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PHASE 1: DESK TOP STUDY REPORT

**MR SIMON FRITH
PROPOSED RESIDENTIAL DEVELOPMENT
KNABBS HILL FARM
CLAYTON LANE
THURNSCOE
ROTHERHAM
S63 0BG**

Project No: 08-034

**Prepared By:
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Date: 14/02/08

**Approved By:
John Ditchburn**

Date: 14/02/08

The information and/or advice contained in this Phase 1: Desk Top Study Report is based solely on, and is limited to, the boundaries of the site, the immediate area around the site, and the historical use(s) unless otherwise stated. This 'Report' has been prepared in order to collate information relating to the physical, environmental and industrial setting of the site, and to highlight, where possible, the likely problems that might be encountered when considering the future development of this site for the proposed end use. All comments, opinions, diagrams, cross sections and/or sketches contained within the report, and/or any configuration of the findings is conjectural and given for guidance only and confirmation of the anticipated ground conditions should be considered before development proceeds. Agreement for the use or copying of this report by any Third Party must be obtained in writing from Arc Environmental Limited (ARC). If a change in the proposed land use is envisaged, then a reassessment of the site should be carried out.

**Report Type:- Phase 1: Desk Top Study Report.
Project:- 08-034 – Knabbs Hill Farm, Thurnscoe.
Prepared For:- Mr. Simon Frith.**

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1.0 Introduction

February 2008

Instruction to carryout this Phase 1: Desk Top Study Report was received from Cooper Lawrence Ltd on behalf of Mr. Simon Frith.

1.1 Project Details: -

Table 1.1

Site Name:	Knabbs Hill Farm.
Site Address:	Knabbs Hill Farm, Clayton Lane, Thurnscoe, Rotherham, S63 0BG.
Client:	Mr. Simon Frith.
Location Plan:	See Appendix I.
Layout plan (Existing):	See Appendix I.
Layout plan (Proposed):	See Appendix I.
Project Type:	Proposed Residential Development.

2.0 Physical Setting

2.1 Site Details/Description: -

Table 2.1 N = North, S = South, etc.

Site Name:	Knabbs Hill Farm.
Site Address:	Knabbs Hill Farm, Clayton Lane, Thurnscoe, Rotherham, S63 0BG.
OS Grid Reference:	444660, 406550 (representative for the central part of the site).
Description of Location:	The site is currently occupied by a factory unit (Stonemasons), located in a rural setting to the NW of Thurnscoe, which is midway between Barnsley and Doncaster.
Site Boundaries:	N= Agricultural Land E= Agricultural Land S = Agricultural Land, a school recorded c.100m SE of the site, W = Agricultural Land.
Site Setting:	Predominantly rural setting, on the outskirts of Thurnscoe, a residential village.
Adjacent Site Uses:	Adjacent site uses are recorded as undeveloped agricultural fields with some development in the area including a farm to the NE and a school the NW.
Site Shape:	Generally square shaped comprising 1.68 hectares.
General Topography:	OS plans indicate that there is a fall in the general topography from north to south
Approximate Ground Levels:	OS plans indicate a spot height of 60.4m AOD, recorded on the NE corner of the site.
Site Surface(s):	According to the aerial photograph the site surface is hardstanding along the access roads with a grassed area along the eastern edge of the site.
Above Ground Structures:	The majority of the site is occupied by three large warehouses, at least two other smaller structures are recorded on the eastern half of the site.
Vegetation:	Areas of grass recorded on the eastern edge of the site and around the periphery with some trees or bushes adjacent to the car park.
Sub-surface Structures:	Some services are anticipated to be present, associated with current site uses i.e. electricity, drainage, etc.
Other Relevant Features:	Two small ponds are recorded on the NE portion of the site.

3.0 Environmental Setting

3.1 Site Geology: -

Table 3.1

MADE GROUND / FILL		Comments
Type:		None recorded on BGS plans; however, site levels may have been raised to accommodate development, particularly across the south of the site where OS plans indicate a fall in the topography.
Thickness:		Anticipated to be variable with areas potentially greater than 2m
Remarks:		Anticipated to comprise disturbed natural strata.
DRIFT		Comments
Type:		British Geological Survey (BGS) plans indicate area is 'free from drift'
Thickness:		Anticipated to be c. <2m.
Remarks:		Some residual soils may be present anticipated to comprise firm to stiff clay with bands of sand and gravel i.e. completely weathered mudstone and sandstone.
SOLID		Comments
Type:		Upper Carboniferous Middle Coal Measures (MCM).
Thickness:		c.>500m
Remarks:		MCM - Cyclical alternations of Sandstone, Ironstone, Mudrocks (siltstone, mudstone & shale), productive Coal Seams and Seat Earths/Fire Clays put down during the Carboniferous period.
Structural Faults or Abnormal Features:		There is a fault recorded close to the northern site boundary, although this is not considered to represent a risk to the site or proposed development.

3.2 Mining Assessment: -

Table 3.2

COAL MINING ACTIVITIES	Yes/No	Comments
Is the site in an area of known shallow coal mining?	Yes.	The site is underlain by Upper Carboniferous Middle Coal Measures (MCM) known to contain productive coal seams.
Are there any potential shallow coal seams present below the site which may represent a risk?	No.	From BGS geological plans, there are no coal seams shown to sub-crop within the vicinity of the site. According to the generalised vertical section (GVA), on the BGS plans. There is no evidence of any historic coal mining activity recorded on historic OS plans, within the vicinity of the site. Two unnamed inpersistent coal seams may be present at a depth of >50m bcgls. For completeness a site specific coal search report was procured for this report along with several BGS borehole logs. Report 221967 and BGS logs; SE40NW10, SE40NW94, SE40NW122N are attached in Appendix III. This information confirms that there are no recorded coal workings at shallow depth below the site, and no unnamed seams that may have been historically worked.
Are there any known shafts, adits, tips, lagoons, or open cast workings likely to affect the site?	No.	~
Is further exploratory work required for shallow coal mining activities/shafts/adits?	No.	No further exploratory work anticipated to be required for this site.

3.0 Environmental Setting (Cont'd)

3.2 Mining Assessment (Cont'd): -

Table 3.3

MINERAL RESOURCES: DRIFT	Yes/No	Comments
Type:	~	BGS plans indicate area is 'free from drift'.
Are there any records or evidence of extraction on or within close proximity to this site?	No.	None recorded within the proximity of the site.
Remarks:	~	No future quarrying or mining likely below this site.
Action Required:	No.	~
MINERAL RESOURCES: SOLID	Yes/No	Comments
Type:	~	Sandstone/mudrocks.
Are there any records or evidence of extraction on or within close proximity to this site?	No.	None recorded within close proximity of the site. Nearest recorded quarry (sandstone) located c.800m to the east, quarry last recorded c.1854.
Remarks:	~	No future quarrying or mining likely below this site.
Action Required:	No.	~

3.3 Site Hydrogeology: -

Table 3.4

STRATA	Aquifer / Soil Leachability EA Classification	Comments
Made Ground:	Soils of Low Leaching Potential.	Soil in which pollutants are unlikely to penetrate the soil layer because water movement is largely horizontal or they have large ability to attenuate diffuse pollutants. Lateral flow from these soils contribute to groundwater recharge elsewhere in the catchment.
Drift Geology: (None recorded)	Not Classified.	'Area free from drift'. Residual soils likely to be variable permeability; Low & Moderate
Solid Geology:	Minor Aquifer.	Variably permeable – These can be fractured or potentially fractured rocks, which do not have a high primary permeability. Although not producing large quantities of water for abstraction, they are important for local supplies and in supplying base flow to rivers.
GROUNDWATER	Presence/Location	Comments
Depth(s):	No available records.	Likely to be at depth within solid geology.
Direction of Flow:	No available records.	~
Licensed Water Abstractions:	None recorded within c.1km.	~
Source Protection Zones:	None recorded within c.1km.	~
Groundwater Monitoring:	None recorded.	~

3.0 Environmental Setting (Cont'd)

3.4 Site Hydrology: -

Table 3.4

SURFACE WATER FEATURE	Location	Comments
GQA Classified River	None recorded within c.250m.	~
Unclassified Watercourse(s)	Recorded on site	Representative of the ponds.
Canals	None recorded within c.250m.	~
Ponds, Lakes, etc.	One recorded within c.250m.	2 no. ponds recorded on site, anticipated to be man made, have a 'yellow' appearance on the aerial photograph indicating they are possible used as part of the stone cutting process.
Flooding	The site lies out with of any areas prone to flooding. Therefore this site is not felt to be at risk from future flooding.	However, given that the site is greater than 0.5Ha it is likely that a Flood Risk Assessment (FRA) will need to be carried out.
Surface Runoff:	Surface runoff likely to be in a southerly direction with topography.	Possibly partial control through any existing surface/field drainage.
RAINFALL	Measurements (mm)	Comments
Annual	824.7	Based on station average measurements from Sheffield, during c.1971 to c.2000.
Precipitation, January	86.5	
Precipitation, July	51.0	

3.5 Site Ecology: -

Table 3.5

FEATURES	Location	Comments
SSSI	None recorded within c.1km.	~
AONB	None recorded within c.1km.	~
Special Areas of Conservation	None recorded within c.1km.	~
Other	Two recorded on site.	Area of Adopted Green Belt. Nitrate Vulnerable Zone.

3.6 Radon Assessment: -

According to the Health Protection Agency, the site lies in an area where less than 1% of homes exceed the Radon Action Level in accordance with the National Radiological Protection Board (NRPB / BR211 Annex A). The site lies in an area where protection measures may be required and a geological assessment should be carried out in accordance with (NRPB / BR211 Annex B) BRE Digest BR211 Radon – Guidance on Protective Measures for New Dwellings.

As part of the Envirocheck report for this site, an assessment is made by the British Geological Survey with regards the requirement for Radon protective measures for this site, the results of which highlight that no Radon protective measures are necessary in the construction of new dwellings and extensions.

Table 3.6

N = 5 km grid is clear.

SOURCE	Assessment	Comments
BR 211: Annex A	N	~
BR 211: Annex B	LS	Basic radon protection measures may be required and a BGS geological assessment should be carried out.
BGS Site Specific Data	No Radon Protective measures are required for this development area.	

4.0 Industrial Setting

4.1 Recent Site History: -

Copies of Ordnance Survey plans covering this site and adjacent areas are included in Appendix II, and a summary of the site history based on these plans are given in Table 4.1 below.

Table 4.1

Significant / Potentially Contaminative uses highlighted in **bold text**.

Date	Site	Adjacent Areas
c.1854	Site is recorded as undeveloped agricultural land.	Surrounding area recorded as undeveloped agricultural land, Clayton Lane runs along the eastern boundary of the site. Thurnscoe recorded c.800m S of the site, and unnamed sandstone quarry recorded c.800m E of the site.
c.1892	The site remains unchanged.	The site remains unchanged.
c.1906	The site remains unchanged.	The immediate surrounding area generally remains unchanged.
c.1907	The site remains unchanged.	Generally as c.1906, with no development within c.800m of the site. Railway lines recorded from c.900m S of the site.
c.1930	Knabshill Farm is recorded on the centre of the site, comprising 6 no. buildings anticipated to be farm house and barns etc.	A raised Reservoir recorded c.50 NE of the site, no other development recorded in the vicinity of the site.
c.1938/48	As c.1930.	The immediate surrounding area within c.500m generally remains unchanged. Significant new residential developments recorded around Thurnscoe c.500m S and SE of the site. Sewage Works recorded c.600 SW of the site.
c.1955/56	The site generally remains unchanged.	The immediate surrounding area, within c.500m, remains unchanged.
c.1962	In excess of 10 no. buildings are recorded on the site, all anticipated to be associated with Knabshill Farm .	The immediate surrounding area remains unchanged.
c.1966/67	As c.1962.	The immediate surrounding area remains undeveloped. Further residential development recorded around Thurnscoe to the SE of the site, with some residential development recorded within c.300m of the site.
c.1983	As c.1966/67	School recorded c. 100m SE of the site. Further residential development recorded at Thurnscoe to the SE and Great Houghton from c.800 W of the site.
c.1988	Knabbs Hill Farm no longer recorded, site now recorded as Warehouses .	Generally as c.1983.
c.1989/91	As c.1988.	Generally as c.1988.
c.1993	As c.1989/91	Generally as c.1989/91
c.2000	As c.1993	Generally as c.1993
c.2007	2 no. ponds recorded on site along with warehouses .	Generally as c.2000
c.2008	The site is currently occupied by Stonemasons UK Ltd who supplies limestones, Sandstones and granites.	

4.2 Landfill and Waste Regulation: -

Table 4.2

FEATURES	Location	Comments
Landfill Site	None recorded within c.250m.	~
Registered Landfill Site	None recorded within c.250m.	~
Historical Evidence of tipping / waste disposal	None recorded within c.250m.	~
Registered Waste Treatment / Disposal Site	None recorded within c.250m.	~
Registered Waste Transfer Site	None recorded within c.250m.	~
Licensed Waste Management Facilities (Locations)	None recorded within c.250m.	~
IPC Registered Waste Site	None recorded within c.250m.	~

4.0 Industrial Setting (Cont'd)

4.3 Pollution Incidents and Discharge Consents: -

Table 4.3

TYPE	Location	Comments
Discharge Consents	None recorded within c.250m.	~
Prosecutions Relating to Controlled Waters	None recorded within c.250m.	~
Pollution Incidents to Controlled Waters	None recorded within c.250m.	~
Substantiated Pollution Incident Register	None recorded within c.250m.	~
IPC / Air Pollution Controls	None recorded within c.250m.	~
Local Authority Pollution Prevention Control (LAPPC)	None recorded within c.250m.	~
Integrated Pollution Prevention and Control (IPPC)	None recorded within c.250m.	~

4.4 Statutory Requirements / Authorisations: -

Table 4.4

TYPE	Location	Comments
Registered Radioactive Substances	None recorded within c.250m.	~
Prosecutions Relating to Authorised Processes	None recorded within c.250m.	~
Enforcement and Prohibition Notices	None recorded within c.250m.	~
Planning Hazardous Substances Consents / Enforcements	None recorded within c.250m.	~
COMAH Sites	None recorded within c.250m.	~
NIHHS Site	None recorded within c.250m.	~
Contemporary Trade Entries	None recorded within c.250m.	~
Fuel Station Entries	None recorded within c.250m.	~

5.0 Conceptual Site Model

5.1 Ground Profile: -

The anticipated existing ground profile for this site has been summarised in Table 5.1 below.

Table 5.1

Strata Type	Anticipated Thickness	Anticipated Depth to Base of Strata	Groundwater	Comments
Made Ground:	Localised areas potentially c.>2m, as site levels may have been raised to accommodate development.	Potentially greater than 2m.	None anticipated - some trapped surface drainage may be present.	Soils of Low Leaching Potential.
Drift: (Residual soil)	Area recorded as free from drift. Residual soils may be present anticipated to be c.<2m	Anticipated to be >c.4m bgl.	Groundwater not anticipated.	N/A. Variable; low & moderate.
Solid Geology: (Middle Coal Measures)	Anticipated to be c.>500m thick.	Anticipated to be c.>500m bgl.	Anticipated to be at depth within the solid geology.	Minor Aquifer.

5.0 Conceptual Site Model (Cont'd)

5.2 Geotechnical Considerations: -

A summary of the potential foundation options for the proposed development can be seen in Table 5.2.1 below.

Table 5.2.1

Foundation Type	Anticipated Depth / Bearing Strata	Max. Allowable Bearing Pressure #	Comments
Strip & Pad*	Generally anticipated up to c.3m bcgl, (min 0.75m bfgl). May incorporate mass trench fill or the like.	Anticipated to be c.80kN/m ² – c.300kN/m ²	Deeper excavations may be required if non-competent ground conditions are encountered (i.e. deeper areas of made ground) below the footprint of the proposed development.
Rafted / Semi-Rafted*	Generally 0.60m bcgl based in made ground or within natural strata.	c.40kN/m ² - c.80kN/m ²	Generally not anticipated for this site.
Ground Improvement*	Determine from Ground Investigation.	Determine from Ground Investigation.	Generally not anticipated for this site.
Piled Foundations*	c.>10m.	Anticipated to be c.> 300kN/m ²	Generally not anticipated for this site.

bfgl = Below finished ground level, bcgl = Below current ground level, # - Maximum allowable bearing pressures should always be accurately determined from intrusive ground investigation works, * Special consideration should be made where foundations straddle the areas of the ponds as an increase in foundation depth will be required in these areas.

A summary of the main potential geotechnical issues and hazards identified for this site can be found in Table 5.2.2 below, and should be considered if future redevelopment is to take place.

Table 5.2.2

Issue/Hazard	Present on Site? Yes / No	Impact on Development
Variable Made Ground	Yes.	Variable made ground may be present below the site area.
Relic sub-surface structures/features	Yes.	Relic foundations (buried structures) are likely to be encountered on site, associated with historic farm buildings and warehouse structures. The pond features will need to be drained and adequately backfilled to avoid the creation of soft spots.
Stability of excavations	Yes.	Made ground and 'non-competent' deposits may be unstable and require adequate lateral support.
Shallow Groundwater	No.	Shallow groundwater is not anticipated.
Trapped Surface water	Yes.	Isolated pockets of trapped surface drainage may be encountered within made ground deposits, although not in significant quantities.
Control of Surface Drainage	Yes.	Surface drainage anticipated to be present associated with current and historic developments on site.
Shallow Coal Workings	No.	The site is not considered to be at risk from shallow coal workings.
Shafts and Adits	No.	No evidence of shafts and adits recorded in the area.
Archaeological	No.	Nothing of archaeological interest is anticipated for this site. However, it is recommended that reference is made to the LA for their comments.
Flooding	No.	The site is not considered to be at risk to flooding from rivers or seas without defences - reference should be made to the EA & LA for their comments. However, given that the site is greater than 0.5Ha it is likely that a Flood Risk Assessment (FRA) will need to be carried out.

5.0 Conceptual Site Model (Cont'd)

5.3 Ground Contamination (Sources): -

A summary of potential sources of ground contamination for the site can be seen in Table 5.3 below.

Table 5.3 N/A – Not Applicable (Not considered to represent a risk with respect to ground contamination)

Source(s)	Type	Affected Area(s) of Site	Potential Contaminants
Generic Made Ground	Typically comprising disturbed natural soils with anthropogenic debris.	Whole of site.	Generic: Toxic and Phytotoxic analytes with some non-organic compounds – typically: Arsenic, Cadmium, Chromium, Lead, Mercury, Selenium, Nickel, Cyanide. Sulphur and pH values should also be determined. Asbestos should be allowed for due to continuous historical site usage.
'Hot Spots'	Potential for lubricating oils and bulk fuel storage.	Localised 'hot spots'	Mineral oils, TPH's etc.
AST's	None recorded, to be confirmed during site investigation phase.	Unknown at this stage.	As above.
UST's	None recorded.	N/A.	N/A.
Contaminated Water/Liquid	None anticipated.	N/A.	N/A.
Groundwater	Anticipated at depth within solid geology.	N/A.	N/A.
Gas	Ground gases.	N/A.	No sources of gas production identified, generally not anticipated to be a significant issue for this site.
Adjacent Sites	Soil and groundwater migration.	Whole of site.	Generally not anticipated to be a significant issue for this site.

* - Historical site uses corresponding to D.o.E. Classification of Contaminating Industries (May 1991) & CLR8 (2002).

5.4 Migration Pathways: -

A summary of the potential migration pathways for this site can be seen in Table 5.4 below.

Table 5.4

Migration Pathway	Available for Site / Plausible Route	Comments
Ingestion	Yes – soil and dust (Limited).	End use classification (<i>Residential with plant uptake</i>).
Dermal/Direct Contact	Yes – soil and dust (Limited).	Where sources are exposed at the surface.
Plant Uptake	Yes.	Where gardens and areas of soft landscaping are present.
Wind Blown Particles	Yes.	Where sources are exposed at surface level.
Vapours	No.	At this stage, no volatile or semi-volatile contaminants are anticipated to be present below the site area, to be confirmed during site investigation works.
Leaching from soils	Yes.	Where sources are exposed to surface water infiltration.
Groundwater Flow	No.	Shallow groundwater is not anticipated to be present below the site. Groundwater is anticipated to be present at depth within the solid geology.
Gas	No.	The made ground is anticipated to comprise disturbed natural strata which will have been insitu for greater than 70 years.

5.0 Conceptual Site Model (Cont'd)

5.5 Sensitive Receptors: -

A summary of the potentially sensitive receptors for this site can be seen in Table 5.5 below.

Table 5.5

Sensitive Receptor	Present for this Site	Comments
Current Site Users	Yes.	Site currently used for the storage and cutting of stone.
Trespassers	Yes.	It is anticipated that trespassers could gain access to the site.
Future Site Users	Yes.	Site is intended for residential development.
Construction Workforce	Yes.	If redevelopment occurs construction workforce will be potentially at risk, although exposure periods will be relatively short.
Controlled Waters: Surface water	No.	No controlled waters within a plausible migration distance.
Controlled Waters: Groundwater	Yes	2 no. ponds are recorded on site, which are likely to be associated with stone masonry and are to be infilled for the proposed development. No other controlled waters identified within a plausible migration distance.
Building Materials	Yes.	Future building materials may be at risk where they come into contact with contaminated materials.
Adjacent Sites	Yes.	Adjacent sites may be at risk if on site contaminants are sufficiently mobile and/or plausible migration pathways are available.
Future Vegetation Cover	Yes.	Any future landscaping will need to take into account the levels of contaminants present on site.

5.6 Conceptual Exposure Model: -

When considering the existing site, a Conceptual Exposure Model (CEM), identifying the future *source-pathway-receptor* linkage for any ground contamination present, has been developed for this site and is summarised in the Table 5.6 below.

Table 5.6

Source(s)	Pathway(s)		Receptor(s)	Route Available?	Comments
	Transportation Mechanisms	Exposure Medium			
Made Ground (Whole of Site + 'hot spots').	Direct contact	SOIL: Ingestion, Dermal Contact & plant uptake.	End Users. Construction Workforce. Building materials.	YES (Limited) YES YES	Site Classification: <i>Residential with Plant Uptake</i> Pollutant linkage (PL) available in areas of private gardens. During any construction standard PPE will be required. Possible aggression where materials come into contact with made ground (i.e. foundations).
Made Ground (Whole of Site + 'hot spots').	Wind / Volatilisation	AIR: Inhalation of vapour and direct contact with dust.	End Users. Construction Workforce.	YES (Limited) YES	Pollutant linkage (PL) available in areas of private gardens. During any construction work standard PPE will be required.
Made Ground (Whole of Site + 'hot spots').	Ground Gases	AIR: Inhalation of ground gases.	End Users.	YES	Pollutant linkage (PL) available in buildings.
Made Ground (Whole of Site + 'hot spots').	Surface infiltration & discharge from damaged surface drainage	WATER:	Adjacent sites & deep groundwater.	YES (Limited)	Pollutant linkage (PL) available where no hard cover is present or leaking drainage allows surface water infiltration.

6.0 Conclusions and Recommendations

6.1 Qualitative Geotechnical Risk Assessment: -

Similarly, if a change in the end use occurs, then a reassessment of the *source-pathway-receptor* pollutant linkage should be carried out.

A summary of the anticipated potential risks associated with the geotechnical issues and hazards identified for this site can be seen in Table 6.1 below. The following general definitions for the allocated level of risk(s) are as follows:

NEGLIGIBLE: - Not considered to have an impact on the current use or proposed development of the site.

LOW:- Unlikely to have a significant impact on the current use or proposed development of the site.

MODERATE:- May have a significant impact on the current use or proposed development of the site.

HIGH:- Likely to have a significant impact on the current use or proposed development of the site.

Table 6.1

Issue/Hazard	Level of Potential Risk	Comments
Made Ground	LOW	Variable made ground may be present across the site area however; this is not anticipated to represent a significant risk.
Relic sub-surface structures/features	MODERATE	Relic subsurface features are likely to be present associated with historic use as a farm and current site use as a factory/warehousing. 2 no. Ponds are also recorded on the site.
Stability of excavations	LOW	Lateral support anticipated for all excavations below 1.20m.
Shallow Groundwater	LOW	Shallow groundwater is not anticipated.
Trapped Surface water	LOW	Not anticipated to be present in large quantities – should be easily dealt with using temporary pumping, if necessary.
Control of Surface Drainage	LOW	Standard surface drainage systems should prove adequate.
Shallow Coal Workings	LOW	The risk from unrecorded shallow coal workings is considered to be low.
Shafts and Adits	NEGLIGIBLE	None recorded or anticipated for this site.
Archaeological	LOW	Not considered to be a significant issue for this site, reference could be made to the LA for their comments.
Flooding	LOW	The site is not considered to be at risk to flooding from rivers or seas without defences - reference should be made to the EA & LA for their comments.

At this stage, taking into account all the above issues, if the site was envisaged to be redeveloped the site has been assessed as having an overall **LOW to MODERATE** geotechnical risk, associated with the potential risk for relic sub surface structures and the ponds.

6.2 Qualitative Ground Contamination Risk Assessment: -

As can be seen from the Conceptual Exposure Model in section 5.6, there are some direct and/or indirect pollutant linkages and pathways available, for the potential sources of ground contamination present within areas of this site, reaching potentially sensitive receptor(s). The final end use for this site has been determined as *Residential with Plant Uptake*. A summary of the anticipated potential level of risk associated with the potential ground contamination on this site can be seen in Table 6.2 on the following page. The following general definitions for the allocated qualitative level of risk(s) are as follows:

6.0 Conclusions and Recommendations (Cont'd)

6.2 Qualitative Ground Contamination Risk Assessment (Cont'd): -

LOW:- Unlikely to have a significant impact on the current use or proposed development of the site.
 MODERATE:- May have a significant impact on the current use or proposed development of the site.
 HIGH:- Likely to have a significant impact on the current use or proposed development of the site.

Table 6.2

Category	Level of Potential Risk	Comments
HUMAN HEALTH:		
Current Site Users:	LOW	The site is currently used for the storage and cutting of stone (i.e. commercial usage).
Future End Users:	MODERATE	Site intended for <i>Residential with plant uptake</i> (with some areas of private gardens).
Construction Workforce	LOW	If redevelopment is envisaged the main contractor should carryout risk assessment once site data is available.
Ground Gases	LOW	Residential housing considered <i>high</i> sensitivity, however at this stage the generation potential is considered <i>very low</i> with made ground, anticipated to comprise disturbed natural strata, the only known potential source (CIRIA C665).
CONTROLLED WATERS:		
Leaching from soils	LOW	Leaching of contaminants not considered to be a significant issue for this site.
Leaching from hot spots, UST's, etc.	LOW-MODERATE	No significant 'hot spots' anticipated at this stage and the leaching of contaminants is not considered to be a significant issue for this site. However, if any 'hot spots' or potential sources of contamination are encountered during the ground investigation phase the level of risk may increase.
Contaminated Groundwater	LOW	Groundwater anticipated being at depth within solid geology.
OFF SITE DISPOSAL TO LANDFILL:	LOW-MODERATE	Any materials to be removed from site are likely to have to go to either a Non-Hazardous Landfill or a Hazardous Landfill. Once waste materials have been identified for disposal to landfill, full Waste Acceptance Criteria (WAC) testing should be carried out.
CONSTRUCTION MATERIALS:	LOW-MODERATE	Significant contamination is not anticipated on-site, however, sulphate resisting concrete may be required along with protection of plastic service pipes, if they come into contact with any ground contamination.
LANDSCAPE VEGETAION:	LOW	Selection of tolerant species may be required – can be assessed by Landscape Consultants following results of intrusive investigation works.

At this stage, taking into account all the above issues, if the site is envisaged to be redeveloped the site has been assessed as having a generally **LOW to MODERATE** level of risk associated with ground contamination on this site.

6.0 Conclusions and Recommendations (Cont'd)

6.3 Summary of Legislative & Regulatory Considerations: -

Table 6.3

PART IIA – EPA (1990)	It is unlikely that this site will be designated as 'Contaminated Land', however further investigations may be required to confirm this. Reference can be made to the Local Authority for their comments.
Section 147 EPA (1990)	At present no known problems associated with statutory nuisances. Provided satisfactory remediation is carried out if required and good 'housekeeping' is observed, no future problems are anticipated.
Water Resources Act (1991) & Groundwater Regulations (1998)	At present no recorded or detected pollution incidents have occurred on site. Future liabilities should be negligible if satisfactory remediation is carried out where required and good 'housekeeping' is maintained.
Section 33 & 34 EPA (1990) and Section 14 Wildlife & Countryside Act (1981)	It is not known if the site is affected by non-native invasive weed species i.e. Japanese Knotweed etc. Site awareness during intrusive investigation works should be undertaken. Failure to identify, manage, dispose and avoid off-site migration may lead to prosecution.
Common Law (Trespass)	At present no recorded or detected problems arising from this site. Future liabilities should be negligible provided satisfactory remediation is carried out, if required and good 'housekeeping' is maintained.
Radon Gas	This site does not lie within an area currently recognised as requiring Radon Protection measures.
Landfill/Onsite Soil Gases	Although considered very low risk there is a potential for ground gas production from the made ground that is anticipated to be on the site.
Flooding	The site lies out with a Zone 2 & 3 flood risk from Rivers or Sea. However, given that the site is greater than 0.5Ha a Flood Risk Assessment is anticipated to be required for this site.

6.4 Recommendations: -

The recommendations for Phase 2: Ground Investigation works are as follows:

Item	Remarks/Scope
Trial Pits:	May be a suitable option depending on site access. However, if site is in continued use it may not be possible to excavate trial pits under the foot print of the existing warehouse building and along access roads and areas of hardstanding therefore, an alternative may need to be considered.
Boreholes (Sampling):	A series of strategically positioned boreholes to ascertain bearing capacities of the variable soils (made ground & natural) and to collect samples from depth. Smaller drilling rigs would allow access within buildings. The depth to competent strata should be investigated immediately adjacent to the pond features.
Boreholes (Rotary):	Not considered to be required for this site.
Groundwater Monitoring:	Not anticipated – to be assessed during field works.
Gas Monitoring:	Proposed development is for <i>residential with Plant Uptake</i> , high sensitivity end use, with a generation potential for this site assessed as: <i>Very Low</i> . Therefore, gas monitoring is required for this site. Based upon the above classifications the minimum requirement is for 6 monitoring visits over a minimum of 3 months (CIRIA C665).
Ground Contamination:	Samples for end use risk assessment. Allow for generic testing with leachate testing on selected samples recommended etc. Samples of groundwater/trapped surface drainage also to be tested (if recovered).
Geotechnical Testing	Representative samples will be selected for geotechnical testing.
Reporting:	Supervision of works, full interpretative reporting, i.e. Phase 2: Ground Investigation report incorporating a Level 1 Risk Assessment in accordance with CLR 11, etc.
Off Site Disposal:	Materials that have been identified for disposal off site may require further testing in order to classify these materials for Waste Acceptance Criteria (WAC).
Other:	A Flood Risk Assessment is anticipated to be required for this site.

End of Report

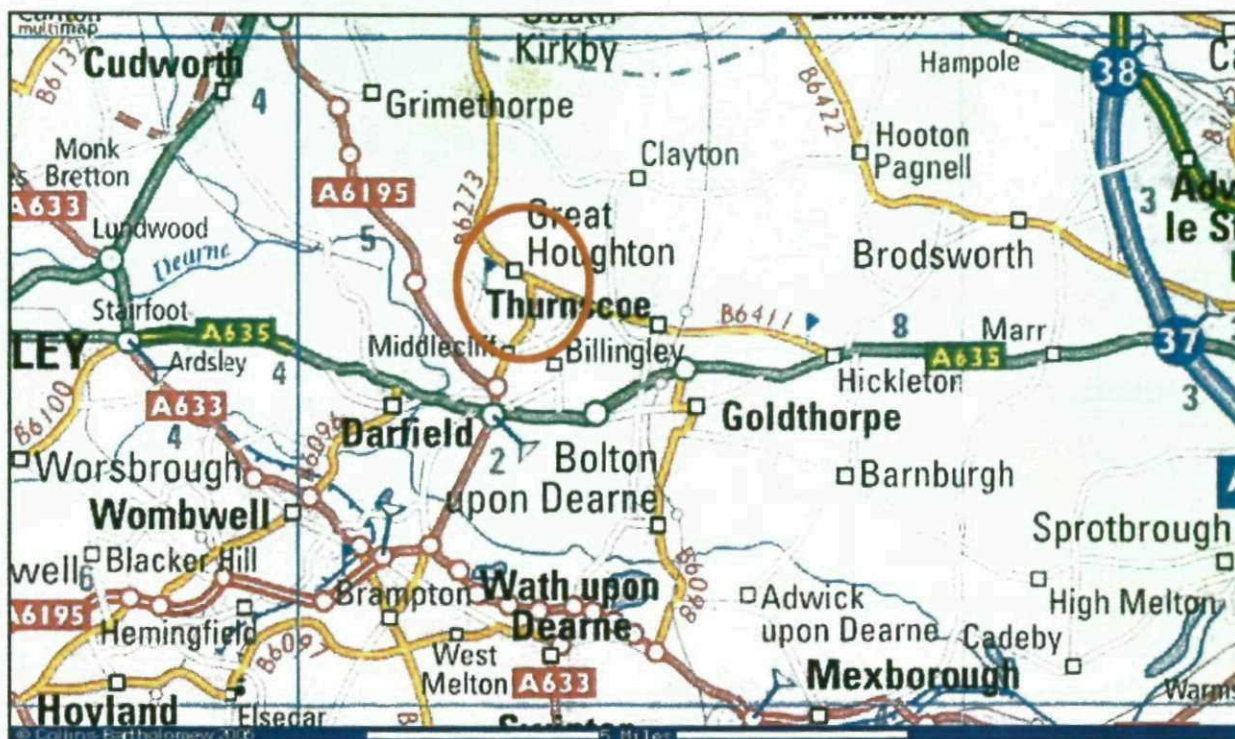
GENERAL REFERENCES

- British Geological Survey: Maps, Reports, Memoirs etc.
Barnsley 1:50 000 Scale (Solid & Drift Editions) Map Sheet 18
- Landmark Information Group – Envirocheck Report – EC24103621_1_1
- D.o.E. - Contaminated Land Reports, CLR 1 – 6 1994 & 1995 & CLR 7 – 11, 2002 onwards
- BS10175:2001: Code of Practice for the Investigation of Potentially Contaminated Sites
- BS5930:1999: Code of Practice for Site Investigations
- Guidance on Investigation and Assessment for Contaminated Sites (CIRIA SP:103)
- Methane and Associated Hazards to Construction - CIRIA Reports 149, 150, 151 & 152
- CIRIA Report, ref: C665 - Assessing risks posed by hazardous ground gases to buildings, dated 2007
- Waste Management Paper No. 27 - D.o.E
- Radon Atlas of England, National Radiological Protection Board (NRPB), NRPB-R290
- BR211 (1999), Radon: Guidance on protective Measures for new dwellings
- David Bellis Coal Search Report: 221967
- BGS Borehole Logs: SE40NW10, SE40NW94, SE40NW122

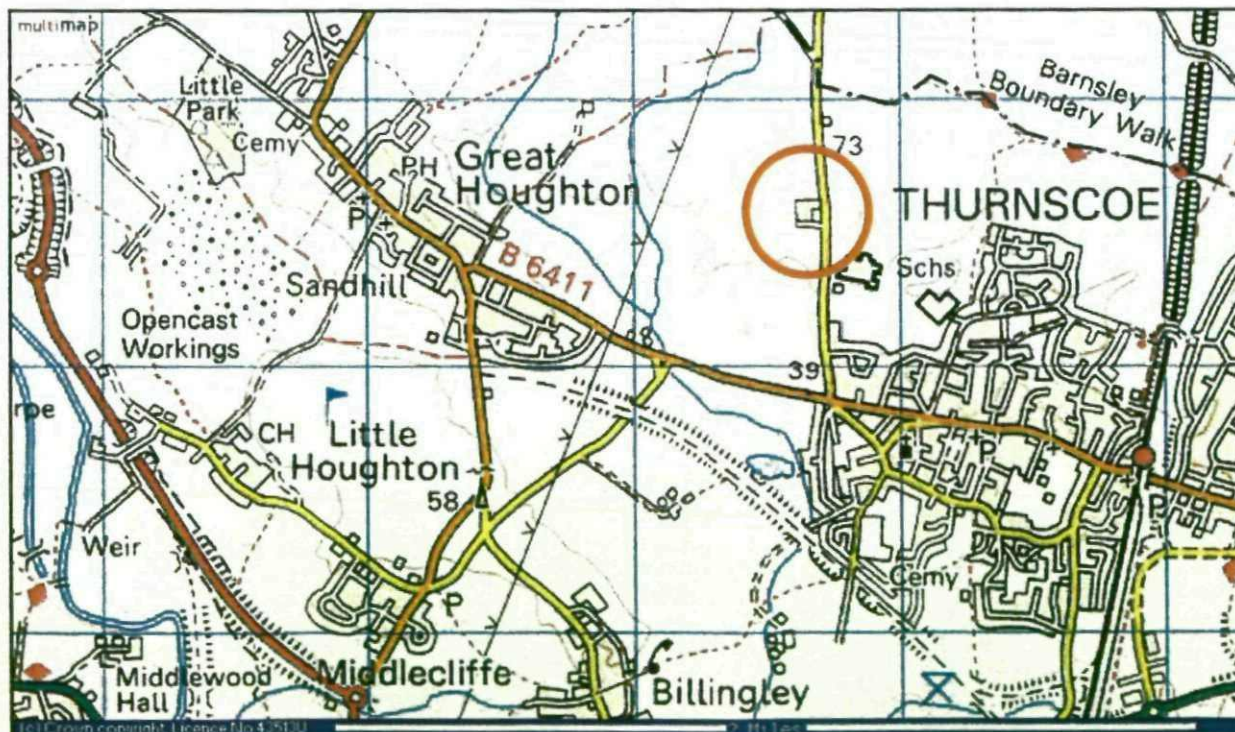
APPENDIX I

Site Location Plans,
Existing Site Layout Plans
Aerial Photograph
Proposed Site layout

Site Location Plan: 1:100 000 Scale

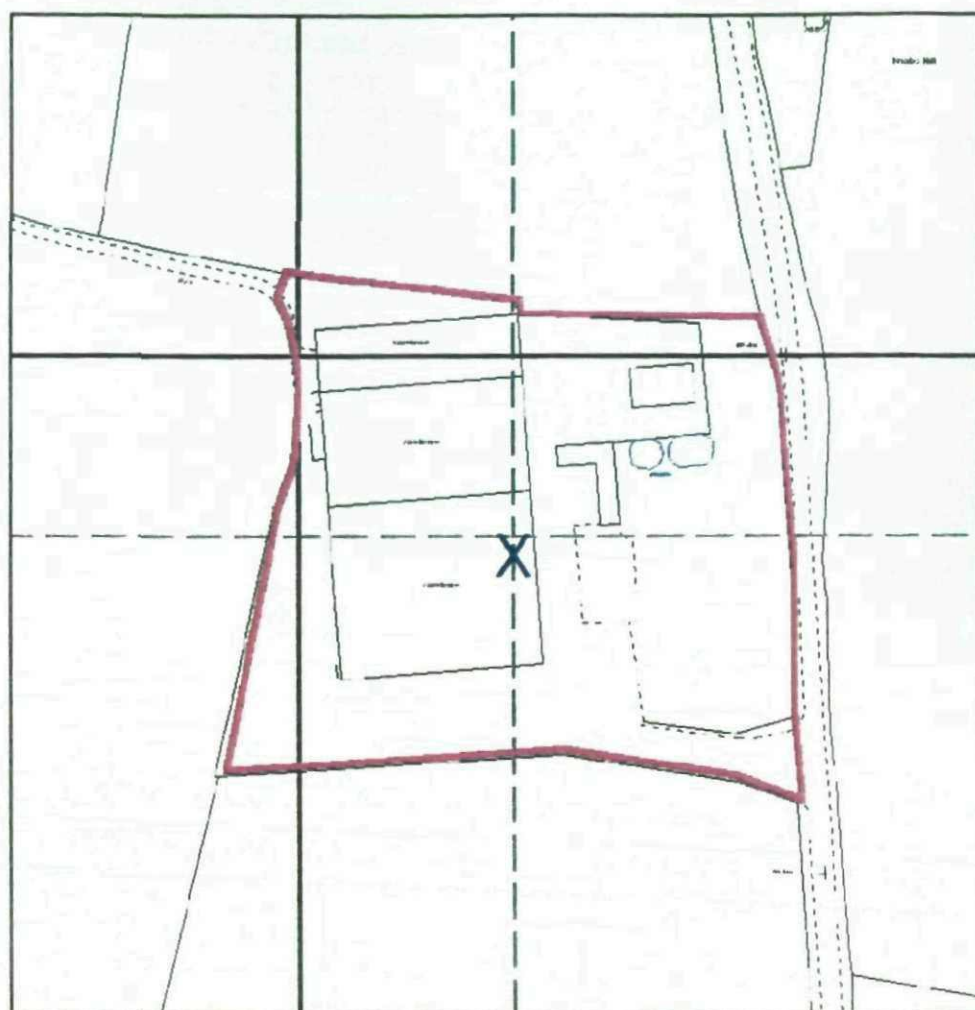


Site Location Plan: 1:25 000 Scale



Report Type:- Phase 1: Desk Top Study Report.
Project:- 08-034 - Knabbs Hill Farm, Thurnscoe.
Prepared For:- Mr. Simon Frith.

Existing Site Layout Plan



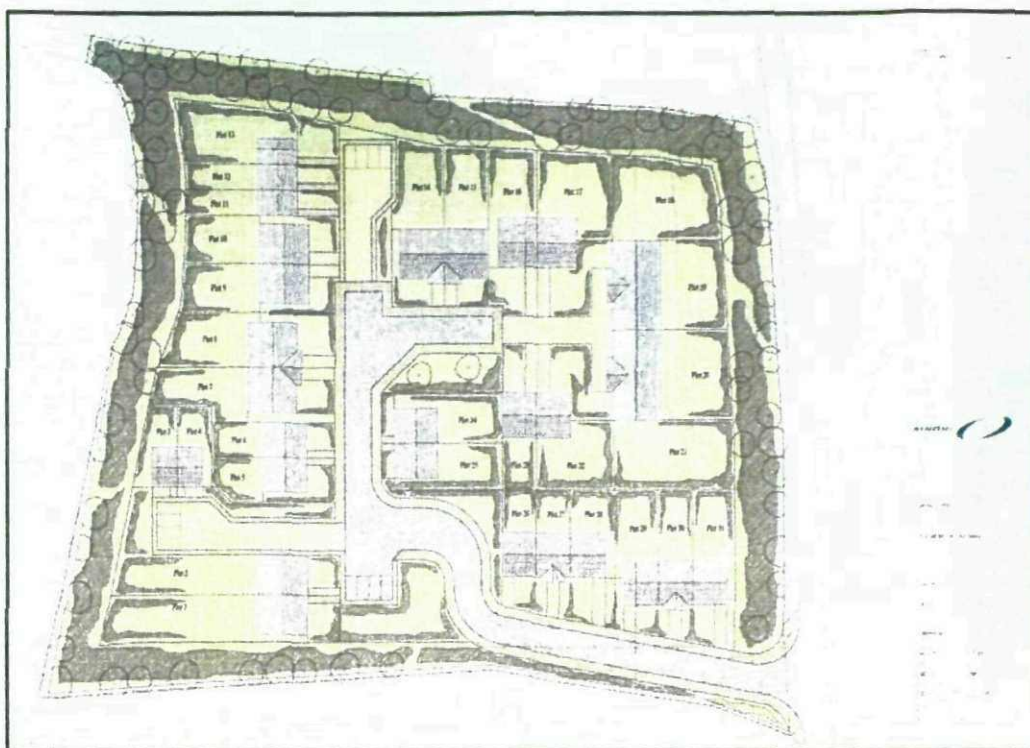
Report Type:- Phase 1: Desk Top Study Report.
 Project:- 08-034 – Knabbs Hill Farm, Thurnscoe.
 Prepared For:- Mr. Simon Frith.

Aerial Photographs



Report Type:- Phase 1: Desk Top Study Report.
 Project:- 08-034 – Knabbs Hill Farm, Thurnscoe.
 Prepared For:- Mr. Simon Frith.

Proposed | Site Layout



Report Type:- Phase 1: Desk Top Study Report.
 Project:- 08-034 – Knabbs Hill Farm, Thurnscoe.
 Prepared For:- Mr. Simon Frith.

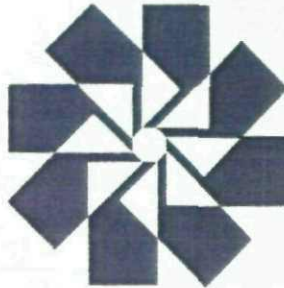
APPENDIX II

Envirocheck Report EC24103621-1-1

Report Type:- Phase 1: Desk Top Study Report.
Project:- 08-034 – Knabbs Hill Farm, Thurnscoe.
Prepared For:- Mr. Simon Frith.

CoalSearchPlus+
8, Mornington Terrace
Harrogate
North Yorkshire
HG1 5DH

Tel : 01423 529911
Fax : 01423 529922
DX 720352 Harrogate



COAL SEARCH PLUS +
Protecting your investment

By

David Bellis
CONSULTING SURVEYORS

Coal Mining Search Report

Incorporating Cheshire Brine Enquiries



WWW.COALSEARCH.PLUS.COM

Serial Number 221967**Client detail :**

ARC Environmental Ltd
The Rivergreen Centre
Aykley Heads
Durham
DH1 5TS

CoalSearchPlus+ by David Bellis Consulting
Surveyors
8 Mornington Terrace
Harrogate
North Yorkshire
HG1 5DH
(DX 720352 Harrogate)

Tel 01423 529911
Fax 01423 529922

Practice Principal M JPeace BSc PgDip FGS

Property details:

Knabbs Hill Farm
Clayton Lane
Thurnscoe
Rotherham
S63 0BG

Your ref : 08-034

Purchaser :

Vendor :

In accordance with your instructions received 11 Feb 2008 we have inspected plans and records of coal mine workings and have made enquiries with respect to Cheshire brine extraction in relation to the above property and can report as follows :

1. **SEAM DETAILS FOR PAST UNDERGROUND COAL MINING** : In relation to the property the undermentioned seam(s) have been worked within the likely zone of physical influence on the surface.

Seam	Depth (m)	Sect (cm)	Date	Remarks
Shafton	145	213	1930	Subjacent
Newhill	391	144	1986	Adjacent
Meltonfield	406	127	1939	Subjacent
Top Beamshaw	447	50	1973	Adjacent
Low Beamshaw	459	91	1967	Subjacent
Barnsley	559	190	1933	Subjacent
Parkgate	786	140	1965	Subjacent
Silkstone	875	101	1984	Subjacent

2. **SEAM DETAILS FOR CURRENT AND FUTURE UNDERGROUND COAL MINING** : The undermentioned seam(s) are currently being worked, or licenses to work are being determined, or have been granted to work, within the likely zone of physical influence on the surface in relation to the property.

Seam	Depth (m)	Sect (cm)	Date	Remarks
				Coal in reserve - no workings currently planned.

Serial Number 221967

3. UNDERLYING GEOLOGY :

The property is situated in an area of Middle Coal Measures, shales and mudstones.
Conjectured faulting at surface.

4. OPENCAST COAL MINING :

Past Opencast Workings : The property is not situated within the boundary of a former opencast coal mining site.

Present Opencast Workings : The property is not situated within 200m of the boundary of a currently operating opencast coal mining site.

Future Opencast Workings : The property is not situated within 800m of the boundary of an opencast site for which a license to extract coal by opencast methods has been granted or a license to do so is currently being determined.

5. SHAFTS, ADITS (MINE ENTRIES) AND ADDITIONAL INFORMATION :

We have no knowledge of any shafts or adits within 20 metres of the property or the boundary of the property.

There are no tips or lagoons in the vicinity of the property.

6. NOTICES IN RELATION TO FUTURE COAL MINING ACTIVITY :

We have no knowledge of any intention to work coal by underground methods , within influencing distance on the surface in the vicinity of the property, for which notices have been issued under the Coal Mining Subsidence Act 1991.

7. PAST COAL MINING RELATED SUBSIDENCE :

Our investigations have shown no evidence of coal mining related subsidence claims in relation to the property in the past 10 years.

8. CONCLUSION (COAL MINING) : In the light of the above facts we conclude that in relation to coal mining :

Old workings are present but all settlement is likely to have completed long ago.
In our opinion it is unlikely that coal will be worked in the foreseeable future.

COAL MINING RISK LEVEL : We recommend that the transaction is treated as :

Abnormal mining risk, severe damage possible -

If development of the site is intended then it would be wise in our opinion to undertake all necessary enquiries and investigations prior to the commencement of works.

Serial Number 221967

Please note that the overall coal mining risk level above is based upon an assessment of the detailed information contained in the body of the report. The risk assessment must be used in conjunction with the detailed report.

CHESHIRE BRINE EXTRACTION INFORMATION :

The property lies outside the Cheshire Brine Compensation District as prescribed by the Cheshire Brine Pumping (Compensation for Subsidence) Act 1952.

With respect to coal mining there is nothing to prevent a claim being made under the provisions of the Coal Mining Subsidence Act 1991 and subsequent legislation, but it must not be inferred that the Coal Authority or their licensees will necessarily accept that any damage has been caused as a result of mining subsidence.

If you require any further information or amplification please contact CoalSearchPlus+ on 01423 529911 or via our website www.coalsearch.plus.com.

Note:

This search report is based upon plans and records currently available from third party organisations and the CoalSearchPlus+ mining record database. Third party organisations reserve the right to vary their proposals and intentions as to their future mining operations without prior notice save as provided in the Coal Mining (subsidence) Act 1991 and the Coal Industry Act 1994.

This is a Coal Mining Search Report and is not to be interpreted as being part of an Environmental Assessment of the property.

We cannot be held responsible for the accuracy of the information provided to us by third party organisations.

The information and/or material supplied is composed from data based in many cases on measurements and records of various standards of reliability and age. We cannot be held responsible for the accuracy of such information.

This report is prepared in accordance with the CoalSearchPlus+ terms and conditions as published on the CoalSearchPlus+ website (www.coalsearch.plus.com) on the date of issue of this report.

Date : 13 Feb 2008

Signed : *M. J. Peace*

APPENDIX III

Coal Mining Report 221967

BGS Borehole Logs

SE40NW10

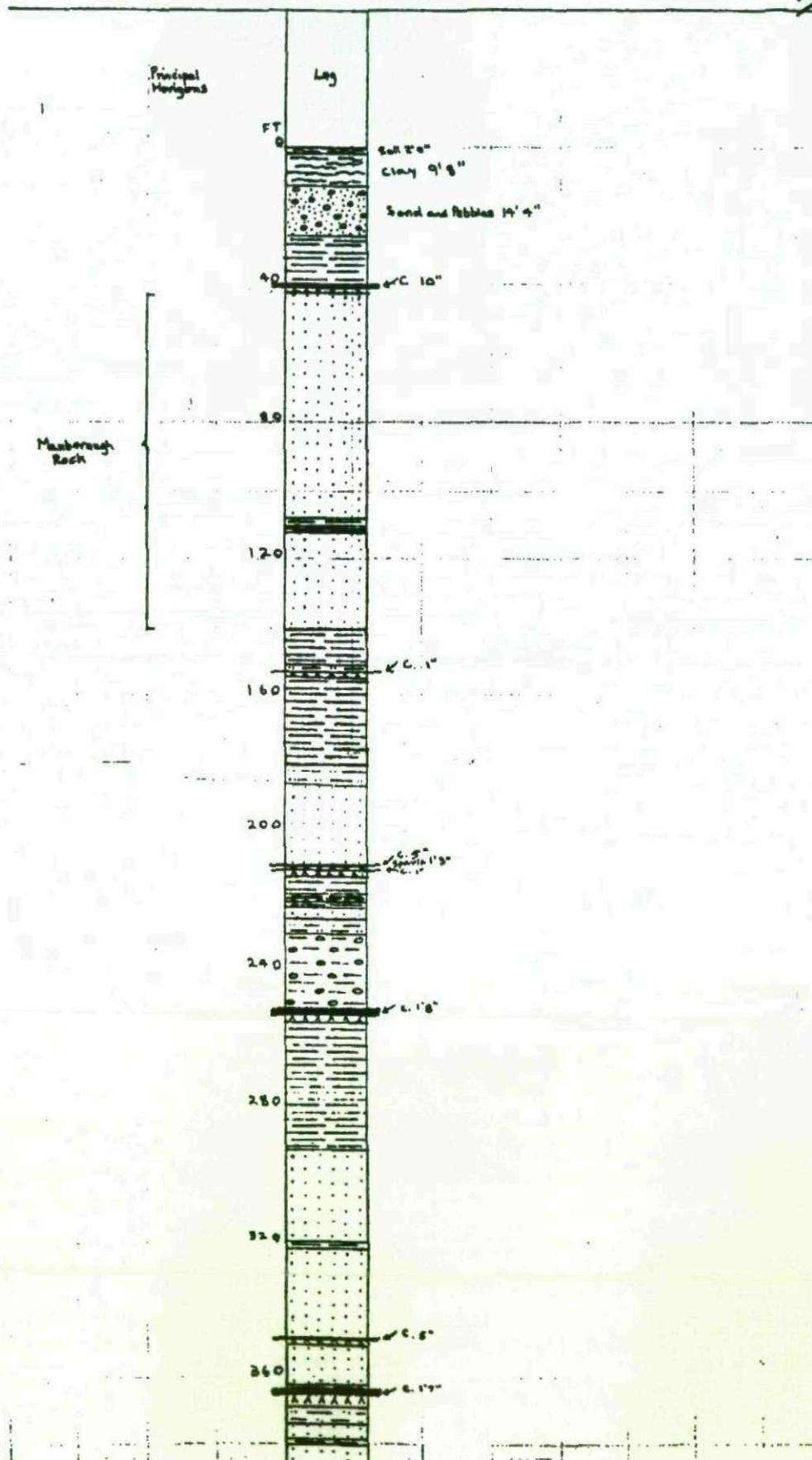
SE40NW94

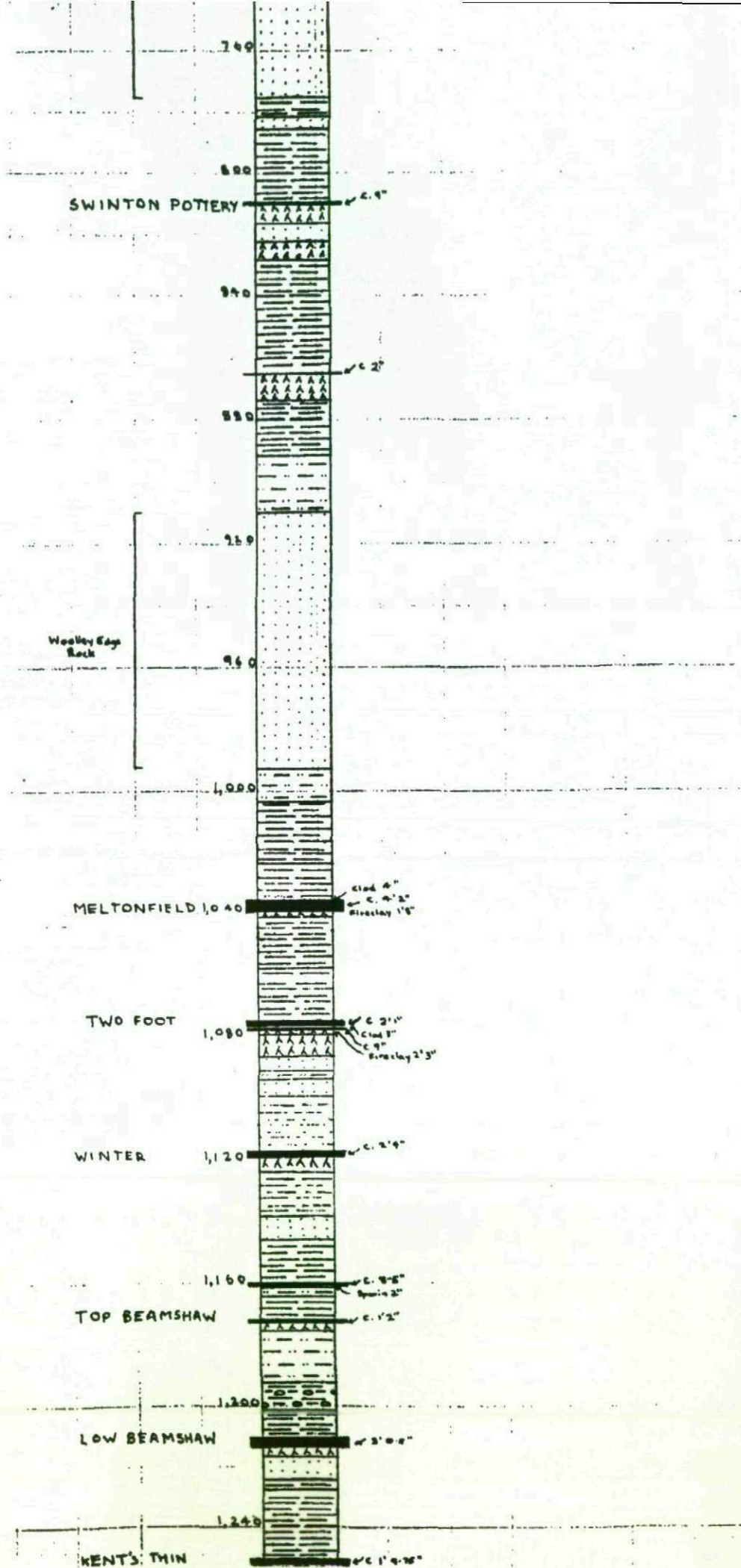
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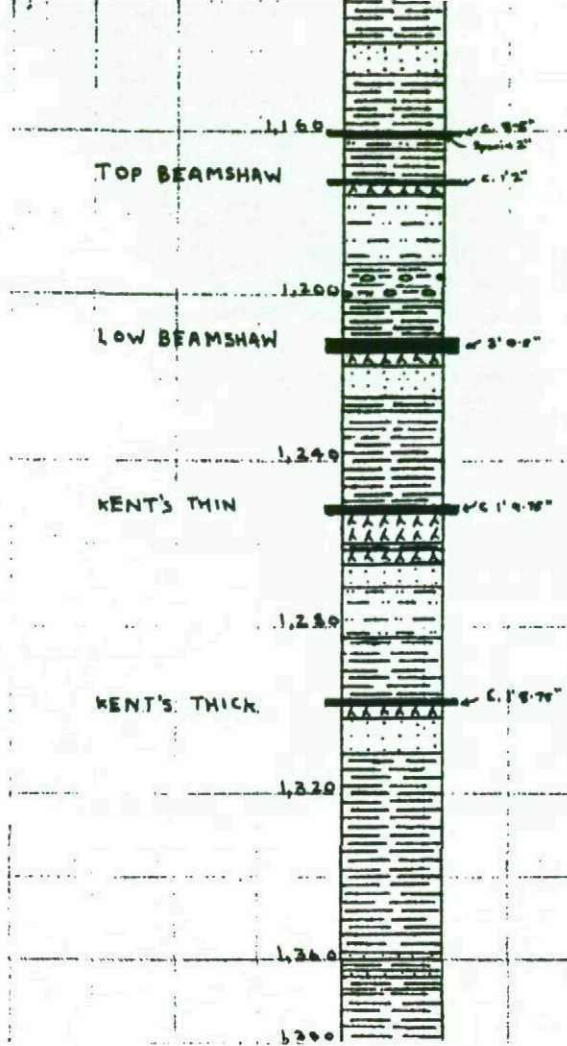
YORKSHIRE 275 SW
HOUGHTON MAIN COLLIERY
E6 (No. 2. SHaft) SECTION
[PART 1]

SE 40 NW/10
1873 - 1878 TO BARNLEY
1919 - 1921 TO THORNCLEIFFE
100' A.D.D.

410
175
235







FENTON COAL

2,220

St. bed 0.5'
St. bed with coal streaking 1.0'
St. bed 1.0'
St. bed 1.0'
St. bed 1.0'
St. bed 1.0'
St. bed 1.0'

St. bed (1.0' Faulty)
C. 0.5'

2,260

Red A. bed parting (Faulty)

PARKGATE

2,300

C. (shale) 10.5'
C. (shale) 10'
C. (shale) 10.5'
St. bed 2.0'

DARK SHALE WITH FOSSILS 6"

2,340

THORNCLIFFE 2,380

C. 1.5'
St. bed 1.0'
C. 1.5'
St. bed 1.0'
C. 1.5'
St. bed 1.0'

BOTTOM OF SHAFT 2,389' 7.25"



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

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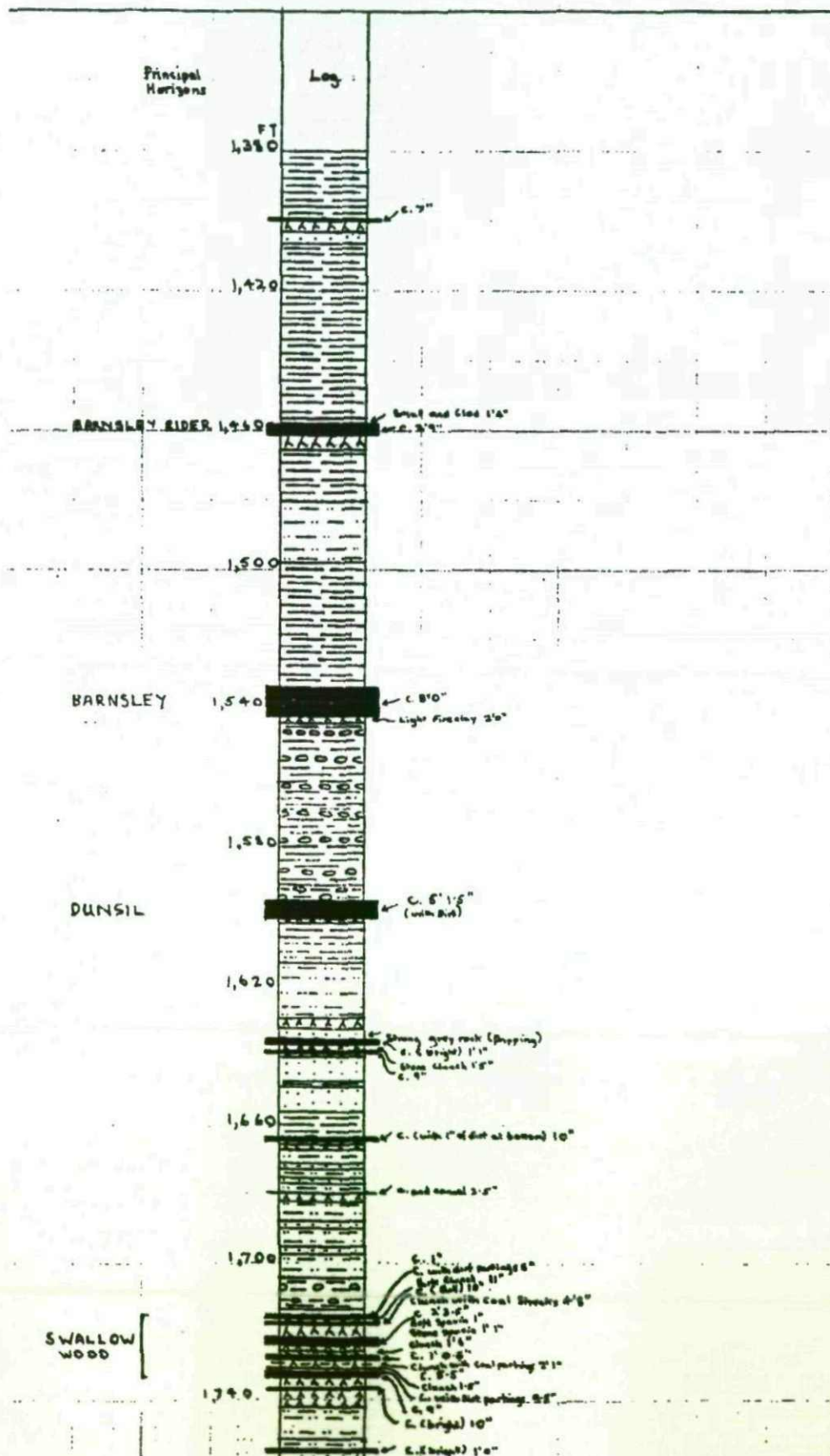
ISF40NW R.I 10 1

Stratigraphic Column (1,740 to 2,180 feet):

- 1,740 - 1,780:
 - C. (Bright) 1' 0"
 - Shale with coal streaks 4' 8"
 - C. 3' 0"
 - Shale 1' 0"
 - Shale 1' 0"
 - C. 1' 0"
 - Shale with coal parting 2' 1"
 - C. 9"
 - Shale 1' 0"
 - C. with coal parting 3' 5"
 - C. (Bright) 1' 0"
 - C. 2' 5"
- 1,780 - 1,820:
 - C. (Bright) 3' 5"
 - Shale with coal streaks 8' 5"
 - Sh. Blue bind (Fossil) 7' 5"
 - Sh. bind 8' 5"
 - Sh. bind with coal streaks 5"
- 1,820 - 1,860:
 - Canal C. 8' 5"
 - C. (Bright) 14"
 - Fossiliferous 2' 5"
- 1,860 - 1,900:
 - Coal with dirt parting 4"
 - Shale 1' 0"
 - Coal with dirt parting 5"
 - Sh. shale with coal streaks 8' 5"
- 1,900 - 1,940:
 - Strong Stone bind with coal bedders
- 1,940 - 1,980:
 - Sh. bind with dirt parting (Traces of Mineral oil)
 - Fraggy top
- 1,980 - 2,020:
 - Sh. bind with dirt parting (Traces of Mineral oil)
 - Fraggy top
- 2,020 - 2,060:
 - Sh. bind with dirt parting (Traces of Mineral oil)
 - Fraggy top
- 2,060 - 2,100:
 - Sh. bind with dirt parting (Traces of Mineral oil)
 - Fraggy top
- 2,100 - 2,140:
 - Sh. bind with dirt parting (Traces of Mineral oil)
 - Fraggy top
- 2,140 - 2,180:
 - Sh. bind with dirt parting (Traces of Mineral oil)
 - Fraggy top

YORKSHIRE 275 SW
HOUGHTON MAIN COLLIERY
E6 (No 2 Shaft) SECTION
[PART 2]

SE 40 NW/10
1873-1878 TO BARNLEY
1919-1921 TO THORNCLIFFE
100' A.D.D.



Section of HOUGHTON MAIN COLLIERY -
No. 42 Underground Borehole
 Purpose To prove the Dunsil Seam
 Exact Site N.G.R. SE/44908/06769
 Level at which bore commenced relative to O.D. 1358
B.O.D.
 Date of sinking or boring March-May 1976
 Sinker or borer N.C.B. (Barnsley Area)
 Cores, other than coal, examined by P. Hirst.

Works: 275 NE
 (County, Sheet and Qtr.)

SE 40 NW
 (Nat. Grid, Sheet & Qtr.)

Attach tracing from a map or sketch map if possible

SE 40 NW / 94

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		Top of stratum in ft	Base of stratum in ft	Top of stratum in ft	Base of stratum in ft
	OPEN HOLE - no cores taken	358	10 1/2	358	10 1/2
	Cemented fine grained micaceous siltstone	0.25	10	359	10 1/2
	Grey slightly silty mudstone	0.16	6 1/2	360	10 1/2
	Ironstone	0.04	1 1/2	360	10 1/2
	Grey slightly silty mudstone - ferruginous at the base	0.21	8 1/2	361	10 1/2
	Ferruginous slightly silty mudstone	0.31	0 1/2	362	10 1/2
	Smooth grey shaly mudstone	0.08	3	362	10 1/2
	Grey silty mudstone	0.03	1	362	10 1/2
	Compact slightly silty mudstone	0.08	3	362	10 1/2
	Ferruginous silty mudstone	0.06	2 1/2	362	10 1/2
	Generally smooth grey shaly mudstone	0.26	10 1/2	363	10 1/2
	Ferruginous mudstone	0.08	3	364	10 1/2
	Compact grey shaly mudstone	10.30	0	365	10 1/2
	Ironstone	0.05	2	365	10 1/2
	Compact grey slightly silty shaly mudstone	0.33	1	366	10 1/2
	Ironstone	0.05	2	366	10 1/2
	Ferruginous mudstone	0.31	0	367	10 1/2
	Smooth grey shaly mudstone with ferruginous bands	0.43	5	368	10 1/2
	Ironstone	0.08	3	369	10 1/2
	Generally smooth ferruginous mudstone	0.36	2	370	10 1/2
	Smooth grey colour-banded mudstone with ironstone nodules	10.37	2 1/2	371	10 1/2
	Ironstone	0.04	1 1/2	371	10 1/2
	Smooth grey mudstone with trace fossils and graptolites and nodular ironstone	20.85	9 1/2	374	10 1/2
DUNSIL	COAL	7"	0.18		
	Dirt	1 1/2"	0.04		
	Inferior COAL	3"	0.08		
	Dirt	1 1/2"	0.04		
	COAL	1'-3"	0.38		
	Dirt	0 1/2"	0.01	51.65	5
	COAL	1'-5 1/2"	0.44		
	Carbonaceous mudstone	2 1/2"	0.06		
	Mudstone-seatearth	2 1/2"	0.06		
	Sandstone	7"	0.18		
	Inferior COAL	7"	0.18		
	Inferior COAL with micaceous siltstone				
	lenticles	0.09	3 1/2	380	10 1/2
	Grey silty mudstone-seatearth	0.89	11 1/2	381	10 1/2
	Grey mudstone-seatearth	0.05	2	381	10 1/2
	Grey silty mudstone-seatearth with ironstone	10.33	1	382	10 1/2
	Lustrated mudstone-seatearth with ironstone nodules	0.10	4	382	10 1/2
	Grey, fine grained siltstone with roots and ironstone nodules	10.57	8	384	10 1/2

Section of **HOUGHTON MAIN COLLIERY -**
No. 42 Underground Borehole

Yorks C275^f NE

SE 4Q-NW

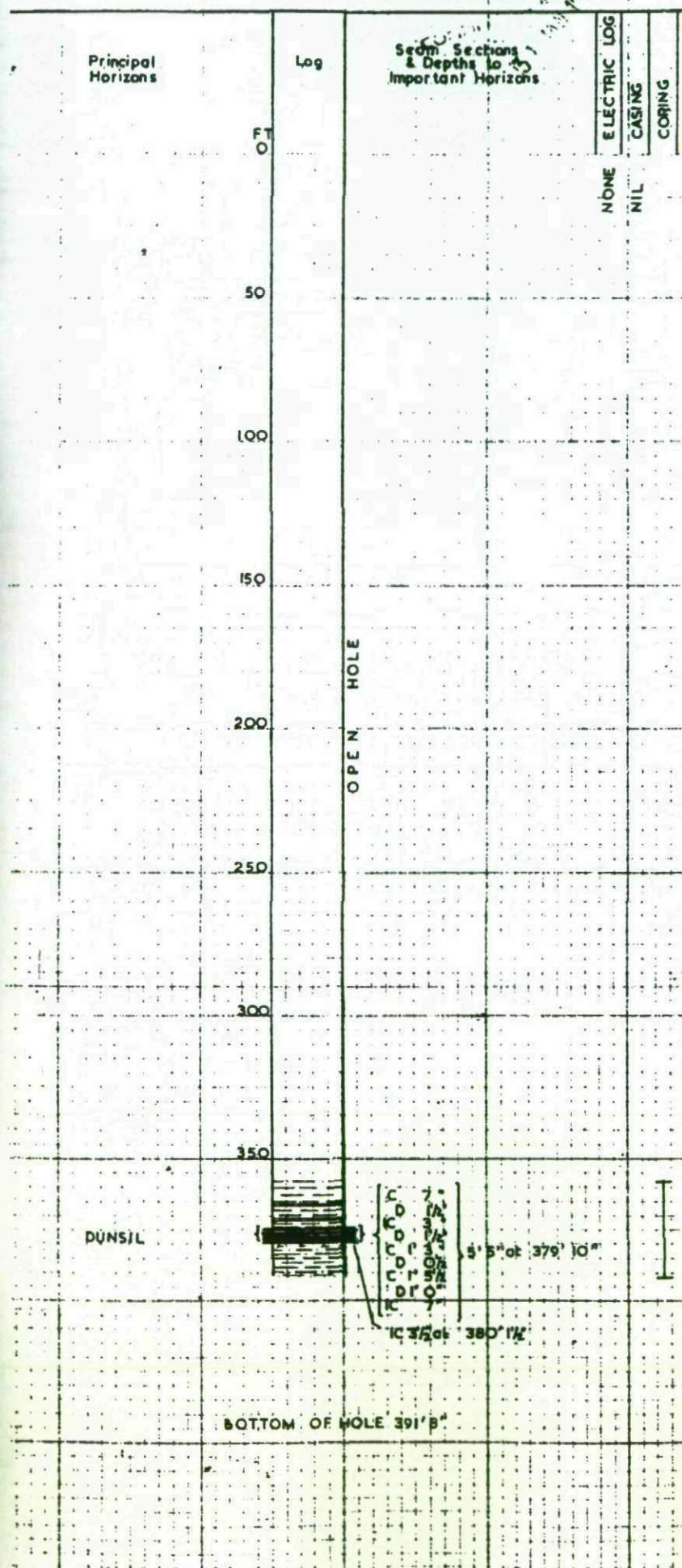
94

Delete as appropriate

[illegible]

YORKSHIRE 275 NE
HOUGHTON MAIN COLLIERY
No. 42 UG BH

SE 40 NW 194
March-May 1976
1356' BQD



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[SE40NW BJ 94]

CLAYTON WITH
SE 40 NW 94

NCB

BARNSELEY AREA.

HOUGHTON MAIN COLLIERY.

D15 TAIL GATE U/G. BH LOW BEAMSHAW TO

DENSIL.

LOCATION PLAN.

B.H. Regd. No.

SCALE - 1/10560.

NAT. GRID REF
SE/449CB/06769
LEVEL 1358 BOD.

BM REF
No. 42

D15 TAIL GATE.

D.15 MAIN GATE

D15 MAIN GATE.

D.13 TAIL GATE.

WORKINGS IN LOW BEAMSHAW SEAM SHOWN RED

BARNSELEY
HOUGHTON MAIN
COLLIERY UNIT
19 MAY 1976

DEYING DEPT.

BARNSELEY AREA

THE BARNSELEY AREA

THE BARNSELEY AREA

THE BARNSELEY AREA

THE BARNSELEY AREA

THE BARNSELEY AREA



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[SE40NW BJ 94 .]

Section of Knabs Hill Borehole

- - MAY 1982

Purpose - To prove the Charlston Top, Low and Yard Seams

Exact Site - SE/44803/06645

- - MAY 1982

Level at which bore commenced relative to O.D. 6465 A.O.D.

Date of sinking or boring - February, 1980

Sinker or borer - Barnsley Area N.C.B.

Cores other than coal examined by W. J. Smith & J. Pianazek

6 inch Map

(County Sheet
and Quarter)

275 NE

(Nat. Grid Sheet
and Quarter)

SE 40 NW/

122

Attach tracing from a map or
sketch map if possible

Geological Classification	Nature of Strata	Thickness		Depth	
		m	cm	m	c.
	Open hole - no cores. Information in open hole portion from Electric Log.	213	46	213	46
	Ackworth Rock 59m - 83.5m. Shafton marine band at 140m. Shafton seam 130m at 147.8m. Mexbrough Rock 168m - 176m. Edmondia Band at 194m.				
	Silty mudstone, occasional sand laminae and well preserves plants.		04	213	50
	Silt/sand, finely interlaminated.		10	213	60
	Siltstone, grey with sandy laminations.		19	213	79
	Silt/sand, interlaminated.		05	213	84
	Sandstone, massive, pale-grey.		87	214	71
	Silt/sand, interlaminated.		10	214	81
	Sandstone, ferruginous, carbonaceous and silty laminations.		10	214	91
	Silt/sand, interlaminated, abundant carbonaceous partings down to 215.32 metres, flaser bedded below.	1	02	215	93
	Siltstone, grey, occasional sand laminations.		12	216	05
	Sandstone, massive, pale-grey with ferruginous banding.	1	10	217	15
	Silt/sand, interlaminated with occasional coaly partings.		20	217	35-
	Siltstone, grey.		23	217	58

M1509JC1040, 1

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[SE40NW BJ 122.]

Form P71

Section of Knabs Hill Borehole

- MAY 1982

6 inch Map	
(County Sheet and Quarter)	275 NE
(Nat. Grid Sheet and Quarter)	SE 40 NW / 122

Geological Classification	Nature of Strata	Thickness		Depth	
		m	cm	m	c.
	Silty mudstone, grey.		07	217	65
	Mudstone, grey with ironstone bands.		44	218	09
	Siltstone, grey.		09	218	18
	Mudstone, grey, compact with ironstone bands.		77	218	95
	Sandstone, pale-grey.		07	219	02
	Siltstone, sandy laminae.		20	219	22
	Mudstone, grey with ironstone bands becoming finer and shalyer downwards.		49	219	71
	Mudstone, dark-grey, shaly, occasional large ironstone modules and coaly whisps. Mussel fragments below 221.52 metres. Occasional animal borings (tubular), carbonaceous in lower 13 cms.		33	222	04
Sharlston Top Seam	(Coal 108 cms)	1	38	223	42
	(Inferior coal 9 cms)				
	(Listricated mudstone 11 cms)				
	(Coal 10 cms)				
	Silty mudstone seat-earth, dark grey.		15	223	57
	Mudstone seat-earth, dark-grey and immature.		10	223	67
	Mudstone seat-earth, dark-grey, highly listricated.		08	223	75
	Mudstone seat-earth, fawn, highly listricated.		20	223	95
	Mudstone seat-earth, dark grey, highly listricated.		09	224	04
	Mudstone seat-earth, highly listricated, fawn, more compact below 224.29 metres.		31	224	35
	Siltstone, seat-earth compact with ironstone nodules.		31	224	66
	Sandstone seat-earth, compact, some admixed silty material, diffuse ironstone nodules, abundant from 225.07 to 225.27 metres. Diffuse ironstone nodules abundant below 225.55 metres with occasional sandstone bands.	2	00	226	66

S1509JC1040, 2



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[SE40NW BJ 122.]

Section of Knabs Hill Borehole

- MAY 1982

6 inch Map	
(County Sheet and Quarter)	275 NE
(Nat. Grid Sheet and Quarter)	SE 40 NW/ 122

Geological Classification	Nature of Strata	Thickness		Depth	
		m	cm	m	cm
	Sandstone, pale-grey.		17	226	83
	Silty mudstone, grey.		04	226	87
	Siltstone, coarse, grey, sandy in part with occasional sandy laminae.		34	227	21
	Siltstone, grey, sandy laminations.		17	227	38
	Sandstone, grey.		16	227	54
	Siltstone, grey.		15	227	69
	Sandstone, grey.		21	227	90
	Siltstone, grey.		15	228	05
	Silty mudstone, grey, occasional sandy laminations and bands diffuse ironstone bands.		55	228	60
	Mudstone, grey, compact with ironstone bands.		33	228	93
	Silty mudstone, with sandy laminations increasingly abundant downwards grading into interlaminated silt/sand.		36	229	29
	Mudstone, grey with ironstone bands.		28	229	57
	Carbonaceous mudstone.		05	229	62
	Coal.		06	229	68
	Carbonaceous mudstone.		01	229	69
	Silty mudstone seat-earth, grey/green, ironstone nodules at base.		11	229	80
	Siltstone seat-earth, silty mudstone, in part, compact, ironstone nodules.		38	230	18
	Silt/sand, interlaminated, bioturbated with ironstone nodules.		30	230	48
	Siltstone, grey, diffuse ironstone nodules and bands.		19	230	67
	Sandstone, bioturbated and colour banded.		42	231	11

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Section of Knabs Hill Borehole

6 inch Map	
(County Sheet and Quarter)	275 NE
(Nat. Grid Sheet and Quarter)	SE 40 NW/ 122

Geological Classification	Nature of Strata	Thickness		Depth	
		m	cm	m	cm
Sharlston Low (Upper Leaf)	Siltstone, coarse, grey, sandy in part with sand laminations.		41	231	52
	Silt/sand, interbanded and interlaminated.		28	231	80
	Sandstone, coarse, pale-grey, ferruginous in part with coaly partings throughout.	5	01	236	81
	Siltstone, grey, sandy laminae.		03	236	84
	Sandstone, pale-grey.		37	237	11
	Siltstone, grey, sandy laminae.		15	237	26
	Mudstone, grey, ironstone bands.		23	237	49
	Mudstone, dark-grey, carbonaceous.		05	237	54
	COAL.		26	237	80
	Pyrites.		05	237	85
	Mudstone seat-earth, coal whisps.		02	237	87
	Silty mudstone seat-earth, grey.		08	237	95
	Siltstone seat-earth, coarse and compact, finer below 238.05 metres.		15	238	10
	Silty mudstone/siltstone, grey and rooty.		26	238	36
	Siltstone, coarse, dark grey in part, sand laminations, ironstone nodules (distorting bedding).		33	238	69
	Siltstone, grey, occasional sandstone bands and laminations abundant comminuted plant debris. Becoming more massive downwards.	2	92	241	61
	Silty mudstone, fine grained comminuted plant debris.	2	44	244	05
	Siltstone, fine sandy laminae.		57	244	62
Sharlston Low (Bottom Leaf)	(COAL 70 cms)				
	(COAL inferior 6 cms)		84	245	46
	(COAL 8 cms)				
	Mudstone seat-earth, black.		17	245	63

SI509JC1040, 4

6 inch Map	
(County Sheet and Quarter)	275 NE
(Nat. Grid Sheet and Quarter)	SE 40 NW / 122

Geological Classification	Nature of Strata	Thickness		Depth	
		m	cm	m	c
	Siltstone seat-earth.		14	245	77
	Mudstone seat-earth listricated.		17	245	94
	Mudstone, carbonaceous with coal streaks.		07	246	01
	Silt/sand, interlaminated, bioturbated, a few small ironstone nodules.	2	25	248	26
	Silty mudstone with plant remains (cordaites).	1	75	250	1
	Mudstone, grey.		99	251	0
	Mudstone, dark-grey, ironstone bands and trace fossils.		28	251	28
	Mudstone, shaly, dark grey.		21	251	49
	Mudstone (shale), black, thin ironstone bands, mussels and fish remains.		23	251	72
	Ironstone.		08	251	80
	Mudstone, listricated.		12	251	92
	Siltstone, coarse.		28	252	20
	Siltstone, fine, grey, thin ironstone bands and sandy laminations.	1	09	253	29
	Silty mudstone, sparse plant debris, abundant thin ironstone bands, occasional thin sandy streaks in upper part.	6	10	259	39
	Mudstone, grey with occasional ironstone bands.	2	18	261	57
	Silty mudstone, compact, ironstone bands and trace fossils.	3	15	264	72
	Ironstone.		02	264	74
	Mudstone.		11	264	74
	Ironstone.		05	264	90
	Shale, dark-grey, compact with thick ironstone bands, fish remains and ostracods in lower part.		83	265	73

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Section of Knabs Hill Borehole

6 inch Map	
(County Sheet and Quarter)	275 NE
(Nat. Grid Sheet and Quarter)	SE 40 NW/ 122

Geological Classification	Nature of Strata	Thickness		Depth	
		m	cm	m	c.
Sharlston Yard	(COAL inferior 4.5)		82	266	55
	(COAL 77.5)				
	Siltstone seat-earth, strong, fawn ironstone nodules at base,		70	267	25
	Siltstone seat-earth, grey/green with ironstone nodules.		51	267	76
	Silty mudstone, grey/green.		43	268	19
	Silty mudstone, dark-grey with plant remains (cordaites) and ironstone bands.		30	268	49
	Silty mudstone, dark-grey and sparse plants.		38	268	87
	Siltstone, fine, dark-grey, sandy laminae and plant debris.		71	269	58
	Siltstone, grey, plants and ironstone nodules.		94	270	52
	Siltstone/silty mudstone with occasional plants.		64	271	16
	Bottom of Borehole.				

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[SE40NW BJ 122.]

31 JUL 1980

COMMERCIAL CONFIDENCE

SE 40 NW 122

W O U G H T O N

NAT GRID REF.
SE/44803 / 06645
LEVEL 64.65^m A.O.D

N.C.B. BARNSELY AREA.

DEARNE VALLEY COLLIERY

KNABS HILL SURFACE BOREHOLE.

SURFACE TO SHARLSTON YARD SEAM.

LOCATION PLAN

SCALE :- 1:10560



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Geological Survey

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