REPORT SDL4284
JUNE 2022

COMPLETION REPORT FOR THE DRILLING AND GROUTING TREATMENT OF MINE WORKINGS

For land at
GREENHEAD SIXTH FORM COLLEGE, HUDDERSFIELD

prepared for
GALLIFORD TRY BUILDING NORTH EAST & YORKSHIRE LTD.

REPORT NUMBER:	SDL4284	**REPORT STATUS:**	FINAL
REPORT TYPE:	COMPLETION REPORT FOR THE DRILLING AND GROUTING TREATMENT OF MINE WORKINGS		
REPORT DATE:	JUNE 2022		
SITE NAME:	GREENHEAD SIXTH FORM COLLEGE, HUDDERSFIELD		
PREPARED FOR:	GALLIFORD TRY BUILDINGS NORTH EAST & YORKSHIRE LTD.		
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COMPLETION REPORT FOR THE DRILLING AND GROUTING TREATMENT OF MINE WORKINGS

for land at

GREENHEAD SIXTH FORM COLLEGE

HUDDERSFIELD

Prepared for

GALLIFORD TRY BUILDING NORTH EAST & YORKSHIRE LTD.

CONTENTS

APPENDICES

APPENDIX A FIGURES AND DRAWINGS

Drawing No.	Title	Scale
SDL4284/CS/01	Site Location Plan	1:25,000
SDL4284/CS/02	Development Layout Plan	1:750
SDL4284/CS/03	As-Built Drilling & Grouting Treatment Layout Plan	1:250

APPENDIX B SPECIFICATION FOR THE STABILISATION OF SHALLOW MINE WORKINGS

APPENDIX C COAL AUTHORITY PERMIT

APPENDIX D DRILLING LOGS, GROUTING LOGS AND SUMMARY TABLES

APPENDIX E GROUT CUBE LABORATORY TEST RESULTS

1. INTRODUCTION

It is understood that Galliford Try Buildings North East & Yorkshire Limited (GTB) are redeveloping parts of the existing college campus, including the construction of a new, multi storey college building in the south eastern part of the site and replacement of a smaller existing building in the central part of the site. The project will also include construction of an artificial sports pitch, car parking and associated infrastructure and soft landscaping. A site location plan and development layout plan are included within Appendix A as drawings SDL4284/CS/01 and SDL4284/CS/02 respectively.

1.1 Background

Dunelm Geotechnical & Environmental Ltd (Dunelm) have previously undertaken a Phase II geotechnical and geoenvironmental assessment of the site, which has identified the presence of a seam of coal, likely to be the Soft Bed Coal, at shallow depth beneath the site. Suspected mine workings have been encountered in the Soft Bed Coal seam without sufficient competent rock cover.

Due to the risk to surface stability from the shallow mine workings a programme of stabilisation below the proposed new multi storey building by means of the drilling of boreholes and injecting a PFA/cement grout into workings, is required.

1.2 Appointment

GTB appointed Sirius Drilling Ltd (SDL) as a specialist contractor to stabilise shallow mine workings across the footprint of the proposed development. SDL also acted as Supervising Engineer for the mine workings treatment works.

SDL were also instructed to prepare a Specification for the Stabilisation of Shallow Mine Workings, a copy of which is included within Appendix B.

A permit to undertake the pressure grouting of the shallow mine workings within the treatment area was obtained by SDL from the Coal Authority (CA) prior to commencement of works. A copy of this permit is included within Appendix C.

1.3 Reporting

This Completion Report includes the following information:

- A summary of the works undertaken and presentation of the findings;
- A drawing showing the location of treatment boreholes (Appendix A – drawing number SDL4284/CS/03); and

- Confirmation that the works have been undertaken in accordance with the specification as well as guidance and established methodologies set out within in CIRIA C758D.

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2. SITE DETAILS AND DESCRIPTION

2.1 Site Location

The Site is located to the north of Greenhead Road, approximately 0.5 km west of Huddersfield town centre at an approximate National Grid Reference of 413750, 416750. A site location plan is included as Drawing No. SDL4284/CS/01 within Appendix A.

2.2 Site Description

The broader college site is an irregular shape and covers an area of approximately 2.6 Ha, sloping gently to the east and split over two plateaus with a gabion retaining wall running north to south. The most topographically elevated part of the site is approximately 131 mAOD and least is 122 mAOD. The centre and north eastern area of the site are occupied by various college buildings. The western area is occupied by a sports pitch and the southern eastern area by a large car park. The site is bounded by soft landscaping.

The treatment area comprises of the footprint of the proposed multi storey building, which lies in the south eastern part of the broader site covering an area of approximately 0.25 Ha. The area had been cleared and levelled prior to the treatment works.

Greenhead Park bounds the site to the north and there are residential developments to the south and west. Mixed use commercial developments occupy the land to the east of the site.

2.3 Geology

A summary of available published geological information is provided in Table 2.1.

Table 2.1 Geological Summary

Sources of Information	British Geological Survey 1:50,000 scale mapping (Sheet 77 Huddersfield). British Geological Survey 1:10,000 scale mapping (Sheet SE11NW) Coal Authority Consultants Coal Mining Report – 8th October 2020.
Made Ground	No made ground is shown beneath the site. Made ground is expected across the site associated with the previous developments on site.
Drift Geology	No superficial deposits are recorded on the BGS map.
Solid Geology	The Site is shown to be underlain by Pennine Lower Coal Measures strata, predominantly comprising a mixed sequence of mudstone, shale, siltstone and sandstones interbedded with coal measures.

Mining and Quarrying	**Coal Seams:** The Soft Bed coal seam is conjectured to outcrop approx. 200 m south west of the site boundary, dipping to the east below the site. This seam is recorded to be 0.6 m thick. The Pot Clay coal seam is detailed to be present 40 m stratigraphically below the Soft Bed coal seam and is recorded to be thin. **Coal Mining:** The Coal Authority mining report states that there is no recorded of past underground mining but that it is probable there are shallow workings below the site. **Other Mining:** None recorded. **Mine Entries:** There are no recorded mine entries within 100 m of the site **Opencast Coal:** There are no recorded opencast coal mines with 500 m of the site

2.4 Previous Investigations

An intrusive investigation was undertaken by Dunelm in March and April 2021 which comprised the excavation of 4 No. trial pits and drilling of 3 No. rotary cored and open hole boreholes. The report noted below summarises the factual information recovered from these works

- *Phase II Geotechnical and Geoenvironmental Assessment for Greenhead Sixth Form College, Kirklees. Prepared by Dunelm Geotechnical & Environmental Ltd on Behalf of Galliford Try Building North East & Yorkshire. Cundall Johnston & Partners LLP Report reference: NE8659-CDL-ZZ-XX-RP-GE-60200. Dated 22nd November 2021*

Summary of Relevant Findings

Made ground was recorded across the site to a maximum depth of 2.00 m bgl and was found to be both granular and cohesive in composition.

Superficial deposits were found to typically to be completely weathered Pennine Lower Coal Measures described as being soft, usually firm, orangey brown sandy gravelly clay in the upper

horizons and stiff to very stiff brown sandy occasionally gravely clay in the lower horizons. It was found to be between 0.55 m and 4.70 m thick.

Rockhead was proven at depths ranging between 0.40 m and 5.90 m bgl, predominantly dark grey/brown extremely week to medium strong thinly laminated mudstone.

No intact coal was encountered in the Dunelm investigation, however evidence of a worked seam that correlated with the assumed depth of the Soft Bed Coal seam was identified. A void was encountered in two of the boreholes at depths of 16.30 m bgl and 15.50 m bgl and with thicknesses of 1.40 m and 1.30 m, respectively. A third borehole experienced loss of flush over a 2.00m section of the borehole but did maintain 100% core recovery.

Within their report Dunelm state:

"The intrusive investigation identified evidence of historical workings within the shallow underlying Soft Bed Coal Seam. With voids in two boreholes and complete loss of flush and non-intact/broken core recovery in a third.

It is generally accepted by CIRIA 578 (Abandoned Mine Workings) that where workings are present and the proposed development will be employing shallow foundations bearing within overlying strata, a thickness of competent rock greater than ten times the worked seam thickness must be present to adequately mitigate the risk of surface instability due to mine working collapse. Table 4 shows that where evidence, or potential of historical mine workings were encountered, the rock cover to seam thickness ratio of 10:1 could not be demonstrated in any of the exploratory holes.

Therefore, based on the findings of the investigation it is considered there is a risk of potential ground instability at surface and damage to future structures resulting from the collapse of historical mine workings. Consequently, ground stabilisation, in the form of drilling and injection of grout into the historic unrecorded mine workings, or a sleeved pile to a depth of 25 m, is recommended."

3. DRILLING AND GROUTING WORKS

3.1 The Works

The objective of the consolidation works was to stabilise the floor plan of the proposed multi storey college building, as shown on Drawing No. SDL4284/CS/03 provided within Appendix A.

The objective was achieved through a process of drilling and grouting utilising a 6 m x 6 m grid across the building footprint, extending up to 3 m beyond the building line. Where boreholes encountered mine workings the grid spacing was reduced locally with the drilling of central treatment holes to form a staggered 6 m x 6 m grid (effective 4.25 m grid spacing).

The stabilisation works were undertaken by injecting a 12:1 PFA/cement grout with 40 to 45% water content into the boreholes.

3.2 Programme

The works were conducted as a continuous operation between the 10th and the 23rd of May 2022.

3.3 Drilling Procedure

Boreholes were drilled using open-hole rotary percussive drilling rigs with water flush. Holes were drilled with a minimum diameter of 75 mm.

In accordance with established best practice, each hole was extended to the base of the coal seam, or the base of the workings, if identified. A minimum 1.0 m thickness of solid strata was then penetrated to prove the presence of competent rock. Sacrificial plastic casing was installed at the top of each borehole to a depths of 1.0 m bgl to maintain integrity of the borehole prior to grouting.

General

119 boreholes were drilled to depths of between 16.50 m and 20.00 m bgl, amounting to a total of 2,119.20 m of drilling, excluding test holes. The layout of boreholes/grout injection points, together with the extent of soft push, broken ground and solid coal is shown on Drawing No. SDL4284/CS/03 within Appendix A.

The ground conditions encountered in each borehole are detailed within SDL's daily drill log sheets, included within Appendix D of this report and are summarised below:

3.4 Ground Conditions Encountered

Soft Bed Coal Seam

Shallow workings were encountered across the footprint of the proposed building. The rotary boreholes encountered evidence of workings (broken ground/soft push) within the Soft Bed Coal seam as well areas of intact coal. Intact coal or evidence of workings were encountered at depths ranging from 14.50 m to 18.20 m bgl with thicknesses as detailed below:

- Solid coal was encountered in 20 boreholes (approx. 17%), ranging in thickness between 0.40 m and 1.00 m, with an average thickness of 0.68 m.
- Broken ground was encountered in 69 boreholes (approx. 58%), ranging in thickness between 0.70 m and 1.50 m, with an average thickness of 1.07 m.
- Soft push was encountered beneath competent bedrock in 28 boreholes (approx. 24%), ranging in thickness between 0.60 m and 1.30 m, with an average thickness of 1.02 m.
- Borehole U03 recorded a loss of flush returns within the superficial strata and solid drilling from 2.00 m to 20.00 m bgl, indicating the likely presence of intact coal.

Gas Monitoring

Continuous gas monitoring was undertaken throughout the drilling works using calibrated Altair 4X Multi-Gas Detectors, worn by the drillers. Elevated gas readings were not observed during the works.

3.5 Grouting Procedure

Grout was injected into the mine workings via boreholes with the grout comprising a 12:1 ratio mixture of Pulverised Fuel Ash (PFA) and Ordinary Portland Cement (OPC) with 40 to 45% water content.

Grout was mixed on site using a bulk mixer and injected into all boreholes utilising a tremie pipe. Grout was injected under static head until grout appeared at the surface.

A total of 364.65 tonnes of grout was injected into these boreholes with the grout acceptance varying between 0.26 tonnes and 4.68 tonnes per hole with an arithmetical mean of 3.06 tonnes per hole.

4. VALIDATION

Grout Acceptance Pressure Testing

In order to confirm the effectiveness of the stabilisation works undertaken, 2 no. test boreholes were drilled in selected locations within the treatment area. The locations of the test boreholes are shown on Drawing No. SDL4284/CS/03 within Appendix A.

The test boreholes both encountered soft ground with grout returns. The efficacy of the treatment works was assessed using grout injection tests in each of the test holes under a constant pressure of up to a maximum of 165 kN/m^2. This pressure was maintained for a period of 2 minutes, after which the recorded drop in pressure was found to be less than 10%. On this basis the treatment of the mine workings was considered satisfactory.

QAQC Testing

Flowability

Bleed tests and flow tests on the grout were carried out regularly during the grouting works. Bleed tests were undertaken over a 6-hour test period with bleed capacities recorded as being below the maximum 5%, as detailed within the specification. Flow tests, carried out at a minimum frequency of two per week, recorded grout flowability readings between 400 mm and 500 mm, using a 'Colcrete' meter, in accordance with guidance contained within the specification. The results of these tests are presented on the grout logs within Appendix D of this report.

Compressive Strength

In order to determine the compressive strength of infill grout, test cubes were formed on site at a frequency of three sets of test cubes of grout from 1 batch of grout per week, and subject to testing by Socotec Ltd, based in Warrington, a UKAS accredited laboratory.

Grout cubes were scheduled to be crushed at 7- and 28-day intervals in accordance with BS 12390-3:2009. The results of testing are presented within Appendix D of this report. The 7-day test is performed to give an indication that the 28-day strength is achievable, with a 7-day minimum strength of around 0.4 MN/m^2 considered suitable to indicate 28-day cubes will achieve the required strength. All 7-day cubes exceeded this minimum target strength and after 28 days the results range from 2.3 to 5.3 MN/m^2, higher than the 1.0 MN/m^2 required minimum.

5. CONCLUSIONS

Key Points

119 number of boreholes were drilled on site to depth of between 16.50 m and 20.00 m, using a 6 m x 6 m grid, reduced to a staggered 6 m x 6 m grid (4.25 m effective spacing) where workings were encountered.

Ground conditions encountered on site included intact coal and evidence of workings in the Soft Bed Coal seam comprising broken ground and soft push at the anticipated seam depth.

364.65 tonnes of grout were injected into the subsurface with a 12:1 PFA:OPC mix (0.4 to 0.45 water ratio).

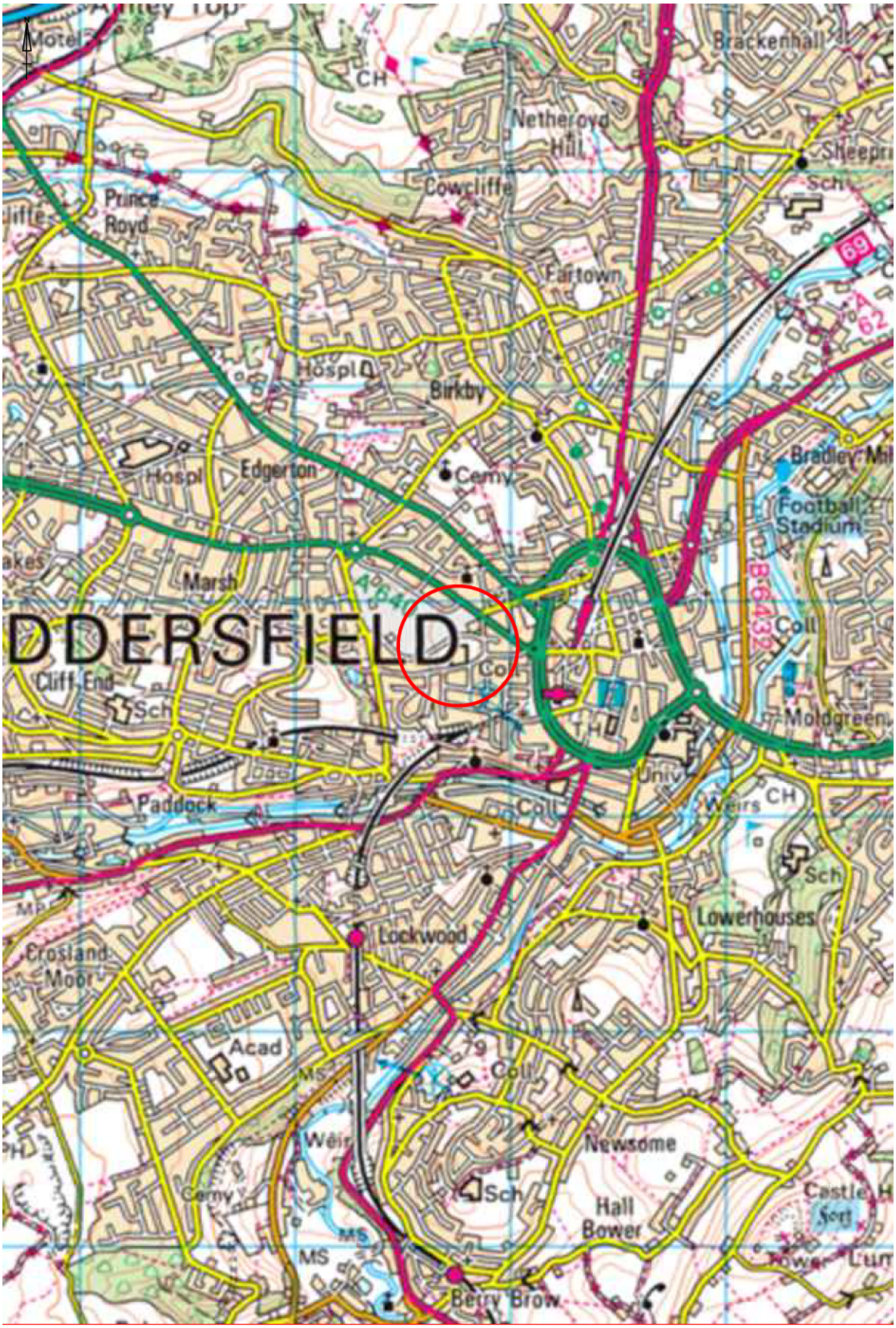
2 number of post treatment grout acceptance tests were conducted which all passed satisfactorily with grout acceptance limited to between 0.26 and 0.39 tonnes at an applied pressure of up to 165 kN/m^2.

Closing Statement

The site observations, drilling and grouting records, test boreholes and cube test results indicate that the drilling and grouting treatment has been carried out to a satisfactory standard in accordance with the Specification as well as the requirements of the Coal Authority permit and the established methodologies set out within CIRIA (C758).

APPENDIX A

FIGURES & DRAWINGS



NOTES

Site

REVISION	
0	>>
A	>>
B	>>
C	>>
D	>>

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CLIENT

GALLIFORD TRY BUILDING NORTH EAST & YORKSHIRE LIMITED

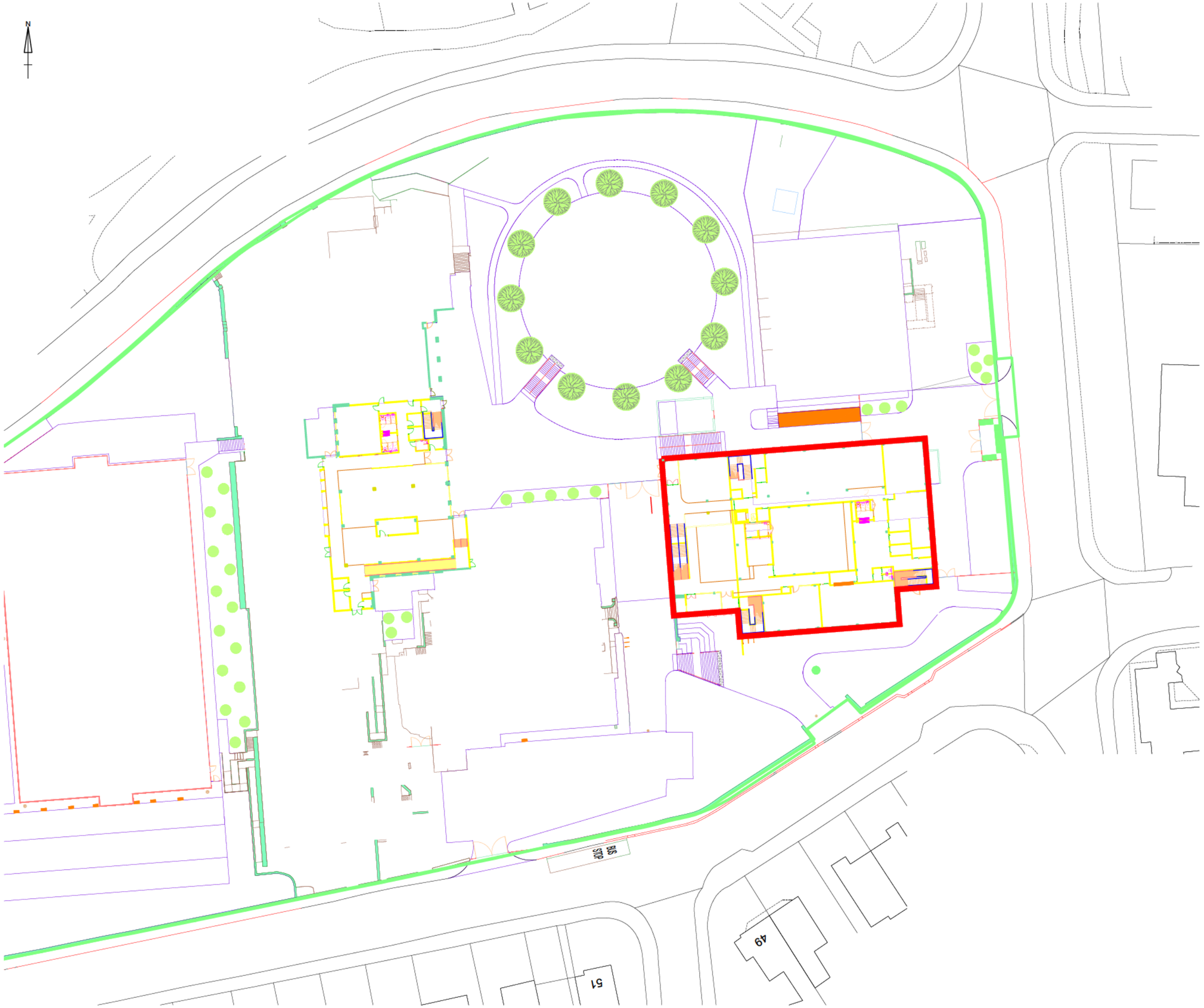
SITE

GREENHEAD SIXTH FORM COLLEGE, HUDDERSFIELD

DRAWING TITLE

SITE LOCATION PLAN

DRAWING NO.	REVISION NO.
SDL4284/CS/01	0
DRAWN BY	APPROVED BY
JCC	JCC
DATE	SCALE	PAPER SIZE
JUNE 2022	1:25,000	A4



NOTES

Site Boundary

Proposed Building Footprint

REVISION		BY	DATE
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A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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GALLIFORD TRY BUILDING NORTH EAST & YORKSHIRE LTD

SITE

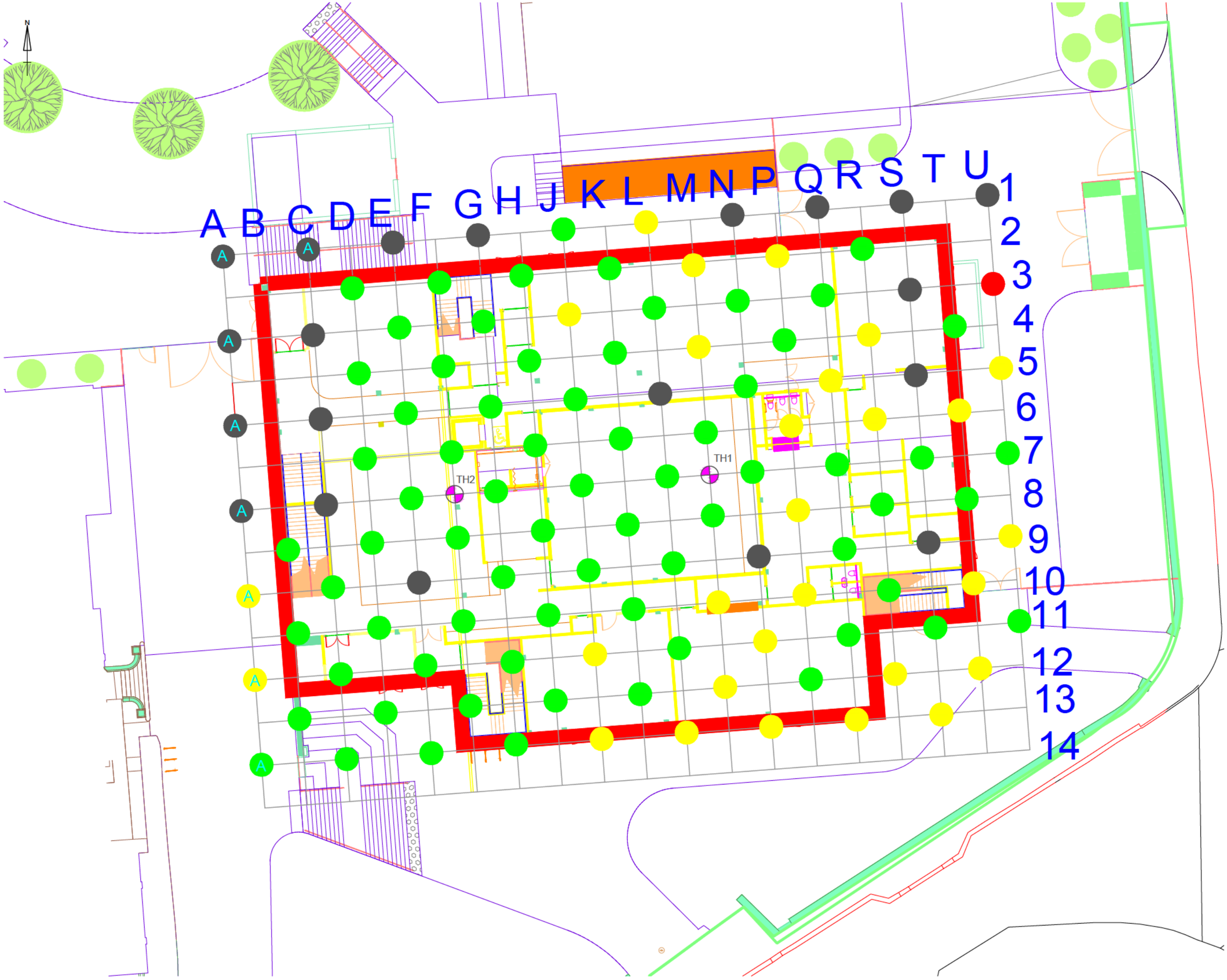
GREENHEAD SIXTH FORM COLLEGE

DRAWING TITLE

DEVELOPMENT LAYOUT PLAN

DRAWING NO.	REVISION NO.
SDL4284/CS/03	0
DRAWN BY	APPROVED BY
NJI	PH

DATE	SCALE	PAPER SIZE
JUNE 2022	1:750	A3



NOTES

DRILLING RETURNS

- COAL
- BROKEN GROUND
- SOLID STRATA - NO RETURNS
- SOFT
- A ANGLED BOREHOLE
- TEST BOREHOLE

REVISION		BY	DATE
0	>>	>>	>>
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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SITE

GREENHEAD SIXTH FORM COLLEGE, HUDDERSFIELD

DRAWING TITLE

AS BUILT DRILL & GROUT TREATMENT LAYOUT PLAN

DRAWING NO.	REVISION NO.
SDL4284/CS/03	0
DRAWN BY	**APPROVED BY**
NJI	PH

DATE	SCALE	PAPER SIZE
JUNE 2022	1:250	A3

APPENDIX B

SPECIFICATION FOR THE STABILISATION OF SHALLOW MINEWORKINGS

REPORT SDL4284
JANUARY 2022

SPECIFCATION FOR THE STABILISATION OF SHALLOW MINE WORKINGS

for
LAND AT GREENHEAD SIXTH FORM COLLEGE
KIRKLEES

Prepared for
GALLIFORD TRY BUILDING NORTH EAST & YORKSHIRE LIMITED

REPORT NUMBER:	SDL4284	**REPORT STATUS:**	FINAL
REPORT TYPE:	SPECIFICATION FOR THE STABILISATION OF SHALLOW MINE WORKINGS		
REPORT DATE:	JANUARY 2022		
SITE:	LAND AT GREENHEAD SIXTH FORM COLLEGE KIRKLEES		
PREPARED FOR:	GALLIFORD TRY BUILDING NORTH EAST & YORKSHIRE LIMITED		
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SPECIFICATION FOR THE

STABILISATION OF SHALLOW MINE WORKINGS

for

LAND AT GREENHEAD SIXTH FORM COLLEGE

KIRKLEES

Prepared for

GALLIFORD TRY BUILING NORTH EAST & YORKSHIRE LTD.

CONTENTS

TABLES

APPENDICES

APPENDIX A FIGURES, DRAWINGS AND PLATES

Drawing No.	Title	Scale
SDL4284/SP/01	Site Location Plan	1:25,000
SDL4284/SP/02	Proposed Borehole Layout Plan	1:750

1. INTRODUCTION

Sirius Drilling Limited (Sirius) have been commissioned by Galliford Try Buildings North East & Yorkshire Limited (GT) to prepare a specification for the stabilisation of shallow mine workings at the proposed development site at Greenhead Sixth Form College, Kirklees.

It is understood that GT intend to redevelop the existing college campus, this will include the construction of a new, multi storey college building in the south eastern part of the site and replacement of a smaller existing building in the central part of the site. The project will also include construction of an artificial sports pitch, car parking and associated infrastructure and soft landscaping.

Dunelm Geotechnical & Environmental Ltd (Dunelm) have previously undertaken a Phase II geotechnical and geoenvironmental assessment of the site, which has identified the presence of a seam of coal, likely to be the Soft bed Coal, at shallow depth beneath the site. Suspected mine workings have been encountered in the Soft Bed coal seam without sufficient competent rock cover.

Due to the risk to surface stability from the shallow mine workings a programme of stabilisation below the proposed new multi storey building by means of the drilling of boreholes and injecting a PFA/ cement grout into workings, is required.

Boreholes below the new building will be on a primary 6m x 6m grid, with treatment extending up to 3m beyond the plot line. Where workings are encountered the grid will be reduced to a staggered 6m grid and where any borehole takes greater than 5.0T of grout the grid will be reduced further to a 3m grid. Treatment will only be carried out where there is insufficient competent cover.

As the works progress, seam thickness, seam depth and the nature and form of the seam will be reviewed in order to assess the effect on the zones of consolidation.

On completion of the drill and grout programme, a validation report containing copies of borehole records, a borehole location plan, procedures followed during the works, the results of validation boreholes and pressure tests, and a record of any deviation from this specification will be produced and issued to the client and all other relevant parties, including the local authority.

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into possession of this report, they rely on it entirely at their own risk and the authors do not owe them any Duty of Care or Skill.

2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview

Location	The site is located to the north of the Greeenhead Road, approximately 550m to the west of Huddersfield town centre. A site location plan is provided as Drawing No. SDL4284/SP/01 within Appendix A.
National Grid Reference	413750, 416750
Topography and Features	The site slopes gently to the east and is split over two plateaus with a gabion retaining wall running north to south. The highest part of the site is approx. 131mAOD and lowest is 122mAOD. The site is roughly rectangular in shape with the centre and north eastern area of the site occupied by various college buildings. The western area is occupied by a sports pitch and the southern eastern area by a large car park. The site is bounded by soft landscaping.
Approximate Site Area	2.6 hectares
Current Land Use	The site is currently a sixth form college.
Adjacent Land Uses	Greenhead Park bounds the site to the north and there are residential developments to the south and west. Mixed use commercial developments occupy the land to the east of the site.

3. GEOLOGICAL SETTING

A summary of available published geological information is provided in Table 3.1 below.

Table 3.1 Geological Summary

Sources of Information	BGS 1:10,000 scale geological map (SE 11 NW). BGS 1:50,000 scale geological map (Newcastle upon Tyne, Sheet 20, 1989). Coal Authority Consultants Coal Mining Report – 8th October 2020.
Made Ground	No made ground is shown beneath the site. Made ground is expected across the site associated with the previous developments on site.
Drift Geology	No superficial deposits are shown beneath the site.
Solid Geology	Pennine Lower Coal Measures group comprising interbedded sequences of mudstone, siltstone, sandstone and coal.
Mining and Quarrying	**Coal Seams:** The Soft Bed coal seam is conjectured to outcrop approx. 200m south west of the site boundary, dipping to the east below the site. This seam is recorded to be 0.6m thick. The Pot Clay coal seam is detailed to be present 40m stratigraphically below the Soft Bed coal seam and is recorded to be thin. **Coal Mining:** The Coal Authority mining report states that there is no recorded of past underground mining but that it is probable there are shallow workings below the site. **Other Mining:** None recorded. **Mine Entries:** There are no recorded mine entries within 100m of the site **Opencast Coal:** There are no recorded opencast coal mines with 500m of the site

4. PREVIOUS INTRUSIVE INVESTIGATIONS

4.1. General

An intrusive investigation was undertaken by Dunelm in March and April 2021, and comprised the excavation of 4 No. trial pits and drilling of 3 No. rotary cored and open hole boreholes. The report below summarises the factual information recovered from these works

Report reference: *Cundall Johnston & Partners LLP. Greenhead Sixth Form College. Phase II Geotechnical and Geoenvironmental Assessment. Dated 22nd November 2021*

4.2. Summary of Relevant Findings

Made ground was recorded across the site to a maximum depth of 2.00m bgl and was found to be both granular and cohesive in composition.

Superficial deposits were found to typically to be completely weathered Pennine Lower Coal Measures described as being soft, usually firm, orangey brown sandy gravelly clay in the upper horizons and stiff to very stiff brown sandy occasionally gravely clay in the lower horizons. It was found to be between 0.55m and 4.70m thick.

Rockhead was proven at depths ranging between 0.40m and 5.90m bgl, predominantly dark grey/ brown extremely week to medium strong thinly laminated mudstone.

No intact coal was encountered in the Dunelm investigation, however evidence of a worked seam that correlated with the assumed depth of the Soft Bed coal seam was identified. A void was encountered in two of the boreholes, at a depth of 16.30m bgl and 15.50m bgl with a thickness of 1.40m and 1.30m respectively. The third borehole had a 2.00m zone of lost flush but did maintain 100% core recovery.

Within their report Dunelm state:

“The intrusive investigation identified evidence of historical workings within the shallow underlying Soft Bed Coal Seam. With voids in two boreholes and complete loss of flush and non-intact/broken core recovery in a third.

It is generally accepted by CIRIA 578 (Abandoned Mine Workings) that where workings are present and the proposed development will be employing shallow foundations bearing within overlying strata, a thickness of competent rock greater than ten times the worked seam thickness

must be present to adequately mitigate the risk of surface instability due to mine working collapse. Table 4 shows that where evidence, or potential of historical mine workings were encountered, the rock cover to seam thickness ratio of 10:1 could not be demonstrated in any of the exploratory holes.

Therefore, based on the findings of the investigation it is considered there is a risk of potential ground instability at surface and damage to future structures resulting from the collapse of historical mine workings. Consequently, ground stabilisation, in the form of drilling and injection of grout into the historic unrecorded mine workings, or a sleeved pile to a depth of 25m, is recommended."

The extent of the area of the site requiring stabilisation of workings is shown on Drawing No. SDL4284/SP/02 in Appendix A, although this should be confirmed during the stabilisation works.

5. CONSTRUCTION DESIGN MANAGEMENT REQUIREMENTS

5.1. General

The Drilling and Grouting Contractor (the 'Contractor) will be supplied with details of all known underground services prior to commencement of the Contract. It shall be the Contractor's responsibility to confirm that each borehole is clear of all underground services, above ground services, equipment and property prior to commencing operations.

The Contractor shall be responsible for preparing and providing a Method Statement and Risk Assessment for the works, and for gaining all approvals and Permissions for undertaking the work from the Coal Authority, prior to commencing operations. No works shall commence without obtaining Permission from the Coal Authority.

All works shall be carried out in accordance with the Construction Design Management (CDM) Regulations current at the time of the contract, and the Contractor's Method Statement and Risk Assessment, as agreed with the Coal Authority, and where applicable, with GT Health and Safety Plan.

6. SUPERVISING GEONVIRONMENTAL ENGINEER

6.1. General

In advance of commencement of the Contract, GT shall appoint a suitably experienced and qualified Geoenvironmental Engineer (GE) to supervise the works as required, and to provide support and advise on relevant matters.

The GE shall attend site as required to ensure that the requirements of this strategy are complied with. The responsibilities of the GE shall include, but not be limited to, the following:

- Liaison with GT and statutory bodies in relation to the treatment works, including obtaining the Coal Authority permit;
- Supervision and quality control of the works;
- Implementation of contingency measures if unexpected conditions are found during the works;
- Review of site records and test results as they become available and make comment and act upon those results accordingly; and,
- Production of a validation report, covering the treatment of the mine workings and mine shafts.

7. GENERAL SPECIFICATION

7.1. Constituent Materials for Grouting

Water shall be from the mains supply or other source approved by the GE and supplied by the Client.

Cement shall be Portland cement complying with BS12.

PFA complying with BS EN 12715: 2000 shall be conditioned hopper ash, or dry powder ash, or a type suitable as a constituent for grout and obtained from an approved supplier.

Sand shall generally comply with BS882 and be of a grading suitable for use in the Contractor's plant and approved by the GE.

Pea gravel shall comply with BS882 and be of grading approved by the GE.

Thixotropic admixtures shall be bentonite, or another admixture approved by the GE.

7.2. Storage and Use of Materials

Storage of materials shall be such as to prevent contamination and deterioration. Cement shall be kept in a dry location, and the sequence of deliveries recorded so that cement can be used in rotation.

PFA shall be stored within a pre-defined area and will be kept dampened to mitigate against fugitive dust.

7.3. Grouting Plant

The Contractor shall submit to the GE, for approval, details of the proposed method of mixing, and pumping of grout to the injection points, together with the means of monitoring grouting pressures and the quantities injected. The materials shall be introduced into the mixer via approved methods.

The grout mixer shall be capable of producing a homogenous mix, all particles being thoroughly wetted without segregation.

7.4. Grout Mixes

With consideration to the future use of the area, the filing material shall generally consist of a PFA: cement grout which should be mixed in the proportions of up to 12:1..

The mixes shall produce cubes with crushing strengths of not less than 1.0 MN/m^2 at 28 days (Note: a 7 day test is performed to indicate that the 28 day strength is achievable i.e. a 7 day value of about 0.4MN/m^2 would probably be considered on target).

Where excessive lateral flow of grout is anticipated or when voids greater than 500mm are encountered, the GE may order or agree to the addition of sand or pea gravel to the mix in accordance with CIRIA C758D. The specified grout mix shall have the minimum water content consistent with effective pumping.

The actual proportions to be used initially for the various grouts shall be agreed with the GE paying due regard of the conditions met in drilling and the results of any trial grouting carried out before work commences.

7.5. Grout Properties and Testing

With water / (cement and PFA) ratios generally in the range of 0.4 to 0.45, (including the moisture in the aggregates), the mixes proposed should produce pumpable grout with flowability readings of between 300 to 600mm, when measured in a meter of the “Colcrete” type.

The sample for the flowability test shall be obtained by the grouting Contractor at the point of injection i.e. from the end of the tremie pipe.

A minimum of two flowability tests per week shall be performed by the Contractor as directed by the GE.

High-bleed grouts shall be avoided. Bleed capacity should be limited to 5% maximum unless agreed otherwise with the GE.

A minimum of two bleed capacity tests shall be performed by the Contractor per shift or as directed the GE. The sample of grout for the test shall be taken from the point of injection i.e. the end of the tremie pipe.

Bleed capacity shall be measured in a clear plastic or glass graduated cylinder which has an internal diameter not less than 50mm and with a volume of approximately 1000ml. After placing

the grout, a cover shall be placed over the cylinder to avoid evaporation. Bleed capacity shall be read at hourly intervals for neat cement grout, and readings should continue for not less than 3 hours. For PFA:cement grouts readings should continue for not less than 6 hours.

The Contractor shall prepare two sets of test cubes of grout per week, or as directed by the GE.

Each cube shall be of 100mm side, or as agreed with the GE, and shall be taken from the grout at the point of injection i.e. the end of the tremie pipe.

At the instruction of the GE, the Contractor shall arrange for them to be tested by crushing at 7 and 28 days in accordance with BS1881.

The testing shall be carried out by an independent laboratory or as agreed with the GE. The results of all testing shall be supplied to the GE within 5 days of receipt of results from the laboratory.

As stated previously mixes shall produce cubes with crushing strengths of not less than 1.0 MN/m^2 at 28 days.

If the GE considers the results of the test indicate that a change of mix proportions is required, the Contractor shall make such modifications as the GE may direct.

7.6. Drilling Procedures for Treatment of Shallow Mine Workings

Gas Monitoring

Monitoring data from the ground investigations indicated elevated CO_2 with the likely source being the mine workings. It has therefore been recommended by Cundall that prior to any works commencing on site CO_2 and CH_4 gas detectors are installed in all existing buildings as well as the proposed infill structure during the construction phase and to remain in place during the service life of the buildings.

In addition to the above the Contractor must monitor gas at the drill head at all times while drilling, in accordance with the Coal Authority guidelines and permit.

Spacing of Boreholes

Boreholes below the new building will be on a primary 6m x 6m grid, with treatment extending up to 3m beyond the plot line. Where workings are encountered the grid will be reduced to a staggered 6m grid and where any borehole takes greater than 5.0T of grout the grid will be reduced further to a 3m grid. Treatment will only be carried out where there is insufficient competent cover

Boreholes shall be drilled to sufficient depth to encounter the Soft Bed coal seam, unless otherwise instructed by the GE, or where at least 10x thickness of the coal seam of intact rock is proven in individual boreholes. Where the seam is encountered, boreholes shall extend through the seam and at least 1.0m into the underlying strata.

Once the development layout has been finalised, the Contractor shall provide a planned borehole location plan with a clear and logical borehole referencing scheme, to both the client and the GE in advance of the works for approval.

Any deviation from the planned layout including the drilling of additional secondary holes shall be recorded by the Contractor and a revised borehole location plan provided to the GE.

General

All boreholes to be used for the injection of grout, including those which strike coal pillars, shall be drilled by rotary or rotary percussive techniques down to a minimum of 1.0m beyond the base of the old workings in the seam or the floor of the seam itself whichever is greater. The drilling system and flushing medium to be used shall be as instructed on the Coal Authority permit and approved by the GE. The Contractor shall allow for the provision of appropriate dust suppression for those holes that are to be drilled near sensitive receptors (e.g. nearby houses, highways, active commercial properties, car parks and public footpaths).

The minimum diameter of the holes shall be 75mm unless otherwise specified by the GE. When it is impracticable to drill at the minimum diameter for the full depth, the diameter of the boreholes shall be increased in the upper lengths.

Boreholes shall be temporarily cased through superficial deposits down to the rockhead and if directed by the GE, down through the rock strata. The boreholes shall be kept open until grout injection into the workings and rock is complete.

Where a borehole proves abortive because it becomes obstructed, it shall be re-drilled in a suitable location as directed by the GE, at a large diameter and re-cased.

During the course of the works, the GE will review the borehole records generated, and will review the potential for the presence of workings at shallow depth below rockhead elsewhere on the site. If so required, the GE shall instruct the Contractor to undertake supplemental investigation boreholes in areas outwith the proposed drill and grout programme, to confirm the presence or otherwise of workings at shallow depth. If such workings are suspected or identified, the drill and grout programme shall be extended to treat such areas.

7.7. Grouting Procedures for Shallow Mine Workings

The aim of the stabilisation work is to substantially fill any old workings within the Soft Bed coal seam, as well as any voids or broken ground found within the overlying strata in order to prevent the development of crown holes at the surface / foundation level.

Perimeter grout walls, if required, shall be formed by filling boreholes with a viscous grout composed of appropriate proportions of cement, PFA, sand or pea gravel and water. The mix, proportions and method must be agreed with the GE.

Pressure need not be applied to the grout in affected boreholes unless required by the GE.

Unless specified otherwise, the section of the perimeter wall at the deepest part of the seam shall be constructed first.

Immediately prior to grouting each borehole, the Contractor shall check that it is unobstructed to the required depth to receive the tubing or tremie pipes for grout injection. Obstructions shall be dealt with as described in ‘drilling procedures’ above.

Grout shall be injected into each hole via an approved flexible tube, or series of steel tubes, placed to the base of the hole or to such other depth to receive the tubing or pipes for grout.

Grouting shall proceed upwards from the base of each borehole to the base of the surface deposits. It is not intended that, as a general rule, significant quantities of grout shall be injected into the surface deposits unless specified otherwise. This requirement will be subject to GE review.

The grout shall be injected at the approved rates until grout appears near the point of injection, when the borehole shall be deemed complete. If the above criteria is reached quickly, the grout tubes shall be lifted to check that a local obstruction is not preventing flow of the grout into the strata.

Pressure shall be applied to the grout in every borehole. If grout has not appeared at the point of injection after 5 tonnes of grouting materials have been introduced, then sand and/or pea gravel (gravel which passes through a 6.33mm sieve and is retained on a 2.36mm sieve) may be added to the mix or placed down the borehole.

7.8. Stabilisation Procedures for the Treatment of Mine Shafts

Any unrecorded mine shafts which are encountered during the works, shall be stabilised in accordance with the recommendations given in the NCB handbook 'The Treatment of Disused Mine Shafts and Adits.' and CIRIA C758D.

All work on or about old mine shafts must be carried out from a safety platform of adequate dimensions that will span the potential collapse zone and support the crew and equipment should a catastrophic failure of the shaft occur.

Prior to work commencing on any mine shaft, the area will be inspected to ensure that the safe movement of heavy equipment can proceed. This will be carried out by a competent, experienced person who will be securely fastened to the surface by means of a full body harness anchored some 10.00 metres away from the shaft perimeter.

In the unlikely event that any shaft is found to be open from the surface, then it shall be backfilled with graded material. Any such material will be introduced directly into the shaft from the surface utilising equipment such as a 360 excavator or conveyor.

If the shaft is backfilled, then reversed stage pressure grouting of the infill material will be undertaken. Such treatment is achieved by a combination of permeation grouting and low-pressure compaction grouting of the infill material which forms an enhanced bond between the infill and the shaft lining / country rock.

Treatment will therefore be undertaken in the following manner.

A safety platform comprising rigid steel and wooden shaft frame will be mounted over the shaft mouth to ensure that any slumping of the shaft infill will not jeopardise the stability of the drilling rig and the safety of the crew.

Once the safety frame is in place, the drill rig will be positioned over the shaft to allow the sinking of a centrally located borehole through fill material.

To confirm the exact location of the mine shaft, a series of trial boreholes may be required, penetrating superficial deposits to confirm the presence of rockhead. If, following trial boring, the central point of the shaft cannot be accessed from the safety platform, then the safety platform shall be repositioned to allow appropriate access.

Treatment will involve the drilling of a single borehole to the base of the shaft and at least three metres into natural strata. This is to ensure that no “staging” is present within the shaft and that the actual shaft base has been reached. Shaft staging would typically be encountered within the first 50m below ground within shafts although no hard or fast rules can be applied to this. Staging can be a problem if, over time, it deteriorates to such an extent that catastrophic failure of the infill material occurs.

On completion of the first borehole temporary steel casing will then be inserted into the borehole. This casing forms the basis of the reversed stage pressure grouting technique.

The grouting operation will commence on completion of the borehole and will involve direct injection down the borehole under pressure through the drill rods or casing in ascending 3m stages.

The grout will possess water: solids ratio of no more than 40% giving an approximate compressive strength of 1.0 MN/m^2 @ 28 days.

Grout will be mixed by loading hopper conditioned PFA and bagged OPC directly into the mixer via a front loading shovel and by hand. Water supplied from the approved water source will be then be added to the mix to produce grout of the correct consistency.

The grout mixer will be capable of producing a homogenous mix, with all particles being thoroughly wetted without segregation occurring.

The grout will be mixed and injected using a 50mm diaphragm pump operating at around 100 psi and will be pumped via 50mm reinforced grout hoses into borehole. This will continue until either a maximum pressure is reached, or refusal of grout occurs. A length of casing will then be extracted, and the process repeated until the complete length of the shaft has been treated.

Should any significant thickness of permeable / granular fill be present on site, grouting may need to be terminated at the level of the base of such material.

If any significant voids are encountered during the operation, a grout - pea gravel mix will be introduced into the borehole to restrict excessive movement of grout. However should any major

mining feature such as roadways running off the shaft be suspected these will require investigation and treating separately from the shaft.

Records of location and treatment work, including borehole records, plans and details of grout takes shall be provided to the GE within 48 hours of completion of the works.

7.9. Services

The Contractor shall take all necessary precautions, including making all reasonable liaison with the Client, to ascertain the positions and depths of underground services and drains passing through the site, making full allowance for working around and protecting live services and drains.

When introducing grout into any borehole the Contractor shall ensure by regular inspections throughout the day that the grout is not entering adjacent drains, services, culverts and ducts. In the event that any such leakage is detected, the Contractor shall immediately suspend the grouting operations and commence to remove any accumulated grout.

7.10. In Situ Testing

When directed by the GE, the Contractor shall test the consolidated ground for permeability and strength.

Permeability by grout acceptance testing shall be checked by drilling test holes within the grouted plots in positions to be selected by the GE (such as areas of significant open voids, or exceptionally high or low grout takes) and injecting grout at pressures appropriate to the depth, all in accordance with the requirements for infilling grouting. If the GE considers that the quantities of grout accepted are excessive, further holes shall be drilled and grouted at the rates and prices agreed.

After testing, boreholes shall be completed in accordance with the requirements for grouting infill holes.

In general, test holes will be undertaken along the adoptable highways adjacent to boreholes exhibiting grout takes in excess of 6 tonnes.

7.11. Records

The Contractor shall prepare, and keep available for inspection on site, plans showing the positions of all boreholes and daily drilling records (see below), together with the total amounts of grout injected.

The plans shall be updated daily in conformity with the Records noted below. On completion of the works, the Contractor shall give fair copies of the plans and sections to the GE within one week of completion of the programme of grouting.

As works proceed, the Contractor shall maintain separate daily records for drilling, for grouting and for materials and plant received in a form to be approved by the GE. The daily records signed by the Contractor's agent shall be submitted each day to the GE for his agreement. The Contractor shall provide one copy of the agreed record for the GE's retention and keep a further copy available for inspection on site.

Daily drilling records shall be provided for each borehole and contain the following information:

1. Job title and location
2. Borehole reference number
3. Date
4. Contractor's name
5. Plant in use, crew members and hours worked
6. Method of boring or drilling
7. Type, diameter and depth of casing used
8. Diameter and depth of hole at the beginning and end of each working day or shift
9. Loss of any flushing medium during drilling
10. Standing time, with reason, or time lost overcoming obstructions
11. Details of underground services located
12. Details of any settlement or ground heave
13. Daily and cumulative length drilled
14. Depth to each major change of stratum
15. Description, with identification, of the stratum and whether it is intact or broken
16. Each depth at which groundwater is encountered (if apparent), the depth to which it rose and any steps taken to stop the flow
17. Depths at which any samples are taken
18. Details and results of any permeability tests instructed by the RE
19. Details of any voids or suspected workings

20. Details of any emissions of gas, water, etc.

21. Depth of completed borehole

Daily grouting records shall be provided for each borehole and contain the following information:

1. Job title and location

2. Borehole reference number

3. Date

4. Contractor's name

5. Plant in use, crew members and hours worked

6. Details of type of injection grout-line dimensions and length of standpipes inserted

7. Type of grout mix and volumetric quantity injected including total quantity by weight by each type of grouting material introduced

8. Grout pressures recorded, with the corresponding depths

9. The results of all flow and bleed tests

10. Details of casing abandoned

11. Details of grouting materials delivered to the site and a running total of each of the materials delivered

12. The nature, frequency and results of all inspections of services to check for grout penetration

13. Details of all stoppages or delays and any other relevant information

The daily records of materials and plant received shall show, in particular, that day's quantities by weight of each type of material and cumulative quantities. With the daily records, the Contractor shall submit to the GE copies of receipts or invoices for all materials delivered and he shall keep them on site until the Works are complete.

Notwithstanding the information listed above, the Contractor shall provide any other information required by the GE.

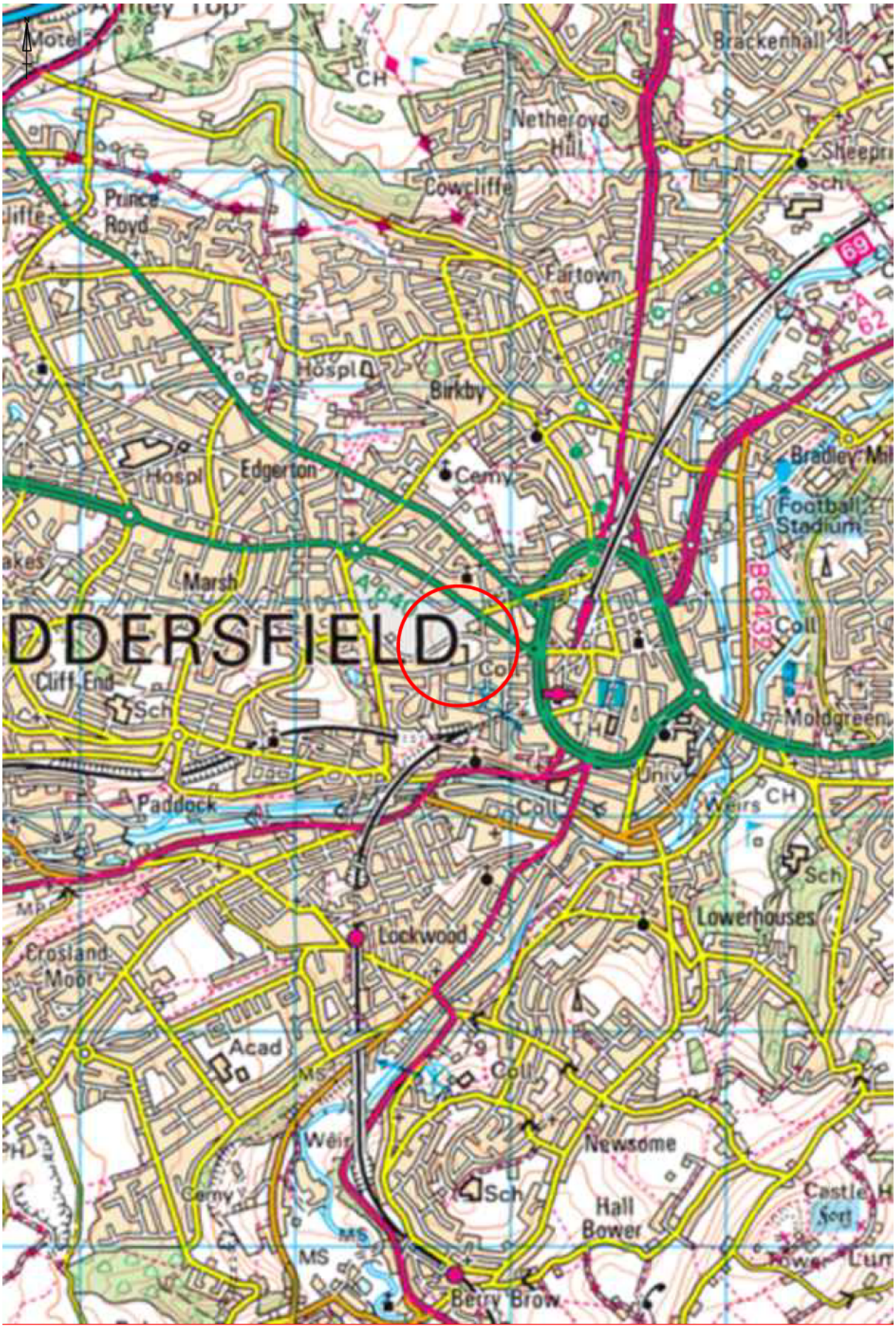
On completion of the drill and grout programme, the GE shall prepare a validation report containing copies of borehole records, a borehole location plan, procedures followed during the works, the results of validation boreholes and pressure tests, and a record of any deviation from this specification.

8. REGULATORY APPROVALS

This Specification is considered suitable and appropriate based on the findings of the site investigation. However it cannot be guaranteed to gain regulatory approval and, therefore, should be passed to the appropriate regulatory authorities and/or other organisations including but not limited to the Coal Authority for their comment and approval prior to commencing any works on site.

APPENDIX A

FIGURES, DRAWINGS AND PLATES



NOTES

Site

REVISION

0	>>
A	>>
B	>>
C	>>
D	>>

SIRIUS DRILLING LIMITED
2 5 Park Approach,
Thorpe Park,
Leeds
LS15 8GB
www.thesiriusgroup.com
TEL: 0113 26 9960
FAX: 0113 26 9962

CLIENT

GALLIFORD TRY BUILDING NORTH EAST & YORKSHIRE LIMITED

SITE

GREENHEAD SIXTH FORM COLLEGE

DRAWING TITLE

SITE LOCATION PLAN

DRAWING NO.	REVISION NO.
SDL4284/SP/01	0
DRAWN BY	APPROVED BY
JCC	JCC

DATE	SCALE	PAPER SIZE
JAN 2022	1:25,000	A4

NOTES

Proposed Building Footprint

Proposed Primary Borehole - 6m

REVISION		BY	DATE
0	>>	>>	>>
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

SIRIUS
REMEDIATION LTD
4245 Park Approach,
Thorpe Park,
Leeds
LS15 8GB
www.thesiriusgroup.com
TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT

GALLIFORD TRY BUILDING NORTH EAST & YORKSHIRE LTD

SITE

GREENHEAD SIXTH FORM COLLEGE

DRAWING TITLE

PROPOSED PRIMARY DRILL & GROUT BOREHOLE PLAN

DRAWING NO.	REVISION NO.
SDL4284/SP/02	>>
DRAWN BY: JCC	APPROVED BY: JCC
DATE: JAN 2022	SCALE: 1:750
PAPER SIZE: A3	

APPENDIX C

COAL AUTHORITY PERMIT

The Coal Authority

Permit to Enter or Disturb Coal Authority Interests

Permit 24968

Name and Address of Permit Holder:

Department for Education & Skills
Level 5, Sanctuary Buildings
Great Smith Street
Westminster
London
SW1P 3BT

Site Location:

Greenhead College
Greenhead Road
Huddersfield
HD1 4ES

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

Ground investigation by 12 boreholes to 20m to determine the depth and thickness of shallow coal seams/presence of shallow mine workings, treatment of shallow mine workings by drilling and grouting on 6m (3m) grid

within the Authority's interests at the identified site location above as shown on the Grant Permit Boundary (overleaf) 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 Permit Holder's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.*

Conditions:

- *Manned entry (i.e. into mine entries/workings) is strictly prohibited.*
- *Water flush*
- *Gas Monitoring CO, CH_4, CO_2, O_2, H_2S at borehole and rig*
- *Operators undertaking the work must be in possession of this certificate and the Permit boundary plan at the time of works*
- *Appropriate borehole sealing without delay and to withstand site level changes*

Signed: Paul Hobson Granted Date: ***04 May 2022***

For and on behalf of The Coal Authority

Nominated Representative: Paul Hobson, Permitting Manager;

The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG
Tel: 01623 637450; E-Mail: permissions@coal.gov.uk

The Coal Authority

Granted Permit Boundary

Permit Ref: 24968

Permit Boundary:

APPENDIX D

DRILLING LOGS, GROUTING LOGS AND SUMMARY TABLES

Borehole ID	Drilled by	Date Drillled	Angle (deg)	Superficials (m bgl)	Strata	From (m bgl)	To (m bgl)	Thickness (m)	BH Depth (m bgl)	Casing (m)	Grout Take (T)	Comments
A01	S. FORMAN	13.05.2022	15	1.00	C	15.20	16.00	0.80	17.00	1.00	0.26	
A03	S. FORMAN	13.05.2022	15	1.00	C	15.20	16.00	0.80	17.00	1.00	0.26	
A05	RY. EDWARDS	17.05.2022	11	1.50	C	15.00	15.80	0.80	16.80	1.50	0.26	
A07	RY. EDWARDS	17.05.2022	11	1.50	C	15.00	15.90	0.90	16.90	1.50	0.26	
A09	RY. EDWARDS	17.05.2022	11	1.50	S	15.00	16.00	1.00	17.00	1.50	3.90	
A11	S. FORMAN	18.05.2022	11	1.50	S	15.00	16.00	1.00	17.00	1.00	4.55	
A13	S. FORMAN	13.05.2022	15	1.00	BG	14.70	16.00	1.30	17.00	1.00	4.55	
B08	S. FORMAN	18.05.2022		1.00	BG	14.50	15.70	1.20	16.70	1.00	3.90	
B10	S. FORMAN	18.05.2022		1.00	BG	15.00	15.80	0.80	16.80	1.00	4.55	
B12	S. FORMAN	18.05.2022		1.00	BG	14.80	15.80	1.00	16.80	1.00	4.55	
C01	S. FORMAN	13.05.2022	8	1.00	C	15.20	16.00	0.80	17.00	1.00	0.26	
C03	S. FORMAN	10.05.2022		1.00	C	15.00	15.50	0.50	20.00	1.00	0.26	
C05	S. FORMAN	13.05.2022		1.00	C	15.00	15.60	0.60	16.60	1.00	0.26	
C07	S. FORMAN	11.05.2022		1.00	C	15.30	15.70	0.40	20.00	1.00	0.26	
C09	S. FORMAN	13.05.2022		1.00	BG	14.70	15.70	1.00	16.70	1.00	4.55	
C11	S. FORMAN	11.05.2022		1.00	BG	14.70	16.00	1.30	17.00	1.00	4.55	
C13	S. FORMAN	13.05.2022		1.00	BG	14.80	16.00	1.20	17.00	1.00	4.55	
D02	S. FORMAN	18.05.2022		1.00	BG	14.50	15.50	1.00	16.50	1.00	4.55	
D04	S. FORMAN	18.05.2022		1.00	BG	14.50	15.60	1.10	16.60	1.00	4.55	
D06	S. FORMAN	18.05.2022		1.00	BG	14.80	15.60	0.80	16.60	1.00	4.55	
D08	S. FORMAN	18.05.2022		1.00	BG	14.80	15.70	0.90	16.70	1.00	4.16	
D10	S. FORMAN	18.05.2022		1.00	BG	15.00	15.90	0.90	16.90	1.00	4.55	
D12	S. FORMAN	18.05.2022		1.00	BG	15.00	16.00	1.00	17.00	1.00	4.55	
E01	S. FORMAN	13.05.2022		1.00	C	15.10	15.70	0.60	16.70	1.00	0.26	
E03	S. FORMAN	13.05.2022		1.00	BG	14.50	15.70	1.20	16.70	1.00	4.16	
E05	S. FORMAN	13.05.2022		1.00	BG	14.60	15.60	1.00	16.60	1.00	4.55	
E07	S. FORMAN	13.05.2022		1.00	BG	15.00	15.70	0.70	16.70	1.00	4.55	
E09	S. FORMAN	13.05.2022		1.00	C	15.20	15.80	0.60	16.80	1.00	0.26	
E11	S. FORMAN	13.05.2022		1.00	BG	14.80	16.00	1.20	17.00	1.00	4.55	
E13	S. FORMAN	13.05.2022		1.00	BG	14.80	16.10	1.30	17.10	1.00	4.55	
F02	S. FORMAN	17.05.2022		1.50	BG	15.00	16.00	1.00	17.00	1.00	4.55	
F04	S. FORMAN	17.05.2022		1.50	BG	15.00	16.10	1.10	17.10	1.00	4.16	
F06	S. FORMAN	17.05.2022		1.50	BG	15.10	16.20	1.10	17.20	1.00	4.55	
F08	S. FORMAN	18.05.2022		1.50	BG	15.10	16.30	1.20	17.30	1.00	4.55	
F10	S. FORMAN	18.05.2022		1.50	BG	15.30	16.30	1.00	17.30	1.00	3.90	
F12	S. FORMAN	18.05.2022		1.50	BG	15.10	16.40	1.30	17.40	1.00	4.42	
G01	S. FORMAN	13.05.2022		1.00	C	15.40	16.00	0.60	17.00	1.00	0.26	
G03	S. FORMAN	11.05.2022		1.20	BG	14.80	16.20	1.40	17.20	1.00	4.55	
G05	S. FORMAN	13.05.2022		1.20	BG	15.20	16.20	1.00	17.20	1.00	4.55	

G07	S. FORMAN	11.05.2022		1.20	BG	15.00	16.20	1.20	17.20	1.00	4.55	
G09	S. FORMAN	13.05.2022		1.20	BG	15.40	16.20	0.80	17.20	1.00	4.68	
G11	S. FORMAN	11.05.2022		1.00	BG	15.00	16.30	1.30	17.30	1.00	4.55	
G13	S. FORMAN	13.05.2022		1.20	BG	15.20	16.30	1.10	17.30	1.00	4.55	
H02	S. FORMAN	17.05.2022		1.50	BG	15.00	16.20	1.20	17.20	1.00	4.55	
H04	S. FORMAN	17.05.2022		1.50	BG	15.10	16.30	1.20	17.30	1.00	4.16	
H06	S. FORMAN	17.05.2022		1.50	BG	15.30	16.40	1.10	17.40	1.00	3.90	
H08	S. FORMAN	17.05.2022		1.50	BG	15.20	16.50	1.30	17.50	1.00	3.90	
H10	S. FORMAN	17.05.2022		1.50	BG	15.50	16.50	1.00	17.50	1.00	3.90	
H12	S. FORMAN	17.05.2022		1.50	BG	15.40	16.60	1.20	17.60	1.00	4.55	
J01	S. FORMAN	16.05.2022		2.00	BG	15.00	16.20	1.20	17.20	1.00	3.90	
J03	S. FORMAN	16.05.2022		2.00	S	15.10	16.30	1.20	17.30	1.00	1.30	
J05	S. FORMAN	12.05.2022		1.50	BG	15.60	16.40	0.80	17.40	1.00	1.30	
J07	S. FORMAN	16.05.2022		2.00	BG	15.50	16.50	1.00	17.50	1.00	1.30	
J09	S. FORMAN	12.05.2022		1.30	BG	15.60	16.60	1.00	17.60	1.00	2.60	
J11	S. FORMAN	16.05.2022		2.00	S	15.40	16.70	1.30	17.70	1.00	1.30	
J13	S. FORMAN	16.05.2022		2.00	S	15.90	16.90	1.00	17.90	1.00	1.30	
K02	S. FORMAN	17.05.2022		2.00	BG	15.80	16.60	0.80	17.60	1.00	2.60	
K04	S. FORMAN	17.05.2022		2.00	BG	15.10	16.60	1.50	17.60	1.00	3.90	
K06	S. FORMAN	17.05.2022		2.00	BG	15.50	16.70	1.20	17.70	1.00	3.90	
K08	S. FORMAN	17.05.2022		2.00	BG	15.60	16.70	1.10	17.70	1.00	2.60	
K10	S. FORMAN	17.05.2022		2.00	BG	15.80	16.80	1.00	17.80	1.00	2.60	
K12	S. FORMAN	17.05.2022		2.00	BG	16.00	16.90	0.90	17.90	1.00	3.90	
L01	S. FORMAN	16.05.2022		2.00	S	15.80	16.50	0.70	17.50	1.00	1.30	
L03	S. FORMAN	11.05.2022		2.00	BG	16.20	17.00	0.80	18.00	1.00	3.90	
L05	S. FORMAN	16.05.2022		2.00	C	16.40	17.00	0.60	18.00	1.00	0.26	
L07	S. FORMAN	11.05.2022		1.20	BG	15.60	17.00	1.40	18.00	1.00	3.90	
L09	S. FORMAN	17.05.2022		2.00	BG	16.00	17.00	1.00	18.00	1.00	3.90	
L11	S. FORMAN	11.05.2022		1.50	BG	16.20	17.10	0.90	18.10	1.00	3.90	
L13	S. FORMAN	17.05.2022		2.00	S	16.40	17.00	0.60	18.00	1.00	1.30	
M02	RY. EDWARDS	17.05.2022		2.40	S	15.40	16.60	1.20	17.60	2.40	1.30	
M04	RY. EDWARDS	17.05.2022		2.40	S	15.50	16.50	1.00	17.50	2.40	2.60	
M06	RY. EDWARDS	17.05.2022		2.40	BG	15.40	16.60	1.20	17.60	2.40	3.90	
M08	RY. EDWARDS	17.05.2022		2.40	BG	15.30	16.50	1.20	17.50	2.40	3.90	
M10	RY. EDWARDS	17.05.2022		2.40	S	15.50	16.50	1.00	17.50	2.40	0.65	
M12	RY. EDWARDS	17.05.2022		2.40	S	15.50	16.60	1.10	17.60	2.40	0.65	
N01	RY. EDWARDS	16.05.2022		2.40	C	16.00	17.00	1.00	18.00	2.40	0.26	
N03	RY. EDWARDS	16.05.2022		2.40	BG	16.00	17.10	1.10	18.10	2.40	3.90	
N05	S. FORMAN	12.05.2022		2.00	BG	16.50	17.20	0.70	18.20	1.00	4.55	
N07	RY. EDWARDS	16.05.2022		2.40	BG	16.20	17.30	1.10	18.30	2.40	3.90	
N09	S. FORMAN	12.05.2022		2.00	C	17.00	17.60	0.60	18.60	1.00	0.26	
N11	RY. EDWARDS	17.05.2022		2.20	S	16.00	17.00	1.00	18.00	2.20	2.60	
N13	RY. EDWARDS	17.05.2022		2.00	S	15.80	16.90	1.10	17.90	2.00	1.30	

P02	RY. EDWARDS	17.05.2022		2.50	S	15.80	17.10	1.30	18.10	2.50	1.30	
P04	RY. EDWARDS	17.05.2022		2.50	BG	16.00	17.20	1.20	18.20	2.50	3.90	
P06	RY. EDWARDS	17.05.2022		2.50	S	16.00	17.00	1.00	18.00	2.50	1.30	
P08	RY. EDWARDS	17.05.2022		2.30	S	16.00	17.10	1.10	18.10	2.30	1.30	
P10	RY. EDWARDS	17.05.2022		2.30	S	16.20	17.20	1.00	18.20	2.30	1.30	
P12	RY. EDWARDS	17.05.2022		2.30	BG	16.00	17.20	1.20	18.20	2.30	3.90	
Q01	RY. EDWARDS	16.05.2022		2.00	C	17.00	17.60	0.60	18.60	2.00	0.26	
Q03	S. FORMAN	11.05.2022		3.00	BG	16.60	17.40	0.80	18.40	1.00	4.55	
Q05	RY. EDWARDS	16.05.2022		2.00	S	17.00	18.00	1.00	19.00	2.00	4.55	
Q07	S. FORMAN	11.05.2022		2.20	BG	16.60	17.20	0.60	18.20	1.00	4.55	
Q09	RY. EDWARDS	16.05.2022		2.00	BG	16.80	18.00	1.20	19.00	2.00	4.68	
Q11	S. FORMAN	12.05.2022		2.00	BG	16.70	17.70	1.00	18.70	1.00	4.68	
Q13	RY. EDWARDS	16.05.2022		2.00	S	17.00	18.00	1.00	19.00	2.00	3.90	
R02	RY. EDWARDS	16.05.2022		2.30	BG	16.70	17.70	1.00	18.70	2.30	4.55	
R04	RY. EDWARDS	16.05.2022		2.30	S	16.70	17.90	1.20	18.90	2.30	3.90	
R06	RY. EDWARDS	16.05.2022		2.30	S	16.80	17.80	1.00	18.80	2.30	3.90	
R08	RY. EDWARDS	16.05.2022		2.50	BG	17.00	18.00	1.00	19.00	2.50	3.90	
R10	RY. EDWARDS	16.05.2022		2.00	BG	16.70	17.80	1.10	18.80	2.00	4.42	
R12	RY. EDWARDS	16.05.2022		2.00	S	16.80	17.80	1.00	18.80	2.00	3.90	
S01	S. FORMAN	16.05.2022		2.50	C	17.00	17.60	0.60	18.60	1.00	0.26	
S03	S. FORMAN	16.05.2022		2.50	C	17.00	17.60	0.60	18.60	1.00	0.26	
S05	S. FORMAN	12.05.2022		2.50	C	16.80	17.40	0.60	18.40	1.00	0.26	
S07	S. FORMAN	16.05.2022		2.50	BG	16.80	17.70	0.90	18.70	1.00	4.55	
S09	S. FORMAN	12.05.2022		2.50	C	17.00	17.60	0.60	18.60	1.00	0.26	
S11	S. FORMAN	16.05.2022		2.50	BG	16.50	17.50	1.00	18.50	1.00	4.55	
S13	S. FORMAN	16.05.2022		2.50	S	17.00	18.00	1.00	19.00	1.00	3.90	
T04	S. FORMAN	16.05.2022		2.80	BG	16.80	17.90	1.10	18.90	1.00	4.55	
T06	S. FORMAN	16.05.2022		2.80	S	17.00	18.00	1.00	19.00	1.00	3.90	
T08	RY. EDWARDS	16.05.2022		2.40	BG	16.80	18.00	1.20	19.00	2.40	4.55	
T10	RY. EDWARDS	16.05.2022		2.40	S	17.00	17.90	0.90	18.90	2.40	3.90	
T12	S. FORMAN	23.05.2022		2.40	S	17.00	18.00	1.00	19.00	1.00	0.65	
U01	S. FORMAN	16.05.2022		3.00	C	17.20	18.20	1.00	19.20	1.00	0.26	
U03	S. FORMAN	11.05.2022		2.00	C				20.00	1.00	0.26	FLUSH LOST IN O/B - SOLID, ASSUMED COAL
U05	S. FORMAN	16.05.2022		3.00	S	17.40	18.00	0.60	19.00	1.00	3.77	
U07	S. FORMAN	11.05.2022		3.00	BG	16.80	17.80	1.00	18.80	1.00	4.55	
U09	RY. EDWARDS	16.05.2022		2.40	S	16.50	17.80	1.30	18.80	2.40	3.90	
U11	S. FORMAN	11.05.2022		2.50	BG	17.00	18.20	1.20	19.20	1.00	4.55	

TEST BOREHOLES

Borehole ID	Drilled by	Date Drillled	Superficials (m bgl)	Strata	From (m bgl)	To (m bgl)	Thickness (m)	BH Depth (m bgl)	Casing (m)	Grout Take (T)	Comments
TH01 (M07)	S. FORMAN	23.05.2022	2.40	S	15.40	16.50	1.10	17.50	2.40	0.39	SOFT WITH GROUT TRACES
TH02 (F07)	S. FORMAN	23.05.2022	1.50	S	15.20	16.30	1.10	17.30	1.50	0.26	SOFT WITH GROUT TRACES

KEY

C	SOLID COAL
S	SOFT GROUND
BG	BROKEN GROUND

DRILL LOGS

OPENHOLE DRILL LOG

Sirius Drilling

Job No. 4284 | Date: 10/5/2022
Contract Name: GREENHEAD COLLEGE | Client: GALLIFORD TRY
Working Day: TUESDAY | Sheet: 1 of 1

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
					0
	2				
C03	0	1	W	1	OVERBURDEN
	1	15			MUDSTONE/SANDSTONE
	15	15.5			COAL
	15.5	20			MUDSTONE/SANDSTONE

Rig Type: C6-1

Crew Details: S. FORMAN, R. HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20%	/	—	/
Mid	20%	/	/	/
End	20%	—	—	/

Weather Conditions:

Boreholes Total	
Today	4
Previous	1
To Date	5

Drilled Total	
Today	39
Previous	6
To Date	45

Casing Total	
Today	1
Previous	0
To Date	1

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OPENHOLE DRILL LOG

Sirius Drilling

Job No. 4284 | Date: 11/5/2022
Contract Name: GREENMEAD COLLEGE | Client: GALLIFORD TRY
Working Day: WEDNESDAY | Sheet: 1 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
C07	0	1		1	OVERBURDEN
	1	15.3			MUDSTONE/SANDSTONE
	15.3	15.9			COAL
	15.9	20			MUDSTONE/SANDSTONE
C11	0	1		1	OVERBURDEN
	1	14.7			MUDSTONE/SANDSTONE
	14.7	16			BROKEN GROUND
	16	17			SOLID
G11	0	1		1	OVERBURDEN
	1	15			MUDSTONE/SANDSTONE
	15	16.3			BROKEN GROUND
	16.3	17.3			SOLID
G07	0	1.2		1	OVERBURDEN
	1.2	15			MUDSTONE/SANDSTONE
	15	16.2			BROKEN GROUND
	16.2	17.2			SOLID
G03	0	1.2		1	OVERBURDEN
	1.2	14.8			MUDSTONE/SANDSTONE
	14.8	16.2			BROKEN GROUND
	16.2	17.2			SOLID
L07	0	1.2		1	OVERBURDEN
	1.2	15.6			MUDSTONE/SANDSTONE
	15.6	17			BROKEN GROUND
	17	18			SOLID
L11	0	1.5		1	OVERBURDEN
	1.5	16.2			MUDSTONE/SANDSTONE
	16.2	17.1			BROKEN GROUND
	17.1	18.1			SOLID
44	0	2.5		1	OVERBURDEN
	2.5	17			MUDSTONE/SANDSTONE
	17	18.2			BROKEN GROUND
	18.2	19.2			SOLID
47	0	3		1	OVERBURDEN
	3	16.8			MUDSTONE/SANDSTONE
	16.8	17.8			BROKEN GROUND
	17.8	18.8			SOLID
43	0	2		1	OVERBURDEN (LOST FLUID)
	2	20			SOLID

Rig Type: C6-1

Crew Details: S.ROZMAN / R.HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.6	/	/	/
Mid	20.8	/	/	/
End	20.8	/	/	/

Weather Conditions:

Boreholes Total	
Today	
Previous	5
To Date	

Drilled Total	
Today	
Previous	45
To Date	

Casing Total	
Today	
Previous	1
To Date	

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OPENHOLE DRILL LOG

Job No. 4284 | Date: 11/5/2022

Contract Name: GREENHEAD COLLEGE | Client: GALLIFORD TRY

Working Day: WEDNESDAY | Sheet: 2 of 3

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
Q03	0	3		1	OVERBURDEN
	3	16.6			MUDSTONE/SANDSTONE
	16.6	17.4			BROKEN GROUND
	17.4	18.4			SOLID
L03	0	2		1	OVERBURDEN
	2	16.2			MUDSTONE/SANDSTONE
	16.2	17			BROKEN GROUND
	17	18			SOLID
Q07	0	2.2		1	OVERBURDEN
	2.2	16.6			MUDSTONE/SANDSTONE
	16.6	17.2			BROKEN GROUND
	17.2	18.2			SOLID

Rig Type: CG-1

Crew Details: S. FORMAN, R. MICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	-	-	-
Mid	20.8	-	-	-
End	20.8	-	-	-

Weather Conditions:

Boreholes Total	
Today	13
Previous	5
To Date	18

Drilled Total	
Today	237.4
Previous	45
To Date	282.4

Casing Total	
Today	13
Previous	1
To Date	14

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OPENHOLE DRILL LOG

Sirius Drilling

Job No. 4-824 | Date: 12/5/2022
Contract Name: GREENHEAD CIRCUIT | Client: GALLIFORD TRY
Working Day: THURSDAY | Sheet: 1 of 1

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
Q11	0	2	W	1	OVERBURDEN
	2	16.7			MUDSTONE/SANDSTONE
	16.7	17.7			BROKEN GROUND
	17.7	18.7			SOLID
SO5	0	2.5		1	OVERBURDEN
	2.5	16.8			MUDSTONE/SANDSTONE
	16.8	17.4			COAL
	17.4	18.4			MUDSTONE
SO9	0	2.5		1	OVERBURDEN
	2.5	17			MUDSTONE/SANDSTONE
	17	17.6			COAL
	17.6	18.6			MUDSTONE
NO5	0	2		1	OVERBURDEN
	2	16.5			MUDSTONE/SANDSTONE
	16.5	17.2			BROKEN GROUND
	17.2	18.2			SOLID
NO9	0	2		1	OVERBURDEN
	2	17			MUDSTONE/SANDSTONE
	17	17.6			COAL
	17.6	18.6			MUDSTONE
JO9	0	1.3		1	OVERBURDEN
	1.3	15.8			MUDSTONE/SANDSTONE
	15.8	16.6			BROKEN GROUND
	16.6	17.6			SOLID
JO5	0	1.5		1	OVERBURDEN
	1.5	15.6			MUDSTONE/SANDSTONE
	15.6	16.4			BROKEN GROUND
	16.4	17.4			SOLID

Rig Type: C6-1

Crew Details:
S. FORMAN
R. HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	-	-	-
Mid	20.8	-	-	-
End	20.8	-	-	-

Weather Conditions:

Boreholes Total	
Today	8
Previous	18
To Date	26

Drilled Total	
Today	132.5
Previous	282.4
To Date	414.9

Casing Total	
Today	7
Previous	14
To Date	21

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OPENHOLE DRILL LOG

Sirius Drilling

Job No. 4284 | Date: 13/5/2022

Contract Name: GREENHEAD COLLIERY | Client: GALLIFORD TRY

Working Day: FRIDAY | Sheet: 1 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
CO1	0	1		1	OVERBURDEN
2M 0/S	1	15.2			MUDSTONE/SANDSTONE
0	15.2	16			COAL
	16	17			MUDSTONE
E05	0	1		1	OVERBURDEN
	1	15			MUDSTONE/SANDSTONE
	15	15.6			COAL
	15.6	16.6			MUDSTONE
E09	0	1		1	OVERBURDEN
	1	14.7			MUDSTONE/SANDSTONE
	14.7	15.7			BROKEN GROUND
	15.7	16.7			SOLID
E13	0	1		1	OVERBURDEN
	1	14.8			MUDSTONE/SANDSTONE
	14.8	16			BROKEN GROUND
	16	17			SOLID
#13	0	1		1	OVERBURDEN
4M 0/S	1	14.7			MUDSTONE/SANDSTONE
	14.7	16			BROKEN GROUND
	16	17			SOLID
E13	0	1		1	OVERBURDEN
	1	14.8			MUDSTONE/SANDSTONE
	14.8	16.1			BROKEN GROUND
	16.1	17.1			SOLID
E11	0	1		1	OVERBURDEN
	1	14.8			MUDSTONE/SANDSTONE
	14.8	16			BROKEN GROUND
	16	17			SOLID
E09	0	1		1	OVERBURDEN
	1	15.2			MUDSTONE/SANDSTONE
	15.2	15.8			COAL
	15.8	16.8			MUDSTONE
E37	0	1		1	OVERBURDEN
	1	15			MUDSTONE/SANDSTONE
	15	15.7			BROKEN GROUND
	15.7	16.7			SOLID
E05	0	1		1	OVERBURDEN
	1	14.6			MUDSTONE/SANDSTONE
	14.6	15.6			BROKEN GROUND
	15.6	16.6			SOLID

Rig Type: C6-1

Crew Details: S. FORMAN, R. HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	/	/	/
Mid	20.8	/	/	/
End	20.8	/	/	/

Weather Conditions:

Boreholes Total	
Today	
Previous	26
To Date	

Drilled Total	
Today	
Previous	414.9
To Date	

Casing Total	
Today	
Previous	21
To Date	

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OPENHOLE DRILL LOG

Sirius Drilling

Job No. 4284 | Date: 13/5/2022

Contract Name: GREENHEAD COLLEGE | Client: GALLIFORD TRY

Working Day: FRIDAY | Sheet: 2 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
E03	0	1		1	OVERBURDEN
	1	14.5			MUDSTONE/SANDSTONE
	14.5	15.7			BROKEN GROUND
	15.7	16.7			SOLID
E01	0	1		1	OVERBURDEN
	1	15.1			MUDSTONE/SANDSTONE
	15.1	15.7			COAL
	15.7	16.7			MUDSTONE
G13	0	1.2		1	OVERBURDEN
	1.2	15.2			MUDSTONE/SANDSTONE
	15.2	16.3			BROKEN GROUND
	16.3	17.3			SOLID
G09	0	1.2		1	OVERBURDEN
	1.2	15.4			MUDSTONE/SANDSTONE
	15.4	16.2			BROKEN GROUND
	16.2	17.2			SOLID
G05	0	1.2		1	OVERBURDEN
	1.3	15.2			MUDSTONE/SANDSTONE
	15.2	16.2			BROKEN GROUND
	16.2	17.2			SOLID
G01	0	1		1	OVERBURDEN
	1	15.4			MUDSTONE/SANDSTONE
	15.4	16			COAL
	16	17			MUDSTONE
A01	0	1		1	OVERBURDEN
4m O/S	1	15.2			MUDSTONE/SANDSTONE
	15.2	16			COAL
	16	17			MUDSTONE
A03	0	1		1	OVERBURDEN
4m O/S	1	15.2			MUDSTONE/SANDSTONE
	15.2	16			COAL
	16	17			MUDSTONE

Rig Type: CB-1

Crew Details: S. FORMAN, R. HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	/	/	/
Mid	20.8	/	/	/
End	20.8	/	/	/

Weather Conditions:

Boreholes Total	
Today	18
Previous	26
To Date	44

Drilled Total	
Today	304.6
Previous	414.9
To Date	719.5

Casing Total	
Today	18
Previous	21
To Date	39

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OPENHOLE DRILL LOG

Job No. 4284 | Date: 16/5/2022

Contract Name: GREENHEAD COLLEGE | Client: GALLIFORD TRY

Working Day: MONDAY | Sheet: 1 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
S13	0	2.5		1	OVERBURDEN
	2.5	17			MUDSTONE/SANDSTONE
	17	18			SOFT
	18	19			SOLID
S11	0	2.5		1	OVERBURDEN
	2.5	16.5			MUDSTONE/SANDSTONE
	16.5	17.5			BROKEN GROUND
	17.8	18.8			SOLID
S07	0	2.5		1	OVERBURDEN
	2.5	16.8			MUDSTONE/SANDSTONE
	16.8	17.7			BROKEN GROUND
	17.7	18.7			SOLID
S03	0	2.5		1	OVERBURDEN
	2.5	17			MUDSTONE/SANDSTONE
	17	17.6			COAL
	17.6	18.6			MUDSTONE
S01	0	2.5		1	OVERBURDEN
	2.5	17			MUDSTONE/SANDSTONE
	17	17.6			COAL
	17.6	18.6			MUDSTONE
401	0	3		1	OVERBURDEN
	3	17.2			MUDSTONE/SANDSTONE
	17.2	18.2			COAL
	18.2	19.2			MUDSTONE
405	0	3		1	OVERBURDEN
	3	17.4			MUDSTONE/SANDSTONE
	17.4	18			~~SOFT~~
	18	19			MUDSTONE
T04	0	2.8		1	OVERBURDEN
	2.8	16.8			MUDSTONE/SANDSTONE
	16.8	17.9			BROKEN GROUND
	17.9	18.9			SOLID
T06	0	2.8		1	OVERBURDEN
	2.8	17			MUDSTONE/SANDSTONE
	17	18			SOFT
	18	19			SOLID
J01	0	2		1	OVERBURDEN
	2	15			MUDSTONE/SANDSTONE
	15	16.2			BROKEN GROUND
	16.2	17.2			SOLID

Rig Type: C6 - 1

Crew Details: S. FORMAN, R. HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	/	/	/
Mid	20.8	/	/	/
End	20.8	/	/	/

Weather Conditions:

Boreholes Total	
Today	
Previous	
To Date	

Drilled Total	
Today	
Previous	
To Date	

Casing Total	
Today	
Previous	
To Date	

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OPENHOLE DRILL LOG

Job No: 4284 | Date: 26/5/2022
Contract Name: GREENHEAD COLLEGE | Client: GALLIFORD TRY
Working Day: MONDAY | Sheet: 2 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
J03	0	2		1	OVERBURDEN
	2	15.1			MUDSTONE/SANDSTONE
	15.1	16.3			SOFT
	16.3	17.3			SOLID
J07	0	2		1	OVERBURDEN
	2	15.5			MUDSTONE/SANDSTONE
	15.5	16.5			BROKEN GROUND
	16.5	17.5			SOLID
J11	0	2		1	OVERBURDEN
	2	15.4			MUDSTONE/SANDSTONE
	15.4	16.7			SOFT
	16.7	17.7			SOLID
J13	0	2		1	OVERBURDEN
	2	15.9			MUDSTONE/SANDSTONE
	15.9	16.9			SOFT
	16.9	17.9			SOLID
L01	0	2		1	OVERBURDEN
	2	15.8			MUDSTONE/SANDSTONE
	15.8	16.5			SOFT
	16.5	17.5			SOLID
L05	0	2		1	OVERBURDEN
	2	16.4			MUDSTONE/SANDSTONE
	16.4	17			COAL
	17	18			MUDSTONE

Rig Type: C6-1

Crew Details: S. ROBINSON, R. HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	/	/	/
Mid	20.8	/	/	/
End	20.8	/	/	/

Weather Conditions:

Boreholes Total	
Today	16
Previous	44
To Date	60

Drilled Total	
Today	292.6
Previous	719.5
To Date	1012.1

Casing Total	
Today	16
Previous	39
To Date	55

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OPENHOLE DRILL LOG

Sirius Drilling

Job No. 4284 | Date: 16/05/22
Contract Name: Greenwood College | Client: Wexford Try
Working Day: Monday | Sheet: 1 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
Q1	00	2.00		2	overburden
	2.00	17.00			Sandstone/Mudstone
	17.00	17.60			Coal
	17.60	18.60			Mudstone
Q5	00	2.00		2	overburden
	2.00	17.00			Sandstone/Mudstone
	17.00	18.00			Soft
	18.00	19.00			Sound
Q9	00	2.00		2	overburden
	2.00	16.80			Sandstone/Mudstone
	16.80	18.00			Broken Ground
	18.00	19.00			Sound
Q13	00	2.00		2	overburden
	2.00	17.00			Sandstone/Mudstone
	17.00	18.00			Soft
	18.00	19.00			Sound
R12	00	2.00		2	overburden
	2.00	16.80			Sandstone/Mudstone
	16.80	17.80			Soft
	17.80	18.80			Sound
R10	00	2.00		2	overburden
	2.00	16.70			Sandstone/Mudstone
	16.70	17.80			Broken Ground
	17.80	18.80			Sound
R8	00	2.50		2.5	overburden
	2.50	17.00			Sandstone/Mudstone
	17.00	18.00			Broken Ground
	18.00	19.00			Sound
R6	00	2.30		2.3	overburden
	2.30	16.80			Sandstone/Mudstone
	16.80	17.80			Soft
	17.80	18.80			Sound
R4	00	2.30		2.3	overburden
	2.30	16.70			Sandstone/Mudstone
	16.70	17.90			Soft
	17.90	18.90			Sound
R2	00	2.30		2.3	overburden
	2.30	16.70			Sandstone/Mudstone
	16.70	17.70			Broken Ground
	17.70	18.70			Sound

Rig Type: C62

Crew Details: R. Edwards, T. Clark.

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start				
Mid				
End				

Weather Conditions:

Boreholes Total	
Today	
Previous	
To Date	

Drilled Total	
Today	
Previous	
To Date	

Casing Total	
Today	
Previous	
To Date	

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OPENHOLE DRILL LOG

Job No. 4284 | Date: 16/05/22
Contract Name: Greenwood College. | Client: Lailford Toy
Working Day: Monday | Sheet: 2 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
T8	00	2.40		2.4	overburden
	2.40	16.80			Sandstone / Mudstone
	16.80	18.00			Broken Ground
	18.00	19.00			Solid
T10	00	2.40		2.4	overburden
	2.40	17.00			Sandstone / Mudstone
	17.00	17.90			Soft
	17.90	18.90			Solid
49	00	2.40		2.4	overburden
	2.40	16.50			Sandstone / Mudstone
	16.50	17.80			Soft
	17.80	18.80			Solid
N1	00	2.40		2.4	overburden
	2.40	16.00			Sandstone / Mudstone
	16.00	17.00			Coal
	17.00	18.00			Mudstone.
N3	00	2.40		2.4	overburden
	2.40	16.00			Sandstone / Mudstone
	16.00	17.10			Broken Ground
	17.10	18.10			Solid
N7	00	2.40		2.4	overburden
	2.40	16.20			Sandstone / Mudstone
	16.20	17.30			Broken Ground
	17.30	18.30			Solid.

Rig Type: C6Z

Crew Details: R. Edwards, T. Clark.

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	208	0	0	0
Mid	208	0	0	0
End	208	0	0	0

Weather Conditions: OK.

Boreholes Total

Today	16
Previous	/
To Date	16

Drilled Total

Today	299.7
Previous	/
To Date	299.7

Casing Total

Today	35.8
Previous	/
To Date	35.8

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OPENHOLE DRILL LOG

Job No. 4284 | Date: 17/5/2022

Contract Name: GREENHEAD COLLEGE | Client: GALLIFORD TRY

Working Day: TUESDAY | Sheet: 1 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
L13	0	2		1	OVERBURDEN
	2	16.4			MUDSTONE/SANDSTONE
	16.4	17			SOFT
	17	18			SOLID
L09	0	2		1	OVERBURDEN
	2	16			MUDSTONE/SANDSTONE
	16	17			BROKEN GROUND
	17	18			SOLID
K02	0	2		1	OVERBURDEN
	2	15.8			MUDSTONE/SANDSTONE
	15.8	16.6			BROKEN GROUND
	16.6	17.6			SOLID
K04	0	2		1	OVERBURDEN
	2	15.6			MUDSTONE/SANDSTONE
	15.6	16.6			BROKEN GROUND
	16.6	17.6			SOLID
K06	0	2		1	OVERBURDEN
	2	15.5			MUDSTONE/SANDSTONE
	15.5	16.7			BROKEN GROUND
	16.7	17.7			SOLID
K08	0	2		1	OVERBURDEN
	2	15.6			MUDSTONE/SANDSTONE
	15.6	16.7			BROKEN GROUND
	16.7	17.7			SOLID
K10	0	2		1	OVERBURDEN
	2	15.8			MUDSTONE/SANDSTONE
	15.8	16.8			BROKEN GROUND
	16.8	17.8			SOLID
K12	0	2		1	OVERBURDEN
	2	16			MUDSTONE/SANDSTONE
	16	16.9			BROKEN GROUND
	16.9	17.9			SOLID
H02	0	1.5		1	OVERBURDEN
	1.5	15			MUDSTONE/SANDSTONE
	15	16.2			BROKEN GROUND
	16.2	17.2			SOLID
H04	0	1.5		1	OVERBURDEN
	1.5	15.1			MUDSTONE/SANDSTONE
	15.1	16.3			BROKEN GROUND
	16.3	17.3			SOLID

Rig Type: C6-1

Crew Details: S. EGHAN, R. HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	✓	✓	✓
Mid	20.8	✓	✓	✓
End	20.7	✓	✓	✓

Weather Conditions:

Boreholes Total

Today	
Previous	
To Date	

Drilled Total

Today	
Previous	
To Date	

Casing Total

Today	
Previous	
To Date	

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OPENHOLE DRILL LOG

Job No. 4284 | Date: 17/5/2022

Contract Name: GREENHEAD COLLEGE | Client: GALLIFORD TRY

Working Day: TUESDAY | Sheet: 2 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
H06	0	1.5		1	OVERBURDEN
	1.5	15.3			MUDSTONE/SANDSTONE
	15.3	16.4			BROKEN GROUND
	16.4	17.4			SOLID
H08	0	1.5		1	OVERBURDEN
	1.5	15.2			MUDSTONE/SANDSTONE
	15.2	16.5			BROKEN GROUND
	16.5	17.5			SOLID
H10	0	1.5		1	OVERBURDEN
	1.5	15.5			MUDSTONE/SANDSTONE
	15.5	16.5			BROKEN GROUND
	16.5	17.5			SOLID
H12	0	1.5		1	OVERBURDEN
	1.5	15.4			MUDSTONE/SANDSTONE
	15.4	16.6			BROKEN GROUND
	16.6	17.6			SOLID
F02	0	1.5		1	OVERBURDEN
	1.5	15			MUDSTONE/SANDSTONE
	15	16			BROKEN GROUND
	16	17			SOLID
F04	0	1.5		1	OVERBURDEN
	1.5	15			MUDSTONE/SANDSTONE
	15	16.1			BROKEN GROUND
	16.1	17.1			SOLID
F06	0	1.5		1	OVERBURDEN
	1.5	15.1			MUDSTONE/SANDSTONE
	15.1	16.2			BROKEN GROUND
	16.2	17.2			SOLID

Rig Type: C6-1

Crew Details: S. STORMAN, R. HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	-	-	-
Mid	20.8	-	-	-
End	20.8	-	-	-

Weather Conditions:

Boreholes Total	
Today	17
Previous	60
To Date	77

Drilled Total	
Today	298.1
Previous	1012.1
To Date	1310.2

Casing Total	
Today	17
Previous	55
To Date	72

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OPENHOLE DRILL LOG

Sirius Drilling

Job No. 4284 | Date: 17/05/22
Contract Name: Greenwood College | Client: Galliford Try
Working Day: Tuesday | Sheet: 1 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
N11	00	2.20		2.2	overburden
	2.20	16.00			Sandstone/Mudstone
	16.00	17.00			Soft
	17.00	18.00			Solid
	00	2.00		2	overburden
N13	2.00	15.80			Sandstone/Mudstone
	15.80	16.90			Soft
	16.90	17.90			Solid
P12	00	2.30		2.3	overburden
	2.30	16.00			Sandstone/Mudstone
	16.00	17.20			Broken Ground
	17.20	18.20			Solid
P10	00	2.30		2.3	overburden
	2.30	16.20			Sandstone/Mudstone
	16.20	17.20			Soft
	17.20	18.20			Solid
P8	00	2.30		2.3	overburden
	2.30	16.00			Sandstone/Mudstone
	16.00	17.10			Soft
	17.10	18.10			Solid
P6	00	2.50		2.5	overburden
	2.50	16.00			Sandstone/Mudstone
	16.00	17.00			Soft
	17.00	18.00			Solid
P4	00	2.50		2.5	overburden
	2.50	16.00			Sandstone/Mudstone
	16.20	17.20			Broken Ground
	17.20	18.20			Solid
P2	00	2.50		2.5	overburden
	2.50	15.80			Sandstone/Mudstone
	15.80	17.10			Soft
	17.10	18.10			Solid
M2	00	2.40		2.4	overburden
	2.40	15.40			Sandstone/Mudstone
	15.40	16.60			Soft
	16.60	17.60			Solid
M4	00	2.40		2.4	overburden
	2.40	15.50			Sandstone/Mudstone
	15.50	16.50			Soft
	16.50	17.50			Solid

Rig Type: C62

Crew Details: R Edwards, T. Clark.

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start				
Mid				
End				

Weather Conditions:

Boreholes Total	
Today	
Previous	
To Date	

Drilled Total	
Today	
Previous	
To Date	

Casing Total	
Today	
Previous	
To Date	

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OPENHOLE DRILL LOG

Job No. 4284 | Date: 17/05/22
Contract Name: Greenwood College | Client: Cranford Toy
Working Day: Tuesday | Sheet: 2 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
M6	00	2.40		2.4	overburden
	2.40	15.40			Sandstone / Mudstone
	15.40	16.60			Broken Ground
	16.60	17.60			Sound.
M8	00	2.40		2.4	overburden
	2.40	15.30			Sandstone / Mudstone
	15.30	16.50			Broken Ground
	16.50	17.50			Sound.
M10	00	2.40		2.4	overburden
	2.40	15.50			Sandstone / Mudstone
	15.50	16.50			Soft
	16.50	17.50			Sound.
M12	00	2.40		2.4	overburden
	2.40	15.50			Sandstone / Mudstone
	15.50	16.60			Soft
	16.60	17.60			Sound
A5	00	1.50		1.5	overburden
110°A	1.50	15.00			Sandstone / Mudstone
	15.00	15.80			Coal
	15.80	16.80			Mudstone
A7	00	1.50		1.5	overburden
110°A	1.50	15.00			Sandstone / Mudstone
	15.00	15.90			Coal
	15.90	16.90			Mudstone
A9	00	1.50		1.5	overburden
110°A	1.50	15.00			Sandstone / Mudstone
	15.00	16.00			Soft
	16.00	17.00			Sound.

Rig Type: C62

Crew Details: R. Edwell, T. Clark.

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	208	0	0	0
Mid	208	0	0	0
End	208	0	0	0

Weather Conditions:

Boreholes Total	
Today	17
Previous	16
To Date	33

Drilled Total	
Today	300.7
Previous	299.7
To Date	600.4

Casing Total	
Today	37.5
Previous	35.8
To Date	73.3

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OPENHOLE DRILL LOG

Job No. 4284 | Date: 18/5/2022

Contract Name: GREENHEAD COLLEGE | Client: GALLIFORD TRY

Working Day: WEDNESDAY | Sheet: 1 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
F08	0	1.5		1	OVERBURDEN
	1.5	15.1			MUDSTONE/SANDSTONE
	15.1	16.3			BROKEN GROUND
	16.3	17.3			SOLID
F10	0	1.5		1	OVERBURDEN
	1.5	15.3			MUDSTONE/SANDSTONE
	15.3	16.3			BROKEN GROUND
	16.3	17.3			SOLID
F12	0	1.5		1	OVERBURDEN
	1.5	15.1			MUDSTONE/SANDSTONE
	15.1	16.4			BROKEN GROUND
	16.4	17.4			SOLID
D02	0	1		1	OVERBURDEN
	1	14.5			MUDSTONE/SANDSTONE
	14.5	15.5			BROKEN GROUND
	15.5	16.5			SOLID
D04	0	1		1	OVERBURDEN
	1	14.5			MUDSTONE/SANDSTONE
	14.5	15.6			BROKEN GROUND
	15.6	16.6			SOLID
D06	0	1		1	OVERBURDEN
	1	14.8			MUDSTONE/SANDSTONE
	14.8	15.6			BROKEN GROUND
	15.6	16.6			SOLID
D08	0	1		1	OVERBURDEN
	1	14.8			MUDSTONE/SANDSTONE
	14.8	15.7			BROKEN GROUND
	15.7	16.7			SOLID
D10	0	1		1	OVERBURDEN
	1	15			MUDSTONE/SANDSTONE
	15	15.9			BROKEN GROUND
	15.9	16.9			SOLID
D12	0	1		1	OVERBURDEN
	1	15			MUDSTONE/SANDSTONE
	15	16			BROKEN GROUND
	16	17			SOLID
B08	0	1		1	OVERBURDEN
	1	14.5			MUDSTONE/SANDSTONE
	14.5	15.7			BROKEN GROUND
	15.7	16.7			SOLID

Rig Type: C6-1

Crew Details: S.FORMAN, R.HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	✓	—	—
Mid	20.8	✓	✓	✓
End	20.8	✓	✓	✓

Weather Conditions:

Boreholes Total	
Today	
Previous	
To Date	

Drilled Total	
Today	
Previous	
To Date	

Casing Total	
Today	
Previous	
To Date	

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OPENHOLE DRILL LOG

Job No. 4284 | Date: 18/5/2022

Contract Name: GREENHEAD COLLEGE | Client: GALLIFORD TRY

Working Day: WEDNESDAY | Sheet: 2 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
B10	0	1		1	OVERBURDEN
	1	15			MUDSTONE / SANDSTONE
	15	15.8			BROKEN GROUND
	15.8	16.8			SOLID
B12	0	1		1	OVERBURDEN
	1	14.8			MUDSTONE / SANDSTONE
	14.8	15.8			BROKEN GROUND
	15.8	16.8			SOLID
A11					
110	0	1.5		1	OVERBURDEN
	1.5	15			MUDSTONE / SANDSTONE
	15	16			SOFT
	16	17			SOLID

Rig Type: C6 - 1

Crew Details: S. FORMAN, RHACRS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	-	-	-
Mid	20.8	-	-	-
End	20.8	-	-	-

Weather Conditions:

Boreholes Total	
Today	13
Previous	77
To Date	90

Drilled Total	
Today	219.6
Previous	1310.2
To Date	1529.8

Casing Total	
Today	13
Previous	72
To Date	85

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OPENHOLE DRILL LOG

Job No. 4284 | Date: 23/5/2022

Contract Name: GREENHEAD COLLEGE | Client: GALLIFORD TRY

Working Day: MONDAY | Sheet: 1 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
TH2	0	2.4		1	OVERBURDEN
	2.4	17			MUDSTONE/SANDSTONE
	17	18			SOFT
	18	19			SOLID
TH1 (M7)	0	2.4		2.4	OVERBURDEN
	2.4	15.4			MUDSTONE/SANDSTONE
	15.4	16.5			SOFT GROUT TRACES
	16.5	17.5			MUDSTONE
TH2 (F7)	0	1.5		1.5	OVERBURDEN
	1.5	15.2			MUDSTONE/SANDSTONE
	15.2	16.3			SOFT GROUT TRACES
	16.3	17.3			MUDSTONE

Rig Type: CG.1

Crew Details: S. FORMAN, R. HICKS

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	✓	✓	✓
Mid	20.8	✓	✓	✓
End	20.9	✓	✓	✓

Weather Conditions:

Boreholes Total	
Today	3
Previous	90
To Date	93

Drilled Total	
Today	53.8
Previous	1529.8
To Date	1583.6

Casing Total	
Today	4.9
Previous	85
To Date	89.9

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GROUT LOGS

DAILY GROUTING RETURN

Job No. SDL4284 | Date: 16/05/2022

Contract Name: Greenhead College | Client: Galliford Try

Working Day: 1 1 | Sheet: 1 of 1

Hole No.	Depth (m)	Strata*	PFA	OPC	Sand	Gravel	Total Grout	Full	Still Taking	Top Up	Press (psi/ bar)
U01		C	0.24	0.02			0.26	X			
U03		C	0.24	0.02			0.26	X			
U05		S	3.00	0.25			3.25		X		
U07		BG	3.00	0.25			3.25		X		
U09		S	3.00	0.25			3.25		X		
U11		BG	3.00	0.25			3.25		X		
T04		BG	3.00	0.25			3.25		X		
T06		S	3.00	0.25			3.25		X		
T08		BG	3.00	0.25			3.25		X		
T10		S	3.00	0.25			3.25		X		
S01		C	0.24	0.02			0.26	X			
S03		C	0.24	0.02			0.26	X			
S05		C	0.24	0.02			0.26	X			
S07		BG	3.00	0.25			3.25		X		
S09		C	0.24	0.02			0.26	X			
S11		BG	3.00	0.25			3.25		X		
S13		S	3.00	0.25			3.25		X		
R02		BG	3.00	0.25			3.25		X		
R04		S	3.00	0.25			3.25		X		
R06		S	3.00	0.25			3.25		X		
Total Used			43.44	3.62	0.00	0.00	47.06				
Previous Total			0.00	0.00	0.00	0.00	0.00				
Total to Date			43.44	3.62	0.00	0.00	47.06				

Crew Details

J Edwards

S Forman

R Hicks

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Materials Delivered Today

Item	Quant	Ticket No.
OPC	12.00	628545
PFA	28.28	443710
PFA	28.04	443729

Testing

Flow (mm)	Bleed (%)		Bleed (%)	
400	2hr	2	2hr	3
400	4hr	2	4hr	3
450	6hr	2	6hr	4

Number of Cubes Taken

	PFA	OPC	Sand	Gravel
Today	56.32	12.00		
Previous	0.00	0.00	0.00	0.00
Total Delivered	56.32	12.00	0.00	0.00
Total Used	43.44	3.62	0.00	0.00
Stock on Site	12.88	8.38	0.00	0.00

Signed by Sirius Drilling Ltd: J Edwards | Date: 16/05/2022

Signed by Client: | Date:

* C-Coal, S-Soft, BG-Broken Ground, V-Void, N/C-No Coal/Workings

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DAILY GROUTING RETURN

Job No. SDL4284 | Date: 17/05/2022

Contract Name: Greenhead College | Client: Galliford Try

Working Day: 2 | Sheet: 1 of 3

Hole No.	Depth (m)	Strata*	PFA	OPC	Sand	Gravel	Total Grout	Full	Still Taking	Top Up	Press (psi/ bar)
U05		S	0.48	0.04			0.52	X			
U07		BG	1.20	0.10			1.30	X			
U09		S	0.60	0.05			0.65	X			
U11		BG	1.20	0.10			1.30	X			
T04		BG	1.20	0.10			1.30	X			
T06		S	0.60	0.05			0.65	X			
T08		BG	1.20	0.10			1.30	X			
T10		S	0.60	0.05			0.65	X			
S07		BG	1.20	0.10			1.30	X			
S11		BG	1.20	0.10			1.30	X			
S13		S	0.60	0.05			0.65	X			
R02		BG	1.20	0.10			1.30	X			
R04		S	0.60	0.05			0.65	X			
R06		S	0.60	0.05			0.65	X			
Q01		C	0.24	0.02			0.26	X			
Q03		BG	4.20	0.35			4.55	X			
Q05		S	4.20	0.35			4.55	X			
Q07		BG	4.20	0.35			4.55	X			
Q09		BG	4.32	0.36			4.68	X			
Q11		BG	4.32	0.36			4.68	X			

Crew Details

J Edwards

S Forman

R Hicks

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Materials Delivered Today

Item	Quant	Ticket No.
PFA	28.34	443816
PFA	28.62	443846
PFA	28.26	443848

Testing

Flow (mm)	Bleed (%)		Bleed (%)	
450	2hr	1	2hr	1
500	4hr	2	4hr	2
450	6hr	2	6hr	2

Number of Cubes Taken: 3

	PFA	OPC	Sand	Gravel
Total Used	33.96	2.83	0.00	0.00	36.79
Previous Total	43.44	3.62	0.00	0.00	47.06
Total to Date	77.40	6.45	0.00	0.00	83.85

	PFA	OPC	Sand	Gravel
Today	85.22			
Previous	56.32	12.00	0.00	0.00
Total Delivered	141.54	12.00	0.00	0.00
Total Used	77.40	6.45	0.00	0.00
Stock on Site	64.14	5.55	0.00	0.00

Signed by Sirius Drilling Ltd: J Edwards | Date: 17/05/2022

Signed by Client: | Date:

* C-Coal, S-Soft, BG-Broken Ground, V-Void, N/C-No Coal/Workings

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DAILY GROUTING RETURN

Job No. SDL4284 | Date: 17/05/2022

Contract Name: Greenhead College | Client: Galliford Try

Working Day: 2 | Sheet: 2 of 3

Hole No.	Depth (m)	Strata*	PFA	OPC	Sand	Gravel	Total Grout	Full	Still Taking	Top Up	Press (psi/ bar)
Q13		S	3.60	0.30			3.90	X			
R12		S	3.60	0.30			3.90	X			
R10		BG	4.08	0.34			4.42	X			
R08		BG	3.60	0.30			3.90	X			
P02		S	1.20	0.10			1.30	X			
P04		BG	3.60	0.30			3.90	X			
P06		S	1.20	0.10			1.30	X			
P08		S	1.20	0.10			1.30	X			
P10		S	1.20	0.10			1.30	X			
P12		BG	3.60	0.30			3.90	X			
N01		C	0.24	0.02			0.26	X			
N03		BG	3.60	0.30			3.90	X			
N05		BG	4.20	0.35			4.55	X			
N07		BG	3.60	0.30			3.90	X			
N09		C	0.24	0.02			0.26	X			
N11		S	2.40	0.20			2.60	X			
N13		S	1.20	0.10			1.30	X			
M02		S	1.20	0.10			1.30	X			
M04		S	2.40	0.20			2.60	X			
M06		BG	3.60	0.30			3.90	X			

Crew Details

J Edwards

S Forman

R Hicks

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Materials Delivered Today

Item	Quant	Ticket No.

Testing

Flow (mm)	Bleed (%)		Bleed (%)	
	2hr		2hr	
	4hr		4hr	
	6hr		6hr	

Number of Cubes Taken

Total Used	49.56	4.13	0.00	0.00	53.69
Previous Total	77.40	6.45	0.00	0.00	83.85
Total to Date	126.96	10.58	0.00	0.00	137.54

	PFA	OPC	Sand	Gravel
Today				
Previous	141.54	12.00	0.00	0.00
Total Delivered	141.54	12.00	0.00	0.00
Total Used	126.96	10.58	0.00	0.00
Stock on Site	14.58	1.42	0.00	0.00

Signed by Sirius Drilling Ltd: J Edwards | Date: 17/05/2022

Signed by Client: | Date:

* C-Coal, S-Soft, BG-Broken Ground, V-Void, N/C-No Coal/Workings

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DAILY GROUTING RETURN

Sirius Drilling

Job No.	SDL4284	Date:	17/05/2022
Contract Name:	Greenhead College	Client:	Galliford Try
Working Day:	2	Sheet:	3 of 3

Hole No.	Depth (m)	Strata*	PFA	OPC	Sand	Gravel	Total Grout	Full	Still Taking	Top Up	Press (psi/ bar)
M08		BG	3.60	0.30			3.90	X			
M10		S	0.60	0.05			0.65	X			
M12		S	0.60	0.05			0.65	X			

Crew Details

J Edwards

S Forman

R Hicks

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Materials Delivered Today

Item	Quant	Ticket No.

Testing

Flow (mm)	Bleed (%)		Bleed (%)	
	2hr		2hr	
	4hr		4hr	
	6hr		6hr	
Number of Cubes Taken				

	PFA	OPC	Sand	Gravel	Total Grout
Total Used	4.80	0.40	0.00	0.00	5.20
Previous Total	126.96	10.58	0.00	0.00	137.54
Total to Date	131.76	10.98	0.00	0.00	142.74

	PFA	OPC	Sand	Gravel
Today				
Previous	141.54	12.00	0.00	0.00
Total Delivered	141.54	12.00	0.00	0.00
Total Used	131.76	10.98	0.00	0.00
Stock on Site	9.78	1.02	0.00	0.00

Signed by Sirius Drilling Ltd: J Edwards Date: 17/05/2022

Signed by Client: Date:

* C-Coal, S-Soft, BG-Broken Ground, V-Void, N/C-No Coal/Workings

DAILY GROUTING RETURN

Job No. SDL4284 | Date: 18/05/2022

Contract Name: Greenhead College | Client: Galliford Try

Working Day: 3 | Sheet: 1 of 1

Hole No.	Depth (m)	Strata*	PFA	OPC	Sand	Gravel	Total Grout	Full	Still Taking	Top Up	Press (psi/ bar)
L01		S	1.20	0.10			1.30	X			
L03		BG	3.60	0.30			3.90	X			
L05		C	0.24	0.02			0.26	X			
L07		BG	2.40	0.20			2.60		X		
L09		BG	2.40	0.20			2.60		X		
L11		BG	2.40	0.20			2.60		X		
L13		S	1.20	0.10			1.30	X			
K02		BG	2.40	0.20			2.60	X			
K04		BG	3.60	0.30			3.90	X			
K06		BG	3.60	0.30			3.90	X			
K08		BG	2.40	0.20			2.60	X			
K10		BG	2.40	0.20			2.60	X			
K12		BG	3.60	0.30			3.90	X			
J01		BG	3.60	0.30			3.90	X			
J03		S	1.20	0.10			1.30	X			
J05		BG	1.20	0.10			1.30	X			
J07		BG	1.20	0.10			1.30	X			
J09		BG	2.40	0.20			2.60	X			
J11		S	1.20	0.10			1.30	X			
J13		S	1.20	0.10			1.30	X			

Crew Details

J Edwards

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Materials Delivered Today

Item	Quant	Ticket No.
OPC	26.00	8/40300
PFA	28.70	443941
PFA	28.22	443924
PFA	28.12	443937

Testing

Flow (mm)	Bleed (%)		Bleed (%)	
500	2hr	2	2hr	1
500	4hr	2	4hr	3
500	6hr	3	6hr	3

Number of Cubes Taken: 3

	PFA	OPC	Sand	Gravel	Total
Total Used	43.44	3.62	0.00	0.00	47.06
Previous Total	131.76	10.98	0.00	0.00	142.74
Total to Date	175.20	14.60	0.00	0.00	189.80

	PFA	OPC	Sand	Gravel
Today	85.04	26.00		
Previous	141.54	12.00	0.00	0.00
Total Delivered	226.58	38.00	0.00	0.00
Total Used	175.20	14.60	0.00	0.00
Stock on Site	51.38	23.40	0.00	0.00

Signed by Sirius Drilling Ltd: J Edwards | Date: 18/05/2022

Signed by Client: | Date:

* C-Coal, S-Soft, BG-Broken Ground, V-Void, N/C-No Coal/Workings

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DAILY GROUTING RETURN

Job No. SDL4284 | Date: 19/05/2022

Contract Name: Greenhead College | Client: Galliford Try

Working Day: 4 | Sheet: 1 of 2

Hole No.	Depth (m)	Strata*	PFA	OPC	Sand	Gravel	Total Grout	Full	Still Taking	Top Up	Press (psi/ bar)
A13		BG	4.20	0.35			4.55	X			
C13		BG	4.20	0.35			4.55	X			
E13		BG	4.20	0.35			4.55	X			
G13		BG	4.20	0.35			4.55	X			
B12		BG	4.20	0.35			4.55	X			
D12		BG	4.20	0.35			4.55	X			
F12		BG	4.08	0.34			4.42	X			
H12		BG	4.20	0.35			4.55	X			
A11		S	4.20	0.35			4.55	X			
C11		BG	4.20	0.35			4.55	X			
E11		BG	4.20	0.35			4.55	X			
G11		BG	4.20	0.35			4.55	X			
A1		C	0.24	0.02			0.26	X			
A3		C	0.24	0.02			0.26	X			
A5		C	0.24	0.02			0.26	X			
A7		C	0.24	0.02			0.26	X			
A9		S	3.60	0.30			3.90	X			
C01		C	0.24	0.02			0.26	X			
E01		C	0.24	0.02			0.26	X			
G01		C	0.24	0.02			0.26	X			

Crew Details

J Edwards

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Materials Delivered Today

Item	Quant	Ticket No.
PFA	28.54	443975
PFA	27.92	443981

Testing

Flow (mm)	Bleed (%)		Bleed (%)	
500	2hr	2	2hr	1
400	4hr	2	4hr	1
400	6hr	2	6hr	3

Number of Cubes Taken

	PFA	OPC	Sand	Gravel
Total Used	55.56	4.63	0.00	0.00	60.19
Previous Total	175.20	14.60	0.00	0.00	189.80
Total to Date	230.76	19.23	0.00	0.00	249.99

	PFA	OPC	Sand	Gravel
Today	56.46			
Previous	226.58	38.00	0.00	0.00
Total Delivered	283.04	38.00	0.00	0.00
Total Used	230.76	19.23	0.00	0.00
Stock on Site	52.28	18.77	0.00	0.00

Signed by Sirius Drilling Ltd: J Edwards | Date: 19/05/2022

Signed by Client: | Date:

* C-Coal, S-Soft, BG-Broken Ground, V-Void, N/C-No Coal/Workings

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DAILY GROUTING RETURN

Job No. SDL4284 | Date: 19/05/2022

Contract Name: Greenhead College | Client: Galliford Try

Working Day: 4 | Sheet: 2 of 2

Hole No.	Depth (m)	Strata*	PFA	OPC	Sand	Gravel	Total Grout	Full	Still Taking	Top Up	Press (psi/ bar)
B10		BG	4.20	0.35			4.55	X			
D10		BG	4.20	0.35			4.55	X			
F10		BG	3.60	0.30			3.90	X			
H10		BG	3.60	0.30			3.90	X			
C09		BG	4.20	0.35			4.55	X			
E09		C	0.24	0.02			0.26	X			
G09		BG	4.32	0.36			4.68	X			
B08		BG	3.60	0.30			3.90	X			
Total Used			27.96	2.33	0.00	0.00	30.29				
Previous Total			230.76	19.23	0.00	0.00	249.99				
Total to Date			258.72	21.56	0.00	0.00	280.28				

Crew Details

J Edwards

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Materials Delivered Today

Item	Quant	Ticket No.

Testing

Flow (mm)	Bleed (%)		Bleed (%)	
	2hr		2hr	
	4hr		4hr	
	6hr		6hr	

Number of Cubes Taken

	PFA	OPC	Sand	Gravel
Today				
Previous	283.04	38.00	0.00	0.00
Total Delivered	283.04	38.00	0.00	0.00
Total Used	258.72	21.56	0.00	0.00
Stock on Site	24.32	16.44	0.00	0.00

Signed by Sirius Drilling Ltd: J Edwards | Date: 19/05/2022

Signed by Client: | Date:

* C-Coal, S-Soft, BG-Broken Ground, V-Void, N/C-No Coal/Workings

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DAILY GROUTING RETURN

Job No. SDL4284 | Date: 20/05/2022

Contract Name: Greenhead College | Client: Galliford Try

Working Day: 5 | Sheet: 1 of 1

Hole No.	Depth (m)	Strata*	PFA	OPC	Sand	Gravel	Total Grout	Full	Still Taking	Top Up	Press (psi/ bar)
C03		C	0.24	0.02			0.26	X			
C05		C	0.24	0.02			0.26	X			
C07		C	0.24	0.02			0.26	X			
D02		BG	4.20	0.35			4.55	X			
D04		BG	4.20	0.35			4.55	X			
D06		BG	4.20	0.35			4.55	X			
D08		BG	3.84	0.32			4.16	X			
E03		BG	3.84	0.32			4.16	X			
E05		BG	4.20	0.35			4.55	X			
E07		BG	4.20	0.35			4.55	X			
F02		BG	4.20	0.35			4.55	X			
F04		BG	3.84	0.32			4.16	X			
F06		BG	4.20	0.35			4.55	X			
F08		BG	4.20	0.35			4.55	X			

Crew Details

J Edwards

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Materials Delivered Today

Item	Quant	Ticket No.
PFA	28.22	444084
PFA	28.08	444083
PFA	27.98	444085

Testing

Flow (mm)	Bleed (%)		Bleed (%)	
450	2hr	1	2hr	2
400	4hr	2	4hr	2
400	6hr	2	6hr	3

Number of Cubes Taken: 3

	PFA	OPC	Sand	Gravel		PFA	OPC	Sand	Gravel
Total Used	45.84	3.82	0.00	0.00	49.66	Today	84.28			
Previous Total	258.72	21.56	0.00	0.00	280.28	Previous	283.04	38.00	0.00	0.00
						Total Delivered	367.32	38.00	0.00	0.00
Total to Date	304.56	25.38	0.00	0.00	329.94	Total Used	304.56	25.38	0.00	0.00
						Stock on Site	62.76	12.62	0.00	0.00

Signed by Sirius Drilling Ltd: J Edwards | Date: 20/05/2022

Signed by Client: | Date:

* C-Coal, S-Soft, BG-Broken Ground, V-Void, N/C-No Coal/Workings

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DAILY GROUTING RETURN

Job No. SDL4284 | Date: 23/05/2022

Contract Name: Greenhead College | Client: Galliford Try

Working Day: 6 | Sheet: 1 of 1

Hole No.	Depth (m)	Strata*	PFA	OPC	Sand	Gravel	Total Grout	Full	Still Taking	Top Up	Press (psi)
L07		BG	1.20	0.10			1.30	X			
L09		BG	1.20	0.10			1.30	X			
L11		BG	1.20	0.10			1.30	X			
T12		S	0.60	0.05			0.65	X			
G03		BG	4.20	0.35			4.55	X			
G05		BG	4.20	0.35			4.55	X			
G07		BG	4.20	0.35			4.55	X			
H02		BG	4.20	0.35			4.55	X			
H04		BG	3.84	0.32			4.16	X			
H06		BG	3.60	0.30			3.90	X			
H08		BG	3.60	0.30			3.90	X			
TH1		G	0.36	0.03			0.39	X			24
TH2		G	0.24	0.02			0.26	X			24
	Test boreholes pressured and held										

Crew Details

J Edwards

S Forman

R Hicks

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Materials Delivered Today

Item	Quant	Ticket No.

Testing

Flow (mm)	Bleed (%)		Bleed (%)	
450	2hr	1	2hr	
400	4hr	2	4hr	
400	6hr	2	6hr	

Number of Cubes Taken

							PFA	OPC	Sand	Gravel
Total Used	32.64	2.72	0.00	0.00	35.36	Today				
Previous Total	304.56	25.38	0.00	0.00	329.94	Previous	367.32	38.00	0.00	0.00
						Total Delivered	367.32	38.00	0.00	0.00
Total to Date	337.20	28.10	0.00	0.00	365.30	Total Used	337.20	28.10	0.00	0.00
						Stock on Site	30.12	9.90	0.00	0.00

Signed by Sirius Drilling Ltd: J Edwards | Date: 23/05/2022

Signed by Client: | Date:

* C-Coal, S-Soft, BG-Broken Ground, V-Void, N/C-No Coal/Workings

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APPENDIX E

CUBE TEST RESULTS

29 Rufford Court
Woolston
Warrington
WA1 4RF
United Kingdom
Tel: +44(0) 1925 286220

CONCRETE TEST CUBE REPORT

UKAS TESTING 0001

SOCOTEC

Date: 14/06/2022

Report no: WAB51326891_01

Client: SIRIUS DRILLING LTD

Scheme: SDL 4284 GREENHEAD SCHOOL

Contract no: 51069588

Request Sheet No.	Lab Ref.	Client Ref.	Date Made	Time Made	Date Received in Laboratory	Date Tested	Age days	Dimensions mm	Density kg/m³	Failure Load kN	Compressive Strength N/mm²	Specified Strength N/mm²
NOR011403	51326891	2	17/05/2022		25/05/2022	14/06/2022	28	100x100x100	1650	52.4	5.2	1.0

Location: NOT GIVEN

Mix details: 12:1

The following apply unless otherwise stated under Remarks.

1) Laboratory curing range 18°-22°C.
2) Cube appearance as received satisfactory.
3) Test moisture condition and density saturated.
4) Cube failure normal. Concrete appearance normal.
5) Volume determined by measurement or designated size. Any fins removed by abrasive stone.
6) Laboratory curing conditions cannot be assured during tank cleaning.
7) Certificate of sampling not received. Certificate of making and curing not received.

8) Rate of Loading 0.4 to 0.8 N/mm² per sec.

Certified that curing of the hardened concrete in the laboratory and testing for shape, dimensions, density and compressive strength was carried out in accordance with BS EN 12390-1:2021, BS EN 12390-2:2019, BS EN 12390-7:2019 and BS 12390-3:2019
Air Content determined in accordance with BS EN 12350-7:2019, Slump test carried out in accordance with BS EN 12350-2:2019

Signed

Iain Rennie - Section Manager

for and on behalf of SOCOTEC UK Limited

Issued to: SIRIUS DRILLING LTD

Form L53GLA V.11/06/22

29 Rufford Court
Woolston
Warrington
WA1 4RF
United Kingdom
Tel: +44(0) 1925 286220

CONCRETE TEST CUBE REPORT

UKAS TESTING 0001

SOCOTEC

Date: 15/06/2022

Report no: WAB51326893_01

Client: SIRIUS DRILLING LTD

Scheme: SDL 4284 GREENHEAD SCHOOL

Contract no: 51069588

Request Sheet No.	Lab Ref.	Client Ref.	Date Made	Time Made	Date Received in Laboratory	Date Tested	Age days	Dimensions mm	Density kg/m³	Failure Load kN	Compressive Strength N/mm²	Specified Strength N/mm²
NOR011404	51326893	4	18/05/2022		25/05/2022	15/06/2022	28	100x100x100	1630	52.9	5.3	1.0

Location: NOT GIVEN

Mix details: 12:1

The following apply unless otherwise stated under Remarks.

1) Laboratory curing range 18°-22°C.
2) Cube appearance as received satisfactory.
3) Test moisture condition and density saturated.
4) Cube failure normal. Concrete appearance normal.
5) Volume determined by measurement or designated size. Any fins removed by abrasive stone.
6) Laboratory curing conditions cannot be assured during tank cleaning.
7) Certificate of sampling not received. Certificate of making and curing not received.

8) Rate of Loading 0.4 to 0.8 N/mm² per sec.

Certified that curing of the hardened concrete in the laboratory and testing for shape, dimensions, density and compressive strength was carried out in accordance with BS EN 12390-1:2021, BS EN 12390-2:2019, BS EN 12390-7:2019 and BS 12390-3:2019
Air Content determined in accordance with BS EN 12350-7:2019, Slump test carried out in accordance with BS EN 12350-2:2019

Signed

Iain Rennie - Section Manager

for and on behalf of SOCOTEC UK Limited

Issued to: SIRIUS DRILLING LTD

Form L53GLA V.11/06/22

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United Kingdom
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CONCRETE TEST CUBE REPORT

UKAS TESTING 0001

SOCOTEC

Date: 23/06/2022

Report no: WAB51326894_02

Client: SIRIUS DRILLING LTD

Scheme: SDL 4284 GREENHEAD SCHOOL

Contract no: 51069588

Request Sheet No.	Lab Ref.	Client Ref.	Date Made	Time Made	Date Received in Laboratory	Date Tested	Age days	Dimensions mm	Density kg/m³	Failure Load kN	Compressive Strength N/mm²	Specified Strength N/mm²
NOR011405	51326894	5	20/05/2022		25/05/2022	27/05/2022	7	100x100x100	1320	23.9	2.4	1.0
Location: NOT GIVEN Mix details: 12:1 Remarks: Degree of saturation uncertain.												
NOR011405	51326895	6	20/05/2022		25/05/2022	17/06/2022	28	100x100x100	1520	23.1	2.3	1.0
Location: NOT GIVEN Mix details: 12:1 Remarks: Damaged/Chipped.												

The following apply unless otherwise stated under Remarks.

1) Laboratory curing range 18°-22°C.
2) Cube appearance as received satisfactory.
3) Test moisture condition and density saturated.
4) Cube failure normal. Concrete appearance normal.
5) Volume determined by measurement or designated size. Any fins removed by abrasive stone.
6) Laboratory curing conditions cannot be assured during tank cleaning.
7) Certificate of sampling not received. Certificate of making and curing not received.

8) Rate of Loading 0.4 to 0.8 N/mm² per sec.

Certified that curing of the hardened concrete in the laboratory and testing for shape, dimensions, density and compressive strength was carried out in accordance with BS EN 12390-1:2021, BS EN 12390-2:2019, BS EN 12390-7:2019 and BS 12390-3:2019
Air Content determined in accordance with BS EN 12350-7:2019, Slump test carried out in accordance with BS EN 12350-2:2019

Signed Paul Thomas - Section Manager

for and on behalf of SOCOTEC UK Limited

Issued to: SIRIUS DRILLING LTD

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