



Dice
Environmental

Hillside

Phase 2 Contamination Assessment

17/11/2023

Ref: 101142

Version 1.0

Site Hillside,
Leckwith Road,
Cardiff,
CF11 8DR

Client William Richards

Date 17/11/2023

Project Reference 101142

Drafted by:



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Date

14th November

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Date

15th November

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Jake Bayne MSc MIEnvSc CEnv
Director

Date

17th November

Executive Summary	
Site Description	<p>The site is a parcel of land set on the side of a hill. It is accessible via a steep access track down from the main road (B4267) via a locked gate.</p> <p>The parcel of land at the base of the track is atop a hill, with a steep bank down to flats, approximately 50m from the River Ely along the north-eastern boundary of the site. There is a residential property, no longer lived in, in the southern corner of the site. The slop downwards was uneven, with occasional ditches present.</p> <p>The site is predominantly covered in grasses, with some larger trees around the border. There is a section of land in the north-west of the site used for burning, which contained remnants of burned materials.</p>
Brief / Proposed Development	<p>Dice Environmental has been told by the client that soils have been imported to infill the void left by a landslide to the front of the existing property, in an attempt to stabilise the bank, and prevent damage to the property itself. Further to the infilled land, a channel was dug to divert spring water around the boundary of the plot, which was thought to have contributed to the initial landslide. It is proposed that the consequential imported soils remain on site, to be used as residential garden land associated with the existing (but currently disused) residential property.</p>
Geology	<p>Geological maps of the area show most of the site to be underlain by superficial strata of calcareous Tufa.</p> <p>Geological maps of the area show the site to be predominantly situated upon bedrock of the Blue Anchor Formation, comprising Mudstone. However, the west of the site is underlain by bedrock of the Penarth Group, comprising Mudstone and Limestone, and the east of the site is underlain by the Mercia Mudstone group, comprising Mudstone.</p> <p>Made ground was identified across the site, to a maximum depth of 5.0mbgl.</p> <p>Natural superficial strata was not identified during the site investigation.</p>
Ground Gas	<p>The worst-case GSV has been identified as CS2 / Amber. Furthermore, Methane levels have been recorded as >1%, and Carbon Dioxide levels above >5%, which is considered the trigger threshold to be considered CS2/ Amber.</p> <p>Whilst no further new structures are proposed for the site, the introduction of gas generating soils adjacent to the existing property may pose a risk to end users of the site, should the existing residential</p>

	<p>property come back into use. It is recommended that internal gas levels in the property be monitored to identify if ground gas migration to potential receptors is complete, and if retrofitting the existing property with ground gas protection measures will be required.</p>
<p>Risk to Controlled Waters</p>	<p>No significant levels of contaminants of concern have been identified with respect to controlled waters at this time. Further assessment may be required at a later date.</p>
<p>Human Health Risk Assessment & Remedial Measures</p>	<p>Exceedances in Lead, Napthalene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenz(ah)anthracene were identified during this site investigation.</p> <p>Therefore, In areas of soft landscaping, it will be necessary to install a clean cover system of a minimum depth of 500mm. The cover system should comprise imported, verified subsoil & topsoil in areas of proposed soft landscaping. Imported soils should comply chemically with criteria highlighted within Appendix E (Residential with Produce end use).</p> <p>Following installation, a verification study shall be required to assess the depth and chemical composition of the installed capping layer and submit the findings as a verification report to the local authority for approval.</p> <p>Due to the uneven nature of the land, steep slope and observed ditches along the side of the bank, it is recommended the topography and stability of the site be considered, to mitigate risk of future movement of the capping system.</p>
<p>Recommendations</p>	<p>A phase 2 intrusive investigation was carried out which successfully characterised made ground across the site, within shallow soils. Representative soil samples were taken of these made ground materials and sent for analysis at a UKAS/MCERTS accredited laboratory for analysis of the identified contaminants of concern.</p> <p>It is considered that the site may be suitable for the proposed use as residential garden area, providing the following recommendations & remedial measures are implemented.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> - In areas of soft landscaping, it will be necessary to install a clean cover system of a minimum depth of 500mm. The cover system should comprise imported, verified subsoil & topsoil in areas of proposed soft landscaping. Imported soils should comply chemically with criteria highlighted within Appendix E (Residential with Produce end use).

- Following installation, a verification study shall be required to assess the depth and chemical composition of the installed capping layer and submit the findings as a verification report to the local authority for approval.
- Due to the uneven nature of the land, steep slope and observed ditches along the side of the bank, it is recommended the topography and stability of the site be considered, to mitigate risk of future movement of the capping system.
- The area of observed burned material in the north west of the site should be scraped and removed from site.

This report should be submitted to your local planning authority for approval.

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1. Introduction

1.1. Client Brief

Dice Environmental was instructed by William Richards to undertake a Phase 2 Contamination Assessment for the site known as 'Hillside, Leckwith Road, Cardiff, CF11 8DR' to determine the chemical suitability of the land for the proposed end use.

Dice Environmental has been told by the client that soils have been imported to infill the void left by a landslide to the front of the existing property, in an attempt to stabilise the bank, and prevent damage to the property itself. Further to the infilled land, a channel was dug to divert spring water around the boundary of the plot, which was thought to have contributed to the initial landslide. It is proposed that the consequential imported soils remain on site, to be used as residential garden land associated with the existing (but currently disused) residential property.

The site location plan and layout are included within Appendix A.

1.2. Report Objectives

This Phase 2 Geo-Environmental Assessment includes:

- The provision and execution of a Phase II Contamination Assessment strategy, to investigate the chemical suitability of shallow soils to remain to remain in-situ for residential (private garden) use.
- The development of a Phase II Conceptual Model.
- Conclusions and recommendations to facilitate responsible use of the site, in relation to the intended end use.

1.3. References

Assessment guidance and site-specific information has been sought from the following locations:

- EA/DEFRA (2020) LCRM: Land contamination Risk Management (Supersedes (2004), CLR11: Model Procedures for the Assessment of Land Contamination).
- BS 5930:2015+A1:2020: Code of practice for ground investigations.
- Nathanail, C.P., McCaffrey, C., Gillett, A.G., Ogden, R.C. and Nathanail, J.F. 2015. The LQM/CIEH S4UIs for Human Health Risk Assessment. Land Quality Press, Nottingham.

- DEFRA (2014). Category 4 Screening Levels (C4SL) – SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination.
- CIRIA. (2001). *Contaminated land risk assessment A guide to good practice*.
- DoE (1995), Industry profiles.
- Environment Agency. (2008). *R&D Publication 66. Guidance for the Safe Development of Housing on Land Affected by Contamination*.
- Environment Agency. (March 2017). *New Groundwater Vulnerability Mapping Methodology in England and Wales. Reference SC040016/R. Environment Agency*.
- BS 8485:2015+A1:2019 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
- BRE (2004), BR465: Cover systems for land regeneration.
- CIRIA (2014), C733 Asbestos in soil and made ground: a guide to understanding and managing risks.
- Scivyer, C. (2015). *BRE 211. Radon: Guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects). Fifth Edition*.
- The Coal Authority. (2018). *Coal Authority Interactive Viewer*. Retrieved from <http://mapapps2.bgs.ac.uk/coalauthority/home.html>

1.4. Limitations

The recommendations and opinions expressed in this report are based on information obtained as part of the desk study or provided by others. Information provided from other sources is taken in good faith and Dice Environmental cannot guarantee its accuracy. By the very nature of a ground investigation, information gained through intrusive investigation is from specific point locations. Ground conditions have the potential to vary significantly across any site, and the ultimate decision with regards to foundation design or other technical specifications lies with the developer and/or structural engineer. Reliance upon the contents of this report is subject to receipt of payment for any outstanding balance owed to Dice Consulting Engineers Ltd. or Dice Environmental Ltd. dated prior to, and in association with this report.

This report does not include specific investigation for the presence of either Potential Asbestos Containing Material (PACM) (unless identified within soils) or Japanese Knotweed at the subject site however, if obvious evidence of either is observed during the site walkover, details will be provided in this report. Specialist contractors should be commissioned to make detailed assessments and recommendations if these materials are suspected.

This report provides an assessment of the chemical suitability of soils to remain in-situ with respect to the proposed end use, and makes no comment or interpretation on which can be relied with respect to geo-technical considerations, such as, but not limited to, slope stability or topography.

The information contained in this report is intended for the use of William Richards and Dice Environmental can take no responsibility for the use of this information by any third party or for uses other than that described in this report or detailed within the terms of our engagement.

2. Site Information

2.1. Site Location

The site is located approximately 3.26km south-west of Cardiff City centre. The national grid reference (NGR) for the approximate centre of the site is ST 160 748.

A site plan is presented within Appendix A.

2.2. Site Description

A site walkover was undertaken by Dice Environmental on the 26th October 2023.

The site is a parcel of land set on the side of a hill. It is accessible via a steep access track down from the main road (B4267) via a locked gate.

The parcel of land at the base of the track is atop a hill, with a steep bank down to flats, approximately 50m from the River Ely along the north-eastern boundary of the site. There is a residential property, no longer lived in, in the southern corner of the site. The slope downwards was uneven, with occasional ditches present.

The site is predominantly covered in grasses, with some larger trees around the border. There is a section of land in the north-west of the site used for burning, which contained remnants of burned materials.

2.3. General Area Context

North: To the immediate north of the site there is a wooded area, with an industrial estate including a concrete supplier approximately 150m north.

East: To the east of the site there are flats leading to the River Ely approximately 50m away, with the A4232 and industrial estate (comprising a recycling centre, a delivery office & car dealerships) beyond.

South: To the south of the site there is predominantly wooded land.

West: To the west of the site there is predominantly forested land and open fields, with occasional unspecified buildings.

3. Phase II Investigation

3.1. Overview of Works

The Phase II intrusive investigation was undertaken on the 26th October 2023 under the supervision of a suitably qualified engineer and in general accordance with the Code of Practice for Site Investigations BS 5930:2015+A1:2020.

The Phase II investigation incorporated the following:

- The advancement of 11No. hand dug pits to a maximum depth of 0.4mbgl.
- The advancement of 5No. Window Sample boreholes to a maximum depth of 5mbgl.

In all exploratory locations, holes were advanced through any made ground onto underlying natural soils, soils were logged and any visual or olfactory evidence of contamination noted.

- The analysis of 4No. soil samples at a UKAS/MCERTS accredited laboratory for general and site specific chemical determinands. This included:
 - 21No. soil samples being analysed for a standard 'CLEA' screening suite of heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, V, Zn), PAHs (USEPA 16 & Total) and asbestos.
 - 8No. soil samples being analysed for hydrocarbons (TPH CWG ali/aro split).
 - 2No. samples undergoing Waste Acceptance Criteria testing to classify the waste of inert, hazardous or non-hazardous.

Sample locations are contained within Appendix A.
Soil logs are contained in Appendix B.

4. Ground Conditions

4.1. Made Ground

Made ground was identified across the site. It predominantly consisted of sandy gravelly clay containing brick, concrete, rare glass, ceramic, wood chippings and plastic fragments.

Dark brown clayey gravelly sandy topsoil with fragments of plastic, rare glass, wood chippings and brick was identified to a maximum depth of 0.1mbgl across the slope of the bank. This was underlain by the sandy gravelly clay made ground, where gravels were as described above, identified across the remainder of the site.

Made ground was identified to a maximum depth of 5.0mbgl. The total depth of the made ground was not identified.

4.2. Superficial Strata

Natural superficial geology was not identified during this site investigation.

4.3. Solid Strata

Solid geology was not encountered during this site investigation.

4.4. Groundwater

Groundwater was not encountered during the excavation of the window sample boreholes and hand pits. However, during groundwater monitoring identified groundwater at 1.95mbgl. This is potentially perched runoff unable to drain into clayey soils.

4.5. Field Observations

Ditches were noted in the side of the bank. Care should be taken when navigating this terrain.

Beyond the presence of made ground no significant visual or olfactory evidence of contamination was noted within soils across the site.

5. Contamination Assessment

The guidance detailed in section 1.3 has been followed to ensure that the risk posed to identified receptors, is reported according to accepted compliance criteria.

A Tier 1 stage, the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published in LQM/CIEH S4UL ("Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3829. All rights reserved") and DEFRA's C4SLs within Appendix E.

5.1. Inorganics & Organics

Determinand	Greatest recorded value across all samples (mg/kg)	Residential with Produce end use (mg/kg)	Pass/Fail	Public Open Space end use (mg/kg)	Pass/Fail
Arsenic (total)	31.4	37	Pass	79	Pass
Cadmium (total)	<2	11	Pass	120	Pass
Chromium (total)	91.7	910	Pass	1500	Pass
Chromium (VI)	<0.05	6	Pass	7.7	Pass
Copper (total)	68.9	2400	Pass	12000	Pass
Lead (total)	209.2	200	Fail WS01 @ 0.1	630	Pass
Mercury (total)	<2	1.2	Pass	16	Pass
Nickel (total)	39.3	180	Pass	230	Pass
Selenium (total)	<3	250	Pass	1100	Pass
Vanadium (total)	200.9	410	Pass	2000	Pass
Zinc (total)	316.4	3700	Pass	81000	Pass
PAHs					
Naphthalene	37.60	13	Fail HP10 @ 0-0.1	4900	Pass
Acenaphthylene	3.87	920	Pass	15000	Pass
Acenaphthene	2.53	1100	Pass	15000	Pass
Fluorene	4.74	860	Pass	9900	Pass
Phenanthrene	30.20	440	Pass	3100	Pass
Anthracene	12.75	11000	Pass	74000	Pass
Fluoranthene	31.67	890	Pass	3100	Pass
Pyrene	25.71	2000	Pass	7400	Pass
Benzo(a)anthracene	14.18	13	Fail WS03 @ 0.2	29	Pass
Chrysene	13.25	27	Pass	57	Pass
Benzo(b)fluoranthene	12.22	3.7	Fail WS03 @ 0.2 HP10 0-0.1	7.2	Fail WS03 @ 0.2 HP10 0-0.1
Benzo(k)fluoranthene	5.49	100	Pass	190	Pass

Benzo(a)pyrene	11.78	3	Fail WS03 @ 0.2 HP10 0-0.1	5.7	Fail WS03 @ 0.2 HP10 0-0.1
Indeno(123cd)pyrene	6.97	41	Pass	82	Pass
Dibenz(ah)anthracene	1.49	0.3	Fail WS03 @ 0.2 HP10 0-0.1	0.58	Fail WS03 @ 0.2 HP10 0-0.1
Benzo(ghi)perylene	6.50	350	Pass	640	Pass
TPH					
VPH Aromatic (>EC5-EC7)	<0.05	300	Pass	56000	Pass
VPH Aromatic (>EC7-EC8)	<0.05	660	Pass	56000	Pass
VPH Aromatic (>EC8-EC10)	<0.05	190	Pass	5000	Pass
EPH Aromatic (>EC10-EC12)	1	380	Pass	5000	Pass
EPH Aromatic (>EC12-EC16)	7	660	Pass	5000	Pass
EPH Aromatic (>EC16-EC21)	31	930	Pass	3800	Pass
EPH Aromatic (>EC21-EC35)	79	1700	Pass	3800	Pass
EPH Aromatic (>EC35-EC44)	15	1700	Pass	3800	Pass
VPH Aliphatic (>C5-C6)	<0.05	160	Pass	600000	Pass
VPH Aliphatic (>C6-C8)	<0.1	530	Pass	620000	Pass
VPH Aliphatic (>C8-C10)	<0.05	150	Pass	13000	Pass
EPH Aliphatic (>C10-C12)	1	760	Pass	13000	Pass
EPH Aliphatic (>C12-C16)	2	4300	Pass	13000	Pass
EPH Aliphatic (>C16-C35)	8	110000	Pass	250000	Pass
EPH Aliphatic (>C35-C44)	1	110000	Pass	250000	Pass

- Based on sandy loam soil as defined in SR3 (Environment Agency, 2009c) and 6% soil organic matter (SOM)
- Figures are rounded to two significant figures
- In applying the rules for non-soil background to the S4UIs, the background ADE is limited to being no larger than the contribution from the relevant soil ADE
- Based on comparison of inhalation exposure with inhalation ID
- Based on comparison of oral and dermal exposure with oral TDI

Based on published LQM/CIEH S4UIs & DEFRA's C4SLs, exceedances in PAHs and Lead were identified with respect to a Residential with produce end use, and an exceedance in PAHs with respect to a Residential Public Open Space end use.

These exceedances of Lead were identified in WS01 at 0.1mbgl and exceedances in Naphthalene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenz(ah)anthracene were identified in in HP10 at 0.1mbgl and WS03 at 0.2mbgl.

Due to soil mixing from a range of unidentified sources, and sampling frequency, it is not considered possible to determine hotspot zones at this time.

Therefore, remedial measures will be proposed in section 7 to address these exceedances.

5.2. Asbestos

No asbestos was identified within any of the soil samples taken from across the site.

5.3. Ground Gas

A monitoring well was installed in WS02. A subsequent monitoring visit was undertaken on 15th November 2023.

The results are displayed in the following table.

Test Location	Max recorded CH4 (% vol)	Max recorded CO2 (% vol)	Max. Flow Rate (l/hr)	GSV
WS02	15.7	8.0	0.1	0.0157

The worst-case GSV has been identified as **CS2 / Amber**. Furthermore, Methane levels have been recorded as >1%, and Carbon Dioxide levels above >5%, which is considered the trigger threshold to be considered CS2/ Amber.

Whilst no further new structures are proposed for the site, the introduction of gas generating soils adjacent to the existing property may pose a risk to end users of the site, should the existing residential property come back into use. It is recommended that internal gas levels in the property be monitored to identify if ground gas migration to potential receptors is complete, and if retrofitting the existing property with ground gas protection measures will be required.

Ground gas monitoring results and corresponding GSVs are contained in Appendix C.

5.4. Controlled Waters

No significant levels of contaminants of concern were identified, with respect to controlled waters. Therefore, the risk posed to controlled waters is considered to be negligible.

6. Phase II Conceptual Site Model

Human Receptors			
Source	Pathway	Receptor	Solution
Exceedances in Lead, Napthalene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenz(ah)anthracene were identified during this site investigation.	Direct dermal contact or ingestion of soils, or inhalation of dust/fibres (i.e. human interaction with surface and subsurface materials).	Site workers during the redevelopment of the site.	Basic PPE and hygiene facilities should be provided for site workers.
		Intended end users of the site (Residents).	In areas of soft landscaping, it will be necessary to install a clean cover system of a minimum depth of 500mm. The cover system should comprise imported, verified subsoil & topsoil in areas of proposed soft landscaping. Following installation, a verification study shall be required to assess the depth and chemical composition of the installed capping layer and submit the findings as a verification report to the local authority for approval.
The site has been identified as CS2 / Amber 1.	The migration and accumulation of ground gases through permeable sub-surface materials and/ or preferential pathways.	Intended end users of the site (Residents).	Whilst no further new structures are proposed for the site, the introduction of gas generating soils adjacent to the existing property may pose a risk to end users of the site, should the existing residential property come back into use. It is recommended that internal gas levels in the property be monitored to identify if ground gas migration to potential receptors is complete, and if

			retrofitting the existing property with ground gas protection measures will be required.
Environmental Receptors (Controlled Waters)			
No significant levels of contaminants of concern have been identified with respect to controlled waters.	Lateral and vertical migration of groundwater through permeable sub-surface materials and/ or preferential pathways.	The River Ely to the east of the site as well as underlying aquifers.	No specific remediation is considered to be necessary for this receptor at this time. Further assessment may be required to include further leachate testing.

7. Risk Management & Remediation

Previous sections have quantified the risk posed to identified receptors. The following section details measures and recommendations for dealing with risks associated with soil, gas, and groundwater contamination in respect to the proposed development.

7.1. Remediation to Protect End Users

Exceedances in Lead, Napthalene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenz(ah)anthracene were identified during this site investigation.

Therefore, in areas of soft landscaping, it will be necessary to install a clean cover system of a minimum depth of 500mm. The cover system should comprise imported, verified subsoil & topsoil in areas of proposed soft landscaping. Imported soils should comply chemically with criteria highlighted within Appendix E (Residential with Produce end use).

Following installation, a verification study shall be required to assess the depth and chemical composition of the installed capping layer and submit the findings as a verification report to the local authority for approval.

Due to the uneven nature of the land, steep slope and observed ditches along the side of the bank, it is recommended the topography and stability of the site be considered, to mitigate risk of future movement of the capping system.

7.2. Ground Gas Protection Measures

The site has been identified as CS2 / Amber 1.

Whilst no further new structures are proposed for the site, the introduction of gas generating soils adjacent to the existing property may pose a risk to end users of the site, should the existing residential property come back into use. It is recommended that internal gas levels in the property be monitored to identify if ground gas migration to potential receptors is complete, and if retrofitting the existing property with ground gas protection measures will be required.

It should be noted that this assessment has been made after only 1 monitoring visit. Whilst further monitoring visits are required to complete a full assessment, it is considered unlikely that recommendations would change from those above. Should further structures be proposed for the site, a full ground gas monitoring regime in accordance with BS 8485:2015 should be undertaken.

7.3. Remediation to Protect Controlled Waters

No significant levels of contaminants of concern have been identified with respect to controlled waters at this time. Further assessment may be required at a later date.

7.4. Remediation to Protect Construction Workers

Basic PPE and hygiene facilities should be sufficient for site workers. A risk assessment should be undertaken by the principal contractor before any work begins, including consideration of topography.

8. Conclusions and Recommendations

A phase 2 intrusive investigation was carried out which successfully characterised made ground across the site, within shallow soils. Representative soil samples were taken of these made ground materials and sent for analysis at a UKAS/MCERTS accredited laboratory for analysis of the identified contaminants of concern.

It is considered that the site may be suitable for the proposed use as residential garden area, providing the following recommendations & remedial measures are implemented.

Recommendations:

- In areas of soft landscaping, it will be necessary to install a clean cover system of a minimum depth of 500mm. The cover system should comprise imported, verified subsoil & topsoil in areas of proposed soft landscaping. Imported soils should comply chemically with criteria highlighted within Appendix E (Residential with Produce end use).
- Following installation, a verification study shall be required to assess the depth and chemical composition of the installed capping layer and submit the findings as a verification report to the local authority for approval.
- Due to the uneven nature of the land, steep slope and observed ditches along the side of the bank, it is recommended the topography and stability of the site be considered, to mitigate risk of future movement of the capping system.
- The area of observed burned material in the north west of the site should be scraped and removed from site.

This report should be submitted to your local planning authority for approval.

APPENDIX A



Title
Site Location


Reference
101142

Date
16/11/2023

Site Address

**Hillside,
Leckwith Road,
CF11 8DR**

Legend

 **Approximate Site Centre**

Scale
NTS

Drawn
AMD

Figure Number
Fig.1



Title
Site Layout

Reference
101142

Date
16/11/2023

Site Address

**Hillside,
Leckwith Road,
CF11 8DR**

Legend

Scale
NTS

Drawn
AMD

Figure Number
Fig.2



Title
Photos

Reference
101142

Date
16/11/2023

Site Address

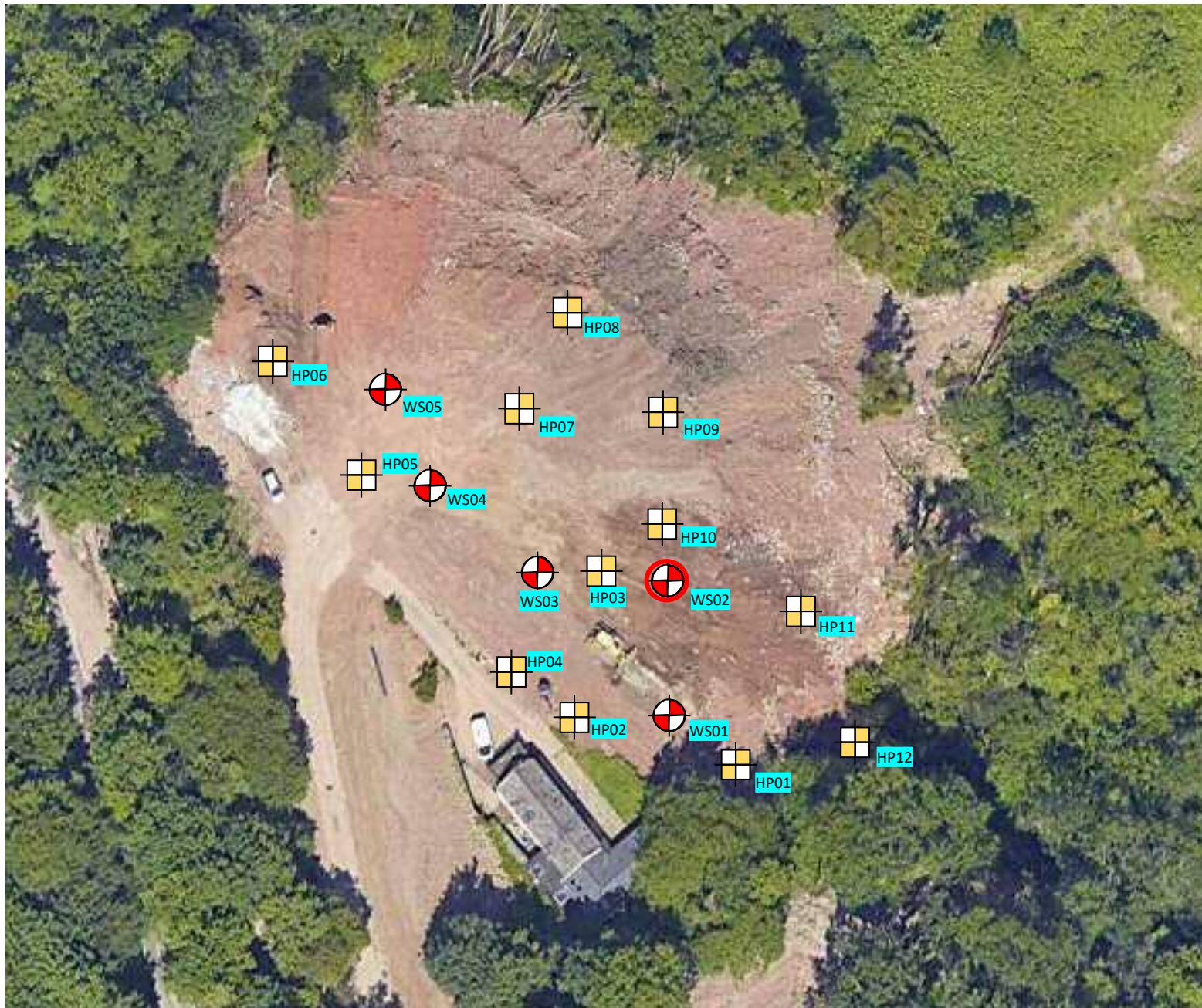
**Hillside,
Leckwith Road,
CF11 8DR**

Legend

Scale
NTS

Drawn
AMD

Figure Number
Fig.3





Title
Development Proposal

Reference
101142

Date
16/11/2023

Site Address
**Hillside,
 Leckwith Road,
 CF11 8DR**

- Legend
-  Borehole location
 -  Trial Pit

Scale
NTS


Drawn
AMD

Figure Number
Fig.4

APPENDIX B

Window Sample Borehole

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name: Regional Drilling		Drilling Equipment: Window Sample Drill	
Borehole Number WS01	Hole Type WS	Level	Logged By AD	Scale 1:15	Page Number Sheet 1 of 1

Well	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10	ES		1.20			MADE GROUND. Slightly sandy gravelly clay. Gravel is concrete, slate, blackened wood chippings, brick, ceramic, bituminous material and mixed lithologies.
	0.60	ES					
				2.00			End of Borehole at 2.00m






Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
 1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.
 2. Refusal at 2.0mbgl.



Window Sample Borehole

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name: Regional Drilling		Drilling Equipment: Window Sample Drill	
Borehole Number WS02	Hole Type WS	Level	Logged By AD	Scale 1:30	Page Number Sheet 1 of 1

Well	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.30	ES		1.20			MADE GROUND. Brown sandy gravelly CLAY. Gravel is fine to coarse mixed lithologies, concrete and ceramic.	1
	0.70	ES						
	2.00	ES		3.00			MADE GROUND. Reddish brown very clayey very gravelly SAND. Gravel is glass, brick, plastic, ceramic an mixed lithologies.	2
				3.50			NO RECOVERY.	3
				4.00			MADE GROUND. Reddish brown and black slightly clayey sandy gravel. Gravel is ceramic, plastic and mixed lithologies.	4
				5.00			MADE GROUND. Brown mottled black sandy gravelly clay. Gravel is concrete, ceramics, brick and mixed lithologies.	4
							End of Borehole at 5.00m	5
								6

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation







Remarks

- Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.
- Monitoring well installed to 5mbgl.



Window Sample Borehole

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name: Regional Drilling		Drilling Equipment: Window Sample Drill	
Borehole Number WS03	Hole Type WS	Level	Logged By AD	Scale 1:30	Page Number Sheet 1 of 1

Well	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.20	ES					MADE GROUND. Brown sandy very gravelly wet CLAY. Gravel is ceramic, concrete, brick fragments, soft plastic, glass and mixed lithologies. <u>Black staining and odour.</u>	
	0.50	ES						
				1.00			NO RECOVERY.	1
				1.50			MADE GROUND. Greyish brown wet clayey sandy gravel. Gravel is fine to coarse brick, concrete, ceramic, mixed lithologies.	
				2.00			NO RECOVERY.	2
				3.00			MADE GROUND. Grey mottled brown slightly sandy gravelly clay. Gravel is fine to coarse brick, concrete, ceramic and mixed lithologies.	3
				5.00			End of Borehole at 5.00m	5
								6






Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Window Sample Borehole

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name: Regional Drilling		Drilling Equipment: Window Sample Drill	
Borehole Number WS04	Hole Type WS	Level	Logged By AD	Scale 1:30	Page Number Sheet 1 of 1

Well	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.10	ES		0.20			MADE GROUND. Brown sandy gravelly clay. Gravel is fine to coarse brick fragments, bituminous material and brick fragments.	
	0.40	ES		0.50			MADE GROUND. Brown clayey sandy gravel with black staining. Gravel is fine to coarse brick, concrete, ceramic, bituminous material, wood chippings and mixed lithologies.	
	0.60	ES					MADE GROUND. Greyish brown sandy gravelly clay. Gravel is fine to coarse brick, concrete, blackened wood chippings and mixed lithologies.	1
								2
				3.00			NO RECOVERY.	3
				3.50			MADE GROUND. Greyish brown sandy gravelly clay. Gravel is fine to coarse brick, concrete, blackened wood chippings and mixed lithologies.	
				4.00			End of Borehole at 4.00m	4
								5
								6


Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Window Sample Borehole

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name: Regional Drilling		Drilling Equipment: Window Sample Drill	
Borehole Number WS05	Hole Type WS	Level	Logged By AD	Scale 1:10	Page Number Sheet 1 of 1

Well	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.20	ES		0.30			MADE GROUND. Brown sandy gravelly clay. Gravel is bituminous material, brick, concrete and mixed lithologies.

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation


Remarks

- Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.
- Refusal at 0.3mbgl on concrete cobbles.



Trial Pit Log

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name:		Equipment:	
Location Number HP01	Location Type HA	Level	Logged By AD	Scale 1:10	Page Number Sheet 1 of 1

Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
Depth (m)	Type	Results				
0.40	ES		0.40			MADE GROUND. Slightly sandy gravelly clay. Gravel is concrete, brick, ceramic and mixed lithologies.
						End of Borehole at 0.40m
						0.5
						1.0
						1.5
						2.0


Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
 1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Percussion Drilling Log

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name:		Drilling Equipment:	
Borehole Number HP02	Hole Type HA	Level	Logged By AD	Scale 1:50	Page Number Sheet 1 of 1

Well	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.40	ES		0.40			MADE GROUND. Sandy gravelly clay. Gravel is concrete, ceramic, brick and mixed lithologies.	
							End of Borehole at 0.40m	1
								2
								3
								4
								5
								6
								7
								8
								9
								10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Trial Pit Log

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name:		Equipment:	
Location Number HP03	Location Type HA	Level	Logged By AD	Scale 1:10	Page Number Sheet 1 of 1

Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.40	ES		0.40		[Cross-hatch pattern]	MADE GROUND. Sandy gravelly clay. Gravel is ceramic, concrete, brick fragments and plastics.	
						End of Borehole at 0.40m	0.5
							1.0
							1.5
							2.0


Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
 1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Trial Pit Log

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name:		Equipment:	
Location Number HP06	Location Type HA	Level	Logged By AD	Scale 1:10	Page Number Sheet 1 of 1

Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
Depth (m)	Type	Results				
0.40	ES		0.40			MADE GROUND. Sandy gravelly clay. Gravel is brick fragments, concrete, bituminous material and mixed lithologies.
						End of Borehole at 0.40m
						0.5
						1.0
						1.5
						2.0


Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
 1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Trial Pit Log

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name:		Equipment:	
Location Number HP07	Location Type HA	Level	Logged By AD	Scale 1:10	Page Number Sheet 1 of 1

Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES		0.10			MADE GROUND. Sandy gravelly clay. Gravel is brick, concrete and mixed lithologies. End of Borehole at 0.10m
						0.5
						1.0
						1.5
						2.0


Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Trial Pit Log

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name:		Equipment:	
Location Number HP08	Location Type HA	Level	Logged By AD	Scale 1:10	Page Number Sheet 1 of 1

Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES		0.10			MADE GROUND. Dark brown clayey sandy gravelly topsoil. Gravel is wood chippings, glass and mixed lithologies.
						End of Borehole at 0.10m
						0.5
						1.0
						1.5
						2.0



Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
 1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Trial Pit Log

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name:		Equipment:	
Location Number HP09	Location Type HA	Level	Logged By AD	Scale 1:10	Page Number Sheet 1 of 1


Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES		0.10			MADE GROUND. Dark brown clayey sandy gravelly topsoil. Gravel is ceramic, brick, glass, wood fragments and mixed lithologies.
			0.20			MADE GROUND. Reddish sandy gravelly clay. Gravel is ceramic, brick, glass, wood fragments and mixed lithologies.
						End of Borehole at 0.20m
						0.5
						1.0
						1.5
						2.0

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
 1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name:		Equipment:	
Location Number HP10	Location Type HA	Level	Logged By AD	Scale 1:10	Page Number Sheet 1 of 1

Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES		0.10			MADE GROUND. Clayey sandy gravelly topsoil. Gravel is plastic, brick and mixed lithologies. End of Borehole at 0.10m
						0.5
						1.0
						1.5
						2.0


Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Trial Pit Log

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name:		Equipment:	
Location Number HP11	Location Type HA	Level	Logged By AD	Scale 1:10	Page Number Sheet 1 of 1

Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES		0.10			MADE GROUND. Dark brown clayey sandy gravelly topsoil. Gravel is mixed lithologies, whole bricks, cobbles and cement fragments. End of Borehole at 0.10m
						0.5
						1.0
						1.5
						2.0


Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



Trial Pit Log

Project Name: Hillend, Cardiff		Client: William Richards		Date: 26/10/2023	
Location: Leckwith Road, Cardiff, CF11 8DR		Contractor:			
Project No. : 101142		Crew Name:		Equipment:	
Location Number HP12	Location Type HA	Level	Logged By AD	Scale 1:10	Page Number Sheet 1 of 1

Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES		0.10			MADE GROUND. Clayey sandy gravel. Gravel is plastic, glass, cobbles, brick, metal wire, soft plastics and mixed lithologies. End of Borehole at 0.10m
						0.5
						1.0
						1.5
						2.0

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
1. Beyond the presence of made ground, no visual or olfactory evidence of contamination was observed.



APPENDIX C



GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	William Richards		Job No:	101142	Instruments Used:	GFM 435							
Project:	Hillside, Cardiff		Date:	15-Nov-23	Monitored By:	AD							
Weather:	Cloudy												
Installation No.	Peak ¹		Steady ²			Total gas flow rate (l/hr)	Atmospheric Pressure (mbar)	Minutes Monitored	Methane		Carbon Dioxide		Groundwater depth (m)
	CH ₄ (% vol)	CO ₂ (% vol)	CH ₄ (% vol)	CO ₂ (% vol)	O ₂ (% vol)				GSV	CS	GSV	CS	
WS02	15.7	8.0	15.7	8.0	0.4	0.1	1010	5	0.0157	CS2	0.008	CS2	1.95

¹ The peak reading is the maximum recorded level during a monitoring event.

² The steady reading is the level which remained constant after approximately 2 minutes.

APPENDIX D



ANALYTICAL TEST REPORT

Contract no: 127962

Contract name: Hillside, Cardiff

Client reference: 101142

Clients name: Dice Environmental

Clients address: 167 Kennington Road
Nottingham
NG8 1QE

Samples received: 31 October 2023

Analysis started: 31 October 2023

Analysis completed: 13 November 2023

Report issued: 13 November 2023

Key

- U UKAS accredited test
- M MCERTS & UKAS accredited test
- \$ Test carried out by an approved subcontractor
- I/S Insufficient sample to carry out test
- N/S Sample not suitable for testing
- NAD No Asbestos Detected

Approved by:



Senior Reporting Administrator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
127962-1	WS01 ES+O	0.10	Sandy Loamy Clay with Gravel & Roots	-	-	14.6
127962-2	WS01 ES	0.60	Loamy Clay with Gravel	-	-	15.4
127962-3	WS02 ES	0.30	Sandy Loamy Clay with Gravel & Roots	-	-	12.3
127962-4	WS02 ES+O	0.70	Loamy Clay with Gravel & Roots	-	-	17.9
127962-5	WS02 WAC ES	2.00	Sandy Clayey Loam with Gravel & Roots	-	-	13.4
127962-6	WS03 ES+O	0.20	Sandy Loamy Clay with Gravel & Roots	-	-	15.6
127962-7	WS03 ES	0.50	Loamy Clay with Gravel & Roots	-	-	13.2
127962-8	WS04 ES+O	0.10	Loamy Clay with Gravel & Roots	-	-	13.5
127962-9	WS04 WAC ES	0.40	Sandy Loamy Clay with Gravel & Roots	-	-	16.5
127962-10	WS04 ES	0.60	Sandy Loamy Clay with Gravel & Roots	-	-	16.4
127962-11	WS05 ES +O	0.20	Sandy Loamy Clay with Gravel	-	-	13.2
127962-12	HP01 ES	0-0.4	Sandy Clayey Loamy with Gravel & Roots	-	-	11.5
127962-13	HP02 ES	0-0.4	Loamy Clay with Gravel & Roots	-	-	17.9
127962-14	HP03 ES	0-0.4	Loamy Clay with Gravel & Roots	-	-	16.6
127962-15	HP04 ES	0-0.4	Clayey Loam with Gravel & Roots	-	-	14.3
127962-16	HP05 ES	0-0.4	Sandy Loamy Clay with Gravel & Roots	-	-	31.6
127962-17	HP06 ES	0-0.4	Loamy Clay with Gravel & Roots	-	-	21.0
127962-18	HP07 ES	0-0.1	Loamy Clay with Gravel & Roots	-	-	13.6
127962-19	HP08 ES	0-0.1	Clayey Loam with Gravel & Roots	-	-	15.7
127962-20	HP09 ES + O	0-0.1	Clayey Loam with Gravel & Roots	-	-	14.8
127962-21	HP10 ES	0-0.1	Clayey Loam with Gravel & Roots	-	-	14.1
127962-22	HP11 ES+O	0-0.1	Sandy Loamy Clay with Gravel & Roots	-	-	21.1
127962-23	HP12 ES+O	0-0.1	Sandy Loamy Clay with Gravel & Roots	-	-	16.4

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SOILS

Lab number			127962-1	127962-2	127962-3	127962-4	127962-5	127962-6
Sample id			WS01 ES+O	WS01 ES	WS02 ES	WS02 ES+O	WS02 WAC ES	WS03 ES+O
Depth (m)			0.10	0.60	0.30	0.70	2.00	0.20
Date sampled			26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023
Test	Method	Units						
Antimony (total)	CE264	mg/kg Sb	-	-	-	-	13.0	-
Arsenic (total)	CE264 ^M	mg/kg As	9.0	10.9	8.2	10.5	12.9	9.8
Barium (total)	CE264 ^U	mg/kg Ba	-	-	-	-	400.7	-
Cadmium (total)	CE264 ^M	mg/kg Cd	<2	<2	<2	<2	<2	<2
Chromium (total)	CE264 ^U	mg/kg Cr	27.7	32.6	33.4	70.4	59.2	32.2
Chromium (VI)	CE263	mg/kg CrVI	<0.04	<0.04	0.07	<0.04	-	<0.04
Copper (total)	CE264 ^M	mg/kg Cu	22.8	25.6	38.8	33.3	36.2	26.5
Lead (total)	CE264 ^U	mg/kg Pb	209.2	77.1	53.5	88.4	91.7	68.8
Mercury (total)	CE264 ^U	mg/kg Hg	<2	<2	<2	<2	<2	<2
Molybdenum (total)	CE264	mg/kg Mo	-	-	-	-	2.2	-
Nickel (total)	CE264 ^M	mg/kg Ni	17.0	22.6	39.3	26.1	20.5	21.2
Selenium (total)	CE264	mg/kg Se	<3	<3	<3	<3	<3	<3
Vanadium (total)	CE264 ^U	mg/kg V	111.9	125.6	120.5	129.7	122.3	121.9
Zinc (total)	CE264 ^M	mg/kg Zn	104.2	119.4	176.0	162.0	316.4	149.1
pH	CE004 ^M	units	8.0	7.6	7.9	8.0	-	7.8
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	243	1129	1437	395	-	254
Sulphate (acid extractable)	CE062 ^M	mg/kg SO ₄	1424	3220	5269	2571	-	1306
Total Organic Carbon (TOC)	CE197	% w/w C	2.6	2.6	2.0	3.8	-	3.0
Estimate of OMC (calculated from TOC)	CE197	% w/w	4.5	4.6	3.4	6.5	-	5.2
PAH								
Naphthalene	CE087 ^M	mg/kg	0.04	0.27	0.06	0.10	-	0.97
Acenaphthylene	CE087 ^M	mg/kg	0.03	0.11	<0.02	0.03	-	3.85
Acenaphthene	CE087 ^M	mg/kg	0.03	0.06	0.04	0.07	-	0.56
Fluorene	CE087 ^U	mg/kg	0.03	0.07	0.04	0.07	-	5.05
Phenanthrene	CE087 ^M	mg/kg	0.38	0.43	0.30	0.54	-	25.45
Anthracene	CE087 ^U	mg/kg	0.11	0.35	0.13	0.20	-	12.75
Fluoranthene	CE087 ^M	mg/kg	0.71	0.74	0.71	1.08	-	30.80
Pyrene	CE087 ^M	mg/kg	0.60	0.82	0.61	0.83	-	23.57
Benzo(a)anthracene	CE087 ^U	mg/kg	0.37	0.38	0.41	0.57	-	14.18
Chrysene	CE087 ^M	mg/kg	0.53	0.40	0.38	0.75	-	13.25
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.49	0.54	0.52	0.72	-	11.54
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.19	0.25	0.19	0.29	-	5.49
Benzo(a)pyrene	CE087 ^U	mg/kg	0.38	0.39	0.33	0.48	-	11.45
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.27	0.32	0.30	0.41	-	6.28
Dibenz(ah)anthracene	CE087 ^M	mg/kg	0.04	0.06	0.05	0.08	-	1.36
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.22	0.27	0.25	0.35	-	5.56
PAH (total of USEPA 16)	CE087	mg/kg	4.42	5.45	4.33	6.58	-	172
TPH								
VPH Aromatic (>EC5-EC7)	\$	mg/kg	<0.05	-	-	<0.05	-	<0.05
VPH Aromatic (>EC7-EC8)	\$	mg/kg	<0.05	-	-	<0.05	-	<0.05
VPH Aromatic (>EC8-EC10)	\$	mg/kg	<0.05	-	-	<0.05	-	<0.05

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SOILS

Lab number			127962-1	127962-2	127962-3	127962-4	127962-5	127962-6
Sample id			WS01 ES+O	WS01 ES	WS02 ES	WS02 ES+O	WS02 WAC ES	WS03 ES+O
Depth (m)			0.10	0.60	0.30	0.70	2.00	0.20
Date sampled			26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023
Test	Method	Units						
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<0.5	-	-	<0.5	-	1
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<1	-	-	<1	-	4
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<2	-	-	<2	-	25
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	<5	-	-	8	-	52
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	<1.5	-	-	<1.5	-	11
VPH Aliphatic (>C5-C6)	\$	mg/kg	<0.05	-	-	<0.05	-	<0.05
VPH Aliphatic (>C6-C8)	\$	mg/kg	<0.1	-	-	<0.1	-	<0.1
VPH Aliphatic (>C8-C10)	\$	mg/kg	<0.05	-	-	<0.05	-	<0.05
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<0.5	-	-	<0.5	-	1
EPH Aliphatic (>C12-C16)	CE250	mg/kg	1	-	-	<0.5	-	2
EPH Aliphatic (>C16-C35)	CE250	mg/kg	<4.5	-	-	<4.5	-	8
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<1	-	-	<1	-	<1
PCB								
PCB Congener 77	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 81	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 105	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 114	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 118	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 123	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 126	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 156	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 157	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 167	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 169	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB Congener 189	CE181	mg/kg	<0.006	-	<0.006	-	-	<0.006
PCB (total of WHO 12)	CE181	mg/kg	<0.061	-	<0.061	-	-	<0.061
Subcontracted Analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	-	NAD

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SOILS

Lab number			127962-7	127962-8	127962-9	127962-10	127962-11	127962-12
Sample id			WS03 ES	WS04 ES+O	WS04 WAC ES	WS04 ES	WS05 ES +O	HP01 ES
Depth (m)			0.50	0.10	0.40	0.60	0.20	0-0.4
Date sampled			26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023
Test	Method	Units						
Antimony (total)	CE264	mg/kg Sb	-	-	12.2	-	-	-
Arsenic (total)	CE264 ^M	mg/kg As	9.9	11.6	10.9	10.9	9.4	9.7
Barium (total)	CE264 ^U	mg/kg Ba	-	-	380.4	-	-	-
Cadmium (total)	CE264 ^M	mg/kg Cd	<2	<2	<2	<2	<2	<2
Chromium (total)	CE264 ^U	mg/kg Cr	30.1	31.8	39.1	31.3	28.7	36.1
Chromium (VI)	CE263	mg/kg CrVI	<0.04	<0.04	-	<0.04	<0.04	<0.04
Copper (total)	CE264 ^M	mg/kg Cu	30.0	26.0	68.9	43.7	31.5	31.3
Lead (total)	CE264 ^U	mg/kg Pb	81.1	49.8	101.1	96.3	72.3	61.4
Mercury (total)	CE264 ^U	mg/kg Hg	<2	<2	<2	<2	<2	<2
Molybdenum (total)	CE264	mg/kg Mo	-	-	2.2	-	-	-
Nickel (total)	CE264 ^M	mg/kg Ni	22.2	27.8	25.2	22.2	19.0	22.3
Selenium (total)	CE264	mg/kg Se	<3	<3	<3	<3	<3	<3
Vanadium (total)	CE264 ^U	mg/kg V	120.3	83.3	150.5	146.0	102.3	122.4
Zinc (total)	CE264 ^M	mg/kg Zn	126.1	119.8	212.7	197.0	173.7	107.7
pH	CE004 ^M	units	8.4	8.1	-	8.0	8.2	8.1
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	895	455	-	1572	1434	476
Sulphate (acid extractable)	CE062 ^M	mg/kg SO ₄	2429	2049	-	9127	4002	1638
Total Organic Carbon (TOC)	CE197	% w/w C	2.5	2.0	-	2.8	2.8	2.4
Estimate of OMC (calculated from TOC)	CE197	% w/w	4.3	3.5	-	4.8	4.8	4.2
PAH								
Naphthalene	CE087 ^M	mg/kg	0.12	0.04	-	0.08	0.04	0.04
Acenaphthylene	CE087 ^M	mg/kg	0.02	<0.02	-	<0.02	0.05	<0.02
Acenaphthene	CE087 ^M	mg/kg	0.07	<0.02	-	0.02	0.09	<0.02
Fluorene	CE087 ^U	mg/kg	0.08	0.04	-	<0.02	0.28	<0.02
Phenanthrene	CE087 ^M	mg/kg	0.65	0.16	-	0.20	2.22	0.21
Anthracene	CE087 ^U	mg/kg	0.32	0.33	-	0.07	1.29	0.06
Fluoranthene	CE087 ^M	mg/kg	1.02	0.24	-	0.46	4.25	0.47
Pyrene	CE087 ^M	mg/kg	0.81	0.19	-	0.40	2.83	0.37
Benzo(a)anthracene	CE087 ^U	mg/kg	0.50	0.14	-	0.28	2.22	0.35
Chrysene	CE087 ^M	mg/kg	0.54	0.16	-	0.29	2.25	0.32
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.47	0.16	-	0.42	1.91	0.46
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.17	0.07	-	0.15	0.79	0.15
Benzo(a)pyrene	CE087 ^U	mg/kg	0.41	0.14	-	0.32	1.48	0.31
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.23	0.09	-	0.29	0.85	0.24
Dibenz(ah)anthracene	CE087 ^M	mg/kg	0.05	<0.02	-	0.07	0.20	0.05
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.24	0.09	-	0.31	0.77	0.26
PAH (total of USEPA 16)	CE087	mg/kg	5.71	1.83	-	3.35	21.5	3.30
TPH								
VPH Aromatic (>EC5-EC7)	\$	mg/kg	-	<0.05	-	-	<0.05	-
VPH Aromatic (>EC7-EC8)	\$	mg/kg	-	<0.05	-	-	<0.05	-
VPH Aromatic (>EC8-EC10)	\$	mg/kg	-	<0.05	-	-	<0.05	-

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SOILS

Lab number			127962-7	127962-8	127962-9	127962-10	127962-11	127962-12
Sample id			WS03 ES	WS04 ES+O	WS04 WAC ES	WS04 ES	WS05 ES +O	HP01 ES
Depth (m)			0.50	0.10	0.40	0.60	0.20	0-0.4
Date sampled			26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023
Test	Method	Units						
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-	1	-	-	<0.5	-
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-	7	-	-	<1	-
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-	31	-	-	<2	-
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-	79	-	-	5	-
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-	15	-	-	<1.5	-
VPH Aliphatic (>C5-C6)	\$	mg/kg	-	<0.05	-	-	<0.05	-
VPH Aliphatic (>C6-C8)	\$	mg/kg	-	<0.1	-	-	<0.1	-
VPH Aliphatic (>C8-C10)	\$	mg/kg	-	<0.05	-	-	<0.05	-
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-	1	-	-	<0.5	-
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-	1	-	-	1	-
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-	8	-	-	<4.5	-
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-	1	-	-	<1	-
PCB								
PCB Congener 77	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 81	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 105	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 114	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 118	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 123	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 126	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 156	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 157	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 167	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 169	CE181	mg/kg	-	-	-	-	<0.006	-
PCB Congener 189	CE181	mg/kg	-	-	-	-	<0.006	-
PCB (total of WHO 12)	CE181	mg/kg	-	-	-	-	<0.061	-
Subcontracted Analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	-	NAD	NAD	NAD

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SOILS

Lab number			127962-13	127962-14	127962-15	127962-16	127962-17	127962-18
Sample id			HP02 ES	HP03 ES	HP04 ES	HP05 ES	HP06 ES	HP07 ES
Depth (m)			0-0.4	0-0.4	0-0.4	0-0.4	0-0.4	0-0.1
Date sampled			26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023
Test	Method	Units						
Antimony (total)	CE264	mg/kg Sb	-	-	-	-	-	-
Arsenic (total)	CE264 ^M	mg/kg As	9.5	11.2	12.0	11.1	10.9	31.4
Barium (total)	CE264 ^U	mg/kg Ba	-	-	-	-	-	-
Cadmium (total)	CE264 ^M	mg/kg Cd	<2	<2	<2	<2	<2	<2
Chromium (total)	CE264 ^U	mg/kg Cr	32.9	38.4	60.7	31.1	64.9	37.8
Chromium (VI)	CE263	mg/kg CrVI	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Copper (total)	CE264 ^M	mg/kg Cu	30.1	29.5	35.6	26.4	37.6	29.3
Lead (total)	CE264 ^U	mg/kg Pb	68.5	81.5	74.0	77.6	76.1	60.9
Mercury (total)	CE264 ^U	mg/kg Hg	<2	<2	<2	<2	<2	<2
Molybdenum (total)	CE264	mg/kg Mo	-	-	-	-	-	-
Nickel (total)	CE264 ^M	mg/kg Ni	24.1	23.7	23.0	18.2	22.8	13.5
Selenium (total)	CE264	mg/kg Se	<3	<3	<3	<3	<3	<3
Vanadium (total)	CE264 ^U	mg/kg V	100.9	106.6	119.9	99.6	111.7	200.9
Zinc (total)	CE264 ^M	mg/kg Zn	139.5	137.4	136.6	114.6	151.6	128.4
pH	CE004 ^M	units	7.8	7.9	8.1	7.9	8.1	8.2
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	931	606	177	364	229	221
Sulphate (acid extractable)	CE062 ^M	mg/kg SO ₄	3930	2096	1259	1890	1281	1643
Total Organic Carbon (TOC)	CE197	% w/w C	2.7	2.8	3.8	6.1	3.4	4.4
Estimate of OMC (calculated from TOC)	CE197	% w/w	4.6	4.9	6.5	10.5	5.9	7.6
PAH								
Naphthalene	CE087 ^M	mg/kg	<0.02	<0.02	0.13	0.09	0.06	0.08
Acenaphthylene	CE087 ^M	mg/kg	<0.02	<0.02	0.05	<0.02	0.06	0.06
Acenaphthene	CE087 ^M	mg/kg	<0.02	<0.02	0.16	0.06	0.07	0.03
Fluorene	CE087 ^U	mg/kg	<0.02	<0.02	0.14	0.06	0.08	0.04
Phenanthrene	CE087 ^M	mg/kg	0.07	0.09	0.93	0.53	0.79	0.55
Anthracene	CE087 ^U	mg/kg	0.04	0.05	0.32	0.17	0.30	0.46
Fluoranthene	CE087 ^M	mg/kg	0.14	0.19	1.77	0.96	1.56	1.98
Pyrene	CE087 ^M	mg/kg	0.11	0.14	1.39	0.77	1.20	1.72
Benzo(a)anthracene	CE087 ^U	mg/kg	0.08	0.12	1.08	0.58	0.88	1.53
Chrysene	CE087 ^M	mg/kg	0.09	0.12	1.25	0.68	1.03	1.26
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.11	0.15	1.32	0.66	1.10	2.09
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.05	0.06	0.48	0.27	0.44	0.72
Benzo(a)pyrene	CE087 ^U	mg/kg	0.07	0.11	0.99	0.48	0.80	1.90
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.06	0.08	0.77	0.34	0.54	1.27
Dibenz(ah)anthracene	CE087 ^M	mg/kg	<0.02	<0.02	0.17	0.08	0.14	0.26
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.07	0.08	0.71	0.33	0.59	1.13
PAH (total of USEPA 16)	CE087	mg/kg	0.88	1.18	11.7	6.05	9.64	15.1
TPH								
VPH Aromatic (>EC5-EC7)	\$	mg/kg	-	-	-	-	-	-
VPH Aromatic (>EC7-EC8)	\$	mg/kg	-	-	-	-	-	-
VPH Aromatic (>EC8-EC10)	\$	mg/kg	-	-	-	-	-	-

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SOILS

Lab number			127962-13	127962-14	127962-15	127962-16	127962-17	127962-18
Sample id			HP02 ES	HP03 ES	HP04 ES	HP05 ES	HP06 ES	HP07 ES
Depth (m)			0-0.4	0-0.4	0-0.4	0-0.4	0-0.4	0-0.1
Date sampled			26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023
Test	Method	Units						
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C5-C6)	\$	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C6-C8)	\$	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C8-C10)	\$	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-	-	-	-	-	-
PCB								
PCB Congener 77	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 81	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 105	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 114	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 118	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 123	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 126	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 156	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 157	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 167	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 169	CE181	mg/kg	-	-	-	-	-	-
PCB Congener 189	CE181	mg/kg	-	-	-	-	-	-
PCB (total of WHO 12)	CE181	mg/kg	-	-	-	-	-	-
Subcontracted Analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD	NAD

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SOILS

Lab number			127962-19	127962-20	127962-21	127962-22	127962-23
Sample id			HP08 ES	HP09 ES + O	HP10 ES	HP11 ES+O	HP12 ES+O
Depth (m)			0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date sampled			26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023
Test	Method	Units					
Antimony (total)	CE264	mg/kg Sb	-	-	-	-	-
Arsenic (total)	CE264 ^M	mg/kg As	9.6	9.0	10.5	12.4	12.2
Barium (total)	CE264 ^U	mg/kg Ba	-	-	-	-	-
Cadmium (total)	CE264 ^M	mg/kg Cd	<2	<2	<2	<2	<2
Chromium (total)	CE264 ^U	mg/kg Cr	35.0	44.5	59.8	91.7	50.8
Chromium (VI)	CE263	mg/kg CrVI	<0.04	<0.04	<0.04	<0.04	0.05
Copper (total)	CE264 ^M	mg/kg Cu	25.5	28.1	30.6	35.5	25.4
Lead (total)	CE264 ^U	mg/kg Pb	56.4	50.0	62.0	85.5	68.2
Mercury (total)	CE264 ^U	mg/kg Hg	<2	<2	<2	<2	<2
Molybdenum (total)	CE264	mg/kg Mo	-	-	-	-	-
Nickel (total)	CE264 ^M	mg/kg Ni	20.4	17.5	19.9	27.0	21.4
Selenium (total)	CE264	mg/kg Se	<3	<3	<3	<3	<3
Vanadium (total)	CE264 ^U	mg/kg V	116.6	134.3	120.0	108.6	92.7
Zinc (total)	CE264 ^M	mg/kg Zn	107.2	105.4	126.4	160.4	191.4
pH	CE004 ^M	units	8.1	7.8	8.2	8.1	8.0
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	540	111	97	41	582
Sulphate (acid extractable)	CE062 ^M	mg/kg SO ₄	2110	915	1684	1061	2627
Total Organic Carbon (TOC)	CE197	% w/w C	3.5	4.2	4.7	3.8	2.1
Estimate of OMC (calculated from TOC)	CE197	% w/w	6.0	7.3	8.2	6.5	3.6
PAH							
Naphthalene	CE087 ^M	mg/kg	0.09	0.24	37.60	0.06	0.06
Acenaphthylene	CE087 ^M	mg/kg	0.03	0.07	3.87	0.04	0.03
Acenaphthene	CE087 ^M	mg/kg	0.04	0.07	2.53	0.04	0.03
Fluorene	CE087 ^U	mg/kg	0.04	0.08	4.74	0.04	0.04
Phenanthrene	CE087 ^M	mg/kg	0.47	0.94	30.20	1.10	0.37
Anthracene	CE087 ^U	mg/kg	0.16	0.50	9.14	0.43	0.86
Fluoranthene	CE087 ^M	mg/kg	0.79	2.41	31.67	2.22	0.68
Pyrene	CE087 ^M	mg/kg	0.64	1.94	25.71	1.83	0.56
Benzo(a)anthracene	CE087 ^U	mg/kg	0.47	1.34	12.64	1.07	0.46
Chrysene	CE087 ^M	mg/kg	0.59	1.44	12.99	1.07	0.59
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.69	1.57	12.22	1.01	0.61
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.24	0.61	4.58	0.39	0.22
Benzo(a)pyrene	CE087 ^U	mg/kg	0.45	1.19	11.78	0.83	0.44
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.38	0.77	6.97	0.53	0.37
Dibenz(ah)anthracene	CE087 ^M	mg/kg	0.07	0.16	1.49	0.11	0.06
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.37	0.77	6.50	0.50	0.36
PAH (total of USEPA 16)	CE087	mg/kg	5.50	14.1	215	11.3	5.73
TPH							
VPH Aromatic (>EC5-EC7)	\$	mg/kg	-	<0.05	-	<0.05	<0.05
VPH Aromatic (>EC7-EC8)	\$	mg/kg	-	<0.05	-	<0.05	<0.05
VPH Aromatic (>EC8-EC10)	\$	mg/kg	-	<0.05	-	<0.05	<0.05

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SOILS

Lab number			127962-19	127962-20	127962-21	127962-22	127962-23
Sample id			HP08 ES	HP09 ES + O	HP10 ES	HP11 ES+O	HP12 ES+O
Depth (m)			0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date sampled			26/10/2023	26/10/2023	26/10/2023	26/10/2023	26/10/2023
Test	Method	Units					
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-	1	-	<0.5	<0.5
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-	2	-	<1	<1
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-	9	-	<2	<2
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-	28	-	<5	<5
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-	7	-	<1.5	<1.5
VPH Aliphatic (>C5-C6)	\$	mg/kg	-	<0.05	-	<0.05	<0.05
VPH Aliphatic (>C6-C8)	\$	mg/kg	-	<0.1	-	<0.1	<0.1
VPH Aliphatic (>C8-C10)	\$	mg/kg	-	<0.05	-	<0.05	<0.05
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-	<0.5	-	<0.5	<0.5
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-	2	-	<0.5	<0.5
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-	7	-	<4.5	<4.5
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-	1	-	<1	<1
PCB							
PCB Congener 77	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 81	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 105	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 114	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 118	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 123	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 126	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 156	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 157	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 167	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 169	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB Congener 189	CE181	mg/kg	-	<0.006	-	<0.006	-
PCB (total of WHO 12)	CE181	mg/kg	-	<0.061	-	<0.061	-
Subcontracted Analysis							
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE264	Antimony (total)	Aqua Regia Extraction, ICPOES	Dry		5	mg/kg Sb
CE264	Arsenic (total)	Aqua Regia Extraction, ICPOES	Dry	M	3	mg/kg As
CE264	Barium (total)	Aqua Regia Extraction, ICPOES	Dry	U	4	mg/kg Ba
CE264	Cadmium (total)	Aqua Regia Extraction, ICPOES	Dry	M	2	mg/kg Cd
CE264	Chromium (total)	Aqua Regia Extraction, ICPOES	Dry	U	2	mg/kg Cr
CE263	Chromium (VI)	Discrete Analyser	Dry			mg/kg CrVI
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE264	Copper (total)	Aqua Regia Extraction, ICPOES	Dry	M	2	mg/kg Cu
CE264	Lead (total)	Aqua Regia Extraction, ICPOES	Dry	U	3	mg/kg Pb
CE264	Mercury (total)	Aqua Regia Extraction, ICPOES	Dry	U	2	mg/kg Hg
CE264	Molybdenum (total)	Aqua Regia Extraction, ICPOES	Dry	U	2	mg/kg Mo
CE264	Nickel (total)	Aqua Regia Extraction, ICPOES	Dry	M	3	mg/kg Ni
CE264	Selenium (total)	Aqua Regia Extraction, ICPOES	Dry	U	3	mg/kg Se
CE264	Vanadium (total)	Aqua Regia Extraction, ICPOES	Dry	U	4	mg/kg V
CE264	Zinc (total)	Aqua Regia Extraction, ICPOES	Dry	M	4	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	M	100	mg/kg SO ₄
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE197	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry		0.1	% w/w
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
\$	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.05	mg/kg
\$	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.05	mg/kg
\$	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.05	mg/kg
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		0.5	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		2	mg/kg
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		5	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE250	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID	As received		1.5	mg/kg
\$	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.05	mg/kg
\$	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
\$	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.05	mg/kg
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		0.5	mg/kg
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		4.5	mg/kg
CE250	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE181	PCB Congener 77	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 81	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 105	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 114	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 118	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 123	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 126	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 156	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 157	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 167	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 169	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB Congener 189	Solvent extraction, GC-MS	As received		0.006	mg/kg
CE181	PCB (WHO 12)	Solvent extraction, GC-MS	As received		0.072	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

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DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
127962-1	WS01 ES+O	0.10	N	-
127962-2	WS01 ES	0.60	N	-
127962-3	WS02 ES	0.30	N	-
127962-4	WS02 ES+O	0.70	N	-
127962-5	WS02 WAC ES	2.00	N	-
127962-6	WS03 ES+O	0.20	N	-
127962-7	WS03 ES	0.50	N	-
127962-8	WS04 ES+O	0.10	N	-
127962-9	WS04 WAC ES	0.40	N	-
127962-10	WS04 ES	0.60	N	-
127962-11	WS05 ES +O	0.20	N	-
127962-12	HP01 ES	0-0.4	N	-
127962-13	HP02 ES	0-0.4	N	-
127962-14	HP03 ES	0-0.4	N	-
127962-15	HP04 ES	0-0.4	N	-
127962-16	HP05 ES	0-0.4	N	-
127962-17	HP06 ES	0-0.4	N	-
127962-18	HP07 ES	0-0.1	N	-
127962-19	HP08 ES	0-0.1	N	-
127962-20	HP09 ES + O	0-0.1	N	-
127962-21	HP10 ES	0-0.1	N	-
127962-22	HP11 ES+O	0-0.1	N	-
127962-23	HP12 ES+O	0-0.1	N	-

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ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

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

Soil/Solid samples will be disposed of 4 weeks from initial receipt unless otherwise agreed.

Waters and leachate samples will be disposed of 2 weeks from report issue unless otherwise agreed.

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For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones, where applicable.

Moisture Content Calculated on a Wet Weight basis

Waste Acceptance Criteria Testing BS EN 12457-Part 3, 2 Stage Process

Sample Details

Contract Name	Hillside, Cardiff
Lab Number	127962-5
Sample ID	WS02 WAC ES 2.00m
Date Sampled	26 October 2023
Date Received	31 October 2023
Particle Size (<4mm)	-
Method of size reduction	N/A
Non-crushable matter	N/A

Test Values

Mass of Raw Test Portion (MW) kg	0.202
Mass of Dried Test Portion (MD) kg	0.175
Moisture Content Ratio (MC) %	15.51
Dry Matter Content Ratio (DR) %	86.57
Leachant Volume (1) (L2) Litre	0.323
Leachant Volume (2) (L8) Litre	1.400
Eluate Volume (1) (VE1) Litre	0.225
Eluate Volume (2) (VE2) Litre	1.180

Eluate Analysis	Conc in Eluate	
	2:1	8:1
Liquid : Waste Ratio	2:1	8:1
pH (units) ²	8.5	9.6
Temperature (°C)	20	20
Conductivity (µS/cm) ²	2000	333
Antimony (µg/l Sb)	9.90	6.45
Arsenic (µg/l As) ²	9.81	12.62
Barium (µg/l Ba) ²	46.8	7.7
Cadmium (µg/l Cd) ²	<0.1	<0.1
Chromium (µg/l Cr) ²	2.6	2.5
Copper (µg/l Cu) ²	9.4	19.3
Lead (µg/l Pb) ²	1.1	1.0
Mercury (µg/l Hg)	<0.05	<0.05
Molybdenum (µg/l Mo)	56.8	12.7
Nickel (µg/l Ni) ²	2.7	1.9
Selenium (µg/l Se) ²	3.51	3.76
Zinc (µg/l Zn) ²	<3.2	<3.2
Chloride (mg/l Cl) ²	42	8.6
Fluoride (mg/l F) ²	1.0	0.1
Sulphate (mg/l SO ₄) ²	1339	1201
Total Dissolved Solids (mg/l TDS)	1520	253
Phenol Index (µg/l PhOH)	<10	<10
Dissolved Organic Carbon (mg/l C)	24	17

Amount Leached		Council Decision 2003/33/EC Limit Values mg/kg at L:S 10:1		
2:1 mg/kg	10:1 mg/kg	Inert Waste	Non-reactive Hazardous Waste	Hazardous Waste
0.020	0.069	0.06	0.7	5
0.020	0.123	0.5	2	25
0.094	0.128	20	100	300
<0.0002	<0.001	0.04	1	5
0.005	0.025	0.5	10	70
0.019	0.180	2	50	100
0.002	0.010	0.5	10	50
<0.0001	<0.0005	0.01	0.2	2
0.114	0.184	0.5	10	30
0.005	0.020	0.4	10	40
0.007	0.037	0.1	0.5	7
<0.006	<0.03	4	50	200
83	129	800	15000	25000
2.1	2.6	10	150	500
2678	12191	1000	20000	50000
3040	4160	4000	60000	100000
<0.02	<0.1	1		
49	182	500	800	1000

Waste Analysis	Units	Result			
Total Organic Carbon	% w/w	2.5	3%	5%	6%
Loss on Ignition	% w/w	5.2			10%
BTEX	mg/kg	<0.06	6		
PCBs (7 congeners)	mg/kg	<0.045	1		
Mineral Oil (C10 - C40)	mg/kg	134	500		
PAH (total)	mg/kg	6.26	100		
pH ¹	pH units	7.5		>6	
Acid Neutralisation Capacity (pH4)	mol/kg	6.30		To be evaluated	
Acid Neutralisation Capacity (pH7)	mol/kg	0.12		To be evaluated	

¹ Results are accredited to MCERTS if matrix confirmed as soil

² Results in leachate are accredited to ISO17025

Disclaimer: The Landfill Waste Acceptance Criteria limits in this report are provided for guidance only and values are transcribed from the Council Decision annex 2003/33/EC Chemtech Environmental Ltd does not take responsibility for any errors or omissions in the transcription, and all data should be verified by the end user. Results will be colour flagged to the lowest threshold value breached. Any assessments made are based on the published results from the Laboratory and make no assessment of uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. Method uncertainty levels can be provided Interpretation/assessment is outside the scope of the laboratory's UKAS accreditation. Moisture Content Calculated on Wet Weight Basis

Comments

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CE709(27) issued 11 Sep 2023

Waste Acceptance Criteria Testing BS EN 12457-Part 3, 2 Stage Process



Sample Details

Contract Name	Hillside, Cardiff
Lab Number	127962-9
Sample ID	WS04 WAC ES 0.40m
Date Sampled	26 October 2023
Date Received	31 October 2023
Particle Size (<4mm)	-
Method of size reduction	N/A
Non-crushable matter	N/A

Test Values

Mass of Raw Test Portion (MW) kg	0.210
Mass of Dried Test Portion (MD) kg	0.175
Moisture Content Ratio (MC) %	19.79
Dry Matter Content Ratio (DR) %	83.48
Leachant Volume (1) (L2) Litre	0.315
Leachant Volume (2) (L8) Litre	1.400
Eluate Volume (1) (VE1) Litre	0.230
Eluate Volume (2) (VE2) Litre	1.280

Eluate Analysis	Conc in Eluate	
	2:1	8:1
Liquid : Waste Ratio	2:1	8:1
pH (units) ²	7.6	9.2
Temperature (°C)	20	20
Conductivity (µS/cm) ²	2340	2070
Antimony (µg/l Sb)	9.80	4.83
Arsenic (µg/l As) ²	5.12	4.57
Barium (µg/l Ba) ²	111.9	43.7
Cadmium (µg/l Cd) ²	<0.1	<0.1
Chromium (µg/l Cr) ²	<0.5	<0.5
Copper (µg/l Cu) ²	3.1	4.1
Lead (µg/l Pb) ²	<0.6	<0.6
Mercury (µg/l Hg)	<0.05	<0.05
Molybdenum (µg/l Mo)	44.5	6.9
Nickel (µg/l Ni) ²	3.5	3.5
Selenium (µg/l Se) ²	1.46	1.29
Zinc (µg/l Zn) ²	<3.2	<3.2
Chloride (mg/l Cl) ²	24	<0.4
Fluoride (mg/l F) ²	0.3	<0.07
Sulphate (mg/l SO ₄) ²	1381	1233
Total Dissolved Solids (mg/l TDS)	1778	1573
Phenol Index (µg/l PhOH)	<10	<10
Dissolved Organic Carbon (mg/l C)	32	14

Amount Leached		Council Decision 2003/33/EC Limit Values mg/kg at L:S 10:1		
2:1	10:1	Inert Waste	Non-reactive Hazardous Waste	Hazardous Waste
mg/kg	mg/kg			
0.020	0.055	0.06	0.7	5
0.010	0.046	0.5	2	25
0.224	0.527	20	100	300
<0.0002	<0.001	0.04	1	5
<0.001	<0.005	0.5	10	70
0.006	0.040	2	50	100
<0.0012	<0.006	0.5	10	50
<0.0001	<0.0005	0.01	0.2	2
0.089	0.118	0.5	10	30
0.007	0.035	0.4	10	40
0.003	0.013	0.1	0.5	7
<0.006	<0.03	4	50	200
48	<34.9	800	15000	25000
0.6	<1.0	10	150	500
2762	12524	1000	20000	50000
3557	16002	4000	60000	100000
<0.02	<0.1	1		
64	165	500	800	1000

Waste Analysis	Units	Result			
Total Organic Carbon	% w/w	2.5	3%	5%	6%
Loss on Ignition	% w/w	6.2			10%
BTEX	mg/kg	<0.06	6		
PCBs (7 congeners)	mg/kg	<0.045	1		
Mineral Oil (C10 - C40)	mg/kg	145	500		
PAH (total)	mg/kg	6.75	100		
pH ¹	pH units	7.6		>6	
Acid Neutralisation Capacity (pH4)	mol/kg	4.58		To be evaluated	
Acid Neutralisation Capacity (pH7)	mol/kg	0.38		To be evaluated	

Units	Result			
% w/w	2.5	3%	5%	6%
% w/w	6.2			10%
mg/kg	<0.06	6		
mg/kg	<0.045	1		
mg/kg	145	500		
mg/kg	6.75	100		
pH units	7.6		>6	
mol/kg	4.58		To be evaluated	
mol/kg	0.38		To be evaluated	

¹ Results are accredited to MCERTS if matrix confirmed as soil

² Results in leachate are accredited to ISO17025

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Comments

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE001	Moisture Content	Gravimetry, reported on Wet Weight basis	As received		0.1	% w/w
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE083	Acid Neutralisation Capacity	Titration	Dry		0.01	mol/kg
CE144	Ammoniacal Nitrogen as N	KCl extraction, Colorimetry	As received		1	mg/kg N
CE007	Electrical conductivity	Conductivity Meter	As received	U	10	µS/cm
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE006	Loss On Ignition at 440°C	Based on BS 1377, Gravimetry	Dry	U	0.1	% w/w
CE087	PAH (total of 17)	Solvent extraction, GC-MS	As received		0.36	mg/kg
CE192	BTEX (total)	Headspace GC-FID	As received		0.06	mg/kg
CE194	Mineral Oil (>C10-C40) silica clean up	Solvent extraction, clean-up, GC-FID	As received		16	mg/kg
CE137	PCB (total of ICES 7)	Solvent extraction, GC-MS	As received		0.045	mg/kg
CE264	Antimony (dissolved)	ICP-MS			0.8	µg/l Sb
CE264	Arsenic (dissolved)	ICP-MS		U	0.1	µg/l As
CE264	Barium (dissolved)	ICP-MS		U	0.9	µg/l Ba
CE264	Cadmium (dissolved)	ICP-MS		U	0.1	µg/l Cd
CE264	Chromium (dissolved)	ICP-MS		U	0.5	µg/l Cr
CE264	Copper (dissolved)	ICP-MS		U	0.6	µg/l Cu
CE264	Lead (dissolved)	ICP-MS		U	0.6	µg/l Pb
CE264	Mercury (dissolved)	ICP-MS			0.05	µg/l Hg
CE264	Molybdenum (dissolved)	ICP-MS			0.9	µg/l Mo
CE264	Nickel (dissolved)	ICP-MS		U	0.4	µg/l Ni
CE264	Selenium (dissolved)	ICP-MS		U	1.1	µg/l Se
CE264	Zinc (dissolved)	ICP-MS		U	3	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter		U	-	units
CE214	Electrical conductivity	Conductivity Meter		U	10	µS/cm
CE049	Chloride	Dsicerete Analyser		U	0.4	mg/l Cl
CE049	Fluoride	Dsicerete Analyser		U	0.1	mg/l F
CE049	Sulphate	Dsicerete Analyser		U	0.3	mg/l SO4
CE148	Phenols (total)	Continuous Flow Colorimetry			10	µg/l PhOH
CE039	Total dissolved solids	TDS meter			10	mg/l TDS
CE247	Total Organic Carbon	Filtration, TOC analyser			5	mg/l C

Statement of Conformity



Statement of Conformity

Where Chemtech reports a statement of conformity to a specification, the decision rules applied are derived from the Ilac document ILAC G8:09/2019.

Acceptance limits (AL), applied are derived from the tolerance limits (TL) by you the client or applicable standard (e.g. 2003.33.EC Council Decision, BS3882, BS8601)

Agreed and reported Decision Rule:

"PASS" if the result < TL, and the bias / precision values for the process meet the targets defined within the methodology and/or applied accreditation.

Reported Decisions:

Result < TL for determinands: PASS

Result > TL for determinands: FAIL

Definitions Used:

Acceptance limit (AL) Specified upper or lower bounds of permissible measured quantity values.

Tolerance limit (TL) Specified upper or lower bound of permissible values of a property.

Accreditation of WAC/BS3882/BS8601

Accreditation in Soil to MCERTS is only applicable for specific matrix types identified as soil (Sand/Loam/Clay) during the sample assessment

If the sample is classified as not soil, not accreditation is conveyed

APPENDIX E

Rational and full list of General Assessment Criteria used by Dice Environmental.

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Determinand	Allotment	R _{AGHP}	R _{AGHP}	Commercial/ Industrial	POSrest	POSpark
Metals						
Arsenic (Inorganic) ^{1,2,3,4}	43	37	40	640	78	170
Beryllium ^{5,6,7,8}	35	1.7	1.7	12	2.2	63
Boron ^{9,10}	45	200	11000	240000	21000	46000
Cadmium (pH6-6) ^{11,12,13}	1.9	11	85	150	120	560
Chromium (trivalent) ^{14,15,16}	18000	910	910	8600	1500	33000
Chromium (hexavalent) ^{17,18,19}	1.8 ²⁰	6	6 ²¹	33 ²²	7.7 ²³	220 ²⁴
Copper ^{25,26}	520	2400	7100	89000	12000	44000
Mercury (elemental) ^{27,28,29}	21	1.2	1.2	30 ³⁰ (25.9)	15	30 ³¹ (25.9)
Mercury (inorganic) ^{32,33}	19	40	55	1100	120	240
Methylmercury ^{34,35}	8	11	15	320	40	68
Nickel ^{36,37}	200 ³⁸	180 ³⁹	180 ⁴⁰	980 ⁴¹	230 ⁴²	3400 ⁴³
Selenium ^{44,45}	85	250	430	12000	1100	1800
Vanadium ^{46,47,48}	91	410	1200	9000	2000	5000
Zinc ^{49,50}	620	3700	40000	730000	81000	170000
BTEX Compounds (SOM 1% / 2.5% / 6%)						
Benzene ^{51,52,53}	0.017/0.034/ 0.075	0.087/0.17/ 0.37	0.38/0.7/1.4	27 / 47 / 90	72 / 72 / 73	80 / 100 / 110
Toluene ^{54,55,56}	22 / 51 / 120	130 / 290 / 690	800 ⁵⁷ (809) /1900(3900)	56000 ⁵⁸ (609) /110000 ⁵⁹ (1820) /180000 ⁶⁰ (4360)	58000 / 58000 / 58000	67000 ⁶¹ (669) /85000 ⁶² (1820) /100000 ⁶³ (4360)
Ethylbenzene ^{64,65,66}	16 / 39 / 81	47 / 110 / 260	83 / 190 / 440	5700 ⁶⁷ (518) /13000 ⁶⁸ (1220) /27000 ⁶⁹ (2840)	24000 / 24000 / 25000	17000 ⁷⁰ (518) /29000 ⁷¹ (1220) /27000 ⁷² (2840)
O – Xylene ^{73,74,75}	28 / 67 / 180	60 / 140 / 330	88 / 210 / 480	6600 ⁷⁶ (478) /15000 ⁷⁷ (1120) /33000 ⁷⁸ (2620)	41000 / 42000 / 43000	17000 ⁷⁹ (478) /24000 ⁸⁰ (1120) /33000 ⁸¹ (2620)
M – Xylene ^{82,83,84}	31 / 74 / 170	59 / 140 / 320	82 / 190 / 450	6200 ⁸⁵ (825) /14000 ⁸⁶ (1470) /31000 ⁸⁷ (3490)	41000 / 42000 / 43000	17000 ⁸⁸ (825) /24000 ⁸⁹ (1470) /32000 ⁹⁰ (3490)
P – Xylene ^{91,92,93}	29 / 69 / 180	56 / 130 / 310	79 / 190 / 430	5800 ⁹⁴ (576) /14000 ⁹⁵ (1350) /30000 ⁹⁶ (3170)	41000 / 42000 / 43000	17000 ⁹⁷ (576) /23000 ⁹⁸ (1350) /31000 ⁹⁹ (3170)
Polycyclic Aromatic Hydrocarbons (SOM 1% / 2.5% / 6%)^{100,101}						
Acenaphthene	34 / 85 / 200	210 / 510 / 1100	3000 ¹⁰² (67.0) /4700 ¹⁰³ (141) /8000 ¹⁰⁴ (328)	84000 ¹⁰⁵ (57.0) /97000 ¹⁰⁶ (141) /100000	15000 / 15000 / 15000	29000 / 30000 / 30000
Acenaphthylene	28 / 69 / 160	170 / 420 / 920	2900 ¹⁰⁷ (86.1) /4600 ¹⁰⁸ (212) /6000 ¹⁰⁹ (365)	83000 ¹¹⁰ (86.1) /97000 ¹¹¹ (212) /100000	15000 / 15000 / 15000	29000 / 30000 / 30000
Anthracene	380 / 960 / 2200	2400 / 6400 / 11000	31000 ¹¹² (11.17) /35000 /37000	620000 / 640000 / 540000	74000 / 74000 / 74000	150000 / 150000 / 150000
Benz(a)anthracene	2.9 / 6.5 / 13	7.2 / 11 / 13	11 / 14 / 15	170 / 170 / 180	29 / 29 / 29	49 / 56 / 62
Benzo(a)pyrene (Bap)	0.97 / 2.0 / 3.6	2.2 / 2.7 / 3.0	3.2 / 3.2 / 3.2	36 / 36 / 36	6.7 / 6.7 / 6.7	11 / 12 / 13
Benzo(b)fluoranthene	0.99 / 2.1 / 3.9	2.6 / 3.3 / 3.7	3.9 / 4.0 / 4.0	44 / 44 / 45	7.1 / 7.2 / 7.2	13 / 15 / 16
Benzo(g,h,i)perylene	290 / 470 / 640	320 / 340 / 350	360/360 / 360	3900/4000/ 4000	640/640/640	1400/1500/ 1600
Benzo(k)fluoranthene	37 / 75 / 130	77 / 93 / 100	110 / 110 / 110	1200 / 1200 / 1200	190 / 190 / 190	370 / 410 / 440
Chrysene	4.1 / 9.4 / 19	15 / 22 / 27	30 / 31 / 32	350 / 350 / 350	67 / 67 / 67	93 / 110 / 120
Dibenz(a,h)anthracene	0.14 / 0.27 / 0.43	0.24 / 0.28 / 0.3	0.31/0.32/ 0.32	3.6 / 3.6 / 3.6	0.5 / 0.5 / 0.5	1.1 / 1.3 / 1.4
Fluoranthene	52 / 130 / 290	280 / 560 / 890	1300 / 1600 / 1900	23000 / 23000 / 23000	3100 / 3100 / 3100	6300 / 6300 / 8100
Fluorene	27 / 67 / 160	170 / 400 / 960	2800 ¹¹³ (30.9) /3000 ¹¹⁴ (76.5) /4500 ¹¹⁵ (183)	63000 ¹¹⁶ (30.9) /69000 / 71000	9900 / 9900 / 9900	20000 / 20000 / 20000
Indeno(1,2,3-cd)pyrene	8.5 / 21 / 39	27 / 36 / 41	45 / 46 / 46	500 / 510 / 510	82 / 82 / 82	150 / 170 / 180
Naphthalene ⁹	4.1 / 10 / 24	2.3 / 5.6 / 13	2.3 / 5.6 / 13	190 ¹¹⁷ (76.4) / 480 ¹¹⁸ (183) / 1100 ¹¹⁹ (432)	4800 / 4800 / 4800	1200 ¹²⁰ (76.4) / 1500 ¹²¹ (183) / 3000
Phenanthrene	15 / 38 / 90	56 / 220 / 440	1300 ¹²² (36.0) /1500 / 1500	22000 / 22000 / 23000	3100 / 3100 / 3100	6200 / 6200 / 5800
Pyrene	110 / 270 / 620	620 / 1200 / 2300	3700 / 3800 / 3800	54000 / 54000 / 54000	7400 / 7400 / 7400	15000 / 15000 / 15000
Coal Tar (Bap as surrogate marker)	0.32 / 0.67 / 1.2	0.79 / 0.98 / 1.1	1.2 / 1.2 / 1.2	15 / 15 / 15	2.2 / 2.2 / 2.2	4.4 / 4.7 / 4.8
Explosives^{123,124}						
2, 4, 6 Trinitrotoluene	0.24 / 0.68 / 1.40	1.6 / 3.7 / 8.0	65 / 66 / 66	1000 / 1000 / 1000	130 / 130 / 130	250 / 270 / 270
RDX (Royal Demolition Explosive C ₃ H ₅ N ₃ O ₆)	17 / 38 / 85	120 / 250 / 540	13000 / 13000 / 13000	210000 / 210000 / 210000	26000 / 26000 / 27000	49000 ¹²⁵ (18.7) / 51000 / 53000
HMX (High Melting Explosive C ₄ H ₈ N ₄ O ₈)	0.85 / 1.9 / 3.9	5.7 / 13 / 26	6700 / 6700 / 6700	110000 / 110000 / 110000	13000 / 13000 / 13000	23000 ¹²⁶ (0.35) /23000 ¹²⁷ (0.39) /24000 ¹²⁸ (0.48)

Determinand	Allotment	R ₅₀ HP	R ₁₀₀ HP	Commercial/ Industrial	POBresi	POBpark
Petroleum Hydrocarbons (BOM 1%/ 2.5%/ 6%)^{1,2,3,4,5}						
Aliphatic EC >6	730 / 1700 / 3800	42 / 79 / 160	42 / 79 / 160	3200 ^{MI} (304) / 5800 ^{MI} (550) / 12000 ^{MI} (1150)	57000 ^{MI} (304) / 58000 / 600000	95000 ^{MI} (304) / 130000 ^{MI} (550) / 180000 ^{MI} (1150)
Aliphatic EC >6-8	2300 / 5000 / 13000	100 / 230 / 530	100 / 230 / 530	7000 ^{MI} (144) / 17000 ^{MI} (322) / 40000 ^{MI} (738)	600000 / 610000 / 620000	150000 ^{MI} (144) / 220000 ^{MI} (322) / 300000 ^{MI} (738)
Aliphatic EC >8-10	320 / 770 / 1700	27 / 65 / 150	27 / 66 / 150	2000 ^{MI} (78) / 4800 ^{MI} (190) / 11000 ^{MI} (451)	13000 / 13000 / 13000	14000 ^{MI} (78) / 18000 ^{MI} (190) / 21000 ^{MI} (451)
Aliphatic EC >10-12	2200 / 4400 / 7300	130 ^{MI} (48) / 330 ^{MI} (118) / 780 ^{MI} (283)	130 ^{MI} (48) / 330 ^{MI} (118) / 770 ^{MI} (283)	9700 ^{MI} (48) / 23000 ^{MI} (118) / 47000 ^{MI} (283)	13000 / 13000 / 13000	21000 ^{MI} (48) / 23000 ^{MI} (118) / 24000 ^{MI} (283)
Aliphatic EC >12-15	11000 / 13000 / 13000	1100 ^{MI} (24) / 2400 ^{MI} (59) / 4300 ^{MI} (142)	1100 ^{MI} (24) / 2400 ^{MI} (59) / 4400 ^{MI} (142)	59000 ^{MI} (24) / 82000 ^{MI} (59) / 90000 ^{MI} (142)	13000 / 13000 / 13000	25000 ^{MI} (24) / 26000 ^{MI} (59) / 26000 ^{MI} (142)
Aliphatic EC >16-35 ⁶	250000 / 270000 / 270000	65000 ^{MI} (8.48) / 92000 ^{MI} (21) / 110000	65000 ^{MI} (8.48) / 92000 ^{MI} (21) / 110000	1500000 / 1700000 / 1800000	250000 / 250000 / 250000	450000 / 480000 / 490000
Aliphatic EC >35-44 ⁶	280000 / 270000 / 270000	65000 ^{MI} (8.48) / 92000 ^{MI} (21) / 110000	65000 ^{MI} (8.48) / 92000 ^{MI} (21) / 110000	1800000 / 1700000 / 1800000	250000 / 250000 / 250000	450000 / 480000 / 490000
Aromatic EC 5-7 (Benzene)	13 / 27 / 57	70 / 140 / 300	370 / 890 / 1400	260000 ^{MI} (1220) / 450000 ^{MI} (2260) / 850000 ^{MI} (4710)	58000 / 58000 / 58000	78000 ^{MI} (1220) / 840000 ^{MI} (2260) / 920000 ^{MI} (4710)
Aromatic EC >7-8 (Toluene)	22 / 51 / 120	130 / 250 / 660	860 / 1900 / 3600	58000 ^{MI} (860) / 110000 ^{MI} (1920) / 180000 ^{MI} (4360)	58000 / 58000 / 58000	87000 ^{MI} (860) / 95000 ^{MI} (1920) / 100000 ^{MI} (4360)
Aromatic EC >8-10	8.8 / 21 / 51	34 / 83 / 190	47 / 110 / 270	3500 ^{MI} (613) / 8100 ^{MI} (1500) / 17000 ^{MI} (3580)	5000 / 5000 / 5000	7200 ^{MI} (613) / 8500 ^{MI} (1500) / 9300 ^{MI} (3580)
Aromatic EC >10-12	13 / 31 / 74	74 / 180 / 380	250 / 590 / 1200	18000 ^{MI} (384) / 28000 ^{MI} (888) / 34000 ^{MI} (2150)	5000 / 5000 / 5000	8200 ^{MI} (384) / 97000 ^{MI} (888) / 10000
Aromatic EC >12-16	23 / 57 / 130	140 / 330 / 690	1800 / 2300 ^{MI} (418) / 2500	38000 ^{MI} (189) / 37000 / 38000	5100 / 5100 / 5000	10000 / 10000 / 10000
Aromatic EC >16-21 ⁷	48 / 110 / 280	280 / 540 / 830	1800 / 1900 / 1900	28000 / 28000 / 28000	3800 / 3800 / 3800	7800 / 7700 / 7800
Aromatic EC >21-35 ⁷	370 / 820 / 1600	1100 / 1500 / 1700	1900 / 1900 / 1900	28000 / 28000 / 28000	3800 / 3800 / 3800	7800 / 7800 / 7900
Aromatic EC >36-44 ⁷	370 / 820 / 1600	1100 / 1500 / 1700	1900 / 1900 / 1900	28000 / 28000 / 28000	3800 / 3800 / 3800	7800 / 7800 / 7900
Aliphatic-Aromatic EC >44-70 ⁸	1200 / 2100 / 3000	1800 / 1800 / 1900	1800 / 1900 / 1900	28000 / 28000 / 28000	3800 / 3800 / 3800	7800 / 7800 / 7900
Chloroalkanes & Chloroalkenes (BOM 1%/ 2.5%/ 6%)^{1,2,3,4}						
1,2-Dichloroethane	0.0045 / 0.0083 / 0.010	0.0071 / 0.011 / 0.019	0.092 / 0.013 / 0.023	0.67 / 0.97 / 1.7	29 / 29 / 29	21 / 24 / 28
1,1,1 Trichloroethane (TCA)	48 / 110 / 240	8.8 / 18 / 30	9.0 / 18 / 40	660 / 1300 / 3000	140000 / 140000 / 140000	57000 ^{MI} (1425) / 75000 ^{MI} (2915) / 100000 ^{MI} (6392)
1,1,1,2 Tetrachloroethane	0.79 / 1.9 / 4.4	1.2 / 2.8 / 6.4	1.5 / 3.5 / 8.2	110 / 250 / 560	1400 / 1400 / 1400	1500 / 1900 / 2100
1,1,2,2 Tetrachloroethane	0.41 / 0.88 / 2.0	1.8 / 3.4 / 7.5	3.9 / 8.0 / 17	270 / 550 / 1100	1400 / 1400 / 1400	1800 / 2100 / 2300
Tetrachloroethane (PCE)	0.65 / 1.5 / 3.6	0.18 / 0.39 / 0.90	0.15 / 0.4 / 0.92	19 / 42 / 85	1400 / 1400 / 1400	510 ^{MI} (124) / 1100 ^{MI} (95) / 1500
Tetrachloromethane (Carbon Tetrachloride)	0.45 / 1.0 / 2.4	0.026 / 0.056 / 0.13	0.025 / 0.056 / 0.13	2.9 / 6.3 / 14	980 / 820 / 850	190 / 270 / 400
Trichloroethene (TCE)	0.041 / 0.091 / 0.21	0.016 / 0.034 / 0.075	0.017 / 0.036 / 0.080	1.2 / 2.5 / 5.7	120 / 120 / 120	70 / 91 / 120
Trichloromethane (Chloroform)	0.42 / 0.83 / 1.7	0.01 / 1.7 / 3.4	1.2 / 2.1 / 4.2	98 / 170 / 350	2500 / 2500 / 2500	2800 / 2800 / 3100
Chloroethene (Vinyl Chloride)	0.0055 / 0.001 / 0.0018	0.00084 / 0.00087 / 0.0014	0.0077 / 0.001 / 0.0015	0.059 / 0.077 / 0.12	3.5 / 3.5 / 3.5	4.8 / 5.0 / 5.4
Phenol & Chlorophenols^{1,2,3,4}						
Phenol	23 / 42 / 83	120 / 200 / 380	440 / 690 / 1200	440 ^{MI} (26000) / 690 ^{MI} (30000) / 1300 ^{MI} (36000)	440 ^{MI} (10000) / 690 ^{MI} (10000) / 1300 ^{MI} (10000)	440 ^{MI} (7600) / 690 ^{MI} (8300) / 1300 ^{MI} (80000)
Chlorophenols (excluding PCP) ¹	0.13 ^{MI} / 0.3 / 0.7	0.87 ^{MI} / 2.0 / 4.5	94 / 100 / 210	3500 / 4000 / 4300	620 / 620 / 620	1100 ^{MI} / 1100
Pentachlorophenol (PCP)	0.03 / 0.08 / 0.19	0.22 / 0.62 / 1.2	27 ^{MI} (16.4) / 29 / 31	400 / 400 / 400	60 / 60 / 60	110 / 120 / 120
Other^{1,2,3,4}						
Carbon Disulphide	4.8 / 10 / 23	0.14 / 0.29 / 0.62	0.14 / 0.29 / 0.62	31 / 22 / 47	11000 / 11000 / 12000	1300 / 1900 / 2700
Hexachlorobutadiene (HCBD)	0.25 / 0.51 / 1.4	0.25 / 0.71 / 1.6	0.32 / 0.78 / 1.8	31 / 66 / 120	25 / 25 / 25	48 / 50 / 61

Determinand	Allotment	R _{HP}	R _{ADHP}	Commercial/Industrial	POSresl	POSpark
Pesticides (SOM 1%/ 2.6%/ 5%)^{a, c, d, e}						
Atrazin	3.2 / 6.1 / 8.6	5.7 / 6.8 / 7.1	7.3 / 7.4 / 7.5	170 / 170 / 170	18 / 18 / 18	30 / 31 / 31
Azinphos	0.5 / 1.2 / 2.7	3.3 / 7.6 / 17.4	610 / 620 / 620	9300 / 9400 / 9400	1200 / 1200 / 1200	2300 / 2400 / 2400
Dieldrin	0.0048 / 0.010 / 0.022	0.032 / 0.068 / 0.14	6.4 / 6.5 / 6.6	140 / 140 / 140	16 / 16 / 16	26 / 26 / 27
Diakrin	0.170 / 410 / 96	0.97 / 2 / 3.5	7.0 / 7.3 / 7.4	170 / 170 / 170	18 / 18 / 18	30 / 30 / 31
Alpha - Endosulfen	1.2 / 2.9 / 8.8	7.4 / 18 / 41	180 ^{resl} (0.003) / 280 ^{resl} (0.007) / 410 ^{resl} (0.016)	5800 ^{resl} (0.003) / 7400 ^{resl} (0.007) / 8400 ^{resl} (0.016)	1200 / 1200 / 1200	2400 / 2400 / 2500
Beta - Endosulfen	1.1 / 2.7 / 8.4	7.0 / 17 / 39	150 ^{resl} (0.00007) / 320 ^{resl} (0.0002) / 440 ^{resl} (0.0004)	6300 ^{resl} (0.00007) / 7800 ^{resl} (0.0002) / 8700	1200 / 1200 / 1200	2400 / 2400 / 2500
Alpha-Hexachlorocyclohexane	0.036 / 0.007 / 0.21	0.23 / 0.55 / 1.2	6.9 / 9.2 / 11	170 / 190 / 180	24 / 24 / 24	47 / 49 / 49
Beta - Hexachlorocyclohexane	0.013 / 0.032 / 0.077	0.085 / 0.2 / 0.46	3.7 / 3.8 / 3.8	65 / 65 / 65	8.1 / 8.1 / 8.1	15 / 15 / 15
Gamma Hexachlorocyclohexane	0.0092 / 0.023 / 0.054	0.06 / 0.14 / 0.33	2.9 / 3.3 / 3.6	67 / 69 / 70	8.2 / 8.2 / 8.2	14 / 15 / 15
Chlorobenzenes^{a, c, d, e}						
Chlorobenzene	5.9 / 14 / 32	0.46 / 1.0 / 2.4	0.46 / 1.0 / 2.4	56 / 130 / 290	1100 / 1300 / 1400	1300 ^{resl} (675) / 2000 ^{resl} (1520) / 2800
1,2-dichlorobenzene (1,2-DCB)	84 / 230 / 540	23 / 55 / 130	24 / 57 / 130	2000 ^{resl} (571) / 4800 ^{resl} (1370) / 11000 ^{resl} (3240)	8000 / 9500 / 8800	2400 ^{resl} (571) / 3800 ^{resl} (1370) / 51000 ^{resl} (3240)
1,3-dichlorobenzene (1,3-DCB)	0.25 / 0.6 / 1.5	0.4 / 1.0 / 2.3	0.44 / 1.1 / 2.5	30 / 73 / 170	300 / 300 / 300	380 / 440 / 470
1,4-dichlorobenzene (1,4-DCB)	15 / 37 / 88	61 ^{resl} / 150 ^{resl} / 350 ^{resl}	61 ^{resl} / 150 ^{resl} / 350 ^{resl}	4400 ^{resl} (224) / 10000 ^{resl} (540) / 25000 ^{resl} (1280)	17000 / 17000 / 17000	36000 ^{resl} (224) / 36000 ^{resl} (540) / 36000 ^{resl} (1280)
1,2,3-Trichlorobenzene	4.7 / 12 / 28	1.5 / 3.6 / 8.6	1.5 / 3.7 / 8.8	102 / 250 / 560	1800 / 1800 / 1800	770 ^{resl} (134) / 1100 ^{resl} (330) / 1600 ^{resl} (759)
1,2,4-Trichlorobenzene	56 / 140 / 320	2.6 / 6.4 / 15	2.6 / 6.4 / 15	220 / 530 / 1300	15000 / 17000 / 19000	1700 ^{resl} (318) / 2600 ^{resl} (796) / 4000 ^{resl} (1950)
1,3,5-Trichlorobenzene	4.7 / 12 / 28	0.33 / 0.81 / 1.9	0.33 / 0.81 / 1.9	23 / 55 / 130	1700 / 1700 / 1800	380 ^{resl} (98.7) / 580 ^{resl} (90.8) / 860 ^{resl} (217)
1,2,3,4-Tetrachlorobenzene	4.4 / 11 / 26	15 / 36 / 78	24 / 58 / 120	1700 ^{resl} (122) / 3080 ^{resl} (304) / 4400 ^{resl} (728)	830 / 830 / 830	1500 ^{resl} (122) / 1600 / 1600
1,2,3,5-Tetrachlorobenzene	0.36 / 0.50 / 2.2	0.66 / 1.6 / 3.7	0.75 / 1.9 / 4.3	49 ^{resl} (38.4) / 120 ^{resl} (98.1) / 240 ^{resl} (236)	78 / 78 / 78	110 ^{resl} (30) / 120 / 130
1,2,4,5-Tetrachlorobenzene	0.06 / 0.16 / 0.37	0.33 / 0.77 / 1.6	0.73 / 1.7 / 3.5	42 ^{resl} (19.7) / 72 ^{resl} (49.1) / 96	13 / 13 / 13	25 / 26 / 26
Pentachlorobenzene (P ₅ CB)	1.2 / 3.1 / 7.0	5.6 / 12 / 22	19 / 39 / 39	640 ^{resl} (43.0) / 770 ^{resl} (107) / 630	100 / 100 / 100	190 / 190 / 190
Hexachlorobenzene (HCB)	0.47 / 1.1 / 2.5	1.8 ^{resl} (0.20) / 3.3 ^{resl} (0.5) / 4.9	4.1 ^{resl} (0.20) / 5.7 ^{resl} (0.5) / 8.7 ^{resl} (1.2)	110 ^{resl} (0.20) / 120 / 120	16 / 16 / 16	30 / 30 / 30

R_{HP} Residential with homegrown produce
R_{ADHP} Residential without homegrown produce
POSresl public open spaces near residential housing
POSpark public open spaces for recreational use but not dedicated sports pitches
SOM Soil Organic Matter – the S4UL for all organic compounds will vary according to SOM
a Based on priority toxic metals defined in SRS (Environment Agency, 2006) and 65 soil organic matter (SOM)
b Figure rounded to two significant figures
c Based only on a comparison of oral and dermal soil exposure with oral Intra Dose
d The background ADE is limited to being no larger than the prediction from the electrical soil ADE
e Based on comparison of inhalation exposure with inhalation TDI only
f Based on a lifetime exposure via the oral, dermal and inhalation pathways
g Based on localized effects comparing inhalation exposure with inhalation ID only
h Based on comparison of inhalation exposure with inhalation ID
i Based on comparison of oral and dermal exposure with oral TDI
j Based on comparison of oral, dermal and inhalation exposure with inhalation TDI
k Based on comparison of all exposure pathways with oral TDI
l S4ULs assume that free arsenic contamination is not present
m S4ULs based on a sub-surface soil to indoor air conversion factor of 10
n The HCV applied to calculate the intake of total styrene and therefore exposure should not consider an entire population
o Oral, dermal and inhalation exposure compared with oral HCV
p S4ULs based on a sub-surface soil to indoor air conversion factor of 1
q Based on a comparison of inhalation exposure with the inhalation TDI for local soil effects
r Based on 2,4-dichlorophenol unless otherwise stated
s Based on 2,3,4,5-tetrachlorophenol
w S4UL presented exceeds the upper saturation limit, which is presented in brackets
x S4UL presented exceeds the solubility saturation limit, which is presented in brackets
y S4ULs based on a threshold protective of direct skin contact, gasoline in brackets based on the health effects for every long term exposure provided for inhalation only

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Category 4 Screening Levels (C4SL) – Table taken from SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document (Department for Environmental, Food and Rural Affairs December 2014).

	Residential (with home-grown produce)	Residential (without home-grown produce)	Allotments	Commercial	Public Open Space 1	Public Open Space 2
Arsenic	37	40	49	640	79	170
Benzene	0.67	3.3	0.18	98	140	230
Benzo(a)pyrene	5.0	5.3	5.7	77	10	21
Cadmium	22	150	3.9	410	220	880
Chromium VI	21	21	170	49	21	250
Lead	200	310	80	2300	630	1300

All in mg/kg

Public Open Space 1 – for grassed area adjacent to residential housing

Public Open Space 2 - Park Type Public Open Space Scenario