

Davies Homes

**DRAINAGE CHANNEL, DRAGON PARC,
MERTHYR TYDFIL**

Geoenvironmental Site Investigation Report

12888/JJ/21/GSI

CLIENT: Davies Homes

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Geotechnical Engineers:

Intégral Géotechnique (Wales) Limited
Integral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX

Tel: 029 2080 7991

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1.0 INTRODUCTION

1.1 GENERAL

Davies Homes are proposing to undertake flood alleviation engineering works at their site at 'Dragon Parc', Merthyr Tydfil. The location of the site is shown in Figure 1. A general arrangement plan showing the proposed works is presented in Figure 2.

The proposed works include the construction of a drainage channel/swale, the raising of site levels, and the construction of a new access road. The area of the proposed flood alleviation engineering works (herein referred to as 'the site') forms part of a larger proposed redevelopment area that has been acquired by Davies Homes for future residential development.

A previous desk study covering the site (and the wider proposed redevelopment area) has been undertaken by Intégral Géotechnique (Wales) Limited. Reference should be made to Desk Study Report No. 11708/LW/16/DS, dated February 2016. Previous intrusive site investigation works have also undertaken across the site (and the wider proposed redevelopment area) by Intégral Géotechnique (Wales) Limited. Reference should be made to Site Investigation Report No. 12392/LW/19/SI Rev A, dated September 2021, and Coal Mining Risk Assessment Report No. 12888/LW/21/CMRA/RevA, dated November 2021.

Following the completion of site clearance works and the removal of several former fuel tanks, Intégral Géotechnique (Wales) Limited were instructed to return to site to undertake additional soil sampling to enable an updated geoenvironmental appraisal of the site and aid the discharge of planning conditions 10 and 11 of planning consent reference: P/20/0025.

The planning application area, which this supplemental report looks to address, is shown in Figure 3.

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1.2 PROPOSED DEVELOPMENT

The proposed flood alleviation engineering works include the construction of a drainage channel/swale, the raising of site levels, and the construction of a new access road.

The proposed drainage channel/swale will be shallow dishd feature to be constructed along the western and southern boundaries of the site and will be in the order of 6m wide. The outfall will be located within the south-eastern area of the site, with discharge into the River Taff. A new site access road will also be constructed over the drainage channel to enter the site from the southeast and link into the existing public highway.

An extract of the General Arrangement Plan is presented in Figure 2.

1.3 SCOPE OF WORKS

The previous desk study and site investigation reports (as detailed above in Section 1.1) were used to make an initial assessment of the site and to design a supplemental geoenvironmental site investigation to be carried out by Intégral Géotechnique (Wales) Limited. The supplemental geoenvironmental site investigation was designed in accordance with BS 5930:2015+A1:2020, the Code of Practice for Site Investigations, BS10175:2011+A2:2017, The Code of Practice for Investigation of Potentially Contaminated Sites, and 'Development of Land Affected by Contamination: A Guide for Developers' prepared by Welsh Local Government Association (WLGA)/Natural Resources Wales (NRW) Land Contamination Working Group, 2017.

The supplemental works comprised:

- A review of the previous desk study and site investigation, and reassessment of relevant previous soil contamination data, to reflect to the proposed end use associated with planning consent ref: P/20/0025.
- The excavation of 10 No. supplemental trial pits and additional soil sampling for laboratory chemical testing (including soil leachate analysis)
- The inspection and sampling of the reduced formation in the area of former fuel tank removal.

1.4 LIMITATIONS

This document is intended to be a working document for further development in discussion with all concerned including the Local Planning Authority, Natural Resources Wales, and the NHBC as appropriate.

1.4 LIMITATIONS (CONTINUED)

“Contamination” is taken throughout the report to mean the “presence of one or more potentially harmful substances as a result of human activity”. The use of the term in this way does not imply that harm is being or might be caused by the contamination. It should be noted that “contamination” can have different meanings under different regulatory regimes, for example, planning, building control and Part IIA of the Environmental Protection Act 1990. Naturally elevated concentrations of potentially harmful substances may also be of concern and the significance of any that have been found is also evaluated in this report.

It is important to recognise that there may be areas of contamination that have not been found, or that contaminants are present at concentrations above those that have been found. It is also important to recognise that contamination may be localised and that no investigation, however comprehensive, is capable of finding such occurrences other than by chance.

It should also be noted that vertical and lateral changes in ground conditions may be present between exploratory hole locations.

The findings and recommendations detailed in the report apply to the planning application associated with the proposed flood alleviation engineering works only.

2.0 THE SITE

2.1 SITE LOCATION AND DESCRIPTION

The site is located in Abercanaid, Merthyr Tydfil, at a National Grid Reference of 305378, 204204, see Figure 1.

The site forms the western and southern parts of the larger proposed 'Dragon Parc' redevelopment area as indicated in Figure 3.

The site is roughly 'L shaped' and occupies an area of approximately 3.0 hectares.

The boundaries of the site are defined by the Dragon Parc development site and the River Taff to the east, existing commercial developments to the north, existing commercial developments, undeveloped land and an existing road to the west and an existing road to the south.

The site is situated within a former floodplain of the River Taff.

The site has been cleared in preparation for reclamation and redevelopment. A large excavation is present in the western area of the site, in the area of former fuel tank removal.

2.2 SITE OPERATIONS

The site has no current site operations. The site has been cleared in preparation for reclamation and redevelopment.

2.3 SURROUNDING LAND USE

The site lies in an area of mixed residential and commercial use. The River Taff is situated to the east of the site.

2.4 AVAILABLE DESK STUDY AND SITE INVESTIGATION DATA

The following previous reports covering the site and the larger surrounding 'Dragon Parc' redevelopment area have been made available for review:

- Intégral Géotechnique (Wales) Limited, Desk Study Report, Ardagh Metal Packaging, Abercanaid, Merthyr Tydfil (Reference: 11708/LW/16/DS, dated February 2016)
- Intégral Géotechnique (Wales) Limited, Site Investigation Report, Dragon Parc, Abercanaid, Merthyr Tydfil (Reference: 12392/LW/19/SI Rev A, dated September 2019)
- Intégral Géotechnique (Wales) Limited, Coal Mining Risk Assessment, Drainage Channel, Dragon Parc, Merthyr Tydfil (Reference: 12888/LW/21/CMRA/RevA, dated November 2021)

Following a review of the above previous reports it is advised that the following previous exploratory works have been undertaken across the site (as indicated in Figure 3):

- 3 No. trial pits (referenced TP01, TP07 and TP11)
- 1 No. exploratory bulk excavation (carried out to investigate the potential presence of an old mine adit)
- 27 No. rotary probeholes (referenced PH1, PH4, PH5, PH7, PH10, PH103, PH104, PH109, PH113 to PH116, PH119, PH122, PH125 to PH132, PH134, PH136 to PH138)

The previous trial pit logs are presented in Appendix A. The previous rotary probehole logs are presented in Appendix B.

3.0 PRELIMINARY CONCEPTUAL SITE MODEL

3.1 RISK ASSESSMENT FRAMEWORK

In order to be consistent with current UK government policies and legislation, it is necessary to identify, assess, estimate, evaluate, and take appropriate action to deal with land contamination, in accordance with the procedures specified in the Environment Agency guidance Land Contamination Risk Management (LCRM) published in October 2020. This replaces the now withdrawn 'Model Procedures for the Management of Land Contamination CLR-11' (Environment Agency 2004).

The risk assessment process is designed to provide a reasoned, structured, and pragmatic mechanism for the identification of any potential human health and controlled waters risks associated with land contamination and where necessary to develop a robust remediation strategy to ensure protection of the sensitive receptors (human health of future residents, controlled waters, etc).

In accordance with LCRM, the term 'land contamination' is defined as:

- All land affected by contamination – land that might have contamination present which may, or may or may not, meet the statutory definition of contaminated land,
- Land determined as contaminated land under Part 2A of the Environmental Protection Act 1990.

LCRM provides a tiered approach to risk assessment, comprising a preliminary risk assessment (including the development of an initial conceptual site model), a generic quantitative risk assessment and a detailed quantitative risk assessment. For each tier of risk assessment, the following steps must be followed:

1. Identify the hazard - establish contaminant sources,
2. Assess the hazard – use a source-pathway-receptor linkage approach to determine if there is potential for unacceptable risk,
3. Estimate the risk – predict what degree of harm or pollution may result and how likely it is to occur, and
4. Evaluate the risk – decide whether a risk is unacceptable.

LCRM also provides definitions of the following terms:

- Hazard – a property or situation that circumstances could lead to harm or pollution,

3.1 RISK ASSESSMENT FRAMEWORK (CONTINUED)

- Risk – a combination of the probability, or frequency of occurrence of a defined hazard and the magnitude of the consequences of the occurrence,
- Risk assessment – the formal process of identifying, assessing, and evaluating the health and environmental risks that may be associated with a hazard,
- Risk management – the formal process to identify, assess and determine the risks, and to select and take action to mitigate them.

The three essential elements to any risk are defined by LCRM as follows:

- A contaminant, or pollutant, that is in, on, or under the land and that has the potential to cause harm, or pollution (Source)
- A route by which a receptor is, or could be affected by a contaminant (Pathway)
- A receptor, i.e., something that could be adversely affected by a contaminant, for example a person, controlled waters, an organism, an ecosystem, or Part 2A receptors such as buildings, crops, or animals (Receptor).

For there to be a potential risk, all three of the above elements must be present. If there is a source of contamination and a receptor (for example a resident or site user), then there is only a potential risk if there is a pathway linking the two. Such an active pathway is known as a relevant pollutant linkage. It is possible for the same contaminant to be linked to a receptor via several pathways, and hence it is important that all relevant pollutant linkages, to both human health and controlled waters, are separately identified on a site in order that a comprehensive conceptual model can be formed and ultimately a robust remediation strategy designed.

Current practice during Generic Quantitative Risk Assessment of land affected by contamination is to use generic soil screening values based on the appropriate proposed end use. These usually comprise risk-based Soil Guideline values (SGVs) or Generic Assessment Criteria (GACs) derived by the Environment Agency's Contaminated Land Exposure Assessment Model (CLEA). The SGVs and the supporting technical guidance were developed in order to assist in the assessment of long-term risk to human health from the exposure to contaminated soils.

Revised Statutory Guidance, published in 2012, to support Part 2A of the Environmental Protection Act 1990, introduced a new four category system for classifying land under Part 2A. Category 1 includes land where the level of risk is clearly unacceptable, and Category 4 includes land where the level of risk posed is considered to be acceptably low. Under Part 2A, land would be determined as contaminated if it falls within Categories 1 or 2.

3.1 RISK ASSESSMENT FRAMEWORK (CONTINUED)

The revised Part 2A Statutory Guidance was accompanied by an Impact Assessment that identified a role for new 'Category 4 Screening Levels' (C4SLs) that would provide a simple test for determining when land is suitable for use and definitely not contaminated land. A Policy Companion Document including the C4SLs was published in March 2014 (England) and May 2014 (Wales).

The C4SLs have been based on the CLEA methodology and derived using the CLEA model, with modified toxicological and exposure parameters. To date, C4SLs have been released for six substances (arsenic, cadmium, chromium (VI), lead, benzo(a)pyrene and benzene).

The C4SLs have been derived on the assumption that where they exist, they will be used as generic screening criteria within generic quantitative risk assessment.

Following publication of the C4SLs, Land Quality Management (LQM), in conjunction with the Chartered Institute for Environmental Health (CIEH) released Suitable 4 Use Levels (S4ULs) in January 2015.

The S4ULs have been derived in accordance with UK legislation and using a modified version of the Environment Agency's CLEA software. As such, the S4ULs are based on the concept of minimal or tolerable risk as described in Human Health Toxicological Assessment of Contaminants in Soil (Science Report SR2, Environment Agency 2009a).

S4ULs have been derived for a wider number of substances.

In addition to the existing SGVs, C4SLs and S4ULs, Atkins ATRISK^{soil} also provide a set of Soil Screening Values. These are currently intended to be used in conjunction with SGVs, although they intend to update these values in line with the C4SLs in due course.

We have reviewed all sets of values and intend to use the most appropriate assessment criteria as Tier 1 screening values in the first instance. Where a published S4UL is available, and considered appropriate, this will be used in the first instance.

3.2 CONCEPTUAL MODEL FRAMEWORK

The preliminary stage of the risk assessment process is to develop and define a conceptual site model, based on the desk study and any existing site investigation data. This is used to establish any potential contaminant sources, identify existing and future receptors, and assess if there are any potentially active pathways by which a potential risk may be present.

The preliminary conceptual site model will be developed and refined as site specific data is gathered, such as actual ground conditions and chemical data, resulting in a more robust conceptual understanding of the site.

3.3 CRITICAL SENSITIVE RECEPTOR – HUMAN HEALTH

The proposed redevelopment comprises the construction of a flood alleviation drainage channel/swale, the raising of site levels, and the construction of a new access road. Since the proposed end use is a non-standard land use in terms of CLEA guidance, we have adopted a 'Public Open Space (Parks)' end use for risk assessment purposes.

In accordance with S4UL and CLEA guidance for a 'Public Open Space (Parks)' scenario, the critical sensitive receptor is a female child, with exposure from 0 to 6 years.

The standard Public Open Space (Parks) end use conceptual model defined by S4UL and CLEA is assumed to be suitable for the purposes of this assessment.

3.4 CRITICAL SENSITIVE RECEPTOR – CONTROLLED WATERS

Based on the proposed redevelopment, and the findings of the desk study, the critical sensitive receptor from a controlled water perspective is groundwater within the superficial and bedrock aquifers underlying the site.

By considering groundwater as the critical sensitive receptor for controlled waters, the groundwater/hydrogeological risk assessment will also be protective of nearby surface water features, including the River Taff.

3.5 POTENTIAL CONTAMINANT SOURCES

As identified in the desk study, the extensive historical land uses at the site since the 1800's has resulted in a list of potentially contaminative uses that include the stockpiling of colliery waste and later a factory for printing, metal packaging and production of cargo restraints.

The potential types of contaminants of concern are listed below:

- Metals, semi-metals, and inorganics within the shallow made ground
- Polyaromatic hydrocarbons (PAH) within the shallow made ground
- Polychlorinated biphenyl (PCB) within shallow made ground
- Petroleum Hydrocarbons (VPH/EPH), Volatile Organic Compounds (VOCs) and Semi Volatile Organic Compounds (SVOCs) within the shallow made ground and possible underground storage tanks
- Asbestos within the shallow made ground.

3.6 POTENTIAL EXPOSURE PATHWAYS

Potential exposure pathways for the critical receptors (both human health and controlled waters) are listed below:

- Dermal contact with soil and/or dust (outdoor)
- Ingestion of soil and dust
- Inhalation of dust (outdoor)
- Inhalation of vapours (outdoor)
- Leaching of contaminants from made ground to groundwater
- Transportation of contaminants within groundwater.

In addition, the following exposure pathways have also been considered:

- Ground gas generation and migration
- Building materials durability.

3.7 SUMMARY OF CONCEPTUAL EXPOSURE MODEL

A preliminary conceptual exposure model has been developed for the site. This is based on the findings of the desk study, historical review and site walk over and includes all potential sources, pathways and receptors that may be present on site. Those that have been identified as being potentially active require further investigation in the form of sampling and testing of soils and groundwater, followed by appropriate risk assessment.

The preliminary conceptual exposure model will be reviewed and refined following the completion of the site works and laboratory testing.

The preliminary conceptual exposure model is presented below in Table 1.

Table 1: Preliminary Conceptual Exposure Model				
Source		Receptor	Pathway	Potentially Active Pathway?
Origin	Contaminant			
Made Ground of unknown origin and historical land uses	Metals, semi-metals, non-metals, PAH, petroleum hydrocarbons, PCBs, VOCs/SVOCs, asbestos	POS end user – human health	Dermal Contact	✓
			Ingestion of soil and/or dust	✓
			Inhalation of dust - outdoor	✓
			Inhalation of vapours – outdoor	✓
	Metals, semi-metals, non-metals, PAH, petroleum hydrocarbons, PCBs, VOCs/SVOCs	Groundwater quality	Leaching from made ground	✓
		Surface water quality	Transportation within groundwater	✓
Above ground and in ground storage tanks	Petroleum hydrocarbons	Resident – human health	Inhalation of Vapours – indoor/outdoor	✓
		Groundwater quality	Localised spillage	✓
		Surface water quality	Transportation within groundwater	✓
Made Ground of unknown origin and natural ground	pH and water-soluble sulphate	Building Materials Durability	Direct contact Confined spaced not proposed	✓
Ground Gas – organic, gas producing materials present within site or adjacent to the site	Methane, carbon dioxide	Human health	Accumulation of gases in confined spaces, and/or migration off site, leading to asphyxiation, or risk of explosion	X Confined / indoor spaces not proposed.

4.0 THE SITE INVESTIGATION

4.1 SUPPLEMENTAL FIELDWORKS

An intrusive site investigation was designed in accordance with BS 5930:2015+A1:2020, the Code of Practice for Site Investigations, BS10175:2011+A2:2017, the Code of Practice for Investigation of Potentially Contaminated Sites, and 'Development of Land Affected by Contamination: A Guide for Developers' prepared by Welsh Local Government Association (WLGA)/Natural Resources Wales (NRW) Land Contamination Working Group, 2017.

The site investigation was also designed to provide information to support and refine the preliminary conceptual site model/conceptual exposure model (as presented in Desk Study Report Ref: 11708/LW/16/DS).

An intrusive site investigation comprising the excavation of 10 No. supplemental trial pits, was carried out during November 2021.

The trial pits (referenced S1 to S10) were positioned across the site and excavated to depths ranging between approximately 1.0m and 3.0m below existing ground level (bgl) using a 20-tonne tracked excavator.

Representative soil samples were taken from the trial pits for laboratory chemical testing and placed in the appropriate sample containers deemed suitable for the analysis required. Strict protocols were adopted during this process to limit the cross contamination of samples.

In addition to the trial pitting, several soil samples were also taken from the base and sides of a large bulk excavation in order to verify the satisfactory removal of several former fuel tanks in the western area of the site.

The fieldworks were supervised by a qualified Geotechnical Engineer from Intégral Géotechnique (Wales) Limited who also logged the trial pits and prepared their detailed engineering logs in accordance with the requirements of BS 5930:2015+A1:2020. The engineering logs provide descriptions of the materials encountered in accordance with BSEN ISO 14688-1 (2002) and 14689-1 (2003) for soils and rocks respectively.

The approximate locations of the trial pits / soil sampling positions are shown in Figure 3. The supplemental trial pit logs are presented in Appendix A. Photographs of the tank validation excavation are presented in Appendix C.

4.2 FIELD OBSERVATIONS

No visual or olfactory evidence of any contamination was observed during the site works.

4.3 LABORATORY CHEMICAL TESTING

Representative soil samples were taken from the supplemental trial pits, stored at the appropriate temperature, and dispatched to the UKAS and MCERTS accredited laboratories of i2 Analytical for laboratory chemical testing within 24 hours.

The samples were tested for a range of contaminants that reflects the historical use of the site, the findings of the desk study and the preliminary conceptual site model/conceptual exposure model. A list of the soil testing carried out is given below:

Beryllium	Cadmium
Total Chromium	Hexavalent Chromium (VI)
Copper	Lead
Mercury	Nickel
Vanadium	Zinc
Arsenic	Boron
Selenium	Elemental Sulphur
Total Cyanide	Total Sulphate
Sulphide	Water Soluble Sulphate
pH	Monohydric Phenol
Petroleum Hydrocarbons	PCBs
VOCs	Asbestos

Additionally, a number of validation soil samples were also taken from the base and sides of a bulk excavation in the area of former fuel tank removal (and from a stockpile of excavated soil arisings). These samples were also tested for petroleum hydrocarbons.

The potential for leachate generation and migration to groundwater was identified as being active in the preliminary conceptual site model. In accordance with the recommendations detailed in our previous Site Investigation Report No. 12392/LW/19/SI Rev A, dated September 2021, a number of samples of the made ground were also tested for their leachability characteristics for a similar suite of contaminants as the soils.

The results of all the soil testing are presented in Appendix D. The results of the soil leachate testing are presented in Appendix E.

5.0 GROUND CONDITIONS

A summary of the ground conditions encountered during the supplemental trial pitting (and during the previous SI works) is presented below in Table 2.

Table 2: Summary of Ground Conditions		
Depth (m)		Stratum
From	To	
0.00	1.50/5.60	MADE GROUND: (Loose) or (loose to medium dense) grey and black silty sandy fine to coarse GRAVEL of angular mudstone, siltstone, and coal. With occasional ash, slag, metal, and concrete [colliery spoil].
1.50/5.60	10.00/20.70	SUPERFICIAL SOILS: Soft to firm orange, brown silty slightly sandy CLAY.
10.00/20.70	>30.00	BEDROCK: Mudstone and sandstone, with occasional bands of coal.

5.1 MADE GROUND

The site is underlain by a layer of made ground typically comprising granular colliery spoil. This material typically consists of loose grey and black silty sandy fine to coarse gravel of angular mudstone, siltstone, and coal, with occasional ash, slag, metal, concrete etc. The thickness of the made ground / colliery spoil is variable, ranging between approximately 1.5m and 5.6m.

It is noted that an anomalous thickness of made ground / colliery spoil (up to 11.5m) was previously recorded in rotary probehole PH4. In order to further investigate this anomaly, trial pit S6 was excavated in the immediate vicinity during the recently completed supplemental site investigation works. Within the trial pit, the base of the made ground / colliery spoil was recorded at a depth of approximately 3.5m bgl. It is considered that the 11.5m thickness recorded in PH4 is erroneous (resulting from difficulties in distinguishing made ground and superficial soils during rotary open hole drilling).

A bulk excavation was undertaken in the area of former fuel tank removal (see photographs presented in Appendix C). The excavation was taken to a depth of approximately 4.0m bgl and terminated in the made ground / colliery spoil throughout. No visual or olfactory evidence of potential petroleum hydrocarbon contamination was encountered.

5.2 SUPERFICIAL DEPOSITS

The made ground / colliery spoil is underlain by natural superficial deposits comprising soft to firm orange, brown silty slightly sandy clay.

The base of the superficial deposits was proven at depths of between approximately 7.1m and 17.8m bgl in the rotary probeholes.

5.3 BEDROCK

The rotary probeholes were principally drilled on site to profile the depth to rockhead and identify the presence and nature of any shallow coal seams and any old mine workings.

The probeholes encountered bedrock at depths ranging between approximately 10.0m bgl and 20.7m bgl. The encountered bedrock strata typically comprised a combination of mudstone, sandstone, with occasional bands of coal.

Evidence of old mine working was encountered in PH4, PH122, PH125, and PH134. A detailed discussion on the encountered mine workings is presented in the previous CMRA prepared for the site (Reference: 12888/LW/21/CMRA/RevA, dated November 2021).

5.4 GROUNDWATER

During the excavation of the trial pits, groundwater was only encountered at TP07 (recorded as a seepage of perched groundwater at a depth of approximately 1.0m bgl).

During drilling of the rotary probeholes, groundwater strikes were encountered within the superficial soils at depths of between approximately 12m bgl and 16m bgl.

The groundwater conditions are based on observations made at the time of the fieldwork. It should be noted that groundwater levels may vary due to seasonal and other effects.

6.0 CONTAMINATION

6.1 AVERAGING AREAS

To assess the laboratory test results reliably and in context, the data have been grouped into an averaging area. An averaging area (or area of interest) is that area of soil to which a receptor is exposed, or which otherwise contributes to the creation of hazardous conditions. This may be an area of historical industrial usage, a soil type, or a specific proposed end use.

In the case of this analysis, a site wide averaging area has been determined based on the site wide presence of made ground.

6.2 SOIL CONTAMINATION

The Suitable 4 Use Levels (S4ULs) published by LQM have been adopted as critical concentrations against which soil contaminant concentrations can be compared. In the absence of additional published S4ULs, the Category 4 Screening Levels (C4SLs) derived by DEFRA and Soil Screening Values (SSVs) derived by Atkins ATRISKsoil have been considered. The proposed redevelopment comprises a flood alleviation channel. Since the proposed end use is a non-standard land use in terms of CLEA guidance, we have adopted a 'Public Open Space (Parks)' end use for risk assessment purposes in the first instance.

A total of 21 No. samples of made ground have tested for contamination. The tested samples comprise 18 No. samples obtained during the supplemental 2021 works, and 3 No. samples obtained during the previous 2019 investigation works).

The soil test results have been compared to the respective guidelines, where applicable, for 1% soil organic matter (SOM) content, this being the most conservative.

The made ground soil results been summarised and are shown in Appendix F.

The results indicate that all the analysed chemical elements and compounds are present at concentrations below the appropriate thresholds for the adopted 'Public Open Space (Parks)' end use scenario.

All PCB and VOC concentrations were recorded below laboratory detection limits.

Asbestos was not detected in any of the tested soil samples.

6.3 SOIL LEACHATE

A total of 5 No. samples of the made ground were tested for their leachable concentrations for a similar suite of contaminants as the soils. The tested samples were obtained from S1, S3, S5, S7, and S9.

As part of a 'Tier 1' screening exercise, the results of the leachate analyses have been compared against the Annual Average Environmental Quality Standards (AA-EQS) for freshwaters in the first instance. Where no AA-EQS values are available, the results have been compared against the available Maximum Allowable Concentration Environmental Quality Standards (MAC-EQS). Where no EQS values are available, the results have been compared against UK and WHO drinking water standards, in hierarchical order.

A summary of the results and comparison against the screening criteria are presented in Appendix G.

All the results were below the laboratory detection limits, or the relevant published guidelines, with the exception of cadmium. A summary of the exceedances recorded within the soil leachate samples is provided below.

- Cadmium was recorded above the adopted AA-EQS (0.15ug/l) in three samples from S1, S7 and S9. The exceeding concentrations were 0.26ug/l, 0.31ug/l, and 0.22ug/l respectively. It should be noted that all concentrations are significantly below the published MAC-EQS of 0.90ug/l, and the UKDWS of 5 ug/l.

No further exceedances were recorded within the analysed soil leachate samples.

7.0 REVISED CONCEPTUAL EXPOSURE MODEL

The preliminary conceptual exposure model has been reviewed and revised to reflect the findings of the site investigation and the results of the laboratory testing of soils and soil leachate. Pathways identified as a relevant pollutant linkage require appropriate risk assessment or mitigation measures (see Section 8).

Table 3: Revised Conceptual Exposure Model						
Source		Receptor	Pathway	Preliminary Active Pathway?	Relevant Pollutant Linkage	Justification/ Mitigation
Origin	Contaminant					
Made Ground of unknown origin and historical land uses	Metals, semi-metals, non-metals, PAH, petroleum hydrocarbons, PCBs, VOCs/SVOCs, asbestos	POS end user – human health	Dermal Contact	✓	X	No elevated soil contaminant concentrations identified.
			Ingestion of soil and/or dust	✓	X	
			Inhalation of dust - outdoor	✓	X	
			Inhalation of vapours – outdoor	✓	X	
	Metals, semi-metals, non-metals, PAH, petroleum hydrocarbons, PCBs, VOCs/SVOCs	Groundwater quality	Leaching from made ground	✓	X	No significantly elevated soil leachate contaminant concentrations identified.
		Surface water quality	Transportation within groundwater	✓	X	
Above ground and in ground storage tanks	Petroleum hydrocarbons	Resident – human health	Inhalation of Vapours – indoor/outdoor	✓	X	Former tanks removed. Validation sampling and testing has not identified elevated contaminant concentrations.
		Groundwater quality	Localised spillage	✓	X	
		Surface water quality	Transportation within groundwater	✓	X	
Made Ground of unknown origin and natural ground	pH and water-soluble sulphate	Building Materials Durability	Direct contact	✓	✓	Building materials will be in contact with made ground
Ground Gas – organic, gas producing materials present within site or adjacent to the site	Methane, carbon dioxide	Human health	Accumulation of gases in confined spaces, and/or migration off site, leading to asphyxiation, or risk of explosion	X	X	Confined spaced not proposed.

8.0 RISK ASSESSMENT

8.1 METHODOLOGY

The risk of pollution, health effects or environmental harm occurring as a result of ground contamination is dependent upon three principal factors:

- The scale of the contamination sources
- The presence of sensitive “receptors”, e.g., Humans: health of the general public, site occupiers, redevelopment workers. Environment: flora, fauna, etc
- The existence of migration pathways by which contaminants can reach the sensitive receptors.

This section assesses each of these factors in order to evaluate the overall level of risk and potential harm to receptors. The receptor may be human, a water resource, an eco-system or construction materials. Pathways connecting a perceived hazard to a receptor are referred to as exposure pathways.

The sources of contamination and the links connecting the hazards to the sensitive receptors will represent the basis for the risk assessment.

8.2 SOURCE-PATHWAY-RECEPTOR MODEL

The preliminary conceptual site model was based on the findings of the desk study. This was later reviewed and refined according to the findings of the site investigation, allowing for the ground conditions encountered and the results of laboratory testing of soil and soil leachate. Any pathways considered to be inactive were removed from the model and all remaining potentially active pathways require risk assessment.

The pathways shown as potentially active in the Revised Conceptual Site Model in Section 7.0 above have been assessed below.

8.3 HUMAN HEALTH RISK ASSESSMENT

8.3.1 *Site in its Present Condition*

The site does not pose any contamination risks to casual visitors or trespassers.

8.3 HUMAN HEALTH RISK ASSESSMENT (CONTINUED)

8.3.2 Future Site Users

The results of the contamination testing have not recorded any elevated contaminant concentrations above the assessment criteria for a proposed 'Public Open Space (Parks)' end use.

Based on the results of the contamination testing and visual observations made during the intrusive site investigation, the risk to future site end users from site sourced contamination is considered to be negligible.

No contamination remedial measures are considered necessary.

8.3.3 Construction Workers

Appropriate health and safety measures are recommended for construction works involving the in-situ soils beneath the site.

Normal good hygiene practices should be adequate to protect the health and safety of redevelopment workers, and should include:

- Minimum handling of materials.
- Washing of hands prior to all meal breaks, which should be taken in a designated clean area.
- The use of standard protective clothing such as boots and overalls and gloves, where considered relevant.

In dry weather, inhalation of dust and gases should be avoided preferably by the use of dust suppression techniques to minimise fugitive emissions and minimisation of exposed materials at any particular time.

All excavations should be regularly checked for safe atmospheres.

Additionally, a system should be established by which any 'unusual' materials / suspected contamination (including any suspected asbestos containing materials) that may be encountered are reported rapidly to the site management, so that the appropriate action may be taken, following specialist advice if necessary. An unusual material / suspected contamination may be identified on site by colour, odour, or physical nature.

8.3 HUMAN HEALTH RISK ASSESSMENT (CONTINUED)

Reference should be made to the Health and Safety Executive document “Protection of Workers and the General Public during the development of contaminated land” for detailed guidance on these matters.

8.4 RISKS TO VEGETATION

The concentrations of phytotoxic elements in the tested soil samples, do not indicate the potential for adverse effects to vegetation. Accordingly, no specific protective measures are considered necessary with respect to the protection of vegetation.

8.5 GROUNDWATER RISK ASSESSMENT

The results of the laboratory chemical testing of soil and soil leachate have not identified any significantly elevated contaminant concentrations. Additionally, no visual or olfactory evidence of contamination was observed during the intrusive site investigation works.

Considering the results of the intrusive site investigation and the chemically benign nature of the made ground, the potential risk to controlled waters from site sourced contamination is considered to be low. Accordingly, no specific remedial mitigation measures are considered necessary with respect to the protection of controlled waters from site sourced contamination.

8.6 CONCRETE CLASSIFICATION

In accordance with BRE Digest SD1:2005 and adopting the assessment procedure specified therein for brownfield sites, the laboratory chemical test results indicate a characteristic value (taking the mean of the highest two test results) for water soluble sulphate within the made ground of 1,800mg/l.

Using Table C2 of BRE Digest SD1:2005, this characteristic value corresponds to Design Sulphate Class DS-3.

The groundwater regime of the site has been assessed as ‘mobile’ and a characteristic pH value within the made ground of 7.7 has been determined (adopting the lowest of the test results). The Design Sulphate Class has been modified to give a site ACEC class of AC-3 for concrete structures constructed within the made ground.

8.7 WASTE DISPOSAL

Excavated materials generated by the development may be considered as waste and subject to waste controls. Any re-use of excavated materials on-site should be undertaken in accordance with current waste and environmental legislation and which may require the production of an approved Materials Management Plan (MMP) prepared in accordance with the CL:AIRE Code of Practice.

It is recommended that a sustainable development strategy is adopted which reduces to a practicable minimum the generation of waste materials and the need for disposal to a licensed tip. Emphasis should be on recovery and re-use rather than disposal.

However, any waste or surplus materials that are generated will need to be classified in accordance with current EC regulations and Environment Agency guidance prior to disposal. It is the responsibility of the waste producer to classify the waste.

Based on the data obtained from the site investigation works, any waste materials comprising of the existing made ground are likely to be classified as non-hazardous/hazardous waste. The existing natural ground are likely to be classified as non-hazardous.

Any asbestos containing materials (ACMs) will be classified as hazardous waste.

This classification is provisional, and indicative of the likely waste classification based on the data obtained to date (including chemical composition, moisture content, etc.). It also assumes that the materials tested will be representative of future generated waste.

In order to minimise disposal, the materials generated should be segregated and examined, with appropriate testing as necessary, to enable the materials to be sorted or treated into lower classifications, with the resultant benefit of potentially generating re-use rather than disposal.

Once final waste sources and volumes are known, the waste stockpile to be disposed off-site will need to be classified in accordance with Environment Agency/Natural Resources Wales Waste Classification – Guidance on the Classification and Assessment of Waste Technical Guidance WM3 (2015). This is likely to require additional sampling and testing of the generated waste materials to provide an up-to-date current basis for classification.

Depending on the waste classification, waste acceptance criteria (WAC) testing may be required, in order to determine which class of landfill site the waste can be sent to.

8.7 WASTE DISPOSAL (CONTINUED)

It is recommended that the results of the waste classification and any WAC test results are sent to the intended licensed waste operator prior to disposal in order to confirm their classification and acceptance.

8.8 UNCERTAINTIES

It is important to recognise that there may be areas of contamination within the site that have not been found or that contaminants may be present at concentrations above those that have been found. It is also important to recognise that contamination may be localised and that no investigation, however comprehensive, is capable of finding such occurrences, other than by chance.

APPENDIX A

TRIAL PIT LOGS (IG 2019 AND 2021)

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc			Project No.: 12392		Trial Pit No.: TP01 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Huntley Wood Investments			Logged By: LW		Scale 1:25	
Equipment: JCB 3CX			Coordinates: 305357.00mE - 204408.00mN			Dimensions 2.80m			
Date Excavated: 27/03/2019			Level: 160.00mAOD			Depth : 1.50m			
Samples & In-situ Testing			Depth (m)		Level (m AOD)		Legend		
Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description			
1.50	ES		1.50	158.50		Made Ground: Vegetation onto loose grey black sandy silty gravel. Gravel is fine to coarse angular of colliery spoil, ash, siltstone, mudstone, concrete with metal sheeting and fragments. Siltstone cobbles and rare boulders. Rare concrete boulder.			
						End of Trialpit at 1.50 m			
Remarks: 1. Trial pit terminated at 1.5m due to water inflow. 2. Trial pit undertaken in boggy/saturated ground.									
Groundwater: Quick inflow of water from ground level						Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
Stability: Relatively stable									

 Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc			Project No.: 12392		Trial Pit No.: TP07 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Huntley Wood Investments			Logged By: LW		Scale 1:25	
Equipment: JCB 3CX			Coordinates: 305403.00mE - 204316.00mN			Dimensions 3.50m			
Date Excavated: 27/03/2019			Level: 154.00mAOD			Depth : 3.70m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.40	ES		0.30	153.70		Made Ground: Crushed concrete/sub base			
						Made Ground: Loose to medium dense grey black clayey, locally very clayey sandy gravel. Gravel is fine to coarse angular to subangular of colliery spoil, ash, clinker, coal fragments, siltstone, mudstone, brick, some concrete and fragments of ceramics, timber and metals. Rare buried tree remains. Cobbles and some boulders of brick, concrete and siltstone. ... frequent iron stained siltstone with cobbles below 2.3m. ... some coal fragments below 2.5m. ... frequent tabular cobbles of mudstone and siltstone below 2.8m. ... slow progress throughout.			
			3.70	150.30		End of Trialpit at 3.70 m			
Remarks: 1. Trial pit terminated at 3.7m at maximum reach of excavator			Groundwater: Seepage at 1.0m.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: Spalling due cobbles and boulders removal.						

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc			Project No.: 12392		Trial Pit No.: TP11 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Huntley Wood Investments			Logged By: LW		Scale 1:25	
Equipment: JCB 3CX			Coordinates: 305433.00mE - 204224.00mN			Dimensions 3.50m			
Date Excavated: 28/03/2019			Level: 155.00mAOD			Depth : 3.50m 0.80m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.50	ES					Made Ground: Loose, loose to medium dense black locally grey black clayey, locally very clayey silty sandy gravel. Gravel is fine to coarse angular to subangular of colliery spoil, ash, clinker, mudstone, siltstone, coal fragments, rare slag material and fragments of metal and plastic. Frequent cobbles and some boulders of siltstone and mudstone. Rare concrete cobbles. ... Foundation in pit side at 0.5m to 1.0m. ... band of slag material between 2.7m and 2.9m.			
			3.50	151.50		End of Trialpit at 3.50 m			
Remarks: 1. Trial pit terminated at 3.5m bgl.			Groundwater: Groundwater not encountered Stability: Relatively stable			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc, Abercanaid			Project No.: 12888		Trial Pit No.: S1 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Davies Homes			Logged By: PD		Scale 1:25	
Equipment: 20-tonne tracked excavator			Coordinates:			Dimensions 1.20m			
Date Excavated: 15/11/2021			Level:			Depth : 1.50m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	MADE GROUND: (Loose to medium dense) grey black sandy silty fine to coarse GRAVEL of angular mudstone, siltstone and coal. With occasional ash and concrete [colliery spoil].			
0.50	ES		1.50			End of Trialpit at 1.50 m			
Remarks:			Groundwater: Groundwater not encountered.			Key:			
			Stability: Stable			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc, Abercanaid			Project No.: 12888		Trial Pit No.: S2 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Davies Homes			Logged By: PD		Scale 1:25	
Equipment: 20-tonne tracked excavator			Coordinates:			Dimensions 1.20m			
Date Excavated: 15/11/2021			Level:			Depth : 1.50m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	MADE GROUND: (Loose to medium dense) grey black sandy silty fine to coarse GRAVEL of angular mudstone, siltstone and coal. With occasional ash and concrete [colliery spoil].			
0.50	ES		1.50			End of Trialpit at 1.50 m			
Remarks:			Groundwater: Groundwater not encountered.			Key:			
			Stability: Stable			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

Intégral Géotechnique			Project Name: Dragon Parc, Abercanaid			Project No.: 12888		Trial Pit No.: S3 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Davies Homes			Logged By: PD		Scale 1:25	
Equipment: 20-tonne tracked excavator			Coordinates:			Dimensions 1.20m			
Date Excavated: 15/11/2021			Level:			Depth : 1.50m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.50	ES		1.50			MADE GROUND: (Loose to medium dense) grey black sandy silty fine to coarse GRAVEL of angular mudstone, siltstone and coal. With occasional ash and concrete [colliery spoil].			
						End of Trialpit at 1.50 m			
Remarks:			Groundwater: Groundwater not encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: Stable						

Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Trial Pit No.: S4 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Davies Homes				Logged By: PD		Scale 1:25	
Equipment: 20-tonne tracked excavator			Coordinates:				Dimensions 1.20m			
Date Excavated: 15/11/2021			Level:				Depth : 1.50m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description				
Depth (m)	Type	Results								
0.50	ES		1.50			MADE GROUND: (Loose to medium dense) grey black sandy silty fine to coarse GRAVEL of angular mudstone, siltstone and coal. With occasional ash and concrete [colliery spoil].				
						End of Trialpit at 1.50 m				
Remarks:			Groundwater: Groundwater not encountered.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			AGS
			Stability: Stable							

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc, Abercanaid			Project No.: 12888		Trial Pit No.: S5 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Davies Homes			Logged By: PD		Scale 1:25	
Equipment: 20-tonne tracked excavator			Coordinates:			Dimensions 1.20m			
Date Excavated: 15/11/2021			Level:			Depth : 1.50m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	MADE GROUND: (Loose to medium dense) grey black sandy silty fine to coarse GRAVEL of angular mudstone, siltstone and coal. With occasional ash and concrete [colliery spoil].			
0.50	ES		1.50			End of Trialpit at 1.50 m			
Remarks:			Groundwater: Groundwater not encountered.			Key:			
			Stability: Stable			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

[illegible]

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc, Abercanaid			Project No.: 12888		Trial Pit No.: S7 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Davies Homes			Logged By: PD		Scale 1:25	
Equipment: 20-tonne tracked excavator			Coordinates:			Dimensions 1.20m			
Date Excavated: 15/11/2021			Level:			Depth : 1.50m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	MADE GROUND: (Loose to medium dense) grey black sandy silty fine to coarse GRAVEL of angular mudstone, siltstone and coal. With occasional ash, slag and concrete [colliery spoil].			
0.50	ES		1.50			End of Trialpit at 1.50 m			
Remarks:			Groundwater: Groundwater not encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: Stable						

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc, Abercanaid			Project No.: 12888		Trial Pit No.: S8 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Davies Homes			Logged By: PD		Scale 1:25	
Equipment: 20-tonne tracked excavator			Coordinates:			Dimensions 1.20m			
Date Excavated: 15/11/2021			Level:			Depth : 1.50m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	MADE GROUND: (Loose to medium dense) grey black sandy silty fine to coarse GRAVEL of angular mudstone, siltstone and coal. With occasional ash, slag and concrete [colliery spoil].			
0.50	ES		1.50			End of Trialpit at 1.50 m			
Remarks:			Groundwater: Groundwater not encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
Stability: Stable									

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc, Abercanaid			Project No.: 12888		Trial Pit No.: S9 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Davies Homes			Logged By: PD		Scale 1:25	
Equipment: 20-tonne tracked excavator			Coordinates:			Dimensions 1.20m			
Date Excavated: 15/11/2021			Level:			Depth : 1.50m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	MADE GROUND: (Loose to medium dense) grey black sandy silty fine to coarse GRAVEL of angular mudstone, siltstone and coal. With occasional ash and concrete [colliery spoil].			
0.50	ES		1.50			End of Trialpit at 1.50 m			
Remarks:			Groundwater: Groundwater not encountered.			Key:			
			Stability: Stable			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Dragon Parc, Abercanaid			Project No.: 12888		Trial Pit No.: S10 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Davies Homes			Logged By: PD		Scale 1:25	
Equipment: 20-tonne tracked excavator			Coordinates:			Dimensions 1.20m			
Date Excavated: 15/11/2021			Level:			Depth : 1.50m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	MADE GROUND: (Loose to medium dense) grey black sandy silty fine to coarse GRAVEL of angular mudstone, siltstone and coal. With occasional ash and concrete [colliery spoil].			
0.50	ES		1.50			End of Trialpit at 1.50 m			
Remarks:			Groundwater: Groundwater not encountered.			Key:			
			Stability: Stable			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

APPENDIX B

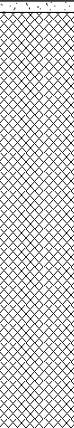
ROTARY PROBEHOLE LOGS (IG 2019 AND 2021)

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc		Project No.: 12392		Borehole No.: PH1 Sheet 1 of 1	
Location: Merthyr Tydfil		Client: Huntley Wood Investments		Coordinates: 305481.00mE 204058.00mN		Hole Type: RO	
Equipment: Klemm 802		Diameter of Casing: 150mm		Level: 153.00mAOD		Scale 1:200	
Diameter of Boring: 142mm		Depth of Casing: 10.00m		Dates 25/03/2019 - 26/03/2019		Logged By: DT	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
											MADE GROUND (Driller's Description)	1
												2
												3
												4
												5
	5.60						147.40				TILL (Driller's Description)	6
												7
												8
												9
												10
10.20						142.80				SANDSTONE (Driller's Description)	11	
											12	
											13	
											14	
											15	
											16	
17.00						136.00				COAL (Driller's Description)	17	
18.40						134.60				SANDSTONE with mudstone bands (Driller's Description)	18	
											19	
											20	
											21	
											22	
											23	
											24	
											25	
											26	
											27	
											28	
											29	
30.00						123.00					End of Borehole at 30.00 m	30
											31	
											32	
											33	
											34	
											35	
											36	
											37	
											38	
											39	
											40	

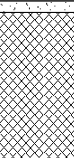
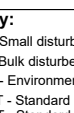
Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet 3. Gas monitoring well installed		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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 Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc		Project No.: 12392		Borehole No.: PH4 Sheet 1 of 1	
Location: Merthyr Tydfil		Client: Huntley Wood Investments		Coordinates: 305411.00mE 204122.00mN		Hole Type: RO	
Equipment: Klemm 802		Diameter of Casing: 150mm		Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm		Depth of Casing: 12.00m		Dates 21/03/2019 - 21/03/2019		Logged By: ND	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description							
		Depth (m)	TCR	SCR	RQD	FI												
						0.30	156.70			TARMAC and CONCRETE (Driller's Description)	1							
															FILL (Driller's Description)	2		
																3		
																4		
																5		
																6		
																7		
																8		
																9		
																10		
																11		
						11.50	145.50									MUDSTONE (Driller's Description)	12	
																	13	
																	14	
																	15	
																	16	
																	17	
						17.50	139.50										OLD WORKINGS (Driller's Description)	18
						19.10	137.90										MUDSTONE (Driller's Description)	19
																	20	
																	21	
																	22	
																	23	
						24.10	132.90										SANDSTONE (Driller's Description)	24
																	25	
																	26	
																	27	
																	28	
																	29	
						30.00	127.00											30
End of Borehole at 30.00 m											31							
										32								
										33								
										34								
										35								
										36								
										37								
										38								
										39								
										40								

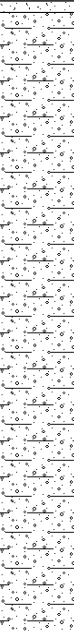
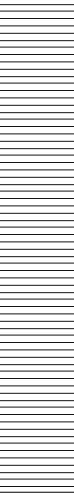
Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet at 12m				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc			Project No.: 12392		Borehole No.: PH5 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments			Coordinates: 305402.00mE 204157.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm			Level: 158.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 12.00m			Dates 22/03/2019 - 22/03/2019		Logged By: ND	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							0.30	157.70			TARMAC and CONCRETE (Driller's Description)	1
											FILL (Driller's Description)	2
												3
												4
												5
												6
												7
												8
												9
							4.20	153.80			CLAY (Driller's Description)	11
											12	
											13	
											14	
											15	
											16	
											17	
											18	
											19	
											20	
							7.40	150.60			GRAVELS (Driller's Description)	21
												22
												23
												24
												25
												26
												27
												28
												29
												30
							11.60	146.40			MUDSTONE (Driller's Description)	31
												32
												33
												34
												35
												36
												37
												38
												39
												40
							16.00	142.00			COAL (Driller's Description)	41
												42
												43
												44
												45
												46
												47
												48
												49
												50
							17.30	140.70			Soft drill poor returns (Driller's Description)	51
												52
												53
												54
												55
												56
												57
												58
												59
												60
							18.10	139.90			MUDSTONE (Driller's Description)	61
												62
												63
												64
												65
												66
												67
												68
												69
												70
							22.00	136.00			SANDSTONE (Driller's Description)	71
												72
												73
												74
												75
												76
												77
												78
												79
												80
							30.00	128.00			End of Borehole at 30.00 m	81
												82
												83
												84
												85
												86
												87
												88
												89
												90

Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet at 16.0m				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH7 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305393.00mE 204204.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 17.00m				Dates 22/03/2019 - 22/03/2019		Logged By: ND	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
							0.30	156.70			TARMAC and CONCRETE (Driller's Description)	1	
												2	
												3	
												4	
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												13	
												14	
												15	
												16	
								16.80	140.20			MUDSTONE and SANDSTONE (Driller's Description)	17
												18	
												19	
												20	
												21	
												22	
												23	
												24	
												25	
												26	
												27	
												28	
												29	
								30.00	127.00				End of Borehole at 30.00 m
										31			
										32			
										33			
										34			
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										38			
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										40			

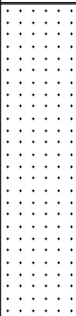
Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet at 16.0m				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc				Project No.: 12392		Borehole No.: PH10 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Huntley Wood Investments				Coordinates: 305351.00mE 204233.00mN		Hole Type: RO	
Equipment: Klemm 802				Diameter of Casing: 150mm				Level: 157.00mAOD		Scale 1:200	
Diameter of Boring: 142mm				Depth of Casing: 13.50m				Dates 26/03/2019 - 26/03/2019		Logged By: DT	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
											MADE GROUND (Driller's Description)	1
												2
												3
												4
		4.80						152.20			TILL (wet) (Driller's Description)	5
												6
												7
												8
												9
												10
13.70						143.30				CLAY/MUDSTONE (Driller's Description)	13	
15.50						141.50				SANDSTONE (Driller's Description)	15	
19.70						137.30				COAL (Driller's Description)	19	
21.00						136.00				MUDSTONE (Driller's Description)	21	
25.20						131.80				Dark MUDSTONE with coal bands (Driller's Description)	25	
26.00						131.00				MUDSTONE (Driller's Description)	26	
30.00						127.00				End of Borehole at 30.00 m	30	
											31	
											32	
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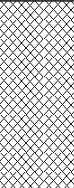
Remarks: 1. Rotary open probehole from GL to 30.0m 2. Probehole noted as wet 3. Gas monitoring well installed				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH103 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 12.00m				Dates 04/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							2.50				Made Ground (Driller's Description)	1
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28												
							11.80			Till (Driller's Description)		
										30		
										31		
										32		
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										34		
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										37		
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							22.50			Sandstone (Driller's Description)	59	
										60		
										61		
										62		
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										64		
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										66		
										67		
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										72		
										73		
							23.50			Coal (Driller's Description)	75	
										76		
										77		
										78		
										79		
										80		
										81		
										82		
										83		
										84		
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										86		
										87		
										88		
										89		
							30.00			Sandstone interbedded with mudstone	91	
										92		
										93		
										94		
										95		
										96		
										97		
										98		
										99		
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End of Borehole at 30.00 m											106	

Remarks: 1. Rotary open borehole to 30.0m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH104 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 19.50m				Dates 03/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
											Made Ground (Driller's Description)	1
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											Sand and Gravel (Driller's Description)	31
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50												
											Coal (Driller's Description)	51
											Sandstone (Driller's Description)	52
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											End of Borehole at 30.00 m	101
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH109 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing:				Level:		Scale 1:200	
Diameter of Boring:				Depth of Casing:				Dates 03/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
											Made Ground (Driller's Description)	1	
												2	
												3	
												4	
								4.70				Till (Driller's Description)	5
													6
													7
													8
								9.00				Sand and Gravel (Driller's Description)	9
													10
													11
													12
								13.10				Mudstone (Driller's Description)	13
													14
								14.70				Coal (Driller's Description)	15
													16
								16.10				Mudstone (Driller's Description)	17
													18
													19
								20.00				Coal (Driller's Description)	20
													21
								21.40				Sandstone (Driller's Description)	22
													23
													24
								24.80				Coal (Driller's Description)	25
													26
								26.30				Mudstone (Driller's Description)	27
													28
													29
								30.00				End of Borehole at 30.00 m	30
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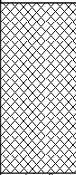
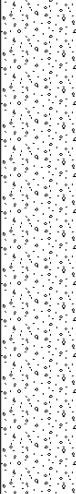
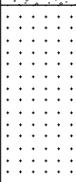
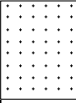
Remarks: 1. Rotary open borehole to 30.0m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH113 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 12.00m				Dates 02/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							3.00				Made Ground (Driller's Description)	1
											2	
											3	
											4	
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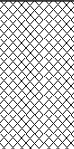
Remarks: 1. Rotary open borehole to 30.0m.						Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)						W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation							
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH114 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 18.00m				Dates 02/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description										
		Depth (m)	TCR	SCR	RQD	FI															
							4.50				Made Ground (Driller's Description)	1									
											2										
											3										
											4										
											5										
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											12										
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											14										
																		17.70			Sand and Gravel (Driller's Description)
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21																					
22																					
23																					
24																					
25																					
26																					
27																					
28																					
							22.50			Sandstone (Driller's Description)											18
										19											
										20											
										21											
										22											
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																	24.00			Coal (Driller's Description)	23
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36																					
							26.70													Sandstone (Driller's Description)	24
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																	27.40			Coal (Driller's Description)	27
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							30.00													Sandstone (Driller's Description)	28
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										End of Borehole at 30.00 m											

Remarks: 1. Rotary open borehole to 30.0m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH115 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 15.00m				Dates 03/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							4.00				Made Ground (Driller's Description)	1
											2	
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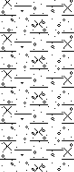
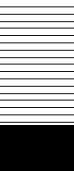
Remarks: 1. Rotary open borehole to 30.0m.						Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)						W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation							
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH116 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 13.50m				Dates 02/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
											Made Ground (Driller's Description)	1
											2	
											3	
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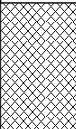
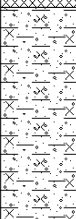
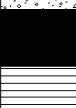
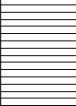
Remarks: 1. Rotary open borehole to 30.0m.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH119 Sheet 1 of 1	
		Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 13.50m				Dates 30/07/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
											Made Ground (Driller's Description)	1	
											2		
											3		
											4		
												Till (Driller's Description)	5
												6	
												7	
												8	
												Sand and Gravel (Driller's Description)	9
												10	
												11	
												12	
												Mudstone (Driller's Description)	13
												14	
												15	
												16	
												Coal (Driller's Description)	17
												18	
												Mudstone (Driller's Description)	19
												20	
	Sandstone with mudstone bands	21											
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
End of Borehole at 30.00 m											30		
31													
32													
33													
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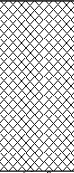
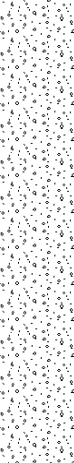
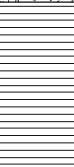
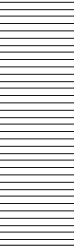
Remarks: 1. Rotary open borehole to 30.0m				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation				
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH122 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Fraste				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 13.20m				Dates 30/07/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
							3.50				Fill (Driller's Description)	1	
											2		
											3		
												Sandy gravelly clay with boulders (Driller's Description)	4
												5	
												6	
												7	
												8	
												Till (Driller's Description)	9
												10	
												Sand and Gravel (Driller's Description)	11
												12	
												Coal (Driller's Description)	13
												14	
												Mudstone with sandstone bands	15
												16	
												17	
												18	
												19	
												Old Workings (Driller's Description)	20
												21	
												Mudstone with sandstone bands (Driller's Description)	22
												23	
												24	
												25	
												26	
												27	
												28	
												29	
												30	
31													
End of Borehole at 30.00 m											32		
33													
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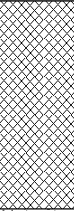
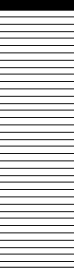
Remarks: 1. Rotary open borehole to 30.0m 2. Wet from 15m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH125 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 18.00m				Dates 02/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
							4.50				Fill (Driller's Description)	1	
											2		
											3		
											4		
												Sand and Gravel (Driller's Description)	5
												6	
												7	
												8	
												9	
												10	
												11	
												12	
												13	
												14	
												15	
												16	
												Mudstone and Sandstone (Driller's Description)	17
												18	
												19	
												20	
												21	
												Old Workings (Driller's Description)	22
												23	
												Mudstone (Driller's Description)	24
												25	
												26	
												27	
												28	
												29	
												30	
End of Borehole at 30.00 m											30		
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													

Remarks: 1. Rotary open borehole to 30.0m. 2. Wet at 17m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation				
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH126 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 21.00m				Dates 03/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							5.50				Fill (Driller's Description)	1
											2	
											3	
											4	
											5	
							18.70				Sand and Gravel (Driller's Description)	6
											7	
											8	
											9	
											10	
											11	
											12	
											13	
											14	
											15	
							20.70				Till (Driller's Description)	16
											17	
											18	
							21.50				Mudstone (Driller's Description)	19
											20	
							23.20				Coal (Driller's Description)	21
											22	
							30.00				Mudstone with sandstone bands (Driller's Description)	23
											24	
											25	
											26	
											27	
											28	
											29	
											30	
					31							
					32							
										End of Borehole at 30.00 m	33	
											34	
											35	
											36	
											37	
											38	
											39	
											40	

Remarks: 1. Rotary open borehole to 30.0m		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH127 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Fraste				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 13.20m				Dates 26/07/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
											Fill (Driller's Description)	1
											2	
											3	
											4	
											5	
											6	
											7	
											8	
											9	
											10	
											11	
											12	
											13	
											14	
											15	
											16	
											17	
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											19	
											20	
											21	
											22	
											23	
											24	
											25	
											26	
											27	
											28	
											29	
											30	
31												
32												
33												
34												
35												
36												
37												
38												
39												
40												

Remarks: 1. Rotary open borehole to 30.0m. 2. Wet from 19.0m.						Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)						W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation							
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH128 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Fraste				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 13.20m				Dates 27/07/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
											Fill (Driller's Description)	1
												2
												3
												4
												5
												6
												7
												8
												9
												10
												11
												12
												13
												14
												15
												16
												17
												18
												19
												20
												21
												22
												23
												24
												25
												26
												27
												28
												29
												30
										31		
										32		
										33		
										34		
										35		
										36		
										37		
										38		
										39		
										40		

Remarks: 1. Rotary open borehole to 30.0m 2. Wet from 1.4m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH129 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Fraste				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 13.20m				Dates 27/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
							2.00				Fill (Driller's Description)	1	
											Sand and Gravel (Driller's Description)	2	
												3	
												4	
												5	
												6	
												7	
												8	
								8.90				Till (Driller's Description)	9
								10.50					10
												Mudstone with sandstone bands (Driller's Description)	11
													12
													13
													14
													15
								16.60				Coal (Driller's Description)	16
								18.10					17
												Mudstone with sandstone bands (Driller's Description)	18
													19
													20
													21
													22
													23
								24.50				Coal (Driller's Description)	24
								25.80					25
												Mudstone with sandstone (Driller's Description)	26
													27
													28
													29
								30.00				End of Borehole at 30.00 m	30
											31		
											32		
											33		
											34		
											35		
											36		
											37		
											38		
											39		
											40		

Remarks: 1. Rotary open borehole to 30.0m. 2. Wet at 14.5m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH130 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Fraste				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 13.20m				Dates 28/07/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
											Concrete and Fill (Driller's Description)	1
											2	
											3	
											4	
											5	
											6	
											7	
											8	
											9	
											10	
											11	
											12	
											13	
											14	
											15	
											16	
											17	
											18	
											19	
											20	
											21	
											22	
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											26	
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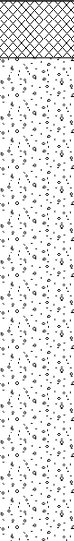
Remarks: 1. Rotary open borehole to 30.0m. 2. Wet from 15.0m.						Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)						W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation							
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH131 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Fraste				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 16.20m				Dates 29/07/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							1.90				Fill (Driller's Description)	1
												Sand and Gravel (Driller's Description)
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		
										21		
										22		
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										24		
										25		
										26		
										27		
										28		
										29		
										30		
								31				
								32				
								33				
								34				
								35				
								36				
								37				
								38				
								39				
								40				

Remarks: 1. Rotary open borehole to 30.0m 2. Wet below 16.0m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH132 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Fraste				Diameter of Casing: 132mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 18.00m				Dates 29/07/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
							1.50				Fill (Driller's Description)	1	
											Sand and Gravel (Driller's Description)	2	
													3
													4
													5
													6
													7
													8
													9
													10
													11
													12
													13
													14
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													17
													18
													19
													20
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													22
													23
													24
													25
										26			
										27			
										28			
										29			
										30			
										31			
										32			
										33			
										34			
										35			
										36			
										37			
										38			
										39			
										40			

Remarks: 1. Rotary open borehole to 30.0m. 2. Wet below 18.0m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH134 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 10.50m				Dates 04/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
											Fill (Driller's Description)	1
											2	
											3	
											4	
											5	
											6	
											7	
											8	
											9	
											10	
											11	
											12	
											13	
											14	
											15	
											16	
											17	
											18	
											19	
											20	
											21	
											22	
											23	
											24	
											25	
											26	
											27	
											28	
											29	
											30	
31												
32												
33												
34												
35												
36												
37												
38												
39												
40												

Remarks: 1. Rotary open borehole to 30.0m 2. Wet at 12.0m.						Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)						W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation							
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH135 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 12.00m				Dates 13/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
											Made Ground (Driller's Description)	1	
												2	
													3
													4
													5
													6
													7
													8
													9
													10
													11
													12
													13
													14
													15
													16
													17
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												39	
												40	

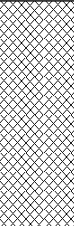
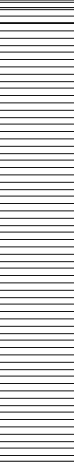
Remarks: 1. Rotary open borehole to 30.0m. 2. Groundwater encountered at 22.0m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH136 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 19.00m				Dates 12/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
	 10.00						5.50				Made Ground (Driller's Description)	1	
												2	
													3
													4
													5
												Sand and Gravel (Driller's Description)	6
													7
													8
													9
													10
													11
													12
													13
													14
													15
													16
													17
								18.30				Mudstone (Driller's Description)	18
								18.50				Coal (Driller's Description)	19
								18.70				Mudstone (Driller's Description)	20
								19.90				Coal (Driller's Description)	21
								21.80				Mudstone (Driller's Description)	22
								22.50				Coal (Driller's Description)	23
								22.80				Mudstone with sandstone bands (Driller's Description)	24
													25
													26
													27
													28
													29
								30.00					End of Borehole at 30.00 m
											31		
											32		
											33		
											34		
											35		
											36		
											37		
											38		
											39		
											40		

Remarks: 1. Rotary open borehole to 30.0m. 2. Groundwater encountered at 10.0m.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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 Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH137 Sheet 1 of 1	
		Location: Merthyr Tydfil				Client: Davies Homes		Coordinates:	
Equipment: Klemm		Diameter of Casing: 115mm				Level:		Hole Type: RO	
Diameter of Boring: 115mm		Depth of Casing: 15.00m				Dates 11/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
							6.00				Made Ground (Driller's Description)	1	
											2		
											3		
											4		
											5		
											6		
												Sand and Gravel (Driller's Description)	7
												8	
												9	
												10	
												11	
												12	
												13	
												14	
												15	
													Mudstone (Driller's Description)
											17		
												Coal (Driller's Description)	18
												19	
												Mudstone (Driller's Description)	20
21													
22													
23													
24													
25													
26													
27													
28													
29													
	End of Borehole at 30.00 m	30											
	31												
	32												
	33												
	34												
	35												
	36												
	37												
	38												
	39												
	40												

Remarks: 1. Rotary open borehole to 30.0m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation				
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		Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Dragon Parc, Abercanaid				Project No.: 12888		Borehole No.: PH138 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Davies Homes				Coordinates:		Hole Type: RO	
Equipment: Klemm				Diameter of Casing: 115mm				Level:		Scale 1:200	
Diameter of Boring: 115mm				Depth of Casing: 17.00m				Dates 10/08/2021 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description		
		Depth (m)	TCR	SCR	RQD	FI							
	 12.00										Made Ground (Driller's Description)	1	
												2	
													3
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Remarks: 1. Rotary open borehole to 30.0m. 2. Groundwater encountered at 12.0m.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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APPENDIX C

TANK EXCAVATION VALIDATION PHOTOGRAPHS (IG 2021)



Appendix C - Tank Excavation Validation Photographs

Drainage Channel, Dragon Parc, Merthyr Tydfil

Intégral
Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991
Fax: 029 2086 2176



Appendix C - Tank Excavation Validation Photographs

Drainage Channel, Dragon Parc, Merthyr Tydfil

Intégral
Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991
Fax: 029 2086 2176

APPENDIX D

LABORATORY CHEMICAL TEST RESULTS (MADE GROUND)



Peter Davies
Integral Geotechnique
Integral House
7 Beddau Way
Castlegate Business Park
CF83 2AX

t: 02920807991
f: 02920862176
e: peterd@integralgeotec.com

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

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

Analytical Report Number : 21-22905-A

Replaces Analytical Report Number: 21-22905, issue no. 2
Additional analysis undertaken.

Project / Site name:	Dragon Park, Methyr Tudfill	Samples received on:	16/11/2021
Your job number:	12888-PD	Samples instructed on/ Analysis started on:	16/11/2021
Your order number:		Analysis completed by:	07/12/2021
Report Issue Number:	3	Report issued on:	08/12/2021
Samples Analysed:	10 soil samples		

Signed:

Izabela Wójcik

Izabela Wójcik
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-22905-A

Project / Site name: Dragon Park, Methyr Tudfill

Lab Sample Number				2082856	2082857	2082858	2082859	2082860
Sample Reference				S1	S2	S3	S4	S5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50
Date Sampled				12/11/2021	12/11/2021	12/11/2021	12/11/2021	12/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	48	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	5.2	8.6	9.4	13	9.8
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.40	0.50

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	BPA	BPA	BPA	BPA	BPA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.5	8.2	8.8	10.0	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	1400	5800	1200	4600	2000
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.24	1.7	0.13	0.27	0.13
Sulphide	mg/kg	1	MCERTS	440	57	7.4	380	120
Total Sulphur	mg/kg	50	MCERTS	4300	2500	1200	3500	2500
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.0	3.0	4.2	3.1	3.8
Loss on Ignition @ 450oC	%	0.2	MCERTS	14.3	19.2	30.1	24.2	33.5

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.90	1.0	2.8	2.3	0.84
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.33	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.25	< 0.05	1.2	0.67	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.32	< 0.05	1.1	0.79	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.5	1.6	4.5	3.4	1.3
Anthracene	mg/kg	0.05	MCERTS	0.22	< 0.05	1.2	0.76	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.74	1.0	2.7	2.3	0.33
Pyrene	mg/kg	0.05	MCERTS	0.54	0.64	1.9	1.7	0.23
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.23	0.55	1.6	1.2	0.20
Chrysene	mg/kg	0.05	MCERTS	0.43	0.90	2.1	1.6	0.53
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.25	0.59	2.5	1.6	0.28
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.18	0.56	2.1	0.84	0.21
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.39	2.1	1.2	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.25	1.2	0.68	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.49	0.27	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.24	1.1	0.68	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	5.60	7.73	28.9	19.9	3.96
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Analytical Report Number: 21-22905-A

Project / Site name: Dragon Park, Methyr Tudfill

Lab Sample Number				2082856	2082857	2082858	2082859	2082860
Sample Reference				S1	S2	S3	S4	S5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50
Date Sampled				12/11/2021	12/11/2021	12/11/2021	12/11/2021	12/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	16	15	12	14
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	2.2	1.3	1.0	1.4	1.7
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.8	0.8	1.0	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	37	12	7.5	9.1	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	34	37	45	35	39
Lead (aqua regia extractable)	mg/kg	1	MCERTS	32	29	30	23	19
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	40	31	24	28
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	80	25	15	14	35
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	50	82	72	59	57

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	1.4	1.2	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	12	11	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	25	16	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	50	47	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35 EH_CU_1D_AL	mg/kg	10	MCERTS	< 10	< 10	75	62	< 10
TPH-CWG - Aliphatic > EC35 - EC44 EH_CU_1D_AL	mg/kg	8.4	NONE	< 8.4	< 8.4	32	17	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	< 10	< 10	88	74	< 10
TPH-CWG - Aliphatic (EC5 - EC44) EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10	120	92	< 10

TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0	5.4	6.1	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	17	10	< 10
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	23	12	< 10
TPH-CWG - Aromatic >EC35 - EC40 EH_CU_1D_AR	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44 EH_CU_1D_AR	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	< 10	< 10	46	29	< 10
TPH-CWG - Aromatic (EC5 - EC44) EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	< 10	46	29	< 10

TPH Total C5 - C44 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	< 10	< 10	170	120	< 10
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Analytical Report Number: 21-22905-A
Project / Site name: Dragon Park, Methyr Tudfill

Lab Sample Number				2082856	2082857	2082858	2082859	2082860
Sample Reference				S1	S2	S3	S4	S5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50
Date Sampled				12/11/2021	12/11/2021	12/11/2021	12/11/2021	12/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
Chloroethane	µg/kg	1	NONE	-	< 1.0	-	< 1.0	-
Bromomethane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
Vinyl Chloride	µg/kg	1	NONE	-	< 1.0	-	< 1.0	-
Trichlorofluoromethane	µg/kg	1	NONE	-	< 1.0	-	< 1.0	-
1,1-Dichloroethene	µg/kg	1	NONE	-	< 1.0	-	< 1.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Trichloromethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	< 1.0	-	< 1.0	-
Benzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Tetrachloromethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Trichloroethene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Dibromomethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Bromodichloromethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
Tetrachloroethene	µg/kg	1	NONE	-	< 1.0	-	< 1.0	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
Chlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
p & m-Xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Styrene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Tribromomethane	µg/kg	1	NONE	-	< 1.0	-	< 1.0	-
o-Xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Isopropylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Bromobenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-

Analytical Report Number: 21-22905-A

Project / Site name: Dragon Park, Methyr Tudfill

Lab Sample Number				2082856	2082857	2082858	2082859	2082860
Sample Reference				S1	S2	S3	S4	S5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50
Date Sampled				12/11/2021	12/11/2021	12/11/2021	12/11/2021	12/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	< 0.007	-	< 0.007	-
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U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-22905-A

Project / Site name: Dragon Park, Methyr Tudfill

Lab Sample Number				2082861	2082862	2082863	2082864	2082865
Sample Reference				S6	S7	S8	S9	S10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50
Date Sampled				12/11/2021	12/11/2021	12/11/2021	12/11/2021	12/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	16	7.3	16	16	15
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	BPA	BPA	BPA	BPA	BPA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	8.4	7.8	7.9	9.0
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	880	880	2700	1100	2400
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.049	0.090	0.91	0.25	0.27
Sulphide	mg/kg	1	MCERTS	2.7	5.2	17	17	94
Total Sulphur	mg/kg	50	MCERTS	1100	1900	1300	680	1500
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	6.2	2.9	1.8	1.8	1.5
Loss on Ignition @ 450oC	%	0.2	MCERTS	42.4	24.4	5.2	5.6	5.6

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	2.3	8.1	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.71	6.8	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.78	6.4	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	4.8	17	0.33	0.33	0.53
Anthracene	mg/kg	0.05	MCERTS	0.88	4.1	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	2.4	12	0.42	0.57	0.85
Pyrene	mg/kg	0.05	MCERTS	1.6	8.3	0.30	0.49	0.66
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.3	7.3	0.28	0.41	0.58
Chrysene	mg/kg	0.05	MCERTS	1.8	5.3	0.31	0.53	0.73
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.7	6.1	0.28	0.57	0.78
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.3	3.1	0.15	0.27	0.41
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.0	5.1	0.23	0.47	0.63
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.71	2.4	< 0.05	0.26	0.35
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.32	0.93	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.58	2.2	< 0.05	0.26	0.35

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	22.1	94.9	2.30	4.16	5.87
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Analytical Report Number: 21-22905-A

Project / Site name: Dragon Park, Methyr Tudfill

Lab Sample Number				2082861	2082862	2082863	2082864	2082865
Sample Reference				S6	S7	S8	S9	S10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50
Date Sampled				12/11/2021	12/11/2021	12/11/2021	12/11/2021	12/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	48	16	11	14	12
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.5	1.0	0.79	1.2	1.2
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.9	0.3	0.5	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	9.5	15	16	16
Copper (aqua regia extractable)	mg/kg	1	MCERTS	83	39	17	28	19
Lead (aqua regia extractable)	mg/kg	1	MCERTS	100	24	30	35	31
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	40	33	18	24	16
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	31	17	18	24	20
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	71	92	100	87

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	1.6	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	8.8	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	14	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	35	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35 EH_CU_1D_AL	mg/kg	10	MCERTS	< 10	49	< 10	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44 EH_CU_1D_AL	mg/kg	8.4	NONE	< 8.4	21	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	< 10	60	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44) EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	81	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	1.4	9.7	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	4.0	22	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	33	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	12	35	11	11	11
TPH-CWG - Aromatic >EC35 - EC44 EH_CU_1D_AR	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44 EH_CU_1D_AR	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	27	99	16	16	15
TPH-CWG - Aromatic (EC5 - EC44) EH_CU+HS_1D_AR	mg/kg	10	NONE	27	99	16	16	15

TPH Total C5 - C44 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	27	180	16	16	15
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Analytical Report Number: 21-22905-A
Project / Site name: Dragon Park, Methyr Tudfill

Lab Sample Number				2082861	2082862	2082863	2082864	2082865
Sample Reference				S6	S7	S8	S9	S10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50
Date Sampled				12/11/2021	12/11/2021	12/11/2021	12/11/2021	12/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
VOCs								
Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
Chloroethane	µg/kg	1	NONE	-	-	-	-	< 1.0
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	< 1.0
Benzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
Toluene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Styrene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Tribromomethane	µg/kg	1	NONE	-	-	-	-	< 1.0
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0

Analytical Report Number: 21-22905-A

Project / Site name: Dragon Park, Methyr Tudfill

Lab Sample Number				2082861	2082862	2082863	2082864	2082865
Sample Reference				S6	S7	S8	S9	S10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50
Date Sampled				12/11/2021	12/11/2021	12/11/2021	12/11/2021	12/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	< 1.0

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	< 0.007
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U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-22905-A

Project / Site name: Dragon Park, Methyr Tudfill

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2082856	S1	None Supplied	0.00-0.50	Grey clay with stones.
2082857	S2	None Supplied	0.00-0.50	Grey clay with gravel.
2082858	S3	None Supplied	0.00-0.50	Grey clay and sand with gravel.
2082859	S4	None Supplied	0.00-0.50	Grey clay and sand with gravel.
2082860	S5	None Supplied	0.00-0.50	Grey clay and sand with gravel.
2082861	S6	None Supplied	0.00-0.50	Grey clay and sand with gravel.
2082862	S7	None Supplied	0.00-0.50	Grey clay and sand with gravel.
2082863	S8	None Supplied	0.00-0.50	Brown clay with gravel and vegetation.
2082864	S9	None Supplied	0.00-0.50	Brown clay with gravel and vegetation.
2082865	S10	None Supplied	0.00-0.50	Brown clay with gravel and vegetation.

Analytical Report Number : 21-22905-A

Project / Site name: Dragon Park, Methyr Tudfill

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS

Analytical Report Number : 21-22905-A

Project / Site name: Dragon Park, Methyr Tudfill

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

APPENDIX E

LABORATORY CHEMICAL TEST RESULTS (LEACHATE)

**Peter Davies**

Integral Geotechnique
Integral House
7 Beddau Way
Castlegate Business Park
CF83 2AX

t: 02920807991
f: 02920862176
e: peterd@integralgeotec.com

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

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

Analytical Report Number : 21-25983

Project / Site name:	Dragon Park, Methyr Tudfill	Samples received on:	16/11/2021
Your job number:	12888-PD	Samples instructed on/ Analysis started on:	30/11/2021
Your order number:		Analysis completed by:	06/12/2021
Report Issue Number:	1	Report issued on:	06/12/2021
Samples Analysed:	5 leachate samples		

Signed: *Karolina Marek*

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.



Analytical Report Number: 21-25983

Project / Site name: Dragon Park, Methyr Tudfill

Lab Sample Number				2099563	2099564	2099565	2099566	2099567
Sample Reference				S1	S3	S5	S7	S9
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50
Date Sampled				12/11/2021	12/11/2021	12/11/2021	12/11/2021	12/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH (automated)	pH Units	N/A	ISO 17025	7.7	8.1	7.9	7.8	7.9
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Sulphate as SO ₄	µg/l	100	ISO 17025	10400	14900	12100	31300	14700
Total Sulphur	µg/l	15	NONE	3500	5000	4000	10000	4900
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Organic Carbon (TOC)	mg/l	0.1	NONE	5.95	4.73	3.97	4.51	7.39
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	5.95	4.27	3.74	4.47	7.26

Total Phenols

Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	1.0	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	2.7	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.62	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.51	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	4.8	< 0.2
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	2.7	5.1	4.6	8.1	5.1
Beryllium (dissolved)	µg/l	0.2	ISO 17025	0.3	0.3	0.3	< 0.2	0.2
Boron (dissolved)	µg/l	10	ISO 17025	19	24	13	40	24
Cadmium (dissolved)	µg/l	0.08	ISO 17025	0.26	< 0.08	< 0.08	0.31	0.22
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.8	0.9	0.6	0.7	1.0
Copper (dissolved)	µg/l	0.7	ISO 17025	20	15	10	23	23
Lead (dissolved)	µg/l	1	ISO 17025	5.3	3.2	2.0	2.1	4.5
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	3.9	3.5	3.6	2.8	3.7
Selenium (dissolved)	µg/l	4	ISO 17025	8.8	9.9	5.5	5.8	< 4.0
Vanadium (dissolved)	µg/l	1.7	ISO 17025	7.2	2.6	< 1.7	5.1	< 1.7
Zinc (dissolved)	µg/l	0.4	ISO 17025	7.4	11	9.1	11	8.8
Calcium (dissolved)	mg/l	0.012	ISO 17025	4.8	8.4	9.5	12	15



Analytical Report Number: 21-25983

Project / Site name: Dragon Park, Methyr Tudfill

Lab Sample Number				2099563	2099564	2099565	2099566	2099567
Sample Reference				S1	S3	S5	S7	S9
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50	0.00-0.50
Date Sampled				12/11/2021	12/11/2021	12/11/2021	12/11/2021	12/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH1 (C10 - C40) EH_1D_TOTAL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
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U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-25983

Project / Site name: Dragon Park, Methyr Tudfill

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
NRA Leachate Prep	10:1 extract with de-ionised water shaken for 24 hours then filtered.	In-house method based on National Rivers Authority	L020-PL	W	NONE
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Monohydric phenols in leachate	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
pH at 20oC in leachate (automated)	Determination of pH in leachate by electrometric measurement.	In house method.	L099B	W	ISO 17025
Sulphide in leachate	Determination of sulphide in leachate by ion selective electrode.	In-house method	L010-PL	W	NONE
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total Sulphur in leachates	Determination of total sulphur in leachates by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	NONE
TPH1 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in leachate	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Dissolved Organic Carbon in leachate	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
BTEX in leachates (Monoaromatics)	Determination of BTEX in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Analytical Report Number : 21-25983

Project / Site name: Dragon Park, Methyr Tudfill

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

APPENDIX F

SUMMARY OF CHEMICAL TEST RESULTS – MADE GROUND

SUMMARY OF LABORATORY SOIL TEST RESULTS

METALS AND SEMI-METALS

Job No.: 12888
 Site: Dragon Parc - Flood Channel Area
 Soil Type: Made Ground
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
1	S1	0.00-0.50	15	0.6	2.2	< 0.2	37	< 4.0	34	32	< 0.3	23	< 1.0	80	50
2	S2	0.00-0.50	16	0.8	1.3	< 0.2	12	< 4.0	37	29	< 0.3	40	< 1.0	25	82
3	S3	0.00-0.50	15	0.8	1.0	< 0.2	7.5	< 4.0	45	30	< 0.3	31	< 1.0	15	72
4	S4	0.00-0.50	12	1.0	1.4	< 0.2	9.1	< 4.0	35	23	< 0.3	24	< 1.0	14	59
5	S5	0.00-0.50	14	0.5	1.7	< 0.2	17	< 4.0	39	19	< 0.3	28	< 1.0	35	57
6	S6	0.00-0.50	48	0.6	1.5	< 0.2	14	< 4.0	83	100	< 0.3	40	< 1.0	31	130
7	S7	0.00-0.50	16	0.9	1.0	< 0.2	9.5	< 4.0	39	24	< 0.3	33	< 1.0	17	71
8	S8	0.00-0.50	11	0.3	0.79	< 0.2	15	< 4.0	17	30	< 0.3	18	< 1.0	18	92
9	S9	0.00-0.50	14	0.5	1.2	< 0.2	16	< 4.0	28	35	< 0.3	24	< 1.0	24	100
10	S10	0.00-0.50	12	0.7	1.2	< 0.2	16	< 4.0	19	31	< 0.3	16	< 1.0	20	87
15	TP1	0.50	9.1	2.1	1.0	< 0.2	8.8	< 4.0	56	22	< 0.3	33	< 1.0	16	63
17	TP7	0.40	22	1.9	2.1	< 0.2	28	< 4.0	91	110	< 0.3	30	< 1.0	57	99
19	TP11	0.50	15	1.1	0.96	< 0.2	8.4	< 4.0	62	29	0.6	36	4.3	16	64
Screening Criteria Value			170.0	46000.0	63.0	532.0	-	220.0	44000.0	1300.0	30.0	3400.0	1800.0	5000.0	170000.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	-	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

INORGANIC CHEMICALS & OTHERS

Job No.: 12888
 Site: Dragon Parc - Flood Channel Area
 Soil Type: Made Ground
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Phenol (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)	Equivalent SOM (%)	Asbestos in Soil	Asbestos Quantification (%)
1	S1	0.00-0.50	< 1.0	14.3	5.2	< 1.0	7.5	0.24	1400	440	4300	#N/A	<0.1	Not-detected	-
2	S2	0.00-0.50	< 1.0	19.2	8.6	< 1.0	8.2	1.7	5800	57	2500	#N/A	<0.1	Not-detected	-
3	S3	0.00-0.50	< 1.0	30.1	9.4	< 1.0	8.8	0.13	1200	7.4	1200	#N/A	<0.1	Not-detected	-
4	S4	0.00-0.50	< 1.0	24.2	13	< 1.0	10.0	0.27	4600	380	3500	#N/A	<0.1	Not-detected	-
5	S5	0.00-0.50	< 1.0	33.5	9.8	< 1.0	8.3	0.13	2000	120	2500	#N/A	<0.1	Not-detected	-
6	S6	0.00-0.50	< 1.0	42.4	16	< 1.0	7.8	0.049	880	2.7	1100	#N/A	<0.1	Not-detected	-
7	S7	0.00-0.50	< 1.0	24.4	7.3	< 1.0	8.4	0.090	880	5.2	1900	#N/A	<0.1	Not-detected	-
8	S8	0.00-0.50	< 1.0	5.2	16	< 1.0	7.8	0.91	2700	17	1300	#N/A	<0.1	Not-detected	-
9	S9	0.00-0.50	< 1.0	5.6	16	< 1.0	7.9	0.25	1100	17	680	#N/A	<0.1	Not-detected	-
10	S10	0.00-0.50	< 1.0	5.6	15	< 1.0	9.0	0.27	2400	94	1500	#N/A	<0.1	Not-detected	-
15	TP1	0.50	< 1	21.5	11	< 1.0	8.6	0.14	970	6.3	1000	#N/A	<0.1	Not-detected	-
17	TP7	0.40	< 1	16.8	9.7	< 1.0	8.4	0.19	2100	450	2100	#N/A	<0.1	Not-detected	-
19	TP11	0.50	< 1	24.4	9.6	< 1.0	8.1	0.15	1200	< 1.0	790	#N/A	<0.1	Not-detected	-
Screening Criteria Value			34.0	-	-	760.0	-	-	-	-	-	-	-	-	0.001
Source of Screening Criteria Value			ATRISK	-	-	S4UL	-	-	-	-	-	-	-	-	IOM

SUMMARY OF LABORATORY SOIL TEST RESULTS

POLYAROMATIC HYDROCARBONS (PAH)

Job No.: 12888
 Site: Dragon Parc - Flood Channel Area
 Soil Type: Made Ground
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
1	S1	0.00-0.50	0.25	< 0.05	0.22	0.23	< 0.05	0.25	< 0.05	0.18	0.43	< 0.05	0.74	0.32	< 0.05	0.90	1.5	0.54
2	S2	0.00-0.50	< 0.05	< 0.05	< 0.05	0.55	0.39	0.59	0.24	0.56	0.90	< 0.05	1.0	< 0.05	0.25	1.0	1.6	0.64
3	S3	0.00-0.50	1.2	0.33	1.2	1.6	2.1	2.5	1.1	2.1	2.1	0.49	2.7	1.1	1.2	2.8	4.5	1.9
4	S4	0.00-0.50	0.67	< 0.05	0.76	1.2	1.2	1.6	0.68	0.84	1.6	0.27	2.3	0.79	0.68	2.3	3.4	1.7
5	S5	0.00-0.50	< 0.05	< 0.05	< 0.05	0.20	< 0.05	0.28	< 0.05	0.21	0.53	< 0.05	0.33	< 0.05	< 0.05	0.84	1.3	0.23
6	S6	0.00-0.50	0.71	< 0.05	0.88	1.3	1.0	1.7	0.58	1.3	1.8	0.32	2.4	0.78	0.71	2.3	4.8	1.6
7	S7	0.00-0.50	6.8	< 0.05	4.1	7.3	5.1	6.1	2.2	3.1	5.3	0.93	12	6.4	2.4	8.1	17	8.3
8	S8	0.00-0.50	< 0.05	< 0.05	< 0.05	0.28	0.23	0.28	< 0.05	0.15	0.31	< 0.05	0.42	< 0.05	< 0.05	< 0.05	0.33	0.30
9	S9	0.00-0.50	< 0.05	< 0.05	< 0.05	0.41	0.47	0.57	0.26	0.27	0.53	< 0.05	0.57	< 0.05	0.26	< 0.05	0.33	0.49
10	S10	0.00-0.50	< 0.05	< 0.05	< 0.05	0.58	0.63	0.78	0.35	0.41	0.73	< 0.05	0.85	< 0.05	0.35	< 0.05	0.53	0.66
15	TP1	0.50	< 0.05	< 0.05	0.23	0.49	< 0.05	< 0.05	< 0.05	< 0.05	0.26	< 0.05	0.74	< 0.05	< 0.05	0.80	1.4	0.57
17	TP7	0.40	< 0.05	< 0.05	0.16	0.61	0.55	0.52	0.32	0.53	0.66	< 0.05	0.77	< 0.05	0.26	0.36	0.86	0.62
19	TP11	0.50	0.36	< 0.05	0.42	1.4	0.87	1.3	0.53	0.70	0.94	< 0.05	1.7	0.22	0.53	0.94	2.1	1.2
Screening Criteria Value			29000.0	29000.0	150000.0	49.0	11.0	13.0	1400.0	370.0	93.0	1.10	6300.0	20000.0	150.0	1200.0	6200.0	15000.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

PETROLEUM HYDROCARBONS

Job No.: 12888
 Site: Dragon Parc - Flood Channel Area
 Soil Type: Made Ground
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Aliphatic C5-C6 (mg/kg)	Aliphatic C6-C8 (mg/kg)	Aliphatic C8-C10 (mg/kg)	Aliphatic C10- C12 EPH (mg/kg)	Aliphatic C12- C16 EPH (mg/kg)	Aliphatic C16-C35 EPH (mg/kg)	Aliphatic C35- C44 EPH (mg/kg)	Aromatic C5-C7 (mg/kg)	Aromatic C7-C8 (mg/kg)	Aromatic C8-C10 (mg/kg)	Aromatic C10- C12 EPH (mg/kg)	Aromatic C12- C16 EPH (mg/kg)	Aromatic C16- C21 EPH (mg/kg)	Aromatic C21- C35 EPH (mg/kg)	Aromatic C35- C40 EPH (mg/kg)
1	S1	0.00-0.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
2	S2	0.00-0.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
3	S3	0.00-0.50	< 0.001	< 0.001	< 0.001	1.4	12	75	32	< 0.001	< 0.001	< 0.001	< 1.0	5.4	17	23	< 8.4
4	S4	0.00-0.50	< 0.001	< 0.001	< 0.001	1.2	11	62	17	< 0.001	< 0.001	< 0.001	< 1.0	6.1	10	12	< 8.4
5	S5	0.00-0.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
6	S6	0.00-0.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	1.4	4.0	< 10	12	< 8.4
7	S7	0.00-0.50	< 0.001	< 0.001	< 0.001	1.6	8.8	49	21	< 0.001	< 0.001	< 0.001	9.7	22	33	35	< 8.4
8	S8	0.00-0.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	11	< 8.4
9	S9	0.00-0.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	11	< 8.4
10	S10	0.00-0.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	11	< 8.4
15	TP1	0.50	< 0.001	< 0.001	< 0.001	1.7	10	53	< 8.4	< 0.001	< 0.001	< 0.001	2.2	9.9	21	46	< 8.4
17	TP7	0.40	< 0.001	< 0.001	< 0.001	< 1.0	2.2	37	16	< 0.001	< 0.001	< 0.001	< 1.0	3.8	13	75	< 8.4
19	TP11	0.50	< 0.001	< 0.001	< 0.001	2.0	4.9	140	16	< 0.001	< 0.001	< 0.001	< 1.0	4.6	18	110	< 8.4
Screening Criteria Value			95000.0	150000.0	14000.0	21000.0	25000.0	450000.0	450000.0	76000.0	87000.0	7200.0	9200.0	10000.0	7600.0	78000.0	78000.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

METALS AND SEMI-METALS

Job No.: 12888
 Site: Dragon Parc - Tank Validation
 Soil Type: Made Ground
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
1	TB1	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TB2	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-
3	TS1	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-
4	TS2	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-
5	TS3	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-
6	TS4	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-
7	TE1	None Supplied	26	0.9	1.1	< 0.2	8.9	< 4.0	60	44	1.1	41	< 1.0	22	97
8	TE2	None Supplied	13	0.5	0.97	< 0.2	11	< 4.0	40	22	< 0.3	27	< 1.0	15	70
Screening Criteria Value			170.0	46000.0	63.0	532.0	-	220.0	44000.0	1300.0	30.0	3400.0	1800.0	5000.0	170000.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	-	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

INORGANIC CHEMICALS & OTHERS

Job No.: 12888
 Site: Dragon Parc - Tank Validation
 Soil Type: Made Ground
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Phenol (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)	Equivalent SOM (%)	Asbestos in Soil	Asbestos Quantification (%)
1	TB1	None Supplied	-	-	14	-	-	-	-	-	-	#N/A	<0.1	-	#N/A
2	TB2	None Supplied	-	-	10	-	-	-	-	-	-	#N/A	<0.1	-	#N/A
3	TS1	None Supplied	-	-	11	-	-	-	-	-	-	#N/A	<0.1	-	#N/A
4	TS2	None Supplied	-	-	10	-	-	-	-	-	-	#N/A	<0.1	-	#N/A
5	TS3	None Supplied	-	-	8.9	-	-	-	-	-	-	#N/A	<0.1	-	#N/A
6	TS4	None Supplied	-	-	14	-	-	-	-	-	-	#N/A	<0.1	-	#N/A
7	TE1	None Supplied	< 1.0	45.0	15	< 1.0	8.4	0.27	2200	4.5	1900	#N/A	<0.1	Not-detected	#N/A
8	TE2	None Supplied	< 1.0	28.5	11	< 1.0	11.0	0.024	2600	7.4	2200	#N/A	<0.1	Not-detected	#N/A
Screening Criteria Value			34.0	-	-	760.0	-	-	-	-	-	-	-	-	0.001
Source of Screening Criteria Value			ATRISK	-	-	S4UL	-	-	-	-	-	-	-	-	IOM

SUMMARY OF LABORATORY SOIL TEST RESULTS

POLYAROMATIC HYDROCARBONS (PAH)

Job No.: 12888
 Site: Dragon Parc - Tank Validation
 Soil Type: Made Ground
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
1	TB1	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TB2	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	TS1	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	TS2	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	TS3	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	TS4	None Supplied	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	TE1	None Supplied	< 0.05	< 0.05	0.28	0.62	0.51	0.83	0.31	0.44	0.92	< 0.05	0.99	0.31	0.29	1.1	2.0	0.76
8	TE2	None Supplied	0.48	< 0.05	0.60	2.1	1.4	1.9	0.67	1.2	1.9	0.32	3.1	0.54	0.68	1.2	3.1	2.1
Screening Criteria Value			29000.0	29000.0	150000.0	49.0	11.0	13.0	1400.0	370.0	93.0	1.10	6300.0	20000.0	150.0	1200.0	6200.0	15000.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

PETROLEUM HYDROCARBONS

Job No.: 12888
 Site: Dragon Parc - Tank Validation
 Soil Type: Made Ground
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Aliphatic C5-C6 (mg/kg)	Aliphatic C6-C8 (mg/kg)	Aliphatic C8-C10 (mg/kg)	Aliphatic C10- C12 EPH (mg/kg)	Aliphatic C12- C16 EPH (mg/kg)	Aliphatic C16-C35 EPH (mg/kg)	Aliphatic C35- C44 EPH (mg/kg)	Aromatic C5-C7 (mg/kg)	Aromatic C7-C8 (mg/kg)	Aromatic C8-C10 (mg/kg)	Aromatic C10- C12 EPH (mg/kg)	Aromatic C12- C16 EPH (mg/kg)	Aromatic C16- C21 EPH (mg/kg)	Aromatic C21- C35 EPH (mg/kg)	Aromatic C35- C40 EPH (mg/kg)
1	TB1	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
2	TB2	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
3	TS1	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
4	TS2	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
5	TS3	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
6	TS4	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
7	TE1	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	11	< 8.4
8	TE2	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	3.4	11	< 10	< 8.4
Screening Criteria Value			95000.0	150000.0	14000.0	21000.0	25000.0	450000.0	450000.0	76000.0	87000.0	7200.0	9200.0	10000.0	7600.0	78000.0	78000.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

APPENDIX G

SUMMARY OF CHEMICAL TEST RESULTS – LEACHATE

Determinand	Unit	Sample Location					Guideline Value		
		S1 @ 0.00-0.50m	S3 @ 0.00-0.50m	S5 @ 0.00-0.50m	S7 @ 0.00-0.50m	S9 @ 0.00-0.50m	MAC-EQS Other Surface Water C4 100 - <200mg/lCa CO3	Freshwater AA-EQS >100- 150mg/l CaCO3	UK (England and Wales) Drinking Water Standards
Metals and Non-Metals	Arsenic	µg/l	2.70	5.10	4.60	8.10	5.10	-	10
	Beryllium	µg/l	0.30	0.30	0.30	< 0.2	0.20	-	-
	Boron	µg/l	19	24	13	40	24	-	1000
	Cadmium	µg/l	0.26	< 0.08	< 0.08	0.31	0.22	-	5
	Calcium	µg/l	4.80	8.40	9.50	12.00	15.00	-	-
	Chromium	µg/l	0.80	0.90	0.60	0.70	1.00	32	50
	Copper	µg/l	20.00	15.00	10.00	23.00	23.00	-	2000
	Cyanide	µg/l	< 10	< 10	< 10	< 10	< 10	5	50
	Lead	µg/l	5.30	3.20	2.00	2.10	4.50	14	10
	Mercury	µg/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.07	1
	Nickel	µg/l	3.90	3.50	3.60	2.80	3.70	34	20
	pH	pH Units	7.7	8.1	7.9	7.8	7.9	-	-
	Selenium	µg/l	8.80	9.90	5.50	5.80	< 4.0	-	10
	Sulphate as SO4	µg/l	10400.00	14900.00	12100.00	31300.00	14700.00	-	250000
	Sulphide	µg/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	-	0.25
	Vanadium	µg/l	7.20	2.60	< 1.7	5.10	< 1.7	-	20
	Zinc	µg/l	7.40	11.00	9.10	11.00	8.80	-	5000
PAH	Acenaphthene	µg/l	< 0.01	< 0.01	< 0.01	2.70	< 0.01	-	10
	Acenaphthylene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	10
	Anthracene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.1	0.1
	Benzo (a) anthracene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	10
	Benzo (g,h,i) perylene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.00082	-
	Benzo (a) pyrene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.027	0.00017
	Benzo (b) fluoranthene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.017	-
	Benzo (k) fluoranthene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.017	-
	Chrysene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	10
	Dibenz (a,h) anthracene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	10
	Fluoranthene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.12	0.0063
	Fluorene	µg/l	< 0.01	< 0.01	< 0.01	0.62	< 0.01	-	10
	Indeno (1,2,3) cd pyrene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-
	Naphthalene	µg/l	< 0.01	< 0.01	< 0.01	1.00	< 0.01	130	2
	Phenanthrene	µg/l	< 0.01	< 0.01	< 0.01	0.51	< 0.01	-	10
	Pyrene	µg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	10
BTEX	Benzene	µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	10
	Toluene	µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	74
	Ethylbenzene	µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	300
	p & m-xylene	µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	500
	o-xylene	µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	500
TPH (C10 - C40)		µg/l	< 10	< 10	< 10	< 10	< 10	-	10

Notes:

Benzo(a)pyrene is used as an indicator for PAH contamination.

EQS for Benzene used for all VPH/EPH compounds

* denotes site-specific PNEC concentration (derived using WFD m-Batt Tool and Lead Screening Tool)

Results exceeding the AA-EQS value, or the most conservative EQS/UKDWS guideline value where AA-EQS values are unavailable, are highlighted in **red bold type****Sources:**

MAC-EQS and AA-EQS values sourced from the Environment Agency/Water Framework Directive

Drinking Water Standards sourced from The Water Supply (Water Quality) Regulations 2018 Water, England and Wales: 2018 No.647 (W.121)

FIGURES



NORTH

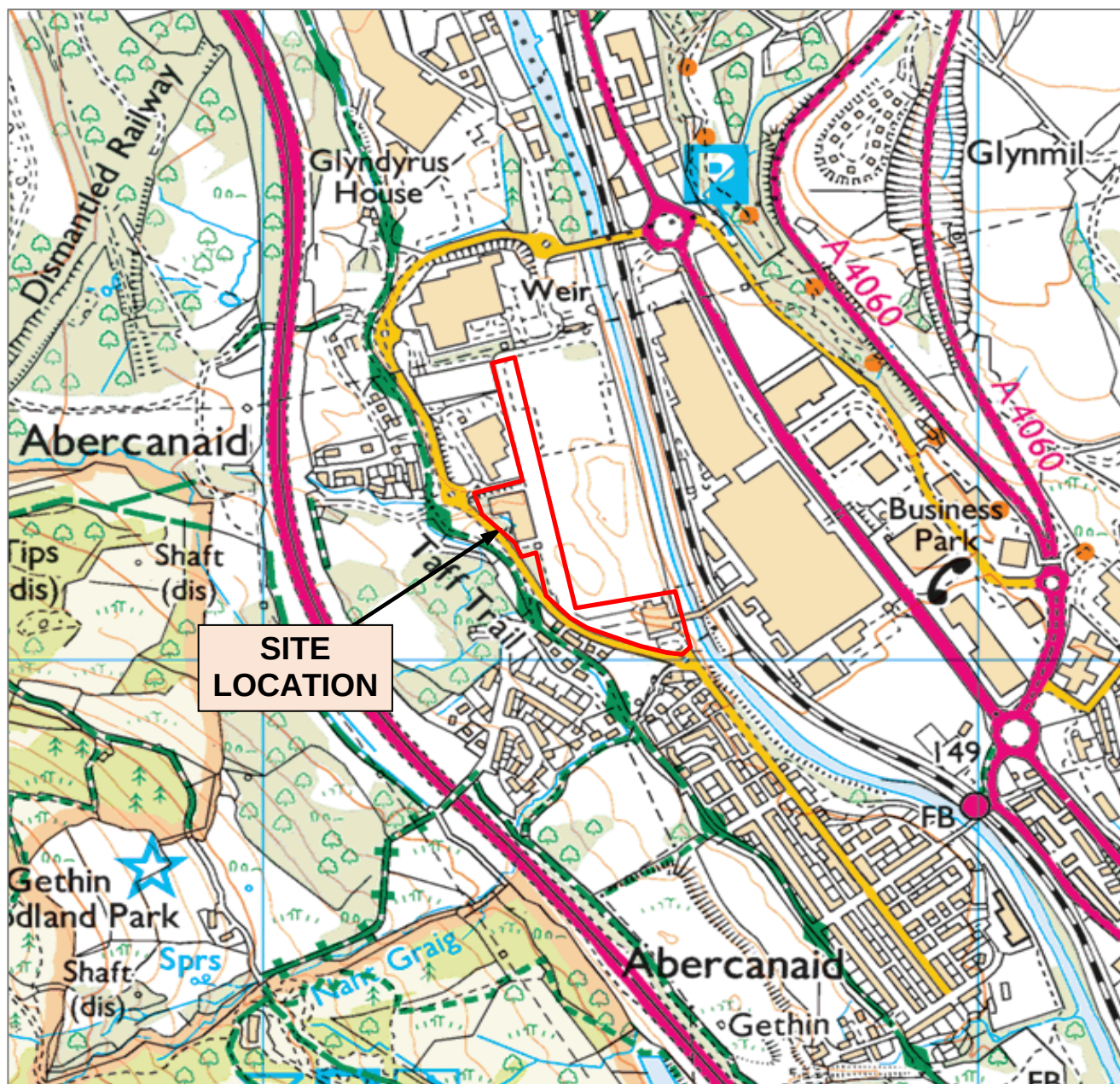


FIGURE 1: SITE LOCATION

Drainage Channel, Dragon Parc

Intégral
Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991
Fax: 029 2086 2176

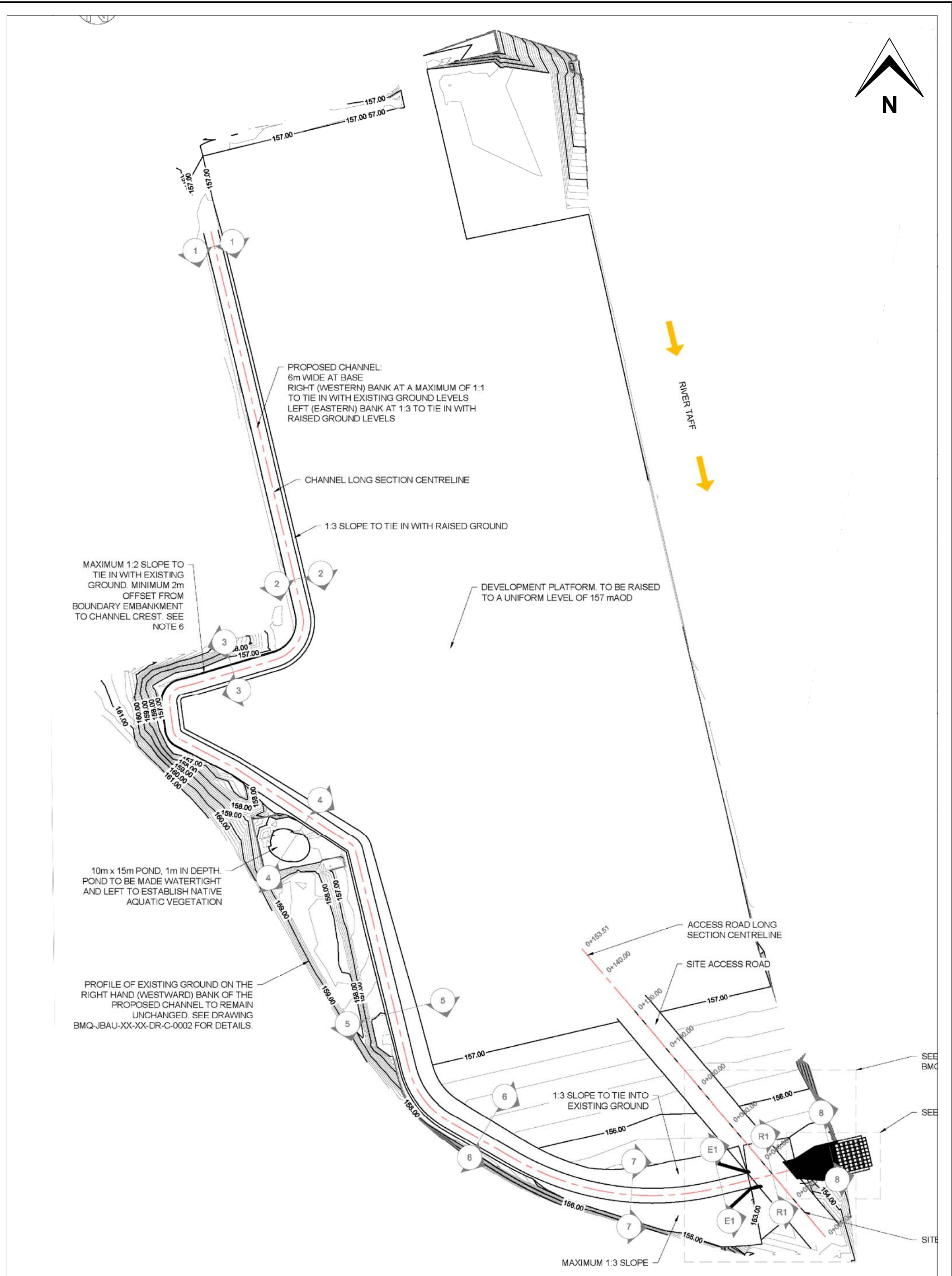


Figure 2: General Arrangement Plan

Project: Drainage Channel, Dragon Parc

Client: Davies Homes

Job No.: 12888

Scale: NTS

Intégral
Géotechnique

Integral House,
 7 Beddau Way,
 Castlegate Business Park,
 Caerphilly,
 CF83 2AX.
 Tel: 029 2080 7991

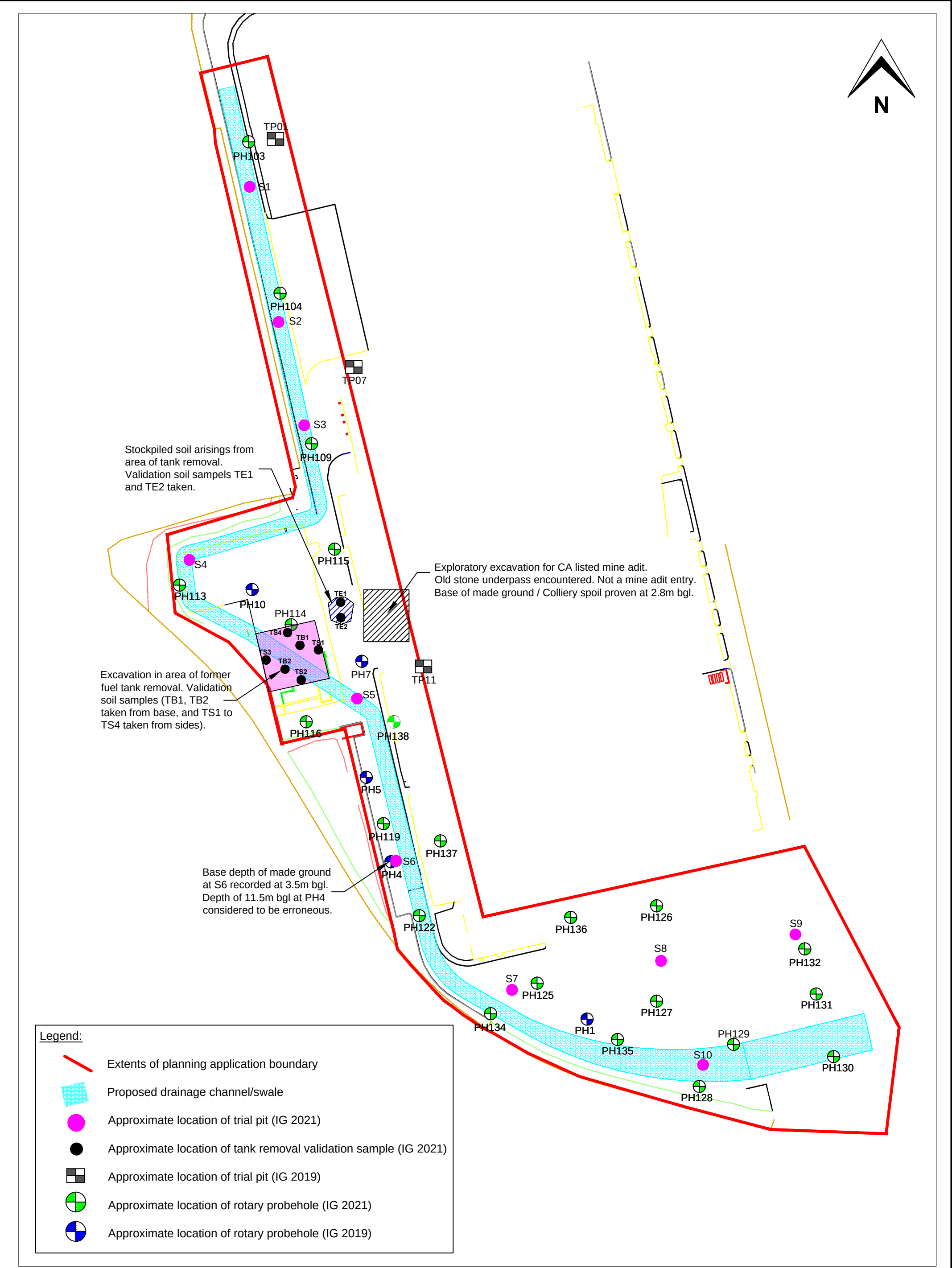


Figure 3: Exploratory Hole Location Plan