GROUND CONTAMINATION INVESTIGATION

and

COAL MINING RISK ASSESSMENT

for the proposed

Residential development

at the

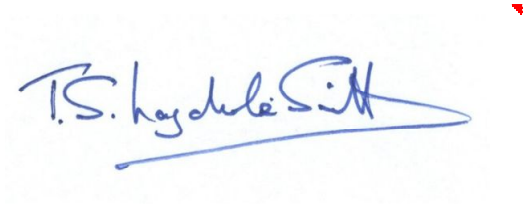
Station Works,
Hill Street,
ELSECAR
S47 8EL



***frontispiece* – view to south across the development site**

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Status of Report:	**FINAL**
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Langdale-Smith and Co Limited
Consulting Engineering and Environmental Geologists

L-S&Co Project Number:	**64 032**
Report on:	Ground Contamination Investigation and Coal Mining Risk Assessment
Report at:	Station Works, Hill Street, Elsecar S74 8EL
Report for:	Monfredi Builders, 106 Holme Lane, Sheffield S6 4JW
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1. INTRODUCTION

1.1 Objectives

It is proposed to convert the existing Ticket Office into a residence with gardens, erect 1 No. block of 4 No. disabled living apartments and 9 No. dwellings for dependant living, under Planning Permission reference 2017/1617 issued by Barnsley Metropolitan Council.

The site is a former railway siding and within an area of coal mining and Conditions 14 and 19 apply.

The site has been subject of a Phase 1 Desk study, with Coal Mining assessment, undertaken by Eastwood and Partners in December 2017 (ref: 42160-001), concluding that:

- the site was occupied by railway sidings and a goods shed, closed in the 1960s, demolished to ground level in the 1980s and left undeveloped;
- the bedrock Pennine Coal Measures (PCM) are overlain by Fill which may be contaminated; and
- there may be shallow mine workings.

Since that time the site has been re-profiled, with much of the Fill overlying the PCM being removed from the development site and placed, within the overall site curtilage, at the west end in an area that will not be developed.

At the request of Monfredi Builders, owner and developer, a ground investigation was undertaken on the re-profiled site to satisfy the planning conditions regarding contamination and mining risks, and to establish the engineering conditions to allow suitable foundation design.

This report gives the trialpit and borehole logs and an assessment of the ground conditions from these records and existing sources of information. This report is limited to the data provided and obtained and responsibility cannot be accepted for conditions not revealed by the investigation. Any diagram or opinion of the possible configuration of the strata around the bore or extension of the findings to greater depths is conjectural and given for guidance only.

1.2 Limitations

Langdale-Smith and Co Limited has prepared this report solely for the use of the client and/or his agent, and the company accepts no responsibility or liability for the:

- use of this report by any party other than the person for whom it was commissioned, or
- consequences of the report being used for any other purpose than that for which it was commissioned.

The conclusions and recommendations in this report represent our professional opinion, derived from currently accepted industry practices, exercising all reasonable skill and care to be expected of a professional engineering and environmental consultancy of similar size and experience. The assessments and judgments given are directed by both the finite quantity of data on which they are based and the proposed works to which they are addressed, taking account of the resources devoted to it by agreement with the client or agent, whether in writing or verbal instructions.

Data acquisition during site investigations is subject to the limitations of the investigation methods and access constraints. Exploratory holes investigate a small portion of the ground in relation to the scale of the site and thus can only be considered to provide an indication of site conditions. There may be ‘hot spots’ not disclosed by initial investigations. Any addition to the knowledge base of this report will make it necessary to re-evaluate the recommendations of this report.

The findings and conditions described are relevant to the dates of the site work and should not be relied upon at substantially later dates because conditions will change over time due to natural variations and human activities (*e.g.* ground water and soil-gas conditions will change with diurnal, seasonal and meteorological variations).

2. SITE PERSPECTIVE

2.1 Location and description

Elsecar is a small former mining town located in South Yorkshire some 10 km north of Sheffield and 5 km southeast of Barnsley and in the borough of Hoyland.

The town has grown on a north-south aligned ridge (see fig. that is followed by Hill Street, and the railway line passes southwest-northeast across the land so that, in Elsecar, the ridge has been cut for the railway line, with the rock won from the excavation used to build the embankments forming Elsecar railway station.

The subject site is located on the southwest side of Hill Street, where it crosses over the railway line and is centred on OS coordinates $^{4}38120$ $^{3}00360$, at approximately 85 m AOD on flat land with a marked 5 m drop along its south side.



Fig 1 – Location of the site

Geographically Elsecar is located on the north bank of the east-flowing River Dearn flood plain which extends at a lower level beyond the south of the site down towards Foundry Lane.

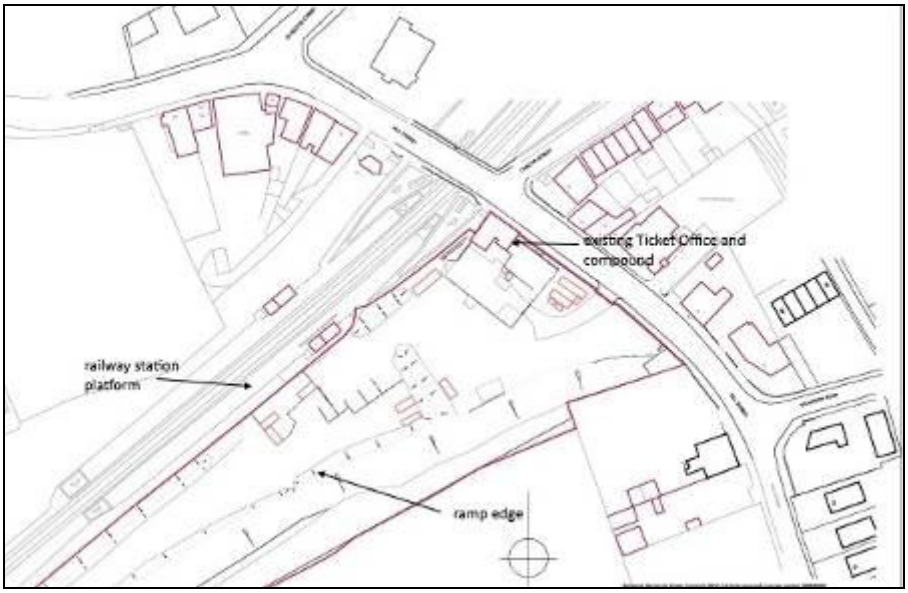


Fig 2 – Site plan

The site is approximately rectangular, fronting on its north side for 120 m onto the existing railway station and for 80 m on its east side onto Hill Street, tapering westwards to 40 m, an estimated area of 0.7 ha.



Fig 3 – aerial view

At the time of the Phase 2 investigation the site had been extensively re-profiled, with up to 1 m of the upper layer of *railway ballast Fill* (fig 5) moved to the western part of the site, exposing the *mudstone lath Fill* that was used to raise the level of the site when the railway lines were built.

A ramp has been constructed at the east end to gain access to the lower terrace (fig 6), affording a good section of the mudstone lath Fill (fig 7), confirming the historical assumptions.



Fig 4 – view east from west boundary along development



Fig 5 – cut into Fill along north boundary with fencing to the railway station platform



Fig 6 – view to west along new access to the low side of embankment



Fig 7 – mudstone lath Fill in embankment

2.2 Brief history

A study of historical OS maps reveal that the site was an open field until the railway arrived by the 1850s, connecting Sheffield to Barnsley, with Elsecar Station opened in 1897, together with a *Goods Shed and Railway Sidings* on the raised land on the south side of the line.

The *Goods Shed and Sidings* were gone by the late 1960s, a victim of Beeching's cuts, and the site remained dormant until the developments extant.

The earthworks undertaken lowered the area of the former Sidings by removing the upper layer of *Railway Ballast.*

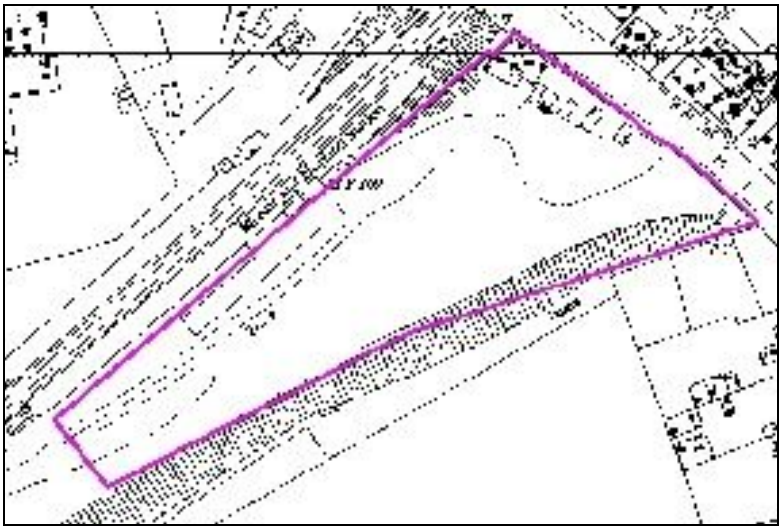


Fig 8 – 1976 OS map 1:1250

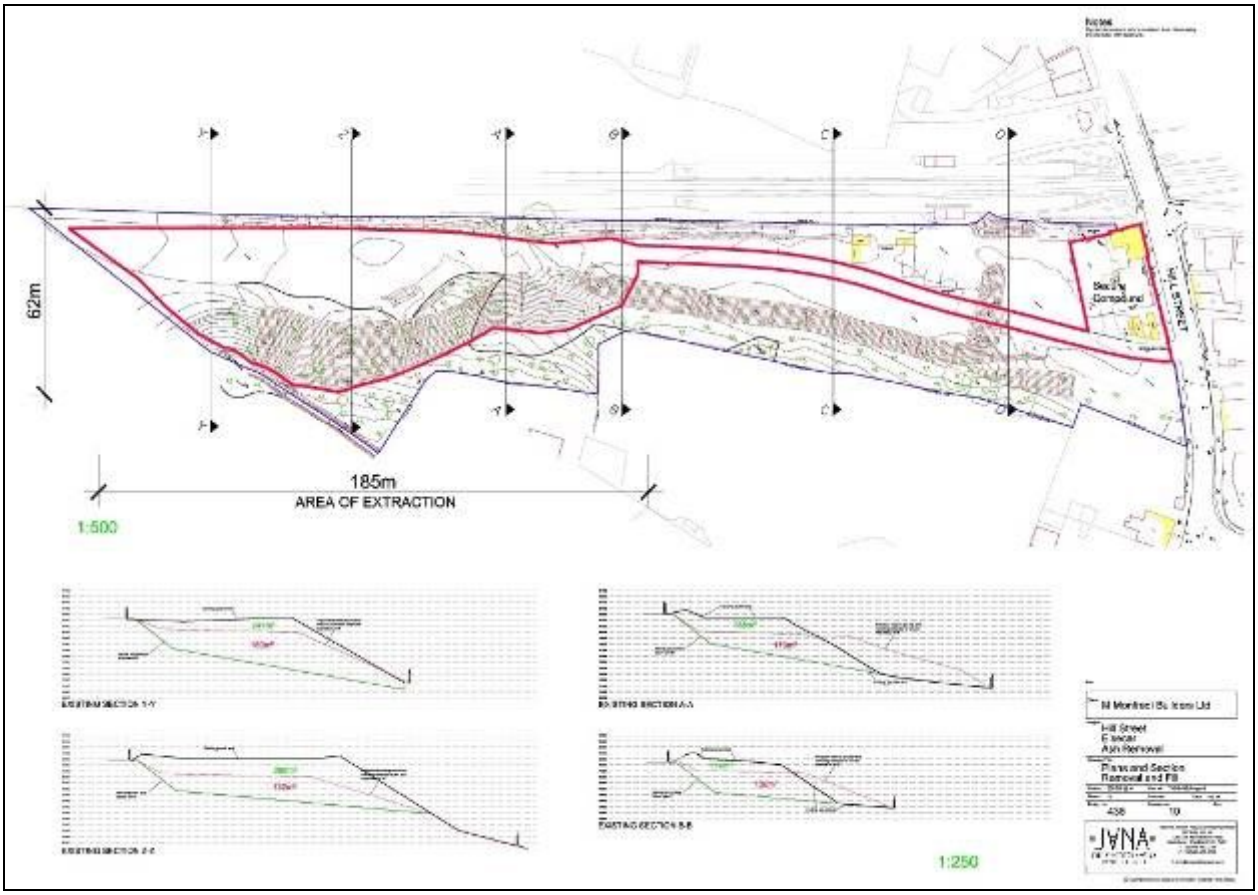


Fig 10 – plan and sections of earthworks (black = original level, red = finished level, green = bedrock

2.3 Geology and hydrogeology

The regional geology at the site comprises of the Carboniferous Pennine Middle Coal Measures (LCM), with no superficial deposits, dipping at 4^0 to the northeast.

The LCM comprise of inter-bedded grey mudstone, siltstone, sandstone and, commonly, coal seams.

The assessment Coal Mining undertaken by Eastwood and Partners revealed:
- Kents Thick (0.75-0.9 m) sub-cropping in north corner of site, poor quality, unlikely to be worked;
- un-named seam (0.3 m) 15 m beneath KK; ashy, unlikely to have been worked
- Barnsley Coal (2.4 m) 55 m beneath KK, major seam, shallowest that has been worked.



Fig 11 – regional geology

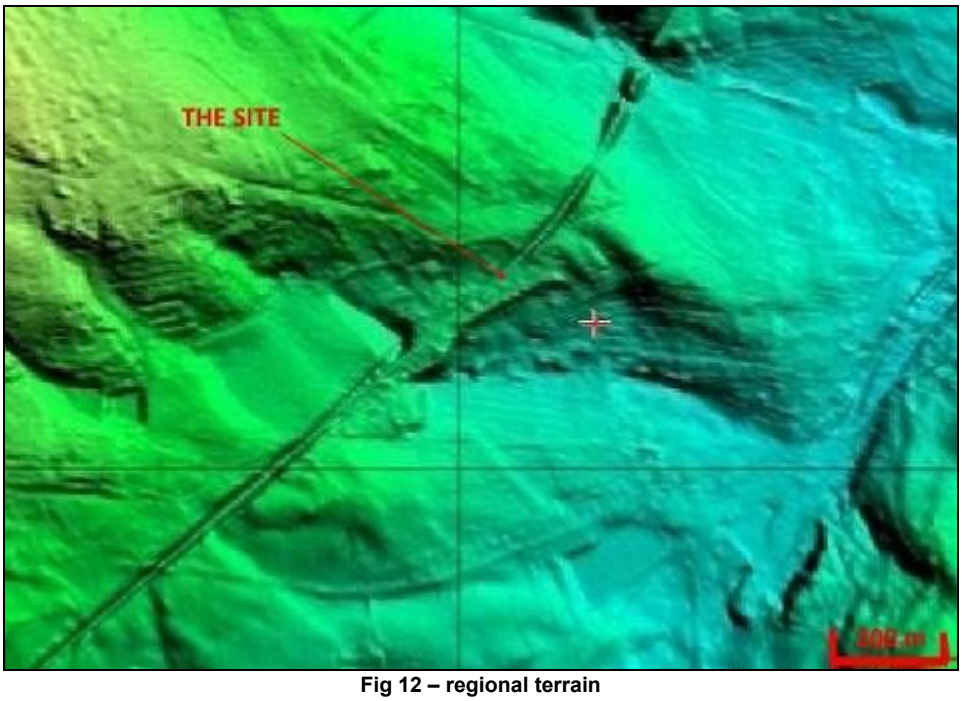


Fig 12 – regional terrain

2.4 Potential sources of contamination

Railway tracks and sidings are built with a thick layer of railway ballast (e.g. strong Sandstone, igneous rocks etc) to provide a strong working surface.

Contamination from railway use includes:
- hearth ash from steam engines;
- lubricants from the rolling stock; and
- herbicides to prevent weeds growing.

The contaminants would accumulate in the railway ballast and would not be able to pass into the underlying *mudstone lath Fill* due to the attenuating properties of clay ground, and the ballast has been removed from the development site.

There is no risk from flooding at this site.

There is no risk from Radon Gas at this site.

3. FIELDWORK

3.1 Strategy

With consideration of the known ground conditions and following the guidelines of BS5930:1999 and BS10175 a programme of boreholes was laid out to derive the stratigraphical sequence and engineering properties of the ground at depth to enable efficient and safe foundation design for the proposed development.

3.1.1 Ground characterisation

The site has been cleared down to the level of the working platform onto which the proposed development will be built.

The working platform comprises of the mudstone lath Fill (figs 5-7) used to build the site levels up in the past and 8 No. samples (TP1 – TP8) were taken from the Fill at approximately 0.5 m bgl.

The samples were placed in amber glass jars, stored in a cooler box, and shipped overnight to i2 Analytical, a well-established UKAS-accredited laboratory.

3.1.2 Shallow mine workings

The Coal Mining Risk Assessment, undertaken by Eastwood and Partners, concluded that there was a moderate risk of shallow mining at the site, and that boreholes to 30 m depth should be made to investigate the possibility of any shallow mine working.

6 No. rotary boreholes (M1A-M6) were made to 30 m bgl, across the footprint of the proposed development, under CA Permit No. 16474, by Site Investigation Services, using water flush as a precaution in case methane gas was present.

Borehole M1A was a redrill of M1.

Readings for methane were taken at the well head using a GA-2000 gas analyser.

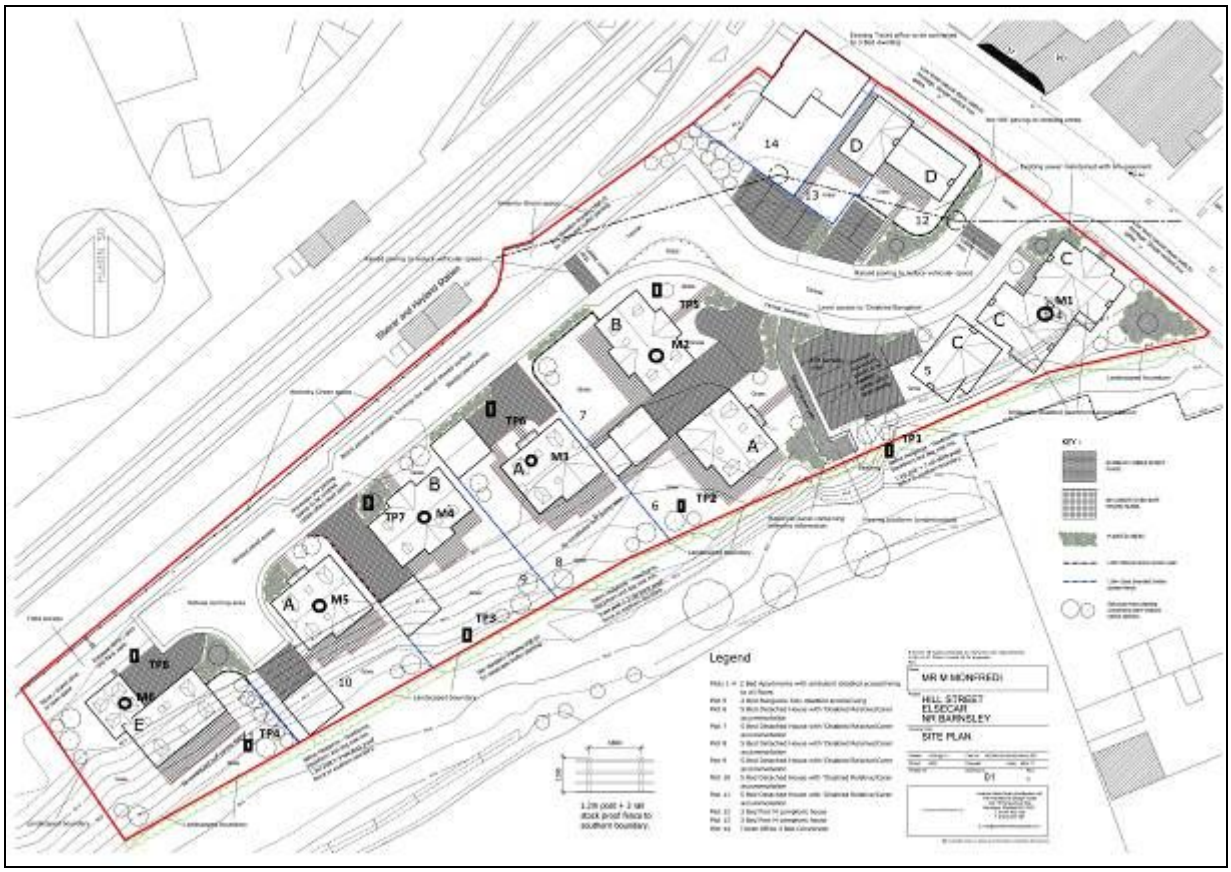


Fig 15 – trialpit and borehole locations

3.2 Description of findings

3.2.1 Ground characterisation

The ground encountered was very similar in every trialpit, comprising of:

0.0 - 1.8 m loose brown clayey Topsoil with fine medium and coarse gravel of mudstone laths and sandstone FILL

This is the same ground that is exposed in the cuts into the *mudstone lath FILL* across the site, with any variations restricted to the surface where other transient soils (*e.g.* pile of bricks, building sand *etc.*) have been stored.

No groundwater was encountered.

3.2.2 Shallow mine workings

The ground encountered was very similar in all boreholes, comprising of (depths approximate):

0.0 – (0.5 -1.5) m	sandstone and brick gravel, ashy in places, FILL
1.5 - 4.5 m	mudstone lath FILL
4.5 – 5.5 m	soft grey/brown and grey silty CLAY
5.5 – 30 m	moderately weak grey MUDSTONE and brown SILTSTONE

Groundwater was encountered in the *soft Clay* at around 5 m bgl, perched on the impermeable bedrock Mudstone.

No groundwater was encountered in the bedrock.

No seams of coal were encountered but a weak dark grey/black MUDSTONE was encountered at around 27 m bgl.

No voids were encountered.

No methane gas was detected at the well head.

4.0 LABORATORY TESTING

4.1 Strategy

There is potential for contamination at this site from the former use as Railway Sidings.

Any contamination would normally be contained within the stone ballast used to improve the ground surface for railway use, and that ballast has been removed from the subject site, exposing the original mudstone lath FILL.

Contamination from railway use includes:
- hearth ash from steam engines;
- lubricants from the rolling stock; and
- long-lasting herbicides to prevent weeds growing.

The use of long-lasting herbicides (*e.g.* DDT) ceased in the early 1960s and any trace would have degraded by now and not be detectable in the natural environment.

Harmful concentrations of TPH are usually detectable in the field, through sight and smell, but the carcinogenic PAH in Hearth Ash are hazardous at low concentrations.

Similarly, asbestos fibres can be present and not observed, as well as toxic metals such as lead.

4.2 Sampling and analysis

8 No. trialpits were excavated to 1.5 m bgl to expose the mudstone lath Fill, and samples were taken at 0.5 m bgl.

The samples were analysed for:
- asbestos fibres;
- General organics and CLEA metal suite;
- TPH,ali/aro split and carbon-banded; and
- PAH (speciated).

4.3 Description of results

The full results are appended and are shown below in tabular form.

The simplest assessment of the potential for harm from the concentrations detected can be made by comparing the values to the Soil Guidance Values (SGV) prepared by LQM/CIEH, suitable for use (S4U) for residences with gardens.

The data shows the Fill to be asbestos-free.

The sample from TP7 showed some PAH to exceed the SGV and this can be attributed to the presence of heavy oil (*i.e.* Aromatic C_{12}-C_{35} which is found in bitumen-coatings) that was also detected

		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8
		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Asbestos in Soil	Type	Not-detected							
pH - Automated	pH Units	8.1	7.1	5.5	4.8	7.4	7.8	9.6	8.3
Total Cyanide	mg/kg	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.058	0.059	0.088	0.29	0.036	0.15	0.95	0.11
Sulphide	mg/kg	2.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	320	140
Total Organic Carbon (TOC)	%	0.7	0.8	0.9	4.2	0.7	0.6	2.7	2.8

		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8
		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Naphthalene	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.50	< 0.05
Acenaphthene	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	2.4	< 0.05
Fluorene	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	2.1	< 0.05
Phenanthrene	mg/kg	< 0.05	< 0.05	0.26	< 0.05	< 0.05	0.19	23	1.6
Anthracene	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	4.3	0.18
Fluoranthene	mg/kg	< 0.05	< 0.05	0.54	< 0.05	< 0.05	0.33	33	1.4
Pyrene	mg/kg	< 0.05	< 0.05	0.49	< 0.05	< 0.05	0.31	29	1.3
Benzo(a)anthracene	mg/kg	< 0.05	< 0.05	0.30	< 0.05	< 0.05	< 0.05	16	0.66
Chrysene	mg/kg	< 0.05	< 0.05	0.30	< 0.05	< 0.05	< 0.05	11	0.77
Benzo(b)fluoranthene	mg/kg	< 0.05	< 0.05	0.30	< 0.05	< 0.05	< 0.05	19	0.86
Benzo(k)fluoranthene	mg/kg	< 0.05	< 0.05	0.13	< 0.05	< 0.05	< 0.05	4.8	0.29
Benzo(a)pyrene	mg/kg	< 0.05	< 0.05	0.18	< 0.05	< 0.05	< 0.05	15	0.65
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.05	< 0.05	0.22	< 0.05	< 0.05	< 0.05	8.1	0.43
Dibenz(a,h)anthracene	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	2.5	< 0.05
Benzo(ghi)perylene	mg/kg	< 0.05	< 0.05	0.22	< 0.05	< 0.05	< 0.05	9.6	0.62
Speciated Total EPA-16 PAHs	**mg/kg**	**< 0.80**	**< 0.80**	**2.94**	**< 0.80**	**< 0.80**	**0.83**	**180**	**8.70**
		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8
		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Arsenic (aqua regia extractable)	mg/kg	13	5.1	10	16	10	9.7	14	15
Boron (water soluble)	mg/kg	1.8	0.9	0.6	1.1	0.9	1.0	2.7	1.3
Cadmium (aqua regia extractable)	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (III)	mg/kg	28	13	18	18	22	22	100	27
Chromium (aqua regia extractable)	mg/kg	28	16	18	18	22	22	100	28
Copper (aqua regia extractable)	mg/kg	50	30	33	59	35	37	88	100
Lead (aqua regia extractable)	mg/kg	31	25	22	23	16	18	62	57
Mercury (aqua regia extractable)	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	34	17	19	28	33	33	25	23
Selenium (aqua regia extractable)	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	88	160	72	67	70	120	170	100
		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8
		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Benzene	ug/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	8.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	10	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8.3	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	16	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	**mg/kg**	**32**	**< 10**	**< 10**	**< 10**	**< 10**	**< 10**	**16**	**< 10**
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	19	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	160	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	240	27
TPH-CWG - Aromatic (EC5 - EC35)	**mg/kg**	**< 10**	**< 10**	**< 10**	**< 10**	**< 10**	**< 10**	**420**	**39**

5. GEOTECHNICAL CONDITIONS

5.1 Engineering Interpretation

The ground encountered was very similar in all boreholes, comprising of (depths approximate):

0.0 – (0.5 -1.5) m	sandstone and brick gravel, ashy in places, FILL
1.5 - 4.5 m	mudstone lath FILL
4.5 – 5.5 m	soft grey/brown and grey silty CLAY
5.5 – 30 m	moderately weak grey MUDSTONE and brown SILTSTONE

Groundwater was encountered in the *soft Clay* at around 5 m bgl, perched on the impermeable bedrock Mudstone.

No groundwater was encountered in the bedrock.

No seams of coal were encountered but a weak dark grey/black MUDSTONE was encountered at around 27 m bgl.

No voids were encountered.

No methane gas was detected at the well head.

5.2 Proposed development

It is proposed to erect detached 2/3 - storey residences along the site.



Fig 16 –proposed development

5.3 Coal mining risk assessment

The borehole logs show that no coal seams, voids or fractured ground will be encountered beneath the site to 30 m bgl.

No special measures need to be taken with respect to any mining risk.

5.4 Excavations and earthworks

Excavations will encounter FILL to 4.5 – 5.5 m bgl, overlying a 1 m thick layer of soft Clay.

The Fill is made up from a surface later, up to 1.5 m thick, of sandstone and brick gravel Fill, overlying a well-compacted mudstone lath Fill.

Generally the Fill is not contaminated although bitumen-coated stone may be encountered.

5.5 Foundations and buried concrete

The ground is not suitable for shallow foundations because:
- the Fill extends to 5.5 m bgl;
- the Fill is embanked within the footprint of each residence; and
- the Fill overlies a 1 m layer of soft Clay.

The bedrock Mudstone will be encountered at 5.5 – 6.5 m bgl, the upper layer of which is weathered to a soft Clay.

It is recommended that a piled foundation be considered.

5.6 Pavements and site drainage

The unconsolidated ground at the site is the mudstone lath Fill that was emplaced to create the levels for the railway station and associated sidings.

The Fill will be a suitable pavement surface due to:
- well-compacted, due to use as a railway sidings; and
- self-consolidated after >100 years of emplacement.

The clay and mudstone ground at the site will be impermeable and is not suitable for soakaway drainage.

6. ENVIRONMENTAL CONDITIONS

6.1 Conceptual exposure model

6.1.1 Sources

The ground at the site comprises of a 5 m thick layer of mudstone lath Fill.

8 No. samples of the Fill were analysed for contamination associated with the former use and 1 No. sample showed elevated concentration for PAH that can be attributed to bitumen (*i.e*. a stray bitumen-coated stone).

No other contamination, including asbestos, was encountered.

6.1.2 Receptors

The site is a privately-owned yard with short term exposure characteristics.

6.1.3 Pathways

Based on the CLEA model, the generic potential pathways of Direct Exposure for future human receptors would be:
- Indoor and Outdoor inhalation of soil vapour;
- Ingestion of home grown vegetables and of soil attached to the vegetables;
- Outdoor exposure to soil through skin;
- Indoor and Outdoor inhalation of fugitive dust; and
- Indoor and Outdoor ingestion of contaminated dust and soil.

There is no sub-surface migration pathway for superficial contaminants.

6.2 Proposed development

It is proposed to erect a series of detached two-storey residences with a gardens (fig 16).

6.3 Qualitative risk assessment

The proposed development will introduce the sensitive receptors of residents with children and garden produce up-take.

No special measures need to be taken with respect to any contamination risk.

There is no risk of Radon gas at the site.

6.4 Recommendations for remediation and validation

No voids or fractured ground were encountered beneath the site to 30 m bgl.

No special precautions are required to deal with shallow mine workings.

<< END >>

10. At this stage, it is anticipated that precast concrete beam and block floors will be required for al plots.

11. Soakaways are not expected to be suitable as a means of surface water disposal. A piped connection will be required, with onsite attenuation.

12. Some contaminated soils may be encountered within the made ground which currently covers the site. At this stage, it is anticipated that any risk to human health and other receptors could be mitigated through the placement of 600 mm clean capping in all gardens and areas of soft landscaping.

13. Before more definite information regarding the properties of the ground and any contamination present can be given, an intrusive ground investigation will be required. This would be best undertaken by trial pits excavated using a mechanical excavator, with subsequent laboratory testing of the soils recovered. A borehole investigation is also considered prudent in order to check for shallow mining, and a programme of gas monitoring should be undertaken if deep fill is present on site.

14. The conclusions made in this report in relation to contamination are subject to agreement by the approving bodies and your warranty provider.

1.0 EXECUTIVE SUMMARY

1. The site has an area of around 0.7 hectares and is located to the south west of Hill Street, in Elsecar, South Yorkshire. It is centred on grid reference 438110 400340. The site is currently used as a general storage yard for building materials. A brick building is located in the northern most corner. It is proposed to develop the site with residential dwellings.

2. Historically, the site was occupied by railway sidings and a goods shed from the early 1900s until around the late 1960s. Since this time, the site has been open land. The ground levels on the site were indicated to have been raised when the railway features were constructed. The surrounding land is currently largely residential in nature.

3. The solid geology below the site is shown to comprise strata of the Middle Coal Measures, with mudstone indicated below the majority of the site. Made ground deposits are anticipated above the natural strata.

4. A seam of coal is anticipated at shallow depth below the site, although this is expected to be thin and therefore is unlikely to have been worked. A more substantial seam is expected below the northern most tip of the site, but again this is not anticipated to have been worked in this area. However, a borehole investigation is considered prudent to confirm that workings are not present.

5. The solid bedrock beneath the site is classified as a Secondary A Aquifer. The site is not within a groundwater source protection zone.

6. No radon precautions are required at the site.

7. There are a number of former landfill sites in the vicinity of the site, although these are not expected to significantly influence the prosed development. However deep made ground may be present on site, and therefore gas monitoring may be necessary. At this stage, allowance should be made for installing gas protective measures in all plots, comprising a fully lapped and sealed gas resistant membrane and sub-floor ventilated void.

8. Traditional trench fill foundations may be suitable, depending on the depth of made ground that is present, taken through and founded within the competent natural clay at an expected minimum depth of between 900 mm and up to around 2.5 m bgl. Alternatively, if significant depths of made ground re encountered, it may be more economical to use piled foundations.

9. Deepening of the footings due to trees may be required locally.

The Coal Authority

Resolving the impacts of mining

CON29M Non-Residential Mining Report





STATION WORKS, HILL STREET
ELSECAR
BARNSLEY
SOUTH YORKSHIRE



Date of enquiry:	05 December 2017
Date enquiry received:	05 December 2017
Issue date:	05 December 2017
Our reference:	51001713445001
Your reference:	148949771_2|

CON29M Non-Residential Mining Report

This report is based on, and limited to, the records held by the Coal Authority and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Client name

LANDMARK INFORMATION GROUP LIMITED

Enquiry address

STATION WORKS, HILL STREET, ELSECAR, BARNSLEY, SOUTH YORKSHIRE



Approximate position of property

Map data

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+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

/company/the-coal-authority
/thecoalauthority
/coalauthority

Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	Yes
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	Yes
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	Yes
13	Working facilities order	Yes
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is in a surface area that could be affected by underground mining in 8 seams of coal at 50m to 400m depth, and last worked in 1979.

Any movement in the ground due to coal mining activity should have stopped.

In addition the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered prior to any site works or future development activity. Your attention is drawn to the Comments on the Coal Authority information section of the report.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4. Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

There may however be mine entries/additional mine entries in the local area which the Coal Authority has no knowledge of.

5. Coal mining geology
The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6. Past opencast coal mining
The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7. Present opencast coal mining
The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8. Future opencast coal mining
There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9. Coal mining subsidence
The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10. Mine gas
The Coal Authority has no record of a mine gas emission requiring action.

11. Hazards related to coal mining
The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

12. Withdrawal of support
The property is in an area where a notice to withdraw support was given in 1975.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

13. Working facilities order

The property is in an area for which the Newton Chambers Order dated 1936 has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

The property is in an area for which the Earl Fitzwilliam Order dated 1939 has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14. Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

15. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Comments on the Coal Authority information

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In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Additional remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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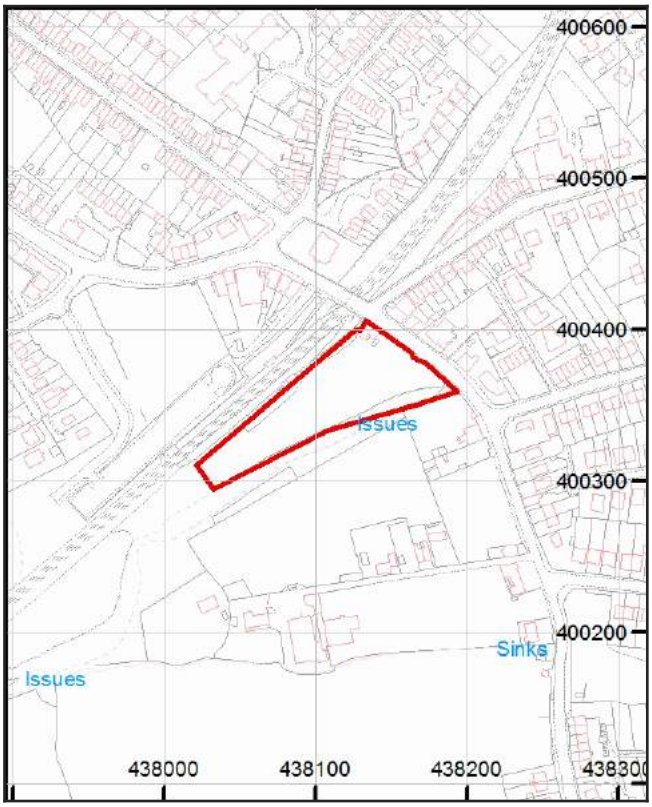
Alternative formats

If you would like this report in an alternative format, please contact our communications team.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



Map data

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Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

/company/the-coal-authority
/thecoalauthority
/coalauthority

The Coal Authority

Permit to Enter or Disturb Coal Authority Mining Interests

Permit Reference Number 16474

Name and Address of Permit Holder:

M Monfredi Builders Ltd
106 Holme Lane
Sheffield
Yorkshire
S6 4JW

Site Location:

The Old Ticket Master's Office
Hill Street
Elsecar
Barnsley
Yorkshire
S74 8EL

This certificate hereby grants the above named Permit Holder a Permit to carry out:-

Investigation of shallow mine workings by six boreholes to 30m bgl

within the Authority's mining interests at the identified site location for the period of 12 months from the granted date shown below. The granting of this Permit does not constitute advice given by the Authority in relation to the proposed operations. It is the Applicant's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.

Signed: Paul Heap Granted Date: ***02/10/2018***

For and on behalf of The Coal Authority

Nominated Representative: Paul Heap, Permitting Manager;
The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG
Tel: 01623 637339; E-Mail: permissions@coal.gov.uk

Project No. 64 032
Project Name: Elsecar
Client: Monfredi Builders
Site: Ticket Office
Location: SE

Date excavated: Sep 10, 2018
Excavated by: JCB 3CX
Contractor: Client
Elevation (m AOD): 0
OS Coords: 438145 400340

TRIALPIT: TP1

Logged By: TSLS
Orientation: E/W
Face Logged: N

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
			loose grey/brown clayey Topsoil with fine medium and coarse Gravel and Cobbles of mudstone laths, sandstone FILL			Pit dry - sides unstable
					1	
1	-1					
2	-2					
3	-3					

Langdale-Smith and Co Limited
Engineering and Environmental Geologists
01673 858766

Project No. 64 032
Project Name: Elsecar
Client: Monfredi Builders
Site: Ticket Office
Location: S

Date excavated: Sep 10, 2018
Excavated by: JCB 3CX
Contractor: Client
Elevation (m AOD): 0
OS Coords: 438125 400340

TRIALPIT: TP2

Logged By: TSLS
Orientation: E/W
Face Logged: N

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
			loose brown clayey Topsoil with fine medium and coarse Gravel and Cobbles of mudstone laths, sandstone FILL			Pit dry - sides unstable
					1	
1	-1					
2	-2					
3	-3					

Langdale-Smith and Co Limited
Engineering and Environmental Geologists
01673 858766

Project No. 64 032
Project Name: Elsecar
Client: Monfredi Builders
Site: Ticket Office
Location: S

Date excavated: Sep 10, 2018
Excavated by: JCB 3CX
Contractor: Client
Elevation (m AOD): 0
OS Coords: 438090 400320

TRIALPIT: TP3

Logged By: TSLS
Orientation: E/W
Face Logged: N

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
			loose brown clayey Topsoil with fine medium and coarse Gravel and Cobbles of mudstone laths, sandstone FILL			Pit dry - sides unstable
					1	
1	-1					
2	-2					
3	-3					

Langdale-Smith and Co Limited
Engineering and Environmental Geologists
01673 858766

Project No. 64 032
Project Name: Elsecar
Client: Monfredi Builders
Site: Ticket Office
Location: SW

Date excavated: Sep 10, 2018
Excavated by: JCB 3CX
Contractor: Client
Elevation (m AOD): 0
OS Coords: 438075 400310

TRIALPIT: TP4

Logged By: TSLS
Orientation: E/W
Face Logged: N

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
			loose brown/black clayey Topsoil with fine medium and coarse coaly Gravel and Cobbles of mudstone laths, sandstone FILL			Pit dry - sides unstable
					1	
1	-1					
2	-2					
3	-3					

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01673 858766

Project No. 64 032
Project Name: Elsecar
Client: Monfredi Builders
Site: Ticket Office
Location: W

Date excavated: Sep 10, 2018
Excavated by: JCB 3CX
Contractor: Client
Elevation (m AOD): 0
OS Coords: 438060 400325

TRIALPIT: TP5

Logged By: TSLS
Orientation: E/W
Face Logged: N

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
			loose brown clayey Topsoil with fine medium and coarse Gravel and Cobbles of mudstone laths, sandstone FILL			Pit dry - sides unstable
					1	
1	-1					
2	-2					
3	-3					

Langdale-Smith and Co Limited
Engineering and Environmental Geologists
01673 858766

Project No. 64 032
Project Name: Elsecar
Client: Monfredi Builders
Site: Ticket Office
Location: NW

Date excavated: Sep 10, 2018
Excavated by: JCB 3CX
Contractor: Client
Elevation (m AOD): 0
OS Coords: 438075 400340

TRIALPIT: TP6

Logged By: TSLS
Orientation: E/W
Face Logged: N

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
			loose brown clayey Topsoil with fine medium and coarse Gravel and Cobbles of mudstone laths, sandstone FILL			Pit dry - sides unstable
					1	
1	-1					
2	-2					
3	-3					

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Engineering and Environmental Geologists
01673 858766

Project No. 64 032
Project Name: Elsecar
Client: Monfredi Builders
Site: Ticket Office
Location: N

Date excavated: Sep 10, 2018
Excavated by: JCB 3CX
Contractor: Client
Elevation (m AOD): 0
OS Coords: 438095 400360

TRIALPIT: TP7

Logged By: TSLS
Orientation: E/W
Face Logged: N

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
			loose brown clayey Topsoil with fine medium and coarse Gravel and Cobbles of mudstone laths, sandstone FILL			Pit dry - sides unstable
					1	
1	-1					
2	-2					
3	-3					

Langdale-Smith and Co Limited
Engineering and Environmental Geologists
01673 858766

Project No. 64 032
Project Name: Elsecar
Client: Monfredi Builders
Site: Ticket Office
Location: N

Date excavated: Sep 10, 2018
Excavated by: JCB 3CX
Contractor: Client
Elevation (m AOD): 0
OS Coords: 438115 400365

TRIALPIT: TP8

Logged By: TSLS
Orientation: E/W
Face Logged: N

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
			loose brown clayey Topsoil with fine medium and coarse Gravel and Cobbles of mudstone laths, sandstone FILL			Pit dry - sides unstable
					1	
1	-1					
2	-2					
3	-3					

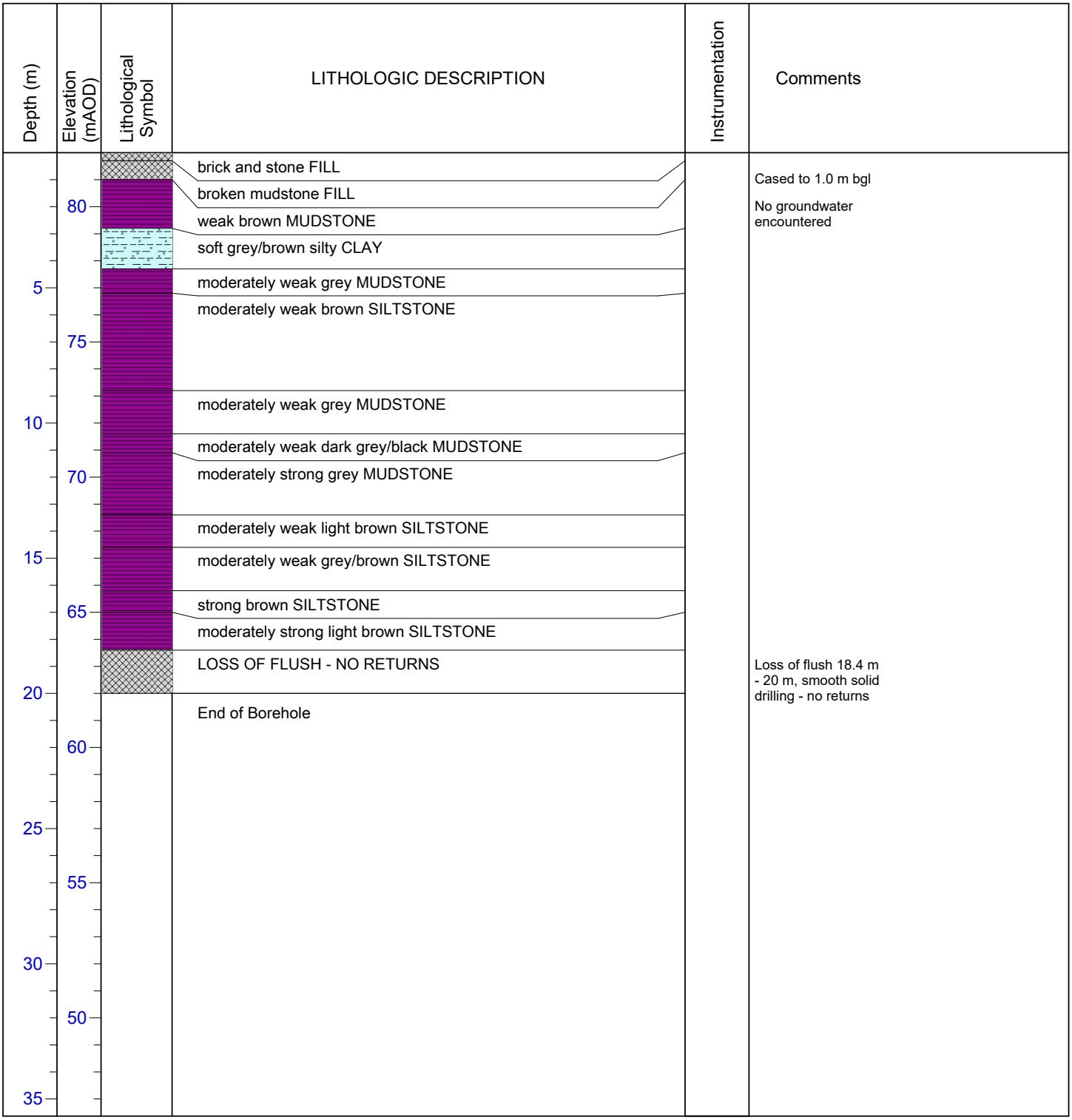
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01673 858766

Project No. 64 032
Project Name: Elsecar
Site: Station Works
Location: east
Bore by Site Investigation Services

Drilling Rig: Beretta T44
Crew: DL
Fluid: Water
Bore Diameter (mm): 100
Core Diameter (mm):

ROTARY BOREHOLE: M1

Date Bored: Oct 3, 2018
Elevation (m AOD): 82
OS Coords: 438170 400370
Logged By: TSLS



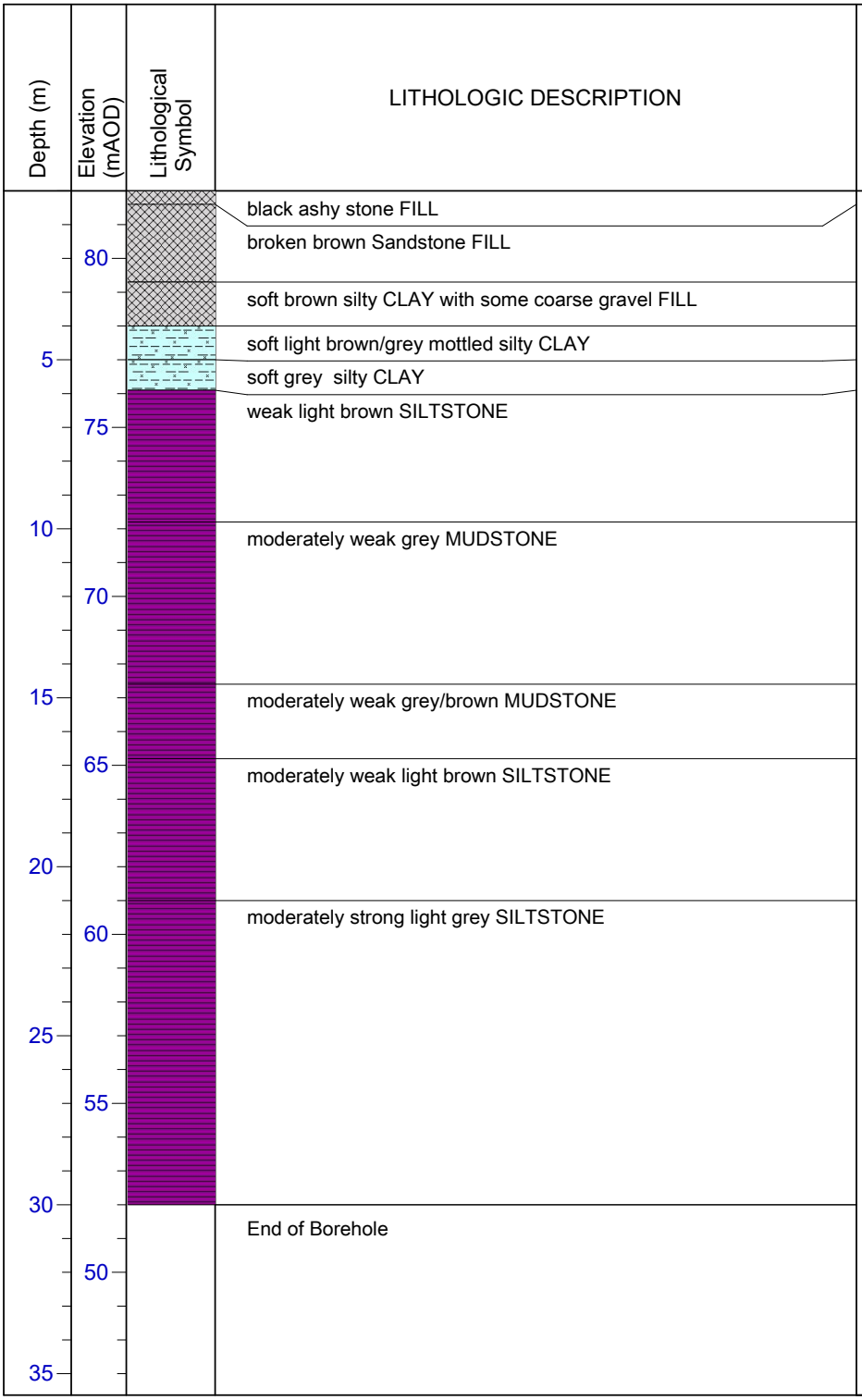
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Project No. 64 032
Project Name: Elsecar
Site: Station Works
Location: N
Bore by Site Investigation Services

Drilling Rig: Beretta T44
Crew: DL
Fluid: Water
Bore Diameter (mm): 100
Core Diameter (mm):

ROTARY BOREHOLE: M1A

Date Bored: Oct 3, 2018
Elevation (m AOD): 82
OS Coords: 438165 400370
Logged By: TSLS



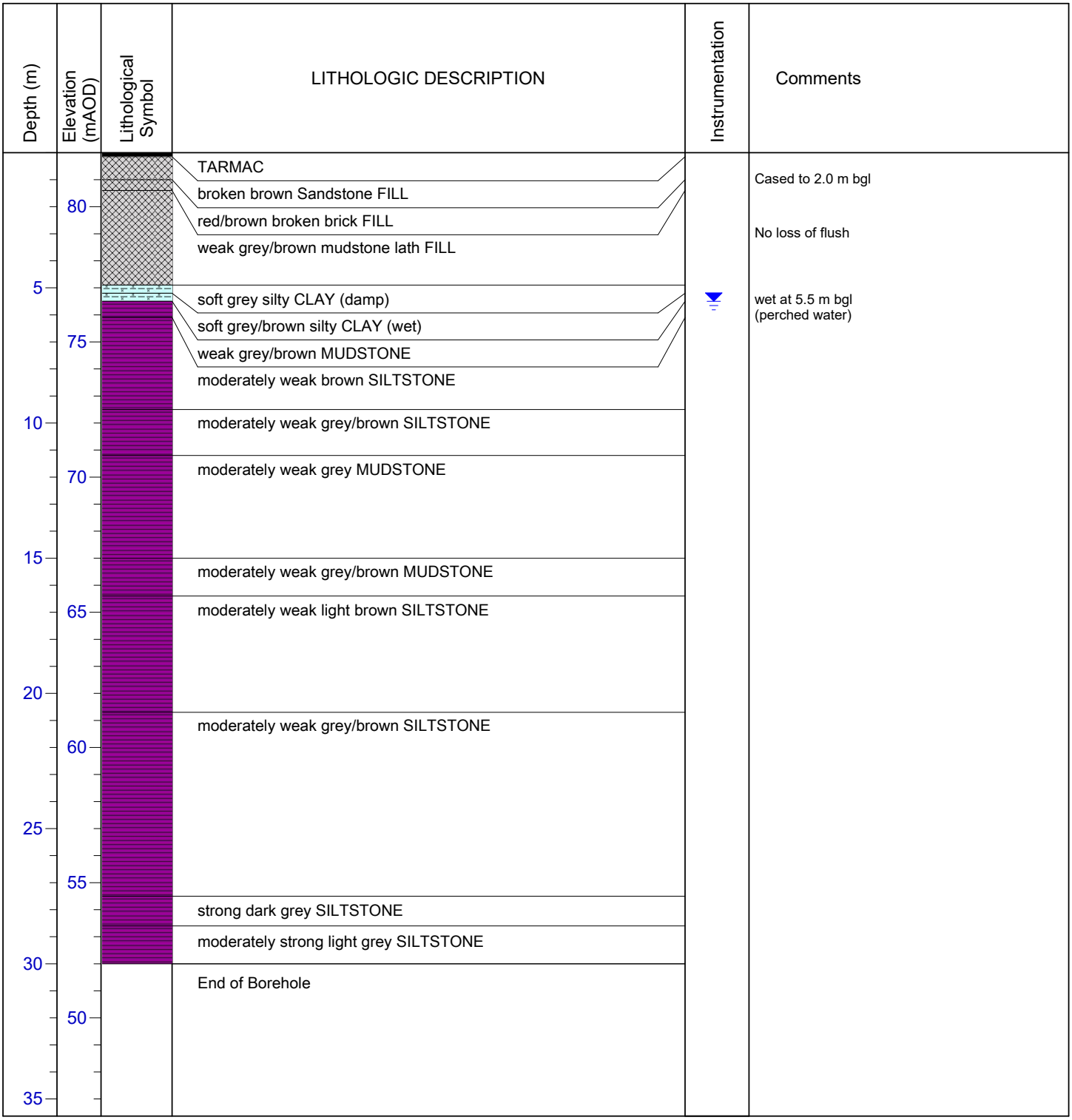
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01673 858766

Project No. 64 032
Project Name: Elsecar
Site: Station Works
Location: east
Bore by Site Investigation Services

Drilling Rig: Beretta T44
Crew: DL
Fluid: water
Bore Diameter (mm): 100
Core Diameter (mm):

ROTARY BOREHOLE: M2

Date Bored: October 3, 2018
Elevation (m AOD): 82
OS Coords: 438115 400365
Logged By: TSLS



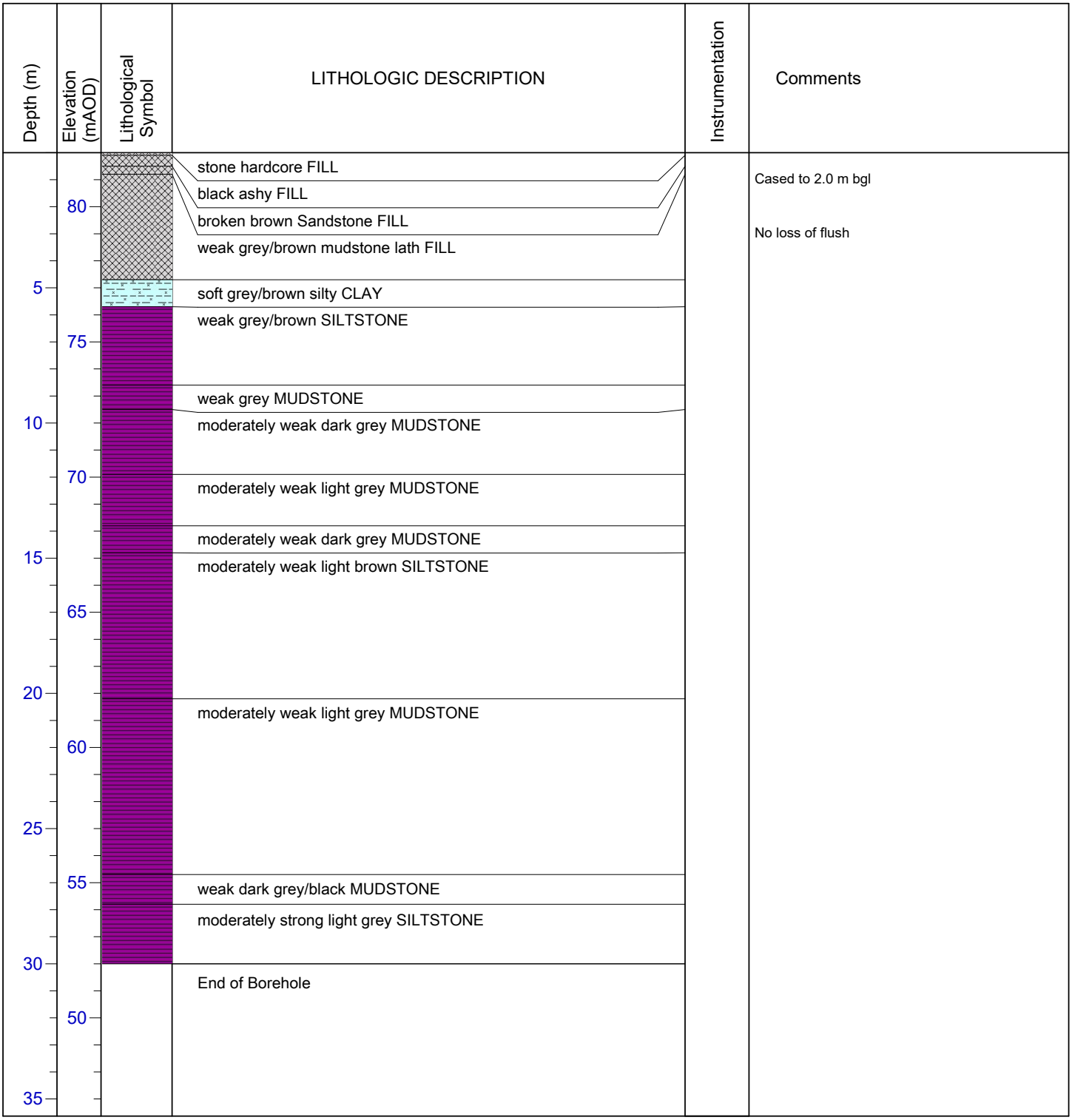
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Engineering and Environmental Geologists
01673 858766

Project No. 64 032
Project Name: Elsecar
Site: Station Works
Location: N
Bore by Site Investigation Services

Drilling Rig: Beretta T44
Crew: DL
Fluid: Water
Bore Diameter (mm): 100
Core Diameter (mm):

ROTARY BOREHOLE: M3

Date Bored: Oct 3, 2018
Elevation (m AOD): 82
OS Coords: 438090 400350
Logged By: TSLS



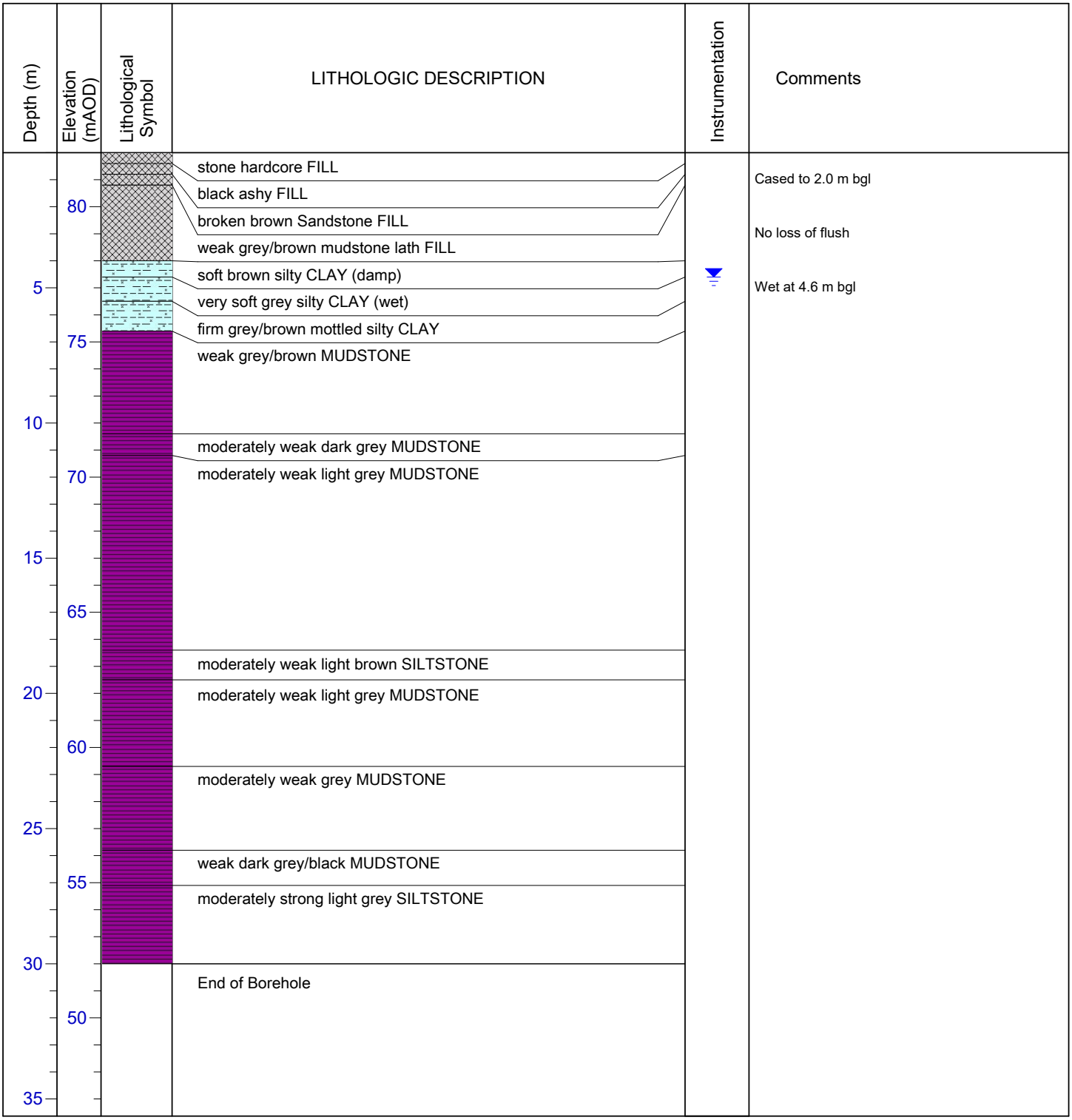
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Project No. 64 032
Project Name: Elsecar
Site: Station Works
Location: N
Bore by Site Investigation Services

Drilling Rig: Beretta T44
Crew: DL
Fluid:
Bore Diameter (mm): 100
Core Diameter (mm):

ROTARY BOREHOLE: M4

Date Bored: Oct 4, 2018
Elevation (m AOD): 82
OS Coords: 438075 400355
Logged By: TSLS



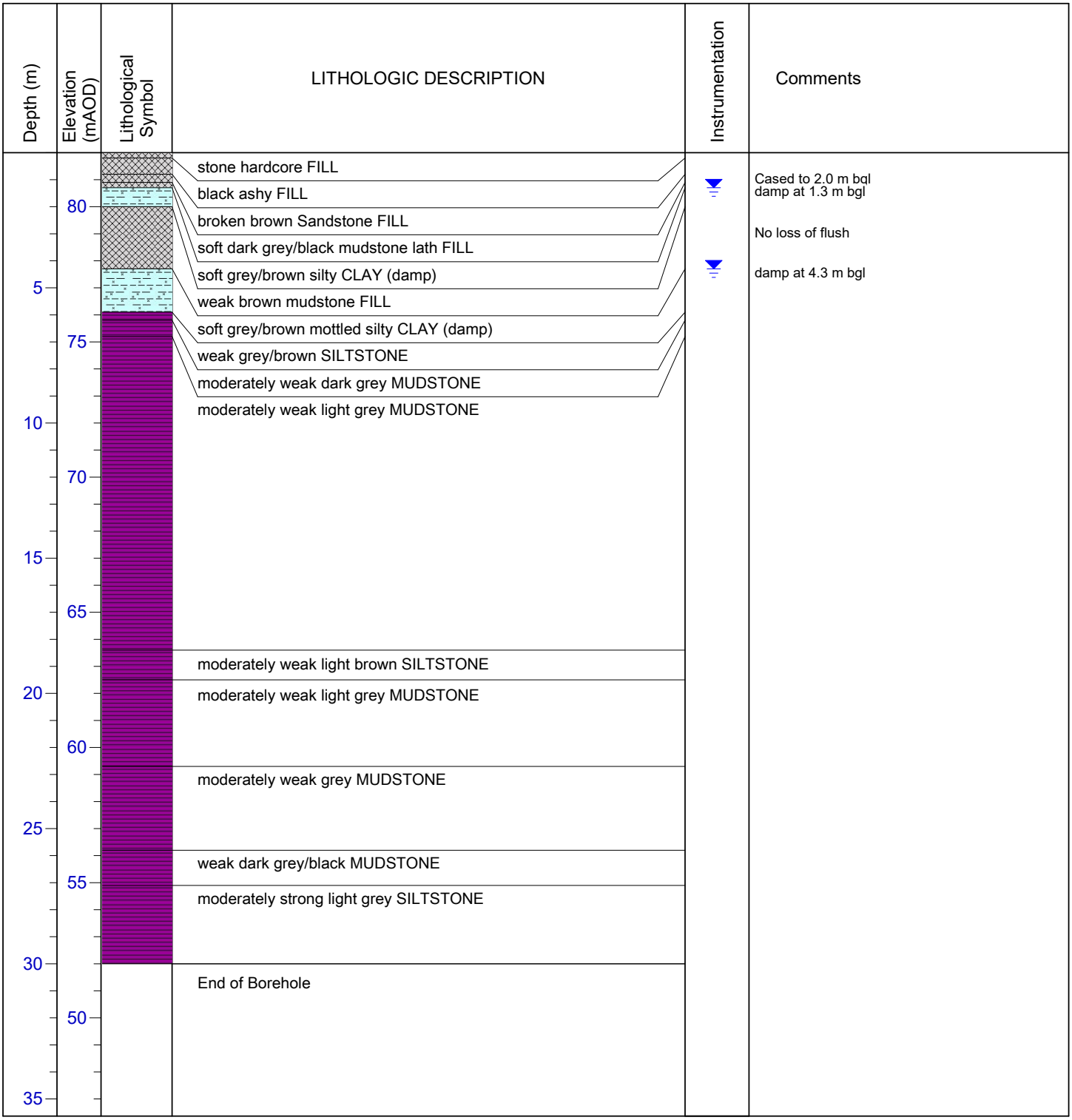
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Engineering and Environmental Geologists
01673 858766

Project No. 64 032
Project Name: Elsecar
Site: Station Works
Location: N
Bore by Site Investigation Services

Drilling Rig: Beretta T44
Crew: DL
Fluid: Water
Bore Diameter (mm): 100
Core Diameter (mm):

ROTARY BOREHOLE: M5

Date Bored: Oct 4, 2018
Elevation (m AOD): 82
OS Coords: 438065 400325
Logged By: TSLS



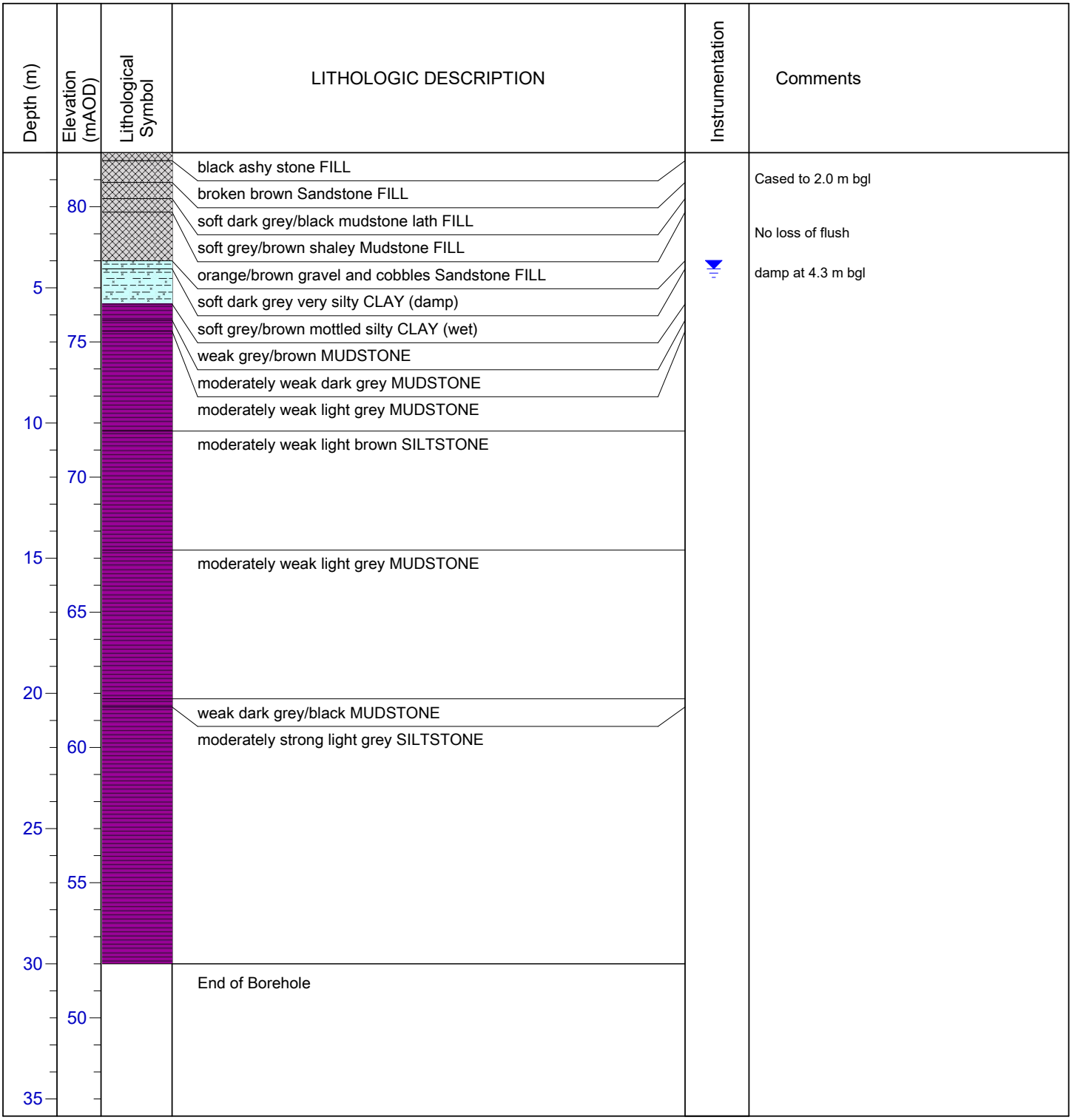
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Engineering and Environmental Geologists
01673 858766

Project No. 64 032
Project Name: Elsecar
Site: Station Works
Location: N
Bore by Site Investigation Services

Drilling Rig: Beretta T44
Crew: DL
Fluid: Water
Bore Diameter (mm): 100
Core Diameter (mm):

ROTARY BOREHOLE: M6

Date Bored: Oct 4, 2018
Elevation (m AOD): 82
OS Coords: 438065 400300
Logged By: TSLS



Langdale-Smith and Company Limited
Engineering and Environmental Geologists
01673 858766

Tim Langdale-Smith
LSCo Geo-Consulting Ltd
Wrangham House
Market Place
Wragby
LN8 5QU

e: geologist@langdalesmith.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 18-10174

Project / Site name:	Elsecar	**Samples received on:**	12/09/2018
Your job number:		**Samples instructed on:**	12/09/2018
Your order number:	64032	**Analysis completed by:**	21/09/2018
Report Issue Number:	1	**Report issued on:**	21/09/2018
Samples Analysed:	8 soil samples		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 18-10174

Project / Site name: Elsecar
Your Order No: 64032

Lab Sample Number				1044731	1044732	1044733	1044734	1044735
Sample Reference				TP1	TP2	TP3	TP4	TP5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.50	0.50	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	5.9	8.2	9.8	13	10
Total mass of sample received	kg	0.001	NONE	0.47	0.44	0.47	0.41	0.47
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.1	7.1	5.5	4.8	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.058	0.059	0.088	0.29	0.036
Sulphide	mg/kg	1	MCERTS	2.7	< 1.0	< 1.0	< 1.0	< 1.0
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.7	0.8	0.9	4.2	0.7
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.26	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.54	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.49	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.30	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.30	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.30	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.13	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.18	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.22	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.22	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	2.94	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	5.1	10	16	10
Boron (water soluble)	mg/kg	0.2	MCERTS	1.8	0.9	0.6	1.1	0.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (III)	mg/kg	1	NONE	28	13	18	18	22
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	16	18	18	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	50	30	33	59	35
Lead (aqua regia extractable)	mg/kg	1	MCERTS	31	25	22	23	16
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	34	17	19	28	33
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	88	160	72	67	70

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Analytical Report Number: 18-10174

Project / Site name: Elsecar
Your Order No: 64032

Lab Sample Number				1044731	1044732	1044733	1044734	1044735
Sample Reference				TP1	TP2	TP3	TP4	TP5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.50	0.50	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	8.1	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	10	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	8.3	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	32	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

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Analytical Report Number: 18-10174

Project / Site name: Elsecar
Your Order No: 64032

Lab Sample Number				1044736	1044737	1044738		
Sample Reference				TP6	TP7	TP8		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.50	0.50	0.50		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	9.2	8.3	8.2		
Total mass of sample received	kg	0.001	NONE	0.47	0.29	0.45		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.8	9.6	8.3		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.15	0.95	0.11		
Sulphide	mg/kg	1	MCERTS	< 1.0	320	140		
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.6	2.7	2.8		
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.50	< 0.05		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	2.4	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	2.1	< 0.05		
Phenanthrene	mg/kg	0.05	MCERTS	0.19	23	1.6		
Anthracene	mg/kg	0.05	MCERTS	< 0.05	4.3	0.18		
Fluoranthene	mg/kg	0.05	MCERTS	0.33	33	1.4		
Pyrene	mg/kg	0.05	MCERTS	0.31	29	1.3		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	16	0.66		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	11	0.77		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	19	0.86		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	4.8	0.29		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	15	0.65		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	8.1	0.43		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	2.5	< 0.05		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	9.6	0.62		
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	0.83	180	8.70		
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.7	14	15		
Boron (water soluble)	mg/kg	0.2	MCERTS	1.0	2.7	1.3		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (III)	mg/kg	1	NONE	22	100	27		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	100	28		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	37	88	100		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	18	62	57		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	33	25	23		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	170	100		

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Analytical Report Number: 18-10174

Project / Site name: Elsecar
Your Order No: 64032

Lab Sample Number				1044736	1044737	1044738		
Sample Reference				TP6	TP7	TP8		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.50	0.50	0.50		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	16	< 8.0		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	16	< 10		
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	19	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	160	< 10		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	240	27		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	420	39		

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Analytical Report Number : 18-10174

Project / Site name: Elsecar

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1044731	TP1	None Supplied	0.50	Light brown sandy clay.
1044732	TP2	None Supplied	0.50	Light brown sandy loam with gravel and vegetation.
1044733	TP3	None Supplied	0.50	Light brown sandy clay with gravel.
1044734	TP4	None Supplied	0.50	Grey clay and sand.
1044735	TP5	None Supplied	0.50	Brown clay and sand with vegetation.
1044736	TP6	None Supplied	0.50	Brown clay and sand with vegetation.
1044737	TP7	None Supplied	0.50	Brown loam and sand with gravel and vegetation.
1044738	TP8	None Supplied	0.50	Brown loam and sand with gravel and rubble.

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Analytical Report Number : 18-10174

Project / Site name: Elsecar

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
TP1		S	18-10174	1044731	a			
TP2		S	18-10174	1044732	a			
TP3		S	18-10174	1044733	a			
TP4		S	18-10174	1044734	a			
TP5		S	18-10174	1044735	a			
TP6		S	18-10174	1044736	a			
TP7		S	18-10174	1044737	a			
TP8		S	18-10174	1044738	a			

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

The Coal Authority

Permit Closure Summary Form

Permit Ref.	16474	Project / Site Location	The Old Ticket Master's Office, Hill Street, Elsecar, Barnsley, Yorkshire, S74 8EL

Please complete and return this e-form within **3 months** of the permitted works being completed. It is supplementary to, and should form part of, the full completion/validation reporting.

Where relevant the report should include; borehole logs and details of mine or mine entry treatment works carried out (incl. engineering drawings, grout takes etc.) and a scaled site layout plan (correlated to O.S N' Grid) showing all relevant mine entry positions, coal seams, voids and broken ground proved by the works.

Summary of works **Start date** 3/10/18 **Finish date** 4/10/18

Have variations occurred to the scope / design of the works since the Permit was granted? ☒ No, ☐ Yes.

If yes, please describe;

Did if any of the following incidents occur?

☐ Spontaneous combustion, ☐ Water emission, ☐ Gas emission (elevated or above action levels)
☐ Geotechnical instability, ☐ Legal issues incl. damage or potential claims, ☒ **None**

If yes, please detail each item;

If shallow coal or coal workings were encountered please describe the conditions.

☐ Intact coal only, ☐ Broken ground, ☐ Backfilled ground, ☐ Voids

Please provide a general description;

No coal seams encountered.

Will further works be necessary that require a Permit? ☒ No ☐ Yes

If yes, please describe, including any recommendations;

Will the closure information be submitted to the LPA for discharge of a Planning Condition? ☐ No ☒ Yes

Relevant Planning Application Reference No.	Barnsley MBC - 2017/1617

Please provide the details;

Name: M. Manfredi	**Email:** manfredibuilders@gmail.com
Company: Manfredi Builders	**Tel:**