

Appendix G.3: East MRT Phase 2 Ground Conditions Assessment

East Reading Mass Rapid Transit Scheme

Phase 2 Ground Condition Assessment

On behalf of
Reading Borough Council
Highways and Transport Department

Project Ref: 28791/3501 | R002 | Rev: 1 | Date: June 2017



Document Control Sheet

Project Name: East Reading Mass Rapid Transit Scheme

Project Ref: 28791/3501

Report Title: Ground Investigation Report

Doc Ref: R002 / Rev1

Date: June 2017

	Name	Position	Signature	Date
Prepared by:	Arie Zamler	Principal Engineer	<i>A Zamler</i>	28/06/2017
Reviewed and Approved by:	Richard Thomas	Senior Consultant	<i>R H Thomas</i>	28/06/2017
For and on behalf of Peter Brett Associates LLP				

Revision	Date	Description	Prepared	Reviewed	Approved
Rev0	June 2017	Final for Issue	AZ	RHT	RHT
Rev1	June 2017	Minor amendments after Client Review	AZ	RHT	RHT

Peter Brett Associates LLP disclaims any responsibility to the Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence within the terms of the Contract with the Client and generally in accordance with the appropriate ACE Agreement and taking account of the manpower, resources, investigations and testing devoted to it by agreement with the Client. This report is confidential to the Client and Peter Brett Associates LLP accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

© Peter Brett Associates LLP 2017

Contents

Summary	1
1 Introduction	3
2 Site Description	4
2.1 Introduction	4
2.2 The Scheme	4
2.3 The Site Location.....	4
2.4 Site History	5
2.5 Current Land Use	5
2.6 Geology	6
2.7 Hydrogeology	6
2.8 Hydrology	7
2.9 Proposed Development.....	7
3 Ground Investigation	8
3.1 Introduction	8
3.2 Aim of the Investigation	8
3.3 Fieldwork	9
3.4 Laboratory Testing.....	9
3.5 In-situ Soil Screening.....	10
3.6 Monitoring.....	10
3.7 Limitations	10
4 Ground Conditions.....	11
4.1 Introduction	11
4.2 Made Ground.....	11
4.3 Alluvium	11
4.4 River Terrace Deposits.....	12
4.5 White Chalk	12
4.6 Groundwater.....	12
5 Geoenvironmental Conditions.....	14
5.1 Introduction	14
5.2 Screening - Volatile Organic Compounds	14
5.3 Contamination	14
5.4 Off Site Disposal.....	17
5.5 Ground Gases	18
6 Tier 2 Environmental Risk Assessment.....	19
6.1 Introduction	19
6.2 Hazard Identification.....	19
6.3 Pathways	20
6.4 Receptor Identification.....	20
6.5 Risk Estimation.....	21
6.6 Risk Evaluation.....	22

7	Outline Remediation and Mitigation Strategy	23
7.1	Introduction	23
7.2	Protection of Site Workers.....	23
7.3	Installation of Piles.....	23
7.4	Management of Unidentified Sources of Contamination	23
8	References	24
	Essential Guidance for Report Readers.....	26

Tables

- 1 Summary of Chemical Analysis of Soil Samples
- 2 Summary of Chemical Analysis of Water Samples

Figures

- 1 Site Location Plan
- 2 Scheme Layout Plan
- 3 Exploratory Hole Plan
- 4 Standard Penetration Tests
- 5 Plasticity Chart
- 6 Particle Size Distribution Analyses

Appendices

- 1 PBA Rationale for Selection of Criteria Used in Tier 2
- 2 A copy of the ESI CIEH Statistical Calculator
- 3 A copy of the TPH Hazard Index
- 4 A copy of the Hazwasteonline™ classification
- 5 PBA Methodology for Assessing Land Contamination in England
- 6 Table Summarising Pollution Linkages and Risk Estimation

Summary

This report presents an interpretation of the findings of the geoenvironmental investigation carried out to determine the ground conditions on a parcel of land (Zone D) forming part of the western section of the Proposed East Reading Mass Rapid Transit Scheme.

The ground investigation was carried out to determine the ground conditions, and the nature and extent of any existing contamination of the ground and groundwater on the site.

Site Location The East MRT Scheme is situated about 1.5 km to the northeast of Reading Town Centre. The proposed scheme is a new road link connecting Napier Road in the west to Thames Valley Park to the east. The overall site comprises a narrow corridor situated along the southern bank of the River Thames with a bridge over the River Kennet. The ground investigation was carried out on a parcel of land in the western part of the Scheme between the Tesco Superstore car park and the River Kennet, where there is a history of potentially contaminative land use.

Historical Land Use Previously the western part of the MRT Scheme site was raised with materials from unidentified sources and is defined by the Environment Agency as a historical landfill, and was used as railway land and fuel tanks. Subsequently, some of the western part of the site was redeveloped as part of the Tesco Superstore development. The eastern part of the proposed Scheme comprises principally undeveloped land.

Ground Conditions The ground conditions revealed by the investigations comprise Made Ground to between 1.5 and 2.20 m depth overlying Alluvium to between 2.5 and 3.9 m depth, River Terrace Deposits to between 5.4 and 8.0 m depth and Chalk a maximum investigated depth of 25 m. Groundwater level was measured between about 1.6 and 2.4 m depth with a hydraulic gradient in a general direction to the north-east towards the River Thames.

Geoenvironmental Conditions Olfactory and visual signs of unusual solids and liquids were not noted during the investigation. The measured concentrations of potential contaminants are below the selected assessment values appropriate for land uses as commercial development. The majority of the measured concentrations of potential groundwater contaminants are below the adopted screening criteria with the exception of copper, nickel, lead and zinc, and some individual Polycyclic Aromatic Hydrocarbons (PAHs). It is expected that the source of the elevated concentrations of metals and the individual PAHs in groundwater is the former offsite gas works situated up-gradient 150m (at its closest) south -west of the site rather than the Site itself, and this is not unexpected. The measured concentrations of ground gases indicate slightly elevated concentrations of carbon dioxide and methane, depleted oxygen concentrations and very low gas flows.

Tier 2 Geoenvironmental Risk Assessment A Tier 2 risk assessment was carried out to assess risks posed by the existing ground conditions to the proposed development is summarised in the following table.

Potential Receptor	Risk Assessment	Description
Future Site Users	Low	There is a Low hazard potential associated with measured concentrations of potential contaminants in the soils, therefore the potential risk to future site users associated with contamination is assessed to be Low.
Site Workers	Low	The risk to site workers is expected to be Low provided appropriate protective clothing and equipment are worn, and good standards of hygiene are adopted to prevent prolonged skin contact, inhalation and ingestion of soils.
Ground Waters	Low	

Potential Receptor	Risk Assessment	Description
Surface Waters	Low	Given the nature of the proposed development, the potential for any mobile contaminants to adversely affect the quality of ground and surface waters is considered to be Low provided that piles installed as part of the proposed scheme will be designed and installed in accordance with the Environment Agency guidance for piling in potentially contaminated sites.
Buildings	Low	Owing to the potential for low hazard potential for contaminants to be present in the ground, the risk to buildings and structures is expected to be Low.
Ecology	Very Low	Owing to the potential for low hazard potential for contaminants to be present in the ground, the risk to ecology is expected to be Very Low.

The geoenvironmental risk assessment indicates that any potential contaminants are not themselves likely to represent an unacceptable risk to human health, controlled waters or ecology and wildlife associated with the development of the Site as currently proposed.

It is considered that additional contaminated land investigation is not required to support the planning application for the proposed Scheme.

The summary contains an overview of the key findings and conclusions. However no reliance should be placed on any part of the summary until the whole of the report has been read.

1 Introduction

Peter Brett Associates LLP, PBA, has been retained by Reading Borough Council Highways and Transport Department, the Client, to carry out a geoenvironmental investigation and a Phase 2 Ground Condition Assessment for the proposed East Reading Mass Rapid Transit Scheme. The East MRT scheme comprises a proposed new bus, cycle and pedestrian link road connecting Napier Road to the west and Thames Valley Park to the east.

Previously, a desk study review of readily available published information was carried out to assess the ground conditions for the proposed Scheme and the potential for contamination to be present associated with previous and present land uses within the proposed Scheme and the surrounding areas. The report includes a Tier 1 qualitative assessment on the geoenvironmental conditions at the site. The findings of the study are presented in a separate report prepared Peter Brett Associates (PBA, 2017).

The desk study identified that the western part of the proposed Scheme had an industrial history with a number of industrial uses including a historical landfill, railway land, railway sheds, and large fuel tanks. By the 1990s the some of the Western Part of the proposed Scheme was redeveloped as part of the Tesco Superstore. The eastern part of the proposed Scheme comprises principally undeveloped land.

Given the level of risk and the relatively low sensitivity of the proposed end use it is considered that a ground investigation and Tier 2 risk assessment is not required to support the planning application for the Scheme and this can be dealt with post consent during the ground investigations for design purposes. However, it was recommended that a preliminary geoenvironmental ground investigation is carried out in Zone D. This is an area of embankment construction and piled foundations for structures, where the risk assessment has identified as moderate geoenvironmental risk associated with the historical landfill and railway land. The investigation should target in particular the potential impacts from the proposed scheme on the highly sensitive Controlled Waters in the adjacent Rives Thames and Kennet, and the aquifer beneath the site.

The intrusive ground investigation has been carried out principally to provide information on the ground conditions and the potential for contamination to be present. Basic geotechnical information was obtained also to assist with future design and construction of the scheme.

The fieldwork was carried out by Endeavour Drilling Limited acting under the technical direction of Peter Brett Associates LLP. The factual results of the investigation are presented in a separate report prepared by Endeavour Drilling Limited (EDL, 2017).

This Phase 2 Ground Condition Assessment presents an assessment of the ground conditions at the Site and immediate surrounding land and a Tier 2 qualitative geoenvironmental assessment of the risks and hazards associated with existing or potential contamination in the ground. In accordance with the requirements of the National Planning Policy Framework (DCLoG, 2012), the Tier 2 assessment has been carried out in accordance with "established procedures" using current UK best practice and guidance as given in British Standard 10175 (2013) and Contaminated Land Report 11 (EA, 2004).

This report will be submitted to Reading Borough Council to support the planning application for the proposed Scheme.

Attention is drawn to the Guidance Note included after the text of this report which provides guidance on the context of the report.

2 Site Description

2.1 Introduction

A summary of the Proposed Scheme and overall Site description including location, history, current use and geology are presented in the section below. Further details of the history and present layout of the Proposed Scheme are given in the desk study report prepared by PBA (2017).

2.2 The Scheme

The proposed Scheme is situated about 1.5 km to the northeast of Reading Town Centre. The Proposed Scheme comprises a narrow corridor about 1.2 km long along the line of a proposed new bus, cycle and pedestrian link road connecting Napier Road to the west and Thames Valley Park to the east along the southern bank of the River Thames with a bridge over the River Kennet.

A site location plan is presented as **Figure 1**.

For ease of reference the Scheme was divided in the desk study into seven zones along the narrow corridor as shown on **Figure 2**. The basic description from west to east along the corridor for each of the zones, is as follows:

- | | |
|---------------|---|
| Zone A | A narrow strip of land comprising carriageway, pavements, and associated landscaping along Napier Road leading to Tesco Superstore |
| Zone B | Mostly landscaping, and an access road forming part of Tesco Superstore |
| Zone C | Access roads and car parking areas serving Tesco Superstore and a narrow band of landscaping to the south |
| Zone D | A triangular parcel of land covered with dense vegetation, situated between Tesco Superstore car park and the River Kennet |
| Zone E | The River Kennet flowing from south-west under the Kings Mead railway bridge and the Horseshoe Footbridge to the north-east where it joins the River Thames |
| Zone F | A narrow strip of land situated immediately to the south of the River Thames and north of the Network Rail land |
| Zone G | A vacant parcel of land covered with scrub and dense vegetation to the west of the A3290 roundabout |

2.3 The Site Location

The Site is situated in Zone D of the Proposed Scheme. The Site comprises a triangular parcel of land about 140 m long and up to 90 m wide and is covered with dense vegetation including semi-mature and mature trees and shrubs. The Thames Towing Path is situated along the River Thames. In addition, a paved footpath crosses the Site connecting the Tesco Superstore car park and the Thames Path through the Site. The Site is centred at National Grid Reference SU 730 738.

The layout of the Site is shown on the Exploratory Hole Plan presented as **Figure 3**.

2.4 Site History

The history of the development of the whole scheme area including the Site and surrounding area has been obtained from a number of available historical Ordnance Survey (OS) maps presented in the desk study (PBA, 2017). A summary of the history of the Site is presented below.

Historically the Site was situated on the flood plain of the Rivers Thames and Kennet. The surrounding area was used for trade along the River Thames and the Kennet and Avon Canal.

According to available information in 1840 the railway line between Reading and London Paddington named The Great Western Railway was completed with a large embankment and a railway bridge crossing the River Kennet immediately to the south of the Site.

In the late 1870s, the Site was in a semi-rural setting to the north-east of the town of Reading. A ferry crossing is recorded across the River Kennet connecting the tow path along the River Thames. Railway sidings, the Great Western Railway embankment and a railway bridge over the River Kennet are recorded immediately to the south of the Site. A railway underpass is shown to cross the railway embankment connecting between the Huntley and Palmers Biscuit Factory and a large gasworks to the south of the railway embankment.

By early 1910s Zones B and C were occupied by railway sidings constructed on raised land. Subsequently, the map dated 1932 shows that the land in most of Zones B, C and D to be raised and occupied by railway sidings. A number of goods and gas coal sheds were constructed in Zones C and D. Electricity pylons with overhead cables crossed the Site orientated east to west.

The map dated 1956 shows that the majority of the railway sidings and the goods and gas coal sheds have been removed.

The maps dating from the early 1970s label Zones B and C as 'Depot'. Two bunded tanks and a rectangular shed appear in the north western part of Zone B with three larger bunded tanks to the north of the site. A 'wagon tippler', typically used to drop off coal loads from railway wagons, is recorded at the railway sidings.

By early 1980s the former Biscuit Factory and the majority of the former gasworks to the south of the railway embankment have been removed.

By the early 1990s Zones A, B and C are vacant with the former tanks and rail sidings having been removed. Subsequently, by the mid 1990s a Tesco Superstore was constructed to the north of the site and some of the associated car parking areas and access roads occupy Zones B and Zones C. A petrol station was constructed immediately to the north of Zone B.

By early 2000s a number of large pylons are recorded on the site with overhead cables shown to run from east to west parallel to the southern Site boundary.

By 2010, the warehouse that was situated immediately to the north of Zone A of the site was demolished and a number of blocks of flats named Luscinia View Development were constructed at this location.

2.5 Current Land Use

At the time of the investigation the Site was unoccupied and covered with dense vegetation including mature and semi mature trees and shrub. A paved footpath crosses the Site in a south-east to north-west direction, that allows public access from Tesco Superstore to the Thames Path. The footpath is demarcated by a metal fence barrier. The southern boundary of the site is fenced off by Network Rail. The northern extent of the Site is the Thames Path and the River Thames. The confluence of the River Thames and the River Kennet forms the eastern boundary of the Site.

The land to the south is occupied by Network Rail with a metal fence present along the boundary. The Tesco Superstore car park is segregated with a metal fence to the west of the Site. The River Thames and the River Kennet are present along the northern and eastern edges of the Site.

2.6 Geology

2.6.1 Geological Map

The 1:50 000 scale geological map of the area; Sheet 268 (BGS, 2000) indicates the Scheme lies on superficial deposits comprising Alluvium, and the Shepperton Gravel Member, a River Terrace Deposit. The Superficial Deposits are underlain by the Seaford Chalk Formation and the Newhaven Chalk Formation (undifferentiated) as part of the White Chalk Subgroup.

According to the lexicon of Named Rock Units of the British Geological Survey the Alluvium generally comprise silty clay with occasional layers of silt, sand, peat and gravel, whilst the Shepperton Gravel Member comprises primarily sand and gravel. The White Chalk Subgroup is described as white chalk with nodular and tabular flint seams and bands.

It is expected that locally Made Ground is present associated with current and past developments of the site.

2.6.2 Historical Borehole Records

The British Geological Survey archives contain records of a number of exploratory holes sunk during two ground investigations in 1986 and 1989 in the vicinity of the Scheme mainly associated with earlier proposals for a bridge over the River Kennet approximately on the alignment of the current scheme.

A summary of the ground conditions based on the historical borehole records in the vicinity of the Scheme is presented in the table below.

Table 2.1 Summary of typical depths and strata descriptions

Strata	Approximate Depth to base (m bgl)	Approximate thickness (m)	Typical Description
Made Ground	0.3 to 3.0 typically 1.0 to 2.5	0.3 to 3.0 typically 1.0 to 2.5	Variable composition, typically CLAY with fragments of brick, clinker, concrete, chalk and flint, locally with ash and organic matter
Alluvium	2.5 to 4.3 Typically about 3.5 to 4.0	0.2 to 3.7 typically about 2.0	CLAY and SILT locally peaty or organic with traces of decaying organic matter, flint gravel and shells. Locally with rare layers of peat (up to 2.1 m thick)
River Terrace Deposits	3.8 to >10.0 Typically about 6.0	0.6 to 6.8, Typically about 3.0	SAND and GRAVEL in variable proportion locally with a thin layer of clayey sandy silt
White Chalk Subgroup	> 25	> 20	White Chalk with flints. Recovered as remoulded chalk with fragments of weak chalk becoming rubbly and blocky with depth

Where recorded, groundwater strikes were recorded between 1.8 and 4.5 m below ground level and rose to between about 0.3 and 2.9 m below ground level.

2.7 Hydrogeology

The Shepperton Gravel Member and the Seaford and Newhaven Chalk Formations are classified as Principal Aquifers. Principal Aquifers are defined as formations that may be highly productive and able to support large abstractions for public supply and other purposes.

The Alluvium is classified as Secondary A Aquifer. This is a formation of variable permeability that, although seldom producing large quantities of water for abstraction, may be important for local supplies and in supplying base flow to rivers.

The proposed Scheme is located within a groundwater Source Protection Zone 3 for a groundwater abstraction well situated about 2.2 km to the south of the site. Groundwater source protection zones are

defined as the groundwater catchment zones for significant public water supply and private wells or boreholes that supply water to portable or equivalent standards. A total catchment (Zone 3) is defined by the Environment Agency as the area around a groundwater abstraction well within which groundwater recharge is presumed to provide water to the abstraction well.

The 1:100,000 Hydrogeological Map of South West Chilterns and the Berkshire and Marlborough Down (BGS, 1978) indicates the groundwater level in the Chalk in August 1976 is recorded at about 40 m AOD with the groundwater flowing in a general direction toward the River Thames.

It is expected that the groundwater in the Alluvium, River Terrace Deposits and the White Chalk Subgroup are in hydraulic continuity with the water in the adjacent rivers and groundwater level is at roughly at the same elevation.

The presence of a Principal Aquifer and a Secondary A Aquifer need to be considered in assessing the effects of the built development on the hydrogeological regime and the risk associated with potential pollutants with regards to both the aquifer as a water source for human consumption, and the potential impact on the adjacent rivers and their aquatic habitat.

2.8 Hydrology

The River Thames flows to the north of the Scheme in general direction to the north-east. The River Kennet crosses the centre of the Scheme flowing from south-west to the north-east where it joins with the River Thames.

The River Thames and the River Kennet are classified by the Environment Agency as a Primary River of Very Good and Good (Grades A and B) Biological and Chemical Quality, respectively.

The chemistry grade is assigned by averaging results for biochemical oxygen demand (BOD), ammonia and dissolved oxygen measured by the Environment Agency until 2009.

The presence of the adjacent rivers need to be considered in assessing the effects of the built development on the hydrogeological and hydrological regime and the risk associated with potential pollutants with regards to the adjacent rivers and their aquatic habitat.

2.9 Proposed Development

It is understood that Reading Borough Council is proposing to construct a new bus, cycle and pedestrian link road connecting Napier Road in the west and the A3290 roundabout in the east via a bridge crossing over the River Kennet. The proposed scheme comprises the construction of an approach road off Napier Road at grade, with an approach embankment leading to the bridge abutment with a 59 m span bridge over the River Kennet. The proposed road to the west of the River Kennet will be constructed on a viaduct to minimise the footprint of the proposed road over the flood plain of the River Thames. The road is proposed for the use of buses, with a cycleway and footpath alongside.

The proposed scheme will also comprise the extension of the Tesco Superstore Car park in Zone D, and realignment of the existing paved footpath in Zone D.

The proposed outline layout of the scheme is presented on **Figure 3**.

3 Ground Investigation

3.1 Introduction

The ground conditions on the Site have been investigated by an intrusive ground investigation to provide geoenvironmental information for the Scheme. The scope of works is summarised in the following sections of this report. The factual results of the investigation are presented in a separate report prepared by Endeavour Drilling Limited (EDL, 2017).

3.2 Aim of the Investigation

The desk study assessed the ground conditions on the site and the potential for contamination to be present associated with previous and present uses of the site and the surrounding areas (PBA, 2017). The potential for significant contamination to be present in the western part of the Scheme associated with its industrial history was assessed to be Moderate, whilst the potential for significant contamination in the eastern part of the Scheme was assessed to be Very Low with Low potential for localised contamination to be present.

The aim of the investigation was to target potential sources of contamination identified in the desk study in Zone D where the area was identified to have a Moderate potential for significant contamination to be present, and the proposed scheme comprises the construction of an embankment and a bridge as part of the Scheme.

The principal aims of the investigation were to determine:

- a) The nature and extent of potential contamination of the ground and groundwater in order to assess the potential impact of the proposed scheme.
- b) The hydrogeological characteristics of the ground to assess the potential for migration of potential contaminants in the area.
- c) Basic geotechnical information to assist with subsequent geotechnical design of the scheme.

With regard to the investigation for potential contamination of the ground, a non-targeted investigation strategy was adopted for the site. The exploratory holes were selected from consideration of the recommendations given in BS 10175 (2013) for exploratory investigations for sites with a potential for contamination to be present making allowance for the expected heterogeneous conditions on the site. Sampling depths were selected to ensure that representative material from the various strata encountered were recovered for laboratory testing to ensure that information on the distribution of potential contaminants in the soils could be determined.

To satisfy the aims of the investigation, the design of the ground investigation allowed for:

- a) The sinking of 3 boreholes to a depth of 8.45 m below the existing ground level using combination of continuous drive sampling and hollow stem auguring with recovery of cores to provide information on the ground conditions.
- b) The sinking of 3 window sample boreholes to between 1.4 and 3.0 m below ground level using hand held equipment.
- c) The installation of a monitoring well in each borehole to allow monitoring of ground gas concentrations and flows, and groundwater levels.
- d) The excavation of 4 trial pits to between 2.0 and 2.5 m below ground level to obtain information on the variation of the near surface ground conditions.
- e) The sampling of groundwater from each of the monitoring wells.

- f) The sampling of surface water from three selected locations along the River Thames and the River Kennet up and down stream of the Site.

3.3 Fieldwork

The fieldwork for the investigation was carried out between 13 and 15 March 2017.

On completion groundwater and ground gas monitoring wells were constructed in each borehole to allow monitoring of groundwater levels and ground gas concentrations in the near-surface soils. The installations were constructed with a 50 mm diameter well.

The installations in the boreholes were screened between 0.5 m to 6.0 m depth. The installations in the window sample boreholes were screened between 0.5 m and the base of the borehole.

The locations of the exploratory holes relative to the existing site layout are shown on **Figure 3**.

3.4 Laboratory Testing

Geochemical Laboratory Testing A programme of geochemical laboratory testing was carried out on 25 soil samples, 5 groundwater samples, and 3 surface water samples to determine the concentrations of a range of commonly occurring potential contaminants. In addition, Waste Acceptance Criteria (WAC) testing was carried out on 4 soil samples for waste disposal classification purposes.

A summary of the geoenvironmental testing carried out is presented in the table below.

Table 3.1 Summary of Geochemical Testing Suites

Testing Suite	Soil samples tested	Water samples tested
Metals	25	6
Inorganic Compounds	25	6
TPH - CWG (C5-35) Aliphatic/Aromatic Split	25	8
Speciated PAH – USEPA 16	25	8
Asbestos	25	-
Volatile Organic Compounds and semi Volatile Organic Compounds	5	-
WAC	4	-

The geochemical analyses were scheduled by PBA, and carried out by Derwentside Environmental Testing Services Ltd of Consett acting on behalf of Endeavour Drilling Ltd. The suites specified use methods that are accredited by MCERTS where available.

The results of the chemical analyses are presented in the factual report (EDL, 2017). A summary of the geochemical test results is discussed in **Section 5.0**.

Geotechnical Laboratory Testing A programme of geotechnical laboratory soils testing was carried out to verify the visual identification and classification, and to determine the physical properties of selected samples of the materials encountered.

The testing was scheduled by PBA, and carried out in accordance with BS 1377 (1990) by Professional Soils Limited, who hold UKAS accreditation for geotechnical soil testing, acting on behalf of Endeavour Drilling Ltd.

The results of the geotechnical testing are presented in the factual report (EDL, 2017). A summary of the geotechnical testing results is presented and discussed in **Section 4.0**.

3.5 In-situ Soil Screening

Volatile Organic Compounds Screening for the presence of Volatile Organic Compounds (VOCs) was carried out using a photo-ionisation detector (PID) at each exploratory hole location. The screening was carried out on the Topsoil, nominal 0.5 m intervals in Made Ground and in the upper 1.0 m of the underlying natural soils.

The PID screening is a qualitative method. The numerical output of which cannot be directly compared to measured soil concentrations of contaminants of concern. Nevertheless, PID readings are a useful field tool for assessing the potential presence of elevated VOCs in the soil.

3.6 Monitoring

The monitoring wells were monitored on three occasions between 23 March and 4 April 2017 on a one weekly basis to determine the water level and the concentrations of methane, carbon dioxide and oxygen together with gas flow rates and differential and atmospheric pressure.

3.7 Limitations

At the time of the investigation the Site was covered with dense vegetation limiting the access across the Site. Therefore, there may be conditions pertaining to the site which were not disclosed by the investigation and which therefore could not be taken into account in the interpretation of the conceptual ground model and in the assessment of the geoenvironmental conditions on the Site that are presented in the following **Sections 4.0 to 6.0** of this report.

4 Ground Conditions

4.1 Introduction

The ground conditions, as revealed by the ground investigation, are in general agreement with the published geological information and known history of the site and comprise locally Made Ground over the superficial deposits of Alluvium and River Terrace Deposits. The White Chalk was encountered in all the boreholes.

4.2 Made Ground

Description Made Ground was encountered at all the locations investigated and was found to comprise principally black, brown and grey SAND with variable proportions of ash and clay and gravel. The gravel size fractions comprised flint, and chalk, and fragments of brick, concrete, glass, clicker and rare cinder. Locally the Made Ground contained cobble size fragments of brick and concrete.

The Made Ground was found to be between 1.55 and 2.20 m deep.

Olfactory and visual signs of Contamination Olfactory and visual signs of unusual solids and liquids were not noted during the investigation.

Penetration Resistance Values of normalised (for hammer efficiency) penetration resistance SPT (N_{60}) determined by standard penetration testing are presented in **Figure 4**. The N_{60} values in the Made Ground are between 1 and 4 corresponding to very loose state in-situ.

4.3 Alluvium

Description Alluvium was encountered at all the locations where the Made Ground was fully penetrated. The Alluvium was typically found to comprise grey, blue, green and brown CLAY or SILT with sand particles and shell fragments. Locally the Alluvium contained rare flint gravel.

Typically, the Alluvium was found to be between about 0.9 and 1.7 m thick extending to between 2.5 and 3.9 m depth, corresponding to reduced levels of between about 32.4 and 35.6 m OD. At one historical borehole (SU77SW310) the Alluvium was found to be 0.2 m thick.

Classification Results of classification testing are presented on a Casagrande Plasticity Chart on **Figure 5**. The results of the classification testing indicate that the Alluvium is SILT (plotted below the A line) of extremely high plasticity with measured values of liquid and plastic limit respectively between 93% and 180%, and 49% and 91%, with corresponding plasticity indices of between 52% and 98%. The measured moisture content was recorded between 56% and 116%.

Results of particle size distribution analyses for the Alluvium is presented on **Figure 6** with measured fines fractions ($<63 \mu\text{m}$) between 39% and 82% by weight of which the clay sized fraction vary between 10% and 28%, and the silt fraction is between 28% and 54%. The sand size fraction is between 14% and 56% and the gravel fractions are below 5%.

The results are indicative that the Alluvium comprises extremely high plasticity silt with variable proportions of clay, sand, and locally little gravel.

Undrained Shear Strength Manual examination of the material indicates the clay and silt are typically very soft and soft in consistency.

The SPT normalised N_{60} in the Alluvium recorded values of 1 and 2, with a single value of zero indicative of the SPT hammer penetrated the soil under its own weight. Derived values of undrained shear strength determined using the empirical correlation with SPT N_{60} values (Stroud, 1989) using a factor N_c of 4.5, are below 10 kPa.

4.4 River Terrace Deposits

Description River Terrace Deposits were encountered at all the locations investigated where the Made Ground or the Alluvium were fully penetrated. The River Terrace Deposits were typically found to comprise brown and grey principally SAND and locally GRAVEL with little clay and silt. The gravel fraction was found to be fine to coarse angular to subrounded and composed of flint and rare chalk.

The River Terrace Deposits were found to be typically between about 1.5 and 3.6 m thick and locally in the historical borehole (SU77SW81) up to 4.9 m thick. The base of the River Terrace Deposits was encountered between about 5.4 and 8.0 m depth, corresponding to a reduced level of between about 29.5 and 31.9 m OD.

Classification Results of particle size distribution analyses for the River Terrace Deposits are presented on **Figure 5** and indicate the sand size fraction is between about 60% and 95% and the gravel sized fraction is up to about 30% by weight. The samples tested were found to contain fines fraction (<63 µm) of between about 5% and 10%.

Penetration Resistance Values of normalised penetration resistance SPT (N_{60}) value determined by standard penetration testing are presented as a plot against reduced level on **Figure 4**. The normalised N_{60} values were found to be variable between 8 and 59 corresponding to loose to very dense state in-situ. A higher value of 92 was recorded, it is expected that the higher value may have been affected by coarse gravel or cobble presenting an obstruction to the test.

4.5 White Chalk

Description The White Chalk was encountered underlying the River Terrace Deposits in all the boreholes sunk on Site.

The White Chalk was described as structureless CHALK recovered as off white slightly sandy, silty gravel. The gravel fragments were found to be fine to coarse gravel and rare cobbles of very weak and low density Chalk and rare nodules of flint. The White Chalk was classified as Grade Dc in accordance with CIRIA (2002) grading system. However, it should be noted that the drilling technique used is likely to have given rise to disturbance of Chalk within the sample tube remoulding structured Chalk to a structureless melange. Therefore, the Chalk grades reported in the Factual Report (EDL 2017) should not be used for Engineering design purposes unless confirmed by other investigatory techniques.

The White Chalk was encountered in an historical borehole situated in the near vicinity of the Site (SU377SW316) to the maximum investigated depth of 25.0 m below ground level corresponding to a reduced level of about 12.5 m OD.

Standard Penetration Test The normalised penetration resistance SPT (N_{60}) values typically increase with depth from less than 10 near the top surface of the Chalk at about 30m OD to greater than 50 below 25m OD.

4.6 Groundwater

The groundwater entries and measured groundwater levels are presented in the ground investigation report (EDL, 2017) and are discussed in this section of the report.

During the fieldwork, groundwater entries into the exploratory holes were recorded in the Made Ground, Alluvium and River Terrace Deposits at five locations between about 2.0 and 3.6 m depth. The water level rose by between 0.05 and 1.55 m within 20 minutes to between about 1.6 and 2.3 m depth.

On completion of the fieldwork recorded groundwater levels were found between about 1.6 and 2.4 m depth corresponding to reduced level of between about 34.5 and 35.5 m OD. The monitoring well installed in HP2A was found to be dry.

The levels are considered to be representative of the groundwater level in the time of the monitoring within the River Terrace Deposits. The groundwater levels indicate a general groundwater flow from

south-west to north-east towards the River Thames with a relatively gentle hydraulic gradient. It should be noted, however that higher groundwater levels may be present following periods of prolonged rainfall or flooding.

5 Geoenvironmental Conditions

5.1 Introduction

This section of the report discusses the measured concentrations of contaminants and assesses the geoenvironmental conditions on the site with respect to the proposed development and the environment from any hazards posed by these conditions.

5.2 Screening - Volatile Organic Compounds

Screening for the presence of Volatile Organic Compounds was carried out using a photo-ionisation detector (PID) at each exploratory hole location. The numerical output of PID cannot be directly compared to measured soil concentrations of contaminants of concern. Nevertheless, PID readings above 100 ppm are considered to be an indicative of potential presence of elevated Volatile Organic Compounds in the soil.

The PID readings were up to 0.4 ppm indicative that the soils screened do not contain elevated concentrations of Volatile Organic Compounds.

5.3 Contamination

5.3.1 Geochemical Testing

Geochemical testing was carried out on 25 samples of soil for a range of potential contaminants, together with carbon banding of total petroleum hydrocarbons (TPH), speciated determination of polynuclear aromatic hydrocarbons (PAH), and individual Volatile Organic Compounds (VOCs) and semi Volatile Organic Compounds (sVOCs). The results are summarised in Table 1.

Geochemical testing was also carried out on 5 samples of groundwater and 3 samples of surface water for a range of determinands and the results of the analysis are summarised in **Table 2**.

In addition, the waste acceptance criteria (WAC) of 4 samples of the near surface Made Ground have been determined to allow a preliminary determination of the waste classification of any material to be disposed of off-site as part of the proposed scheme.

Full results of the chemical analysis are presented in the factual report of the ground investigation (EDL, 2017).

5.3.2 Contamination Assessment Regime

Soils The results of the geochemical testing on the soil samples have been compared to the Category 4 Screening Levels (C4SL) for commercial land use prepared under the auspices of DEFRA (CLAIRE, 2014). Where a C4SL is not available the concentrations were compared against the Land Quality Management Ltd (LQM) Suitable 4 Use Levels (S4UL) for commercial land use (CIEH, 2015).

In addition, the additive effect of the hydrocarbon fractions is considered by calculating a hazard quotient for each carbon banding which is the concentration divided by the fraction S4UL criterion. All hazard quotients are added to give a Hazard Index for each sample assessed. A Hazard Index that exceeds 1 can be indicative of a potentially significant human health risk.

Full details of the selected assessment criteria are given in the note presented in **Appendix 1**.

Groundwater Under the EC Groundwater Daughter Directive the quality of groundwater is related to the potential to adversely impact the quality of surface waters and the potential for use as a water resource. On this basis the quality of groundwater has been assessed in relation to the directions to the Environment Agency in regard to the implementation of the Water Framework Directive (WFD) (DEFRA, 2010) and the UK drinking water quality standards (DETR, 2000). Full details of the assessment criteria are given in the guidance note included after the text of this report.

5.3.3 Assessment of Contamination

Soils

In general, the measured concentrations of potential contaminants, as summarised on **Table 1**, are below the selected assessment values appropriate for land use as commercial land use.

Metals Review of the metal concentrations tested, as summarised on Table 1, indicates that in general the measured concentration of metals are below the corresponding assessment values appropriate for commercial land use. The only exception comprises an elevated concentration of mercury recorded in a single location TP4 in the Made Ground at 1.0 m depth.

The mercury concentrations have been assessed using the ESI CIEH Statistics Calculator which compares the true mean of the sample population to the critical concentration of the dataset. The results of the statistical analysis indicate that there is a 97% confidence level that the true mean of the dataset is below the critical concentration. Anything above 95% confidence level is considered robust in this instance. The elevated mercury result recorded above is considered to be an outlier for Made Ground. As such, mercury has been ruled out as a potential hazard to the identified human health receptors over the site area.

A copy of the outputs of the ESI CIEH Statistical Calculator are presented in **Appendix 2**.

Review of the leachability testing carried out on 4 soil samples recorded mercury concentrations below the analytical detection limit. Furthermore, all the groundwater samples tested recorded mercury concentrations below the analytical detection limit. Furthermore, the surface water samples tested up and downstream from the site recorded concentrations below the analytical limit and the assessment criteria indicating that there is no significant impact in the adjacent rivers. Therefore, mercury is not considered to represent a potential hazard for groundwater or surface waters.

Petroleum Hydrocarbons (TPHs) Review of the Petroleum Hydrocarbons banded analysis (TPH), as summarised on **Table 1**, indicates that the measured concentration of petroleum hydrocarbons are below the corresponding assessment values appropriate for commercial land use.

Furthermore, the TPH Hazard Index for all the samples tested were significantly below 1, therefore, the additive effect of the hydrocarbon fractions for the samples tested is not considered to represent a significant human health risk.

A copy of the outputs of the TPH Hazard Index are presented in **Appendix 3**.

Polycyclic Aromatic Hydrocarbons (PAHs) Review of the Polycyclic Aromatic Hydrocarbons analysis (PAHs), as summarised on **Table 1**, indicates that the measured concentration of individual PAHs are below the corresponding assessment values appropriate for commercial land use.

Volatile Organic Compounds (VOCs) Review of the Volatile Organic Compounds (VOCs) and semi Volatile Organic Compounds (SVOCs), as summarised on **Table 1**, indicates that the measured concentration of VOCs and SVOCs are below the corresponding assessment values appropriate for commercial land use.

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

Groundwater

The measured concentrations of potential contaminants, as summarised on **Table 2a and 2b**, are in general below the selected assessment criteria for assessing potential groundwater impacts on surface waters and the UK drinking water quality standards.

Metals Review of the metals, as summarised on **Table 2a and 2b**, indicates that the measured concentrations of metals are below the corresponding assessment values appropriate for protection of surface waters and the UK drinking water quality standards. The exceptions included slightly elevated

concentrations of metals comprising copper in 2 locations, lead in 1 location, and nickel in 2 locations, Zinc in 1 location, and sulphate in 2 locations.

The advisory group UK Water Framework Directive TAG has developed a simplified Metal Bioavailability Assessment Tool (M-BAT) for copper, zinc, manganese, nickel and lead in water. The M-BAT tool has been used to determine the bioavailability of certain metals through the use of local water chemistry data, specifically pH, dissolved organic carbon, and Calcium.

The samples contained total metal concentrations that exceed the assessment criteria that triggered further assessment using the M-BAT tool. All the samples with the exception of a single elevated concentration of zinc did not exceed the calculated predicted i.e. predicts no effect concentration (PNEC). Therefore, the total metal exceedances are not considered a significant risk to human health or the environment and are not considered further.

Petroleum Hydrocarbons (TPH) Review of the Petroleum Hydrocarbons banded analysis (TPH), as summarised on **Tables 2a and 2b**, indicates that in general, the measured concentration of petroleum hydrocarbons are below the corresponding assessment values appropriate for groundwater impacts on surface waters and the UK drinking water quality standards. The only exception comprises a slightly elevated concentration of total TPH that was recorded at a single location above the UK drinking water quality standards.

Polycyclic Aromatic Hydrocarbons (PAHs) Review of the Polycyclic Aromatic Hydrocarbons analysis (PAHs), as summarised on **Tables 2a and 2b**, indicates that in general the measured concentration of individual PAHs are below the corresponding assessment values appropriate for surface waters and the UK drinking water quality standards.

The only exceptions comprise a slightly elevated concentration for benzo(b)fluoranthene recorded above the selected assessment criterion for the protection of surface waters in a single location (BH2). In addition, a number of individual Polycyclic Aromatic Hydrocarbons recorded concentrations above the analytical limit of detection, where the limit of detection is above the assessment criteria for the protection of surface waters comprising fluoranthene in 5 locations, benzo(a)pyrene in 1 location, and benzo(g,h,i)perylene in 2 locations. A slightly elevated concentration of benzo(a)pyrene was recorded at a single location above the UK drinking water quality standard. In addition, all the groundwater samples tested recorded marginally elevated concentrations of total PAHs above the assessment criterion for UK drinking water quality standards.

The groundwater samples tested indicate that the groundwater quality is fair, albeit with slight exceedances for the screening criteria for several PAHs, total TPH, and metal compounds. When comparing the concentrations of up and down gradient wells there is no obvious trend of the water quality tested. The precise reason for the slight exceedances is unknown, however, considering the urban environment in which the site lies and the former gas works situated in the near vicinity of the Site up gradient for groundwater flow and previous industrialised nature of the Site and surrounding area, this is not unexpected.

Surface Water

The measured concentrations of potential contaminants, as summarised on **Table 2a and 2b**, are in general below the assessment criteria for fresh water or the UK drinking water quality standards.

Metals Review of the metals, as summarised on **Table 2a and 2b**, indicates that the measured concentrations of metals are below the corresponding assessment values. The exceptions included slightly elevated concentrations of chromium trivalent and copper in all the locations tested.

Polycyclic Aromatic Hydrocarbons (PAHs) Review of the Polycyclic Aromatic Hydrocarbons analysis (PAHs), as summarised on **Tables 2a and 2b**, indicates that in general the measured concentration of individual PAHs are below the corresponding assessment values with the exception of slightly elevated fluorene concentration in a single location tested.

The surface water samples tested up and downstream from the site record concentrations below the analytical limit of detection and the assessment criteria indicating that there is no significant impact in the adjacent rivers. Therefore, the exceedances in the groundwater do not appear to have a significant impact on the adjacent rivers.

Further discussion on the hazard potential of the PAH and metal concentrations within the groundwater is presented in Section 6.

5.4 Off Site Disposal

5.4.1 Total Concentrations

An initial classification for disposal purposes was carried out using a web-hosted software programme, Hazwasteonline™. The programme uses total concentrations of various contaminants to characterise the waste classification for the samples tested. The software follows the latest Environment Agency guidance and European regulations. The software is maintained, updated and operated by One Touch Data Ltd and classifies the waste in accordance with EA Technical Guidance WM3 (EA, 2015).

The results of the waste classification assessment indicate that the majority of samples tested are likely to be classified as Non-Hazardous waste under List of Waste Codes and should be described using EWC Code 17 05 04 (soils including excavated soil from contaminated sites).

Three samples (BH1 @ 0.8m, BH3 @ 2.2m and TP1 @ 0.5m) have been classified as Potentially Hazardous (HP3(i) Flammable) due to toluene and TPH(C6-C40) concentrations above the assessment criteria for Non-Hazardous Waste.

One sample (TP4 @ 1.0m) was classified as Hazardous (HP7 Carcinogenic) due to the elevated concentration of zinc and the potential for zinc chromate to be present. In accordance with the Classification, Labelling and Packaging (CLP) Zinc chromate is the worst case species for zinc and is the default compound used for the Hazwaste online assessment. Zinc chromate is generally associated with paint works; being used for coatings and pigments. The site has no recorded history as a paint works or similar land use, nor has there been any record in the nearby surrounding area. The site has historically been occupied by railway sidings and ashy Made Ground material has been recorded in the shallow soils. As such, it was considered appropriate to amend the zinc determinand to zinc sulphate, which is the next worst case CLP and is generally associated with mining, fly ash and other smelter wastes. Following this change to the determinand, the sample for TP4 at 1.0 m depth was re-run through the classification tool and is considered to be representative of Non-Hazardous waste.

A copy of the outputs of the Hazwasteonline™ classification is presented in **Appendix 4**.

5.4.2 Waste Acceptance Criteria (WAC)

The results of the analyses to determine the waste acceptance classification of recovered samples of the soils encountered are presented in the factual report of the ground investigation (ED, 2017). In general, the concentrations of the determinants tested are typically below the limiting values for classification as inert waste outlined within the waste acceptance procedures (Defra, 2005). The exceptions comprise elevated concentrations of molybdenum, total sulphate, organic content (loss of ignition method) and total dissolved solids in one or two of the four samples tested above the limiting value for classification as inert waste. In addition, elevated concentrations of total organic carbon and organic content (loss of ignition method) above the limiting value for classification as stable non-reactive waste in three and one of the four samples tested, respectively.

Classification of the materials for disposal off site will depend on the acceptability of the elevated concentrations to the EA regional office that regulates the landfill where the material is to be disposed. However, considering the results of the waste acceptance classification analysis and the nature and variability of the material, an allowance should be made for the disposal of any Made Ground arising to an off-site facility as non-hazardous or hazardous waste, principally owing to the presence of elevated concentrations of organic carbon and organic content. Similarly, the Alluvium might be classified as stable non-reactive hazardous waste or hazardous waste owing to its high organic content.

It is expected that the River Terrace Deposits and Chalk will be classified as inert waste.

Additional testing of the materials will be required to confirm the actual classification of any material for off-site disposal.

It should be noted that there are a number of techniques for the treatment of soils with high organic content in order to reduce disposal costs associated with the disposal of the materials as Hazardous Waste. The cost effectiveness of treatment of soils will depend principally on the nature of the soil, the organic content concentrations and the volume of soils required to be treated and disposed off-site. Additional advice and costing can be sought from a soil disposal and treatment specialist.

5.5 Ground Gases

The concentrations and flow of ground gases have been measured in the monitoring wells installed in the boreholes sunk as part of the ground investigation and are summarised in the following table.

Table 5.1 Summary of Gas Concentrations and Flow

Gas	Concentration / flow
Methane, %v/v	0.2 – 0.3
Carbon Dioxide, %v/v	0.7 – 6.5
Oxygen, %v/v	12.3 – 20.8
Gas Flow, l/hr	ND – 0.1
Note ND denotes None Detected	

The measured concentrations of ground gases indicate slightly elevated concentrations of carbon dioxide and methane and corresponding depleted oxygen concentrations.

Using the procedure for classifying gassing sites proposed by BS 8485 (2015), the site would be classified as Characteristic Situation 2 assuming the measured concentrations of ground gases are representative of the long term equilibrium values. This Situation is representative of ground with a low risk associated with natural soil, high peat/organic content or a “Typical” Made Ground. The source of the elevated carbon dioxide and methane concentrations is likely to be related to the Made Ground and/or the Alluvium present on Site.

The proposed Scheme does not include habited structures. However, in line with current regulations and best practice, appropriate ventilation will need to be provided to all confined spaces during construction and appropriate procedures should be adopted to ensure they are checked for hazardous gases prior to man-entry to ensure any potential risk associated with ground gases does not occur. Any enclosed spaces provided as part of the permanent works such as manholes etc, will require similarly suitable health and safety procedures before man entry.

6 Tier 2 Environmental Risk Assessment

6.1 Introduction

To assess the potential risk from the proposed Scheme in relation to the quality of the ground and groundwaters, a qualitative risk assessment has been carried out utilising a Conceptual Site Model and 'source-pathway-receptor' to identify significant pollutant linkages. The assessment has been carried out by considering both historical information and the findings of the ground investigation including a review of site specific data against applicable screening criteria.

The hazard identification and Conceptual Site Model (CSM) has been updated from that presented in Tier 1 Preliminary Risk Assessment presented in the Phase 1 report (PBA, 2017), with a Tier 2 Generic Risk Assessment presented in this Section in accordance with the Contaminated Land Report CLR11 (EA, 2004).

For the purposes of this study the potential for a significant source, pathway or receptor being present have been assessed in terms of their probability and magnitude as being very low, low, moderate, high or very high. The geoenvironmental risk is determined by the interrelationship between the potential for a source of contamination to be present, the potential for migration along a given pathway, and the significance of potential receptors for any plausible source-pathway-receptor linkage. This approach allows the probability and magnitude of the possible consequences that may arise as a result of a hazard to be assessed and possible unacceptable risks to be identified.

The methodology developed and adopted by PBA for the assessment of risks and hazards associated with existing contamination in the ground is presented in **Appendix 5** of this report.

6.2 Hazard Identification

The western part of the Scheme had an industrial history with a number of industrial uses. Based on the ground investigation the following potential hazards have been considered to be taken forward to the risk assessment.

6.2.1 Human Health Hazards

The ground investigation identified that concentrations of potential contaminants in the soils across the Site are below the assessment criteria for a commercial land use. On this basis, the soils on site are not considered to be represent a significant hazard for human health at the site.

The one exception to above statement is the presence of mercury above the assessment criterion for commercial use. The mercury was identified to be an outlier and therefore is not considered to be representative of the Made Ground on site. As such, the hazard associated with mercury in the Made Ground has not been taken forward for future site users.

6.2.2 Controlled Waters Hazards

The results of the groundwater analysis undertaken show that the majority of the measured concentrations of potential groundwater contaminants are below the adopted screening criteria. Hydrocarbons (TPH) were not recorded in any of the positions investigated with the exception of a single location and a marginally elevated total TPH concentration.

The concentrations of metals were similarly low albeit with exceedances for copper, lead, nickel, zinc and sulphate. The majority of these metals did not exceed the calculated predicted no effect concentration and therefore were not considered further as a potential hazard to groundwater.

With regard to Polycyclic Aromatic Hydrocarbons (PAHs), a number of groundwater samples recorded slightly elevated concentrations of PAHs. The groundwater samples tested indicate that the groundwater quality is fair, albeit with slight exceedances for the screening criteria for several PAHs and metal compounds. When comparing the concentrations of up and down gradient wells there is no obvious trend of the water quality tested. The precise reasons for the slight exceedances are unknown,

however, it is highly likely that the elevated PAHs are associated with the former gas works which lies just a short distance up the groundwater gradient from the site and this would not be unexpected.

The surface water samples tested up and downstream from the site record concentrations below the analytical limit of detection and the assessment criteria indicating that there is no significant impact in the adjacent rivers. Therefore, the exceedances in the groundwater do not appear to have a significant impact on the adjacent rivers.

In consideration of the findings of the ground investigation it is considered that the minor exceedances that have been identified in the groundwater have been interpreted to reflect a regional baseline of slightly impaired groundwater quality and do not pose a significant hazard to controlled waters in the vicinity of the Site.

6.3 Pathways

Potential environmental hazards need a pathway connecting the source (if present) to potential receptors in order to be able to impact upon the receptors. These pathways are capable of conveying the contaminants. Pathways may be anthropogenic (artificial) or natural.

Anthropogenic pathways are artificial routes capable of conveying contaminants and include such routes as surface water drains, high permeability backfill materials, poorly consolidated Made Ground, foundations, and persons disturbing contamination sources in such a way as to liberate contaminants.

In the case of persons working with contaminated ground (e.g. to lay foundations or install services) direct contact with the source becomes possible, and pathways such as dermal contact, inhalation or ingestion require consideration.

The proposed development in western part of the Scheme consists of the construction of a new road, car parking and paved footpaths with restricted access elsewhere so the potential pathways to future site users would also be generally limited to the migration of soil gas and vapours.

The site is expected to be underlain by a layer of Alluvium. Downward and lateral migration of contaminants within the Alluvium is likely to be somewhat limited owing to the presence of a mantle of relatively low permeability cohesive Alluvium in the near surface soils. However, it is expected that the installation of piled foundations as part of the proposed development is likely to form a potential pathway for groundwater migration. Therefore, the impacts on the Alluvium, River Terrace Deposits and Chalk Aquifers should be taken into account.

The groundwater flow direction in the Superficial Deposits was found to be flowing in general direction to the north-east towards the River Thames and Kennet. The Alluvium, River Terrace Deposits and the White Chalk are considered to be in hydraulic continuity. Therefore, groundwater flow is a potential pathway for migration of potential contaminants to the adjacent rivers.

6.4 Receptor Identification

The proposed development is for a road and a bridge transport link with pedestrian use. Access in the western part of the Site will be restricted.

The Chalk and River Terrace Deposits Aquifers are considered to be sensitive receptor. Similarly, the adjacent River Thames and the River Kennet are considered to be highly sensitive controlled water receptors.

Details of the potential receptors considered and whether or not the receptor is plausible are summarised in the table presented below.

Table 6.1 - Potential Receptors

Receptor Type	Potential Receptor? (Y/N) / Sensitivity Value	Comment
Human Health Current	Y / 5	Open space
Human Health Future	Y / 5	Pedestrians
Neighbouring Human Health	Y / 5	commercial/light industrial
Construction Workers	Y / 4	Full development with excavations
Surface Waters	Y / 5	The River Kennet and the River Thames
Groundwater	Y / 3	Superficial Deposits (Shallow) - Secondary Aquifer
	Y / 5	Chalk Aquifer (Deep) - Principal Aquifer
Property (Buildings/Materials)	Y / 2	Proposed river bridge crossing
Property (Animals / Crop)	N	Crops/produce or domestic animals/livestock are not present on or immediately adjacent to the site.
Ecological Systems	Y/2	A Local Wildlife Site known as "The Coal, Kennetmouth and Kings Meadow East".

Note: The Sensitivity Value is based on Table 2 of the PBA Methodology given in Appendix 5.

Table 2 in the PBA methodology describes possible pathways for each receptor type. Each of these possible pathways is then considered when assessing the possible pollutant linkage (see below).

Potential pollutant linkages have been identified using the information on potential sources (contaminant types), receptors and exposure pathways. **Table 1** in **Appendix 6** identifies which pollutant linkages are considered to potentially exist.

6.5 Risk Estimation

Further to the findings of the ground investigation, the Conceptual Site Model has been revised. The hazard potential for the western part of the Scheme for significant site wide contamination to be present at the site has been reduced from **Moderate** to **Low**. A Low hazard potential is assigned to sites with locally or slightly elevated concentrations of contaminants.

The risk estimation in the Phase 1 Report (PBA, 2017) has been updated using the recent data available for the Site. The risk estimation involves predicting the likely consequence (what degree of harm might result) and the probability that the consequences will arise (how likely the outcome is). An updated table summarising the estimated risks for the identified pollutant linkages is presented in **Appendix 6**.

Risk estimation involves predicting the likely consequence (what degree of harm might result) and the probability that the consequences will arise (how likely the outcome is). The table in **Appendix 6** summarises the estimated risks for the identified pollutant linkages.

Based on the information available, the estimated risks from the proposed development have been designated with further comments are given in the sections below:

- **Human Health** (Future use as Commercial) – **Low**
- **Human Health Off-Site** (Commercial) – **Low**
- **Human Health** (Construction Workers) – **Moderate** (See Section 6.5.1 below)

- **Groundwater – Low** (Shallow Aquifer) and **Moderate** (Deep Aquifer) (See Section 6.5.2 below)
- **Surface Water – Moderate or Low** (See Section 6.5.2 below)
- **Property (Buildings/Structures) – Low**
- **Ecological Systems – Very Low**

6.5.1 Human Health – Construction Workers

The risk to construction workers relates to the risk of ingestion, inhalation or skin contact of contaminated materials on the Site and inhalation of any potentially hazardous ground gases. Considering the expected variable and locally potentially significant concentrations of potential contaminants within the soils present on the Site, the potential risk to site workers is expected to be **Moderate**.

The provision of appropriate protective clothing and equipment to be worn by site workers together with the adoption of good standards of hygiene to prevent prolonged skin contact, inhalation and ingestion of soils during construction will be required to mitigate the risk to site workers. In addition, the methods of working should be selected to limit disturbance to the existing near-surface soils present on the Site.

Given the adoption of appropriate measures, the risks associated with the potential for skin contact, inhalation and ingestion of the near-surface soils to construction workers involved in earthworks or groundworks is expected to be **Low**.

6.5.2 Controlled Waters

The installation of piled foundations might create a pathway through the Alluvium for migration of potential contaminants from the Made Ground to the Aquifer at depth and subsequently to the adjacent rivers. It is recommended that in order to minimise the potential for groundwater contamination any piles installed as part of the proposed scheme will be designed and installed in accordance with the Environment Agency guidance for piling in potentially contaminated sites (EA, 2001 and 2002).

Given the adoption of appropriate measures for the installations of piles for the Scheme, the risks associated with the potential for migration of contamination, if present from the near-surface soils to the aquifer and subsequently to the adjacent rivers is expected to be **Low**.

6.6 Risk Evaluation

Possible pollutant linkages are determined using professional judgement. If a linkage is considered possible, it is considered that this represents a potentially 'unacceptable risk' and therefore requires further consideration. This may be through remediation or mitigation or through further tiers of assessment.

Based on the findings of this investigation it is not considered that further tiers of assessment are required to support the planning application for the Scheme. Furthermore, on the basis of the Tier 2 Risk Assessment, remediation is unlikely to be required. Mitigation measures principally required for the protection of construction workers and for the installation of piles are detailed in **Section 7.0** below.

Further ground investigation will be required as part of the geotechnical design of the Scheme. Any requirement to carry out further site wide geoenvironmental intrusive investigation can be satisfactorily dealt with by incorporation as a condition in any granted Planning Consent and carried out as part of the geotechnical investigation for the Scheme.

7 Outline Remediation and Mitigation Strategy

7.1 Introduction

The geoenvironmental risk assessment presented in **Section 6.0** indicates that any potential contaminants in the ground or groundwater do not by themselves represent an unacceptable risk to human health, controlled waters or ecology and wildlife, associated with the development of the site as currently proposed. Remediation and/or mitigation measures are not required for the scheme with the exception of the risks to site workers associated with ingestion, inhalation or prolonged skin contact of contaminated material during the construction works, and for the installations of piles.

7.2 Protection of Site Workers

Measures to be adopted to mitigate the risk to site workers will include (i) informing the site workers of the potential risk through site induction and 'tool box talks'; (ii) the provision of appropriate protective clothing and equipment to be worn by site workers; and (iii) the adoption of good standards of hygiene to prevent prolonged skin contact, inhalation and ingestion of soils during construction. In addition, in line with current regulations and best practice, appropriate methods of working will be selected to limit disturbance to the contaminated materials and the potential for air-borne dust to arise associated with the excavation and disturbance of the soils present on the site.

7.3 Installation of Piles

It is recommended that in order to minimise the potential for groundwater contamination any piles installed as part of the proposed scheme will be designed and installed in accordance with the Environment Agency guidance for piling in potentially contaminated sites (EA, 2001 and 2002).

7.4 Management of Unidentified Sources of Contamination

There is a possibility that other sources of contamination may be encountered during site clearance or ground works that have not been previously identified. It is recommended that a watching brief will be maintained throughout the excavation works for unsuitable or unexpected condition are encountered. If previously unidentified areas of potential contamination are encountered, they will be dealt with in line with an agreed protocol. Soil will either be sampled in-situ in the ground (and left undisturbed while the samples are tested and the results interpreted) or excavated and stockpiled in an appropriate manner while verification testing for potential contamination is carried out. The storage area will be contained to ensure that contamination does not migrate and affect other areas of the site.

Once the nature, location and extent of the contamination has been identified appropriate mitigation measures should be adopted. Although these cannot be identified at this time, the main emphasis will be on methods of isolating or treating these materials. If such measures are unlikely to be practical or effective in mitigating the risk from the identified contamination, consideration will be given to excavating and removing the contaminated soil from site for disposal at a suitably licensed landfill.

Where remediation of unidentified sources of contamination is required, an implementation and verification process will be established to identify the remediation activities required and to confirm that the remediation has been undertaken correctly. As part of this process, remediation objectives will be identified and remediation criteria selected for measuring compliance against these objectives in consultation with the Local Authority and other statutory consultees.

8 References

- BGS (1978) Hydrogeological map of the area between South West Chilterns and the Berkshire and Marlborough Down, Sheet 7, 1:100,000 published by the British Geological Survey (BGS, former Institute of Geological Sciences), Keyworth.
- BGS (2000) Reading, England and Wales Sheet 268, Solid and Drift Geology, 1 to 50,000 Scale British Geological Survey, Keyworth, Notts.
- BRE (2005) Concrete in aggressive ground, Special Digest 1. Building Research Establishment, Garston, Herts.
- BS 5930 (2015) Code of practice for ground investigations. British Standards Institution, London.
- BS 8485 (2007) Code of practice for the characterization and remediation from ground gas in affected developments. British Standards Institution, London.
- BS EN 1997-2 (2007) Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing. British Standards Institution, London.
- BS EN 1997-1 (2004a) Eurocode 7: Geotechnical design – Part 1: General rules. British Standards Institute, London.
- BS EN 1997-1 (2004b) UK National Annex to Eurocode 7: Geotechnical design – Part 1: General rules. British Standards Institute, London.
- CIRIA (2002) Engineering in Chalk, Report C574. Construction Industry Research and Information Association, London.
- CIRIA (2007) Assessing risks posed by hazardous ground gases to buildings. Report C665, Construction Industry Research and Information Association, London.
- CL:AIRE (2014) Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report SP1010 (Rev 2), Contaminated Land: Applications in Real Environments, London.
- DCLG (2014) Planning Practice Guidance on Land Stability. Document 45-001-20140306, Department for Communities and Local Government, London.
- DCLoG (2012) National Planning Policy Framework. Department of Communities and Local Government, London.
- DEFRA (2005) The Landfill (England and Wales) (Amendment) Regulations 2005. Statutory Instrument 2005 No 1640. Department of the Environment, Food and Rural Affairs, London.
- DEFRA (2010) The River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) England and Wales) Direction 2010. Department of the Environment, Food and Rural Affairs, London.
- DETR (1999) The Water Supply (Water Fittings) Regulations 1999. Statutory Instrument 1999 No 1148. Department of the Environment, Food and Rural Affairs, (formerly Department of the Environment, Transport and the Regions), London.
- DETR (2000) The Water Supply (Water Quality) Regulations, 2000. Statutory Instrument 2000 No. 3184. Department of the Environment, Food and Rural Affairs (formerly Department of the Environment, Transport and Regions), London.

- DETR (2000) The Water Supply (Water Quality) Regulations, 2000. Statutory Instrument 2000 No. 3184. Department of the Environment, Food and Rural Affairs (formerly Department of the Environment, Transport and Regions), London.
- EA (2001) Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention. National Groundwater & Contaminated Land Centre report: NC/99/73. Environment Agency, Solihull, West Midlands.
- EA (2002) Piling into contaminated sites. Environment Agency, Bristol.
- EA (2004). Model Procedures for the Management of Land Contamination. Contaminated Land Report CLR11. Environment Agency, Bristol.
- EA (2009) Soil Guideline Value Reports. CLEA website <http://www.environment-agency.gov.uk/research/planning/33714.aspx> Environment Agency, Bristol.
- EA (2012) Groundwater Protection, Principles and Practice (version 1). Environment Agency, Bristol.
- LQM & CIEH (2015) The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham.
- PBA (2017) Phase 1 Ground Condition Assessment (Contamination and Geotechnical), East Reading Mass Rapid Transit Scheme. Report Ref: 28791/3500/R001/Rev2, Peter Brett Associates, Reading.
- Stroud M A (1989) The standard penetration test its application and interpretation. ICE Conference on Penetration Testing in the UK, Birmingham, pp 29-50.

Essential Guidance for Report Readers

This report has been prepared within an agreed timeframe and to an agreed budget that will necessarily apply some constraints on its content and usage. The remarks below are presented to assist the reader in understanding the context of this report and any general limitations or constraints. If there are any specific limitations and constraints they are described in the report text.

The opinions and recommendations expressed in this report are based on statute, guidance, and appropriate practice current at the date of its preparation. Peter Brett Associates LLP (PBA) does not accept any liability whatsoever for the consequences of any future legislative changes or the release of subsequent guidance documentation, etc. Such changes may render some of the opinions and advice in this report inappropriate or incorrect and we will be pleased to advise if any report requires revision due to changing circumstances, especially those over one year old. Following delivery of any report PBA has no obligation to advise the Client or any other party of such changes or their repercussions.

Some of the conclusions in this report may be based on third party data. No guarantee can be given for the accuracy or completeness of any of the third party data used. Historical maps and aerial photographs provide a “snap shot” in time about conditions or activities at the site and cannot be relied upon as indicators of any events or activities that may have taken place at other times.

The conclusions and recommendations made in this report and the opinions expressed are based on the information reviewed and/or the ground conditions encountered in exploratory holes and the results of any field or laboratory testing undertaken. There may be ground conditions at the site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be taken into account in any analysis and reporting.

It should be noted that groundwater levels, groundwater chemistry, surface water levels, surface water chemistry, soil gas concentrations and soil gas flow rates can vary due to seasonal, climatic, tidal and man made effects.

This report has been written for the sole use of the Client stated at the front of the report in relation to a specific development or scheme. The conclusions and recommendations presented herein are only relevant to the scheme or the phase of project under consideration. This report shall not be relied upon or transferred to any other party without the express written authorisation of PBA. Any such party relies upon the report at its own risk.

The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not taken into account the perceptions of, for example, banks, insurers, other funders, lay people, etc, unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.

Public or legal consultations or enquiries, or consultation with any Regulatory Bodies (such as the Environment Agency, Natural England or Local Authority) have taken place only as part of this work where specifically stated.

TABLES

EAST READING MRT
TABLE SUMMARISING SOIL RESULTS AND HIGHLIGHTING EXCEEDANCES ABOVE HUMAN HEALTH ASSESSMENT CRITERIA

SOM 2.5%		Assessment Criteria			Strata	Made Ground	Made Ground	Alluvium	Made Ground	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Made Ground	Alluvium	Made Ground	Made Ground	Made Ground	Made Ground
		Allotments	RwHP	Commercial	BH1	BH1	BH1	BH2	BH2	BH2	BH3	BH3	HP1	HP1	HP2	HP2	HP2A	HP3	HP3	TP1	TP1	TP1	TP2	TP2	TP3	TP3
Analyte	Units				0.4	0.8	2.4	0.3	0.9	2.5	0.4	2.2	0.6	2.3	0.3	1.2	1.8	0.7	1.7	0.5	1.2	2.3	0.4	1.1	0.4	1.0
Stones BG 2.6/3.0	%	-	-	-																						
Moisture content at 30 C	%	-	-	-																						
Arsenic*	mg/kg	43	37	640	37		15		39	18	47	15	30	20	39		19	25	17		37	25	67		30	19
Cadmium	mg/kg	1.9	11	190	0.3		0.4		0.3	0.4	0.5	0.3	1.1	0.4	0.5		0.3	0.4	0.4		0.7	0.6	0.7		0.9	0.7
Chromium Trivalent	mg/kg	18000	910	8600																						
Chromium Hexavalant*	mg/kg	1.8	6	33	1		1		1	1	1	1	1	1	1		1	1	1		1	1	1		1	1
Copper	mg/kg	520	2400	68000	410		19		88	18	110	16	160	49	120		16	120	35		240	110	120		240	160
Lead*	mg/kg	80	200	2300	230		40		130	31	100	17	170	170	230		43	70	83		410	280	130		290	150
Mercury	mg/kg	19	1.2	58	12		5.6		0.34	0.08	0.21	0.07	1.7	43	0.61		3	0.08	0.16		3.6	39	0.58		0.13	6.1
Nickel	mg/kg	53	130	980	29		36		35	33	46	31	130	26	39		27	59	24		89	28	49		70	71
Selenium	mg/kg	88	250	12000	0.7		0.6		0.9	0.6	0.9	0.6	0.8	3.2	0.6		1.2	0.5	1.6		0.7	4	1		0.9	1
Zinc	mg/kg	620	3700	730000	100		94		77	90	94	84	320	100	140		81	120	76		260	160	120		140	240
Beryllium	mg/kg	35	1.7	12																						
Boron	mg/kg	45	290	240000																						
Vanadium	mg/kg	91	410	9000																						
Cyanide (Total)	mg/kg	-	-	-																						
Organic matter	%	-	-	-	11		2.3		2.9	2	5.3	1.8	7.4	5.8	4.5		1.8	8.7	4.9		6.4	5.9	8.1		6.2	8
Phenol, Total	mg/kg	42	200	690		0.1		0.1								0.1				0.1				0.1		
Sulphate (Total) as SO4	%	-	-	-									580	170	27		390	91	1100		1300	790	1400		200	410
pH	pH Units	-	-	-									7.3	7.8	8		7.9	7.9	7.7		7.4	7.6	7.4		6.5	7.5
>C5 to C6 Aliphatic	mg/kg	1700	78	5900	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
>C6 to C8 Aliphatic	mg/kg	5600	230	17000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
>C8 to C10 Aliphatic	mg/kg	770	65	4800	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
>C10 to C12 Aliphatic	mg/kg	4400	330	23000	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
>C12 to C16 Aliphatic	mg/kg	13000	2400	82000	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
>C16 to C21 Aliphatic	mg/kg	-	-	-	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
>C21 to C35 Aliphatic	mg/kg	-	-	-	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
>C16 to C35 Aliphatic	mg/kg	270000	92000	1700000	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
>C35 to C44 Aliphatic	mg/kg	270000	92000	1700000																						
Total Aliphatic C5-35	mg/kg	-	-	-	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
>C5 to C7 Aromatic	mg/kg	27	140	46000																						
>C7 to C8 Aromatic	mg/kg	51	290	110000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
>C8 to C10 Aromatic	mg/kg	21	83	8100	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
>C10 to C12 Aromatic	mg/kg	31	180	28000	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
>C12 to C16 Aromatic	mg/kg	57	330	37000	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5
>C16 to C21 Aromatic	mg/kg	110	540	28000	3	0.6	0.6	2.8	0.8	0.6	0.6	4.4	0.6	0.6	1	1.5	0.6	0.6	0.6	13	0.6	0.6	0.6	0.6	0.6	0.6
>C21 to C35 Aromatic	mg/kg	820	1500	28000	2.8	1.4	1.4	3.6	1.4	1.4	1.4	5.8	1.4	1.4	1.7	4.7	1.4	1.4	1.4	23	1.4	1.4	1.4	1.4	2.5	1.4
>C35 to C44 Aromatic	mg/kg	820	1500	28000																						
Total Aromatic C5-C35	mg/kg	-	-	-	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	38	10	10	10	10	10	10
TPH Ali/Aro	mg/kg	-	-	-	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	38	10	10	10	10	10	10
EPH (C10-C40)	mg/kg	-	-	-																						
Benzene*	mg/kg	0.034	0.17	47	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Ethylbenzene	mg/kg	39	110	13000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Toluene	mg/kg	51	290	110000	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylene	mg/kg	67	130	14000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
MTBE	mg/kg	-	-	-		0.01		0.01								0.01				0.01				0.01		
naphthalene	mg/kg	10	5.6	460	0.38	0.3	0.03	0.2	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.2	0.03	0.03	0.03	2.2	0.05	0.03	0.03	0.1	0.05	0.03
acenaphthylene	mg/kg	69	420	97000	0.04	0.1	0.03	0.2	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.2	0.03	0.03	0.03	1.2	0.04	0.03	0.03	0.1	0.06	0.03
acenaphthene	mg/kg	85	510	97000	0.03	0.1	0.03	0.1	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.1	0.03	0.03	0.03	0.05	0.03	0.03	0.03	0.1	0.2	0.03
fluorene	mg/kg	67	400	68000	0.03	0.1	0.03	0.1	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.1	0.03	0.03	0.03	0.2	0.03	0.03	0.03	0.1	0.14	0.03
phenanthrene	mg/kg	38	220	22000	0.55	0.3	0.03	1.2	0.15	0.03	0.03	0.03	0.08	0.03	0.48	0.4	0.03	0.03	0.03	4.7	0.26	0.03	0.09	0.3	1.8	0.1
anthracene	mg/kg	950	5400	540000	0.1	0.1	0.03	0.4	0.04	0.03	0.03	0.03	0.03	0.03	0.13	0.2	0.03	0.03	0.03	1	0.05	0.03	0.03	0.1	0.39	0.03
fluoranthene	mg/kg	130	560	23000	1	0.7	0.03	2.7	0.36	0.03	0.12	0.03	0.24	0.03	1.1	1.9	0.04	0.06	0.03	4.7	0.59	0.03	0.23	0.6	2.2	0.16
pyrene	mg/kg	270	1200	54000	1.1	0.9	0.03	2.4	0.33	0.03	0.11	0.03	0.24	0.03	0.96	1.9	0.04	0.06	0.03	4.2	0.59	0.03	0.21	0.6	1.9	0.14
benzo(a)anthracene	mg/kg	6.5	11	170	0.38	0.4	0.03	1.5	0.14	0.03	0.05	0.03	0.12	0.03	0.43	1.2	0.03	0.03	0.03	4.3	0.21	0.03	0.09	0.3	0.75	0.05
chrysene	mg/kg	9.4	22	350	0.42	0.5	0.03	1.6	0.15	0.03	0.06	0.03	0.14	0.03	0.49	1.2	0.03	0.03	0.03	5	0.28	0.03	0.11	0.3	0.82	0.08
benzo(b)fluoranthene	mg/kg	2.1	3.3	44	0.39	0.4	0.03	1.9	0.18	0.03	0.06	0.03	0.17	0.03	0.53	1.9	0.03	0.03	0.03	6.8	0.28	0.03	0.12	0.4	0.8	0.06
benzo(k)fluoranthene	mg/kg	75	93	1200	0.16	0.2	0.03	0.8	0.07	0.03	0.03	0.03	0.08	0.03	0.19	0.7	0.03	0.03	0.03	2.5	0.12	0.03	0.05	0.2	0.33	0.03
benzo(a)pyrene*	mg/kg	2	2																							

EAST READING MRT

TABLE SUMMARISING SOIL RESULTS AND HIGHLIGHTING EXCEEDANCES ABOVE HUMAN HEALTH ASSESSMENT CRITERIA

SOM 2.5%		Assessment Criteria			Strata	Alluvium	Made Ground	Made Ground
		Allotments	RwHP	Commercial	TP3	TP4	TP4	TP4
Analyte	Units				1.9	0.5		1.0
Stones BG 2.6/3.0	%	-	-	-				
Moisture content at 30 C	%	-	-	-				
Arsenic*	mg/kg	43	37	640		37		
Cadmium	mg/kg	1.9	11	190	25	1.6		22
Chromium Trivalent	mg/kg	18000	910	8600				
Chromium Hexavalant*	mg/kg	1.8	6	33	1	1		1
Copper	mg/kg	520	2400	68000	87	200		160
Lead*	mg/kg	80	200	2300	180	570		410
Mercury	mg/kg	19	1.2	58	3.7	3.9		160
Nickel	mg/kg	53	130	980	33	180		97
Selenium	mg/kg	88	250	12000	2.3	2.3		0.7
Zinc	mg/kg	620	3700	730000	150	320		490
Beryllium	mg/kg	35	1.7	12				
Boron	mg/kg	45	290	240000				
Vanadium	mg/kg	91	410	9000				
Cyanide (Total)	mg/kg	-	-	-				
Organic matter	%	-	-	-	6.2	7.7		5.7
Phenol, Total	mg/kg	42	200	690				
Sulphate (Total) as SO4	%	-	-	-	300	150		170
pH	pH Units	-	-	-	7.7	7.3		8
>C5 to C6 Aliphatic	mg/kg	1700	78	5900	0.01	0.01		0.01
>C6 to C8 Aliphatic	mg/kg	5600	230	17000	0.01	0.01		0.01
>C8 to C10 Aliphatic	mg/kg	770	65	4800	0.01	0.01		0.01
>C10 to C12 Aliphatic	mg/kg	4400	330	23000	1.5	1.5		1.5
>C12 to C16 Aliphatic	mg/kg	13000	2400	82000	1.2	1.2		1.2
>C16 to C21 Aliphatic	mg/kg	-	-	-	1.5	1.5		1.5
>C21 to C35 Aliphatic	mg/kg	-	-	-	3.4	3.4		3.4
>C16 to C35 Aliphatic	mg/kg	270000	92000	1700000	4.9	4.9		4.9
>C35 to C44 Aliphatic	mg/kg	270000	92000	1700000				
Total Aliphatic C5-35	mg/kg	-	-	-	10	10		10
>C5 to C7 Aromatic	mg/kg	27	140	46000				
>C7 to C8 Aromatic	mg/kg	51	290	110000	0.01	0.01		0.01
>C8 to C10 Aromatic	mg/kg	21	83	8100	0.01	0.01		0.01
>C10 to C12 Aromatic	mg/kg	31	180	28000	0.9	0.9		0.9
>C12 to C16 Aromatic	mg/kg	57	330	37000	0.5	0.5		0.5
>C16 to C21 Aromatic	mg/kg	110	540	28000	0.6	0.6		0.6
>C21 to C35 Aromatic	mg/kg	820	1500	28000	1.4	1.4		1.4
>C35 to C44 Aromatic	mg/kg	820	1500	28000				
Total Aromatic C5-C35	mg/kg	-	-	-	10	10		10
TPH Ali/Aro	mg/kg	-	-	-	10	10		10
EPH (C10-C40)	mg/kg	-	-	-				
Benzene*	mg/kg	0.034	0.17	47	0.01	0.01		0.01
Ethylbenzene	mg/kg	39	110	13000	0.01	0.01		0.01
Toluene	mg/kg	51	290	110000	0.01	0.01		0.01
Xylene	mg/kg	67	130	14000	0.01	0.01		0.01
MTBE	mg/kg	-	-	-				
naphthalene	mg/kg	10	5.6	460	0.03	0.03		0.03
acenaphthylene	mg/kg	69	420	97000	0.03	0.03		0.03
acenaphthene	mg/kg	85	510	97000	0.03	0.03		0.03
fluorene	mg/kg	67	400	68000	0.03	0.03		0.03
phenanthrene	mg/kg	38	220	22000	0.07	0.2		0.03
anthracene	mg/kg	950	5400	540000	0.03	0.03		0.03
fluoranthene	mg/kg	130	560	23000	0.28	0.28		0.03
pyrene	mg/kg	270	1200	54000	0.28	0.24		0.03
benzo(a)anthracene	mg/kg	6.5	11	170	0.09	0.09		0.03
chrysene	mg/kg	9.4	22	350	0.16	0.15		0.03
benzo(b)fluoranthene	mg/kg	2.1	3.3	44	0.16	0.18		0.03
benzo(k)fluoranthene	mg/kg	75	93	1200	0.07	0.07		0.03
benzo(a)pyrene*	mg/kg	2	2.7	35	0.09	0.07		0.03
indeno(1,2,3-c,d)pyrene	mg/kg	21	36	510	0.09	0.14		0.03
dibenzo(ah)anthracene	mg/kg	0.27	0.28	3.6	0.03	0.03		0.03
benzo(g,h,i)perylene	mg/kg	470	340	4000	0.09	0.2		0.03
Coal Tar (Bap as surrogate)	mg/kg	0.67	0.98	15	0.09	0.07		0.03
PCB (as Aroclors)	mg/kg	-	-	-				
1,2 Dichloroethane	mg/kg	0.89	3.4	550				
1,1,1 Trichloroethane (TCA)	mg/kg	110	18	1300				
1,1,1,2 Tetrachloroethane	mg/kg	1.9	2.8	250				
1,1,2,2 Tetrachloroethane	mg/kg	0.89	3.4	550				
Tetrachloroethene (PCE)	mg/kg	1.5	0.39	42				
Carbon Tetrachloride	mg/kg	1	0.056	6.3				
Trichloroethene (TCE)	mg/kg	0.091	0.034	2.6				
Trichloromethane (Chloroform)	mg/kg	0.091	0.034	2.6				
Vinyl Chloride (Chloroethene)	mg/kg	0.001	0.00087	0.077				
Asbestos	TEXT	-	-	-				
Fluoride	mg/kg	-	-	-				
Molybdenum	mg/kg	-	-	-				

LQM/CIEH S4ULs Copyright Land Quality Management Limited Reproduced with Permission; Publicatic
* Category 4 Screening Value @ 6% SOM



EAST READING MRT
TABLE SUMMARISING WATER RESULTS AND HIGHLIGHTING EXCEEDANCES ABOVE WATER
ASSESSMENT CRITERIA

		Assessment Criteria	BH1	BH2	BH3	HP1	HP3	SW1	SW2	SW3
Analyte	Units	Human Consumption	23/03/2017	23/03/2017	23/03/2017	23/03/2017	23/03/2017	23/03/2017	23/03/2017	23/03/2017
Arsenic	µg/l	10	3.4	2.1	1.2			0.6	0.81	0.89
Cadmium	µg/l	5	0.03	0.04	0.03			0.03	0.03	0.03
Chromium Trivalent	µg/l	-	1	1	1			5.1	5.7	5.8
Copper	µg/l	2000	0.4	1.9	1.2			5	3.8	3.1
Lead	µg/l	10	0.23	0.69	3.9			0.4	0.6	0.46
Mercury	µg/l	1	0.01	0.01	0.01			0.01	0.01	0.01
Nickel	µg/l	20	7.2	12	2.9			1.2	1.8	1.2
Selenium	µg/l	10	1.1	1.2	3.8			1	0.88	0.8
Zinc	µg/l	5000	6	110	10			5.2	5.4	8.3
Chloride	µg/l	250000	34	80	58			31	30	30
Sulphate	mg/l	250	320	540	200			41	49	56
pH	pH Units	-	7.1	7	7.2	7.1	7.3	8	8.2	8.2
>C5 to C6 Aliphatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C6 to C8 Aliphatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C8 to C10 Aliphatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C10 to C12 Aliphatic	µg/l	-	1	1	1	1	1	1	1	1
>C12 to C16 Aliphatic	µg/l	-	1	1	1	1	1	1	1	1
>C16 to C21 Aliphatic	µg/l	-	1	2.8	1	1	1	1	1	1
>C21 to C35 Aliphatic	µg/l	-	1	8.4	1	1	1	1	1	1
Total Aliphatic C5-35	µg/l	-	10	11	10	10	10	10	10	10
>C5 to C7 Aromatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C7 to C8 Aromatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C8 to C10 Aromatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C10 to C12 Aromatic	µg/l	-	1	1	1	1	1	1	1	1
>C12 to C16 Aromatic	µg/l	-	1	1	1	1	1	1	1	1
>C16 to C21 Aromatic	µg/l	-	1	1	1	1	1	1	1	1
>C21 TO C35 Aromatic	µg/l	-	1	1	1	1	1	1	1	1
Total Aromatic C5-C35	µg/l	-	10	10	10	10	10	10	10	10
TPH Ali/Aro	µg/l	10	10	11	10	10	10	10	10	10
Benzene	µg/l	1	1	1	1	1	1	1	1	1
Ethylbenzene	µg/l	300	1	1	1	1	1	1	1	1
Toluene	µg/l	700	1	1	1	1	1	1	1	1
Xylene	µg/l	500	1	1	1	1	1	1	1	1
naphthalene	µg/l	-	0.03	0.06	0.02	0.77	0.02	0.01	0.01	0.01
acenaphthylene	µg/l	-	0.01	0.02	0.02	0.06	0.01	0.01	0.01	0.01
acenaphthene	µg/l	-	0.01	0.02	0.38	0.02	0.01	0.01	0.01	0.01
fluorene	µg/l	-	0.01	0.03	0.01	0.05	0.01	0.01	0.01	0.01
phenanthrene	µg/l	-	0.01	0.09	0.01	0.09	0.01	0.01	0.01	0.01
anthracene	µg/l	-	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.01
fluoranthene	µg/l	-	0.02	0.07	0.01	0.03	0.03	0.01	0.02	0.01
pyrene	µg/l	-	0.05	0.17	0.04	0.03	0.06	0.01	0.02	0.01
benzo(a)anthracene	µg/l	-	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
chrysene	µg/l	-	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
benzo(b)fluoranthene	µg/l	0.1	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
benzo(k)fluoranthene	µg/l	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
benzo(a)pyrene	µg/l	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
benzo(g,h,i)perylene	µg/l	-	0.01	0.04	0.01	0.01	0.02	0.01	0.01	0.01
dibenzo(ah)anthracene	µg/l	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
indeno(1,2,3-c,d)pyrene	µg/l	-	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Total PAH	µg/l	0.1	0.11	0.62	0.48	1.1	0.12	0.04	0.07	0.04

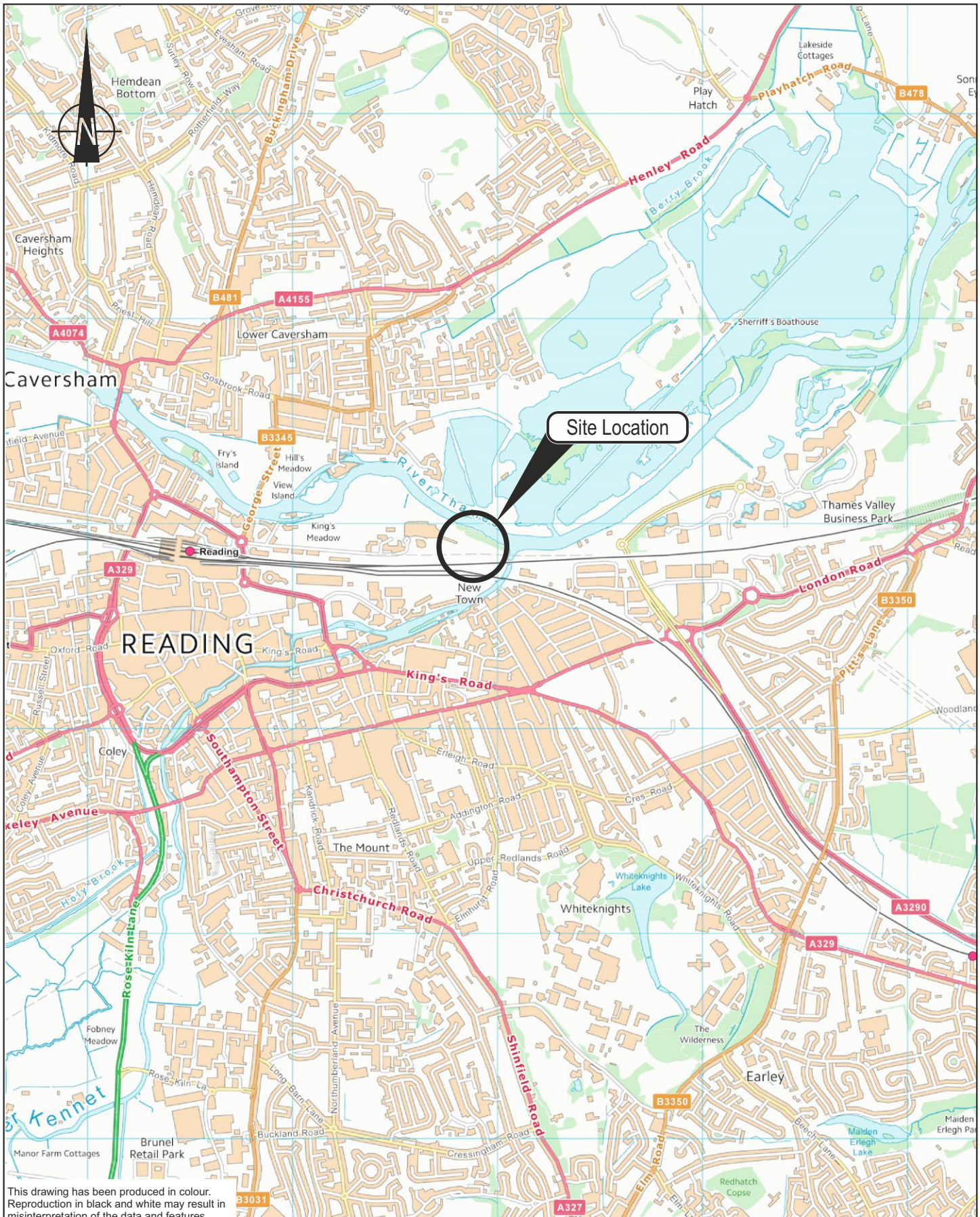


EAST READING MRT

TABLE SUMMARISING WATER RESULTS AND HIGHLIGHTING EXCEEDANCES ABOVE WATER ASSESSMENT CRITERIA

		Assessment Criteria	BH1	BH2	BH3	HP1	HP3	SW1	SW2	SW3
Analyte	Units	Fresh Water	23/03/2017	23/03/2017	23/03/2017	23/03/2017	23/03/2017	23/03/2017	23/03/2017	23/03/2017
Arsenic	µg/l	20	3.4	2.1	1.2			0.6	0.81	0.89
Cadmium	µg/l	0.08	0.03	0.04	0.03			0.03	0.03	0.03
Chromium Trivalent	µg/l	4.7	1	1	1			5.1	5.7	5.8
Copper	µg/l	1	0.4	1.9	1.2			5	3.8	3.1
Lead	µg/l	1.2	0.23	0.69	3.9			0.4	0.6	0.46
Mercury	µg/l	0.07	0.01	0.01	0.01			0.01	0.01	0.01
Nickel	µg/l	4	7.2	12	2.9			1.2	1.8	1.2
Selenium	µg/l	-	1.1	1.2	3.8			1	0.88	0.8
Zinc	µg/l	10.9	6	110	10			5.2	5.4	8.3
Chloride	µg/l	-	34	80	58			31	30	30
Sulphate	mg/l	-	320	540	200			41	49	56
pH	pH Units	-	7.1	7	7.2	7.1	7.3	8	8.2	8.2
>C5 to C6 Aliphatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C6 to C8 Aliphatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C8 to C10 Aliphatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C10 to C12 Aliphatic	µg/l	-	1	1	1	1	1	1	1	1
>C12 to C16 Aliphatic	µg/l	-	1	1	1	1	1	1	1	1
>C16 to C21 Aliphatic	µg/l	-	1	2.8	1	1	1	1	1	1
>C21 to C35 Aliphatic	µg/l	-	1	8.4	1	1	1	1	1	1
Total Aliphatic C5-35	µg/l	-	10	11	10	10	10	10	10	10
>C5 to C7 Aromatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C7 to C8 Aromatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C8 to C10 Aromatic	µg/l	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
>C10 to C12 Aromatic	µg/l	-	1	1	1	1	1	1	1	1
>C12 to C16 Aromatic	µg/l	-	1	1	1	1	1	1	1	1
>C16 to C21 Aromatic	µg/l	-	1	1	1	1	1	1	1	1
>C21 TO C35 Aromatic	µg/l	-	1	1	1	1	1	1	1	1
Total Aromatic C5-C35	µg/l	-	10	10	10	10	10	10	10	10
TPH Ali/Aro	µg/l	-	10	11	10	10	10	10	10	10
Benzene	µg/l	10	1	1	1	1	1	1	1	1
Ethylbenzene	µg/l	-	1	1	1	1	1	1	1	1
Toluene	µg/l	74	1	1	1	1	1	1	1	1
Xylene	µg/l	30	1	1	1	1	1	1	1	1
naphthalene	µg/l	2	0.03	0.06	0.02	0.77	0.02	0.01	0.01	0.01
acenaphthylene	µg/l	-	0.01	0.02	0.02	0.06	0.01	0.01	0.01	0.01
acenaphthene	µg/l	-	0.01	0.02	0.38	0.02	0.01	0.01	0.01	0.01
fluorene	µg/l	-	0.01	0.03	0.01	0.05	0.01	0.01	0.01	0.01
phenanthrene	µg/l	-	0.01	0.09	0.01	0.09	0.01	0.01	0.01	0.01
anthracene	µg/l	0.1	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.01
fluoranthene	µg/l	0.0063	0.02	0.07	0.01	0.03	0.03	0.01	0.02	0.01
pyrene	µg/l	-	0.05	0.17	0.04	0.03	0.06	0.01	0.02	0.01
benzo(a)anthracene	µg/l	-	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
chrysene	µg/l	-	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
benzo(b)fluoranthene	µg/l	0.017	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
benzo(k)fluoranthene	µg/l	0.017	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
benzo(a)pyrene	µg/l	0.0017	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
benzo(g,h,i)perylene	µg/l	0.0082	0.01	0.04	0.01	0.01	0.02	0.01	0.01	0.01
dibenzo(ah)anthracene	µg/l	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
indeno(1,2,3-c,d)pyrene	µg/l	-	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Total PAH	µg/l	-	0.11	0.62	0.48	1.1	0.12	0.04	0.07	0.04

FIGURES



This drawing has been produced in colour. Reproduction in black and white may result in misinterpretation of the data and features being presented.

Site Grid Ref: SU 730 738



Offices throughout the UK and continental Europe.
www.peterbrett.com

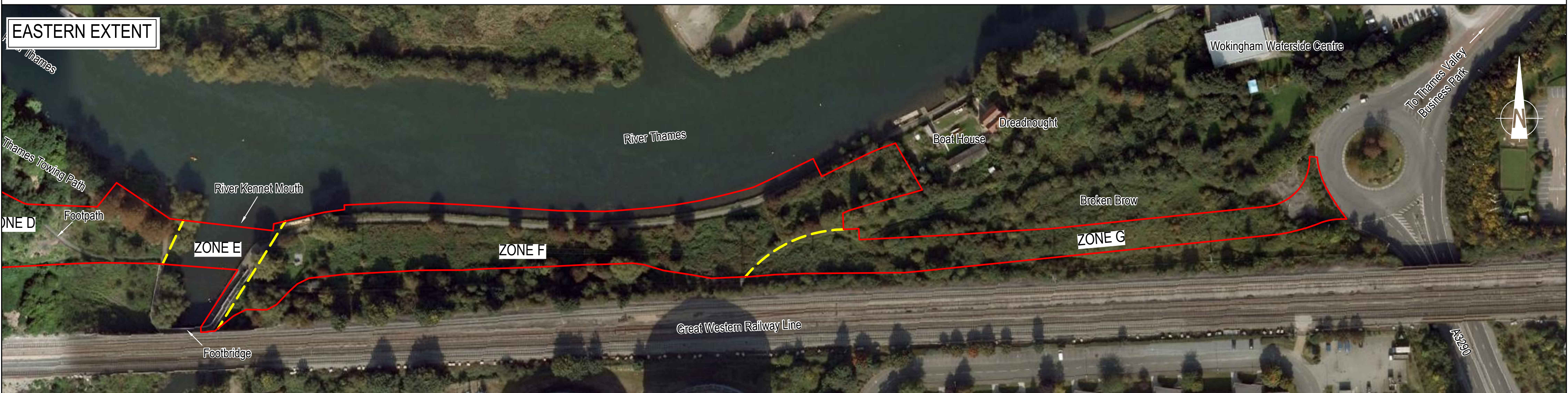
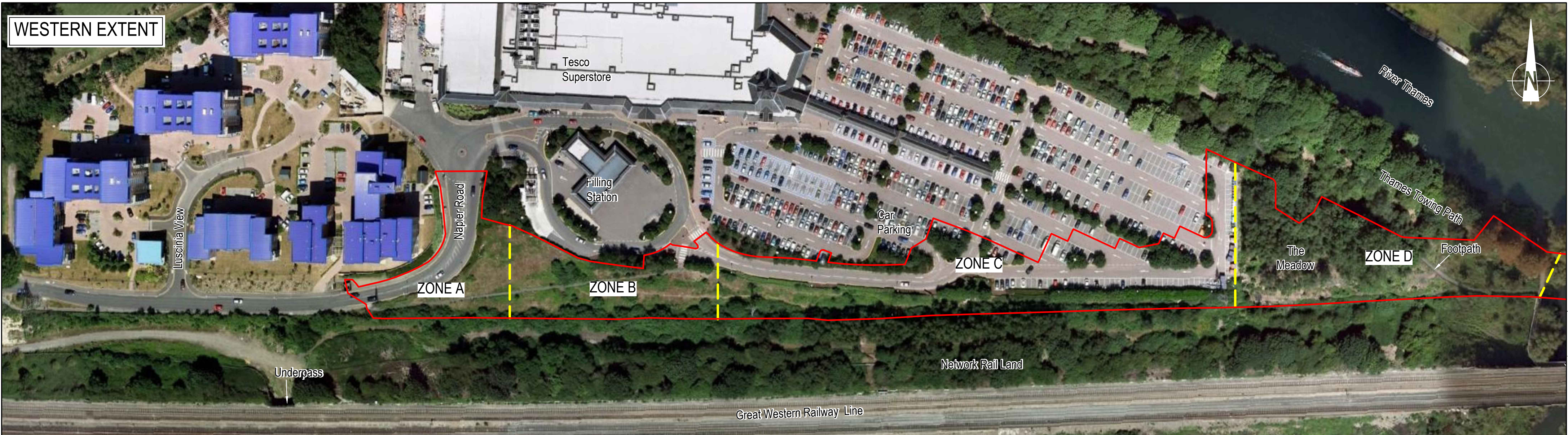
Client
**READING BOROUGH
COUNCIL HIGHWAYS AND
TRANSPORT DEPARTMENT**

Contains Ordnance Survey data © Crown copyright and database right 2015.

**EAST READING MASS RAPID
TRANSIT SCHEME**

SITE LOCATION PLAN

Date	02.05.2017
A4 Scale	1:25 000
Drawn by	davco
Checked by	AZ
Revision	0
FIGURE 1	



Key

Approximate Site Boundary

Note:
This drawing has been produced in colour. Reproduction in black and white may result in misinterpretation of the data and features being presented.

EAST READING MASS RAPID TRANSIT SCHEME

SITE LAYOUT PLAN

Client
READING BOROUGH COUNCIL HIGHWAYS AND TRANSPORT DEPARTMENT

Date of 1st Issue
02.05.2017

Drawn by
davco

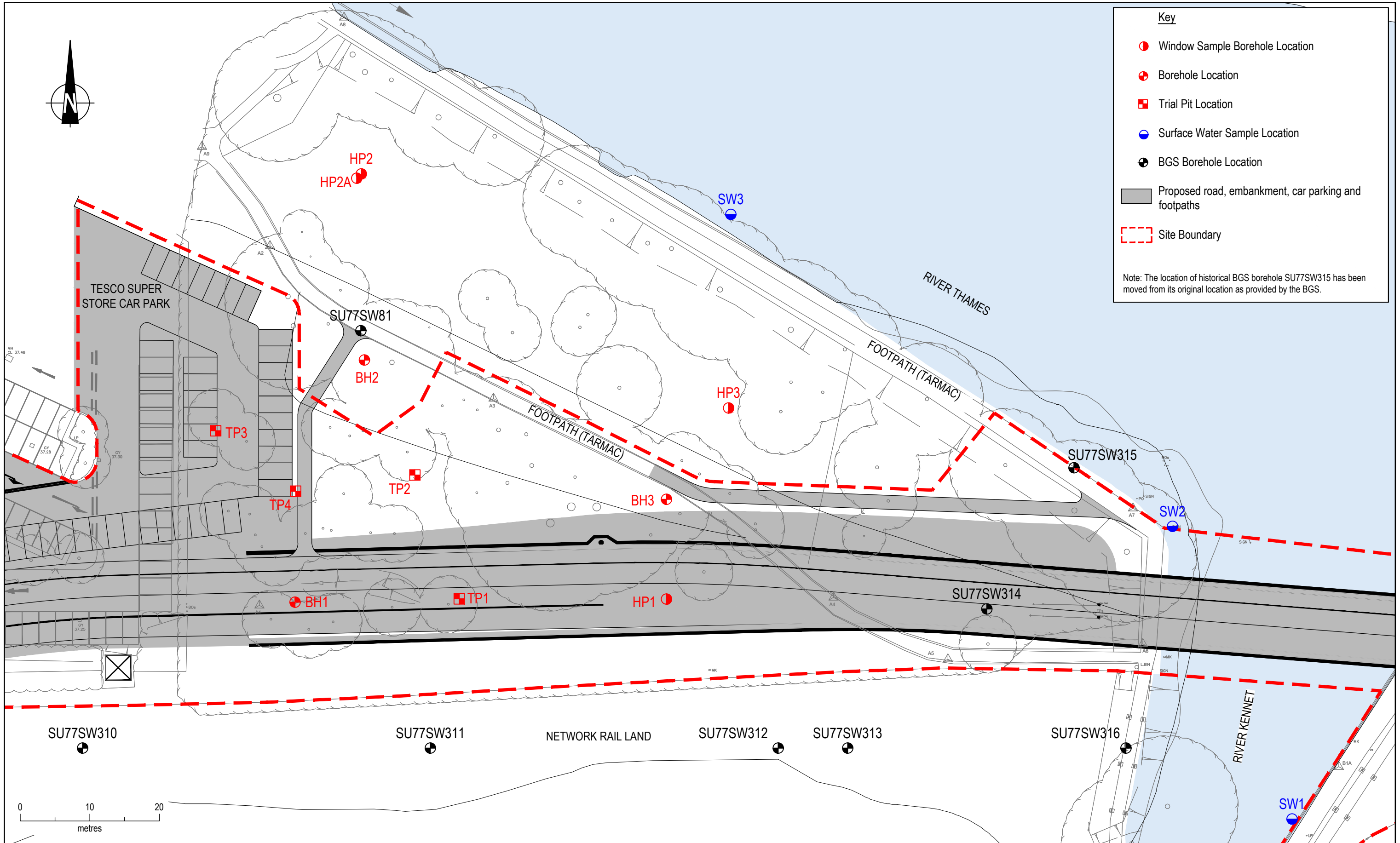
A2 Scale
1:1250

Checked by
AZ

Figure Number
2



Offices throughout the UK and Europe
www.peterbrett.com
© Peter Brett Associates LLP
READING
Tel: 0118 950 0761



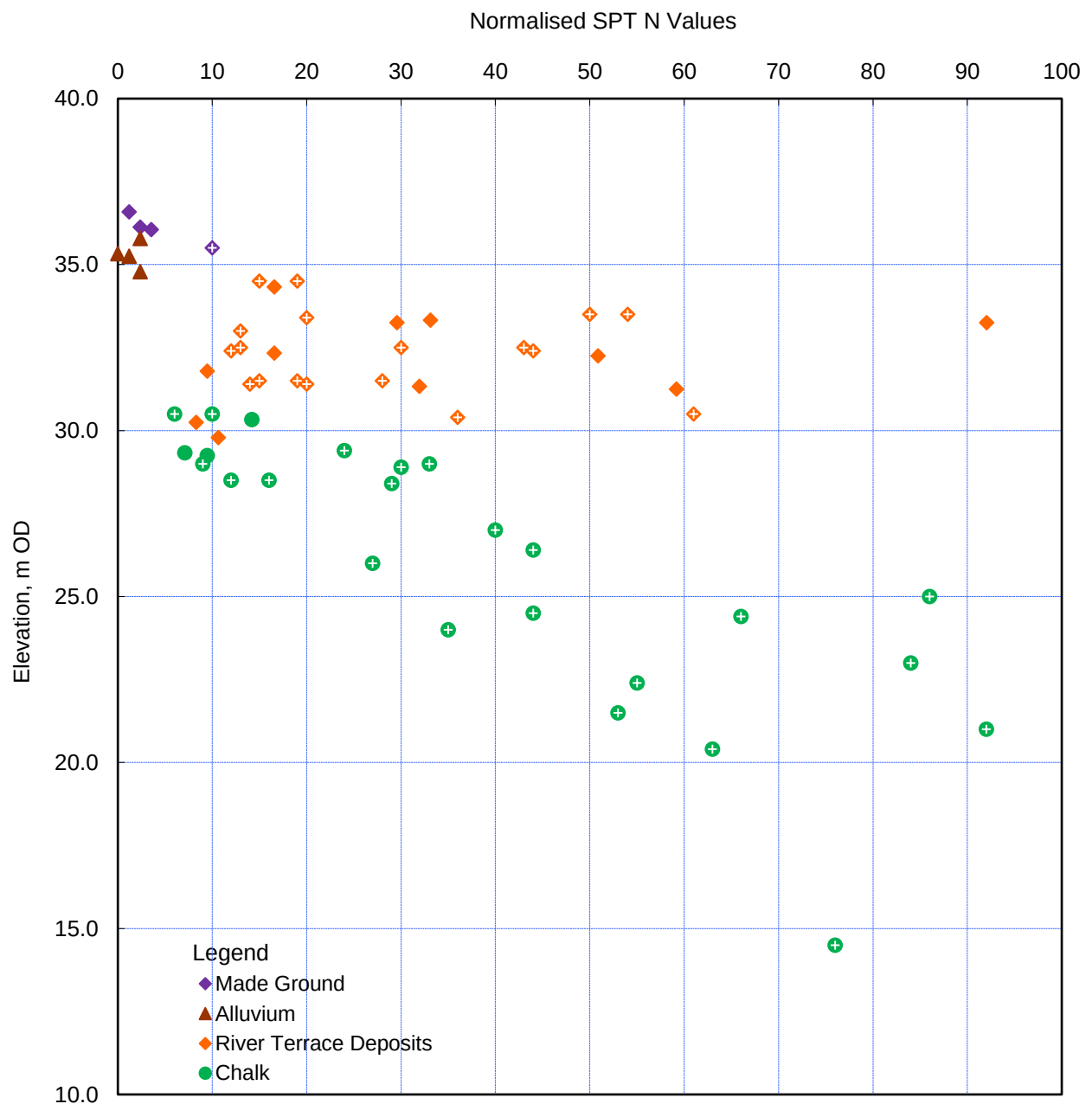


Offices throughout
the UK and Europe
www.peterbrett.com
© Peter Brett Associates LLP
READING
Tel: 0118 950 0761

Client
READING BOROUGH
COUNCIL HIGHWAYS AND
TRANSPORT DEPARTMENT

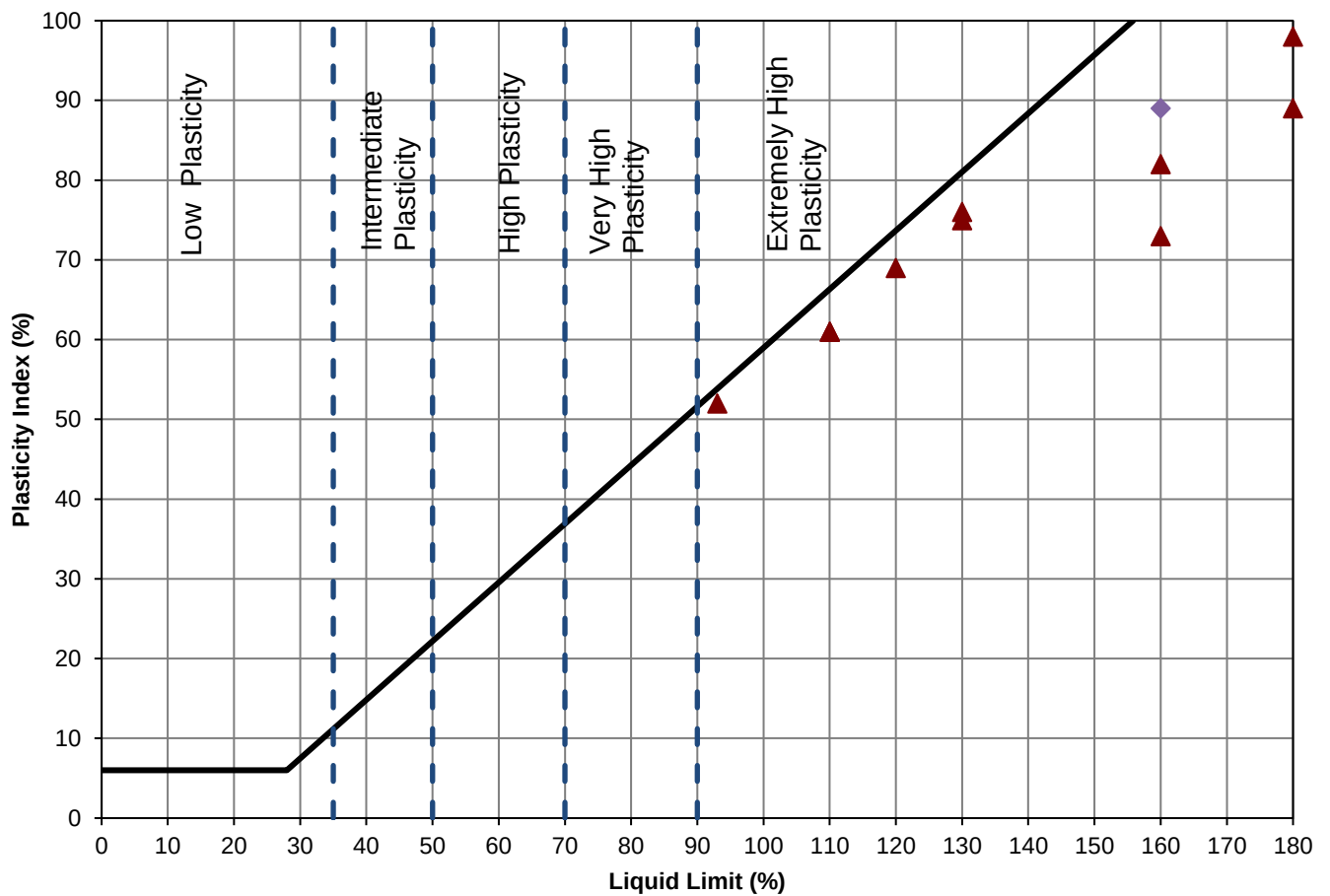
EAST READING MASS RAPID TRANSIT SCHEME
EXPLORATORY HOLE LOCATION PLAN

Date	02.05.2017
A3 Scale	1:500
Drawn by	davco
Checked by	AZ
Figure Number	3



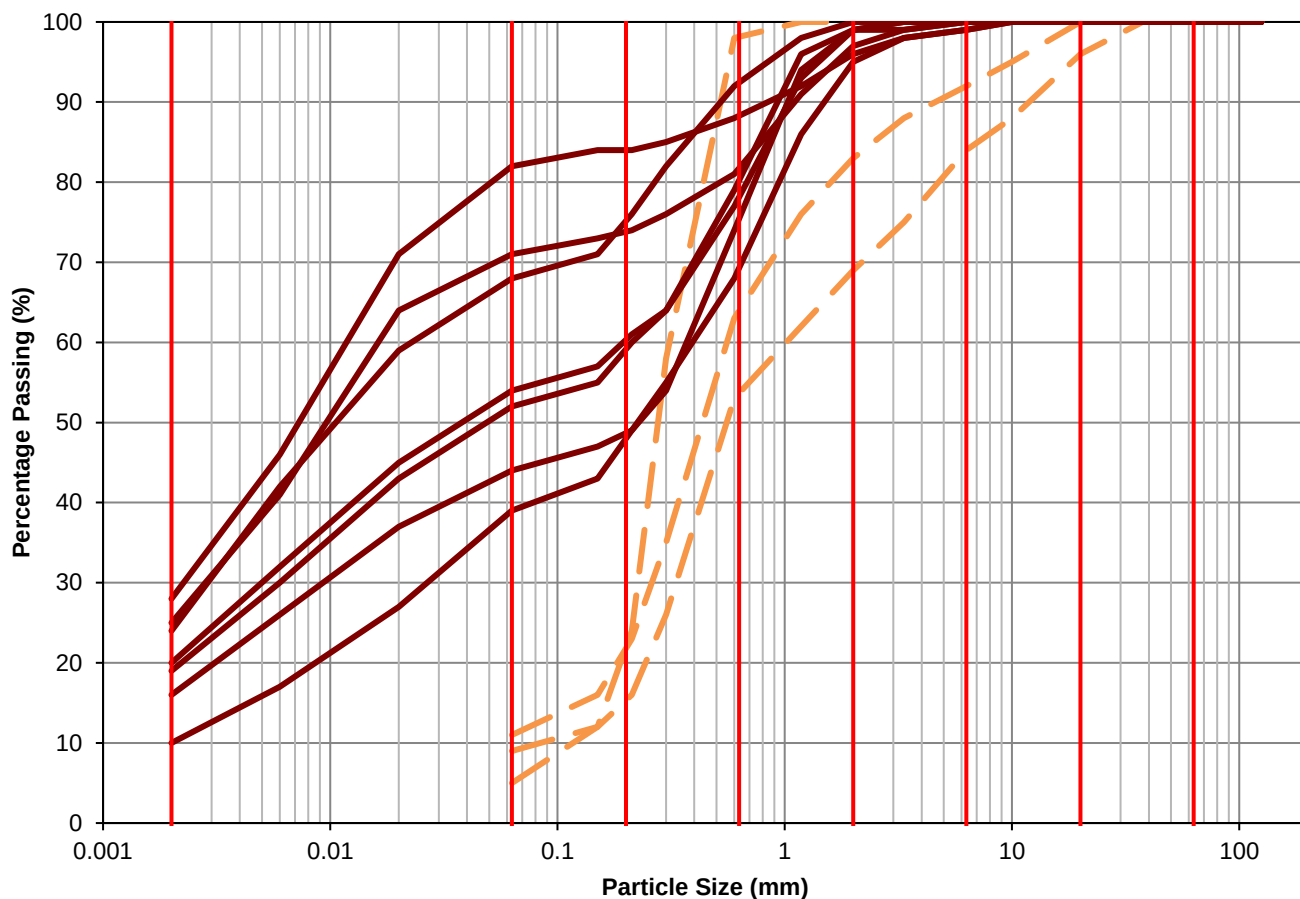
- Note: 1. SPT N values have been normalised for hammer efficiency
 2. Selected Data: Zone D only
 3. Symbols marked + denote data from historical ground investigations
 4. Values from historical ground investigations were normalised using an assumed hammer efficiency of 60%

	Client	NORMALISED SPT N VALUES East Reading Mass Rapid Transit Scheme	Date	June 2017
	Reading Borough Council Highways and Transport Department		A4 Scale	nts
			Drawn	az
			Checked	rht
			Figure	
Caversham Bridge House, Waterman Place, Reading, RG1 8DN Tel 0118 950 0761 Fax 0118 959 7499				



▲ Alluvium ◆ Made Ground — A - Line

Clay	Silt	Fine	Med	Coarse	Fine	Med	Coarse	Cobbles
		Sand			Gravel			



— Alluvium - - - River Terrace Deposits

APPENDIX 1

1 Introduction

The aim of this document is to present an explanation for the selection of the assessment criteria routinely used by PBA when undertaking a Tier 2 contamination risk assessment. Any deviation from the routine criteria and/or selection of criteria for parameters not covered in this document will be described in the report text.

A Tier 2 assessment is a quantitative assessment using published criteria to screen the site-specific contamination testing data and identify potential hazards to specific receptors. Generic criteria are typically cautious in derivation and exceedance does not indicate that a site is statutorily contaminated and/or necessarily unsuitable for use in the planning context. These criteria are used to identify situations where further assessment and/or action may be required.

This document is divided into general introductory text and sections on soils, waters and gases.

2 General Notes

This document should be read in conjunction with another entitled "PBA Methodology for Assessment of Land Contamination" which summarises the legislative regime and our approach to ground contamination and risk assessment.

Any PBA interpretation of contamination test results is based on a scientific and engineering appraisal. The perceptions of, for example, banks, insurers, lay people etc are not taken into account.

Any tables included in this document are produced for ease of reference to the criteria, they do not in any way replace the documents of origin (which are fully referenced) and which should be read to ensure appropriate use and interpretation of the data.

Generic criteria provide an aid to decision-making, but they do not replace the need for sound professional judgement in risk assessment (EA, 2006b). The criteria are based on numerous and complex assumptions. The appropriateness of these assumptions in a site-specific context requires confirmation on a project by project basis. Our interpretative report will comment on the appropriateness of the routine criteria for project objectives or ground conditions. It is important to note that if the use of the published criteria is challenged, it may be necessary to carry out modelling to generate site-specific assessment criteria.

3 Criteria for Assessing Soil Results

3.1 Potential Harm to Human Health

The criteria routinely used by PBA as Tier 2 soil screening values for the protection of human health are:-

- Suitable 4 Use Levels (S4ULs) published in 2015 which adopt a minimal or tolerable risk as described in SR2 (EA 2009c).
- Category 4 Screening Levels (C4SLs) published in 2014 which adopt a "low level of toxicological concern" (LLTC) as the toxicological benchmark.

The criteria have been generated using the Contaminated Land Exposure Assessment model (CLEA) and supporting technical guidance (EA, 2009a, 2009b, 2009c). The CLEA model uses generic assumptions about the fate and transport of chemicals in the environment and a generic conceptual model for site conditions and human behaviour to estimate child and adult exposures to soil contaminants for those potentially living, working, and/or playing on contaminated sites over long time periods (EA, 2009b).

The handbook (EA 2009e) referring to version 1.05 is still valid for the 1.071 software. An update to the software (1.071) was published on 04/09/2015. The update includes the library data sets from the DEFRA research project SP1010 (Development of Category 4 Screening Levels for assessment of land affected by contamination). It also fixes a problem in version 1.07 with the adding of new chemicals.).

The CLEA model uses ten exposure pathways (Ingestion (outdoor soil, indoor dust, homegrown vegetables and soil attached to homegrown vegetables), Dermal Contact (outdoor soil and indoor dust) and Inhalation (outdoor dust, indoor dust, outdoor vapours and indoor vapours)). There are exposure pathways not included in the CLEA model such as the permeation of organics into plastic water supply pipes.

The presence and/or significance of each of the potential exposure pathways is dependent on the land use being considered. The model uses standard land use scenarios as follows:-

Residential – habitation of a dwelling up to two storeys high with various default material and design parameters, access to either private or nearby community open space with soil track back to form indoor dust. Assumes ingestion of homegrown produce.

Allotments – the model has default parameters for use and consumption of vegetables but not animals or their products (eggs).

Industrial/commercial – assumes office or light physical work in a permanent three storey structure with breaks taken outside and that the site is NOT covered in hardstanding.

The assessment criteria generated using CLEA can be used as a starting point for evaluating long-term risks to human health from chemicals in soil. It is important to note that the model does not assess all the potential exposure risks for example risk to workers in excavations (short term exposure), inhalation of vapours generated from contaminants in groundwater, diffusion of contaminants through drinking water pipes.

Recent guidance (DEFRA 2012) introduces a four stage classification system where Category 1 sites are obviously contaminated and Category 4 sites uncontaminated as defined by EPA 1990. Outside of these categories further specific risk assessment is required to determine if the site should fall into Category 2 contaminated or Category 3 uncontaminated. Category 4 screening values are considered to be more pragmatic than the current published SGV/GAC criteria but still strongly precautionary with the aim of allowing rapid identification of sites where the risk is above minimal but still low/acceptable (within the context of Part 2A).

At the end of 2013 technical guidance in support of DEFRA's revised Statutory Guidance (SG) was published (CL:AIRE 2013) which provided:

- A methodology for deriving C4SLs for the standard land-uses and two new public open space scenarios using the updated assumptions relating to the modelling of human exposure to soil contaminants; and
- A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

Following issue of an Erratum in December 2014 a Policy Companion Document was published (DEFRA 2014B).

Soil Guideline Values (SGVs)

The first series of SGVs were generated using a probabilistic version of the CLEA model. However, on 22 July 2008 DEFRA announced the withdrawal of these SGVs and revised SGVs were calculated for all substances except lead using a deterministic version of the CLEA model (v1.05). Table 1 presents the SGVs which have not been withdrawn but it should be noted that they were developed using assumptions for body weight and inhalation rates that have been revised since publication.

Category 4 Screening Levels (C4SLs)

A letter from Lord de Mauley dated 3rd September 2014 provides more explicit direction to local authorities on the use of the C4SL in a planning context. The letter identifies four key points:

- 1) that the screening values were developed expressly with the planning regime in mind
- 2) their use is recommended in DCLG's planning guidance
- 3) soil concentrations below a C4SL limit are considered to be 'definitely not contaminated' under Part IIA of the 1990 Environmental Protection Act and pose at most a 'low level of toxicological concern' and
- 4) exceedance of a C4SL screening value does not mean that land is definitely contaminated, just that further investigation may be warranted. Table 6 summarises the C4SL (DEFRA 2014B) for each of the six substances. PBA uses the criterion for lead and may use the other criteria, depending on site specific conditions.

Suitable 4 Use Levels (S4ULs)

In July 2009, Generic Assessment Criteria (GACs) for 82 substances were published by the Chartered Institute of Environmental Health (CIEH) (LQM and CIEH, 2009) using the then current version of the CLEA software v1.04 and replacing those generated in 2006 using the original version of the model CLEA UK beta. In 2015 S4ULs were published by LQM/CIEH to replace the second edition GACs. Table 5 summarises the S4ULs.

Note on Mercury, Chromium and Arsenic Assessment The analytical testing routinely undertaken by PBA determines total concentration, however, the toxicity depends on the form of the contaminant.

If a source of Mercury, Chromium or Arsenic is identified or the total concentration exceeds the relevant worst case speciated criteria it will be desirable/necessary to undertake additional speciated testing and further assessment.

Note on Polycyclic Aromatic Hydrocarbons

Polycyclic Aromatic Hydrocarbons (PAHs) are a family of hundreds of different congeners whose chemical structures contain 2 or more fused aromatic rings. Whilst it is recognised that there is an ongoing debate on the most appropriate method to assess health effects of PAH mixtures in 2010 the Health Protection Agency recommended the use of benzo[a]pyrene (BaP) as a surrogate marker approach in the assessment of carcinogenic risks posed by PAHs in soils.

In most cases, BaP is chosen as the surrogate marker (SM) due to its ubiquitous nature and the vast amount of data available and has been used by various authoritative bodies to assess the carcinogenic risk of PAHs in food. The SM approach estimates the toxicity of a mixture of PAHs in an environmental matrix by using toxicity data for a PAH mixture for which the composition is known.

Exposure to the SM is assumed to represent exposure to all PAHs in that matrix therefore the toxicity of the SM represents the toxicity of the mixture. The SM approach relies on a number of assumptions (HPA 2010).

- The SM (BaP) must be present in all the samples.
- The profile of the different PAH relative to BaP should be similar in all samples.
- The PAH profile in the soil samples should be sufficiently similar to that used in the pivotal toxicity study on which HBGV was based i.e. the Culp study (Culp et al. (1998)).

In order to justify the use of a surrogate marker assessment criterion (C4SL for benzo(a)pyrene and S4UL coal tar) the LQM PAH Profiling Tool is used by PBA to assess the similarity of the PAH profile in a soil sample to that of the toxicity study. The spreadsheet that calculates the relative proportions of the genotoxic PAHs and plots them on the two charts relative to composition of the two coal mixtures used by Culp et al. (the plus/minus an order of magnitude limits suggested by HPA).

Note on Asbestos

Asbestos in soil and made ground is currently under review by a number of bodies. There are no current published guidance values for asbestos in soil other than the waste classification values given in the EA's Technical Guidance WM3, Hazardous Waste – Interpretation of the definition and classification of hazard waste (3d Edition, 2015). This guidance is only appropriate for soils that are being discarded as waste.

Testing for asbestos will be carried out on selected samples of made ground encountered during investigation, initially samples will be subjected to an asbestos screen and, if asbestos is found to be present, subjected to quantification depending on the project specific requirements. The reader is directed to the report text for guidance on the approach adopted in respect to any asbestos found to be present. Further guidance is also available in the 2014 CIRIA publication C733, Asbestos in soil and made ground: a guide to understanding and managing risks.

3.2 Potential Harm to the Built Environment

Land contamination can pose risks to buildings, building materials and services (BBM&S) in a number of ways. Volatile contaminants and gases can accumulate and cause explosion or fire. Foundations and buried services can be damaged by corrosive substances and contaminants such as steel slags can create unstable ground conditions through expansion causing structural damage.

PBA use the following primary guidance to assess the significance of soil chemistry with respect to its potential to harm the built environment.

- i) Approved Document C - Site Preparation and Resistance to Contaminants and Moisture. (DCLG 2010);
- ii) Concrete in aggressive ground SD1 (BRE 2005);
- iii) Guidance for the selection of water supply pipes to be used in brownfield sites (UKWIR 2011);
- iv) Protocols published by agreement between Water UK and the Home Builders Federation providing supplementary guidance which includes the Risk Assessment for Water Pipes (the 'RA') (Water UK 2014).
- v) Performance of Building Materials in Contaminated Land report BR255 (BRE 1994).
- vi) Risks of Contaminated Land to Buildings, Building Materials and Services. A Literature Review - Technical Report P331 (EA 2000).
- vii) Guidance on assessing and managing risks to buildings from land contamination - Technical Report P5 035/TR/01 (EA 2001).

3.3 Potential to Harm Ecosystems, Animals, Crops etc

The criteria routinely used by PBA as Tier 2 screening values to assess the potential of soil chemistry to harm ecosystems are taken from the following guidance and summarised in are given in Table 2.

- i) Ecological Risk Assessment (ERA) Science Report Series SC070009, published by the Environment Agency, Bristol (EA, 2008);
- ii) The Restoration and Aftercare of Metalliferous Mining Sites for Pasture and Grazing (ICRCL 70/90, 1990); and
- iii) Code of Practice for Agricultural Use of Sewage Sludge 2nd Edition (DOE, 2006).
- iv) BS 3882:2015 Specification for topsoil and requirements for use.

Unless stated in the report the assessment is solely for phytotoxic parameters and additional assessment is required to determine suitability as a growing medium.

4 Criteria for Assessing Liquid Results

4.1 Potential Harm to Human Health

The criteria routinely used by PBA as Tier 2 water screening values (Table 4) are taken from Statutory Instrument (S.I.) The Water Supply (Water Quality) Regulations (S.I. 2016/614).

It should be noted that some of the prescribed concentrations listed in the Water Supply Regulations have been set for reasons other than their potential to cause harm to human health. The concentrations of iron and manganese are controlled because they may taint potable water with an undesirable taste, odour or colour or may potentially deposit precipitates in water supply pipes.

4.2 Potential to Harm Controlled Waters

When assessing ground condition data and the potential to harm Controlled Waters PBA uses the approach presented in Groundwater Protection Policy and Practice (GP3) (EA 2013). Controlled Waters are rivers, estuaries, coastal waters, lakes and groundwaters. Water in the unsaturated zone is not groundwater but does come within the scope of the term “ground waters” as used and defined in the Water Resources Act 1991. It will continue to be a technical decision for the Environment Agency to determine what is groundwater in certain circumstances for the purposes of the Regulations.

The EU Water Framework Directive (WFD) 2000/60/EC provides for the protection of sub-surface, surface, coastal and territorial waters through a framework of river basin management.

The EU Updated Water Framework Standards Directive 2014/101/EU amended the EU WFD to update the international standards therein; it entered into force on 20 November 2014 and its provisions must be transposed in Member State law by 20 May 2016.

Member States are required under the EU WFD to update their river basin management plans every six years. The first river basin management plans for England and Wales, Scotland and Northern Ireland were published in December 2009, and the process of producing the second RBMPs is currently ongoing.

Other EU Directives in the European water management framework include:

- the EU Priority Substances Directive 2013/39/EU;
- EU Groundwater Pollutants Threshold Values Directive 2014/80/EU amending the EU Groundwater Directive 2006/118/EC; and
- the EU Biological Monitoring Directive 2014/101/EU.

The Priority Substances Directive set environmental quality standards (EQS) for the substances in surface waters (river, lake, transitional and coastal) and confirmed their designation as priority or priority hazardous substances (PS), the latter being a subset of particular concern. Environmental Quality Standards for PS are determined at the European level and apply to all Member States. Member States identify and develop standards for ‘Specific

Pollutants’. Specific Pollutants (SP) are defined as substances that can have a harmful effect on biological quality.

The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 were issued by Defra to the Environment Agency as an associated document of the Water Environment (WFD) (England and Wales) Regulations 2015 (S.I. 2015/1623) and provide directions for the classification of surface water and groundwater bodies. Schedule 3 parts 2 and 3 relate to surface water standards for specific pollutants in fresh or salt water bodies and priority substances in inland (rivers, lakes and related modified/artificial bodies) or other surface waters respectively. Although Schedule 5 presents threshold values for groundwater the Direction specifically excludes their use as part of site specific investigations.

The criteria routinely used by PBA as Tier 2 screening values (Table 4). This table only presents a selection of the more commonly analysed parameters and the source documents should be consulted for other chemicals. For screening groundwater the criteria selected are the standards for surface water and/or human consumption as appropriate together with the following:-

For a **hazardous substance** PBA adopts the approach that, if the concentration in a discharge is less than the Minimum Reporting Value (MRV), the input is regarded as automatically meeting the Article 2 (b) ‘de-minimis’ requirement of exemption 6 (3) (b) of the GWDD. PBA has selected hazardous substances and associated MRV from those listed in Table 13 of UKTAG WFD River Basin Management 2015-21 Updated Recommendations on Environmental Standards (as referenced in Defra 2014). MRV is the lowest concentration of a substance that can be routinely determined with a known degree of confidence, and may not be equivalent to limit of detection.

For **non-hazardous substances** the GWDD requires that inputs be limited to avoid deterioration. UKTAG guidance equates deterioration with pollution. Non-hazardous substances are all substances not classified as hazardous.

5 Criteria for Assessing Gas Results

PBA use the following primary guidance on gas monitoring methods and strategy, the assessment of risk posed by soil gases (including Volatile Organic Compounds (VOCs)) and mitigation measures/risk reduction during site development.

- i) BS 8576:2013 – Guidance on Ground Gas Investigations: Permanent gases and Volatile Organic Compounds (VOCs) (BSI 2013);

PBA Rationale for Selection of Criteria Used in Tier 2 (Generic) Risk Assessment (England)

- ii) A pragmatic approach to Ground Gas Risk Assessment. CL:AIRE Research Bulletin RB17 (Card 2012);
- iii) The VOCs Handbook. C682 (CIRIA 2009).
- iv) Assessing risks posed by hazardous gases to buildings C665 (CIRIA 2007);
- v) Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present. (NHBC 2007); and
- vi) BS 8485:2015 - Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (BSI 2015).

Gas and borehole flow data are used to obtain the gas screening value (GSV) for methane and carbon dioxide. The GSV is used to establish the characteristic situation and to make recommendations for gas protection measures for buildings if required.

Radon

PBA use the following primary guidance to assess the significance of the radon content of soil gas.

- i) Radon: guidance on protective measures for new dwellings. Report BR211 (BRE, 2015); and
- ii) Radon Atlas of England, R290 (NRPB, 1996).

6 References

BRE (2005) Concrete in aggressive ground. Special Digest 1, Building Research Establishment, Garston, Herts.

BRE (2015) BR211-2015 : Radon: Guidance on protective measures for new buildings (2015 edition) Building Research Establishment, Garston, Herts.

BSI (2015) BS 8485:2015 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. British Standards Institute, London.

BSI (2011) BS10175:2011 +A1:2013 Investigation of contaminated sites – code of practice. British Standards Institute, London.

BSI (2013) BS 8576:2013 – Guidance on Ground Gas Investigations : Permanent gases and Volatile Organic Compounds (VOCs). British Standards Institute, London.

Card G, Wilson S, Mortimer S. (2012). A Pragmatic Approach to Ground Gas Risk Assessment. CL:AIRE Research Bulletin RB17. CL:AIRE, London, UK. ISSN 2047-6450 (Online)

CIRIA (2007) Assessing risks posed by hazardous gases to buildings. C665, Construction Industry Research and Information Association, London.

CL:AIRE (2010) Soil Generic Assessment Criteria for Human Health Risk Assessment.

Published in January 2010 by Contaminated Land: Applications in Real Environments, London. ISBN 978-1-905046-20-1.

CL:AIRE (2013) SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report published by Contaminated Land: Applications in Real Environments (CL:AIRE) 20th December 2013

CLAN2-05 Contaminated land advice note 02 from September 2005. Department for the Environment, Food and Rural Affairs, London.

DCLG (2013) Approved Document C - Site preparation and resistance to contamination and moisture (2004 Edition incorporating 2010 and 2013 amendments).

DEFRA (2012) Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance.

DEFRA (2014) Water Framework Directive implementation in England and Wales: new and updated standards to protect the water environment

DEFRA (2014B) SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document. Department for Environment, Food and Rural Affairs December 2014

DoE (2006) Code of Practice for Agricultural Use of Sewage Sludge. Department of the Environment, London.

EA (2006b) CLEA update No. 4. Environment Agency, Bristol.

EA (2008) Ecological Risk Assessment (ERA). Science Report Series SC070009, Environment Agency, Bristol.

EA (2009a) Using Soil Guideline Values. Science Report SC050021/SGV Introduction. Environment Agency, Bristol.

EA (2009b) Updated Technical Background to the CLEA model. Science Report SC050021/SR3 Introduction. Environment Agency, Bristol.

EA (2009c) Human health toxicological assessment of contaminants in soil. Science Report SC050021/SR2. Environment Agency, Bristol.

EA (2009d) Compilation data for priority organic contaminants for derivation of soil guideline values Science Report SC50021/SR7

EA (2009e) CLEA Software (Version 1.05) Handbook Science Report SC050021/SR4

EA (2013) Groundwater Protection Policy and Practice (GP3) August 2013 Version 1.1

EA (2015) Guidance on the classification and assessment of waste (3rd edition 2015) - Technical Guidance WM3

PBA Rationale for Selection of Criteria Used in Tier 2 (Generic) Risk Assessment (England)

- EA (2015) The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.
- ICRCL (1990) The Restoration and Aftercare of Metalliferous Mining Sites for Pasture and Grazing 70/90. Interdepartmental Committee on the Redevelopment of Contaminated Land, London.
- LQM & CIEH (2015) The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham.
- NRPB (1996) Radon Atlas of England. R290, National Radiological Protection Board, Didcot, Oxfordshire.
- NHBC (2007) Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present. National House Building Council.
- S.I. (2016/614). Statutory Instrument 2016 No 614 The Water Supply (Water Quality) Regulations, 2016.
- S.I. (2015/1623). Statutory Instrument 2015 No 1623 The Water Environment (WFD) (England and Wales) Regulations, 2015.
- UKWIR (2011) Guidance for the selection of Water Pipes to be used in Brownfield Sites.
- Water UK 2014 Contaminated Land Assessment Guidance

Rationale for Generic Assessment Criteria Routinely Used by PBA

Table 1: Category 4 Screening Levels (C4SL) – Table taken from SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document (Department for Environment, Food and Rural Affairs December 2014)

	Residential (with home-grown produce)	Residential (without home-grown produce)	Allotments	Commercial	Public Open Space 1	Public Open Space 2
Arsenic	37	40	49	640	79	170
Benzene	0.87	3.3	0.18	98	140	230
Benzo(a)pyrene	5.0	5.3	5.7	77	10	21
Cadmium	22	150	3.9	410	220	880
Chromium VI	21	21	170	49	21	250
Lead	200	310	80	2300	630	1300

Units mg/kg

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

Public Open Space 2 - Park Type Public Open Space Scenario

Table 2: Tier 2 Criteria for the Assessment of Soils – Protection of Ecological Systems

Parameter	ICRCL 70/90 ^a		Proposed SSVs ^b	Code of Practice for Agricultural Use of Sewage Sludge ^c	BS 3882:2015 Specification for topsoil and requirements for use
	Maximum				
	Livestock mg/kg	Crop Growth mg/kg	mg/kg	mg/kg	Phytotoxic contaminants mg/kgDS
Benzo(a)pyrene			0.15		
Arsenic	500	1000		50	
Cadmium	30	50	1.15	3	
Chromium			21.1	400	
Copper	500	250	88.4	80/ 100/ 135/ 200 ^d	<100/<135/<200 ^e
Fluoride	1000			500	
Lead	1000		167.9	300	
Mercury			0.06	1	
Molybdenum				4	
Nickel			25.1	50/ 60/ 75/ 110 ^d	<60/<75/<110 ^e
Pentachlorobenzene			0.029		
Pentachlorophenol			0.6		
Selenium				3	
Tetrachloroethene			0.01		
Toluene			0.3		
Zinc	3000	1000	90.1	200/200/200/300 ^d	<200/<200/<300 ^e

- Interdepartmental Committee on the Redevelopment of Contaminated Land (ICRCL) 70/90 Restoration and Aftercare of Metalliferous Mining Sites for Pasture and Grazing 1st edition 1990.
- Proposed Soil Screening Values (SSVs) – Consultation, Environment Agency 2008. Threshold which if exceeded prompts further assessment.
- Maximum permissible concentration of potentially toxic elements from the Code of Practice for Agricultural Use of Sewage Sludge. Second Edition. DOE 2006.
- Where four values are presented, concentrations are for soils with pH values 5.0-5.5/ 5.5-6.0/ 6.0-7.0/ >7.0
- Where three values are presented, concentrations are for soils with pH values <6.0/ 6.0-7.0/ >7.0

Rationale for Generic Assessment Criteria Routinely Used by PBA

Table 3: Suitable 4 Use Levels (S4UL) - units are mg/kg Dry Weight

Determinand	Allotment	R _{WH} P	R _{WO} HP	Commercial/ Industrial	POSresi	POSpark
Metals						
Arsenic (Inorganic) ^{a, b, c}	43	37	40	640	79	170
Beryllium ^{a, b, d, e}	35	1.7	1.7	12	2.2	63
Boron ^{a, b, d}	45	290	11000	240000	21000	46000
Cadmium (pH6-8) ^{a, b, d, f}	1.9	11	85	190	120	560
Chromium (trivalent) ^{a, b, d, g}	18000	910	910	8600	1500	33000
Chromium (hexavalent) ^{a, b, c}	1.8 ^h	6 ⁱ	6 ⁱ	33 ^j	7.7 ^j	220 ^j
Copper ^{a, b, c}	520	2400	7100	68000	12000	44000
Mercury (elemental) ^{a, b, c, j}	21	1.2	1.2	58 ^{vap} (25.8)	16	30 ^{vap} (25.8)
Mercury (inorganic) ^{a, b, c}	19	40	56	1100	120	240
Methylmercury ^{a, b, c}	6	11	15	320	40	68
Nickel ^{a, b, c}	53 ^k	130 ^e	180 ^e	980 ^e	230 ^e	800 ^k
Selenium ^{a, b, c}	88	250	430	12000	1100	1800
Vanadium ^{a, b, c, i, j}	91	410	1200	9000	2000	5000
Zinc ^{a, b, c}	620	3700	40000	730000	81000	170000
BTEX Compounds (SOM 1%/ 2.5%/ 6%)						
Benzene ^{a, b, l, m}	0.017/0.034/ 0.075	0.087/0.17/ 0.37	0.38/0.7/1.4	27 / 47 / 90	72 / 72 / 73	90 / 100 / 110
Toluene ^{a, b, l, m}	22 / 51 / 120	130 / 290 / 660	800 ^{vap} (869) /1900/3900	56000 ^{vap} (869) / 110000 ^{vap} (1920) / 180000 ^{vap} (4360)	56000 / 56000 / 56000	87000 ^{vap} (869) / 95000 ^{vap} (1920) / 100000 ^{vap} (4360)
Ethylbenzene ^{a, b, l, m}	16 / 39 / 91	47 / 110 / 260	83 / 190 / 440	5700 ^{vap} (518) / 13000 ^{vap} (1220) / 27000 ^{vap} (2840)	24000 / 24000 / 25000	17000 ^{vap} (518) / 22000 ^{vap} (1220) / 27000 ^{vap} (2840)
O – Xylene ^{a, b, l, m, n}	28 / 67 / 160	60 / 140 / 330	88 / 210 / 480	6600 ^{sol} (478) / 15000 ^{sol} (1120) / 33000 ^{sol} (2620)	41000 / 42000 / 43000	17000 ^{sol} (478) / 24000 ^{sol} (1120) / 33000 ^{sol} (2620)
M – Xylene ^{a, b, l, m, n}	31 / 74 / 170	59 / 140 / 320	82 / 190 / 450	6200 ^{vap} (625) / 14000 ^{vap} (1470) / 31000 ^{vap} (3460)	41000 / 42000 / 43000	17000 ^{vap} (625) / 24000 ^{vap} (1470) / 32000 ^{vap} (3460)
P – Xylene ^{a, b, l, m, n}	29 / 69 / 160	56 / 130 / 310	79 / 180 / 430	5900 ^{sol} (576) / 14000 ^{sol} (1350) / 30000 ^{sol} (3170)	41000 / 42000 / 43000	17000 ^{sol} (576) / 23000 ^{sol} (1350) / 31000 ^{sol} (3170)
Polycyclic Aromatic Hydrocarbons (SOM 1%/ 2.5%/ 6%)^{a, b, l, p}						
Acenaphthene	34 / 85 / 200	210 / 510 / 1100	3000 ^{sol} (57.0) / 4700 ^{sol} (141) / 6000 ^{sol} (336)	84000 ^{sol} (57.0) / 97000 ^{sol} (141) / 100000	15000 / 15000 / 15000	29000 / 30000 / 30000
Acenaphthylene	28 / 69 / 160	170 / 420 / 920	2900 ^{sol} (86.1) / 4600 ^{sol} (212) / 6000 ^{sol} (506)	83000 ^{sol} (86.1) / 97000 ^{sol} (212) / 100000	15000 / 15000 / 15000	29000 / 30000 / 30000
Anthracene	380 / 950 / 2200	2400 / 5400 / 11000	31000 ^{sol} (1.17 /35000/ 37000)	520000 / 540000 / 540000	74000 / 74000 / 74000	150000 / 150000 / 150000
Benzo(a)anthracene	2.9 / 6.5 / 13	7.2 / 11 / 13	11 / 14 / 15	170 / 170 / 180	29 / 29 / 29	49 / 56 / 62
Benzo(a)pyrene (Bap)	0.97 / 2.0 / 3.5	2.2 / 2.7 / 3.0	3.2 / 3.2 / 3.2	35 / 35 / 36	5.7 / 5.7 / 5.7	11 / 12 / 13
Benzo(b)fluoranthene	0.99 / 2.1 / 3.9	2.6 / 3.3 / 3.7	3.9 / 4.0 / 4.0	44 / 44 / 45	7.1 / 7.2 / 7.2	13 / 15 / 16
Benzo(g,h,i)perylene	290 / 470 / 640	320 / 340 / 350	360/360 / 360	3900/4000/ 4000	640/640/640	1400/1500/ 1600
Benzo(k)fluoranthene	37 / 75 / 130	77 / 93 / 100	110/ 110 / 110	1200/ 1200/1200	190/190/190	370 / 410 / 440
Chrysene	4.1 / 9.4 / 19	15 / 22 / 27	30 / 31 / 32	350 / 350 / 350	57 / 57 / 57	93 / 110 / 120
Dibenzo(ah)anthracene	0.14 / 0.27 / 0.43	0.24 / 0.28 / 0.3	0.31/0.32/ 0.32	3.5 / 3.6 / 3.6	0.57/0.57/0.58	1.1 / 1.3 / 1.4
Fluoranthene	52 / 130 / 290	280 / 560 / 890	1500/1600/ 1600	23000/23000/ 23000	3100/3100/ 3100	6300 / 6300 / 6400
Fluorene	27 / 67 / 160	170 / 400 / 860	2800 ^{sol} (30.9) /3800 ^{sol} (76.5) /4500 ^{sol} (183)	63000 ^{sol} (30.9) / 68000 / 71000	9900 / 9900 / 9900	20000 / 20000 / 20000
Indeno(1,2,3-cd)pyrene	9.5 / 21 / 39	27 / 36 / 41	45 / 46 / 46	500 / 510 / 510	82 / 82 / 82	150 / 170 / 180
Naphthalene ^q	4.1 / 10 / 24	2.3 / 5.6 / 13	2.3 / 5.6 / 13	190 ^{sol} (76.4) / 460 ^{sol} (183) / 1100 ^{sol} (432)	4900/ 4900/ 4900	1200 ^{sol} (76.4) / 1900 ^{sol} (183) / 3000
Phenanthrene	15 / 38 / 90	95 / 220 / 440	1300 ^{sol} (36.0) / 1500/1500	22000 / 22000 / 23000	3100 / 3100 / 3100	6200 / 6200 / 6300
Pyrene	110 / 270 / 620	620 / 1200 / 2000	3700 / 3800 / 3800	54000 / 54000 / 54000	7400 / 7400 / 7400	15000 / 15000 / 15000
Coal Tar (Bap as surrogate marker)	0.32 / 0.67 / 1.2	0.79 / 0.98 / 1.1	1.2 / 1.2 / 1.2	15 / 15 / 15	2.2 / 2.2 / 2.2	4.4 / 4.7 / 4.8
Explosives^{a, b, l, p}						
2, 4, 6 Trinitrotoluene	0.24 / 0.58 / 1.40	1.6 / 3.7 / 8.0	65 / 66 / 66	1000/1000/1000	130/130 / 130	260 / 270 / 270
RDX (Royal Demolition Explosive C ₃ H ₆ N ₆ O ₆)	17 / 38 / 85	120 / 250 / 540	13000 / 13000 / 13000	210000 / 210000 / 210000	26000/26000/ 27000	49000 ^{sol} (18.7) / 51000 / 53000
HMX (High Melting Explosive C ₄ H ₈ N ₈ O ₈)	0.86 / 1.9 / 3.9	5.7 / 13 / 26	6700 / 6700 / 6700	110000 / 110000 / 110000	13000 / 13000 / 13000	23000 ^{vap} (0.35) /23000 ^{vap} (0.39) /24000 ^{vap} (0.48)

Rationale for Generic Assessment Criteria Routinely Used by PBA

Determinand	Allotment	R _w HP	R _w HP	Commercial/ Industrial	POSresi	POSpark
Petroleum Hydrocarbons (SOM 1%/ 2.5%/ 6%)^{a, b, l, m}						
Aliphatic EC 5-6	730 / 1700 / 3900	42 / 78 / 160	42 / 78 / 160	3200 ^{sol} (304) / 5900 ^{sol} (558) / 12000 ^{sol} (1150)	570000 ^{sol} (304) / 590000 / 600000	95000 ^{sol} (304) / 130000 ^{sol} (558) / 180000 ^{sol} (1150)
Aliphatic EC >6-8	2300 / 5600 / 13000	100 / 230 / 530	100 / 230 / 530	7800 ^{sol} (144) / 17000 ^{sol} (322) / 40000 ^{sol} (736)	600000 / 610000 / 620000	150000 ^{sol} (144) / 220000 ^{sol} (322) / 320000 ^{sol} (736)
Aliphatic EC >8-10	320 / 770 / 1700	27 / 65 / 150	27 / 65 / 150	2000 ^{sol} (78) / 4800 ^{vap} (190) / 11000 ^{vap} (451)	13000 / 13000 / 13000	14000 ^{sol} (78) / 18000 ^{vap} (190) / 21000 ^{vap} (451)
Aliphatic EC >10-12	2200 / 4400 / 7300	130 ^{vap} (48) / 330 ^{vap} (118) / 760 ^{vap} (283)	130 ^{vap} (48) / 330 ^{vap} (118) / 770 ^{vap} (283)	9700 ^{sol} (48) / 23000 ^{vap} (118) / 47000 ^{vap} (283)	13000 / 13000 / 13000	21000 ^{sol} (48) / 23000 ^{vap} (118) / 24000 ^{vap} (283)
Aliphatic EC >12-16	11000 / 13000 / 13000	1100 ^{sol} (24) / 2400 ^{sol} (59) / 4300 ^{sol} (142)	1100 ^{sol} (24) / 2400 ^{sol} (59) / 4400 ^{sol} (142)	59000 ^{sol} (24) / 82000 ^{sol} (59) / 90000 ^{sol} (142)	13000 / 13000 / 13000	25000 ^{sol} (24) / 25000 ^{sol} (59) / 26000 ^{sol} (142)
Aliphatic EC >16-35 °	260000 / 270000 / 270000	65000 ^{sol} (8.48) / 92000 ^{sol} (21) / 110000	65000 ^{sol} (8.48) / 92000 ^{sol} (21) / 110000	1600000 / 1700000 / 1800000	250000 / 250000 / 250000	450000 / 480000 / 490000
Aliphatic EC >35-44 °	260000 / 270000 / 270000	65000 ^{sol} (8.48) / 92000 ^{sol} (21) / 110000	65000 ^{sol} (8.48) / 92000 ^{sol} (21) / 110000	1600000 / 1700000 / 1800000	250000 / 250000 / 250000	450000 / 480000 / 490000
Aromatic EC 5-7 (benzene)	13 / 27 / 57	70 / 140 / 300	370 / 690 / 1400	26000 ^{sol} (1220) / 46000 ^{sol} (2260) / 86000 ^{sol} (4710)	56000 / 56000 / 56000	76000 ^{sol} (1220) / 84000 ^{sol} (2260) / 92000 ^{sol} (4710)
Aromatic EC >7-8 (toluene)	22 / 51 / 120	130 / 290 / 660	860 / 1800 / 3900	56000 ^{vap} (869) / 110000 ^{sol} (1920) / 180000 ^{vap} (4360)	56000 / 56000 / 56000	87000 ^{vap} (869) / 95000 ^{sol} (1920) / 100000 ^{vap} (4360)
Aromatic EC >8-10	8.6 / 21 / 51	34 / 83 / 190	47 / 110 / 270	3500 ^{vap} (613) / 8100 ^{vap} (1500) / 17000 ^{vap} (3580)	5000 / 5000 / 5000	7200 ^{vap} (613) / 8500 ^{vap} (1500) / 9300 ^{vap} (3580)
Aromatic EC >10-12	13 / 31 / 74	74 / 180 / 380	250 / 590 / 1200	16000 ^{sol} (364) / 28000 ^{sol} (899) / 34000 ^{sol} (2150)	5000 / 5000 / 5000	9200 ^{sol} (364) / 9700 ^{sol} (899) / 10000
Aromatic EC >12-16	23 / 57 / 130	140 / 330 / 660	1800 / 2300 ^{sol} (419) / 2500	36000 ^{sol} (169) / 37000 / 38000	5100 / 5100 / 5000	10000 / 10000 / 10000
Aromatic EC >16-21 °	46 / 110 / 260	260 / 540 / 930	1900 / 1900 / 1900	28000 / 28000 / 28000	3800 / 3800 / 3800	7600 / 7700 / 7800
Aromatic EC >21-35 °	370 / 820 / 1600	1100 / 1500 / 1700	1900 / 1900 / 1900	28000 / 28000 / 28000	3800 / 3800 / 3800	7800 / 7800 / 7900
Aromatic EC >35-44 °	370 / 820 / 1600	1100 / 1500 / 1700	1900 / 1900 / 1900	28000 / 28000 / 28000	3800 / 3800 / 3800	7800 / 7800 / 7900
Aliphatic+Aromatic EC >44-70 °	1200 / 2100 / 3000	1600 / 1800 / 1900	1900 / 1900 / 1900	28000 / 28000 / 28000	3800 / 3800 / 3800	7800 / 7800 / 7900
Chloroalkanes & Chloroalkenes (SOM 1%/ 2.5%/ 6%)^{a, b, l, p}						
1,2-Dichloroethane	0.0046 / 0.0083 / 0.016	0.0071 / 0.011 / 0.019	0.0092 / 0.013 / 0.023	0.67 / 0.97 / 1.7	29 / 29 / 29	21 / 24 / 28
1,1,1 Trichloroethane (TCA)	48 / 110 / 240	8.8 / 18 / 39	9.0 / 18 / 40	660 / 1300 / 3000	140000 / 140000 / 140000	57000 ^{vap} (1425) / 76000 ^{vap} (2915) / 100000 ^{vap} (6392)
1,1,1,2 Tetrachloroethane	0.79 / 1.9 / 4.4	1.2 / 2.8 / 6.4	1.5 / 3.5 / 8.2	110 / 250 / 560	1400 / 1400 / 1400	1500 / 1800 / 2100
1,1,2,2 Tetrachloroethane	0.41 / 0.89 / 2.0	1.6 / 3.4 / 7.5	3.9 / 8.0 / 17	270 / 550 / 1100	1400 / 1400 / 1400	1800 / 2100 / 2300
Tetrachloroethene (PCE)	0.65 / 1.5 / 3.6	0.18 / 0.39 / 0.90	0.18 / 0.4 / 0.92	19 / 42 / 95	1400 / 1400 / 1400	810 ^{sol} (424) / 1100 ^{sol} (951) / 1500
Tetrachloromethane (Carbon Tetrachloride)	0.45 / 1.0 / 2.4	0.026 / 0.056 / 0.13	0.026 / 0.056 / 0.13	2.9 / 6.3 / 14	890 / 920 / 950	190 / 270 / 400
Trichloroethene (TCE)	0.041 / 0.091 / 0.21	0.016 / 0.034 / 0.075	0.017 / 0.036 / 0.080	1.2 / 2.6 / 5.7	120 / 120 / 120	70 / 91 / 120
Trichloromethane (Chloroform)	0.42 / 0.83 / 1.7	0.91 / 1.7 / 3.4	1.2 / 2.1 / 4.2	99 / 170 / 350	2500 / 2500 / 2500	2600 / 2800 / 3100
Chloroethene (Vinyl Chloride)	0.00055 / 0.001 / 0.0018	0.00064 / 0.00087 / 0.0014	0.00077 / 0.001 / 0.0015	0.059 / 0.077 / 0.12	3.5 / 3.5 / 3.5	4.8 / 5.0 / 5.4
Phenol & Chlorophenols^{a, b, l, p}						
Phenol	23 / 42 / 83	120 / 200 / 380	440 / 690 / 1200	440 ^{dir} (26000) / 690 ^{dir} (30000) / 1300 ^{dir} (34000)	440 ^{dir} (10000) / 690 ^{dir} (10000) / 1300 ^{dir} (10000)	440 ^{dir} (7600) / 690 ^{dir} (8300) / 1300 ^{dir} (93000)
Chlorophenols (excluding PCP) ^r	0.13 ^s / 0.3 / 0.7	0.87 ^s / 2.0 / 4.5	94 / 150 / 210	3500 / 4000 / 4300	620 / 620 / 620	1100 / 1100 / 1100
Pentachlorophenol (PCP)	0.03 / 0.08 / 0.19	0.22 / 0.52 / 1.2	27 ^{vap} (16.4) / 29 / 31	400 / 400 / 400	60 / 60 / 60	110 / 120 / 120
Other^{a, b, l, p}						
Carbon Disulphide	4.8 / 10 / 23	0.14 / 0.29 / 0.62	0.14 / 0.29 / 0.62	11 / 22 / 47	11000 / 11000 / 12000	1300 / 1900 / 2700
Hexachlorobutadiene (HCBD)	0.25 / 0.61 / 1.4	0.29 / 0.7 / 1.6	0.32 / 0.78 / 1.8	31 / 66 / 120	25 / 25 / 25	48 / 50 / 51

Rationale for Generic Assessment Criteria Routinely Used by PBA

Determinand	Allotment	R _{WH} P	R _{WO} HP	Commercial/ Industrial	POSresi	POSpark
Pesticides (SOM 1%/ 2.5%/ 6%) ^{a, b, i, p}						
Aldrin	3.2 / 6.1 / 9.6	5.7/ 6.6 / 7.1	7.3 / 7.4 / 7.5	170 / 170 / 170	18 / 18 / 18	30 / 31 / 31
Atrazine	0.5 / 1.2 / 2.7	3.3/7.6/17.4	610/ 620 / 620	9300 / 9400 / 9400	1200/1200 / 1200	2300 / 2400 / 2400
Dichlorvos	0.0049/0.010/ 0.022	0.032/0.066 /0.14	6.4 / 6.5 / 6.6	140 / 140 / 140	16 / 16 / 16	26 / 26 / 27
Dieldrin	0.17/0.41/0.96	0.97/ 2 / 3.5	7.0 / 7.3 / 7.4	170 / 170 / 170	18 / 18 / 18	30 / 30 / 31
Alpha - Endosulfan	1.2 / 2.9 / 6.8	7.4 / 18 / 41	160 ^{vap} (0.003)/ 280 ^{vap} (0.007)/ 410 ^{vap} (0.016)	5600 ^{vap} (0.003) / 7400 ^{vap} (0.007) / 8400 ^{vap} (0.016)	1200 / 1200 / 1200	2400 / 2400 / 2500
Beta - Endosulfan	1.1 / 2.7 / 6.4	7.0 / 17 / 39	190 ^{vap} (0.00007) / 320 ^{vap} (0.0002) / 440 ^{vap} (0.0004)	6300 ^{vap} (0.00007) / 7800 ^{vap} (0.0002) / 8700	1200 / 1200 / 1200	2400 / 2400 / 2500
Alpha-Hexachlorocyclohexane	0.035/0.087/ 0.21	0.23/0.55 / 1.2	6.9 / 9.2 / 11	170 / 180 / 180	24 / 24 / 24	47 / 48 / 48
Beta - Hexachlorocyclohexane	0.013/0.032/ 0.077	0.085 / 0.2/ 0.46	3.7 / 3.8 / 3.8	65 / 65 / 65	8.1 / 8.1 / 8.1	15 / 15 / 16
Gamma – Hexachlorocyclohexane	0.0092 / 0.023 / 0.054	0.06/0.14/ 0.33	2.9 / 3.3 / 3.5	67 / 69 / 70	8.2 / 8.2 / 8.2	14 / 15 / 15
Chlorobenzenes ^{a, b, i, p}						
Chlorobenzene	5.9 / 14 / 32	0.46 / 1.0 / 2.4	0.46 / 1.0 / 2.4	56 / 130 / 290	11000 / 13000 / 14000	1300 ^{sol} (675)/ 2000 ^{sol} (1520)/ 2900
1,2-dichlorobenzene (1,2-DCB)	94 / 230 / 540	23 / 55 / 130	24 / 57 / 130	2000 ^{sol} (571) / 4800 ^{sol} (1370) / 11000 ^{sol} (3240)	90000 / 95000 / 98000	24000 ^{sol} (571) / 36000 ^{sol} (1370) / 51000 ^{sol} (3240)
1,3-dichlorobenzene (1,3-DCB)	0.25 / 0.6 / 1.5	0.4 / 1.0 / 2.3	0.44/1.1 / 2.5	30 / 73 / 170	300/ 300 / 300	390 / 440 / 470
1-4-dichlorobenzene (1,4-DCB)	15 ⁱ / 37 ⁱ / 88 ⁱ	61 ^q / 150 ^q / 350 ^q	61 ^q /150 ^q /350 ^q	4400 ^{vap,q} (224) / 10000 ^{vap,q} (540) / 25000 ^{vap,q} (1280)	17000 ⁱ / 17000 ⁱ / 17000 ⁱ	36000 ^{vap,i} (224) / 36000 ^{vap,i} (540) / 36000 ^{vap,i} (1280)
1,2,3-Trichlorobenzene	4.7 / 12 / 28	1.5 / 3.6 / 8.6	1.5 / 3.7 / 8.8	102 / 250 / 590	1800 / 1800 / 1800	770 ^{vap} (134) / 1100 ^{vap} (330) / 1600 ^{vap} (789)
1,2,4- Trichlorobenzene	55 / 140 / 320	2.6 / 6.4 / 15	2.6 / 6.4 / 15	220 / 530 / 1300	15000 / 17000 / 19000	1700 ^{vap} (318) / 2600 ^{vap} (786) / 4000 ^{vap} (1880)
1,3,5- Trichlorobenzene	4.7 / 12 / 28	0.33 / 0.81 / 1.9	0.33 / 0.81 / 1.9	23 / 55 / 130	1700 / 1700 / 1800	380 ^{vap} (36.7) / 580 ^{vap} (90.8) / 860 ^{vap} (217)
1,2,3,4-Tetrachlorobenzene	4.4 / 11 / 26	15 / 36 / 78	24 / 56 / 120	1700 ^{vap} (122) / 3080 ^{vap} (304) / 4400 ^{vap} (728)	830 / 830 / 830	1500 ^{vap} (122) / 1600 / 1600
1,2,3,5- Tetrachlorobenzene	0.38 / 0.90 / 2.2	0.66 / 1.6 / 3.7	0.75 / 1.9 / 4.3	49 ^{vap} (39.4) / 120 ^{vap} (98.1) / 240 ^{vap} (235)	78 / 79 / 79	110 ^{vap} (39) / 120 / 130
1,2,4,5- Tetrachlorobenzene	0.06 / 0.16 / 0.37	0.33 / 0.77 / 1.6	0.73 / 1.7 / 3.5	42 ^{sol} (19.7) / 72 ^{sol} (49.1) / 96	13 / 13 / 13	25 / 26 / 26
Pentachlorobenzene (P ₅ CB)	1.2 / 3.1 / 7.0	5.8 / 12 / 22	19 / 30 / 38	640 ^{sol} (43.0) / 770 ^{sol} (107) / 830	100 / 100 / 100	190 / 190 / 190
Hexachlorobenzene (HCB)	0.47 / 1.1 / 2.5	1.8 ^{vap} (0.20) / 3.3 ^{vap} (0.5) / 4.9	4.1 ^{vap} (0.20) / 5.7 ^{vap} (0.5) / 6.7 ^{vap} (1.2)	110 ^{vap} (0.20) / 120 / 120	16 / 16 / 16	30 / 30 / 30

Copyright Land Quality Management Ltd reproduced with permission; Publication Number S4UL3202. All rights reserved

R_{WH}P Residential with homegrown produce

R_{WO}HP Residential without homegrown produce

POSresi public open spaces near residential housing

POSpark public open space for recreational use but not dedicated sports pitches

SOM Soil Organic Matter – **the S4UL for all organic compounds will vary according to SOM**

a Based on a sandy loam soil as defined in SR3 (Environment Agency, 2009b) and 6% soil organic matter (SOM)

b Figures rounded to two significant figures

c Based only on a comparison of oral and dermal soil exposure with oral Index Dose

d The background ADE is limited to being no larger than the contribution from the relevant soil ADE

e Based on comparison of inhalation exposure with inhalation TDI only

f Based on a lifetime exposure via the oral, dermal and inhalation pathways

g Based on localised effects comparing inhalation exposure with inhalation ID only

h Based on comparison of inhalation exposure with inhalation ID

i Based on comparison of oral and dermal exposure with oral TDI

j Based on a comparison of oral, dermal and inhalation exposure with inhalation TDI

k Based on comparison of all exposure pathways with oral TDI

l S4ULs assume that free phase contamination is not present

m S4ULs based on a sub-surface soil to indoor air correction factor of 10

n The HCV applied is based on the intake of total Xylene and therefore exposure should not consider an isomer in isolation

o Oral, dermal and inhalation exposure compared with oral HCV

p S4ULs based on a sub-surface soil to indoor air correction factor of 1

q Based on a comparison of inhalation exposure with the inhalation TDI for localised effects

r Based on 2,4-dichlorophenol unless otherwise stated

s Based on 2,3,4,6-tetrachlorophenol

vap S4UL presented exceeded the vapour saturation limit, which is presented in brackets

sol S4UL presented exceeds the solubility saturation limit, which is presented in brackets

dir S4ULs based on a threshold protective of direct skin contact, guideline in brackets based on the health effects following long term exposure provided for illustration only

Rationale for Generic Assessment Criteria Routinely Used by PBA

Table 4: Tier 2 Criteria for Screening Liquids

	Screening Concentration (mg/l)			
	Minimum Reporting Value	Human Consumption	Fresh Water/Inland	Salt Water/Other
Metals				
Arsenic SP	-	0.01	0.05 ⁽²⁾	0.025 ⁽²⁾
Boron	-	1	-	-
Cadmium PS	0.0001	0.005	≤0.00008, 0.00008, 0.00009, 0.00015, 0.00025 ⁽¹⁴⁾	0.0002
Chromium (total)	-	0.05	-	-
Chromium (III) SP	-	-	0.0047	-
Chromium (VI) SP	-	-	0.0034	0.0006
Copper SP	-	2	0.001 bioavailable	0.00376 bioavailable
Iron SP	-	0.2	0.001	0.001
Lead PS	-	0.01	0.0012 bioavailable	0.0013 bioavailable
Mercury compounds PS	0.00001	0.001	0.00007 max	0.00007 max
Manganese SP	-	0.05	0.123 bioavailable	-
Nickel PS	-	0.02	0.004 bioavailable	0.0086 bioavailable
Selenium	-	0.01	-	-
Zinc SP	-	5 ⁽³⁾	0.0109 bioavailable ⁽¹³⁾	0.068 bioavailable ⁽¹³⁾
Chlorinated Compounds				
C10-13 chloroalkanes PS	-	-	0.0004	0.0004
Dichloromethane PS	-	-	0.02	0.02
1,2-Dichloroethane PS	0.001	0.003	0.01	0.01
Trichloroethene PS	0.0001	0.01 ⁽⁵⁾	0.01	0.01
1,1,1-Trichloroethane	0.0001	-	-	-
1,1,2-Trichloroethane	0.0001	-	-	-
Trichloromethanes PS	-	0.1 ⁽¹⁾	0.0025	0.0025
1, 2, 4-Trichlorobenzene	0.00001	-	-	-
Tetrachloroethene PS	0.0001	0.01 ⁽⁵⁾	0.01	0.01
Tetrachloromethane PS	0.0001	0.003	0.012	0.012
Tetrachloroethane SP	-	-	0.140	-
Vinyl chloride	-	0.00005	-	-
Trichlorobenzene (TCB) PS	0.00001	-	0.0004	0.0004
Chloroform	0.0001	-	-	-
Chloronitrotoluenes(CNT) ⁽¹¹⁾	0.001	-	-	-
Hexachlorobutadiene PS	0.000005	-	0.0006 max	0.0006 max
Hexachlorocyclohexanes (HCH) PS	0.000001	-	0.00002	0.000002
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	-	-	-	-
Acenaphthylene	-	-	-	-
Anthracene PS	-	-	0.0001	0.0001
Benzo(a)anthracene	-	-	-	-
Benzo(b)fluoranthene PS	-	0.0001	0.000017 max ⁽¹²⁾	0.000017 max ⁽¹²⁾
Benzo(a)pyrene PS	-	0.00001	0.00000017	0.00000017
Benzo(k)fluoranthene PS	-	-	0.000017 max ⁽¹²⁾	0.000017 max ⁽¹²⁾
Benzo(g,h,i)perylene PS	-	-	0.0000082 max ⁽¹²⁾	0.00000082 max ⁽¹²⁾
Indeno(1,2,3-cd)pyrene PS	-	-	- ⁽¹²⁾	- ⁽¹²⁾
Chrysene	-	-	-	-
Dibenzo(a,h)anthracene	-	-	-	-
Fluoranthene PS	-	-	0.0000063	0.0000063
Fluorene	-	-	-	-
Phenanthrene	-	-	-	-
Pyrene	-	-	-	-
Naphthalene PS	-	-	0.002	0.002
Polycyclic Aromatic Hydrocarbons	-	0.0001 ⁽¹⁰⁾	-	-
Petroleum hydrocarbons				
Total petroleum hydrocarbons	-	0.01 ⁽³⁾	-	-
Benzene PS	0.001	0.001	0.01	0.008
Toluene SP	0.004	0.7 ⁽⁹⁾	0.074	0.074
Ethylbenzene	-	0.3 ⁽⁹⁾	-	-
Xylene	0.003 ⁽⁴⁾	0.5 ⁽⁹⁾	0.03	0.03
Methyl tert-butyl ether (MTBE)	-	0.015 ⁽⁷⁾	-	-

Rationale for Generic Assessment Criteria Routinely Used by PBA

	Screening Concentration (mg/l)			
	Minimum Reporting Value	Human Consumption	Fresh Water/Inland	Salt Water/Other
Pesticides and Herbicides				
Alachlor PS	-	-	0.0003	0.0003
Aldrin PS	0.000003	0.000013	0.00001 ⁽⁸⁾	0.000005 ⁽⁸⁾
Dieldrin PS	0.000003	0.00003		
Endrin PS	0.000003	0.0006 ⁽⁹⁾		
Isodrin	0.000003	-	-	-
2,4 dichlorophenol SP	0.0001	-	0.0042	0.0042
2,4 D ester SP	0.0001	-	0.0003	0.0003
op and pp DDT (each) PS		0.001 ⁽⁶⁾	0.000025	0.000025
op and pp DDE (each)				
op and pp TDE (each)				
Dimethoate SP	0.00001	-	0.00048	0.00048
Endosulfan PS	0.000005	-	0.000005	0.0000005
Hexachlorobenzene PS	0.000001		0.00005 max	0.00005 max
Permethrin SP		-	0.000001	0.0000002
Atrazine PS	0.00003	-	0.0006	0.0006
Simazine PS	0.00003	-	0.001	0.001
Linuron SP		-	0.0005	0.0005
Mecoprop SP		-	0.018	0.018
Trifluralin PS	0.00001	-	0.00003	0.00003
Miscellaneous				
Ammonium (as NH ₄ ⁺)	-	0.5	-	
Unionised Ammonia (NH ₃) SP	-	-	-	0.021
Chloride	-	250		
Chlorine SP			0.002	0.01 max
Cyanide SP (hydrogen cyanide)	-	0.05	0.001	0.001
Nitrate (as NO ₃)	-	50	-	-
Nitrite (as NO ₂)	-	0.1	-	-
Phenol SP	-	0.5	0.0077	0.0077
Pentachlorophenol PS	0.0001	-	0.0004	0.0004
PCBs (individual congeners)	0.000001	-	-	-
Sodium	-	200	-	-
Sulphate	-	250		
Tributyl and triphenyl tin compounds (each) PS	0.000001	-	0.0000002	0.0000002
Di(2-ethylhexyl)-phthalate (DEPH) PS	-	-	0.0013	0.0013

Notes:

PS = Priority Substances

SP = Specific Pollutants

'-' screening concentration is not available

'max' – maximum allowable concentration used where no annual average provided

- Concentration for trihalomethanes is the sum of chloroform, bromoform, dibromochloromethane and bromodichloromethane.
- Concentration is the dissolved fraction of a water sample obtained by filtration through a 0.45µm filter.
- Concentration is taken from Statutory Instrument 1989 No. 1147. The Water Supply (Water Quality) Regulations 1989, as amended.
- Concentration for xylenes is 0.003mg/l each for o-xylene and m/p xylene.
- Concentration is the Sum of TCE and PCE.
- Concentration is for Total DDT. Para DDT on its own has a target concentration of 0.00001mg/l.
- Concentration for MTBE is taken from Environment Agency guidance, dated 2006.
- Concentration is the sum of aldrin, dieldrin, endrin.
- Concentration is taken from WHO (2004) guidelines for drinking-water quality.
- Sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, indeno(1,2,3-cd)pyrene
- Concentration is for 2,6-CNT, 4,2-CNT, 4,3-CNT, 2,4-CNT, 2,5-CNT
- BAP can be considered as a marker of the other PAHs for comparison with the annual average
- Concentration plus ambient background concentration (dissolved)
- For cadmium and its compounds the EQS values vary depending on the hardness of the water as specified in five class categories (Class 1: < 40 mg CaCO₃/l, Class 2: 40 to < 50 mg CaCO₃/l, Class 3: 50 to < 100 mg CaCO₃/l, Class 4: 100 to < 200 mg CaCO₃/l and Class 5: ≥ 200 mg CaCO₃/l).

APPENDIX 2

Test Results

Mercury (mg/kg) F/T:20/20

Client/client ref: RBC

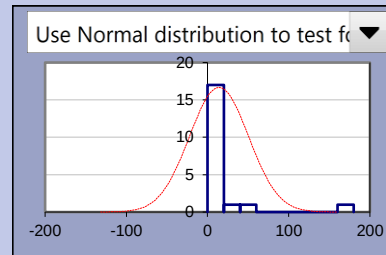
Site ref: 28791/3500

Date: 27-Apr-2017

Project ref: MRT East Reading Data description: Zone D

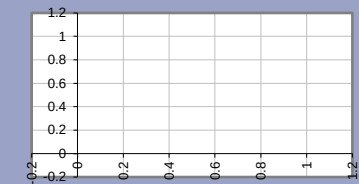
User details: Arie Zamler

Dataset:	Mercury (mg/kg) F/T:20/20
Sample mean (mg/kg), $\bar{X}$	14.193
Sample standard deviation, s	36.425
Sample size, n	20
Critical concentration, Cc (mg/kg)	58



Outliers & non-detects

Outliers present?	Yes
Significance level	5%
Outliers excluded	0
Non-detects	0

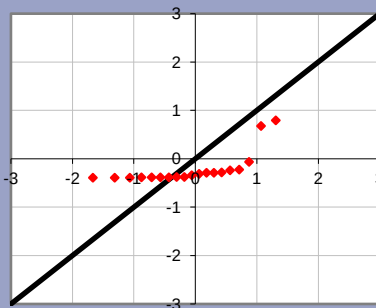


Normality test

Significance level: 5%

Non-normal distribution

Use: Auto: Chebychev

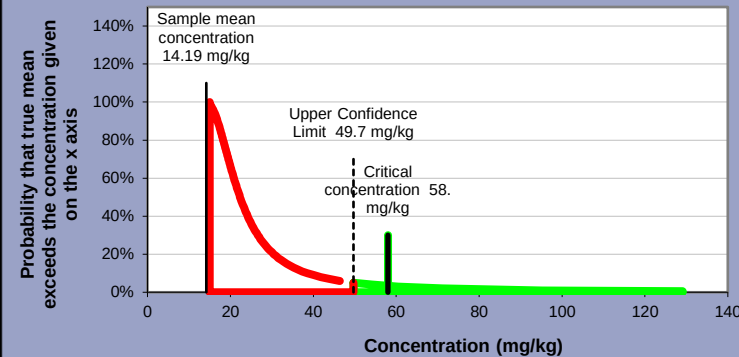


Test scenario:

Planning: is true mean lower than critical concentration ($\mu < C_c$)?

Null hypothesis: The true mean concentration is equal to or greater than the critical concentration: $\mu \geq C_c$

Alternative hypothesis: The true mean concentration is less than the critical concentration: $\mu < C_c$



Evidence against Null hypothesis:

97%

Base decision on: evidence level

Evidence level required: 95%

Balance of probability? N/A

Reject Null Hypothesis? Yes

$\mu < C_c$ (re this dataset)

Back to data

Back to summary

Go to outlier test

Go to normality test

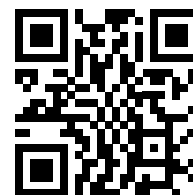
APPENDIX 3

TPH CWG	Assessment Criteria	Sample Reference													
Hydrocarbon Fraction	End Use & %SOM	BH1	BH1	BH1	BH2	BH2	BH2	BH3	BH3	HP1	HP1	HP2	HP2	HP2A	
		0.4	0.8	2.4	0.3	0.9	2.5	0.4	2.2	0.6	2.3	0.3	1.2	1.8	
>C5 to C6 Aliphatic	12000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
>C6 to C8 Aliphatic	40000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
>C8 to C10 Aliphatic	11000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
>C10 to C12 Aliphatic	47000	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
>C12 to C16 Aliphatic	90000	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
>C16 to C21 Aliphatic	-	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
>C21 to C35 Aliphatic	-	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	
>C16 to C35 Aliphatic	1800000	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	
>C35 to C44 Aliphatic	1800000														
Total Aliphatic C5-35	-	10	10	10	10	10	10	10	10	10	10	10	10	10	
>C5 to C7 Aromatic	86000														
>C7 to C8 Aromatic	180000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
>C8 to C10 Aromatic	17000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
>C10 to C12 Aromatic	34000	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	
>C12 to C16 Aromatic	38000	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
>C16 to C21 Aromatic	28000	3	0.6	0.6	2.8	0.8	0.6	0.6	4.4	0.6	0.6	1	1.5	0.6	
>C21 TO C35 Aromatic	28000	2.8	1.4	1.4	3.6	1.4	1.4	1.4	5.8	1.4	1.4	1.7	4.7	1.4	
>C35 to C44 Aromatic	28000														
Total Aromatic C5-C35	-	10	10	10	10	10	10	10	10	10	10	10	10	10	
HAZARD INDEX (HI)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
If the calculated HI exceeds unity then consideration is given to the potential for significant human health effects due to additive effects															
 Offices throughout the UK and continental Europe www.peterbrett.com	Client  Reading Borough Council Working better with you		Proposed MRT Scheme, East Reading Table Presenting the Calculated Individual Hydrocarbon Fraction Hazard Quotient and Hazard Index								Date	May 2017			
											Scale	NTS			
											Prepared by	az			
											Checked by	rht			
											Table:	1			

TPH CWG	Assessment Criteria	Sample Reference												
		HP3	HP3	TP1	TP1	TP1	TP2	TP2	TP3	TP3	TP3	TP4	TP4	
		0.65	1.7	0.5	1.2	2.3	0.4	1.1	0.4	1	1.9	0.5	1	
Hydrocarbon Fraction	End Use & %SOM													
>C5 to C6 Aliphatic	12000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
>C6 to C8 Aliphatic	40000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
>C8 to C10 Aliphatic	11000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
>C10 to C12 Aliphatic	47000	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
>C12 to C16 Aliphatic	90000	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
>C16 to C21 Aliphatic	-	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
>C21 to C35 Aliphatic	-	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	
>C16 to C35 Aliphatic	1800000	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	
>C35 to C44 Aliphatic	1800000													
Total Aliphatic C5-35	-	10	10	10	10	10	10	10	10	10	10	10	10	
>C5 to C7 Aromatic	86000													
>C7 to C8 Aromatic	180000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
>C8 to C10 Aromatic	17000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
>C10 to C12 Aromatic	34000	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	
>C12 to C16 Aromatic	38000	0.5	0.5	1.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
>C16 to C21 Aromatic	28000	0.6	0.6	13	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
>C21 TO C35 Aromatic	28000	1.4	1.4	23	1.4	1.4	1.4	1.4	2.5	1.4	1.4	1.4	1.4	
>C35 to C44 Aromatic	28000													
Total Aromatic C5-C35	-	10	10	38	10	10	10	10	10	10	10	10	10	
HAZARD INDEX (HI)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
If the calculated HI exceeds unity then consideration is given to the potential for significant human health effects due to additive effects														
 Offices throughout the UK and continental Europe www.peterbrett.com	 Reading Borough Council <i>Working better with you</i>		Proposed MRT Scheme, East Reading Table Presenting the Calculated Individual Hydrocarbon Fraction Hazard Quotient and Hazard Index							Date	May 2017			
										Scale	NTS			
										Prepared by	az			
										Checked by	rht			
										Table:	1			

APPENDIX 4

Waste Classification Report



S7GC4-JCBN5-6E8K4

Job name

Proposed MRT Scheme, East Reading

Description/Comments

Project

28791/3500

Site

Ground Investigation carried out by Endeavour Drilling Report No; END17-021 April 2017

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Gemma Bates
Date:
02/05/2017 14:14:40 UTC
Telephone:
01223 802929

Company:
Peter Brett Associates
Telford House
Fulbourn
Cambridge
CB21 5HB

Report

Created by: Gemma Bates
Created date: 02/05/2017 14:14 UTC

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	BH1 0.4		Non Hazardous		3
2	BH1 0.8		Potentially Hazardous	HP 3(i)	5
3	BH1 2.4		Non Hazardous		7
4	BH2 0.3		Non Hazardous		9
5	BH2 0.9		Non Hazardous		11
6	BH2 2.5		Non Hazardous		13
7	BH3 0.4		Non Hazardous		15
8	BH3 2.2		Potentially Hazardous	HP 3(i)	17
9	HP1 0.6		Non Hazardous		19
10	HP1 2.3		Non Hazardous		21
11	HP2 0.3		Non Hazardous		23
12	HP2 1.2		Non Hazardous		25
13	HP2A 1.8		Non Hazardous		27
14	HP3 0.7		Non Hazardous		29
15	HP3 1.7		Non Hazardous		31
16	TP1 0.5		Potentially Hazardous	HP 3(i)	33
17	TP1 1.2		Non Hazardous		35
18	TP1 2.3		Non Hazardous		37
19	TP2 0.4		Non Hazardous		39
20	TP2 1.1		Non Hazardous		41

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
21	TP3 0.4		Non Hazardous		43
22	TP3 1		Non Hazardous		45
23	TP3 1.9		Non Hazardous		47
24	TP4 0.5		Non Hazardous		49
25	TP4 1		Non Hazardous		51

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	53
Appendix B: Rationale for selection of metal species	54
Appendix C: Version	55

Classification of sample: BH1 0.4

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH1 0.4	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				37 mg/kg	1.32	48.852 mg/kg	0.00489 %			
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				0.3 mg/kg	1.14	0.343 mg/kg	0.000034 %			
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]								
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
4	copper { dicopper oxide; copper (I) oxide }				410 mg/kg	1.13	461.614 mg/kg	0.0462 %			
	029-002-00-X	215-270-7	1317-39-1								
5	lead { lead chromate }			1	230 mg/kg	1.56	358.757 mg/kg	0.023 %			
	082-004-00-2	231-846-0	7758-97-6								
6	mercury { mercury dichloride }				12 mg/kg	1.35	16.242 mg/kg	0.00162 %			
	080-010-00-X	231-299-8	7487-94-7								
7	nickel { nickel chromate }				29 mg/kg	2.98	86.312 mg/kg	0.00863 %			
	028-035-00-7	238-766-5	14721-18-7								
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.7 mg/kg	2.55	1.788 mg/kg	0.000179 %			
	034-002-00-8										
9	zinc { zinc sulphate }				100 mg/kg	2.47	246.93 mg/kg	0.0247 %			
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %			<LOD
			TPH								
11	confirm TPH has NOT arisen from diesel or petrol				☒						
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
16	naphthalene	601-052-00-2	202-049-5	91-20-3	0.38 mg/kg		0.38 mg/kg	0.000038 %		
17	acenaphthylene	205-917-1	208-96-8		0.04 mg/kg		0.04 mg/kg	0.000004 %		
18	acenaphthene	201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	fluorene	201-695-5	86-73-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	phenanthrene	201-581-5	85-01-8		0.55 mg/kg		0.55 mg/kg	0.000055 %		
21	anthracene	204-371-1	120-12-7		0.1 mg/kg		0.1 mg/kg	0.00001 %		
22	fluoranthene	205-912-4	206-44-0		1 mg/kg		1 mg/kg	0.0001 %		
23	pyrene	204-927-3	129-00-0		1.1 mg/kg		1.1 mg/kg	0.00011 %		
24	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.38 mg/kg		0.38 mg/kg	0.000038 %		
25	chrysene	601-048-00-0	205-923-4	218-01-9	0.42 mg/kg		0.42 mg/kg	0.000042 %		
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.39 mg/kg		0.39 mg/kg	0.000039 %		
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.16 mg/kg		0.16 mg/kg	0.000016 %		
28	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.22 mg/kg		0.22 mg/kg	0.000022 %		
29	indeno[123-cd]pyrene	205-893-2	193-39-5		0.11 mg/kg		0.11 mg/kg	0.000011 %		
30	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
31	benzo[ghi]perylene	205-883-8	191-24-2		0.11 mg/kg		0.11 mg/kg	0.000011 %		
Total:								0.111 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH1 0.8

✱ **Potentially Hazardous Waste**
 Classified as **17 05 04** or **17 05 03 ***
 in the List of Waste

Sample details

Sample Name:	LoW Code:	
BH1 0.8	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
0 m		
Moisture content:		
0%		
(no correction)		

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 0.000002%)

Determinands

Moisture content: **0%** No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	TPH (C6 to C40) petroleum group				<10 mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH								
2	confirm TPH has NOT arisen from diesel or petrol				☒						
3	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4								
4	benzene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2								
5	toluene				0.02 mg/kg		0.02	mg/kg	0.000002 %		
	601-021-00-3	203-625-9	108-88-3								
6	ethylbenzene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4								
7	xylene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
8	naphthalene				0.3 mg/kg		0.3	mg/kg	0.00003 %		
	601-052-00-2	202-049-5	91-20-3								
9	acenaphthylene				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8								
10	acenaphthene				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9								
11	fluorene				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7								
12	phenanthrene				0.3 mg/kg		0.3	mg/kg	0.00003 %		
		201-581-5	85-01-8								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
13	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
14	fluoranthene	205-912-4	206-44-0		0.7 mg/kg		0.7 mg/kg	0.00007 %			
15	pyrene	204-927-3	129-00-0		0.9 mg/kg		0.9 mg/kg	0.00009 %			
16	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.4 mg/kg		0.4 mg/kg	0.00004 %			
17	chrysene	601-048-00-0	205-923-4	218-01-9	0.5 mg/kg		0.5 mg/kg	0.00005 %			
18	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.4 mg/kg		0.4 mg/kg	0.00004 %			
19	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.2 mg/kg		0.2 mg/kg	0.00002 %			
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.3 mg/kg		0.3 mg/kg	0.00003 %			
21	indeno[123-cd]pyrene	205-893-2	193-39-5		0.2 mg/kg		0.2 mg/kg	0.00002 %			
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
23	benzo[ghi]perylene	205-883-8	191-24-2		0.3 mg/kg		0.3 mg/kg	0.00003 %			
24	phenol	604-001-00-2	203-632-7	108-95-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
25	1,1-dichloroethane and 1,2-dichloroethane (combined)	203-458-1, 200-863-5	107-06-2, 75-34-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
26	trichloroethylene; trichloroethene	602-027-00-9	201-167-4	79-01-6	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
27	vinyl chloride; chloroethylene	602-023-00-7	200-831-0	75-01-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
Total:									0.00152 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Potentially Hazardous result
■	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: BH1 2.4

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample Name:	LoW Code:
BH1 2.4	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				15 mg/kg	1.32	19.805 mg/kg	0.00198 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.4 mg/kg	1.14	0.457 mg/kg	0.000046 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				19 mg/kg	1.13	21.392 mg/kg	0.00214 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	40 mg/kg	1.56	62.393 mg/kg	0.004 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				5.6 mg/kg	1.35	7.58 mg/kg	0.000758 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				36 mg/kg	2.98	107.146 mg/kg	0.0107 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.6 mg/kg	2.55	1.532 mg/kg	0.000153 %		
	034-002-00-8									
9	zinc { zinc sulphate }				94 mg/kg	2.47	232.114 mg/kg	0.0232 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
17	acenaphthylene	205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	acenaphthene	201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	fluorene	201-695-5	86-73-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	phenanthrene	201-581-5	85-01-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	anthracene	204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
22	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
23	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
24	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
25	chrysene	601-048-00-0	205-923-4	218-01-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
28	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
29	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
30	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
31	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
Total:									0.0442 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH2 0.3

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH2 0.3	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	TPH (C6 to C40) petroleum group				<10 mg/kg		<10	mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol				☒						
3	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X 216-653-1 1634-04-4				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
4	benzene 601-020-00-8 200-753-7 71-43-2				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
5	toluene 601-021-00-3 203-625-9 108-88-3				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
6	ethylbenzene 601-023-00-4 202-849-4 100-41-4				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
7	xylene 601-022-00-9 202-422-2 [1] 95-47-6 [1] 203-396-5 [2] 106-42-3 [2] 203-576-3 [3] 108-38-3 [3] 215-535-7 [4] 1330-20-7 [4]				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
8	naphthalene 601-052-00-2 202-049-5 91-20-3				0.2 mg/kg		0.2	mg/kg	0.00002 %		
9	acenaphthylene 205-917-1 208-96-8				0.2 mg/kg		0.2	mg/kg	0.00002 %		
10	acenaphthene 201-469-6 83-32-9				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11	fluorene 201-695-5 86-73-7				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12	phenanthrene 201-581-5 85-01-8				1.2 mg/kg		1.2	mg/kg	0.00012 %		
13	anthracene 204-371-1 120-12-7				0.4 mg/kg		0.4	mg/kg	0.00004 %		
14	fluoranthene 205-912-4 206-44-0				2.7 mg/kg		2.7	mg/kg	0.00027 %		
15	pyrene 204-927-3 129-00-0				2.4 mg/kg		2.4	mg/kg	0.00024 %		
16	benzo[a]anthracene 601-033-00-9 200-280-6 56-55-3				1.5 mg/kg		1.5	mg/kg	0.00015 %		

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
17	chrysene				1.6 mg/kg		1.6 mg/kg	0.00016 %			
	601-048-00-0	205-923-4	218-01-9								
18	benzo[b]fluoranthene				1.9 mg/kg		1.9 mg/kg	0.00019 %			
	601-034-00-4	205-911-9	205-99-2								
19	benzo[k]fluoranthene				0.8 mg/kg		0.8 mg/kg	0.00008 %			
	601-036-00-5	205-916-6	207-08-9								
20	benzo[a]pyrene; benzo[def]chrysene				1.6 mg/kg		1.6 mg/kg	0.00016 %			
	601-032-00-3	200-028-5	50-32-8								
21	indeno[123-cd]pyrene				0.9 mg/kg		0.9 mg/kg	0.00009 %			
		205-893-2	193-39-5								
22	dibenz[a,h]anthracene				0.2 mg/kg		0.2 mg/kg	0.00002 %			
	601-041-00-2	200-181-8	53-70-3								
23	benzo[ghi]perylene				1.1 mg/kg		1.1 mg/kg	0.00011 %			
		205-883-8	191-24-2								
24	phenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
25	1,1-dichloroethane and 1,2-dichloroethane (combined)				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
		203-458-1, 200-863-5	107-06-2, 75-34-3								
26	trichloroethylene; trichloroethene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	602-027-00-9	201-167-4	79-01-6								
27	vinyl chloride; chloroethylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	602-023-00-7	200-831-0	75-01-4								
Total:									0.00271 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: BH2 0.9

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH2 0.9	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				39 mg/kg	1.32	51.493 mg/kg	0.00515 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.3 mg/kg	1.14	0.343 mg/kg	0.000034 %		
	048-002-00-0	231-152-8 [1]	7440-43-9 [1]							
		215-146-2 [2]	1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				88 mg/kg	1.13	99.078 mg/kg	0.00991 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	130 mg/kg	1.56	202.776 mg/kg	0.013 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				0.34 mg/kg	1.35	0.46 mg/kg	0.000046 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				35 mg/kg	2.98	104.169 mg/kg	0.0104 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.9 mg/kg	2.55	2.298 mg/kg	0.00023 %		
	034-002-00-8									
9	zinc { zinc sulphate }				77 mg/kg	2.47	190.136 mg/kg	0.019 %		
	030-006-00-9	231-793-3 [1]	7446-19-7 [1]							
		231-793-3 [2]	7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☑					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1]	95-47-6 [1]							
		203-396-5 [2]	106-42-3 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
17	acenaphthylene 205-917-1	208-96-8			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	acenaphthene 201-469-6	83-32-9			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	fluorene 201-695-5	86-73-7			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	phenanthrene 201-581-5	85-01-8			0.15 mg/kg		0.15 mg/kg	0.000015 %			
21	anthracene 204-371-1	120-12-7			0.04 mg/kg		0.04 mg/kg	0.000004 %			
22	fluoranthene 205-912-4	206-44-0			0.36 mg/kg		0.36 mg/kg	0.000036 %			
23	pyrene 204-927-3	129-00-0			0.33 mg/kg		0.33 mg/kg	0.000033 %			
24	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		0.14 mg/kg		0.14 mg/kg	0.000014 %			
25	chrysene 601-048-00-0	205-923-4	218-01-9		0.15 mg/kg		0.15 mg/kg	0.000015 %			
26	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		0.18 mg/kg		0.18 mg/kg	0.000018 %			
27	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		0.07 mg/kg		0.07 mg/kg	0.000007 %			
28	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		0.13 mg/kg		0.13 mg/kg	0.000013 %			
29	indeno[123-cd]pyrene 205-893-2	193-39-5			0.08 mg/kg		0.08 mg/kg	0.000008 %			
30	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
31	benzo[ghi]perylene 205-883-8	191-24-2			0.09 mg/kg		0.09 mg/kg	0.000009 %			
Total:									0.0592 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH2 2.5

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH2 2.5	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				18 mg/kg	1.32	23.766 mg/kg	0.00238 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.4 mg/kg	1.14	0.457 mg/kg	0.000046 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				18 mg/kg	1.13	20.266 mg/kg	0.00203 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	31 mg/kg	1.56	48.354 mg/kg	0.0031 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				0.08 mg/kg	1.35	0.108 mg/kg	0.000011 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				33 mg/kg	2.98	98.217 mg/kg	0.00982 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.6 mg/kg	2.55	1.532 mg/kg	0.000153 %		
	034-002-00-8									
9	zinc { zinc sulphate }				90 mg/kg	2.47	222.237 mg/kg	0.0222 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
17	acenaphthylene	205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	acenaphthene	201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	fluorene	201-695-5	86-73-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	phenanthrene	201-581-5	85-01-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	anthracene	204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
22	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
23	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
24	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
25	chrysene	601-048-00-0	205-923-4	218-01-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
28	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
29	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
30	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
31	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
Total:									0.041 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH3 0.4

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH3 0.4	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				47 mg/kg	1.32	62.055 mg/kg	0.00621 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.5 mg/kg	1.14	0.571 mg/kg	0.000057 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				110 mg/kg	1.13	123.848 mg/kg	0.0124 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	100 mg/kg	1.56	155.982 mg/kg	0.01 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				0.21 mg/kg	1.35	0.284 mg/kg	0.000028 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				46 mg/kg	2.98	136.908 mg/kg	0.0137 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.9 mg/kg	2.55	2.298 mg/kg	0.00023 %		
	034-002-00-8									
9	zinc { zinc sulphate }				94 mg/kg	2.47	232.114 mg/kg	0.0232 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
17	acenaphthylene	205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	acenaphthene	201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	fluorene	201-695-5	86-73-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	phenanthrene	201-581-5	85-01-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	anthracene	204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
22	fluoranthene	205-912-4	206-44-0		0.12 mg/kg		0.12 mg/kg	0.000012 %			
23	pyrene	204-927-3	129-00-0		0.11 mg/kg		0.11 mg/kg	0.000011 %			
24	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.05 mg/kg		0.05 mg/kg	0.000005 %			
25	chrysene	601-048-00-0	205-923-4	218-01-9	0.06 mg/kg		0.06 mg/kg	0.000006 %			
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.06 mg/kg		0.06 mg/kg	0.000006 %			
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
28	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.04 mg/kg		0.04 mg/kg	0.000004 %			
29	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
30	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
31	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
Total:									0.0671 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH3 2.2

 **Potentially Hazardous Waste**
 Classified as **17 05 04** or **17 05 03 ***
 in the List of Waste

Sample details

Sample Name:	LoW Code:	
BH3 2.2	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
0 m		
Moisture content:		
0%		
(no correction)		

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Determinands

Moisture content: **0%** No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				15 mg/kg	1.32	19.805 mg/kg	0.00198 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.3 mg/kg	1.14	0.343 mg/kg	0.000034 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				16 mg/kg	1.13	18.014 mg/kg	0.0018 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	17 mg/kg	1.56	26.517 mg/kg	0.0017 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				0.07 mg/kg	1.35	0.095 mg/kg	0.000009474 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				31 mg/kg	2.98	92.264 mg/kg	0.00923 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.6 mg/kg	2.55	1.532 mg/kg	0.000153 %		
	034-002-00-8									
9	zinc { zinc sulphate }				84 mg/kg	2.47	207.421 mg/kg	0.0207 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				10 mg/kg		10 mg/kg	0.001 %		
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
16	naphthalene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
17	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-917-1	208-96-8								
18	acenaphthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-469-6	83-32-9								
19	fluorene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-695-5	86-73-7								
20	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-581-5	85-01-8								
21	anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		204-371-1	120-12-7								
22	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-912-4	206-44-0								
23	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		204-927-3	129-00-0								
24	benzo[a]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-033-00-9	200-280-6	56-55-3								
25	chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
26	benzo[b]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
27	benzo[k]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
28	benzo[a]pyrene; benzo[def]chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
29	indeno[123-cd]pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-893-2	193-39-5								
30	dibenz[a,h]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
31	benzo[ghi]perylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-883-8	191-24-2								
Total:									0.0369 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Potentially Hazardous result
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP1 0.6

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
HP1 0.6	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				30 mg/kg	1.32	39.61 mg/kg	0.00396 %			
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				1.1 mg/kg	1.14	1.257 mg/kg	0.000126 %			
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]								
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
4	copper { dicopper oxide; copper (I) oxide }				160 mg/kg	1.13	180.142 mg/kg	0.018 %			
	029-002-00-X	215-270-7	1317-39-1								
5	lead { lead chromate }			1	170 mg/kg	1.56	265.169 mg/kg	0.017 %			
	082-004-00-2	231-846-0	7758-97-6								
6	mercury { mercury dichloride }				1.7 mg/kg	1.35	2.301 mg/kg	0.00023 %			
	080-010-00-X	231-299-8	7487-94-7								
7	nickel { nickel chromate }				130 mg/kg	2.98	386.914 mg/kg	0.0387 %			
	028-035-00-7	238-766-5	14721-18-7								
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.8 mg/kg	2.55	2.043 mg/kg	0.000204 %			
	034-002-00-8										
9	zinc { zinc sulphate }				320 mg/kg	2.47	790.175 mg/kg	0.079 %			
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %			<LOD
			TPH								
11	confirm TPH has NOT arisen from diesel or petrol				☒						
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	● pH		PH		7.3 pH		7.3 pH	7.3 pH			
17	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	● acenaphthylene		205-917-1	208-96-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	● acenaphthene		201-469-6	83-32-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	● fluorene		201-695-5	86-73-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	● phenanthrene		201-581-5	85-01-8	0.08 mg/kg		0.08 mg/kg	0.000008 %			
22	● anthracene		204-371-1	120-12-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
23	● fluoranthene		205-912-4	206-44-0	0.24 mg/kg		0.24 mg/kg	0.000024 %			
24	● pyrene		204-927-3	129-00-0	0.24 mg/kg		0.24 mg/kg	0.000024 %			
25	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.12 mg/kg		0.12 mg/kg	0.000012 %			
26	chrysene	601-048-00-0	205-923-4	218-01-9	0.14 mg/kg		0.14 mg/kg	0.000014 %			
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.17 mg/kg		0.17 mg/kg	0.000017 %			
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.08 mg/kg		0.08 mg/kg	0.000008 %			
29	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.12 mg/kg		0.12 mg/kg	0.000012 %			
30	● indeno[123-cd]pyrene		205-893-2	193-39-5	0.12 mg/kg		0.12 mg/kg	0.000012 %			
31	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
32	● benzo[ghi]perylene		205-883-8	191-24-2	0.13 mg/kg		0.13 mg/kg	0.000013 %			
Total:									0.159 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: HP1 2.3

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
HP1 2.3	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				20 mg/kg	1.32	26.407 mg/kg	0.00264 %			
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				0.4 mg/kg	1.14	0.457 mg/kg	0.000046 %			
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]								
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
4	copper { dicopper oxide; copper (I) oxide }				49 mg/kg	1.13	55.169 mg/kg	0.00552 %			
	029-002-00-X	215-270-7	1317-39-1								
5	lead { lead chromate }			1	170 mg/kg	1.56	265.169 mg/kg	0.017 %			
	082-004-00-2	231-846-0	7758-97-6								
6	mercury { mercury dichloride }				43 mg/kg	1.35	58.2 mg/kg	0.00582 %			
	080-010-00-X	231-299-8	7487-94-7								
7	nickel { nickel chromate }				26 mg/kg	2.98	77.383 mg/kg	0.00774 %			
	028-035-00-7	238-766-5	14721-18-7								
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				3.2 mg/kg	2.55	8.172 mg/kg	0.000817 %			
	034-002-00-8										
9	zinc { zinc sulphate }				100 mg/kg	2.47	246.93 mg/kg	0.0247 %			
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %			<LOD
			TPH								
11	confirm TPH has NOT arisen from diesel or petrol				☒						
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]								

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP2 0.3

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample Name:	LoW Code:
HP2 0.3	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				39 mg/kg	1.32	51.493 mg/kg	0.00515 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.5 mg/kg	1.14	0.571 mg/kg	0.000057 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				120 mg/kg	1.13	135.107 mg/kg	0.0135 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	230 mg/kg	1.56	358.757 mg/kg	0.023 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				0.61 mg/kg	1.35	0.826 mg/kg	0.000083 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				39 mg/kg	2.98	116.074 mg/kg	0.0116 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.6 mg/kg	2.55	1.532 mg/kg	0.000153 %		
	034-002-00-8									
9	zinc { zinc sulphate }				140 mg/kg	2.47	345.701 mg/kg	0.0346 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	pH PH				8 pH		8 pH	8pH			
17	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	acenaphthylene	205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	acenaphthene	201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	fluorene	201-695-5	86-73-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	phenanthrene	201-581-5	85-01-8		0.48 mg/kg		0.48 mg/kg	0.000048 %			
22	anthracene	204-371-1	120-12-7		0.13 mg/kg		0.13 mg/kg	0.000013 %			
23	fluoranthene	205-912-4	206-44-0		1.1 mg/kg		1.1 mg/kg	0.00011 %			
24	pyrene	204-927-3	129-00-0		0.96 mg/kg		0.96 mg/kg	0.000096 %			
25	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		0.43 mg/kg		0.43 mg/kg	0.000043 %			
26	chrysene 601-048-00-0	205-923-4	218-01-9		0.49 mg/kg		0.49 mg/kg	0.000049 %			
27	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		0.53 mg/kg		0.53 mg/kg	0.000053 %			
28	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		0.19 mg/kg		0.19 mg/kg	0.000019 %			
29	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		0.35 mg/kg		0.35 mg/kg	0.000035 %			
30	indeno[123-cd]pyrene	205-893-2	193-39-5		0.22 mg/kg		0.22 mg/kg	0.000022 %			
31	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		0.06 mg/kg		0.06 mg/kg	0.000006 %			
32	benzo[ghi]perylene	205-883-8	191-24-2		0.24 mg/kg		0.24 mg/kg	0.000024 %			
Total:									0.0899 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- ⚗

 Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: HP2 1.2

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample Name:	LoW Code:
HP2 1.2	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	TPH (C6 to C40) petroleum group				<10 mg/kg		<10	mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol				☒						
3	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X 216-653-1 1634-04-4				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
4	benzene 601-020-00-8 200-753-7 71-43-2				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
5	toluene 601-021-00-3 203-625-9 108-88-3				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
6	ethylbenzene 601-023-00-4 202-849-4 100-41-4				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
7	xylene 601-022-00-9 202-422-2 [1] 95-47-6 [1] 203-396-5 [2] 106-42-3 [2] 203-576-3 [3] 108-38-3 [3] 215-535-7 [4] 1330-20-7 [4]				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
8	naphthalene 601-052-00-2 202-049-5 91-20-3				0.2 mg/kg		0.2	mg/kg	0.00002 %		
9	acenaphthylene 205-917-1 208-96-8				0.2 mg/kg		0.2	mg/kg	0.00002 %		
10	acenaphthene 201-469-6 83-32-9				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11	fluorene 201-695-5 86-73-7				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12	phenanthrene 201-581-5 85-01-8				0.4 mg/kg		0.4	mg/kg	0.00004 %		
13	anthracene 204-371-1 120-12-7				0.2 mg/kg		0.2	mg/kg	0.00002 %		
14	fluoranthene 205-912-4 206-44-0				1.9 mg/kg		1.9	mg/kg	0.00019 %		
15	pyrene 204-927-3 129-00-0				1.9 mg/kg		1.9	mg/kg	0.00019 %		
16	benzo[a]anthracene 601-033-00-9 200-280-6 56-55-3				1.2 mg/kg		1.2	mg/kg	0.00012 %		

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
17	chrysene				1.2 mg/kg		1.2 mg/kg	0.00012 %			
	601-048-00-0	205-923-4	218-01-9								
18	benzo[b]fluoranthene				1.9 mg/kg		1.9 mg/kg	0.00019 %			
	601-034-00-4	205-911-9	205-99-2								
19	benzo[k]fluoranthene				0.7 mg/kg		0.7 mg/kg	0.00007 %			
	601-036-00-5	205-916-6	207-08-9								
20	benzo[a]pyrene; benzo[def]chrysene				1.4 mg/kg		1.4 mg/kg	0.00014 %			
	601-032-00-3	200-028-5	50-32-8								
21	indeno[123-cd]pyrene				1 mg/kg		1 mg/kg	0.0001 %			
		205-893-2	193-39-5								
22	dibenz[a,h]anthracene				0.2 mg/kg		0.2 mg/kg	0.00002 %			
	601-041-00-2	200-181-8	53-70-3								
23	benzo[ghi]perylene				1.2 mg/kg		1.2 mg/kg	0.00012 %			
		205-883-8	191-24-2								
24	phenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
25	1,1-dichloroethane and 1,2-dichloroethane (combined)				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
		203-458-1, 200-863-5	107-06-2, 75-34-3								
26	trichloroethylene; trichloroethene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	602-027-00-9	201-167-4	79-01-6								
27	vinyl chloride; chloroethylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	602-023-00-7	200-831-0	75-01-4								
Total:									0.0024 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: HP2A 1.8

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
HP2A 1.8	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				19 mg/kg	1.32	25.086 mg/kg	0.00251 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.3 mg/kg	1.14	0.343 mg/kg	0.000034 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				16 mg/kg	1.13	18.014 mg/kg	0.0018 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	43 mg/kg	1.56	67.072 mg/kg	0.0043 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				3 mg/kg	1.35	4.06 mg/kg	0.000406 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				27 mg/kg	2.98	80.359 mg/kg	0.00804 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.2 mg/kg	2.55	3.064 mg/kg	0.000306 %		
	034-002-00-8									
9	zinc { zinc sulphate }				81 mg/kg	2.47	200.013 mg/kg	0.02 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

HazWasteOnline™

HazWasteOnline™

HazWasteOnline™

Classification of sample: HP3 0.7

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample Name:	LoW Code:
HP3 0.7	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				25 mg/kg	1.32	33.008 mg/kg	0.0033 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.4 mg/kg	1.14	0.457 mg/kg	0.000046 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				120 mg/kg	1.13	135.107 mg/kg	0.0135 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	70 mg/kg	1.56	109.187 mg/kg	0.007 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				0.08 mg/kg	1.35	0.108 mg/kg	0.000011 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				59 mg/kg	2.98	175.6 mg/kg	0.0176 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.55	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc sulphate }				120 mg/kg	2.47	296.316 mg/kg	0.0296 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	pH				7.9 pH		7.9 pH	7.9 pH			
17	naphthalene 601-052-00-2 202-049-5 91-20-3				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	acenaphthylene 205-917-1 208-96-8				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	acenaphthene 201-469-6 83-32-9				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	fluorene 201-695-5 86-73-7				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	phenanthrene 201-581-5 85-01-8				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
22	anthracene 204-371-1 120-12-7				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
23	fluoranthene 205-912-4 206-44-0				0.06 mg/kg		0.06 mg/kg	0.000006 %			
24	pyrene 204-927-3 129-00-0				0.06 mg/kg		0.06 mg/kg	0.000006 %			
25	benzo[a]anthracene 601-033-00-9 200-280-6 56-55-3				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
26	chrysene 601-048-00-0 205-923-4 218-01-9				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
27	benzo[b]fluoranthene 601-034-00-4 205-911-9 205-99-2				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
28	benzo[k]fluoranthene 601-036-00-5 205-916-6 207-08-9				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
29	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 200-028-5 50-32-8				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
30	indeno[123-cd]pyrene 205-893-2 193-39-5				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
31	dibenz[a,h]anthracene 601-041-00-2 200-181-8 53-70-3				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
32	benzo[ghi]perylene 205-883-8 191-24-2				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
Total:									0.0724 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: HP3 1.7

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample Name:	LoW Code:
HP3 1.7	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				17 mg/kg	1.32	22.446	mg/kg	0.00224 %		
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				0.4 mg/kg	1.14	0.457	mg/kg	0.000046 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]								
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0								
4	copper { dicopper oxide; copper (I) oxide }				35 mg/kg	1.13	39.406	mg/kg	0.00394 %		
	029-002-00-X	215-270-7	1317-39-1								
5	lead { lead chromate }			1	83 mg/kg	1.56	129.465	mg/kg	0.0083 %		
	082-004-00-2	231-846-0	7758-97-6								
6	mercury { mercury dichloride }				0.16 mg/kg	1.35	0.217	mg/kg	0.000022 %		
	080-010-00-X	231-299-8	7487-94-7								
7	nickel { nickel chromate }				24 mg/kg	2.98	71.43	mg/kg	0.00714 %		
	028-035-00-7	238-766-5	14721-18-7								
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.6 mg/kg	2.55	4.086	mg/kg	0.000409 %		
	034-002-00-8										
9	zinc { zinc sulphate }				76 mg/kg	2.47	187.667	mg/kg	0.0188 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH								
11	confirm TPH has NOT arisen from diesel or petrol				☒						
12	benzene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2								
13	toluene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3								
14	ethylbenzene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4								
15	xylene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	● pH		PH		7.7 pH		7.7 pH	7.7 pH			
17	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	● acenaphthylene		205-917-1	208-96-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	● acenaphthene		201-469-6	83-32-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	● fluorene		201-695-5	86-73-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	● phenanthrene		201-581-5	85-01-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
22	● anthracene		204-371-1	120-12-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
23	● fluoranthene		205-912-4	206-44-0	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
24	● pyrene		204-927-3	129-00-0	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
25	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
26	chrysene	601-048-00-0	205-923-4	218-01-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
29	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
30	● indeno[123-cd]pyrene		205-893-2	193-39-5	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
31	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
32	● benzo[ghi]perylene		205-883-8	191-24-2	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
Total:									0.0421 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP1 0.5

✱ **Potentially Hazardous Waste**
 Classified as **17 05 04** or **17 05 03 ***
 in the List of Waste

Sample details

Sample Name:	LoW Code:	
TP1 0.5	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
0 m		
Moisture content:		
0%		
(no correction)		

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0038%)

Determinands

Moisture content: **0%** No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	TPH (C6 to C40) petroleum group				38 mg/kg		38 mg/kg		0.0038 %		
			TPH								
2	confirm TPH has NOT arisen from diesel or petrol				☒						
3	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01 mg/kg		<0.01 mg/kg		<0.000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4								
4	benzene				<0.01 mg/kg		<0.01 mg/kg		<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2								
5	toluene				<0.01 mg/kg		<0.01 mg/kg		<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3								
6	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg		<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4								
7	xylene				<0.01 mg/kg		<0.01 mg/kg		<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
8	naphthalene				2.2 mg/kg		2.2 mg/kg		0.00022 %		
	601-052-00-2	202-049-5	91-20-3								
9	acenaphthylene				1.2 mg/kg		1.2 mg/kg		0.00012 %		
		205-917-1	208-96-8								
10	acenaphthene				0.05 mg/kg		0.05 mg/kg		0.000005 %		
		201-469-6	83-32-9								
11	fluorene				0.2 mg/kg		0.2 mg/kg		0.00002 %		
		201-695-5	86-73-7								
12	phenanthrene				4.7 mg/kg		4.7 mg/kg		0.00047 %		
		201-581-5	85-01-8								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
13	anthracene	204-371-1	120-12-7		1 mg/kg		1 mg/kg	0.0001 %			
14	fluoranthene	205-912-4	206-44-0		4.7 mg/kg		4.7 mg/kg	0.00047 %			
15	pyrene	204-927-3	129-00-0		4.2 mg/kg		4.2 mg/kg	0.00042 %			
16	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	4.3 mg/kg		4.3 mg/kg	0.00043 %			
17	chrysene	601-048-00-0	205-923-4	218-01-9	5 mg/kg		5 mg/kg	0.0005 %			
18	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	6.8 mg/kg		6.8 mg/kg	0.00068 %			
19	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	2.5 mg/kg		2.5 mg/kg	0.00025 %			
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	4.2 mg/kg		4.2 mg/kg	0.00042 %			
21	indeno[123-cd]pyrene	205-893-2	193-39-5		2.9 mg/kg		2.9 mg/kg	0.00029 %			
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.7 mg/kg		0.7 mg/kg	0.00007 %			
23	benzo[ghi]perylene	205-883-8	191-24-2		3.3 mg/kg		3.3 mg/kg	0.00033 %			
24	phenol	604-001-00-2	203-632-7	108-95-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
25	1,1-dichloroethane and 1,2-dichloroethane (combined)	203-458-1, 200-863-5	107-06-2, 75-34-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
26	trichloroethylene; trichloroethene	602-027-00-9	201-167-4	79-01-6	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
27	vinyl chloride; chloroethylene	602-023-00-7	200-831-0	75-01-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
Total:									0.00861 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Potentially Hazardous result
■	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: TP1 1.2

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP1 1.2	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				37 mg/kg	1.32	48.852 mg/kg	0.00489 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.7 mg/kg	1.14	0.8 mg/kg	0.00008 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				240 mg/kg	1.13	270.213 mg/kg	0.027 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	410 mg/kg	1.56	639.524 mg/kg	0.041 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				3.6 mg/kg	1.35	4.873 mg/kg	0.000487 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				89 mg/kg	2.98	264.888 mg/kg	0.0265 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.7 mg/kg	2.55	1.788 mg/kg	0.000179 %		
	034-002-00-8									
9	zinc { zinc sulphate }				260 mg/kg	2.47	642.017 mg/kg	0.0642 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
16	● pH		PH		7.4 pH		7.4 pH	7.4 pH		
17	naphthalene	601-052-00-2	202-049-5	91-20-3	0.05 mg/kg		0.05 mg/kg	0.000005 %		
18	● acenaphthylene		205-917-1	208-96-8	0.04 mg/kg		0.04 mg/kg	0.000004 %		
19	● acenaphthene		201-469-6	83-32-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	● fluorene		201-695-5	86-73-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	● phenanthrene		201-581-5	85-01-8	0.26 mg/kg		0.26 mg/kg	0.000026 %		
22	● anthracene		204-371-1	120-12-7	0.05 mg/kg		0.05 mg/kg	0.000005 %		
23	● fluoranthene		205-912-4	206-44-0	0.59 mg/kg		0.59 mg/kg	0.000059 %		
24	● pyrene		204-927-3	129-00-0	0.59 mg/kg		0.59 mg/kg	0.000059 %		
25	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.21 mg/kg		0.21 mg/kg	0.000021 %		
26	chrysene	601-048-00-0	205-923-4	218-01-9	0.28 mg/kg		0.28 mg/kg	0.000028 %		
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.28 mg/kg		0.28 mg/kg	0.000028 %		
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.12 mg/kg		0.12 mg/kg	0.000012 %		
29	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.18 mg/kg		0.18 mg/kg	0.000018 %		
30	● indeno[123-cd]pyrene		205-893-2	193-39-5	0.16 mg/kg		0.16 mg/kg	0.000016 %		
31	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.04 mg/kg		0.04 mg/kg	0.000004 %		
32	● benzo[ghi]perylene		205-883-8	191-24-2	0.18 mg/kg		0.18 mg/kg	0.000018 %		
Total:								0.166 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP1 2.3

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample Name:	LoW Code:
TP1 2.3	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				25 mg/kg	1.32	33.008 mg/kg	0.0033 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.6 mg/kg	1.14	0.685 mg/kg	0.000069 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				110 mg/kg	1.13	123.848 mg/kg	0.0124 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	280 mg/kg	1.56	436.748 mg/kg	0.028 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				39 mg/kg	1.35	52.786 mg/kg	0.00528 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				28 mg/kg	2.98	83.335 mg/kg	0.00833 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				4 mg/kg	2.55	10.214 mg/kg	0.00102 %		
	034-002-00-8									
9	zinc { zinc sulphate }				160 mg/kg	2.47	395.087 mg/kg	0.0395 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	pH PH				7.6 pH		7.6 pH	7.6 pH			
17	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	acenaphthylene	205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	acenaphthene	201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	fluorene	201-695-5	86-73-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	phenanthrene	201-581-5	85-01-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
22	anthracene	204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
23	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
24	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
25	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
26	chrysene 601-048-00-0	205-923-4	218-01-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
27	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
28	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
29	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
30	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
31	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
32	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
Total:									0.0991 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP2 0.4

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP2 0.4	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				67 mg/kg	1.32	88.462 mg/kg	0.00885 %			
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				0.7 mg/kg	1.14	0.8 mg/kg	0.00008 %			
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]								
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
4	copper { dicopper oxide; copper (I) oxide }				120 mg/kg	1.13	135.107 mg/kg	0.0135 %			
	029-002-00-X	215-270-7	1317-39-1								
5	lead { lead chromate }			1	130 mg/kg	1.56	202.776 mg/kg	0.013 %			
	082-004-00-2	231-846-0	7758-97-6								
6	mercury { mercury dichloride }				0.58 mg/kg	1.35	0.785 mg/kg	0.000079 %			
	080-010-00-X	231-299-8	7487-94-7								
7	nickel { nickel chromate }				49 mg/kg	2.98	145.837 mg/kg	0.0146 %			
	028-035-00-7	238-766-5	14721-18-7								
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1 mg/kg	2.55	2.554 mg/kg	0.000255 %			
	034-002-00-8										
9	zinc { zinc sulphate }				120 mg/kg	2.47	296.316 mg/kg	0.0296 %			
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %			<LOD
			TPH								
11	confirm TPH has NOT arisen from diesel or petrol				☒						
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]								

Report created by Gemma Bates on 02/03/2017														
#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value		MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number										
			203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]										
16	●	pH				7.4	pH		7.4	pH	7.4 pH			
				PH										
17	●	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD	
		601-052-00-2	202-049-5	91-20-3										
18	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD	
			205-917-1	208-96-8										
19	●	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD	
			201-469-6	83-32-9										
20	●	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD	
			201-695-5	86-73-7										
21	●	phenanthrene				0.09	mg/kg		0.09	mg/kg	0.000009 %			
			201-581-5	85-01-8										
22	●	anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD	
			204-371-1	120-12-7										
23	●	fluoranthene				0.23	mg/kg		0.23	mg/kg	0.000023 %			
			205-912-4	206-44-0										
24	●	pyrene				0.21	mg/kg		0.21	mg/kg	0.000021 %			
			204-927-3	129-00-0										
25	●	benzo[a]anthracene				0.09	mg/kg		0.09	mg/kg	0.000009 %			
		601-033-00-9	200-280-6	56-55-3										
26	●	chrysene				0.11	mg/kg		0.11	mg/kg	0.000011 %			
		601-048-00-0	205-923-4	218-01-9										
27	●	benzo[b]fluoranthene				0.12	mg/kg		0.12	mg/kg	0.000012 %			
		601-034-00-4	205-911-9	205-99-2										
28	●	benzo[k]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %			
		601-036-00-5	205-916-6	207-08-9										
29	●	benzo[a]pyrene; benzo[def]chrysene				0.07	mg/kg		0.07	mg/kg	0.000007 %			
		601-032-00-3	200-028-5	50-32-8										
30	●	indeno[123-cd]pyrene				0.09	mg/kg		0.09	mg/kg	0.000009 %			
			205-893-2	193-39-5										
31	●	dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD	
		601-041-00-2	200-181-8	53-70-3										
32	●	benzo[ghi]perylene				0.09	mg/kg		0.09	mg/kg	0.000009 %			
			205-883-8	191-24-2										
Total:											0.0813 %			

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- ⚗

 Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP2 1.1

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP2 1.1	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	TPH (C6 to C40) petroleum group				<10 mg/kg		<10	mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol				☒						
3	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X 216-653-1 1634-04-4				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
4	benzene 601-020-00-8 200-753-7 71-43-2				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
5	toluene 601-021-00-3 203-625-9 108-88-3				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
6	ethylbenzene 601-023-00-4 202-849-4 100-41-4				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
7	xylene 601-022-00-9 202-422-2 [1] 95-47-6 [1] 203-396-5 [2] 106-42-3 [2] 203-576-3 [3] 108-38-3 [3] 215-535-7 [4] 1330-20-7 [4]				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
8	naphthalene 601-052-00-2 202-049-5 91-20-3				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
9	acenaphthylene 205-917-1 208-96-8				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
10	acenaphthene 201-469-6 83-32-9				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11	fluorene 201-695-5 86-73-7				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12	phenanthrene 201-581-5 85-01-8				0.3 mg/kg		0.3	mg/kg	0.00003 %		
13	anthracene 204-371-1 120-12-7				<0.1 mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14	fluoranthene 205-912-4 206-44-0				0.6 mg/kg		0.6	mg/kg	0.00006 %		
15	pyrene 204-927-3 129-00-0				0.6 mg/kg		0.6	mg/kg	0.00006 %		
16	benzo[a]anthracene 601-033-00-9 200-280-6 56-55-3				0.3 mg/kg		0.3	mg/kg	0.00003 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		chrysene				0.3	mg/kg		0.3	mg/kg	0.00003 %		
		601-048-00-0	205-923-4	218-01-9									
18		benzo[b]fluoranthene				0.4	mg/kg		0.4	mg/kg	0.00004 %		
		601-034-00-4	205-911-9	205-99-2									
19		benzo[k]fluoranthene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
		601-036-00-5	205-916-6	207-08-9									
20		benzo[a]pyrene; benzo[def]chrysene				0.3	mg/kg		0.3	mg/kg	0.00003 %		
		601-032-00-3	200-028-5	50-32-8									
21	●	indeno[123-cd]pyrene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
			205-893-2	193-39-5									
22		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
23	●	benzo[ghi]perylene				0.3	mg/kg		0.3	mg/kg	0.00003 %		
			205-883-8	191-24-2									
24		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		604-001-00-2	203-632-7	108-95-2									
25	●	1,1-dichloroethane and 1,2-dichloroethane (combined)				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			203-458-1, 200-863-5	107-06-2, 75-34-3									
26		trichloroethylene; trichloroethene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		602-027-00-9	201-167-4	79-01-6									
27		vinyl chloride; chloroethylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		602-023-00-7	200-831-0	75-01-4									
Total:											0.00143 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
■	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: TP3 0.4

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample Name:	LoW Code:
TP3 0.4	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				30 mg/kg	1.32	39.61	mg/kg	0.00396 %		
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				0.9 mg/kg	1.14	1.028	mg/kg	0.000103 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]								
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0								
4	copper { dicopper oxide; copper (I) oxide }				240 mg/kg	1.13	270.213	mg/kg	0.027 %		
	029-002-00-X	215-270-7	1317-39-1								
5	lead { lead chromate }			1	290 mg/kg	1.56	452.346	mg/kg	0.029 %		
	082-004-00-2	231-846-0	7758-97-6								
6	mercury { mercury dichloride }				0.13 mg/kg	1.35	0.176	mg/kg	0.000018 %		
	080-010-00-X	231-299-8	7487-94-7								
7	nickel { nickel chromate }				70 mg/kg	2.98	208.339	mg/kg	0.0208 %		
	028-035-00-7	238-766-5	14721-18-7								
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.9 mg/kg	2.55	2.298	mg/kg	0.00023 %		
	034-002-00-8										
9	zinc { zinc sulphate }				140 mg/kg	2.47	345.701	mg/kg	0.0346 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH								
11	confirm TPH has NOT arisen from diesel or petrol				☒						
12	benzene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2								
13	toluene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3								
14	ethylbenzene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4								
15	xylene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
16	● pH		PH		6.5 pH		6.5 pH	6.5 pH		
17	naphthalene	601-052-00-2	202-049-5	91-20-3	0.05 mg/kg		0.05 mg/kg	0.000005 %		
18	● acenaphthylene		205-917-1	208-96-8	0.06 mg/kg		0.06 mg/kg	0.000006 %		
19	● acenaphthene		201-469-6	83-32-9	0.2 mg/kg		0.2 mg/kg	0.00002 %		
20	● fluorene		201-695-5	86-73-7	0.14 mg/kg		0.14 mg/kg	0.000014 %		
21	● phenanthrene		201-581-5	85-01-8	1.8 mg/kg		1.8 mg/kg	0.00018 %		
22	● anthracene		204-371-1	120-12-7	0.39 mg/kg		0.39 mg/kg	0.000039 %		
23	● fluoranthene		205-912-4	206-44-0	2.2 mg/kg		2.2 mg/kg	0.00022 %		
24	● pyrene		204-927-3	129-00-0	1.9 mg/kg		1.9 mg/kg	0.00019 %		
25	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.75 mg/kg		0.75 mg/kg	0.000075 %		
26	chrysene	601-048-00-0	205-923-4	218-01-9	0.82 mg/kg		0.82 mg/kg	0.000082 %		
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.8 mg/kg		0.8 mg/kg	0.00008 %		
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.33 mg/kg		0.33 mg/kg	0.000033 %		
29	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.57 mg/kg		0.57 mg/kg	0.000057 %		
30	● indeno[123-cd]pyrene		205-893-2	193-39-5	0.35 mg/kg		0.35 mg/kg	0.000035 %		
31	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.08 mg/kg		0.08 mg/kg	0.000008 %		
32	● benzo[ghi]perylene		205-883-8	191-24-2	0.37 mg/kg		0.37 mg/kg	0.000037 %		
Total:								0.118 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP3 1

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP3 1	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				19 mg/kg	1.32	25.086 mg/kg	0.00251 %			
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				0.7 mg/kg	1.14	0.8 mg/kg	0.00008 %			
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]								
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
4	copper { dicopper oxide; copper (I) oxide }				160 mg/kg	1.13	180.142 mg/kg	0.018 %			
	029-002-00-X	215-270-7	1317-39-1								
5	lead { lead chromate }			1	150 mg/kg	1.56	233.972 mg/kg	0.015 %			
	082-004-00-2	231-846-0	7758-97-6								
6	mercury { mercury dichloride }				6.1 mg/kg	1.35	8.256 mg/kg	0.000826 %			
	080-010-00-X	231-299-8	7487-94-7								
7	nickel { nickel chromate }				71 mg/kg	2.98	211.315 mg/kg	0.0211 %			
	028-035-00-7	238-766-5	14721-18-7								
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1 mg/kg	2.55	2.554 mg/kg	0.000255 %			
	034-002-00-8										
9	zinc { zinc sulphate }				240 mg/kg	2.47	592.631 mg/kg	0.0593 %			
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %			<LOD
			TPH								
11	confirm TPH has NOT arisen from diesel or petrol				☒						
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	● pH		PH		7.5 pH		7.5 pH	7.5 pH			
17	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	● acenaphthylene		205-917-1	208-96-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	● acenaphthene		201-469-6	83-32-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	● fluorene		201-695-5	86-73-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	● phenanthrene		201-581-5	85-01-8	0.1 mg/kg		0.1 mg/kg	0.00001 %			
22	● anthracene		204-371-1	120-12-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
23	● fluoranthene		205-912-4	206-44-0	0.16 mg/kg		0.16 mg/kg	0.000016 %			
24	● pyrene		204-927-3	129-00-0	0.14 mg/kg		0.14 mg/kg	0.000014 %			
25	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.05 mg/kg		0.05 mg/kg	0.000005 %			
26	chrysene	601-048-00-0	205-923-4	218-01-9	0.08 mg/kg		0.08 mg/kg	0.000008 %			
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.06 mg/kg		0.06 mg/kg	0.000006 %			
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
29	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
30	● indeno[123-cd]pyrene		205-893-2	193-39-5	0.04 mg/kg		0.04 mg/kg	0.000004 %			
31	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
32	● benzo[ghi]perylene		205-883-8	191-24-2	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
Total:									0.118 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP3 1.9

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP3 1.9	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				25 mg/kg	1.32	33.008 mg/kg	0.0033 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.6 mg/kg	1.14	0.685 mg/kg	0.000069 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				87 mg/kg	1.13	97.952 mg/kg	0.0098 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	180 mg/kg	1.56	280.767 mg/kg	0.018 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				3.7 mg/kg	1.35	5.008 mg/kg	0.000501 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				33 mg/kg	2.98	98.217 mg/kg	0.00982 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				2.3 mg/kg	2.55	5.873 mg/kg	0.000587 %		
	034-002-00-8									
9	zinc { zinc sulphate }				150 mg/kg	2.47	370.394 mg/kg	0.037 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	● pH		PH		7.7 pH		7.7 pH	7.7 pH			
17	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	● acenaphthylene		205-917-1	208-96-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	● acenaphthene		201-469-6	83-32-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	● fluorene		201-695-5	86-73-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	● phenanthrene		201-581-5	85-01-8	0.07 mg/kg		0.07 mg/kg	0.000007 %			
22	● anthracene		204-371-1	120-12-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
23	● fluoranthene		205-912-4	206-44-0	0.28 mg/kg		0.28 mg/kg	0.000028 %			
24	● pyrene		204-927-3	129-00-0	0.28 mg/kg		0.28 mg/kg	0.000028 %			
25	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.09 mg/kg		0.09 mg/kg	0.000009 %			
26	chrysene	601-048-00-0	205-923-4	218-01-9	0.16 mg/kg		0.16 mg/kg	0.000016 %			
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.16 mg/kg		0.16 mg/kg	0.000016 %			
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.07 mg/kg		0.07 mg/kg	0.000007 %			
29	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.09 mg/kg		0.09 mg/kg	0.000009 %			
30	● indeno[123-cd]pyrene		205-893-2	193-39-5	0.09 mg/kg		0.09 mg/kg	0.000009 %			
31	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
32	● benzo[ghi]perylene		205-883-8	191-24-2	0.09 mg/kg		0.09 mg/kg	0.000009 %			
Total:									0.0805 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP4 0.5

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample Name:	LoW Code:
TP4 0.5	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				37 mg/kg	1.32	48.852 mg/kg	0.00489 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				1.6 mg/kg	1.14	1.828 mg/kg	0.000183 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				200 mg/kg	1.13	225.178 mg/kg	0.0225 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	570 mg/kg	1.56	889.095 mg/kg	0.057 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				3.9 mg/kg	1.35	5.279 mg/kg	0.000528 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				180 mg/kg	2.98	535.728 mg/kg	0.0536 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				2.3 mg/kg	2.55	5.873 mg/kg	0.000587 %		
	034-002-00-8									
9	zinc { zinc sulphate }				320 mg/kg	2.47	790.175 mg/kg	0.079 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

Report created by Gemma Bates on 02/03/2017													
#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
			203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]									
16	●	pH				7.3	pH		7.3	pH	7.3 pH		
				PH									
17		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
18	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
19	●	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-469-6	83-32-9									
20	●	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
21	●	phenanthrene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
			201-581-5	85-01-8									
22	●	anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-371-1	120-12-7									
23	●	fluoranthene				0.28	mg/kg		0.28	mg/kg	0.000028 %		
			205-912-4	206-44-0									
24	●	pyrene				0.24	mg/kg		0.24	mg/kg	0.000024 %		
			204-927-3	129-00-0									
25		benzo[a]anthracene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
		601-033-00-9	200-280-6	56-55-3									
26		chrysene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
		601-048-00-0	205-923-4	218-01-9									
27		benzo[b]fluoranthene				0.18	mg/kg		0.18	mg/kg	0.000018 %		
		601-034-00-4	205-911-9	205-99-2									
28		benzo[k]fluoranthene				0.07	mg/kg		0.07	mg/kg	0.000007 %		
		601-036-00-5	205-916-6	207-08-9									
29		benzo[a]pyrene; benzo[def]chrysene				0.07	mg/kg		0.07	mg/kg	0.000007 %		
		601-032-00-3	200-028-5	50-32-8									
30	●	indeno[123-cd]pyrene				0.14	mg/kg		0.14	mg/kg	0.000014 %		
			205-893-2	193-39-5									
31		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
32	●	benzo[ghi]perylene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
			205-883-8	191-24-2									
Total:											0.22 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- ⚗

 Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP4 1

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP4 1	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content:	
0%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				22 mg/kg	1.32	29.047 mg/kg	0.0029 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				1.3 mg/kg	1.14	1.485 mg/kg	0.000149 %		
	048-002-00-0	231-152-8 [1] 215-146-2 [2]	7440-43-9 [1] 1306-19-0 [2]							
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.92	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
4	copper { dicopper oxide; copper (I) oxide }				160 mg/kg	1.13	180.142 mg/kg	0.018 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	410 mg/kg	1.56	639.524 mg/kg	0.041 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				160 mg/kg	1.35	216.558 mg/kg	0.0217 %		
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				97 mg/kg	2.98	288.698 mg/kg	0.0289 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.7 mg/kg	2.55	1.788 mg/kg	0.000179 %		
	034-002-00-8									
9	zinc { zinc sulphate }				490 mg/kg	2.47	1209.955 mg/kg	0.121 %		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
11	confirm TPH has NOT arisen from diesel or petrol				☒					
12	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]								
16	● pH		PH		8 pH		8 pH	8pH			
17	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	● acenaphthylene		205-917-1	208-96-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
19	● acenaphthene		201-469-6	83-32-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
20	● fluorene		201-695-5	86-73-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	● phenanthrene		201-581-5	85-01-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
22	● anthracene		204-371-1	120-12-7	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
23	● fluoranthene		205-912-4	206-44-0	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
24	● pyrene		204-927-3	129-00-0	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
25	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
26	chrysene	601-048-00-0	205-923-4	218-01-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
29	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
30	● indeno[123-cd]pyrene		205-893-2	193-39-5	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
31	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
32	● benzo[ghi]perylene		205-883-8	191-24-2	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
Total:									0.235 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

• **dicopper oxide; copper (I) oxide** (EC Number: 215-270-7, CAS Number: 1317-39-1)

CLP index number: 029-002-00-X

Data source: Regulation (EU) 2016/1179 of 19 July 2016 (ATP9)

Additional Risk Phrases: N R50/53 , N R50/53 >= 0.25 %

Additional Hazard Statement(s): None.

Reason for additional Hazards Statement(s)/Risk Phrase(s):

10/10/2016 - N R50/53 risk phrase sourced from: WM3 v1 still uses ecotoxic risk phrases

10/10/2016 - N R50/53 >= 0.25 % risk phrase sourced from: WM3 v1 still uses ecotoxic risk phrases

• **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25/05/2015

Risk Phrases: R10 , R45 , R46 , R51/53 , R63 , R65

Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

• **confirm TPH has NOT arisen from diesel or petrol**

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)

Data source: WM3 1st Edition 2015

Data source date: 25/05/2015

Risk Phrases: None.

Hazard Statements: None.

• **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4

Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)

Additional Risk Phrases: None.

Additional Hazard Statement(s): Carc. 2 H351

Reason for additional Hazards Statement(s)/Risk Phrase(s):

03/06/2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

• **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17/07/2015

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

• **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17/07/2015

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

• **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06/08/2015

Risk Phrases: N R50/53

Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

• **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06/08/2015

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

■ **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17/07/2015

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

■ **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21/08/2015

Risk Phrases: Xn R22 , N R50/53

Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

■ **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21/08/2015

Risk Phrases: Xi R36/37/38 , N R50/53

Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

■ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06/08/2015

Risk Phrases: R40

Hazard Statements: Carc. 2 H351

■ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23/07/2015

Risk Phrases: N R50/53

Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

■ **1,1-dichloroethane and 1,2-dichloroethane (combined)** (EC Number: 203-458-1, 200-863-5, CAS Number: 107-06-2, 75-34-3)

Description/Comments: Combines the hazard statements and risk phrases for 1,1-dichloroethane and 1,2-dichloroethane

Data source: N/A

Data source date: 14/10/2016

Risk Phrases: F R11 , Xn R22 , Xi R36/37/38 , Carc Cat 2 R45 , R52/53

Hazard Statements: Flam. Liq. 2 H225 , Acute Tox. 4 H302 , Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 1B H350 , Aquatic Chronic 3 H412

■ **pH** (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25/05/2015

Risk Phrases: None.

Hazard Statements: None.

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worst case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc sulphate}

Ashy made ground recorded on-site, zinc sulphate more representative of site conditions.

Appendix C: VersionHazWasteOnline Classification Engine: **WM3 1st Edition, May 2015**

HazWasteOnline Classification Engine Version: 2017.114.3285.6593 (24 Apr 2017)

HazWasteOnline Database: 2017.114.3285.6593 (24 Apr 2017)

This classification utilises the following guidance and legislation:

WM3 - Waste Classification - May 2015**CLP Regulation** - Regulation 1272/2008/EC of 16 December 2008**1st ATP** - Regulation 790/2009/EC of 10 August 2009**2nd ATP** - Regulation 286/2011/EC of 10 March 2011**3rd ATP** - Regulation 618/2012/EU of 10 July 2012**4th ATP** - Regulation 487/2013/EU of 8 May 2013**Correction to 1st ATP** - Regulation 758/2013/EU of 7 August 2013**5th ATP** - Regulation 944/2013/EU of 2 October 2013**6th ATP** - Regulation 605/2014/EU of 5 June 2014**WFD Annex III replacement** - Regulation 1357/2014/EU of 18 December 2014**Revised List of Wastes 2014** - Decision 2014/955/EU of 18 December 2014**7th ATP** - Regulation 2015/1221/EU of 24 July 2015**8th ATP** - Regulation (EU) 2016/918 of 19 May 2016**9th ATP** - Regulation (EU) 2016/1179 of 19 July 2016**POPs Regulation 2004** - Regulation 850/2004/EC of 29 April 2004**1st ATP to POPs Regulation** - Regulation 756/2010/EU of 24 August 2010**2nd ATP to POPs Regulation** - Regulation 757/2010/EU of 24 August 2010

APPENDIX 5

PBA Methodology for Assessing Land Contamination in England

1 Introduction

This document defines the approach adopted by PBA in relation to the assessment of land contamination in England. The aim is for the approach to (i) be systematic and objective, (ii) provide for the assessment of uncertainty and (iii) provide a rational, consistent, transparent framework.

When preparing our methodology we have made reference to various technical guidance documents and legislation referenced in Section 7 of which the principal documents are (i) Contaminated Land Statutory Guidance (Defra 2012), (ii) the Model Procedures for the Management of Contamination (CLR 11) (EA 2004), (iii) Contaminated land risk assessment: A guide to good practice (C552) (CIRIA 2001) and (iv) National Planning Policy Framework (DCLG 2012).

2 Dealing with Land Contamination

Government policy on land contamination aims to prevent new contaminated land from being created and promotes a risk based approach to addressing historical contamination. With regard to historical contamination, regulatory intervention is held in reserve for land that meets the legal definition and cannot be dealt with through any other means, including through planning. Land is only considered to be "contaminated land" in the legal sense if it poses an unacceptable risk.

UK legislation on contaminated land is principally contained in Part 2A of the Environmental Protection Act, 1990 (which was inserted into the 1990 Act by section 57 of the Environment Act 1995). Part 2A was introduced in England on 1 April 2000 and provides a risk-based approach to the identification and remediation of land where contamination poses an unacceptable risk to human health or the environment. In 2004 the Model Procedures for the Management of Contamination (CLR 11) were published providing guidance on how the statutory requirements were to be delivered. The approach, concepts and principles for land contamination management promoted by CLR 11 are applied to the determination of planning applications.

Other legislative regimes may also provide a means of dealing with land contamination issues, such as the regimes for waste, water, environmental permitting, and environmental damage. Further, the law of statutory nuisance may result in contaminants being unacceptable to third parties whilst not attracting action under Part 2A or other environmental legislation.

2.1 Part 2A

The Regulations and Statutory Guidance that accompanied the Act, including the Contaminated Land (England) Regulations 2006, has been revised with the issue of The Contaminated Land (England) (Amendment) Regulations 2012 (SI 2012/263) and the Contaminated Land Statutory Guidance for England 2012.

Part 2A defines contaminated land as "*land which appears to the Local Authority in whose area it is situated to be in such a condition that, by reason of substances in, on or under the land that significant harm is being caused, or there is a significant*

possibility that such harm could be caused, or pollution of controlled waters is being, or likely to be, caused".

Harm is defined as "*harm to the health of living organisms or other interference with the ecological systems of which they form part, and in the case of man, includes harm to his property*".

For the purposes of Part 2A, land is contaminated if it poses a significant possibility of significant harm (SPOSH).

Part 2A provides a means of dealing with unacceptable risks posed by land contamination to human health and the environment, and under the guidance enforcing authorities should seek to find and deal with such land. It states that "*under Part 2A the starting point should be that land is not contaminated land unless there is reason to consider otherwise. Only land where unacceptable risks are clearly identified, after a risk assessment has been undertaken in accordance with the Guidance, should be considered as meeting the Part 2A definition of contaminated land*". Further the guidance makes it clear that "*regulatory decisions should be based on what is reasonably likely, not what is hypothetically possible*".

The overarching objectives of the Government's policy on contaminated land and the Part 2A regime are:

- "(a) To identify and remove unacceptable risks to human health and the environment.
- (a) To seek to ensure that contaminated land is made suitable for its current use.
- (b) To ensure that the burdens faced by individuals, companies and society as a whole are proportionate, manageable and compatible with the principles of sustainable development".

The enforcing authority may need to decide whether and how to act in situations where decisions are not straight forward, and where there is uncertainty. "*In so doing, the authority should use its judgement to strike a reasonable balance between: (a) dealing with risks raised by contaminants in land and the benefits of remediating land to remove or reduce those risks; and (b) the potential impacts of regulatory intervention including financial costs to whoever will pay for remediation, health and environmental impacts of taking action, property blight, and burdens on affected people*". The authority is required to "*take a precautionary approach to the risks raised by contamination, whilst avoiding a disproportionate approach given the circumstances of each case*". The aim is "*that the regime produces net benefits, taking account of local circumstances*".

The guidance recognises that "*normal levels of contaminants in soils should not be considered to cause land to qualify as contaminated land, unless there is a particular reason to consider otherwise*".

Normal levels are quoted as:

- "a) natural presence of contaminants' such as from underlying geology 'that have not been shown to pose an unacceptable risk to health and the environment
- b) ...low level diffuse pollution, and common human activity..."

PBA Methodology for Assessment of Potentially Contaminated Land

Similarly the guidance states that significant pollution of controlled waters is required for land to be considered contaminated and the *"fact that substances are merely entering water"* or *"where discharge from land is not discernible at a location immediately downstream"* does not constitute contaminated land.

To help achieve a more targeted approach to identifying and managing contaminated land in relation to the risk (or possibility) of harm to human health, the revised Statutory Guidance presented a new four category system for considering land under Part 2A, ranging from Category 4, where there is no risk that land poses a significant possibility of significant harm (SPOSH), or the level of risk is low, to Category 1, where the risk that land poses a significant possibility of significant harm (SPOSH) is unacceptably high.

For land that cannot be readily placed into Categories 1 or 4 further assessment is required. If there is a sufficiently strong case that the risks are of sufficient concern to cause significant harm/pollution or have the significant possibility of significant harm/pollution the land is to be placed into Category 2. If the concern is not met land is considered Category 3.

The technical guidance clearly states that the currently published SGV and GAC's represent *"cautious estimates of level of contaminants in soils"* which should be considered *"no risk to health or, at most, a minimal risk"*. These values do not represent the boundary between categories 3 and 4 and *"should be considered to be comfortably within Category 4"*.

At the end of 2013 technical guidance in support of Defra's revised Statutory Guidance (SG) was published (CL:AIRE 2013) which provided:

- A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and
- A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

2.2 Planning

The Local Planning Authority (LPA) is responsible for the control of development, and in doing so it has a duty to take account of all material considerations, including contamination.

Section 11, Paragraph 109 of the National Planning Policy Framework (NPPF) (DCLG 2012) states the planning system should contribute to and enhance the natural and local environment by *"preventing both new and existing developments from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water pollution"* and *"remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate"*. Paragraphs 120 and 121 describe the policy considerations the Government expects LPA to have in regard to land affected by contamination when preparing policies for development plans and in taking decisions on applications.

For planning purposes, the NPPF requires that the assessment of risks arising from contamination and remediation requirements should be considered on the

basis of the current environmental setting, the current land use, and the circumstances of its proposed new use. The NPPF stipulates that planning policies and decisions should ensure that *"the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation"*; and that *"after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990; and adequate site investigation information, prepared by a competent person, is presented."*

The level at which contamination is deemed to be unacceptable, or, gives rise to adverse effects under a planning context has not been identified but is envisaged to be more precautionary than the level required to determine land as contaminated under Part 2A.

In paragraph 121 the developer is required to ensure that land, after development, is not capable of being determined as contaminated land under Part 2A of the EPA 1990.

The principal planning objective is to ensure that any unacceptable risks to human health, buildings and other property and the natural and historical environment from the contaminated condition of the land are identified so that appropriate action can be considered and taken to address those risks. In order to grant a planning permission the Local Planning Authority (LPA) has to be satisfied that there is sufficient information about the condition of the land, its impacts and the availability of viable remedial options. NPPF Paragraph 21 states that *"planning policies and decisions should also ensure that adequate site investigation information, prepared by a competent person, is presented"*. Site investigation information is further defined in the NPPF Glossary page 56 and that also states that investigations should be carried out in accordance with established procedures, including BS10175 (BSI 2011) that in turn links procedure to the requirements of CLR11.

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to human health."

A letter from Lord de Mauley dated 3rd September 2014 provides more explicit direction to local authorities on the use of the C4SL in a planning context. The letter identifies four key points:

- 1) that the screening values were developed expressly with the planning regime in mind
- 2) their use is recommended in DCLG's planning guidance
- 3) soil concentrations below a C4SL limit are considered to be 'definitely not contaminated' under Part IIA of the 1990 Environmental Protection Act and pose at most a 'low level of toxicological concern' and
- 4) exceedance of a C4SL screening value does not mean that land is definitely contaminated, just that further investigation may be warranted.

PBA Methodology for Assessment of Potentially Contaminated Land

2.3 Building Control

The building control department of the local authority or private sector approved inspectors are responsible for the operation and enforcement of the Building Regulations (DCLG 2010) to protect the health, safety and welfare of people in and around buildings. Approved Document C requires the protection of buildings and associated land from the effects of contamination, to be applied (non-exclusively) in all changes of use from commercial or industrial premises, to residential property.

3 Approach

CLR 11 recommends a phased or tiered approach to risk assessment with the three tiers being:-

- Tier 1 - preliminary – a qualitative assessment forming part of a Phase 1 report,
- Tier 2 - generic - a quantitative assessment using published criteria to screen site specific ground condition data forming part of a Phase 2 report
- Tier 3 - detailed – a quantitative assessment involving the generation of site specific assessment criteria

Each tier of risk assessment comprises the following four stages:-

1. Hazard Identification – identifying potential contaminant sources on and off site;
2. Hazard Assessment – assessing the potential for unacceptable risks by identifying what pathways and receptors could be present, and what pollutant linkages could result (forming the Conceptual Site Model (CSM));
3. Risk Estimation – estimating the magnitude and probability of the possible consequences (what degree of harm might result to a defined receptor and how likely); and
4. Risk Evaluation – evaluating whether the risk needs to be, and can be, managed.

A PBA Phase 1 report normally comprises a desk study, walkover and Tier 1 risk assessment (the project specific offer defines the actual scope of work). This is the minimum requirement as defined by the NPPF, pp56. At Tier 1 the PBA approach to risk estimation involves identifying the magnitude of the potential consequence (taking into account both the potential severity of the hazard and the sensitivity of the receptor) and the magnitude of the likelihood i.e. the probability (taking into account the presence of the hazard and the receptor and the integrity of the pathway). This approach is promoted in current guidance such as R&D 66 (NHBC 2008).

The PBA approach is that if a pollution linkage is identified then it represents a potential risk which requires further consideration and either (1) remediation / direct risk management or (2) further tiers of assessment.

A PBA preliminary Phase 2 report comprises an intrusive investigation to collect site specific information, a Tier 2 quantitative generic risk assessment and a refinement of the CSM using the site specific data. Depending on the findings further investigation and/or progression to Tier 3 risk assessment and the generation of site specific assessment criteria may be required.

The PBA methodology provides an estimate of the level of risk, it does not identify a risk level at which the risk is considered “significant” and/or “unacceptable” as this is dependant on the view of the individual / stakeholder. For example; to a risk adverse stakeholder even a risk level of “very low” may be considered unacceptable and as such this stakeholder may require risk management options to be implemented.

4 Identification of Pollutant Linkages and Conceptual Site Model (CSM)

For all Tiers the underlying principle to ground condition assessment is the identification of *pollutant linkages* in order to evaluate whether the presence of a source of contamination could potentially lead to harmful consequences. A pollutant linkage consists of the following three elements:-

- A source/hazard – a substance or situation which has the potential to cause harm or pollution;
- A pathway – a means by which the hazard moves along / generates exposure; and
- A receptor/target – an entity which is vulnerable to the potential adverse effects of the hazard.

The *Conceptual Site Model* identifies the types and locations of potential contaminant sources/hazards and potential receptors and potential migration/transportation pathway(s). The CSM is refined as the assessment progresses through the Tiers.

4.1 Hazard Identification

A hazard is a substance or situation that has the potential to cause harm. Hazards may be chemical, biological or physical (e.g. explosive gases).

At Tier 1 the potential for hazards to be present is determined from consideration of the previous or ongoing activities on or near to the site in accordance with the criteria presented in the **Table 1**.

Based on the land use information Potential Contaminants of Concern (PCOC) are identified. The PCOC direct the scope of the collection of site specific data and the analytical testing selected for subsequent Tiers.

At Tier 2 the site specific data is screened using published assessment criteria (refer to PBA document entitled Rationale for the Selection of Tier 2 Assessment Criteria). In general, published criteria have been developed using highly conservative assumptions and therefore if the screening criterion is not exceeded then the PCOC is eliminated as a potential Hazard. It should be noted that exceedance does not necessarily indicate that a site is contaminated and/or unsuitable for use only that the PCOC is retained as a potential Hazard. Published criteria are generated using models based on numerous and complex assumptions. Whether or not these assumptions are appropriate in a site-specific context requires confirmation on a project by project basis and would form part of a Tier 3 assessment.

When reviewing or assessing site specific data PBA utilise published guidance on comparing contamination

PBA Methodology for Assessment of Potentially Contaminated Land

data with a critical concentration (CL:AIRE/CIEH 2008) which presents a structured process for employing statistical techniques for data assessment purposes. The benefit of the statistical tool is uncertainty is quantified and decisions are made knowing the strength of the evidence. Correct decision probability is a function of sample size, difference in the mean and the critical concentration, variation in measured values and the significance level.

4.2 Receptor and Pathway Identification

For all Tiers the potential receptors (for both on site and adjoining land) that will be considered are:

- Human Health – including current and future occupiers, construction and future maintenance workers, and neighbouring properties/third parties;
- Ecological systems; ^{*1}
- Controlled waters ^{*2} – including surface water and groundwater;
- Property, Animal or Crop (existing or proposed) - including buildings, service lines and pipes, crops, livestock, pets, woodland; and
- Archaeological sites and ancient monuments.

^{*1} International or nationally designated sites (as defined in the statutory guidance (Defra Circular 04/12)) “in the local area” will be identified as potential ecological receptors. A search radius of 1, 2 or 5km will be utilised depending on the site specific circumstances (see also pathway identification). The Environment Agency has published an ecological risk assessment framework (EA 2008) which promotes (as opposed to statutorily enforces) consideration of additional receptors to include locally protected sites and protected or notable species. These additional potential receptors will only be considered if a Phase 1 habitat survey, undertaken in accordance with guidance (JNCC 1993), is commissioned and the data provided to PBA. It should be noted that without such a survey the Tier 1 risk assessment may conclude that the identification of potential ecological receptors is inconclusive (refer to PBA Specification for Phase 1).

^{*2} the definition of “pollution of controlled water” was amended by the introduction of Section 86 of the Water Act 2003. For the purposes of Part 2A groundwater does not include waters above the saturated zone and our assessment does not therefore address perched water other than where development causes a pathway to develop.

If a receptor is taken forward for further assessment it will be classified in terms of its sensitivity, the criteria for which are presented in **Table 2**. Table 2 has been generated using descriptions of environmental receptor importance/value given in various guidance documents including R&D 66 (NHBC 2008) and Transport Analysis Guidance (based on DETR 2000). Human health and buildings classifications have been generated by PBA using the attribute description for each class.

The exposure pathway and modes of transport that will be considered are presented in **Table 3**.

4.3 Note regarding Ecological Systems

The Environment Agency (EA) has developed an ecological risk assessment framework which aims to provide a structured approach for assessing the risks to ecology from chemical contaminants in soils (EA 2008). In circumstances where contaminants in water represent a potential risk to aquatic ecosystems then risk assessors will need to consider this separately.

The framework consists of a three tiered process:-

- Tier 1 is a screening step where the site soils chemical data is compared to a soil screening value (SSV)
- Tier 2 uses various tools (including surveys and biological testing) to gather evidence for any harm to the ecological receptors
- Tier 3 seeks to attribute the harm to the chemical contamination

Tier 1 is preceded by a desk study to collate information about the site and the nature of the contamination to assess whether pollutant linkages are feasible. The framework presents ten steps for ecological desk studies and development of a conceptual site model as follows.

- 1 Establish Regulatory Context
- 2 Collate and Assess Documentary Information
- 3 Summarise Documentary Information
- 4 Identify Potential Contaminants of Concern
- 5 Identify Likely Fate Transport of Contaminants
- 6 Identify Potential Receptors of Concern
- 7 Identify Potential Pathways of Concern
- 8 Create a Conceptual Site Model
- 9 Identify Assessment and Measurement Endpoints
- 10 Identify Gaps and Uncertainties

The information in a standard PBA Phase 1 report covers Steps 1 to 4 inclusive. Step 5 considers fate and transport of contaminants and it should be noted that our standard report adopts a simplified approach considering only transport mechanisms. A simplified approach has also been adopted in respect of Steps 6 and 7 receptors (a detailed review of the ecological attributes has not been undertaken) and pathways (a food chain assessment has not been undertaken). Step 9 is outside the scope of our standard Phase 1 report.

It should be noted that the Tier 1 assessment for ecological systems (i.e. where designated sites are identified) as part of a Phase 1 report will assess the viability of the mode of transport given the site specific circumstances not specific pathways.

The Tier 1 risk assessment may conclude that the risk to potential ecological receptors is inconclusive (see PBA Specification for Phase 1).

4.4 Note regarding Controlled Waters

Controlled Waters are rivers, estuaries, coastal waters, lakes and groundwaters, but not perched waters.

The EU Water Framework Directive (WFD) 2000/60/EC provides for the protection of sub-surface, surface, coastal and territorial waters through a framework of river basin management. The EU Updated Water Framework Standards Directive 2014/101/EU amended the EU WFD to update the international standards therein; it enters into force on 20 November 2014 and its provisions must be transposed in Member State law by 20 May 2016. Other EU Directives in the European water management framework include:

- the EU Priority Substances Directive 2013/39/EU;

PBA Methodology for Assessment of Potentially Contaminated Land

- EU Groundwater Pollutants Threshold Values Directive 2014/80/EU amending the EU Groundwater Directive 2006/118/EC; and
- EU Biological Monitoring Directive 2014/101/EU.

The Ground Water Daughter Directive (GWDD) was enacted by the Groundwater Regulations (2009), which were subsumed by the Environmental Permitting Regulations (2010) which provide essential clarification including on the four objectives specifically for groundwater quality in the WFD:-

- Achieve 'Good' groundwater chemical status by 2015, commonly referred to as 'status objective';
- Achieve Drinking Water Protected Area Objectives;
- Implement measures to reverse any significant and sustained upward trend in groundwater quality, referred to as 'trend objective'; and
- Prevent or limit the inputs of pollutants into groundwater, commonly referred to as 'prevent or limit' objectives

The Water Act 2003 (Commencement No.11) Order 2012 amends the test for 'contaminated land' which relates to water pollution so that pollution of controlled waters must now be "significant" to meet the definition of contaminated land.

River Basin Management Plans (RBMP) have been developed for the 11 River Basin Districts in England and Wales. These were released by Defra in 2009 (Defra 2009).

These RBMP's establish the current status of waters within the catchments of the respective Districts and the current status of adjoining waters identified. As part of a Tier 2 risk assessment water quality data is screened against the WFD assessment criteria. Compare to the RBMP's current status of waters for the catchment under consideration would form part of a Tier 3 assessment.

5 Risk Estimation

Risk estimation classifies what degree of harm might result to a receptor (defined as consequence) and how likely it is that such harm might arise (probability).

At Tier 1 the consequence classification is generated by multiplying the hazard classification score and the receptor sensitivity score. This approach follows that presented in the republished R&D 66 (NHBC 2008).

The criteria for classifying probability are set out in **Table 4** and have been taken directly from Table 6.4 CIRIA C552 (CIRIA 2001). Probability considers the integrity of the exposure pathway.

The consequence classifications detailed in **Table 5** have been adapted from Table 6.3 presented in C552 and R&D 66 (Annex 4 Table A4.3).

The Tier 1 risk classification is estimated for each pollutant linkage using the matrix given in **Table 6** which is taken directly from C552 (Table 6.5). Subsequent Tiers refine the CSM through retention or elimination of potential hazards and pollutant linkages.

6 Risk Evaluation

In order to put the Tier 1 risk classification into context the likely actions are described in **Table 7** which is taken directly from C552 (Table 6.6). Subsequent Tiers identify potential risk management options through remediation and/or mitigation measures.

7 References

BSI 2007 BS 8485 Code of Practice for characterisation and remediation from ground gas in affected developments.

BSI 2011 BS 10175 (2011) Code of practice - Investigation of potentially contaminated sites

CIRIA 2001: Contaminated land risk assessment – a guide to good practice C552.

CIRIA 2008: Assessing risks posed by hazardous ground gases to buildings C655

CL:AIRE/EIH 2008 Guidance on Company Soil Contamination Data with a Critical Concentration. Published by Contaminated Land: Applications in Real Environments (CL:AIRE)

CL:AIRE 2013 SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report published by Contaminated Land: Applications in Real Environments (CL:AIRE) 20th December 2013

DCLG 2010 Building Regulations 2010 Approved Document C Site preparation and resistance to contaminants and moisture.

DCLG 2012 National Planning Policy Framework.

DETR 2000 Methodology for Multi Modal Studies. Volume 2 Section 4. The Environmental Objective.

Defra Circular 01/2006

Defra Circular 04/2012 Environmental Protection Act 1990: Part 2A. Contaminated Land Statutory Guidance.

DEFRA, 2006 The Contaminated Land (England) Regulations 2006.

DEFRA, 2012 The Contaminated Land (England) (Amendment) Regulations 2012 (SI2012/263).

DEFRA, 2012 Environmental Protection Act 1990: Part 2A. Contaminated Land Statutory Guidance. April 2012.

DEFRA, 2013 Environmental Damage (Prevention and Remediation) Regulations 2009: Guidance for England and Wales

Defra '2009 Water for Life and Livelihoods. River Basin Management Plan. (11 Districts: Anglia, Dee, Humber, Northumbria, Northwest, Severn, Solway and Tweed, Southeast, Thames, Western Wales) December 2009

EA 2004: The Model Procedures for the Management of Land Contamination CRL 11 published by the Environment Agency (EA).

EA 2008 Ecological Risk Assessment Science Report Series SC070009 published by the Environment Agency (EA).

JNCC 1993 Handbook for Phase 1 Habitat Survey – A Technical for Environmental Audit prepared by the Joint Nature Conservancy Council (JNCC)

NHBC/EA/CIEH 2008: R&D Publication 66 Guidance for the safe development of housing on land affected by contamination.

Table 1: Criteria for Classifying Hazards / Potential for Generating Contamination

Classification/Score	Potential for generating contamination/gas based on land use
Very Low 1	Land Use: greenfield Contamination: None. Gas generation potential : Inert Made Ground
Low 2	Land Use: residential, retail or office use, recent small scale industrial. Contamination: None or locally slightly elevated concentrations. Gas generation potential : Shallow thickness of Alluvium
Moderate 3	Land Use: railway yards, collieries, scrap yards, light industry, engineering works. Contamination: Locally elevated concentrations. Gas generation potential : Dock silt and substantial thickness of organic alluvium/peat
High 4	Land Use: gas works, chemical works, heavy industry, non-hazardous landfills. Contamination: Possible widespread elevated concentrations. Gas generation potential : Shallow mine workings Pre 1960's landfill
Very High 5	Land Use: hazardous waste landfills. Contamination: Likely widespread elevated concentrations. Gas generation potential: Domestic landfill post 1960

"Greenfield" is land which has not been developed including not used for crop production or animal husbandry and no contamination source therefore no pollutant linkages.

Table 2: Criteria for Classifying Receptor Sensitivity/Value

Classification/Score	Definition
Very Low 1	Receptor of limited importance Groundwater: Non aquifer Surface water: Water body within 25m or eliminate Ecology: No local designation Buildings: Replaceable Human health: Unoccupied/limited access
Low 2	Receptor of local or county importance with potential for replacement Groundwater: Secondary B aquifer or Secondary Undifferentiated Surface water: Tertiary water body immediately adjacent Ecology: local habitat resources Buildings: Local value Human health: Minimum score 4 where human health identified as potential receptor
Moderate 3	Receptor of local or county importance with potential for replacement Groundwater: Secondary A aquifer Surface water: Secondary water body immediately adjacent Ecology: County wildlife sites, Areas of Outstanding Natural Beauty (AONB) Buildings: Area of Historic Character Human health: Minimum score 4 where human health identified as potential receptor
High 4	Receptor of county or regional importance with limited potential for replacement Groundwater: Principal aquifer Surface water: Primary water body immediately adjacent Ecology: SSSI, National or Marine Nature Reserve (NNR or MNR) Buildings: Conservation Area Human health: Minimum score 4 where human health identified as potential receptor
Very High 5	Receptor of national or international importance Groundwater: Source Protection Zone Surface water: Primary water body on site Ecology: Special Areas of Conservation (SAC and candidates), Special Protection Areas (SPA and potentials) or wetlands of international importance (RAMSAR) Buildings: World Heritage site Human health: Residential, open spaces and uses where children are present

Table 3: Exposure Pathway and Modes of Transport

Receptor	Pathway	Mode of transport
Human health	Ingestion	Fruit or vegetable leaf or roots
		Contaminated water
		Soil/dust indoors
		Soil/dust outdoors
	Inhalation	Particles (dust / soil) – outdoor
		Particles (dust / soil) - indoor
		Vapours – outdoor - migration via natural or anthropogenic pathways
		Vapours - indoor - migration via natural or anthropogenic pathways
	Dermal absorption	Direct contact with soil
		Direct contact with waters (swimming / showering)
		Irradiation
Groundwater	Leaching	Gravity / permeation
	Migration	Natural – groundwater as pathway Anthropogenic (e.g. boreholes, culverts, pipelines etc.)
Surface Water	Direct	Runoff or discharges from pipes
	Indirect	Recharge from groundwater
	Indirect	Deposition of wind blown dust
Buildings	Direct contact	Sulphate attack on concrete, hydrocarbon corrosion of plastics
	Gas ingress	Migration via natural or anthropogenic paths
Ecological systems	See Notes	Runoff/discharge to surface water body
	See Notes	Windblown dust
	See Notes	Groundwater migration
	See Notes	At point of contaminant source
Animal and crop	Direct	Wind blown or flood deposited particles / dust / sediments
	Indirect	Plants via root up take or irrigation. Animals through watering
	Inhalation	By livestock / fish - gas / vapour / particulates / dust
	Ingestion	Consumption of vegetation / water / soil by animals

Table 4: Classification of Probability

Classification	Definition
High likelihood	There is a pollution linkage and an event either appears very likely in the short-term and almost inevitable over the long-term, or there is already evidence at the receptor of harm / pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter-term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

PBA Methodology for Assessment of Potentially Contaminated Land

Table 5: Classification of Consequence (score = magnitude of hazard Table 1 and sensitivity of receptor Table 2)

Classification / Score	Examples
Severe 17-25 (3 out of 25 outcomes)	Human health effect - exposure likely to result in "significant harm". Significant harm to humans is defined in circular 01/2006 as death, disease, serious injury, genetic mutation, birth defects or impairment of reproductive function. Controlled water effect - short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Equivalent to EA Category 1 incident (persistent and/or extensive effects on water quality leading to closure of potable abstraction point or loss of amenity, agriculture or commercial value. Major fish kill. Ecological effect - short-term exposure likely to result in a substantial adverse effect. Catastrophic damage to crops, buildings or property
Medium 10-16 (7 out of 25 outcomes)	Human health effect - exposure could result in "significant harm". Significant harm to humans is defined in circular 01/2006 as death, disease, serious injury, genetic mutation, birth defects or impairment of reproductive function. Controlled water effect - equivalent to EA Category 2 incident requiring notification of abstractor Ecological effect - short-term exposure may result in a substantial adverse effect. Damage to crops, buildings or property
Mild 5-9 (7 out of 25 outcomes)	Human health effect - exposure may result in "significant harm". Significant harm to humans is defined in circular 01/2006 as death, disease, serious injury, genetic mutation, birth defects or impairment of reproductive function. Controlled water effect - equivalent to EA Category 3 incident (short lived and/or minimal effects on water quality). Ecological effect - unlikely to result in a substantial adverse effect. Minor damage to crops, buildings or property. Damage to building rendering it unsafe to occupy (for example foundation damage resulting in instability).
Minor 1-4 (8 out of 25 outcomes)	No measurable effect on humans. Protective equipment is not required during site works. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects to crops, buildings or property. The loss of plants in a landscaping scheme. Discolouration of concrete.

Table 6: Classification of Risk (Combination of Consequence Table 5 and Probability Table 4)

	Consequence			
Probability	Severe	Medium	Mild	Minor
High likelihood	Very high	High	Moderate	Low
Likely	High	Moderate	Moderate/	Low
Low likelihood	Moderate	Moderate	Low	Very low
Unlikely	Low	Low	Very low	Very low

Table 7: Description of Risks and Likely Action Required

Risk Classification	Description
Very high risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation is likely to be required in the short term.
High risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer-term.
Moderate risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.
Low risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very low risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

APPENDIX 6

