



**Garth Isaf Farm
Efail Isaf,
Pontypridd,
Rhondda Cynon Taff
CF38 1SN**

SITE CONDITION REPORT (Inc. HISTORICAL FILL)

**Concerning the use of recovered material from Inert/Non-Hazardous Construction
Waste**

Reference Number RJPH WAST-004 HIST

Rev. No	Date	Description	Approved	Issued
000	18 Jun 2018	First issue	PB	
001	04 Aug 2018	Review and rebrand as Site Condition Report	PB	
002	07 Sept 2018	Review and update for issue	PB	
003	20 Sept 2018	Revised at time of application	PB	
004	04 Oct 2018	Revised after GDH review	PB	
005	09 Nov 2018	Review and update for Permit Application	PB	

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1. Historical Fill

1.1 Description of the Historical Works and Principal Quantities

The works concerned have been completed between the approximate period of 2004-2017 and broadly cover the area from the western boundary along the Nant y Felin stream, eastwards to the access lane leading into Garth Isaf Farm covering some 4.7 hectares. Part of the area, some 3 hectares, is covered by an existing planning permission, reference 03/1595/10, with the remaining area being subject to a new application, Portal Refence PP-07264905, RCT Planning reference 18/1030/10¹, submitted early September 2018. It must be noted that certain areas of the site are incomplete against the 2003 planning and, in the proposed lake area, levels are higher than the proposed 2003 design. This revision was due to safety concerns which resulted in the depth of water being reduced from 2m to 1m and the side slopes being flattened from 1:2 (v:h) to 1:3 (v:h) or flatter. This change, illustrated in Figure 1, resulted in the cross section of the lake raising levels to the lake invert and towards the manège area.

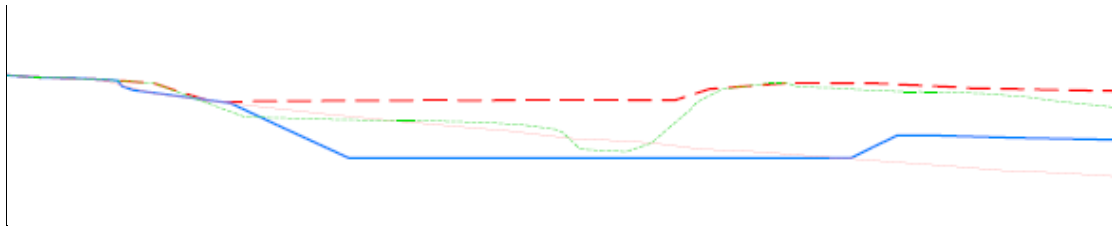


Figure 1: Blue line is 2003 design, Red dotted line is revised design for 2018 application, Green line is as existing 2018

This change has been discussed with RCT Planning and it has been agreed that the area can be viewed as isolated from the 2003 consent and included in the new 2018 application. This application has been submitted and, at time of writing, is under consideration via planning reference 18/1030/10. Notwithstanding the above, the area has also been included in the Ground Contamination Report under the historical fill aspect and so any material placed has been considered as part of the existing site conditions.

To establish quantities relating to the historical fill, an isopachyte exercise, to compare the existing ground survey of circa 2003 and a similar survey completed in 2017-18, was completed by CD Gray & Associates, who are professional consulting and design engineers.

¹ Confirmed planning reference from RCT Planning Department

The exercise shows the depths of fill in various areas of the site and calculates the difference in between the surfaces as m³. The exercise generated a volume of some 85,711 m³ of material had been placed during the period between the surveys, however, this included temporary stockpiles that when removed, leaves an adjusted volume of some 69,313 m³².

Using a conversion factor of 1.442 tonnes per m³ from BS 648³, this generated an estimated tonnage of 99,949 tonnes of recovered waste as being placed to site during the referred period.

While few records if any exist on this material, it is presumed that the recovery procedure for this material, from waste to non-waste, would be of like to the current Quality Management System etc., and the material placed is considered a non-waste by recovery, placed under whatever Quality Management System was in place at the time.

To confirm that material placed was, in fact, acceptable for adoption in-situ, an external geotechnical consultant, CJ Associates Geotechnical Ltd., was commissioned to complete a site investigation, based on the isopachyte survey comparison 2003-2018, and produce a Ground Contamination Report. A copy of the comparison survey, together with the Ground Contamination Report, is included by attachment.

² Estimated volume

³ BS 648 – While being withdrawn is still widely used by the construction industry

1.2 Special Requirements to Statutory Bodies

The following Statutory Undertakers have been identified as having apparatus or an interest in the works completed as historical fill.

Natural Resources Wales	Environmental permits, watercourses etc.
Electricity	Overhead power lines and pylons
Gas	High pressure gas main
	Intermediate pressure gas main
Water	No identified services in works areas
RCTCBC	Local Authority, Planning etc. Development Constraints
Coal Authority	Risks from former coal mining activities

1.3 Project Constraints

The site operated under various exemptions, and planning permission as referred to above, over the period concerned, it is considered that common constraints relevant to the activities included that no works shall be carried out:

- Within 10m of any watercourse
- Within 50m from any well, spring or borehole not used to supply water for domestic or food production purposes; and
- Within 50m from any well, spring or borehole used for the supply of water for human consumption. This must include private water supplies.
- Within 250m of the presence of Great Crested Newts, where it is linked to the breeding ponds of the newts by good habitat;
- Within 50m of a site that has relevant species or habitats protected under the Biodiversity Action Plan that Natural Resources Wales considers at risk to this activity are any National Nature Reserve (NNR), Local Nature Reserve (LNR), Local Wildlife Site (LWS), Ancient woodland or Scheduled Ancient Monument
- Outside the minimum recommended safe clearance levels to overhead cables
- Under the safe depth of cover to buried gas mains

There are no records of any of these common constraints being breached by any waste recovery or filling activities during the period.

1.4 Register of Drawings and Figures

Table 1 below provides a schedule of drawings that would have been the working drawings for any material placed during the 2003-2018 period, together with the 2018 survey and isopachyte drawing that was used to establish volumes etc.

Drawing No.	Title	Rev
GIF-2018 PAA-001	Site Location	B
CDGA-6940-01	Existing Site Layout, 2003	0
CDGA-6940-02	Proposed Site Layout - Planning April 2003	C
CDGA-6940-03	Sections – Planning April 2003	A
CDGA-6940-01	Existing Site Layout – March 2018	B
CDGA-9439-SK09	Isopachyte Analysis (with comments)	P1
CDGA-9439-SK11	Existing Pylons – Distance above ground	P1
RJPH NRW 18-003	Site Drainage Plan	A

1.5 Register of related documents

This Historical Fill Report sets out in detail elements of waste recovered as non-waste during the period 2003 to 2018, used to complete a portion of the works. It forms part of a suite of documents relevant to waste recovery at Garth Isaf Farm, CF38 1SN (the Documents) and therefore should be read in conjunction with

RJPH WAST 001 –	Waste Recovery Plan
RJPH WAST 002 –	Construction Quality Assurance Plan
RJPHWAST 002A –	Quality Management System
RJPH WAST 003 –	Specification for the Works
RJPH WAST 004 –	Site Condition Report (Including Historical Fill)
RJPH WAST 005 –	Environmental Action Plan

where any ambiguity is found between documents, then the more specific/onerous detail is to be considered dominant.

1.6 Working Hours

Although no records exist relating to working hours during 2003-2018, it is considered that they would be as per the current working hours. As such, unless otherwise required for operational and emergency repairs, work would have likely to be confined to the following working hours:

Mon-Fri	0800-1800
Sat	0800-1300
Sun and Bank Holidays	No working

2. Site Condition Report

Stage 1 – (At permit application)

2.1 Site Details

Name of Applicant	
Activity Address	Garth Isaf Farm Efail Isaf Pontypridd CF38 1SN
National Grid Reference	ST 094842
Document reference and dates for Site Condition Report at permit application and surrender	RJPH WAST-004 HIST v5, 09 Nov 2018
Document references for site plans (including location and boundaries)	See Table 1

2.2 Condition of the land at permit issue

Environmental setting including <ul style="list-style-type: none"> • Geology • Hydrogeology • Surface waters 	See Table 1
Pollution history including <ul style="list-style-type: none"> • Pollution incidents that may have affected land • Historical land-uses and associated contaminants • Any visual/olfactory evidence of existing contamination • Evidence of damage to pollution prevention measures 	<p>There are no records of any pollution incidents to the site.</p> <p>Historical land-uses are mainly of agricultural activities, with ad hoc improvements by filling low lying depressions etc.</p> <p>There is no visual/olfactory evidence of existing contamination.</p> <p>There is no evidence of any damage to pollution prevention measures</p> <p>Refer to Land Contamination Report by CJ Associates 2018 which states that any risks of contamination are very low.</p>
Baseline soil and groundwater reference data	Unknown for period 2003-2018

2.3 Permitted activities

Permitted activities	Refer to Table 1 for drawing showing 2018 existing site layout for processing area and stockpiles existing at the time of application.
Non-permitted activities undertaken	None known during period

Stage 2 - During life of permit - Maintain Sections 2.4 – 2.7

2.4 Changes to the activity

Have there been any changes to the activity boundary?	<i>If yes, provide a plan showing the changes to the activity boundary</i>
Have there been any changes to the permitted activities?	<i>If yes, provide a description of the changes to the permitted activities</i>
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	<i>If yes, include a list of them</i>
Checklist of supporting information	<ul style="list-style-type: none"> <i>Plan showing any changes to the boundary (where relevant)</i> <i>Description of the changes to the permitted activities (Where relevant)</i> <i>List of 'dangerous substances' produced by the permitted activities that were not identified in the Application Site Condition Report (where relevant)</i>

2.5 Measures to be taken to protect land

Use records collected during the life of the permit to summarise whether pollution prevention measures worked. If no records kept, then land/groundwater data may be required to assess whether the land has deteriorated.

Checklist of supporting information	<ul style="list-style-type: none"> <i>Inspection records and summary of findings of inspections for all pollution prevention measures</i> <i>Records of maintenance, repair and replacement of pollution prevention measures</i>
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2.6 Pollution incidents that may have had an impact on land, and their remediation

Summarise any pollution incidents that may have damaged the land. Describe how investigated and remediated. If no records are kept, then land and/or groundwater reference data may be required to assess whether the land has deteriorated during the activities

Checklist of supporting information	<ul style="list-style-type: none"> <i>Records of pollution incidents that may have impacted on the land, or a periodical statement that has not been any pollution incidents.</i> <i>If incidents occurred, records of their investigation and remediation</i>
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2.7 Soil gas and water quality monitoring (where undertaken)

Provide details of any soil gas and/or water monitoring carried out during the permit. Maintain a tracker to show whether the land has deteriorated because of the permitted activities. If so, outline any investigation and remedial works completed.

Checklist of supporting information	<ul style="list-style-type: none"> • <i>Description of soil gas and/or water monitoring undertaken</i> • <i>Monitoring results (including graphs)</i>
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Stage 3 - At surrender – Add new reference in 2.1, complete Sections 2.8 – 2.10 and submit with the Permit Surrender application.

2.8 Decommissioning and removal of pollution risk

Description of how the site was decommissioned. Include demonstration that all sources of pollution risk have been removed. Describe whether the decommissioning had any impact on the land including an outline of how this was investigated, and any remediation required.

Checklist of supporting information	<ul style="list-style-type: none"> • <i>Site Closure Plan</i> • <i>List of potential sources of pollution risk</i> • <i>Investigation and remediation reports (where relevant)</i>
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2.9 Refence data and remediation (where relevant)

Include a statement of whether there was a requirement to collect land and ground/water data. If no requirement, because the information from 2.3-2.6 of the Surrender Site Condition Report showed that the land has not deteriorated.

If reference data was collected, summarise what this entailed, and any results derived from the data. The statement should include whether the condition of the land has deteriorated, or whether the land at the site is in a “satisfactory state”. If the land has deteriorated, then the statement should include what was done to remediate the land for it to be in a “satisfactory state” at surrender.

Checklist of supporting information	<ul style="list-style-type: none"> • <i>Land and/or groundwater data collected at application (if collected)</i> • <i>Lan and/or groundwater data collected at surrender (where needed)</i> • <i>Assessment of satisfactory state</i> • <i>Remediation and verification reports (where undertaken)</i>
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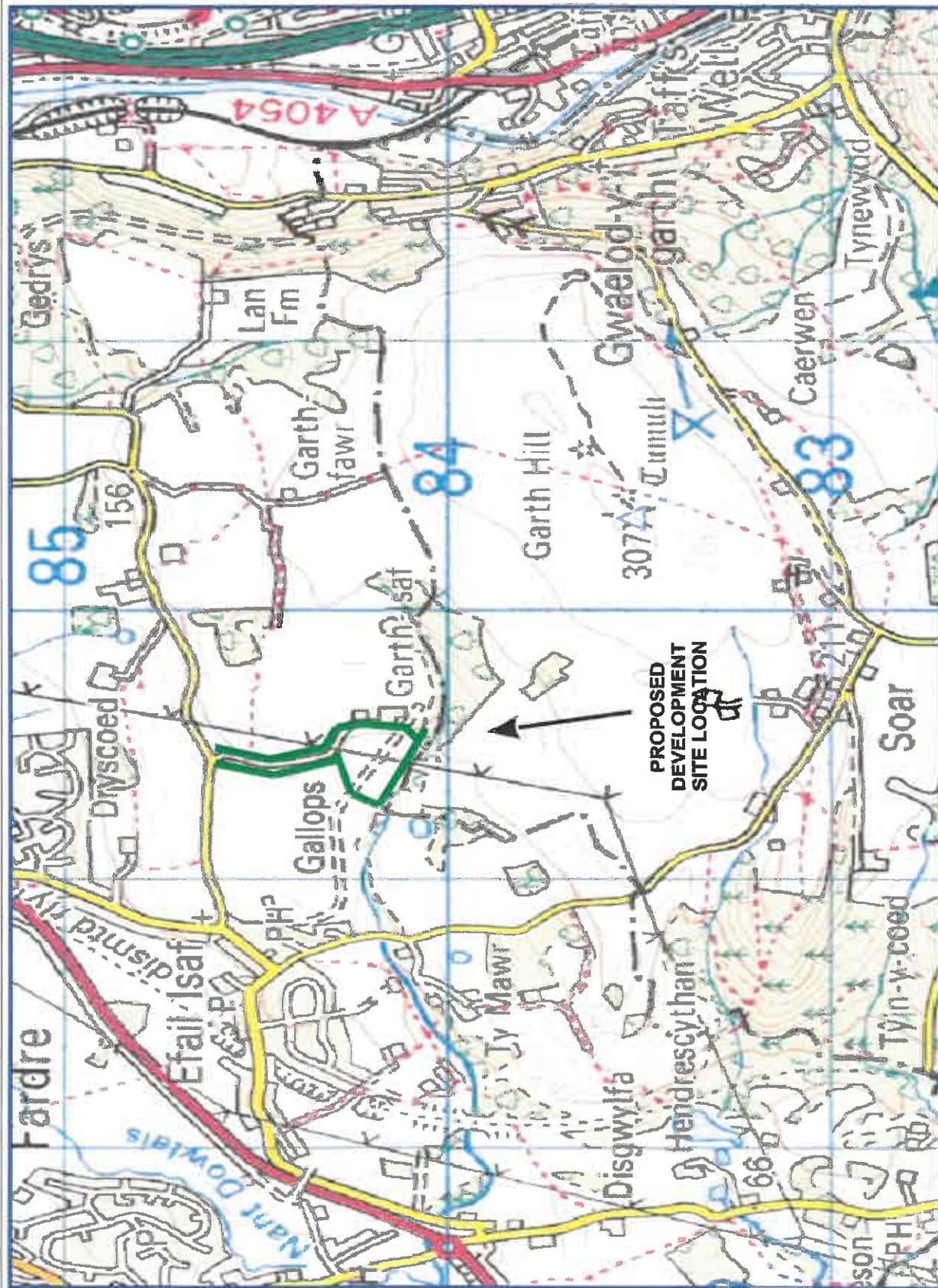
2.10 Statement of site condition

Using the information from sections 2.3 – 2.7, issue a statement about the condition of the land at the site. The statement should confirm that:

- The permitted activities have stopped
- Decommissioning is complete, and any pollution risk has been removed.
- Th land is in a satisfactory condition.

LEGEND

Proposed works area



GARTH ISAF FARM
EFAIL ISAF
CF38 1SN

Garth Isaf Farm
Efail Isaf
Pontypridd
Rhonda Cynon Taff
CF38 1SN
T: 01443 20273

GARTH ISAF FARM, EFAIL ISAF

RE-PROFILING PLAN

SITE LOCATION

GIF-2018 PAA - 001 Rev B

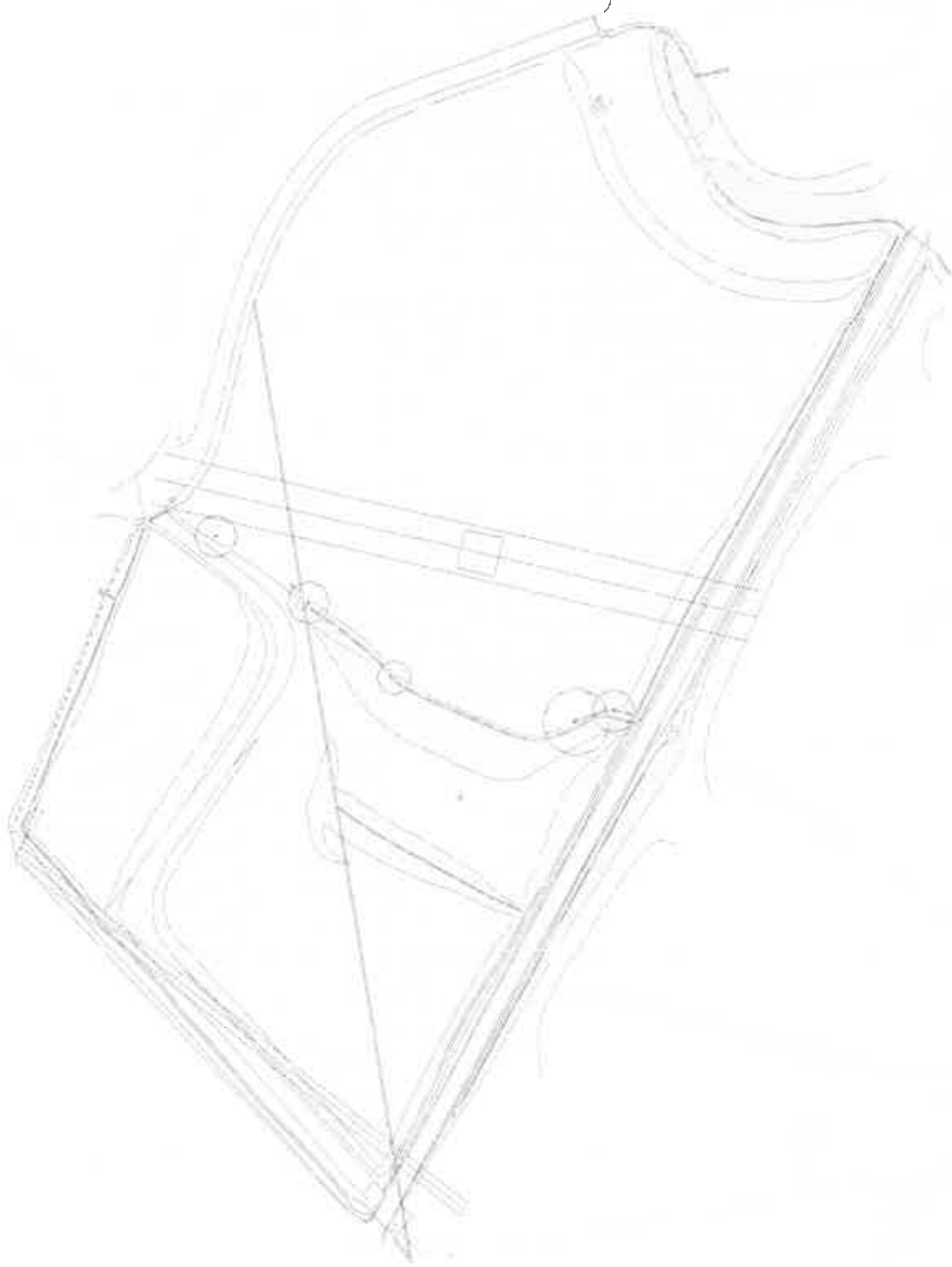
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Sept 2018

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C.D. GRAY & ASSOCIATES LTD
Geotechnical and Structural Engineers
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D.H. JONES

GARTH ISAF FARM
EFALL ISAF

EXISTING SITE LAYOUT

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NOTES:

1. THIS DRAWING IS A PRELIMINARY DESIGN AND IS NOT TO BE USED FOR CONSTRUCTION.
2. THE DESIGNER HAS CONDUCTED VISUAL ANALYSIS OF THE PROPOSED DEVELOPMENT AND HAS DETERMINED THAT THE PROPOSED DEVELOPMENT IS VISUALLY COMPATIBLE WITH THE SURROUNDING LANDSCAPE.
3. THE DESIGNER HAS CONDUCTED VISUAL ANALYSIS OF THE PROPOSED DEVELOPMENT AND HAS DETERMINED THAT THE PROPOSED DEVELOPMENT IS VISUALLY COMPATIBLE WITH THE SURROUNDING LANDSCAPE.
4. THE DESIGNER HAS CONDUCTED VISUAL ANALYSIS OF THE PROPOSED DEVELOPMENT AND HAS DETERMINED THAT THE PROPOSED DEVELOPMENT IS VISUALLY COMPATIBLE WITH THE SURROUNDING LANDSCAPE.
5. THE DESIGNER HAS CONDUCTED VISUAL ANALYSIS OF THE PROPOSED DEVELOPMENT AND HAS DETERMINED THAT THE PROPOSED DEVELOPMENT IS VISUALLY COMPATIBLE WITH THE SURROUNDING LANDSCAPE.



FOR INFORMATION					
CDGray					
D.H. JONES					
GARTH-ISA FARM					
EXISTING SITE LAYOUT					
DATE	BY	REV	BY	REV	BY
12/24/2018	CD	01			
1:500					

SURFACE LEVEL DATA			
AREA	AREA (m²)	LEVEL (m)	COLOUR
1	4.07	0.00	Red
2	1.00	0.00	Red
3	3.00	0.00	Red
4	0.00	0.00	Red
5	0.00	0.00	Red
6	0.00	0.00	Red
7	0.00	0.00	Red
8	0.00	0.00	Red
9	0.00	0.00	Red
10	0.00	0.00	Red



Microbial film 203 v 2018
 = 85,711 m³
 BEDDING STOCKPILES, FEED +
 COMPOST @ - 16,398 m³
 = 69,313 m³ ADJUSTED.
 @ 1.442 t/m³ = 99,949 TONNES

R. Jones June 2018

PRELIMINARY

CD

10/10/2018

RYAN JONES GROUP

GARTH ISAF FARM

ISO-MACHYTE ANALYSIS

10/10/2018

← DIRECTION OF FLOW

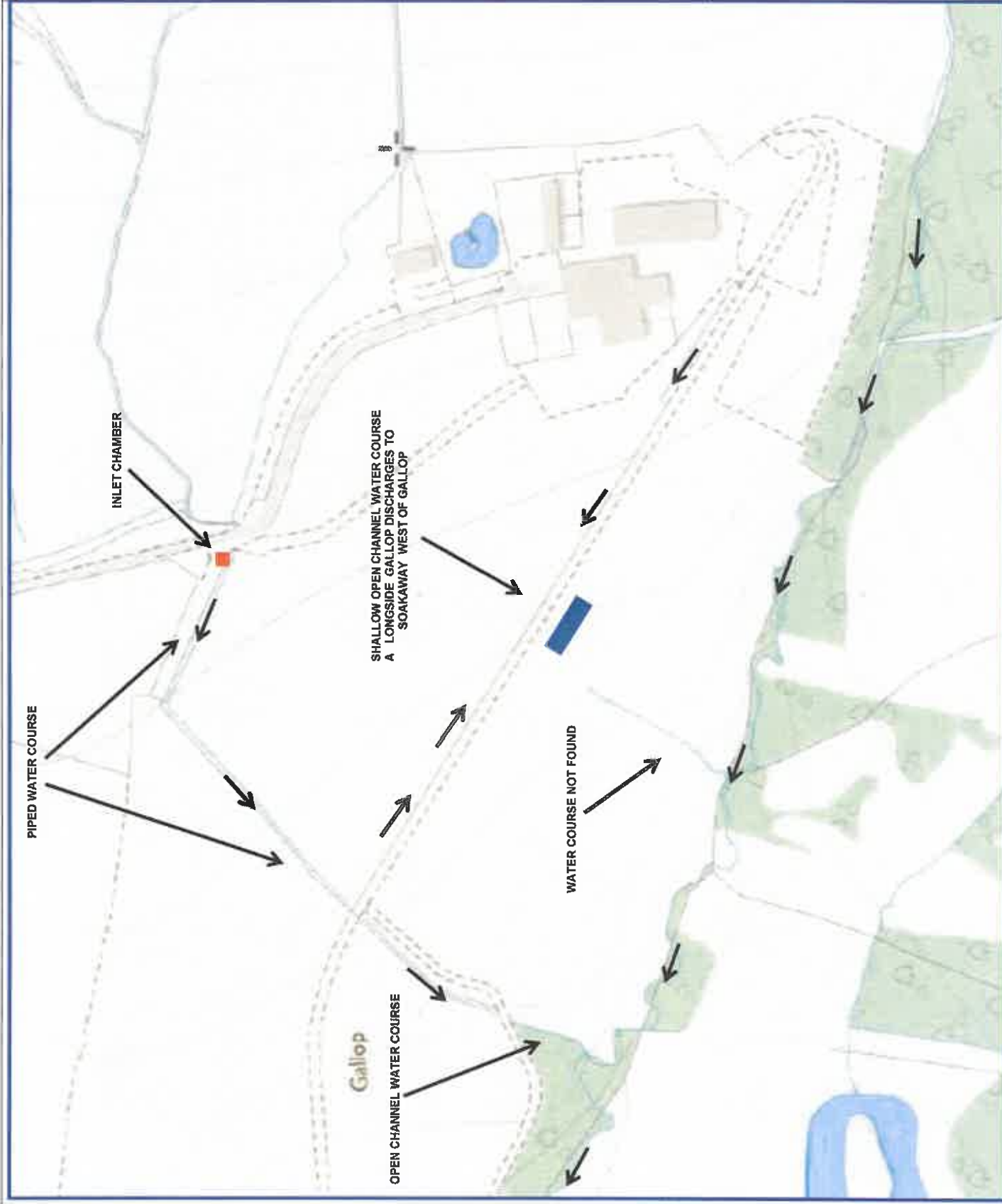


Garth Isaf Farm
Efail Isaf
Pontypridd
Rheoldda Cynon Taff
CF35 7SN

GARTH ISAF FARM, EFAIL ISAF
WASTE MANAGEMENT PLAN
SITE DRAINAGE PLAN

RJPH NRW 17 - 005 Rev A

Scale BESPOKE SCALE Date Oct 2017



Site Investigation No. AG0363
Ground Contamination Assessment Report

Garth Isaf Farm

May 2018

**Site Investigation No. AG0363
Ground Contamination Assessment Report**

Garth Isaf Farm

May 2018

Report Status:	Draft		
Issue Number:	1		
Issue Date:	May 2018		
Prepared By:	MV		
Signed:			
Checked By:	I Parsons		
Signed:			

Client:
Ryan Jones Group

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LOGSHEETS

Trial Pit Log Sheets

Window Sample Log Sheets

LABORATORY TESTS

DRAWINGS

Site Location Plan

1.INTRODUCTION

1.1 Instruction

C.J. Associates Geotechnical Limited (CJA) was instructed by the Client Ryan Jones Group, to carry out a ground contamination investigation at a site in Garth Isaf, Efail Isaf, Wales.

1.2 Brief and Report Scope

The general specification for the works was provided by the Client and incorporated the brief to undertake a Phase II Intrusive Investigation and Contamination Assessment. The investigation comprised window sampling and trial pitting with associated sampling, laboratory contamination testing, and the provision of a Factual and Interpretative Report.

This report is based upon full factual records of the site work carried out, the ground conditions encountered in the exploratory holes and the laboratory test results. All information collected has been used to provide an interpretation of the ground conditions, with recommendations on potential ground contamination risks for the proposed development.

1.3 Limitations

The recommendations and opinions expressed in this report are based on the strata observed in the exploratory holes, the results of the site and laboratory tests, and information obtained as part of the desk study or provided by others. CJA take no responsibility for conditions that have not been revealed by the exploratory holes, or which occur between them. Information provided from other sources is taken in good faith and CJA cannot guarantee its accuracy.

The report has been prepared exclusively for the Client, for the site area indicated, and for the purpose stated. CJA accepts no responsibility for any site, client or type of development not indicated in this report.

This report should be reviewed at all stages of construction by someone familiar with the terms and assumptions it contains. It is essential that a suitably qualified and

experienced engineer be appointed for the design of the works, and supervise construction.

2.THE SITE

2.1 Site Location & Description

The site is located east of Efail Isaf, at National Grid Reference ST 09588 84254.

The site is roughly rectangular in plan shape and is currently in use as an area for rock crushing and sorting in the north of the site, and unused lightly vegetated land in the south. These areas are separated by a track.

At the time of the investigation the site was mainly covered by grass and small trees/saplings in the south, and muddy/rocky lightly grassed in the north. No surface water was encountered.

2.2 Published Geology

According to the British Geological Survey (BGS), the site is underlain by Diamicton superficial deposits of Quaternary age. This in turn is underlain by Carboniferous sandstone of the Hughes Member.

2.3 Hydrogeology

The Environment Agency classifies the ground beneath the site as a 'secondary A' aquifer, described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

There are no recorded groundwater abstractions close to the site and the site is not located within a source protection zone.

2.4 Hydrology

The nearest surface watercourse is the Nant y Felin brook, 200m to the south.

3.FIELDWORK

3.1 General

The fieldwork was carried out by CJA on 11th, 12th and 24th April 2018 and comprised window sampling, trial pitting and associated sampling.

The fieldwork was carried out generally in accordance with BS 5930:2015 *Code of Practice for Site Investigations*, and the Client's instructions, unless otherwise stated. Exploratory locations were selected by Ryan Jones Group.

All trial pit locations were scanned for buried services using a Cable Avoidance Tool (CAT) to check for underground services.

On completion all samples recovered from the site were taken to CJA's laboratory for further examination and testing. Details of the depths and types of samples recovered are indicated on the attached log sheets.

3.2 Window Sampler Boring

Three window sample boreholes (designated WS1, WS3 and WS8) were sunk to depths of between 0.20 and 2.70m below existing ground level.

Window sampler boring is carried out with a small, track-mounted rig, which uses a chain-driven trip hammer to drive sampling tubes or penetrometers into the ground. These tools are coupled to the anvil of the hammer by solid drill rods. Sampling tubes comprise "windowless samplers", which are plain sampler tubes in which a continuous disturbed sample is recovered within a semi-rigid plastic liner. In order to reduce friction within the borehole, sampling tubes of progressively smaller diameter are used as the borehole depth increases. Sampler diameters generally range from between approximately 90mm to 50mm.

Groundwater observations were noted where possible. These observations relate to the time of the investigation only, and do not necessarily reflect seasonal or tidal fluctuations.

In accordance with the Client's instructions, all positions were backfilled with bentonite pellets upon completion.

3.3 Trial Pitting

Six trial pits (designated TP01A, TP04, TP05A, TP06, TP07 and TP08) were excavated to depths of between 1.50m and 5.40m below existing ground level, using a 20-tonne excavator, under the direct and continuous supervision of CJA.

Representative environmental samples were recovered from the excavated material as pitting proceeded. Groundwater was encountered in TP01A and TP05A at 1.50m and 1.30m respectively.

The trial pits were backfilled immediately on completion of sampling.

3.4 The Logging of Soils and Rocks

The logging of soils and rocks has been carried out in accordance with BS5930⁽²⁰¹⁵⁾ except where superseded by the soil and rock description methodology in BS EN14688-1⁽²⁰⁰²⁾, BS EN 14688-2⁽²⁰⁰⁴⁾ and BS EN 14689-1⁽²⁰⁰³⁾.

4. LABORATORY WORK

The environmental chemistry of the samples was investigated by specialist chemical analysis, scheduled by CJA and carried out by Envirolab.

Chemical analyses were carried out on seven samples, which were submitted for the following suite of determinants:

Arsenic, Boron, Cadmium, Chromium, Chromium VI, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, Cyanide, Thiocyanate, Phenols, Sulphur, Sulphate, Sulphide, Soil Organic Matter, Beryllium, pH, speciated Polyaromatic Hydrocarbons (PAH), Asbestos ID and TPH by CWG.

The results of the laboratory contamination tests are included in the Appendices to this Report.

The range of potentially hazardous contaminants present on the site can be wide and varied, and the suite has been chosen to reflect both commonly found contaminants and others indicated by research to have a significant risk of being present. It is, however, possible that others may exist for which analyses have not been carried out. It is also possible that contaminants exist on the site but were not present at any of the exploratory hole locations.

5.GROUND CONDITIONS ENCOUNTERED

5.1 Soil Profile

The sequence of strata encountered beneath the site was:

- Made Ground (thickness up to 5.00mm)
- Sandy CLAY

5.2 Obstructions

Underground man-made obstructions were encountered in most exploratory holes comprising concrete boulders and rubble.

5.3 Groundwater

Groundwater was encountered in TP01A and TP05A at 1.50m and 1.30m respectively.

5.4 Visual / Olfactory Evidence of Contamination

A slightly odour of hydrocarbons was detected within TP08.

6. CONTAMINATION ASSESSMENT

6.1 Introduction

In accordance with current best practice, the assessment of potentially contaminated sites is normally carried out by means of a risk assessment, based on a conceptual model, which examines possible sources of contamination, potential receptors, and likely links between the two. For contamination to be a hazard, it must be demonstrated that there is an identifiable source of contamination (either inside or outside the site), potential receptors that may be at risk (occupiers of the site, for example, or the environment in general), and that there are also potential pathways through which the former may affect the latter.

Potential sources of contamination can be determined from the results of the laboratory tests that have been carried out on the soil samples. Other potential sources may be evident from the information on the history of the site and its environs. Contaminants are only a hazard if they are present in suitably high concentrations.

6.2 Conceptual Model

6.2.1 Contaminant Sources

Based on the current and historical uses of the site and its surroundings, and the findings of the investigation, it is concluded that the following contaminant sources should be considered:

Historical/Current Site Sources: The site has been used as historical landfill, this is considered a high risk contamination source.

Materials present on the site: Minor hydrocarbon visual evidence of contamination was seen within arisings from one trial pit. No other evidence was noted.

Ground Water: Groundwater was encountered within two trial pits at a depth of 1.30-1.50mbgl.

Asbestos: Asbestos was not encountered in any of the trial pits, or within any of the samples subsequently tested.

Contamination arising from external sources: Based on freely available historical maps and current site usage, it is possible that areas near to the site are considered likely to contain elevated concentrations of some contaminants, which might affect the site itself.

6.2.2 Contaminant Pathways:

Contaminants can reach potential receptors through various routes. The following are considered to be applicable to this site:

- **Ingestion:** Some contaminants can be harmful if ingested directly, either after handling contaminated soils, or due to eating plants grown in such soils that may not be thoroughly clean.
- **Absorption through Plants:** Other contaminants can be taken up by plants grown in contaminated soils, and ingested by anybody eating such plants.
- **Leachate:** Soluble fractions of some contaminants can leach into the ground, contaminating groundwater.
- **Services / Drains:** Contaminants in solution can be transported from one part of the site to another, or from outside the site to within the site, through old drains, or other service trenches which may be present.

6.2.3 Contaminant Receptors:

The following potential receptors are considered to be applicable to this site:

- **Future Site Occupants:** Future site occupants could be at risk from the effects of any contaminants in the soil and groundwater, and also from land gas.
- **Construction Workers:** The personnel involved in the construction of the proposed development are also at risk.
- **Groundwater / River Water:** As well as being a potential source of contamination, the groundwater also needs to be considered as a potential receptor of further contamination.
- **Vegetation:** New planting on the site could be at risk from contamination.

6.3 Soil Risk Assessment

6.3.1 Risk of Soil Contamination to Groundworkers During Construction

To assess the risk of soil contamination to construction and ground workers during development, guidelines from the HSE Document *'Protection of workers and the general public during development of contaminated land'*⁽¹⁹⁹¹⁾ are used. The document assesses soil contamination test results and classifies the site as being uncontaminated or contaminated with varying degrees of contamination from 'slight' to 'unusually heavy'.

The guideline values and laboratory test results are summarised in the following table:

**Summary of guideline values for protection of workers and the general public
during development of contaminated land**

Contaminant	Typical Values* for:					Test Results	Class
	Uncontaminated Soils	Slight Contamination	Contaminated	Heavy Contamination	Unusually Heavy Contamination		
	Class A	Class B	Class C	Class D	Class E		
pH (alkaline)	7 - 8	8 - 9	9 - 10	10 - 12	12	8.01-9.24	B-C
Arsenic	0 - 30	30 - 50	50 - 100	100 - 500	500	9-13	A
Cadmium	0 - 1	1 - 3	3 - 10	10 - 50	50	0.7-1.8	A-B
Chromium	0 - 100	100 - 200	200 - 500	500 - 2500	2500	10-73	A
Copper	0 - 100	100 - 200	200 - 500	500 - 2500	2500	10-29	A
Lead	0 - 500	500 - 1000	1000 - 2000	2000 - 1%	1.0%	25-66	A
Mercury	0 - 1	1 - 3	3 - 10	10 - 50	50	<1	A
Nickel	0 - 20	20 - 50	50 - 200	200 - 1000	1000	11-24	A-B
Zinc	0 - 250	250 - 500	500 - 1000	1000 - 5000	5000	51-113	A
Boron	0 - 2	2 - 5	5 - 50	50 - 250	250	<1-1.7	A
Selenium	0 - 1	1 - 3	3 - 10	10 - 50	50	<1-2	A-B
Beryllium	0 - 5	5 - 10	10 - 20	20 - 50	50	<0.5-0.9	A
Vanadium	0 - 100	100 - 200	200 - 500	500 - 2500	2500	12-30	A
Sulphate	0 - 2000	2000 - 5000	5000 - 1%	1% - 5%	5.05%	<200-990	A
Sulphur	0 - 100	100 - 500	500 - 1000	1000 - 5000	5000	<5-120	A-B
Sulphide	0 - 10	10 - 20	20 - 100	100 - 500	500	<5-19	A-B
Cyanide (free)	0 - 1	1 - 5	5 - 50	50 - 100	100	<1	A
Thiocyanate	0 - 10	10 - 50	50 - 100	100 - 500	2500	<5	A
Phenol	0 - 2	2 - 5	5 - 50	50 - 250	250	<0.2	A

Based on results of laboratory testing, the site can generally be classified as uncontaminated to slightly contaminated with the exception of pH levels where the site would be classified as contaminated in TP01A at 2.20m.

Based on the above results there is a low to moderate potential risk from soil contamination to construction workers, ground workers and members of the public during construction, and appropriate measures, such as PPE, site health plans, appropriate disposal of material arisings will mitigate this risk – particularly with respect to lead contamination.

6.3.2 Risk of Soil Contamination to Future Site Users After Development

As part of the contamination assessment, the chemical results obtained by CJA have been screened against accepted compliance criteria, namely:

- Defra C4SL Health Criteria Values (March 2014), where available; and
- CJA Tier 1 assessment values - based on LQM/CIEH Suitable 4 Use Levels⁽²⁰¹⁵⁾ (S4ULs).

The Land Quality Management (LQM)/Chartered Institute of Environmental Health (CIEH) 'Suitable 4 Use Levels' (S4ULs) have been derived for soil contaminants for which there are no C4SLs, and have been derived in accordance with UK legislation, national and Environment Agency Policy and using the Environment Agency's tools and available guidance.

The S4ULs replace the previous LQM/CIEH Generic Assessment Criteria (GAC) published in 2009. The assessment criteria have been updated in line with developments in UK human health risk assessment, in particular the additional land uses and exposure assumptions presented in Defra's C4SL guidance. For each substance, S4ULs have been derived for six generic land uses (including the two Public Open Space land uses defined in C4SL guidance) and a range of Soil Organic Matter contents (organic contaminants only).

In March 2014 Defra published Category 4 Screening Levels (C4SLs) for assessment of land affected by contamination. C4SLs are intended for use in determining whether land is 'clearly not contaminated' as defined by the revised Part 2A Statutory Guidance, i.e. Category 4 is where there is no risk or the level of risk to human health is acceptably low. The framework developed presents a departure from the conventional approach of defining 'minimal risk' and the derivation of C4SLs has involved the development of a new toxicological criterion, the 'low level of

toxicological concern' (LLTC), alongside modifications to the exposure modelling previously used to determine similar generic assessment criteria.

The S4ULs and C4SLs are intended to be used as generic assessment criteria and can be used in the preliminary evaluation of the risk to human health from long-term exposure to chemicals in soil. They represent values, which indicate to an assessor that soil concentrations above this level might present risk to the health of site-users and that further assessment, quantitative risk assessment, site investigation or remediation may be required.

The use of these reference values for initial screening purposes does not imply that they are categoric indicators of whether contamination conditions are significant, this being subject to a more detailed risk assessment.

In the case of possible receptors, one of the most significant factors is the proposed future use of the site (as some potential uses are much less sensitive to the presence of contamination than others). With regard to the assessment, at the time of writing this report, the proposed end use of the site was for residential purposes. Therefore, for the purposes of this report, the following sections compare the results of contamination analyses to residential types of end development and also commercial end development, which is considered the most appropriate for hard cover areas.

The comparison of results is summarised in the following table:

Soil Results Comparison with Defra C4SL HCV/LLTC Values

Determinand	C4SL (mg/kg)*			Min. (mg/kg)	Max. (mg/kg)	No. of Samples with Exceedences
	Residential with home grown produce (1a)	Residential without home grown produce (1b)	Commercial (2)			
Arsenic	37	40	640	9	13	0
Benzo(a)pyrene	5.0	5.3	76	0.05	8.101	1 for (1a and 1b)
Cadmium	26	149	410	0.7	1.8	0
Chromium VI	21	21	49	<1	<1	0
Lead	200	310	2300	25	66	0
*Minimal risk Health Criteria Values						

The samples have shown most contaminants at levels below the recommended C4SL's for residential and commercial end use with the exception of Benzo(a)pyrene, where one sample within TP04 at a depth of 2.20m had a reading at that in exceedance of residential use – but not commercial.

The following contaminants were not assessed with respect to risks posed to Human Health as they are not generally considered to represent a significant risk to Human Health (CLR 8); sulphate and sulphide.

For contaminants not covered by the Defra C4SLs/CLEA SGVs, reference is made to the Suitable for Use Levels (S4ULs) derived by The Land Quality Management Ltd & Chartered Institute of Environmental Health⁽²⁰¹⁵⁾, and summarised in the following table:

Soil Results Comparison with LQM/CIEH S4ULs

Determinand	Suitable 4 Use Levels (mg/kg)*			No. of Samples	Min. (mg/kg)	Max. (mg/kg)	No of Exceedences
	Residential		Commercial (3)				
	with homegrown produce (1)	without homegrown produce (2)					
Metals							
Beryllium	1.7	1.7	12	7	<2	2	1 for (2)
Boron	290	11000	240000	7	<1	<1	0
Chromium	910	910	8600	7	34	41	0
Copper	2400	7100	68000	7	25	41	0
Mercury	1.2	1.2	58	7	<1	<1	0
Nickel	180	180	980	7	31	37	0
Selenium	250	430	12000	7	<3	<3	0
Vanadium	410	1200	9000	7	41	56	0
Zinc	3700	4000	730000	7	110	140	0
Petroleum Hydrocarbons							
Toluene	130	880	56000	7	<0.010	<0.010	0
Ethylbenzene	47	83	5700	7	<0.010	<0.010	0
o-xylenes	60	88	6600	7	<0.010	<0.010	0
m-xylenes	59	82	62000	7	<0.010	<0.010	0
p-xylenes	56	79	5900	7	<0.010	<0.010	0
Aliphatic C 5-6	42	42	3200	7	<0.100	<0.100	0
Aliphatic C >6-8	100	100	7800	7	<0.10	<0.10	0
Aliphatic C >8-10	27	27	2000	7	<0.10	<0.10	0
Aliphatic C >10-12	130	130	9700	7	<1	<1	0
Aliphatic C >12-16	110	1100	59000	7	<2	<2	0
Aliphatic C >16-21	65000	65000	1600000	7	<1	<1	0
Aliphatic C >21-35	65000	65000	1600000	7	<4	<4	0
Aromatic C 6-7	70	370	26000	7	<0.10	<0.10	0
Aromatic C >7-8	130	860	56000	7	<0.10	<0.10	0
Aromatic C >8-10	34	47	3500	7	<0.10	<0.10	0
Aromatic C >10-12	74	250	16000	7	<1	<1	0
Aromatic C>12-16	140	1800	26000	7	<1	<1	0
Aromatic C>16-21	280	1900	28000	7	<1	<1	0
Aromatic C>21-35	1100	1900	28000	7	<1	<1	0
Aromatic C>35-44	1100	1900	28000	7	<1	<1	0
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.3	2.3	190	7	<0.1	<0.1	0
Acenaphthylene	170	2900	83000	7	<0.1	<0.1	0
Acenaphthene	210	3000	84000	7	<0.1	<0.1	0
Fluorene	170	2800	63000	7	<0.1	<0.1	0
Phenanthrene	95	1300	22000	7	<0.1	<0.1	0
Anthracene	2400	31000	520000	7	<0.1	<0.1	0
Fluoranthene	280	1500	23000	7	<0.1	<0.1	0
Pyrene	620	3700	54000	7	<0.1	<0.1	0
Benz(a)anthracene	7.2	11	170	7	<0.1	<0.1	0
Chrysene	15	30	350	7	<0.1	<0.1	0
Benzo(b)fluoranthene	2.6	3.9	44	7	<0.1	<0.1	0
Benzo(k)fluoranthene	77	110	1200	7	<0.1	<0.1	0
Indeno(1,2,3-cd)pyrene	27	45	500	7	<0.1	<0.1	0
Dibenz(a,h)anthracene	0.24	0.31	3.5	7	<0.1	<0.1	0
Benzo(ghi)perylene	320	360	3900	7	<0.1	<0.1	0
Phenols							
Phenol	280	750	760	7	<1	<1	0

In general the samples have shown contaminants at levels below the S4ULs, with the exception of the following:

- One samples have elevated levels of **Beryllium** (2mg/kg) in excess of the recommended S4UL for residential use with and without homegrown produce (1.7mg/kg).

Based on all the above, it is considered the risk from soil contamination to future site users is low for areas of hardcover development and low to moderate for soft landscaped areas.

6.4 Groundwater Risk Assessment

Based on the ground conditions encountered, anticipated ground conditions at depth (clays which are largely impermeable) and low soil contamination levels, it is considered that the risk of contamination from groundwater is low.

6.5 Surface Water Risk Assessment

Given the low levels of most soil contamination, ground conditions encountered (clays which are largely impermeable), and likely lack of hydraulic connection between the site and small surface water streams off site, it is considered the risk to surface waters is low.

6.6 Land Gas Risk Assessment

Another potential source of contamination is land gas. Land gas is largely generated by the decomposition of organic matter, both in natural soils such as peat, and manmade materials such as landfill or other fill materials. The gases that are normally associated with these materials, which can pose a risk to health, include methane (which is toxic and potentially explosive) and carbon dioxide (which is toxic). Oxygen depletion is also a consequence of the generation of these other gases. Based the ground conditions encountered it is considered the risk posed by land gas is low.

6.7 Risk from Asbestos in Ground

Asbestos was not encountered in any of the trial pits, or within any of the samples subsequently tested. It is therefore considered the risk of asbestos being present in the ground is low.

6.8 Risk to Buried Services

It is considered that, due to the low levels of contamination on the site, standard materials are likely to be appropriate for new water pipes. Further advice should be sought from the local water company.

Previous guidance on buried water pipes was contained in Water Regulations Advisory Scheme (WRAS) Guidance Note No. 9-04-03⁽²⁰⁰²⁾, however this has been superseded by the UK Water Industry Research Report 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' Ref 10/WM/03/21 (January 2011).

6.9 Risk to New Planting and Vegetation

Elevated levels of Boron, Copper and Zinc, which are phytotoxic and harmful to plants, have not been encountered. However, slightly elevated levels of Nickel were encountered in one sample (TP06) which is considered the risk of contamination to new planting and vegetation is moderate.

6.10 Site Risk Assessment

The following table presents an outline summary of the contamination assessment discussed above.

Contamination Assessment Summary

Description of Receptor or Source	Risk rating
Health and safety of workers during redevelopment	Low
Current and future site users and third parties	Low
Hard cover development	Low to Moderate
Gardens and soft landscaping	Low
Risk to groundwater	Low
Risk to surface waters	Low
On site and off site migration of land gasses	Low
Presence of asbestos in ground	Low
Risk to buried services	Low
Risk to new planting and vegetation	Low to moderate
OVERALL GROUND CONTAMINATION RISK RATING	Low

6.11 Discussion and Conclusions

The possible actions considered appropriate for the proposed development, together with other precautionary measures, are given below:

6.11.1 Contaminated Soils

As discussed in the above sections, the contamination tests indicate generally low concentrations of the potential contaminants, with the exception of slightly elevated levels of pH across all samples and elevated in TP01A, slight contamination of cadmium, nickel, selenium, sulphur and sulphide, and benzo(a)pyrene which is in excess of the recommended guidelines for residential but not commercial development. Should the site remain as farm land and undeveloped there should be no environmental risk.

The presence of higher levels of contamination on parts of the site not covered by the exploratory holes should not be discounted and additional spot checks are recommended, particularly during any groundworks. Should any elevated levels of contamination be found in such areas, remedial measures, such as the replacement of the upper zone of contaminated soil with a suitable thickness of clean soil, may need to be undertaken as described above.

There is a low potential risk from soil contamination to construction workers, ground workers and members of the public, and appropriate measures, such as PPE, site health plans, appropriate disposal of material arisings will mitigate this risk. The groundworks contractor will need to prepare a Soil Management Plan with methods of dealing with any ground contamination (known or unanticipated).

6.11.2 Contaminated Groundwater

Due to the generally low levels of contamination found at the site, it is not considered likely that there would be a hazard to the groundwater beneath the site, and no remedial action should be necessary.

6.11.3 Radon Gas

According to the BRE protection against the ingress of radon gas into new buildings is not required.

6.11.4 Asbestos

Asbestos was not encountered nor identified during laboratory testing.

6.11.5 Waste Disposal

Soils excavated from the site should either be taken to a suitable facility, registered to take the levels of contamination encountered. The materials are not suitable for re-use.

6.11.6 Fluorescent Tubes

It should be noted that fluorescent light tubes must now be classified as hazardous waste and disposed of accordingly, as laid out in the Environment Agency's Technical Guidance WM2, and in accordance with the new Hazardous Waste Regulations (England & Wales), effective from July 16th 2005.

6.11.7 Site Personnel

As with all construction sites, personnel working on the site during the construction period should be encouraged to maintain a high standard of personal hygiene and on site washing facilities should be available.

6.11.8 Other Matters

Due diligence is required during the construction period, and should any further evidence of contamination be found, appropriate investigation and / or action should be taken. The significance of any contamination not discovered by this investigation is outside the scope of this report.

It is emphasised that only a small number of tests for contamination have been carried out, and that the possibility of further contamination existing elsewhere on the site cannot be ruled out. CJA does not accept any liability for contamination.

7. LIST OF REFERENCES

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APPENDICES

LOGSHEETS

Trial Pit Log Sheet

TP No: TP1A

CJAssociates

Site: Garth Isaf Farm

Job Number: AG0363

Client: Ryan Jones Group

Machine Type: 20-tonne excavator

Sheet 1 of 1


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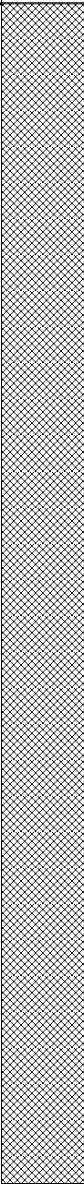

Vertical Scale: 1:25

King Road Avenue
Avonmouth
Bristol
BS11 9HF

Depth (m)	Samp Ref	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m.O.D.)
0.50				0.60	(0.60)		MADE GROUND: Brown slightly clayey gravelly fine to coarse SAND. Gravel is of fine to coarse angular to subangular flint and occasional brick and concrete.	
1.00							MADE GROUND: Grey slightly clayey sandy GRAVEL of fine to coarse angular flint, brick and concrete. Frequent cobbles and boulders.	
1.50								
2.00								
2.50	1	2.20			(3.80)			
3.00								
3.50								
4.00								
4.50	2	4.50		4.40	(0.10)		Stiff orange mottled grey sandy slightly gravelly CLAY. Gravel is of fine to coarse subangular to subrounded flint with frequent cobbles.	
				4.50			END OF TRIAL PIT	

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:	Trial Pit Width (m) 0.80	Trial Pit Length (m) 2.50
Trial Pit Side Stability: Slight instability	Logged By: MV	Checked By: IP
Groundwater Observations: Slight seepage at 1.50	Direction of Face A (degrees from N): 0	Excavator D  B
General Remarks:	ES samples contain 1x 1000g tub, 1x 258g jar, 2x 60g vials.	

Depth (m)	Samp Ref	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m.O.D.)
0.50	1	2.20			(3.90)		MADE GROUND: Greyish brown slightly clayey sandy GRAVEL of concrete, flint, tarmac and occasional brick. Frequent cobbles, large boulders, occasional plastics and metal fragements.	
1.00								
1.50								
2.00								
2.50								
3.00								
3.50								
4.00								
4.50								
Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.								
Co-ordinates:						Trial Pit Width (m) 1.20		Trial Pit Length (m) 2.50
Trial Pit Side Stability: Unstable						Logged By: MV		Checked By: IP
Groundwater Observations:				Slight seepage at		Direction of Face A (degrees from N): 0		Excavator  B
General Remarks:		Pit terminated due to collapse. ES samples contain 1x 1000g tub, 1x 258g jar, 2x 60g vials.						

Site: Garth Isaf Farm
Job Number: AG0363
Client: Ryan Jones Group
Machine Type: 20-tonne excavator

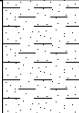

Sheet 1 of 2

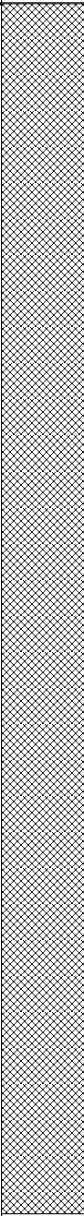
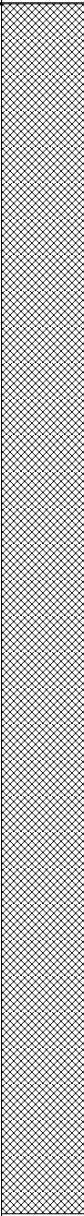
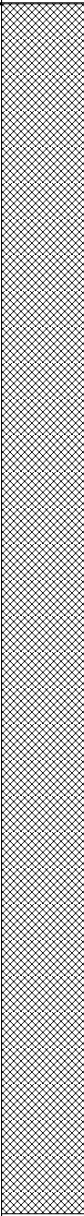
Date: 24/04/2018

Vertical Scale: 1:25

**King Road Avenue
Avonmouth
Bristol
BS11 9HF**

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.									
Co-ordinates:				Trial Pit Width (m) 0.80		Trial Pit Length (m) 2.50			
Trial Pit Side Stability: Slight instability				Logged By: MV		Checked By: IP			
Groundwater Observations:		Slight seepage at 1.20		Direction of Face A (degrees from N): 0		Excavator D			
General Remarks:		ES samples contain 1x 1000g tub, 1x 258g jar, 2x 60g vials.							

Depth (m)	Samp Ref	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m.O.D)
	2	5.30		5.00	(0.40)		Brown sandy CLAY with occasional flint gravel and cobbles.	
5.50				5.40			END OF TRIAL PIT	
6.00								
6.50								
7.00								
7.50								
8.00								
8.50								
9.00								
9.50								
Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.								
Co-ordinates:						Trial Pit Width (m) 0.80		Trial Pit Length (m) 2.50
Trial Pit Side Stability: Slight instability						Logged By: MV		Checked By: IP
Groundwater Observations:			Slight seepage at 1.20			Direction of Face A (degrees from N): 0		Excavator D  B
General Remarks:		ES samples contain 1x 1000g tub, 1x 258g jar, 2x 60g vials.						

Depth (m)	Samp Ref	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m.O.D)
0.50	1	0.70		0.60	(0.60)		MADE GROUND: Stiff brown sandy gravelly CLAY. Gravel is of fine to coarse angular brick, concrete and tarmac with frequent metal and plastic fragments.	
1.00					MADE GROUND: Grey clayey sandy GRAVEL of fine to coarse angular brick, concrete, tarmac and flint. Frequent cobbles and large boulders of concrete and tarmac. Frequent small to large woody fragments and plastics.			
1.50	2	3.40		4.00	(4.00)		END OF TRIAL PIT	
2.00								
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:

Trial Pit Width (m)1.40

Trial Pit Length (m)2.50

Trial Pit Side Stability:Unstable

Logged By: MV

Checked By: IP

Groundwater Observations:

Slight seepage at

Direction of Face A (degrees from N):0

Excavator

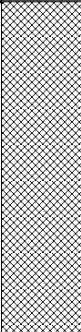
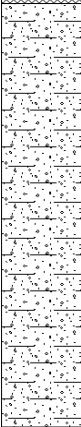
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C


B

General Remarks:

Pit terminated due to collapse. ES samples contain 1x 1000g tub, 1x 258g jar, 2x 60g vials.

Depth (m)	Samp Ref	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m.O.D.)
0.50					(1.10)		MADE GROUND: Brown clayey sandy GRAVEL of fine to coarse angular brick, concrete and flint with frequent cobbles and large boulders.	
1.00	1	0.95		1.10			Greyish clayey gravelly fine to coarse SAND. Gravel is of fine to coarse subangular to subrounded flint with occasional cobbles.	
1.50					(1.40)			
2.00	2	2.10		2.50			END OF TRIAL PIT	
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:		Trial Pit Width (m) 0.80	Trial Pit Length (m) 2.50
Trial Pit Side Stability: Slight instability		Logged By: MV	Checked By: IP
Groundwater Observations:	Slight seepage at	Direction of Face A (degrees from N): 0	Excavator D  B
General Remarks:	ES samples contain 1x 1000g tub, 1x 258g jar, 2x 60g vials.		

Depth (m)	Samp Ref	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m.O.D.)
0.50	1	0.80			(1.35)		MADE GROUND: Dark brown slightly clayey sandy GRAVEL of brick, concrete and tarmac with occasional plastics and fabric and clayey pockets. Slightly hydrocarbon odour.	
1.00								
1.50	2	1.40		1.35	(0.15)		Stiff orange mottled grey sandy slightly gravelly CLAY. Gravel is of fine to coarse subangular to subrounded flint with frequent cobbles.	
2.00				1.50				
2.50							END OF TRIAL PIT	
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:		Trial Pit Width (m)0.80	Trial Pit Length (m)2.50
Trial Pit Side Stability: Slight instability		Logged By: MV	Checked By: IP
Groundwater Observations:	Slight seepage at	Direction of Face A (degrees from N): 0	Excavator DB
General Remarks:	ES samples contain 1x 1000g tub, 1x 258g jar, 2x 60g vials.		

Window Sampler Borehole Log Sheet

WS No. **WS1**

Site: **Garth Isaf Farm**

Start Date: 11/04/2018

King Road Avenue

Job Number: **AG0363**

Finish Date: 11/04/2018

Bristol

Client: Ryan Jones Group

Sheet 1 of 1

BS11 9HF

Tel: 0117 982 1473

Rig Type: Archway Competitor 130

Vertical Scale: 1:25

[illegible]

Window Sampler Borehole Log Sheet

WS No. **WS3**

CJAssociates

Site: **Garth Isaf Farm**

Start Date: 11/04/2018

King Road Avenue

Job Number: **AG0363**

Finish Date: 11/04/2018

Bristol

Client: **Ryan Jones Group**

Sheet 1 of 1

BS11 9HF

Rig Type: **Archway Competitor 130**

Vertical Scale: 1:25

Tel: 0117 982 1473

Sample / Test Depth (m)	Sample Ref.	Windowless Sample (L) Blows / % rec. (sample dia.)	Standard Penetration Tests (SPTs)						Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m.O.D)	Installation
			Test Type	Seat. Blows	Test Drive Blows	Seat. Pen.	Test Pen.	N-Value						
0.00 - 0.60	L1											MADE GROUND: Grey clayey gravelly fine to coarse SAND. Gravel is of fine to coarse angular to subangular brick, concrete, mudstone and quartzite with frequent cobbles.		
0.50	ES1								0.60	(0.60)		END OF BOREHOLE		
0.50	J1													
<div>General Remarks:</div> <div>Pit terminated at 0.60m due to obstruction. ES samples contain 1x 1000g tub, 1x 500g jar, 2x 60g vials.</div> <div>Water Remarks:</div> <div>Borehole dry</div> <div>Drilled By:</div> <div>ML</div> <div>Casing:</div> <div>Logged By:</div> <div>MV</div> <div>Coordinates:</div> <div>Checked By:</div> <div>IP</div>														

Window Sampler Borehole Log Sheet

WS No. **WS8**

CJAssociates

Site: **Garth Isaf Farm**

Start Date: 12/04/2018

King Road Avenue

Job Number: **AG0363**

Finish Date: 12/04/2018

Bristol

Client: **Ryan Jones Group**

Sheet 1 of 1

BS11 9HF

Rig Type: **Archway Competitor 130**

Vertical Scale: 1:25

Tel: 0117 982 1473

Sample / Test Depth (m)	Sample Ref.	Windowless Sample (L) Blows / % rec. (sample dia.)	Standard Penetration Tests (SPTs)						Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m.O.D)	Installation		
			Test Type	Seat. Blows	Test Drive Blows	Seat. Pen.	Test Pen.	N-Value								
0.00 - 1.00	L1											MADE GROUND: Brown to grey clayey gravelly fine to coarse SAND. Gravel is of fine to coarse angular to subangular concrete, brick, tarmac and clinker with frequent concrete cobbles and wood fragments.				
0.70 0.70	ES1 J1								(1.20)							
1.00 - 2.00	L2								1.20			MADE GROUND: Brown slightly sandy slightly gravelly CLAY. Gravel is of fine to coarse angular to subangular brick and concrete with occasional concrete cobbles, pockets of brown sand and wood fragments.				
1.50 1.50	ES2 J2								(1.50)							
2.00 - 2.70	L3								2.70			END OF BOREHOLE				
General Remarks:			Pit terminated at 2.70m due to obstruction. ES samples contain 1x 1000g tub, 1x 500g jar, 2x 60g vials.						Water Remarks:			Medium seepage at 2.7m			Drilled By: KP	
									Casing:						Logged By: MV	
									Coordinates:						Checked By: IP	

LABORATORY TESTS

FINAL ANALYTICAL TEST REPORT

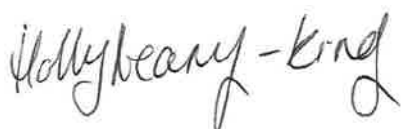
Envirolab Job Number: 18/03186
Issue Number: 1

Date: 02 May, 2018

Client: CJ Associates
King Road
Bristol
BS11 9HF

Project Manager: Admin/Lorna Logan
Project Name: Garth Isaf Farm
Project Ref: AG0363-L12905-S6808
Order No: AG0363-L12905-S6808
Date Samples Received: 26/04/18
Date Instructions Received: 26/04/18
Date Analysis Completed: 02/05/18

Prepared by:



Holly Neary-King
Administrative Assistant

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 18/03186

Client Project Name: Garth Isaf Farm

Client Project Ref: AG0363-L12905-S6808

Lab Sample ID	18/03186/1	18/03186/2	18/03186/3	18/03186/4	18/03186/5	18/03186/6	18/03186/7		Units	Method ref
Client Sample No										
Client Sample ID	TP01A	TP04	TP05A	TP06	TP06	TP07	TP08			
Depth to Top	2.20	2.20	0.90	0.70	3.40	0.95	0.80			
Depth To Bottom										
Date Sampled	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6A	4A	6A	6A	6A	6A	6A			
% Stones >10mm _A	28.1	21.8	20.6	20.7	27.7	20.1	27.2		% w/w	A-T-044
pH _D ^{M#}	9.24	8.67	8.75	8.01	8.33	8.72	8.36		pH	A-T-031s
Sulphate (acid soluble) _D ^{M#}	360	990	410	260	<200	530	610		mg/kg	A-T-028s
Cyanide (free) _A ^{M#}	<1	<1	<1	<1	<1	<1	<1		mg/kg	A-T-042sFCN
Cyanide (total) _A ^{M#}	<1	<1	<1	<1	<1	<1	<1		mg/kg	A-T-042sTCN
Thiocyanate _A	<5	<5	<5	<5	<5	<5	<5		mg/kg	A-T-041s
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		mg/kg	A-T-050s
Sulphide _A	<5	15	19	<5	<5	<5	<5		mg/kg	A-T-S2-s
Sulphur (elemental) _D ^{M#}	6	120	<5	34	<5	23	11		mg/kg	A-T-029s
Organic matter _D ^{M#}	12.7	5.6	9.3	3.3	2.2	2.5	5.3		% w/w	A-T-032 OM
Arsenic _D ^{M#}	9	11	11	13	12	13	13		mg/kg	A-T-024s
Beryllium _D [#]	<0.5	0.9	<0.5	<0.5	0.7	<0.5	0.5		mg/kg	A-T-024s
Boron (water soluble) _D ^{M#}	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	1.7		mg/kg	A-T-027s
Cadmium _D ^{M#}	0.7	0.7	0.8	1.4	1.5	1.8	0.9		mg/kg	A-T-024s
Copper _D ^{M#}	29	16	10	13	18	19	22		mg/kg	A-T-024s
Chromium _D ^{M#}	10	13	16	13	20	73	16		mg/kg	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	<1	<1	<1		mg/kg	A-T-040s
Lead _D ^{M#}	32	47	28	25	27	43	66		mg/kg	A-T-024s
Mercury _D	<0.17	0.44	<0.17	<0.17	<0.17	<0.17	0.23		mg/kg	A-T-024s
Nickel _D ^{M#}	17	11	16	18	24	17	15		mg/kg	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	2	1		mg/kg	A-T-024s
Vanadium _D ^{M#}	12	17	21	16	17	30	18		mg/kg	A-T-024s
Zinc _D ^{M#}	51	71	52	60	79	113	90		mg/kg	A-T-024s

Envirolab Job Number: 18/03186

Client Project Name: Garth Isaf Farm

Client Project Ref: AG0363-L12905-S6808

Lab Sample ID	18/03186/1	18/03186/2	18/03186/3	18/03186/4	18/03186/5	18/03186/6	18/03186/7		Units	Method ref
Client Sample No										
Client Sample ID	TP01A	TP04	TP05A	TP06	TP06	TP07	TP08			
Depth to Top	2.20	2.20	0.90	0.70	3.40	0.95	0.80			
Depth To Bottom										
Date Sampled	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6A	4A	6A	6A	6A	6A	6A			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	NAD	NAD	NAD	NAD	NAD			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A	N/A			

Envirolab Job Number: 18/03186

Client Project Name: Garth Isaf Farm

Client Project Ref: AG0363-L12905-S6808

Lab Sample ID	18/03186/1	18/03186/2	18/03186/3	18/03186/4	18/03186/5	18/03186/6	18/03186/7		Units	Method ref
Client Sample No										
Client Sample ID	TP01A	TP04	TP05A	TP06	TP06	TP07	TP08			
Depth to Top	2.20	2.20	0.90	0.70	3.40	0.95	0.80			
Depth To Bottom										
Date Sampled	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6A	4A	6A	6A	6A	6A	6A			
PAH-16MS										
Acenaphthene _A ^{M#}	0.03	0.17	0.06	<0.01	<0.01	<0.01	0.84		mg/kg	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	0.15	<0.01	<0.01	<0.01	<0.01	0.06		mg/kg	A-T-019s
Anthracene _A ^{M#}	0.06	0.99	0.04	<0.02	<0.02	<0.02	1.22		mg/kg	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.21	7.24	0.24	0.05	0.05	0.14	3.48		mg/kg	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.21	8.10	0.26	0.06	0.05	0.15	2.53		mg/kg	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.30	12.2	0.36	0.09	0.07	0.22	3.75		mg/kg	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.14	4.83	0.18	<0.05	<0.05	0.10	1.02		mg/kg	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.10	3.57	0.12	<0.07	<0.07	0.08	1.24		mg/kg	A-T-019s
Chrysene _A ^{M#}	0.28	8.18	0.32	0.07	<0.06	0.16	3.38		mg/kg	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.04	1.71	0.06	<0.04	<0.04	<0.04	0.33		mg/kg	A-T-019s
Fluoranthene _A ^{M#}	0.33	8.56	0.38	<0.08	0.08	0.18	8.51		mg/kg	A-T-019s
Fluorene _A ^{M#}	0.05	0.24	0.06	<0.01	0.02	<0.01	0.94		mg/kg	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.15	5.94	0.17	0.05	0.03	0.11	1.22		mg/kg	A-T-019s
Naphthalene _A ^{M#}	0.04	<0.03	0.04	<0.03	<0.03	<0.03	0.13		mg/kg	A-T-019s
Phenanthrene _A ^{M#}	0.26	2.24	0.21	0.04	0.05	0.07	5.21		mg/kg	A-T-019s
Pyrene _A ^{M#}	0.26	7.08	0.30	<0.07	<0.07	0.16	6.34		mg/kg	A-T-019s
PAH (total 16) _A ^{M#}	2.47	71.2	2.79	0.42	0.49	1.42	40.2		mg/kg	A-T-019s

Envirolab Job Number: 18/03186

Client Project Name: Garth Isaf Farm

Client Project Ref: AG0363-L12905-S6808

Lab Sample ID	18/03186/1	18/03186/2	18/03186/3	18/03186/4	18/03186/5	18/03186/6	18/03186/7		Units	Method ref
Client Sample No										
Client Sample ID	TP01A	TP04	TP05A	TP06	TP06	TP07	TP08			
Depth to Top	2.20	2.20	0.90	0.70	3.40	0.95	0.80			
Depth To Bottom										
Date Sampled	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18	24-Apr-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6A	4A	6A	6A	6A	6A	6A			
TPH CWG										
Ali >C5-C6 _A [#]	<0.02	-	-	-	-	-	<0.02		mg/kg	A-T-022s
Ali >C6-C8 _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s
Ali >C8-C10 _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s
Ali >C10-C12 _A [#]	1.0	-	-	-	-	-	0.8		mg/kg	A-T-023s
Ali >C12-C16 _A [#]	6.5	-	-	-	-	-	7.5		mg/kg	A-T-023s
Ali >C16-C21 _A [#]	26.9	-	-	-	-	-	18.7		mg/kg	A-T-023s
Ali >C21-C35 _A [#]	75.5	-	-	-	-	-	68.0		mg/kg	A-T-023s
Total Aliphatics _A	110	-	-	-	-	-	95.1		mg/kg	A-T-023s
Aro >C5-C7 _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s
Aro >C7-C8 _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s
Aro >C8-C9 _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s
Aro >C9-C10 _A [#]	0.03	-	-	-	-	-	0.02		mg/kg	A-T-022s
Aro >C10-C12 _A [#]	2.0	-	-	-	-	-	1.2		mg/kg	A-T-023s
Aro >C12-C16 _A [#]	3.9	-	-	-	-	-	6.2		mg/kg	A-T-023s
Aro >C16-C21 _A [#]	8.0	-	-	-	-	-	19.6		mg/kg	A-T-023s
Aro >C21-C35 _A [#]	59.4	-	-	-	-	-	80.1		mg/kg	A-T-023s
Total Aromatics _A	73.3	-	-	-	-	-	107		mg/kg	A-T-023s
TPH (Ali & Aro) _A	183	-	-	-	-	-	202		mg/kg	A-T-023s
BTEX - Benzene _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s
BTEX - Toluene _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s
BTEX - o Xylene _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s
MTBE _A [#]	<0.01	-	-	-	-	-	<0.01		mg/kg	A-T-022s

REPORT NOTES

General:

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

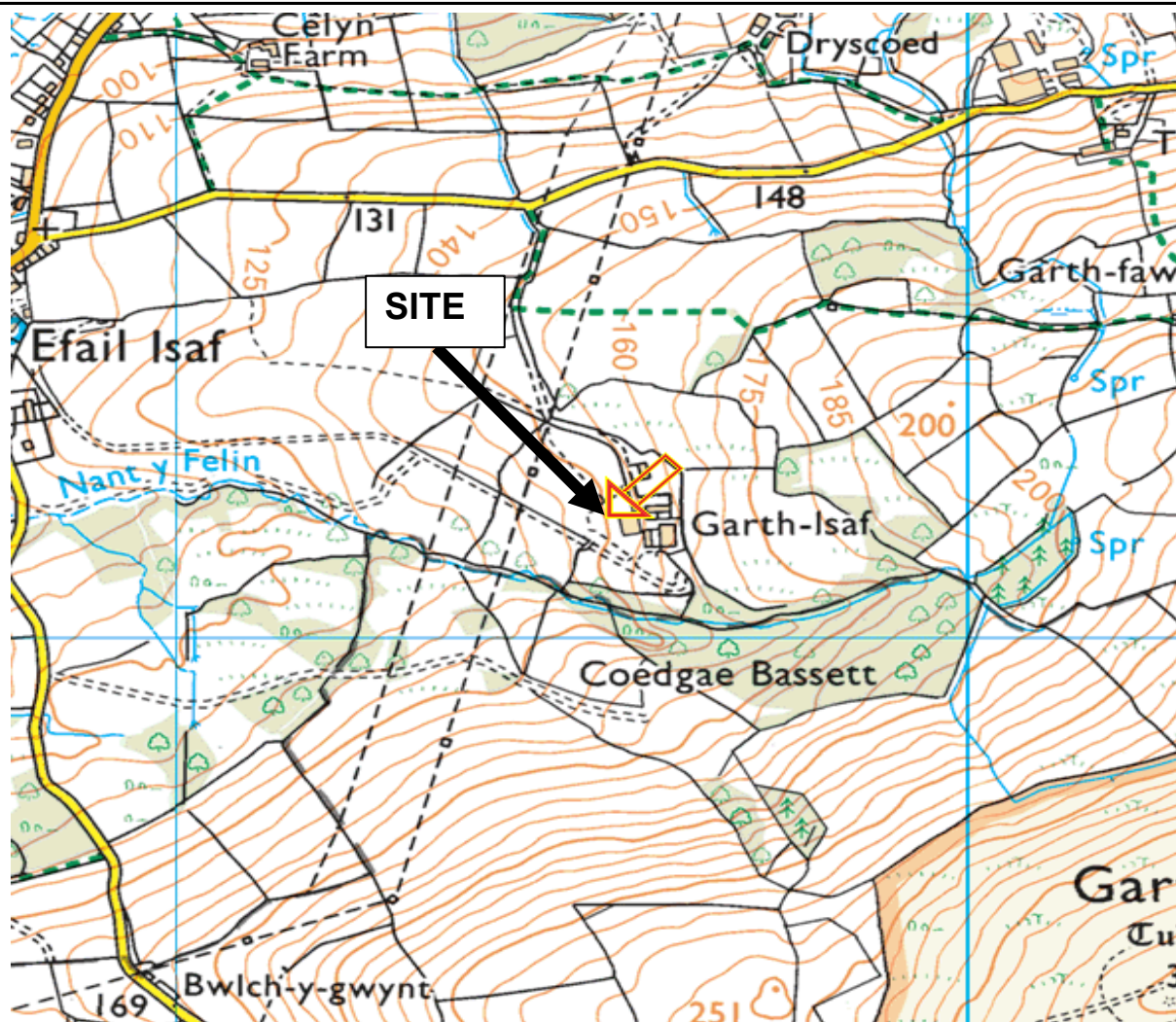
Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

DRAWINGS



cjassociates

King Road Avenue,
Avonmouth,
Bristol. BS11 9HF
Tel: 0117 982 1473

Site Location Plan - Garth Isaf Farm

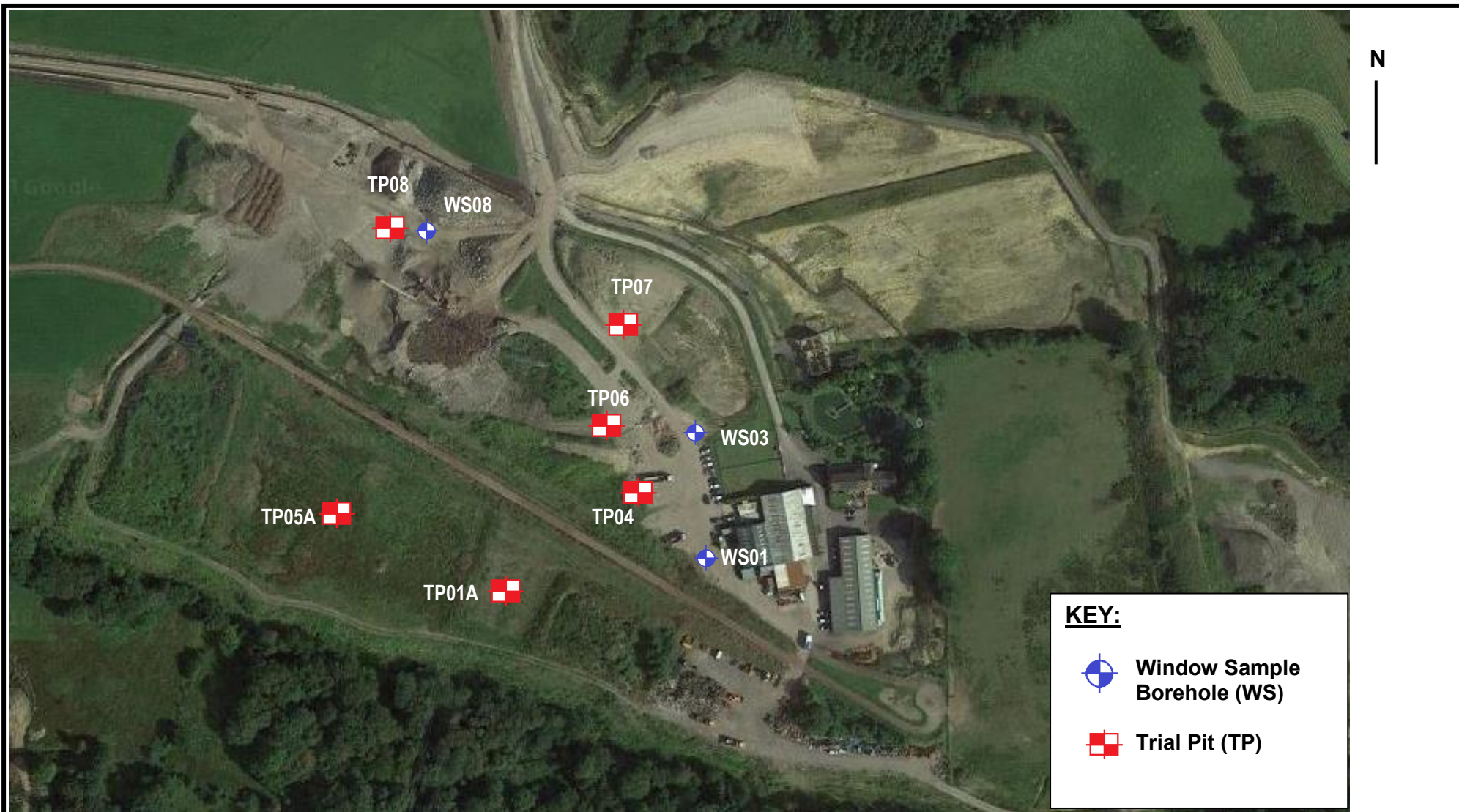
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Job No. AG0363

Drawn by: MV

Date: May 2018

Scale: NTS



Title: Exploratory Hole Location Plan – Garth Isaf Farm

Job No.: AG0363

Drawn by: MV

Date: May 2018

cjassociates