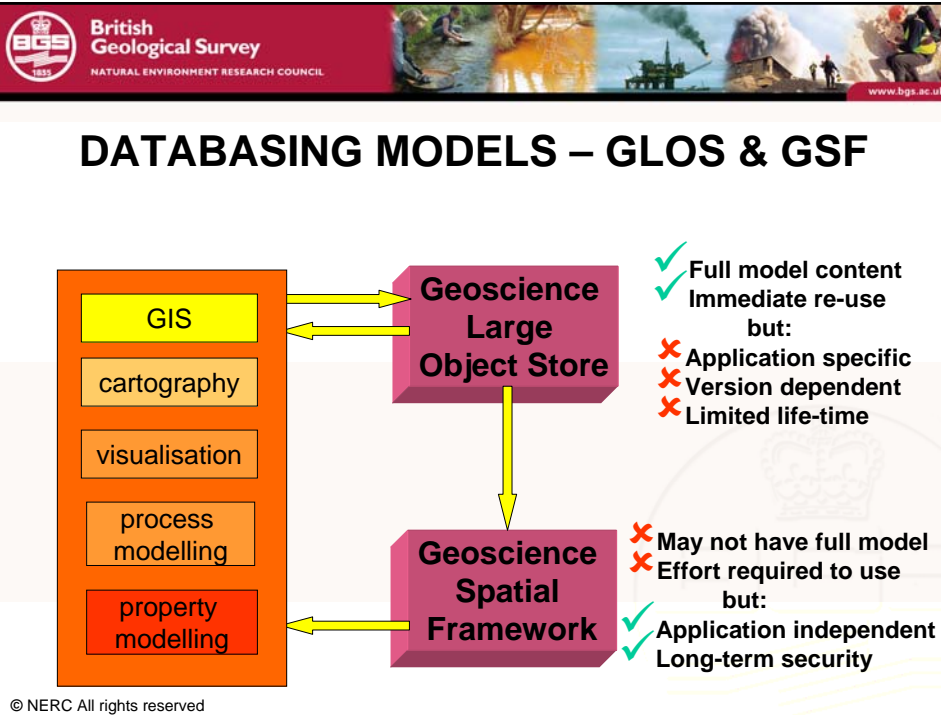
PRODUCTS

- Corporate Data Policy
- Data Management Plan(s)
- Metadata
 - Discovery Metadata
 - Technical Metadata
 - GIS Data Index in ArcGIS and the web
- Corporate Data Model enhancement & documentation
- Data Standards & Best Practice
- Application Standards (Software Systems)
- Corporate Data Access Interface (IDA)



CONSTRAINTS

- Development and implementation must not interrupt the supply of existing products and services
- Impact of intrusion must be minimised
- Existing systems are valuable assets
 - database design
 - application architecture
 - user experience
 - user confidence





NATIONAL GEOSCIENCE DATA CENTRE

- **NGDC has five components:**
 - National Geoscience Records Centre
 - National Geoscience Materials Collection
 - National Hydrocarbons Data Archive
 - NGDC Earth Science Academic Archive
 - NGDC Digital Data Management



NATIONAL GEOSCIENCE RECORDS CENTRE



- **Numerous datasets:**

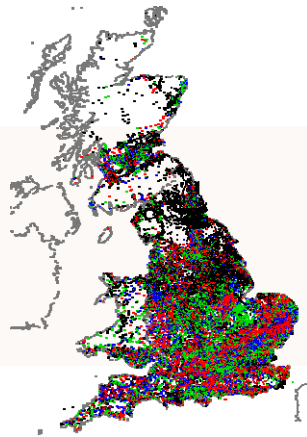
- Borehole logs
- SI Reports
- Shaft logs
- Section
- Maps
- Plans
- Mine plans
- Field slips
- Notebooks



Scanned



NATIONAL GEOSCIENCE RECORDS CENTRE



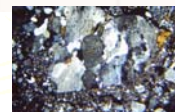
- **Borehole Records**
 - NGDC holds over 1,000,000 records of boreholes, shafts and wells
 - Digital index
 - Most have a lithological record
 - Collection dates back to 1790
 - Mine Industry Act 1926
 - Water Resources Act 1991



NATIONAL GEOSCIENCE MATERIALS COLLECTION



- Borehole core
- Rock specimens
- Thin sections
- Rocks and sediment core sample photographs
- Biostratigraphical material



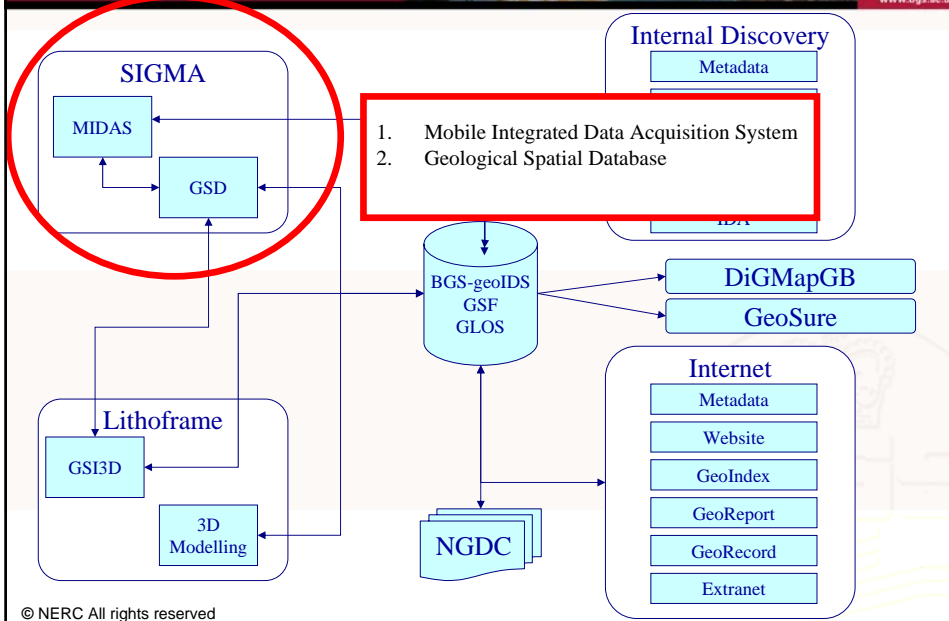


NATIONAL GEOSCIENCE MATERIALS COLLECTION



- **Borehole materials**

- 400,000m of core from over 3000 boreholes
- 1,000,000 individual specimens in trays from over 5000 boreholes
- 650,000 bottles and bags of washed cuttings from 1294 boreholes
- Digital index being populated
- Oldest borehole specimen is from 1825



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TRADITIONAL TOOLS

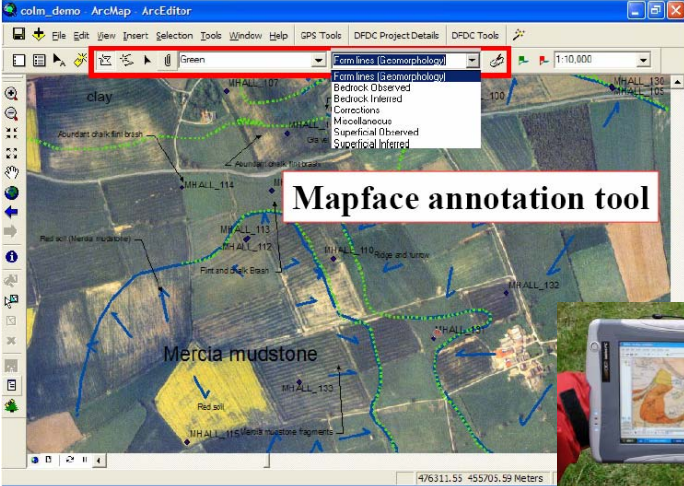
- Pens
- Coloured pencils
- Paper maps
- Graph paper
- Tracing paper
- The photocopier
- Drawing and contouring boreholes by hand



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MIDAS
Mobile Integrated Data Acquisition System



Mapface annotation tool

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MIDAS
Mobile Integrated Data Acquisition System

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GEOLOGICAL SPATIAL DATABASE (GSD)

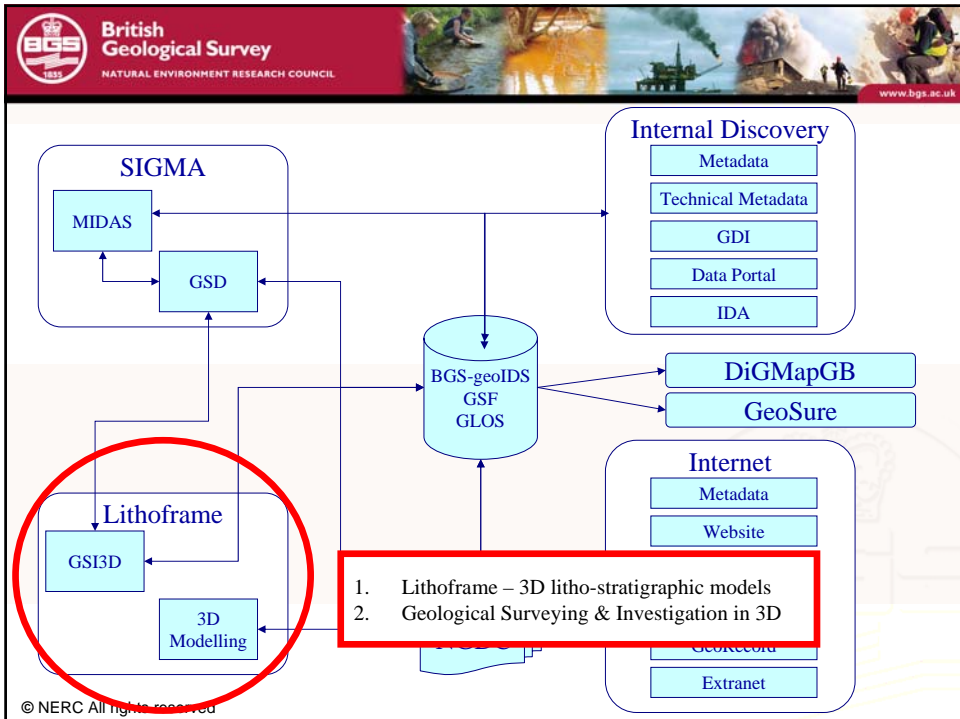
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GEOLOGICAL SPATIAL DATABASE (GSD)

Ordnance Survey licence number 100017897/2006

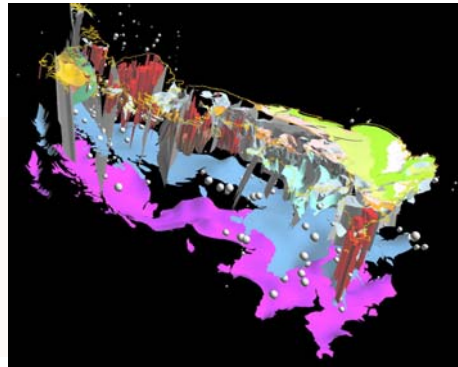
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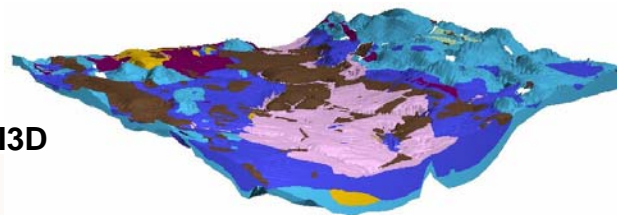
LITHOFRAME

- LithoFrame is a new strategy to produce standard systematic models of the subsurface geology for Britain
 - LithoFrame - shows the most significant stratigraphic divisions and major faults
 - LithoFrame250 - will be prepared for stratigraphic groups
 - LithoFrame50 - will be modelled at the formation level
 - LithoFrame10 - will focus on well-characterised and relatively shallow superficial deposits

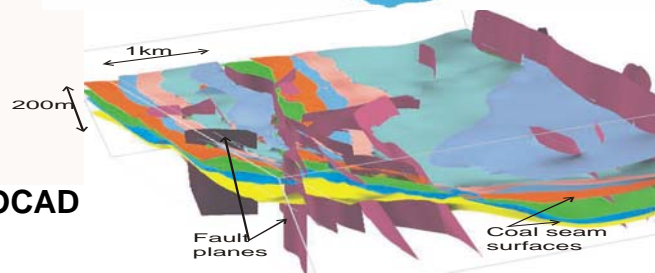


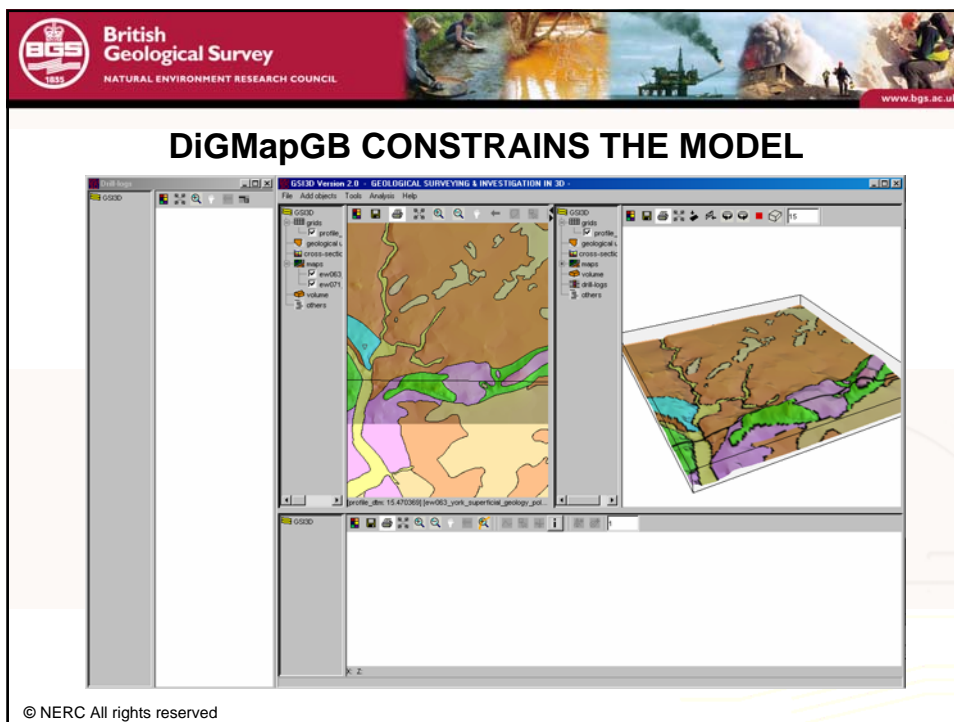
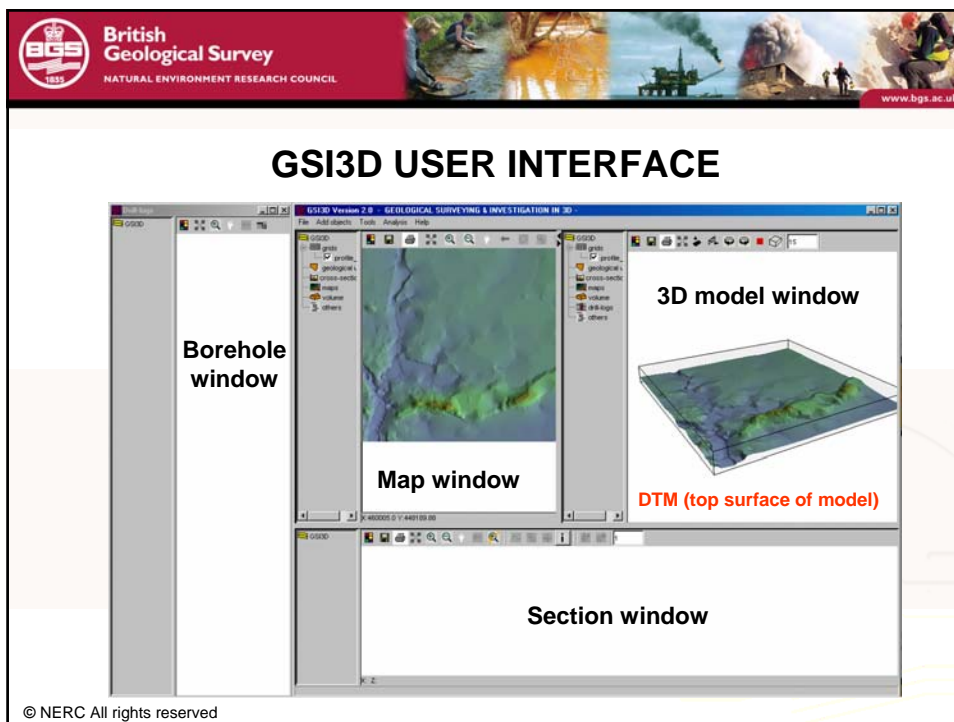
BUILDING LITHOFRAMES

Superficials - GSI3D



Bedrock - GOCAD





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DIGITAL BOREHOLES PROVIDE INSIGHT TO 3D

The screenshot displays the GSI3D software interface. On the left, a tree view lists various geological data layers. The main window shows a 2D geological map with a red rectangular box highlighting a specific region. To the right, a 3D view shows vertical black lines representing digital boreholes extending through the geological layers. The software title bar reads 'GSI3D Version 2.0 - GEOLOGICAL SURVEYING & INVESTIGATION IN 3D'.

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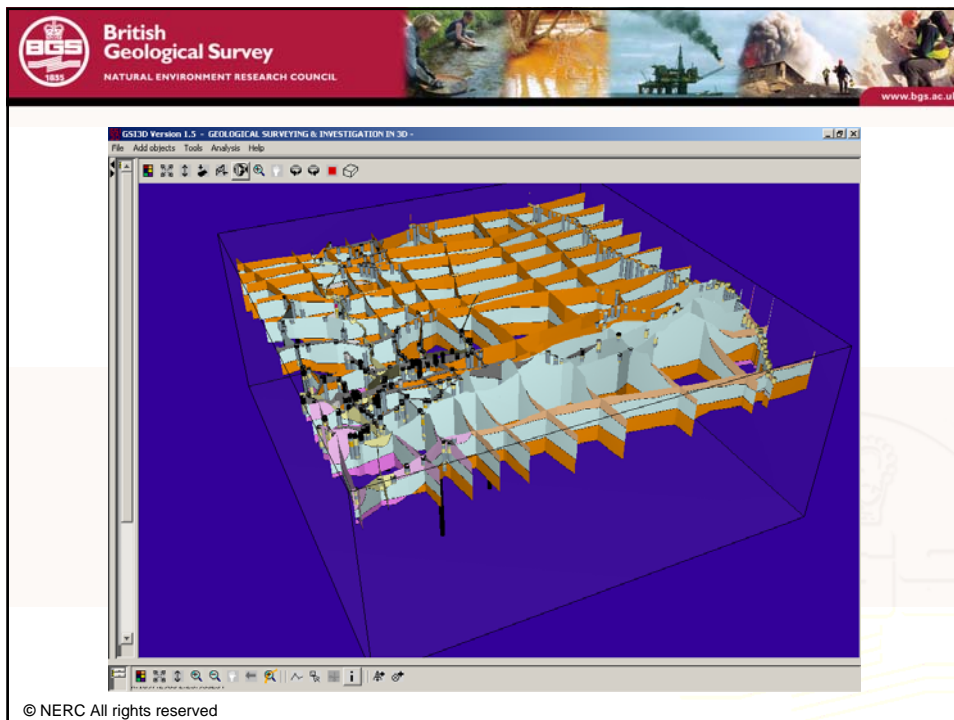
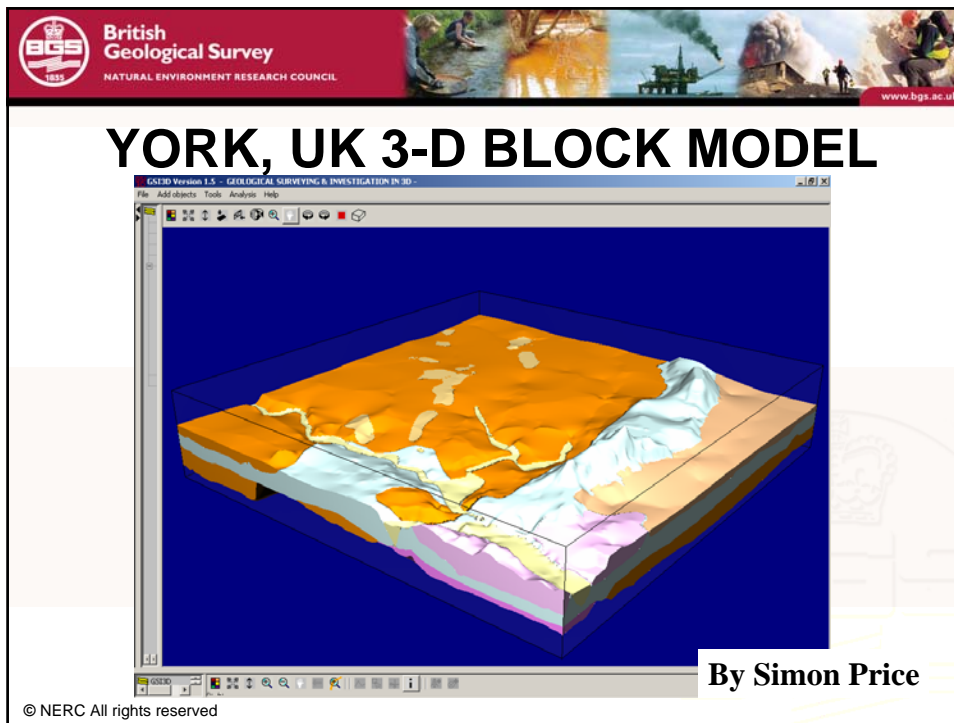
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INTERPRETATION SYNCHRONOUS WITH MODEL CONSTRUCTION

The screenshot displays the GSI3D software interface. The top left shows a 2D geological map. The top right shows a 3D wireframe model of the geological structure. The bottom section shows a cross-section view of the model, with various geological layers colored in shades of orange, yellow, and blue. The software title bar reads 'GSI3D Version 2.0 - GEOLOGICAL SURVEYING & INVESTIGATION IN 3D'.

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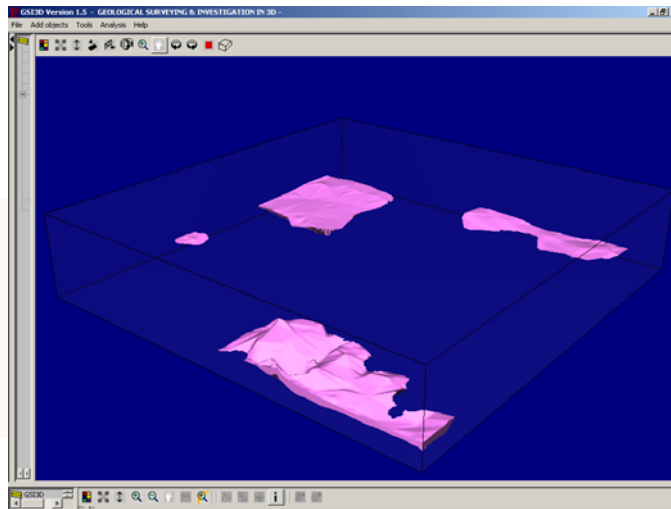
Ordnance Survey licence number 100017897/2006





Unravelling Glacial History

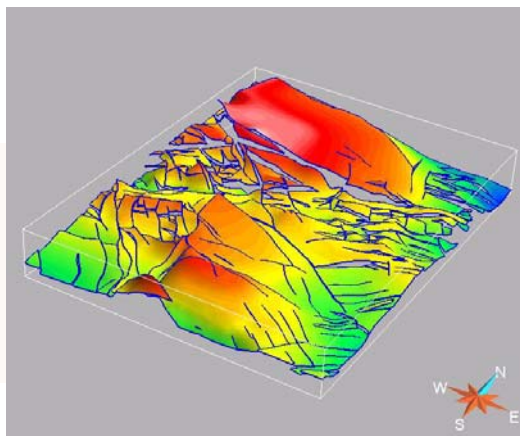
- Glacial Sand & Gravel
- Pro-glacial glaciolacustrine silt & clay
- Till & Esker
- Higher level glaciolacustrine silt & clay (14-17mOD)
- Fluvio-aeolian sand
- Modern Drainage



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BEDROCK LITHOFRAME



- GSI3d cannot model faulted/folded bedrock
- GoCAD recommended
- **The pluses**
 - good 3d visualisation
 - extensive functionality
- **The minuses**
 - Complex, needs specialist operation
 - Interpretation and model construction are separate tasks

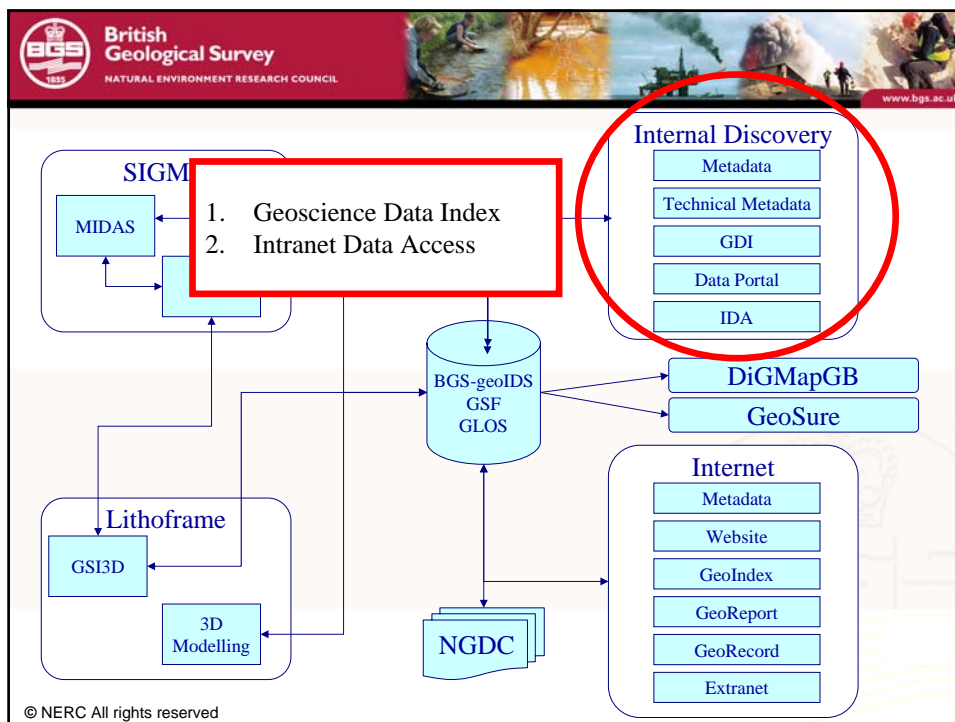
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3D VISUALISATION SUITE

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Internal Discovery

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METADATA

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METADATA

The screenshot displays the 'BGS Data Holdings Metadata Application' interface. The main content area is titled 'Model/Dataset summary' for the 'BGS Landslide Database'. It includes sections for 'Dataset Summary', 'Presentation Form', 'Abstract', 'Progress Status', and 'Supplementary Information'. The 'Abstract' section describes the database's origin and purpose, mentioning the Bradford Manifold District and the DOE. The 'Progress Status' indicates the database is 'complete'. The 'Supplementary Information' section lists the authors: 'Varnes, D.J. 1978. Slope Movement Types and Processes. In Special Report 176. Landslides: Analysis and Control (R.L. Schuster and R.J. Keefer, eds.), TRB, National Research Council, Washington, D.C., pp. 16-33'. Navigation buttons for 'Full Printable Metadata Report' and 'Start Duplicate of this Record' are visible at the bottom of the main content area.

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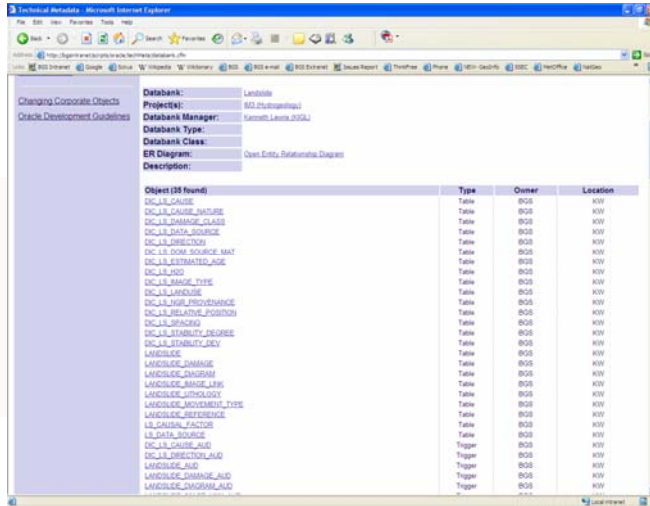
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TECHNICAL METADATA

The screenshot displays the 'BGS Technical Metadata Application' interface. The main content area contains introductory text about the database system. The text states: 'BGS has numerous parts to its Oracle® database system. These include databases, tables, views, indexes, synonyms etc. The system as a whole contains some of BGS most critical digital data. The system is complex and to help users the Technical Metadata is maintained. The system works to extend Oracle's own data dictionary, and is designed to help those with a basic understanding of Oracle® to navigate the objects that make up the BGS Data Architecture. The application front end also provides Best Practice Guidelines for Oracle Development. Procedures for changing the structure of database objects and some documentation on data models.' Navigation buttons for 'Back' and 'Top' are visible at the bottom of the main content area.

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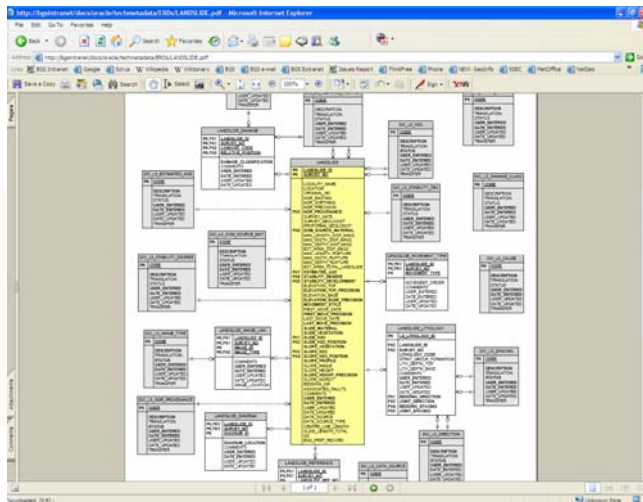
TECHNICAL METADATA



Object (35 found)	Type	Owner	Location
DC.LI_CAUSE	Table	BGS	K09
DC.LI_CAUSE_DAMAGE	Table	BGS	K09
DC.LI_DAMAGE_CLASS	Table	BGS	K09
DC.LI_DATA_SOURCE	Table	BGS	K09
DC.LI_DIRECTION	Table	BGS	K09
DC.LI_DOM_SOURCE_MAT	Table	BGS	K09
DC.LI_ESTIMATED_AGE	Table	BGS	K09
DC.LI_ID	Table	BGS	K09
DC.LI_LENGTH	Table	BGS	K09
DC.LI_LENGTH_PROBABILITY	Table	BGS	K09
DC.LI_RELATIVE_POSITION	Table	BGS	K09
DC.LI_SHAPE	Table	BGS	K09
DC.LI_STABILITY_DEGREE	Table	BGS	K09
DC.LI_STABILITY_DEV	Table	BGS	K09
LANDUSE	Table	BGS	K09
LANDUSE_DAMAGE	Table	BGS	K09
LANDUSE_DAMAGE_ID	Table	BGS	K09
LANDUSE_DAMAGE_LEN	Table	BGS	K09
LANDUSE_ITOLOGY	Table	BGS	K09
LANDUSE_MOVEMENT_TYPE	Table	BGS	K09
LANDUSE_REFERENCE	Table	BGS	K09
LI_CAUSE_FACTORS	Table	BGS	K09
LI_DATA_SOURCE	Table	BGS	K09
DC.LI_CAUSE_AID	Trigger	BGS	K09
DC.LI_DIRECTION_AID	Trigger	BGS	K09
LANDUSE_AID	Trigger	BGS	K09
LANDUSE_DAMAGE_AID	Trigger	BGS	K09
LANDUSE_DAMAGE_LEN_AID	Trigger	BGS	K09

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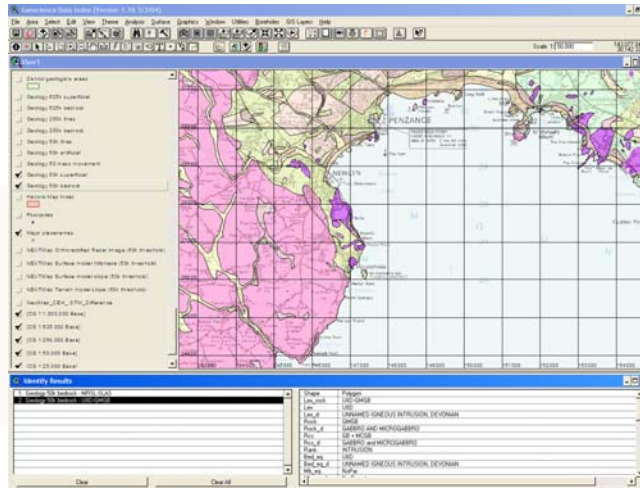
TECHNICAL METADATA




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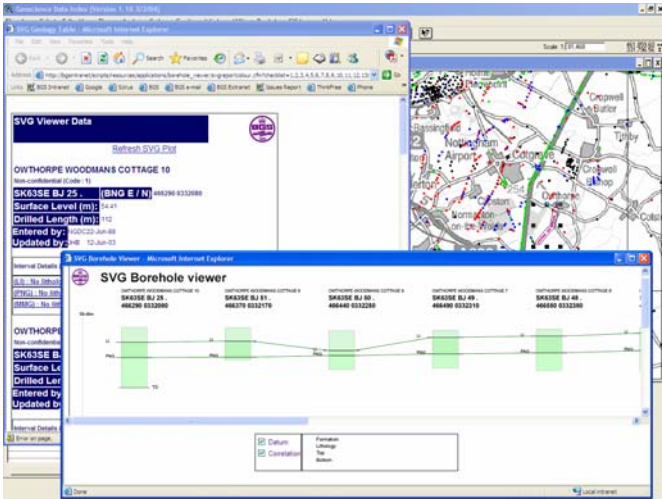
GDI





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GDI



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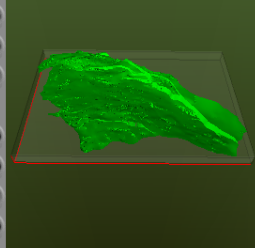
3D DATA PORTAL

- providing modellers with access to 3D data
- based on well-proven GDI technology
- extensible range of data-types
- extensible range of output formats

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GSF Surface Viewer Frameset - Microsoft Internet Explorer

Surface ID : SB-7 Description : No Description supplied Jump to Parent Models - choose from below



392507, 386146, -26.5291, SB7
 392512, 373127, 158.1640, SB7
 392517, 373134, 158.3910, SB7
 392536, 378333, -747.35, SB7
 392537, 380407, -621.3930, SB7
 392545, 386313, -16.7520, SB7
 392552, 388120, -173.7220, SB7
 392561, 375591, -223.8570, SB7
 392561, 388151, -594.40, SB7
 392567, 378568, -784.9460, SB7
 392569, 373200, 160.6850, SB7
 392576, 380823, -560.9980, SB7
 392584, 374191, 8.161790, SB7
 392591, 373229, 156.3720, SB7
 392597, 373228, 157.1010, SB7
 392598, 373228, 157.2670, SB7
 392603, 386582, -16.4502, SB7
 392610, 373227, 159.4610, SB7
 392616, 386644, -1.188412, SB7
 392619, 388290, -801.8250, SB7
 392620, 373226, 161.25, SB7
 392623, 382449, -398.1920, SB7
 391414, 395670, 93.9872, SB7
 391416, 381997, -204.6260, SB7
 391419, 388497, -198.0710, SB7
 391425, 382000, -327.84, SB7
 391426, 395615, 95.8137, SB7
 391427, 378651, -756.1180, SB7
 391430, 383426, -351.8120, SB7
 391431, 382512, -338.27, SB7
 391431, 383403, -211.9660, SB7
 391433, 382584, -190.5490, SB7
 391435, 384397, -160.5370, SB7
 391438, 382977, -336.9050, SB7
 391438, 382992, -198.9220, SB7
 391440, 388586, -237.6060, SB7
 391441, 381300, -423.7030, SB7
 391445, 395520, 95.8826, SB7
 391468, 382016, -405.7620, SB7
 391485, 384572, -154.0290, SB7
 391507, 395226, 93.3636, SB7
 391513, 384671, -316.0610, SB7
 391518, 379726, -679.0490, SB7
 391526, 385931, -168.8380, SB7


Information Downloads Linked models


Downloads

[Parent model CB1](#)

[Parent model CB2](#)

[GSF raw data](#)
(can do any ASCII formats required)

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INTRANET DATA ACCESS (IDA)

IDA Main - Microsoft Internet Explorer

[Home](#) [Search](#) [Favorites](#) [Tools](#) [Help](#)

Address bar: <http://reports.nrc.gov.uk/ida/ida.htm>

IDA Menu

- NGRC IDA menu
- Accounts
- Geoscience Imagebase (GIB)
- Accessions/Site Investigations
- Geoscience
- Borehole Geology
- Borehole Materials (BMD)
- Loans
- Plans and Aerial Photos
- Geological Maps
- Geographical Links Index
- BGS Reports
- Offshore Reports
- Offshore Data Retrieval Interface
- NGRC Loans and Archives
- Coal and Waste Tips
- Coal Authority Data
- Land Surveys, Field Records
- Minerals
- Palaeontology Data
- Borehole Databases
- Geofiler
- GIS Databases
- QA Utilities
- Geographic Searches
- Geoscience Home
- BGS Data Archive

Intranet Data Access Application (Version 1.03)

The IDA (Intranet Data Access) system provides routine searching (browse) and data management functionality for a wide range of BGS data.

The BGS Reports search facility now retrieves reports held in the Library OLIS database as well as those held in the Technical Reports database. Thus this screen can be used to search for technical reports held on OLIS.

Quick Links to frequently used/new modules (also available from the left hand menu):

- Borehole Materials Database (BMD) Interface
- BGS Dictionaries - improved browse/update interface
- BGS Dictionaries - new tool for creating dictionaries to BGS standards
- Offshore Data Retrieval Interface
- Access the Palaeosaurus IDA Interface
- SObI
- Wellmaster - Browse Facility
- Britrocks Database
- NGRC Loans

Feedback on the system is welcomed. Please report any problems you experience with the system via the [Software Support Request Form](#). This will enable the development team to address these as quickly as possible.

To use the system first select the type(s) of data you want to work with from the scrollable list on the left hand side.

Each data set is accessed via a search (query) input form. The search form allows the use of [Quick and Dirty Searches](#). Data may be searched and retrieved to screen without logging in to Oracle. If you wish to insert or amend data (and have the appropriate Oracle privileges) then you will be prompted to enter your Oracle id and password on clicking on "Insert" or "Edit" etc.

Search Tips

This page is for BGS internal use only.
 Resources: [Data/IDA/Welcome.htm](#)
 Modified: 24/12/2008 10:57:02

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INTRANET DATA ACCESS (IDA)

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INTRANET DATA ACCESS (IDA)

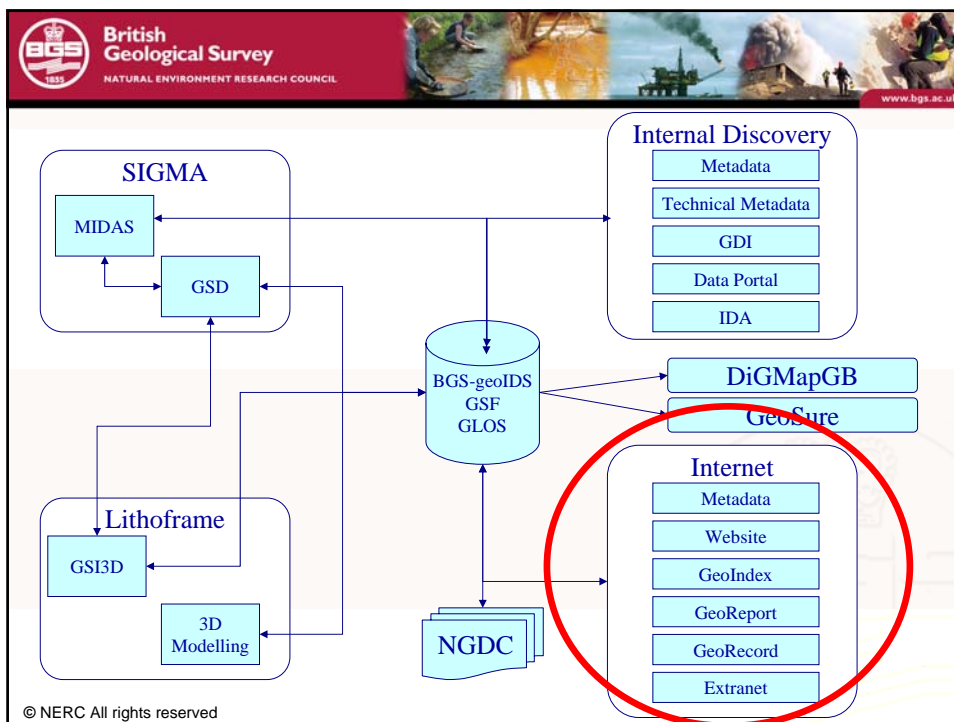
Job No.	Photo No.	Job Description
SI 10 no. P006494	SI 10 no. 1	Old photograph number: A1126 DNR, Loving & St. Govan's Head, Southampton, Looe, NE
SI 10 no. P006495	SI 10 no. 1	Old photograph number: A1127 Coast between Slings Beach and Saffin Head, S. of Waver, Looe, NE
SI 10 no. P006496	SI 10 no. 1	Old photograph number: A1183 The Green Bridge of Waver, Looe, NE
SI 10 no. P006497	SI 10 no. 1	Old photograph number: A1183 St. Govan's Head
SI 10 no. P006498	SI 10 no. 1	Old photograph number: A1188

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INTERNET

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PUBLIC METADATA

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PUBLIC METADATA

Discovery Metadata Dataset: LANDSLIDE(G) - Microsoft Internet Explorer

Address: [http://www.bgs.ac.uk/scripts/metadata/igtrmeta.ch?file=LANDSLIDE\(G\).htm](http://www.bgs.ac.uk/scripts/metadata/igtrmeta.ch?file=LANDSLIDE(G).htm)

**Discovery Metadata Dataset
BGS Landslide Database.**

Dataset description
The current database was developed from one originally established for recording landslide information during the applied geological mapping survey of the Bradford Metropolitan District, funded by the DOE and undertaken by BGS between 1993 and 1996. The database has been expanded to record additional landslide information acquired as part of its onshore core and commissioned mapping programmes. The dataset is currently updated on an irregular basis as new landslide information is received from field surveys. Landslide details observed and measured in the field are recorded on a standard proforma to ensure consistency of information and to allow easy entry into the database. The database currently holds details of over 400 landslides located, primarily in the area covered by three 1:50 000-scale geological sheets, Bradford (69), Huddersfield (77) and Clitheroe (66). Less extensive landslide information is also available for the Rochdale sheet (76). The database is eventually intended to hold information on landslides throughout Great Britain; information held on the database includes details of landslide location, slope type, angle, aspect, vegetation, groundwater, geology, landslide type, dimensions, state of activity, and evidence of associated damage.

Location
British National Grid
W 0: 1300000 N
S 0: 700000 E

Constraints
Copyright control.

For more information please contact:
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British Geological Survey
Keyworth
Nottingham
NG12 5GG
Tel: +44 (0)115 9363100
Fax: +44 (0)115 9363100
Email: enquiries@bgs.ac.uk

Storage format(s) Updated: 26 MAR 2003

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PUBLIC METADATA

NERC DATAGRID

Try the NDG Discovery Service

Version 0.2 released 25th May 2005

NERC Datagrid Version 0.2 release of [Data, Status, Guide and Documentation](#). Contains new Data Provider Guide and more.

gigateway

Overview
Data discovery and delivery are enhanced by a processing chain that starts with production of information that is direct

What is Metadata?
Metadata is the technical word for 'data about data'. It is the term used to describe the summary information or characteristics of a set of data. In the area of geospatial information, or information with a geographic component, this normally means the What, Who, Where, When and How of the data. The only major difference between geographic metadata and the many other metadata sets being created for libraries, academia, professions, etc, is the emphasis on the spatial component - the 'where' element. Just as a consumer looks at the label on a food product to determine the ingredients, nutritional value and manufacturer, so to can a user of geospatial data review a metadata record to determine whether the dataset is fit for their purpose.

With the advent of GIS and the expanding use of digital data, the benefits and requirements for geospatial metadata are now well known. Consequently, there are recognised approaches to metadata documentation. The IGGI Guide: [Principles of Good Metadata Management](#) provides an excellent introduction to this subject.

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GEOINDEX

Borehole Records

Index No	REFERENCE	NAME	GRID REF.	EASTING	NORTHING	PROVISION LENGTH	YEAR	KNOWN INTERPOINT	HEI/LAT	SI
1	TQ17M889	BUCKINGHAM PALACE AIR RAID SHELTER SH1	TQ 170889 78710	170889	78710	1.18	1978	19.78	51.51	198871
2	TQ17M870	BUCKINGHAM PALACE AIR RAID SHELTER SH2	TQ 170889 78710	170889	78710	1.18	1978	19.78	51.51	198872
3	TQ17M871	BUCKINGHAM PALACE AIR RAID SHELTER SH3	TQ 170889 78710	170889	78710	1.18	1978	19.78	51.51	198873
4	TQ17M871	BUCKINGHAM PALACE AIR RAID SHELTER SH4	TQ 170889 78710	170889	78710	1.18	1978	19.78	51.51	198874

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GEOINDEX

Bedrock 1:625000

Index No	GEOLOGY	VERSION	RELEASED	BATHYMETRY	SYSTEM	SCALE	TYPE	REG	CURTAIN	WALK
1	Basal granite, gneiss and schist	1.10	28.04.2003		Geospatial	Geospatial	250	0	200	
2	Basal and tuff	1.10	28.04.2003		Geospatial	Geospatial	250	200	250	
3	Basal granite, gneiss and schist	1.10	28.04.2003		Geospatial	Geospatial	250	0	200	
4	Basal granite, tuff, schist and schist	1.10	28.04.2003		Geospatial	Geospatial	250	117	31	
5	Basal and tuff	1.10	28.04.2003		Geospatial	Geospatial	250	200	250	
6	Lower Old Red Sandstone and Upper Devonian	1.10	28.04.2003	PhA4E2234	Devonian	Secondary Rocks	250	250	250	
7	Lower Devonian and Old Red Sandstone and Middle Devonian	1.10	28.04.2003	PhA4E2234	Devonian	Secondary Rocks	250	250	250	
8	Granite, schist, gneiss and schist	1.10	28.04.2003		Geospatial	Geospatial	250	0	0	
9	Lower Old Red Sandstone and Upper Devonian	1.10	28.04.2003	PhA4E2234	Devonian	Secondary Rocks	250	250	250	
10	Lower Devonian	1.10	28.04.2003	PhA4E2234	Devonian	Secondary Rocks	250	250	250	

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GeoReport

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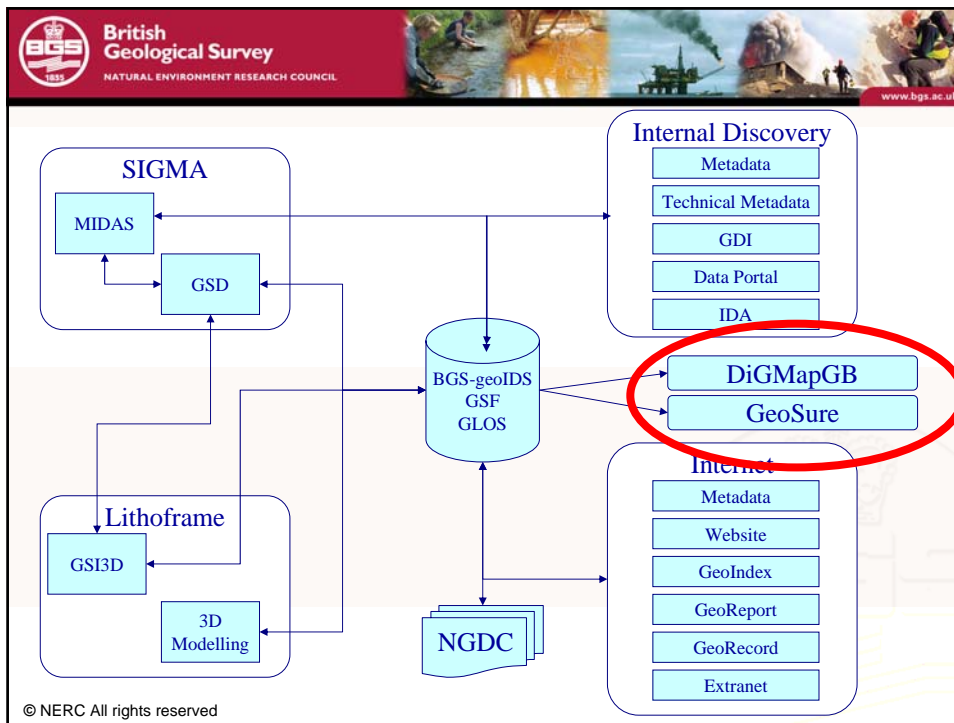
The screenshot shows the BGS GeoReports website interface. On the left, there is a navigation menu with sections like 'Order progress', 'Example Reports', and 'Links'. The main content area displays 'BGS GeoReports — introduction' with a list of benefits and a 'Click here to start by choosing your report location' button. On the right, there is a preview of a 'Radon (RPM) Report - Detailed' with sections for 'Section 2. Requirement for radon protective measures' and 'Section 3. Geological units within the search area'. The report includes a list of geological units: '1. DOUGLE CLAY AND MIDDLE DEVONIAN TO TRIASSIC SANDS (early pebbly clay)' and '2. MIDDLE DEVONIAN TO EARLY TRIASSIC SANDS (well-sorted)'. A 'SAMPLE' watermark is visible over the report preview.

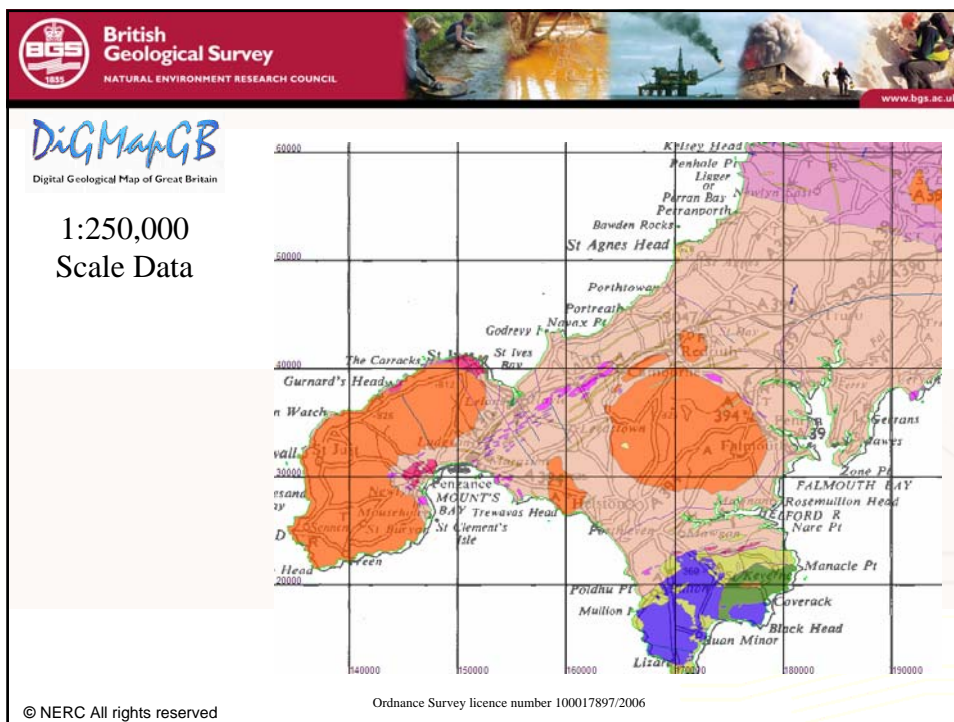
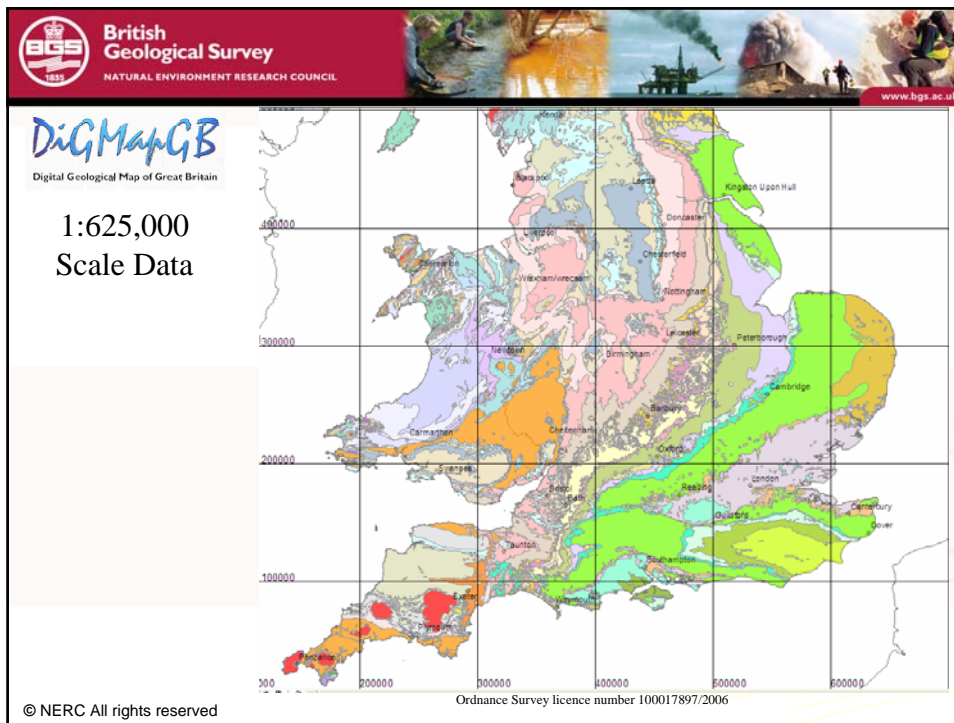
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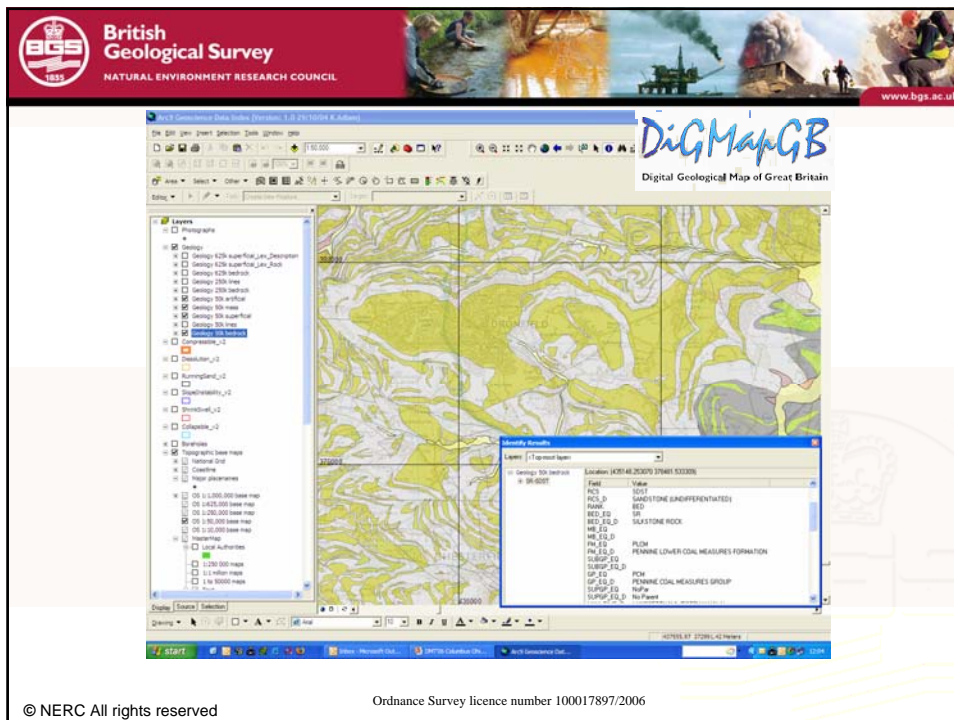
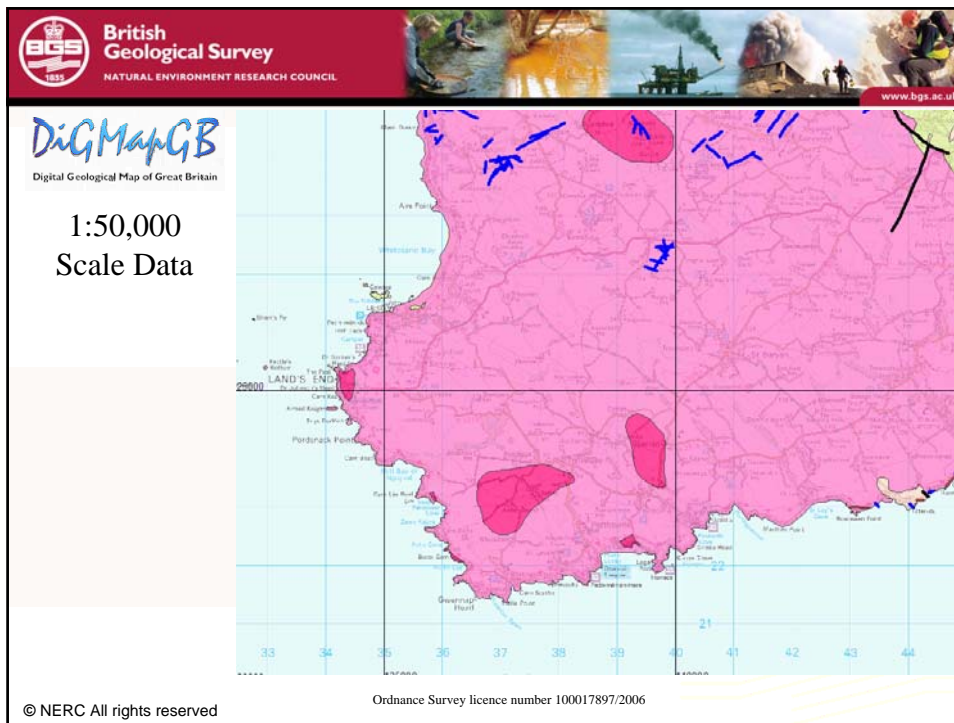
GeoRecord

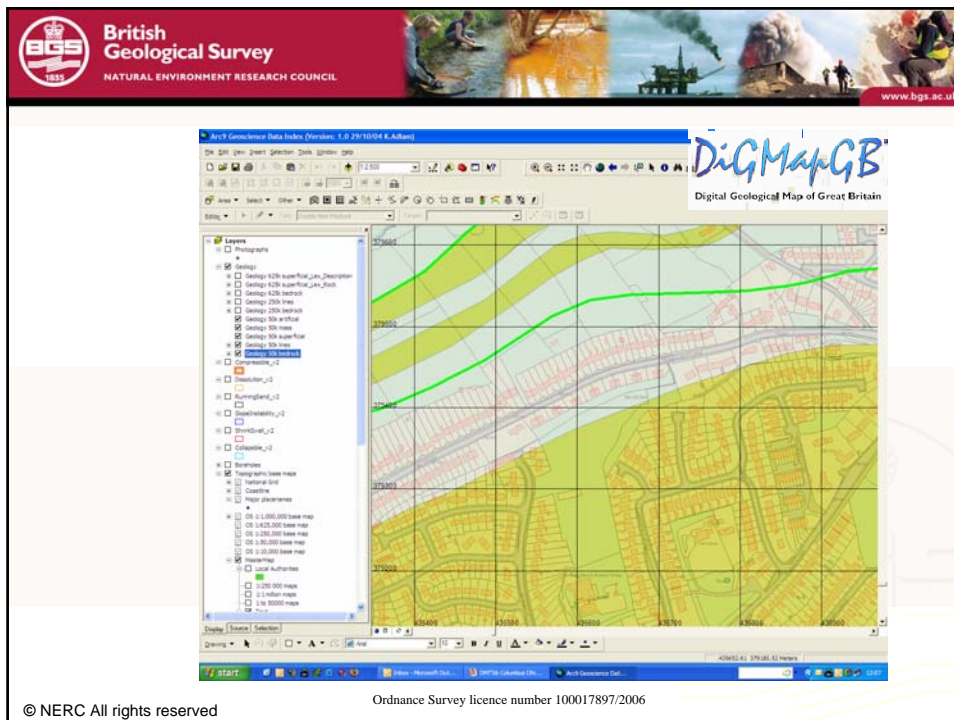
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The screenshot shows the BGS GeoRecord website's 'borehole ordering facility'. The left sidebar contains navigation links such as 'About BGS', 'What's New', 'Products & Shopping', and 'Publications catalogue'. The main content area explains the borehole ordering facility, stating that users can view the locations of nearly 1,000,000 boreholes and request copies of records. It also provides contact information for the Central Enquiry Desk. On the right, there is a detailed image of a borehole record form. The form includes a header with 'SPB' and 'Exploration Boring CS', a grid for recording data, and a section for 'Borehole Record' with fields for 'Borehole No.', 'Project', and 'Exploration Objectives'. A large 'SAMPLE' watermark is overlaid on the right side of the page.









GeoSure objectives

- National geospatial data sets that identify potential geo-hazards to the human environment
- Natural Ground Stability Hazards
 - Swell-shrink
 - Dissolution
 - Running sands
 - Compressible
 - Collapsible
 - Slope instability
 - Potential radon hazard
 - Models of thickness of superficial deposits



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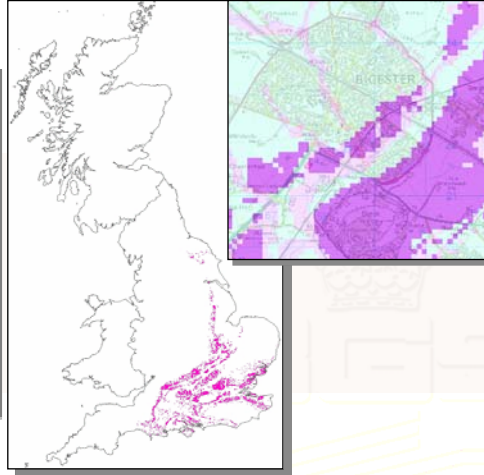
www.bgs.ac.uk

Natural ground stability hazards

Swell-shrink deposits



Heave damage, London



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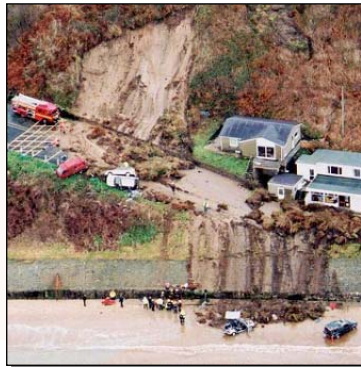
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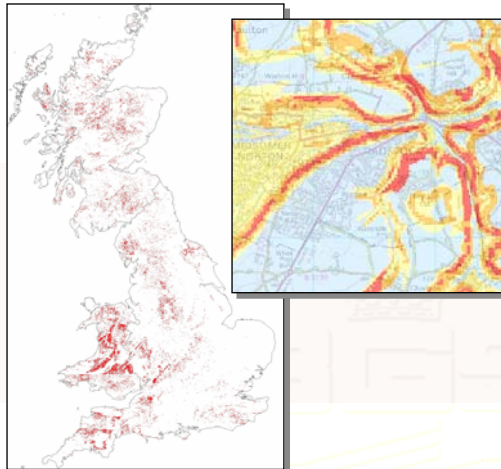
www.bgs.ac.uk

Natural ground stability hazards

Slope instability



Landslide, Nefyn, S. Wales



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Natural ground stability hazards

Dissolution features

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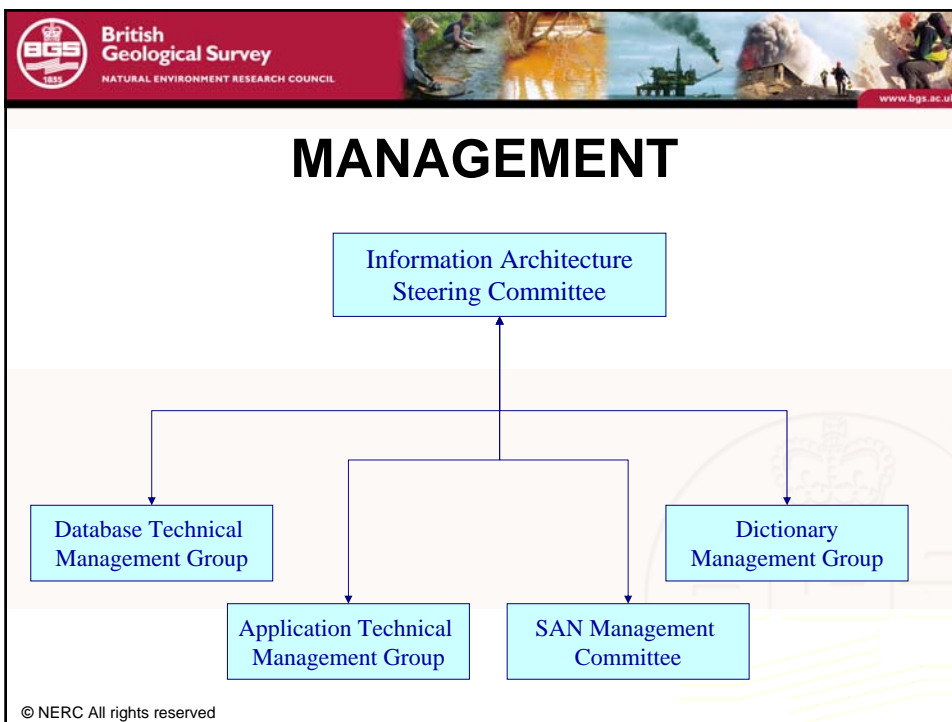
Modelled thickness of superficial deposits

Thickness

Rockhead





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KEY ROLES

- Data Architect 
- Application Architect 
- Records Manager (Vacant)
- Archives Manager (Vacant)
- Collections Manager 
- Information Manager 

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QUESTIONS



- Web addresses
 - <http://www.bgs.ac.uk>
 - <http://www.bgs.ac.uk/geoindex>
 - <http://www.thebgs.co.uk/shop/home.cfm>
 - <http://www.bgs.ac.uk/discoverymetadata/home.html>
- E-mail address
 - Enquires@bgs.ac.uk