iD GeoEnvironmental Limited

North West & Midlands
Caledonian House, Tatton Street
Knutsford, Cheshire, WA16 6AG
t: 01565 755557

North East & Yorkshire
The Stables, Aske Hall, Aske,
Richmond
North Yorkshire, DL10 5HG
t: 01748 889010
www.id-geo.co.uk

SUPPLEMENTARY GEOENVIRONMENTAL APPRAISAL

of land at

PHASE 3, EDGEHILL PARK, WHITEHAVEN, CUMBRIA

Prepared for

STORY HOMES

Report No. 4046-G-R019

Date: November 2020

EXECUTIVE SUMMARY

The Phase 3 site is located off Wilson Pit Road, approximately 2km southwest of Whitehaven town centre. The site occupies an area of 13.85 hectares. The western half of the site slopes gently to the south. The eastern half comprises a southerly extending ridge, east of which the site slopes gently towards the southeast and eastern site boundary. There is evidence of historical surface excavations along the eastern boundary.

Historical plans indicate that a surface depression in the centre-north of the site was formerly occupied by "Gameriggs Reservoir", a brickfield was present at the base of an east/southeast facing slope in the east of the site and a cluster of buildings labelled Lower Prestonhows was present in the west. The Prestonhows site was redeveloped by Marchon Chemical Works and later operated as a TDG (tanker refuelling and washing) Depot in the late 20th Century. A large rectangular area in the centre south of the site was also used for phosphorite storage. Since 2010, an approximately 3m high stockpile of Granular Made Ground principally comprising anhydrite rock has been stockpiled in the site's southwest corner, which was sourced from beneath Story Homes Magellan Park development immediately north.

IDG were commissioned by Story Homes to provide a supplementary geoenvironmental appraisal of the site. It is understood that the site is to be redeveloped with residential housing; a proposed layout is not currently available.

IDG's investigation included a review of third party geoenvironmental reports and a ground investigation comprising 45 trial pits, 30 rotary probeholes, installation of 6 ground gas monitoring wells and a hazardous gas monitoring programme.

A summary of salient geoenvironmental issues is provided in the following table.

Issue	**Remarks**
Ground Conditions	Granular and Cohesive Made Ground was encountered in the former TDG Depot (<2.4m depth), within the infilled Reservoir (<2.7m depth), in the west of the site and vicinity of the Fox Pit shaft (<0.5m depth), on the sites eastern boundary (<0.6m depth) and potentially within a hollow where clay extraction is indicated to have taken place in the east of the site (<3.2m depth). Glacial Till is present to in excess of 3.2m thickness beneath a zone extending south across the centre of the site, thinning where higher ground is present in the west and where a ridge extends southwards across the site. Bedrock comprises weathered Coal Measures sandstone and mudstone. However, coarse red Permian-Triassic sandstone and marl is present at shallow depth in the northwest of the site.
Mining & Quarrying	No evidence of shallow coal mining has been identified. The risk from shallow mineworkings is considered to be very low. Two former mine shafts associated with deep mineworkings are indicated to be present in the west of the site which require locating, treatment and capping.
Hazardous Gas	An ongoing hazardous ground gas monitoring programme has not detected any significant gas flows or gas concentrations to date. A gas risk assessment will be presented on completion of the monitoring programme.
Radon	No risk from radon gas has been identified.
Contamination & Remediation	Anhydrite Made Ground stockpiled in the former TDG Depot in the southwest of the site contains elevated concentrations of PAH's. However, this material contains significant concentrations of sulphate, is at this stage considered geotechnically unstable and is not considered suitable for re-use as aggregate due to its unpredictable geotechnical properties and its potential for sub-surface concrete decay. Minor hotspot of lead contamination at TP733 to be delineated excavated and placed within soil cover in POS. Delineation, controlled excavation of ACM encountered at TP720 within the Infilled Reservoir. Excavation of arsenic contaminated Granular Made Ground at indicated location of former Fox Pit and either offsite disposal or placement beneath hardstanding. 600mm of clean soil cover layer to mitigate against elevated metals and PAH within Infilled Reservoir.

This brief summary should not be assumed to represent a complete account of all the potential geo-environmental issues that may exist at the site. As such it is strongly recommended that the report be read in its entirety.

Issue	Remarks
Foundations	Reinforced strip/trenchfill across site. Vibratory improvement in the east, subject to approval of an agreed specification and re-engineering of natural material cut from beneath adjacent ridge.
Groundwater & Excavations	Perched water within Made Ground and interface between topsoil and cohesive soils. Shallow groundwater within centre north of site and surface depression occupied by the Infilled Reservoir.
Highways	The firm to stiff Glacial Till clay deposits are anticipated to have a CBR in excess of 2%.
Flooding & Drainage	Northwest corner of site subject to flooding during periods of high rainfall. Ground conditions are not considered suitable for adoption of soakaway drainage.

Geoenvironmental issues with potential for significant 'abnormal' costs include:

- Demolition/removal of reinforced concrete slabs and oil-water separator from within former TDG Depot
- Remediation or off-site disposal of any contaminated made ground encountered following TDG Depot slab demolition
- Off-site disposal of Anhydrite Made Ground stockpile
- Excavation of "ridge" and re-engineering of mudstone/sandstone to an appropriate specification to enable vibro improvement and adoption of reinforced strip foundations in the east of the site.
- Location, treatment and capping of two mineshafts

This brief summary should not be assumed to represent a complete account of all the potential geo-environmental issues that may exist at the site. As such it is strongly recommended that the report be read in its entirety.

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APPENDICES

Appendix A - Drawings

Drawing No.	Title
4046-G-D042	Site Location Plan
4046-G-D043	Existing Site Features & Site Photographs
4046-G-D044	Historical Site Features
4046-G-D045	Exploratory Hole Location Plan

Appendix B – BGS Records

Appendix C - Exploratory Records

Appendix D – Geological Sections

Appendix E - Contamination Analysis & Chemical Test Results

Appendix F - Geotechnical Test Results

Appendix G- Gas Monitoring Results

Appendix H - Commission

Appendix I - General Notes

01	Environmental Setting
02	Ground Investigation Fieldwork
03	Geotechnical Testing
04	Contamination Laboratory Analysis & Interpretation (including WAC)
05	Hazardous Gas

Revision History

From	**Date**	**Comments**
4046-G-R019	November 2020	Original Report

FOREWORD (Geoenvironmental Investigation Report)

This report has been prepared for the sole internal use and reliance of the Client named on page 1. This report shall not be relied upon or transferred to any other parties without the express written authorisation of ID Geoenvironmental Limited (IDG); such authorisation not to be unreasonably withheld. If any unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill.

The report presents observations and factual data obtained during our site investigation, and provides an assessment of geoenvironmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from IDG prior to significant revision of the development proposals.

The report should be read in its entirety, including all associated drawings and appendices. IDG cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context. However, it should be noted that in order to keep the number of sheets of paper in the hard copy to a minimum, some information (e.g. laboratory test certificates) is only included within the "electronic", PDF Report.

The findings and opinions conveyed in this report (including review of any third party reports) are based on information obtained from a variety of sources as detailed within this report, and which IDG believes are reliable. All reasonable care and skill has been applied in examining the information obtained. Nevertheless, IDG cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

The report represents the findings and opinions of experienced geo-environmental consultants. IDG does not provide legal advice and the advice of lawyers may also be required.

Intrusive investigation can only investigate shallow ground beneath a small proportion of the total site area. It is possible therefore that the intrusive investigation undertaken by IDG, whilst fully appropriate, may not have encountered all significant subsurface conditions. Consequently, no liability can be accepted for conditions not revealed by the exploratory holes. Any opinion expressed as to the possible configuration of strata between or below exploratory holes is for guidance only and no responsibility is accepted as to its accuracy.

It should be borne in mind that the timescale over which the investigation was undertaken may not allow the establishment of equilibrium groundwater levels. Particularly relevant in this context is that groundwater levels are susceptible to seasonal and other variations and may be higher during wetter periods than those encountered during this commission.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

This report assumes that ground levels will not change significantly from those existing at present. If this is not to be the case, then some modification may be required.

ID Geoenvironmental Limited cannot be responsible for the consequences of changing practices, revisions to waste management legislation etc that may affect the viability of proposed remediation options.

IDG reserve the right to amend their conclusions and recommendations in the light of further information that may become available.

SUPPLEMENTARY GEOENVIRONMENTAL APPRAISAL

of land at

PHASE 3, EDGEHILL PARK, WHITEHAVEN, CUMBRIA

1 INTRODUCTION

1.1 The Commission and Brief

1.1.1 ID Geoenvironmental Limited (IDG), have been commissioned by Story Homes to undertake a supplementary geoenvironmental appraisal of land at Phase 3, Edgehill Park, hereafter referred to as 'the site'.

1.1.2 IDG have been provided with copies of the following reports prepared by Integra on behalf of Story Homes:

- Post Remediation Validation Report for the Site at the Former TDG Tanker Depot, High Road, Whitehaven, Cumbria for Story Land, reference 2074 dated June 2010.
- Geotechnical Ground Investigation at Land at High Road, Rhodia, Whitehaven, Cumbria for Story Homes Limited (Draft), reference 2546 dated September 2011.
- Phase 2 Environmental Ground Investigation at Land at High Road, Rhodia, Whitehaven, Cumbria for Story Homes Limited (Draft), reference 2725 Rev A dated February 2014.

1.1.3 Reference should be made to the Integra Phase 2 report for details of the site's history and environmental setting.

1.1.4 The agreed scope of works for this phase of investigation comprised:

- Review of the conceptual model for the site and design of an intrusive investigation.
- An intrusive investigation comprising forty-two trial pits and up to 40 rotary probeholes
- Installation of gas and groundwater monitoring wells and monitoring of hazardous ground gases for an initial four occasions over a two-month period.
- Undertaking a quantitative contamination risk assessment using generic assessment criteria.
- Identification of site development constraints and provision of recommendations for site remediation works
- Provision of recommendations for appropriate foundation solutions

1.1.5 Correspondence regarding IDG's appointment, including the brief for this investigation, is included in Appendix H.

1.2 Geotechnical Category of Proposed Development

1.2.1 It is understood that consideration is being given to residential redevelopment of the site as described in Section 2.4 below.

IDG have classified the proposed development as Geotechnical Category 2. Geotechnical Category 2 sites typically include conventional types of structure and foundation with no exceptional risk or difficult soil or loading conditions.

1.2.2 The principal objective of supplementary investigation is to identify salient geoenvironmental issues affecting the site. Supplementary investigation to satisfy the Local Planning Authority, develop a Remediation Strategy may be required.

1.3 Report Format and Limitations

1.3.1 All standard definitions, procedures and guidance are contained within Appendix I, which includes background, generic information on:

- Assessment of the environmental setting of the site

- Ground investigation fieldwork
- Geotechnical Testing
- Contamination Testing
- Hazardous Gas

1.3.2 General notes and limitations relevant to all IDG investigations are described in the Foreword and should be read in conjunction with this report. The text of the report draws specific attention to any modification to these procedures and to any other special techniques employed.

2 SITE DESCRIPTION AND DEVELOPMENT PROPOSALS

2.1 General

2.1.1 The site location is shown on Drawing No. 4046-G-D042 presented in Appendix A. Site details are summarised in the following table.

Summary of Site Location Details

Location	2 km southwest of Whitehaven town centre
NGR	251570297081,
Approximate Area	13.85ha
Known services	Underground high pressure gas main

2.2 Site Features

2.2.1 An IDG Engineer completed a walkover survey of the site on 5th August, 2020.

2.2.2 Existing site features together with a photographic record of the site at the time of the walkover survey are presented in Drawing No. 4046-G-D043 in Appendix A.

2.2.3 The southwest of the site is occupied by Story Homes construction compound and an approximately 3m high stockpile of made ground is present in the site's southwest corner. The Story Homes compound is surfaced with concrete and includes several steel containers and office cabins, stockpiles of brick and block and cement dispenser tanks.

2.2.4 It is understood that the stockpile in the site's southwest corner comprises approximately 17,000m^3 of anhydrite and slag gravel, cobbles and boulders sourced from beneath the former Marchon Works car park during development of the adjacent Magellan Park development.

2.2.5 The centre south of the site is occupied by stockpiles of subsoil sourced from the adjacent Phase 2 development. Stockpiles of topsoil sourced from the adjacent Phase 2 development are present in the south-eastern site corner.

2.2.6 The remainder (northern half) of the site comprises unused fields which slope gently to the south, east and southeast. A ridge of higher ground extends southwards into the site from the north. The site surface falls steeply from the ridge to the site's eastern and south-eastern boundary.

2.2.7 There is evidence of historical surface excavation along the site's eastern boundary.

Summary of Site Details

Current Access	Off Wilson Pit Road
Topography	Steep slopes down from "ridge to the eastern boundary.
Approximate Areas	20,000m^2 (or ha) concrete hardstand incl. 8,200m^2 (or ha) Anhydrite/slag stockpile 118,500m^2 (or ha) grass 16,000m^2 (or ha) Subsoil stockpile

2.3 Invasive Weeds

2.3.1 During the site walkover, we did not observe Japanese Knotweed or Himalayan Balsam. However, it should be noted that we are not qualified ecologists and recommend that specialist ecological advice be sought prior to development.

2.4 The Proposed Development

2.4.1 It is understood that consideration is being given to redevelopment of the site with two storey domestic dwellings, associated gardens, Public Open Space (POS) areas and adoptable roads and sewers. No site layout has been provided at this stage.

3 PREVIOUS INVESTIGATION FINDINGS

3.1 General

3.1.1 Story Homes provided IDG with copies of the following Integra Consulting reports:

- Post Remediation Validation Report for the Site at the Former TDG Tanker Depot, High Road, Whitehaven, Cumbria for Story Land, reference 2074 dated June 2010.
- Geotechnical Ground Investigation at Land at High Road, Rhodia, Whitehaven, Cumbria for Story Homes Limited (Draft), reference 2546 dated September 2011.
- Phase 2 Environmental Ground Investigation at Land at High Road, Rhodia, Whitehaven, Cumbria for Story Homes Limited (Draft), reference 2725 Rev A dated February 2014.

3.1.2 The Integra reports include a brief review of a report prepared by Elliot Environmental Services dated October 2007 and findings of preliminary (desk study) investigations and ground investigation works undertaken at the site (and adjacent land to the south) over two phases undertaken during April 2009 and May to June 2011.

3.1.3 IDG carried out an exploratory shallow mining investigation of Phase 2 and Phase 3, the findings of which are presented in Report Reference 4046-G-R003 dated February 2017.

3.2 Summary of Integra Findings

3.2.1 Integra's Validation Report reference 2074 (2010), was prepared to validate remediation works comprising removal of 50m^3 of soil and soil sampling undertaken within the TDG Depot following unauthorised release of transformer insulating oil (di-electric fluid) resulting from the theft of the copper components. While the report confirmed removal of the spilled transformer oil, the remediation indicated a Total Petroleum Hydrocarbon contamination "plume" may be present beneath the concrete surfacing possibly originating from more than one source and that "further remediation will be required including the "entire area is excavated being backfilled with inert acceptable material".

3.2.2 Integra's Desk Study presented in report 2456 (2011) identified:

- A former lorry park, refuelling and container washing depot (TDG Depot) including above ground storage tanks (ASTs), tanker washing facility and electrical substation was formerly present in the southwest of the site (2.05ha).
- A rectangular area (approximately 1.05ha) immediately east of the TDG Depot and roughly centre of the site was used for phosphorite storage.
- A stockpile of anhydrite including slag waste sourced from Story Homes adjacent Magellan Park was temporarily stockpiled in the southwest of the former TDG Depot (Integra state that the stockpile movement was subject to the Environment Agency approval of a Materials Management Plan reference EMMS0571. However, this approval reference relates to an Extractive Materials Management Statement approved by the Environment Agency on the basis that the stockpiled anhydrite was not extractive (mined) waste.
- The infilled (Gameriggs) reservoir (approximately 1.0ha in area), occupied the northwest of the site.
- A high-pressure gas main runs from north to south beneath the west of the site.
- Two mineshafts were formerly present in the northwest of the site.
- The infilled Gameriggs reservoir, TDG Depot and phosphorite rock storage were identified as potential historical contamination sources.

- The infilled reservoir, off-site infilled ground and coal measures were identified as potential ground gas sources.
- Review of EES Report includes observation that calorific values from the colliery waste in the vicinity of the infilled reservoirs indicated the presence of potentially flammable materials.

3.2.3 Historical site features referenced in Integra Reports are depicted on Drawing 4046-G-D043 in Appendix A.

3.2.4 Integra's ground investigation works took place in two phases and findings presented in Reports referenced 2456 (2011) and 2725 (2014) indicate the total works comprised:

- A total of 33 trial pits excavated within the open fields in the north and east of the site, including fourteen pits which focussed on the infilled reservoir.
- A total of 35 trial pits excavated within the former TDG Depot, anhydrite stockpile and Phosphorite storage areas.
- Six rotary probeholes (RH4-RH6 & RH12-RH14) drilled across the Phase 3 site.
- Monitoring wells were installed in probeholes RH04, RH05 & RH12 with response zones spanning Made Ground and Glacial superficial deposits and/or shallow siltstone bedrock.

3.2.5 The Coal Authority Report obtained by Integra confirms workings within seams between depths of 70m and 200m beneath the site. Whilst not stated in the Integra report, the CA report also states that the property is in an area “where the CA believe coal to be at or close to the surface” and “this coal may have been worked at some time in the past”.

3.2.6 While Integra encountered shallow coal seams they did not conclude that shallow mineworkings beneath either Phase 3 or Phases 1 and 2 to the south could represent a risk to ground stability. Integra concluded that the Fox Pit and Gameriggs pit shafts extended to the seams between 70m and 200m depth, which were interpreted to be the Main and Bannock seams.

3.2.7 Integra 2725 (2014) stated that with the exception of the infilled reservoir and TDG Depot no significant elevated metals semi metals or organics were recorded across the site above respective LQM Generic Assessment Criteria (GAC) 2009 (now superceded). However, review of Integra’s Solid Chemical Test Results Tables identifies the following:

- Arsenic, chromium, nickel, vanadium, PAH & TPH contamination were detected within Made Ground in the infilled reservoir.
- Arsenic, chromium, nickel, PAH & TPH were detected within Made Ground beneath the TDG Depot, (including 98mg/kg benzo(a)pyrene, 1750mg/kg of EC_{12}-EC_{35} TPH at 0.5m depth in TP37). Despite hydrocarbon odours being noted on the exploratory hole log for TP37, Integra considered the TPH and PAH detected to be derived from coal combustion and no further investigation of the identified hotspot was carried out.
- Locally elevated concentrations of arsenic detected in topsoil in the undeveloped field.
- TPH was locally detected in Made Ground proven in TP57 in the northeast of the site.
- No evidence of groundwater contamination was detected.

3.2.8 Integra identified that the anhydrite was geotechnically unsuitable for re-use. It was recommended that the anhydrite be placed at 300mm below ground level beneath proposed POS.

3.2.9 A 600m thick clean soil cover layer comprising 450mm of subsoil/topsoil underlain by 150mm no dig layer of stone be placed within gardens within the envelope of the TDG Depot and infilled reservoir.

3.2.10 It was recommended that plots outside of the clean cover system be “overlain by at least 300mm of imported/site won clean soils to negate any human health risk posed by unsuitable materials”.

3.2.11 Integra’s hazardous ground gas monitoring programme carried out between May 2009 and January 2010 recorded concentrations of up to 1.5l/hr methane, 2.0l/hr CO2, oxygen concentrations >13.9l/hr and no positive flows at RH04 (within the infilled reservoir), RH05 and RH12. The ground

gas risk assessment did not identify any significant risk associated with either landfill gas or mines gases within the Phase 3 Area. However, NHBC Amber 1 gas mitigation measures were recommended for Plots within Edgehill Phase 1 (200m to the south), where probable mines gases methane and carbon dioxide were detected.

3.3 IDG Mining Investigation 2017

3.3.1 IDG drilled eighteen exploratory rotary probeholes within Phase 2 and Phase 3 to assess ground conditions and potential risks from shallow mine workings. The investigation encountered thin coal seams dipping at shallow angle beneath the west of Phase 3, a number of seams of potentially productive thickness at the centre of Phase 3 and several closely spaced seams with potentially productive thicknesses of coal at shallow depth in the east of Phase 3.

3.3.2 While no evidence of shallow workings was encountered, IDG concluded that thin seams of coal in the west of the site were unlikely to be worked and therefore represented a low risk. Seams encountered at shallow depth within the centre of the site had a moderate risk of being worked and there was a high risk of workings within multiple coal seams proven at shallow depth which were indicated to outcrop immediately to the east of the site. Evidence of surface workings along the eastern boundary of Phase 3 reinforced this hypothesis. Further investigation within the "moderate risk" and "high risk" zones was recommended.

3.3.3 Findings presented in Report 4046-G-R003 are reviewed in Section 4 Geology & Mining below together with updated BGS and Coal Authority search results.

3.4 IDG Comments

3.4.1 Despite Integra's recommendations that site won topsoil/subsoil be used within the proposed cover systems, no specific assessment of the re-usability of topsoil at the development was undertaken.

3.4.2 Integra did not discuss the locally elevated concentrations of arsenic and TPH detected in topsoil and made ground outside of the TDG Depot and infilled reservoir. However, in the absence of a contamination source there is no justification for the proposed 300mm of clean soil cover for plots outside of the area of the clean soil cover system. In the absence of a contamination source, NHBC Standards (Chapter 9.2) only require a minimum 100mm thickness of topsoil.

3.4.3 Integra's compared laboratory soil chemical results against former LQM soil screening GAC's which have been superseded by LQM (2014), Suitable 4 Use Levels (S4UL) and CL:AIRE Category 4 Screening Levels (C4SL) GAC's.

3.4.4 Integra Geotechnical Report (2011 subsurface concrete classification states that the site is DS1 with the exception of the TDG Depot, classified as DS2/DS3. However, no consideration of the potential effects from pyritic ground (i.e. Coal Measures) has been provided.

3.4.5 Integra concluded that there was no significant risk from shallow mineworkings. As a consequence, the hazardous gas conceptual model did not consider risks from shallow mine workings or from gas migration pathways such as mine shafts and adits. During development, substantial shallow mineworkings were encountered beneath Phase 1 to the south which were subsequently treated where these were proven within 30m of the surface. These workings are known to continue at depth beneath Phase 3 and while these workings are not considered to influence surface stability, remain a potential source of mines gases and any shafts represent migration pathways.

3.4.6 IDG's shallow mining investigation (2017) also encountered abandoned shallow mineworkings within approximately 20m depth of the surface beneath the southeast of adjacent Phase 2. IDG considered that these workings were likely to be the source of hazardous ground gases detected at PH08 during Integra's gas monitoring programme and which informed Integra's NHBC Amber 1 characterisation of Phase 1 and part of Phase 2.

3.4.7 The spacing and number of Integra's monitoring wells is considered insufficient to enable zoning of gas measures. Integra recorded slightly elevated concentrations of methane and low carbon dioxide

concentrations within the one monitoring installation (PH04) within the infilled reservoir, which do not appear to have been fully investigated. Furthermore, the exploratory logs show that the monitoring well response zones spanned Made Ground, Glacial deposits and siltstone/sandstone solid strata. It would be difficult from these records to establish which strata represented the source or pathway of any gases or gas flows detected.

3.4.8 Integra's Geotechnical Report (2010) highlights the geotechnical properties of anhydrite (swelling) and high sulphate content and recommends removal of at least 1.0m thickness of this material from beneath roads/developable areas.

3.4.9 Planning permission was subsequently granted for retention of the Anhydrite material for a period of 5 years within a stockpile in the southwest of the site within the former TDG Depot, where the material was anticipated to weather to gypsum and to be suitable for placement within proposed POS. It should be noted that anhydrite converts to gypsum when in contact with groundwater or in humid conditions.

3.4.10 IDG are not aware of any further regulatory approval for retention of the anhydrite stockpile. It should be noted that the Environment Agency consider any material which has been stockpiled for more than 12 months to be waste and retention in stockpile or reuse should be subject to an Environmental Permit.

3.5 Recommendations

3.5.1 Give the intervening period since Integra investigations, improved understanding of coal mining activity, risk associated with mines gases and availability of revised soil screening GACs, it is recommended that a supplementary geoenvironmental investigation be undertaken, incorporating the following actions:

- Revision of the conceptual site model and risks from soil contamination and ground gas
- Trial pitting, soil sampling & chemical analysis of topsoil from the surface of the wider site to establish suitability for re-use within the proposed development
- Further sampling and chemical analysis of Made Ground within infilled reservoir and localised deposits identified by Integra to establish significance of Integra findings
- Trial pitting and sampling within TDG Depot to investigate significance of hydrocarbon odours, TPH and PAHs detected by Integra at TP37and evidence for wider TPH "plume" reported by Integra
- Comparison of soil contamination results and re-assessment of Integra chemical data with current S4UL and C4SL GAC's
- Trial pitting and soil sampling of anhydrite stockpile to enable geotechnical and chemical analysis, to inform waste characterisation and assessment for off-site disposal or if any potential options for re-use exist (subject to agreement with the Environment Agency)
- Supplementary intrusive mining investigation to determine risks associated with sequence of potentially productive seams within the moderate and high-risk zones highlighted by IDG's 2017 Mining Investigation.
- Trial trenching to seek evidence of two shafts indicated to be present beneath the centre and west of the site.

4 GEOLOGY AND MINING

4.1 Review of BGS 1:50,000 & 1:10,000 Geological Maps & Geological Memoir

4.1.1 The published 1:50,000 scale geological map (BGS Sheet 28 Whitehaven) and 1:10,000 scale geological map (BGS Sheet NX91NE) indicate that the site is directly underlain by Carboniferous Middle Coal Measures bedrock comprising mudstone, siltstone and sandstone with coal seams. Superficial deposits are not depicted. The far west of the site is underlain by Permian-Triassic St Bees Evaporite and Brockram Formation comprising sandstones with mudstone/anhydrite and limestone/sedimentary breccia respectively. The BGS Map indicates the Permian Triassic strata to

lie unconformably upon the Coal Measures and to dip steeply to the west.

4.1.2 The BGS Sheet NX91NE generalised stratigraphic column and BGS Memoir Geology of West Cumbria (Sheets 28, 37 & 47) 1997, records the Middle Coal Measures strata and coal seams within the vicinity of the site as being distributed as follows:

BGS Stratigraphic Column: Sheet NX91 NE

Coal Seam/Strata	**Thickness (m)**
Brassey Coal	Up to 0.85
Mudstone	-
Un-named Coal	Up to 0.4
Mudstone	-
Black Metal Coal	Up to 0.3m
Countess Pit Sandstone/Mudstone	Approximately 20m
White Metal Coal	Up to 0.8m
Mudstone	-
Slaty Coal	Up to 0.75
Sandstone/Mudstone	-
Ten Quarters Coal	Up to 1.5m
Bannock Band Sandstone	-
Rattler/Bannock Coal	Up to 2.5m
Sandstone/Mudstone	-
Main Band Coal	Up to 4.0m
Main Band Sandstone	-

4.1.3 The Geological Memoir states that the Main Band and Bannock Band are the most widely exploited seams. The Memoir also describes the Ten Quarters, Slaty and White Metal seams as being the major coals within the overriding 50-70m of predominantly mudstone bedrock. The Memoir indicates that the Black Metal and Brassy Coal seams are separated from the White Metal, Slaty and Ten Quarters sequence by up to 20m of sandstone. However, neither 1:10,000 or 1:50,000 scale geological maps depict the White Metal at outcrop between Slaty and Black Metal seams where these outcrop in relation to the site.

4.1.4 A major geological fault striking southeast–northwest and downthrown to the northeast crosses the eastern half of the site which displaces the strata depicted in the above stratigraphic column. As a consequence, the outcrops of Black Metal and Brassey Coals coal seams are repeated either side of the fault. The major fault is truncated within the north of the site by a fault striking northeast to southwest, downthrown to the northwest.

4.1.5 The Black Metal and Brassey Coal seams are depicted as outcropping beneath the site to the west of the major fault within the upthrown fault block and to dip to the west at shallow angle. Based upon the above column, the stratigraphically lower White Metal, Slaty and Ten Quarters coal seams are therefore unlikely to be present at shallow depth beneath the site.

4.1.6 No coal seams are depicted at outcrop within the site east of the fault. However, the Black Metal Coal seam alsooutcrops east of the site and dips to the west at shallow angle beneath the site. The Un-named and Brassey Coals are not depicted east of the fault on the BGS maps. However, based upon the above stratigraphic column, these seams should outcrop in the extreme east of the site or immediately east of the site.

4.1.7 Both the Fox Pit and Gameriggs Pit shafts are depicted west of the major fault in the vacant field in the northern half of the site. The Fox Pit Mine shaft is depicted approximately 20m from the site's western boundary and Gameriggs Pit Shaft is depicted 150m from the site's western boundary.

4.1.8 The above geological features and positions of BGS recorded mineshafts are depicted on Drawing 4046-G-D045 in Appendix A.

4.2 BGS Borehole Records

4.2.1 Updated BGS records have been obtained for ten shallow cable percussive boreholes drilled within the former TDG Depot in the southwest of the site. These records are presented in Appendix B and are summarised in the following table.

BGS Borehole Records

BGS reference	Date	Location	Final depth m	Summary of strata encountered (m)
NX91NE 405 (Borehole 1)	March 1996	On site (tanker park)	5.75	0.0 - 0.1 Tarmac surfacing 0.1 – 0.2 Stone sub-base 0.2 – 2.4 Made Ground – dense slag fill 5.0 – 5.75 Hard slightly weathered reddish-brown SANDSTONE.
NX91NE 405 (Borehole 2)	March 1996	On site (tanker park)	5.75	0.0 - 0.1 Tarmac surface 0.1 – 1.9 Made Ground – dense slag fill 1.9 – 2.4 Firm brown & grey sandy gravelly CLAY 2.4 – 5.0 Stiff brown GLACIAL TILL 5.0 – 5.75 Hard slightly weathered reddish-brown SANDSTONE.
NX91NE 404 (Borehole 3)	March 1996	On site (tanker park)	4.0	0.0 - 0.2 Tarmac surface 0.2 – 1.2 Made Ground – dense slag fill 1.2 – 1.8 Firm brown & grey sandy gravelly CLAY 1.8 – 3.6 Stiff brown GLACIAL TILL 3.6 – 4.0 Hard slightly weathered reddish-brown SANDSTONE.
NX91NE 405 (Borehole 4)	March 1996	On site (tanker park)	5.5	0.0 - 0.1 Tarmac surface 0.1 – 1.1 Made Ground – dense slag fill 1.1 – 1.4 Firm brown & grey sandy gravelly CLAY 1.4 – 4.1 Stiff brown GLACIAL TILL 4.1 – 5.5 Hard slightly weathered reddish-brown SANDSTONE.
NX91NE 405 (Borehole 5)	March 1996	On site (tanker park)	4.2	0.0 - 0.25 Tarmac surface 0.25– 1.1 Sandstone Gravel Fill 0.2 – 0.9 Made Ground – dense slag fill 0.9 – 1.7 Firm brown & grey sandy gravelly CLAY 1.7 – 3.8 Stiff brown GLACIAL TILL 3.8 – 4.2 Hard slightly weathered reddish-brown SANDSTONE.
NX91NE 405 (Borehole 6)	March 1996	On site (tanker park)	4.5	0.0 - 0.25 Reinforced concrete 0.25 – 0.9 Made Ground – hard compact gravel fill 0.9 – 2.2 Stiff brown & grey sandy gravelly CLAY 2.2 – 3.6 Stiff brown GLACIAL TILL 3.6 – 4.5 Dense brown GLACIAL TILL numerous sandstone possibly weathered/disturbed rockhead
NX91NE 405 (Borehole 7)	March 1996	On site (tanker park)	4.0	0.0 - 0.2 Concrete slab 0.2 – 1.4 Made Ground – compact clay and sandstone gravel fill 1.4 – 1.6 Stiff brown & grey GLACIAL TILL 1.6 – 3.9 Stiff brown GLACIAL TILL 3.9 – 4.0 Hard slightly weathered reddish-brown SANDSTONE.
NX91NE 409 (Borehole 8)	March 1996	On site (tanker park)	3.8	0.0 - 0.2 Reinforced concrete 0.2 – 0.6 Made Ground – hard compact gravel fill 0.6 – 2.9 Stiff brown GLACIAL TILL 2.9 – 3.8 Hard slightly weathered reddish-brown SANDSTONE.
NX91NE 405 (Borehole 9)	March 1996	On site (tanker park)	4.5	0.0 - 0.2 Reinforced concrete 0.2 – 0.7 Made Ground – hard compact gravel fill 0.7 – 3.0 Stiff to very stiff brown GLACIAL TILL 3.0 – 4.5 Hard weathered reddish-brown SANDSTONE..
NX91NE 405 (Borehole 10)	March 1996	On site (tanker park)	4.5	0.0 - 0.2 Concrete slab 0.2 – 0.7 Made Ground – dense slag fill 0.7 –0.9 Clay & slag fill material 0.9 – 2.4 Firm brown & grey sandy gravelly CLAY/possibly reworked

BGS reference	Date	Location	Final depth m	Summary of strata encountered (m)
				2.4 – 3.3 Stiff brown & grey sandy gravelly CLAY 3.3 – 4.3 Stiff brown GLACIAL TILL 4.4 – 4.5 Hard slightly weathered reddish-brown SANDSTONE.

4.2.2 The BGS borehole records indicate that the TDG Depot, including the area beneath the Anhydrite Stockpile, is surfaced with a combination of concrete and tarmac and is underlain by up to 2.4m thickness of Made Ground, typically comprising granular material including slag (dense slag fill).

4.3 Coal Authority Shaft Records

4.3.1 Coal Authority online records have been obtained by IDG for the shafts shown in the following table. Shaft positions are depicted on Drawing 4046-G-D043 in Appendix A.

Coal Authority Shaft Records

Coal Authority reference	Location	Final depth m	CA Details
296515-003	On site	NR	Fox Pit, 3m diameter, untreated
297515-001	On site	110	Gameriggs Pit, 2m diameter, untreated

4.4 Coal Authority Interactive Viewer

4.4.1 The Coal Authority Interactive Viewer (http://mapapps2.bgs.ac.uk/coalauthority/home.html), depicts "Development High Risk Zones" which correspond with the outcrop and shallow dip of the Black Metal Coal seam where it outcrops west of the major fault.

4.4.2 The viewer also depicts development high risk zones around the positions of the Gameriggs Pit and Fox Pit shafts.

4.5 IDG Mining Investigation 2017

4.5.1 Strata encountered within probeholes drilled within Phase 3 are summarised in the following table. Probehole locations are depicted on Drawing No. 4046-G-D045 in Appendix A

Summary of Coal Strata & Possible Workings Encountered in Exploratory Holes

Hole ID (Collar elevation mAOD)	Final Depth (m bgl)	Depth to Rockhead (m bgl)	Depth to Coal (m bgl)	Coal Thickness (mm)	Base of Coal (m AOD)	Influencing Distance of surface? (m bgl)
PH308 (95.35)	36	6.5	17.6 23.5	200 300	77.55 71.55	No No
PH309 (95.93)	30	3.0	10.6	300	85.33	No
PH310 (93.05)	30	2.7	4.8 8.4 20.2	700 300 400	87.35 84.35 72.45	***Yes*** No No
PH311 (91.73)	30	3.0	7.4 9.5 11.8 14.7 28.0	300 700 600 300 300	84.03 81.53 79.73 76.73 63.43	No ***Yes*** ***Yes*** No No
PH312 (91.43)	30	2.7	10.8 12.8 14.6 17.5	200 500 300 500	80.43 78.13 76.53 73.43	No No No No
PH313 (92.39)	21	0.0	NR	-		-
PH314 (93.02)	30	4.0	23.0 26.6 28.0	400 300 300	69.62 66.12 64.72	No No No

Hole ID (Collar elevation mAOD)	**Final Depth (m bgl)**	**Depth to Rockhead (m bgl)**	**Depth to Coal (m bgl)**	**Coal Thickness (mm)**	**Base of Coal (m AOD)**	**Influencing Distance of surface? (m bgl)**
PH315 (98.00)	36	2.4	12.0	-	84.6	-
PH316 (93.8)	36	1.6	14.2	400	79.2	No
			17.9	600	75.3	No
			33.7	700	59.3	No
PH317 (91.80)	30	2.4	9.7	700	81.4	***Yes***
			11.2	800	79.8	***Yes***
			14.1	600	77.1	***Yes***
			16.8	300	74.7	No
			28.0	800	62.8	No
PH318 (93.02)	30	2.0	7.1	200	85.92	No
			18.7	2500	71.82	***Yes***
			23.7	300	69.02	No
			26.6	300	66.12	No
PH319 (88.28)	30	2.0	2.8	500	84.98	***Yes***
			4.2	400	83.68	***Yes***
			6.6	400	81.28	***Yes***
			9.5	300	78.58	***Yes***
			20.6	400	67.38	No
			21.9	700	65.68	No
PH320 (88.22)	30	1.8	11.4	300	76.52	No
			13.4	300	74.52	No
			16.8	200	71.22	No
			29.0	300	58.92	No
PH321 (90.11)	36	2.3	14.0	200	75.91	No
			17.0	300	72.81	No
			17.7	300	72.11	No
			26.6	800	62.71	No
PH322 (89.41)	36	3.8	16.7	500	72.21	No
			34.1	300	55.01	No
PH323 (95.5)	36	5.8	21.5	300	73.7	No
			26.2	400	68.9	No
PH324 (95.2)	36	3.5	12.0	600	82.6	No
			16.8	200	78.2	No
			29.4	400	65.2	No
PH325 (92.77)	36	2.7	9.4	400	82.97	No
			22.5	200	70.07	No
			33.8	1000	57.97	No

4.5.2 As noted in the above table, potentially workable thicknesses of coal have been proven within influencing distance of the site surface in PH310 and PH311 (moderate risk zone) located in the centre north of the site and in proximity to the Gameriggs Pit shaft and in PH317, PH318 and PH319 (high risk zone), in proximity to the site's eastern boundary.

4.5.3 The multiple coal seams encountered in the high-risk zone on the site's eastern boundary are likely to be the Brassey and Un-named Coal at shallow depth and the Black Metal Coal seam at greater depth.

4.5.4 The seams encountered in PH310 and PH311 to the west of the major fault and within the upthrown fault block, are also considered to be the Brassey (and Un-named Coal) and partings thereof at shallow depth and the deeper Black Metal Coal seam.

5 ENVIRONMENTAL SETTING

5.1 General

5.1.1 Environmental information was obtained from the Integra Reports and the Environmental Searches presented by Integra. Borehole records obtained from the BGS are presented in Appendix B. A summary of relevant information is presented in the following table.

Summary of Geological and Environmental Information

Issue	Data reviewed	Summary	
Geology	1:50,000 BGS map (Sheet 28) 1:10,000 BGS map (Sheet NX91NE) BGS Memoir/Technical Report	Superficial Deposits (Drift):	Non depicted
		Solid (Bedrock):	Carboniferous Middle Coal Measures
		Bedrock Strata Dip:	4 degrees to the west
		Faults:	A major fault cross the site from SE-NW downthrown to the northeast. Major fault truncated by a fault oriented NE-SW downthrown to the northwest.
Mining	Coal Authority Interactive (http://mapapps2.bgs.ac.uk/coalauthority/home.html) Coal Authority Report BGS maps	Past and present workings: Shallowest coal seam: Shallow Mineworkings: Mine entries: Opencast:	Workings within 2 seams of coal between 70m and 200m depth Brassey Coal & Black Metal Coal at outcrop Coal Authority believe there is coal at or close to the surface. This coal may have been worked in the past. Two shafts within the site (Fox Pit and Gameriggs Pit The property is not within the boundary of an opencast site.
Quarrying	Historical OS Plans	A brickfield was present in the east of the site and on adjacent land.	
Radon	Public Health England (http://www.ukradon.org/ website)	No radon protection measures required.	
Hydrogeology	Integra/Envirocheck report	Superficial (Drift):	N/A
		Solid (Bedrock):	Secondary (A) Aquifer
		Source Protection Zone:	None depicted within the vicinity of the site
		Soil leaching potential:	High (Urban)
		Groundwater abstractions:	None within 1km of the site.
		Pollution incidents:	None relevant to site
Hydrology	Integra/Envirocheck report	Nearest watercourse(s)	Unnamed watercourse issues 20m SE of the site.
		Water quality:	None available
		Pollution incidents:	None relevant to site
		Surface Water Abstractions:	None within 1km of the site.
		Discharge consents to surface water:	None relevant to site
Flood Risk – surface water	Environment Agency Flood Map for Planning / Risk of Flooding from rivers or sea	The site **does not lie** within an area depicted on EA Flood Zone maps to be at risk of flooding from rivers or the sea.	

6 PRELIMINARY CONCEPTUAL SITE MODEL

General

6.1.1 Based on the data presented in the preceding sections of this report, an updated Conceptual Site Model has been determined as outlined below.

Anticipated Ground Conditions

6.1.2 Based on the data presented in the preceding sections of this report, anticipated ground conditions are shown in the following table.

Anticipated Ground Conditions

Made Ground	Concrete hardstanding and relic foundations within former TDG Depot site to nominal 1m depth. Organic Made Ground within infilled reservoir to >2.0m depth Localised colliery spoil Made Ground associated with two shafts to <1.0m depth
Natural Soils	Weathered Coal Measures clay at shallow depth
Rock Strata	Weathered Coal Measures sandstones/mudstones at <10m depth
Mineworkings	Possible, however depth unknown
Groundwater	Perched shallow groundwater considered unlikely; deep groundwater likely in Coal Measures strata
Hazardous Gas	Coal Mineworkings could represent a potential gas source

Potential contamination sources

6.1.3 Previous reports and OS historical map records show that the north of the site has been most recently used as agricultural land which is considered unlikely to have caused ground contamination.

6.1.4 The southwest of the site has been occupied by a former tanker fuelling and washing (TDG) depot which is considered to have the potential to have caused ground contamination. Potential sources include leaks from above ground fuel tanks, and underground oil/water separator. Previous investigations have detected elevated concentrations of metal, aliphatic and aromatic TPH (C_{12}-C_{35}) and PAH contamination and have indicated a potential "plume" of hydrocarbon may be present beneath the concrete hardstanding. Remediation works have previously been undertaken to remove transformer fluids which spilled onto the site.

6.1.5 A stockpile of Made Ground comprising anhydrite and slag is present in the south of the site which was placed in 2010. The stockpile represents a potential source of inorganic, organic, metal, sulphide and sulphate contamination.

6.1.6 A Phosphorite storage area was formerly present within the approximate centre south of the site. Previous investigations have detected inorganic/metal contamination within the made ground.

6.1.7 An infilled reservoir is present within the centre north of the site. Made Ground within the reservoir comprises organic waste (timber, turf, topsoil). Previous investigations have detected elevated concentrations of metal and PAH contamination within the fill materials.

6.1.8 A brickfield was formerly present in the northeast of the site. Made Ground has been encountered within exploratory holes in this area which may contain minor localised contamination.

6.1.9 Two mine shafts were formerly present within the northwest of the site. Colliery spoil, ash and clinker associated with these features represent a localised source of metal and PAH contamination.

6.1.10 Potential shallow mineworkings and known shafts represent both a source and pathways for hazardous ground gas. Previous ground gas monitoring at one monitoring well installed within the reservoir briefly detected elevated concentrations of methane. Notwithstanding Integra results, biodegradation and chemical degradation of organic material and any gypsum material within the infilled reservoir represents a localised source of hazardous ground gas which merits further

consideration.

Human receptors

6.1.11 Following the proposed redevelopment, human receptors will include residents within the new properties, visitors using public open space areas and residents in neighbouring properties. In addition, future utility maintenance workers could be affected by contaminants that remain in the ground following site redevelopment.

6.1.12 Transient risks to construction workers from handling contaminated soils are normally addressed by the adoption of appropriate health and safety measures during the construction works, and therefore these receptors are not considered further. Similarly, risks to residents in neighbouring properties due to airborne dust or vapours during redevelopment works should be addressed by the adoption of suitable measures.

Controlled water receptors

6.1.13 The nearest surface watercourse is an unnamed spring, which issues within a ravine approximately 20m southeast of the site and flows in a south easterly direction.

6.1.14 The underlying Coal Measures are classified as Secondary A aquifer. However, the site does not lie within a Source Protection Zone and there are no groundwater or surface water abstractions which could be impacted by contamination beneath the site.

6.1.15 Based on the above, the site's environmental setting has been assessed as low sensitivity.

6.2 Preliminary Conceptual Site Model

Potential pollutant linkages are summarised in the following table.

Summary of Potential Pollutant Linkages

Potential Contamination Source	Receptors	Plausible Pathways	Evidence / Site Features
Metals in Made Ground	Human Health (future site users –residential with consumption of homegrown produce)	Ingestion, direct contact, inhalation of dust	Made Ground beneath: • former TDG Depot • Anhydrite stockpile • Infilled former reservoir
PAH in Ash and Clinker Made Ground	Human Health (future site users –residential with consumption of homegrown produce)	Direct contact, inhalation of dust	Ash and clinker within Made Ground and in vicinity of former shafts - potential source of PAH hydrocarbons
Asbestos cement fragments/fibres in Made Ground	Human Health (future site users –residential with consumption of homegrown produce)	Inhalation of dust containing asbestos fibres	Made Ground beneath: • Slabs within former TDG Depot • Within Made Ground/ anhydrite stockpile
Hydrocarbon impacted soils	Human Health (future site users –residential with consumption of homegrown produce)	Ingestion, direct contact and inhalation of vapours	• Associated with AST and oil/water separator in former TDG Depot • Made Ground within infilled reservoir
Hazardous Gas (CO_2, CH_4)	Human Health	Migration of Carbon Dioxide through granular strata and ingress into confined spaces leading to potential asphyxiating mixtures of gas	• Mines gas associated with potential shallow coal mine workings and migrating via shafts from deeper workings • Infilled former reservoir
	Proposed Buildings	Migration of Methane through granular strata and ingress into confined spaces leading to potential explosive mixtures of gas	

7 GROUND INVESTIGATION DESIGN

7.1 Ground Investigation Design & Strategy

7.1.1 The preliminary conceptual site model was used as a basis for design of an appropriate ground investigation, the scope of which is summarised below.

Initial Ground Investigation Strategy

Exploratory Holes	Purpose
Trial Pits	To determine the general nature of soils underlying the site, including the: • nature, distribution and thickness of Made Ground • nature, degree and extent of contamination • proportion of undesirable elements e.g. biodegradable matter, foundations etc • suitability of the ground for founding structures and highways
Trial Pits	To obtain samples from the Made Ground/ anhydrite stockpile to assess for contamination assessment, waste characteristics and geotechnical properties
Trial trenching	To investigate the indicated locations of former Fox Pit and Gameriggs Pit shafts
Rotary probeholes	To check for the presence of voids or broken ground associated with possible unrecorded shallow mine workings and install monitoring wells across the site in order to: • monitor for hazardous gas. • determine groundwater levels and assess flow direction.

7.1.2 Proposed exploratory hole locations were selected to provide a representative view of the strata beneath the site and to target potential areas of interest noted in the preceding sections of this report. Additional exploratory locations are typically scheduled by the site engineer in light of the ground conditions actually encountered.

7.1.3 Anticipated potential contaminants within soil and/or groundwater include:

- Metals & metal oxides
- metal sulphates (associated with anhydrite and/or gypsum)
- PAHs
- Asbestos fibres
- TPH
- BTEX
- Semi-Volatile Organic Compounds (SVOC's)
- Volatile Organic Compounds (VOC's)

8 FIELDWORK

8.1 Exploratory Hole Location Constraints

8.1.1 No access was available east of the former TDG compound and only one exploratory location was possible within the former Phosphorite storage are due to the presence of a large subsoil stockpile and ongoing site operations to remove the stockpile.

8.1.2 Exploratory positions within the Story Homes compound (former TDG Depot) were limited by site operations, vehicle movements, stockpiles of building materials and position of the high-pressure gas main which runs beneath the site. As a consequence of vehicle movements associated with the site entrance it was only possible to excavate one trial pit immediately north of Integra TP37 and not carry out the proposed delineation.

8.1.3 Heavy rainfall coinciding with the commencement of the site investigation works resulted in surface flooding of the fields including the position of the infilled former reservoir in the northwest of the site. As a consequence, it was not possible to manoeuvre the rotary drilling rig within the footprint of the reservoir or marshy ground to the northwest of the indicated position of the former Gameriggs Shaft.

8.1.4 The flooded and marshy ground within this zone also prevented the proposed topsoil strip to locate

the former Gameriggs Shaft position from taking place.

8.2 Scope of Works

8.2.1 Fieldwork was supervised by IDG between 2nd September and 11th September 2020 and comprised the exploratory holes listed in the following table.

Scope of Ground Investigation Works

Technique	Exploratory holes	Final depth(s)	Remarks
Trial Pitting	Trial pits TP701-TP742	0.85m - 3.5m	Vane tests in cohesive soils.
Trial Pitting	Trial pits TP801-TP805	0.85m - 3.5m	Excavated on 8th August 2020
Rotary Probeholes	Probeholes PH601-PH629	18m - 32m	
Rotary Probeholes	PH606B, PH608A, PH614A, PH620, PH621A, PH622A	2.0m – 5.3m	Monitoring wells

8.2.2 Notes describing ground investigation techniques, in-situ testing and sampling are included in Appendix I.

8.2.3 Exploratory hole locations are shown on Drawing No. 4046-G-D045 presented in Appendix A.

9 GROUND CONDITIONS

9.1 General

9.1.1 A complete record of strata encountered beneath the proposed development site is given on the exploratory hole logs in Appendix C. A summary of the ground conditions is provided below.

9.1.2 The exploratory hole logs include:

- Details of the samples taken
- Descriptions of the strata
- Details of groundwater conditions encountered
- Results of in-situ testing
- Details of monitoring wells installed

9.1.3 The site can be divided into 4 areas based on ground conditions. These areas are shown on Drawing 4046-G-D045 and are summarised below:

Site Areas based on Ground Conditions

General Location	Approximate area (m^2)
Former TDG Depot	20,050
Infilled Reservoir	9100
Made Ground / Anhydrite Stockpile (within TDG Depot Footprint)	8,100
Open/vacant fields	108,900

9.1.4 Only one exploratory location (TP730) was possible upon the eastern fringe of the Phosphorite Storage area which encountered up to 0.2m of Topsoil Made Ground comprising coal fragments, brick and masonry. The findings of this one exploratory hole is insufficient to describe overall ground conditions within this area at this time.

9.1.5 Typical ground conditions encountered in each of these areas are described below in Sections 9.2 (Made Ground) and 9.4 (natural ground).

9.2 Made Ground

Topsoil

9.2.1 Trial pits excavated in the open fields proved between 0.2m and 0.35m thickness of generally natural Topsoil comprising gravelly silty sandy clayey loam, locally reworked (over Made Ground) where it contains anthropogenic items such as brick cobbles.

9.2.2 Relict Topsoil was proven between 1.0m and 1.45m bgl beneath Made Ground in TP739 within the Site Compound.

Made Ground

9.2.3 Made Ground was proven in the following locations:

Anhydrite stockpile within former TDG Depot

9.2.4 Trial Pits TP801-TP805: In excess of 2.7m thickness of pink and grey mottled slightly sandy gravelly cobbles and boulders of anhydrite/sandstone with large boulders of blue-grey slag, with bands of dark brown-black ash and clinker and locally brick and concrete cobbles.

TDG Depot/Construction Compound

9.2.5 TP737-TP742: Up to 250mm thickness of reinforced concrete underlain by between 0.4m and 1.4m thickness of Made Ground variously comprising Hardcore (black and grey gravel), Granular Made Ground comprising grey sandy gravel with varying quantities of sandstone cobbles and boulders and Cohesive Made Ground comprising sandy gravelly clay.

9.2.6 Whilst not encountered during this investigation, it is possible that asbestos sheeting, used as shuttering, and/or fragments of asbestos sheeting remain present within the hardcore beneath concrete slabs / within service ducts.

Infilled Reservoir

9.2.7 Trial Pits TP720-TP723 & TP729: Between 0.8m and 2.7m thickness of Reworked Glacial Till, Reworked Bedrock (mudstone and siltstone) including brick, pottery, glass, metal wire, organic plant material, Granular Made Ground comprising timber, metal sheets, rubber and pockets of ash and clinker and tarmacadam.

9.2.8 Probable settlement lagoon deposits comprising greenish-grey silty fine sand with clay flecks and layers of partially composted grass/turf was proven between depths of 1.4m and 2.7m bgl within TP720, TP722 and TP723. The possible lagoon deposits within TP723 also contained metal sheet, brick and glass bottles.

9.2.9 Soft blue-grey clay proven from 0.8m-1.0m in TP729 could represent a puddle clay liner or settlement sediment.

Open/Vacant Fields

9.2.10 At the indicated location of Fox Pit, Trial Pits TP735-TP736 encountered Made Ground Topsoil underlain by 250mm thickness of clayey sand and mudstone gravel, ash and brick.

9.2.11 Trial pits TP719, TP725 & TP726 located at the location of a former brickfield on the site's eastern boundary and vicinity of a surface excavation zone, encountered between 0.35m and 0.5m thickness of Topsoil Made Ground including slag, brick, glass and pottery fragments.

9.2.12 Potentially3.2m of clayey sand and gravel Made Ground and/or very soft natural clay was encountered above rockhead in PH614 within a shallow depression in the former brickfield location. It is difficult to be precise regarding thickness of overburden materials due to the mixed nature of returns recovered using rotary drilling.

9.2.13 Trial pit TP728 excavated upon the site's northern boundary encountered 0.5m of Topsoil Made Ground comprising coal, brick, glass slag and clinker fragments with potential anhydrite gravel/cobbles and a sandstone boulder.

9.3 Obstructions

9.3.1 Trial pits TP738 to TP742 excavated within the former TDG Depot encountered between 0.2m and 0.25m thickness of steel reinforced concrete surfacing.

9.3.2 A former oil/water separator indicated to extend to >2.0m bgl is also present in the east of the former depot which is indicated to have a concrete sides and base, which is also anticipated to be

steel reinforced. Allowance for demolition of the reinforced concrete hardstand and reinforced concrete separator structure is recommended.

9.4 Natural Ground

Superficial Deposits

9.4.1 Relatively thin superficial deposits were proven to depths of between 0.5m (TP715) and in excess of 3.2m bgl (TP739) across the majority of the site. The superficial deposits comprised light brown gravelly clay with varying proportion of gravel and cobbles which was interpreted to be Glacial Till (Boulder Clay).

9.4.2 Superficial deposits were not proven in TP716 on the crest of the north-south ridge extending southwards in the northeast of the site and only thin deposits (i.e. 0.3m - 0.6m thickness) of clay were proven in trial pits TP215 and TP727 further north along the ridge feature and south of the ridge at TP730.

9.4.3 The thickest Glacial Till deposits are noted to occur between the ridge and where the site surface rises to meet the site's western boundary and beneath the current site compound and former TDG Depot. The superficial deposits are thinnest or are absent on the higher ground and beyond the ridge in the east of the site.

Shear vane tests undertaken in the clay deposits between depths of 0.7m and 2.5m varied between 35kPa and 135+kPa. The lowest values including the 35kPa obtained at TP734 are generally associated with clay comprising sand pockets and the granular content is considered likely to have influenced the results. The average shear vane result of 90kPa is considered the most appropriate value to describe the generally stiff /medium to high strength clay.

Solid Strata

9.4.4 Middle Coal Measures comprising mudstone, siltstone and sandstone beds with coal seams were proven from below depths of 0.25m (TP716) and in excess of 3.2m bgl (TP739).

9.4.5 Solid strata encountered in the majority of trial pits typically comprised weak, partially weathered purple-grey mudstone and muddy siltstone, recovered as angular/tabular gravel and cobbles.

9.4.6 However, Trial pits TP715, TP716 and TP727 excavated on the crest of the north-south ridge encountered purple brown and yellow-brown clayey sandy gravel and cobbles interpreted to be residual weathered sandstone from depths of between 0.25m to 1.4m bgl, which transitioned into distinctly weathered/extremely weak purple -grey sandstone from approximately 1.1m bgl. Trial pit TP715 excavated on the ridge crest and TP717 excavated on the eastern slope of the ridge, encountered weak purple-grey marl from depths of between 1.7m and 1.9m bgl.

9.4.7 Trial pits TP702 and TP734 located in proximity to the site's western boundary encountered thinly bedded red-brown and grey sandstone which was recovered as tabular/angular gravel and cobbles. interpreted to be weathered Permo-Triassic bedrock.

9.4.8 Shear vanes within the weathered bedrock at recorded values between 107kPa and 135+ indicating high strength.

9.4.9 A 0.4m thick seam of weathered coal was encountered at outcrop at 1.2m depth beneath the Glacial Till deposits in TP731.

9.4.10 Detailed discussion of the findings of the rotary probeholes and interpretation of the coal seams and shallow mining risk is presented in Section 10 below.

9.5 Visual & Olfactory Evidence of Hydrocarbon Contamination

9.5.1 Exploratory locations where possible evidence of localised hydrocarbon contamination was noted are summarised in the following table.

Evidence of Hydrocarbon Contamination

Site Area	Hole ID	Material	Depth m bgl	Observation
Anhydrite Stockpile	TP801	Anhydrite Sandstone Made Ground	1.5	Hydrocarbon odour
Infilled Reservoir	TP729	Cohesive Made Ground	0.8 – 1.0	Dark grey staining – possible oil stain
Former TDG Depot	TP738	Hardcore Made Ground	0.45 – 0.55	Possible diesel odour
Former TDG Depot	TP740	Granular Made Ground	0.7 – 1.0	Hydrocarbon sheen on perched water
Former TDG Depot	TP740	Glacial Till	1.0 – 1.5	Hydrocarbon stain and diesel odour
Former TDG Depot	TP741	Glacial Till	0.55 – 0.85	Hydrocarbon stain and diesel odour
Former TDG Depot	TP742	Cohesive Made Ground	0.55 – 1.4	Slight hydrocarbon odour

9.5.2 Selected samples of potentially contaminated materials were scheduled for chemical testing to determine the nature and extent of the identified contamination, see Section 13.

9.6 Groundwater

9.6.1 Surface water was encountered perched at the base of the Topsoil within several trial pits. Perched water was also encountered in the Made Ground within the infilled reservoir between depths of 0.5m and 1.1m bgl.

9.6.2 Slight/moderate inflows/seepages of groundwater were recorded within granular layers in the superficial deposits some trial pits, typically at depths below 1.0m bgl and at the interface between Glacial Till and underlying bedrock. Groundwater seepages were also recorded within the solid strata between depths of 1.7m (TP715) and 3.1m (TP717).

9.6.3 Deep groundwater was recorded during the drilling of the rotary probeholes between depths of 7.0m (PH611 & PH615) and 17.0m (PH714). Six additional shallow boreholes were drilled to enable installation of response zones within strata identified as potential source or migration pathway for ground gases. These monitoring wells are summarised in the following table, together with the typical standing water level based on monitoring to date. Groundwater monitoring is ongoing at the time of producing this report and the results are included in Appendix G.

Groundwater Levels

Hole ID	Depth of water strike during drilling (depth after 20 mins)	Groundwater Body	Installation Response Zone Depth	Typical recorded standing water level
PH606B	None	Coal Measures	2.0 – 5.0	1.15
PH608A	None	Coal Measures	3.0 – 5.0	1.27
PH614A	None	Granular Made Ground	1.0 – 3.0	2.85
PH620	None	Coal Measures	3.0 – 5.0	0.37
PH621A	None	Coal Measures	2.0 – 4.0	0.29
PH622A	None	Coal Measures	1.0 – 2.0	1.32

All measurements are in metres below ground level

9.7 Stability

9.7.1 With the exception of some of the trial pits within the infilled reservoir where sidewall collapse occurred the stability of excavations within both the made ground and natural ground was generally good.

10 MINING INVESTIGATION

10.1.1 A total of thirty rotary probeholes (PH601-PH629 & PH606A), were drilled to a maximum depth of 42m using air and water flush to determine whether the site is underlain by shallow mine workings. Probeholes PH601-PH605 & PH622 were drilled in the vicinity of the Gameriggs Shaft where the 2017 mining investigation had encountered several potentially productive seams at shallow depth. PH606A-PH6629 were drilled in in the east of the site and Shallow Mining High Risk Zone.

10.1.2 It should be noted that PH606A terminated at 1.0m on an unusually hard feature. This feature was considered likely to be a boulder of granite or similar hard rock.

10.2 PH601-PH605 & PH622 Interpretation

10.2.1 The strata encountered within the vicinity of the former Gameriggs Shaft and to the west of the major fault which bisects the site, are summarised in the following table.

Summary of Strata Encountered by Rotary Drilling (PH601-605 & PH621)

Hole ID (Collar elevation mAOD)	Final Depth (m bgl)	Depth to Rockhead (m bgl)	Depth to Coal (m bgl)	Coal Thickness (mm)	Top of Coal (m AOD)	Influencing Distance of surface? (m bgl)
PH601 (91.80)	30.00	1.50	8.00	300	83.80	No
			10.20	700	81.60	No
			12.60	400	79.20	No
			15.50	400	76.30	No
			28.20	500	63.60	No
PH602 (93.10)	30.00	1.60	4.20	500	88.90	**Yes**
			6.60	300	86.50	No
			10.20	300	82.90	No
			22.80	400	70.30	No
PH603 (93.75)	30.00	1.60	3.60	400	90.15	**Yes**
			7.00	300	86.75	No
PH604 (93.20)	30.00	1.40	5.20	400	88.00	**Yes**
			8.20	300	85.00	No
			20.90	600	72.30	No
PH605 (92.50)	30.00	1.60	5.00	300	87.50	No
			7.00	700	85.50	**Yes**
			9.50	400	83.00	No
			12.50	300	80.00	No
			26.80	200	65.70	No
PH621 (91.80)	21.00	1.80	8.60	400	83.20	No
			10.60	500	81.20	No
			13.60	600	78.20	No
			16.20	400	75.60	No

10.2.2 As shown in the above table, several coal seams were proven at depths of between 3.6m bgl in PH603 and 28.7m bgl in PH601. Based upon the relative depths and intervals between the coal seams, the strata are interpreted to dip towards the west-southwest at approximately 7 degrees. The logs record a sequence of four shallow seams (PH601, PH605 and PH621) within a 7.5-7.6m thickness of rock separated from a deeper seam by between 12.3-14.3m of rock. The shallowest sequence of seams are interpreted to be the Brassey and Un-named Coal seams and the deeper seam to be the Black Metal Coal.

10.2.3 The shallowest two seams (Brassey Coal) are inferred to outcrop between PH605 and PH604, as only three shallow seams were recorded in PH602 and two shallow seams were recorded within PH604. The relative positions of these seams and strata dip are shown on Sections PH311-PH604 & PH621-604 presented in Appendix D.

10.2.4 As indicated by the above table, a maximum thickness of coal of 700mm thickness was recorded within PH605 at 7.0m bgl which is probably the Brassey Coal. This coal seam is also present at 10.1m bgl in PH601, at 10.2m bgl within PH621 (although 500mm thick) and at 9.5m bgl within PH311. If this particular seam were worked in the vicinity of PH605, it could potentially be within influencing distance of the site surface. However, no evidence of workings has been encountered in the relatively closely spaced rotary probeholes. Further comparison with 2017 drilling records PH308, PH312, PH314 and PH323 also shows that this locally thicker coal and associated shallow sequence of seams either pinch out or are thinner to both the north and south of the Gameriggs Shaft location. Given the overall relatively thin nature of these coal seams and thickness of intervening

rock bands, these coal seams are considered unlikely to have been worked.

10.2.5 The deeper seam interpreted to be the Black Metal Coal is typically between 400mm and 500mm in thickness and has not been encountered within influencing distance of the surface in any of the 2020 exploratory locations. The Black metal Coal is likely be truncated by the major fault bisecting the site to the east of the Gameriggs Shaft. This seam is also considered too thin and too deep to influence the stability of the site surface west of the major fault.

10.2.6 Based upon the above the risk from unrecorded shallow workings beneath this area of Phase 3 is considered very low.

10.3 PH606A-PH6629 Interpretation

10.3.1 The strata encountered within the east of the site are summarised in the following table.

Summary of Strata Encountered by Rotary Drilling (PH601-605 & PH621)

Hole ID (Collar elevation mAOD)	Final Depth (m bgl)	Depth to Rockhead (m bgl)	Depth to Coal (m bgl)	Coal Thickness (mm)	Top of Coal (m AOD)	Influencing Distance of surface? (m bgl)
PH606A (95.80)	1.0	1.0	N/A	N/A	N/A	N/A
PH606B (95.80)	33.00	0.50	26.90 29.80	500 500	68.90 66.00	No No
PH607 (92.20)	30.00	1.50	16.50 18.50	400 500	75.70 73.70	No No
PH608 (89.95)	30.00	1.50	5.00 6.20 11.90 25.00	300 400 500 400	84.95 83.75 78.05 64.95	No No No No
PH609 (90.60)	30.00	1.60	7.00 11.30	400 400	83.60 79.30	No No
PH610 (93.50)	30.00	2.80	12.00 24.20	500 500	81.50 69.30	No No
PH611 (91.80)	27.00	1.80	4.70 11.10	200 400	87.10 80.70	No No
PH612 (92.70)	27.00	1.50	7.20 8.00	300 400	85.50 84.70	No No
PH613 (94.10)	30.00	1.60	9.30 13.70	400 400	84.80 80.40	No No
PH614 (94.05)	27.0	3.2?	14.10 15.90 19.00	400 400 400	79.95 78.15 75.05	No No No
PH615 (93.80)	27.00	1.80	12.20 20.00	400 300	81.60 73.80	No No
PH616 (93.00)	21.00	2.00	7.50 11.20 14.50	600 300 300	85.50 81.80 78.50	**Yes** No No
PH617 (91.70)	27.00	1.70	3.70 5.40 8.20 11.00	400 300 400 200	88.00 86.30 83.50 80.70	Yes No No No
PH618 (90.60)	15.00	1.60	6.30 8.00 10.60	300 400 400	84.30 82.60 80.00	No No No
PH619 (90.80)	15.00	1.40	6.30 7.80 10.40	400 400 400	84.50 83.00 80.40	No No No
PH622 (91.20)	30.00	1.00	1.70 18.00	300 300	89.50 73.20	**Yes** **Yes**

Hole ID (Collar elevation mAOD)	Final Depth (m bgl)	Depth to Rockhead (m bgl)	Depth to Coal (m bgl)	Coal Thickness (mm)	Top of Coal (m AOD)	Influencing Distance of surface? (m bgl)
PH623 (90.50)	30.00	1.50	12.00 13.50 15.20	400 300 400	78.50 77.00 75.30	No No No
PH624 (89.90)	30.00	1.00	7.60 11.50 26.50	400 400 900	82.30 78.40 63.40	No No No
PH625 (89.05)	30.00	1.50	3.20 5.40 21.00	300 500 1000	85.85 83.65 68.05	**Yes** No No
PH626 (89.00)	18.00	1.60	2.90 3.60 4.20 6.70	200 400 500 300	86.15 85.45 84.85 82.35	**Yes** **Yes** **Yes** No
PH627 (88.20)	24.00	1.20	2.00 2.60 5.40	200 500 300	86.20 85.60 82.80	**Yes** **Yes** No
PH628 (87.50)	28.00	1.20	2.00 4.90	500 200	85.50 82.60	**Yes** No
PH629 (87.10)	21.00	1.20	4.10 16.00	100 1000	83.00 70.10	No No

10.3.2 Probeholes PH608, PH609, PH611, PH612 and PH613 drilled upon a south to north transect upon the site's eastern boundary proved at least two shallow coal seams, generally between 0.3m and 0.4m thickness (although locally thickening to 0.5m thickness) from 5.0m bgl. These thin seams were typically separated by between 0.5m and 4.0m of intervening bedrock. Coal seams of equivalent dimensions and intervening overburden are also proven at greater depth within westerly transect PH606A, PH607, PH610, PH614 and PH615 indicating a general dip to the west as indicated by Section PH606A-PH608 in Appendix D. Based upon the regional stratigraphic column, the two coals seams are likely to be the Brassey and Un-named Coal seams, displaced by the major fault.

10.3.3 Structure contours based upon correlation of the base of the two coal seams indicate the seams will outcrop within the zone of surface workings within the eastern boundary of Phase 3 and the west of Phase 4. The zone of surface workings and Structure Contours of the base of the lowest of the two seams are depicted on Drawing 4046-GD045 in Appendix A. The Structure Contours determine the likely outcrop of the base of the coal seam (depicted on Drawing 4046-G-D045), based on current topographic levels and assumed constant seam dip.

10.3.4 While only two thin seams are indicated to outcrop and these seams would not ordinarily be considered worthy of economic mining, IDG drilled a series of interstitial rotary probeholes within transect PH608-PH613, equivalent to holes at approximately 12-15m centres, to provide further confidence that artisanal workings had not progressed from the surface workings into the dipping seams. Probeholes PH616-PH619 proved thin dipping seams of solid coal with no evidence of workings. No evidence has been encountered to indicate that shallow workings extended beneath the eastern section of Phase 3 from the surface excavation. Based upon the findings of the investigation there is a negligible risk to ground stability.

10.4 Shaft Search

10.4.1 As stated in Section 8.1, it was not possible to undertake a Topsoil strip at the indicated location of the Gameriggs Pit shaft. It is understood that Story Homes have carried out a brief investigation within this area however the shaft has not been located.

10.4.2 IDG stripped approximately 600m^2 of topsoil at the indicated location of the Fox Pit shaft. While a thin horizon of colliery spoil including brick coal and clinker was encountered, no evidence of a shaft was identified in the surface of the exposed natural clay beneath.

10.4.3 Further investigation should be undertaken during site preparatory works when topsoil is completely stripped around both the Fox Pit and Gamerigg Pit shaft locations.

11 HAZARDOUS GAS

11.1 General

11.1.1 A preliminary assessment of the risks associated with hazardous ground gas has been undertaken as described in Section 6. Based on this assessment, shallow gas monitoring wells have been installed in six boreholes; details of the installations are shown on the exploratory records presented in Appendix C.

11.1.2 The generation potential of the gas source(s) was initially considered to be very low. Therefore, in accordance with guidance given in CIRIA Report C665 (Section 5.5), and given the proposed residential end use, an initial monitoring period of four visits over two months was selected.

11.2 Scope of Works

11.2.1 To date, the wells have been monitored on two occasions to record flow rates, hazardous gas concentrations and groundwater levels.

11.2.2 A standard procedure was followed, in accordance with CIRIA guidance, comprising measurement of the following:

- Ambient oxygen concentration
- Atmospheric pressure
- Borehole flow rate using a Gas Data LMSx infra-red gas analyser
- Methane, oxygen and carbon dioxide concentrations using a Gas Data LMSx infra-red gas analyser, together with carbon monoxide and/or hydrogen sulphide concentrations where appropriate
- Ambient oxygen concentration (to provide a check for instrument drift)
- Standing water level using a dipmeter

11.3 Monitoring Results

11.3.1 The results of the monitoring completed to date are presented in Appendix G and are summarised in the following table.

Summary of Gas Monitoring Results

Hole ID	Range of Methane ConcentrationsN/A (% v/v)	Range of Carbon Dioxide Concentrations (% v/v)	Range of Positive Flow Rates (litre/hour)	Comments
PH606B	N/A	N/A	ND	Flooded
PH608A	N/A	N/A	ND	Flooded
PH614A	ND	1.1	ND	
PH620	N/A	N/A	ND	Flooded
PH621A	N/A	N/A	ND	Flooded
PH622A	ND	3.7	ND	

ND: None detected. N/A; Data not applicable

11.3.2 Gas concentrations obtained from wells where groundwater monitoring subsequently demonstrates the response zone was flooded are discounted from the dataset.

11.4 Discussion

11.4.1 Four out of the six wells monitored to date have been flooded and results obtained have therefore

been discounted.

11.4.2 However, carbon dioxide concentrations of up to 3.7% have been detected at PH622A located in the southeast of the site, no significant methane concentrations and no significant positive flow rates.

11.4.3 A hazardous gas risk assessment incorporating all of the results will be issued on completion of the monitoring programme.

11.4.4 Based upon the results to date, the following scenarios are envisaged:

- Worst case: Characteristic Situation 2
- Best case: Characteristic Situation 1.

12 CHEMICAL ANALYSIS

12.1 General

12.1.1 An assessment of potential contaminants associated with the former uses of the site has been undertaken as outlined in Section 7.1.3. In addition, chemical testing of the topsoil is required in order to determine its suitability for re-use.

12.2 Testing Scheduled

12.2.1 Based on the above assessment, an IDG Engineer submitted a test schedule (summarised in the following table) to a UKAS accredited laboratory.

Chemical Testing Scheduled

Type of Sample	No. of Samples	Determinands
Topsoil	21	pH and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc)
	14	Asbestos screens
	21	speciated PAH
	21	TOC
Made Ground	10	pH and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc)
	10	Calcium
	3	Iron
	2	Hexavalent chromium
	2	Cyanide
	9	Total Sulphate
	9	Soluble Sulphate
	9	Sulphur
	4	Asbestos screen
	7	Speciated PAH
	3	Speciated TPH, BTEX
	1	VOC
	5	SVOC
	9	TOC
Natural Soil	3	pH and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc)
	2	Calcium
	11	Total Sulphate
	11	Soluble Sulphate
	11	Sulphur
	3	Speciated TPH, BTEX
	2	TOC

Type of Sample	No. of Samples	Determinands
Groundwater	2	pH and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc)
	2	Speciated PAH

12.3 Human Health Generic Risk Assessment

12.3.1 The soil contamination test results are shown in Tables 1 to 5 presented in Appendix E, together with the laboratory test results. The tables also present laboratory results obtained by Integra in 2011, which have been re-assessed against current screening criteria.

12.3.2 The results have been classified by comparison with the relevant LQM/CIEH S4UL (2015) and C4SL (lead only) UK guidance threshold values for an end use including residential with consumption of homegrown produce.

12.3.3 Notes outlining current guidance with respect to the interpretation of analytical data are included in Appendix I.

12.3.4 It should be noted that analysis of Integra data identifies widespread elevated concentrations of up to 9.5mg/kg of beryllium within both the Made Ground and Glacial Till.

12.3.5 The BGS state that prominent beryllium concentrations are associated with volcanic intrusions (principally the nearby Skiddaw and Borrowdale Volcanic Group which form the Lake District) and consequent hydrothermal alteration of the surrounding bedrock. Beryllium concentrations over the granite intrusions exceed 5ppm (5mg/kg). Beryllium enriched rock would be anticipated to be redistributed by successive glacial events and to be present within the Glacial Till and is considered responsible for the concentrations detected within the natural strata. The BGS also state that locally high concentrations "such as those between Whitehaven and Workington may be due to industrial contamination". Given that concentrations of beryllium are both locally and regionally elevated, the concentrations detected beneath the site are considered most likely attributable to regional geology and are not considered further.

Topsoil

12.3.6 In accordance with current industry practice, Topsoil samples were tested for selected inorganic determinands, together with selected polycyclic aromatic hydrocarbon compounds (PAHs).

12.3.7 A mean TOC content of 5.4%, equivalent to a SOM of 9.3%, was recorded within the fifteen IDG Topsoil samples tested. Based upon this, human health GAC for a 6% SOM content has been utilised for all Topsoil screening purposes.

12.3.8 Contamination analysis presented on Table 1 shows that one sample of Topsoil contains an elevated concentration of lead (350mg/kg) which is in excess of the relevant threshold value.

12.3.9 A slightly elevated concentration of arsenic (40mg/kg) was detected by Integra in one sample of Topsoil obtained from TP73 within the field south of the Infilled Reservoir.

12.3.10 No elevated concentrations of PAHs have been detected in any of samples of Topsoil.

12.3.11 Asbestos fibres were not identified in any of the Topsoil samples screened.

12.3.12 Statistical analysis of the combined IDG and Integra results has been undertaken, in accordance with CL:AIRE / CIEH Publication Guidance on Comparing Soil Contamination Data with a Critical Concentration (May 2008).

12.3.13 The statistical analysis results are summarised in the following table. A value in bold indicates that the upper 95th percentile bound value (95_{UCL}) determined exceeds the relevant Tier 1 value.

Statistical Analysis of Topsoil Test Results

Material Type	Contaminant type and US_{95} value determined	
	Lead (200)	Arsenic (37)
Topsoil	65 (91)	23 (24)

Notes: Values in brackets are US95 values inclusive of any outliers which exceed the critical concentration.

12.3.14 Statistical analysis of the arsenic and lead results has identified non-normally distributed datasets. The one-sided t-test demonstrates that concentrations of arsenic and lead within the Topsoil are lower than the critical concentration. However, the dataset also indicates that maximum concentrations of arsenic of 40mg/kg detected at Integra TP73 and maximum concentration of lead of 350mg/kg detected at IDG TP733 are both outliers which in isolation exceed each determinands critical concentration. The assessment also indicates that lead concentrations of 190mg/kg detected at TP721 and 110mg/kg detected in TP719 are also outliers, although these concentrations do not exceed the critical concentration.

12.3.15 The elevated concentration of arsenic in TP73 is insignificant and therefore is not considered further in this report. Further discussion of the significance of the lead outlier at TP733 is provided in Section 13 below.

Anhydrite Stockpile

12.3.16 A total of five samples were obtained by IDG from the Anhydrite Stockpile which have been assessed for a range of inorganic and organic compounds.

12.3.17 Table 2 indicates that slightly elevated concentrations of Benzo(a)pyrene, Benzo(a)anthracene and Dibenzo(ah)anthracene PAHs have been detected within samples of Made Ground obtained from TP801 and TP803. The PAHs are probably associated with the ash material intermixed with the anhydrite.

12.3.18 Samples obtained from the stockpile also contain high concentrations of calcium and sulphate associated with the anhydrite minerals which form the principal component of the stockpile.

Made Ground

12.3.19 The presence of TPH and PAHs within the Made Ground is considered to influence TOC concentrations. Consequently, the most conservative SOM of 1.0% has been employed to assess all Made Ground soils.

12.3.20 Contamination analysis presented in Table 1 & 2 identifies:

- Elevated concentrations of up to 91mg/kg of arsenic, 299mg/kg of lead and 290mgkg of nickel in Made Ground within the infilled reservoir
- Elevated concentrations of arsenic within Made Ground beneath the TDG Depot
- A locally elevated concentration of arsenic (54mg/kg) within Granular Made Ground at the indicated location of the former Fox Pit shaft in the west of the open Field
- Elevated concentrations of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Dibenz(ah)anthracene, Indeno(123-cd)pyrene, Naphthalene and Phenanthrene PAHs detected by Integra within Made Ground beneath the former TDG Depot.
- Elevated concentrations of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, and Dibenz(ah)anthracene PAHs detected by Integra in Made Ground within the Infilled Reservoir.

12.3.21 The elevated arsenic, lead and PAHs listed above are specific to Made Ground isolated beneath individual site areas. Further assessment (i.e. statistical analysis) is not considered appropriate to Made Ground beneath each of these distinct areas as the Made Ground within each was probably

placed within differing timescales and is probably attributable to different sources and operations.

12.3.22 It is confirmed that a fragment of cement obtained from Made Ground within TP720 within the Infilled reservoir contains chrysotile asbestos fibres. However, asbestos screen tests have not detected loose fibres within any of the Made Ground samples.

12.3.23 High concentrations of calcium and acid soluble sulphate have been detected in samples obtained from the Anhydrite Stockpile which are typically in the order of ten times that of the natural strata. High concentrations of calcium and sulphate comparable with those obtained from the Stockpile have also been detected in samples of Hardcore and Granular Made Ground obtained from beneath hardstanding within the former TDG Compound. These results suggest that the Made Ground beneath the former TDG Depot hardstanding also contains anhydrous materials.

Natural Soil

12.3.24 No evidence of inorganic and PAH contamination was detected in samples of the natural superficial deposits obtained by IDG. Samples of the solid strata were also tested for calcium and sulphates to establish background concentrations and potential for gypsum or anhydrite.

12.3.25 Contamination analysis presented in Tables 1 and 2 indicates elevated concentrations of lead (299mg/kg) and of nickel (290mg/kg) within samples of Glacial Till obtained from respective Integra trial pits TP64 (0.5m depth) and TP49 (2.5m depth) at located within the infilled reservoir. It should be noted that both samples were obtained at the interface of Made Ground with underlying natural strata. The elevated concentrations are considered to represent Made Ground and natural soil intermixing at this interface and are not indicative of the natural Glacial Till. No evidence of contamination was detected in any of the other forty-nine samples of Glacial Till and two samples of bedrock selected by Integra.

12.3.26 Concentrations of calcium and sulphate detected within bedrock are typically one tenth of the concentrations detected in the anhydrite stockpile.

12.4 Testing for Petroleum Hydrocarbons

12.4.1 IDG scheduled speciated TPH and BTEX analysis on samples of Made Ground and natural soil which were recovered from TP738 and TP740-TP742 within the former TDG Depot, TP801 within the anhydrite stockpile and TP729 within the infilled reservoir where there were indications of potential hydrocarbon contamination.

12.4.2 TP742 was excavated at the location of Integra TP37, where elevated concentrations of aromatic EC_{35}-EC_{44} TPH were detected in TP37 in 2011. However, no evidence of TPH or PAH contamination was identified Within TP742 or within any of the other trial pits excavated by IDG within the former TDG Depot. In the absence of any further evidence of a mobile hydrocarbon source or elevated PAHs, it is considered likely that the elevated concentrations of EC_{35}-EC_{44} TPH and PAHs detected by Integra are associated with tar fragments.

12.4.3 Re-assessment of the Integra data has identified an elevated concentration of 229mg/kg of EC_{12}-EC_{16} TPH was detected in TP64 at 0.7m depth. No evidence of BTEX was detected and PAH analysis associated with this sample did not detect any elevated concentrations. No significant source of TPH contamination has been identified in the Made Ground within the reservoir and no evidence of TPH contamination has been identified within other Integra trial pits within the Infilled Reservoir.

12.5 Phytotoxic Generic Risk Assessment

12.5.1 An assessment of the topsoil and Made Ground was carried out to determine the potential for phytotoxic effects. The test results were classified by comparison with the relevant UK guidance threshold value as shown in Table 3. Table 3 indicates Made Ground in Integra TP51 and IDG TP721, contain concentrations of copper, nickel and zinc which exceed the relevant guidance threshold Samples of Topsoil obtained from TP726 and TP733 contain elevated concentrations of zinc. Elevated concentrations of zinc were also detected in Glacial Till within Integra TP49 and TP51.

12.5.2 The detected concentrations have the potential to hinder the growth of plants or shrubs.

12.6 Controlled Waters Generic Risk Assessment

Perched Water/Groundwater Samples

12.6.1 Discoloured perched water which was noted to issue from Made Ground into TP720 and orange water which issued from a buried pipe into TP729 within the infilled reservoir were sampled to establish whether soil contamination had also impacted water perched within the Made Ground. The results of water contamination test results are summarised in Tables 6 and 7 which are presented in Appendix E together with the laboratory test results. The significance of the results has been assessed by comparison with Groundwater Thresholds (Water Framework Directive) 2010 (Part 8).

12.6.2 No evidence of significant contamination was detected, although a high concentration comprising 1100mg/kg of iron was detected in the sample obtained from TP720 which is probably associated with the noted iron pipe.

13 CONTAMINATION AND REMEDIATION

13.1 Introduction

13.1.1 The Conceptual Site Model was presented in Section 6 of this report. In order to produce a Revised Conceptual Site Model, consideration has been given to the following:

- the nature and distribution of Made Ground
- the nature and distribution of contamination sources
- sources of hazardous gas and initial ground gas monitoring results

13.1.2 The above issues have been discussed in preceding sections of this report and are summarised in the sections below. The Revised Conceptual Site Model also includes consideration of the nature of natural strata below the site and development constraints associated with shafts, stockpiled anhydrite and Made Ground within an infilled former reservoir.

13.2 Contaminant Sources

13.2.1 The results of the chemical testing have been presented in the preceding section of this report; an assessment of the significance of the results is summarised below.

Topsoil/ Topsoil Made Ground

Topsoil, typically 300mm thick is present at surface in the northern half and east of the site. Testing suggests that this material is suitable for re-use. However, a hotspot of lead contamination has been detected in Topsoil in TP733 which exceeds screening criteria for a residential end use but does not exceed screening criteria for residential POS.

Natural Subsoil

13.2.2 Natural Glacial Till subsoil is present from 0.2m – 0.3m depth. Elevated concentrations detected in a small number of Integra samples are likely to be skewed by the sample selection at the interface between made and natural ground. The significant proportion of testing otherwise undertaken by Integra demonstrates that the Glacial Till is suitable for re-use.

Anhydrite Stockpile

13.2.3 A stockpile comprising approximately 17,000m^3 of Anhydrite/sandstone Made Ground is present on the surface of the TDG Depot and southwest of the area of the former TDG Depot now currently occupied by the Story Homes construction compound. Testing has detected slightly elevated concentrations of PAH's which represent a potential risk to human health.

Made Ground

13.2.4 Made Ground has been proven to greater than 1.4m depth beneath the former TDG Depot, up to 2.2m depth within the Infilled Reservoir and thin deposits have been locally proven on the eastern site boundary and in proximity to the former Fox Pit shaft location.

13.2.5 Elevated concentrations of arsenic and PAHs have been detected in the Made Ground beneath the former TDG Depot. Integra testing detected slightly elevated concentrations of EC_{35}-EC_{40} TPH, PAH and naphthalene at TP37, although no evidence of TPH or elevated PAHs was detected by IDG during excavation of TP742 at the same location.

13.2.6 Re-assessment of Integra data has identified an isolated slightly elevated concentration of EC_{12}-EC_{16} TPH within in Integra TP64 at 0.7m depth TP64 is located within the Infilled Reservoir which is proposed POS. The detected concentration of TPH does not exceed the relevant screening criteria for Residential POS and provided the reservoir remains as POS, no further action in respect of the TPH is required.

13.2.7 Made Ground beneath the TDG Depot is also indicated to comprise anhydrite or gypsum material which, while not representing a significant risk to human health, could potentially pose geotechnical issues. Further assessment of the Made Ground is required once the concrete slab has been removed and the anhydrite stockpile relocated, to identify the extent and volume of anhydrite/gypsum present beneath the hardstanding.

13.2.8 Initial assessment using residential with gardens screening criteria indicates Made Ground within the infilled reservoir contains slightly elevated concentrations of arsenic, lead nickel, PAHs and fragments of cement comprising chrysotile asbestos have been locally identified at TP720. It is understood that the footprint of the Infilled Reservoir is to remain as POS. Further assessment using residential with POS screening criteria indicates concentrations of nickel and PAHs exceed the relevant screening criteria.

13.2.9 Thin deposits of Made Ground at the location of the former Fox Pit Shaft (TP736) contain slightly elevated concentrations of arsenic.

Petroleum Hydrocarbon Contamination

13.2.10 Re-assessment of Integra data indicates that TPH and PAH contamination including naphthalene was present within shallow Made Ground in TP37. However, further investigation at this locality did not detect any evidence of significant hydrocarbon contamination. Integra have also stated that a plume of hydrocarbon contamination could be present beneath the concrete hardstanding surfacing the former TDG Depot. While IDG have not detected any evidence of significant hydrocarbon contamination it remains possible that pockets of localised hydrocarbon contamination remain beneath areas of the hardstanding which as a consequence of site operations, it was not possible for IDG to investigate.

Groundwater

13.2.11 No significant groundwater contamination was encountered during this investigation.

Hazardous Gas

13.2.12 Potential sources of hazardous ground gas have been identified and gas monitoring is ongoing; therefore, the Revised Conceptual Site Model has been based on preliminary data.

13.2.13 The site is not indicated to be at risk from Radon gas.

13.3 Pollutant Linkages

13.3.1 As outlined above, contamination sources have been identified in the Anhydrite Stockpile and soils beneath this site. Potential receptors identified in connection with the development were outlined in Section 6 and are shown in the following table together with the contamination sources and plausible pathways.

13.3.2 Remediation options considered viable at this stage are also shown in the following table and are discussed further below.

Revised Conceptual Site Model and Potential Remediation Options

Sources	Receptors	Plausible Pathways	Potential Remediation Options	Post-Remediation Pollutant Linkage
Lead hotspot within Topsoil TP733	Human Health (future site users –residential with consumption of homegrown produce)	Direct contact, inhalation of dust	Delineation, excavation and placement in POS	Contaminant source removed
Arsenic lead and PAH contamination within Made Ground beneath TDG Depot	Human Health (future site users –residential with consumption of homegrown produce)	Direct contact, inhalation of dust	Isolation beneath hardstanding or 600mm of clean soil cover	Pollutant linkage broken
Nickel and PAH contamination in Made Ground within Infilled Reservoir	Human Health (future site users –residential with consumption of homegrown produce)	Direct contact, inhalation of dust	Isolation beneath 300mm of clean soil cover in proposed POS	Pollutant linkage broken
PAHs within Anhydrite Made Ground Stockpile	Human Health (future site users –residential with consumption of homegrown produce)	Direct contact, inhalation of dust	Off-site disposal (at this stage not considered geotechnically suitable for retention beneath hardstanding or POS)	Contaminant source removed
Asbestos cement fragments in Made Ground at TP720	Human Health (future site users –residential with consumption of homegrown produce)	Inhalation of dust containing asbestos fibres	Controlled delineation, excavation and off-site disposal	Contaminant source removed
Hazardous Gas (carbon dioxide, methane) Subject to on-going monitoring and gas risk assessment	Human Health	Migration of Carbon Dioxide through granular strata and ingress into confined spaces leading to potential asphyxiating mixtures of gas	Gas protection measures within proposed properties Subject to on-going monitoring and gas risk assessment	Pollutant linkage broken
	Proposed Buildings	Migration of Methane through granular strata and ingress into confined spaces leading to potential explosive mixtures of gas		Pollutant linkage broken

13.4 Remediation Strategy Report

13.4.1 Redevelopment of this site will almost certainly be subject to planning conditions relating to remediation and validation. Potential remediation options are outlined in Section 13.5 below, and these options will need to be developed to produce a detailed Remediation Strategy report. IDG could then liaise with the Local Planning Authority, NHBC and the Environment Agency to gain their approval of the proposed strategy.

13.5 Potential Remediation Options

General

13.5.1 Potential Remediation Options have been outlined in the preceding section of this report; further discussion of these is presented below. Approval of the recommendations given below should be sought from the appropriate regulatory authorities prior to commencement of site redevelopment.

Topsoil (TP733)

13.5.2 The topsoil in the immediate vicinity of TP733 is indicated to comprise elevated concentrations of lead which exceed residential with gardens screening criteria. It is recommended that the localised lead hotspot be excavated and placed within the footprint of the Infilled Reservoir and proposed

POS area.

Anhydrite Stockpile

13.5.3 The Anhydrite stockpile contains relatively low concentrations of PAHs which represent a risk to human health. Ordinarily granular Made Ground comprising minor PAH contamination would be considered suitable for on-site retention beneath hardstanding or clean soil cover. However, anhydrite is an anhydrous calcium sulphate ($CASO_4$), which can convert to gypsum when in contact with groundwater or infiltrating water and the transformation results in a significant change in volume. This potential for volume change represents a significant constraint as this material cannot be readily re-used for any geotechnical purpose. In addition, while anhydrite is relatively insoluble, gypsum is moderately soluble. Anhydrite can take several forms. However, bulk chemical and mineral testing is required to establish which form and proportion of anhydrite is present within the stockpile, although further analysis may establish if any of the stockpiled material could be re-used.

13.5.4 Integra (2011) recommended that the stockpiled Anhydrite be allowed to weather for up to two years prior to placement beneath the proposed POS. Trial pits TP801 -TP805 did not encounter any evidence of a transition from anhydrite to gypsum. However, it is likely that this transition would be more likely to occur if the anhydrite were continually saturated by groundwater or stored in humid conditions.

13.5.5 Chemical analysis indicates anhydrite/gypsum is also present within the Made Ground beneath the former TDG Depot. Any remediation measures which are proposed for the anhydrite stockpile are also applicable to the Made Ground beneath the former TDG Depot.

13.5.6 The following points outline the constraints considered most likely to influence retention of anhydrite/gypsum materials on site:

- The area of proposed POS is located over the Infilled Reservoir. Groundwater monitoring indicates that groundwater around the Infilled Reservoir is present at shallow depth and water is perched at shallow depth within the Infilled Reservoir. This area of the site is also susceptible to surface flooding during periods of high rainfall.
- The presence of surface water and shallow groundwater is likely to enhance the transformation from anhydrite to gypsum and consequent volumetric changes. Gypsum being moderately soluble would be anticipated to dissolve into groundwater and to permeate the underlying deposits and during periods of groundwater flooding, any material placed above.
- Anhydrite/gypsum reacts when mixed with organic rich material and the reaction results in generation of toxic and malodorous hydrogen sulphide gas. Trial pits indicate the reservoir fill materials contain a significant organic material (relict turf horizons, timber, topsoil). Previous investigations by EES (not provided to IDG) indicate that colliery spoil within the fill materials is potentially combustible, indicating a high organic content, although caloric values of between 1500 – 7200 KJ/kg obtained by Integra are described as “exhibiting low thermal energy”. It should be noted that soils with a calorific value in excess of 5000KJ/kg are potentially combustible.
- Infiltration of surface water and groundwater and dissolution of gypsum could ultimately result in generation of hydrogen sulphide gas and sulphate enrichment of groundwater. Sulphate enriched groundwater could ultimately impact upon buried concrete in the vicinity of the infilled reservoir.
- The Anhydrite Stockpile has been in-situ for approximately ten years, is likely to be regarded as waste by the Environment Agency and any further retention or re-use on-site is likely to require an Environmental Permit.

Made Ground (Fields & Infilled Reservoir)

13.5.7 Fragments of asbestos cement sheeting (ACM) have been encountered in Made Ground in TP720 within the infilled reservoir. No evidence of ACM or loose asbestos fibres have been detected in samples from within the infilled reservoir or in Made Ground elsewhere at the site. Further investigation, to establish the significance of the identified ACM is recommended, including delineation excavation and if required off-site disposal of ACM contaminated material from this location.

13.5.8 Nickel and PAH contamination has also been detected in Made Ground within the Infilled Reservoir. It is understood that the footprint of the reservoir is located within the proposed POS. It is recommended that 300mm of clean soil cover be placed over the footprint of the Infilled Reservoir. The soil cover may be formed entirely of topsoil, or alternatively may comprise subsoil overlain by topsoil; in this case the topsoil thickness should be a minimum of 150mm.

13.5.9 Further investigation, delineation and excavation of the thin deposits of locally contaminated Granular Made Ground at TP735 is recommended. Subject to the findings of the investigation, the Granular Made Ground could be excavated and retained on site placed beneath plots, or beneath areas of hardstanding such as footpaths and drives, where the contaminants would be isolated from end users. Alternatively the Made Ground could be placed within the Infilled Reservoir beneath clean soil cover.

Made Ground (TDG Depot)

13.5.10 Made Ground beneath the TDG Depot contains elevated concentrations of metals and PAH's and in addition, is indicated to contain anhydrite/ gypsum. As a consequence of site operations, it has only been possible undertake limited investigation within the area currently occupied by Story Homes construction compound and not possible to undertake any further investigation of the Made Ground beneath the surface of the former depot not covered by the Anhydrite Stockpile.

13.5.11 It is recommended that further assessment of the Made Ground beneath the TDG Depot be undertaken following removal of the Anhydrite Stockpile, when the concrete /tarmac surfacing has been removed. Any hydrocarbon contamination encountered should be delineated, excavated and disposed off-site. Further assessment of the proportion of anhydrite/gypsum material present within the Made Ground should also be carried out to establish if the Made Ground is geotechnically suitable to remain on site.

13.5.12 Subject to the above assessments, residual risks associated with relatively immobile PAH and metal contamination within the Made Ground beneath the former TDG Depot footprint may be mitigated by placement of a 600mm clean soil cover in residential gardens.

13.5.13 The soils used for the cover layer may be sourced from the Topsoil stripped from the fields in the north and east of the site.

13.5.14 In order to minimise the risks to future maintenance workers, it is recommended that trenches for underground services within the footprint of the former TDG Depot are excavated to a specification agreed with utility providers and backfilled with clean material. This material could potentially be sourced from excavated natural soil arisings.

Petroleum Hydrocarbon Contamination

13.5.15 No areas of significant hydrocarbon contamination were encountered during the site works. Further investigation at TP37 within the TDG Depot has not identified the source of elevated TPH and PAH including volatile naphthalene detected by Integra. However, it remains possible that localised hydrocarbon contamination remains present beneath the hardstanding in the former TDG Depot.

13.6 Health & Safety Issues

13.6.1 Remediation works such as mine shaft treatment are required at the site and it is likely that these

will be undertaken by specialist remediation contractors. It is assumed that such contractors have sufficient knowledge and experience to review the content of this report and produce their own risk assessments in relation to the identified contamination sources and other hazards such as abandoned mine shafts or wells. These assessments should consider risks to the general public and residents in nearby properties who may be affected by the work, as well as their own personnel.

13.6.2 Following the completion of remediation work, it is not anticipated that future maintenance workers would come into contact with contaminated materials.

13.6.3 Workers involved in excavations for foundations, drainage, and utilities may come into contact with contaminated materials. Although their exposure is likely to be of a relatively short duration, contractors undertaking work that involves excavating or handling soils should be provided with a copy of this report, and the client should ensure that the contractor's risk assessment reflects the risks from handling contaminated soils.

13.6.4 These assessments should consider risks (such as from contaminated dust) to the general public and residents in nearby properties who may be affected by the work, as well as their own personnel. In addition, contractors should consider the potential for hazardous gases to be present within excavations or below ground structures.

13.7 New Utilities

13.7.1 Providers of utility services including water, electricity, gas and telecommunications should be provided with a copy of this report and requested to undertake their own assessment of whether ground conditions could affect their buried apparatus, and inform the developer of any potential abnormal costs. Utility providers should note that ground conditions will be different following the completion of the proposed remediation works.

13.7.2 Assessments from the utility providers should be incorporated during the design of the remediation works.

13.8 Other Remediation Issues

13.8.1 As discussed in Section 3, a high-pressure gas main runs from north to south beneath the west of the site and the former TDG Depot, which will impact upon the proposed development and will require a stand-off zone.

14 RE-USE, DISPOSAL AND IMPORT OF MATERIALS

14.1 Background

14.1.1 Materials are considered to be waste if they are discarded, if there is an intention to discard, or if there is a requirement to discard. Waste can only be disposed of at a site holding an environmental permit.

14.1.2 Soils (Made Ground or natural deposits) are considered to be waste at the point of excavation. If these "waste" soils are placed back into the ground or transferred to other sites, it could be deemed that waste has been disposed of without a permit. The person disposing of the waste and anyone who knowingly facilitates the disposal may be liable for payment of Landfill Tax. All parties involved could also be liable to penalties for non-compliance and face criminal prosecution.

14.1.3 A Materials Management Plan (MMP) should be produced for the receiving site in accordance with the CL:AIRE *Definition of Waste, Construction* Industry *Code of Practice*. This will provide details of excavation, stockpiling, and placement or disposal in relation to each material type. An MMP will provide evidence of the intended purpose of excavated materials and avoid the possibility of the materials becoming subject to either waste management legislation by the Environment Agency or landfill tax by HM Revenue and Customs (HMRC).

14.2 Re-use of Materials

14.2.1 Natural topsoil or subsoil generated by site development which is re-used on the site of origin is

excluded from the Waste Framework Directive (WFD) and does not require an MMP or Declaration by a QP provided it has been subject to detailed assessment by means of an appropriate Desk Study and Site Investigation which demonstrates that it does not present a risk to human health or to environmental receptors.

14.2.2 Made Ground can be re-used on the site of origin provided it has been subject to detailed assessment by means of an appropriate Desk Study and Site Investigation which demonstrates it is suitable for re-use in a way that it does not present a risk to human health or to environmental receptors. A Remediation Strategy and Verification Plan must be agreed by the LPA prior to its re-use. An MMP must be prepared and a QP Declaration will need to be submitted prior to re-use of the material.

14.2.3 Low volumes (i.e. 1000 tonnes) of uncontaminated Made Ground may be re-used subject to the submission of a U1 Exemption.

14.2.4 With reference to the contamination assessment undertaken in Section 13, and subject to the potential remediation requirements outlined in Section 14, Made Ground and Natural Materials are considered to be suitable for retention and re-use on this site.

14.2.5 Further assessment of the geotechnical properties of the Anhydrite Made Ground within the stockpile and within Made Ground beneath the TDG Depot should be undertaken to determine whether it may remain.

14.2.6 In accordance with sustainable development principles, and for economic reasons, the developer should ensure that the groundworker forms separate stockpiles of the following excavated materials:

- Topsoil/Made Ground Topsoil
- Granular Made Ground (TDG Depot)
- Anhydrite stockpile
- Natural soils.

14.2.7 Stockpiles should be enclosed by fencing once complete, and measures put in place to ensure that further materials are not added. This will enable re-use of materials to be maximised, and minimise off-site disposal costs.

14.2.8 There is the potential for the above noted materials to be re-used as shown in the following table.

Potential Re-use of Materials

Material Type	Potential for re-use on site
Topsoil Made Ground	Re-use within gardens and soft landscaped areas
Natural clay and bedrock	Re-use as subsoil or general fill.

14.3 Waste Classification

14.3.1 As noted above, the developer should aim to ensure that soil arisings are retained on site wherever possible. However, should material be required to be disposed of site, indicative waste classification information is provided in the following table.

Indicative Waste Classification

Material Type	Waste Classification	Remarks
Anhydrite Stockpile or Anhydrite/Gypsum containing Made Ground	Non-Hazardous	Must be disposed of in landfills for non-hazardous waste in a cell where no biodegradable waste is accepted.
Made Ground	Non-Hazardous	
Glacial Till /Coal Measures bedock	Inert	WAC test required for material to be accepted as inert
Topsoil	Non-Hazardous	Topsoil cannot normally be classed as inert due to its organic matter content

14.3.2 The approximate extents of the material types shown above can be inferred from the exploratory

hole records and Drawing No. 4046-G-D045. Groundworks/remediation contractors should be asked to review the content of this report and make their own estimates of the likely volumes and categories of waste to be disposed of.

14.4 Import of Materials

14.4.1 Development of the site may require importation of materials such as subsoil, topsoil, and crushed brick and concrete (6F2 or similar) to site. These materials are likely to be designated 'waste' upon export from their donor sites and will be subject to waste management legislation. In addition, changes to landfill tax rules in April 2018 could also mean that illegal deposits of 'waste' could attract landfill tax and fines.

14.4.2 To ensure that waste materials are not illegally deposited, any imported waste for use in the proposed development should comply with importation criteria which will be set out in the agreed Remediation Strategy. Materials must be imported in accordance with one of the following:

- A Materials Management Plan (MMP) for the receiving site which identifies a donor site providing clean naturally occurring materials
- A Waste Exemption as defined by the EA , typically *U1 Use of Waste in Construction*
- A Standard Rules Permit under the Environmental Permitting Regulations (England and Wales) 2010 *(e.g. SR2015 No39 Use of waste in a deposit for recovery operation Construction, reclamation, restoration or improvement of land other than by mobile plant)*
- A "bespoke" Environmental Permit where it not possible to meet the requirement of the rules of a Standard Rules Permit.

15 GEOTECHNICAL TESTING

15.1 General

15.1.1 Eight samples of natural soil obtained from across the Phase 3 site and four samples of Made Ground obtained from the Anhydrite Stockpile were delivered to a suitably accredited laboratory with a schedule of geotechnical testing drawn up by IDG.

15.1.2 The geotechnical laboratory test results are presented in Appendix F and summarised below. The results of in-situ testing carried out during

15.2 Soil Classification Testing

15.2.1 The Atterberg limit test is used to determine arbitrarily defined boundaries between the liquid and plastic states, and between the plastic and brittle states of grained soils, expressed as water percentage. Testing for moisture content, liquid limit, plastic limit and plasticity index was carried out on selected soil samples in accordance with guidance contained in BS1377-2:1990. No discussion of soil plasticity testing has been provided for comparison.

15.2.2 Plasticity index results have been modified in accordance with guidance contained in Chapter 4.2 of the NHBC Standards. The results are summarised in the following table, together with an assessment of Volume Change Potential (Shrinkability).

Plasticity Index Results

Soil type	Range of Modified Plasticity Indices (Average)	Volume Change Potential
Glacial Till	17.5 – 26.5 (22)	Medium

15.2.3 For the purposes of foundation design, it is recommended that cohesive soils be regarded as being of medium volume change potential.

15.3 Soluble Sulphate and pH

15.3.1 An assessment to determine the appropriate specification for buried concrete, testing has been carried out in accordance with guidance contained in BRE Special Digest 1:2005 *Concrete in*

Aggressive Ground.

15.3.2 The site has been classified as brownfield. The groundwater regime has been classified as mobile.

15.3.3 Samples of Made Ground and natural strata taken from depths ranging from 0.4m to 2.4m below ground level (bgl), which have been submitted for testing for pH and water-soluble sulphate. Testing for acid-soluble sulphate and total sulphur was also undertaken on selected samples. Results are presented in Table 1 in Appendix E.

15.3.4 The highest water-soluble sulphate concentration and the lowest pH value for each soil type analysed are shown in the following table.

Summary of Sulphate and pH results

Site Area	Soil type (No. of Samples)	Lowest pH	Soluble Sulphate Concentration (g/l)	Highest Total Potential Sulphate Concentration (%)
TDG Depot	Anhydrite Made Ground (5)	9.4	1.60	
	Made Ground (25)	7.2	1.58	
	Glacial Till (15)	6.0	0.21	
Infilled Reservoir	Made Ground (11)	6.7	0.98	
	Glacial Till (11)	6.17	0.18	
Field	Made Ground (3)	6.5	0.015	
	Glacial Till (21)	6.49	0.08	
	Coal Measures Bedrock (4)	7.5	0.11	0.11
	Permo-Triassic Bedrock (1)	8.5	<0.01	<0.01

**The mean of the highest two values (5-9 samples) or mean of the highest 20% of values (10 or more results) have been utilised.*

15.3.5 The average values of pH in all material types were all greater than 5.5, therefore concentrations of chloride and nitrate are considered insignificant.

15.3.6 Comparison of Total Sulphate with calculated TPS for a number of Coal Measures and Glacial Till samples indicates the presence of pyrite. However, within Made Ground this may relate to either coal or to the presence of anhydrite or gypsum.

TDG Depot Footprint

15.3.7 Based upon the above table sub-surface concrete within the footprint of the former TDG Depot specified in accordance with Tables C1 and C2 of BRE Special Digest 1:2005 should be Design Sulphate Class DS-3, allocated an ACEC Classification of AC-3.

15.3.8 However, it should be noted that concentrations of soluble sulphate of 1500mg/l and total sulphur concentrations in excess of 1% have been detected within both the Anhydrite and Made Ground beneath hardstanding surfacing the TDG Depot site which are equivalent to or exceed Series 800 (2016) Specification for Highway Works criteria for unbound mixtures to be placed within 500mm of concrete or cement bound materials. Further assessment of the Made Ground beneath this area of the site is recommended.

Field

15.3.9 Based upon the above data, sub-surface concrete within the Field should be Design Sulphate Class DS-2, allocated an ACEC Classification of AC-2.

Infilled Reservoir

15.3.10 At this stage it is understood that the footprint of the Infilled Reservoir is to remain as POS, although it remains possible that subsurface concrete structures affiliated to the development will be required within the POS.

15.3.11 Based upon the above data, sub-surface concrete within the Infilled Reservoir should also be Design Sulphate Class DS-2, allocated an ACEC Classification of AC-2.

15.4 Particle Size Distribution

15.4.1 Particle size distribution tests were carried out on two samples of natural strata (TP712 & TP715) and four samples (TP801-TP804) of Made Ground sampled from the Anhydrite Stockpile.

15.4.2 TP712 and TP715 were located in a zone where Story Homes indicate site levels will be reduced and excavated material will ultimately be re-engineered where it is considered necessary to raise site levels.

15.4.3 Samples of the anhydrite stockpile were tested to inform shrink/swelling testing.

PSD Testing - Natural Materials

15.4.4 The results of the PSD tests for the natural soils and classification of the material type in accordance with Series 600 Highways Specification is summarised in the following tables.

Particle Size Distribution Results – Natural Soils

	Sample Location	TP712	TP715
	Sample Depth	1.5m	2.0m
	Material Type	Glacial Till	Coal Measures Bedrock
Soil Fraction	**Particle Size (mm)**		
Cobbles	<200	0%	0%
Gravel	2.0 - 200	6%	38%
Sand	0.063 - 2.0	27%	47%
Silt	0.002 – 0.063	15%	5%
Clay	<0.002	52%	10%

15.4.5 In accordance with BS5930:1999+A2:2010, the Glacial Till sampled from TP712 would be described as 'slightly gravelly very sandy CLAY' and the sample of weathered sandstone bedrock obtained from TP715 would be described as "very gravelly slightly silty clayey SAND".

15.4.6 Classification of the natural materials in accordance with Table 6/2 of the 600 Series Earthworks specification for highway works is provided in the following table.

600 Highways Series Material Classification

Sample Location and Depth	**TP712 – 0.5m-0.8m**	**TP715 – 0.6m-0.9m**
Material Type	Glacial Till	Coal Measures Bedrock
Materials Classification	Class 2A/2B	Class 1B

PSD Testing - Anhydrite Made Ground

15.4.7 The results of the PSD tests for the Anhydrite Made Ground and classification of the material type in accordance with Series 600 Highways Specification is summarised in the following tables.

Particle Size Distribution Results – Anhydrite Stockpile

	Sample Location	TP801	TP802	TP803	TP805
	Sample Depth	1.5m	2.0m	1.5m	1.0m
	Material Type	Granular Made Ground	Granular Made Ground	Granular Made Ground	Granular Made Ground
Soil Fraction	**Particle Size (mm)**				
Cobbles	<200	0%	0%	11%	9%
Gravel	2.0 - 200	42%	55%	60%	56%
Sand	0.063 - 2.0	24%	19%	10%	17%
Silt	0.002 – 0.063	20%	15%	12%	11%
Clay	<0.002	14%	11%	7%	7%

15.4.8 In accordance with BS5930:1999+A2:2010,

- TP801 would be described as 'gravelly very sandy CLAY'.
- TP802 would be described as 'sandy very clayey GRAVEL"
- TP803 and TP804 would be described as sandy clayey GRAVEL with cobbles".

15.4.9 The Anhydrite Made Ground is indicated to comprise significant concentrations of calcium and sulphate, has a potential to transform into gypsum. Furthermore, concentrations of water soluble sulphate of 1500mg/l or greater were detected in three samples and concentrations of total sulphur exceed 1% and are therefore equivalent to or exceed Series 800 (2016) Specification for Highway Works criteria for unbound mixtures to be placed within 500mm of concrete or cement bound materials.

15.5 Compaction Tests

15.5.1 Four samples of Anhydrite Made Ground were tested at the laboratory using both 2.5kg and 4.5kg rammer to assess suitability for compaction. In addition, one sample of Glacial Till and one sample of weathered Coal Measures bedrock obtained from a zone where it is anticipated natural material will be excavated, were tested using a 2.5kg rammer to determine their suitability for re-engineering. Testing was carried out in accordance with guidance contained in BS1377-4:1990.

15.5.2 Laboratory compaction tests are only appropriate if the material grading demonstrates that:

- At least 70% of the material passes the 20mm sieve and/or
- At least 90% of the material passes the 37.5mm sieve

15.5.3 If particle sizes are only slightly in excess of the above limits, compaction tests can be useful in order to indicate target densities, but the results should be treated with caution and used for guidance only. However, if a particular material type is significantly coarser than the above limits allow, the results of laboratory compaction testing would be meaningless and a field trial would be necessary. Particle size distribution results are shown in the following table.

Summary of Particle Size Distribution Results

Sample location & depth	Material description	% passing 37.5mm sieve	% passing 20mm sieve
TP712	Glacial Till	100	100
TP715	Weathered Coal Measures	92	73
TP801	Anhydrite Made Ground	86	74
TP802	Anhydrite Made Ground	86	70
TP803	Anhydrite Made Ground	61	41
TP804	Anhydrite Made Ground	59	51

15.5.4 The test results show that the Glacial Till is suitable for compaction testing. The weathered Coal Measures and Anhydrite Made Ground samples TP801 and TP802 comprise more coarse material than desirable. Anhydrite Made Ground samples TP803 and TP804 are too coarse and field trials are likely to be necessary to establish an appropriate compaction specification.

15.5.5 The 2.5kg rammer compaction testing results are summarised in the following table.

Compaction Testing Results 2.5kg Rammer

Sample location & depth	G_s (Mg/m^3)	MDD (Mg/m^3)	OMC (%)	Allowable mc range for 95% MDD & <5% air voids	In-situ moisture content (%)
TP712	2.65	1.67	19	19.0 – 25.0	22
TP715	2.68	1.98	10	10.5 – 16.5	12
TP801	2.57	1.64	19	19.0 – 24.0	25
TP802	2.54	1.69	17	17.0 – 23.0	20
TP803	2.58	1.68	18	17.5 – 23.0	24
TP804	2.66	1.37	32	32.0 – 38.5	38

G_s – Particle Specific Gravity, MDD – Maximum Dry Density, OMC – Optimum Moisture content

15.5.6 The 4.5kg rammer compaction testing results are summarised in the following table.

Compaction Testing Results 45kg Rammer

Sample location & depth	G_s (Mg/m^3)	MDD (Mg/m^3)	OMC (%)	Allowable mc range for 95% MDD & <5% air voids	In-situ moisture content (%)
TP801	2.57	1.75	16	15.0 – 20.0	25
TP802	2.54	1.81	14	13.0 – 18.0	20
TP803	2.58	1.78	15	14.5 – 19.5	24
TP804	2.66	1.45	29	28.0 – 34.5	38

G_s – Particle Specific Gravity, MDD – Maximum Dry Density, OMC – Optimum Moisture content

15.5.7 Based on the above results it is apparent that the in-situ moisture content of the Glacial Till and weathered Coal Measures are generally within the allowable moisture content (MC) range to achieve 95% of the maximum dry density. However it is notable that the in-situ MC is slightly wet of optimum and it would be advisable to re-engineer the Glacial Till during dry summer months as excavation and movement during periods of wet weather is likely to increase the MC beyond the allowable MC range.

15.5.8 On this basis it is considered that these materials are likely to be suitable for re-engineering for use beneath highways and hardstanding. Further testing is recommended following excavation and stockpiling.

15.5.9 However, the majority of the Anhydrite Made Ground samples are generally outside of the allowable moisture content range. Given the nature of the material, attempts to reduce the in-situ moisture content could chemically transform the mineral content. Further bulk chemistry & mineral testing to establish the form and proportion of anhydrite/gypsum present are required before this materials geotechnical properties are considered further.

15.6 California Bearing Ratio (CBR) Tests

15.6.1 Four samples of saturated Anhydrite Made Ground were tested in accordance with BS1377 (1990) to assess the bearing value of the crushed rock and shrink/swell properties when subject to 2.5kg compaction and saturated for 14 days.

15.6.2 The results describe the ratio of Force (kN) against penetration of plunger (mm) into a 125mm thick sample. CBR values (%) have been derived to describe the degree of sample penetration. The amount of swelling which occurs over 336 hours (14 days) is also recorded. Tests are summarised in the following table.

CBR Testing Results

Hole ID	Depth (m)	Material	CBR Top (%)	CBR Bottom (%)	Swelling at 14 days (mm)	Volume Change (%)
TP801	1.5	Anhydrite Made Ground	1.0	2.4	0.03	0.024
TP802	2.0	Anhydrite Made Ground	3.2	3.5	0.21	0.168
TP803	1.5	Anhydrite Made Ground	2.6	4.8	0.18	0.144
TP804	1.0	Anhydrite Made Ground	1.8	3.4	0.10	0.080

15.6.3 The tabulated results indicate limited swelling occurred over 14 days saturation and CBR values are comparable with values obtained from clay soils. However, the anhydrite's limited swelling potential should be treated with caution; clay soils can absorb water relatively swiftly, whereas anhydrite (dependent upon the form of anhydrite and its degree of hydration), accommodates water on a molecular level and can chemically transform between phases when hydrated. Chemical transformation from anhydrite to gypsum is likely to take place over significantly longer period than the period allowed for the above CBR tests and transition between calcium sulphate containing forms is also likely to be influenced by temperature.

16 GEOTECHNICAL ASSESSMENT

16.1 Introduction

16.1.1 Consideration is being given to redevelopment of the site with two storey dwellings adoptable roads and sewers as described in Section 2.

16.1.2 The revised Conceptual Site Model has been outlined in Section 14. Geotechnical issues affecting the site are described below.

16.2 Mining and Quarrying

16.2.1 The site is underlain by the Brassey, Un-named and Black Metal Coal seams which, as a consequence of faulting, outcrop in the east of the site and to the west of a major fault which bisects the site. The Coal Authority viewer indicates a development high risk zone corresponding to the outcrop of the Black Metal seam outcrop west of the fault. An exploratory mining investigation undertaken in 2017 identified a possible high risk of shallow mining associated with seams outcropping in the east of the site. Therefore, as described in Section 10, thirty probeholes were drilled to determine whether the site is underlain by unrecorded shallow mine workings. While sequences of closely spaced, generally thin coal seams were encountered, no evidence of unrecorded workings was noted. It is therefore considered that the likelihood of the site being affected by shallow mine workings is very low.

16.2.2 However, there are two shafts (Fox Pit and Gameriggs Pit) indicated to be present in the western half of the site, the exact positions of which have not yet been determined. Further investigation during site preparatory works (i.e. topsoil strip) will be required to precisely locate the positions and depth and dimensions of these shafts. Each of the shafts will require treatment by drilling and pressure grouting of the shaft fill, together with the construction of a reinforced shaft cap. It is recommended that new properties are not located directly above, or within a zone of influence based upon an angle of 45 degrees from the interface between the shaft and surface of bedrock.

16.2.3 There is evidence that clay has been quarried within a shallow hollow in the northeast of the site where Made Ground comprising colliery spoil has been proven. Rotary probeholes indicate either Made Ground or soft natural strata may locally be present up to 3.2m bgl.

16.3 Infilled Reservoir

16.3.1 An infilled feature described by OS Historical maps as a “reservoir” is present in the centre north of the site. The Infilled Reservoir has been infilled with up to 2.7m thickness of Made Ground including organic soil, clinker, colliery spoil, demolition sourced materials, timber, turf and metal fragments. Soft clay and relict turf horizons have been identified beneath the western half of the Infilled Reservoir which indicate periodic flooding and sedimentation typical of a settlement lagoon. A relict sluice gate remains at the centre of the Infilled reservoir feature.

16.3.2 At this stage it is understood that the footprint of the reservoir is to remain as POS.

16.4 Former TDG Depot

16.4.1 The former TDG Depot in the southwest of the site is surfaced with up to 250mm of reinforced concrete and a below ground concrete lined oil water separator is present in the north east of this area.

16.4.2 A stockpile comprising 17,000m^3 of principally Anhydrite Made Ground including slag and ash material is present in the southwest of the former TDG Depot.

16.4.3 IDGs investigation encountered up to 1.4m thickness of mixed Cohesive and Granular Made Ground beneath the TDG Depot. However, BGS boreholes and Integra trial pits indicate up to 2.4m thickness of Made Ground, including the part of the former Depot which also extends beneath the Anhydrite Stockpile.

16.4.4 Chemical analysis has detected significantly elevated concentrations of calcium and sulphate and Integra trial pits record the presence of gypsum beneath the TDG Depot. Concentrations of sulphate

and total sulphur exceed Series 800 specifications for unbound fill and are likely to damage subsurface concrete within the footprint of the former TDG Depot. Further investigation, delineation and removal of all calcium sulphate rich Made Ground is recommended.

16.5 Site Regrade, Remediation and Preparatory Works

16.5.1 A ridge of higher ground extends south from the northern boundary which slopes steeply down to the east and southeast. An engineering layout has not been produced at this stage; however, it is understood that Story Homes propose to cut up to 2.0m from the ridge and replace the material in the east of the site in order to achieve the desired development levels. Exploratory holes excavated along the top and sides of the ridge indicate only thin to absent Glacial Till deposits are underlain by weathered sandstone strata. Excavation of solid rock should be anticipated.

16.5.2 It is anticipated that site levels will be locally raised by up to 3.0m in the east of the site, including within a hollow where it is indicated clay extraction has historically taken place and where Made Ground has been proven. The natural material cut from the ridge is indicated to be suitable for re-engineering and to potentially enable the adoption of vibratory improvement beneath plots proposed in the east of the site. However, further sampling, laboratory testing and field tests are required to inform a detailed specification if vibratory improvement is to be adopted.

16.5.3 Excavation and either re-engineering or removal of the Made Ground indicated to be present within the base of the hollow in the east of the site will be required.

16.5.4 Hotspots of Made Ground have been detected in the Topsoil Made Ground which require further investigation and delineation prior to any Topsoil stripping.

16.6 Summary of Ground Conditions

16.6.1 Made Ground up to 2.4m depth and indicated to comprise anhydrite/gypsum was encountered in the former TDG Depot. Granular and Cohesive Made Ground entrained with demolition and organic material was proven up to 2.7m within the infilled Reservoir. Granular Made Ground including ash and coal was proven up to 0.5m in the west of the site and vicinity of the Fox Pit shaft. Granular Made Ground was proven up to 0.6m on the sites eastern boundary and potentially up to 3.2m within hollow where clay extraction is indicated to have taken place in the east of the site.

16.6.2 Glacial Till comprising brown silty sandy gravelly clay is present across the site which has been proven to depths greater than 3.2m bgl and to be thickest beneath the Infilled Reservoir, extending southwards beneath the centre of the site and thinnest in the west and beneath the ridge extending south in the east of the site. The Glacial Till is locally absent on the top of the ridge where the underlying Coal Measures comprising sandstone are present at outcrop. Elsewhere the Coal Measures comprise weathered mudstone and siltstone encountered as firm to stiff clay or very weak weathered rock. Shear vanes indicate the Glacial Till is generally of medium to high strength and the weathered cohesive bedrock is of high strength.

16.6.3 A 0.4m thick seam of weathered coal was encountered at outcrop at 1.2m depth beneath the Glacial Till deposits in TP731.

16.6.4 Red sandstones interpreted to be of Permo-Triassic origin have been encountered at shallow depth (i.e. 1.0-2.0m bgl) in proximity to the site's north-western boundary.

16.6.5 Inflows of perched water were encountered within the Infilled Reservoir and at the interface between Topsoil and underlaying clay deposits. Shallow groundwater seepages were recorded in weathered bedrock, typically at depths below 1.0m bgl.

16.6.6 Groundwater monitoring indicates shallow groundwater is present in strata surrounding the Infilled Reservoir and the central north of the site.

16.6.7 Clay classification tests suggest that natural cohesive soils at the site should be regarded as being of medium volume change potential.

16.7 Foundation Recommendations

16.7.1 The foundation recommendations presented below assume that the proposed development will comprise two storey houses with line loads not exceeding 60kN/m run.

16.7.2 Based on the information presented in the preceding sections, anticipated foundation solutions are shown in the following table. The final foundation solution should be specified by the Structural Engineer responsible for design.

16.7.3 IDG have not been provided with a proposed layout. However, it is anticipated that reinforced strip /trenchfill foundations will be appropriate for the majority of plots. However, a significant cut and fill operation is proposed in the east of the site where a ridge of high ground is to be reduced and material excavated is to be placed to the east to achieve development levels.

16.7.4 Geotechnical testing indicates the bedrock and Glacial Till material it is proposed to cut is suitable for re-engineering to enable adoption of vibro-improvement, although further sampling, laboratory testing and field tests are required to inform a detailed engineering specification. Shear vane tests demonstrate that the Glacial Clay it is proposed to excavate is of a generally high shear strength. Re-engineering to achieve 95% compaction is likely to increase the shear strength and as a consequence, it may be necessary to pre-bore to enable installation of vibro-stone columns.

16.7.5 The anticipated foundation solutions are discussed further below.

Strip/Trench Fill Foundations

16.7.6 The following should be noted in relation to strip and trench fill foundations. Reference should also be made to guidance contained in NHBC Standards (Chapters 4.2 and 4.4).

16.7.7 Made Ground is not considered to be a suitable foundation material and foundations should therefore be taken through these materials into underlying natural strata of adequate bearing capacity.

16.7.8 The generally stiff gravelly clay is of medium volume change potential and a minimum depth of 0.9m below external levels is therefore recommended for strip foundations.

16.7.9 Assuming a strip foundation of 10m length and 0.6m width, founding at 0.9m depth, the firm becoming stiff gravelly clay is generally considered to have a ***safe bearing capacity*** of 200kN/m^2. Settlements less than 25mm would be anticipated and this is considered likely to be acceptable.

16.7.10 Weathered sandstone rock is considered to have a ***safe bearing capacity*** in excess of 200kN/m^2 and to provide a suitable stratum for strip foundations placed at a minimum depth of 0.45m below ground level.

16.7.11 There are several situations where foundation depths may need to be increased as follows:

- foundations should be placed below a line drawn up at an angle of 45° from the base of any adjacent existing *or proposed* services or excavation.
- where relict foundations or excavations are present, foundations should deepened to extend into undisturbed natural ground of adequate bearing capacity
- where unexpected ground conditions (such as soft spots) are encountered in foundation excavations, foundation depths may need to be increased and further advice should be sought from IDG
- where trees are present, the foundation depth should be determined in accordance with guidance contained in NHBC Standards (Chapter 4.2)
- where rock is encountered at shallow depth, foundations should be placed entirely on rock, and not partly on rock and partly on superficial deposits or residual soil (completely weathered rock) ; this may result in deeper foundations.

16.7.12 Excavations for foundation trenches may encounter significant 'overbreak' due to the presence of cobbles or boulders.

16.7.13 Coal seams have been encountered at shallow depth (<3m) during the ground investigation. Exposed coal can be at risk of spontaneous combustion. Care should be taken to ensure any exposed seams within excavations are effectively sealed with a cement-based material at the earliest opportunity to prevent continued ingress of air.

16.7.14 Where foundation excavations do come into contact with coal, the foundation should be taken through the coal seam, into underlying natural in-situ strata of adequate bearing. The full thickness of coal should then be sealed with concrete to create a trench fill foundation.

16.7.15 Sub-surface concrete in contact with the Made Ground and natural ground outside of the footprint of the former TDG Depot should be Design Sulphate Class DS-3, with the site allocated an ACEC Classification of AC-3. Further investigation is recommended to confirm concrete classification within the footprint of the former TDG Depot.

Vibratory Improvement

16.7.16 Vibratory improvement is a technique used to improve the geotechnical characteristics of Made Ground, loose granular soils, and cohesive soils with undrained shear strength exceeding 30 kN/m^2.

16.7.17 Vibratory improvement is not suitable in ground with a significant content of biodegradable material, large obstructions, voids, very soft clay, or Made Ground that may be susceptible to collapse settlement or that is still settling under its self-weight. It can be used within backfilled basements, if the underlying ground is of adequate bearing capacity.

16.7.18 On residential developments, stone columns are typically 500mm to 700mm in diameter at spacings of between 1.5m and 2.0m. After treatment, properties can be founded on either reinforced strip or raft foundations.

16.7.19 In accordance with guidance contained in Chapter 4.6 of NHBC Standards, NHBC should be notified of any proposed vibratory ground improvement works in advance. Furthermore, the Client should obtain written confirmation from the specialist contractor that the site and ground conditions are suitable for the proposed ground improvement, and submit this confirmation to NHBC.

16.7.20 The specialist contractor should also provide the following:

- a detailed schedule of work and a programme
- an indication of what tests are to be carried out on completion of the work, and who will be responsible for undertaking these tests
- the layout and depth of stone columns, and the accuracy to be achieved in their installation
- the factor of safety incorporated into the design
- the criteria for non-acceptance of the work
- calculations and case histories to justify the ground improvement proposals
- details of the equipment and process.

16.7.21 Typically, the full thickness of Made Ground is treated (up to a maximum of between 5 and 6m), but stone columns do not usually extend into the underlying natural strata, unless it is soft. Partial depth treatment is possible (e.g. in deep, backfilled quarries), but would normally require a raft foundation.

16.8 Floor Construction.

16.8.1 A suspended ground floor construction should be used in areas where the depth of Made Ground beneath a plot exceeds 600mm. This is likely to affect the approximately 30% of the site.

16.8.2 Further discussion regarding requirement for ground gas protection measures (if any) will be provided on completion of the Hazardous Gas Monitoring programme.

16.9 Groundwater and Excavations

16.9.1 Based on the results of this investigation groundwater flows should be anticipated in excavations

in the vicinity of the Infilled Reservoir and the surrounding strata. However, it should be noted that groundwater levels during redevelopment work may be higher than those encountered during this investigation.

16.9.2 Excavations to relatively shallow depth should remain stable in the short term; where excavations are to be left open for a significant period of time, these will require shoring to prevent collapse, especially in Made Ground and granular soils.

16.9.3 Rock was encountered in several exploratory holes, especially on the crest of the ridge in the east of the site and in excavations close to the site's western boundary. It would therefore be prudent to allow for excavation of hard rock in any deep excavations such as those that may be required for service trenches.

16.9.4 Coal seams have been encountered at shallow depth during the ground investigation. Consequently, excavations (such as for foundations and services) may come into contact with coal. In order to minimise the likelihood of encountering coal, such excavations should be taken to the minimum depth required. Where foundation excavations come into contact with coal, the foundation should be taken through the coal seam into underlying rock strata of adequate bearing capacity. The full thickness of coal should then be sealed with concrete to create a trench fill foundation. To prevent the ingress of air, the mass concrete fill should be placed as soon as possible after exposing the seam.

16.10 Highways

16.10.1 The natural gravelly clay deposits will have a CBR value of at least 2% (as noted in Highways Agency Interim Advice Note 73/06 Rev 1 [2009] *Design Guidance for Road Pavement Foundations*). This estimate is based on visual inspection of the soils and the recorded plasticity index results; CBR values should be confirmed on site prior to road construction.

16.10.2 Made Ground is typically 1.5m thick beneath the former TDG Depot in the southwest of the site. This Made Ground contains high concentrations of sulphate which is indicated to be unsuitable for inclusion as unbound fill in proximity to buried concrete. It is strongly recommended that a copy of this report is provided to the adopting authority to enable them to consider the specification of the highways.

16.10.3 It is recommended that the uppermost 2m of Made Ground be excavated from beneath the proposed highway footprint. Suitable aggregate should then be placed in engineered layers to an appropriate level, in accordance with guidance contained in the Highways Agency Specification for Highway Works (Series 600 Earthworks).

16.10.4 Residual Made Ground materials in the base of the excavation (i.e. in areas where the thickness of Made Ground exceeds 2m) should be inspected and (where necessary) any soft spots removed and replaced with suitable engineered fill.

16.10.5 Further Laboratory testing is recommended in order to determine the suitability of Made Ground materials derived from beneath the former TDG Depot.

16.10.6 However, granular materials arisings from demolition and the excavation of hardstand areas may be crushed in order to generate aggregate which (subject to confirmatory testing) could be suitable for use as unbound pavement materials within the highways.

16.11 Flooding and Drainage

16.11.1 The centre north of the site and low ground immediately west of the Infilled reservoir was noted to flood following heavy rainfall. Groundwater monitoring indicates groundwater to be present at shallow depth in the vicinity of the Infilled Reservoir.

16.11.2 Based on the ground conditions encountered, it is considered that soakaways would not represent an effective method of surface water drainage.

16.12 External Works

16.12.1 The site slopes steeply down to the site's eastern boundary where it is proposed to raise site levels. It is considered likely that there will be a requirement for retaining walls in this area in order to facilitate development.

17 SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

17.1 General

17.1.1 The conclusions below are summarised from the preceding sections of this report.

17.1.2 Redevelopment of the site with domestic dwellings is being considered. It should be noted that investigation work was not possible in the former Phosphorite Storage Area due to soil stockpiles and site operations and was limited within the former TDG Depot due to site operations.

17.1.3 Historical plans indicate that the southwest of the site was occupied by a TDG Depot (tanker refuelling and washing facility), a Phosphorite Storage Area was present in the centre-south of the site, a "reservoir" (probable tailings pond) was present in the centre north of the site and clay extraction took place associated with a brickfield in the northeast of the site.

17.2 Ground Conditions

17.2.1 Made Ground up to 2.4m depth was encountered in the former TDG Depot, up to 2.7m within the infilled Reservoir, 0.5m in the west of the site and vicinity of the Fox Pit shaft, up to 0.6m on the sites eastern boundary and potentially up to 3.2m within hollow where clay extraction is indicated to have taken place in the east of the site.

17.3 Mining and Quarrying

17.3.1 No significant risk from shallow mining has been identified. However, two mine shafts are indicated to remain within the west of the site whose locations require proving during site preparatory works. Treatment (grouting and capping) of both shafts will be required.

17.4 Hazardous Gas

17.4.1 A hazardous ground gas monitoring programme is ongoing. Conclusions will be presented on completion of the monitoring programme.

17.5 Contamination and Remediation

17.5.1 A hotspot of lead contamination which exceeds residential with gardens end use screening criteria have been identified in Topsoil at IDG TP733. Delineation, excavation and placement of the topsoil in the footprint of the infilled reservoir is recommended.

17.5.2 Elevated concentrations of metal and PAH contamination have been detected in Made Ground within the Infilled Reservoir and beneath the former TDG Depot.

17.5.3 No evidence of significant TPH hydrocarbon was identified beneath the former TDG Depot. A localised slightly elevated concentration of EC_{12}-EC_{16} TPH was detected in TP64 within the infilled reservoir. However, provided the footprint of the Infilled Reservoir remains as POS this minor detection does not represent a risk to the proposed development.

17.5.4 Confirmation of the absence of any further TPH contamination within the Made Ground beneath the TDG Depot is recommended once the hardstanding has been removed.

17.5.5 ACM has been locally detected in TP720 within the Infilled Reservoir. Controlled delineation and excavation by an appropriately qualified asbestos removal contractor is recommended.

17.5.6 The Anhydrite Made Ground stockpiled within the southwest of the TDG Depot contains slightly elevated concentrations of PAH. However, this material is at present considered unsuitable for re-use on site due to its unpredictable geotechnical properties.

17.6 Foundations

17.6.1 Reinforced strip/trenchfill foundations constructed upon firm to stiff clay or weathered bedrock are considered appropriate for the majority of plots. Subject to preparation of a detailed specification, vibratory improvement of re-engineered natural deposits is anticipated in the east of the site to enable adoption of reinforced strip foundations.

17.7 Groundwater and Excavations

17.7.1 Based on the results of this investigation groundwater flows should be anticipated in shallow excavations within the centre north of the site and vicinity of the Infilled Reservoir,

17.7.2 Excavations to relatively shallow depth should remain stable in the short term; where excavations are to be left open for a significant period of time, these will require shoring to prevent collapse, particularly in Made Ground and granular soils where perched water ingress may be anticipated.

17.8 Highways

17.8.1 The natural gravelly clay Glacial Till deposits will have a CBR value of at least 2%. Made Ground beneath the former TDG Depot contains high concentrations of sulphate and is unsuitable as unbound fill within 500mm of buried concrete.

17.9 Flooding and Drainage

17.9.1 The site is not located within an indicative floodplain. However, the site surface in the centre north of the site, immediately west of the Infilled Reservoir is noted to flood during periods of heavy rainfall.

17.9.2 Soakaways are not considered to represent an effective method of surface water drainage, based on the ground conditions encountered during this investigation.

17.10 Further Works

17.10.1 A foundation schedule is recommended due to the localised variability of the ground conditions within the former TDG Depot and remainder of the site.

17.10.2 Further investigation is required to establish the proportions of anhydrite/gypsum and to establish significance of TPH at TP37 following removal of the concrete slab in the north of the TDG Depot and exposure of the underlying Made Ground.

17.10.3 Further trial pit investigation is required at Integra TP64 to eliminate significance of elevated EC_{12}-EC_{16} TPH detected at 0.7m depth.

17.10.4 Further investigation (trial pitting and soil sampling) is required in the footprint of the former phosphorite storage area once the soil stockpiles have been removed.

17.10.5 Bulk soil sampling and geotechnical testing is recommended to inform a specification for re-engineering of deposits within the east of the site where it is proposed to raise development levels and adopt vibratory improvement.

17.10.6 Further assessment to establish the positions of the Fox Pit and Gameriggs Pit shafts is required once the topsoil has been stripped from the site and the natural clay exposed.

APPENDIX A

iD Geo
iD GeoEnvironmental Limited
iD GeoEnvironmental
Consulting Engineers

North West & Midlands:
Caledonian House
Tatton Street
Knutsford, Cheshire
WA16 6AG
Tel: 01565 755557
Fax: 01565 740263

North East & Yorkshire:
The Stables, Aske Hall
Aske, Richmond
Yorkshire, DL10 5HG
Tel: 01748 889015
Fax: 01565 740263

CLIENT	Story Homes
JOB TITLE	Phase 3, Edgehill Park, Whitehaven
DRAWING TITLE	Site Location Plan

DRAWN BY	SIGNATURE	DATE	STATUS
NW		3-11-20	FINAL

APPROVED	SIGNATURE	DATE	SCALE	DRG No.
BRB		3-11-20	1:25,000@A4	4046-G-D042

A4 border: 186 x 218

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KEY

- P3 Site Boundary
- Anhydrite Stockpile
- P3 Subsoil Stockpile
- P3 Subsoil Stockpile
- Evidence of Surface Workings
- Story Builders Compound
- Infilled Reservoir & Marsh Ground
- Open Field
- View Direction
- 296515-001 — CA Recorded Mine Shaft

Services

- High Pressure Gas
- Medium Pressure Gas

Revision	Description	Date

iD GeoEnvironmental Limited

North West & Midlands:
Caledonian House
Tatton Street
Knutsford, Cheshire
WA16 6AG

Tel: 01565 755557
Fax: 01565 740263

North East & Yorkshire:
The Stables, Aske Hall
Aske, Richmond
Yorkshire, DL10 5HG

Tel: 01748 889015
Fax: 01565 740263

CLIENT: Story Homes

JOB TITLE: Edgehill Park Phase 3

DRAWING TITLE: Site Features & Photographs

STATUS: FINAL

DRAWN BY	SIGNATURE	DATE
NW		28-10-20

APPROVED	SIGNATURE	DATE
BRB		03-11-20

SCALE	DRG No.
1:1000@A1	4046-G-D043

A1 Border: 841 X 594

100 metres

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KEY

P3 Site Boundary

296515-001 — CA Recorded Mine Shaft

HARTFIELD CLOSE
WINDERMERE ROAD
HIGH ROAD
Posts
El Sub Sta
297515-003 Baxter Pit
297515-002 Banks Pit
Gameriggs Brickfield 1865
Gameriggs Settlement Lagoon? 1870
Gameriggs Reservoir 1960
296515-003 Fox Pit
297515-001 Gameriggs Pit
Phosphorite Storage 1994-2002
TDG Depot 1983-2002
Far Prestonhows 1865-1962
HEAP 1
HEAP 2
HEAP 5
HEAP 6
297515-008 Watson Pit
297515-009
297515-011 Country Pit
High House
Cattle Grid
Gas Gov
Tanks
DOVE WAY
CLAREDON DRIVE
EDGEHILL PARK (PHASE 1)
95.7m
94.2m
94.3m
93.3m
89.8m
100 metres

Revision	Description	Date

iD Geo
iD GeoEnvironmental Limited

North West & Midlands:
Caledonian House
Talton Street
Knutsford, Cheshire
WA16 6AG
Tel: 01565 755557
Fax: 01565 740263

North East & Yorkshire:
The Stables, Aske Hall
Aske, Richmond
Yorkshire, DL10 5HG
Tel: 01748 889015
Fax: 01565 740263

CLIENT: Story Homes

JOB TITLE: Edgehill Park Phase 3

DRAWING TITLE: Historical Features

STATUS: FINAL

DRAWN BY: NW	SIGNATURE:	DATE: 28-10-20
APPROVED: BRB	SIGNATURE:	DATE: 03-11-20
SCALE: 1:1000@A1	DRG No.: 4046-G-D044	

A1 Border: 837 X 617

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KEY

- P2B Site Boundary
- IDG Probehole 2020 (PH600)
- IDG Trial Pit 2020 (TP700)
- IDG Probehole Dec 2016 (PH300)
- IDG Probeholehole Sept 2018 (PH500)
- Integra Trial Pit (June 2011) (TP)
- Integra Probehole (2009-11) (RH5)
- CA Recorded Mine Shaft (296515-001)
- BGS Geological Fault
- IDG Inferred Geological Fault
- BGS Coal Seam Outcrop
- Coal Seam Base Structure Contours (m AOD)

Revision	Description	Date

iGeo
ID GeoEnvironmental Limited

☒ North West & Midlands:
Caledonian House
Talton Street
Knutsford, Cheshire
WA16 6AG
Tel: 01565 755557
Fax: 01565 740263

☐ North East & Yorkshire:
The Stables, Aske Hall
Aske, Richmond
Yorkshire, DL10 5HG
Tel: 01748 889015
Fax: 01565 740263

CLIENT: Story Homes

JOB TITLE: Edgehill Park Phase 3

DRAWING TITLE: Exploratory Hole Location Plan

STATUS: FINAL

DRAWN BY	SIGNATURE	DATE
NW		28-10-20

APPROVED	SIGNATURE	DATE
BRB		03-11-20

SCALE	DRG No.
1:1000@A1	4046-G-D045

100 metres

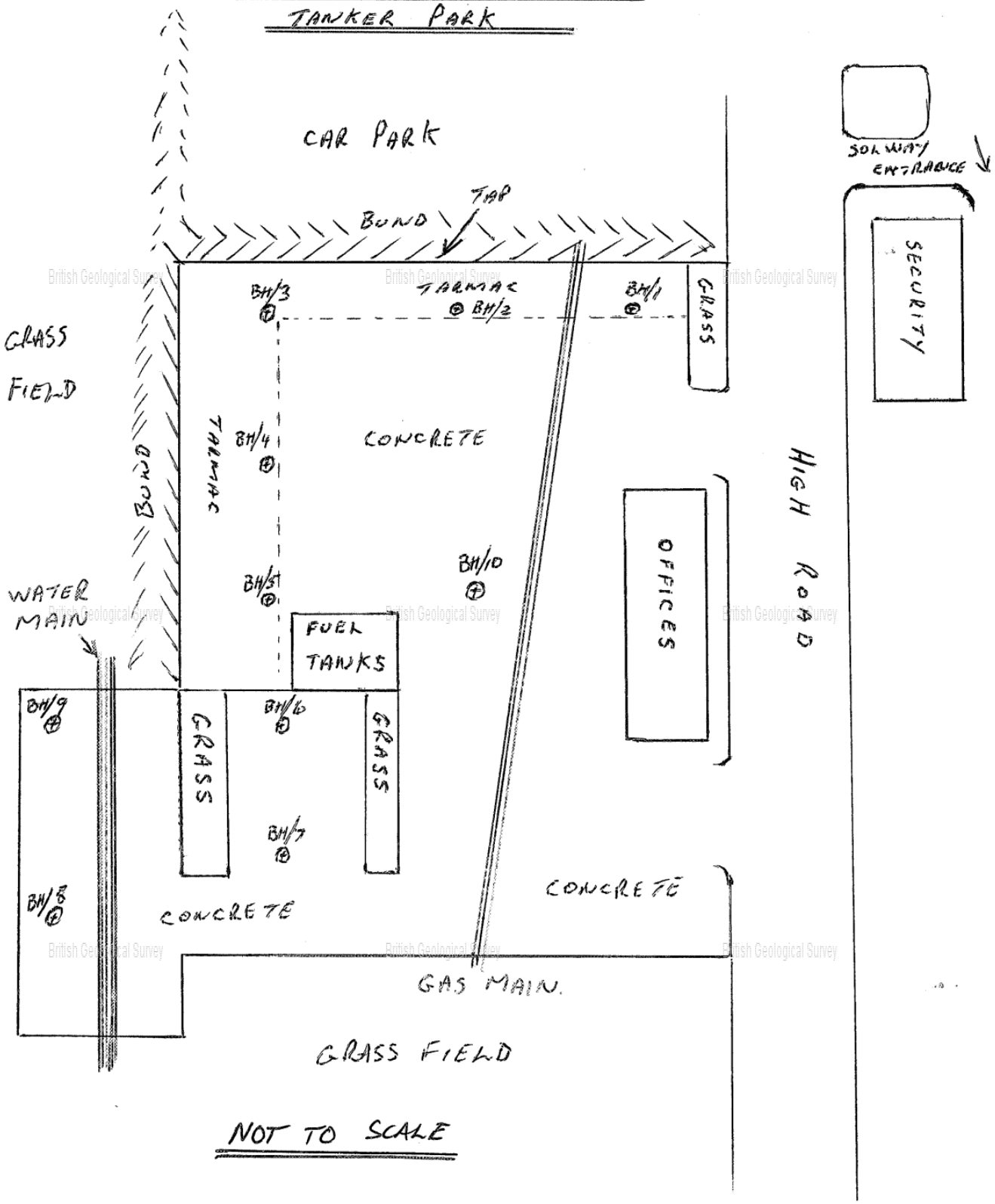
A1 Border: 837 X 577

APPENDIX B

BOREHOLE LOCATION SKETCH PLAN

British Geological Survey

ALBRIGHT AND WILSON TANKER PARK



NOT TO SCALE

CLIENT	JOB NO	LOCATION	BOREHOLE NO
BORDER CONSTRUCTION GRP.	C8375	ALBRIGHT & WILSON, WHITEHAVEN	BH1
DATE: MARCH 1996 / SCALE: 1 to 50	BORING METHOD: CABLE PERCUSSIVE		Sheet: 1

Drilling & Casing Progress	SAMPLE/TEST Type & No.	SAMPLE/TEST Depth(M)	SPT N – value or COHESION	DESCRIPTION	O D LEVEL	LEGEND	DEPTH
7TH							0.0
				MADE GROUND–Tarmac surfacing			0.10
				MADE GROUND–Gravel stone subbase			0.20
	B 1	0.50		MADE GROUND–Dense slag fill materials.			
	C 2	1.00 – 1.20	65				
	B 3	1.50					
	C 4	2.00 – 2.10	50				
	B 5	2.00					
	B 6	2.40					2.40
	S 7	2.70 – 3.00	65	Hard slightly weathered reddish brown clayey SANDSTONE.			
7TH							3.50

DUNELM DRILLING COMPANY
TEL 091-526-2534 FAX 091-517-0085

BOREHOLE LOGSHEET

Water Observations, Remarks, Etc
Water struck @ 2.70m
Standing @ 2.70m

Chiselling slag for 2 hrs.
Chiselling sandstone for 1 hr to prove.

CLIENT	JOB NO	LOCATION	BOREHOLE NO
BORDER CONSTRUCTION GRP.	C8375	ALBRIGHT & WILSON, WHITEHAVEN	BH3
DATE: MARCH 1996 — SCALE: 1 to 50	BORING METHOD: CABLE PERCUSSIVE		Sheet: 1

Drilling & Casing Progress	SAMPLE/TEST Type & No.	SAMPLE/TEST Depth(M)	SPT N – value or COHESION	DESCRIPTION	O D LEVEL	LEGEND	DEPTH
6TH							0.0
				MADE GROUND–Tarmac surfacing			0.20
	B 1	0.50		MADE GROUND–Dense slag fill materials.			
	C 2	0.80 – 1.25	35				
	D 3	1.20					1.20
	U 4	1.40 – 1.85	88.00	Firm to stiff brown & grey mottled sandy gravelly CLAY.			
	D 5	1.90					1.80
				Stiff to very stiff brown GLACIAL TILL (Boulder clay).			
	U 6	2.40 – 2.85	232.90				
	D 7	2.90					
	U 8	3.50 – 3.60					3.60
6TH				Hard slightly weathered reddish brown clayey SANDSTONE.			4.00

DUNELM DRILLING COMPANY
TEL 091-526-2534 FAX 091-517-0085

BOREHOLE LOGSHEET

Water Observations, Remarks, Etc
Borehole dry

Chiselling slag for 1hr.

CLIENT	JOB NO	LOCATION	BOREHOLE NO
BORDER CONSTRUCTION GRP.	C8375	ALBRIGHT & WILSON, WHITEHAVEN	BH2
DATE: MARCH 1996 — SCALE: 1 to 50	BORING METHOD: CABLE PERCUSSIVE		Sheet: 1

Drilling & Casing Progress	SAMPLE/TEST Type & No.	SAMPLE/TEST Depth(M)	SPT N – value or COHESION	DESCRIPTION	O D LEVEL	LEGEND	DEPTH
6TH							0.0
				MADE GROUND—Tarmac surfacing			0.10
	B 1	0.50		MADE GROUND—Dense slag fill materials.			
	C 2	1.00 – 1.45	77				
	B 3	1.20					
	C 4	2.00 – 2.45	13	Firm to stiff brown & grey mottled sandy gravelly CLAY.			1.90
	B 5	2.30					2.40
6TH				Stiff brown GLACIAL TILL (Boulder clay).			
	U 6	3.00 – 3.50	132.70				
	D 7	3.50					
	U 8	4.00 – 4.50	96.40				
	D 9	4.40					
	S 10	5.30 – 5.75	47	Hard slightly weathered reddish brown clayey SANDSTONE.			5.00
6TH							5.75

DUNELM DRILLING COMPANY
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BOREHOLE LOGSHEET

Water Observations, Remarks, Etc

Water struck @ 2.50m
Standing @ 4.30m – water ingress possibly from running tape

Chiselling slag for 2 hrs
Chiselling sandstone for 0.5hr to prove.

CLIENT	JOB NO	LOCATION	BOREHOLE NO
BORDER CONSTRUCTION GRP.	C8375	ALBRIGHT & WILSON, WHITEHAVEN	BH5
DATE: MARCH 1996 — SCALE: 1 to 50	BORING METHOD: CABLE PERCUSSIVE		Sheet: 1

Drilling & Casing Progress	SAMPLE/TEST Type & No.	SAMPLE/TEST Depth(M)	SPT N – value or COHESION	DESCRIPTION	O D LEVEL	LEGEND	DEPTH
6TH							0.0
				MADE GROUND–Tarmac surfacing			0.10
	B 1	0.50		MADE GROUND–Red sandstone gravel fill.			0.20
				MADE GROUND–Dense slag fill.			
	U 2	1.10 – 1.60	68.70	Firm brown & grey mottled sandy gravelly CLAY.			0.90
	D 3	1.70					1.70
	U 4	2.00 – 2.50	191.10	Stiff to very stiff brown GLACIAL TILL (Boulder clay).			
	D 5	2.50					
	U 6	3.00 – 3.50	143.40				
	D 7	3.50					
	S 8	4.00 – 4.20	55	Hard slightly weathered reddish brown clayey SANDSTONE.			3.80
6TH							4.20

DUNELM DRILLING COMPANY
TEL. 091-526-2534 FAX 091-517-0085

BOREHOLE LOGSHEET

Water Observations, Remarks, Etc
Borehole dry

Chiselling slag for 1hr.

CLIENT	JOB NO	LOCATION	BOREHOLE NO
BORDER CONSTRUCTION GRP.	C8375	ALBRIGHT & WILSON, WHITEHAVEN	BH4
DATE: MARCH 1996 — SCALE: 1 to 50	BORING METHOD: CABLE PERCUSSIVE		Sheet: 1

Drilling & Casing Progress	SAMPLE/TEST Type & No.	SAMPLE/TEST Depth(M)	SPT N – value or COHESION	DESCRIPTION	O D LEVEL	LEGEND	DEPTH
6TH							0.0
				MADE GROUND—Tarmac surfacing.			0.25
	B 1	0.50		MADE GROUND—Dense slag fill materials.			
	C 2	0.80 – 1.10	49				1.10
	U 3	1.40 – 1.90	137.60	Stiff brown & grey mottled sandy gravelly CLAY.			1.40
	D 4	1.90		Stiff to very stiff brown GLACIAL TILL (Boulder clay).			
	U 5	2.40 – 2.90	181.30				
	D 6	3.00					
	U 7	3.50 – 4.00					
	D 8	4.10					4.10
	S 9	4.50 – 5.00	50	Hard slightly weathered reddish brown clayey SANDSTONE.			
6TH	S 10	5.30 – 5.50	50				5.50

DUNELM DRILLING COMPANY
TEL 091-528-2534 FAX 091-517-0085

BOREHOLE LOGSHEET

Water Observations, Remarks, Etc

Borehole dry

Chiselling slag for 1hr
Chiselling sandstone for 0.5hr

CLIENT	JOB NO	LOCATION	BOREHOLE NO
BORDER CONSTRUCTION GRP.	C8375	ALBRIGHT & WILSON, WHITEHAVEN	BH6
DATE: MARCH 1996 — SCALE: 1 to 50	BORING METHOD: CABLE PERCUSSIVE		Sheet: 1

Drilling & Casing Progress	SAMPLE/TEST Type & No.	SAMPLE/TEST Depth(M)	SPT N – value or COHESION	DESCRIPTION	O D LEVEL	LEGEND	DEPTH
5TH							0.0
				MADE GROUND–Reinforced concrete			
	B 1	0.40		MADE GROUND–Compact sandstone gravel fill			0.25
	U 2	1.00 – 1.50	144.10	Stiff brown & grey mottled sandy gravelly CLAY.			0.90
5TH	D 3	1.60					
	U 4	2.00 – 2.50	187.00				
	D 5	2.40		Stiff to very stiff dark brown GLACIAL TILL (Boulder clay)			2.20
	U 6	3.00 – 3.50	139.00				
	D 7	3.50					
	D 8	3.80		Dense brown GLACIAL TILL with numerous sandstone fragments – possibly weathered/disturbed rockhead.			3.60
	S 9	4.20 – 4.65	33				
5TH							4.50

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TEL 091-526-2534 FAX 091-517-0085

BOREHOLE LOGSHEET

Water Observations, Remarks, Etc
Borehole dry

Chiselling concrete for 1hr.

Standing time waiting to gain access 10.30am – 11.30am = 10hrs.

CLIENT	JOB NO	LOCATION	BOREHOLE NO
BORDER CONSTRUCTION GRP.	C8375	ALBRIGHT & WILSON, WHITEHAVEN	BH8
DATE: MARCH 1996 — SCALE: 1 to 50	BORING METHOD: CABLE PERCUSSIVE		Sheet: 1

Drilling & Casing Progress	SAMPLE/TEST Type & No.	SAMPLE/TEST Depth(M)	SPT N – value or COHESION	DESCRIPTION	O D LEVEL	LEGEND	DEPTH
8TH							0.0
				MADE GROUND—Reinforced concrete			0.20
				MADE GROUND—Hard compact gravel fill.			0.60
	U 1	0.75 – 1.25	176.50	Stiff brown GLACIAL TILL (Boulder clay) becoming stiffer with depth.			
8TH							
	D 2	1.30					
	U 3	1.50 – 2.00	92.90				
	D 4	2.00					
	U 5	2.50 – 3.00	155.00				
	D 6	3.00		Hard slightly weathered reddish brown clayey SANDSTONE.			2.90
	S 7	3.50 – 3.80	58				
8TH							3.80

DUNELM DRILLING COMPANY
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BOREHOLE LOGSHEET

Water Observations, Remarks, Etc
Borehole dry

Chiselling concrete & fill materials for 1.5hr.

CLIENT	JOB NO	LOCATION	BOREHOLE NO
BORDER CONSTRUCTION GRP.	C8375	ALBRIGHT & WILSON, WHITEHAVEN	BH7
DATE: MARCH 1996 — SCALE: 1 to 50	BORING METHOD: CABLE PERCUSSIVE		Sheet: 1

Drilling & Casing Progress	SAMPLE/TEST Type & No.	SAMPLE/TEST Depth(M)	SPT N – value or COHESION	DESCRIPTION	O D LEVEL	LEGEND	DEPTH
5TH							0.0
				MADE GROUND–Reinforced concrete			0.25
	B 1	0.40		MADE GROUND–Compact brown clay &			
	C 2	0.75 – 1.15	21	sandstone gravel fill materials.			
5TH							1.40
	U 3	1.60 – 2.10	143.30	Stiff brown & grey mottled sandy gravelly CLAY.			1.60
	D 4	2.10		Stiff brown GLACIAL TILL (Boulder clay).			
	U 5	2.50 – 3.00	149.40	– becoming darker & denser with depth.			
	D 6	2.90					
	U 7	3.50 – 4.00	138.30				
5TH	D 8	4.00		Hard slightly weathered reddish brown clayey SANDSTONE.			3.90 4.00

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BOREHOLE LOGSHEET

Water Observations, Remarks, Etc
Borehole dry

Chiselling concrete & fill materials for 1.5hr.

CLIENT	JOB NO	LOCATION	BOREHOLE NO
BORDER CONSTRUCTION GRP.	C8375	ALBRIGHT & WILSON, WHITEHAVEN	BH9
DATE: MARCH 1996 — SCALE: 1 to 50	BORING METHOD: CABLE PERCUSSIVE		Sheet: 1

Drilling & Casing Progress	SAMPLE/TEST Type & No.	SAMPLE/TEST Depth(M)	SPT N – value or COHESION	DESCRIPTION	O D LEVEL	LEGEND	DEPTH
8TH							0.0
				MADE GROUND—Reinforced concrete.			0.20
				MADE GROUND—Dense gravel stone fill.			
	U 1	0.75 – 1.25	128.20				0.70
8TH				Stiff to very stiff brown GLACIAL TILL (Boulder clay).			
	D 2	1.30					
	U 3	1.50 – 2.00	148.30				
	U 4	2.00 – 2.50	156.40				
	B 5	2.00 – 3.00					
	U 6	3.00 – 3.50					3.00
				Hard weathered reddish brown clayey SANDSTONE.			
	D 7	3.50					
	S 8	4.00 – 4.50	42				
8TH							4.50

DUNELM DRILLING COMPANY
TEL 091-526-2534 FAX 091-517-0085

BOREHOLE LOGSHEET

Water Observations, Remarks, Etc
Borehole dry

Chiselling concrete & fill for 1.5hr.

CLIENT	JOB NO	LOCATION	BOREHOLE NO
BORDER CONSTRUCTION GRP.	C8375	ALBRIGHT & WILSON, WHITEHAVEN	BH10
DATE: MARCH 1996 — SCALE: 1 to 50	BORING METHOD: CABLE PERCUSSIVE		Sheet: 1

Drilling & Casing Progress	SAMPLE/TEST Type & No.	SAMPLE/TEST Depth(M)	SPT N – value or COHESION	DESCRIPTION	O D LEVEL	LEGEND	DEPTH
2ND							0.0
				MADE GROUND—Concrete slab.			0.20
	B 1	0.40		MADE GROUND—Dense slag fill.			0.70
				MADE GROUND—Clay & slag fill materials.			0.90
	U 2	1.10 – 1.60	86.60	Firm dark brown & grey silty gravelly CLAY. Possibly fill/disturbed material.			
	D 3	1.80					
	U 4	2.10 – 2.60	124.00				
				Stiff brown & grey mottled sandy gravelly CLAY.			2.40
	U 5	3.00 – 3.50	155.20				
	D 6	3.50		Stiff dark brown GLACIAL TILL (Boulder clay).			3.30
	U 7	4.00 – 4.50	148.00				
2ND	D 8	4.50		Hard slightly weathered reddish brown clayey SANDSTONE.			4.30 4.50

DUNELM DRILLING COMPANY
TEL 091-526-2534 FAX 091-517-0085

BOREHOLE LOGSHEET

Water Observations, Remarks, Etc
Borehole dry

Chiselling concrete & slag fill for 1.5hr.

APPENDIX C

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH601
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 91.80	N Coord: 515692	E Coord: 297012
Date: 02/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						90.30		1.50	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
									Yellow-brown weathered silty MUDSTONE. (MIDDLE COAL MEASURES)		
						85.80		6.00	Dark grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						83.80		8.00			
						83.50		8.30	COAL. (MIDDLE COAL MEASURES)		
									Dark grey MUDSTONE (MIDDLE COAL MEASURES)		
						81.60		10.20			
						80.90		10.90	COAL. (MIDDLE COAL MEASURES)		
									Dark grey MUDSTONE (MIDDLE COAL MEASURES)		
						79.20		12.60			
						78.80		13.00	COAL (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						76.30		15.50			
						75.90		15.90	COAL (MIDDLE COAL MEASURES)		
									.Grey SILTSTONE and MUDSTONE laminations. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	PH601
	Project Number: 4046 / Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 91.80 / N Coord: 515692	E Coord: 297012
Date: 02/09/2020	Method: Casagrande C6 / Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									.Grey SILTSTONE and MUDSTONE laminations. (MIDDLE COAL MEASURES)		
						63.60		28.20	Dark brown and light brown MUDSTONE. (MIDDLE COAL MEASURES)		
						63.60		28.20			
						63.10		28.70	Black COAL. (MIDDLE COAL MEASURES)		
									White silty muddy SANDSTONE. (MIDDLE COAL MEASURES)		
						61.80		30.00	End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	**PH602**
	Project Number: 4046 / Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 93.10 / N Coord: 515698	E Coord: 297048
Date: 02/09/2020	Method: Casagrande C6 / Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						91.50		1.60	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
									Yellow-brown weathered MUDSTONE. (MIDDLE COAL MEASURES)		
						90.10		3.00	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						88.90		4.20			
						88.40		4.70	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						86.50		6.60			
						86.10		7.00	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE (MIDDLE COAL MEASURES)		
						82.90		10.20			
						82.60		10.50	COAL (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
						78.10		15.00			
						77.60		15.50	Hard grey SANDSTONE . (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		**PH602**
	Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 93.10	N Coord: 515698	E Coord: 297048
Date: 02/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
						70.30		22.80			
						69.90		23.20	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
						63.10		30.00	End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	PH603
	Project Number: 4046 / Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 93.75 / N Coord: 515703	E Coord: 297081
Date: 02/09/2020	Method: Casagrande C6 / Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						92.15	1.60	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						90.75	3.00	Yellow-brown weathered MUDSTONE. (MIDDLE COAL MEASURES)		
						90.15	3.60	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						89.75	4.00	COAL. (MIDDLE COAL MEASURES)		
								Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						86.75	7.00			
						86.45	7.30	Black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
								Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
								Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	**PH603**
	Project Number: 4046 / Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 93.75 / N Coord: 515703	E Coord: 297081
Date: 02/09/2020	Method: Casagrande C6 / Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						93.75		Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
						73.75	20.00	White muddy silty SANDSTONE. (MIDDLE COAL MEASURES)		
						69.75	24.00	Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
						63.75	30.00	End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths / Flushing Medium

Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		**PH604**
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 93.20	N Coord: 515723	E Coord: 297065
Date: 02/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						91.80		1.40	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						89.90		3.30	Yellow-brown weathered MUDSTONE. (MIDDLE COAL MEASURES)		
						88.00		5.20	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						87.60		5.60	COAL. (MIDDLE COAL MEASURES)		
						85.00		8.20	Light grey becoming dark grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						84.70		8.50	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
									12.50 - 12.90 Very hard sandstone bed.		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH604
	Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 93.20	N Coord: 515723	E Coord: 297065
Date: 02/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
						72.30		20.90			
						71.70		21.50	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
						63.20		30.00			
									End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths / Flushing Medium

Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		**PH605**
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 92.50	N Coord: 515716	E Coord: 297026
Date: 02/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						90.90	1.60	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						89.50	3.00	Yellow-brown weathered MUDSTONE. (MIDDLE COAL MEASURES)		
						87.50	5.00	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						87.20	5.30	COAL. (MIDDLE COAL MEASURES)		
						85.50	7.00	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						84.80	7.70	COAL. (MIDDLE COAL MEASURES)		
						83.00	9.50	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						82.60	9.90	COAL. (MIDDLE COAL MEASURES)		
						80.00	12.50	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						79.70	12.80	COAL. (MIDDLE COAL MEASURES)		
								Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
								Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH605
	Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 92.50	N Coord: 515716	E Coord: 297026
Date: 02/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
						66.00		26.50			
						65.70		26.80	Black MUDSTONE. (MIDDLE COAL MEASURES)		
						65.50		27.00	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
						62.50		30.00	End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

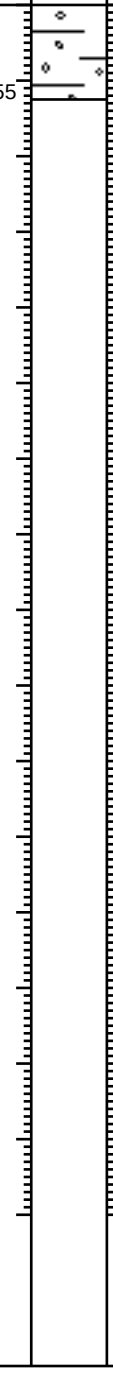
From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH606
Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
GL (mAOD): 95.80	N Coord: 515742	E Coord: 297152
Date: 03/09/2020	Method: Casagrande C6	Driller:
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						94.55		1.25	Turf over red-brown silty sandy gravelly CLAY. (GLACIAL TILL) 1.20 - 1.25 Very hard obstruction (possible quartzite boulder?) unable to proceed. End Of Borehole At 1.25 m		



KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Halted at 1.2m upon very hard boulder/strata.

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	**PH606A**
	Project Number: 4046 / Client: Story Homes	Sheet 1 Of 3
	GL (mAOD): 95.80 / N Coord: 515743	E Coord: 297150
Date: 03/09/2020	Method: Casagrande C6 / Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						95.30		0.50	Turf over red-brown clayey gravelly SAND. Probable weathered bedrock. (MIDDLE COAL MEASURES)		
									Red-brown, muddy SILTSTONE. (MIDDLE COAL MEASURES)		
						90.80		5.00	Red-brown and grey silty MUDSTONE laminations. (MIDDLE COAL MEASURES)		
						86.20		9.60			
						85.80		10.00	Grey MUDSTONE with siltstone laminations. (MIDDLE COAL MEASURES)		
						84.80		11.00	Hard grey SANDSTONE witth MUDSTONE laminations. (MIDDLE COAL MEASURES)		
									Red-brown and grey silty MUDSTONE laminations. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
08/12/2016	12				
08/12/2016	19.8				

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		**PH606A**
	Project Number: 4046	Client: Story Homes	Sheet 2 Of 3
	GL (mAOD): 95.80	N Coord: 515743	E Coord: 297150
Date: 03/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Red-brown and grey silty MUDSTONE laminations. (MIDDLE COAL MEASURES)		
									18.50 - 19.20 Hard light grey-brown SANDSTONE		
						71.90		23.90	Light grey MUDSTONE with siltstone laminations. (MIDDLE COAL MEASURES)		
						68.90		26.90			
						68.40		27.40	COAL. (MIDDLE COAL MEASURES)		
									Light grey MUDSTONE. (MIDDLE COAL MEASURES)		
						66.00		29.80			
						65.50		30.30	COAL. (MIDDLE COAL MEASURES)		
									Light grey MUDSTONE. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
08/12/2016	12				
08/12/2016	19.8				

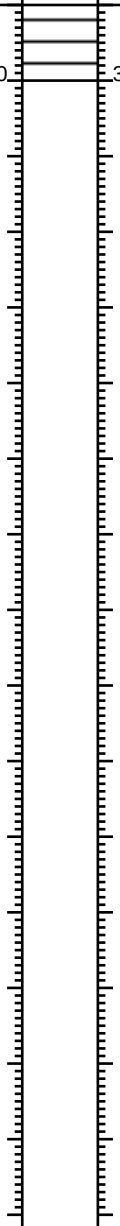
Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH606A
Project Number: 4046	Client: Story Homes	Sheet 3 Of 3
GL (mAOD): 95.80	N Coord: 515743	E Coord: 297150
Date: 03/09/2020	Method: Casagrande C6	Driller:
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						62.80		33.00	Light grey MUDSTONE. (MIDDLE COAL MEASURES)		
									End Of Borehole At 33.00 m		



KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
08/12/2016	12				
08/12/2016	19.8				

Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH607
Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
GL (mAOD): 92.20	N Coord: 515750	E Coord: 297203
Date: 03/09/2020	Method: Casagrande C6	Driller:
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						90.70		1.50	Brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						89.60		2.60	Red-brown silty MUDSTONE. (MIDDLE COAL MEASURES)		
						87.20		5.00	Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									Grey SILTSTONE and red-bown MUDSTONE laminations. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
08/12/2016	10.6				

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH607
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 92.20	N Coord: 515750	E Coord: 297203
Date: 03/09/2020	Method: Casagrande C6	Driller:
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						75.70	16.50	Grey SILTSTONE and red-bown MUDSTONE laminations. (MIDDLE COAL MEASURES)		
						75.30	16.90	COAL. (MIDDLE COAL MEASURES)		
						73.70	18.50	Grey MUDSTONE. (MIDDLE COAL MEASURES)		
						72.80	19.40	COAL. (MIDDLE COAL MEASURES)		
								Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						62.20	30.00	End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
08/12/2016	10.6				

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH608
Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
GL (mAOD): 89.95	N Coord: 515754	E Coord: 297253
Date: 03/09/2020	Method: Casagrande C6	Driller:
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Brown gravelly silty sandy CLAY. (GLACIAL TILL)		
						88.45		1.50	Dark grey MUDSTONE. (MIDDLE COAL MEASURES)		
						84.95		5.00			
						84.65		5.30	COAL. (MIDDLE COAL MEASURES)		
						83.75		6.20	Grey MUDSTONE. (MIDDLE COAL MEASURES)		
						83.35		6.60	COAL. (MIDDLE COAL MEASURES)		
									Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						78.05		11.90			
						77.95		12.00	Dark grey to black MUDSTONE. (MIDDLE COAL MEASURES)		
						77.55		12.40	COAL. (MIDDLE COAL MEASURES)		
									Light grey MUDSTONE. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
03/09/2020	16.1				

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	PH608
	Project Number: 4046 / Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 89.95 / N Coord: 515754	E Coord: 297253
Date: 03/09/2020	Method: Casagrande C6 / Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						73.15		16.80	Light grey MUDSTONE. (MIDDLE COAL MEASURES)		
									16.10 - 16.80 Very hard sandstone bed.		
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						64.95		25.00			
						64.55		25.40	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE with hard SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						59.95		30.00			
									End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
03/09/2020	16.1				

Daily Log Of Depths / Flushing Medium

Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	PH609
	Project Number: 4046 / Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 90.60 / N Coord: 515788	E Coord: 297245
Date: 03/09/2020	Method: Casagrande C6 / Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						89.00	1.60	Brown gravelly silty sandy CLAY. (GLACIAL TILL)		
								Dark grey MUDSTONE. (MIDDLE COAL MEASURES)		
						83.60	7.00			
						83.20	7.40	COAL. (MIDDLE COAL MEASURES)		
								Grey MUDSTONE. (MIDDLE COAL MEASURES)		
						79.30	11.30			
						78.90	11.70	COAL. (MIDDLE COAL MEASURES)		
								Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
								Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
03/09/2020	18.6				Moderate

Daily Log Of Depths / Flushing Medium

Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH609
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 90.60	N Coord: 515788	E Coord: 297245
Date: 03/09/2020	Method: Casagrande C6	Driller:
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									18.60 - 19.00 Very hard light grey-brown SANDSTONE		
						60.60		30.00	End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
03/09/2020	18.6				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH610
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 93.50	N Coord: 515780	E Coord: 297194
Date: 03/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						90.70		2.80	Red-brown silty MUDSTONE. (MIDDLE COAL MEASURES)		
						89.50		4.00			
						89.00		4.50	Hard grey-brown SANDSTONE. (MIDDLE COAL MEASURES)		
									Grey SILTSTONE and red-bown MUDSTONE laminations. (MIDDLE COAL MEASURES)		
						84.40		9.10			
						83.90		9.60	Hard grey SANDSTONE. (MIDDLE COAL MEASURES)		
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						81.50		12.00			
						81.00		12.50	Black MUDSTONE with COAL laminations. (MIDDLE COAL MEASURES)		
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

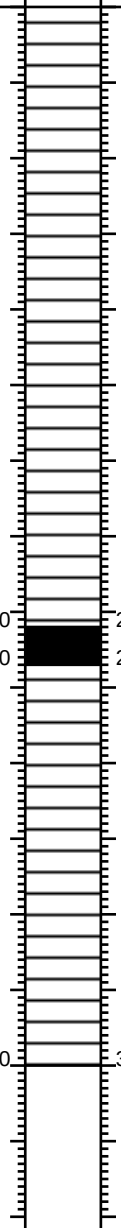
Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		**PH610**
	Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 93.50	N Coord: 515780	E Coord: 297194
Date: 03/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						69.30		24.20			
						68.80		24.70	COAL. (MIDDLE COAL MEASURES)		
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						63.50		30.00			
									End Of Borehole At 30.00 m		



KEY

D - Disturbed Sample
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S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH611
Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
GL (mAOD): 91.80	N Coord: 515815	E Coord: 297242
Date: 04/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						90.00	1.80	Brown gravelly silty sandy CLAY. (GLACIAL TILL)		
								Dark grey MUDSTONE recovered as shale gravel. (MIDDLE COAL MEASURES)		
						87.10	4.70			
						86.90	4.90	Black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
								Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						80.70	11.10			
						80.30	11.50	COAL. (MIDDLE COAL MEASURES)		
								Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
								Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	7				Moderate

Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH611
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 91.80	N Coord: 515815	E Coord: 297242
Date: 04/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						75.70		16.10	Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						75.30		16.50	Hard grey SANDSTONE. (MIDDLE COAL MEASURES)		
									Grey-brown silty MUDSTONE with siltstone laminations. (MIDDLE COAL MEASURES)		
						64.80		27.00	End Of Borehole At 27.00 m		

KEY

D - Disturbed Sample
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C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	7				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH612
Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
GL (mAOD): 92.70	N Coord: 515847	E Coord: 297235
Date: 04/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						91.20	1.50	Brown gravelly silty sandy CLAY. (GLACIAL TILL)		
						90.20	2.50	Yellow-brown silty MUDSTONE. (MIDDLE COAL MEASURES)		
								Grey-brown MUDSTONE. (MIDDLE COAL MEASURES)		
						85.50	7.20			
						85.20	7.50	COAL. (MIDDLE COAL MEASURES)		
						84.70	8.00			
						84.30	8.40	Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
								COAL. (MIDDLE COAL MEASURES)		
								Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
								Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	8.5				Moderate

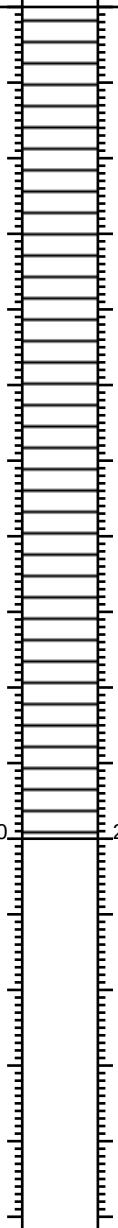
Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

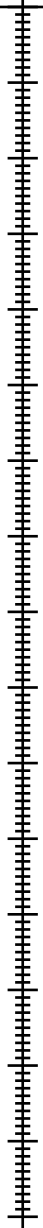
Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH612
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 92.70	N Coord: 515847	E Coord: 297235
Date: 04/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						65.70		27.00	End Of Borehole At 27.00 m		





KEY

D - Disturbed Sample
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S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	8.5				Moderate

Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH613
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 94.10	N Coord: 515870	E Coord: 297218
Date: 07/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						92.50		1.60	Brown gravelly silty sandy CLAY. (GLACIAL TILL)		
						91.00		3.10	Yellow-brown silty MUDSTONE. (MIDDLE COAL MEASURES)		
						84.80		9.30	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						84.40		9.70	COAL. (MIDDLE COAL MEASURES)		
						82.00		12.10	Dark grey silty MUDSTONE with SANDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						81.60		12.50	Hard grey SANDSTONE (MIDDLE COAL MEASURES) 12.10 - 12.50 Very hard sandstone bed.		
						80.40		13.70	Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						80.00		14.10	COAL. (MIDDLE COAL MEASURES)		
									Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES) Borehole Continues		

KEY

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S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	10				Slight

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH613
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 94.10	N Coord: 515870	E Coord: 297218
Date: 07/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						64.10		30.00	End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	10				Slight

Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH614
Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
GL (mAOD): 94.05	N Coord: 515866	E Coord: 297189
Date: 07/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						90.85		3.20	MADE GROUND: Topsoil underlain by soft grey and black clayey gravel of mudstone and siltstone, clinker and coal fragments. (GRANULAR MADE GROUND)		
									Grey silty MUDSTONE.		
						79.95		14.10			
						79.55		14.50	COAL. (MIDDLE COAL MEASURES)		
									Dark grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						78.15		15.90	COAL. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	17				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH614
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 94.05	N Coord: 515866	E Coord: 297189
Date: 07/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						77.75		16.30	COAL. (MIDDLE COAL MEASURES)		
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						75.05		19.00			
						74.65		19.40	Black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
									Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						67.05		27.00	End Of Borehole At 27.00 m		

KEY

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C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	17				Moderate

Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH615
Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
GL (mAOD): 93.80	N Coord: 515854	E Coord: 297194
Date: 07/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						92.00	1.80	Brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						90.50	3.30	Light red-brown muddy SILTSTONE. (MIDDLE COAL MEASURES)		
								Grey MUDSTONE with siltstone bands. (MIDDLE COAL MEASURES)		
						83.40	10.40	Dark grey MUDSTONE. (MIDDLE COAL MEASURES)		
						83.10	10.70	Dark grey to black MUDSTONE. (MIDDLE COAL MEASURES)		
						81.60	12.20	COAL with black mudstone traces. (MIDDLE COAL MEASURES)		
						81.20	12.60	Light grey MUDSTONE. (MIDDLE COAL MEASURES)		
								Borehole Continues		

KEY

D - Disturbed Sample
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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	7				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH615
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 93.80	N Coord: 515854	E Coord: 297194
Date: 07/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Light grey MUDSTONE. (MIDDLE COAL MEASURES)		
						74.20		19.60			
						73.80		20.00	Dark grey to black MUDSTONE. (MIDDLE COAL MEASURES)		
						73.50		20.30	COAL. (MIDDLE COAL MEASURES)		
									Brown muddy SILTSTONE (MIDDLE COAL MEASURES)		
						70.80		23.00	Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						66.80		27.00	End Of Borehole At 27.00 m		

KEY

D - Disturbed Sample
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W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	7				Moderate

Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH616
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 93.00	N Coord: 515860	E Coord: 297229
Date: 04/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Brown gravelly silty sandy CLAY. (GLACIAL TILL)		
						91.00		2.00	Yellow-brown silty MUDSTONE. (MIDDLE COAL MEASURES)		
						89.60		3.40	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						85.50		7.50			
						84.90		8.10	COAL with black mudstone laminations. (MIDDLE COAL MEASURES)		
									Dark grey silty MUDSTONE with SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									8.50 - 8.80 Hard light grey-brown SANDSTONE		
						81.80		11.20			
						81.50		11.50	COAL. (MIDDLE COAL MEASURES)		
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						78.50		14.50			
						78.20		14.80	COAL. (MIDDLE COAL MEASURES)		
									Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
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W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	7.5				Slight

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH616
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 93.00	N Coord: 515860	E Coord: 297229
Date: 04/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						72.00		21.00	End Of Borehole At 21.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
07/09/2020	7.5				Slight

Daily Log Of Depths / Flushing Medium

Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH617
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 91.70	N Coord: 515837	E Coord: 2972432
Date: 04/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Brown gravelly silty sandy CLAY. (GLACIAL TILL)		
						90.00		1.70	Dark grey MUDSTONE recovered as shale gravel. (MIDDLE COAL MEASURES)		
						88.00		3.70			
						87.60		4.10	COAL. (MIDDLE COAL MEASURES)		
						86.30		5.40	Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						86.00		5.70	COAL. (MIDDLE COAL MEASURES)		
						84.30		7.40	Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)	▼	
						83.50		8.20	Hard grey SANDSTONE. (MIDDLE COAL MEASURES)		
						83.10		8.60	COAL. (MIDDLE COAL MEASURES)		
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						80.70		11.00			
						80.50		11.20	Black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
									Grey-brown silty MUDSTONE with siltstone laminations. (MIDDLE COAL MEASURES)	▼	
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
08/09/2020	7.4				Slight
08/09/2020	15				Rapid

Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH617
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 91.70	N Coord: 515837	E Coord: 2972432
Date: 04/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey-brown silty MUDSTONE with siltstone laminations. (MIDDLE COAL MEASURES)		
						64.70		27.00	End Of Borehole At 27.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
08/09/2020	7.4				Slight
08/09/2020	15				Rapid

Daily Log Of Depths

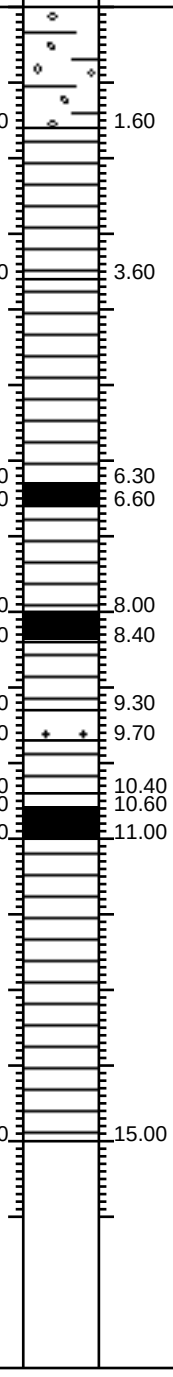
Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	**PH618**
	Project Number: 4046 / Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 90.60 / N Coord: 515788	E Coord: 297245
Date: 03/09/2020	Method: Casagrande C6 / Driller:	Logged By: NW



Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						90.60	0.00	Brown gravelly silty sandy CLAY. (GLACIAL TILL)		
						89.00	1.60	Yellow-brown MUDSTONE. (MIDDLE COAL MEASURES)		
						87.00	3.60	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						84.30	6.30	COAL with MUDSTONE laminations. (MIDDLE COAL MEASURES)		
						84.00	6.60	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						82.60	8.00	COAL. (MIDDLE COAL MEASURES)		
						82.20	8.40	Grey-brown MUDSTONE. (MIDDLE COAL MEASURES)		
						81.30	9.30	Hard SANDSTONE. (MIDDLE COAL MEASURES)		
						80.90	9.70	Grey MUDSTONE. (MIDDLE COAL MEASURES)		
						80.20	10.40	Black organic MUDSTONE. (MIDDLE COAL MEASURES)		
						80.00	10.60	COAL. (MIDDLE COAL MEASURES)		
						79.60	11.00	Grey MUDSTONE with SILTSTONE laminations (MIDDLE COAL MEASURES)		
						75.60	15.00	End Of Borehole At 15.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
08/09/2020	7				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	PH619
	Project Number: 4046 / Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 90.80 / N Coord: 515801	E Coord: 297246
Date: 08/09/2020	Method: Casagrande C6 / Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						89.40	1.40	Brown gravelly silty sandy CLAY. (GLACIAL TILL)		
								Grey and red-brown laminated MUDSTONE. (MIDDLE COAL MEASURES)		
						84.50	6.30			
						84.10	6.70	Very soft black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
						83.00	7.80			
						82.60	8.20	Damp black/dark grey MUDSTONE. (MIDDLE COAL MEASURES)		
						81.70	9.10	COAL (MIDDLE COAL MEASURES)		
						81.30	9.50			
						80.70	10.10	Grey-brown MUDSTONE & SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						80.40	10.40			
						80.00	10.80	Hard grey SANDSTONE (MIDDLE COAL MEASURES)		
								Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
								Dark grey to black MUDSTONE. (MIDDLE COAL MEASURES)		
								COAL. (MIDDLE COAL MEASURES)		
						75.80	15.00	Light grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
								End Of Borehole At 15.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
08/09/2020	9.5				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH621
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 91.80	N Coord: 515730	E Coord: 296997
Date: 08/09/2020	Method:	Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						90.00		1.80	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						88.80		3.00	Red-brown weathered muddy SILTSTONE. (MIDDLE COAL MEASURES)		
									Grey SILTSTONE and MUDSTONE laminations. (MIDDLE COAL MEASURES)		
						83.20		8.60			
						82.80		9.00	COAL (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						81.20		10.60			
						80.70		11.10	COAL (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						78.70		13.10			
						78.20		13.60	Dark grey/black silty MUDSTONE. (MIDDLE COAL MEASURES)		
						77.60		14.20	COAL (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	PH621
	Project Number: 4046 / Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 91.80 / N Coord: 515730	E Coord: 296997
Date: 08/09/2020	Method: / Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						75.60		16.20	Grey silty MUDSTONE (MIDDLE COAL MEASURES)		
						75.20		16.60	COAL (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE (MIDDLE COAL MEASURES)		
						70.80		21.00	End Of Borehole At 21.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks

Daily Log Of Depths / Flushing Medium

Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		**PH622**
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 91.20	N Coord: 515683	E Coord: 297211
Date: 09/09/2020	Method: Casagrande C6	Driller: GDC	Logged By:

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						90.20		1.00	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						89.50		1.70	Red-brown MUDSTONE with SILTSTONE laminations (MIDDLE COAL MEASURES)		
						89.20		2.00	COAL (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						82.20		9.00	Hard grey-brown SANDSTONE (MIDDLE COAL MEASURES)		
						81.60		9.60	Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	10				Slight

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH622
	Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 91.20	N Coord: 515683	E Coord: 297211
Date: 09/09/2020	Method: Casagrande C6	Driller: GDC	Logged By:

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						73.60		17.60			
						73.20		18.00	Black MUDSTONE (MIDDLE COAL MEASURES)		
						72.90		18.30	COAL (MIDDLE COAL MEASURES)		
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						69.20		22.00			
						68.80		22.40	Black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						61.20		30.00	End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	10				Slight

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH623
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 90.50	N Coord: 515697	E Coord: 297227
Date: 09/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						89.00		1.50	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						88.00		2.50	Light yellow-brown weathered silty MUDSTONE. (MIDDLE COAL MEASURES)		
									Light grey MUDSTONE. (GRANULAR MADE GROUND)		
						78.50		12.00			
						78.10		12.40	Black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
						77.00		13.50	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						76.70		13.80	Black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
						75.30		15.20	Grey silty MUDSTONE with SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						74.90		15.60	Black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE with SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	8				Rapid

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH623
	Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 90.50	N Coord: 515697	E Coord: 297227
Date: 09/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey silty MUDSTONE with SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						66.70		23.80			
						66.20		24.30	Very hard grey SANDSTONE. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE with SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						60.50		30.00	End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
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S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	8				Rapid

Daily Log Of Depths / Flushing Medium

Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	PH624
	Project Number: 4046 / Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 89.90 / N Coord: 515713	E Coord: 297247
Date: 09/09/2020	Method: Casagrande C6 / Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						88.90		1.00	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
									Light yellow-brown weathered silty MUDSTONE. (MIDDLE COAL MEASURES)		
						87.40		2.50	Light grey-brown MUDSTONE with SILTSTONE laminations. (GRANULAR MADE GROUND)		
						82.30		7.60			
						81.90		8.00	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						79.90		10.00	Black organic MUDSTONE. (MIDDLE COAL MEASURES)		
						78.40		11.50			
						78.00		11.90	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	10				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH624
	Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 89.90	N Coord: 515713	E Coord: 297247
Date: 09/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						63.40		26.50			
									Black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
						62.50		27.40			
									Grey silty MUDSTONE with SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						59.90		30.00			
									End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	10				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		**PH625**
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 89.05	N Coord: 515726	E Coord: 297267
Date: 09/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						87.55		1.50	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
									Light grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						85.85		3.20			
						85.35		3.70	COAL (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE and SILTSTONE laminations (MIDDLE COAL MEASURES)		
						83.65		5.40			
						83.35		5.70	COAL. (MIDDLE COAL MEASURES)		
									Black organic MUDSTONE. (MIDDLE COAL MEASURES)		
						77.55		11.50			
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						76.25		12.80			
						75.85		13.20	Hard grey SANDSTONE. (MIDDLE COAL MEASURES)		
						74.85		14.20	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)	▼	
						74.35		14.70	Hard grey SANDSTONE (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	14.2				Rapid

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH625
	Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
	GL (mAOD): 89.05	N Coord: 515726	E Coord: 297267
Date: 09/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey silty MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						68.05		21.00			
									Black organic MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
						67.05		22.00			
									Grey silty MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						59.05		30.00			
									End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
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W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	14.2				Rapid

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	**PH626**
	Project Number: 4046 / Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 89.05 / N Coord: 515726	E Coord: 297267
Date: 09/09/2020	Method: Casagrande C6 / Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						87.45		1.60			
						87.25		1.80	COAL. (MIDDLE COAL MEASURES)		
						86.15		2.90	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						85.75		3.30			
						85.45		3.60	Hard SANDSTONE. (MIDDLE COAL MEASURES)		
						85.05		4.00			
						84.85		4.20	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						84.35		4.70			
									COAL (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						82.35		6.70			
						82.05		7.00	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	7.8				Slight
09/09/2020	12				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH626
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 89.05	N Coord: 515726	E Coord: 297267
Date: 09/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						71.05		18.00	Grey silty MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									End Of Borehole At 18.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
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W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	7.8				Slight
09/09/2020	12				Moderate

Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH627
Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
GL (mAOD): 88.20	N Coord: 515708	E Coord: 297283
Date: 09/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						87.00		1.20	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
						86.20		2.00	Yellow-brown silty MUDSTONE. (MIDDLE COAL MEASURES)		
						85.80		2.40	COAL. (MIDDLE COAL MEASURES)		
						85.60		2.60	.Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						85.10		3.10	COAL (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						82.80		5.40	COAL (MIDDLE COAL MEASURES)		
						82.50		5.70	Grey silty MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
									Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	16				Slight

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH627
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 88.20	N Coord: 515708	E Coord: 297283
Date: 09/09/2020	Method: Casagrande C6	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
									Grey silty MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)	▼	
						64.20		24.00	End Of Borehole At 24.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

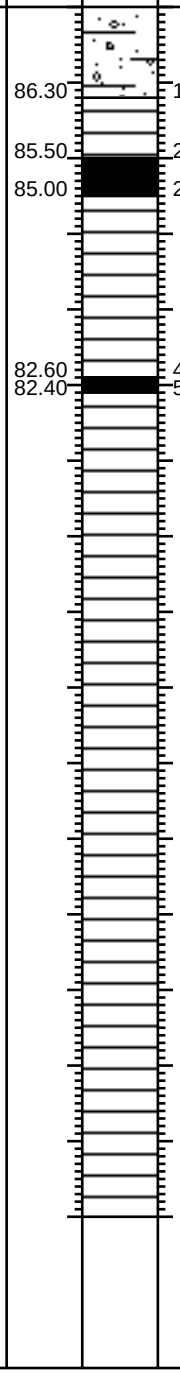
Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
09/09/2020	16				Slight

Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven	PH628
	Project Number: 4046 / Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 87.50 / N Coord: 515696	E Coord: 297291
Date: 10/09/2020	Method: / Driller: GDC	Logged By: NW



Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Depth (m)	Description	Water	Standpipe
						86.30	1.20	Turf over brown silty sandy gravelly CLAY. (MIDDLE COAL MEASURES)		
						85.50	2.00	Yellow-brown weathered silty MUDSTONE. (MIDDLE COAL MEASURES)		
						85.00	2.50	COAL. (MIDDLE COAL MEASURES)		
								Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						82.60	4.90			
						82.40	5.10	COAL. (MIDDLE COAL MEASURES)		
								Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
								Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
10/09/2020	11				Moderate

Daily Log Of Depths / Flushing Medium

Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH628
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 87.50	N Coord: 515696	E Coord: 297291
Date: 10/09/2020	Method:	Driller: GDC
		Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						70.60		16.90	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						69.50		18.00	Hard black MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)		
									Grey MUDSTONE and SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						59.70		27.80			
						59.50		28.00	Hard SANDSTONE. (MIDDLE COAL MEASURES)		
									End Of Borehole At 28.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
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S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
10/09/2020	11				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH629
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 2
	GL (mAOD): 87.10	N Coord: 515681	E Coord: 297298
Date: 10/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						85.90		1.20	Turf over brown silty sandy gravelly CLAY. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						83.00		4.10			
						82.90		4.20	COAL. (MIDDLE COAL MEASURES)		
									Grey silty MUDSTONE with SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						71.10		16.00	Borehole Continues		

KEY

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B - Bulk Sample
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W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
10/09/2020	16				Moderate

Daily Log Of Depths

Date	Casing	Water

Flushing Medium

From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven		PH629
Project Number: 4046	Client: Story Homes	Sheet 2 Of 2
GL (mAOD): 87.10	N Coord: 515681	E Coord: 297298
Date: 10/09/2020	Method: Casagrande C6	Driller: GDC

Core/Samples	TCR	SCR	RQD	FI	ISPT	Level	Legend	Depth (m)	Description	Water	Standpipe
						70.10		17.00	Black organic MUDSTONE with COAL traces. (MIDDLE COAL MEASURES)	▼	
									Grey silty MUDSTONE with SILTSTONE laminations. (MIDDLE COAL MEASURES)		
						66.10		21.00	End Of Borehole At 21.00 m		

KEY

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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Scale: 1:100

Water Strikes

Date	Strike	Level	Minutes	Casing	Remarks
10/09/2020	16				Moderate

Daily Log Of Depths			Flushing Medium		
Date	Casing	Water	From	To	Type

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

	Project Title: Rhodia, Whitehaven		**PH606B**
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 95.80	N Coord: 515744	E Coord: 297547
Date: 03/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Turf over red-brown silty sandy gravelly CLAY. (GLACIAL TILL)		
			93.40		2.40			
						Red-brown, muddy SILTSTONE. (MIDDLE COAL MEASURES)		
			90.80		5.00			
						End Of Borehole At 5.00 m		

KEY

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S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH608A
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 89.95	N Coord: 515754	E Coord: 297253
Date: 03/09/2020	Method: Casagrande C6	Driller:	Logged By: NW

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Brown gravelly silty sandy CLAY. (GLACIAL TILL)		
			88.45		1.50			
						Dark grey MUDSTONE. (MIDDLE COAL MEASURES)		
			84.95		5.00			
			84.65		5.30	COAL. (MIDDLE COAL MEASURES)		
						End Of Borehole At 5.30 m		

KEY

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C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH614A
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 94.05	N Coord: 515863	E Coord: 297190
Date: 07/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						MADE GROUND: Topsoil underlain by soft grey and black clayey gravel of mudstone and siltstone, clinker and coal fragments. (GRANULAR MADE GROUND)		
			91.05		3.00	End Of Borehole At 3.00 m		

KEY

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C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

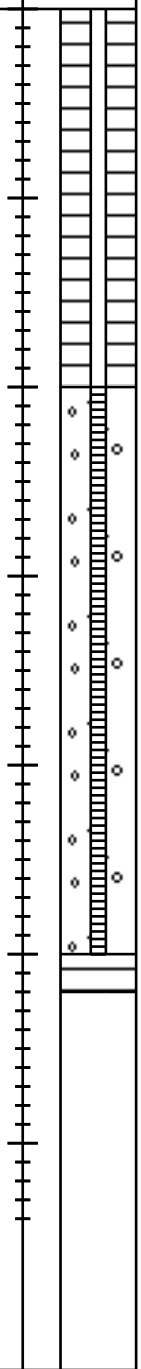
Chiselling

From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		**PH620**
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 95.40	N Coord: 515838	E Coord: 297046
Date: 08/09/2020	Method: Casagrande C6	Driller: GDC	Logged By: NW

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Brown silty sandy gravelly CLAY. (GLACIAL TILL)		
			93.60		1.80			
						SILTSTONE and MUDSTONE comprising hard grey siltstone with very soft red clay laminations. (MIDDLE COAL MEASURES)		
			90.30		5.10			
			90.20		5.20	Grey silty MUDSTONE. (MIDDLE COAL MEASURES)		
						End Of Borehole At 5.20 m		



KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

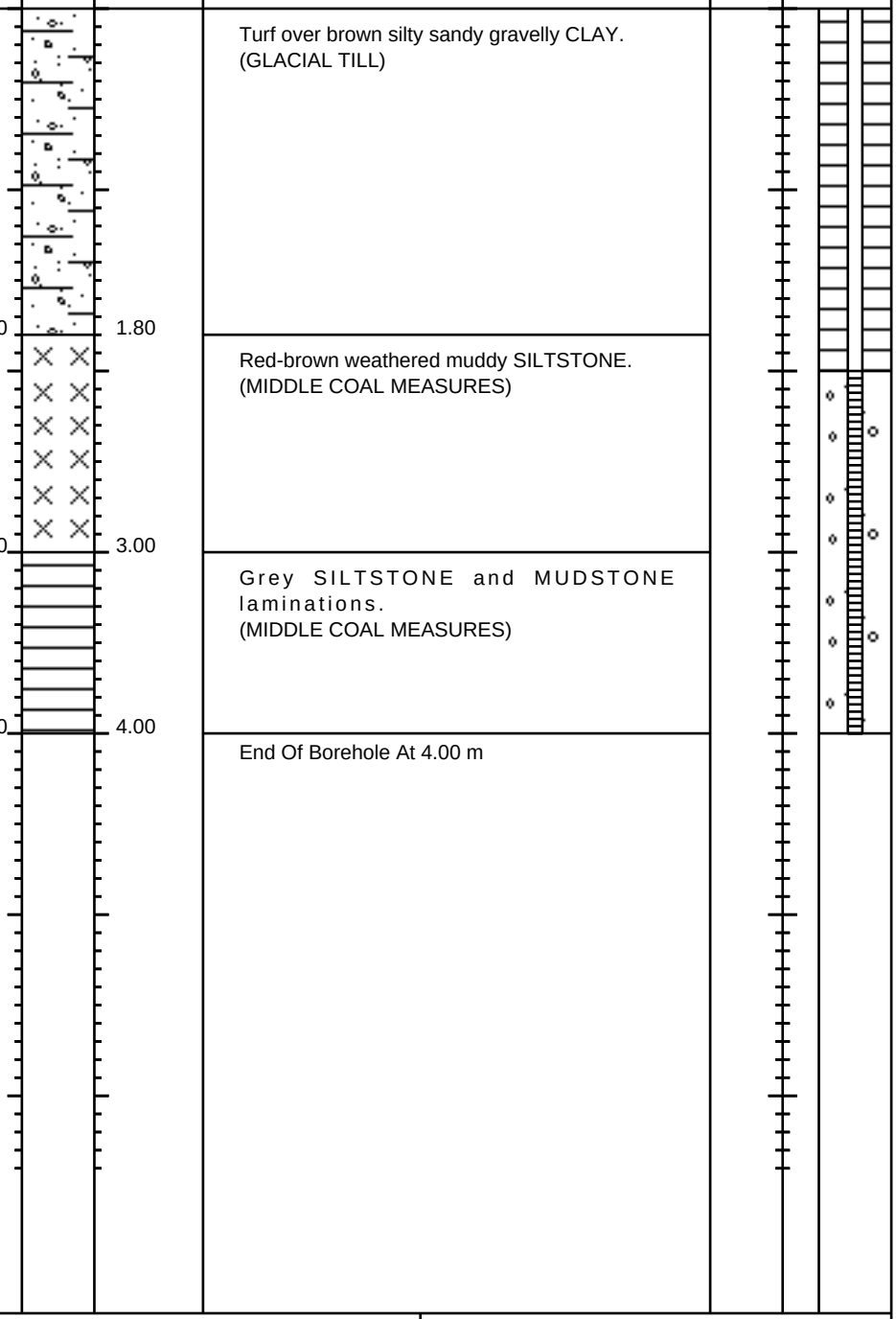
Chiselling

From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH621A
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 91.80	N Coord: 515729	E Coord: 296998
Date: 08/09/2020	Method:	Driller: GDC	Logged By: NW

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
			90.00		1.80	Red-brown weathered muddy SILTSTONE. (MIDDLE COAL MEASURES)		
			88.80		3.00	Grey SILTSTONE and MUDSTONE laminations. (MIDDLE COAL MEASURES)		
			87.80		4.00	End Of Borehole At 4.00 m		



KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		PH622A
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 91.20	N Coord: 515684	E Coord: 297210
Date: 09/09/2020	Method: Casagrande C6	Driller: GDC	Logged By:

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
			90.20		1.00	Turf over brown silty sandy gravelly CLAY. (GLACIAL TILL)		
			89.50		1.70	Red-brown MUDSTONE with SILTSTONE laminations (MIDDLE COAL MEASURES)		
			89.20		2.00	COAL (MIDDLE COAL MEASURES)		
						End Of Borehole At 2.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP701
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 90.90	N Coord: 515634	E Coord: 296988
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.10 0.10	J T		90.55	0.35	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	
0.75	SV	V=77kPa			Firm becoming stiff, brown mottled grey, slightly sandy slightly gravelly CLAY with rare small sand pockets. Sand is fine to coarse. Gravel is rounded to subrounded fine to coarse of sandstone, coal and limestone. (GLACIAL TILL)	
0.90	D				0.70 - 0.80 Land drain, broken during excavation.	
1.00	SV	V=84kPa	89.90	1.00		
1.10	SV	V=89kPa			0.75 - 2.30 Becoming stiff.	
1.40	SV	V=113kPa			1.20 - 2.30 Becoming purple-brown mottled grey.	
2.00	SV	V=84kPa	88.90	2.00	1.90 - 2.30 Becoming slightly sandy gravelly CLAY with low cobble content.	▼
			88.60	2.30	Very thinly bedded, purple-grey, MUDSTONE and SILTSTONE. Interpreted as very weak, partially weathered. Recovered as slightly clayey gravel and cobble sized particles; gravel and cobbles were angular and tabular. (MIDDLE COAL MEASURES)	
			87.90	3.00		
			87.70	3.20	End Of Trial Pit At 3.20 m	
			86.90	4.00		
			85.90	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Localised standing groundwater at 2.1m bgl. Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP702
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.00	N Coord: 515621	E Coord: 296943
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.15	T		91.70		0.30	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	
0.50	T		91.30		0.70	Soft to firm, very friable, red-brown, sandy CLAY. Sand is fine to medium. (GLACIAL TILL)	
1.00	B		91.00		1.00	Red-brown fine grained SANDSTONE and grey coarse grained SANDSTONE. Interpreted as interbedded, weathered (residual). Recovered as very clayey sand and gravel sized particles with low cobble content; gravel and cobbles were subrounded to angular fine to coarse. (PERMIAN-TRIASSIC?)	
			90.15		1.85		
			90.00		2.00	Very thinly bedded, purple-grey, MUDSTONE and SILTSTONE. Interpreted as very weak, partially weathered. Recovered as slightly clayey gravel and cobble sized particles; gravel and cobbles were angular and tabular. (MIDDLE COAL MEASURES)	
			89.00		3.00		
			88.90		3.10	End Of Trial Pit At 3.10 m	
			88.00		4.00		
			87.00		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit side collapse: 0.2m to 1.5m bgl.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP703
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 93.20	N Coord: 515650	E Coord: 296913
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.20 0.20	J T		92.90	0.30	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	
			92.40	0.80	Firm, red-brown, slightly gravelly CLAY with low cobble content. Gravel and cobbles are subrounded and tabular of sandstone. Possible weathered (residual) SANDSTONE.	
1.00	T		92.20	1.00	Red-brown fine grained SANDSTONE and grey coarse grained SANDSTONE. Interpreted as interbedded, weathered (residual). Recovered as very clayey sand and gravel sized particles with low cobble content; gravel and cobbles were subrounded to angular fine to coarse. (PERMIAN-TRIASSIC?)	
			91.20	2.00		
			91.10	2.10	Very thinly bedded, purple-grey, MUDSTONE and SILTSTONE. Interpreted as very weak, partially weathered. Recovered as slightly clayey gravel and cobble sized particles; gravel and cobbles were angular and tabular. (MIDDLE COAL MEASURES)	
			90.20	3.00		
			90.10	3.10	End Of Trial Pit At 3.10 m	
			89.20	4.00		
			88.20	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Significant pit side collapse: 0.2m to 2.1m bgl.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP704
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 93.00	N Coord: 515692	E Coord: 296902
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.10	T		92.75	0.25	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	
0.75	SV	V=135kPa	92.25	0.75	Firm, red-brown, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to subrounded fine to coarse of coal and sandstone. (GLACIAL TILL)	
1.00	D		92.00	1.00	Very stiff, red-brown, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to subrounded fine to coarse of coal and sandstone. (GLACIAL TILL)	
1.50	D	V=135kPa			1.20 - 1.90 Gravel becoming predominantly rounded medium grained mudstone, plus coal traces.	
1.50	SV		91.10	1.90		▼
			91.00	2.00	Red-brown fine grained SANDSTONE and grey coarse grained SANDSTONE. Interpreted as interbedded, weathered (residual). Recovered as very clayey sand and gravel sized particles with low cobble content; gravel and cobbles were subrounded to angular fine to coarse. (PERMIAN-TRIASSIC?)	
			90.60	2.40	Very thinly bedded, purple-grey, MUDSTONE. Interpreted as very weak, partially weathered. Recovered as slightly clayey sandy gravel and cobble sized particles; gravel and cobbles were angular and tabular. (MIDDLE COAL MEASURES)	
			90.00	3.00		
			89.60	3.40	End Of Trial Pit At 3.40 m	
			89.00	4.00		
			88.00	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Moderate groundwater flows at 1.9m bgl. Pit sides stable.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		**TP705**
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.00	N Coord: 515763	E Coord: 2969936
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.15 0.15	J T		91.75	0.25	Rough grass over dark grey-brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	▼
0.75 0.75	D SV	V=64kPa			Firm becoming very stiff, light brown and grey, slightly sandy slightly gravelly CLAY with occasional small sand pockets. Sand is fine to medium. Gravel is rounded fine to coarse of sandstone. (GLACIAL TILL)	
0.95	SV	V=66kPa	91.00	1.00	0.40 - 0.60 Possible cast iron pipe with brick and gravel surround (eastern end of pit, running W-E). Groundwater entering pit from this material.	
1.30	SV	V=93kPa	90.60	1.40		
1.60	SV	V=*			Red-brown, MUDSTONE. Interpreted as weathered (residual). Recovered as stiff, friable, gravelly clay sized particles; gravel were tabular medium to coarse. (PERMIAN-TRIASSIC?)	
			90.00	2.00	1.60 - 1.65 *Shear Vane test not possible due to ex-situ friable gravel sized particles.	
			89.90	2.10		
					Very thinly bedded, purple-grey, MUDSTONE. Interpreted as very weak, partially weathered. Recovered as slightly clayey very sandy gravel sized particles with moderate cobble content; gravel and cobbles were angular and tabular. (MIDDLE COAL MEASURES)	
			89.00	3.00		
			88.80	3.20		
					End Of Trial Pit At 3.20 m	
			88.00	4.00		
			87.00	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Slight groundwater trickles at 0.2m bgl as well as entering pit from material surrounding iron pipe at 0.4-0.6m bgl. Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP706
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 91.30	N Coord: 515717	E Coord: 296954
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.20	T		91.05	0.25	Rough grass over dark grey-brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	▼
0.75	SV	V=47kPa			Firm locally soft, grey and brown, slightly gravelly fine sandy CLAY with some sand pockets. (GLACIAL TILL)	
0.90	SV	V=48kPa			0.80 - 0.90 Land drain.	
1.10	D		90.30	1.00		
1.10	T				Stiff, red-brown, gravelly CLAY. Gravel is rounded to angular fine to coarse of coal and mudstone. (GLACIAL TILL)	
1.30	SV	V=68kPa			1.20 - 2.00 Becoming purple-brown.	
1.80	SV	V=77kPa	89.30	2.00		
					Weak, purple-grey, MUDSTONE. Interpreted as weak, partially weathered. Recovered as friable, very clayey gravel sized particles; gravel were angular and cube-shaped. (MIDDLE COAL MEASURES)	
			88.60	2.70		
					End Of Trial Pit At 2.70 m	
			88.30	3.00		
			87.30	4.00		
			86.30	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Slight groundwater trickles at 0.2m bgl. Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP707
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 91.10	N Coord: 515680	E Coord: 296977
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.10 0.10	J T		90.80	0.30	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	
			90.50	0.60	Firm, grey, slightly fine sandy slightly silty CLAY. (GLACIAL TILL)	
0.75	SV	V=83kPa			Stiff, red-brown, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to subrounded fine to coarse of coal, sandstone and mudstone. (GLACIAL TILL)	
1.00 1.10	SV B	V=106kPa	90.10	1.00		
1.40	SV	V=*			1.40 - 1.45 *Shear Vane tests not possible due to friable gravel ex-situ material. 1.40 - 1.90 Becoming friable and grey.	▼
			89.20	1.90		
			89.10	2.00	Very thinly bedded, purple-grey, MUDSTONE. Interpreted as very weak, partially weathered. Recovered as tabular, angular gravel sized particles. (MIDDLE COAL MEASURES)	
			88.50	2.60		
					End Of Trial Pit At 2.60 m	
			88.10	3.00		
			87.10	4.00		
			86.10	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Groundwater at 1.9m bgl, standing after 1 minute. Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP708
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.70	N Coord: 515672	E Coord: 297035
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.15	T		92.45	0.25	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	
0.75	SV	V=49kPa			Firm locally stiff, brown mottled grey, slightly fine sandy slightly gravelly CLAY with some fine sand pockets. (GLACIAL TILL)	
0.75	T					
1.00	SV	V=80kPa	91.70	1.00		
1.20	D				1.00 - 3.00 Becoming gravelly CLAY.	
1.30	SV	V=70kPa				
					1.50 - 3.00 Becoming brown and friable.	
			90.70	2.00		
			89.70	3.00	End Of Trial Pit At 3.00 m	
			88.70	4.00		
			87.70	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP709
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.30	N Coord: 515702	E Coord: 297017
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.20	J		92.05	0.25	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	
0.20	T					
					Firm locally stiff, brown mottled grey, slightly fine sandy gravelly CLAY with some fine sand pockets. (GLACIAL TILL)	
0.75	D	V=47kPa				
0.75	SV					
0.90	SV	V=45kPa				
			91.30	1.00		
1.10	SV	V=56kPa				
					1.30 - 2.10 Becoming stiff, grey and friable.	
1.50	SV	V=*			1.50 - 1.55 *Shear Vane tests not possible due to friable ex-situ clay.	
			90.30	2.00		
			90.20	2.10	1.90 - 2.10 Occasional brown thin organic rootlets with minor soft grey clay around thin rootlet. In addition, two rounded boulders of sandstone of maximum 0.5m dimension.	▼
					Very thinly bedded, purple-grey, MUDSTONE. Interpreted as very weak, partially weathered. Recovered as tabular, angular gravel sized particles. (MIDDLE COAL MEASURES)	
			89.70	2.60	End Of Trial Pit At 2.60 m	
			89.30	3.00		
			88.30	4.00		
			87.30	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Groundwater at 2.1m bgl was perched above the mudstone. Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP710
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.10	N Coord: 515769	E Coord: 296974
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.10	T		91.90	0.20	Rough grass over grey, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	▼
			91.70	0.40	Soft, grey, gravelly very sandy CLAY with many sand pockets. (GLACIAL TILL)	
0.75	SV	V=45kPa			Firm, red-brown and orange and grey, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse of sandstone and coal. (GLACIAL TILL)	
			91.10	1.00		
1.10	SV	V=87kPa			Firm becoming stiff, red-brown mottled grey, slightly sandy gravelly CLAY with low cobble and boulder content and with very thin organic rootlets. Gravel is subrounded fine to coarse of coal and sandstone. Cobbles and boulders are rounded of sandstone and of 0.5m maximum dimension. (GLACIAL TILL)	
1.10	T					
1.20	D					
1.30	SV	V=*			1.30 - 1.60 *Shear Vane tests not possible due to friable gravel ex-situ material.	
1.60	SV	V=*				
			90.10	2.00		
			89.90	2.20	Very thinly bedded, purple-grey, MUDSTONE. Interpreted as very weak, partially weathered. Recovered as tabular, angular gravel sized particles. (MIDDLE COAL MEASURES)	
			89.10	3.00		
					End Of Trial Pit At 3.00 m	
			88.10	4.00		
			87.10	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Moderate groundwater flows at 0.2m bgl beneath the topsoil. Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP711
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.40	N Coord: 515799	E Coord: 296973
Date: 02/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.15	T		92.10	0.30	Rough grass over grey, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse. (TOPSOIL)	▼
0.85	SV	V=91kPa			Firm becoming stiff, red-brown, slightly sandy slightly gravelly CLAY. with moderate cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of sandstone, mudstone and coal. Cobbles are rounded of sandstone. (GLACIAL TILL)	
0.95	D		91.40	1.00	0.80 - 2.00 Becoming stiff and friable.	
1.50	SV	V=*			1.50 - 1.55 *Shear Vane tests not possible on ex-situ material due to friable gravelly clay.	
2.20	SV	V=135kPa	90.40	2.00	2.00 - 3.00 Becoming very stiff.	
			89.40	3.00	End Of Trial Pit At 3.00 m	
			88.40	4.00		
			87.40	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Moderate groundwater flows at 0.3m bgl beneath the topsoil. Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP712
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 94.10	N Coord: 515698	E Coord: 297085
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.10 0.10	J T		93.85	0.25	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse of coal and sandstone. (TOPSOIL)	
0.80 - 1.00 0.80	B SV	V=79kPa			Firm becoming stiff and very stiff, light brown mottled grey, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded fine to coarse of sandstone, mudstone and coal. (GLACIAL TILL)	
1.00	SV	V=95kPa	93.10	1.00	1.00 - 2.50 Becoming stiff, friable, red-brown mottled grey.	
1.40	SV	V=135kPa			1.40 - 2.50 Becomign very stiff, slightly sandy gravelly CLAY with low cobble and boulder content. Cobbles and boulders are rounded of sandstone and of 0.4m maximum dimension.	
			92.10	2.00		
			91.60	2.50	2.40 - 2.50 Large boulder in base of pit. End Of Trial Pit At 2.50 m	
			91.10	3.00		
			90.10	4.00		
			89.10	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable. Pit terminated due to slow progress.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP713
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 95.50	N Coord: 515744	E Coord: 297103
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.15 0.15	J T		95.25	0.25	Rough grass over brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse of coal and sandstone. (TOPSOIL)	
0.75	SV	V=99kPa			Firm becoming stiff and very stiff, light brown mottled grey, slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is rounded fine to coarse of sandstone, mudstone and coal. Cobbles are rounded of sandstone. (GLACIAL TILL)	
0.95	SV	V=107kPa	94.50	1.00	0.70 - 2.60 Becoming stiff and red-brown.	
					1.00 - 2.60 Becoming friable, slightly sandy gravelly CLAY.	
1.60	SV	V=135kPa				
			93.50	2.00	1.80 - 2.60 Becoming very stiff and with low cobble and boulder content.	
			92.90	2.60	End Of Trial Pit At 2.60 m	
			92.50	3.00		
			91.50	4.00		
			90.50	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable. Pit terminated due to slow progress.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP714
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 96.30	N Coord: 515790	E Coord: 297100
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.10	T		96.05	0.25	Rough grass over brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse of coal and sandstone. (TOPSOIL)	
0.80	SV	V=60kPa			Firm becoming stiff and very stiff, light brown mottled grey, slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is rounded fine to coarse of sandstone, mudstone and coal. Cobbles are rounded of sandstone. (GLACIAL TILL)	
1.00	D		95.30	1.00		
1.00	T				1.10 - 1.60 Becoming stiff.	
1.10	SV	V=107kPa				
			94.70	1.60	Purple-grey, MARL / MUDSTONE. Interpreted as extremely weak, weathered (residual). Recovered as clayey sand and fine gravel sized particles. (MIDDLE COAL MEASURES)	
			94.40	1.90		
			94.30	2.00	Purple-grey, MARL / MUDSTONE. Interpreted as very weak, weathered (destructured). Recovered as clayey sandy gravel sized particles with high cobble content; gravel and cobbles were tabular and angular. (MIDDLE COAL MEASURES)	
			94.10	2.20	End Of Trial Pit At 2.20 m	
			93.30	3.00		
			92.30	4.00		
			91.30	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP715
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 98.40	N Coord: 515803	E Coord: 297136
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.10 0.10	J T		98.20	0.20	Rough grass over purple-brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse of coal and sandstone. (TOPSOIL)	
			97.90	0.50	Firm, red-brown, slightly sandy slightly gravelly CLAY with high cobble and boulder content. Sand is fine to coarse. Gravel is angular fine to coarse of sandstone. Cobbles and boulders are subrounded and subangular of sandstone of maximum dimension of 0.35m. (GLACIAL TILL)	
1.00	B		97.40	1.00	Purple-grey and light yellow-brown, SANDSTONE. Interpreted as weathered (residual). Recovered as slightly clayey sand and gravel sized particles with high angular cobble and boulder content. (MIDDLE COAL MEASURES)	
			97.00	1.40	Purple-grey and light yellow-brown, SANDSTONE. Interpreted as extremely weak, weathered (destructured). Recovered as cobble and boulder sized particles with much gravel. (MIDDLE COAL MEASURES)	▼
			96.70	1.70		
			96.40	2.00	Purple-grey MARL / MUDSTONE. Interpreted as extremely weak, weathered (destructured). Recovered as clayey sand and gravel sized particles. (MIDDLE COAL MEASURES)	
			96.10	2.30	Purple-grey, fine SANDSTONE. Interpreted as very weak, distinctly weathered. Recovered as gravel sized particles with high cobble content. (MIDDLE COAL MEASURES)	
			95.80	2.60	End Of Trial Pit At 2.60 m	
			95.40	3.00		
			94.40	4.00		
			93.40	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Slight groundwater trickle at 1.7m bgl. Pit sides stable.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP716
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 96.70	N Coord: 515758	E Coord: 297148
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.20	T		96.45	0.25	Rough grass over red-brown, slightly gravelly silty sandy clayey TOPSOIL. Sand is fine to coarse. Gravel is subrounded fine to coarse of coal and sandstone. (TOPSOIL)	
0.80	T		95.70	1.00	Purple-brown and red-brown and occasionally light yellow-brown, SANDSTONE. Interpreted as weathered (residual). Recovered as very clayey sand and gravel sized particles with high cobble content; gravel and cobbles were subangular to angular. (MIDDLE COAL MEASURES)	
			95.60	1.10	Purple-grey, SANDSTONE. Interpreted as weak, distinctly weathered. Recovered as slightly clayey sandy gravel sized particles with high cobble content; gravel and cobbles were tabular, angular and subangular. (MIDDLE COAL MEASURES)	▼
			94.70	2.00	End Of Trial Pit At 2.00 m	
			93.70	3.00		
			92.70	4.00		
			91.70	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Groundwater standing at 1.8m bgl after 1 minute. Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven			TP717
Project Number: 4046	Client: Story Homes		Sheet 1 Of 1
GL (mAOD): 94.50	N Coord: 515784		E Coord: 297176
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.15	J		94.30	0.20	Rough grass over grey-brown, slightly gravelly silty sandy clayey TOPSOIL. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of coal and sandstone. (TOPSOIL)	
0.15	T				Firm becoming stiff, brown mottled light brown, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to subangular fine to coarse of sandstone, coal and mudstone. (GLACIAL TILL)	
0.75	SV	V=58kPa				
0.95	SV	V=78kPa	93.50	1.00		
1.20	D					
1.30	SV	V=91kPa				
			92.60	1.90		
			92.50	2.00	Very thinly bedded, purple-grey, MUDSTONE. Interpreted as very weak, weathered (destructured). Recovered as clayey very sandy gravel sized particles; gravel were tabular and angular. (MIDDLE COAL MEASURES)	
			91.50	3.00		▼
			91.30	3.20	3.10 - 3.15 Very thin bed of coal. End Of Trial Pit At 3.20 m	
			90.50	4.00		
			89.50	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Groundwater standing at 3.1m bgl after 3 minutes. Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP718
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 94.50	N Coord: 515825	E Coord: 297185
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
			94.30	0.20	Rough grass over grey-brown, slightly gravelly silty sandy clayey TOPSOIL. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of coal and sandstone. (TOPSOIL)	
0.80	SV	V=85kPa			Firm locally stiff, brown mottled light brown, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to subangular fine to coarse of sandstone, coal and mudstone. (GLACIAL TILL)	
1.05	D	V=59kPa	93.50	1.00	0.40 - 0.60 Single subrounded boulder of sandstone of maximum dimension 0.45m.	
1.05	SV		93.40	1.10	Firm, possibly slightly organic, slightly gravelly CLAY. Gravel is angular fine to coarse of mudstone. (GLACIAL TILL)	
1.05	T				Very thinly bedded, dark grey, MUDSTONE. Interpreted as very weak, distinctly weathered. Recovered as slightly clayey very sandy gravel sized particles with moderate cobble content; gravel and cobbles were tabular and angular. (MIDDLE COAL MEASURES)	
1.50	T		92.50	2.00	1.20 - 2.60 Some thin bands of brown clayey mudstone and rare thick lamination of coal.	
			91.90	2.60	End Of Trial Pit At 2.60 m	
			91.50	3.00		
			90.50	4.00		
			89.50	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Slight pit side collapse: 1.2 to 2.3m bgl.

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iD GeoEnvironmental Limited

	Project Title: Rhodia, Whitehaven		TP719
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 93.80	N Coord: 515857	E Coord: 297205
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.10 0.10	J T		93.45	0.35	MADE GROUND TOPSOIL: Rough grass over dark grey, sandy gravelly clayey topsoil. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of coal, sandstone occasional slag, brick, glass, and ceramics. Single whole brick. (MADE GROUND TOPSOIL)	
0.75	SV	V=85kPa	93.00	0.80	Firm becoming stiff, red-brown, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of coal. (GLACIAL TILL)	
1.00	T		92.80	1.00	0.75 - 0.80 Becoming stiff,	
			92.40	1.40	Very thinly bedded, light brown and grey and orange, MUDSTONE. Interpreted as extremely weak, distinctly weathered. Recovered as sandy gravel sized particles; gravel was tabular and angular. (MIDDLE COAL MEASURES)	
			91.80	2.00	Very thinly bedded, light brown and grey and orange, MUDSTONE. Interpreted as very weak, distinctly weathered. Recovered as gravel sized particles with high cobble content; gravel and cobbles were tabular and angular. (MIDDLE COAL MEASURES)	
			91.40	2.40	End Of Trial Pit At 2.40 m	
			90.80	3.00		
			89.80	4.00		
			88.80	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP720
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 93.80	N Coord: 515749	E Coord: 297054
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.05	J					
0.05	T					
			93.50	0.30	MADE GROUND TOPSOIL: Rough grass over dark brown, slightly sandy gravelly clayey topsoil. Sand is fine to coarse. Gravel is angular fine to coarse of coal and brick. Single whole brick. (MADE GROUND TOPSOIL)	
0.60	J				MADE GROUND: Brown, sandy gravelly clay with some pockets of sandy gravel and some whole bricks. Sand is fine to coarse. Gravel is angular of brick. (COHESIVE MADE GROUND)	
0.60	T					
			92.90	0.90		
			92.80	1.00	MADE GROUND: Dark grey to black, clayey sand and gravel with the following anthropogenic material: three possible Asbestos Cement fragments, rubber strips, rare timber, occasional gravel sized macadam and glass and brick, and boulder sized concrete (0.4m maximum dimension). (GRANULAR MADE GROUND)	▼
1.10	B					
1.10	EW					
1.20	J					
1.20	T					
1.20	V					
			92.40	1.40		
1.70	J				MADE GROUND: Greenish-grey with white flecks, very silty fine sand with bands of brown silty clay. (SETTLEMENT POND MADE GROUND)	
1.70	T					
1.70	V					
			91.80	2.00		
			91.60	2.20		
2.40	D				Stiff, red-brown, slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded to angular fine to coarse of coal and sandstone. (MIDDLE COAL MEASURES)	
2.40	J	V=79kPa				
2.40	T					
2.40	V					
2.50	SV					
			91.10	2.70		
					End Of Trial Pit At 2.70 m	
			90.80	3.00		
			89.80	4.00		
			88.80	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Groundwater standing at 1.1m bgl. Pit side collapse: 0.3m to 1.4m bgl.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP721
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 94.10	N Coord: 515782	E Coord: 297050
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.05	J		94.00	0.10	MADE GROUND TOPSOIL: Rough grass and brambles over brown, slightly sandy gravelly clayey topsoil. Sand is fine to coarse. Gravel is angular fine to coarse of coal. (MADE GROUND TOPSOIL)	
0.05	T					
0.20	J		93.80	0.30		
0.20	T					
0.40	J		93.60	0.50	MADE GROUND: Red-brown, slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is rounded to angular of coal and sandstone. (REWORKED GLACIAL TILL)	▼
0.40	T					
			93.10	1.00	MADE GROUND: Dark grey to black, sand and gravel including possible ash and clinker. (Engineer recorded that the material was very hard to excavate.) (ASH & CLINKER)	
			92.60	1.50	MADE GROUND: Grey, cobbles and boulders with much gravel. Gravel, cobbles and boulders are angular of mudstone and maximum dimension of 0.5m. Occasional timber, metal sheet, and rubber (conveyor?) belt. (GRANULAR MADE GROUND)	
					End Of Trial Pit At 1.50 m	
			92.10	2.00		
			91.10	3.00		
			90.10	4.00		
			89.10	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Groundwater standing at 0.6m bgl after 15 minutes. Pit terminated due to groundwater impeding vision. Slight pit sides collapse: 0.1m to 1.0m bgl.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP722
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 95.20	N Coord: 515814	E Coord: 297064
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.05	J					MADE GROUND TOPSOIL: Rough grass and weeds over brown, sandy gravelly clayey topsoil. Sand is fine to coarse. Gravel is angular fine to coarse of coal. (MADE GROUND TOPSOIL)	
0.05	T		94.95		0.25		
0.40	J					MADE GROUND: Red-brown, gravelly clay. Gravel is angular of mudstone. (REWORKED GLACIAL TILL)	
0.40	T		94.70		0.50		
0.60	J					MADE GROUND: Dark grey to black, sand and gravel. Sand is fine to coarse. Gravel is angular fine to coarse of mudstone and coal. Rare pockets of partially decomposed grass, rare ceramic and glass fragments and wire. (REWORKED BEDROCK)	
0.60	T		94.40		0.80		
			94.30		0.90		
			94.20		1.00		
						MADE GROUND: Brown, slightly sandy slightly gravelly CLAY with occasional brick. (REWORKED GLACIAL TILL)	
1.50	J					MADE GROUND: Black macadam. (GRANULAR MADE GROUND)	
1.50	T		93.50		1.70		
1.80	J					MADE GROUND: Brown and light brown and red-brown, CLAY. (REWORKED GLACIAL TILL)	
1.80	T		93.30		1.90		
2.00	J		93.20		2.00	MADE GROUND: Greenish grey, fine sandy silt with layers of partially composted grass. (SETTLEMENT POND MADE GROUND)	
2.00	T		92.90		2.30	Light purple-grey, MARL / MUDSTONE. Interpreted as weathered (destructured). Recovered as friable clay blocks and sand and gravel sized particles with some relict bedding apparent. (MIDDLE COAL MEASURES)	
						End Of Trial Pit At 2.30 m	
			92.20		3.00		
			91.20		4.00		
			90.20		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Groundwater quickly flowing into pit from 0.2m bgl. Pit terminated due to groundwater impeding vision. Significant pit side collapse: 0.1m to 1.2m bgl.

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iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven			TP723
Project Number: 4046	Client: Story Homes		Sheet 1 Of 1
GL (mAOD): 95.30	N Coord: 515851		E Coord: 297034
Date: 03/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.50 0.50	J T					MADE GROUND TOPSOIL: Rough grass and weeds over brown, sandy gravelly clayey topsoil. Sand is fine to coarse. Gravel is angular fine to coarse of coal. (MADE GROUND TOPSOIL)	
						MADE GROUND: Brown, sandy gravelly clay. Sand is fine to coarse. Gravel is rounded to angular fine to coarse including occasional brick, glass and plastic. Occasional whole brick. (COHESIVE MADE GROUND)	
			94.30		1.00		
1.50	T					MADE GROUND: Red-brown and grey, slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. Cobbles are rounded of sandstone. (REWORKED GLACIAL TILL)	
			93.30		2.00		
2.10 2.10	J T					MADE GROUND: Greenish grey, fine sandy silt with layers of partially composted grass. Single metal sheet, glass bottle and whole brick. (SETTLEMENT POND MADE GROUND)	
			92.60		2.70		
2.90 2.90	D SV	V=130kPa				Stiff locally very stiff, red-brown mottled grey, slightly sandy gravelly CLAY with low cobble content. Gravel is rounded of sandstone. Cobbles are subrounded of sandstone. (GLACIAL TILL)	
			92.30		3.00		
			92.10		3.20	End Of Trial Pit At 3.20 m	
			91.30		4.00		
			90.30		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Groundwater trickling from 0.2m bgl. Slight pit side collapse: 0.0m to 1.0m bgl.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP724
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 90.00	N Coord: 515751	E Coord: 297268
Date: 04/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.10	J		89.70	0.30	Rough grass over brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of coal, sandstone and limestone. (TOPSOIL)	
0.10	T				Firm becoming stiff, light brown mottled grey, slightly sandy slightly gravelly CLAY with occasional sand pockets. Sand is fine to coarse. Gravel is rounded to subrounded fine to coarse of sandstone and coal. (GLACIAL TILL)	
0.75	SV	V=75kPa				
0.90	D	V=82kPa				
0.90	SV		89.00	1.00	0.90 - 2.00 Becoming stiff, brown mottled grey, friable with low rounded cobble content.	
1.10	SV	V=124kPa				
1.50	SV	V=*76kPa			1.50 - 1.55 *Only one Shear Vane test possible due to friable ex-situ material.	
			88.00	2.00	Thinly laminated, grey, MUDSTONE. Interpreted as very weak, partially weathered. Recovered as sandy gravel sized particles; gravel were tabular and angular. (MIDDLE COAL MEASURES)	▼
					2.40 - 2.90 Becoming dark grey with occasional very thin bed of (blocky) coal.	
			87.10	2.90		
			87.00	3.00	End Of Trial Pit At 2.90 m	
			86.00	4.00		
			85.00	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Slight groundwater trickling at 2.4m bgl after. Slight pit side collapse: 2.4m to 2.9m bgl.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP725
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 90.00	N Coord: 515751	E Coord: 297268
Date: 04/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.05	J		89.70	0.30	MADE GROUND TOPSOIL Rough grass over brown, clayey topsoil with some gravel of brick. (MADE GROUND TOPSOIL)	
0.05	T				0.20 - 0.40 MADE GROUND: whole bricks and sand (southern end of pit).	
0.75	D	V=43kPa			Firm becoming stiff, light brown mottled grey, slightly sandy slightly gravelly CLAY with occasional sand pockets. Sand is fine to coarse. Gravel is rounded to subrounded fine to coarse of sandstone and coal. (GLACIAL TILL)	
0.75	SV		89.00	1.00		
0.90	SV	V=66kPa				
1.20	SV	V=93kPa			1.20 - 1.70 Becoming stiff.	
			88.30	1.70		
					Thinly laminated, blue-grey and orange-brown, fine SANDSTONE with occasional siltstone beds. Interpreted as extremely weak, distinctly weathered. Recovered as sandy gravel sized particles with high cobble content; sand was fine to medium, gravel and cobbles were tabular and angular. (MIDDLE COAL MEASURES)	
			88.00	2.00		
			87.60	2.40		
					End Of Trial Pit At 2.40 m	
			87.00	3.00		
			86.00	4.00		
			85.00	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Slight groundwater trickling at 0.4m bgl from bricks and at 1.9m bgl within weathered bedrock. Pit sides stable.

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iD GeoEnvironmental Limited

	Project Title: Rhodia, Whitehaven		TP726
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 90.00	N Coord: 515751	E Coord: 297268
Date: 04/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.20 0.20	J T		89.40	0.60	MADE GROUND TOPSOIL Rough grass over dark brown, sandy gravelly clayey topsoil with many whole bricks, some cobble sized concrete and some pockets of weathered mudstone and coal. (MADE GROUND TOPSOIL)	
0.80	SV	V=42kPa	89.00	1.00	Firm, light brown mottled grey, slightly sandy slightly gravelly CLAY with some sand pockets. Sand is fine to coarse. Gravel is rounded fine to coarse of chalk. (GLACIAL TILL)	
1.10	SV	V=46kPa	88.40	1.60		
1.90	SV	V=107kPa	88.00	2.00	Thinly laminated, blue-grey, MUDSTONE. Interpreted as extremely weak, distinctly weathered. Recovered as clayey lumps which easily crumble to sandy gravel sized particles; gravel and cobbles were tabular and angular. (MIDDLE COAL MEASURES)	
			87.70	2.30		
			87.00	3.00	Thinly laminated, brown and grey, SILTSTONE. Interpreted as extremely weak, partially weathered. Recovered as sandy gravel sized particles; gravel were tabular and angular. (MIDDLE COAL MEASURES)	
			86.70	3.30	End Of Trial Pit At 3.30 m	
			86.00	4.00		
			85.00	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Slight pit side collapse: 2.3m to 2.6m bgl.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP727
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 98.50	N Coord: 515863	E Coord: 297146
Date: 04/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.20	J					Rough grass over brown, slightly sandy clayey topsoil. Sand is fine to coarse. Gravel is rounded fine to coarse of sandstone and coal. Occasional rounded cobble of possibly anhydrite. (TOPSOIL)	
0.20	T		98.15		0.35		
0.75	D	V=90kPa				Firm, light brown mottled grey, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded fine to coarse of chalk. (GLACIAL TILL)	
0.75	J		97.65		0.85		
0.75	SV					Thinly laminated, blue-grey, very fine SANDSTONE and SILTSTONE. Interpreted as very weak, partially weathered. Recovered as sand and gravel sized particles; gravel were tabular and angular. (MIDDLE COAL MEASURES)	
0.95	SV	V=135kPa	97.50		1.00		
1.10	J		96.50		2.00		
			96.10		2.40	End Of Trial Pit At 2.40 m	
			95.50		3.00		
			94.50		4.00		
			93.50		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven			TP728
Project Number: 4046	Client: Story Homes		Sheet 1 Of 1
GL (mAOD): 96.80	N Coord: 515872		E Coord: 297092
Date: 04/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.05	J				MADE GROUND TOPSOIL: Rough grass over dark grey and black and brown, very clayey sand and gravelly topsoil. Sand is fine to coarse. Gravel is rounded fine to coarse of weathered coal, brick and rare glass, possible slag and clinker. Some rounded cobbles of possible anhydrite. Some pockets of reworked grey mudstone and pockets of brown sandy clay. Single boulder of 0.6m of sandstone. (MADE GROUND TOPSOIL)	
0.05	T		96.30	0.50		
0.80	D	V=51kPa			Firm locally soft, orange-brown mottled grey, sandy CLAY with thin bands of sand. Sand is fine to medium. (GLACIAL TILL)	
0.80	J					
0.80	SV	V=51kPa				
0.95	SV		95.80	1.00		
1.15	SV					
			95.40	1.40		
1.50	J				Interbedded yellow SANDSTONE (interpreted as weak, distinctly weathered) with red-brown SANDSTONE (interpreted as extremely weak, residually weathered). Recovery of the yellow sandstone was as sandy gravel sized particles with high cobble content and the red-brown sandstone as sand sized particles. (MIDDLE COAL MEASURES)	▼
		V=40kPa	94.80	2.00		
			93.80	3.00	End Of Trial Pit At 3.00 m	
			92.80	4.00		
			91.80	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Moderate groundwater trickles from 1.5m bgl. Slight pit side collapse: 1.4m to 3.0m bgl.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP729
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 93.00	N Coord: 515791	E Coord: 297006
Date: 04/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.05	J					MADE GROUND TOPSOIL: Brambles over brown, slightly sandy slightly gravelly clayey topsoil. Sand is fine to coarse. Gravel is angular fine to coarse. Rare glass and metal strip. Single rounded boulder of sandstone of maximum 0.4m dimension. (MADE GROUND TOPSOIL)	
0.05	T		92.70		0.30		
0.50	EW					MADE GROUND: Mixed brown and red-brown and light brown and grey, slightly sandy slightly gravelly clay. Occasional whole brick. (COHESIVE MADE GROUND)	
0.50	J					0.50 - 0.70 Terracotta pipe running N-S, broken during excavation; orange stained water and sediment emerging.	
0.50	T		92.20		0.80		
0.85	J					Soft, blue-grey, sandy CLAY with dark grey possible hydrocarbon streaky staining. (GLACIAL TILL)	
0.85	V		92.00		1.00		
1.15	D	V=**52kPa				Firm becoming stiff, red-brown, slightly sandy gravelly CLAY with low cobble content, occasional sand pocket, and occasional organic rootlets. (GLACIAL TILL)	
1.15	SV					1.15 - 1.20 **Only one Shear Vane tests possible due to friable gravelly ex-situ material.	
1.20	J					1.60 - 1.65 *Shear Vane tests not possible due to friable gravelly ex-situ material.	
1.20	V					1.60 - 2.00 High content of rounded and tabular cobbles of sandstone.	
1.40	SV	V=50kPa				1.80 - 3.00 Becoming stiff.	
1.60	SV	V=*	91.00		2.00		
			90.00		3.00	End Of Trial Pit At 3.00 m	
			89.00		4.00		
			88.00		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit excavated on a slope 1.2m high; the log's measurements are from half way up the slope (i.e. 0.6m higher than the ground to the west). Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP730
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.50	N Coord: 515698	E Coord: 297176
Date: 04/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.05 0.05	J T		92.30		0.20	MADE GROUND TOPSOIL: Rough grass over dark brown, very clayey gravelly sandy topsoil. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of mudstone, coal and brick. Some masonry, maximum dimension of 1m . (MADE GROUND TOPSOIL)	▼
0.75 0.80	SV D	V=135kPa	91.90		0.60	Firm, red-brown mottled light brown, slightly gravelly CLAY with low cobble content. Gravel is rounded to angular fine to coarse of sandstone and coal. Cobbles are rounded of sandstone. (GLACIAL TILL)	
			91.50		1.00	Thinly inter-laminated, red-brown and brown, very fine SANDSTONE and SILTSTONE. Interpreted as distinctly weathered. Recovered as stiff clay sized particles with thin laminations visible. (MIDDLE COAL MEASURES)	
			91.00		1.50	Thinly inter-laminated, red-brown and brown, very fine SANDSTONE and SILTSTONE. Interpreted as extremely weak, distinctly weathered. Recovered as clayey sandy tabular gravel sized particles with moderate tabular cobble content. (MIDDLE COAL MEASURES) 1.90 - 2.50 Possibly becoming very weak.	
			90.50		2.00		
			90.00		2.50	End Of Trial Pit At 2.50 m	
			89.50		3.00		
			88.50		4.00		
			87.50		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Slight groundwater trickles from 0.2m bgl. Slight pit side collapse: 1.6m to 2.5m bgl.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP731
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 91.50	N Coord: 515724	E Coord: 297220
Date: 04/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.10	J		91.25	0.25	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (TOPSOIL)	
					Firm locally stiff, brown, CLAY. Single subangular boulder of sandstone, maximum dimension of 0.4m. (GLACIAL TILL)	
0.75	SV	V=86kPa				
0.95	SV	V=67kPa	90.50	1.00		
1.10	SV	V=91kPa				
			90.30	1.20		
					Thinly laminated, black, COAL. Interpreted as very weak, distinctly weathered. Recovered as angular gravel sized particles. (MIDDLE COAL MEASURES)	
			89.90	1.60	1.20 - 1.60 Damp.	
					Grey, SILTSTONE. Interpreted as extremely weak, weathered (destructured). Recovered as angular gravel sized particles. (MIDDLE COAL MEASURES)	
			89.50	2.00		
			89.40	2.10	End Of Trial Pit At 2.10 m	
			88.50	3.00		
			87.50	4.00		
			86.50	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP732
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 88.50	N Coord: 515708	E Coord: 297273
Date: 04/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
0.05	J		88.25	0.25	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (TOPSOIL)	
0.75	SV	V=70kPa			Firm becoming stiff, light brown mottled grey, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded to angular fine to coarse of sandstone and coal. (GLACIAL TILL)	
0.80	D		87.50	1.00	0.90 - 1.70 Becoming stiff, friable and brown mottled grey.	
0.90	SV	V=99kPa			1.15 - 1.20 *Shear Vane tests not possible due to friable ex-situ material.	
		V=*	86.80	1.70		
			86.50	2.00	Very thinly laminated, grey and brown, MUDSTONE. Interpreted as extremely weak, distinctly weathered. Recovered as sandy gravel sized particles; gravel were tabular and angular. (MIDDLE COAL MEASURES)	
			85.90	2.60	End Of Trial Pit At 2.60 m	
			85.50	3.00		
			84.50	4.00		
			83.50	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
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V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited

	Project Title: Rhodia, Whitehaven		TP733
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 90.40	N Coord: 515681	E Coord: 297228
Date: 04/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result
0.15	J	
0.75	SV	V=64kPa
0.95	SV	V=66kPa
1.00	D	
1.00	J	

Level	Depth (m)	Description
90.15	0.25	Rough grass over grey-brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (TOPSOIL)
		Firm, light brown mottled grey, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (GLACIAL TILL)
		0.60 - 0.70 Land drain, broken during excavation.
89.40	1.00	
89.20	1.20	Grey and red-brown, MUDSTONE with an occasional thick lamination of COAL. The mudstone was interpreted as weathered (residual). Recovered as stiff clay sized particles with occasional relict tabular gravel. (MIDDLE COAL MEASURES)
		1.70 - 2.20 Becoming grey and light brown.
88.40	2.00	
88.20	2.20	Grey and light brown, MUDSTONE. Interpreted as extremely weak, weathered (residual). Recovered as sandy gravel sized particles; gravel were angular. (MIDDLE COAL MEASURES)
87.80	2.60	End Of Trial Pit At 2.60 m
87.40	3.00	
86.40	4.00	
85.40	5.00	

Water

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable.

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP734
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 93.80	N Coord: 515779	E Coord: 296876
Date: 07/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.10 0.10	J T		93.55		0.25	Rough grass over dark brown, slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (TOPSOIL)	
0.75	SV	V=35kPa	93.20		0.60	Firm, red-brown, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (GLACIAL TILL)	
1.00	J		92.95		0.85	Soft, brown, slightly gravelly clayey fine sandy SILT. Possibly organic rich. (GLACIAL TILL)	
			92.80		1.00	Very thinly to thinly bedded, brown, fine SANDSTONE and SILTSTONE. Interpreted as medium strong, slightly weathered. Recovered as tabular and angular cobble and boudler sized particles. (PERMIAN-TRIASSIC?)	
			92.20		1.60	End Of Trial Pit At 1.60 m	
			91.80		2.00		
			90.80		3.00		
			89.80		4.00		
			88.80		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Slight pit side collapse: 0.3m to 1.0m bgl. Pit terminated due to difficulty of excavation.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP735
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 93.30	N Coord: 515724	E Coord: 296894
Date: 07/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.40 0.40	J T		93.00		0.30	MADE GROUND TOPSOIL: Rough grass over brown, slightly sandy slightly gravelly clayey topsoil. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (MADE GROUND TOPSOIL)	
			92.75		0.55	MADE GROUND: Dark grey and black clayey sand and gravel including coal, weathered bedrock and ash. Occasional whole brick. (GRANULAR MADE GROUND)	
			92.45		0.85	Firm, brown, slightly gravelly CLAY. Gravel is rounded fine to coarse of sandstone. (GLACIAL TILL)	
			92.30		1.00	End Of Trial Pit At 0.85 m	
			91.30		2.00		
			90.30		3.00		
			89.30		4.00		
			88.30		5.00		

KEY

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B - Bulk Sample
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▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Trial pit excavated within area stripped in investigation of 'Fox Pit' shaft.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP736
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 93.40	N Coord: 515735	E Coord: 296889
Date: 07/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.40 0.40	J T		93.10		0.30	MADE GROUND TOPSOIL: Rough grass over brown, slightly sandy slightly gravelly clayey topsoil. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (MADE GROUND TOPSOIL)	
			92.85		0.55	MADE GROUND: Dark grey and black clayey sand and gravel including coal, weathered bedrock and ash. Occasional whole brick. (GRANULAR MADE GROUND)	
			92.50		0.90	Firm, brown, slightly gravelly CLAY. Gravel is rounded fine to coarse of sandstone. (GLACIAL TILL)	
			92.40		1.00	End Of Trial Pit At 0.90 m	
			91.40		2.00		
			90.40		3.00		
			89.40		4.00		
			88.40		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Trial pit excavated within area stripped in investigation of 'Fox Pit' shaft.

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iD GeoEnvironmental Limited

Project Title: Rhodia, Whitehaven			TP737
Project Number: 4046	Client: Story Homes		Sheet 1 Of 1
GL (mAOD): 92.50	N Coord: 515605		E Coord: 297026
Date: 08/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
			92.10	0.40	MADE GROUND: Black and grey, gravelly hardcore. (HARDCORE) 0.10 - 0.40 Many angular cobbles and boulders of sandstone; maximum dimension of 0.4m.	
0.75	SV	V=75kPa			Firm becoming stiff, light brown mottled grey, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to subangular fine to coarse of sandstone and coal. (GLACIAL TILL)	
0.80	D					
0.80	J					
1.00	SV	V=78kPa	91.50	1.00		
1.25	SV	V=71kPa			1.30 - 3.00 Low rounded cobble of sandstone.	
1.60	SV	V=*			1.60 - 1.65 *Shear Vane tests not possible due to friable ex-situ material. 1.70 - 3.00 Becoming stiff, friable, brown-grey mottled blue-grey.	
			90.50	2.00		
					2.80 - 3.00 Becoming purple-brown mottled grey.	
			89.50	3.00	End Of Trial Pit At 3.00 m	
			88.50	4.00		
			87.50	5.00		

KEY

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B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		**TP738**
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.50	N Coord: 515607	E Coord: 297042
Date: 08/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
			92.25	0.25	MADE GROUND: Concrete with rebar. (CONCRETE)	
			92.05	0.45	MADE GROUND: Red, sandy gravelly hardcore. (HARDCORE)	
0.50	J		91.95	0.55	MADE GROUND: Mixed hardcore and clay with strong possible hydrocarbon (diesel?) odour and dark grey staining. (HARDCORE)	
0.50	V					
0.75	J	V=135kPa				
0.75	SV					
0.75	V					
0.95	SV	V=135kPa	91.50	1.00	Stiff and very stiff, brown mottled grey, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (GLACIAL TILL)	
1.30	SV	V=*			0.75 - 2.00 Becoming very stiff and friable.	
1.50	D				1.30 - 1.35 *Shear Vane test not possible on ex-situ material due to friable gravelly clay.	
			90.50	2.00		
2.10	SV	V=107kPa			2.00 - 2.60 Becoming stiff and purple-brown.	
			89.90	2.60	End Of Trial Pit At 2.60 m	
			89.50	3.00		
			88.50	4.00		
			87.50	5.00		

KEY

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B - Bulk Sample
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V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP739
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.50	N Coord: 515593	E Coord: 297012
Date: 08/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
			92.25	0.25	MADE GROUND: Concrete with rebar. (CONCRETE)	
			92.10	0.40	MADE GROUND: Red, sandy gravelly hardcore. (HARDCORE)	
					0.35 - 0.50 Concrete across N end of pit - 0.5m wide.	
					MADE GROUND: Cobbles and boulders of angular sandstone blocks of 0.5m maximum dimension. (GRANULAR MADE GROUND)	
			91.50	1.00	0.45 - 0.65 Ceramic pipe running W-E (probably disused).	
					0.65 - 0.80 Concrete beneath ceramic pipe.	
1.20 1.20 1.20	J T V				Dark grey, slightly gravelly clayey sandy SILT. Sand is fine to medium. Gravel is angular fine to coarse of coal. Occasional rootlets. Possible relict topsoil. (TOPSOIL)	
			91.05	1.45		
1.60 1.60 1.60 1.60	D J SV V	V=60kPa			Firm becoming stiff, brown mottled light brown and orange and black, slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (GLACIAL TILL)	
2.00	SV	V=*124kPa	90.50	2.00	2.00 - 2.05 *Only one Shear Vane test possible due to friable gravelly ex-situ material.	
					2.00 - 3.20 Becoming stiff and friable.	
					2.50 - 3.20 Becoming brown.	
			89.50	3.00		
			89.30	3.20	End Of Trial Pit At 3.20 m	
			88.50	4.00		
			87.50	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Some pit side collapse: 0.0m to 1.0m bgl.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP740
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.50	N Coord: 515570	E Coord: 297017
Date: 08/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
			92.25		0.25	MADE GROUND: Concrete with rebar. (CONCRETE)	
			91.80		0.70	MADE GROUND: Red-brown, sandy gravelly hardcore. Many cobbles and boulders of sandstone. (HARDCORE)	
0.80 0.80	J V					MADE GROUND: Grey-brown, mixed sand and clay. (GRANULAR MADE GROUND)	
			91.50		1.00	0.70 - 1.00 Plastic pipe running W-E in centre of pit and contains water and possible slight hydrocarbon sheen.	▼
1.10 1.10	J V					0.80 - 0.85 Uncertainty exists as to whether soil sample is damp due to water emerging from broken pipe.	
			91.00		1.50	Light brown, clayey SAND with bands of clay. Slight possible hydrocarbon grey staining and odour. (GLACIAL TILL)	
1.70 1.70	J V					1.20 - 1.40 Concrete slab with rebar in western side of northern half of pit.	
			90.70		1.80	Firm, light brown mottled grey and orange-brown, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to angular fine to coarse of sandstone and coal. (GLACIAL TILL)	
			90.50		2.00	End Of Trial Pit At 1.80 m	
			89.50		3.00		
			88.50		4.00		
			87.50		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Slow groundwater trickles at 1.0m bgl. Some pit side collapse: 0.0m to 1.0m bgl.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP741
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.50	N Coord: 515584	E Coord: 297048
Date: 08/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Depth (m)	Description	Water
			92.40	0.10	MADE GROUND: Macadam. (CONCRETE)	
					MADE GROUND: Grey-brown, sandy gravelly hardcore. Many some half and whole bricks. Concrete boudler, 1.2m maximum dimension. (HARDCORE)	
			91.95	0.55		
0.75	J				Light brown, fine to medium SAND with grey possible hydrocarbon staining with (diesel?) odour. (GLACIAL TILL)	
0.75	V		91.65	0.85		
1.00	D	V=78kPa	91.50	1.00	Firm becoming stiff, light brown mottled grey, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded to subangular fine to coarse of sandstone and coal. (GLACIAL TILL)	
1.00	SV					
1.00	V					
1.30	SV	V=78kPa				
1.60	SV	V=85kPa			1.60 - 2.50 Becoming stiff, purple-brown mottled grey, slightly gravelly CLAY.	
			90.50	2.00	2.00 - 2.50 Becoming very stiff.	
			90.00	2.50	End Of Trial Pit At 2.50 m	
			89.50	3.00		
			88.50	4.00		
			87.50	5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

Slow groundwater trickles at 0.5m bgl. Some pit side collapse: 0.0m to 0.5m bgl.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP742
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 92.60	N Coord: 515556	E Coord: 296975
Date: 08/09/2020	Method: Tracked Excavator	Logged By: SD	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
			92.40		0.20	MADE GROUND: Brown and red-brown, sandy gravelly handcore. (CONCRETE)	
0.50 0.50	J T		92.05		0.55	MADE GROUND: Greeny grey slag. (GRANULAR MADE GROUND) 0.20 - 0.55 Engineer recorded that this material was welded like concrete and required the excavator's breaker to penetrate it. 0.50 - 1.00 Concrete in pit centre. Depth uncertain.	
1.00	V		91.60		1.00	MADE GROUND: Brown, sandy gravelly clay. Sand is fine to coarse. Gravel is angular fine to coarse of coal, weathered bedrock and brick. Possible slight hydrocarbon odour. Occasional wire and rebar. (COHESIVE MADE GROUND)	
			91.20		1.40	End Of Trial Pit At 1.40 m	
			90.60		2.00		
			89.60		3.00		
			88.60		4.00		
			87.60		5.00		

KEY

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▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit sides stable. Pit terminated due to concrete in pit centre at 0.5m bgl impeding progress.

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP801
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 95.16	N Coord: 515522	E Coord: 297044
Date: 05/08/2020	Method: Tracked Excavator	Logged By: NW	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
1.50 1.50 1.50 1.50	B CD J V		94.16		1.00	MADE GROUND: Dark red-brown to black bouldery, cobbly gravelly ashy sand. Gravel and cobbles fine to coarse of blue-grey slag, concrete, shale mudstone, red marl, clinker, granite, sandstone, brick and grey and pink mottled sandstone/anhydrite gravel and cobbles. Approximately 5% small boulders of blue-grey slag, concrete, red marl and sandstone. (SANDSTONE/ANHYDRITE STOCKPILE)	
			93.26		1.90		
			93.16		2.00	End Of Trial Pit At 1.90 m	
			92.16		3.00		
			91.16		4.00		
			90.16		5.00		

KEY

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▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Slight diesel hyydrocarbon odour

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP802
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 94.90	N Coord: 515510	E Coord: 296999
Date: 05/08/2020	Method: Tracked Excavator	Logged By: NW	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
			93.90		1.00	MADE GROUND: Dark brown to black bouldery, very cobbly very gravelly sand. Gravel and cobbles fine to coarse of blue-grey slag, concrete, shale mudstone, red marl, clinker, granite, sandstone, brick and grey and pink mottled sandstone/anhydrite. Approximately 5% small boulders of blue-grey slag, concrete, red marl and sandstone. (SANDSTONE/ANHYDRITE STOCKPILE)	
2.00 - 2.50	B		92.90		2.00		
2.30 - 2.50 2.30 - 2.50 2.30 - 2.50	CD J V		92.20		2.70	MADE GROUND: Blue-grey fine to coarse angular gravel, cobbles and boulders of slag, concrete, pink & grey sandstone/anhydrite with boulders of red marl and concrete. (SANDSTONE/ANHYDRITE STOCKPILE)	
			91.90		3.00	End Of Trial Pit At 2.70 m	
			90.90		4.00		
			89.90		5.00		

KEY

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V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered

Printed By GeoLogs (www.GeoLogs.com)

iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP803
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 93.40	N Coord: 515460	E Coord: 297040
Date: 05/08/2020	Method: Tracked Excavator	Logged By: NW	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.50 - 0.70	ES					MADE GROUND: Dark brown to black very gravelly, very cobbly, bouldery sand. Gravel and cobbles fine to coarse of blue-grey slag, grey and pink mottled sandstone/anhydrite, concrete, red marl, clinker, granite, sandstone and brick. Approximately 5% small boulders of slag, concrete, red marl and sandstone. (SANDSTONE/ANHYDRITE STOCKPILE)	
			92.40		1.00		
1.20 - 1.50	CD					MADE GROUND: Pockets of pink and grey mottled gravelly cobbles of sandstone/anhydrite, blue-grey slag, concrete, with boulders of red marl and blue-grey slag. (SANDSTONE/ANHYDRITE STOCKPILE)	
1.20 - 1.50	J						
1.20 - 1.50	V						
1.50 - 2.00	B						
			91.40		2.00		
						End Of Trial Pit At 2.00 m	
			90.40		3.00		
			89.40		4.00		
			88.40		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP804
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 93.70	N Coord: 515487	E Coord: 297064
Date: 05/08/2020	Method: Tracked Excavator	Logged By: NW	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.80 - 1.00 0.80 - 1.00 0.80 - 1.00 1.00 - 1.50	CD J V B		92.70		1.00	MADE GROUND: Pink and grey mottled slightly sandy gravelly cobbles and boulders of sandstone/anhydrite with large cobbles and boulders of blue-grey slag and bands of brown-black gravelly sandy clinker. (SANDSTONE/ANHYDRITE STOCKPILE)	
			91.70		2.00		
			91.60		2.10	End Of Trial Pit At 2.10 m	
			90.70		3.00		
			89.70		4.00		
			88.70		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
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V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered

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iD GeoEnvironmental Limited	Project Title: Rhodia, Whitehaven		TP805
	Project Number: 4046	Client: Story Homes	Sheet 1 Of 1
	GL (mAOD): 94.10	N Coord: 515495	E Coord: 297036
Date: 05/08/2020	Method: Tracked Excavator	Logged By: NW	Scale: 1:25

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.60 - 0.80 0.60 - 0.80 0.60 - 0.80	CD J V					MADE GROUND: Pink and grey mottled slightly sandy gravelly cobbles and boulders of anhydrite/sandstone with large boulders of blue-gey slag and bands of brown-black gravelly sandy clinker. (SANDSTONE/ANHYDRITE STOCKPILE)	
1.00 - 1.50	B		93.10		1.00		
			92.10		2.00		
			92.00		2.10	End Of Trial Pit At 2.10 m	
			91.10		3.00		
			90.10		4.00		
			89.10		5.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered

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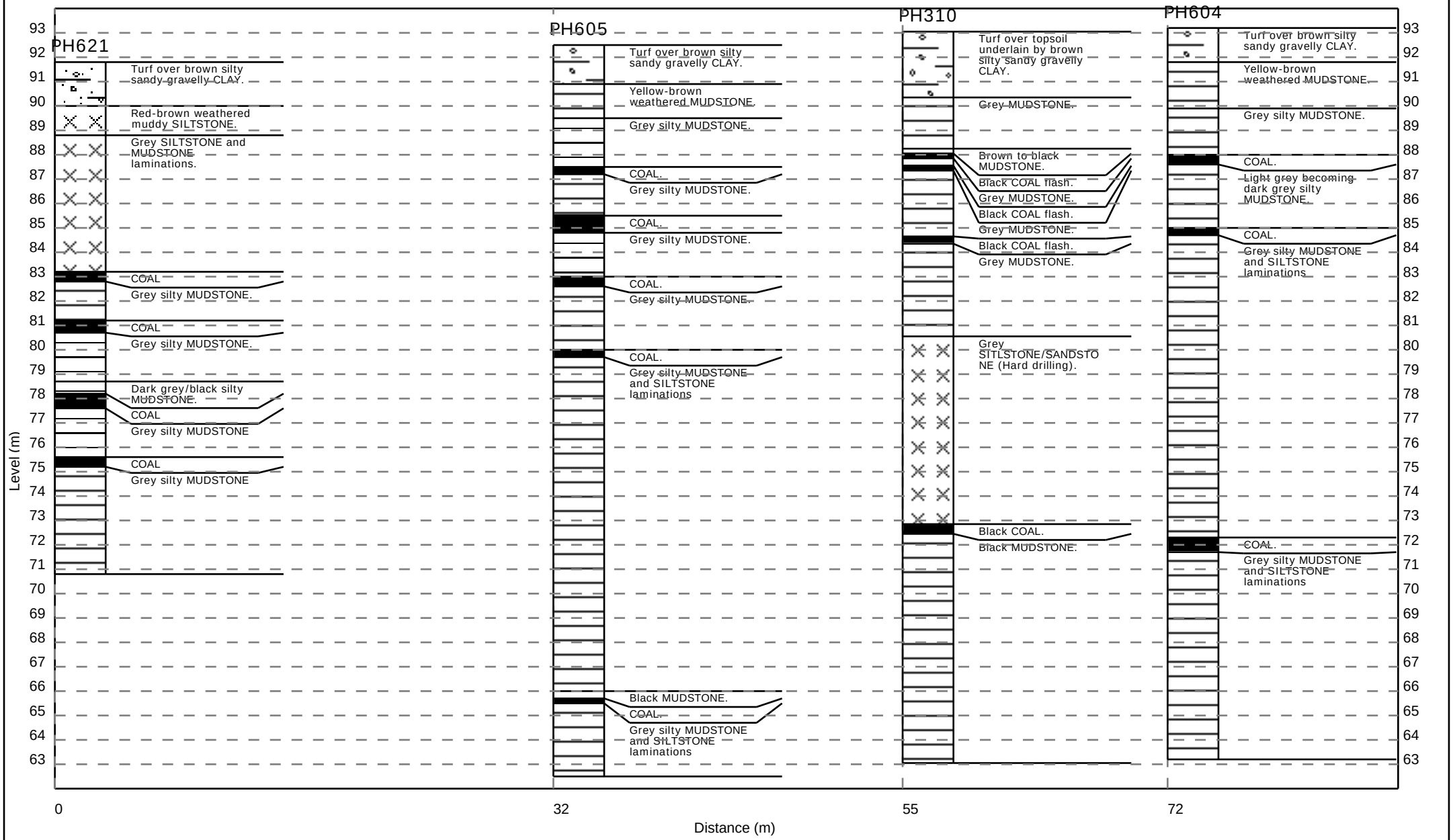
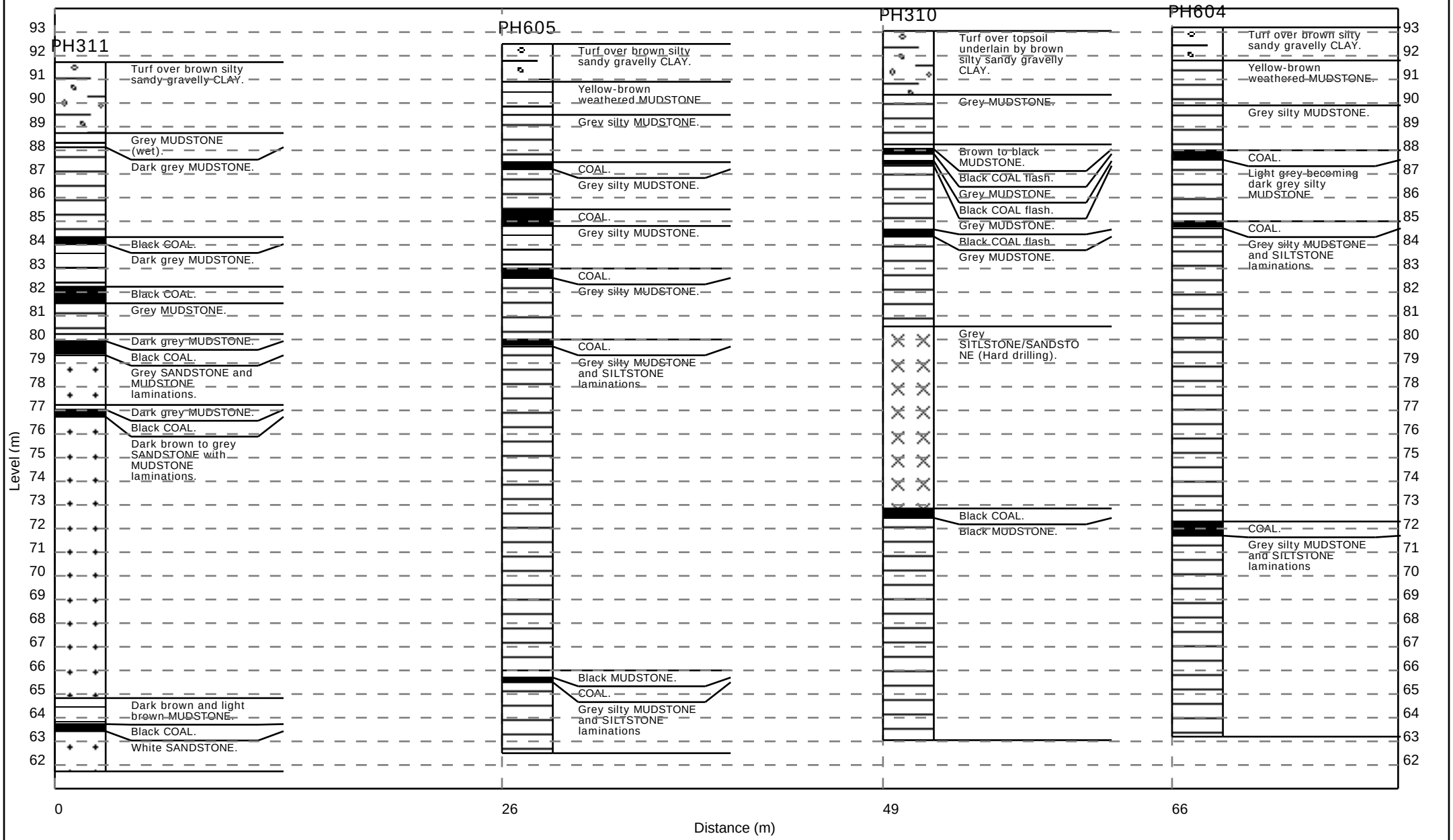
APPENDIX D



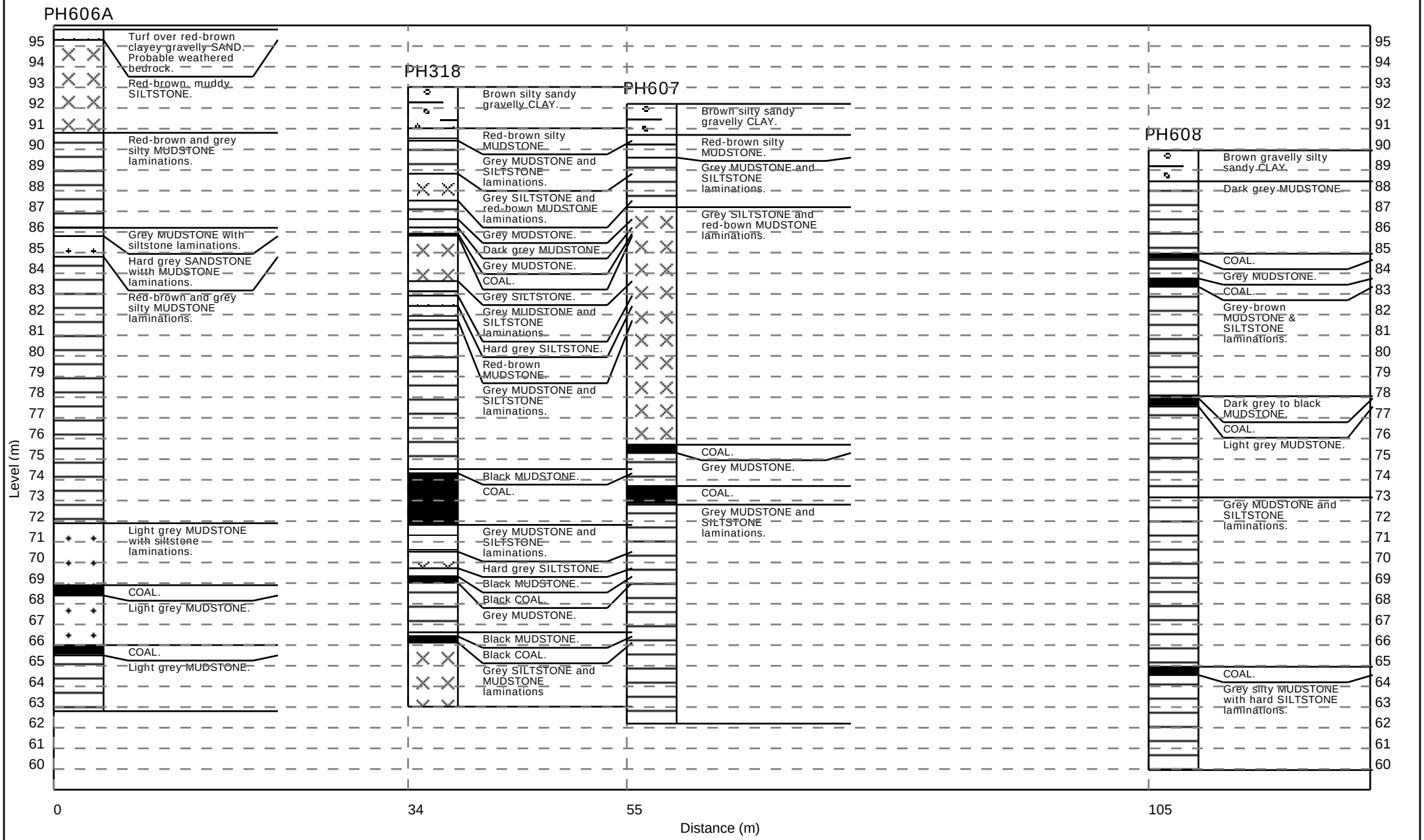
iD Geo iD GeoEnvironmental Limited	H:Scale 1:328	Project Rhodia, Whitehaven	Proj No 4046
	V:Scale 1:208	Title PH621-604	Figure 1

GeoLogs (www.GeoLogs.com)



iD Geo iD GeoEnvironmental Limited	H:Scale 1:301	Project Rhodia, Whitehaven	Proj No 4046
	V:Scale 1:215	Title PH311-PH604	Figure 3

GeoLogs (www.GeoLogs.com)



iD GeoEnvironmental Limited	H:Scale 1:479	Project Rhodia, Whitehaven	Proj No 4046
	V:Scale 1:241	Title PH606-PH608	Figure 2

GeoLogs (www.GeoLogs.com)

APPENDIX E

Site Area	Hole ID	Depth (m)	Material	Table 1 Inorganic Determinands: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																				
				TOC	SOM	pH	As	B	Ca	Cd	Cr (III)	Cr (VI)	Cu	CN (total)	Fe	Pb	Hg	Ni	Se	Zn	Be	V	SO_4 (Total)	SO_4	S (Total)	Asbestos
	S4UL Residential with homegrown produce			%	%		37	290		11	910	6	2400			200*	40	130	250	3700	1.7	410	%	2:1 Extract (g/l)	%	
	S4UL Open Public Space (residential)			%	%		79	21000		120	1500	7.7	12000			630	120	230	1100	81000	2.2	2000				
IDG Laboratory Data 2020																									
Anhydrite Stockpile	TP801	1.5	Anhydrite/Sandstone Made Ground	4.4	7.6	10.1	25	-	72000	0.23	18	< 0.50	20	0.50	17000	40	0.13	26	0.67	49	-	-	0.890	1.100	0.370	AND
Anhydrite Stockpile	TP802	2.3	Anhydrite/Sandstone Made Ground	-	-	9.2	19	-	83000	0.72	18	-	14	-	-	18	0.10	18	0.55	44	-	-	0.570	0.700	0.230	AND
Anhydrite Stockpile	TP803	1.2	Anhydrite/Sandstone Made Ground	3.2	5.5	9.4	23	-	78000	0.33	18	< 0.50	19	< 0.50	-	29	< 0.10	23	0.65	47	-	-	1.100	1.500	2.200	AND
Anhydrite Stockpile	TP804	0.8	Anhydrite/Sandstone Made Ground	2.2	3.8	9.6	21	-	74000	0.20	15	-	15		-	45	0.10	24	0.35	55	-	-	1.100	1.500	2.200	AND
Anhydrite Stockpile	TP805	0.6	Anhydrite/Sandstone Made Ground	5.6	9.7	9.8	32	-	53000	0.28	20	-	34		-	68	0.17	41	1.1	99	-	-	0.380	1.700	1.700	AND
Field	TP701	0.10	Made Ground Topsoil	7.0	12.1	7.0	14	-	-	0.7	34	-	31	-	-	40	0.1	26	0.5	57	-	-	-	-	-	AND
Field	TP702	0.50	Glacial Till	-	-	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.064	< 0.010	0.029	-
Field	TP703	0.20	Made Ground Topsoil	5.8	10.0	7.6	23	-	-	0.5	35	-	40	-	-	71	0.2	42	1.0	85	-	-	-	-	-	AND
Field	TP703	1.00	Permian-Triassic Bedrock	-	-	8.5	-	-	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.010	0.017	-
Field	TP705	0.15	Made Ground Topsoil	0.9	1.5	7.8	18	-	-	0.2	24	-	37	-	-	29	<0.1	20	0.7	78	-	-	-	-	-	AND
Field	TP708	0.75	Glacial Till	-	-	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.039	0.140	0.130	-
Field	TP707	0.10	Made Ground Topsoil	5.4	9.3	6.9	17	-	-	0.4	29	-	30	-	-	40	0.2	26	0.8	48	-	-				AND
Field	TP709	0.20	Made Ground Topsoil	2.6	4.5	6.7	15	-	-	0.4	26	-	24	-	-	29	0.1	20	0.5	44	-	-	-	-	-	AND
Field	TP710	1.10	Glacial Till	-	-	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.010	<0.01	0.029	-
Field	TP712	0.10	Made Ground Topsoil	4.6	7.9	6.8	18	-	-	0.4	26	-	25	-	-	53	0.1	17	0.6	49	-	-			-	AND
Field	TP713	0.15	Made Ground Topsoil	3.4	5.9	6.6	20	-	-	0.2	24	-	25	-	-	45	0.1	15	0.5	40	-	-			-	AND
Field	TP714	1.00	Glacial Till	0.4	0.7	8.2	14	-	-	<0.1	23	-	12	-	-	13	<0.1	11	0.4	18	-	-			-	AND
Field	TP714	0.10	Made Ground Topsoil	3.5	6.0	7.5	16	-	-	0.2	23	-	22	-	-	30	<0.1	16	0.5	39	-	-			-	AND
Field	TP715	0.10	Made Ground Topsoil	2.4	4.1	7.5	28	-	-	0.3	26	-	21	-	-	49	0.1	19	0.6	43	-	-			-	AND
Field	TP716	0.80	Coal Measures Bedrock	-	-	7.5	-	-	1600	-	-	-	-	-	-	-	-	-	-	-	-	-		< 0.010	0.021	-
Field	TP717	0.15	Made Ground Topsoil	3.5	6.0	6.9	14	-	-	0.1	20	-	20	-	-	24	<0.1	13	0.5	28	-	-			-	AND
Field	TP719	0.10	Made Ground Topsoil	9.1	15.7	6.9	25	-	-	0.3	23	-	69	-	-	110	0.1	58	0.8	52	-	-			-	AND
Field	TP719	1.00	Coal Measures Bedrock	-	-	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.010	< 0.010	0.013	-
Infilled Reservoir	TP720	0.05	Made Ground Topsoil	6.9	11.9	6.6	25	-	-	0.3	24	-	41	-	-	54	0.1	35	0.7	110	-	-	-	-	-	AND
Infilled Reservoir	TP720	0.60	Cohesive Made Ground	2.7	4.7	8.1	18	-	2700	<0.1	19	-	31	-	24000	29	<0.1	32	0.4	70	-	-	-	-	-	AND
Infilled Reservoir	TP720	1.10	Asbestos cement fragment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**Chrysotile**
Infilled Reservoir	TP720	2.40	Glacial Till	-	-	9.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.010	<0.01	0.022	-
Infilled Reservoir	TP721	0.40	Ash & Clinker	24.0	41.4	7.2	**61**	-	7800	<0.1	22	-	230	-	29000	34	0.6	**180**	1.4	61	-	-	-	-	-	AND
Infilled Reservoir	TP722	0.05	Made Ground Topsoil	6.1	10.5	7.4	24	-	-	0.3	22	-	31	-	-	40	0.1	27	1.1	60	-	-	-	-	-	AND
Infilled Reservoir	TP723	0.05	Made Ground Topsoil	5.8	10.0	7.6	19	-	-	0.3	18	-	25	-	-	33	<0.1	23	0.8	58	-	-	-	-	-	AND
Field	TP724	0.10	Made Ground Topsoil	3.1	5.3	6.8	14	-	-	0.1	15	-	16	-	-	41	<0.1	14	0.4	31	-	-	-	-	-	AND
Field	TP725	0.05	Made Ground Topsoil	5.6	9.7	6.4	25	-	-	0.2	20	-	56	-	-	43	0.1	46	0.7	40	-	-	-	-	-	AND
Field	TP726	0.20	Made Ground Topsoil	7.3	12.6	8.0	29	-	-	6.8	22	-	57	-	-	190	0.3	25	1.2	470	-	-	-	-	-	AND
Field	TP727	0.75	Glacial Till	-	-	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.037	0.096	0.023	-
Field	TP728	0.05	Made Ground Topsoil	16.0	27.6	8.1	21	-	-	0.2	14	-	50	-	-	26	<0.1	79	0.8	38	-	-	-	-	-	-
Field	TP728	1.50	Coal Measures Bedrock	-	-	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.110	0.035	-
Infilled Reservoir	TP729	0.85	Glacial Till	1.0	1.7	7.8	5	-	-	<0.1	12	-	5	-	-	11	<0.1	8	0.5	12	-	-	-	-	-	-
Phosphorite storage	TP730	0.05	Made Ground Topsoil	6.4	11.0	7.9	22	-	-	4.2	110	-	27	-	-	35	0.2	29	0.5	750	-	-	-	-	-	AND
Field	TP731	0.10	Made Ground Topsoil	2.6	4.5	6.7	18	-	-	0.1	19	-	12	-	-	22	<0.1	10	0.7	38	-	-	-	-	-	AND
Field	TP733	0.15	Made Ground Topsoil	3.9	6.7	7.5	26	-	-	7.8	23	-	55	-	-	**360**	0.3	15	1.1	640	-	-	-	-	-	AND
Field	TP733	1.00	Glacial Till	-	-	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.010	0.020	0.021	-
Field	TP734	0.10	Made Ground Topsoil	7.0	12.1	7.2	26	-	-	0.4	31	-	50	-	-	69	0.2	45	1.0	76	-	-	-	-	-	AND
Field	TP735	0.40	Granular Made Ground	27.0	46.6	8.2	**54**	-	10000	<0.1	11	-	62	-	31000	68	0.1	88	1.0	46	-	-	-	-	-	AND
Field	TP736	0.40	Granular Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.510	<0.01	0.540	-
TDG Depot	TP737	0.80	Glacial Till	-	-	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.026	0.029	0.032	-
TDG Depot	TP738	0.50	Hardcore	1.8	3.1	8.7	19	-	55000	0.7	37	-	30	-	-	75	0.7	28	1.0	69	-	-	0.270	0.200	0.270	-
TDG Depot	TP739	1.20	Possible Relict Topsoil	7.7	13.3	6.7	34	-	-	0.4	23	-	47	-	-	100	0.3	48	0.9	140	-	-	-	-	-	AND
TDG Depot	TP740	1.10	Glacial Till	1.0	1.6	8.2	25	-	-	6.9	230	-	30	-	-	17	0.1	35	0.8	150	-	-	-	-	-	-
TDG Depot	TP741	0.75	Glacial Till	0.5	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP742	0.50	Granular Made Ground	0.3	0.4	11.4	23	-	120000	0.2	15	-	4	<0.5	-	10	<0.1	7	4.2	11	-	-	5.100	2.400	2.100	-
TDG Depot	TP742	1.00	Cohesive Made Ground	-	-	-	-	-	39000	-	-	-	-	-	-	-	-	-	-	-	-	-	0.270	1.100	0.410	-
Integra Laboratory Data 2011																									
TDG Depot	GR1	-	Location not provided	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	GR2	-	Location not provided	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP26	0.50	Made Ground Hardcore	-	-	11.25	<3	<3.5		0.4	<4.5	-	7	<1		4	<0.4	<0.9	<3	12	<0.4	7.2	0.055	0.083	0.08	-
TDG Depot	TP26	1.00	Made Ground Sand	-	-	8.35	9	<3.5		8.7	180	-	26	<1		4	<0.4	24	<3	230	1.6	110	1.7	0.15	0.59	-

Site Area	Hole ID	Depth (m)	Material	Table 1 Inorganic Determinands: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																				
				TOC	SOM	pH	As	B	Ca	Cd	Cr (III)	Cr (VI)	Cu	CN (total)	Fe	Pb	Hg	Ni	Se	Zn	Be	V	SO_4 (Total)	SO_4	S (Total)	Asbestos
TDG Depot	TP26	1.50	Glacial Till	-	-	8.22	3	<3.5		3.3	74	-	14	<1		3	<0.4	12	<3	96	0.8	52	0.58	0.17	0.28	-
TDG Depot	TP27	0.50	Made Ground Hardcore	-	-	10.4	<3	<3.5		0.4	<4.5	-	<6	<1		8	<0.4	1.8	<3	13	<0.4	7.9	0.097	0.028	0.06	-
TDG Depot	TP27	1.00	Made Ground Sand	-	-	7.82	4	<3.5		1.7	75	-	28	<1		12	<0.4	28	<3	110	1.4	58	0.36	0.083	0.17	-
TDG Depot	TP27	1.50	Glacial Till	-	-	8.5	9	<3.5		9.8	220	-	30	<1		<2	<0.4	29	<3	270	1.6	130	0.18	0.17	0.7	-
TDG Depot	TP28	0.50	Made Ground Hardcore	-	-	12.29	<3	<3.5		0.5	8	-	<6	<1		7	<0.4	3.2	<3	19	<0.4	10	0.13	0.062	0.12	-
TDG Depot	TP28	1.00	Glacial Till	-	-	8.14	4	<3.5		0.6	19	-	13	<1		11	<0.4	11	<3	61	0.6	22	0.12	0.15	0.15	-
TDG Depot	TP28	1.50	Glacial Till	-	-	6.17	5	<3.5		<0.2	15	-	28	<1		24	<0.4	25	<3	96	0.9	20	0.075	0.16	0.08	-
TDG Depot	TP29	0.50	Made Ground Granular	-	-	10.4	<3	<3.5		0.4	<4.5	-	<6	<1		7	<0.4	<0.9	<3	8.7	<0.4	6.4	0.063	0.19	0.15	-
TDG Depot	TP29	1.00	Made Ground Granular	-	-	8.33	<3	<3.5		0.5	6.8	-	<6	<1		4	<0.4	1.2	<3	21	<0.4	10	0.19	0.12	0.09	-
TDG Depot	TP29	1.50	Glacial Till	-	-	7.11	7	<3.5		0.2	16	-	26	<1		17	<0.4	28	<3	83	0.9	21	0.049	0.12	0.06	-
TDG Depot	TP30	0.50	Made Ground Hardcore	-	-	8.93	<3	<3.5		0.4	<4.5	-	<6	<1		18	<0.4	<0.9	<3	11	<0.4	5.2	0.062	0.17	0.08	-
TDG Depot	TP30	1.00	Made Ground Sand	-	-	8.92	4	<3.5		2.7	67	-	13	<1		12	<0.4	13	<3	91	0.8	49	0.59	0.068	0.28	-
TDG Depot	TP30	1.50	Glacial Till	-	`	6.04	5	<3.5		0.7	35	-	24	<1		15	<0.4	19	<3	62	0.8	33	0.19	0.12	0.21	-
TDG Depot	TP31	0.50	Made Ground Hardcore	-	-	11.16	23	<3.5		0.4	5.2	-	14	<1		<2	<0.4	<0.9	<3	14	<0.4	8.4	<0.010	0.026	0.03	-
TDG Depot	TP31	1.50	Glacial Till	-	-	7.55	7	<3.5		<0.2	16	-	25	<1		12	<0.4	28	<3	56	0.8	17	0.019	0.021	0.09	-
TDG Depot	TP32	0.50	Made Ground Hardcore	-	-	7.34	6	<3.5		<0.2	18	-	27	<1		15	<0.4	30	<3	56	1.3	20	0.032	0.052	0.05	-
TDG Depot	TP32	1.50	Coal Measures Bedrock	-	-	6.8	15	<3.5		<0.2	13	-	35	<1		23	<0.4	27	<3	54	0.7	16	0.035	0.034	0.23	-
TDG Depot	TP33	0.50	Made Ground Granular	-	-	8.55	25	<3.5		0.5	6.2	-	24	<1		15	<0.4	15	<3	65	<0.4	10	0.04	0.038	0.43	-
TDG Depot	TP33	1.50	Glacial Till	-	-	6.81	9	<3.5		<0.2	16	-	32	<1		14	<0.4	30	<3	68	0.7	19	0.023	0.052	0.05	-
TDG Depot	TP34	0.50	Made Ground Granular	-	-	8.48	7	<3.5		6	85	-	15	<1		6	<0.4	17	<3	210	1.3	66	0.6	0.21	0.33	-
TDG Depot	TP34	1.50	Glacial Till	-	-	5.69	6	<3.5		<0.2	17	-	27	<1		19	<0.4	31	<3	75	1	17	0.029	0.067	0.07	-
TDG Depot	TP35	0.50	Made Ground Hardcore	-	-	9.87	4	<3.5		0.3	<4.5	-	<6	<1		5	<0.4	3	<3	5.7	<0.4	6.6	0.088	0.27	0.11	-
TDG Depot	TP36	0.50	Made Ground Slag	-	-	11.97	10	<3.5		<0.2	<4.5	-	<6	<1		5	<0.4	<0.9	<3	9.8	**9.4**	6.7	2.7	0.07	2.7	-
TDG Depot	TP36	1.50	Glacial Till	-	-	5.74	4	<3.5		0.4	33	-	25	<1		24	<0.4	20	<3	63	0.9	31	0.18	0.089	0.06	-
TDG Depot	TP37	0.50	Made Ground Slag	-	-	11.29	8	5.4		0.5	8	-	<6	<1		8	<0.4	1.9	5	21	**5.7**	11	1.8	0.17	1.2	-
TDG Depot	TP37	1.50	Made Ground Organic Granular	-	-	7.52	**40**	<3.5		0.3	9.5	-	26	<1		40	<0.4	24	<3	27	<0.4	15	1.4	1.5	0.66	-
TDG Depot	TP38	0.50	Made Ground Slag	-	-	10.87	5	<3.5		0.4	7.5	-	<6	<1		44	<0.4	7	5	61	**6.2**	14	1.6	0.019	1.2	-
TDG Depot	TP38	1.50	Made Ground Organic Granular	-	-	7.17	**43**	<3.5		0.2	17	-	24	<1		22	<0.4	33	<3	57	1	18	0.04	0.035	0.07	-
TDG Depot	TP39	0.50	Made Ground Slag	-	-	8.26	<3	<3.5		<0.2	5.3	-	<6	<1		7	<0.4	2.7	<3	18	<0.4	11	2.3	1.5	12	-
TDG Depot	TP39	1.50	Glacial Till	-	-	5.83	6	<3.5		<0.2	16	-	27	<1		15	<0.4	32	<3	61	1	18	0.086	0.27	0.07	-
TDG Depot	TP40	0.50	Made Ground Slag	-	-	9.11	<3	<3.5		<0.2	8	-	<6	<1		3	<0.4	5	<3	13	**1.8**	15	9.9	1.4	5	-
TDG Depot	TP40	1.50	Glacial Till	-	-	6.93	6	<3.5		<0.2	19	-	23	<1		32	<0.4	13	<3	43	0.6	23	0.12	0.28	0.04	-
TDG Depot	TP41	0.50	Glacial Till	-	-	8.35	6	<3.5		<0.2	20	-	23	<1		15	<0.4	26	<3	63	1.2	21	0.027	0.066	0.13	-
TDG Depot	TP41	1.50	Glacial Till	-	-	8.29	8	<3.5		<0.2	19	-	22	<1		15	<0.4	25	<3	45	1.1	21	0.053	0.041	0.14	-
Phosporite Storage	TP42	0.50	Glacial Till	-	-	8.45	17	<3.5		1.1	15	-	9	<1		12	<0.4	5.1	<3	43	1.6	16	0.15	0.067	0.1	-
Phosporite Storage	TP42	1.50	Coal Measures Bedrock	-	-	7.54	4	<3.5		<0.2	37	-	<6	<1		<2	<0.4	17	<3	21	1.4	23	<0.010	0.013	0.01	-
Phosporite Storage	TP43	0.50	Granular Made Ground	-	-	10.69	4	8.7		<0.2	<4.5	-	<6	<1		<2	<0.4	<0.9	<3	6.9	**9.5**	8.4	1.4	0.18	2.4	-
Phosporite Storage	TP43	1.50	Glacial Till	-	-	7.56	10	<3.5		<0.2	17	-	33	<1		39	<0.4	36	<3	27	0.8	32	0.1	0.16	0.14	-
Phosporite Storage	TP44	0.50	Granular Made Ground	-	-	6.82	11	<3.5		<0.2	20	-	33	<1		20	<0.4	38	<3	62	1.1	21	0.066	0.12	0.15	-
Phosporite Storage	TP44	1.50	Glacial Till	-	-	8.26	9	<3.5		<0.2	17	-	27	<1		14	<0.4	27	<3	58	0.9	18	0.032	0.047	0.17	-
Phosporite Storage	TP45	0.50	Glacial Till	-	-	6.33	7	<3.5		<0.2	18	-	30	<1		14	<0.4	35	<3	65	1	19	0.054	0.11	0.06	-
Phosporite Storage	TP45	1.50	Coal Measures Bedrock	-	-	6.25	10	<3.5		<0.2	16	-	25	<1		13	<0.4	28	<3	57	0.8	18	0.11	0.47	0.16	-
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP106	0.40	Made Ground Granular	-	1.05	7.93	9.98	<1		0.659	19.1	-	26.3	<1		8.07	<0.14	30.1	<1	41.2	0.988	15.9	-	<0.008		-
TDG Depot	TP107	0.50	Glacial Till	-	2.19	7.54	8.9	<1		0.85	17.7	-	12.7	<1		14.3	<0.14	11.2	1.17	17.1	0.628	23.9	-	<0.008		-
TDG Depot	TP108	0.60	Glacial Till	-	1.88	7.81	10.3	<1		0.722	25.7	-	12.3	<1		20.4	<0.14	9.34	1.37	27.4	0.57	30.6	-	<0.008		-
TDG Depot	TP109	0.50	Glacial Till	-	1.05	7.63	14.8	<1		1.83	14.1	-	18.1	<1		<7	<0.14	4.09	<10	41.7	0.227	24.9	-	<0.008		-
TDG Depot	TP110	0.50	Glacial Till	-	0.552	7.24	4.4	<1		0.405	16.8	-	18.5	<1		4.08	<0.14	13.1	<1	24	0.555	14.7	-	<0.008		-
TDG Depot	TP111	0.10	Topsoil	-	5.14	5.21	14.9	<1		0.873	29.1	-	24.4	<1		64	<0.14	20.1	2	52.5	0.678	55.5	-	0.0229		-
TDG Depot	TP111	0.50	Glacial Till	-	0.741	8.1	4.01	<1		0.46	16.4	-	20.6	<1		7.7	<0.14	15.4	<1	33.4	0.416	15.5	-	<0.008		-
TDG Depot	TPA	-	NO LOG PRESENTED	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPB	-	NO LOG PRESENTED	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPC	-	NO LOG PRESENTED	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP48	0.50	Glacial Till	-	-	7.22	16	<3.5		<0.2	22	-	<6	<1		14	<0.4	16	<3	24	<0.4	30	0.046	0.008	0.03	-
Field	TP48	1.50	Coal Measures Bedrock	-	-	7.24	12	<3.5		<0.2	26	-	<6	<1		6	<0.4	15	<3	24	<0.4	20	0.01	-	0.01	-
Infilled Reservoir	TP49	0.50	Glacial Till	-	-	6.97	18	<3.5		<0.2	36	-	110	<1		110	<0.4	**290**	<3	300	**14**	110	0.077	0.045	0.25	-
Infilled Reservoir	TP49	1.50	Glacial Till	-	-	7.17	12	<3.5		<0.2	14	-	18	<1		14	<0.4	17	<3	44	0.6	18	0.015	0.045	0.03	-
Infilled Reservoir	TP50	0.50	Made Ground	-	-	7.07	**39**	<3.5		0.2	17	-	38	<1		90	<0.4	28	<3	120	0.6	16	0.19	0.036	0.52	-

Site Area	Hole ID	Depth (m)	Material	Table 1 Inorganic Determinands: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																				
				TOC	SOM	pH	As	B	Ca	Cd	Cr (III)	Cr (VI)	Cu	CN (total)	Fe	Pb	Hg	Ni	Se	Zn	Be	V	SO_4 (Total)	SO_4	S (Total)	Asbestos
Infilled Reservoir	TP50	1.50	Glacial Till	-	-	7.11	18	<3.5		0.2	30	-	48	<1		43	<0.4	32	<3	110	0.7	19	0.045	0.081	0.26	-
Infilled Reservoir	TP51	0.50	Made Ground	-	-	7.7	**47**	<3.5		0.6	21	-	170	<1		**230**	<0.4	83	<3	370	**2.2**	45	0.19	0.17	0.42	-
Infilled Reservoir	TP51	1.50	Glacial Till	-	-	6.84	33	<3.5		0.4	16	-	85	<1		120	<0.4	56	<3	270	1.3	35	0.12	0.086	0.31	-
Infilled Reservoir	TP52	0.50	Made ground	-	-	6.62	18	<3.5		<0.2	18	-	25	<1		34	<0.4	24	<3	56	0.8	28	0.036	0.034	0.13	-
Infilled Reservoir	TP52	1.50	Made ground	-	-	7.13	24	<3.5		<0.2	20	-	38	<1		71	<0.4	33	<3	110	1.3	38	0.073	0.093	0.15	-
Field	TP53	0.60	Glacial Till	-	1.81	8.05	12.4	<1		0.652	19.1	-	25.6	<1		18.7	<0.14	25	1.17	54	0.99	19.9	-	<0.008	-	-
Field	TP54	0.50	Glacial Till	-	1.24	7.51	12.2	<1		0.538	19.5	-	4.22	<1		20.9	<0.14	10.2	1.1	20.9	0.513	30.4	-	0.0362	-	-
Infilled Reservoir	TP55	0.90	Made Ground	-	9.33	6.38	22.3	1.73		0.666	16.8	-	50.3	<1		157	<0.14	49.9	1.26	121	1.36	36.3	-	1.59	-	NAD
Infilled Reservoir	TP55	1.40	Glacial Till	-	1.52	7.07	14.6	<1		0.585	21.4	-	14.9	<1		12.3	<0.14	21.4	<1	33.4	1.2	22.4	-	0.0282	-	-
Field	TP56	-	NO LOG PRESENTED	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP57	0.50	Made Ground	-	1.72	7.54	15.7	<1		0.74	23.2	-	23.9	<1		18.2	<0.14	30.2	1.01	41	1.47	24.3	-	0.0151	-	-
Field	TP58	0.75	Coal Measures Bedrock	-	<0.35	7.16	24	<1		0.6	36.7	-	3.5	<1		8.54	<0.14	17.7	<1	22	1.37	25.2	-	<0.008	-	-
Field	TP59	0.20	Topsoil	-	7.78	5.85	23.6	<1		0.851	25.9	-	49	<1		53.6	<0.14	42.3	1.83	56.4	**2.11**	37.3	-	<0.008	-	-
Field	TP59	0.50	Made Ground	-	5.22	6.5	22.3	<1		0.603	24.8	-	52.8	<1		10.1	<0.14	41.3	1.16	34.7	**3.09**	23.4	-	<0.008	-	-
Field	TP60	0.50	Glacial Till	-	<0.35	6.49	34.2	<1		2.49	<9	-	<14	<1		<7	<0.14	<2	<10	<19	0.276	41.3	-	<0.008	-	-
Infilled Reservoir	TP61	0.35	Glacial Till	-	4.33	7.78	**91.2**	<1		1.45	22.7	-	42	<1		45.4	<0.14	103	<10	58.7	**1.92**	56.7	-	0.078	-	-
Infilled Reservoir	TP62	0.70	Glacial Till	-	1.63	7.77	12.5	<1		0.499	20.3	-	21.8	<1		17.7	<0.14	18	<1	39.6	1.06	20.9	-	0.0162	-	-
Infilled Reservoir	TP63	0.30	Made Ground	-	1.28	7.01	19.4	<1		0.679	28.1	-	17.8	<1		17.5	<0.14	29.4	<1	41.7	**2.43**	28.5	-	0.0219	-	-
Infilled Reservoir	TP64	0.70	Made Ground	-	12.1	6.67	16	<1		0.516	18.8	-	128	<1		34.9	<0.14	57.7	1.23	61.3	1.51	29.1	-	0.085	-	NAD
Infilled Reservoir	TP64	2.40	Glacial Till	-	2.22	7.34	19	<1		0.701	18.1	-	16.8	<1		**299**	<0.14	24.5	<1	40.4	1.08	20.2	-	0.0289	-	-
Infilled Reservoir	TP64a	0.80	Made Ground	-	1.14	7.41	14.3	<1		0.564	25	-	13.1	<1		16.1	<0.14	25.2	<1	35.5	**2.45**	23.8	-	0.0237	-	-
Infilled Reservoir	TP65	0.40	Made Ground	-	45.7	7.4	31.7	1.13		0.866	12.8	-	78.1	<1		80.8	<0.14	61	1.97	136	1.65	30.9	-	0.373	-	NAD
Infilled Reservoir	TP65	1.30	Glacial Till	-	0.603	7.25	14.5	<1		0.566	18.9	-	2.32	<1		13.1	<0.14	14.9	<1	18.7	0.488	29	-	<0.008	-	-
Infilled Reservoir	TP66	0.60	Made Ground	-	6.48	6.79	21.3	<1		0.81	20.1	-	45.2	<1		49.7	<0.14	38.3	1.68	100	0.913	15.9	-	0.0881	-	NAD
Infilled Reservoir	TP66	2.60	Glacial Till	-	1.28	7.28	19.4	<1		0.588	18.3	-	9.33	<1		15	<0.14	19.9	<1	31.6	1.03	27.4	-	0.0336	-	-
Field	TP67	0.80	Glacial Till	-	1.28	6.98	10.1	<1		0.425	19.3	-	15.8	<1		16.5	<0.14	13.1	<1	19.2	0.518	24.2	-	0.0262	-	-
Field	TP68	0.20	Topsoil	-	14.1	7.39	28.4	1.01		0.892	35.4	-	57.6	<1		94.2	<0.14	43.1	3.28	91.8	1.37	52.9	-	<0.008	-	-
Field	TP68	0.50	Glacial Till	-	1.88	7.89	12.6	<1		0.541	20.5	-	23.1	<1		17	<0.14	15.1	1.14	34.8	0.636	21.4	-	<0.008	-	-
Field	TP69	0.75	Glacial Till	-	1.95	7.52	7.92	<1		0.638	40.4	-	20.3	<1		14.2	<0.14	32.1	<1	56.3	1.64	33.1	-	0.0221	-	-
Field	TP70	0.50	Glacial Till	-	<0.35	8.53	2.37	<1		0.421	10.2	-	<1.4	<1		0.97	<0.14	8.08	2.03	14.9	0.399	24.7	-	<0.008	-	-
Field	TP71	0.60	Glacial Till	-	2.05	7.91	15.8	<1		0.826	20.3	-	23.7	<1		13.9	<0.14	28.3	<1	55.5	**1.85**	22.8	-	0.0237	-	-
Field	TP72	0.60	Glacial Till	-	1.7	7.76	10	<1		0.783	20.6	-	18.9	<1		13.7	<0.14	11.3	<1	23.6	0.619	23.1	-	0.0208	-	-
Field	TP73	0.20	Topsoil	-	5.45	6.41	**40.4**	<1		3.56	18.2	-	<14	<1		47.4	<0.14	21.2	<10	61.4	1.02	47.5	-	0.223	-	-
Field	TP73	0.60	Glacial Till	-	1.1	7.61	11.9	<1		0.619	22.2	-	20	<1		11	<0.14	9.5	<1	19.5	0.553	23.1	-	<0.008	-	-
Field	TP74	0.55	Glacial Till	-	1.22	6.98	13.7	<1		0.306	15.4	-	2.79	<1		12.6	<0.14	7.75	<1	8.11	0.492	21.5	-	0.0323	-	-
Field	TP75	0.50	Glacial Till	-	2.31	7.87	18.1	<1		0.516	22.1	-	13.4	<1		24.7	<0.14	14	1.16	20.3	0.679	27.6	-	0.0122	-	-
Field	TP76	0.65	Glacial Till	-	1.58	7.33	13	<1		0.504	20.2	-	28.9	<1		14.1	<0.14	16.1	<1	30.2	1.31	22.9	-	0.0107	-	-
Field	TP77	0.50	Glacial Till	-	0.914	7.39	8.82	<1		0.568	19.5	-	15.1	<1		10.5	<0.14	9.91	<1	25.1	0.542	22.7	-	0.014	-	-
Field	TP78	0.10	Topsoil	-	7.14	6.98	20	<1		0.791	30	-	27.4	<1		54.7	<0.14	21	1.49	61.4	0.843	46.9	-	<0.008	-	-
Field	TP78	0.70	Glacial Till	-	1.11	7.65	13.6	<1		0.567	20.1	-	9.87	<1		12.8	<0.14	9.9	<1	13.2	0.769	23.2	-	<0.008	-	-
Field	TP79	0.55	Glacial Till	-	1.88	7.1	14.7	<1		0.581	22	-	27.3	<1		12.2	<0.14	14	<1	27.2	0.84	23.6	-	<0.008	-	-
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorite Storage	TP83	0.60	Glacial Till	-	1.38	7.89	10	<1		3.79	22.9	-	14.4	<1		<7	<0.14	48.2	<10	37.3	**1.91**	69	-	0.0238	-	-

Key	
BOLD	Determinand in excess of critical concentration
-	Determinand not tested for
<	Determinand concentration is below indicated “method” level of detection
AND	Abestos not detected

Source of Critical Concentration
For source of Generic Assessment Criteria refer to Generic Notes 4 "Contamination Assessment"
* C4SL

Site Area	Hole ID	Depth (m)	Material	Table 2 Speciated Polycyclic Aromatic Hydrocarbons: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																	
				TOC	SOM	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(ah)anthracene	Fluoranthene	Fluorene	Indeno(123-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
	S4UL Residential with homegrown produce (1% SOM)			%	%	210	170	2400	7.2	2.2	2.6	320	77	15	0.24	280	170	27	2.3	95	620
	S4UL Residential with homegrown produce (2.5% SOM)			%	%	510	420	5400	11	2.7	3.3	340	93	22	0.28	560	400	36	5.6	220	1200
IDG Laboratory Data 2020																					
Anhydrite Stockpile	TP801	1.5	Anhydrite/Sandstone Made Ground	4.4	7.6	1.1	0.24	2.6	5.0	**4.0**	**3.5**	2.0	1.9	4.7	**0.76**	11	1.6	2.4	0.76	9.4	9.8
Anhydrite Stockpile	TP802	2.3	Anhydrite/Sandstone Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anhydrite Stockpile	TP803	1.2	Anhydrite/Sandstone Made Ground	3.2	5.5	0.27	0.11	0.87	3.7	**3.2**	**4.2**	1.5	1.7	4.1	**0.56**	7.8	0.30	1.9	0.34	3.6	7.3
Anhydrite Stockpile	TP804	0.8	Anhydrite/Sandstone Made Ground	2.2	3.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anhydrite Stockpile	TP805	0.6	Anhydrite/Sandstone Made Ground	5.6	9.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP701	0.10	Topsoil	7.0	12.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	<0.1	<0.1	0.5
Field	TP703	0.20	Topsoil	5.8	10.0	<0.1	<0.1	0.1	0.5	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	0.6	<0.1	<0.1	<0.1	0.9	0.7
Field	TP705	0.15	Topsoil	0.9	1.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<	<0.1
Field	TP708	0.75	Glacial Till	5.4	9.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	0.4
Field	TP709	0.20	Topsoil	2.6	4.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Field	TP712	0.10	Topsoil	4.6	7.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	0.8
Field	TP713	0.15	Topsoil	3.4	5.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Field	TP714	1.00	Glacial Till	0.4	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Field	TP714	0.10	Topsoil	3.5	6.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Field	TP715	0.10	Topsoil	2.4	4.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Field	TP717	0.15	Topsoil	3.5	6.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Field	TP719	0.10	Made Ground Topsoil	9.1	15.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Infilled Reservoir	TP722	0.05	Made Ground Topsoil	5.8	10.0	<0.1	<0.1	0.1	0.5	0.6	0.7	0.5	0.2	0.7	0.2	1.2	<0.1	0.4	<0.1	0.8	1.2
Infilled Reservoir	TP720	0.05	Made Ground Topsoil	6.9	11.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	<0.1	<	0.6
Infilled Reservoir	TP720	0.60	Cohesive Made Ground	2.7	4.7	<0.1	<0.1	0.2	0.3	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	0.5	<0.1	<0.1	<0.1	0.5	0.5
Infilled Reservoir	TP721	0.40	Ash & Clinker	24.0	41.4	<0.1	<0.1	0.3	0.6	<0.1	<0.1	<0.1	<0.1	0.7	<0.1	0.9	<0.1	<0.1	<0.1	2.3	1.1
Infilled Reservoir	TP722	0.05	Made Ground Topsoil	6.1	10.5	<0.1	<0.1	0.2	0.5	<0.1	<0.1	<0.1	<0.1	0.9	<0.1	1.0	<0.1	<0.1	<0.1	0.7	1.1
Field	TP724	0.10	Topsoil	3.1	5.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Field	TP725	0.05	Made Ground Topsoil	5.6	9.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	0.5
Field	TP726	0.20	Made Ground Topsoil	7.3	12.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Field	TP728	0.05	Made Ground Topsoil	16.0	27.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phosphorite Storage	TP730	0.05	Made Ground Topsoil	6.4	11.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	0.7
Field	TP731	0.10	Topsoil	2.6	4.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Field	TP733	0.15	Topsoil	3.9	6.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Field	TP734	0.10	Topsoil	7.0	12.1	<0.1	<0.1	0.1	0.6	0.6	0.7	0.4	0.3	0.9	0.1	1.2	<0.1	0.3	<	1.6	1.2
Field	TP735	0.40	Granular Made Ground	27.0	46.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDG Depot	TP739	1.20	Possible Relict Topsoil	7.7	13.3	<0.1	<0.1	0.9	0.6	<0.1	<0.1	<0.1	<0.1	1.6	<	1.2	<	<	<	1.4	1.4
TDG Depot	TP742	0.50	Granular Made Ground	0.3	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Integra Laboratory Data 2011																					
TDG Depot	GR1	-	Location not provided	-	-	0.1	0.0	0.8	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.4	0.4	0.1	0.0	0.8	0.3
TDG Depot	GR2	-	Location not provided	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
TDG Depot	TP26	0.50	Made Ground Hardcore	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	0.0	<0.023	<0.017	<0.010	<0.018	0.0	0.0	<0.015
TDG Depot	TP26	1.00	Made Ground Sand	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	0.0	0.0	<0.015
TDG Depot	TP26	1.50	Glacial Till	-	-	0.3	0.1	0.4	0.0	0.1	0.1	0.0	0.0	0.1	<0.023	0.2	0.9	0.0	0.2	0.9	0.3
TDG Depot	TP27	0.50	Made Ground Hardcore	-	-	0.2	<0.012	0.4	1.8	1.5	1.4	0.7	0.6	1.2	0.2	3.2	0.2	0.7	0.0	2.1	2.4
TDG Depot	TP27	1.00	Made Ground Sand	-	-	<0.008	<0.012	<0.016	<0.014	<0.15	0.1	<0.024	<0.014	0.0	<0.023	0.0	0.0	<0.018	0.0	0.2	0.0
TDG Depot	TP27	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
TDG Depot	TP28	0.50	Made Ground Hardcore	-	-	0.0	<0.012	0.0	0.0	0.1	0.1	0.0	0.0	0.0	<0.023	0.1	0.0	0.0	0.1	0.1	0.1
TDG Depot	TP28	1.00	Glacial Till	-	-	0.1	0.0	0.1	0.0	0.1	0.2	0.1	0.1	0.1	<0.023	0.3	0.2	0.1	0.1	0.3	0.3
TDG Depot	TP28	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.0	0.0	0.1	0.1	<0.014	0.1	<0.023	0.1	<0.010	<0.018	0.0	0.5	0.1

Site Area	Hole ID	Depth (m)	Material	Table 2 Speciated Polycyclic Aromatic Hydrocarbons: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																	
				TOC	SOM	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(ah)anthracene	Fluoranthene	Fluorene	Indeno(123-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
TDG Depot	TP29	0.50	Made Ground Granular	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	0.0	<0.015
TDG Depot	TP29	1.00	Made Ground Granular	-	-	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	<0.023	0.2	0.0	0.0	0.0	0.2	0.2
TDG Depot	TP29	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.0	0.0	0.1	0.0	<0.014	0.1	<0.023	0.1	0.0	<0.018	0.0	0.2	0.1
TDG Depot	TP30	0.50	Made Ground Hardcore	-	-	<0.008	<0.012	<0.016	0.0	0.0	0.0	<0.024	<0.014	0.0	<0.023	0.0	0.0	<0.018	0.2	0.2	0.0
TDG Depot	TP30	1.00	Made Ground Sand	-	-	0.0	<0.012	0.0	0.0	0.0	0.0	<0.024	<0.014	0.0	<0.023	0.0	0.0	<0.018	0.0	0.1	0.1
TDG Depot	TP30	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.1	0.0	0.1	0.1	<0.014	0.1	<0.023	0.1	<0.010	<0.018	0.0	0.3	0.1
TDG Depot	TP31	0.50	Made Ground Hardcore	-	-	<0.008	<0.012	<0.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.010	0.0	<0.009	0.0	0.0
TDG Depot	TP31	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.1	0.0	0.0	0.0	<0.014	0.1	<0.023	0.0	<0.010	<0.018	0.1	0.3	0.1
TDG Depot	TP32	0.50	Made Ground Hardcore	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	0.0	<0.023	<0.017	<0.010	<0.018	0.0	0.1	0.0
TDG Depot	TP32	1.50	Coal Measures Bedrock	-	-	<0.008	<0.012	<0.016	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
TDG Depot	TP33	0.50	Made Ground Granular	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	0.0	<0.024	<0.014	0.0	<0.023	<0.017	<0.010	<0.018	<0.009	0.0	0.0
TDG Depot	TP33	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	0.0	0.0	<0.014	0.0	<0.023	0.0	<0.010	<0.018	0.0	0.1	0.0
TDG Depot	TP34	0.50	Made Ground Granular	-	-	<0.008	<0.012	0.0	0.1	0.1	0.1	0.0	0.0	0.1	<0.023	0.2	0.0	0.1	0.1	0.2	0.1
TDG Depot	TP34	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.0	0.0	0.1	0.1	<0.014	0.1	<0.023	0.1	<0.010	<0.018	0.0	0.3	0.1
TDG Depot	TP35	0.50	Made Ground Hardcore	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	0.0	0.0	<0.015
TDG Depot	TP36	0.50	Made Ground Slag	-	-	<0.008	<0.012	<0.016	0.1	0.1	0.1	0.1	0.0	0.1	<0.023	0.1	<0.010	0.0	<0.009	0.0	0.1
TDG Depot	TP36	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.0	<0.015	0.1	0.0	<0.014	0.1	<0.023	0.0	<0.010	<0.018	0.0	0.2	0.1
TDG Depot	TP37	0.50	Made Ground Slag	-	-	13.0	0.5	26.0	**100.0**	**98.0**	**97.0**	52.0	45.0	**80.0**	**14.0**	200.0	12.0	**47.0**	**3.1**	**100.0**	170.0
TDG Depot	TP37	1.50	Made Ground Organic Granular	-	-	0.0	0.0	0.1	0.3	0.1	0.2	0.2	0.1	0.5	0.1	0.3	0.1	0.1	1.7	2.2	0.3
TDG Depot	TP38	0.50	Made Ground Slag	-	-	<0.008	<0.012	<0.016	0.0	0.0	0.0	<0.024	<0.014	0.0	<0.023	0.0	<0.010	<0.018	0.0	0.1	0.0
TDG Depot	TP38	1.50	Made Ground Organic Granular	-	-	<0.008	<0.012	<0.016	0.0	<0.015	<0.015	<0.024	<0.014	0.0	<0.023	0.0	0.0	<0.018	0.0	0.2	0.0
TDG Depot	TP39	0.50	Made Ground Slag	-	-	0.5	0.0	1.0	**7.6**	**7.2**	**5.6**	4.0	3.5	6.0	**1.1**	13.0	0.4	3.6	0.1	4.6	11.0
TDG Depot	TP39	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.1	0.0	0.1	0.1	0.0	0.1	<0.023	0.1	<0.010	<0.018	0.1	0.5	0.1
TDG Depot	TP40	0.50	Made Ground Slag	-	-	0.0	<0.012	0.1	0.4	0.4	0.4	0.2	0.2	0.4	0.1	0.7	0.0	0.2	0.1	0.4	0.6
TDG Depot	TP40	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	0.0	<0.023	<0.017	<0.010	<0.018	<0.009	0.1	<0.015
TDG Depot	TP41	0.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.0	0.0	0.0	0.0	<0.014	0.0	<0.023	0.0	0.0	<0.018	0.0	0.2	0.0
TDG Depot	TP41	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.0	<0.015	<0.015	<0.024	<0.014	0.0	<0.023	0.0	0.0	<0.018	0.1	0.2	0.0
Phosporite Storage	TP42	0.50	Glacial Till	-	-	0.0	0.1	0.1	0.6	0.9	1.0	1.3	0.6	0.6	**0.3**	0.8	0.1	1.0	0.2	0.4	0.8
Phosporite Storage	TP42	1.50	Coal Measures Bedrock	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Phosporite Storage	TP43	0.50	Granular Made Ground	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Phosporite Storage	TP43	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.0	0.0	0.0	<0.024	<0.014	0.0	<0.023	0.0	<0.010	<0.018	0.0	0.1	0.0
Phosporite Storage	TP44	0.50	Granular Made Ground	-	-	<0.008	<0.012	<0.016	0.1	0.0	0.1	0.0	<0.014	0.1	<0.023	0.1	<0.010	<0.018	0.0	0.1	0.0
Phosporite Storage	TP44	1.50	Glacial Till	-	-	<0.008	<0.012	0.0	0.0	0.0	0.0	0.0	<0.014	0.1	<0.023	0.0	0.1	<0.018	0.2	0.3	0.0
Phosporite Storage	TP45	0.50	Glacial Till	-	-	<0.008	<0.012	<0.016	0.0	<0.015	0.0	0.0	<0.014	0.1	<0.023	0.0	<0.010	<0.018	0.0	0.3	0.1
Phosporite Storage	TP45	1.50	Coal Measures Bedrock	-	-	<0.008	<0.012	0.0	0.0	0.0	0.0	0.0	<0.014	0.0	<0.023	0.0	0.0	<0.018	0.1	0.3	0.0
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP106	0.40	Made Ground Granular	-	1.1	<0.008	<0.012	<0.016	<0.014	<0.015	0.0	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
TDG Depot	TP107	0.50	Glacial Till	-	2.2	<0.008	<0.012	<0.016	<0.014	<0.015	0.0	<0.024	<0.014	0.0	<0.023	<0.017	<0.010	<0.018	0.0	0.0	<0.015
TDG Depot	TP108	0.60	Glacial Till	-	1.9	<0.008	0.0	<0.016	0.1	0.1	0.1	0.0	0.0	0.1	<0.023	0.1	<0.010	0.0	0.0	0.0	0.1
TDG Depot	TP109	0.50	Glacial Till	-	1.1	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
TDG Depot	TP110	0.50	Glacial Till	-	0.6	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
TDG Depot	TP111	0.10	Topsoil	-	5.1	0.0	0.0	0.0	0.2	0.2	0.3	0.2	0.1	0.2	0.0	0.4	0.0	0.1	0.1	0.3	0.3
TDG Depot	TP111	0.50	Glacial Till	-	0.7	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
TDG Depot	TPA	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPB	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPC	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP48	0.50	Glacial Till	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	0.0	<0.015
Field	TP48	1.50	Coal Measures Bedrock	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015

Site Area	Hole ID	Depth (m)	Material	Table 2 Speciated Polycyclic Aromatic Hydrocarbons: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																	
				TOC	SOM	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(ah)anthracene	Fluoranthene	Fluorene	Indeno(123-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Infilled Reservoir	TP49	0.50	Glacial Till	-	-	0.0	0.0	0.1	0.3	0.3	0.4	0.2	0.2	0.4	0.1	0.5	0.0	0.2	0.3	0.8	0.4
Infilled Reservoir	TP49	1.50	Glacial Till	-	-	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	0.0	0.0
Infilled Reservoir	TP50	0.50	Made Ground	-	-	0.0	<0.012	0.0	0.1	0.0	0.0	0.0	<0.014	0.1	<0.023	0.1	0.1	<0.018	0.6	0.7	0.1
Infilled Reservoir	TP50	1.50	Glacial Till	-	-	0.0	<0.012	0.0	0.1	0.0	0.1	0.0	0.0	0.1	<0.023	0.1	0.1	<0.018	0.5	0.4	0.1
Infilled Reservoir	TP51	0.50	Made Ground	-	-	0.3	1.2	5.1	**13.0**	**11.0**	**10.0**	5.1	4.9	10.0	**1.4**	29.0	1.2	5.0	1.2	12.0	22.0
Infilled Reservoir	TP51	1.50	Glacial Till	-	-	0.1	0.4	0.7	3.3	**2.8**	**3.5**	1.6	1.6	2.8	**0.5**	6.1	0.4	1.5	1.0	4.0	4.6
Infilled Reservoir	TP52	0.50	Made ground	-	-	<0.008	<0.012	0.0	0.1	0.1	0.1	0.1	0.0	0.1	<0.023	0.2	0.0	0.0	0.1	0.3	0.1
Infilled Reservoir	TP52	1.50	Made ground	-	-	0.1	<0.012	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.0	0.3	0.1	0.1	0.4	0.8	0.2
Field	TP53	0.60	Glacial Till	-	1.8	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	0.0	<0.015
Field	TP54	0.50	Glacial Till	-	1.2	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Infilled Reservoir	TP55	0.90	Made Ground	-	9.3	0.1	0.0	0.2	0.5	0.4	0.6	0.3	0.2	0.5	0.1	0.9	0.2	0.2	0.4	0.9	0.6
Infilled Reservoir	TP55	1.40	Glacial Till	-	1.5	<0.008	<0.012	<0.016	<0.014	<0.015	0.0	<0.024	<0.014	0.0	<0.023	<0.017	<0.010	<0.018	0.0	0.1	0.0
Field	TP56	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP57	0.50	Made Ground	-	1.7	<0.008	<0.012	<0.016	<0.014	<0.015	0.0	<0.024	<0.014	0.0	<0.023	0.0	<0.010	<0.018	<0.009	0.0	0.0
Field	TP58	0.75	Coal Measures Bedrock	-	<0.35	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Field	TP59	0.20	Topsoil	-	7.8	<0.008	0.0	<0.016	0.1	0.0	0.1	0.0	0.0	0.1	<0.023	0.1	<0.010	0.0	0.1	0.2	0.1
Field	TP59	0.50	Made Ground	-	5.2	<0.008	<0.012	<0.016	<0.014	<0.015	0.1	<0.024	0.0	0.0	<0.023	0.0	<0.010	<0.018	<0.009	0.1	0.1
Field	TP60	0.50	Glacial Till	-	<0.35	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Infilled Reservoir	TP61	0.35	Glacial Till	-	4.3	<0.008	<0.012	<0.016	0.0	0.0	0.0	<0.024	<0.014	0.0	<0.023	0.0	<0.010	<0.018	0.0	0.1	0.0
Infilled Reservoir	TP62	0.70	Glacial Till	-	1.6	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	0.0	0.0	<0.015
Infilled Reservoir	TP63	0.30	Made Ground	-	1.3	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Infilled Reservoir	TP64	0.70	Made Ground	-	12.1	0.1	0.0	0.3	0.6	0.4	0.6	0.3	0.2	0.5	0.1	1.2	0.2	0.2	0.4	1.3	0.9
Infilled Reservoir	TP64	2.40	Glacial Till	-	2.2	<0.008	<0.012	<0.016	0.0	<0.015	0.0	0.0	<0.014	0.0	<0.023	0.0	0.0	<0.018	0.0	0.2	0.0
Infilled Reservoir	TP64a	0.80	Made Ground	-	1.1	<0.008	<0.012	<0.016	0.0	<0.015	0.0	<0.024	<0.014	0.0	<0.023	0.0	<0.010	<0.018	0.0	0.1	0.0
Infilled Reservoir	TP65	0.40	Made Ground	-	45.7	0.2	0.1	0.5	1.4	1.1	1.4	0.6	0.5	1.3	0.2	2.7	0.5	0.5	0.8	2.8	2.1
Infilled Reservoir	TP65	1.30	Glacial Till	-	0.6	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Infilled Reservoir	TP66	0.60	Made Ground	-	6.5	0.0	<0.012	0.0	0.1	0.0	0.0	0.0	<0.014	0.1	<0.023	0.1	0.1	<0.018	0.2	0.4	0.0
Infilled Reservoir	TP66	2.60	Glacial Till	-	1.3	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	0.0	0.0	<0.015
Field	TP67	0.80	Glacial Till	-	1.3	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Field	TP68	0.20	Topsoil	-	14.1	0.0	0.0	0.1	0.5	0.4	0.8	0.3	0.2	0.5	0.1	0.8	0.1	0.2	0.6	1.8	0.6
Field	TP68	0.50	Glacial Till	-	1.9	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	0.0	<0.015
Field	TP69	0.75	Glacial Till	-	2.0	<0.008	<0.012	<0.016	<0.014	<0.015	0.0	<0.024	<0.014	0.0	<0.023	0.0	<0.010	<0.018	0.0	0.1	0.0
Field	TP70	0.50	Glacial Till	-	<0.35	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Field	TP71	0.60	Glacial Till	-	2.1	<0.008	<0.012	<0.016	0.0	<0.015	0.0	<0.024	<0.014	0.0	<0.023	0.0	<0.010	<0.018	0.0	0.1	0.0
Field	TP72	0.60	Glacial Till	-	1.7	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Field	TP73	0.20	Topsoil	-	5.5	<0.008	0.0	0.0	0.2	0.2	0.3	0.2	0.1	0.2	0.0	0.4	<0.010	0.1	0.1	0.2	0.3
Field	TP73	0.60	Glacial Till	-	1.1	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Field	TP74	0.55	Glacial Till	-	1.2	<0.008	<0.012	0.0	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Field	TP75	0.50	Glacial Till	-	2.3	<0.008	<0.012	<0.016	0.0	0.0	0.1	<0.024	0.0	0.0	<0.023	0.1	<0.010	0.0	0.0	0.0	0.0
Field	TP76	0.65	Glacial Till	-	1.6	<0.008	<0.012	<0.016	<0.014	<0.015	0.0	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Field	TP77	0.50	Glacial Till	-	0.9	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Field	TP78	0.10	Topsoil	-	7.1	<0.008	0.0	0.0	0.3	0.3	0.6	0.2	0.2	0.3	0.1	0.4	0.0	0.2	0.1	0.3	0.3
Field	TP78	0.70	Glacial Till	-	1.1	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	<0.015	<0.015
Field	TP79	0.55	Glacial Till	-	1.9	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	0.0	<0.015
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorite Storage	TP83	0.60	Glacial Till	-	1.4	<0.008	<0.012	<0.016	<0.014	<0.015	<0.015	<0.024	<0.014	<0.010	<0.023	<0.017	<0.010	<0.018	<0.009	0.0	<0.015

Site Area	Hole ID	Depth (m)	Material	Table 2 Speciated Polycyclic Aromatic Hydrocarbons: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																
				TOC	SOM	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(ah)anthracene	Fluoranthene	Fluorene	Indeno(123-cd)pyrene	Naphthalene	Phenanthrene	Pyrene

Key		Source of Critical Concentration
BOLD	Determinand in excess of critical concentration	For source of Generic Assessment Criteria refer to Generic Notes 4 "Contamination Assessment"
-	Determinand not tested for	
<	Determinand concentration is below indicated “method” level of detection	

Site Area	Hole ID	Depth (m)	Material	Table 3 Phytotoxic Assessment: Concentrations in mg/kg unless otherwise stated. Critical Concentrations are dependant on pH value of the material.												
				pH	Cu $				Ni $				Zn $			
					5.0-5.5	5.5-6.0	6.0-7.0	7.0+	5.0-5.5	5.5-6.0	6.0-7.0	7.0+	5.0-5.5	5.5-6.0	6.0-7.0	7.0+
				-	80	100	135	200	50	60	75	110	200	200	200	300
IDG Laboratory Data 2020																
Anhydrite Stockpile	TP801	1.5	Anhydrite/Sandstone Made Ground	10.1				20				26				49
Anhydrite Stockpile	TP802	2.3	Anhydrite/Sandstone Made Ground	9.2				14				18				44
Anhydrite Stockpile	TP803	1.2	Anhydrite/Sandstone Made Ground	9.4				19				23				47
Anhydrite Stockpile	TP804	0.8	Anhydrite/Sandstone Made Ground	9.6				15.0				24.0				55.0
Anhydrite Stockpile	TP805	0.6	Anhydrite/Sandstone Made Ground	9.8				34				41				99
Field	TP701	0.10	Topsoil	7.0				31				26				57
Field	TP702	0.50	Glacial Till	7.5				-				-				-
Field	TP703	0.20	Topsoil	7.6				40				42				85
Field	TP703	1.00	Permian-Triassic Bedrock	8.5				-				-				-
Field	TP705	0.15	Topsoil	7.8				37				20				78
Field	TP708	0.75	Glacial Till	6.9			30				26				48	
Field	TP709	0.20	Topsoil	6.7			23				20				44	
Field	TP710	1.10	Glacial Till	6.6			-					-				-
Field	TP712	0.10	Topsoil	6.8			25.0				17.0				49.0	
Field	TP713	0.15	Topsoil	6.6			25				15				40	
Field	TP714	1.00	Glacial Till	8.2				12				11				18
Field	TP714	0.10	Topsoil	7.5				22				16				39
Field	TP715	0.10	Topsoil	7.5				21				19				43
Field	TP716	0.80	Permian-Triassic Bedrock	7.5				-				-				-
Field	TP717	0.15	Topsoil	7				20				13				28
Field	TP719	0.10	Made Ground Topsoil	6.9			69				58				52	
Field	TP719	1.00	Weathered Middle Coal Measures	7.5				-				-				-
Infilled Reservoir	TP720	0.05	Made Ground Topsoil	6.6			41				35				110	
Infilled Reservoir	TP720	0.60	Cohesive Made Ground	8.1				31				32				70
Infilled Reservoir	TP720	1.10	Asbestos cement fragment	-				-				-				-
Infilled Reservoir	TP720	2.40	Glacial Till	9.8				-				-				-
Infilled Reservoir	TP721	0.40	Ash & Clinker	7.2				**230**				**180**				61
Infilled Reservoir	TP722	0.05	Made Ground Topsoil	7.4				31				27				60
Infilled Reservoir	TP722	0.05	Made Ground Topsoil	7.6				25				23				58
Field	TP724	0.10	Topsoil	6.8			16				14				31	
Field	TP725	0.05	Made Ground Topsoil	6.4			56				46				40	
Field	TP726	0.20	Made Ground Topsoil	8.0				57				25				**470**
Field	TP727	0.75	Glacial Till	7.9				-				-				-

Site Area	Hole ID	Depth (m)	Material	Table 3 Phytotoxic Assessment: Concentrations in mg/kg unless otherwise stated. Critical Concentrations are dependant on pH value of the material.												
				pH	Cu $				Ni $				Zn $			
					5.0-5.5	5.5-6.0	6.0-7.0	7.0+	5.0-5.5	5.5-6.0	6.0-7.0	7.0+	5.0-5.5	5.5-6.0	6.0-7.0	7.0+
				-	80	100	135	200	50	60	75	110	200	200	200	300
Field	TP728	0.05	Made Ground Topsoil	8.1				50				79				38
Field	TP728	1.50	Permian-Triassic	7.9				-				-				-
Infilled Reservoir	TP729	0.85	Glacial Till (possible hydrocarbon staining)	7.8				5				8				12
Phosphorite storage	TP730	0.05	Made Ground Topsoil	7.9				27				29				750
Field	TP731	0.10	Topsoil	6.7			12.0				10.0				38.0	
Field	TP733	0.15	Topsoil	7.5				55.0				15.0				**640.0**
Field	TP733	1.00	Glacial Till	7.9				-				-				-
Field	TP734	0.10	Topsoil	7.2				50				45				76
Field	TP735	0.40	Granular Made Ground	8.2				62				88				46
Field	TP736	0.40	Granular Made Ground	-				-				-				-
TDG Depot	TP737	0.80	Glacial Till	8.2				-				-				-
TDG Depot	TP738	0.50	Hardcore (possible hydrocarbon staining & odour)	8.7				30.0				28.0				69.0
TDG Depot	TP739	1.20	Possible Relict Topsoil	6.7			47.0				48.0				140.0	
TDG Depot	TP740	1.10	Glacial Till (possible hydrocarbon staining)	8.2				30.0				35.0				150.0
TDG Depot	TP742	0.50	Granular Made Ground	11.4				3.9				6.7				11.0
TDG Depot	TP742	1.00	Cohesive Made Ground	-				-				-				-

Integra Laboratory Data 2011

TDG Depot	TP26	0.50	Made Ground Hardcore	11.3				7				<0.9				12
TDG Depot	TP26	1.00	Made Ground Sand	8.4				26				24				230
TDG Depot	TP26	1.50	Glacial Till	8.2				14				12				96
TDG Depot	TP27	0.50	Made Ground Hardcore	10.4				<6				1.8				13
TDG Depot	TP27	1.00	Made Ground Sand	7.8				28				28				110
TDG Depot	TP27	1.50	Glacial Till	8.5				30				29				270
TDG Depot	TP28	0.50	Made Ground Hardcore	12.3				<6				3.2				19
TDG Depot	TP28	1.00	Glacial Clay	8.1				13				11				61
TDG Depot	TP28	1.50	Glacial Till	6.2			28				25				96	
TDG Depot	TP29	0.50	Made Ground Granular	10.4				<6				<0.9				8.7
TDG Depot	TP29	1.00	Made Ground Granular	8.3				<6				1.2				21
TDG Depot	TP29	1.50	Glacial Till	7.1				26				28				83
TDG Depot	TP30	0.50	Made Ground Hardcore	8.9				<6				<0.9				11
TDG Depot	TP30	1.00	Made Ground Sand	8.9				13				13				91
TDG Depot	TP30	1.50	Glacial Till	6.0			24				19				62	
TDG Depot	TP31	0.50	Made Ground Hardcore	11.2				14				<0.9				14

Site Area	Hole ID	Depth (m)	Material	Table 3 Phytotoxic Assessment: Concentrations in mg/kg unless otherwise stated. Critical Concentrations are dependant on pH value of the material.												
				pH	Cu $				Ni $				Zn $			
					5.0-5.5	5.5-6.0	6.0-7.0	7.0+	5.0-5.5	5.5-6.0	6.0-7.0	7.0+	5.0-5.5	5.5-6.0	6.0-7.0	7.0+
				-	80	100	135	200	50	60	75	110	200	200	200	300
TDG Depot	TP31	1.50	Glacial Till	7.6				25				28				56
TDG Depot	TP32	0.50	Made Ground Hardcore	7.3				27				30				56
TDG Depot	TP32	1.50	Glacial Till	6.8			35				27				54	
TDG Depot	TP33	0.50	Made Ground Granular	8.6				24				15				65
TDG Depot	TP33	1.50	Glacial Till	6.8			32				30				68	
TDG Depot	TP34	0.50	Made Ground Granular	8.5				15				17				210
TDG Depot	TP34	1.50	Glacial Till	5.7		27				31				75		
TDG Depot	TP35	0.50	Made Ground Hardcore	9.9				<6				3				5.7
TDG Depot	TP36	0.50	Made Ground Slag	12.0				<6				<0.9				9.8
TDG Depot	TP36	1.50	Glacial Till	5.7		25				20				63		
TDG Depot	TP37	0.50	Made Ground Slag	11.3				<6				1.9				21
TDG Depot	TP37	1.50	Made Ground Organic Granular	7.5				26				24				27
TDG Depot	TP38	0.50	Made Ground Slag	10.9				<6				7				61
TDG Depot	TP38	1.50	Made Ground Organic Granular	7.2				24				33				57
TDG Depot	TP39	0.50	Made Ground Slag	8.3				<6				2.7				18
TDG Depot	TP39	1.50	Glacial Till	5.8		27				32				61		
TDG Depot	TP40	0.50	Made Ground Slag & Anhydrite	9.1				<6				5				13
TDG Depot	TP40	1.50	Glacial Till	6.9			23				13				43	
TDG Depot	TP41	0.50	Glacial Till	8.4				23				26				63
TDG Depot	TP41	1.50	Glacial Till	8.3				22				25				45
Phosporite Storage	TP42	0.50	Glacial Till	8.5				9				5.1				43
Phosporite Storage	TP42	1.50	Siltstone	7.5				<6				17				21
Phosporite Storage	TP43	0.50	Red Granular Made Ground	10.7				<6				<0.9				6.9
Phosporite Storage	TP43	1.50	Glacial Till	7.6				33				36				27
Phosporite Storage	TP44	0.50	Granular Made Ground	6.8			33				38				62	
Phosporite Storage	TP44	1.50	Glacial Till	8.3				27				27				58
Phosporite Storage	TP45	0.50	Glacial Till	6.3			30				35				65	
Phosporite Storage	TP45	1.50	Coal Measures Bedrock	6.3			25				28				57	
TDG Depot	TP80	-	NO LOG PRESENTED	-				-				-				-
TDG Depot	TP81	-	NO LOG PRESENTED	-				-				-				-
TDG Depot	TP82	-	NO LOG PRESENTED	-				-				-				-
TDG Depot	TP106	0.40	Made Ground Granular	7.9				26.3				30.1				41.2
TDG Depot	TP107	0.50	Glacial Till	7.5				12.7				11.2				17.1
TDG Depot	TP108	0.60	Glacial Till	7.8				12.3				9.34				27.4

Site Area	Hole ID	Depth (m)	Material	Table 3 Phytotoxic Assessment: Concentrations in mg/kg unless otherwise stated. Critical Concentrations are dependant on pH value of the material.												
				pH	Cu $				Ni $				Zn $			
					5.0-5.5	5.5-6.0	6.0-7.0	7.0+	5.0-5.5	5.5-6.0	6.0-7.0	7.0+	5.0-5.5	5.5-6.0	6.0-7.0	7.0+
				-	80	100	135	200	50	60	75	110	200	200	200	300
TDG Depot	TP109	0.50	Glacial Till	7.6				18.1				4.09				41.7
TDG Depot	TP110	0.50	Glacial Till	7.2				18.5				13.1				24
TDG Depot	TP111	0.10	Topsoil	5.2			24.4				20.1				52.5	
TDG Depot	TP111	0.50	Glacial Till	8.1				20.6				15.4				33.4
TDG Depot	TPA	-	NO LOG PRESENTED	-				-				-				-
TDG Depot	TPB	-	NO LOG PRESENTED	-				-				-				-
TDG Depot	TPC	-	NO LOG PRESENTED	-				-				-				-
Field	TP48	0.50	Glacial Till	7.2				<6				16				24
Field	TP48	1.50	Coal Measures Bedrock	7.2				<6				15				24
Infilled Reservoir	TP49	0.50	Glacial Till	7.0				110				**290**				**300**
Infilled Reservoir	TP49	1.50	Glacial Till	7.2				18				17				44
Infilled Reservoir	TP50	0.50	Made Ground	7.1				38				28				120
Infilled Reservoir	TP50	1.50	Glacial Till	7.1				48				32				110
Infilled Reservoir	TP51	0.50	Made Ground	7.7				170				83				**370**
Infilled Reservoir	TP51	1.50	Glacial Till	6.8			85				56				**270**	
Infilled Reservoir	TP52	0.50	Made ground	6.6			25				24				56	
Infilled Reservoir	TP52	1.50	Made ground	7.1				38				33				110
Field	TP53	0.60	Glacial Till	8.1				25.6				25				54
Field	TP54	0.50	Glacial Till	7.5				4.22				10.2				20.9
Infilled Reservoir	TP55	0.90	Made Ground	6.4			50.3				49.9				121	
Infilled Reservoir	TP55	1.40	Glacial Till	7.1				14.9				21.4				33.4
Field	TP56	-	NO LOG PRESENTED	-				-				-				-
Field	TP57	0.50	Made Ground	7.5				23.9				30.2				41
Field	TP58	0.75	Glacial Till	7.2				3.5				17.7				22
Field	TP59	0.20	Topsoil	5.9		49				42.3				56.4		
Field	TP59	0.50	Made Ground	6.5			51.8				40.3				33.7	
Field	TP60	0.50	Glacial Till	6.5			<13				<1				<18	
Infilled Reservoir	TP61	0.35	Glacial Clay	7.8				42				103				58.7
Infilled Reservoir	TP62	0.70	Glacial Till	7.8				21.8				18				39.6
Infilled Reservoir	TP63	0.30	Made Ground	7.0				17.8				29.4				41.7
Infilled Reservoir	TP64	0.70	Made Ground	6.7			128				57.7				61.3	
Infilled Reservoir	TP64	2.40	Glacial Till	7.3				16.8				24.5				40.4
Infilled Reservoir	TP64a	0.80	Made Ground	7.4				13.1				25.2				35.5
Infilled Reservoir	TP65	0.40	Made Ground	7.4				78.1				61				136

Site Area	Hole ID	Depth (m)	Material	Table 3 Phytotoxic Assessment: Concentrations in mg/kg unless otherwise stated. Critical Concentrations are dependant on pH value of the material.												
				pH	Cu $				Ni $				Zn $			
					5.0-5.5	5.5-6.0	6.0-7.0	7.0+	5.0-5.5	5.5-6.0	6.0-7.0	7.0+	5.0-5.5	5.5-6.0	6.0-7.0	7.0+
				-	80	100	135	200	50	60	75	110	200	200	200	300
Infilled Reservoir	TP65	1.30	Glacial Till	7.3				2.32				14.9				18.7
Infilled Reservoir	TP66	0.60	Made Ground	6.8			45.2				38.3				100	
Infilled Reservoir	TP66	2.60	Glacial Till	7.3				9.33				19.9				31.6
Field	TP67	0.80	Glacial Till	7.0				15.8				13.1				19.2
Field	TP68	0.20	Topsoil	7.4				57.6				43.1				91.8
Field	TP68	0.50	Glacial Till	7.9				23.1				15.1				34.8
Field	TP69	0.75	Glacial Till	7.5				20.3				32.1				56.3
Field	TP70	0.50	Glacial Till	8.5				<1.4				8.08				14.9
Field	TP71	0.60	Glacial Till	7.9				23.7				28.3				55.5
Field	TP72	0.60	Glacial Till	7.8				18.9				11.3				23.6
Field	TP73	0.20	Topsoil	6.4			<13				21.2				61.4	
Field	TP73	0.60	Glacial Till	7.6				20				9.5				19.5
Field	TP74	0.55	Glacial Till	7.0				2.79				7.75				8.11
Field	TP75	0.50	Glacial Till	7.9				13.4				14				20.3
Field	TP76	0.65	Glacial Till	7.3				28.9				16.1				30.2
Field	TP77	0.50	Glacial Till	7.4				15.1				9.91				25.1
Field	TP78	0.10	Topsoil	7.0				27.4				21				61.4
Field	TP78	0.70	Glacial Clay	7.7				9.87				9.9				13.2
Field	TP79	0.55	Glacial Till	7.1				27.3				14				27.2
TDG Depot	TP80	-	NO LOG PRESENTED	-				-				-				-
TDG Depot	TP81	-	NO LOG PRESENTED	-				-				-				-
TDG Depot	TP82	-	NO LOG PRESENTED	-				-				-				-
Phosphorite Storage	TP83	0.60	Glacial Till	7.9				14.4				48.2				37.3

Key				Source of Critical Concentration	
BOLD	Determinand in excess of critical concentration			$	Department of Environment Code of Practice for Agricultural use of Sewage Sludge Revised 2006
-	Determinand not tested for				
<	Determinand concentration is below indicated “method” level of detection				

Site Area	Hole ID	Depth (m)	Material	Table 4 Speciated Total Petroleum Hydrocarbons : Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																			
						BTEX				Aliphatic TPH Bandings							Aromatic TPH Bandings						
				TOC	SOM	Benzene	Toluene	Ethyl Benzene	Xylenes	C_5-C_6	C_6-C_8	C_8-C_{10}	C_{10}-C_{12}	C_{12}-C_{16}	C_{16}-C_{21}	C_{21}-C_{35}	EC_5-EC_7	EC_7-EC_8	EC_8-EC_{10}	EC_{10}-EC_{12}	EC_{12}-EC_{16}	EC_{16}-EC_{21}	EC_{21}-EC_{35}	EC_{35}-EC_{44}
	S4UL Residential with homegrown produce (1% SOM)			%	%	0.087	130	47	56	42	100	27	130	1100	65000	65000	70	130	34	74	140	260	1100	1100
IDG Laboratory Data 2020																							
Anhydrite Stockpile	TP801	1.5	Anhydrite/sandstone Made Gr	4.4	7.6	<0.000	<0.001	0.002	0.201	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Infilled Reservoir	TP729	0.85	Glacial Till	1.0	1.7	<0.001	<0.001	<0.001	<0.001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TDG Depot	TP738	0.50	Hardcore	1.8	3.1	<0.001	<0.001	<0.001	<0.001	<1.0	<1.0	13	110	310	310	6400	<1.0	<1.0	<1.0	13	69	23	1000	13
TDG Depot	TP740	1.10	Glacial Till	1.0	1.6	<0.001	<0.001	<0.001	<0.001	<1.0	<1.0	<	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TDG Depot	TP741	0.75	Glacial Till	0.5	0.8	<0.001	<0.001	<0.001	<0.001	<1.0	<1.0	39	210	1000	600	110	<1.0	<1.0	2	23	140	12	11	2
TDG Depot	TP742	1.00	Cohesive Made Ground	9.4	16.2	<0.001	<0.001	<0.001	<0.001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Integra Laboratory Data 2011																								
TDG Depot	GR1	-	Location not provided	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	330	3600	2200	<0.001	<0.001	<0.001	<0.001	27	500	710	1200
TDG Depot	GR2	-	Location not provided	-	-	<0.001	<0.001	<0.001	<0.001	0.52	<0.001	<0.001	<0.001	260	1800	1000	<0.001	<0.001	<0.001	<0.001	28	200	280	510
TDG Depot	TP26	0.5	Made Ground Hardcore	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	36	190	120	<0.001	<0.001	<0.001	<0.001	5.8	35	48	88
TDG Depot	TP26	1	Made Ground Sand	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	42	130	140	<0.001	<0.001	<0.001	<0.001	3.7	18	36	58
TDG Depot	TP26	1.5	Glacial Till	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.1	2.7	890	1200	790	<0.001	<0.001	0.15	4.1	130	260	280	680
TDG Depot	TP27	0.5	Made Ground Hardcore	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.6	2.4	0.6	<0.001	<0.001	<0.001	<0.001	<0.1	<0.1	6.5	6.5
TDG Depot	TP27	1	Made Ground Sand	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	100	270	200	<0.001	<0.001	<0.001	<0.001	14	53	77	140
TDG Depot	TP27	1.5	Glacial Till	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	16	50	58	<0.001	<0.001	<0.001	<0.001	<0.1	5.7	14	20
TDG Depot	TP28	0.5	Made Ground Hardcore	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	10	89	63	<0.001	<0.001	<0.001	<0.001	1.7	19	27	47
TDG Depot	TP28	1	Glacial Till	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	52	200	240	<0.001	<0.001	<0.001	<0.001	7,9	46	81	130
TDG Depot	TP28	1.5	Glacial Till	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	13	33	270	<0.001	<0.001	<0.001	<0.001	3.2	12	28	43
TDG Depot	TP29	0.5	Made Ground Granular	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	5.3	23	460	<0.001	<0.001	<0.001	<0.001	<0.1	<0.1	<0.1	<0.1
TDG Depot	TP29	1	Made Ground Granular	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	52	340	220	<0.001	<0.001	<0.001	<0.001	<0.1	32	62	94
TDG Depot	TP29	1.5	Glacial Till	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	19	76	61	<0.001	<0.001	<0.001	<0.001	1.8	9.6	27	38
TDG Depot	TP30	0.5	Made Ground Hardcore	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.47	1.8	0.4	<0.001	<0.001	<0.001	<0.001	<100	<100	<100	<100
TDG Depot	TP30	1	Made Ground Sand	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	120	440	260	<0.001	<0.001	<0.001	<0.001	13	67	92	170
TDG Depot	TP30	1.5	Glacial Till	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	31	90	200	<0.001	<0.001	<0.001	<0.001	7.4	22	54	84
TDG Depot	TP31	0.5	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP31	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP32	0.5	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP32	1.5	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP33	0.5	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP33	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP34	0.5	Made Ground Granular	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	18	66	140	<0.001	<0.001	<0.001	<0.001	0.93	6.5	38	45
TDG Depot	TP34	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP35	0.5	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP36	0.5	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP36	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP37	0.5	Made Ground Slag	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.026	19	27	24	<0.001	<0.001	<0.001	0.04	24	250	**1500**	**1800**
TDG Depot	TP37	1.5	Made Ground Organic Granula	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	26	22	28	<0.001	<0.001	<0.001	<0.001	48	47	110	200
TDG Depot	TP38	0.5	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP38	1.5	Made Ground Organic Granula	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP39	0.5	Made Ground Slag	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.1	<0.1	<0.1	<0.001	<0.001	<0.001	<0.001	0.17	2	35	37
TDG Depot	TP39	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP40	0.5	Made Ground Slag	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	3.5	12	49	<0.001	<0.001	<0.001	<0.001	0.62	8.1	73	81
TDG Depot	TP40	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP41	0.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP41	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP42	0.5	Glacial Till	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.88	5.3	13	<0.001	<0.001	<0.001	<0.001	0.26	4.4	63	68
Phosporite Storage	TP42	1.5	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site Area	Hole ID	Depth (m)	Material	Table 4 Speciated Total Petroleum Hydrocarbons : Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																				
				TOC	SOM	BTEX				Aliphatic TPH Bandings							Aromatic TPH Bandings							
						Benzene	Toluene	Ethyl Benzene	Xylenes	C_5-C_6	C_6-C_8	C_8-C_{10}	C_{10}-C_{12}	C_{12}-C_{16}	C_{16}-C_{21}	C_{21}-C_{35}	EC_5-EC_7	EC_7-EC_8	EC_8-EC_{10}	EC_{10}-EC_{12}	EC_{12}-EC_{16}	EC_{16}-EC_{21}	EC_{21}-EC_{35}	EC_{35}-EC_{44}
	S4UL Residential with homegrown produce (1% SOM)			%	%	0.087	130	47	56	42	100	27	130	1100	65000	65000	70	130	34	74	140	260	1100	1100
Phosporite Storage	TP43	0.5	Granular Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP43	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP44	0.5	Granular Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP44	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP45	0.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP45	1.5	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP106	0.4	Made Ground Granular	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP107	0.5	Glacial Till	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP108	0.6	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP109	0.5	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP110	0.5	Glacial Till	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP111	0.1	Topsoil	-	5.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP111	0.5	Glacial Till	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPA	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPB	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPC	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP48	0.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP48	1.5	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP49	0.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP49	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP50	0.5	Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP50	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP51	0.5	Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP51	1.5	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP52	0.5	Made ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP52	1.5	Made ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP53	0.6	Glacial Till	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP54	0.5	Glacial Till	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP55	0.9	Made Ground	-	9.3	<0.01	0.003	<0.003	<0.006	<0.01	<0.01	<0.01	<0.01	6.59	9.35	92.6	<0.01	<0.01	<0.01	<0.01	25.8	22.7	214	38.6
Infilled Reservoir	TP55	1.4	Glacial Till	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP56	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP57	0.5	Made Ground	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP58	0.75	Coal Measures Bedrock	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP59	0.2	Topsoil	-	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP59	0.5	Made Ground	-	5.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP60	0.5	Glacial Till	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP61	0.35	Glacial Till	-	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP62	0.7	Glacial Till	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP63	0.3	Made Ground	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP64	0.7	Made Ground	-	12.1	<0.01	0.005	<0.003	<0.006	0.02	0.029	0.013	0.01	30.4	29.3	71	<0.01	<0.01	0.015	<0.01	**229**	55.3	138	56.5
Infilled Reservoir	TP64	2.4	Glacial Till	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP64a	0.8	Made Ground	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP65	0.4	Made Ground	-	45.7	<0.01	0.004	<0.003	<0.006	0.036	0.084	0.032	0.031	51.2	69.8	181	<0.01	<0.01	0.03	0.021	88.3	140	300	88.5
Infilled Reservoir	TP65	1.3	Glacial Till	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP66	0.6	Made Ground	-	6.5	<0.01	0.005	<0.003	<0.006	0.028	0.059	0.032	0.018	16.9	13.4	21.7	<0.01	<0.01	0.035	0.012	22.6	22.7	9.3	122
Infilled Reservoir	TP66	2.6	Glacial Till	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site Area	Hole ID	Depth (m)	Material	Table 4 Speciated Total Petroleum Hydrocarbons : Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																				
						BTEX				Aliphatic TPH Bandings							Aromatic TPH Bandings							
				TOC	SOM	Benzene	Toluene	Ethyl Benzene	Xylenes	C_5-C_6	C_6-C_8	C_8-C_{10}	C_{10}-C_{12}	C_{12}-C_{16}	C_{16}-C_{21}	C_{21}-C_{35}	EC_5-EC_7	EC_7-EC_8	EC_8-EC_{10}	EC_{10}-EC_{12}	EC_{12}-EC_{16}	EC_{16}-EC_{21}	EC_{21}-EC_{35}	EC_{35}-EC_{44}
	S4UL Residential with homegrown produce (1% SOM)			%	%	0.087	130	47	56	42	100	27	130	1100	65000	65000	70	130	34	74	140	260	1100	1100
Field	TP67	0.8	Glacial Till	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP68	0.2	Topsoil	-	14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP68	0.5	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP69	0.75	Glacial Till	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP70	0.5	Glacial Till	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP71	0.6	Glacial Till	-	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP72	0.6	Glacial Till	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP73	0.2	Topsoil	-	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP73	0.6	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP74	0.55	Glacial Till	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP75	0.5	Glacial Till	-	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP76	0.65	Glacial Till	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP77	0.5	Glacial Till	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP78	0.1	Topsoil	-	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP78	0.7	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP79	0.55	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorite Storage	TP83	0.6	Glacial Till	-	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Key		Source of Critical Concentration
BOLD	Parameter tested and found to be in excess of critical concentration	For source of Generic Assessment Criteria refer to Generic Notes 4 "Contamination Assessment"
-	Determinand not tested for	
<	Determinand concentration is below indicated “method” level of detection	

Site Area	Hole ID	Depth (m)	Material	Table 5 CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																					
				TOC	SOM	N-Butylbenzene	Methyl tert butyl ether	bis(2-ethylhexyl) phthalate	2-methylphenol	Hexachloroethane	3-Methylphenol	4-Methylphenol	2,4-Dimethylphenol	2-Methylnaphthalene	2-Chloronaphthalene	2,6-Dinitrotoluene	2,4-Dinitrotoluene	Diethyl phthalate	Carbazole	Di-N-Butyl Phthalate	Butyl Benzyl Phthalate	Di-N-Octyl Phthalate	Dichloromethane	Isopropyltoluene	Propylbenzene
	CL:AIRE Residential (1% SOM)					-	49	280	80	0.2	80	80	19	-	3.7	0.78	1.5	120		13	1400	2300	0.58	-	34
IDG Laboratory Data 2020																									
Anhydrite Stockpile	TP801	1.5	Anhydrite/Sandstone Made Ground	4.40	7.6	< 0.001	< 0.001	< 0.50	< 0.50	< 0.50	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	-	-	-
Anhydrite Stockpile	TP802	2.3	Anhydrite/Sandstone Made Ground	-	-	-	-	< 0.50	< 0.50	< 0.50	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	-	-	-
Anhydrite Stockpile	TP803	1.2	Anhydrite/Sandstone Made Ground	3.20	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anhydrite Stockpile	TP804	0.8	Anhydrite/Sandstone Made Ground	2.20	3.8	-	-	< 0.50	< 0.50	< 0.50	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	-	-	-
Anhydrite Stockpile	TP805	0.6	Anhydrite/Sandstone Made Ground	5.60	9.7	-	-	< 0.50	< 0.50	< 0.50	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	-	-	-
TDG Depot	TP742	1.00	Cohesive Made Ground (possible hydrocarbon odour)	9.4	16.2	-	-	-	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-
Integra Laboratory Data 2011																									
TDG Depot	GR1	-	Location not provided	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	GR2	-	Location not provided	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP26	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP26	1.00	Made Ground Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP26	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP27	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP27	1.00	Made Ground Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP27	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP28	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP28	1.00	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP28	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP29	0.50	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP29	1.00	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP29	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP30	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP30	1.00	Made Ground Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP30	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP31	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP31	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP32	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP32	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP33	0.50	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP33	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP34	0.50	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP34	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP35	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP36	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP36	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP37	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP37	1.50	Made Ground Organic Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP38	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP38	1.50	Made Ground Organic Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP39	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP39	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP40	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP40	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site Area	Hole ID	Depth (m)	Material	Table 5 CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																				
				TOC	SOM	N-Butylbenzene	Methyl tert butyl ether	bis(2-ethylhexyl) phthalate	2-methylphenol	Hexachloroethane	3-Methylphenol	4-Methylphenol	2,4-Dimethylphenol	2-Methylnaphthalene	2-Chloronaphthalene	2,6-Dinitrotoluene	2,4-Dinitrotoluene	Diethyl phthalate	Carbazole	Di-N-Butyl Phthalate	Butyl Benzyl Phthalate	Di-N-Octyl Phthalate	Dichloromethane	Isopropyltoluene	Propylbenzene
	CL:AIRE Residential (1% SOM)					-	49	280	80	0.2	80	80	19	-	3.7	0.78	1.5	120		13	1400	2300	0.58	-	34
TDG Depot	TP41	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP41	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP42	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP42	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP43	0.50	Granular Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP43	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP44	0.50	Granular Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP44	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP45	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP45	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP106	0.40	Made Ground Granular	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP107	0.50	Glacial Till	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP108	0.60	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP109	0.50	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP110	0.50	Glacial Till	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP111	0.10	Topsoil	-	5.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP111	0.50	Glacial Till	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPA	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPB	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPC	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP48	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP48	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP49	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP49	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP50	0.50	Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP50	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP51	0.50	Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP51	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP52	0.50	Made ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP52	1.50	Made ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP53	0.60	Glacial Till	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP54	0.50	Glacial Till	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP55	0.90	Made Ground	-	9.3	<0.01	<0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	-	<0.11
Infilled Reservoir	TP55	1.40	Glacial Till	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP56	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP57	0.50	Made Ground	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP58	0.75	Coal Measures Bedrock	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP59	0.20	Topsoil	-	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP59	0.50	Made Ground	-	5.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP60	0.50	Glacial Till	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP61	0.35	Glacial Till	-	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP62	0.70	Glacial Till	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site Area	Hole ID	Depth (m)	Material	Table 5 CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																				
				TOC	SOM	N-Butylbenzene	Methyl tert butyl ether	bis(2-ethylhexyl) phthalate	2-methylphenol	Hexachloroethane	3-Methylphenol	4-Methylphenol	2,4-Dimethylphenol	2-Methylnaphthalene	2-Chloronaphthalene	2,6-Dinitrotoluene	2,4-Dinitrotoluene	Diethyl phthalate	Carbazole	Di-N-Butyl Phthalate	Butyl Benzyl Phthalate	Di-N-Octyl Phthalate	Dichloromethane	Isopropyltoluene	Propylbenzene
	CL:AIRE Residential (1% SOM)					-	49	280	80	0.2	80	80	19	-	3.7	0.78	1.5	120		13	1400	2300	0.58	-	34
Infilled Reservoir	TP63	0.30	Made Ground	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP64	0.70	Made Ground	-	12.1	<0.01	<0.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	-	<0.22
Infilled Reservoir	TP64	2.40	Glacial Till	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP64a	0.80	Made Ground	-	1.1	<0.20	<0.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	-	<0.22
Infilled Reservoir	TP65	0.40	Made Ground	-	45.7	<0.20	<0.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	-	<0.22
Infilled Reservoir	TP65	1.30	Glacial Till	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP66	0.60	Made Ground	-	6.5	<0.20	<0.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	-	<0.22
Infilled Reservoir	TP66	2.60	Glacial Till	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP67	0.80	Glacial Till	-	1.3	<0.20	<0.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	-	<0.22
Field	TP68	0.20	Topsoil	-	14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP68	0.50	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP69	0.75	Glacial Till	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP70	0.50	Glacial Till	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP71	0.60	Glacial Till	-	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP72	0.60	Glacial Till	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP73	0.20	Topsoil	-	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP73	0.60	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP74	0.55	Glacial Till	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP75	0.50	Glacial Till	-	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP76	0.65	Glacial Till	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP77	0.50	Glacial Till	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP78	0.10	Topsoil	-	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP78	0.70	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP79	0.55	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorite Storage	TP83	0.60	Glacial Till	-	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Key	
BOLD	Determinand in excess of critical concentration
-	Determinand not tested for
<	Determinand concentration is below indicated “method” level of detection

Source of Critical Concentration
For source of Generic Assessment Criteria refer to Generic Notes 4 "Contamination Assessment"

x	Land Quality Management (Rev. 2009)
ˣ	IDG risk-derived Tier 1 screening values based on a soil organic matter content of 2.5%. (see Generic Notes in Appendix A).
∫	CL:AIRE Generic Assessment Criteria 2009 based on a soil organic matter content of 2.5%. (see Generic Notes in Appendix A).

Site Area	Hole ID	Depth (m)	Material	Table 6 CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below Table 5 Cont: CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																	
				TOC	SOM	Chloromethane	Chloroethane	1,1-Dichloethene	Trans 1,2-Dichloroethene	1,1-Dichloethane	cis 1,2-Dichloroethene	1,2-Dichloropropane	Bromodichloromethane	1,1,2-trichloroethane	Bromoform (Tribromomethane)	Styrene	Iso-propylbenzene	Bromobenzene	1,3,5-trimethylbenzene	Tert-butyl benzene	1,2,4-trimethylbenzene	Sec-butyl benzene
	CL:AIRE Residential (1% SOM)			%	%	0.0083	8.3	0.23	0.19	2.4	0.11	0.024	0.016	0.6	2.8	8.1	11	0.87			0.35	
IDG Laboratory Data 2020																						
Anhydrite Stockpile	TP801	1.5	Anhydrite/Sandstone Made Ground	4.40	7.6	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 10	< 1.0	< 1.0	< 1.0	< 1.0	330	< 1.0	**130**	< 1.0
Anhydrite Stockpile	TP802	2.3	Anhydrite/Sandstone Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anhydrite Stockpile	TP803	1.2	Anhydrite/Sandstone Made Ground	3.20	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anhydrite Stockpile	TP804	0.8	Anhydrite/Sandstone Made Ground	2.20	3.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anhydrite Stockpile	TP805	0.6	Anhydrite/Sandstone Made Ground	5.60	9.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP742	1.00	Cohesive Made Ground (possible hydrocarbon odour)	9.40	16.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Integra Laboratory Data 2011																						
TDG Depot	GR1	-	Location not provided	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	GR2	-	Location not provided	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP26	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP26	1.00	Made Ground Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP26	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP27	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP27	1.00	Made Ground Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP27	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP28	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP28	1.00	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP28	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP29	0.50	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP29	1.00	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP29	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP30	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP30	1.00	Made Ground Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP30	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP31	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP31	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP32	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP32	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP33	0.50	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP33	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP34	0.50	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP34	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP35	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP36	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP36	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP37	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP37	1.50	Made Ground Organic Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP38	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP38	1.50	Made Ground Organic Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP39	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP39	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site Area	Hole ID	Depth (m)	Material	Table 6 CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																		
				Table 5 Cont: CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																		
				TOC	SOM	Chloromethane	Chloroethane	1,1-Dichloethene	Trans 1,2-Dichloroethene	1,1-Dichloethane	cis 1,2-Dichloroethene	1,2-Dichloropropane	Bromodichloromethane	1,1,2-trichloroethane	Bromoform (Tribromomethane)	Styrene	Iso-propylbenzene	Bromobenzene	1,3,5-trimethylbenzene	Tert-butyl benzene	1,2,4-trimethylbenzene	Sec-butyl benzene
	CL:AIRE Residential (1% SOM)			%	%	0.0083	8.3	0.23	0.19	2.4	0.11	0.024	0.016	0.6	2.8	8.1	11	0.87			0.35	
TDG Depot	TP40	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP40	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP41	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP41	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP42	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP42	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP43	0.50	Granular Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP43	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP44	0.50	Granular Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP44	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP45	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP45	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP106	0.40	Made Ground Granular	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP107	0.50	Glacial Till	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP108	0.60	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP109	0.50	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP110	0.50	Glacial Till	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP111	0.10	Topsoil	-	5.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP111	0.50	Glacial Till	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPA	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPB	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPC	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP48	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP48	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP49	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP49	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP50	0.50	Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP50	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP51	0.50	Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP51	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP52	0.50	Made ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP52	1.50	Made ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP53	0.60	Glacial Till	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP54	0.50	Glacial Till	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP55	0.90	Made Ground	-	9.3	<0.007	<0.014	<0.01	<0.011	<0.008	-	<0.012	<0.007	<0.01	-	<0.01	<0.005	<0.01	<0.008	<0.012	<0.009	<0.01
Infilled Reservoir	TP55	1.40	Glacial Till	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP56	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP57	0.50	Made Ground	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP58	0.75	Coal Measures Bedrock	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP59	0.20	Topsoil	-	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5: Summary of Soil Organic (VOC SVOC) Chemical Assessment
Receptor: Human Health

Site Area	Hole ID	Depth (m)	Material	Table 6 CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																		
				Table 5 Cont: CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																		
				TOC	SOM	Chloromethane	Chloroethane	1,1-Dichloethene	Trans 1,2-Dichloroethene	1,1-Dichloethane	cis 1,2-Dichloroethene	1,2-Dichloropropane	Bromodichloromethane	1,1,2-trichloroethane	Bromoform (Tribromomethane)	Styrene	Iso-propylbenzene	Bromobenzene	1,3,5-trimethylbenzene	Tert-butyl benzene	1,2,4-trimethylbenzene	Sec-butyl benzene
	CL:AIRE Residential (1% SOM)			%	%	0.0083	8.3	0.23	0.19	2.4	0.11	0.024	0.016	0.6	2.8	8.1	11	0.87			0.35	
Field	TP59	0.50	Made Ground	-	5.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP60	0.50	Glacial Till	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP61	0.35	Glacial Till	-	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP62	0.70	Glacial Till	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP63	0.30	Made Ground	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP64	0.70	Made Ground	-	12.1	<0.14	<0.28	<0.20	<0.22	<0.16	-	<0.24	<0.14	<0.20	-	<0.20	<0.10	<0.20	<0.16	<0.24	<0.18	<0.20
Infilled Reservoir	TP64	2.40	Glacial Till	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP64a	0.80	Made Ground	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP65	0.40	Made Ground	-	45.7	<0.14	<0.28	<0.20	<0.22	<0.16	-	<0.24	<0.14	<0.20	-	<0.20	<0.10	<0.20	<0.16	<0.24	<0.18	<0.20
Infilled Reservoir	TP65	1.30	Glacial Till	-	0.6																	
Infilled Reservoir	TP66	0.60	Made Ground	-	6.5	<0.14	<0.28	<0.20	<0.22	<0.16	-	<0.24	<0.14	<0.20	-	<0.20	<0.10	<0.20	<0.16	<0.24	<0.18	<0.20
Infilled Reservoir	TP66	2.60	Glacial Till	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP67	0.80	Glacial Till	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP68	0.20	Topsoil	-	14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP68	0.50	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP69	0.75	Glacial Till	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP70	0.50	Glacial Till	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP71	0.60	Glacial Till	-	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP72	0.60	Glacial Till	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP73	0.20	Topsoil	-	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP73	0.60	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP74	0.55	Glacial Till	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP75	0.50	Glacial Till	-	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP76	0.65	Glacial Till	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP77	0.50	Glacial Till	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP78	0.10	Topsoil	-	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP78	0.70	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP79	0.55	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorite Storage	TP83	0.60	Glacial Till	-	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Key		Source of Critical Concentration
BOLD	Determinand in excess of critical concentration	For source of Generic Assessment Criteria refer to Generic Notes 4 "Contamination Assessment"
-	Determinand not tested for	
<	Determinand concentration is below indicated “method” level of detection	

Site Area	Hole ID	Depth (m)	Material	Table 7 S4UL VOC & SVOC Assessment: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below Table 5 Cont: CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																	
				TOC	SOM	Chloroethene (Vinyl Chloride)	1,2 Dichloroethane	1,1,1-Trichloroethane	1,1,2,2 Tetrachlorothane	Tetrachloroethene (PCE)	Tetrachloromethane (Carbon Tetrachloride)	Trichloroethene (TCE)	Trichloromethane (Chloroform)	Chlorobenzene	1,3-Dichlorobenzene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	Hexachlorobenzene	Phenol	Pentachlorophenol	Hexachlorobutadiene
	S4UL Residential with homegrown produce (1% SOM)					0.00064	0.0071	8.8	1.6	0.18	0.026	0.016	0.91	0.46	0.4	1.5	1.6	1.8	120	0.22	0.29
IDG Laboratory Data 2020																					
Anhydrite Stockpile	TP801	1.5	Anhydrite/Sandstone Made Ground	4.40	7.6	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.50	< 0.002	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Anhydrite Stockpile	TP802	2.3	Anhydrite/Sandstone Made Ground	-	-	-	-	-	-	-	-	-	-	-	< 0.50	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Anhydrite Stockpile	TP803	1.2	Anhydrite/Sandstone Made Ground	3.20	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anhydrite Stockpile	TP804	0.8	Anhydrite/Sandstone Made Ground	2.20	3.8	-	-	-	-	-	-	-	-	-	< 0.50	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Anhydrite Stockpile	TP805	0.6	Anhydrite/Sandstone Made Ground	5.60	9.7	-	-	-	-	-	-	-	-	-	< 0.50	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TDG Depot	TP742	1.00	Cohesive Made Ground (possible hydrocarbon odour)	9.40	16.2	-	-	-	-	-	-	-	-	-	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50
Integra Laboratory Data 2011																					
TDG Depot	GR1	-	Location not provided	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	GR2	-	Location not provided	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP26	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP26	1.00	Made Ground Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP26	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP27	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP27	1.00	Made Ground Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP27	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP28	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP28	1.00	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP28	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP29	0.50	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP29	1.00	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP29	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP30	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP30	1.00	Made Ground Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP30	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP31	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP31	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP32	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP32	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP33	0.50	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP33	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP34	0.50	Made Ground Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP34	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP35	0.50	Made Ground Hardcore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site Area	Hole ID	Depth (m)	Material	Table 7 S4UL VOC & SVOC Assessment: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below Table 5 Cont: CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																
				TOC	SOM	Chloroethene (Vinyl Chloride)	1,2 Dichloroethane	1,1,1-Trichloroethane	1,1,2,2 Tetrachlorothane	Tetrachloroethene (PCE)	Tetrachloromethane (Carbon Tetrachloride)	Trichloroethene (TCE)	Trichloromethane (Chloroform)	Chlorobenzene	1,3-Dichlorobenzene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	Hexachlorobenzene	Phenol	Pentachlorophenol	Hexachlorobutadiene
TDG Depot	TP36	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP36	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP37	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP37	1.50	Made Ground Organic Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP38	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP38	1.50	Made Ground Organic Granular	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP39	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP39	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP40	0.50	Made Ground Slag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP40	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP41	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP41	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP42	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP42	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP43	0.50	Granular Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP43	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP44	0.50	Granular Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP44	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP45	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosporite Storage	TP45	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP106	0.40	Made Ground Granular	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP107	0.50	Glacial Till	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP108	0.60	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP109	0.50	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP110	0.50	Glacial Till	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP111	0.10	Topsoil	-	5.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP111	0.50	Glacial Till	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPA	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPB	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TPC	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP48	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP48	1.50	Coal Measures Bedrock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP49	0.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP49	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site Area	Hole ID	Depth (m)	Material	Table 7 S4UL VOC & SVOC Assessment: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below Table 5 Cont: CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																
				TOC	SOM	Chloroethene (Vinyl Chloride)	1,2 Dichloroethane	1,1,1-Trichloroethane	1,1,2,2 Tetrachlorothane	Tetrachloroethene (PCE)	Tetrachloromethane (Carbon Tetrachloride)	Trichloroethene (TCE)	Trichloromethane (Chloroform)	Chlorobenzene	1,3-Dichlorobenzene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	Hexachlorobenzene	Phenol	Pentachlorophenol	Hexachlorobutadiene
Infilled Reservoir	TP50	0.50	Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP50	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP51	0.50	Made Ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP51	1.50	Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP52	0.50	Made ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP52	1.50	Made ground	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP53	0.60	Glacial Till	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP54	0.50	Glacial Till	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP55	0.90	Made Ground	-	9.3	<0.01	<0.08	<0.07	<0.01	<0.005	-	<0.009	<0.008	<0.005	<0.006	<0.006	<0.006	-	<0.01	-	<0.012
Infilled Reservoir	TP55	1.40	Glacial Till	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP56	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP57	0.50	Made Ground	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP58	0.75	Coal Measures Bedrock	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP59	0.20	Topsoil	-	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP59	0.50	Made Ground	-	5.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP60	0.50	Glacial Till	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP61	0.35	Glacial Till	-	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP62	0.70	Glacial Till	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP63	0.30	Made Ground	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP64	0.70	Made Ground	-	12.1	<0.2	<0.16	<0.14	<20	<0.1	-	<0.18	<0.16	<0.10	<0.12	<0.12	<0.12	-	<0.01	-	<0.24
Infilled Reservoir	TP64	2.40	Glacial Till	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP64a	0.80	Made Ground	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP65	0.40	Made Ground	-	45.7	<0.2	<0.16	<0.14	<20	<0.1	-	<0.18	<0.16	<0.10	<0.12	<0.12	<0.12	-	<0.01	-	<0.24
Infilled Reservoir	TP65	1.30	Glacial Till	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infilled Reservoir	TP66	0.60	Made Ground	-	6.5	<0.2	<0.16	<0.14	<20	<0.1	-	<0.18	<0.16	<0.10	<0.12	<0.12	<0.12	-	<0.01	-	<0.24
Infilled Reservoir	TP66	2.60	Glacial Till	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP67	0.80	Glacial Till	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP68	0.20	Topsoil	-	14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP68	0.50	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP69	0.75	Glacial Till	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP70	0.50	Glacial Till	-	<0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP71	0.60	Glacial Till	-	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP72	0.60	Glacial Till	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP73	0.20	Topsoil	-	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP73	0.60	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP74	0.55	Glacial Till	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP75	0.50	Glacial Till	-	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site Area	Hole ID	Depth (m)	Material	Table 7 S4UL VOC & SVOC Assessment: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below Table 5 Cont: CL:AIRE VOC & SVOC Assessement: Concentrations in mg/kg unless otherwise stated. Critical Concentrations (GAC) are shown below																
				TOC	SOM	Chloroethene (Vinyl Chloride)	1,2 Dichloroethane	1,1,1-Trichloroethane	1,1,2,2 Tetrachlorothane	Tetrachloroethene (PCE)	Tetrachloromethane (Carbon Tetrachloride)	Trichloroethene (TCE)	Trichloromethane (Chloroform)	Chlorobenzene	1,3-Dichlorobenzene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	Hexachlorobenzene	Phenol	Pentachlorophenol	Hexachlorobutadiene
Field	TP76	0.65	Glacial Till	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP77	0.50	Glacial Till	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP78	0.10	Topsoil	-	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP78	0.70	Glacial Till	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	TP79	0.55	Glacial Till	-	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP80	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP81	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDG Depot	TP82	-	NO LOG PRESENTED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorite Storage	TP83	0.60	Glacial Till	-	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Key		Source of Critical Concentration
BOLD	Determinand in excess of critical concentration	For source of Generic Assessment Criteria refer to Generic Notes 4 "Contamination Assessment"
-	Determinand not tested for	
<	Determinand concentration is below indicated “method” level of detection	

Site Area	Hole ID	Depth (m)	Material	Table 6 Groundwater Inorganic Assessment: Concentrations in ug/l unless otherwise stated. Results are quoted to 2 significant figures. Critical Concentrations are shown below																						
				TOC	pH	Conductivity	$CaCO_3$	NH^-	As	B	S04	Ca	K	Na	Cd	Cl	Cr (III)	Cr(VI)	Cu	CN	SCN	Pb	Hg	Fe	Ni	Se	Zn
			EQS Transitional & coastal 2010	%	-				25*						-	10*	32*	0.6	5*	1*		-	-	1*	-	-	-
			GW Theshold (SW impact) 2010	%	-				51.6#						0.2#	-	5#	-	10.1#	-		7.3#	-	-	20.2#	-	75.8#
Infilled Reservoir	TP720	1.1	Water	-	7.5	-	-	-	6.6	75	98	180	3	8	<0.08	-	<1.0	<20	<1	<0.05	<0.5	<1	<0.5	**1100**	<1	1	3
Infilled Reservoir	TP729	0.5	Water	-	7.4	-	-	-	2.3	77	360	220	6	25	<0.08	-	2	<20	1	<0.05	<0.5	<1	<0.5	**420**	2	1	7

Key							Source of Critical Concentration	
BOLD	Determinand in excess of critical concentration						*	Critical concentration reported as 'Good' EQS standard Annual Mean Concentration - River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 (Part 4)
-	Determinand not tested for						∞	Annual Average – Other Surface Waters – River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 (Parts 5 & 6)
<	Determinand concentration is below indicated "method" level of detection						#	Groundwater threshold value - River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 (Part 8)
							$	Groundwater threshold value (Drinking Water Protected Areas)- River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 (Part 8)

Site Area	Hole ID	Depth (m)	Material	Table 7 Groundwater Organic Assessment: Concentrations in µg/l unless otherwise stated. Results are quoted to 4 significant figures. Critical Concentrations are shown below														
				TOC	pH	Benzene	Toluene	Ethylbenzene	Xylene	Phenols	Dissolved TPH	PAH	Benzo(a)pyrene	Anthracene	Flouranthene	Benzo(b,k)flouranthene	Benzo(g,h,i)perylene & Indeno(1,2,3-cd)pyrene	Naphthalene
Hide as appropriate			**EQS Transitional & coastal 2010**	%	-	8∞	40∞	-	30∞	7.7*	-	-	0.05∞	0.1*	0.01∞	0.03∞	0.002∞	1.2∞
Hide as appropriate			**GW Theshold (SW impact) 2010**	%	-	10.1#	50.5#	-	30.3∞	15.2#	-	-	-	0.1#	0.1#	-	-	2.4#
Infilled Reservoir	TP120	1.1	Water	-	7.5	-	-	-	-	<0.03	-	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Infilled Reservoir	TP729	0.5	Water	-	7.4	-	-	-	-	<0.03	-	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Key						Source of Critical Concentration	
BOLD	Determinand in excess of critical concentration					*	Critical concentration reported as 'Good' EQS standard Annual Mean Concentration - River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 (Part 4)
-	Determinand not tested for					∞	Annual Average – Other Surface Waters – River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 (Parts 5 & 6)
<	Determinand concentration is below indicated "method" level of detection					#	Groundwater threshold value - River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 (Part 8)
						$	Groundwater threshold value (Drinking Water Protected Areas)- River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 (Part 8)

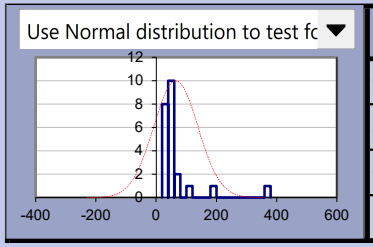
Test Results

Lead

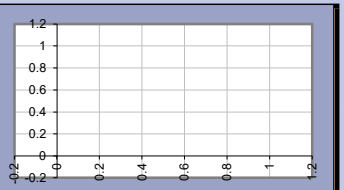
Client/client ref: Story Homes | Site ref: Phase 3 Edgehill Park | Date: 20-Oct-2020

Project ref: 4046 | Data description: Topsoil/Topsoil Made Ground | User details: NW

Dataset:	Lead
Sample mean $\bar{x}$	64.957
Sample standard deviation, s	73.605
Sample size, n	23
Critical concentration, Cc	200



Outliers & non-detects	
Outliers present?	**Yes**
Significance level	5%
Outliers excluded	0
Non-detects	0

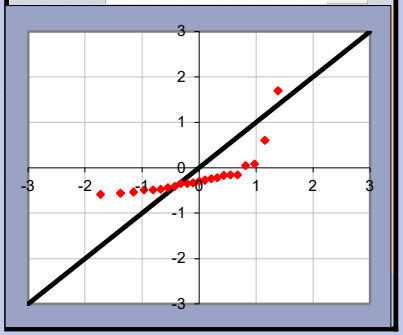


Normality test

Significance level: 5%

Non-normal distribution

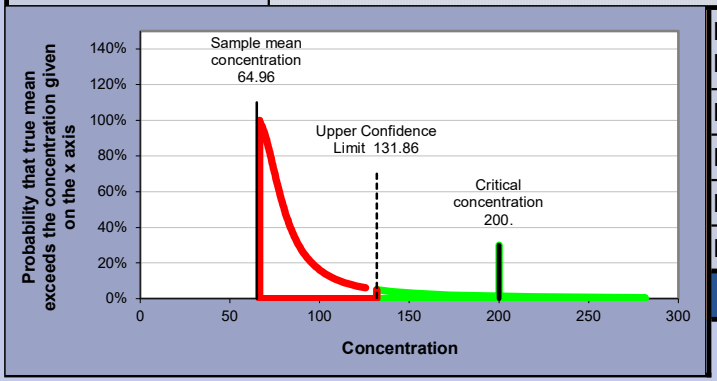
Use: Auto: Chebychev



Test scenario:

Planning: is true mean lower than critical concentration (μ < Cc)?

Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	**99%**
Base decision on:	evidence level
Evidence level required:	**95%**
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

Back to data | Back to summary | Go to outlier test | Go to normality test

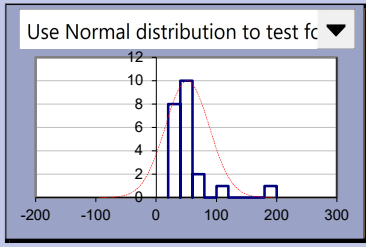
Test Results

Lead O/T:22/23

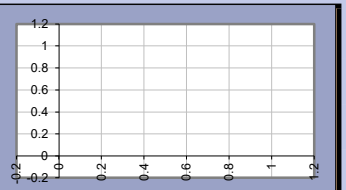
Client/client ref: Story Homes | Site ref: Phase 3 Edgehill Park | Date: 20-Oct-2020

Project ref: 4046 | Data description: Topsoil/Topsoil Made Ground | User details: NW

Dataset:	Lead O/T:22/23
Sample mean $\bar{x}$	51.545
Sample standard deviation, s	36.633
Sample size, n	22
Critical concentration, Cc	200



Outliers & non-detects	
Outliers present?	**Yes**
Significance level	5%
Outliers excluded	1
Non-detects	0

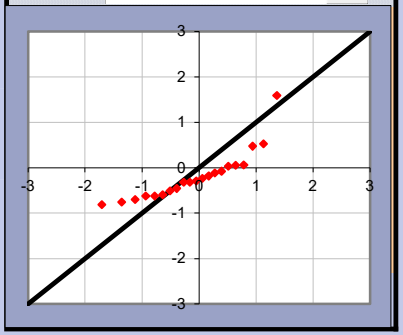


Normality test

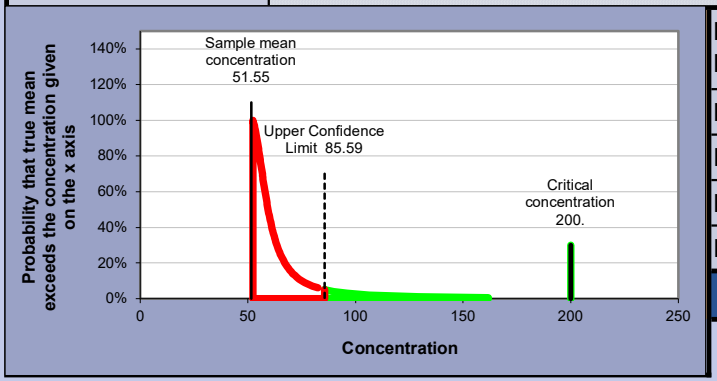
Significance level: 5%

Non-normal distribution

Use: Auto: Chebychev



Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?
Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	**100%**
Base decision on:	evidence level
Evidence level required:	**95%**
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

Back to data | Back to summary | Go to outlier test | Go to normality test

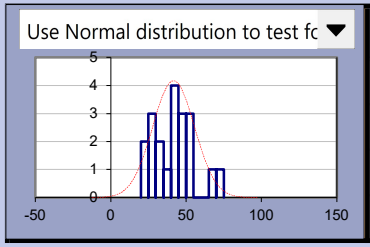
Test Results

Lead O/T:20/23

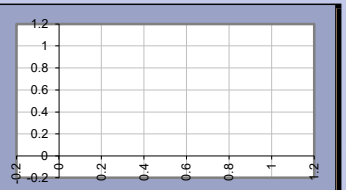
Client/client ref: Story Homes | Site ref: Phase 3 Edgehill Park | Date: 20-Oct-2020

Project ref: 4046 | Data description: Topsoil/Topsoil Made Ground | User details: NW

Dataset:	Lead O/T:20/23
Sample mean $\bar{x}$	41.7
Sample standard deviation, s	13.873
Sample size, n	20
Critical concentration, Cc	200



Outliers & non-detects	
Outliers present?	No
Significance level	5%
Outliers excluded	3
Non-detects	0

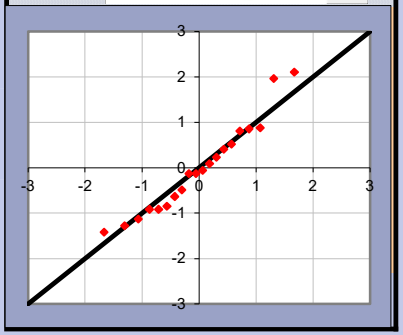


Normality test

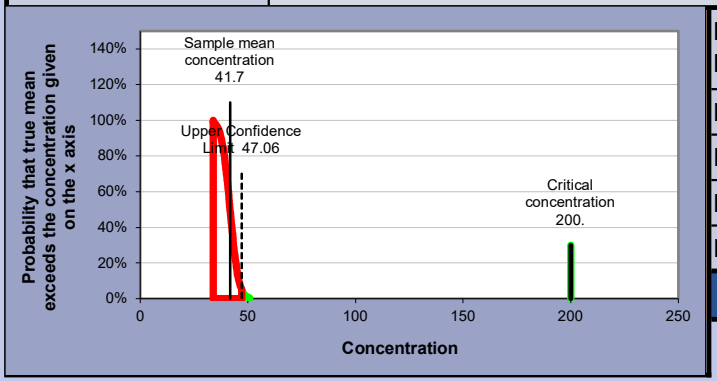
Significance level: 5%

Normal distribution

Use: Auto: One-sample t-test



Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?
Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	**100%**
Base decision on:	evidence level
Evidence level required:	**95%**
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

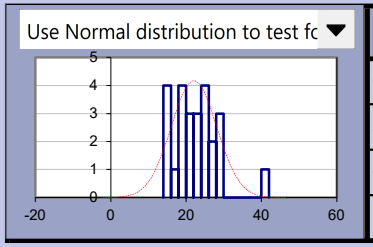
Back to data | Back to summary | Go to outlier test | Go to normality test

Test Results

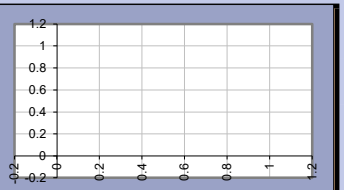
Arsenic

Client/client ref: Story Homes
Project ref: 4046
Site ref: Edhehill Park Phase 3
Data description: Topsoil
Date: 24-Oct-2020
User details: NW

Dataset:	Arsenic
Sample mean $\bar{x}$	22.096
Sample standard deviation, s	6.0341
Sample size, n	25
Critical concentration, Cc	37



Outliers & non-detects	
Outliers present?	**Yes**
Significance level	5%
Outliers excluded	0
Non-detects	0

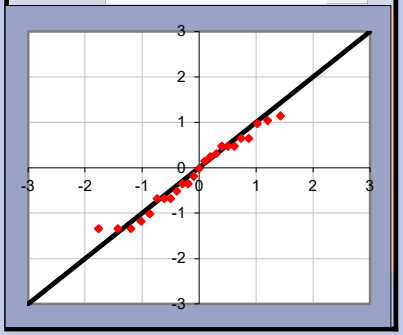


Normality test

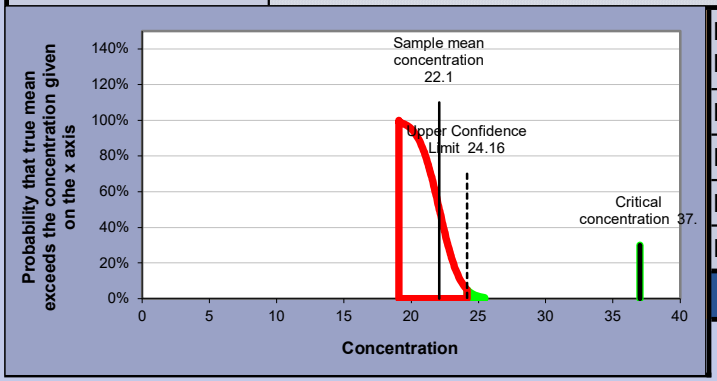
Significance level: 5%

Normal distribution

Use: Auto: One-sample t-test



Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?
Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	**100%**
Base decision on:	evidence level
Evidence level required:	**95%**
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

Back to data | **Back to summary** | **Go to outlier test** | **Go to normality test**

Test Results

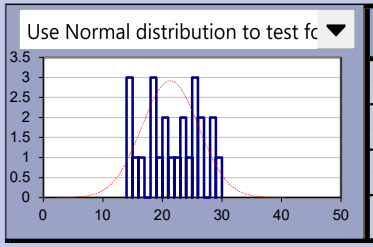
Arsenic O/T:24/25

Client/client ref: Story Homes
Project ref: 4046

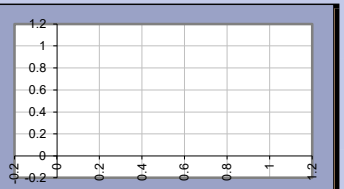
Site ref: Edhehill Park Phase 3
Data description: Topsoil

Date: 24-Oct-2020
User details: NW

Dataset:	Arsenic O/T:24/25
Sample mean $\bar{x}$	21.333
Sample standard deviation, s	4.777
Sample size, n	24
Critical concentration, Cc	37



Outliers & non-detects	
Outliers present?	No
Significance level	5%
Outliers excluded	1
Non-detects	0

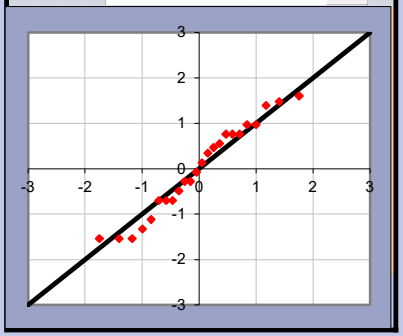


Normality test

Significance level: 5%

Normal distribution

Use: Auto: One-sample t-test

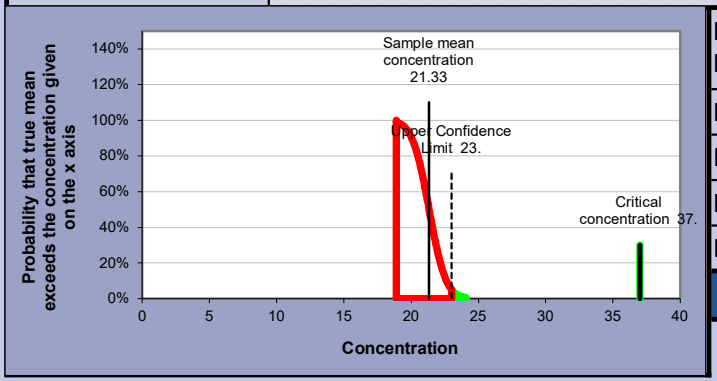


Test scenario:

Planning: is true mean lower than critical concentration (μ < Cc)?

Null hypothesis: The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc

Alternative hypothesis: The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	**100%**
Base decision on:	evidence level
Evidence level required:	**95%**
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

Back to data | Back to summary | Go to outlier test | Go to normality test

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Amended Report

Report No.:	20-24349-3		
Initial Date of Issue:	25-Sep-2020	**Date of Re-Issue:**	10-Nov-2020
Client	iD GeoEnvironmental		
Client Address:	Caledonian House Tatton Street Knutsford Cheshire WA16 6AG		
Contact(s):	Stephen Drew		
Project	4046 Edgehill Rhodia, Whitehaven		
Quotation No.:	Q20-21360	**Date Received:**	11-Sep-2020
Order No.:		**Date Instructed:**	21-Sep-2020
No. of Samples:	7		
Turnaround (Wkdays):	5	**Results Due:**	25-Sep-2020
Date Approved:	25-Sep-2020		

Approved By:

Details: Glynn Harvey, Technical Manager

Bulk Identification Certificate

Client: iD GeoEnvironmental

Site Address:

Date Sampled: 03-Sep-2020

Date Received: 11-Sep-2020

Your Ref.:

Project: 4046 Edgehill Rhodia, Whitehaven

Job Number: 20-24352

No Samples:

Date Reported: 30-Sep-2020

Sample No.	Sample ID	Sample Ref.	Description	Top (m)	Bottom (m)	SOP	Accred.	Laboratory	Material	Result
1062829			TP720	1.10		2185	U	COVENTRY	Cement	Chrysotile

The in-house procedure SOP2185 is in accordance with the requirements of Appendix 2 of the Analyst Guide (HSG 248).
The results relate only to items tested as supplied by the client.
Comments and interpretations are beyond the scope of UKAS accreditation.
Samples associated with asbestos in building surveys are retained for six months (HSG 264 refers)

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental				**Chemtest Job No.:**	20-24349	20-24349	20-24349	20-24349	20-24349	20-24349	20-24349	20-24350	20-24350
Quotation No.: Q20-21360				**Chemtest Sample ID.:**	1062789	1062790	1062792	1062795	1062797	1062799	1062800	1062801	1062802
				Sample Location:	TP737	TP738	TP739	TP740	TP741	TP742	TP742	TP730	TP731
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.80	0.50	1.20	1.10	0.75	0.50	1.00	0.05	0.10
				Date Sampled:	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	04-Sep-2020	04-Sep-2020
				Asbestos Lab:			COVENTRY			COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A			-					-	-
Asbestos Identification	U	2192		N/A			No Asbestos Detected					No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A			-					-	-
Moisture	N	2030	%	0.020	17	13	26	17	13	5.0	21	46	29
pH	U	2010		4.0	8.2	8.7	6.7	8.2		11.4	10.2	7.9	6.7
Magnesium (Water Soluble)	U	2120	mg/kg	20		< 20					20		
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.029	0.20				2.4	1.1		
Total Sulphur	U	2175	%	0.010	0.032	0.27				2.1	0.41		
Chloride (Water Soluble)	U	2220	g/l	0.010		0.059					0.10		
Nitrate (Water Soluble)	N	2220	g/l	0.010		< 0.010					< 0.010		
Cyanide (Total)	U	2300	mg/kg	0.50						< 0.50			
Calcium (Total)	N	2430	mg/kg	100		55000				120000	39000		
Iron (Total)	N	2430	mg/kg	100									
Sulphate (Total)	U	2430	mg/kg	100									
Sulphate (Acid Soluble)	U	2430	%	0.010	0.026	0.27				5.1	0.27		
Arsenic	U	2450	mg/kg	1.0		19	34	25		23		22	18
Cadmium	U	2450	mg/kg	0.10		0.66	0.37	6.9		0.15		4.2	0.13
Chromium	U	2450	mg/kg	1.0		37	23	230		15		110	19
Copper	U	2450	mg/kg	0.50		30	47	30		3.9		27	12
Mercury	U	2450	mg/kg	0.10		0.71	0.28	0.10		< 0.10		0.21	< 0.10
Nickel	U	2450	mg/kg	0.50		28	48	35		6.7		29	10
Lead	U	2450	mg/kg	0.50		75	100	17		10		35	22
Selenium	U	2450	mg/kg	0.20		0.96	0.92	0.83		4.2		0.52	0.69
Zinc	U	2450	mg/kg	0.50		69	140	150		11		750	38
Total Organic Carbon	U	2625	%	0.20		1.8	7.7	0.95	0.48	0.26	9.4	6.4	2.6
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		< 1.0		< 1.0	< 1.0		< 1.0		
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		< 1.0		< 1.0	< 1.0		< 1.0		
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0		13		< 1.0	39		< 1.0		
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0		110		< 1.0	210		< 1.0		
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0		310		< 1.0	1000		< 1.0		
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0		310		< 1.0	600		< 1.0		
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0		6400		< 1.0	110		< 1.0		
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		740		< 1.0	< 1.0		< 1.0		
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		7900		< 5.0	1900		< 5.0		
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		< 1.0		< 1.0	< 1.0		< 1.0		
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		< 1.0		< 1.0	< 1.0		< 1.0		
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0		< 1.0		< 1.0	1.5		< 1.0		
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0		13		< 1.0	23		< 1.0		

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental					Chemtest Job No.:	20-24349	20-24349	20-24349	20-24349	20-24349	20-24349	20-24349	20-24350	20-24350
Quotation No.: Q20-21360					Chemtest Sample ID.:	1062789	1062790	1062792	1062795	1062797	1062799	1062800	1062801	1062802
					Sample Location:	TP737	TP738	TP739	TP740	TP741	TP742	TP742	TP730	TP731
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.80	0.50	1.20	1.10	0.75	0.50	1.00	0.05	0.10
					Date Sampled:	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	04-Sep-2020	04-Sep-2020
					Asbestos Lab:			COVENTRY			COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0		69		< 1.0	140		< 1.0			
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		23		< 1.0	12		< 1.0			
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0		1000		< 1.0	11		< 1.0			
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		13		< 1.0	2.0		< 1.0			
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		1100		< 5.0	180		< 5.0			
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		9000		< 10	2100		< 10			
Naphthalene	U	2700	mg/kg	0.10			< 0.10						< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10			< 0.10						< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10			< 0.10						< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10			< 0.10						< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10			1.4						< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10			0.85						< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10			1.2						0.64	< 0.10
Pyrene	U	2700	mg/kg	0.10			1.4						0.73	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10			0.56						< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10			1.6						< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10			< 0.10						< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10			< 0.10						< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10			< 0.10						< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10			< 0.10						< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10			< 0.10						< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10			< 0.10						< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0			7.0						< 2.0	< 2.0
Benzene	U	2760	mg/kg	0.0010		< 0.0010		< 0.0010	< 0.0010			< 0.0010		
Toluene	U	2760	mg/kg	0.0010		< 0.0010		< 0.0010	< 0.0010			< 0.0010		
Ethylbenzene	U	2760	mg/kg	0.0010		< 0.0010		< 0.0010	< 0.0010			< 0.0010		
m & p-Xylene	U	2760	mg/kg	0.0010		< 0.0010		< 0.0010	< 0.0010			< 0.0010		
o-Xylene	U	2760	mg/kg	0.0010		< 0.0010		< 0.0010	< 0.0010			< 0.0010		
N-Nitrosodimethylamine	U	2790	mg/kg	0.50							< 0.50			
Phenol	U	2790	mg/kg	0.50							< 0.50			
2-Chlorophenol	U	2790	mg/kg	0.50							< 0.50			
Bis-(2-Chloroethyl)Ether	U	2790	mg/kg	0.50							< 0.50			
1,3-Dichlorobenzene	U	2790	mg/kg	0.50							< 0.50			
1,4-Dichlorobenzene	N	2790	mg/kg	0.50							< 0.50			
1,2-Dichlorobenzene	U	2790	mg/kg	0.50							< 0.50			
2-Methylphenol	U	2790	mg/kg	0.50							< 0.50			
Bis(2-Chloroisopropyl)Ether	U	2790	mg/kg	0.50							< 0.50			
Hexachloroethane	N	2790	mg/kg	0.50							< 0.50			
N-Nitrosodi-n-propylamine	U	2790	mg/kg	0.50							< 0.50			

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental		Chemtest Job No.:			20-24349	20-24349	20-24349	20-24349	20-24349	20-24349	20-24349	20-24350	20-24350
Quotation No.: Q20-21360		Chemtest Sample ID.:			1062789	1062790	1062792	1062795	1062797	1062799	1062800	1062801	1062802
		Sample Location:			TP737	TP738	TP739	TP740	TP741	TP742	TP742	TP730	TP731
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.80	0.50	1.20	1.10	0.75	0.50	1.00	0.05	0.10
		Date Sampled:			08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	04-Sep-2020	04-Sep-2020
		Asbestos Lab:					COVENTRY			COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
4-Methylphenol	U	2790	mg/kg	0.50						< 0.50			
Nitrobenzene	U	2790	mg/kg	0.50						< 0.50			
Isophorone	U	2790	mg/kg	0.50						< 0.50			
2-Nitrophenol	N	2790	mg/kg	0.50						< 0.50			
2,4-Dimethylphenol	N	2790	mg/kg	0.50						< 0.50			
Bis(2-Chloroethoxy)Methane	U	2790	mg/kg	0.50						< 0.50			
2,4-Dichlorophenol	U	2790	mg/kg	0.50						< 0.50			
1,2,4-Trichlorobenzene	U	2790	mg/kg	0.50						< 0.50			
Naphthalene	U	2790	mg/kg	0.50						< 0.50			
4-Chloroaniline	N	2790	mg/kg	0.50						< 0.50			
Hexachlorobutadiene	U	2790	mg/kg	0.50						< 0.50			
4-Chloro-3-Methylphenol	U	2790	mg/kg	0.50						< 0.50			
2-Methylnaphthalene	U	2790	mg/kg	0.50						< 0.50			
4-Nitrophenol	N	2790	mg/kg	0.50						< 0.50			
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50						< 0.50			
2,4,6-Trichlorophenol	U	2790	mg/kg	0.50						< 0.50			
2,4,5-Trichlorophenol	U	2790	mg/kg	0.50						< 0.50			
2-Chloronaphthalene	U	2790	mg/kg	0.50						< 0.50			
2-Nitroaniline	U	2790	mg/kg	0.50						< 0.50			
Acenaphthylene	U	2790	mg/kg	0.50						< 0.50			
Dimethylphthalate	U	2790	mg/kg	0.50						< 0.50			
2,6-Dinitrotoluene	U	2790	mg/kg	0.50						< 0.50			
Acenaphthene	U	2790	mg/kg	0.50						< 0.50			
3-Nitroaniline	N	2790	mg/kg	0.50						< 0.50			
Dibenzofuran	U	2790	mg/kg	0.50						< 0.50			
4-Chlorophenylphenylether	U	2790	mg/kg	0.50						< 0.50			
2,4-Dinitrotoluene	U	2790	mg/kg	0.50						< 0.50			
Fluorene	U	2790	mg/kg	0.50						< 0.50			
Diethyl Phthalate	U	2790	mg/kg	0.50						< 0.50			
4-Nitroaniline	U	2790	mg/kg	0.50						< 0.50			
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50						< 0.50			
Azobenzene	U	2790	mg/kg	0.50						< 0.50			
4-Bromophenylphenyl Ether	U	2790	mg/kg	0.50						< 0.50			
Hexachlorobenzene	U	2790	mg/kg	0.50						< 0.50			
Pentachlorophenol	N	2790	mg/kg	0.50						< 0.50			
Phenanthrene	U	2790	mg/kg	0.50						< 0.50			
Anthracene	U	2790	mg/kg	0.50						< 0.50			
Carbazole	U	2790	mg/kg	0.50						< 0.50			
Di-N-Butyl Phthalate	U	2790	mg/kg	0.50						< 0.50			

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental					**Chemtest Job No.:**	20-24349	20-24349	20-24349	20-24349	20-24349	20-24349	20-24349	20-24350	20-24350
Quotation No.: Q20-21360					**Chemtest Sample ID.:**	1062789	1062790	1062792	1062795	1062797	1062799	1062800	1062801	1062802
					Sample Location:	TP737	TP738	TP739	TP740	TP741	TP742	TP742	TP730	TP731
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.80	0.50	1.20	1.10	0.75	0.50	1.00	0.05	0.10
					Date Sampled:	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	08-Sep-2020	04-Sep-2020	04-Sep-2020
					Asbestos Lab:			COVENTRY			COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Fluoranthene	U	2790	mg/kg	0.50							< 0.50			
Pyrene	U	2790	mg/kg	0.50							< 0.50			
Butylbenzyl Phthalate	U	2790	mg/kg	0.50							< 0.50			
Benzo[a]anthracene	U	2790	mg/kg	0.50							< 0.50			
Chrysene	U	2790	mg/kg	0.50							< 0.50			
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50							< 0.50			
Di-N-Octyl Phthalate	U	2790	mg/kg	0.50							< 0.50			
Benzo[b]fluoranthene	U	2790	mg/kg	0.50							< 0.50			
Benzo[k]fluoranthene	U	2790	mg/kg	0.50							< 0.50			
Benzo[a]pyrene	U	2790	mg/kg	0.50							< 0.50			
Indeno(1,2,3-c,d)Pyrene	U	2790	mg/kg	0.50							< 0.50			
Dibenz(a,h)Anthracene	U	2790	mg/kg	0.50							< 0.50			
Benzo[g,h,i]perylene	U	2790	mg/kg	0.50							< 0.50			

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental		**Chemtest Job No.:**			20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350
Quotation No.: Q20-21360		**Chemtest Sample ID.:**			1062804	1062805	1062806	1062807	1062808	1062809	1062810	1062811	1062812
		Sample Location:			TP733	TP733	TP734	TP735	TP736	TP724	TP725	TP726	TP727
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.15	1.00	0.10	0.40	0.40	0.10	0.05	0.20	0.75
		Date Sampled:			04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020
		Asbestos Lab:			COVENTRY		COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A	-		-	-		-	-	-	
Asbestos Identification	U	2192		N/A	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	
ACM Detection Stage	U	2192		N/A	-		-	-		-	-	-	
Moisture	N	2030	%	0.020	27	19	25	22	24	27	25	21	18
pH	U	2010		4.0	7.5	7.9	7.2	8.2		6.8	6.4	8.0	7.6
Magnesium (Water Soluble)	U	2120	mg/kg	20					< 20				
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		0.020			< 0.010				0.096
Total Sulphur	U	2175	%	0.010		0.021			0.54				0.023
Chloride (Water Soluble)	U	2220	g/l	0.010					< 0.010				
Nitrate (Water Soluble)	N	2220	g/l	0.010					< 0.010				
Cyanide (Total)	U	2300	mg/kg	0.50									
Calcium (Total)	N	2430	mg/kg	100				10000					
Iron (Total)	N	2430	mg/kg	100				31000					
Sulphate (Total)	U	2430	mg/kg	100					980				
Sulphate (Acid Soluble)	U	2430	%	0.010		0.010			0.51				0.037
Arsenic	U	2450	mg/kg	1.0	26		26	54		14	25	29	
Cadmium	U	2450	mg/kg	0.10	7.8		0.42	< 0.10		0.11	0.15	6.8	
Chromium	U	2450	mg/kg	1.0	23		31	11		15	20	22	
Copper	U	2450	mg/kg	0.50	55		50	62		16	56	57	
Mercury	U	2450	mg/kg	0.10	0.29		0.17	0.12		< 0.10	0.12	0.29	
Nickel	U	2450	mg/kg	0.50	15		45	88		14	46	25	
Lead	U	2450	mg/kg	0.50	360		69	68		41	43	190	
Selenium	U	2450	mg/kg	0.20	1.1		0.98	0.95		0.43	0.71	1.2	
Zinc	U	2450	mg/kg	0.50	640		76	46		31	40	470	
Total Organic Carbon	U	2625	%	0.20	3.9		7.0	27		3.1	5.6	7.3	
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0									
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0									
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0									
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0									
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0									
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0									
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0									
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0									
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0									
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0									
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0									
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0									
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental		Chemtest Job No.:			20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350
Quotation No.: Q20-21360		Chemtest Sample ID.:			1062804	1062805	1062806	1062807	1062808	1062809	1062810	1062811	1062812
		Sample Location:			TP733	TP733	TP734	TP735	TP736	TP724	TP725	TP726	TP727
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.15	1.00	0.10	0.40	0.40	0.10	0.05	0.20	0.75
		Date Sampled:			04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020
		Asbestos Lab:			COVENTRY		COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0									
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0									
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0									
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0									
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0									
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0									
Naphthalene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Acenaphthene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Fluorene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	
Phenanthrene	U	2700	mg/kg	0.10	< 0.10		1.6	< 0.10		< 0.10	< 0.10	< 0.10	
Anthracene	U	2700	mg/kg	0.10	< 0.10		0.13	< 0.10		< 0.10	< 0.10	< 0.10	
Fluoranthene	U	2700	mg/kg	0.10	< 0.10		1.2	< 0.10		< 0.10	0.56	< 0.10	
Pyrene	U	2700	mg/kg	0.10	< 0.10		1.2	< 0.10		< 0.10	0.52	< 0.10	
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10		0.64	< 0.10		< 0.10	< 0.10	< 0.10	
Chrysene	U	2700	mg/kg	0.10	< 0.10		0.86	< 0.10		< 0.10	< 0.10	< 0.10	
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10		0.71	< 0.10		< 0.10	< 0.10	< 0.10	
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10		0.28	< 0.10		< 0.10	< 0.10	< 0.10	
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10		0.56	< 0.10		< 0.10	< 0.10	< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10		0.34	< 0.10		< 0.10	< 0.10	< 0.10	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10		0.12	< 0.10		< 0.10	< 0.10	< 0.10	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10		0.40	< 0.10		< 0.10	< 0.10	< 0.10	
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0		8.0	< 2.0		< 2.0	< 2.0	< 2.0	
Benzene	U	2760	mg/kg	0.0010									
Toluene	U	2760	mg/kg	0.0010									
Ethylbenzene	U	2760	mg/kg	0.0010									
m & p-Xylene	U	2760	mg/kg	0.0010									
o-Xylene	U	2760	mg/kg	0.0010									
N-Nitrosodimethylamine	U	2790	mg/kg	0.50									
Phenol	U	2790	mg/kg	0.50									
2-Chlorophenol	U	2790	mg/kg	0.50									
Bis-(2-Chloroethyl)Ether	U	2790	mg/kg	0.50									
1,3-Dichlorobenzene	U	2790	mg/kg	0.50									
1,4-Dichlorobenzene	N	2790	mg/kg	0.50									
1,2-Dichlorobenzene	U	2790	mg/kg	0.50									
2-Methylphenol	U	2790	mg/kg	0.50									
Bis(2-Chloroisopropyl)Ether	U	2790	mg/kg	0.50									
Hexachloroethane	N	2790	mg/kg	0.50									
N-Nitrosodi-n-propylamine	U	2790	mg/kg	0.50									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental			**Chemtest Job No.:**		20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350
Quotation No.: Q20-21360			**Chemtest Sample ID.:**		1062804	1062805	1062806	1062807	1062808	1062809	1062810	1062811	1062812
			Sample Location:		TP733	TP733	TP734	TP735	TP736	TP724	TP725	TP726	TP727
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.15	1.00	0.10	0.40	0.40	0.10	0.05	0.20	0.75
			Date Sampled:		04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020
			Asbestos Lab:		COVENTRY		COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
4-Methylphenol	U	2790	mg/kg	0.50									
Nitrobenzene	U	2790	mg/kg	0.50									
Isophorone	U	2790	mg/kg	0.50									
2-Nitrophenol	N	2790	mg/kg	0.50									
2,4-Dimethylphenol	N	2790	mg/kg	0.50									
Bis(2-Chloroethoxy)Methane	U	2790	mg/kg	0.50									
2,4-Dichlorophenol	U	2790	mg/kg	0.50									
1,2,4-Trichlorobenzene	U	2790	mg/kg	0.50									
Naphthalene	U	2790	mg/kg	0.50									
4-Chloroaniline	N	2790	mg/kg	0.50									
Hexachlorobutadiene	U	2790	mg/kg	0.50									
4-Chloro-3-Methylphenol	U	2790	mg/kg	0.50									
2-Methylnaphthalene	U	2790	mg/kg	0.50									
4-Nitrophenol	N	2790	mg/kg	0.50									
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50									
2,4,6-Trichlorophenol	U	2790	mg/kg	0.50									
2,4,5-Trichlorophenol	U	2790	mg/kg	0.50									
2-Chloronaphthalene	U	2790	mg/kg	0.50									
2-Nitroaniline	U	2790	mg/kg	0.50									
Acenaphthylene	U	2790	mg/kg	0.50									
Dimethylphthalate	U	2790	mg/kg	0.50									
2,6-Dinitrotoluene	U	2790	mg/kg	0.50									
Acenaphthene	U	2790	mg/kg	0.50									
3-Nitroaniline	N	2790	mg/kg	0.50									
Dibenzofuran	U	2790	mg/kg	0.50									
4-Chlorophenylphenylether	U	2790	mg/kg	0.50									
2,4-Dinitrotoluene	U	2790	mg/kg	0.50									
Fluorene	U	2790	mg/kg	0.50									
Diethyl Phthalate	U	2790	mg/kg	0.50									
4-Nitroaniline	U	2790	mg/kg	0.50									
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50									
Azobenzene	U	2790	mg/kg	0.50									
4-Bromophenylphenyl Ether	U	2790	mg/kg	0.50									
Hexachlorobenzene	U	2790	mg/kg	0.50									
Pentachlorophenol	N	2790	mg/kg	0.50									
Phenanthrene	U	2790	mg/kg	0.50									
Anthracene	U	2790	mg/kg	0.50									
Carbazole	U	2790	mg/kg	0.50									
Di-N-Butyl Phthalate	U	2790	mg/kg	0.50									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental				**Chemtest Job No.:**	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350	20-24350
Quotation No.: Q20-21360				**Chemtest Sample ID.:**	1062804	1062805	1062806	1062807	1062808	1062809	1062810	1062811	1062812
				Sample Location:	TP733	TP733	TP734	TP735	TP736	TP724	TP725	TP726	TP727
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.15	1.00	0.10	0.40	0.40	0.10	0.05	0.20	0.75
				Date Sampled:	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020
				Asbestos Lab:	COVENTRY		COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Fluoranthene	U	2790	mg/kg	0.50									
Pyrene	U	2790	mg/kg	0.50									
Butylbenzyl Phthalate	U	2790	mg/kg	0.50									
Benzo[a]anthracene	U	2790	mg/kg	0.50									
Chrysene	U	2790	mg/kg	0.50									
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50									
Di-N-Octyl Phthalate	U	2790	mg/kg	0.50									
Benzo[b]fluoranthene	U	2790	mg/kg	0.50									
Benzo[k]fluoranthene	U	2790	mg/kg	0.50									
Benzo[a]pyrene	U	2790	mg/kg	0.50									
Indeno(1,2,3-c,d)Pyrene	U	2790	mg/kg	0.50									
Dibenz(a,h)Anthracene	U	2790	mg/kg	0.50									
Benzo[g,h,i]perylene	U	2790	mg/kg	0.50									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental		Chemtest Job No.:			20-24350	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352
Quotation No.: Q20-21360		Chemtest Sample ID.:			1062814	1062816	1062818	1062819	1062820	1062821	1062823	1062824	1062827
		Sample Location:			TP728	TP712	TP713	TP714	TP714	TP715	TP716	TP717	TP719
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			1.50	0.10	0.15	1.00	0.10	0.10	0.80	0.15	0.10
		Date Sampled:			04-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
		Asbestos Lab:				DURHAM	DURHAM	COVENTRY	DURHAM	COVENTRY		DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A		-	-	-	-	-		-	-
Asbestos Identification	U	2192		N/A		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A		-	-	-	-	-		-	-
Moisture	N	2030	%	0.020	13	22	26	16	25	22	14	25	24
pH	U	2010		4.0	7.9	6.8	6.6	8.2	7.5	7.5	7.5	6.9	6.9
Magnesium (Water Soluble)	U	2120	mg/kg	20									
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.11						< 0.010		
Total Sulphur	U	2175	%	0.010	0.035						0.021		
Chloride (Water Soluble)	U	2220	g/l	0.010									
Nitrate (Water Soluble)	N	2220	g/l	0.010									
Cyanide (Total)	U	2300	mg/kg	0.50									
Calcium (Total)	N	2430	mg/kg	100	990						1600		
Iron (Total)	N	2430	mg/kg	100									
Sulphate (Total)	U	2430	mg/kg	100									
Sulphate (Acid Soluble)	U	2430	%	0.010									
Arsenic	U	2450	mg/kg	1.0		18	20	14	16	28		14	25
Cadmium	U	2450	mg/kg	0.10		0.36	0.15	< 0.10	0.21	0.27		0.12	0.28
Chromium	U	2450	mg/kg	1.0		26	24	23	23	26		20	23
Copper	U	2450	mg/kg	0.50		25	25	12	22	21		20	69
Mercury	U	2450	mg/kg	0.10		0.12	0.10	< 0.10	< 0.10	0.11		< 0.10	0.14
Nickel	U	2450	mg/kg	0.50		17	15	11	16	19		13	58
Lead	U	2450	mg/kg	0.50		53	45	13	30	49		24	110
Selenium	U	2450	mg/kg	0.20		0.60	0.52	0.42	0.50	0.62		0.50	0.80
Zinc	U	2450	mg/kg	0.50		49	40	18	39	43		28	52
Total Organic Carbon	U	2625	%	0.20		4.6	3.4	0.42	3.5	2.4		3.5	9.1
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0									
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0									
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0									
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0									
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0									
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0									
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0									
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0									
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0									
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0									
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0									
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0									
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental		Chemtest Job No.:			20-24350	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352
Quotation No.: Q20-21360		Chemtest Sample ID.:			1062814	1062816	1062818	1062819	1062820	1062821	1062823	1062824	1062827
		Sample Location:			TP728	TP712	TP713	TP714	TP714	TP715	TP716	TP717	TP719
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			1.50	0.10	0.15	1.00	0.10	0.10	0.80	0.15	0.10
		Date Sampled:			04-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
		Asbestos Lab:				DURHAM	DURHAM	COVENTRY	DURHAM	COVENTRY		DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0									
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0									
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0									
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0									
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0									
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0									
Naphthalene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10		0.65	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Pyrene	U	2700	mg/kg	0.10		0.78	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0		< 2.0	< 2.0
Benzene	U	2760	mg/kg	0.0010									
Toluene	U	2760	mg/kg	0.0010									
Ethylbenzene	U	2760	mg/kg	0.0010									
m & p-Xylene	U	2760	mg/kg	0.0010									
o-Xylene	U	2760	mg/kg	0.0010									
N-Nitrosodimethylamine	U	2790	mg/kg	0.50									
Phenol	U	2790	mg/kg	0.50									
2-Chlorophenol	U	2790	mg/kg	0.50									
Bis-(2-Chloroethyl)Ether	U	2790	mg/kg	0.50									
1,3-Dichlorobenzene	U	2790	mg/kg	0.50									
1,4-Dichlorobenzene	N	2790	mg/kg	0.50									
1,2-Dichlorobenzene	U	2790	mg/kg	0.50									
2-Methylphenol	U	2790	mg/kg	0.50									
Bis(2-Chloroisopropyl)Ether	U	2790	mg/kg	0.50									
Hexachloroethane	N	2790	mg/kg	0.50									
N-Nitrosodi-n-propylamine	U	2790	mg/kg	0.50									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental			**Chemtest Job No.:**		20-24350	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352
Quotation No.: Q20-21360			**Chemtest Sample ID.:**		1062814	1062816	1062818	1062819	1062820	1062821	1062823	1062824	1062827
			Sample Location:		TP728	TP712	TP713	TP714	TP714	TP715	TP716	TP717	TP719
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.50	0.10	0.15	1.00	0.10	0.10	0.80	0.15	0.10
			Date Sampled:		04-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
			Asbestos Lab:			DURHAM	DURHAM	COVENTRY	DURHAM	COVENTRY		DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
4-Methylphenol	U	2790	mg/kg	0.50									
Nitrobenzene	U	2790	mg/kg	0.50									
Isophorone	U	2790	mg/kg	0.50									
2-Nitrophenol	N	2790	mg/kg	0.50									
2,4-Dimethylphenol	N	2790	mg/kg	0.50									
Bis(2-Chloroethoxy)Methane	U	2790	mg/kg	0.50									
2,4-Dichlorophenol	U	2790	mg/kg	0.50									
1,2,4-Trichlorobenzene	U	2790	mg/kg	0.50									
Naphthalene	U	2790	mg/kg	0.50									
4-Chloroaniline	N	2790	mg/kg	0.50									
Hexachlorobutadiene	U	2790	mg/kg	0.50									
4-Chloro-3-Methylphenol	U	2790	mg/kg	0.50									
2-Methylnaphthalene	U	2790	mg/kg	0.50									
4-Nitrophenol	N	2790	mg/kg	0.50									
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50									
2,4,6-Trichlorophenol	U	2790	mg/kg	0.50									
2,4,5-Trichlorophenol	U	2790	mg/kg	0.50									
2-Chloronaphthalene	U	2790	mg/kg	0.50									
2-Nitroaniline	U	2790	mg/kg	0.50									
Acenaphthylene	U	2790	mg/kg	0.50									
Dimethylphthalate	U	2790	mg/kg	0.50									
2,6-Dinitrotoluene	U	2790	mg/kg	0.50									
Acenaphthene	U	2790	mg/kg	0.50									
3-Nitroaniline	N	2790	mg/kg	0.50									
Dibenzofuran	U	2790	mg/kg	0.50									
4-Chlorophenylphenylether	U	2790	mg/kg	0.50									
2,4-Dinitrotoluene	U	2790	mg/kg	0.50									
Fluorene	U	2790	mg/kg	0.50									
Diethyl Phthalate	U	2790	mg/kg	0.50									
4-Nitroaniline	U	2790	mg/kg	0.50									
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50									
Azobenzene	U	2790	mg/kg	0.50									
4-Bromophenylphenyl Ether	U	2790	mg/kg	0.50									
Hexachlorobenzene	U	2790	mg/kg	0.50									
Pentachlorophenol	N	2790	mg/kg	0.50									
Phenanthrene	U	2790	mg/kg	0.50									
Anthracene	U	2790	mg/kg	0.50									
Carbazole	U	2790	mg/kg	0.50									
Di-N-Butyl Phthalate	U	2790	mg/kg	0.50									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental					**Chemtest Job No.:**	20-24350	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352	20-24352
Quotation No.: Q20-21360					**Chemtest Sample ID.:**	1062814	1062816	1062818	1062819	1062820	1062821	1062823	1062824	1062827
					Sample Location:	TP728	TP712	TP713	TP714	TP714	TP715	TP716	TP717	TP719
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.50	0.10	0.15	1.00	0.10	0.10	0.80	0.15	0.10
					Date Sampled:	04-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
					Asbestos Lab:		DURHAM	DURHAM	COVENTRY	DURHAM	COVENTRY		DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Fluoranthene	U	2790	mg/kg	0.50										
Pyrene	U	2790	mg/kg	0.50										
Butylbenzyl Phthalate	U	2790	mg/kg	0.50										
Benzo[a]anthracene	U	2790	mg/kg	0.50										
Chrysene	U	2790	mg/kg	0.50										
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50										
Di-N-Octyl Phthalate	U	2790	mg/kg	0.50										
Benzo[b]fluoranthene	U	2790	mg/kg	0.50										
Benzo[k]fluoranthene	U	2790	mg/kg	0.50										
Benzo[a]pyrene	U	2790	mg/kg	0.50										
Indeno(1,2,3-c,d)Pyrene	U	2790	mg/kg	0.50										
Dibenz(a,h)Anthracene	U	2790	mg/kg	0.50										
Benzo[g,h,i]perylene	U	2790	mg/kg	0.50										

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental		Chemtest Job No.:			20-24352	20-24352	20-24353	20-24353	20-24353	20-24353	20-24353	20-24353	20-24355
Quotation No.: Q20-21360		Chemtest Sample ID.:			1062828	1062832	1062833	1062837	1062840	1062842	1062843	1062844	1062848
		Sample Location:			TP719	TP722	TP728	TP729	TP701	TP702	TP703	TP703	TP705
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			1.00	0.05	0.05	0.85	0.10	0.50	0.20	1.00	0.15
		Date Sampled:			03-Sep-2020	03-Sep-2020	04-Sep-2020	04-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020
		Asbestos Lab:				COVENTRY	COVENTRY		COVENTRY		COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A		-	-		-		-		-
Asbestos Identification	U	2192		N/A		No Asbestos Detected	No Asbestos Detected		No Asbestos Detected		No Asbestos Detected		No Asbestos Detected
ACM Detection Stage	U	2192		N/A		-	-		-		-		-
Moisture	N	2030	%	0.020	14	35	15	22	26	19	24	12	37
pH	U	2010		4.0	7.5	7.6	8.1	7.8	7.0	7.8	7.6	8.5	7.8
Magnesium (Water Soluble)	U	2120	mg/kg	20									
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010					< 0.010		< 0.010	
Total Sulphur	U	2175	%	0.010	0.013					0.029		0.017	
Chloride (Water Soluble)	U	2220	g/l	0.010									
Nitrate (Water Soluble)	N	2220	g/l	0.010									
Cyanide (Total)	U	2300	mg/kg	0.50									
Calcium (Total)	N	2430	mg/kg	100								1500	
Iron (Total)	N	2430	mg/kg	100									
Sulphate (Total)	U	2430	mg/kg	100									
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010					0.064			
Arsenic	U	2450	mg/kg	1.0		19	21	5.1	14		23		18
Cadmium	U	2450	mg/kg	0.10		0.25	0.15	< 0.10	0.66		0.51		0.15
Chromium	U	2450	mg/kg	1.0		18	14	12	34		35		24
Copper	U	2450	mg/kg	0.50		25	50	5.3	31		40		37
Mercury	U	2450	mg/kg	0.10		< 0.10	< 0.10	< 0.10	0.11		0.16		< 0.10
Nickel	U	2450	mg/kg	0.50		23	79	8.4	26		42		20
Lead	U	2450	mg/kg	0.50		33	26	11	40		71		29
Selenium	U	2450	mg/kg	0.20		0.80	0.75	0.53	0.50		0.98		0.65
Zinc	U	2450	mg/kg	0.50		58	38	12	57		85		78
Total Organic Carbon	U	2625	%	0.20		5.8	16	1.0	7.0		5.8		0.88
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0				< 1.0					
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0				< 1.0					
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0				< 1.0					
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0				< 1.0					
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0				< 1.0					
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0				< 1.0					
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0				< 1.0					
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0				< 1.0					
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0				< 5.0					
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0				< 1.0					
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0				< 1.0					
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0				< 1.0					
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0				< 1.0					

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental													
			Chemtest Job No.:		20-24352	20-24352	20-24353	20-24353	20-24353	20-24353	20-24353	20-24353	20-24355
Quotation No.: Q20-21360			Chemtest Sample ID.:		1062828	1062832	1062833	1062837	1062840	1062842	1062843	1062844	1062848
			Sample Location:		TP719	TP722	TP728	TP729	TP701	TP702	TP703	TP703	TP705
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.00	0.05	0.05	0.85	0.10	0.50	0.20	1.00	0.15
			Date Sampled:		03-Sep-2020	03-Sep-2020	04-Sep-2020	04-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020
			Asbestos Lab:			COVENTRY	COVENTRY		COVENTRY		COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0				< 1.0					
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0				< 1.0					
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0				< 1.0					
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0				< 1.0					
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0				< 5.0					
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0				< 10					
Naphthalene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10		< 0.10		< 0.10
Acenaphthylene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10		< 0.10		< 0.10
Acenaphthene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10		< 0.10		< 0.10
Fluorene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10		< 0.10		< 0.10
Phenanthrene	U	2700	mg/kg	0.10		0.84	< 0.10		< 0.10		0.86		< 0.10
Anthracene	U	2700	mg/kg	0.10		0.13	< 0.10		< 0.10		0.12		< 0.10
Fluoranthene	U	2700	mg/kg	0.10		1.2	< 0.10		0.46		0.64		< 0.10
Pyrene	U	2700	mg/kg	0.10		1.2	< 0.10		0.52		0.69		< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10		0.52	< 0.10		< 0.10		0.46		< 0.10
Chrysene	U	2700	mg/kg	0.10		0.67	< 0.10		< 0.10		0.64		< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10		0.66	< 0.10		< 0.10		< 0.10		< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10		0.19	< 0.10		< 0.10		< 0.10		< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10		0.61	< 0.10		< 0.10		< 0.10		< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10		0.39	< 0.10		< 0.10		< 0.10		< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10		0.21	< 0.10		< 0.10		< 0.10		< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10		0.49	< 0.10		< 0.10		< 0.10		< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0		7.1	< 2.0		< 2.0		3.4		< 2.0
Benzene	U	2760	mg/kg	0.0010				< 0.0010					
Toluene	U	2760	mg/kg	0.0010				< 0.0010					
Ethylbenzene	U	2760	mg/kg	0.0010				< 0.0010					
m & p-Xylene	U	2760	mg/kg	0.0010				< 0.0010					
o-Xylene	U	2760	mg/kg	0.0010				< 0.0010					
N-Nitrosodimethylamine	U	2790	mg/kg	0.50									
Phenol	U	2790	mg/kg	0.50									
2-Chlorophenol	U	2790	mg/kg	0.50									
Bis-(2-Chloroethyl)Ether	U	2790	mg/kg	0.50									
1,3-Dichlorobenzene	U	2790	mg/kg	0.50									
1,4-Dichlorobenzene	N	2790	mg/kg	0.50									
1,2-Dichlorobenzene	U	2790	mg/kg	0.50									
2-Methylphenol	U	2790	mg/kg	0.50									
Bis(2-Chloroisopropyl)Ether	U	2790	mg/kg	0.50									
Hexachloroethane	N	2790	mg/kg	0.50									
N-Nitrosodi-n-propylamine	U	2790	mg/kg	0.50									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental		Chemtest Job No.:			20-24352	20-24352	20-24353	20-24353	20-24353	20-24353	20-24353	20-24353	20-24355
Quotation No.: Q20-21360		Chemtest Sample ID.:			1062828	1062832	1062833	1062837	1062840	1062842	1062843	1062844	1062848
		Sample Location:			TP719	TP722	TP728	TP729	TP701	TP702	TP703	TP703	TP705
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			1.00	0.05	0.05	0.85	0.10	0.50	0.20	1.00	0.15
		Date Sampled:			03-Sep-2020	03-Sep-2020	04-Sep-2020	04-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020
		Asbestos Lab:				COVENTRY	COVENTRY		COVENTRY		COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
4-Methylphenol	U	2790	mg/kg	0.50									
Nitrobenzene	U	2790	mg/kg	0.50									
Isophorone	U	2790	mg/kg	0.50									
2-Nitrophenol	N	2790	mg/kg	0.50									
2,4-Dimethylphenol	N	2790	mg/kg	0.50									
Bis(2-Chloroethoxy)Methane	U	2790	mg/kg	0.50									
2,4-Dichlorophenol	U	2790	mg/kg	0.50									
1,2,4-Trichlorobenzene	U	2790	mg/kg	0.50									
Naphthalene	U	2790	mg/kg	0.50									
4-Chloroaniline	N	2790	mg/kg	0.50									
Hexachlorobutadiene	U	2790	mg/kg	0.50									
4-Chloro-3-Methylphenol	U	2790	mg/kg	0.50									
2-Methylnaphthalene	U	2790	mg/kg	0.50									
4-Nitrophenol	N	2790	mg/kg	0.50									
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50									
2,4,6-Trichlorophenol	U	2790	mg/kg	0.50									
2,4,5-Trichlorophenol	U	2790	mg/kg	0.50									
2-Chloronaphthalene	U	2790	mg/kg	0.50									
2-Nitroaniline	U	2790	mg/kg	0.50									
Acenaphthylene	U	2790	mg/kg	0.50									
Dimethylphthalate	U	2790	mg/kg	0.50									
2,6-Dinitrotoluene	U	2790	mg/kg	0.50									
Acenaphthene	U	2790	mg/kg	0.50									
3-Nitroaniline	N	2790	mg/kg	0.50									
Dibenzofuran	U	2790	mg/kg	0.50									
4-Chlorophenylphenylether	U	2790	mg/kg	0.50									
2,4-Dinitrotoluene	U	2790	mg/kg	0.50									
Fluorene	U	2790	mg/kg	0.50									
Diethyl Phthalate	U	2790	mg/kg	0.50									
4-Nitroaniline	U	2790	mg/kg	0.50									
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50									
Azobenzene	U	2790	mg/kg	0.50									
4-Bromophenylphenyl Ether	U	2790	mg/kg	0.50									
Hexachlorobenzene	U	2790	mg/kg	0.50									
Pentachlorophenol	N	2790	mg/kg	0.50									
Phenanthrene	U	2790	mg/kg	0.50									
Anthracene	U	2790	mg/kg	0.50									
Carbazole	U	2790	mg/kg	0.50									
Di-N-Butyl Phthalate	U	2790	mg/kg	0.50									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental					**Chemtest Job No.:**	20-24352	20-24352	20-24353	20-24353	20-24353	20-24353	20-24353	20-24353	20-24355
Quotation No.: Q20-21360					**Chemtest Sample ID.:**	1062828	1062832	1062833	1062837	1062840	1062842	1062843	1062844	1062848
					Sample Location:	TP719	TP722	TP728	TP729	TP701	TP702	TP703	TP703	TP705
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.00	0.05	0.05	0.85	0.10	0.50	0.20	1.00	0.15
					Date Sampled:	03-Sep-2020	03-Sep-2020	04-Sep-2020	04-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020
					Asbestos Lab:		COVENTRY	COVENTRY		COVENTRY		COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Fluoranthene	U	2790	mg/kg	0.50										
Pyrene	U	2790	mg/kg	0.50										
Butylbenzyl Phthalate	U	2790	mg/kg	0.50										
Benzo[a]anthracene	U	2790	mg/kg	0.50										
Chrysene	U	2790	mg/kg	0.50										
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50										
Di-N-Octyl Phthalate	U	2790	mg/kg	0.50										
Benzo[b]fluoranthene	U	2790	mg/kg	0.50										
Benzo[k]fluoranthene	U	2790	mg/kg	0.50										
Benzo[a]pyrene	U	2790	mg/kg	0.50										
Indeno(1,2,3-c,d)Pyrene	U	2790	mg/kg	0.50										
Dibenz(a,h)Anthracene	U	2790	mg/kg	0.50										
Benzo[g,h,i]perylene	U	2790	mg/kg	0.50										

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental		Chemtest Job No.:			20-24355	20-24355	20-24355	20-24355	20-24357	20-24357	20-24357	20-24357	20-24357
Quotation No.: Q20-21360		Chemtest Sample ID.:			1062852	1062853	1062854	1062856	1062859	1062860	1062862	1062866	1062875
		Sample Location:			TP708	TP707	TP709	TP710	TP720	TP720	TP720	TP722	TP721
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.75	0.10	0.20	1.10	0.05	0.60	2.40	0.05	0.40
		Date Sampled:			02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
		Asbestos Lab:				COVENTRY	COVENTRY		COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A		-	-		-	-		-	-
Asbestos Identification	U	2192		N/A		No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A		-	-		-	-		-	-
Moisture	N	2030	%	0.020	27	34	27	11	35	19	13	46	26
pH	U	2010		4.0	6.6	6.9	6.7	6.6	6.6	8.1	9.8	7.4	7.2
Magnesium (Water Soluble)	U	2120	mg/kg	20									
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.039			< 0.010			< 0.010		
Total Sulphur	U	2175	%	0.010	0.13			0.029			0.022		
Chloride (Water Soluble)	U	2220	g/l	0.010									
Nitrate (Water Soluble)	N	2220	g/l	0.010									
Cyanide (Total)	U	2300	mg/kg	0.50									
Calcium (Total)	N	2430	mg/kg	100						2700			7800
Iron (Total)	N	2430	mg/kg	100						24000			29000
Sulphate (Total)	U	2430	mg/kg	100									
Sulphate (Acid Soluble)	U	2430	%	0.010	0.14			0.010			< 0.010		
Arsenic	U	2450	mg/kg	1.0		17	15		25	18		24	61
Cadmium	U	2450	mg/kg	0.10		0.44	0.35		0.30	< 0.10		0.34	< 0.10
Chromium	U	2450	mg/kg	1.0		29	26		24	19		22	22
Copper	U	2450	mg/kg	0.50		30	24		41	31		31	230
Mercury	U	2450	mg/kg	0.10		0.15	0.11		0.10	< 0.10		0.10	0.61
Nickel	U	2450	mg/kg	0.50		26	20		35	32		27	180
Lead	U	2450	mg/kg	0.50		40	29		54	29		40	34
Selenium	U	2450	mg/kg	0.20		0.81	0.51		0.72	0.44		1.1	1.4
Zinc	U	2450	mg/kg	0.50		48	44		110	70		60	61
Total Organic Carbon	U	2625	%	0.20		5.4	2.6		6.9	2.7		6.1	24
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0									
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0									
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0									
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0									
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0									
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0									
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0									
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0									
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0									
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0									
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0									
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0									
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental		Chemtest Job No.:			20-24355	20-24355	20-24355	20-24355	20-24357	20-24357	20-24357	20-24357	20-24357
Quotation No.: Q20-21360		Chemtest Sample ID.:			1062852	1062853	1062854	1062856	1062859	1062860	1062862	1062866	1062875
		Sample Location:			TP708	TP707	TP709	TP710	TP720	TP720	TP720	TP722	TP721
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.75	0.10	0.20	1.10	0.05	0.60	2.40	0.05	0.40
		Date Sampled:			02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
		Asbestos Lab:				COVENTRY	COVENTRY		COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0									
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0									
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0									
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0									
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0									
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0									
Naphthalene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	0.52		0.74	2.3
Anthracene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	0.23		0.20	0.28
Fluoranthene	U	2700	mg/kg	0.10		0.28	< 0.10		0.54	0.52		1.0	0.91
Pyrene	U	2700	mg/kg	0.10		0.37	< 0.10		0.63	0.52		1.1	1.1
Benzo[a]anthracene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	0.27		0.51	0.55
Chrysene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	0.57		0.92	0.72
Benzo[b]fluoranthene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0		< 2.0	< 2.0		< 2.0	2.6		4.5	5.9
Benzene	U	2760	mg/kg	0.0010									
Toluene	U	2760	mg/kg	0.0010									
Ethylbenzene	U	2760	mg/kg	0.0010									
m & p-Xylene	U	2760	mg/kg	0.0010									
o-Xylene	U	2760	mg/kg	0.0010									
N-Nitrosodimethylamine	U	2790	mg/kg	0.50									
Phenol	U	2790	mg/kg	0.50									
2-Chlorophenol	U	2790	mg/kg	0.50									
Bis-(2-Chloroethyl)Ether	U	2790	mg/kg	0.50									
1,3-Dichlorobenzene	U	2790	mg/kg	0.50									
1,4-Dichlorobenzene	N	2790	mg/kg	0.50									
1,2-Dichlorobenzene	U	2790	mg/kg	0.50									
2-Methylphenol	U	2790	mg/kg	0.50									
Bis(2-Chloroisopropyl)Ether	U	2790	mg/kg	0.50									
Hexachloroethane	N	2790	mg/kg	0.50									
N-Nitrosodi-n-propylamine	U	2790	mg/kg	0.50									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental		Chemtest Job No.:			20-24355	20-24355	20-24355	20-24355	20-24357	20-24357	20-24357	20-24357	20-24357
Quotation No.: Q20-21360		Chemtest Sample ID.:			1062852	1062853	1062854	1062856	1062859	1062860	1062862	1062866	1062875
		Sample Location:			TP708	TP707	TP709	TP710	TP720	TP720	TP720	TP722	TP721
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.75	0.10	0.20	1.10	0.05	0.60	2.40	0.05	0.40
		Date Sampled:			02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
		Asbestos Lab:				COVENTRY	COVENTRY		COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
4-Methylphenol	U	2790	mg/kg	0.50									
Nitrobenzene	U	2790	mg/kg	0.50									
Isophorone	U	2790	mg/kg	0.50									
2-Nitrophenol	N	2790	mg/kg	0.50									
2,4-Dimethylphenol	N	2790	mg/kg	0.50									
Bis(2-Chloroethoxy)Methane	U	2790	mg/kg	0.50									
2,4-Dichlorophenol	U	2790	mg/kg	0.50									
1,2,4-Trichlorobenzene	U	2790	mg/kg	0.50									
Naphthalene	U	2790	mg/kg	0.50									
4-Chloroaniline	N	2790	mg/kg	0.50									
Hexachlorobutadiene	U	2790	mg/kg	0.50									
4-Chloro-3-Methylphenol	U	2790	mg/kg	0.50									
2-Methylnaphthalene	U	2790	mg/kg	0.50									
4-Nitrophenol	N	2790	mg/kg	0.50									
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50									
2,4,6-Trichlorophenol	U	2790	mg/kg	0.50									
2,4,5-Trichlorophenol	U	2790	mg/kg	0.50									
2-Chloronaphthalene	U	2790	mg/kg	0.50									
2-Nitroaniline	U	2790	mg/kg	0.50									
Acenaphthylene	U	2790	mg/kg	0.50									
Dimethylphthalate	U	2790	mg/kg	0.50									
2,6-Dinitrotoluene	U	2790	mg/kg	0.50									
Acenaphthene	U	2790	mg/kg	0.50									
3-Nitroaniline	N	2790	mg/kg	0.50									
Dibenzofuran	U	2790	mg/kg	0.50									
4-Chlorophenylphenylether	U	2790	mg/kg	0.50									
2,4-Dinitrotoluene	U	2790	mg/kg	0.50									
Fluorene	U	2790	mg/kg	0.50									
Diethyl Phthalate	U	2790	mg/kg	0.50									
4-Nitroaniline	U	2790	mg/kg	0.50									
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50									
Azobenzene	U	2790	mg/kg	0.50									
4-Bromophenylphenyl Ether	U	2790	mg/kg	0.50									
Hexachlorobenzene	U	2790	mg/kg	0.50									
Pentachlorophenol	N	2790	mg/kg	0.50									
Phenanthrene	U	2790	mg/kg	0.50									
Anthracene	U	2790	mg/kg	0.50									
Carbazole	U	2790	mg/kg	0.50									
Di-N-Butyl Phthalate	U	2790	mg/kg	0.50									

Results - Soil

Project: 4046 Edgehill Rhodia, Whitehaven

Client: iD GeoEnvironmental					**Chemtest Job No.:**	20-24355	20-24355	20-24355	20-24357	20-24357	20-24357	20-24357	20-24357
Quotation No.: Q20-21360					**Chemtest Sample ID.:**	1062852	1062853	1062854	1062856	1062859	1062860	1062862	1062866	1062875
					Sample Location:	TP708	TP707	TP709	TP710	TP720	TP720	TP720	TP722	TP721
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.75	0.10	0.20	1.10	0.05	0.60	2.40	0.05	0.40
					Date Sampled:	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
					Asbestos Lab:		COVENTRY	COVENTRY		COVENTRY	COVENTRY		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Fluoranthene	U	2790	mg/kg	0.50										
Pyrene	U	2790	mg/kg	0.50										
Butylbenzyl Phthalate	U	2790	mg/kg	0.50										
Benzo[a]anthracene	U	2790	mg/kg	0.50										
Chrysene	U	2790	mg/kg	0.50										
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50										
Di-N-Octyl Phthalate	U	2790	mg/kg	0.50										
Benzo[b]fluoranthene	U	2790	mg/kg	0.50										
Benzo[k]fluoranthene	U	2790	mg/kg	0.50										
Benzo[a]pyrene	U	2790	mg/kg	0.50										
Indeno(1,2,3-c,d)Pyrene	U	2790	mg/kg	0.50										
Dibenz(a,h)Anthracene	U	2790	mg/kg	0.50										
Benzo[g,h,i]perylene	U	2790	mg/kg	0.50										

Results - Water

Project: 4046 Edgehill, Rhodia, Whitehaven

Client: iD GeoEnvironmental		**Chemtest Job No.:**			20-24353	20-24357
Quotation No.: Q20-21360		**Chemtest Sample ID.:**			1062839	1062863
			Sample Location:		TP729	TP720
			Sample Type:		WATER	WATER
			Top Depth (m):		0.50	1.10
			Date Sampled:		04-Sep-2020	03-Sep-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
pH	U	1010		N/A	7.4	7.5
Nitrate	U	1220	mg/l	0.50	< 0.50	< 0.50
Sulphate	U	1220	mg/l	1.0	360	98
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050
Thiocyanate	U	1300	mg/l	0.50	< 0.50	< 0.50
Sulphide	U	1325	mg/l	0.050	[B] < 0.050	[B] < 0.050
Calcium	U	1415	mg/l	5.0	220	180
Potassium	U	1415	mg/l	0.50	6.3	3.2
Sodium	U	1415	mg/l	0.50	25	7.9
Arsenic (Dissolved)	U	1450	µg/l	1.0	2.3	6.6
Boron (Dissolved)	U	1450	µg/l	20	77	75
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	1.5	< 1.0
Copper (Dissolved)	U	1450	µg/l	1.0	1.2	< 1.0
Iron (Dissolved)	N	1450	µg/l	20	420	1100
Mercury (Dissolved)	U	1450	µg/l	0.50	< 0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1.0	1.8	< 1.0
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	1.3	1.0
Zinc (Dissolved)	U	1450	µg/l	1.0	7.4	2.7
Chromium (Hexavalent)	U	1490	µg/l	20	[B] < 20	[B] < 20
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0
Total Phenols	U	1920	mg/l	0.030	< 0.030	[B] < 0.030

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1062839			TP729	04-Sep-2020	B	Coloured Winchester 1000ml
1062839			TP729	04-Sep-2020	B	EPA Vial 40ml
1062863			TP720	03-Sep-2020	B	Coloured Winchester 1000ml
1062863			TP720	03-Sep-2020	B	EPA Vial 40ml

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N–dimethyl-pphenylenediamine.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2185	Asbestos	Asbestos	Polarised light microscopy
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

APPENDIX F

LABORATORY REPORT

4043

Contract Number: PSL20/4046

Report Date: 21 September 2020

Client's Reference: 4046

Client Name: ID Geoenvironmental
Caledonian House
Tatton Stret
Knutsford
Cheshire
WA16 6AG

For the attention of: Nick Ward

Contract Title: Rhodia, Whitehaven

Date Received: 7/8/2020
Date Commenced: 7/8/2020
Date Completed: 17/9/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
S Royle (Laboratory Manager)	S Eyre (Senior Technician)	L Knight (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP801		B	1.50		MADE GROUND brown very gravelly very sandy clay.
TP802		B	2.00		MADE GROUND brown sandy very clayey gravel.
TP803		B	1.50		MADE GROUND brown sandy clayey gravel with cobbles.
TP804		B	1.00		MADE GROUND brown sandy clayey gravel with some cobbles, gravel consists of chalk.

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP801		B	1.50		25		2.57					
TP802		B	2.00		20		2.54					
TP803		B	1.50		24		2.58					
TP804		B	1.00		38		2.64					

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL Professional Soils Laboratory

Rhodia, Whitehaven

Contract No:

PSL20/4046

Client Ref:

4046

PARTICLE SIZE DISTRIBUTION TEST

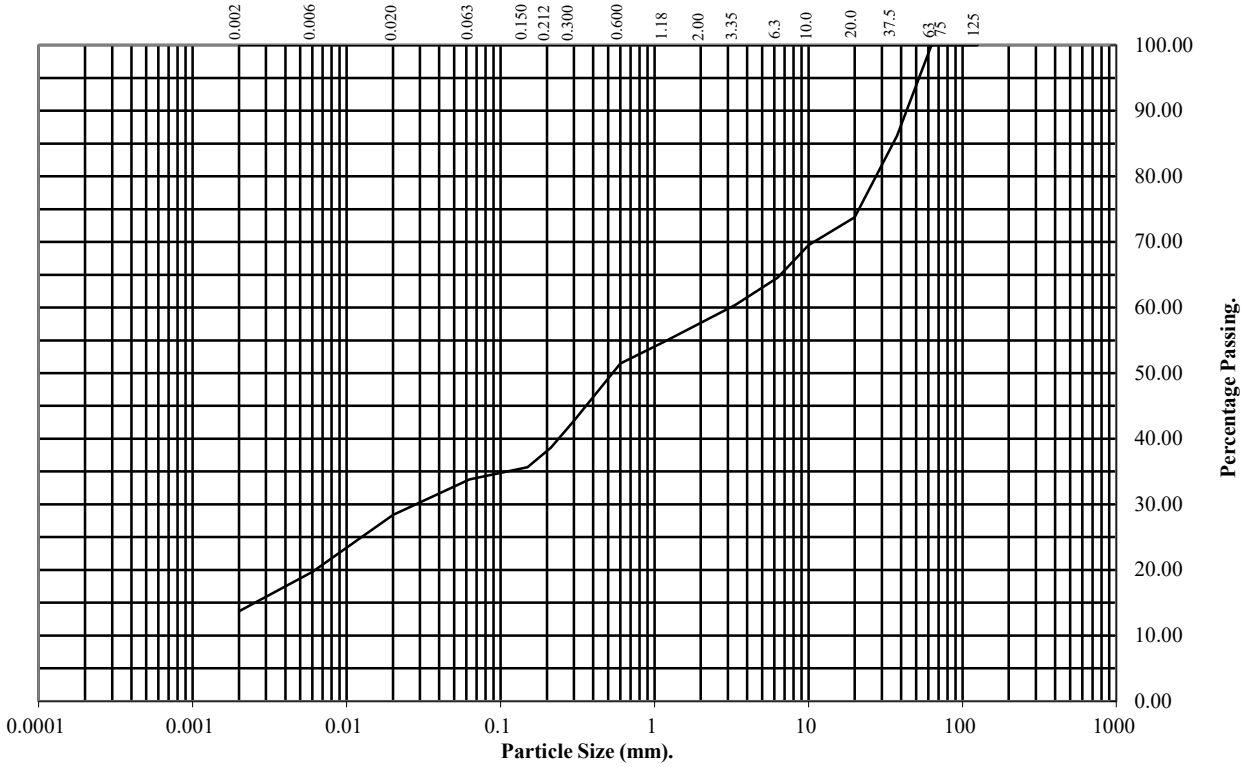
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP801 **Top Depth (m):** 1.50

Sample Number: **Base Depth(m):**

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	86
20	74
10	70
6.3	65
3.35	60
2	58
1.18	55
0.6	51
0.3	43
0.212	39
0.15	36
0.063	34

Particle Diameter	Percentage Passing
0.02	28
0.006	20
0.002	14

Soil Fraction	Total Percentage
Cobbles	0
Gravel	42
Sand	24
Silt	20
Clay	14

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043

PSL Professional Soils Laboratory

Rhodia, Whitehaven

Contract No: PSL20/4046

Client Ref:

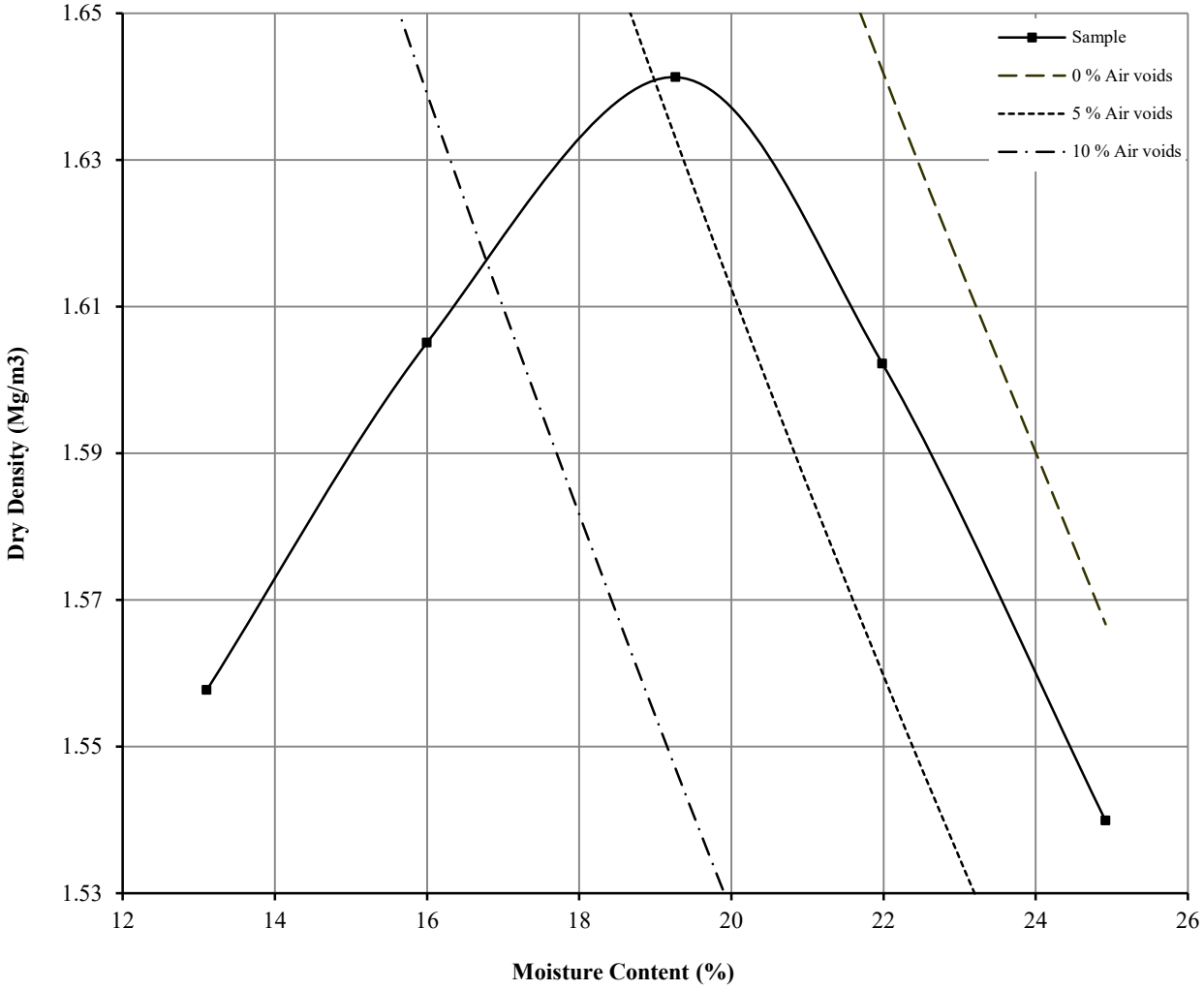
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : Clause 3.4 : 1990

Hole Number: TP801 **Top Depth (m) :** 1.50

Sample Number: **Base Depth (m) :**

Sample Type: B



Initial Moisture Content:		25	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.57	Measured	Material Retained on 37.5 mm Test Sieve (%):		14
Maximum Dry Density (Mg/m3):		1.64	Material Retained on 20.0 mm Test Sieve (%):		12
Optimum Moisture Content (%):		19			
Remarks See summary of soil descriptions.					

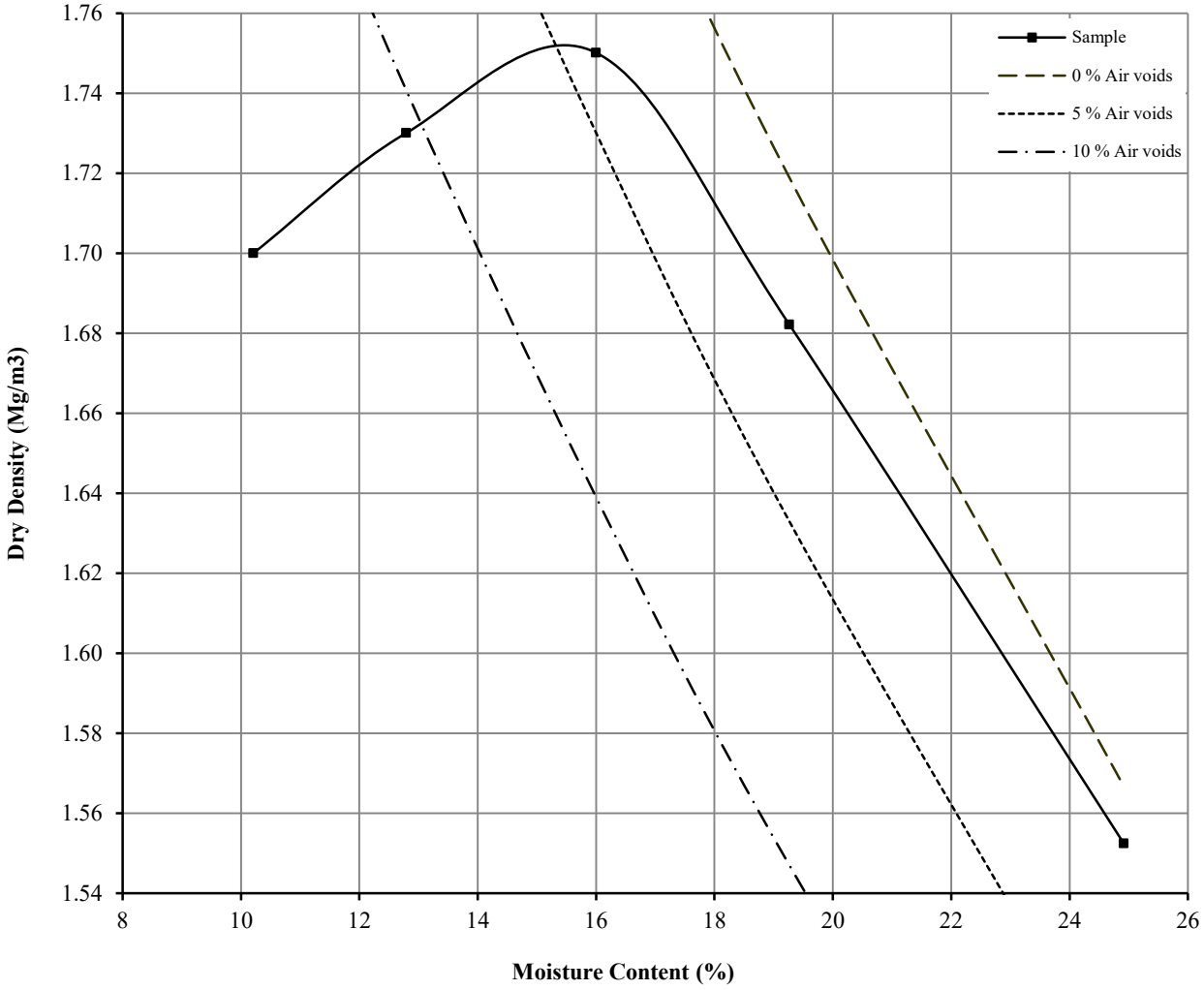
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : Clause 3.6 : 1990

Hole Number: TP801 **Top Depth (m) :** 1.50

Sample Number: **Base Depth (m) :**

Sample Type: B



Initial Moisture Content:		25	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m3):	2.57	Measured	Material Retained on 37.5 mm Test Sieve (%):		14
Maximum Dry Density (Mg/m3):		1.75	Material Retained on 20.0 mm Test Sieve (%):		12
Optimum Moisture Content (%):		16			
Remarks See summary of soil descriptions.					

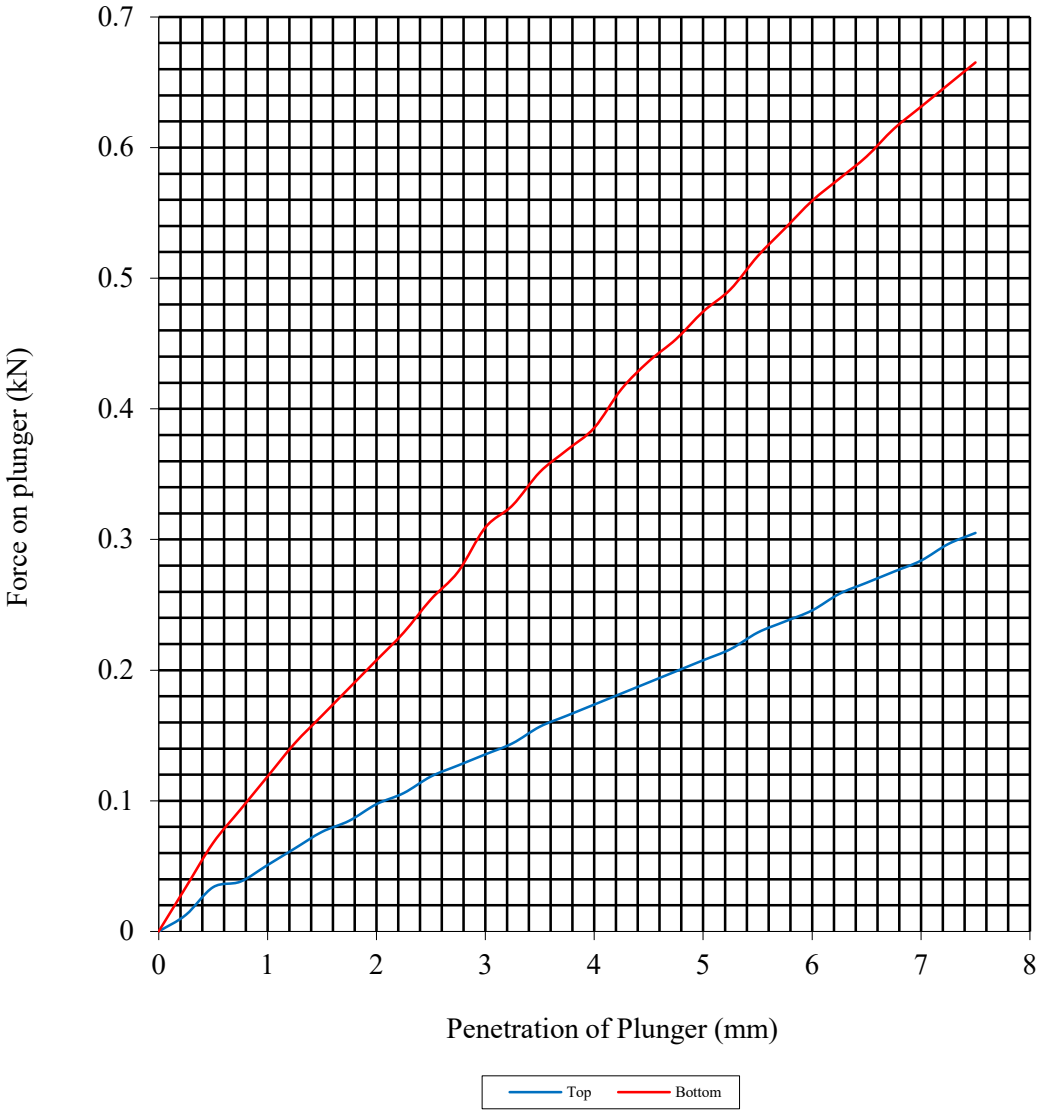
CALIFORNIA BEARING RATIO TEST

Non compliance with BS 1377 : Part 4 : 1990

Hole Number: TP801 **Top Depth (m):** 1.50

Sample Number: **Base Depth (m):**

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	25	Surcharge Kg:	4.20	Sample Top	27	Sample Top	1.0
Bulk Density Mg/m3:	1.92	Soaking Time hrs	336	Sample Bottom	27	Sample Bottom	2.4
Dry Density Mg/m3:	1.54	Swelling mm:	0.04	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			26	**Swelling at 7 days - 0.03mm**			
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Rhodia, Whitehaven

Contract No: PSL20/4046

Client Ref: 4046

PARTICLE SIZE DISTRIBUTION TEST

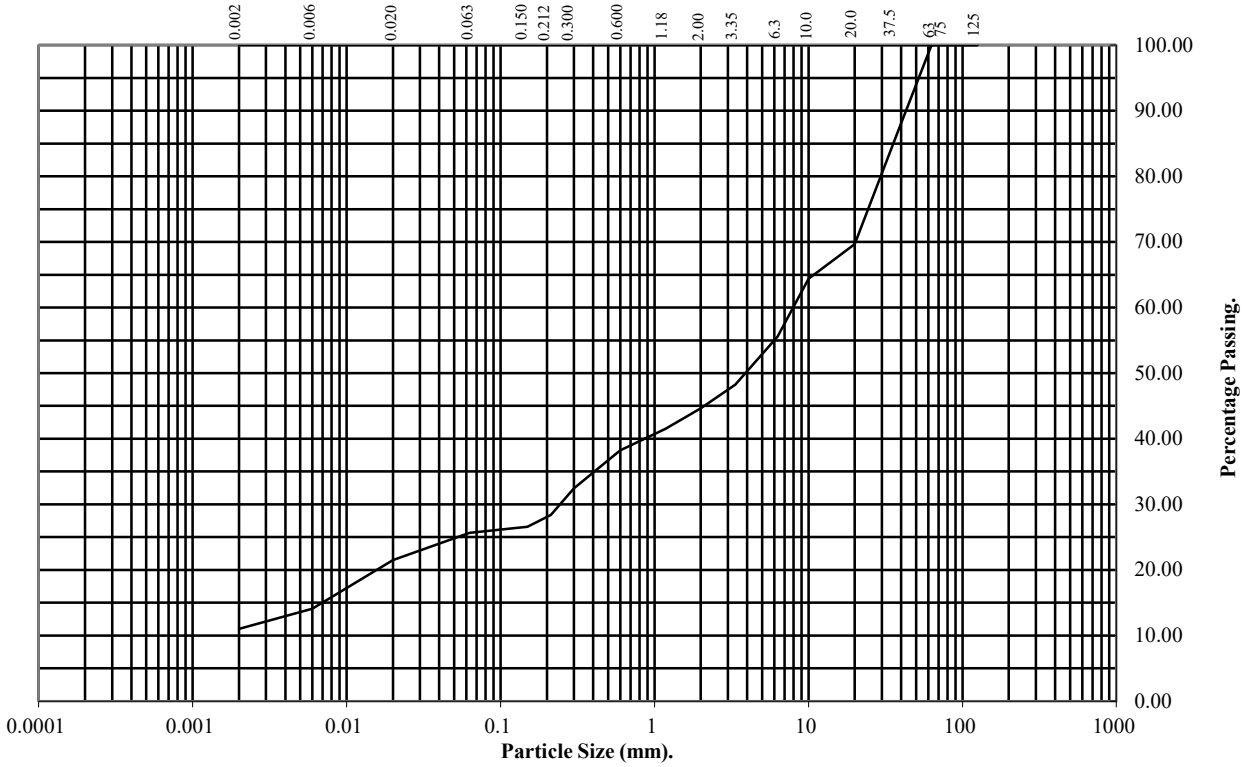
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP802 **Top Depth (m):** 2.00

Sample Number: **Base Depth(m):**

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	86
20	70
10	64
6.3	56
3.35	48
2	45
1.18	41
0.6	38
0.3	32
0.212	28
0.15	27
0.063	26

Particle Diameter	Percentage Passing
0.02	22
0.006	14
0.002	11

Soil Fraction	Total Percentage
Cobbles	0
Gravel	55
Sand	19
Silt	15
Clay	11

Remarks:
See Summary of Soil Descriptions

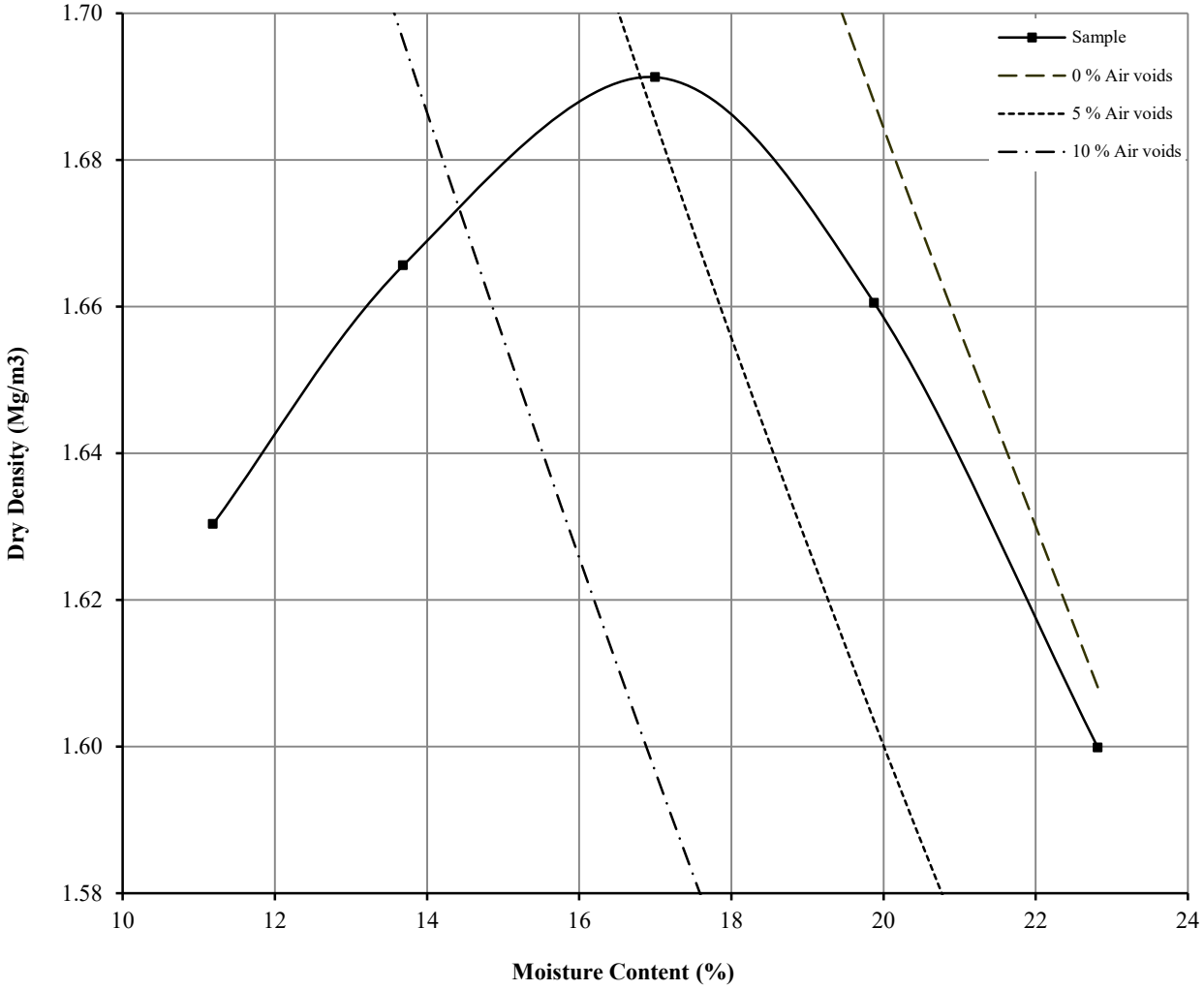
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : Clause 3.4 : 1990

Hole Number: TP802 **Top Depth (m) :** 2.00

Sample Number: **Base Depth (m) :**

Sample Type: B



Initial Moisture Content:		20	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.54	Measured	Material Retained on 37.5 mm Test Sieve (%):		14
Maximum Dry Density (Mg/m3):		1.69	Material Retained on 20.0 mm Test Sieve (%):		16
Optimum Moisture Content (%):		17			
Remarks See summary of soil descriptions.					

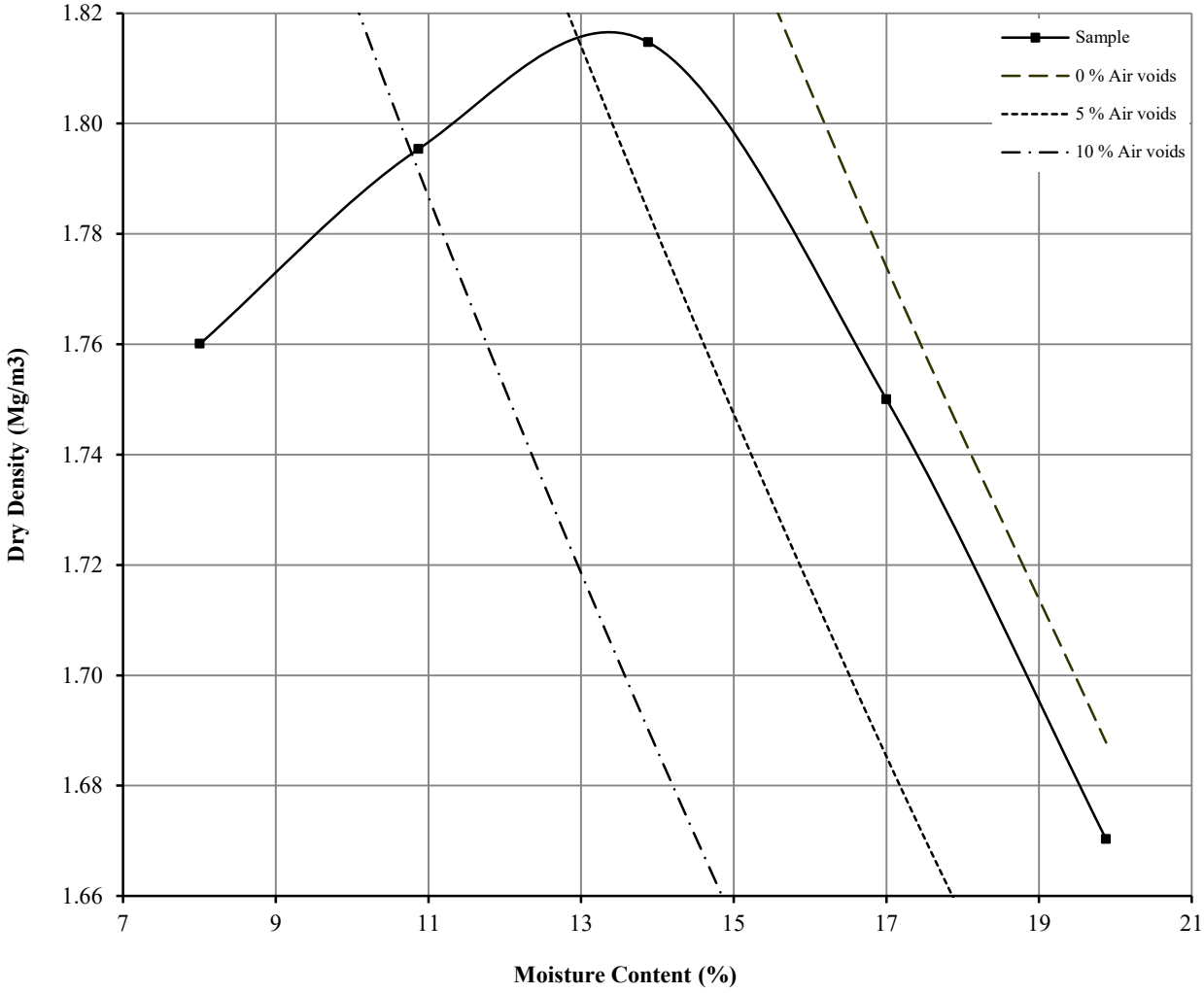
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : Clause 3.6 : 1990

Hole Number: TP802 **Top Depth (m) :** 2.00

Sample Number: **Base Depth (m) :**

Sample Type: B



Initial Moisture Content:		20	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m3):	2.54	Measured	Material Retained on 37.5 mm Test Sieve (%):		14
Maximum Dry Density (Mg/m3):		1.81	Material Retained on 20.0 mm Test Sieve (%):		16
Optimum Moisture Content (%):		14			
Remarks See summary of soil descriptions.					

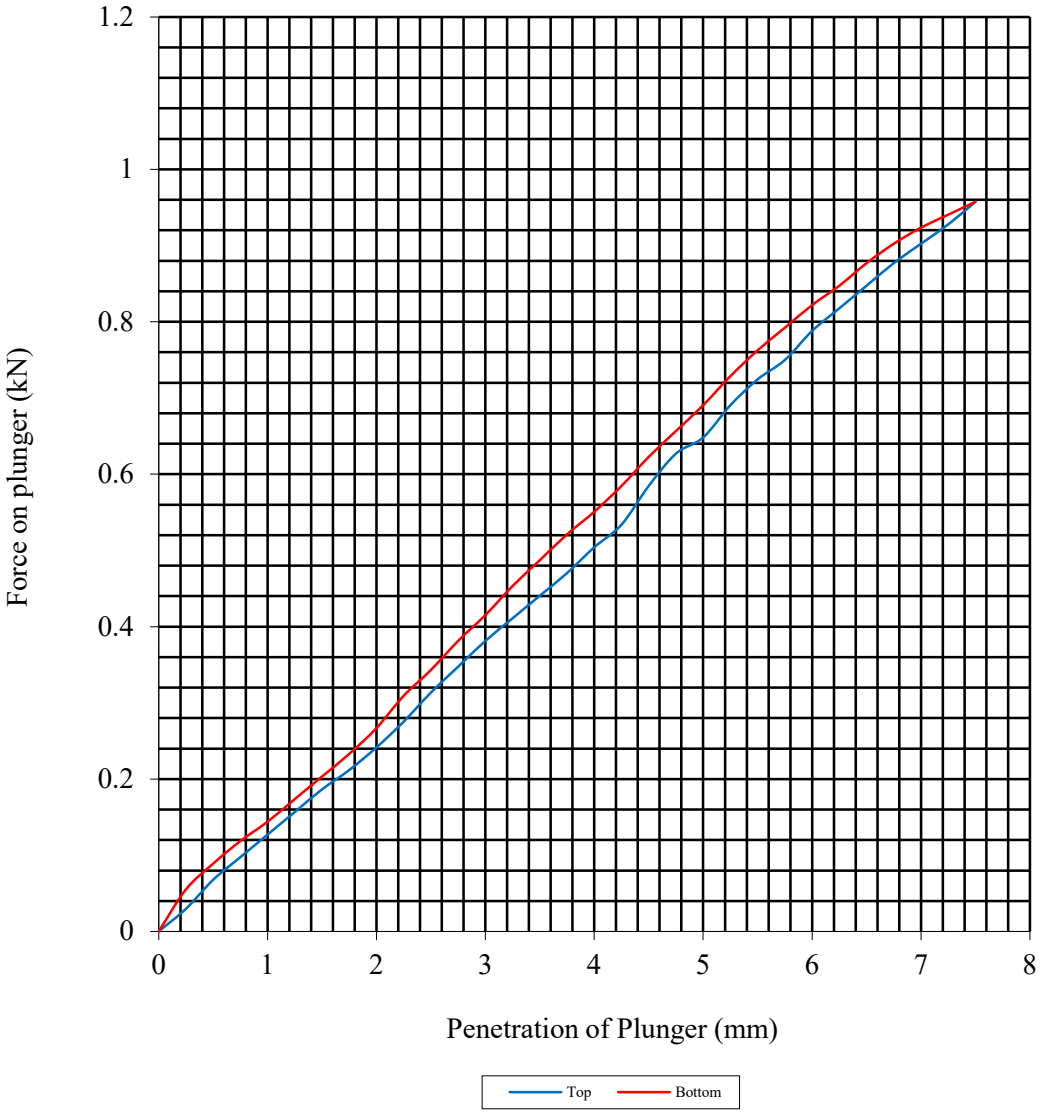
CALIFORNIA BEARING RATIO TEST

Non compliance with BS 1377 : Part 4 : 1990

Hole Number: TP802 **Top Depth (m):** 2.00

Sample Number: **Base Depth (m):**

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	20	Surcharge Kg:	4.20	Sample Top	22	Sample Top	3.2
Bulk Density Mg/m3:	1.98	Soaking Time hrs	336	Sample Bottom	21	Sample Bottom	3.5
Dry Density Mg/m3:	1.65	Swelling mm:	0.30	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			30	**Swelling at 7 days - 0.21mm**			
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Rhodia, Whitehaven

Contract No: PSL20/4046

Client Ref: 4046

PARTICLE SIZE DISTRIBUTION TEST

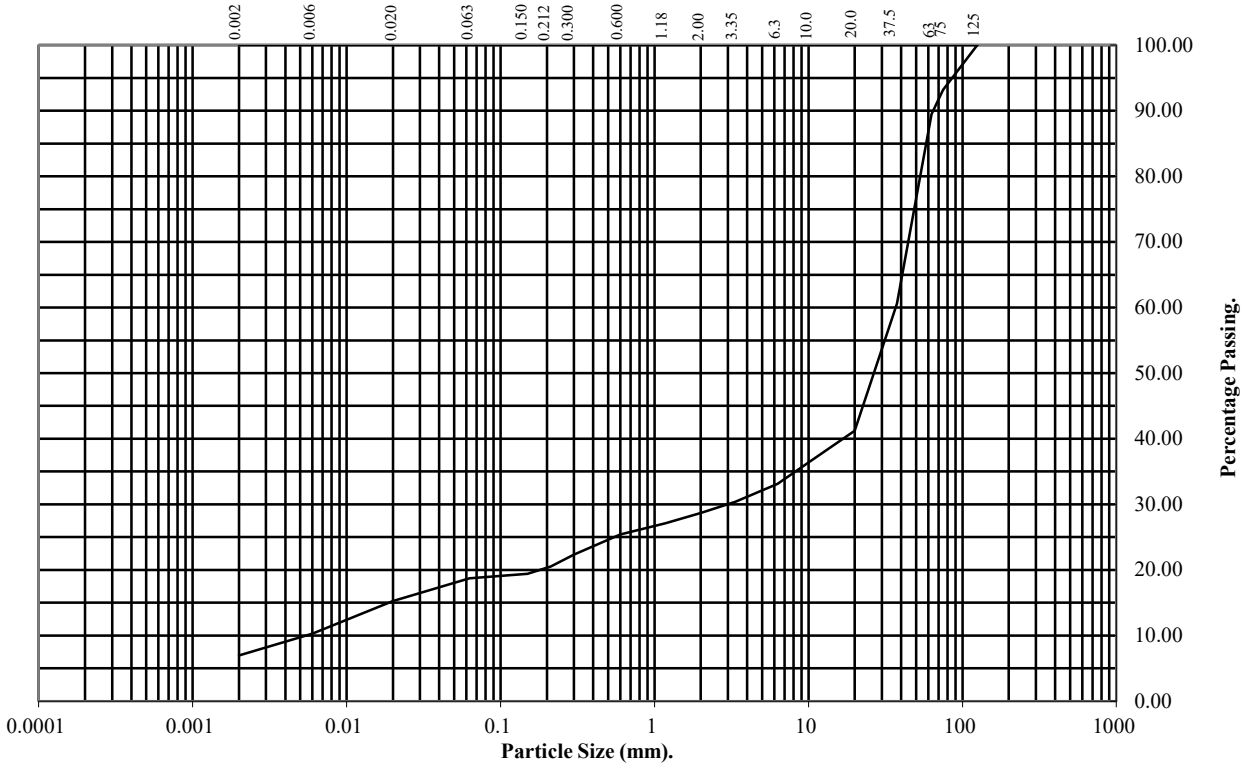
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP803 **Top Depth (m):** 1.50

Sample Number: **Base Depth(m):**

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	93
63	89
37.5	61
20	41
10	36
6.3	33
3.35	30
2	29
1.18	27
0.6	25
0.3	22
0.212	21
0.15	19
0.063	19

Particle Diameter	Percentage Passing
0.02	15
0.006	10
0.002	7

Soil Fraction	Total Percentage
Cobbles	11
Gravel	60
Sand	10
Silt	12
Clay	7

Remarks:
See Summary of Soil Descriptions

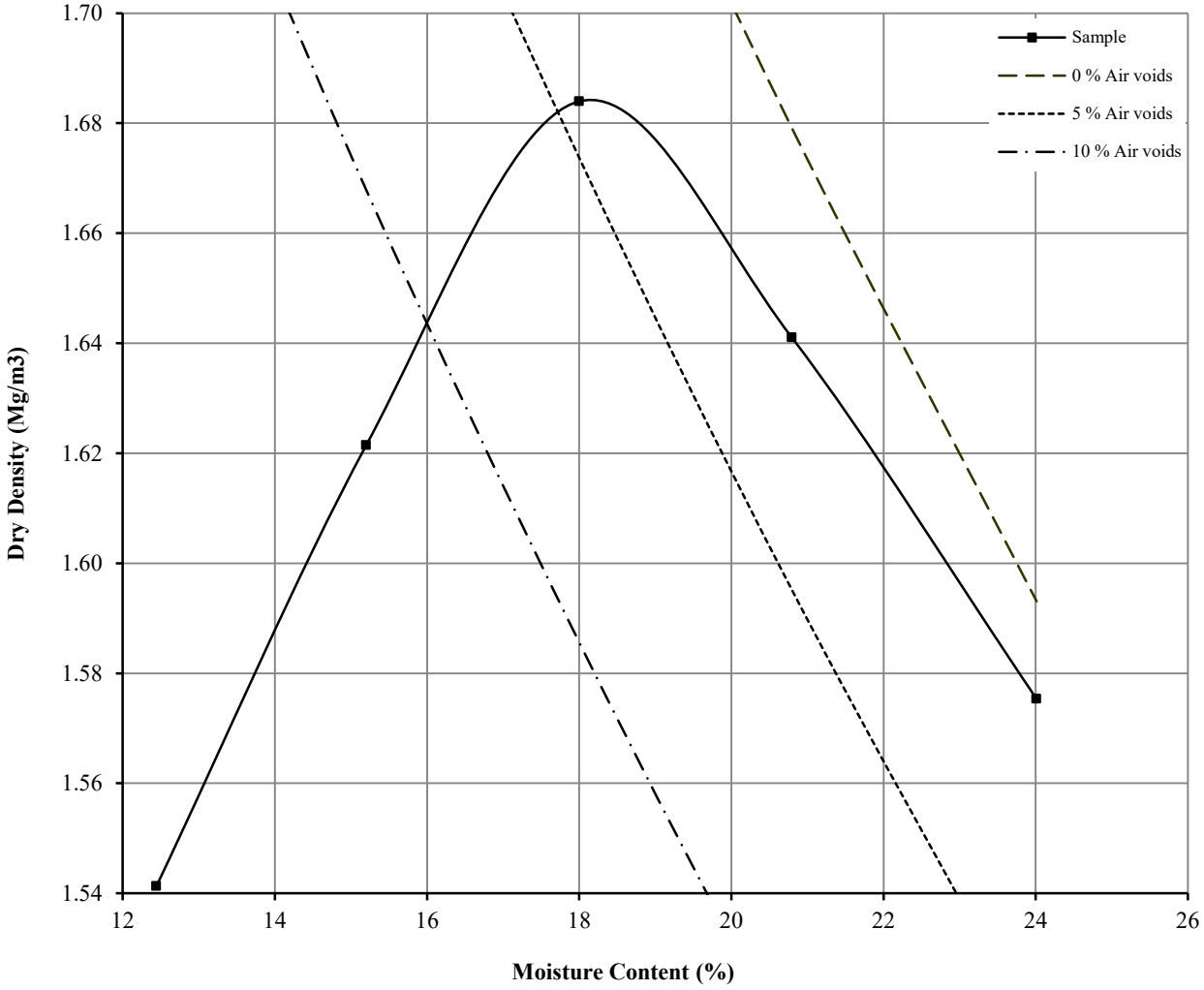
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : Clause 3.4 : 1990

Hole Number: TP803 **Top Depth (m) :** 1.50

Sample Number: **Base Depth (m) :**

Sample Type: B



Initial Moisture Content:		24	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.58	Measured	Material Retained on 37.5 mm Test Sieve (%):		39
Maximum Dry Density (Mg/m3):		1.68	Material Retained on 20.0 mm Test Sieve (%):		20
Optimum Moisture Content (%):		18			
Remarks See summary of soil descriptions.					

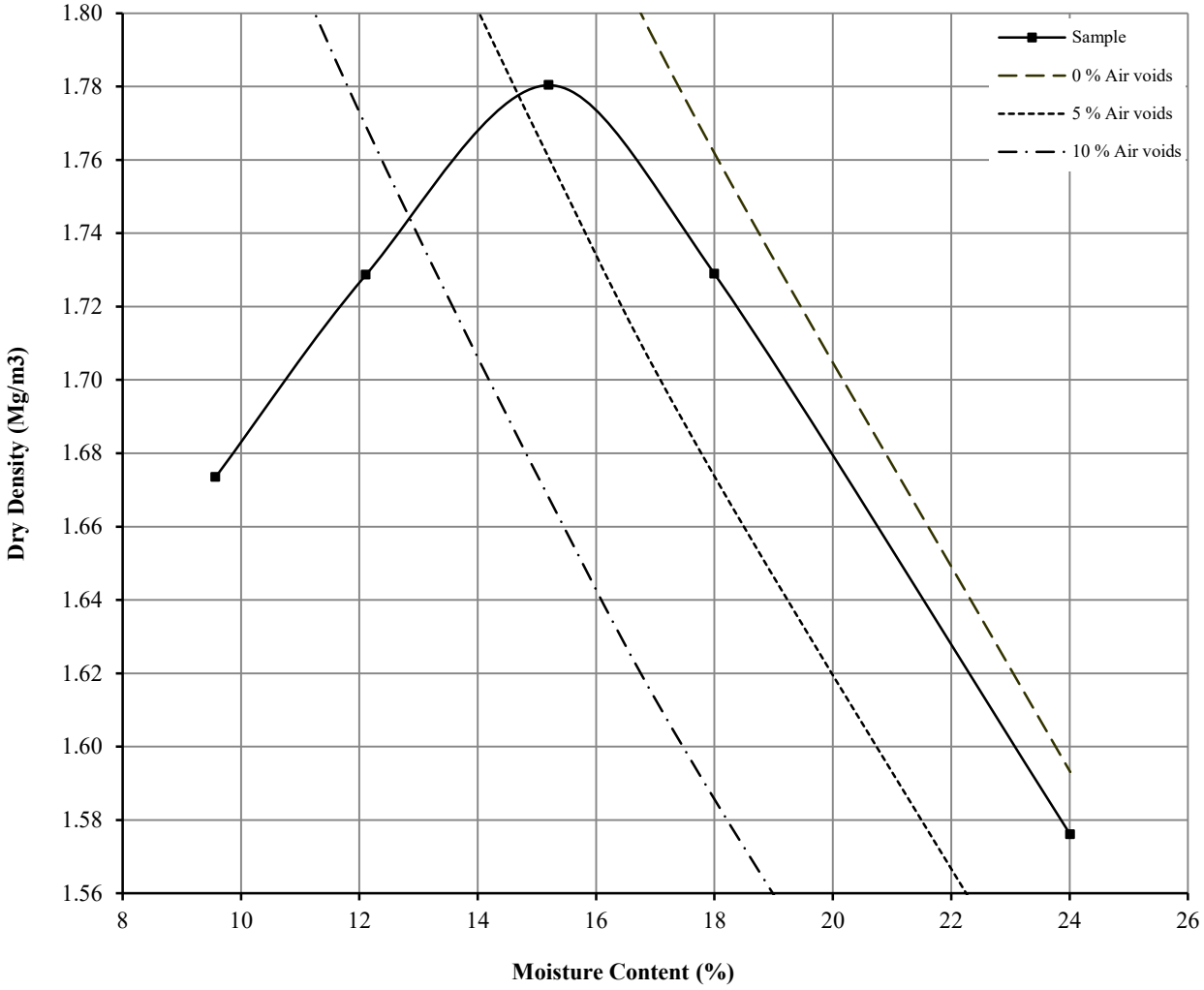
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : Clause 3.6 : 1990

Hole Number: TP803 **Top Depth (m) :** 1.50

Sample Number: **Base Depth (m) :**

Sample Type: B



Initial Moisture Content:		24	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m3):	2.58	Measured	Material Retained on 37.5 mm Test Sieve (%):		39
Maximum Dry Density (Mg/m3):		1.78	Material Retained on 20.0 mm Test Sieve (%):		20
Optimum Moisture Content (%):		15			
Remarks See summary of soil descriptions.					

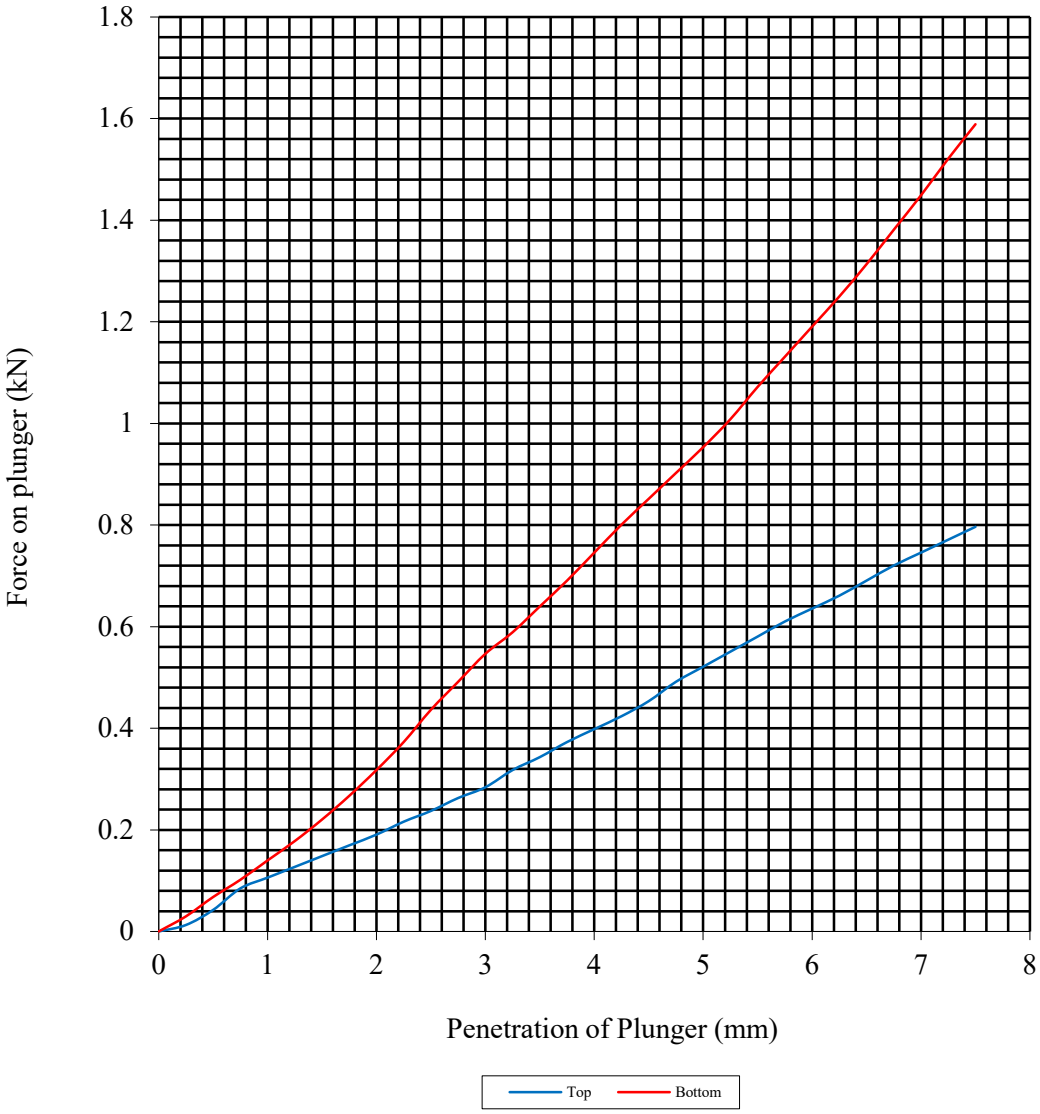
CALIFORNIA BEARING RATIO TEST

Non compliance with BS 1377 : Part 4 : 1990

Hole Number: TP803 **Top Depth (m):** 1.50

Sample Number: **Base Depth (m):**

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	24	Surcharge Kg:	4.20	Sample Top	25	Sample Top	2.6
Bulk Density Mg/m3:	1.96	Soaking Time hrs	336	Sample Bottom	26	Sample Bottom	4.8
Dry Density Mg/m3:	1.58	Swelling mm:	0.20	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			59	**Swelling at 7 days - 0.18mm**			
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Rhodia, Whitehaven

Contract No: PSL20/4046

Client Ref: 4046

PARTICLE SIZE DISTRIBUTION TEST

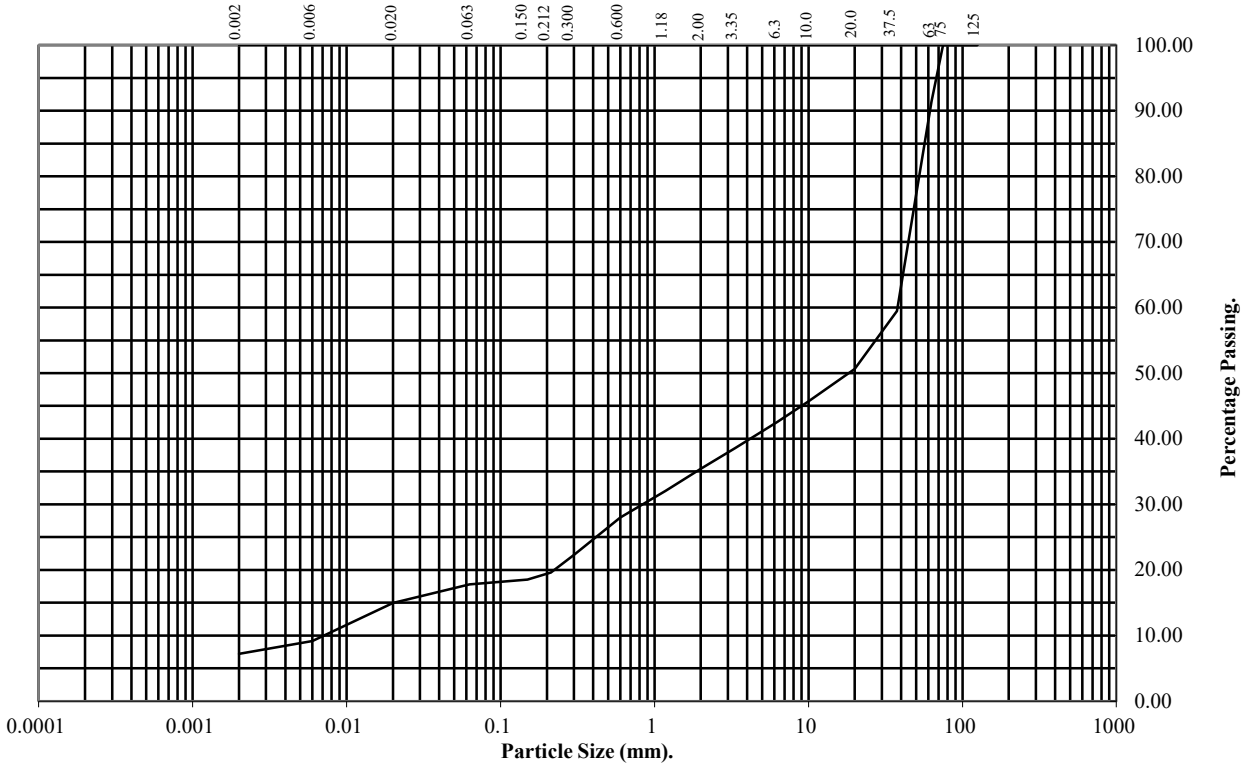
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP804 **Top Depth (m):** 1.00

Sample Number: **Base Depth(m):**

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	91
37.5	59
20	51
10	46
6.3	43
3.35	39
2	35
1.18	32
0.6	28
0.3	22
0.212	20
0.15	19
0.063	18

Particle Diameter	Percentage Passing
0.02	15
0.006	9
0.002	7

Soil Fraction	Total Percentage
Cobbles	9
Gravel	56
Sand	17
Silt	11
Clay	7

Remarks:
See Summary of Soil Descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Rhodia, Whitehaven**	**Contract No:** PSL20/4046 **Client Ref:**

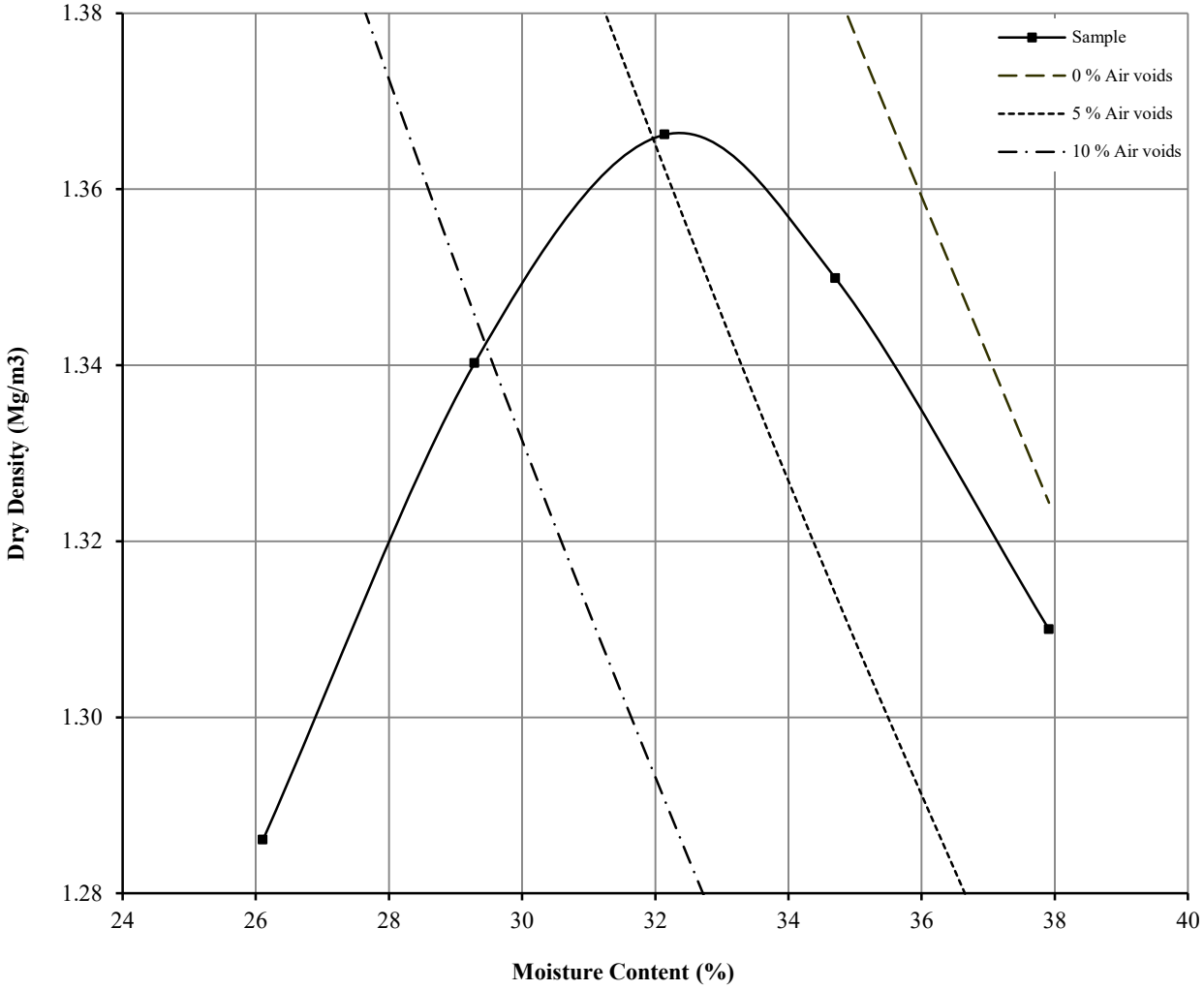
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : Clause 3.4 : 1990

Hole Number: TP804 **Top Depth (m) :** 1.00

Sample Number: **Base Depth (m) :**

Sample Type: B



Initial Moisture Content:		38	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.66	Measured	Material Retained on 37.5 mm Test Sieve (%):		41
Maximum Dry Density (Mg/m3):		1.37	Material Retained on 20.0 mm Test Sieve (%):		8
Optimum Moisture Content (%):		32			
Remarks See summary of soil descriptions.					

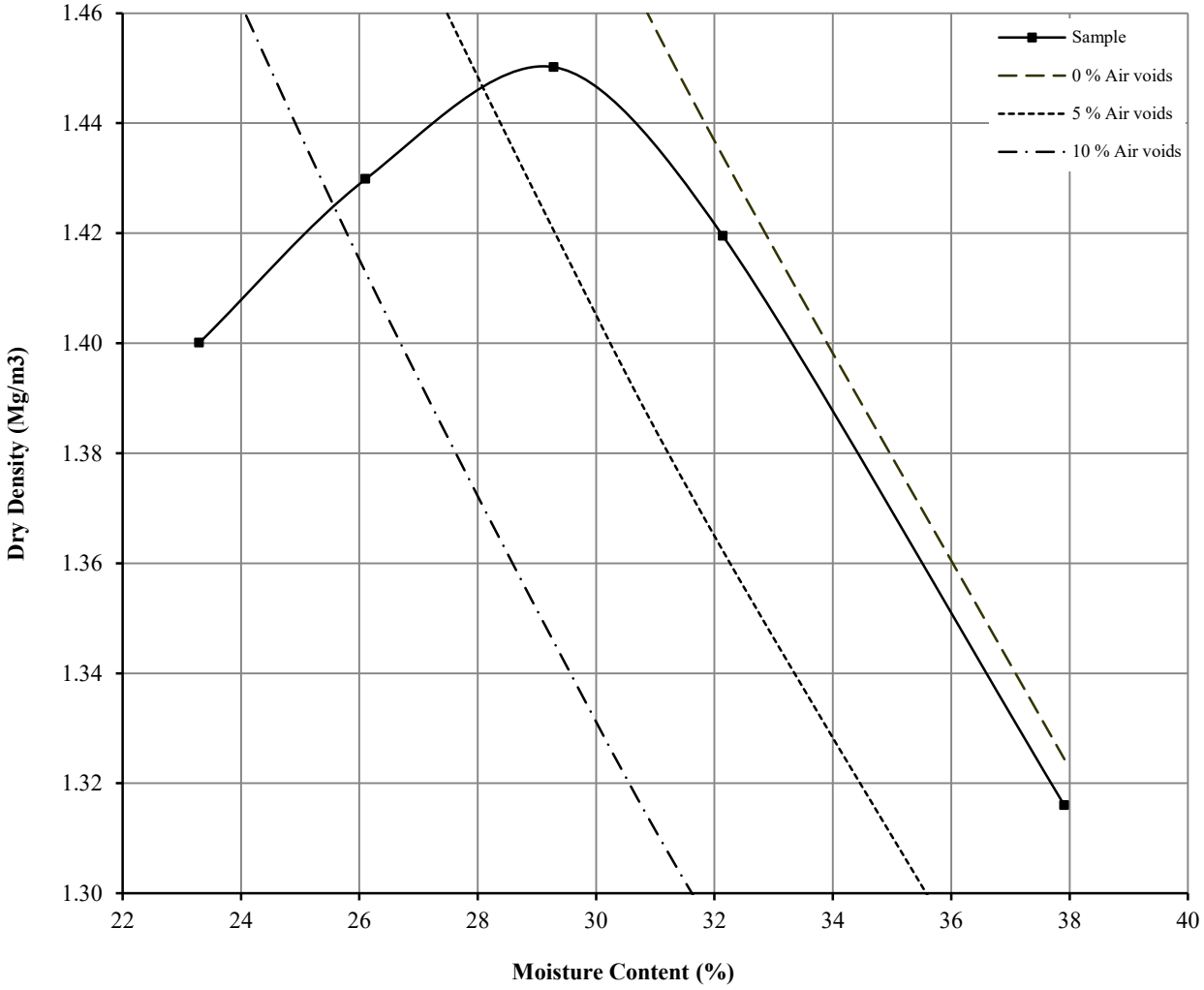
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : Clause 3.6 : 1990

Hole Number: TP804 **Top Depth (m) :** 1.00

Sample Number: **Base Depth (m) :**

Sample Type: B



Initial Moisture Content:		38	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m3):	2.66	Measured	Material Retained on 37.5 mm Test Sieve (%):		41
Maximum Dry Density (Mg/m3):		1.45	Material Retained on 20.0 mm Test Sieve (%):		8
Optimum Moisture Content (%):		29			
Remarks See summary of soil descriptions.					

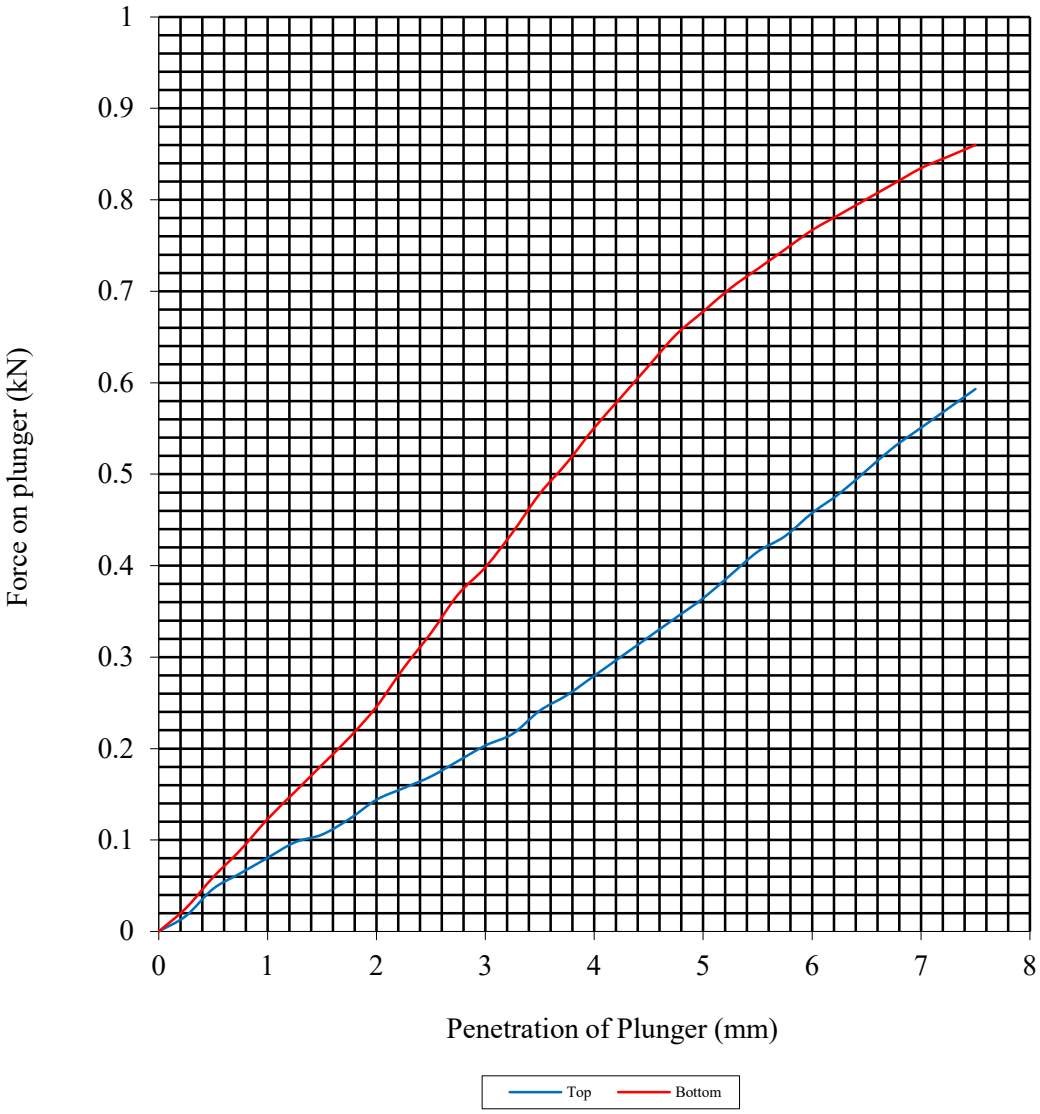
CALIFORNIA BEARING RATIO TEST

Non compliance with BS 1377 : Part 4 : 1990

Hole Number: TP804 **Top Depth (m):** 1.00

Sample Number: **Base Depth (m):**

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	38	Surcharge Kg:	4.20	Sample Top	42	Sample Top	1.8
Bulk Density Mg/m3:	1.80	Soaking Time hrs	336	Sample Bottom	40	Sample Bottom	3.4
Dry Density Mg/m3:	1.31	Swelling mm:	0.19	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			49	**Swelling at 7 days - 0.10mm**			
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Rhodia, Whitehaven

Contract No: PSL20/4046

Client Ref: 4046

LABORATORY REPORT

4043

Contract Number: PSL20/5008

Report Date: 09 October 2020

Client's Reference: 4046

Client Name: ID Geoenvironmental
Caledonian House
Tatton Stret
Knutsford
Cheshire
WA16 6AG

For the attention of: Steve Drew

Contract Title: Rhodia, Whitehaven

Date Received: 22/9/2020
Date Commenced: 22/9/2020
Date Completed: 9/10/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

H Daniels (Senior Technician)	A Watkins (Director)	R Berriman (Quality Manager)
S Royle (Laboratory Manager)	S Eyre (Senior Technician)	L Knight (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP701		D	0.90		Brown slightly gravelly very sandy CLAY.
TP712		B	0.80		Brown slightly gravelly very sandy CLAY.
TP715		B	1.00		Reddish brown very gravelly slightly silty clayey SAND.
TP725		D	0.75		Brown slightly gravelly slightly sandy CLAY.
TP728		D	0.80		Brown slightly gravelly sandy CLAY.
TP729		D	1.15		Brown slightly gravelly sandy CLAY.
TP732		D	0.80		Brown slightly gravelly slightly sandy CLAY.
TP739		D	1.60		Brown slightly gravelly sandy CLAY.

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP701		D	0.90		23			43	18	25	96	Intermediate plasticity CI.
TP725		D	0.75		34			59	27	32	98	High plasticity CH.
TP728		D	0.80		29			45	22	23	94	Intermediate plasticity CI.
TP729		D	1.15		24			42	19	23	92	Intermediate plasticity CI.
TP732		D	0.80		26			56	27	29	97	High plasticity CH.
TP739		D	1.60		25			43	23	20	93	Intermediate plasticity CI.

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

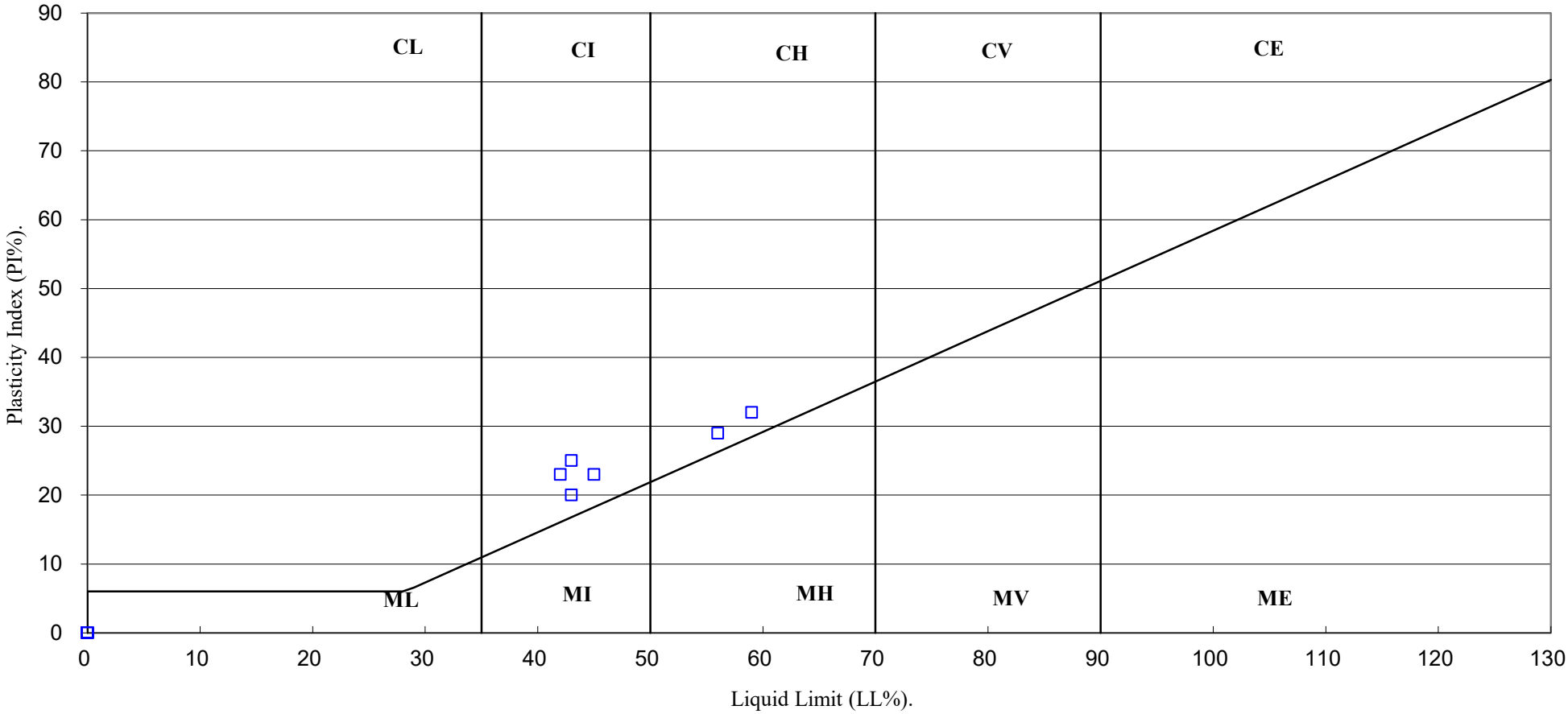
PSL Professional Soils Laboratory

Rhodia, Whitehaven

Contract No: PSL20/5008

Client Ref: 4046

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Rhodia, Whitehaven	Contract No: PSL20/5008 Client Ref: 4046

PARTICLE SIZE DISTRIBUTION TEST

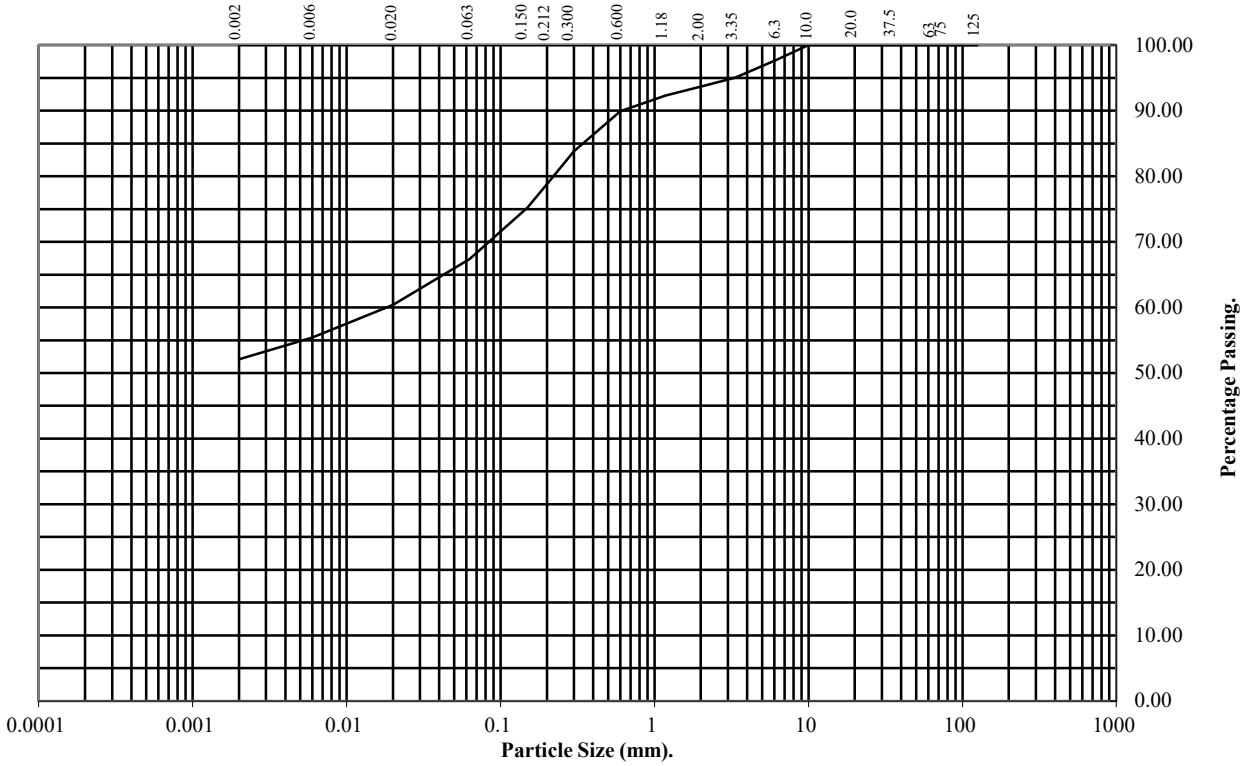
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP712 **Top Depth (m):** 0.80

Sample Number: **Base Depth(m):**

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	98
3.35	95
2	94
1.18	92
0.6	90
0.3	84
0.212	80
0.15	75
0.063	67

Particle Diameter	Percentage Passing
0.02	60
0.006	55
0.002	52

Soil Fraction	Total Percentage
Cobbles	0
Gravel	6
Sand	27
Silt	15
Clay	52

Remarks:
See Summary of Soil Descriptions

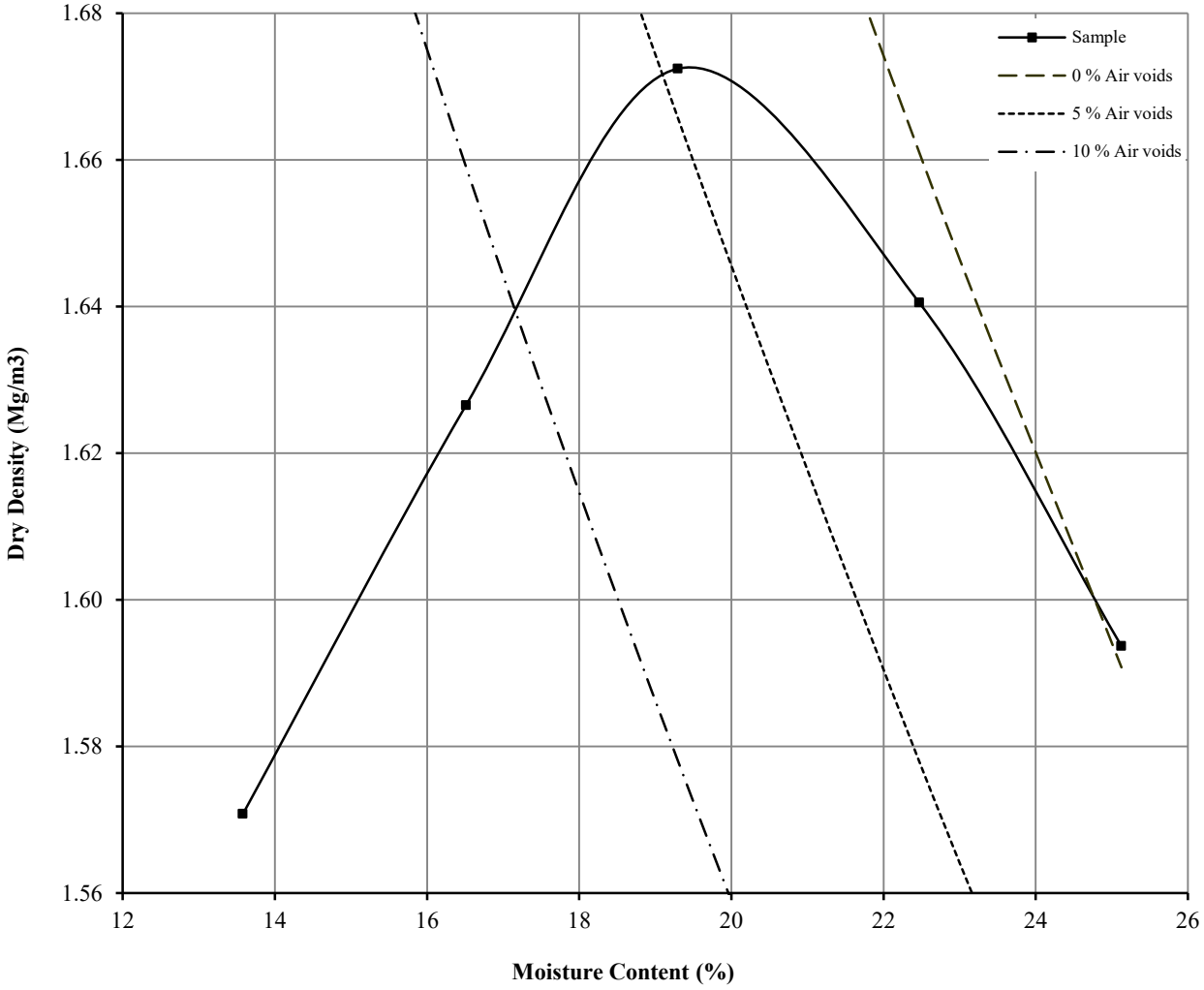
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.3 : 1990

Hole Number: TP712 **Top Depth (m) :** 0.80

Sample Number: **Base Depth (m) :**

Sample Type: B



Initial Moisture Content:		22	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.65	Measured	Material Retained on 37.5 mm Test Sieve (%):		0
Maximum Dry Density (Mg/m3):		1.67	Material Retained on 20.0 mm Test Sieve (%):		0
Optimum Moisture Content (%):		19			
Remarks See summary of soil descriptions.					

PARTICLE SIZE DISTRIBUTION TEST

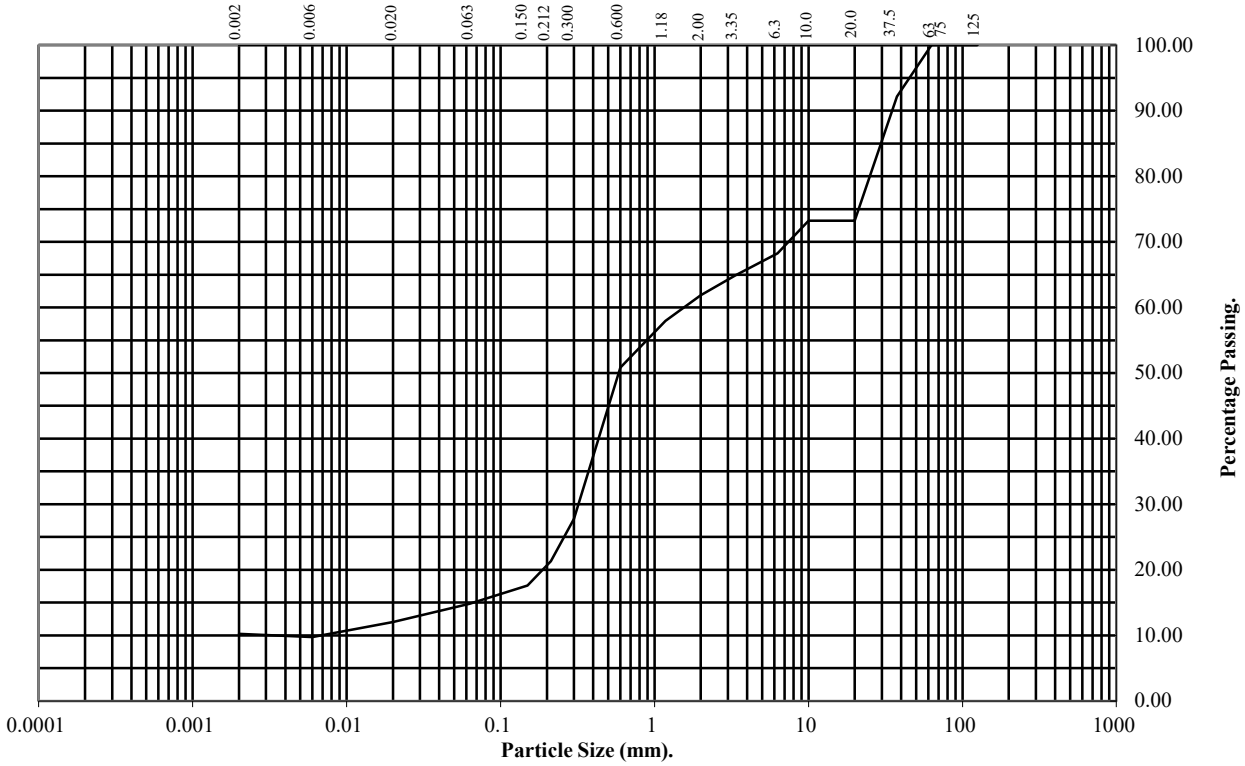
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP715 **Top Depth (m):** 1.00

Sample Number: **Base Depth(m):**

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	92
20	73
10	73
6.3	68
3.35	65
2	62
1.18	58
0.6	51
0.3	28
0.212	21
0.15	18
0.063	15

Particle Diameter	Percentage Passing
0.02	12
0.006	10
0.002	10

Soil Fraction	Total Percentage
Cobbles	0
Gravel	38
Sand	47
Silt	5
Clay	10

Remarks:
See Summary of Soil Descriptions

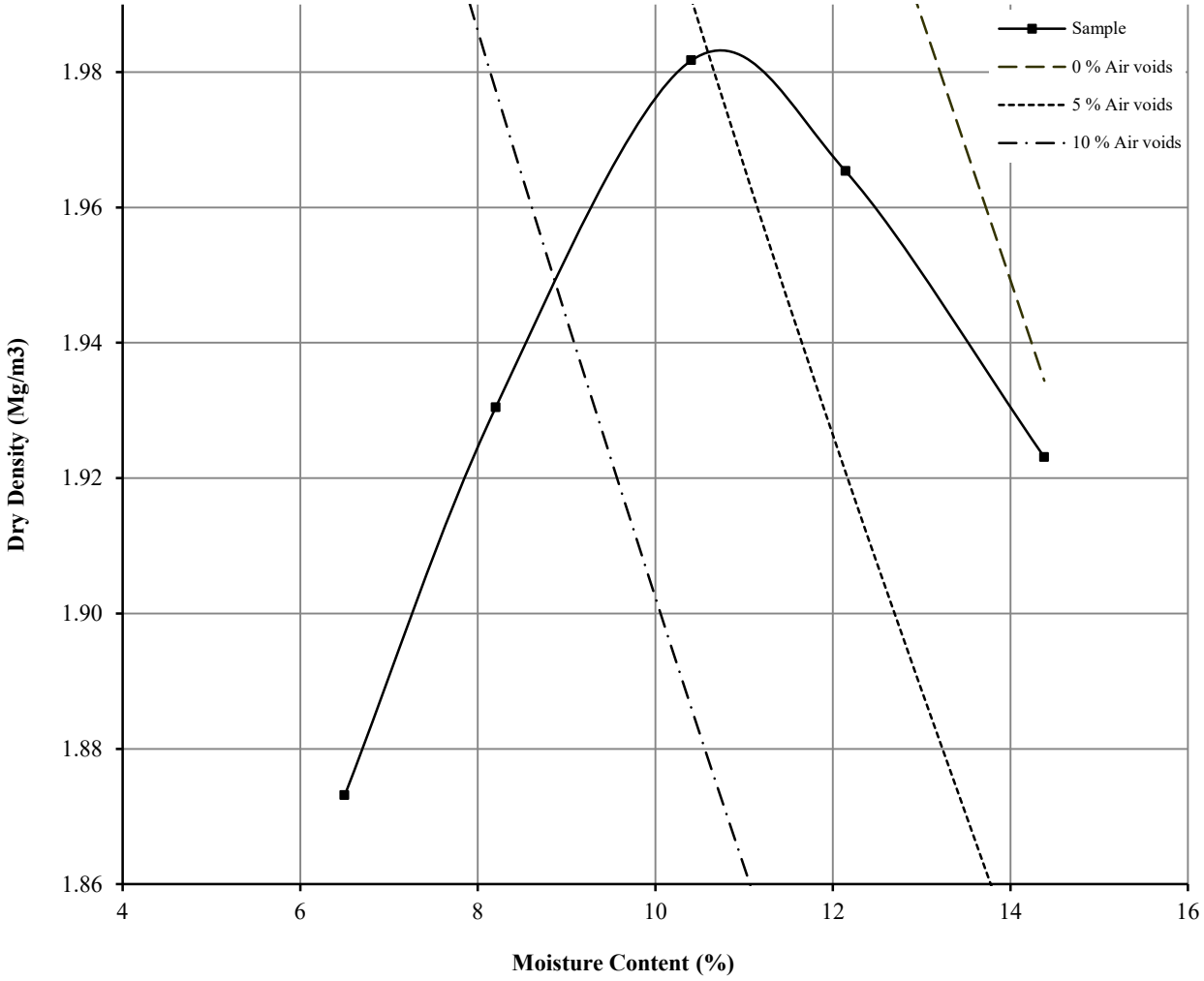
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.4 : 1990

Hole Number: TP715 **Top Depth (m) :** 1.00

Sample Number: **Base Depth (m) :**

Sample Type: B



Initial Moisture Content:		12	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.68	Measured	Material Retained on 37.5 mm Test Sieve (%):		8
Maximum Dry Density (Mg/m3):		1.98	Material Retained on 20.0 mm Test Sieve (%):		19
Optimum Moisture Content (%):		10			
Remarks See summary of soil descriptions.					

APPENDIX G

Ground Gas Monitoring Results 2020

Visit	Initials	Borehole Reference	Monitoring Date	Observations	AOD	Top of Install Zone (m)	Base of Install Zone (m)	Measured Base of Standpipe (m)	Groundwater Level (m)	Response Zone Flooded	Top of Install Zone (m AOD)	Base of Install Zone (m AOD)	Groundwater Level (m AOD)	Response Zone Material	Barometric Pressure - Start (mb)	Barometric Pressure - Finish (mb)	Barometric Pressure Trend	CH_4 Peak %V/V	CH_4 Steady %V/V	CO_2 Peak %V/V	CO_2 Steady %V/V	O_2 %V/V	CO ppm	H_2S ppm	Flow Peak l/hr	Flow Steady l/hr	Q_{HG} CH_4 l/hr	Implied CS	Q_{HG} CO_2 l/hr	Implied CS	Max Q_{HG} CH_4 l/hr	Implied CS	Max Q_{HG} CO_2 l/hr	Implied CS
1	SD	BH606A	15/10/2020		95.80	2.00	5.00	4.50	1.15	FLOODED	93.80	90.80	94.65		1016	1015	Falling	ND	ND	ND	ND	20.9	8	ND	ND	ND	0.0001	CS1	0.0001	CS1	0.0061	CS1	0.0061	CS1
2			20/10/2020	Pumping effects	95.80	2.00	5.00	4.50	1.21	FLOODED	93.80	90.80	94.59		980	978	Falling	ND	ND	ND	ND	20.1	7	ND	6.1	6.1	0.0061	CS1	0.0061	CS1	0.0061	CS1	0.0366	CS1
3					95.80	2.00	5.00	4.50		-	93.80	90.80	95.80	Siltstone (Middle Coal Measures)																				
4										-	0.00	0.00	0.00																				
5										-	0.00	0.00	0.00																				
6										-	0.00	0.00	0.00																				
1	SD	BH608A	15/10/2020		89.95	3.00	5.30	5.73	1.27	FLOODED	86.95	84.65	88.68		1016	1015	Falling	ND	ND	0.6	0.6	20.9	7	ND	ND	ND	0.0001	CS1	0.0006	CS1	0.0001	CS1	0.0025	CS1
2			20/10/2020		89.95	3.00	5.30	5.73	1.33	FLOODED	86.95	84.65	88.62		980	978	Falling	ND	ND	2.5	2.5	19.1	6	ND	ND	ND	0.0001	CS1	0.0025	CS1	0.0001	CS1	0.0025	CS1
3										-	0.00	0.00	0.00	Mudtone & coal (Middle Coal Measures)																				
4										-	0.00	0.00	0.00																				
5										-	0.00	0.00	0.00																				
6										-	0.00	0.00	0.00																				
1	SD	BH614A	15/10/2020	No gas data; gas return pipe submerged.	94.05	1.00	3.00	2.03	2.85	-	93.05	91.05	91.20		1016	1015	Falling	ND	ND	0.1	ND	20.9	ND	ND	ND	ND	0.0001	CS1	0.0001	CS1	0.0001	CS1	0.0001	CS1
2			20/10/2020	Gas Valve replaced	94.05	1.00	3.00	2.03	2.05	-	93.05	91.05	92.00		980	978	Falling	ND	ND	0.1	0.1	20.9	1	ND	ND	ND	0.0001	CS1	0.0001	CS1	0.0001	CS1	0.0001	CS1
3										-	0.00	0.00	0.00	Granular Made Ground																				
4										-	0.00	0.00	0.00																				
5										-	0.00	0.00	0.00																				
6										-	0.00	0.00	0.00																				
1	SD	BH620	15/10/2020	No gas data; gas return pipe submerged.	95.4	2.00	5.00	4.77	0.37	FLOODED	93.40	90.40	95.03		1016	1015	Falling	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0001	CS1	0.0001	CS1	0.0001	CS1	0.0004	CS1
2			20/10/2020		95.4	2.00	5.00	4.77	0.43	FLOODED	93.40	90.40	94.97		980	978	Falling	ND	ND	0.6	0.4	20.9	3	ND	0.4	0.0	0.0001	CS1	0.0004	CS1	0.0001	CS1	0.0004	CS1
3										-	0.00	0.00	0.00	Siltstone & mudstone (Middle Coal Measures)																				
4										-	0.00	0.00	0.00																				
5										-	0.00	0.00	0.00																				
6										-	0.00	0.00	0.00																				
1	SD	BH621A	15/10/2020		91.8	2.00	4.00	4.3	0.29	FLOODED	89.80	87.80	91.51		1016	1015	Falling	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0001	CS1	0.0001	CS1	0.0001	CS1	0.0003	CS1
2			20/10/2020		91.8	2.00	4.00	4.3	0.28	FLOODED	89.80	87.80	91.52		980	978	Falling	ND	ND	0.3	0.3	20.7	3	ND	1	0.0	0.0001	CS1	0.0003	CS1	0.0001	CS1	0.0037	CS1
3										-	0.00	0.00	0.00	Siltstone & mudstone (Middle Coal Measures)																				
4										-	0.00	0.00	0.00																				
5										-	0.00	0.00	0.00																				
6										-	0.00	0.00	0.00																				
1	SD	BH622A	15/10/2020		91.2	1.00	2.00	1.86	1.32	-	90.20	89.20	89.88		1016	1015	Falling	ND	ND	3.7	3.7	19.3	3	3	ND	ND	0.0001	CS1	0.0037	CS1	0.0001	CS1	0.0037	CS1
2			20/10/2020		91.2	1.00	2.00	1.86	1.32	-	90.20	89.20	89.88		980	978	Falling	ND	ND	2.4	2.4	19.5	3	ND	ND	ND	0.0001	CS1	0.0024	CS1	0.0001	CS1	0.0024	CS1
3										-	0.00	0.00	0.00	Siltstone & mudstone & coal (Middle Coal Measures)																				
4										-	0.00	0.00	0.00																				
5										-	0.00	0.00	0.00																				
6										-	0.00	0.00	0.00																				

Minimum Barometric Pressure

Maximum Barometric Pressure

>>>= outside the range of +100 to -60 l/hr

Monitoring Assessment																																0.0061	CS1	0.0061	CS1
Borehole Worst Case																																0.0061	CS1	0.0366	CS1
Sitewide Worst Case				MAXIMUM =	0	0			3.7	3.7		19.1	8	3	6.1	6.1																0.0061	CS1	0.2257	CS2

APPENDIX H

Our Reference: 4046-G-P010

Date: 13th January 2020

iD GeoEnvironmental Limited

North West & Midlands
Caledonian House, Tatton Street,
Knutsford, Cheshire, WA16 6AG
t: 01565 755557

North East & Yorkshire
The Stables, Aske Hall, Aske,
Richmond
North Yorkshire, DL10 5HG
t: 01748 889010
www.id-geo.co.uk

Mr Craig Kerr
Story Homes
Story House
Lords Way
Kingmoor Business Park
Carlisle
CA6 4SL

Dear Mr Kerr,

Edgehill Phase 3 – Supplementary Intrusive Geoenvironmental & Shallow Mining Investigation

Further to your request we are pleased to present cost proposals for supplementary geoenvironmental investigation within Phase 3, Edgehill Park, Whitehaven.

The following Integra reports have been provided to IDG which relate to the Phase 3 site:

- Geotechnical Ground Investigation at Land at High Road, Rhodia, Whitehaven, Cumbria for Story Homes Limited (Draft), reference 2546 dated September 2011.
- Phase 2 Environmental Ground Investigation at Land at High Road, Rhodia, Whitehaven, Cumbria for Story Homes Limited (Draft), reference 2725 Rev A dated February 2014.

In addition to the above reports, IDG carried out an intrusive shallow mining investigation during 2016, the findings of which are presented in Shallow Mining Report for land at Magellan Park/Edgehill Park Phase 2 Whitehaven, reference 4046-G-R002 dated February 2017.

Based on our brief review of the above reports, we consider that the following geoenvironmental factors are likely to influence the proposed development:

- Historic Land Uses of the site (total area = 13.85ha) include:
  - 9.8 ha is mainly undeveloped agricultural land,
  - 2.05 ha was formerly a lorry park, including refuelling and container washing depot ("TDG Depot")
  - 1.05 ha was a phosporite storage area
  - 1.0 ha was formerly occupied by a "reservoir". The "reservoir" is understood to have been infilled by the 1990's. Historical OS maps indicate the reservoir may more accurately have comprised settlement lagoons associated with the former Rhodia/Marchon Chemical works.
- A high-pressure gas main runs N-S across the west of the site.
- A large stockpile comprising approximately 11,500m^3 of slag, soil/clay and anhydrite remains within the southern half of the depot, adjacent to Wilson Pit Road which was placed during 2010 following preparatory works at Story Homes adjacent Magellan park development to the North. Integra State that a Materials Management Plan associated with the stockpile has been approved by the Environment Agency and that Planning Permission for the stockpile has been provided by the Local Authority. However, the correspondence appended to Integra's report states that an Extractive Materials Management Statement (EMMS) ref: EMMS0571, was approved by the Environment Agency on the basis that the stockpiled anhydrite was not extractive (mined) waste. Further discussion in respect of this permit and implications for proposed re-use of the material is required. In the meantime, detailed investigation of the stockpiled materials chemical and geotechnical properties is required to establish how it may be satisfactorily re-used.

- Between 0.4m and 1.3m thickness of Made Ground was proven beneath the former refuelling/tanker washing depot. Integra proved up to 2.0m of Made Ground comprising colliery spoil, timber, rubber and plastics within the former reservoir. Up to 1.0m of Made Ground comprising slag, red gravel and cobbles was proven on the phosphorite storage area.
- Beyond the TDG Depot, phosphorite storage area and infilled reservoir, Integra trial pits recorded up to 0.4m of topsoil, underlain by firm to very stiff sandy gravelly cobbly slightly boulder clay with bedrock at shallow depth.
- The Coal Authority (CA) hold records of two former mineshafts within the Phase 3 Area: Fox Pit, reference 296515-003 and Gameriggs Pit, reference 297515-001 located in the western half of Phase 3. CA Records indicate the Gameriggs shafts to be 110m deep. Two mine shafts are also recorded within 40m of the eastern site boundary. The CA have no records of shaft treatment or capping. The CA report workings between 70m and 200m depth beneath the site. However, the CA also state that coal is "at or close to the surface" which "may have been worked in the past".
- Evidence of probable excavation has been noted at surface within the north-eastern boundary of the site. IDG Probeholes PH316-PH320 drilled within the east of Phase 3 (and proximity of the above excavation) encountered numerous seams of coal of between 0.3m and 1.4m in thickness at shallow depth which were considered to be of potentially workable thickness. A zone considered to be at High Risk of Shallow Mining associated with the encountered seams is depicted upon Drawing Reference 4046-G-D011 presented in the IDG Report 4046-G-R002. No evidence for shallow mineworkings was encountered by IDG to the west of a fault bisecting the Phase 3 site. However, productive thicknesses of coal were proven in PH310 and PH311 in proximity of the Gamesriggs Shaft which are within influencing depth of the surface.
- Integra identified an infilled former reservoir and former TDG Depot in the north and west respectively of the Phase 3 Area and a phosphorite rock storage facility in the centre of the site as potential historical contamination sources. IDG consider it likely that the former Gameriggs reservoir was used for the disposal of tailings sourced from the former Rhodia works.
- Contamination analysis detected elevated concentrations of TPH and significantly elevated concentrations of PAHs within Made Ground at TP37 within the former TDG Depot, (i.e. 98mg/kg benzo(a)pyrene). Integra analysis also reports aromatic TPH (1750mg/kg of EC_{12}-EC_{35}) at 0.5m depth in TP37 which IDG consider to be evidence of a diesel spillage. In addition, elevated concentrations of metals, semi-metals and inorganics were also detected beneath the TDG Depot. Despite hydrocarbon odours being noted on the exploratory hole log for TP37, Integra considered the TPH and PAH detected to be derived from coal combustion and no further investigation of the identified hotspot was carried out. Further investigation/delineation of the indicated diesel spillage is required.
- Contamination analysis was compared against generic Tier 1 LQM/CIEH & CLEA Soil Guideline Values screening criteria, which have since been withdrawn. It is recommended that the Integra data be re-assessed against current Tier 1 screening criteria to generate an updated contamination model and establish where additional SI works should focus. It should also be noted that waste disposal facilities do not accept chemical analysis in excess of two years old to establish as characterisation of waste soils.
- Integra identified a former electricity transformer within the TDG Depot to represent a source of contamination. Contamination testing detected significantly elevated concentrations of TPH and PAHs. Integra state that the soils at this location were remediated under supervision of Integra in 2010. A copy of the Verification Report has not been provided to IDG. However, while TPH and volatile analysis was undertaken during the initial SI, PCB analysis was not carried out to assess risks from spillage of di-electric fluids.
- No evidence of contamination was identified by Integra outside of the infilled reservoir or TDG depot. However, it should be noted that a significant amount of Made Ground, believed to have been sourced from Phase 1 and Phase 2 has been placed upon the former phosphate storage area.
- Integra concluded that two surface water courses located in proximity to the site were not at risk from contamination detected beneath the TDG Depot due to a distance of 300m. However, it does

not appear that a Quantitative Groundwater Risk Assessment (i.e. P20) has been carried out to establish remedial targets to demonstrate this.

- Integra's hazardous ground gas risk assessment did not identify any significant risk associated with either landfill gas or mines gases within the Phase 3 Area. However, the assessment was based upon widely spaced monitoring wells and Integra had not satisfactorily established the risk from shallow mineworkings which has been subsequently identified during development in the Phase 1 and Phase 2 Areas.

Our proposal is based on the above and allows for the following works:

- Desk based re-assessment of the Integra chemical data against current Tier 1 screening criteria for human health and the environment to enable provision of an updated Conceptual Site Model
- One day of trial pitting with breaker to penetrate hard surfaces within the former TDG Depot compound
- One day of trial pitting to characterise materials and obtain disturbed and bulk samples from the "anhydrite stockpile" for geotechnical and laboratory testing
- Three days of trial pitting across the wider site to obtain in-situ geotechnical tests, representative topsoil samples to demonstrate suitability for re-use to obtain bulk soil samples for geotechnical testing and to enable provision of foundation recommendations
- One day of trial trenching (i.e. topsoil strip) to search for the positions of the Fox Pit and Gamerigg Pit shafts (additional days may be required if the CA positions are inaccurate)
- Provisional costs for drilling of up to forty-eight rotary probeholes within the shallow mining high risk area in the east of the site and vicinity of PH310-PH311 to assess potential for workings (estimated 10 days drilling programme dependent upon ground conditions). Subject to confirmation of costs from drilling contractors
- Provisional costs for installation of gas wells within eight rotary probeholes and six gas monitoring visits, (in the event that the intrusive shallow mining investigation identifies evidence of a risk of ground gas associated with abandoned mineworkings).
- Laboratory Geotechnical Testing comprising pH, soluble sulphates and Atterberg limits tests across the wider site. Provisional costs have been provided for 4 No. soluble sulphate, magnesium, chloride and nitrate tests, atterberg limits, particle size distribution gradings, 14/28 day swelling & remoulded CBRs tests on bulk samples of the anhydrite to assess potential for re-engineering. Provisional costs have also been provided for 4 No. soluble sulphates, PSD and compactions tests of Made Ground stockpiled upon and surfacing the former phosphorite storage area.
- Proportionate chemical testing of 14 samples of topsoil (i.e. 1/ha) for metals, asbestos and speciated PAH to demonstrate suitability for re-use (to confirm Integra data).
- Provisional budget for chemical screening of Made Ground within TDG compound, infilled former reservoir and phosphorite storage to include metals, asbestos and speciated PAH, together with total petroleum hydrocarbons, solvents and volatile organics to establish significance of TPH and PAHs detected at TP37 and PCBs at the location of the former transformer (SUBJECT TO DETAILED REVIEW OF INTEGRA CHEMICAL DATA).
- Chemical analysis of samples obtained from the anhydrite stockpile to include metals, asbestos screens, speciated PAHs, TPH volatiles, sulphates to assess remediation options and WAC for waste disposal purposes (SUBJECT TO DETAILED REVIEW OF INTEGRA CHEMICAL DATA)
- Undertaking a generic quantitative contamination risk assessment (GQRA) and preparing a revised conceptual model for the site
- Preparation of a Geoenvironmental Appraisal Report
- Issue of an electronic pdf copy of the report.

Costs are shown in the following table, together with costs for provisional items. Costs associated with re-assessment of the waste permit for the anhydrite stockpile will be provided separately.

COST PROPOSAL REMOVED

Programme

We can make an **immediate start** re-assessing the Integra chemical data and we anticipate commencement of the intrusive investigation within two weeks of your instruction to proceed, subject to site access & surface conditions and availability of drilling contractors. Fieldwork is scheduled to take ten days.

We will issue a concise **overview** report within 3 days of fieldwork completion. Our comprehensive report will be issued within 4 weeks of fieldwork completion. A gas risk assessment letter report will be issued on completion of the monitoring programme.

Assumptions and Additional Notes

We have assumed the following:

- Copies of all service plans must be provided to us *five days* before intrusive works commence. IDG could obtain statutory services information on your behalf however this will be subject to an additional fee and we will require a minimum of three weeks' notice.
- The proposed development will include traditional 2 and 3 storey domestic dwellings with associated gardens, POS, adoptable roads and sewers.
- Access is available for a tracked excavator.
- Reinstatement of the hardstanding or soft landscaping is not required, other than compacted arisings swept over each trial pit using the excavator to leave low mounds of spoil about 3m long by 1m wide, and unsuitable for trafficking.
- Soakaway testing is not required.
- IDG can provided costs for surveying however, it is assumed that collar heights of the exploratory holes will be surveyed by a representative from Story Contracting unless otherwise instructed.
- At this stage asbestos testing comprises laboratory screening only. Quantification tests (at a cost of £XX each) may be required should asbestos be detected.

The following should also be noted:

The above scope of works should enable us to assess abnormal development issues, associated with investigable ground conditions. However, the nature of site investigation is such that it is not always possible to foresee all the potential issues and it is sometimes necessary to recommend additional work. Should this occur, we will inform you immediately, provide costs, and seek your further instruction.

Depending on the rotary investigation findings, additional probe holes may be required to determine the risks associated with shallow mining and delineate the extent of workings in order to obtain fixed price quotations for the necessary consolidation works.

Reporting

On completion of the works a comprehensive factual and interpretative report will be issued containing engineering records, laboratory test results, copies of all relevant correspondence and drawings of the site. The report will include qualitative risk assessment with respect to both controlled waters and human health and will provide technically feasible options for redevelopment of the site with housing, including consideration of foundation types and treatment/removal of contamination. Copies of the final report will be issued to the relevant regulatory authorities on receipt of written instruction from yourselves.

Terms & Conditions

The scope of work outlined in this proposal will be undertaken in accordance with our Standard Terms and Conditions, a copy of which are enclosed. Your attention is drawn to the Sections 8 and 9 of the terms and conditions which relate to provision of Professional Indemnity Insurance and Limitation of Liability

respectively. We will be pleased to accept your instruction to proceed as acceptance of this proposal and agreement of our Terms and Conditions.

We understand that our report is solely for the benefit of Story Homes. If, however, at a later date, a third party wishes also to rely on the benefit of our report then we will consider any such request. Whether or not we enter into a warranty with a third party will be at our discretion, and subject to payment of a fee to cover our legal and incidental costs. We will also require approval from our insurers should more than one beneficiary require a warranty, or should the proposed warranty not be in our approved standard form.

Invoicing

The attached proposal provides a breakdown of the costs associated with this project. Variation will only occur in the event that a given item is not undertaken or that substantial additional works are recommended, in which case we will inform you immediately, provide costs for the required works, and seek your prior consent.

Our proposal allows for submission of the report to the Local Authority and NHBC, and for submission of a single piece of subsequent correspondence with each regulator to address any queries they may have. Any further meetings, correspondence etc, are chargeable at our hourly rates.

We will submit invoices for this project at the milestones defined below:

- 1st milestone invoice (Items A, C, D, E, F, G, H, I, L, M & O) within 5 days of fieldwork completion, with exploratory hole logs and an interim letter report outlining our initial findings and preliminary recommendations report.
- 2nd milestone invoice (Item Q) on issue of the Final report, which will be issued on or before the date agreed on receipt of your written instruction to proceed.
- 3rd and final invoice (Item P) after completion of the gas groundwater monitoring/issue of the Supplementary letter report.

It is hoped the above is sufficient for your present needs. However, should you require any further information, please contact the undersigned.

Yours sincerely,

Nick Ward BSc (Hons), FGS
for and on behalf of
iD GEOENVIRONMENTAL LIMITED

Encl: Proposed Exploratory Probeholes Drawing No. 4046-G-D034

Terms and Conditions for the Appointment of iD Geoenvironmental Limited

V009

1 DEFINITIONS AND INTERPRETATION

1.1 In this Agreement, unless the context otherwise requires, the following words and expressions have the following meanings:

"IDG" shall mean ID Geoenvironmental Limited whose registered offices are at Caledonian House, Tatton Street, Knutsford, Cheshire, WA16 6AG.

"Agreement" shall mean these Terms (entitled "Terms and Conditions for the Appointment of ID Geoenvironmental Limited"), the Proposal, any document recording the Client's unequivocal acceptance of the Proposal and any other documents or parts of other documents expressly referred to in any of the foregoing;

"Client" shall mean the party for whom the Services are being provided by IDG;

"Documents" shall mean all documents of any kind and includes plans, drawings, reports, programmes, specifications, Bills of Quantities, calculations, letters, e-mails, faxes, memoranda, films and photographs (including negatives), or any other form of record prepared or provided or received by, or on behalf of IDG, and whether in paper form or stored electronically or on disk, or otherwise;

"Intellectual Property" includes all rights to, and any interests in, any patents, designs, trade marks, copyright, know-how, trade secrets and any other proprietary rights or forms of intellectual property (protectable by registration or not) in respect of any technology, concept, idea, data, programme or other software (including source and object codes), specification, plan, drawing, schedule, minutes, correspondence, scheme, formula, programme, design, system, process logo, mark, style, or other matter or thing, existing or conceived, used, developed or produced by any person;

"Parties" shall mean the Client and IDG;

"Project" shall mean the project described in the Proposal and any enquiry from the Client on which IDG has based its Proposal;

"Proposal" means the offer document prepared by IDG in response to an enquiry or otherwise, in connection with the proposed provision of the Services;

"Services" means the work and services relating to the Project to be provided by IDG pursuant to the Agreement and as set out in the Proposal and shall include any additions or amendments thereto made in accordance with these Terms;

"Terms" means these terms entitled "Terms and Conditions for the Appointment of IDG";

1.2 Words importing the singular only shall also include the plural and vice versa, where the context requires.

1.3 Words importing persons or parties shall include firms, corporations and any organisation having legal capacity and vice versa, where the context requires; and words importing a particular gender include all genders.

1.4 The sub-headings to the clauses of these Terms are for convenience only and shall not affect the construction of the Agreement.

1.5 A reference to legislation includes that legislation as from time to time amended, re-enacted or substituted and any Orders in Council, orders, rules, regulations, schemes, warrants, by-laws, directives or codes of practice issued under any such legislation.

1.6 In the event of conflict between the documents forming part of the Agreement, the Proposal shall prevail, followed by the Terms.

2 APPOINTMENT & OBLIGATIONS OF IDG

2.1 The Client agrees to engage IDG and IDG agrees to provide the Services in accordance with the provisions of the Agreement.

2.2 IDG shall perform the Services using the reasonable standard of skill and care normally exercised by similar professional consultancy firms in performing similar services under similar conditions and shall use all reasonable endeavours to perform the Services in accordance with all relevant environmental and safety legislation.

3 OBLIGATIONS OF THE CLIENT

3.1 Throughout the period of this Agreement the Client shall afford to IDG or procure the affording to IDG of access to any site where access is required for the performance of the Services. In doing so, the Client accepts responsibility for ensuring that IDG is notified in writing of all special site and/or plant conditions, including without prejudice to the generality of the foregoing, the existence and precise location of all underground services, cables, pipes, drains or underground buildings, constructions or any hazards known or suspected by the Client, which the Client shall clearly mark on the ground or identify on accurate location plans supplied to IDG prior to the commencement of the Services. The Client shall also inform IDG in writing of any relevant operating procedures including any site safe operating procedures and any other regulations relevant to the carrying out of the Services. The Client shall indemnify IDG against all costs, claims, demands and expenses arising as a result of any non-disclosure in this respect, including but not limited to indemnification against any action brought by the owner of the land or otherwise. Whilst IDG will scan all potential exploratory locations with a Cable Avoidance Tool, IDG shall not be liable for any damage to underground services, cables, pipes, drains or underground buildings, constructions and the like which were either not marked on site or for which accurate plans were not provided.

3.2 If the Client discovers any conflict, defect or other fault in the information or designs provided by IDG pursuant to the Agreement, he will advise IDG in writing of such defect, conflict or other fault and IDG shall have the right to rectify the same or where necessary, to design the solution for rectification of any works carried out by others pursuant the conflicting, defective or in any other way faulty information or designs.

4 INTELLECTUAL PROPERTY

4.1 The copyright in all Intellectual Property prepared by or on behalf of IDG shall remain vested in IDG. The Client shall have a non-exclusive licence to copy and use such Intellectual Property for purposes directly related to the Project. Such licence shall enable the Client to copy and use the Intellectual Property but solely for its own purposes in connection with the Project and such use shall not include any licence to reproduce any conceptual designs or professional opinions contained therein nor shall it include any license to amend any drawing, design or other Intellectual Property produced by IDG.

4.2 Should the Client wish to use such Intellectual Property in connection with any other works or for any other purpose not directly related to the Project or wish to pass any Intellectual Property to any third party, it must obtain the prior written consent of IDG. The giving of such consent shall be at the discretion of IDG and shall be upon such terms as may be required by IDG. IDG shall not be liable for the use by any person of such Intellectual Property for any purpose other than that for which the same were prepared by or on behalf of IDG.

4.3 Ownership of any proposals submitted to the Client that are not subsequently confirmed as part of the Services to be provided for the Client remain with IDG and such proposals must not be used as the basis for any future work undertaken by the Client or a third party and no liability can be accepted howsoever arising from such proposals.

4.4 In the event of the Client being in default of payment of any fees or other amounts due, IDG may suspend further use of the licence on giving 2 days' notice of the intention to do so. Use of the licence may be resumed on receipt of the outstanding amounts.

5 TITLE

6.1 IDG shall transfer only such title or rights in respect of the Documents as it has, and if any part is purchased from a third party IDG shall transfer only such title or rights as that party had and has transferred to IDG.

6.2 Title in the Documents shall remain with and shall not pass to the Client until the amount due under the invoice(s) (including interest and costs) has been paid in full.

6 CONFIDENTIALITY

6.1 IDG undertakes not to divulge or disclose to any third party without the written consent of the Client information which is designated confidential by the Client or which can reasonably be considered to be confidential and arises during the performance of the Services unless required to do so by law or necessary in the proper performance of its duties in relation to the Project, or in order to make full frank and proper disclosure to its insurers or intended insurers, or to obtain legal or accounting advice. Subject to this IDG shall be permitted to use information related to the Services it provides in connection with the Project for the purposes of marketing its services and in proposals for work of a similar type.

7 THIRD PARTIES

7.1 The Agreement or any part thereof or any benefit or interest there-under may not be assigned by the Client without the prior written consent of IDG. The giving of such consent shall be at the discretion of IDG and IDG will only agree to an assignment on its terms and in return for payment of a fee by the Client to IDG to cover IDG's legal and other costs associated with any assignment. IDG will consider and may consent to any request from the Client for IDG to enter a collateral warranty with a third party with regard to the Services provided under the Agreement. The giving of such consent shall be at the discretion of IDG and IDG will only enter a collateral warranty on its terms and in return for payment of a fee by the Client to IDG to cover IDG's legal and other costs associated with any collateral warranty.

7.2 The Agreement shall not confer and shall not purport to confer on any third party any benefit or any right to enforce any term of this Agreement for the purposes of the Contracts (Rights of Third Parties) Act 1999 or otherwise.

8 INSURANCE

8.1 IDG warrants to the Client that there is in force a policy of Professional Indemnity insurance covering its liabilities for negligence under this Agreement, with a limit of indemnity of £2,000,000 (TWO MILLION POUNDS) but subject to separate annual aggregate limits of indemnity in respect of pollution/contamination claims of £2,000,000 and asbestos (£1,000,000). This policy is annually renewable and IDG agrees to use reasonable endeavours to maintain such insurance at all times until six years from the date of the completion (or termination) of the Services under the Agreement, provided such insurance is available at commercially reasonable rates having regard, inter alia, to premiums required and policy terms obtainable. If for any period such insurance is not available at commercially reasonable rates, IDG shall forthwith inform the Client and shall obtain in respect of such period such reduced level of Professional Indemnity insurance as is available and as would be fair and reasonable in the circumstances for IDG to obtain.

9 LIMITATIONS ON LIABILITY

9.1 Unless otherwise agreed in writing, IDG's liability under or in connection with the Agreement whether in contract, tort, negligence, breach of statutory duty or otherwise (other than in respect of personal injury or death) shall be limited to and shall not exceed the lesser of either two million pounds or 20 times the total value of invoices issued to the Client for consultancy work instructed under the Agreement. IDG's liability in connection with any claim relating to asbestos shall not exceed £1,000,000. No action or proceedings under or in respect of the Agreement whether in contract, tort, negligence, under statute or otherwise shall be commenced against IDG after the expiry of a period of six years from the date of the completion (or termination) of the Services under the Agreement.

9.2 IDG shall not be liable for the cost of rectifying any defect, conflict or other fault in the information or designs provided by IDG or for the cost of designing a solution for and rectifying any subsequent works carried out by others pursuant to the conflicting, defective or in any other way faulty information or designs, unless IDG has been advised in writing of the same by the Client and has been given the opportunity to rectify the same or where necessary, to design the solution for rectification of any subsequent works carried out by others pursuant to the same.

10 PAYMENT

10.1 Invoices for services rendered will be submitted for payment in accordance with the Proposal. The due date for payment is the date of the invoice and the final date for payment is 14 days from the date of the invoice. If the Client disputes the amount included for payment in an invoice a written notice must be served on IDG by the Client not later than 7 days before the final date for payment. If no notice is given the amount due shall be the amount stated in the invoice. If the Client shall fail to pay in full any sum due under the terms of the Agreement by the final payment date for that sum and no effective notice of intention to withhold payment has been issued, IDG may serve written notice on the Client demanding payment within 14 days of such notice. If the Client shall fail to comply with such notice, IDG shall be entitled to terminate its employment under the Agreement forthwith.

10.2 In the event of failure on the part of the Client to pay any monies in accordance with the foregoing payment provisions, IDG will be entitled to charge interest on any monies owed to it by the Client, such interest to be at a rate of 8% above the base rate of a clearing bank from time to time calculated from the final date for payment to the date of actual payment on a compound basis. IDG will also be entitled to claim any additional costs in collecting the debt plus compensation for time spent.

11 DELAY

11.1 IDG will comply with any timescale agreed for completion of the Services unless delayed or prevented by circumstances beyond its reasonable control and in the event of any such circumstances arising IDG undertakes to complete the Services within a reasonable period, but will not be liable to the Client for any delay as a result.

12 TERMINATION

12.1 The Agreement may be determined by either party in the event of the other making a composition or arrangement with its creditors, becoming bankrupt, or being a company, making a proposal for a voluntary arrangement for a composition of debts, or has a provisional liquidator appointed, or has a winding-up order made, or passes a resolution for voluntary winding-up (except for the purposes of a bona fide scheme of amalgamation or reconstruction), or has an administrator or an administrative receiver appointed to the whole or any part of its assets. Notice of determination must be given to the party which is insolvent by the other party.

12.2 If for any reason the performance of the Services by IDG is suspended for a period in excess of three calendar months then IDG shall be entitled to determine its appointment in respect of the Services by seven days written notice to the Client.

12.3 Any determination of the appointment of IDG howsoever caused shall be without prejudice to the right of IDG to require payment for all services performed up to the date of such determination including but not limited to payment of a fair and reasonable proportion of any figure identified in the Proposal or otherwise for fees in respect of a particular service which IDG has started, but not completed.

13 NOTICES

13.1 Any notice provided for in the Agreement shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post to the address of the relevant party as may have been notified by each party to the other or, in the absence of notification, to the address of IDG set out above or to the registered address of the Client. Such notice shall be deemed to have been received on the day of delivery if delivered by hand or on the second working day after the day of posting if sent by first class post.

14 ENTIRE AGREEMENT

14.1 The Agreement constitutes the complete and entire agreement between the Client and IDG with respect to the Services and supersedes any prior oral and/or written warranties, terms, conditions, communications and representations, whether express or implied and any claim against IDG in respect of the Services can only be made in contract under the provisions of the Agreement and not otherwise under the law or tort or otherwise. IDG will not be bound by any standard or printed terms or conditions furnished by the Client in any of its documents unless IDG specifically states in writing separately from such documents that it intends such terms and conditions to apply.

14.2 No amendments, modifications or variation of the Agreement shall be valid unless made in writing and agreed to by both the Client and IDG; such agreement must be recorded in writing by at least one of the Parties.

15 DISPUTES AND GOVERNING LAW

15.1 The Agreement shall be governed by and construed in accordance with English law and the Parties irrevocably and unconditionally submit to the jurisdiction of the English Courts.

15.2 Where the Housing Grants, Construction and Regeneration Act 1996 applies, any dispute between the Parties may be referred to adjudication in accordance with The Scheme for Construction Contracts Regulations 1998 or any amendment or modification thereof being in force at the time of the dispute, as applicable to England, Wales, Scotland and Northern Ireland.

APPENDIX I

Generic Notes – ID Geoenvironmental Investigations

Environmental Setting

General

Third party information obtained from the British Geological Survey (BGS), the Coal Authority and the Local Authority etc is presented in the Correspondence Appendix of this Geoenvironmental Report.

Geology, Mining & Quarrying

In order to establish the geological setting of a site, ID Geoenvironmental refer to BGS maps for the area, and the relevant geological memoir.

A coal mining report is obtained from the Coal Authority. Further information is sourced from the Local Authority and by reference to current and historical OS plans.

Landfills and other Historical Land Uses

ID Geoenvironmental obtain data from the Landmark Information Group, the Environment Agency and the Local Authority with respect to known areas of landfilling within 250m of the proposed development site. Reference is also made to historical OS plans, which are inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Historical maps dating from the middle of the nineteenth century are also studied for evidence of historical land uses (i.e. gas works, foundries, chemical works) which may represent potential sources of contamination or ground instability.

Radon

Radon is a colourless, odourless gas, which is radioactive. It is formed in strata that contain uranium and radium (most notably granite), and can move though fissures eventually discharging to atmosphere, or the spaces under and within buildings. Where radon occurs in high concentrations, it can pose a risk to health.

In order to assess potential risks associated with radon gas, ID Geoenvironmental refer to BRE Report BR211, 2007: "*Radon: guidance on protective measures for new buildings*".

The level of protection needed is site-specific and is determined by reference to the maps contained in Annex A of BR211. These maps are derived from the Radon Atlas of England and Wales (2007), and indicate the highest radon potential within each 1km grid square.

If the site falls within a light grey square on the relevant map in Annex A then basic radon protection should be installed in new buildings; if the site falls within a dark grey square then full radon protection should be installed. **If the site is in an un-shaded square then no radon protection is needed.**

BR211 provides a preliminary indication of the measures required for a particular site, but it is also often beneficial to request a BR211 Radon Report from the BGS. The Annex A maps indicate the highest geological radon potential within each 1km grid square, but in many cases the radon potential varies considerably within the grid square. The BR211 Radon Report gives definitive guidance on the requirement for radon protective measures, and therefore may allow the adoption of a lower level of protection than that indicated in the Annex A maps.

ID Geoenvironmental typically obtain a BR211 Radon Report for all sites that fall within a shaded square on the relevant Annex A map.

When requesting a BR211 Radon Report from the BGS ID Geoenvironmental select the search radius carefully, since too large a search radius may result in the inclusion of areas of higher geological radon potential, and therefore in the recommendation of too high a level of protection.

Further details of the protective measures required, if appropriate, are provided in the Hazardous Gas section of this Geoenvironmental Report.

Hydrogeology

ID Geoenvironmental obtain information from the Environment Agency (EA) and the Landmark Information Group with respect to:

- groundwater quality
- recorded pollution incidents
- licensed groundwater abstractions

From 1 April 2010 the Environment Agency's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.

The aquifer designation data is based on geological mapping provided by the British Geological Survey.

These maps are split into two differing aquifer designations:

- **Superficial (Drift)** – permeable unconsolidated (loose) deposits such as sands and gravels.
- **Bedrock** – solid permeable formations such as sandstone, chalk or limestone.

The maps display the following aquifer designations:

- **Principal aquifers:** *"These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer"*.
- **Secondary A** – *"permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers";*

- **Secondary B** - *predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers*

- **Unproductive Strata**: *These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. However groundwater flow through such rocks, although imperceptible, does take place and needs to be considered in assessing the risk associated with persistent pollutants. Some non-aquifers can yield water in sufficient quantities for domestic use".*

Groundwater vulnerability is determined by 4 variables:

1. The presence and nature of overlying soil (the weathered zone affected by living organisms; soil in the UK can extend up to 2m in depth). Physical properties of the soil affect the downward passage of water and it's ability to attenuate pollutants. The EA make reference to a three-fold classification of soil types:-

   - Soils of **low** leaching potential are defined as *"soils in which the pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants".*
   - Soils of **intermediate** leaching potential are defined as *"soils which have a moderate ability to attenuate diffuse source pollutants or in which it is possible that some non-adsorbed diffuse source pollutants and liquid discharges could penetrate the soil layer".*
   - Soils of **high** leaching potential are defined as *"soils with little ability to attenuate diffuse source pollutants and in which non-adsorbed diffuse source pollutants and liquid discharges have the potential to move rapidly to underlying strata or to shallow groundwater".*

   In urban areas and restored mineral workings the soil information is based on fewer observations than elsewhere. A worst-case vulnerability (H) is therefore assumed for these areas and for current mineral workings by the EA. All are given a designation of **HU** unless proved otherwise.

2. The presence and nature of Drift, which often overlies bedrock. Where Drift is of substantial thickness and low permeability, it can provide an effective barrier to surface pollutant migration. Permeable Drift is classified as a Minor Aquifer except where it is in probable hydraulic continuity with a Major Aquifer, where it is regarded as part of the Major Aquifer unless proven otherwise by site investigation.

3. The nature of the geological strata (bedrock). Rocks that contain groundwater in exploitable quantities are called aquifers.

4. The depth of the unsaturated zone; i.e. that part of the aquifer which lies above the water table

The EA have also designated Source Protection Zones, which are based on proximity to a groundwater source (springs, wells and abstraction boreholes). The size of a Source Protection Zone is a function of the aquifer, volume of groundwater abstracted and the effective rainfall, and may vary from tens to several thousand hectares.

Hydrology

ID Geoenvironmental obtain information from the Environment Agency and the Landmark Information Group with respect to:

- surface water quality
- recorded pollution incidents
- licensed abstractions (groundwater & surface waters)
- licensed discharge consents
- site susceptibility to flooding

The EA have set **water quality** targets for all rivers. These targets are known as River Quality Objectives (RQO's). The water quality classification scheme used to set RQO planning targets is known as the River Ecosystem scheme. The scheme comprises five classes (RE1 to RE5) which reflect the chemical quality requirements of communities of plants and animals occurring in our rivers.

General Quality Assessment (GQA) grades reflect actual water quality. They are based on the most recent analytical testing undertaken by the EA. There are six GQA grades (denoted A to F) defined by the concentrations of biochemical oxygen demand, total ammonia and dissolved oxygen.

The susceptibility of a site to **flooding** is assessed by reference to a Flood Map on the Environment Agency's website. These maps provide show natural floodplains - areas potentially at risk of flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

There are two different kinds of area shown on the Flood Map:

1. Dark blue areas could be flooded by the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year, or by a river by a flood that has a 1% (1 in 100) or greater chance of happening each year

2. Light blue areas show the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance of occurring each year.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements

The maps also show all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods.

The Agency's assessment of the likelihood of flooding from rivers and the sea at any location is based on the presence and effect of all flood defences, predicted flood levels, and ground levels.

It should also be noted that as the floodplain shown is the 1 in 100 year (or 1 in 200 year as appropriate), areas outside this may be flooded by more extreme floods (e.g. the 1 in 1000 year

flood). Also, parts of the areas shown at risk of flooding will be flooded by lesser floods (e.g. the 1 in 5 year flood). In some places due to the shape of the river valley, the smaller floods will flood a very similar extent to larger floods but to a lesser depth.

If a site falls within a floodplain, it is recommended that a flood survey be undertaken by a specialist consultant who can advise on appropriate mitigating measures; ie raising slab levels, provision of storage etc.

Furthermore, as discussed in Planning Policy Statement 25 (PPS25) a consequence of amendment 8 to Article 10 of The Town and Country Planning (General Development Procedure) Order 1995 ("the GDPO"), on 1st October 2006, LPAs are required to consult the Environment Agency on all applications for development in flood risk areas (except minor development), including those in areas with critical drainage problems and for any development on land exceeding 1 hectare outside flood risk areas.

COMAH & Explosive Sites

ID Geoenvironmental obtain information from the Landmark Information Group with respect to COMAH or explosive sites within 1km of the proposed development site. MMi's report refers to any that are present, and recommends that the Client seeks further advice from the HSE.

Areas around COMAH sites (chemical plants etc) are zoned with respect to the implementation of emergency plans. The HSE are a statutory consultee to the local planning authority for all COMAH sites. The COMAH site may have to revise it's emergency action plan if development occurs. This might be quite straightforward or could entail significant expenditure. Consequently, the COMAH site may object to a proposed development (although it is the Local Authority who have final say, and they are likely to place more weight on advice from the HSE).

Preliminary Conceptual Ground Model

The site's environmental setting (and proposed end use) is used by ID Geoenvironmental to assess the significance of any contamination encountered during the subsequent ground investigation

Assessment of contaminated land is based on an evaluation of pollutant linkages (source-pathway-receptor). Contaminants within the near surface strata represent a potential source of pollution. The environment (most notably groundwater), site workers and end users are potential targets.

Potential pollutant linkages are shown on a preliminary conceptual site model, presented as a Drawing in an Appendix to this Geoenvironmental Report. The preliminary model is revised in light of data arising from the subsequent ground investigation.

Generic Notes 2.
Ground Investigation Fieldwork

General

IDG Ground Investigations are undertaken in accordance with current UK guidance including:

- *BS EN 1997-1:2004+A1:2013 Eurocode 7: Geotechnical design — Part 1: General rules*
- *BS EN 1997-2:2007 Eurocode 7: Geotechnical design —Part 2: Ground investigation and testing*
- *NA to BS EN 1997-2:2007 UK National Annex to Eurocode 7. Geotechnical design. Ground investigation and testing*
- *BS 5930:2015 Code of practice for site investigations.*
- *BS 10175:2011+A2:2017* Investigation of potentially contaminated sites. Code of practice.
- *BS EN ISO 14688-1:2018 Geotechnical investigation and testing. Identification and classification of soil. Identification and description.*
- *BS EN ISO 14688-2:2018 Geotechnical investigation and testing. Identification and classification of soil. Principles for a classification.*
- *BS EN ISO 14689:2018 Geotechnical investigation and testing. Identification and classification of rock. Identification and description.*
- "*Guidance on the protection of housing on contaminated land*" – NHBC & EA R&D Publication 66 (2000, 2008) updated 3rd June 2014
- "*Technical Aspects of Site Investigation*" – EA R&D Technical Report P5-065/TR (2000)
- "*Development of appropriate soil sampling strategies for land contamination*" – EA R&D Technical Report P5-066/TR (2001)
- "AGS Guide: *The selection of Geotechnical Soil Laboratory Testing*" AGS: 2018

Exploratory hole logs are presented in Appendices to this Geoenvironmental Report. These logs include details of the:

- Investigation technique adopted
- Descriptions of the solid strata, and any groundwater encountered.
- Samples taken
- Results of any in-situ testing
- Any gas\groundwater monitoring well installed

Exploratory Hole Locations

Exploratory hole locations are selected by IDG, prior to commencement of fieldwork, to provide a representative view of the strata beneath the site and to target potential contaminant sources identified

during the preliminary investigation (desk study). Additional exploratory locations are often determined by the site engineer in light of the ground conditions actually encountered; this enables better delineation of the depth and lateral extent of organic contamination, poor ground, relict structures etc.

Investigation Techniques

Ground conditions can be investigated by a number of techniques. Techniques most commonly used by IDG include:

- Machine excavated trial pits, usually equipped with a backactor and a 0.6m wide bucket.
- Cable percussive (Shell & Auger) boreholes, typically using 150mm diameter tools and casing. Cable Percussive drilling is employed to advance boreholes in superficial (made ground and Drift strata).
- Window or Windowless Sampling boreholes. Constraints associated with existing buildings, operations and underground service runs can render some sites partly or wholly inaccessible to a mechanical excavator. In such circumstances, window sampling is often the most appropriate technique. A window sampling drilling rig can be manoeuvred in areas of restricted access and results in minimal disturbance of the ground (a 150mm) diameter tarmac/concrete core can be lifted and put to one side). However, it should be noted that window sampling allows only a limited inspection of the ground (especially made ground with a significant proportion of coarse material) and cannot be used in solid strata.
- Rotary percussive open-hole probeholes are typically drilled using a tricone rock roller bit with water or air as the flushing medium. Rotary probeholes are generally lined through made ground with temporary steel casing to prevent hole collapse. Rotary boreholes are used to enable progress in solid strata (rockhead) and are commonly drilled to identify the presence of shallow mineworkings or to install deep groundwater monitoring boreholes in the solid strata.

Hazardous ground gas and groundwater monitoring boreholes may be installed in cable percussive boreholes, window sample probeholes and rotary boreholes. Where installed, gas\groundwater monitoring wells typically comprise a lower slotted section, surrounded by a filter pack of 10 mm diameter non-calcareous gravel and an upper plain section surrounded in part by a bentonite seal and in part by gravel or arisings. The top of the plain pipe is cut off below ground level and the monitoring well protected by a circular or square, stopcock type manhole cover set in concrete, or the plain pipe is cut off just above ground level and the well protected by 100mm diameter raised steel helmet set in concrete, which stands approximately 300mm proud of ground level.

Monitoring well details, including the location of the response zone and bentonite seal are presented on the relevant exploratory hole logs.

In-situ Testing

Where relative densities of granular materials given on the trial pit and window sample logs are based on visual inspection only, they do not relate to any specific bearing capacities.

BS EN ISO 22476-3:2005+A1:2011 Geotechnical investigation and testing. Field testing. Standard penetration test

The relative densities of granular materials encountered in cable percussive boreholes are based on Standard Penetration Test (SPT) results. SPTs are carried out boreholes, in accordance with BS EN ISO 22476-3:2005. The sampler is penetrated over an initial seating drive of 150mm. The sampler is then driven for a test drive of 300mm in four increments of 75mm. The total number of blow required to drive the sampler 300mm is recorded as the penetration resistance or N-value. Where full penetration (450mm) is not possible the test is continued up to a maximum of 50 blows and the depth of penetration is recorded in millimetres.

The strength of cohesive deposits is determined using a hand shear vane in general accordance with BS1377-7-1990.

Shear strength test results reported on trial pit logs are considered to be more reliable than those reported on window sample logs. Significant sample disturbance occurs during window sampling and consequently shear strength results on disturbed window samples are generally lower than results obtained during trial pitting, in-situ or in large excavated blocks.

Sampling

Representative soil/fill samples are taken at regular intervals from the exploratory holes to assist in description of the ground and to allow selected laboratory testing to be performed. The type of sample taken is dependent on the nature of the stratum and the purpose of the analysis.

Where the soils encountered contain a significant proportion of coarse grained material, truly representative samples are not typically obtained and only the finer fraction is placed in sample containers. However, a visual estimate of the amount of coarse material is made on site. Note: Coarse constituents not sampled are defined as: coarse gravel, cobble and boulder. (i.e. any 'particles' with an average diameter greater than 20mm).

Occasionally, unrepresentative 'spot' samples are also taken from some exploratory locations for contaminant analysis, typically where unusual, localised pockets of materials are encountered.

Samples of soil for chemical testing are placed into appropriate containers (see below) prior to delivery to the selected laboratory. Samples of water are taken in one litre, brown glass bottles and stored in cool boxes, at a temperature of approximately 4ºC, until delivery to the selected laboratory. Soil\fill samples for organic analysis are also stored in cool boxes.

Sample Containers (for geotechnical analysis). The majority of samples are only scheduled for PI and sulphate testing, for which 500g of sample is required (a full 0.5-litre plastic tub). However, bulk bags are taken where scheduling of compaction or grading tests are required.

Containers (for contaminant analysis). In order to comply with MCERTS requirements, labs have to provide a sample description and consequently require sufficient soil sample, and the use of wide-necked containers. For any sample requiring both inorganic & organic analysis, it is necessary to submit both a 1-litre glass jar and a 1 kg plastic tub.

Where scheduling for VOC (including GRO) testing is anticipated, a glass vial is also required. In summary (for contaminant analysis):

Anticipated testing	Container(s)	Remarks
pH & metals only	1 kg plastic tub	
organics (TPH, PAH) etc only	1 litre wide-necked glass jar	Vial required if TPH is to include GRO as well as DRO & LRO, or speciated PAH
VOCs (incl. naphthalene and\or GRO) only	glass vial & 1kg plastic tub	
pH & metals, and organics	1 litre wide-necked glass jar 1kg plastic tub	
pH & metals, and organics (incl. VOCs or GRO)	glass vial 1 litre wide-necked glass jar 1kg plastic tub	

Groundwater

Where encountered during fieldwork, groundwater is recorded on exploratory hole logs. If monitoring wells are installed, groundwater levels are also recorded on one or more occasions after completion of the fieldwork.

It should be borne in mind that the rapid excavation rates used during a ground investigation may not allow the establishment of equilibrium water levels. Water levels are likely to fluctuate with season/rainfall and could be substantially higher at wetter times of the year than those found during the ground investigation.

Long-term monitoring of standpipes or piezometers is always recommended if water levels are likely to have a significant effect on earthworks or foundation design.

Description of Strata

Soils encountered during an IDG investigation are described (logged) in general accordance with EN ISO 14688-1. The descriptions and depth of deposits encountered are presented on the exploratory hole logs and summarised in the Ground Conditions section of the report within the main body of text.

Rocks encountered during an IDG investigation are described (logged) in general accordance with EN ISO 14689-1. The descriptions and depth of strata encountered are presented on the exploratory hole logs and summarised in the Ground Conditions section of the report within the main body of text.

The materials encountered in the trial pits are logged, samples taken, and tests performed on the in-situ materials in the excavation faces, to depths of up to 1.2m; below this depth these operations are conducted at the surface on disturbed samples recovered from the excavation.

Key to Exploratory Hole Logs

Keys to logs are presented in the Appendix(ces) containing the logs. There are two Keys – Symbols & Legends and Terms & Definitions.

Generic Notes – ID Geoenvironmental Investigations

3. Geotechnical Laboratory Tests

General

Soil samples are delivered to the laboratory for testing along with a schedule of testing drawn up by IDG. All tests are carried out in accordance with BS 1377:1990.

The test results are presented as received in an Appendix to this Geoenvironmental Report.

The following laboratory testing are routinely carried out on a selection of samples:

- Atterberg limits & moisture contents
- Soluble sulphate & pH

The additional tests are typically only scheduled where significant earthworks regrade is anticipated:

- Grading.
- Compaction tests
- Particle density.

Atterberg Limits & Moisture Content

The Liquid and Plastic Limits of samples of natural in-situ clay are determined using the cone penetrometer method and the rolling thread test. These tests enable determination of an average Plasticity Index (PI) for each "type" of clay, although judgement is applied where variable results are reported.

PI can be related to shrinkability (low, medium or high) and then to minimum founding depth. IDG typically only consider a soil to be shrinkable if the proportion finer than 63μm is >35%.

PI results are compared against guidance given in the NHBC Standards, Chapter 4.2 (revised April 2003), which advocates the use of modified Plasticity Index (I'p), defined as:

I'p = Ip * (%< 425μm/100)

ie if PI is 30%, but the soil contains 80% < 425μm, then: I'p = 30 * 80/100 = 24%.

It should be noted that in accordance with the requirements of BS 1377, the % passing the 425μm sieve is routinely reported by testing labs.

IDG apply engineering judgment where PI results are spread over a range of classifications. Consideration is given to:

- the average values for each particular soil type (ie differentiate between residual soil and alluvium),
- the number of results in each class and
- the actual values.

Unless the judgment strongly indicates otherwise, IDG typically adopt a conservative approach and recommend assumption of the higher classification.

Soluble Sulphate and pH

Sulphates in soil and groundwater are the chemical agents most likely to attack sub-surface concrete, resulting in expansion and softening of the concrete to a mush. Another common cause of concrete deterioration is groundwater acidity.

The rate of chemical attack depends on the concentration of aggressive ions and their replenishment at the reaction surface. The rate of replenishment is related to the presence and mobility of groundwater.

IDG refer to BRE Special Digest 1 (SD1) "Concrete in aggressive ground. Part 1: Assessing the aggressive chemical environment" (2005). SD 1 provides definitions of:

- the nature of the site (greenfield, brownfield or pyritic)
- the groundwater regime (static, mobile or highly mobile)
- the Design Sulphate Class (DC Class) and
- the Aggressive Chemical Environment for Concrete (ACEC Class)

IDG reports clearly state each of the above for the site being considered.

The concentrations of sulphate in aqueous soil/fill extracts are determined in the laboratory using the gravimetric method. The results are expressed in terms of SO_4 for direct comparison with BS 5328:1997. The pH value of each sample was determined by the electrometric method.

SD1 also discusses determination of "representative" sulphate concentration from a number of tests. Essentially if <10 samples of a given soil-type have been tested, the highest measured sulphate concentration should be taken. If >10 samples have been tested, the mean of the highest 20% of the sulphate test results can be taken. With respect to groundwater, the highest sulphate concentration should always be taken.

With respect to pH (soil & groundwater) the value used is the lowest value if <10 samples have been tested and the mean of the lowest 20% if >10 samples have been tested.

4 Contamination Laboratory Analysis & Interpretation (including WAC)

Current UK Guidance

The UK approach to contaminated land is set out in Contaminated Land Report No. 11 (2004) "Model Procedures for the Management of Land Contamination". The approach is based upon risk assessment, where risk is defined as the combination of the probability of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.

In the context of land contamination, there are three essential elements to any risk: (1) a contaminant source, (2) a receptor (eg controlled water or people exposed to the contaminants) and (3) a pathway linking (1) and (2). Risk can only exist where all three elements combine to create a pollutant linkage. Risk assessment requires the formulation of a conceptual model which supports the identification and assessment of pollutant linkages.

As recommended by CLR11, IDG adopt a tiered approach to risk assessment, consistent with UK guidance and best practice. In general this comprises the following elements of work:

- A Preliminary Risk Assessment (PRA)
- A Generic Quantitative Risk Assessment (GQRA)
- A Detailed Quantitative Risk Assessment (DQRA)

Preliminary Risk Assessment
A preliminary risk assessment is generally undertaken as part of a "Desk Study" investigation. This investigation collates readily available information including historical land uses, the geological, hydrogeological and hydrological setting of the site, and the proposed end-use which is presented as a "Preliminary Conceptual Model". Potential pollutant linkages are defined and a preliminary assessment of the risks posed to receptors is stated.

Further information regarding the development of a conceptual model for the site is presented in Generic Notes 1 – Environmental Setting and Preliminary Risk Assessment.

Generic Quantitative Risk Assessment
Where potential pollutant linkages are identified in the preliminary conceptual model a generic quantitative risk assessment (GQRA) generally forms part of an intrusive phase of site investigation, allowing for the sampling of both soil and groundwater. The intrusive investigation should target pollutant linkages identified in the Preliminary Conceptual Model, but should also investigate previously unidentified sources and contaminant pathways encountered during the site investigation works.

Human Health
Detailed guidance on human health risk assessment is available in the following:

- Evaluation of models for predicting plant uptake of chemicals from soil - Science Report – SC050021/SR
- Human health toxicological assessment of contaminants in soil - Science Report: SC050021/SR2
- Updated technical background to the CLEA model - Science Report: SC050021/SR3
- CLEA Software (Version 1.05) Handbook Science report: SC050021/SR4
- Compilation of data for priority organic pollutants for derivation of Soil Guideline Values - Science Report: SC050021/SR7
- Guidance on Comparing Soil Contamination Data with a Critical Concentration - CL:AIRE and CIEH, May 2008

Generic Assessment Criteria represent "screening concentrations" devised for a number of standard land-use scenarios. They are based conservative receptor and exposure parameters and provide a useful method of screening out sites where contaminants pose a negligible risk. GACs are available from a number of sources for the following land-use scenarios. These scenarios include:

- Residential end-use with consumption of homegrown produce.
- Residential end-use without consumption of homegrown produce.
- Residential Public Open Space (Landscaped Areas)
- Public Open Space (Parks)
- Allotments
- Commercial Development

The initial step of such a generic quantitative risk assessment is to compare site chemical data with appropriate UK generic assessment criteria. These following GACs are currently appropriate.

- Soil Guideline Values (SGVs) (Environment Agency 2009) are based on CLEA "default settings and therefore represent screening criteria based on minimal risk to human health. SGVs are available for arsenic, cadmium, mercury, nickel, selenium, BTEX, phenols and dioxins, furans and dioxin-like PCB substances for residential, allotments and commercial land-uses based on a sandy loam soil and a 6% soil organic matter (SOM) content.
- Soil Generic Assessment Criteria for Human Health Risk Assessment (EIC/AGS/CL:AIRE 2009) adopted CLEA default settings and therefore represent screening criteria based on minimal risk to human health. GACs were derived for 3 metals and 32 organic contaminants for four standard land uses at 1%, 2% and 6% SOM content.
- Suitable for Use Levels (S4ULs) (LQM/CIEH, Nathanail 2015) represent generic assessment criteria for each of the above standard land-uses, based on updated toxicological assessments and modified exposure parameters. They therefore represent screening criteria based on minimal risk to human health. S4ULs for organic compounds are available for 1%, 2% and 6% SOM. *(S4ULs Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3061. All rights Reserved.)*
- Category 4 Screening Levels (Defra March 2014) are primarily intended to be used to assist the classification of land under the revised Part 2A Statutory Guidance issued in 2012. The revised guidance introduced the concept of four categories of contaminated land (Category 1 (significant/high risk) – Category 4 (low risk). C4SLs are low risk levels which are not representative of significant possibility of significant harm (SPoSH) and, whilst not intended to mark the top of Category 4, should the C4SLs not be exceeded, land can be demonstrated as being in Category 4 and cannot be determined as contaminated land.

The GAC selected to form the basis of a Generic Risk Assessment are dependent on the existing or proposed land use as defined in the Conceptual Model (which identifies the critical receptor and exposure parameters) and other factors such as the SOM content of the near surface soils at the site.

Soil organic matter (SOM) is the fraction of soil composed of organic matter. It consists principally of decomposed plant remains. The presence of SOM is important in determining the fate and behaviour of a number of organic contaminants. Generally, the greater the SOM content of soil, the greater the sorptive capacity of the soil and the lower the mobility of certain contaminant phases. (Note: TOC = SOM x 0.58; and FOC = TOC/100).

Generic Assessment Criteria adopted by IDG available, by regulators, upon request.

The CLEA model assumes a simple linear partitioning between the sorbed, dissolved and vapour phases. The theoretical upper boundaries to this behaviour are represented by the maximum aqueous solubility

and pure saturated vapour concentration of the chemical. The CLEA model uses a traffic light system to identify when individual and/or combined assessment criteria exceed the lower of either the aqueous or vapour based saturation limit (the lower saturation limit). Assessment criteria which exceed the lower of the two saturation limits and where the vapour pathway is an important contributor to exposure are highlighted in red in the CLEA model. These values are depicted as shaded values in the IDG GAC Tables. In such cases the exposure from the vapour phase will be over predicted and where the vapour pathway is the only exposure route being considered the risk is likely to be negligible.

IDG Reports will therefore state the applicable land-use scenario, and the SOM content adopted for the assessment. In general, the initial assessment **assumes a low soil organic matter content (1% SOM)** to ensure that the assessment is appropriately conservative. Where contaminant concentrations exceed the adopted GAC, site-specific assessment (for example applying measured SOM contents of soils or development site-specific exposure parameters) will be undertaken to further evaluate the risk. It should be noted that exceedance of GAC does not necessarily mean that remediation will be required.

Interpretation of Results

Prior to undertaking any comparison of soil contamination data, the issue of the averaging area requires further consideration. IDG consider that contamination across the entire site needs to be characterised by reference to the Conceptual Site Model. Consequently, IDG gather and analyse sample results by "soil type", or by former use in a given sub-area of the site, before undertaking statistical analysis; ie the averaging area is associated with the extent of a particular fill type, or an area affected by spillage\leakage rather than from within a specified depth below the site surface.

In terms of brownfield redevelopment, this is considered an appropriate methodology which provides a representative sample population for statistical analysis which allows for the necessary relocation of soils during site development works.

Should any of the GAC criteria detailed above be exceeded, then three possible courses of action could be considered. (The first is only applicable in terms of human health, but the second and third could also be applied to groundwater or landfill gas).

- Undertake further statistical analysis to determine whether contaminant concentrations of inorganic contaminants within soil\fill actually present a risk (only applicable to assessing the risk to human health).
- Based on a Generic Quantitative Risk Assessment, advocate an appropriate level of remediation to "break" the pollutant linkage - for example the removal/relocation of the contaminated materials or the provision of a clean cover.
- Carry out a more a Detailed Quantitative Risk Assessment in order to further assess the risk.

Controlled Waters Receptors

Where the environmental setting of a site is considered moderately or highly "sensitive" in respect of controlled waters (i.e where a pollutant linkage potentially exists to a controlled waters receptor) a risk assessment will be undertaken. This initially comprises comparison of soil-leachate or groundwater concentrations to the appropriate water quality standard. Depending upon the specific characteristics and environmental setting of the site the appropriate standard is likely to be one of the following:

- Water Supply (Water Quality) Regulations 1989
- Environmental Quality Standards: The River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive)(England and Wales) Directions 2010.
- The Surface Waters (Abstraction for Drinking Water) Regulations

It is not possible to derive generic GAC values for controlled waters, because distance to the receptor, ground permeability and hydraulic gradient are key factors in the assessment, and both are extremely site-

specific. As a consequence should groundwater or soil leachate concentrations exceed the adopted water quality standards in a site with moderate or high sensitivity, a detailed quantitative risk assessment may be required.

Phytotoxic Effects

With respect to the assessment of potential **phytotoxic effects** of contaminants, IDG refer to available publications relating to allowable concentrations of heavy metals (copper and zinc) in arable soils which have been set by the Department of Environment[i]. These values are detailed in the table below.

Allowable Concentrations of Heavy Metals in Arable Soils

Element	Limit According to pH of soil (mg/kg)			
	5.0 to <5.5	5.5 to <6.0	6.0 to 7.0	>7.0
Copper	80	100	135	200
Nickel	50	60	75	110
Zinc	200	200	200	300

IDG have reviewed the available data on Boron behaviour in soil, plant uptake and the relatively high precipitation rates typical in the UK. In the absence of any definitive value IDG have opted to be relatively conservative and have adopted a Boron Soil Screening Value of 5mg/kg. This value is considered protective of the majority of common landscape plants.

Hazardous Ground Gas

Tier 1 risk assessment of **hazardous gas** is undertaken through reference to the following documents:

- Approved Document C, Building Regulations 2000
- Boyle & Witherington (2007) – Guidance on evaluation on development proposals on sites where methane and carbon dioxide are present, incorporating "traffic lights". Report Ref. 10627-R01-(02), for NHBC
- CIRIA C665 (2006) – Assessing risks posed by hazardous ground gases to buildings
- BS 8485:2007 – Code of Practice for the characterisation & remediation from ground gas in affected developments

Further information is presented in Generic Notes No. 5 – Hazardous Gas.

Waste Classification & WAC

Waste soils to be disposed off-site should be characterised by a general chemical testing for a broad suite to include pH, TOC, metals, speciated PAH and banded hydrocarbons. WAC testing is not required to characterise the waste. Chemical test result should be provided to the waste haulier and receiving landfill who will confirm the classification of the waste soils.

In the context of waste soils generated by remediation and\or groundwork activities on brownfield sites, the following definitions (from the Landfill Regulations 2002) apply:

- Inert (e.g. uncontaminated 'natural' soil, bricks, concrete, tiles & ceramics).
- Non-Hazardous (e.g. soil excavated from a contaminated site which contains dangerous substances, but at concentrations below prescribed thresholds).
- Hazardous (e.g. soil excavated from a contaminated site which contains dangerous substances at concentrations above prescribed thresholds).

Dangerous substances include compounds containing a variety of determinants commonly found in contaminated soils on brownfield sites, for example arsenic, lead, chromium, benzene etc.

From 16th July 2005, landfill operators require Waste Acceptance Criteria (WAC) laboratory data, should soil waste be classified as **hazardous**, and such waste must have been subjected to pre-treatment. However, subject to WAC testing it may be possible to classify it as stable, non-reactive hazardous waste, which can be placed within a dedicated cell within the non-hazardous landfill.

It should be noted that where non-hazardous waste is accepted at a non-hazardous landfill facility, WAC testing is not is required.

Should off-site disposal of soils classified as hazardous waste be undertaken during redevelopment, then WAC analysis should be scheduled at an early stage in the remediation programme.

However, organic compounds (BTEX, TPH, PAH etc) are the most common contaminants that result in soils being classed as hazardous. These contaminants can often be dealt with by alternative technologies (eg by bioremediation or stabilisation) and consequently retention on site is often possible.

Key References

Environment Agency (2008), "Evaluation of models for predicting plant uptake of chemicals from soil" Science Report – SC050021/SR.

Environment Agency (2008), "Human health toxicological assessment of contaminants in soil". Science Report – SR2.

Environment Agency (2009), "Updated Technical Background to the CLEA Model (as amended 2009)". Science Report - SC050021/SR3.

Environment Agency (2009), "CLEA Software (Version 1.05) Handbook". Science Report - SC050021/SR4.

"Guidance on Comparing Soil Contamination Data with a Critical Concentration". CL:AIRE and CIEH (May 2008).

CL:AIRE (2010), "Soil Generic Assessment Criteria for Human Health Risk Assessment".

CL:AIRE (2013), "Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. SP1010 Final Project Report.

DEFRA (2014), "Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination –. SP1010 Policy Companion Document.

Nathanial (*et. al.*) (2015). The LQM/S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham.

Department of Environment (1996), "Code of Practice for Agricultural use of Sewage Sludge".

Generic Notes – ID Geoenvironmental Investigations

5. Hazardous Gas

General

Hazardous gas is considered to be any mixture of potentially explosive, toxic or asphyxiating gases, most notably methane, carbon dioxide and oxygen (deficiency).

IDG Investigations are undertaken in accordance with the following Standards and Guidance:

- BS8576:2013 Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs).
- BS 8485:2015+A1:2019 Code of practice for the design of protective measures for methane and carbon-dioxide ground gases for new buildings.
- BS10175:2011 +A2-2017 Investigation of potentially contaminated sites – Code of practice.
- CIRIA C665 (2007) Assessing risks posed by hazardous ground gases to buildings.
- CIRIA C716 Remediating and mitigating risks from volatile organic compound (VOC) vapours from land affected by contamination.
- CIRIA 735 (2014) Good practice on the testing and verification of protection systems for buildings against hazardous ground gases.

In addition, radon, a naturally occurring radioactive gas is also considered. Further information about radon is included in Notes 1. – Environmental Setting.

At preliminary stage, the assessment of potential risks associated with hazardous gas are based on a review of data obtained from the Landmark Information Group/Groundsure Limited, and the Local Authority. Reference is also made to historical OS plans, which are inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Sources

Potential sources of hazardous gas include:

- Landfill sites
- Made ground, especially where significant depths are present
- Shallow mineworkings associated with coal extraction
- Geological strata, including peat, organic silts, coal-bearing strata and limestone (reaction with acidic waters), granite (radon)
- Groundwater can sometimes act as a “carrier” for hazardous gas.
- Leakages from pipelines or storage tanks
- Sewers, septic tanks and cess pits

Generation

Wherever biodegradable material is deposited, landfill gas (principally a mixture of methane and carbon dioxide) is likely to be generated by microbial activity. Carbon dioxide is an asphyxiant and toxic; methane is

flammable and a mixture containing between 5% and 15% methane by volume in air is explosive. Landfill gas in the ground is unlikely in itself to pose a significant risk, though it may damage vegetation. However, infiltration of landfill gas into confined spaces (e.g. cellars, services, etc) may give rise to considerable risk.

There is no typical figure for the length of time that landfill gas will be evolved, but at many sites significant gas generation continues for at least 15 years after the last deposit of waste.

Migration

Gas migration from a landfill site may occur in several ways. It may migrate through adjacent strata; the distance of migration being dependent on the pressure gradients, volume of gas and permeability of the strata. Where there are faults, cavities and fissures within the strata, gas may move considerable distances. Other migration pathways for gas include man-made features such as mine shafts, roadways and underground services.

Gas migration is influenced by a number of climatic factors, such as atmospheric pressure variations, water table level variations and the influence of a covering of snow or ice over the surface of the site and surrounding area.

Gas Monitoring Procedure

IDG adopt a standard gas monitoring procedure. This procedure involves the measurement, in the following order of:

- Atmospheric temperature, pressure and ambient oxygen concentration on site immediately prior to and on completion of monitoring.
- Borehole gas emission rate.
- Methane, oxygen and carbon dioxide concentrations using an infra-red gas analyser.
- Standing water level using a dipmeter.

In addition, ground conditions at each sampling location are recorded together with prevailing weather conditions and any other observations such as any vandalism.

Where samples of gas are required for laboratory analysis, Gresham Tubes or Tedlar Bags are used. Gas concentrations in the well are typically recorded immediately before and after retrieval of a sample.

Monitoring Programme
The appropriate length of the monitoring programme is confirmed in accordance with BS8576:2013 (Figure 6).

Site Characterisation
Gas monitoring results are assessed in accordance with BS8485:2015.

Borehole gas flow rates (Q_{hg}) are calculated for each gas at borehole standpipe for each monitoring event. On completion of the monitoring programme a GSV is adopted for the site taking into account the monitoring data, conceptual model, hazardous gas source(s) and nature of pathway. Where the dataset is representative and comprehensive, the GSV should be at the maximum borehole Q_{hg} measured for all the monitoring events.

A worst case check (based on site wide highest flow rate and site wide highest gas concentration) should also be calculated for the site. The worst case Q_{hg} should be compared with the maximum borehole Q_{hg}.

Characteristic gas situation (CS) is determined using the Q_{hg} adopted for the site in accordance with BS8485:2015.

Table 1 – Characteristic Situation BS8485:2015

Characteristic Situation	GSV CH_4 or CO_2 (l/hr)	Additional limiting factors	Typical source of generation
1	<0.07	Typically <1% methane concentration and <5% carbon-dioxide concentration (otherwise consider and increase to CS2)	Natural soils with low organic content
2	<0.07 to <0.7	Typical measured flow rate <70 litre/hr)otherwise increase to Characteristic Situation 3)	Natural soil, high peat/organic content
3	0.7 to <3.5		Old landfill, inert waste, mineworking flooded.
4	3.5 to <15	Quantitative Risk Assessment required to evaluate scope of protection measures.	Mineworking – susceptible to flooding, completed landfill, inert waste (WMP 26B criteria)
5	15 to <70		Mineworking unflooded, inactive
6	>70		Recent landfill site

Notes:

Borehole flow rate = volume of gas (regardless of composition) which is escaping from well (l/hr).

Gas Screening Value (litre/hour) = gas concentration (%) / 100 x borehole flow rate (l/hr).

Gas protection measures

A minimum "Gas Protection Score" is allocated for new buildings at the site. This is based on the characteristic situation of the site and the proposed building type. Low rise residential properties are generally classed as "Type A" buildings, whilst managed residential apartments are classed as "Type B buildings".

The required gas protection measures, taking into account the proposed foundation and floor slab construction methods are selected to meet the required gas protection score. A combination of at least two of the following three types of gas protection measures are required to achieve the minimum gas protection score.

- The structural barrier of the floor slab, or of the basement slab and walls if a basement is present (Gas Protection Score 0-2.5).
- Ventilation measures (Gas Protection Score 0.5-4.0); and,
- Gas resistant membrane (Gas Protection Score 2). It is important to note that there are several requirements (including independent validation) that need to be fulfilled in order to achieve the score of 2.

Generic Notes – Materials Management Plans

Development of a site usually requires either re-use and/or importation of materials such as subsoil, topsoil, general Made Ground fill and crushed brick or concrete (6F5 or similar). Any material excavated from the ground becomes waste at the moment of excavation. If that soil (now a "waste") is then placed on another part of the development site (or used on another development site) without appropriate waste permits or exemptions being in place, this material will be "illegally deposited waste".

Changes to landfill tax rules made on 1 April 2018 have significant implications for groundworks on development sites in England and Wales. As a result of the change, HM Revenue & Customs (HMRC) can now recover landfill tax on illegally deposited waste, for which a number of parties involved in the development may be liable. Anyone who deposits the waste or knowingly causes or permits the disposal is jointly and severally liable. Officers of liable companies may also have personal liability. In addition, the developer could now have a tax liability where excavated material or other construction waste is sent off-site for disposal but which is ultimately not disposed of at an appropriately permitted site.

The Contaminated Land: Applications in Real Environments (CL:AIRE) body representing the development industry devised a methodology termed Definition of Waste Code of Practice (DoWCoP), 2011, as an alternative mechanism to complex Environmental Permits and Waste Exemptions, the latter two options typically placing strict limits upon the volumes of waste materials which may be re-used. DoWCoP is recognised by regulatory bodies (i.e. Environment Agency, Local Authorities) as an efficient process which enables the re-use of excavated materials on-site or movement of natural materials between sites by means of a Materials Management Plan (MMP).

The DoWCoP enables:

- The direct transfer and reuse of clean naturally occurring soil materials between sites
- The conditions to support the establishment/operation of fixed soil treatment facilities
- The reuse of both contaminated/uncontaminated materials on their site of origin
- The re-use of Made Ground on other sites within a defined Cluster Project.

DoWCoP can be used by individuals involved in development activities ranging from general earthworks to complex land remediation projects and is applicable to both Greenfield and Brownfield sites.

In practice, prior to any excavation of material, the developer or their Consultant(s) prepares a detailed MMP. The MMP consolidates details of the nature and origin of materials it is proposed to excavate, volumes of excavated and stockpiled and placed materials and contamination test results and risk assessments thereof, together with proposed materials movements during the development. The MMP must also reference the agreed Remediation Strategy, the relevant Planning Permission and regulatory correspondence with the Local Authority and Environment Agency indicating they have no objection to the scheme. The MMP is reviewed by a Suitably Qualified Person, who Declares to the Environment Agency that the MMP is satisfactory. An administrative fee of £40 plus a declaration fee equivalent to £10 for every 1000m^3 in excess of 5000m^3 is chargeable by CL:AIRE.

The following broadly summarises application of the CL:AIRE DoWCoP, although this summary is by no means exhaustive :

- Subject to qualification by means of an appropriate Desk Study and Site Investigation (i.e. soils description and chemical testing), natural topsoil or subsoil generated by site development which is re-used on the site of origin does not require an MMP or Declaration by a QP, although it is

good practice to prepare one (and probably of economic benefit to the developer as it provides definitive volumes of material to be excavated and moved by the groundworker).

- Natural won topsoil and subsoil surplus to requirements may be moved between sites provided an appropriate Desk Study & adequate site investigation (i.e. soils description and chemical testing) an MMP and QP Declaration is in place for the receiving site. See Table A1 Summary of Direct Transfer process – Minimum Requirements Page 28 of the CL:AIRE DoWCoP.
- Made Ground be re-used on the site of origin provided an appropriate Desk Study and Site Investigation demonstrates its suitable for re-use an agreed Remediation Strategy and Verification Plan is in place and is subject to an MMP and QP Declaration. Low volumes (i.e. 1000T) of uncontaminated Made Ground may be re-used provided a U1 Exemption is in place.
- Made Ground **may not** be moved between sites unless (subject to an agreed Remediation Strategy, Verification Plan an MMP and QP Declaration) it is moved within a Cluster project and is subject to soil treatment (e.g. bioremediation) at a hub site which possesses an appropriate Environmental Permit.
- Demolition derived material can only be moved if an appropriate waste permit is in place or the material meets WRAP protocol (i.e. site won 6F2 demolition material which has been crushed in accordance with an Environmental Permit) and meets chemical and geotechnical acceptance criteria (i.e. no asbestos fibres and suitable gradings).

Further detail concerning the CL:AIRE DoWCoP can be found at https://www.claire.co.uk/projects-and-initiatives/dow-cop

Recycled aggregates (i.e. 6F2 derived from crushed concrete) may be produced under the Waste & Resources Action Programme (WRAP) protocol. WRAP sets out steps that must be taken for waste to become a non-waste product or material that can be re-used in industry or supplied to other markets without waste regulation controls.

Further detail concerning WARP can be found at http://www.wrap.org.uk/content/quality-protocols

Please contact IDG if you have any questions in respect of the above.