VALE OF GLAMORAGAN COUNCIL

MAES Y FFYNON,
BONVILSTON, CARDIFF CF5 6TT

REPORT ON GROUND INVESTIGATION

Contract: 70270

Date: June 2015

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REPORT ON GROUND INVESTIGATION

carried out at

MAES Y FFYNON,

BONVILSTON, CARDIFF CF5 6TT

Prepared for

VALE OF GLAMORAGAN COUNCIL
Civic Offices
Holton Road
Barry
CF63 4RU

Contract No: 70270

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EXECUTIVE SUMMARY

It is understood that the proposed development comprises a number of terraced houses with private gardens and an estate type access road.

On the instructions of Vale of Glamorgan Council, an investigation was undertaken to determine ground conditions to enable foundation and road/hard standing design to be carried out, together with a contamination risk assessment.

The site is situated at the northern end of Maes-y-Ffynon approximately 200m north of the A48 in Bonvilston and may be located by Grid Reference ST 067 743.

The site consists of a number of masonry lock-up garages with access road and mown grass to the south of the garages. Trees were located in the grassed area and trees and bushes were present around the perimeter of the site. Houses were located south and west of the site and a golf course was present to the east and north.

The 1:50000 British Geological Survey Sheet Number 262 indicates the site to be underlain by superficial deposits of Glacial Till, typically comprising of clay rich sand, gravels and cobbles.

On the basis of observations made on site together with results of in-situ and laboratory tests, consideration could be given to the adoption of shallow spread foundations to support the proposed structures.

Outside the zone of influence of existing and proposed trees, it is recommended that conventional shallow spread footings should be taken through any topsoil and Made Ground and placed in the underlying natural strata at a minimum depth of 0.90m.

Within the zone of influence of recently removed, existing or proposed trees, foundations should be taken through the Made Ground and topsoil and placed at depths recommended by the NHBC for soils of low volume change potential or onto the underlying sand and gravel whichever is the shallower.

Such foundations, assuming a 0.6m wide strip/pad foundation at the minimum depth of 0.9m, may be designed to an allowable bearing pressure of 100kPa, which would provide an adequate factor of safety against shear failure.

For the purposes of this contamination risk assessment, the results of the soil analyses have been compared to been compared to Suitable 4 Use Levels (S4ULs), determined by LQM and CIEH, in accordance with current legislation and guidance.

The assessment did not identify any ground contamination that would represent a risk to the proposed residential development and therefore, no recommendations for remediation are proposed.

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1.0 INTRODUCTION

1.1 It is understood that the proposed development comprises a number of terraced houses with private gardens and an estate type access road.

1.2 On the instructions of Vale of Glamorgan Council, an investigation was undertaken to determine ground conditions to enable foundation and road/hard standing design to be carried out, together with a contamination risk assessment.

1.3 This report should be read in conjunction with the Preliminary Investigation, which was reported under reference 70270 in June 2015.

1.4 It is recommended that a copy of this report be submitted to the relevant authorities to enable them to carry out their own site assessments and provide any comments.

1.5 This report has been prepared for the sole use of the Client for the purpose described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

1.6 The comments given in this report and the opinions expressed herein are based on the information received, the conditions encountered during site works, and on the results of tests made in the field and laboratory. However, there may be conditions prevailing at the site which have not been disclosed by the investigation and which have not been taken into account in the report.

1.7 The comments on groundwater conditions are based on observations made at the time the site work was carried out. It should be noted that groundwater levels vary owing to seasonal or other effects.

2.0 SITE SETTING

2.1 Site Location and Description

2.1.1 The site is situated at the northern end of Maes-y-Ffynon approximately 200m north of the A48 in Bonvilston and may be located by Grid Reference ST 067 743.

2.1.2 The site consists of a number of masonry lock-up garages with access road and mown grass to the south of the garages. Trees were located in the grassed area and trees and bushes were present around the perimeter of the site. Houses were located south and west of the site and a golf course was present to the east and north.

2.1.3 A site plan is included in Appendix 1, Figure A1.1.

2.2 Geological Setting

2.2.1 The 1:50000 British Geological Survey Sheet Number 262 indicates the site to be underlain by superficial deposits of Glacial Till, typically comprising of clay rich sand, gravels and cobbles.

2.2.2 The superficial deposits are underlain by Friars Point Limestone of the Lower Carboniferous.

3.0 SUMMARY DESK STUDY FINDINGS

3.1 A Preliminary Investigation in the form of a desk study and site reconnaissance was carried out in June 2015 in order to assess the potential hazards on and adjacent to the site and prepare a risk assessment for further consideration.

3.2 The site was indicated to comprise part of an agricultural field on the first available map, dated 1878. Between 1964 and 1972 lock-up garages have been built. No further changes have been indicated until the most recently published map dated 2014

3.3 There is evidence for the potential for radon to be present at levels for which basic protection measures have been recommended. The risk to end-users is considered to be moderate, however, with the implementation of basic radon protection measures then the associated risk could be considered to be very low

3.4 There is the potential for contamination associated with the made ground and existing garages and hardstanding on-site. However, the risk to end users is considered to be moderate to low.

3.5 The following scope of works is suggested in order to collect the required data:

- The sinking of exploratory holes for the recovery of samples for geotechnical and chemical contamination analysis.
- The installation of basic radon protection measures will be required in the proposed new dwellings.

4.0 SITE WORK

4.1 The site work was carried out on the 30th April 2015. The locations of exploratory holes have been planned, where possible, in general accordance with CLR 4, ref. 10.1 and the site work carried out on the basis of the practices set out in BS 10175:2001, ref. 10.2, BS 5930:1999, ref. 10.3, and ISO 1997:2007, ref. 10.4.

4.2 Four trial pits, designated TP1 to TP4, were dug by mechanical excavator at the positions shown on the site plan, Appendix 1, Figure A1.1. The depths of trial pits, descriptions of strata encountered and comments on groundwater conditions are given in the trial pit records, Appendix 2, Figures 70270.TP1 to TP4.

4.3 Representative disturbed samples were taken at the depths shown on the trial pit records and despatched to the laboratory. Standard (split-barrel and cone) penetration tests, ref. 10.5, were carried out in the boreholes in the various strata to assess the relative density or consistency. The values of penetration resistance are given in the borehole records.

4.4 Samples for environmental purposes were collected in amber glass jars and kept in a cool box.

4.5 The ground levels at the trial pit locations were not determined.

4.6 Soakaway tests were carried out in trial pit TP2, in line with guidelines given in BRE Digest 365, ref. 10.6. The results are included in Figures A2.1.

5.0 LABORATORY TESTS

5.1 Geotechnical Testing

5.1.1 Geotechnical soil analysis was undertaken of samples obtained during the investigation as follows:

- 4 No. Water Content Tests
- 4 No. Plasticity Index Tests
- 2 No. Particle Size Distributions (by Wet Sieving)
- 2 No. pH Values
- 2 No. Sulphate Contents (Water Soluble)
- 1 No. Total Sulphur
- 1 No. Total Sulphate

5.1.2 The laboratory test reports are given in Appendix 3, Figures 70270/1 and 15-35873.

5.2 Chemical Testing

5.2.1 The suite of chemical analyses has been based upon the findings of the preliminary investigation, along with any on-site observations, to investigate the potential sources of contamination identified in the conceptual model. The chemical analyses were carried out on two samples of Made Ground and six samples of natural soil. The nature of the analyses is detailed below:

5.2.2 **Metals Suite** - arsenic, cadmium, chromium (hexavalent), chromium (total), copper, lead, mercury, nickel, selenium and zinc.

5.2.3 **Organic Suite -** petroleum hydrocarbons – EPH basic carbon banded analysis and polycyclic aromatic hydrocarbons (PAH) – USEPA 16 suite.

5.2.4 **Others** - pH, organic matter content and asbestos.

5.2.5 The results of these tests are shown in Appendix 4, Figure A4.1.

6.0 GROUND CONDITIONS ENCOUNTERED

6.1 Made Ground and Topsoil

6.1.1 Made ground was encountered in TP3 in the north west of the site and appeared to be sandy gravely silt and cobbles which backfilled a possible service trench. TP3 was terminated in the made ground at 1.00m due to possible underlying services.

6.1.2 The remaining three trial pits encountered topsoil to 0.10m below ground level.

6.2 Glacial Till

6.2.1 Underlying the topsoil in TP1, TP2 and TP3, firm and stiff orange brown silty clay with some gravel and cobbles was present to 1.50m or 2.00m deep where orange brown clayey silty sand and gravel continued to the full depths of these trial pits at between 2.20m and 3.30m below ground level.

6.3 Groundwater

6.3.1 Groundwater was not encountered in any of the trial pits.

7.0 GEOTECHNICAL ASSESSMENT AND RECOMMENDATIONS IN RELATION TO THE PROPOSED DEVELOPMENT

7.1 Structural Details

7.1.1 It is understood that the proposed development is to consist of a number of terraced houses with private gardens and an estate type access road.

7.1.2 Precise structural details were not available at the time of preparation of this report, however, it is likely that the houses will be of traditional load bearing masonry construction and wall loads are likely to be of the order of 100kN.m run.

7.2 Assessment of Soil Condition

7.3 Glacial Clay

7.3.1 Laboratory testing for the Glacial Clay recorded natural moisture contents of between 12% and 23%, with an average of 15.5% and plasticity indices of between 13% and 18%, with an average of 15%.

7.3.2 These results indicate the clay is of low to intermediate plasticity and of low volume change potential as defined by the National House Building Council, ref. 10.7 and other published data, refs 10.8 and 10.9. Changes in moisture content will result in small changes in volume, seasonal changes being exacerbated by the presence of trees.

7.4 Sand and Gravel

7.4.1 Particple size distributions undertaken on bulk samples from the trial pits indicated a cobble content of zero and 13 %, gravel content of 41% and 47%, sand content of 24% and 40% and silt/clay content of 16% and 19%.

7.5 Foundation Options

7.5.1 On the basis of observations made on site together with results of in-situ and laboratory tests, consideration could be given to the adoption of shallow spread foundations to support the proposed structures.

7.5.2 Outside the zone of influence of existing and proposed trees, it is recommended that conventional shallow spread footings should be taken through any topsoil and Made Ground and placed in the underlying natural strata at a minimum depth of 0.90m.

7.5.3 Within the zone of influence of recently removed, existing or proposed trees, foundations should be taken through the Made Ground and topsoil and placed at depths recommended by the NHBC for soils of low volume change potential or onto the underlying sand and gravel whichever is the shallower. Compressible material should be placed on the inside faces of foundations as specified by the NHBC.

7.5.4 Such foundations, assuming a 0.6m wide strip/pad foundation at the minimum depth of 0.9m, may be designed to an allowable bearing pressure of 100kPa, which would provide an adequate factor of safety against shear failure. Settlements are likely to be less than 20mm, however, these should be checked when the final structural loading is known.

7.5.5 TP3, which was in the north west of the site, was terminated at shallow depth due to the presence of service. Other services also appeared to be located in the west of the site, therefore, no trial pits were carried out in that area. Once the location of the services has been established it would be prudent for a trial pit to be carried out by a competent person to confirm that the soil conditions are similar to the trial pits in the east of the site.

7.6 Ground Floor Slabs

7.6.1 On the basis of observations on site together with the results of laboratory tests, it is recommended that outside the zone of influence of trees, consideration is given to constructing the ground floor slab on formation prepared in the gravelly clay. Any soft or deleterious material should be removed and replaced with properly compacted granular fill.

7.6.2 Within the zone of influence of trees, the floor slabs should be suspended over a void, in accordance with NHBC guidelines.

7.6.3 Where the final levels dictate that the depth of sub floor fill exceeds 600mm, ground floor slabs should be suspended in accordance with NHBC requirements.

7.7 Excavations

7.7.1 On the basis of observations on site together with the results of the laboratory tests, it is considered that excavations to less than 1.20m should stand unsupported in the short term. Side support for safety purposes should of course be provided to all excavations which appear unstable, and those in excess of 1.20m deep, in accordance with Health and Safety Regulations, ref. 10.10.

7.7.2 Groundwater should not be expected in shallow excavations for foundations or services.

7.8 Road and Hard Standing Design

7.8.1 The structural design of a road or hard standing is based on the strength of the subgrade, which is assessed on the California Bearing Ratio, CBR, scale from which the subgrade surface modulus can be estimated. Experience has indicated that the measurement of the in-situ CBR value tends to give unreliable results because of the influence of the moisture content of the materials. In practice, the correlation given by the Highways Agency, ref. 10.11, is usually more appropriate than direct determination of the CBR.

7.8.2 The process of design given in the guidance notes requires an estimate of CBR and subgrade stiffness modulus to be made at the design stage and in-situ measurement prior to construction.

7.8.3 On the basis of laboratory classification tests it is recommended that for formation prepared in the gravelly clay, with a characteristic plastic index value of 15%, a subgrade CBR value of 4.5% be adopted for design purposes. The assessment assumes there to be a low water table, average construction conditions and a thin pavement construction. Any areas of soft or deleterious material should be excavated and replaced with a properly compacted granular fill.

7.8.4 The results of the laboratory tests indicate that the gravelly clay is likely to be frost susceptible.

7.9 Surface Water Soakaways

7.9.1 The results of the soakaway tests gave infiltration rates of $3.3x10^{-5}$ m/s which suggests the stratum to be of moderate to good drainage characteristics, ref. 10.12.

7.10 Chemical Attack on Buried Concrete

7.10.1 The site has been classified in accordance with BRE Special Digest 1, ref. 10.13, as natural ground without the presence of pyrite and laboratory testing undertaken accordingly. It is recommended that the guidelines given in BRE Special Digest 1, ref. 10.13, be adopted.

7.10.2 The results of chemical tests indicate a sulphate concentration in the soil of 11mg/l and 51mg/l as a 2:1 water/soil extract, with pH values of 7.1 and 7.4.

7.10.3 It is recommended that for conventional shallow foundations the groundwater should be regarded as mobile.

7.10.4 On the basis of the laboratory test results it is considered that a Design Sulphate Class may be taken as DS-1. The site conditions would suggest that an ACEC class for the site of AC-1 would be appropriate.

8.0 ENVIRONMENTAL RISK ASSESSMENT IN RELATION TO PROPOSED DEVELOPMENT

8.1 Contaminated Land

8.1.1 The statutory definition of contaminated land is defined in the Environmental Protection Act 1990, ref. 10.14, which was introduced by the Environment Act 1995, ref. 10.15, as;

8.1.2 'Land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that –

- significant harm is being caused or there is a significant possibility of such harm being caused; or
- significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.'

8.2 Risk Assessment

8.2.1 The definition of contaminated land is based on the principles of risk assessment. Risk is defined as a combination of:

- The probability, or frequency of exposure to a substance with the potential to cause harm, and:
- The seriousness of the consequence.

8.3 Pollutant Linkage

8.3.1 The basis of an environmental risk assessment involves identifying a 'source' of contamination, a 'pathway' along which the contamination may migrate and a 'receptor' at risk from the contamination.

8.3.2 Current legislation defines the various elements of the pollution linkage as:

- A contaminant is a substance, which is in or under the ground and which has the potential to cause harm or to cause pollution of controlled waters.
- A pathway is one or more routes through which a receptor is being exposed to, or affected by, a contaminant, or could be so affected.
- A receptor is either a living organism, an ecological system, a piece of land or property, or controlled water.

8.3.3 A pollutant linkage indicates that all three elements have been identified. The site can only be defined as 'Contaminated Land' if a pollutant linkage exists and the contamination meets the criteria in Section 8.1 above.

8.3.4 The guidance proposes a four-stage approach for the assessment of contamination and the associated risks. The four stages are listed below:

- Hazard Identification
- Hazard Assessment
- Risk Assessment
- Risk Evaluation

8.3.5 The hazard identification and hazard assessment have been based upon the Preliminary Investigation and formed the conceptual site model, detailed in our report, reference 70270, dated June 2015.

8.3.6 The risk assessment and evaluation stages are presented in this phase 2 interpretive report, after an intrusive ground investigation has taken place.

8.4 Risk Assessment – Human Health

8.4.1 The proposed development consists of a number of terraced houses with private gardens and an estate type access road. The risk assessment has therefore been based on guidelines for a residential end use with homegrown produce. Should the proposed development be changed in the future then further risk assessment may be required.

8.4.2 The results of the soil analyses have been compared to Suitable 4 Use Levels (S4ULs), determined by LQM and CIEH, ref. 10.16, in accordance with current legislation and guidance, as detailed in Appendix 6.

8.4.3 The Generic Assessment Criteria (GAC) used within this contamination assessment have been tabulated and are detailed within Appendix 6. An average soil organic matter content of 2.5% has been adopted for the Glacial Till, and 1% for the Made Ground and Limestone.

8.4.4 The results of chemical analyses have been processed in accordance with recommendations set out in the CIEH and CL:AIRE document ‘Guidance on Comparing Soil Contamination Data with a Critical Concentration’, ref. 10.17. Where the concentrations determined on site are at or below the respective Generic Assessment Criteria, they are considered not to pose a risk and are removed from further consideration, unless otherwise stated.

8.4.5 None of the soil concentrations exceeded the relevant screening criteria and therefore, no contamination has been identified that is considered to represent a risk to the proposed development.

8.5 Risk Assessment - Asbestos

8.5.1 Asbestos including Asbestos Containing Soils (ACS) only presents a risk to health if fibres are released into the air. It is generally assumed that only near surface ACS would contribute airborne fibres. However, in instances where gardens are proposed, then there is a risk that ACS could be exposed to the atmosphere through the action of digging.

8.5.2 Although no assessment criteria (AC) has been proposed in the new CIRIA C733, ref.: 10.18, Ian Farmer Associates have adopted the view that if asbestos is identified within soil then further sampling and testing will be required; specifically to quantify the amount and type of asbestos present. This information should then be used in Detailed Quantitative Risk Assessment (DQRA) as outline in CIRIA C733.

8.5.3 None of the samples at this site contained asbestos.

8.6 Risk Assessment - Controlled Waters

8.6.1 The site is located above a unproductive strata relating to the negligibly permeable superficial deposits of Glacial Till, underlain by a Principal aquifer relating to the permeable Limestone, is not within a groundwater source protection zone and there are two licensed groundwater abstractions within 500m, located approximately 343m to the southeast for general farming and domestic use.

8.6.2 The nearest surface watercourse is located approximately 112m to the east of the site and there are no licensed surface water abstractions within 500m.

8.6.3 Given the ground conditions encountered at the site and the absence of contamination identified in the soils overlying the Principal aquifer, it is considered unlikely that further assessment of the risks to controlled waters will be required.

8.7 Gas Generation

8.7.1 The BRE guidance on Radon producing areas within the UK, (BR211:2007), indicates that the site lies within an area where radon protective measures are required.

8.7.2 It is recommended that the Local Authority/NHBC are consulted regarding these measures for their approval prior to commencing construction.

8.8 Protection Of Services

8.8.1 Due to the increasing number of developments being undertaken on potentially contaminated land, the Water Supply Industry has identified the need to protect newly laid water supply pipes. They are likely to impose constraints on the nature of water supply pipes that are to be laid in contaminated land. Current guidance on the selection of materials for water pipes is provided by the UK Water Industry Research Limited, ref. 10.19, though some water supply companies may continue to refer to the previous guidance provided by Water Regulations Advisory Scheme, ref. 10.20, and should be consulted for confirmation.

8.9 Risk Evaluation

8.9.1 Whilst the conceptual model formed within the Preliminary Investigation identified the potential for contamination associated with Made Ground and possible vehicle maintenance, no elevated soil concentrations were identified in relation to the proposed residential development.

8.10 Summary of Risk Evaluation

8.10.1 The above assessment has not identified a 'source – pathway – receptor' linkage and therefore, no recommendations for remediation are proposed.

8.11 Waste

8.11.1 An initial assessment of the likely waste classification for any material to be disposed of has been conducted on the basis of the chemical test results obtained as part of the contamination risk assessment.

8.11.2 This assessment has been conducted using the HazWasteOnline^{tm} tool, ref. 10.21, the summary output sheet from which is included within Appendix 4, Figure A4.2, with a full copy of the output included on the accompanying CD.

8.11.3 This initial assessment indicates that none of the samples are likely to be classified as hazardous.

8.11.4 It should be noted that individual tips might require further analysis prior to the disposal of any material from the site. Any such requirements should be clarified with the tip prior to any further analysis being undertaken.

9.0 MANAGEMENT OF CONTAMINATION

9.1 Remediation and Verification

9.1.1 The risk management framework set out in the Model Procedures for the Management of Land Contamination, CLR 11, ref. 10.22, is applicable to the redevelopment of sites that may be affected by contamination.

9.1.2 The risk management process set out in the Model Procedures has three main components:

- Risk assessment
- Options appraisal
- Implementation

9.1.3 This initial risk assessment has not identified the presence of any ground contamination at the site that would represent a risk to the proposed residential development.

9.1.4 An important part of the risk management process is identifying and informing all stakeholders with an interest in the outcome of the risk management project. To this end, if the regulators have not yet been contacted with regard to the redevelopment of this site, it is recommended that they be supplied with a copy of both the Preliminary Investigation report and this Phase 2 Ground Investigation report in order to enable liaison to be undertaken with them.

9.2 Management of Unidentified Sources of Contamination

9.2.1 There is the possibility that sources of contamination may be present on the site, which were not detected during the investigation. Should such contamination be identified or suspected during the site clearance or ground works, these should be dealt with accordingly. A number of options are available for handling this material, which include:

- The removal from site and disposal to a suitably licensed tip of all material suspected of being contaminated. The material would need to be classified prior to disposal.
- Short-term storage of the suspected material while undertaking verification testing for potential contamination. The storage area should be a contained area to ensure that contamination does not migrate and affect other areas of the site. Depending upon the amounts of material under consideration, this could be either a skip or a lined area.
- Having a suitably experienced environmental engineer either on-call or with a watching brief for the visual and olfactory assessment of the material, and sampling for verification purposes.

9.3 Consultation

9.3.1 During the development of a site, consultation may be required for a number of reasons with a number of regulatory Authorities. The following provides an indication as to the most likely Authorities with which consultation may be required.

- **Local Authority.** There may be a planning condition regarding contamination and consultation will be required with a designated Contaminated Land Officer within the Environmental Health Department. The Local Authority is generally concerned with human health risks. Some Authorities now require 'Completion Certificates' to be signed off following remediation works.

- **Environment Agency.** Where a site is situated above an aquifer, within a groundwater protection zone or has been designated as a special site, the Environment Agency is likely to be involved to ensure that controlled waters are protected.

- **National House Building Council, NHBC.** Section 4.1 of the NHBC Standards requires land management to be addressed. For a new housing development to be approved by the NHBC, any remediation will require a validation report.

9.3.2 Based on the results of any consultation, there may be specific remediation requirements imposed by one or more of the Authorities.

9.4 Risk Management During Site Works

9.4.1 During ground works, some simple measures may have to be put in place to mitigate the risk of any known or previously unidentified contamination affecting the site workers and the environs. The majority of the proposed measures represent good practice for the construction industry and include:

- Informing the site workers of the contamination on site and the potential health effects from exposure.

- Where appropriate, the provision of suitable Personal Protective Equipment (PPE) for workers who may be potentially impacted by working in areas of the contamination.

- Ensuring good hygiene is enforced on site and washing facilities are maintained on the site. Workers are discouraged from smoking, eating or drinking without washing their hands first.

- Dust monitoring, and if necessary, suppression measures should be put into practice where contamination is becoming airborne.

9.4.2 Where contaminated materials are being removed from the site they should be disposed of at a suitably licensed landfill, with a 'duty of care' system in place and maintained throughout the disposal operations.

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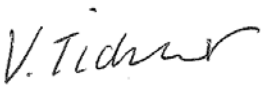
For and on behalf of Ian Farmer Associates (1998) Limited



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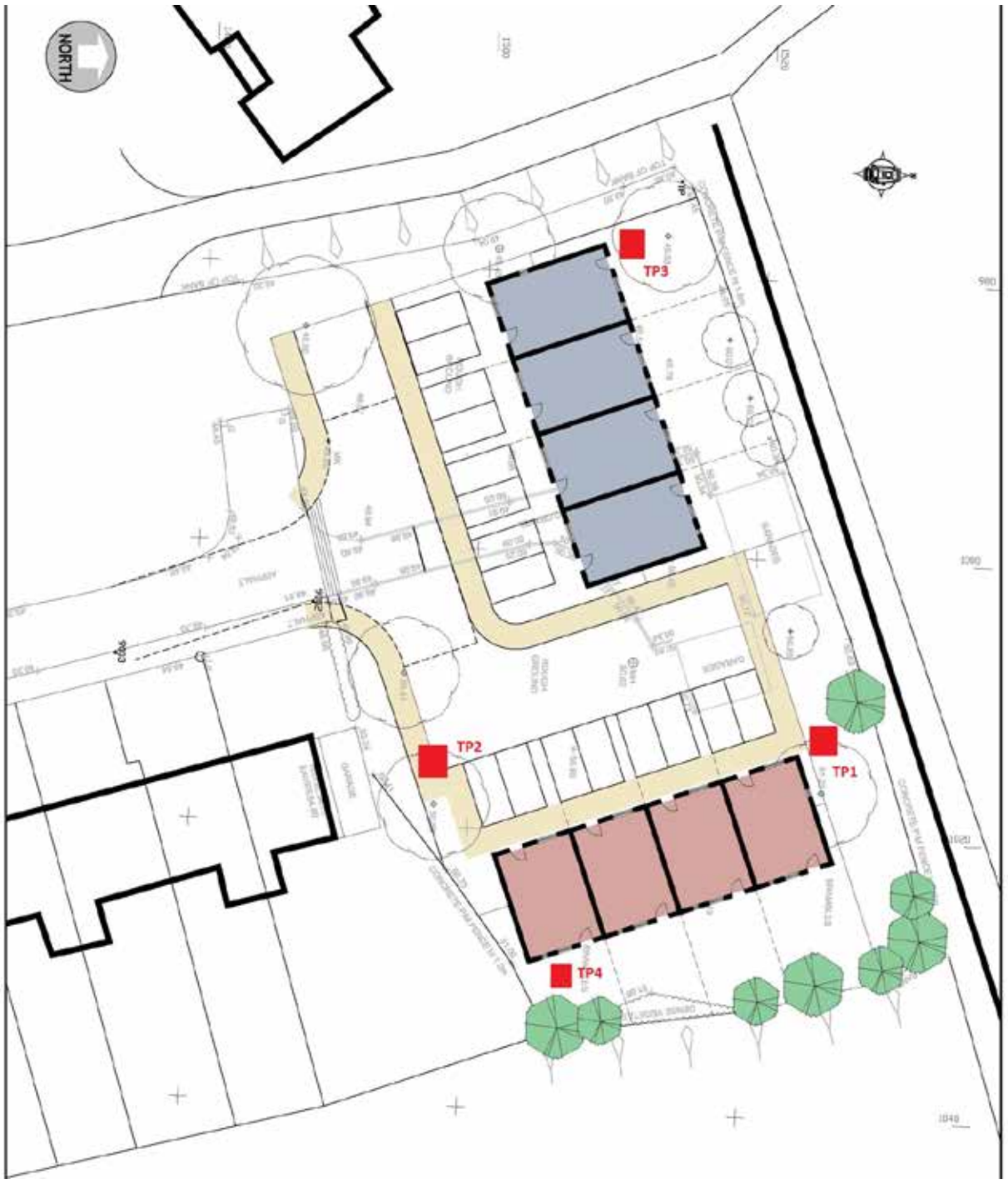
APPENDIX 1

DRAWINGS

Job No: 70270
Site: Bonvilston, Barry



Site Plan	**Figure A1.1**

APPENDIX 2

SITE WORK

IAN FARMER ASSOCIATES

Site	Trial Pit Number
Maes-y-fynon, Bonvilston CF5 6TT	TP1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
JCB 3CX				70270
	Location ST 067 742	**Dates** 30/04/2015	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.10	TOP SOIL		
0.20	ES1					Firm orange brown friable silty CLAY with some fine to medium gravel and cobbles		
0.40	ES2				(1.40)			
1.00	D5							
1.50	ES3				1.50	Orange brown clayey silty SAND AND GRAVEL with cobbles with depth. Gravels and cobbles fine to coarse sandstone		
1.70	D6				(1.00)			
2.50	D7				2.50	Complete at 2.50m		
2.50	ES4							

Plan

Remarks

Groundwater not encountered

Scale (approx)	Logged By	Figure No.
1:50	WHS	70270.TP1

IAN FARMER ASSOCIATES

Site	Trial Pit Number
Maes-y-fynon, Bonvilston CF5 6TT	TP2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
JCB 3CX	2.30m x 0.70m x 2.20m			70270
	Location ST 067 742	**Dates** 30/04/2015	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.10	TOP SOIL		
0.25	ES1					Firm orange brown friable silty CLAY with some fine to medium gravel		
					(1.40)			
1.00	D5							
1.20	ES2							
					1.50	Orange brown clayey silty SAND AND GRAVEL with cobbles with depth. Gravels and cobbles fine to coarse sandstone		
					(0.70)			
2.00	ES3							
2.20	D6				2.20	Complete at 2.20m		
2.20	ES4							

Plan

Remarks

Groundwater not encountered
Soakaway test carried out

Scale (approx)	Logged By	Figure No.
1:50	WHS	70270.TP2

IAN FARMER ASSOCIATES

Site	Trial Pit Number
Maes-y-fynon, Bonvilston CF5 6TT	TP3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
JCB 3CX				70270
	Location ST 067 742	**Dates** 30/04/2015	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOP SOIL		
0.30	ES1				0.30	MADE GROUND Clayey sandy gravely silt with cobbles		
					(0.70)			
1.00	D3				1.00	Abandoned due to underlying services		
1.00	ES2					Complete at 1.00m		

Plan

Remarks

Groundwater not encountered

Scale (approx)	Logged By	Figure No.
1:50	WHS	70270.TP3

IAN FARMER ASSOCIATES

Site	Trial Pit Number
Maes-y-fynon, Bonvilston CF5 6TT	TP4

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
JCB 3CX				70270
	Location 742	**Dates** 30/04/2015	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.10	TOP SOIL		
0.30	ES1					Stiff orange brown sandy CLAY with some cobbles		
0.60	D5							
1.00	ES2				(1.90)			
1.60	D6							
					2.00	Orange brown clayey silty SAND AND GRAVEL with cobbles and clayey sub layers with depth. Gravels and cobbles fine to coarse sandstone		
2.20	D7							
2.20	ES3				(1.30)			
					3.30			
3.30	D8					Complete at 3.30m		
3.30	ES4							

Plan

Remarks

Groundwater not encountered

Scale (approx)	Logged By	Figure No.
1:50	WHS	70270.TP4

SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	**Vale of Glamorgan Council**		
Site:	**Bonvilston, Barry**		
Job No:	**70270**	**Test No:**	**TP2 Test 1**

CALCULATION OF SOIL INFILTRATION RATE

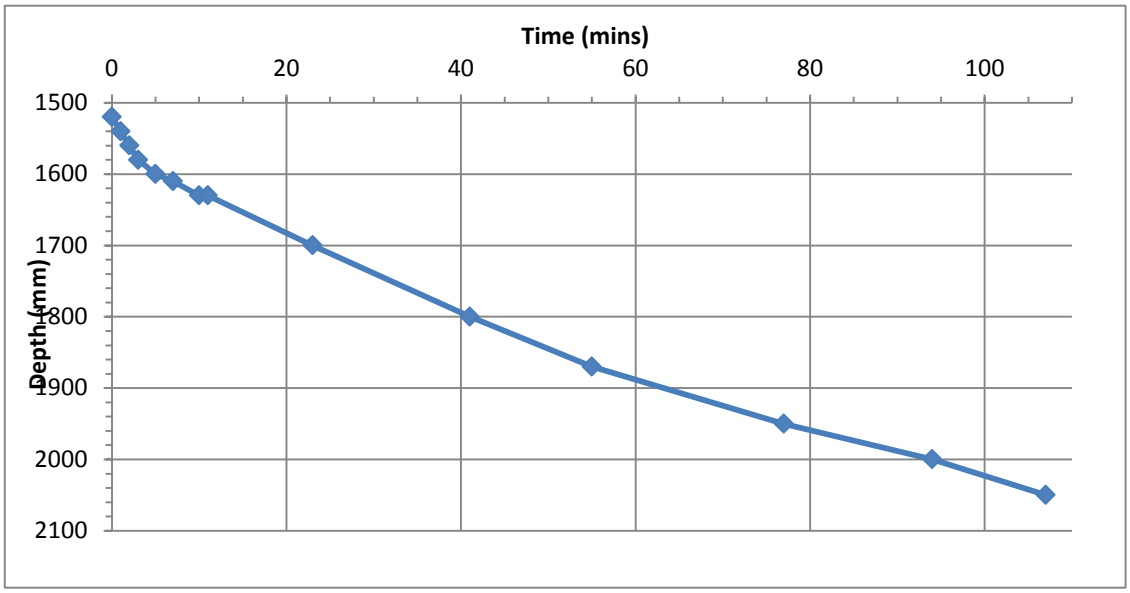
Time (min)	Depth (mm)
0	1520
1	1540
2	1560
3	1580
5	1600
7	1610
10	1630
11	1630
23	1700
41	1800
55	1870
77	1950
94	2000
107	2050

Size of Soakaway	Length (m) =	2.30
	Width (m) =	0.70
	Depth (m) =	2.20

Depth to water at start of test =	1520mm
Depth to water at end of test =	2050mm
Depth to water at 75% level =	1650mm
Depth to water at 50% level =	1785mm
Depth to water at 25% level =	1920mm
Base area of pit (m^2) =	1.610
Eff area of loss 75 - 25% (m^2) =	4.100
Volume outflow 75 - 25% (m^3) =	0.435

From the graph:	
tp 75 (min) =	14.5
tp 25 (min) =	68

Soil infiltration rate, f, (m/s) =		**3.30E-05**	**normal test**
Soil infiltration rate, f, (m/s) =			**pit with stone**
Input by:	**WHS**	**Date:**	**09/06/2015**
Checked by:	**Hand calc**	**Date:**	



Notes

Fig A2.1

APPENDIX 2

GENERAL NOTES ON SITE WORKS

A2.1 SITE WORK

A2.1.1 General

Site work is carried out in general accordance with the guidelines given in ISO 1997, 10.4 and BS 5930, ref. 10.3.

A2.1.2 Trial Pits

Shallow trial pits are generally dug by mechanical excavator, however, in difficult access locations or adjacent to structures, such pits may be hand dug. Pits are best used where the ground will stand unsupported and generally, the maximum depth of machine dug pits is 4m to 5m. Where personnel are required to enter pits, it is essential that side support is provided. Entry by personnel into unsupported pits deeper than 1.2m is not allowed for health and safety reasons.

Trial pits allow the in-situ condition of the ground to be examined both laterally and vertically and also allow discontinuities to be recorded. The field record should give the orientation of the pit with details of which face was logged, assessment of stability of sides of pit and groundwater as well as the strata encountered. Photographs of the pit should also be taken.

In-situ testing, such as hand penetrometer, hand vane, Macintosh probe, or similar, can be undertaken in the sides or base of pits while both disturbed and undisturbed samples recovered.

It is generally advisable to backfill the pits as soon as possible, open pits should not be left unattended.

A2.2 SAMPLES

A2.2.1 General

Samples have been recovered and stored in accordance with the guidelines given in ISO 22475-1:2006, ref. 10.23 and BS 5930, ref. 10.3.

The undisturbed samples recovered from the percussive sampler were of varying diameters depending upon the depth taken and the ground conditions encountered.

In accordance with EN ISO 22475, ref. 10.23, and BS 5930, ref. 10.3, the thick walled U100 sample is considered as a Class B sampling technique and will only produce Class 3 to 5 quality samples in accordance with EN 1997-2:2007, ref. 10.4. A similar assumption can be made from samples tested from the percussive window sample probing.

Laboratory strength and consolidation testing can only be carried out on Class 1 quality samples, which can be obtained from a Class A sampling technique, ref. 10.4. This is due to possible disturbance during sampling, giving a weaker strength in testing.

Therefore values for c_u and mv derived for use in this report can only be used as guidance and not used to determine the shear strength properties of the clay and is not used to give a descriptive strength in the borehole records.

B represents large bulk disturbed samples

D represents small disturbed sample

W represents water sample

▽ represents water strike

▼ represents level to which water rose

A2.3 DESCRIPTION OF SOILS

A2.3.1 General

The procedures and principles given in ISO 14688 Parts 1 and 2, ref. 10.24, supplemented by section 6 of BS 5930, ref. 10.3 have been used in the soil descriptions contained within this report.

APPENDIX 3

LABORATORY TESTS

IAN FARMER ASSOCIATES

Unit 4 Faraday Close, Pattinson North Industrial Estate, Washington, Tyne & Wear, NE38 8QJ.
Tel. 0191 4828500 Fax. 0191 4828520 Email. washington@ianfarmer.co.uk Internet.www.ianfarmer.co.uk

Ian Farmer Associates (1998) Ltd
Unit 1.2,
Parc Dyfatty Park,
Burry Port,
SA16 0FB

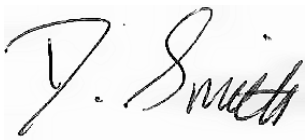
F.A.O. Bill Sell

TEST REPORT - 70270/1

Site :	Maes-y-fynon, Bonvilston CF5 6TT
Job Number :	70270
Originating Client :	
Originating Reference :	70270
Date Sampled :	Not given
Date Scheduled :	14/05/2015
Date Testing Started :	20/05/2015
Date Testing Finished :	29/05/2015

Remarks :

- First Report for above Job Number
- Samples will be disposed of 28 days after the report is issued unless otherwise agreed
- This report may contain results from tests which are not included within the scope of the UKAS accreditation. Please see final sheet for details.

Authorised By:  Daniel Smith

Position : Laboratory Supervisor Date : 29/05/2015

IAN FARMER ASSOCIATES

Laboratory Test Report - 70270/1

Site : Maes-y-fynon, Bonvilston CF5 6TT

Client :

Job Number 70270

DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX

Borehole/ Trial Pit	Depth (m)	Sample	Natural / Sieved	Natural Moisture Content %	Sample Passing 425µm Sieve		Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Class	Description / Remarks
					Percentage %	Moisture Content %						
TP1	1.00	D5	Sieved	13	62	18	29	16	13	0.15	CL	Brown clayey sandy gravelly SILT
TP2	1.00	D5	Sieved	12	59	17	33	19	14	-0.14	CL	Brown sandy silty clayey GRAVEL
TP4	0.60	D5	Sieved	14	67	18	29	15	14	0.21	CL	Brown sandy silty gravelly CLAY
TP4	1.60	D6	Natural	23	86	26	37	19	18	0.39	CI	Brown sandy silty gravelly CLAY

Method of Preparation : BS 1377:PART 1:1990:7.4 Preparation of samples for classification tests BS 1377:PART 2:1990:4.2 & 5.2 Sample preparations

Method of Test : BS 1377:PART 2:1990:3.2 Determination of moisture content 4.3 Determination of the liquid limit 5.3 Determination of the plastic limit and plasticity index

IAN FARMER ASSOCIATES

Laboratory Test Report - 70270/1

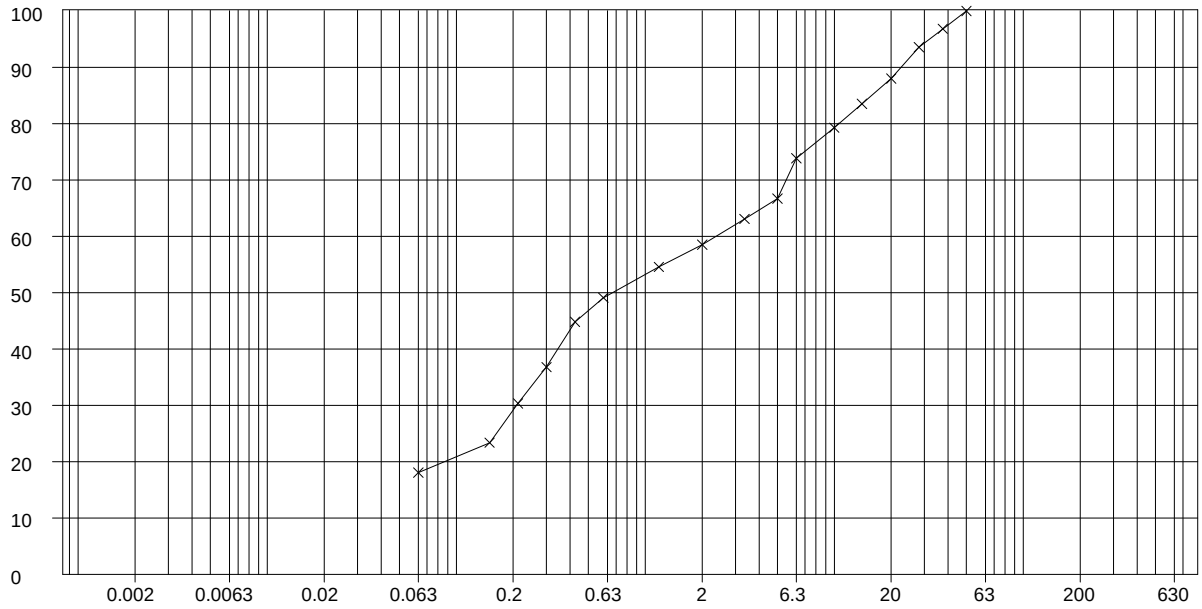
Site : Maes-y-fynon, Bonvilston CF5 6TT

Client :

Job Number 70270

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Pipette/ Hydrometer	Description
TP1	1.70	D6	N/A	Brown silty clayey sandy GRAVEL



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieve / Particle Size	% Passing
200 mm	100
150 mm	100
125 mm	100
90 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	97
28 mm	94
20 mm	88
14 mm	84
10 mm	79
6.3 mm	74
5 mm	67
3.35 mm	63
2 mm	59
1.18 mm	55
600 µm	49
425 µm	45
300 µm	37
212 µm	30
150 µm	23
63 µm	18

Grading Analysis	
D85	16.0 mm
D60	2.4 mm
D10	-
Uniformity Coefficient	-

Particle Proportions	
Cobbles + Boulders	0%
Gravel	41%
Sand	40%
Silt/Clay	19%

Method of Preparation : BS 1377:PART 1:1990:7.3 Initial preparation 7.4.5 Particle size tests

Preparation Details : Sample washed with no dispersant used, Oven Dried at 105 - 110℃

Method of Test : BS 1377:PART 2:1990:9 Determination of particle size distribution

Remarks :

IAN FARMER ASSOCIATES

Laboratory Test Report - 70270/1

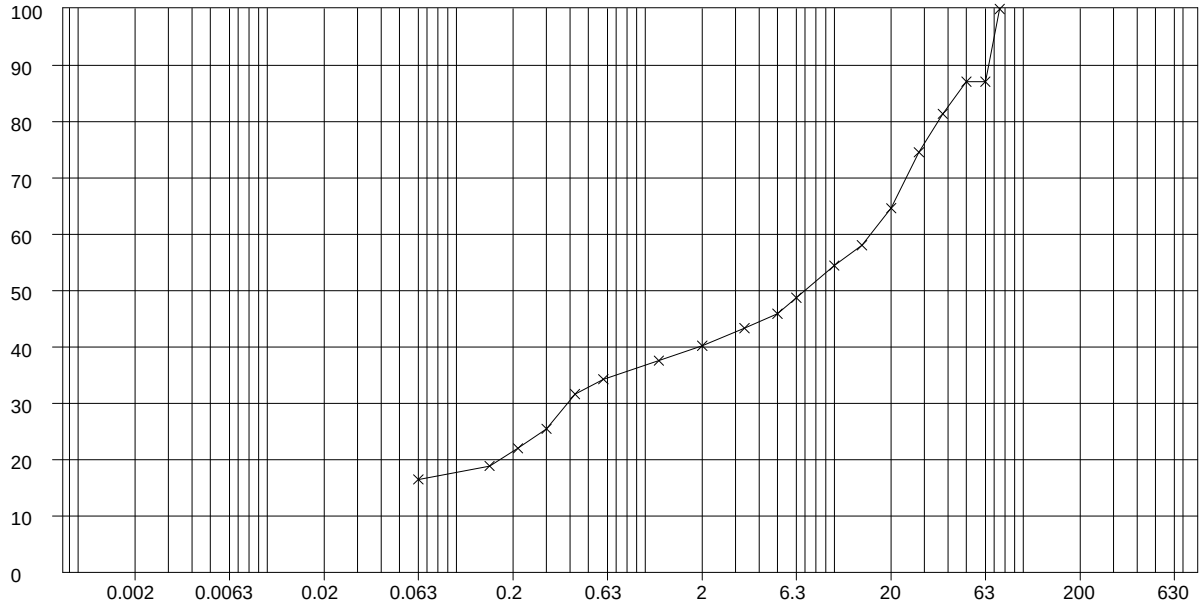
Site : Maes-y-fynon, Bonvilston CF5 6TT

Client :

Job Number 70270

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Pipette/ Hydrometer	Description
TP2	2.20	D6	N/A	Brown silty clayey sandy GRAVEL includes cobbles



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieve / Particle Size	% Passing
200 mm	100
150 mm	100
125 mm	100
90 mm	100
75 mm	100
63 mm	87
50 mm	87
37.5 mm	81
28 mm	75
20 mm	65
14 mm	58
10 mm	54
6.3 mm	49
5 mm	46
3.35 mm	43
2 mm	40
1.18 mm	38
600 µm	34
425 µm	32
300 µm	25
212 µm	22
150 µm	19
63 µm	17

Grading Analysis	
D85	45.4 mm
D60	15.8 mm
D10	-
Uniformity Coefficient	-

Particle Proportions	
Cobbles + Boulders	13%
Gravel	47%
Sand	24%
Silt/Clay	16%

Method of Preparation : BS 1377:PART 1:1990:7.3 Initial preparation 7.4.5 Particle size tests

Preparation Details : Sample washed with no dispersant used, Oven Dried at 105 - 110℃

Method of Test : BS 1377:PART 2:1990:9 Determination of particle size distribution

Remarks :

IAN FARMER ASSOCIATES

Test Report : **70270/1**

Site : Maes-y-fynon, Bonvilston CF5 6TT
Job Number : 70270
Originating Client :

All opinions and interpretations contained within this report are outside of our Scope of Accreditation.

The following tests contained within this report are not UKAS Accredited.

Date of Issued : 29/05/2015

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-35873

01-Jun-15

Client	Ian Farmer Associates 4 Faraday Close District 15 Pattinson North Industrial Est Washington Tyne & Wear NE38 8QJ
Our Reference	15-35873
Client Reference	70270
Contract Title	Maes-y-fynon
Description	2 Soil samples.
Date Received	23-May-15
Date Started	23-May-15
Date Completed	01-Jun-15
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 15-35873
Client Ref 70270
Contract Title Maes-y-fynon

			Lab No	816089	816090
			Sample ID	TP1	TP4
			Depth	1.00	1.60
			Other ID	5	6
			Sample Type	D	D
			Sampling Date	n/s	n/s
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Inorganics					
pH	DETSC 2008#			7.1	7.4
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	11	51
Total Sulphur as S	DETSC 2320	0.01	%	< 0.01	
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.02	

Key: # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 15-35873
Client Ref 70270
Contract Maes-y-fynon

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
816089	TP1 1.00 SOIL		PT 500ml	Sample date not supplied	
816090	TP4 1.60 SOIL		PT 500ml	Sample date not supplied	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

APPENDIX 3

GENERAL NOTES ON LABORATORY TESTS ON SOILS

A3.1 GENERAL

A3.1.1 Where applicable all tests are carried out in accordance with the relevant British Standard. The laboratory test procedures are given in the laboratory test reports.

A3.1.2 Any discussion in this report is based on the values and results obtained from the appropriate tests. Due allowance should be made, when considering any result in isolation, of the possible inaccuracy of any such individual result. Details of the accuracy of results are included in this section, where applicable.

A3.2 SOIL CLASSIFICATION

A3.2.1 Classification of soils is usually undertaken by means of the Plasticity Classification Chart, sometimes called the A-Line Chart. This is graphical plot of PI against LL with the A-Line defined as PI = 0.73(LL - 20).

A3.2.2 This line is defined from experimental evidence and does not represent a well-defined boundary between soil types, but forms a useful reference datum. When the values of LL and PI for inorganic clays are plotted on the chart they generally lie just above the A-Line in a narrow band parallel to it, while silts and organic clays plot below this line.

A3.2.3 Clays and silts are divided into five zones of plasticity:

Low Plasticity (L)	LL less than 35
Intermediate Plasticity (I)	LL between 35 and 50
High Plasticity (H)	LL between 50 and 70
Very High Plasticity (V)	LL between 70 and 90
Extremely High Plasticity (E)	LL greater than 90

A3.2.4 In general, clays of high plasticity are likely to have a lower permeability, are more compressible and consolidate over a longer period of time under load than clays of low plasticity. Clays of high plasticity are more difficult to compact as fill material.

APPENDIX 4

CHEMICAL TESTS

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-35176

26-May-15

Client	Ian Farmer Associates Unit 1 Fairfield Court Seven Stars Industrial Estate Wheler Road Coventry West Midlands CV3 4LJ
Our Reference	15-35176
Client Reference	70270
Contract Title	Maes-y-fynon
Description	8 Soil samples.
Date Received	18-May-15
Date Started	18-May-15
Date Completed	26-May-15
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 15-35176
Client Ref 70270
Contract Title Maes-y-fynon

			Lab No	812286	812287	812288	812289	812290	812291
			Sample ID	TP1	TP1	TP2	TP2	TP3	TP3
			Depth	0.20	1.50	0.25	1.20	0.30	1.00
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	30/04/15	30/04/15	30/04/15	30/04/15	30/04/15	30/04/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	13	8.6	15	11	15	7.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.9	0.6	0.6	0.6	0.6
Chromium	DETSC 2301#	0.15	mg/kg	14	17	20	20	19	20
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	18	17	21	16	15	16
Lead	DETSC 2301#	0.3	mg/kg	55	21	44	39	48	43
Mercury	DETSC 2325#	0.05	mg/kg	0.10	0.06	0.10	0.05	0.08	< 0.05
Nickel	DETSC 2301#	1	mg/kg	15	27	16	24	13	15
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	88	86	82	78	84	85
Inorganics									
pH	DETSC 2008#			6.7	7.3	6.8	7.3	6.5	6.9
Organic matter	DETSC 2002#	0.1	%	3.7	0.6	3.8	0.3	0.1	1.4
Petroleum Hydrocarbons									
EPH (C10-C20)	DETSC 3311	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
EPH (C20-C30)	DETSC 3311	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
EPH (C30-C40)	DETSC 3311	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-35176
Client Ref 70270
Contract Title Maes-y-fynon

			Lab No	812292	812293
			Sample ID	TP4	TP4
			Depth	0.30	1.00
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	30/04/15	30/04/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	8.6	8.6
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.5
Chromium	DETSC 2301#	0.15	mg/kg	22	21
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	12	17
Lead	DETSC 2301#	0.3	mg/kg	30	29
Mercury	DETSC 2325#	0.05	mg/kg	0.05	0.06
Nickel	DETSC 2301#	1	mg/kg	19	22
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	86	72
Inorganics					
pH	DETSC 2008#			6.0	6.1
Organic matter	DETSC 2002#	0.1	%	1.9	1.3
Petroleum Hydrocarbons					
EPH (C10-C20)	DETSC 3311	10	mg/kg	< 10	< 10
EPH (C20-C30)	DETSC 3311	10	mg/kg	< 10	< 10
EPH (C30-C40)	DETSC 3311	10	mg/kg	< 10	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10
PAHs					
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
PAH	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-35176
Client Ref 70270
Contract Title Maes-y-fynon

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
812286	TP1 0.20	SOIL	NAD	none	Michael Kay
812287	TP1 1.50	SOIL	NAD	none	Michael Kay
812288	TP2 0.25	SOIL	NAD	none	Michael Kay
812289	TP2 1.20	SOIL	NAD	none	Michael Kay
812290	TP3 0.30	SOIL	NAD	none	Michael Kay
812291	TP3 1.00	SOIL	NAD	none	Michael Kay
812292	TP4 0.30	SOIL	NAD	none	Michael Kay
812293	TP4 1.00	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 15-35176
Client Ref 70270
Contract Maes-y-fynon

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
812286	TP1 0.20 SOIL	30/04/15	GJ 250ml, PT 1L	Naphthalene (14 days), PAH FID (14 days), pH (7 days), EPH/TPH (14 days)	
812287	TP1 1.50 SOIL	30/04/15	GJ 250ml, PT 1L	Naphthalene (14 days), PAH FID (14 days), pH (7 days), EPH/TPH (14 days)	
812288	TP2 0.25 SOIL	30/04/15	GJ 250ml, PT 1L	Naphthalene (14 days), PAH FID (14 days), pH (7 days), EPH/TPH (14 days)	
812289	TP2 1.20 SOIL	30/04/15	GJ 250ml, PT 1L	Naphthalene (14 days), PAH FID (14 days), pH (7 days), EPH/TPH (14 days)	
812290	TP3 0.30 SOIL	30/04/15	GJ 250ml, PT 1L	Naphthalene (14 days), PAH FID (14 days), pH (7 days), EPH/TPH (14 days)	
812291	TP3 1.00 SOIL	30/04/15	GJ 250ml, PT 1L	Naphthalene (14 days), PAH FID (14 days), pH (7 days), EPH/TPH (14 days)	
812292	TP4 0.30 SOIL	30/04/15	GJ 250ml, PT 1L	Naphthalene (14 days), PAH FID (14 days), pH (7 days), EPH/TPH (14 days)	
812293	TP4 1.00 SOIL	30/04/15	GJ 250ml, PT 1L	Naphthalene (14 days), PAH FID (14 days), pH (7 days), EPH/TPH (14 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

IAN FARMER ASSOCIATES

HazWasteOnline™

Waste Classification Report

TFLU5-NGPDC-LAHT4

Job name

70270 Maes-y-fynon

Waste Stream

IFA Default WM3

Comments

Project

Site

Classified by

Name:
Tickner, Victoria
Date:
07/07/2015 15:17 UTC
Telephone:
01582 460018

Company:
Ian Farmer Associates
1A Baford Mill
Lower Luton Road
Harpenden
AL5 5BZ

Report

Created by: Tickner, Victoria
Created date: 07/07/2015 15:17 UTC

Job summary

Classification of sample: TP1[1]

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:
TP1[1]
Sample Depth:
0.2 m
Moisture content: **0%**
(dry weight correction)

EWC Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 0%, dry weight correction)

arsenic trioxide: (Cation conc. entered: 13 mg/kg, converted to compound conc.:17.164 mg/kg or 0.00172%)
cadmium sulfide: (Cation conc. entered: 0.6 mg/kg, converted to compound conc.:0.771 mg/kg or 0.0000771%, Note 1 conc.: 0.00006%)
chromium(VI) oxide: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.923 mg/kg or <0.000192%) IGNORED Because: "<LOD"
copper (I) oxide: (Cation conc. entered: 18 mg/kg, converted to compound conc.:20.266 mg/kg or 0.00203%)
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 55 mg/kg, converted to compound conc.:83.05 mg/kg or 0.00831%, Note 1 conc.: 0.0055%)
mercury dichloride: (Cation conc. entered: 0.1 mg/kg, converted to compound conc.:0.135 mg/kg or 0.0000135%)
nickel dihydroxide: (Cation conc. entered: 15 mg/kg, converted to compound conc.:23.692 mg/kg or 0.00237%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<0.75 mg/kg or <0.000075%) IGNORED Because: "<LOD"
zinc chloride: (Cation conc. entered: 88 mg/kg, converted to compound conc.:183.438 mg/kg or 0.0183%)
pH: (Whole conc. entered as: 6.7 pH, converted to conc.:6.7 pH or 6.7 pH)
diesel petroleum group: (Whole conc. entered as: <10 mg/kg or <0.001%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "copper (I) oxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "mercury dichloride"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "zinc chloride"

Note 1 , used on:

Test: "HP 5 on STOT SE 1; H370, STOT RE 1; H372" for determinand: "cadmium sulfide"
Test: "HP 5 on STOT SE 2; H371, STOT RE 2; H373" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H302" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H332" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 7 on Carc. 1B; H350, Carc. 1A; H350, Carc. 1B; H350i, Carc. 1A; H350i" for determinand: "cadmium sulfide"
Test: "HP 7 on Carc. 2; H351" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 1A; H360, Repr. 1B; H360, Repr. 1B; H360F, Repr. 1A; H360F, Repr. 1A; H360D, Repr. 1B; H360D, Repr. 1B; H360FD, Repr. 1A; H360FD, Repr. 1A; H360Fd, Repr. 1B; H360Fd, Repr. 1B; H360Df, Repr. 1A; H360Df" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 2; H361, Repr. 2; H361f, Repr. 2; H361d, Repr. 2; H361fd" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 11 on Muta. 2; H341" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "cadmium sulfide"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Classification of sample: TP1[2]

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:
TP1[2]
Sample Depth:
1.5 m
Moisture content: **0%**
(dry weight correction)

EWC Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 0%, dry weight correction)

arsenic trioxide: (Cation conc. entered: 8.6 mg/kg, converted to compound conc.:11.355 mg/kg or 0.00114%)
cadmium sulfide: (Cation conc. entered: 0.9 mg/kg, converted to compound conc.:1.157 mg/kg or 0.000116%, Note 1 conc.: 0.00009%)
chromium(VI) oxide: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.923 mg/kg or <0.000192%) IGNORED Because: "<LOD"
copper (I) oxide: (Cation conc. entered: 17 mg/kg, converted to compound conc.:19.14 mg/kg or 0.00191%)
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 21 mg/kg, converted to compound conc.:31.71 mg/kg or 0.00317%, Note 1 conc.: 0.0021%)
mercury dichloride: (Cation conc. entered: 0.06 mg/kg, converted to compound conc.:0.0812 mg/kg or 0.00000812%)
nickel dihydroxide: (Cation conc. entered: 27 mg/kg, converted to compound conc.:42.646 mg/kg or 0.00426%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<0.75 mg/kg or <0.000075%) IGNORED Because: "<LOD"
zinc chloride: (Cation conc. entered: 86 mg/kg, converted to compound conc.:179.269 mg/kg or 0.0179%)
pH: (Whole conc. entered as: 7.3 pH, converted to conc.:7.3 pH or 7.3 pH)
diesel petroleum group: (Whole conc. entered as: <10 mg/kg or <0.001%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "copper (I) oxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "mercury dichloride"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "zinc chloride"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Classification of sample: TP2

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:
TP2
Sample Depth:
0.25 m
Moisture content: **0%**
(dry weight correction)

EWC Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 0%, dry weight correction)

arsenic trioxide: (Cation conc. entered: 15 mg/kg, converted to compound conc.:19.805 mg/kg or 0.00198%)
cadmium sulfide: (Cation conc. entered: 0.6 mg/kg, converted to compound conc.:0.771 mg/kg or 0.0000771%, Note 1 conc.: 0.00006%)
chromium(VI) oxide: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.923 mg/kg or <0.000192%) IGNORED Because: "<LOD"
copper (I) oxide: (Cation conc. entered: 21 mg/kg, converted to compound conc.:23.644 mg/kg or 0.00236%)
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 44 mg/kg, converted to compound conc.:66.44 mg/kg or 0.00664%, Note 1 conc.: 0.0044%)
mercury dichloride: (Cation conc. entered: 0.1 mg/kg, converted to compound conc.:0.135 mg/kg or 0.0000135%)
nickel dihydroxide: (Cation conc. entered: 16 mg/kg, converted to compound conc.:25.272 mg/kg or 0.00253%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<0.75 mg/kg or <0.000075%) IGNORED Because: "<LOD"
zinc chloride: (Cation conc. entered: 82 mg/kg, converted to compound conc.:170.931 mg/kg or 0.0171%)
pH: (Whole conc. entered as: 6.8 pH, converted to conc.:6.8 pH or 6.8 pH)
diesel petroleum group: (Whole conc. entered as: <10 mg/kg or <0.001%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "copper (I) oxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "mercury dichloride"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "zinc chloride"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Classification of sample: TP2[1]

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:
TP2[1]
Sample Depth:
1.2 m
Moisture content: **0%**
(dry weight correction)

EWC Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 0%, dry weight correction)

arsenic trioxide: (Cation conc. entered: 11 mg/kg, converted to compound conc.:14.524 mg/kg or 0.00145%)
cadmium sulfide: (Cation conc. entered: 0.6 mg/kg, converted to compound conc.:0.771 mg/kg or 0.0000771%, Note 1 conc.: 0.00006%)
chromium(VI) oxide: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.923 mg/kg or <0.000192%) IGNORED Because: "<LOD"
copper (I) oxide: (Cation conc. entered: 16 mg/kg, converted to compound conc.:18.014 mg/kg or 0.0018%)
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 39 mg/kg, converted to compound conc.:58.89 mg/kg or 0.00589%, Note 1 conc.: 0.0039%)
mercury dichloride: (Cation conc. entered: 0.05 mg/kg, converted to compound conc.:0.0677 mg/kg or 0.00000677%)
nickel dihydroxide: (Cation conc. entered: 24 mg/kg, converted to compound conc.:37.908 mg/kg or 0.00379%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<0.75 mg/kg or <0.000075%) IGNORED Because: "<LOD"
zinc chloride: (Cation conc. entered: 78 mg/kg, converted to compound conc.:162.593 mg/kg or 0.0163%)
pH: (Whole conc. entered as: 7.3 pH, converted to conc.:7.3 pH or 7.3 pH)
diesel petroleum group: (Whole conc. entered as: <10 mg/kg or <0.001%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "copper (I) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "mercury dichloride"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc chloride"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Note 1 , used on:

Test: "HP 5 on STOT SE 1; H370, STOT RE 1; H372" for determinand: "cadmium sulfide"
Test: "HP 5 on STOT SE 2; H371, STOT RE 2; H373" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H302" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H332" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 7 on Carc. 1B; H350, Carc. 1A; H350, Carc. 1B; H350i, Carc. 1A; H350i" for determinand: "cadmium sulfide"
Test: "HP 7 on Carc. 2; H351" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 1A; H360, Repr. 1B; H360, Repr. 1B; H360F, Repr. 1A; H360F, Repr. 1A; H360D, Repr. 1B; H360D, Repr. 1B; H360FD, Repr. 1A; H360FD, Repr. 1A; H360Fd, Repr. 1B; H360Fd, Repr. 1B; H360Df, Repr. 1A; H360Df" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 2; H361, Repr. 2; H361f, Repr. 2; H361d, Repr. 2; H361fd" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 11 on Muta. 2; H341" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Classification of sample: TP3

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:
TP3
Sample Depth:
0.3 m
Moisture content: **0%**
(dry weight correction)

EWC Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 0%, dry weight correction)

arsenic trioxide: (Cation conc. entered: 15 mg/kg, converted to compound conc.:19.805 mg/kg or 0.00198%)
cadmium sulfide: (Cation conc. entered: 0.6 mg/kg, converted to compound conc.:0.771 mg/kg or 0.0000771%, Note 1 conc.: 0.00006%)
chromium(VI) oxide: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.923 mg/kg or <0.000192%) IGNORED Because: "<LOD"
copper (I) oxide: (Cation conc. entered: 15 mg/kg, converted to compound conc.:16.888 mg/kg or 0.00169%)
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 48 mg/kg, converted to compound conc.:72.48 mg/kg or 0.00725%, Note 1 conc.: 0.0048%)
mercury dichloride: (Cation conc. entered: 0.08 mg/kg, converted to compound conc.:0.108 mg/kg or 0.0000108%)
nickel dihydroxide: (Cation conc. entered: 13 mg/kg, converted to compound conc.:20.533 mg/kg or 0.00205%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<0.75 mg/kg or <0.000075%) IGNORED Because: "<LOD"
zinc chloride: (Cation conc. entered: 84 mg/kg, converted to compound conc.:175.1 mg/kg or 0.0175%)
pH: (Whole conc. entered as: 6.5 pH, converted to conc.:6.5 pH or 6.5 pH)
diesel petroleum group: (Whole conc. entered as: <10 mg/kg or <0.001%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "copper (I) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "mercury dichloride"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc chloride"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Classification of sample: TP3[1]

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:
TP3[1]
Sample Depth:
1 m
Moisture content: **0%**
(dry weight correction)

EWC Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 0%, dry weight correction)

arsenic trioxide: (Cation conc. entered: 7.3 mg/kg, converted to compound conc.:9.638 mg/kg or 0.000964%)
cadmium sulfide: (Cation conc. entered: 0.6 mg/kg, converted to compound conc.:0.771 mg/kg or 0.0000771%, Note 1 conc.: 0.00006%)
chromium(VI) oxide: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.923 mg/kg or <0.000192%) IGNORED Because: "<LOD"
copper (I) oxide: (Cation conc. entered: 16 mg/kg, converted to compound conc.:18.014 mg/kg or 0.0018%)
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 43 mg/kg, converted to compound conc.:64.93 mg/kg or 0.00649%, Note 1 conc.: 0.0043%)
mercury dichloride: (Cation conc. entered: <0.05 mg/kg, converted to compound conc.:<0.0677 mg/kg or <0.00000677%) IGNORED Because: "<LOD"
nickel dihydroxide: (Cation conc. entered: 15 mg/kg, converted to compound conc.:23.692 mg/kg or 0.00237%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<0.75 mg/kg or <0.000075%) IGNORED Because: "<LOD"
zinc chloride: (Cation conc. entered: 85 mg/kg, converted to compound conc.:177.184 mg/kg or 0.0177%)
pH: (Whole conc. entered as: 6.9 pH, converted to conc.:6.9 pH or 6.9 pH)
diesel petroleum group: (Whole conc. entered as: <10 mg/kg or <0.001%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5

"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "copper (I) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc chloride"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Classification of sample: TP4

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:
TP4
Sample Depth:
0.3 m
Moisture content: **0%**
(dry weight correction)

EWC Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 0%, dry weight correction)

arsenic trioxide: (Cation conc. entered: 8.6 mg/kg, converted to compound conc.:11.355 mg/kg or 0.00114%)
cadmium sulfide: (Cation conc. entered: 0.6 mg/kg, converted to compound conc.:0.771 mg/kg or 0.0000771%, Note 1 conc.: 0.00006%)
chromium(VI) oxide: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.923 mg/kg or <0.000192%) IGNORED Because: "<LOD"
copper (I) oxide: (Cation conc. entered: 12 mg/kg, converted to compound conc.:13.511 mg/kg or 0.00135%)
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 30 mg/kg, converted to compound conc.:45.3 mg/kg or 0.00453%, Note 1 conc.: 0.003%)
mercury dichloride: (Cation conc. entered: 0.05 mg/kg, converted to compound conc.:0.0677 mg/kg or 0.00000677%)
nickel dihydroxide: (Cation conc. entered: 19 mg/kg, converted to compound conc.:30.01 mg/kg or 0.003%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<0.75 mg/kg or <0.000075%) IGNORED Because: "<LOD"
zinc chloride: (Cation conc. entered: 86 mg/kg, converted to compound conc.:179.269 mg/kg or 0.0179%)
pH: (Whole conc. entered as: 6 pH, converted to conc.:6 pH or 6 pH)
diesel petroleum group: (Whole conc. entered as: <10 mg/kg or <0.001%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "copper (I) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "mercury dichloride"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc chloride"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Note 1 , used on:

Test: "HP 5 on STOT SE 1; H370, STOT RE 1; H372" for determinand: "cadmium sulfide"
Test: "HP 5 on STOT SE 2; H371, STOT RE 2; H373" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H302" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H332" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 7 on Carc. 1B; H350, Carc. 1A; H350, Carc. 1B; H350i, Carc. 1A; H350i" for determinand: "cadmium sulfide"
Test: "HP 7 on Carc. 2; H351" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 1A; H360, Repr. 1B; H360, Repr. 1B; H360F, Repr. 1A; H360F, Repr. 1A; H360D, Repr. 1B; H360D, Repr. 1B; H360FD, Repr. 1A; H360FD, Repr. 1A; H360Fd, Repr. 1B; H360Fd, Repr. 1B; H360Df, Repr. 1A; H360Df" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 2; H361, Repr. 2; H361f, Repr. 2; H361d, Repr. 2; H361fd" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 11 on Muta. 2; H341" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Classification of sample: TP4[1]

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:
TP4[1]
Sample Depth:
1 m
Moisture content: **0%**
(dry weight correction)

EWC Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 0%, dry weight correction)

arsenic trioxide: (Cation conc. entered: 8.6 mg/kg, converted to compound conc.:11.355 mg/kg or 0.00114%)
cadmium sulfide: (Cation conc. entered: 0.5 mg/kg, converted to compound conc.:0.643 mg/kg or 0.0000643%, Note 1 conc.: 0.00005%)
chromium(VI) oxide: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.923 mg/kg or <0.000192%) IGNORED Because: "<LOD"
copper (I) oxide: (Cation conc. entered: 17 mg/kg, converted to compound conc.:19.14 mg/kg or 0.00191%)
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 29 mg/kg, converted to compound conc.:43.79 mg/kg or 0.00438%, Note 1 conc.: 0.0029%)
mercury dichloride: (Cation conc. entered: 0.06 mg/kg, converted to compound conc.:0.0812 mg/kg or 0.00000812%)
nickel dihydroxide: (Cation conc. entered: 22 mg/kg, converted to compound conc.:34.749 mg/kg or 0.00347%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<0.75 mg/kg or <0.000075%) IGNORED Because: "<LOD"
zinc chloride: (Cation conc. entered: 72 mg/kg, converted to compound conc.:150.086 mg/kg or 0.015%)
pH: (Whole conc. entered as: 6.1 pH, converted to conc.:6.1 pH or 6.1 pH)
diesel petroleum group: (Whole conc. entered as: <10 mg/kg or <0.001%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "copper (I) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "mercury dichloride"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc chloride"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Appendix A: Classifier defined and non CLP determinands

pH

Comments: Appendix C, C4.5
Data source: WM2 - Interpretation of the definition and classification of hazardous waste (Second Edition, version2.2), Environment Agency
Data source date: 30/05/2008
Risk Phrases: None.
Hazard Statements: None.

diesel petroleum group

Comments: Risk phrase data given in table A3, page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Risk Phrases: R40, R51/53, R65, R66
Hazard Statements: Flam. Liq. 3; H226, Skin Irrit. 2; H315, Acute Tox. 4; H332, Carc. 2; H351, Asp. Tox. 1; H304, STOT RE 2; H373, Aquatic Chronic 2; H411

acenaphthene (CAS Number: 83-32-9)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=133563&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: R36, R37, R38, N; R50/53, N; R51/53
Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Aquatic Chronic 2; H411

acenaphthylene (CAS Number: 208-96-8)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=59285&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: R22, R26, R27, R36, R37, R38
Hazard Statements: Acute Tox. 4; H302, Acute Tox. 1; H330, Acute Tox. 1; H310, Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315

anthracene (CAS Number: 120-12-7)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=101102&HarmOnly=no
Data source date: 08/03/2013
Risk Phrases: R36, R37, R38, R43, N; R50/53
Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

benzo[ghi]perylene (CAS Number: 191-24-2)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=15793&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: N; R50/53
Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410

fluoranthene (CAS Number: 206-44-0)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=56375&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: R20, R22, R36, N; R50/53
Hazard Statements: Acute Tox. 4; H302, Acute Tox. 4; H332, Eye Irrit. 2; H319, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

fluorene (CAS Number: 86-73-7)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=81845&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: N; R50/53, R53
Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Aquatic Chronic 4; H413

indeno[123-cd]pyrene (CAS Number: 193-39-5)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=128806&HarmOnly=no
Data source date: 08/03/2013
Risk Phrases: R40
Hazard Statements: Carc. 2; H351

phenanthrene (CAS Number: 85-01-8)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=109754&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: R22, R36, R37, R38, R40, R43, N; R50/53
Hazard Statements: Acute Tox. 4; H302, Eye Irrit. 2; H319, STOT SE 3; H335, Carc. 2; H351, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Skin Irrit. 2; H315

pyrene (CAS Number: 129-00-0)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=87484&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: R23, N; R50/53
Hazard Statements: Acute Tox. 3; H331, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

Appendix B: Notes

C14: Step 5

from section: WM3: C14 in the document: "WM3 - Waste Classification"

"identify whether any individual ecotoxic substance is present at or above a cut-off value ..."

Note 1

from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"

"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note A

from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"

"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Appendix C: Version

Classification utilises the following:

- CLP Regulations - Regulation 1272/2008/EC of 16 December 2008
  REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
- 1st ATP - Regulation 790/2009/EC of 10 August 2009
  COMMISSION REGULATION (EC) No 790/2009 of 10 August 2009 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- 2nd ATP - Regulation 286/2011/EC of 10 March 2011
  COMMISSION REGULATION (EU) No 286/2011 of 10 March 2011 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- 3rd ATP - Regulation 618/2012/EU of 10 July 2012
  COMMISSION REGULATION (EU) No 618/2012 of 10 July 2012 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- 4th ATP - Regulation 487/2013/EU of 8 May 2013
  COMMISSION REGULATION (EU) No 487/2013 of 8 May 2013 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
  COMMISSION REGULATION (EU) No 758/2013 of 7 August 2013 correcting Annex VI to Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- 5th ATP - Regulation 944/2013/EU of 2 October 2013
  COMMISSION REGULATION (EU) No 944/2013 of 2 October 2013 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- 6th ATP - Regulation 605/2014/EU of 5 June 2014
  COMMISSION REGULATION (EU) No 605/2014 of 5 June 2014 amending, for the purposes of introducing hazard and precautionary statements in the Croatian language and its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
  COMMISSION REGULATION (EU) No 1357/2014 of 18 December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives
- Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
  COMMISSION DECISION of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council (2014/955/EU)
- WM3 - Waste Classification - May 2015
  Technical Guidance WM3 - Guidance on the classification and assessment of waste (1st edition 2015)
- POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
  REGULATION (EC) No 850/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC
- 1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
  COMMISSION REGULATION (EU) No 756/2010 of 24 August 2010 amending Regulation (EC) No 850/2004 of the European Parliament and of the Council on persistent organic pollutants as regards Annexes IV and V
- 2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010
  COMMISSION REGULATION (EU) No 757/2010 of 24 August 2010 amending Regulation (EC) No 850/2004 of the European Parliament and of the Council on persistent organic pollutants as regards Annexes I and III

HazWasteOnline Engine: WM3 1st Edition, May 2015
HazWasteOnline Engine Version: 2015.169.2852.5804 (18 Jun 2015)
HazWasteOnline Database: 2015.169.2852.5804 (18 Jun 2015)

APPENDIX 5

DESIGN CONSIDERATIONS

Aggressive Chemical Environment for Concrete (ACEC) classification for natural ground locations

Sulphate				Groundwater		
Design Sulphate Class for location	**2:1 water/soil extract[b]**	**Groundwater**	**Total potential sulphate[c]**	**Static water**	**Mobile water**	**ACEC class for location**
	(SO_4 mg/l)	**(SO_4mg/l**	**(SO_4 %)**	**(pH)**	**(pH)**	
DS-1	<500	<400	0.24	≥2.5		AC-1s
					>5.5[d]	AC-1[d]
					2.5-5.5	AC-2z
DS-2	500-1500	400-1400	0.24-0.6	>3.5		AC-1s
					>5.5	AC-2
				2.5-3.5		AC-2s
					2.5-5.5	AC-3z
DS-3	1600-3000	1500-3000	0.7-1.2	>3.5		AC-2s
					>5.5	AC-3
				2.5-3.5		AC-3s
					2.5-5.5	AC-4
DS-4	3100-6000	3100-6000	1.3-2.4	>3.5		AC-3s
					>5.5	AC-4
				2.5-3.5		AC-4s
					2.5-5.5	AC-5
DC5	>6000	>6000	>2.4	>3.5		AC-4s
				2.5-3.5	≥2.5	AC-5

Notes

a Applies to locations on sites that comprise either undisturbed ground that is in its natural state (ie is not brownfield) or clean fill derived from such ground.

b The limits of Design Sulphate Classes based on 2:1 water/soil extracts have been lowered relative to previous Digests

c Applies only to locations where concrete will be exposed to sulphate ions (SO_4) which may result from the oxidation of sulfides (eg pyrite) following ground disturbance

d For flowing water that is potentially aggressive to concrete owing to high purity or an aggressive carbon dioxide level greater than 15 mg/l, increase the ACEC Class to AC-2z.

Explanation of suffix symbols to ACEC Class

- Suffix ‘s’ indicates that the water has been classified as static
- Concrete placed in ACEC Classes that include the suffix ‘z’ primarily have to resist acid conditions and may be made with any of the cements or combinations listed in Digest

APPENDIX 6

CONTAMINATION ASSESSMENT

APPENDIX 6

GENERAL NOTES ON CONTAMINATION ASSESSMENT

A6.1 STATUTORY FRAMEWORK AND DEFINITIONS

A6.1.1 The statutory definition of contaminated land is defined in the Environmental Protection Act 1990, ref. 10.14, which was introduced by the Environment Act 1995, ref. 10.15;

'Land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that –

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) pollution of controlled waters is being, or is likely to be, caused.'

A6.1.2 The UK guidance on the assessment of contaminated has developed as a direct result of the introduction of these two Acts. The technical guidance supporting the new legislation has been summarised in a number of key documents collectively known as the Contaminated Land Reports (CLRs), a proposed series of twelve documents. Seven were originally published in March 1994, four more were published in April 2002, while the last remaining guidance document, CLR 11, ref. 10.22 was published in 2004. In 2008 CLR reports 7 to 10 were withdrawn by DEFRA and the Environment Agency and updated version of CLR 9 and 10 were produced in the form of Science Reports SR2, ref. 10.25 and SR3, ref. 10.26.

A6.1.3 In establishing whether a site fulfils the statutory definition of 'contaminated land' it is necessary to identify, whether a pollutant linkage exists in respect of the land in question and whether the pollutant linkage:

- is resulting in significant harm being caused to the receptor in the pollutant linkage,
- presents a significant possibility of significant harm being caused to that receptor,
- is resulting in the pollution of the controlled waters which constitute the receptor, or
- is likely to result in such pollution.

A6.1.4 A *'pollutant linkage'* may be defined as the link between a contaminant *'source'* and a *'receptor'* by means of a *'pathway'*.

A6.2 ASSESSMENT METHODOLOGY

A6.2.1 The guidance proposes a four-stage assessment process for identifying potential pollutant linkages on a site. These stages are set out in the table below:

No.	Process	Description
1	Hazard Identification	Establishing contaminant sources, pathways and receptors (the conceptual model).
2	Hazard Assessment	Analysing the potential for unacceptable risks (what linkages could be present, what could be the effects).
3	Risk Estimation	Trying to establish the magnitude and probability of the possible consequences (what degree of harm might result and to what receptors, and how likely is it).
4	Risk Evaluation	Deciding whether the risk is unacceptable.

A6.2.2 Stages 1 and 2 develop a *'conceptual model'* based upon information collated from desk based studies, and frequently a walkover of the site. The walkover survey should be conducted in general accordance with CLR 2, ref. 10.27. The formation of a conceptual model is an iterative process and as such, it should be updated and refined throughout each stage of the project to reflect any additional information obtained.

A6.2.3 The extent of the desk studies and enquiries to be conducted should be in general accordance with CLR 3, ref. 10.28. The information from these enquiries is presented in a desk study report with recommendations, if necessary, for further work based upon the conceptual model. CLR 8, ref. 10.29, together with specific DoE 'Industry Profiles' provides guidance on the nature of contaminants relating to specific industrial processes. Although CLR 8 has been withdrawn, no replacement guidance has been published that lists the contaminants likely to be present on contaminated sites and as such the guidance relating to this issue of CLR 8 is considered to still be relevant.

A6.2.4 If potential pollutant linkages are identified within the conceptual model, a Phase 2 site investigation and report will be recommended. The investigation should be planned in general accordance with CLR 4, ref. 10.1. The number of exploratory holes and samples collected for analysis should be consistent with the size of the site and the level of risk envisaged. This will enable a contamination risk assessment to be conducted, at which point the conceptual model can be updated and relevant pollutant linkages can be identified.

A6.2.5 A two-stage investigation may be more appropriate where time constraints are less of an issue. The first stage investigation being conducted as an initial assessment for the presence of potential sources, a second being a more refined investigation to delineate wherever possible the extent of the identified contamination.

A6.2.6 All site works should be in general accordance with the British Standards, BS 5930:1999, ref. 10.3, ISO 1997, ref. 10.4 and BS 10175:2001, ref. 10.2.

A6.2.7 The generic contamination risk assessment screens the results of the chemical analysis against generic guidance values which are dependent on the proposed end-use of the development.

A6.2.8 The end-use may be defined as one of the following ref. 10.30;

- Residential with homegrown produce – domestic low rise and low density housing with gardens where vegetable may be grown for home consumption
- Residential without homegrown produce – domestic low density and low density housing where no gardens are present.
- Allotments – specific areas where vegetables are grown for home consumption.
- Public open space in close proximity to residential housing – includes the predominantly grassed area adjacent to high density housing and the central green area around which houses are developed. This land-use includes the

smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soil with planting.

- Public open space in use as general parkland – provided for recreational use and may be used for family visits and picnics, children's play area, sports grounds and dig walking.

- Commercial – industrial premises where there is limited exposure to soil.

A6.2.9 Exposure pathways for each type of end-use are given below:

Standard Land Use	**Oral Routes**			**Dermal Routes**		**Inhalation Routes**			
	Direct soil & dust ingestion	**Consumption of homegrown produce**	**Soil attached to homegrown produce**	**Indoor**	**Outdoor**	**Indoor dust**	**Outdoor dust**	**Indoor vapour**	**Outdoor vapour**
Residential with homegrown produce	✓	✓	✓	✓	✓	✓	✓	✓	✓
Residential without homegrown produce	✓	X	X	✓	✓	✓	✓	✓	✓
Allotments	✓	✓	✓	X	✓	X	✓	✓	✓
Public open space – adjacent to dwellings	✓	X	X	✓	✓	✓	✓	X	✓
Public open space – parkland	✓	X	X	X	✓	X	✓	X	✓
Commercial	✓	X	X	✓	X	✓	X	✓	X

A6.2.10 Soils will be compared to Suitable 4 Use Levels (S4ULs) published by LQM ref. 10.16 Assessment Criteria. Where no S4UL is available, the assessment criteria (AC) are generated using the Contaminated Land Exposure Assessment (CLEA) Software Version 1.06, ref. 10.31. Toxicological and physico-chemical/fate and transport data used to generate the AC has been derived from a hierarchy of data sources as follows:

1. Environment Agency or Department of Environment Food and Rural Affairs

   (DEFRA) documents;

2. Other documents produced by UK Government or state organisations;

3. European institution documents;

4. International organisation documents;

5. Foreign government institutions.

A6.2.11 In the case of the majority of contaminants considered, the toxicological data has been drawn from the relevant CLR 9 TOX report, or updated toxicological data published by the Environment Agency (2009), ref. 10.32, where available. Where no TOX report is available reference has been made to the health criteria values, derived for use in Land Quality Press (2006), ref. 10.33, as this is considered to represent a peer reviewed data source. Similarly, fate and transport data has been derived in the first instance from

Environment Agency (2003), ref. 10.34 and for contaminants not considered in this document the fate and transport data used in previous versions of the CLEA model has been used.

A6.2.12 Chemical laboratory test results are processed as follows. A statistical analysis of the results is conducted, as detailed in CIEH and CL:AIRE 'Guidance on Comparing Soil Contamination Data with a Critical Concentration', ref. 10.31. Individual concentrations are compared to the selected guideline values to identify concentrations of contaminants that are above the selected screening criteria.

A6.2.13 Initially the distribution of the data set is to determine if the data set is, or is not, normally distributed. Where the distribution of the data is shown to be normal, the mean value test is applied to determine whether the mean characteristics of the selected soil unit present a significant possibility of significant harm to human health. Where the data is not normally distributed a method based on the Chebychev Theorem can be applied to test the same hypothesis. The significance of the data is further tested using the maximum value test. This determines whether the highest recorded contaminant concentrations are from the same statistical distribution or whether they may represent a 'hot spot'.

A6.2.14 Where the risk estimation identifies significant concentrations of one or more contaminants, a further risk evaluation needs to be undertaken.

A6.2.15 The risk evaluation will address the potential pollutant linkages between an identified source of contamination and the likely receptors both on and off site.

A6.2.16 The potential receptors include:

1) Humans – current site occupants, construction workers, future site users and neighbouring site users.

2) Controlled Waters – surface water and groundwater resources

3) Plants – current and future site vegetation

4) Building materials

A6.2.17 The potential hazards to be considered in relation to contamination are:

a) Ingestion and inhalation.

b) Uptake of contaminants via cultivated vegetables.

c) Dermal contact

d) Phytotoxicity (the prevention or inhibition of plant growth)

e) Contamination of water resources

f) Chemical attack on building materials and services

g) Fire and explosion

A6.2.18 Dependent on the outcome of the initial, generic contamination risk assessment, further detailed assessment of the identified risks may be required.

A6.3 Generic Guidance Values Used Within Contamination Risk Assessment

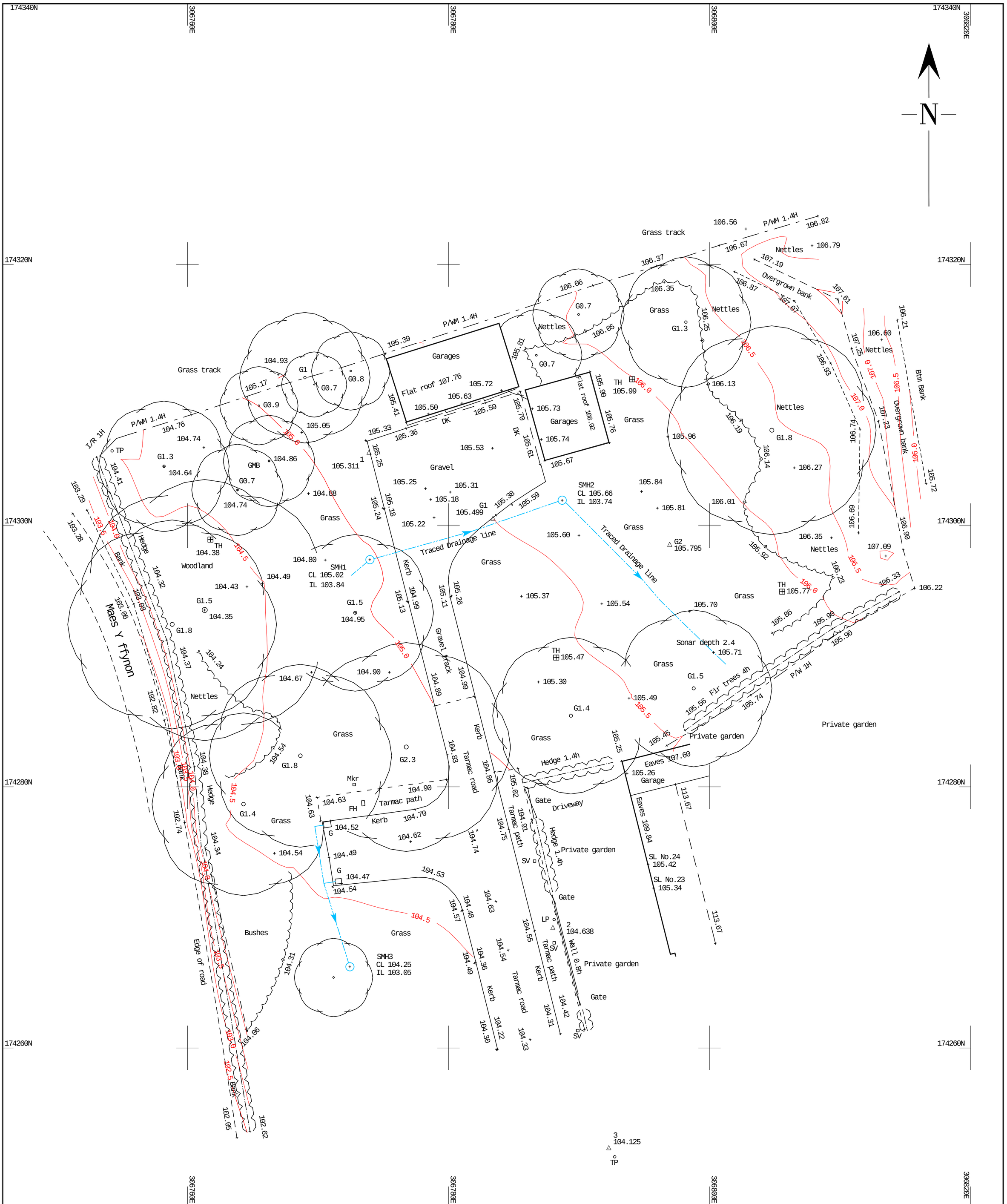
Residential End Use with Homegrown Produce

Residential with Homegrown Produce	Determinant	Guidance Value (mg/kg)	Guidance Value (mg/kg)	Primary Data Source
		1% SOM	2.5% SOM	
PAH	Acenaphthene	210	510	LQM/CIEH S4UL
	Acenaphthylene	170	420	LQM/CIEH S4UL
	Anthracene	2400	5400	LQM/CIEH S4UL
	Benzo(a)anthracene	7.2	11	LQM/CIEH S4UL
	Benzo(a)pyrene	2.2	2.7	LQM/CIEH S4UL
	Benzo(b)fluoranthene	2.3	3.3	LQM/CIEH S4UL
	Benzo(ghi)perylene	320	340	LQM/CIEH S4UL
	Benzo(k)fluoranthene	77	93	LQM/CIEH S4UL
	Chrysene	15	22	LQM/CIEH S4UL
	Dibenzo(ah)anthracene	0.24	0.28	LQM/CIEH S4UL
	Fluoranthene	280	560	LQM/CIEH S4UL
	Fluorene	170	400	LQM/CIEH S4UL
	Indeno(123-cd)pyrene	27	36	LQM/CIEH S4UL
	Naphthalene	2.3	5.6	LQM/CIEH S4UL
	Phenanthrene	95	220	LQM/CIEH S4UL
	Pyrene	620	1200	LQM/CIEH S4UL
Other Organics	Phenol	280	550	LQM/CIEH S4UL
Metals	Arsenic	37	37	LQM/CIEH S4UL
	Beryllium	1.7	1.7	LQM/CIEH S4UL
	Boron	290	290	LQM/CIEH S4UL
	Cadmium	11	11	LQM/CIEH S4UL
	Chromium (III)	910	910	LQM/CIEH S4UL
	Chromium (VI)	21	21	LQM/CIEH S4UL
	Copper	2400	2400	LQM/CIEH S4UL
	Lead	200	200	LQM/CIEH S4UL
	Mercury	1.2	1.2	LQM/CIEH S4UL
	Nickel	180	180	LQM/CIEH S4UL
	Selenium	250	250	LQM/CIEH S4UL
	Vanadium	410	410	LQM/CIEH S4UL
	Zinc	3700	3700	LQM/CIEH S4UL

Residential with Homegrown Produce	Guidance Value (mg/kg)	Guidance Value (mg/kg)	Primary Data Source
	1% SOM	2.5% SOM	
Aliphatic			
EC 5-6	42	78	LQM/CIEH S4UL
EC >6-8	100	230	LQM/CIEH S4UL
EC >8-10	27	65	LQM/CIEH S4UL
EC >10-12	130 (48)	330 (118)	LQM/CIEH S4UL
EC >12-16	1100 (24)	2400 (59)	LQM/CIEH S4UL
EC >16-35	65000 (8.48)	92000 (21)	LQM/CIEH S4UL
EC >35-44	65000 (8.48)	92000 (21)	LQM/CIEH S4UL
Aromatic			
EC 5-7 (benzene)	70	140	LQM/CIEH S4UL
EC >7-8 (toluene)	130	290	LQM/CIEH S4UL
EC >8-10	34	83	LQM/CIEH S4UL
EC >10-12	74	180	LQM/CIEH S4UL
EC >12-16	140	330	LQM/CIEH S4UL
EC >16-21	260	540	LQM/CIEH S4UL
EC >21-35	1100	1500	LQM/CIEH S4UL
EC >35-44	1100	1500	LQM/CIEH S4UL
Aliphatic and Aromatic			
EC >44-70	1600	1800	LQM/CIEH S4UL
BTEX			
Benzene	0.087	0.17	LQM/CIEH S4UL
Toluene	130	290	LQM/CIEH S4UL
Ethylbenzene	47	110	LQM/CIEH S4UL
m/p Xylenes	56	130	LQM/CIEH S4UL
o Xylene	60	140	LQM/CIEH S4UL

SOM = Soil Organic Matter

Values in brackets indicate the solubility or vapour saturation limit where this is exceeded by the GAC



Sheet Layout

One Sheet Only

Rev.	By	Date	Description of update

Station coordinates

Station	Easting	Northing	Level
1	306773.903	174305.565	105.311
2	306787.994	174269.168	104.638
3	306792.281	174252.301	104.125
G1	306783.409	174300.508	105.499
G2	306796.943	174298.517	105.795
G3	306794.156	174225.799	103.217

Garages at Maes y ffynon, Bonvilston, Cardiff

Topographic Survey

Catling's Land Surveys
A Passion for Mapping.
47 Heol Las, Ynysmeudwy, Pontardawe, Swansea, SA8 4PR
Tel / Mobile 07790 588323
email: adrian@catlingslandsurveys.co.uk

ABBREVIATIONS

AV	–	Air valve
B	–	Bollard
BB	–	Belisha beacon
BH	–	Bore hole
BM	–	Site bench mark
BT	–	British telecom
B/W	–	Barbed wire fence
CAM	–	Camera
CB	–	Phone box
CDP	–	Cable draw pit
CL	–	Cover level
Conc	–	Concrete
C/B	–	Closed board fence
C/I	–	Corrugated fence
DP	–	Down pipe
DK	–	Drop kerb
EIC	–	Electric cover
EL	–	Eaves level
EP	–	Electricity pole
ER	–	Earthing rod
FL	–	Floor level
FH	–	Fire hydrant
FP	–	Flag pole
G	–	Gulley
G1.2	–	Tree girth (m)
GV	–	Gas valve
IC	–	Inspection cover
IL	–	Invert Level
I/R	–	Iron Railings
JB	–	Junction box
KO	–	Kerb outlet
LB	–	Letter box
LP	–	Lamp post
Mkr	–	Utility marker
MP	–	Mile post
OSBM	–	Ordnance Survey bench mark
O/B	–	Open board fence
P	–	Post
PS	–	Paving
P/R	–	Post/rail fence
P/W	–	Post/wire fence
RE	–	Rodding eye
RL	–	Ridge Level
RS	–	Road Sign
SAP	–	Sapling
SC	–	Stop Cock
SE	–	Service entry Pt
SL	–	Step Level
SOF	–	Soffit level
SP	–	Sign Post
SV	–	Stop Valve
TAC	–	Tactile Paving
TH	–	Trial Hole
T.O.W	–	Top of Wall
TP	–	Telegraph Pole
TS	–	Traffic signal
TSC	–	Traffic signal cover
TV	–	Cable television
UTL	–	Unable To Lift
VP	–	Vent Pipe
WL	–	Water Level
WM	–	Water Meter
△	–	Survey Station
ø	–	Pipe Diameter(m)

LINE TYPES

Building
Kerbs, Walls
Fences
Iron railings
Top of banks
Bottom of banks
Hedges
Overhead Wires —T— —E—
Change of surface — — — —

Survey Details

1. OS grid & datum by GPS
2. North arrow indicates approximate North.
3. Scale factor 1.0000000
4. Contour interval 0.50m

Scale: 1:200 at A2
Drawing No. 15–523/200A2/1.1
Date: June 2015

CLS Job No. 15–523
Surveyor: Adrian Catling
Checked: Adrian Catling

CLIENT

Vale of Glamorgan Council