

Buro Happold

024435 Hayle Harbour Development

Contaminated Land Generic

Quantitative Risk Assessment -

Cocklebank

August 2009

Revision 01

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Contents

Exe	ecutive Summary		5		
1	Introduction		6		
2	Site Location and Description				
3	Summary of Existing Information				
4	Buro Happold 2008/	/2009 Ground Investigations	13		
5	Ground Conditions		17		
6	Soil data assessment - contaminant source characterisation				
7	7 Contaminated Land Risk Assessment				
8	Waste Management	t	41		
9	Conclusions		43		
10	Recommendations		45		
	References				
	Figures				
	Appendix A	Analytical Tables			
	Appendix B	Hydrock Ground Investigation Factual Report			
	Appendix C	Laboratory Analytical Reports			
	Appendix D	Photographs			

Executive Summary

Buro Happold was appointed by CPR Regeneration Ltd (CPR) to undertake a contaminated land risk assessment for Cocklebank, Hayle. As part of the proposed Hayle Harbour Redevelopment, Cocklebank will be removed in order to facilitate the construction of floating pontoons for yacht mooring. This report collates and summarises contamination information from recent and previous ground investigations on Cocklebank and its surrounds. This report therefore provides a Generic Quantitative Risk Assessment (GQRA) for Cocklebank in accordance with CLR11-'Model Procedures (ref 1).

Cocklebank is located within Hayle Harbour, part of the coastal estuary of the Hayle and Angarrack Rivers. Two tidal water storage lagoons, Copperhouse Pool and Carnsew Pool, are located to the south east and south west of Cocklebank respectively and are classified as Sites of Special Scientific Interest (SSSIs). To the east of Cocklebank, the quay area (North Quay) is located, primarily used by fisherman and a dredging vessel (operating under license). Recent investigation has showed Cocklebank to comprise alternating fine to medium grained sands and silty sands in the upper 1.5m, with lenses of silty clays noted throughout. This sequence is underlain by medium grained sands. The northwest and southeast ends of the bank feature gravel, boulders and cobbles at the surface. Gravel is also present at depth within the Bank. The main contaminants of concern within Cocklebank sediments are arsenic and to a lesser extent copper and zinc. Contaminant concentrations generally decrease with depth and increasing grain size with concentrations recorded in coarser sand, below the low tide level (i.e. >2m bgl) being comparable to background concentrations found in Hayle Harbour/ Estuary, Harvey's Towans and the adjacent beach. Maximum concentrations are highly elevated, recorded within the finer grained materials (silty clay and silty sand). Arsenic, copper and zinc are highly leachable within all materials types.

The generic quantitative risk assessment indicates that there are potentially moderate risks to the environment under the currently existing conditions. Provided the appropriate mitigation measures are put in place and the recommendations in Section 10 adopted, the risks to people and the environment can all be mitigated to acceptably low levels. The proposed development anticipates the potential re-use of excavated material on other suitable areas of the site. Preliminary waste classification indicates that material in the top 1.5m of Cocklebank (generally silty sand and silty clay, but also some gravel) is likely to be classified as Hazardous Waste due to heavy metal concentrations. The majority of coarser grained materials (fine to medium and medium grained sand) below this depth are likely to be classified as Inert or Non-Hazardous waste. One option would be to reuse material containing contaminants at background concentrations (the lower portion of Cocklebank) in areas of soft landscaping, while pre-treating the upper portion of Cocklebank prior to placement beneath hardstanding. Any such re-use would be subsequent to discussions with the Environment Agency and could be carried out under an exemption from Environmental Permitting, or in accordance with the recently published CL:AIRE/EA Code of Practice (ref 36).

1 Introduction

1.1 General

Buro Happold Limited has been appointed by CPR Regeneration Ltd (CPR) to undertake a contaminated land risk assessment [a Generic Quantitative Risk Assessment (GQRA)] for Cocklebank, Hayle in general accordance with CLR11-'Model Procedures (ref 1).

The site of the proposed redevelopment is extensive and comprises much of Hayle Harbour. This report, however, deals solely with the area known as Cocklebank (Figure 2). The proposed removal of Cocklebank is to facilitate the construction of floating pontoons for yacht mooring as part of the Phase 1 Hayle Harbour redevelopment. Consideration is being given to re-using the excavated spoil on other suitable areas of the proposed development.

1.2 Scope

This report collates and summarises contamination information from recent and previous ground investigations on Cocklebank. The objectives of this report are:

- To assess the potential for significant risks to both human and environmental receptors from contaminants identified within Cocklebank during construction and for the proposed development;
- To ascertain the contaminative status and composition of the Cocklebank to assist in the identification
 of an appropriate remedial strategy and potential reuse of this material; and
- To determine the likely waste classes for excavated material which is not suitable for reuse.

1.3 Existing information and reporting

A number of ground investigations have been carried out on or in relation to Cocklebank as discussed in Section 3.5). The analytical data from two of these investigations has been summarised and collated within this report in conjunction with the recent ground investigation. Detail on these investigations can be found in the following reports:

- Buro Happold 'Hayle Harbour Redevelopment Master Planning Vol 1 Contamination Report' (Revision 2) Job number 007838, August 2007 (ref 2).
- Buro Happold 'Re. Hayle Harbour Proposed Dredging' Letter Report 022961L071217SP, 18
 December 2007 (ref 3).

1.4 Limitations and exceptions

The ground investigations carried out to date have been undertaken in general accordance with good practice guidance, relevant British Standards and established good practice. The scope and design of the recent site investigations have been based upon the known history of site use, the results of previous studies and investigations and on the development plan. On this basis the spacing of the exploratory holes and the sampling and analysis plan for this investigation is considered to have provided a reasonable level of certainty about the ground conditions. However it is important to recognise that contamination can be both widespread and relatively localised, depending upon its source and nature etc. No investigation, however comprehensive can be expected to determine absolutely the nature and extent of all the contamination which could be present on any site. There will always be an element of uncertainty about the ground conditions including contamination.

2 Site Location and Description

2.1 Location

The site is located at Hayle Harbour, Cornwall, at National Grid Reference SU 855 540 (Figure 1). Photographs of the site are presented in Appendix D.

2.2 Current layout and description

At low tide Cocklebank is approximately 360m x 60m in area whilst at high tide the bank is almost completely submerged. Situated to the north-east of the bank is North Quay, to the east and south-east are East Quay and South Quay, to the north-west lies the harbour entrance, and to the south-west is a spit of land that separates Lelant Water from the main harbour (see Figure 2 for site layout).

The top of the bank is approximately 2.0m above low tide level gradually rising at the northwest and south-eastern extremities to approximately 3.0m above low tide level. The surface is generally sandy with some seaweed cover. Localised muddy areas are present, particularly on the south-western side. The north-western and south-eastern extremities are coarser than the central portion of the bank, containing gravel, boulders and cobbles at the surface. Both extremities are marked by large wooden posts that are thought to have been used for turning boats in the harbour. Photographs of the bank are included in Appendix D.

Cocklebank is accessible at low tide for two to three hours each day. The most convenient access is from the north-western end of North Quay where the water level in the channel drops to 0.5 – 1.0m during low tide. This route has been used in the past and where necessary a causeway has been created using granular materials dredged from the harbour.

Various submerged electricity cables cross beneath the harbour entrance to the north-west of the bank trending approximately north to south.

2.2.1 Surrounding land uses

Cocklebank is flanked by Hayle Harbour, part of the coastal estuary of the Hayle and Angarrack Rivers (Figure 2). The town of Hayle is located at the southern end of the harbour and the open waters of the estuary are situated to the north-west (downstream) of Cocklebank. The town itself includes a large harbour and has a long history of industrial development. This history has led to its current division into the western "Foundry" and eastern "Copperhouse" areas. The harbour is dominated by two tidal water storage lagoons, Copperhouse Pool and Carnsew Pool constructed to flush sediment from the harbour along the eastern and western sides of Cocklebank, respectively. Both these pools are classified as Sites of Special Scientific Interest (SSSIs).

East of Cocklebank, the quay area (North Quay) is primarily used by fisherman and a dredging vessel (operating under license). The estuary surrounding Cocklebank is routinely dredged, with dredged spoil stored on North Quay.

2.3 Proposed development

The outline scheme design for the Hayle Harbour Redevelopment is for a mixed use development comprising residential dwellings, offices, retail, a hotel, commercial/industrial and leisure uses, along with associated land and water based infrastructure.

Part of the proposed Stage 1 infrastructure works for the development include the removal of Cocklebank to create space for floating pontoons for yacht mooring. Consideration is being given to re-using this material on other areas of the development. It is anticipated that the majority of the dredged sands could be used for land raising works around North Quay, with the remaining material utilised for dune rebuilding along the northern and eastern edges of the estuary mouth. Proposed end uses for North Quay include retail, residential, industrial (fisherman's quay), sport and leisure (marina). The proposed Stage 1 infrastructure development in the vicinity of Cocklebank is shown in Figure 3.

3 Summary of Existing Information

3.1 Site history

Cocklebank is understood to have been created in the 1830s to aid the flushing of sediment from the harbour by increasing the flow of water released from the Copperhouse and Carnsew Pools. The source of material for the bank is unknown but there is potential for mine waste, industrial waste and locally dredged material to have been used in its construction. A record dated 1832 obtained from the Hayle Archive entitled "Expense of making an embankment at Hayle" indicates that the bank was constructed of sand covered in clay. The record also refers to a weir and lists the cost of rail road, sluice gates etc. so it is possible that this record may actually relates to the construction of Carnsew Pool or the spit. Numerous vessels are known to have foundered on Cocklebank in the late 18th and early 19th centuries. Posts, presumably for navigation, are shown on the earliest map (1888) until the map dated 1964.

3.2 Geology

The BGS 1:50,000 Solid and Drift Penzance Sheet 351 & 358 shows Cocklebank to be underlain by Marine and Estuarine Alluvium. This in turn is underlain by Devonian Gramscatho Beds (well graded turbiditic sandstones in beds up to 2m thick with interbedded slates). Previous investigations (Section 3.5) indicate that the bank contained sandy gravelly materials to at least 4.5m below ground level (bgl). The methods of excavation however (trial pit excavation and shell and auger drilling) may not have provided representative samples below the tidal water level. Two BGS logs are available, SW53NE109 and SW53113 completed in the 1940s (refer Figure 4). These logs provide brief descriptions, mainly of sand with some gravel and cobbles extending to 33m below ground level. The interface between the Cocklebank sands and the underlying natural strata is not clear

3.3 Hydrogeology & hydrology

Cocklebank is surrounded by waters of Hayle Harbour which is a coastal estuary open to the Atlantic Ocean and partially fed (*via* Lelant pond located to the south-west of the harbour) by the River Hayle. The waters surrounding Cocklebank are tidally influenced, with a maximum tidal range of up to 5m during spring tide.

The Groundwater Vulnerability Map, Sheet 53 shows the site to lie on a Minor Aquifer. The Environment Agency (EA) informed Buro Happold in 2006 that there are no specific Environmental Quality Standards (EQSs) for Hayle Harbour. This correspondence, together with monitoring results are included in Appendix D of the Buro Happold 'Hayle Harbour Redevelopment Master Planning Report - Vol 1: Contamination Report (ref 2).

3.4 Ecology

According to the online map, the waters on the western side of Cocklebank are incorporated into the Hayle Estuary SSSI. The estuary is classed as being in a 'favourable' condition by the EA (as on August 2008). The

SSSI incorporates a littoral sand habitat within a marine intertidal and shallow estuarine environment. The primary reason for the SSSI status of the estuary lies in the populations of waterfowl and shorebirds that occur in winter and pass through on spring and autumn migration. The main area of terrestrial habitat within the SSSI is the Triangular Spit, which is outside the Phase 1 infrastructure boundary.

Cocklebank itself is of low ecological interest, with very low invertebrate diversity or usage by birds. Modelling of plume dispersion from dredging Cocklebank (undertaken as part of the Environmental Impact Assessment for the development, ref 4) shows some deposition of fines in lower Lelant Water, Carnsew and Copperhouse Pool. However, the settling velocity chosen for the fine material was low in order to show potential transport pathways.

A full ecological impact assessment for the site, based on the proposed development, has been carried out as part of the Environmental Impact Assessment (EIA) by others as detailed in the Environmental Statement (ref 4). Further assessment of potential risks to the ecology of the site is outside the scope of this investigation and has therefore not been undertaken.

3.5 Previous investigations

A number of ground investigations have been carried out on Cocklebank and the surrounding area including the harbour/estuary, sand dunes and Copperhouse Pool. Details of these investigations have been summarised as follows.

Dr P Smith, MRSC, November 1988

The 1988 investigation (ref 5) into metal concentrations within Copperhouse Pool and other sites within Hayle reported dissolved arsenic concentrations of up to 180ug/l within the stream which runs through Copperhouse Pool (Mill Leat) and up to 3830mg/kg within sediment in the upper 0.1m. Arsenic was recorded at concentrations of up to 3400mg/kg within the top 0.5m of sediment within the Pool. Arsenic concentrations within sediments at Lelant Water, Carnsew Pool, Penpol Creek and the mouth of the Estuary were considerably lower than those in Copperhouse Pool and were considered to be comparable to background concentrations within Cornwall and Devon.

Copper concentrations in sediment within Copperhouse Pool were significantly high, ranging from 108-9315mg/kg in the upper 0.1m and 30-4090mg/kg between 0.5 and 1.5m bgl. Zinc concentrations ranged from 64-2880mg/kg in the top 0.1m and between 150 and 3125mg/kg in the 0.5-1.5m depth range.

The main source of arsenic, copper and zinc within Copperhouse Pool was considered to be freshwater inputs, e.g. Mill Leat. The report concludes that the situation could be improved if the freshwater inputs were diluted by seawater at all tidal states (i.e. keeping the water level in Copperhouse Pool high) and/or reducing/diverting the input from these freshwater sources to the Pool.

WSP Environmental, March 1998

The WSP report (ref 6) gives limited details of three trial pits excavated along Cocklebank numbered BH22, BH23 and BH24. It is understood that these were carried out by Geotechnical Engineering in January 1988 however the trial pit logs and locations are not available. The report states that the core of the bank was formed using stone/rubble material. No chemical data is available from this investigation.

Buro Happold, August 2007

Six trial pits (TP1 to TP6) and three boreholes (BH803 to BH805) were progressed within Cocklebank by CJ Associates Ltd on behalf of Buro Happold in 2005 (ref 2). The maximum depth of these boreholes (using shell & auger methods) reached 4.5mbgl, with the trial pits excavated to deeps ranging between 1.5 to 2.5mbgl. A further two boreholes BH801 and BH802 were drilled within the harbour. Exploratory hole locations are shown on Figure 4, with the analytical results presented in Section 5 of this report.

HR Wallingford, August 2007

HR Wallingford (ref 7) undertook a numerical hydrodynamic and sediment transport modelling to assess the performance and impact of the scheme on the existing environment as part of the Environmental Impact Assessment (EIA) for Phase 1 of the development. The study focused on the current condition, impacts during construction and under the proposed operating conditions. Part of the study assessed the dispersion of fine material from Cocklebank during its removal and associated dredging of the marina area. The study concluded that the quantities of fine material released into the water column are likely to be small (in comparison to the volume of fine material naturally entrained in the water column by tide and wave action) and will depend on the type of dredging plant used. Modelling of dispersion pathways showed sediment is likely to be dispersed over a relatively wide area, extending from the Pools (Copperhouse and Carnsew) to outside the estuary with a proportion of sediment settling within the Pools. HR Wallingford recommended that sediment dispersion could be reduced by using specialist plant and restrictions on dredging to specific periods within the tidal cycle.

Buro Happold, December 2007

Buro Happold Limited was requested by Hayle Harbour Port Authority to undertake some sampling of the areas of Hayle Estuary that are required to be dredged under a maintenance licence with Penwith District Council. The investigation comprised the excavation of 12 hand dug trial pits to a maximum depth of 0.65m within Hayle Harbour/Estuary and the adjacent beach (ref 3). The locations of these pits in relation to Cocklebank are shown on Figure 4. Pits S5 – S7 dug in the upper extent of the proposed dredge area contained sand that was stained black with organic matter (silts etc.) with a strong natural organic odour. The remaining pits contained yellow/golden sands to the base of the pit. No samples were taken from Cockle Bank. Chemical analytical results from this investigation are summarised in Section 5 of this report.

4 Buro Happold 2008/2009 Ground Investigations

4.1 Initial ground investigation works (2008)

The initial ground investigation was designed by Buro Happold to obtain further information on the geological profile of Cocklebank and associated contamination. Site works were undertaken by Hydrock Special Projects Limited (Hydrock) between 15 and 31 October 2008 and comprised the following:

- Drilling of 5 No. window samples on Cocklebank (designated WS701 to 705 and 707) to depths ranging between 3.8m and 5.05m; and
- Drilling one borehole using rotary percussive techniques (using an air-mist flush) to a depth of 13.8mbgl.
- Drilling of three boreholes to depths of up to 18.12m bgl, one within the former ESSO tank farm and two
 adjacent the Copperhouse Pool entrance;

[Note: Information gained from the boreholes not directly related to Cocklebank (i.e. former ESSO tank farm and adjacent Copperhouse Pool entrance) have not been included within this report. These results will be reported on at a later stage.]

The location of the exploratory holes are shown on Figure 4. All logging and sampling was undertaken by a Hydrock site engineer, under direct supervision of Buro Happold. The ground conditions encountered in all exploratory holes were logged in accordance with BS5930:1999. Logs for the boreholes are provided in the Hydrock Factual Report (ref 8 and Appendix B). Appropriate methods of sample collection and preservation together with procedures to avoid cross-contamination were followed as recommended in BS5930:1999 and BS10175:2001. Soil samples for contamination testing were collected from site by courier on a daily basis and sent to ALcontrol Laboratories for subsequent analysis (refer Table 4-1).

4.2 Supplemental Ground Investigation Works (2009)

Following the initial investigation in October 2008, further investigation works were undertaken between 24 and 26 February 2009 to provide additional information on the contamination status of the upper Cocklebank soils and to determine background concentrations for soils located in the proposed land raising and dune rebuilding areas. Site works were undertaken by Buro Happold and comprised the following:

- Drilling of 30 hand auger holes on Cocklebank (designated HA1 to HA30) to depths ranging between 0.2 metres below ground level (mbgl) to 1.4mbgl);
- Drilling of 6 hand auger holes on North Quay (designated NQHA1 to NQHA6) to depths ranging between
 0.1mbgl to 0.4mbgl; and

 Collection of near surface samples (0-1.1mbgl) from the proposed dune rebuilding area (i.e. Hayle Towans) at five locations.

The location of the exploratory holes are shown on Figure 2. All logging and sampling was undertaken by a Buro Happold engineer. The ground conditions encountered in all exploratory holes were logged in accordance with BS5930:1999. Logs are provided in Appendix B. Hand auger holes were not advanced to greater depths on Cocklebank due to slumping sands (encountered at various depths) inhibiting sampling collection. Hand auger holes on North Quay were similarly restricted due to practical refusal within relatively dense soils. Further hand auger holes on North Quay were restricted by the presence of hardstanding (i.e. concrete and tarmae) or obstructions (such as vehicles and a dredged sand stockpiles).

Appropriate methods of sample collection and preservation together with procedures to avoid cross-contamination were followed as recommended in BS5930:1999 and BS10175:2001. Soil samples for contamination testing were collected from site by courier on a daily basis and sent to ALcontrol Laboratories for subsequent analysis (refer Table 4-1).

4.3 Laboratory Testing

Buro Happold scheduled a programme of chemical testing on soil samples for both investigations. All analysis was undertaken by Alcontrol Laboratories in accordance with the Buro Happold schedule. Details of the specific suites of analysis for soil samples can be found in Tables A1-7 presented in Appendix A of this report. Analysis was undertaken using methods approved under the MCERTS performance standard for soils where possible. A summary of the laboratory testing undertaken in both the 2008 and 2009 investigation is summarised in Table 4.1. The analytical data is presented in Appendix C and is discussed further in Section 6 and 7 of this report.

Table 4-1 Number of samples analysed and suites of analysis (2008 and 2009 investigations)

Suite	Soil
General Suite ¹	44
Sieved Suite Only ²	40
Heavy Metal Suite Only ³	63
Antimony, Beryllium, Mercury, Selenium, Sulphur, Sulphide	22
Tin	32
Sulphate	15
Chloride	39
Leachate suite	23
Cyanide (free or total)	35
PAHs/TPH	4
WAC analysis	1

¹ General Suite: Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Zinc, pH

Following initial analysis for the General Suite, further testing was undertaken on selected soil samples. These samples were dispatched to a geotechnical laboratory (Geotechnical Engineering Limited). The soil samples were submitted for particle size analysis (wet sieve) as per BS1377 Part 2. Water was used as the primary sieving medium, and the laboratory did not add any dispersal agents.

Samples were sieved across the following size fractions:

- >2mm;
- 0.6mm to 2mm;
- 0.212mm to 0.6mm;
- 0.063mm to 0.212mm; and
- <0.063mm.

Sieved Suite: Arsenic, Cadmium, Chromium, Lead, Zinc, undertaken on sieved grain fractions of several soil samples

³ Heavy Metal Suite: Arsenic, Cadmium, Copper, Lead and Zinc

Following sieving, the sieved fractions were dispatched back to ALcontrol Laboratories and analysed for Arsenic, Chromium, Cadmium, Lead and Zinc to determine whether any correlation existed between grain size and metal concentrations. Several samples were unable to be analysed due to insufficient sample quantity following sieving. Soil samples collected in the supplemental ground investigation were analysed for metals that were deemed to be of potential concern (i.e. arsenic, cadmium, lead, copper and zinc) based on initial investigation results, rather than a broad analytical suite.

5 Ground Conditions

5.1 Cocklebank

Cocklebank comprises alternating fine to medium grained sands and silty sands in the upper 1.5m, with lenses of silty clays noted throughout. This sequence is underlain by medium grained sands. The northwest and southeast ends of the bank feature gravel, boulders and cobbles at the surface. Gravel is also present at depth. Cross-sections through Cocklebank are provided as Figure 5 and 6. Borehole log classifications were supported by sieving results, which determined that majority of soils were comprised of medium grained sand either as a primary (such as the 'sand' and 'silty sand' designated soil units) or a secondary component (such as coarse sand and sandy silts/clays), with the highest fraction range in the 212µm-600µm fraction range. The interbedded soil types are described as follows:

Silty Clay

Fine grained lenses (generally 0.05m to 0.3m thickness), comprising mostly of red/brown silty clay or sandy silt were encountered in the upper 1.2m of the central portion of Cocklebank. Occasional layers of soft black sandy silt were recorded however no evidence of organic matter or shell content were noted.

Silty Sand

The upper 1.0m of Cocklebank consisted predominantly of brown/red silty sands with some clayey sand. Occasional lenses of brown/yellow, brown or brown/grey silty sands were also recorded.

Fine to Medium Grained Sand

Fine to medium grained sands were noted within the upper 4.0m of Cocklebank. These sands are characterised as typically fine to medium grained, brown or yellow/brown with no visible carbonate or trace minerals.

Medium Grained Sand

Dense, medium grained sands were encountered throughout the soil profile, becoming predominant below approximately 1.0m. Sandy gravel lenses were also noted throughout. These sands contained a visible carbonate content and trace minerals such as zircon and showed no evidence of anthropogenic material. The soils were logged as marine deposits. No sub-surface evidence of buried materials (such as scoria blocks) was recorded.

Gravel

Sandy gravels and cobbles were noted in the southern and northern extremities of Cocklebank. The cobbles are of varied lithological origin, similar to cobbles strewn around the flanks of Cocklebank. Gravel was also recorded during previous investigations (Buro Happold, 2007, ref 2) within the centre of the Bank at depth.

Bedrock

Siltstone was encountered at 13.5mbgl (-12.08 mAOD) within the rotary percussive borehole. A layer of gravelly silt (approximately 3m thick) was located above this, thought to be weathered siltstone.

Based on evidence received to date, it is considered likely that the Cocklebank sands are sourced from historically dredged sands from within the estuary, or from other local sources such as near shore sediments and sand dunes. Finer grained fractions observed in the upper portion of Cocklebank are likely to have originated from deposition from upstream areas during slack tide, or from more recent dredged material.

5.2 North Quay

During the recent investigations, accessible areas of North Quay were covered by thin veneers of unconsolidated material (such as gravels or silty sands) overlaying relatively dense coal wash gravels. The density of the coal wash restricted penetration past 0.5mbgl depth.

Borehole logs from the Buro Happold, 2007 investigation (ref 2) recorded variable thicknesses of Made Ground, overlying the Gramscatho Beds at depth (approximately 6.0m bgl).

5.3 Harvey's Towans

Harvey's Towans (proposed dune re-building area) consists of dune sands typical of Aeolian (wind blown) deposits (i.e. fine grained, well sorted, angular) with some organic content in the upper 0.2m. A disturbed area was observed in the south, containing scoria gravels throughout. The Harbour Master has indicated that locally sourced sand (possibly dredged from Hayle Harbour) was used for emergency dune restoration material, to provide short term protection for housing on Harvey's Towans

5.4 Groundwater

With the exception of sea water encountered during drilling on Cocklebank, groundwater was not encountered during the recent investigation in 2008 or 2009.

6 Soil data assessment - contaminant source characterisation

6.1 Approach

6.1.1 Soil assessment criteria

Analytical data derived from the investigation has been put into context by comparison with published guidance or derived thresholds values. Current UK guidance published thresholds comprise Soil Guideline Values (SGVs), which are available for a limited number of determinands (ref 9 to 16) and land uses. For contaminants without published SGVs or where soil conditions are different to those assumed for the published SGVs (6% soil organic matter content and sandy loam soil), Generic Assessment Criteria (GAC) have been derived. The derivation of GACs has been carried out based on published statutory guidance documents (ref 17 and 18) and with consideration of the most sensitive receptors in the respective CLEA standard land-uses scenarios (the 0 to 6 year old child for the residential with and without plant uptake scenarios and the adult for the commercial / industrial land-use scenario) using the software model 'CLEA 1.04 and associated handbook (ref 19 and 20). The software model (CLEA 1.04) was issued by the Environment Agency in January 2009 and replaces all the previously issued software versions.

When deriving assessment criteria for contaminants for which updated tox reports are not currently available, health criteria value (HCV) model input parameters have been adopted as issued in the 'old style tox reports'. The old style tox reports will in due course be superseded by new tox reports derived in line with the new guidance. However, in the interim the Environment Agency advice is to use the old style tox reports as changes associated with the new guidance are unlikely to result in significantly different HCVs.

Assessment criteria for aliphatic and aromatic hydrocarbons bands have been derived also in line with the EA publication 'The UK approach for evaluating human health risks (ref 21).

6.1.2 Statistical analysis

Statistical analysis of the soil analytical results has been carried out in general accordance with the 'Guidance on Comparing Soil Contaminant Data with Critical Concentrations' (ref 23). An estimate of the true population mean has been calculated (upper confidence limit of the sample mean) for all contaminants where a sample has exceeded relevant screening criteria. The "conservative mean" contaminant concentration (US95) is then compared against the screening criteria. This approach is intended to assess the average exposure to a contaminant rather than looking at solely worst case values. Outlier testing has been carried out to indicate whether or not a data point is likely to form part of the same statistical distribution. Where a maximum concentration has been determined as an outlier (confirmed by visual/olfactory evidence or the result of an error) this concentration has not been included in the US95 calculation, but has been separately assessed.

6.1.3 Controlled waters assessment criteria

Potential risks to controlled waters have been assessed by examining both the soil analytical data and the soil leachability data. For the initial data assessment the principal thresholds adopted for assessing potential risks to the Minor Aquifer were the UK Drinking Water Standards (DWS) (ref 24). World Heath Organisation (WHO) guidelines (ref 25) have been used where no UK DWS are available. For assessing potential risks to the harbour, Copperhouse Pool and Carnsew Pool, Marine Environmental Quality Standards (EQSs) derived under the requirements of the EC Dangerous Substances Directive (ref 26) have been adopted. The Environment Agency non-statutory EQS (operational EQS) (ref 27) along with UK DWS have been adopted where no EQS are available.

6.2 Sub division of chemical data

The data has been assessed with respect to:

1. Chronic risks to human health

- 2. Acute risks to human health
- 3. Risks to controlled waters (Hayle Harbour & SSSI)
- 4. Risks to flora

5. Risks to buildings/ structures

6.2.1 Reporting of data

Analytical results from the Buro Happold August 2007 and December 2007 investigations have been combined with the recent investigations in 2008 and 2009 to enable assessment and characterisation of the site wide dataset for Cocklebank. The chemical testing results together with together with their screening criteria are presented in Appendix A of this report as follows:

Table A1 Soil results (inorganic determinands)

Table A2 Soil results (following sieving)

Table A3 Soil results (organic determinands)

Table A4 Background soil results

Table A5 Soil leachate results

Table A6 Waste classification based on soil values

Table A7 Soil results screened against Waste Acceptance Criteria

6.3 Chronic Risks to Human Health

6.3.1 Inorganic soil results

As part of the Buro Happold, August 2007 investigation, a total of 30 soil samples from Cocklebank were analysed for a suite of inorganic and organic contaminants. During the recent 2008 and 2009 investigation, a

total of 107 soil samples from Cocklebank were analysed for a suite of inorganic and organic determinands. Results from all of these investigations have been assessed together (Appendix A – Table A1). Determinands showing one or more exceedance of a relevant threshold value have been subjected to statistical analysis in general accordance with the 'Guidance on Comparing Soil Contaminant Data with Critical Concentrations' and CLR11 where appropriate and are summarised in Table 6-1.

With the exception of arsenic and lead, all inorganic determinand concentrations were below the relevant SGVs/GACs for residential and commercial/industrial landuses. The majority of samples (70%) recorded concentrations of arsenic above the SGV for residential landuse, however in total less than 1% of samples recorded concentrations above commercial/industrial screening criteria. Two samples (<1%) recorded concentrations of lead above the SGV for residential landuse, with a single concentration of lead recorded above the SGV for commercial/industrial landuse.

Table 6—1 Inorganic determinands (only where concentrations > SGV/GAC)

Soil Type	Determinand	No of samp	GAC (No	GAC (No of samples exceeding GAC)			Min	US95	Outliers
		les	Resi (with plant uptake)	Resi (without Plant uptake)	Commercial / industrial				
Silty Clay	Arsenic	10	32 (10) 100%	35 (10) 100%	640 (5) 50%	1200	250	832.7	ı
	Lead	10	450 (1) 10%	450 (1) 10%	750 (0) 0%	460	69	228	-
Silty Sand	Arsenic	31	32 (29) 96%	35 (29) 96%	640 (4) 17%	1100	19	437.6	-
	Lead	31	450(1) 0.03%	450 (1) 0.03%	750 (1) 0.03%	1761	6	139	-
Fine- Med Sand	Arsenic	65	32 (45) 69%	35 (45) 69%	640 (0) 0%	550	9	125.9	-
Med Sand	Arsenic	20	32 (5) 25%	35 (4) 17%	640 (0) 0%	65	10	43.4	1
Other*	Arsenic	11	32 (8) 73%	35 (7) 64%	640 (0) 0%	630	25	348.3	-

All concentrations in mg/kg

Chart 6-1 illustrates arsenic concentrations in relation to soil type (Chart 6-1) and depth below the ground surface. (Chart 6-3). Elevated arsenic concentrations are more common in the finer grained sediments (as shown in Chart 6-1 and Table 6.1) in particular the silty sands and silty clays noted in the upper 1.5m of Cocklebank. The two sand units (fine to medium grained sands and medium grained sands) recorded considerably lower arsenic concentrations. The majority of the gravelly soils exceeded residential SGVs for arsenic, with one sample also exceeding the commercial/industrial SGV. These gravelly soils are associated with scoria block (slag from historical metal refining processes) which is likely to be the source of the high arsenic concentrations recorded.

^{*}includes gravel material (made ground) and weathered natural gravels

The calculated US95 value for each soil type was above the SGV for residential landuse, but only above the commercial/industrial SGV in the silty clay.

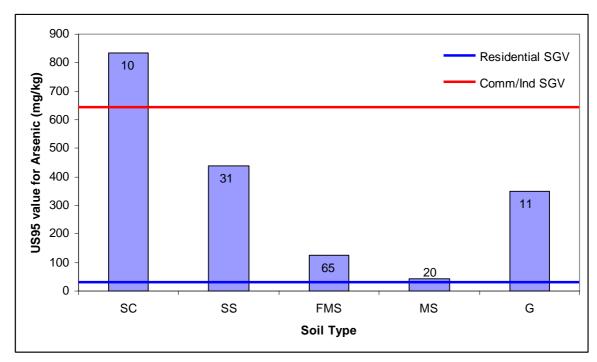


Chart 6-1 US95 value for arsenic based on soil type within Cocklebank. (Number of samples in each category shown on bar). SC- silty clay, SS- silty sand, FMS – fine to medium grained sand, MS- medium grained sand, G – gravel

6.3.2 Sieving Results

Following initial analysis, nine samples were submitted for particle size analysis and then each sieved fraction re-submitted for further analysis. Table A2 in Appendix A presents the results from subsequent analysis following sieving. Metal concentrations (arsenic, cadmium and lead) do not appear to be confined to a particular grain size, although metal concentrations are noticeably higher in the finer (<0.063mm) fractions and lower in the 212µm to 600µm fractions. Chart 6.2 summarises recorded arsenic concentrations across the grain sizes.

It is likely, that a proportion of the metals analysed for would have been washed out from the soil/sediment during sieving. The water used in the sieving process was not retained and therefore the proportion leached could not be determined. The concentrations recorded will therefore be different to the actual concentrations in their normal state. Refer to Section 6.7 for leachate results.

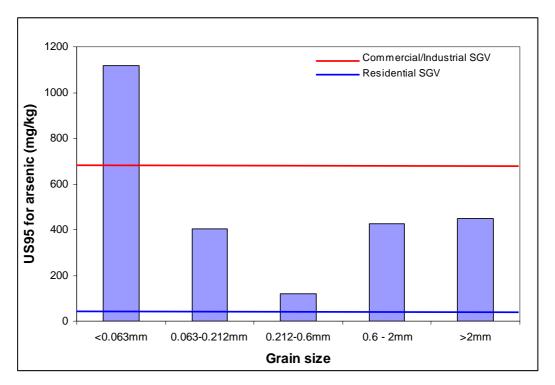


Chart 7-2 US95 value for arsenic based on grain size. (Number of samples in each category shown on bar).

6.3.3 Baseline Data

Baseline concentrations of inorganic data were derived from samples collected during the recent investigation (2008) from potential re-use areas where dredged Cocklebank soils could be emplaced, but also during the previous investigations in August and December 2007. The number of samples assessed within this report are outlined as follows:

- Seven samples from the beach/foredune at Rivere Towans (Buro Happold August & December 2007);
- Nine samples from Hayle Harbour/Estuary (Buro Happold December 2007);
- Nine samples from Harvey's Towans (2009); and
- Thirty four samples (August 2007) and six samples (2008) within North Quay.

Soils from the beach, harbour and Harvey's Towans are considered to have been deposited by 'natural' processes (such as marine, estuarine and aeolian processes) and have not been subjected to any anthropogenic point-source contamination. Soils from North Quay comprise of Made Ground. Results are summarised in Table 6-2 and within Appendix A – Table A.4.

Table 6-2 Range of metal concentrations recorded within 'background' areas

Oall Torre	Datamainand	No of	SGV/DIV				11005
Soil Type	Determinand	samples	Resi (without plant uptake)	Commercial/ Industrial	Max	Min	US95
	Arsenic*	7	35 (1) 14%	640 (0) 0%	39	18.9	-
Beach	Copper**	7	190 (0) 0%	-	32	12.6	-
	Zinc**	7	720 (0) 0%	-	70	23.7	-
	Arsenic*	9	35 (1) 11%	640(0) 0%	40	24	35.5
Harbour Bottom	Copper**	9	190 (0) 0%	-	24	17	-
	Zinc**	9	720 (0) 0%	-	54	42	-
	Arsenic*	9	35 (6) 67%	640 (0) 0%	280	34	125
Harvey's Towans	Copper**	9	190 (1) 11%	-	490	23	154
	Zinc**	9	720 (1) 11%	-	750	48	266
	Arsenic*	40	35 (34) 85%	640 (2) 5%	1500	8.6	245
North Quay	Copper**	40	190 (22) 55%	-	24,200	17	871
	Zinc**	40	720 (9) 23%		21,300	21.2	901

All concentrations in mg/kg

^{*}SGV

^{**}DIV

North Quay

The majority of samples collected from across North Quay recorded concentrations of arsenic above residential (without plant uptake) SGV. Occasional samples also recorded concentrations of arsenic above the commercial/industrial SGV. The maximum concentration was some 40 times the SGV for residential (without plant uptake) landuse. The US95 value for arsenic was elevated above the residential (without plant uptake) SGV but below the commercial/industrial SGVs.

Over half the samples analysed recorded copper concentrations above the DIV with approximately 20% of samples recording zinc concentrations above the DIV. Maximum concentrations of both copper and zinc were highly elevated (approximately two orders of magnitude greater than the DIV). These maximum concentrations were not isolated/localised with a number of samples recording concentrations within the same order of magnitude as the maximum. The US95 value for both of these metals was above the relevant DIV.

Hayle Towans

Numerous concentrations of arsenic (67%) were recorded above the residential (without plant uptake) SGV. A single sample also recorded concentrations of copper and zinc above relevant DIV. This sample recorded the maximum arsenic concentration and was indicated to be a statistical outlier. However, based on the borehole logs and sampling location, this sample is not considered to be part of a different soil population and was therefore included within the US95 calculation. The US95 value for arsenic was elevated above the SGV for residential (without plant uptake), while the US95 for copper and zinc was below the relevant DIV.

Harbour Bottom

A single sample (11%) recorded concentrations of arsenic above the SGV for residential (without plant uptake) landuse. Concentrations of copper and zinc were below the relevant DIV. The US95 for arsenic was calculated at the SGV for residential (without plant uptake) landuse.

Beach

A single sample (14%) recorded concentrations of arsenic marginally above the SGV for residential (without plant uptake) landuse. All concentrations of copper and zinc were below relevant DIV. The conservative average US95 value for arsenic was below the SGV for residential landuse.

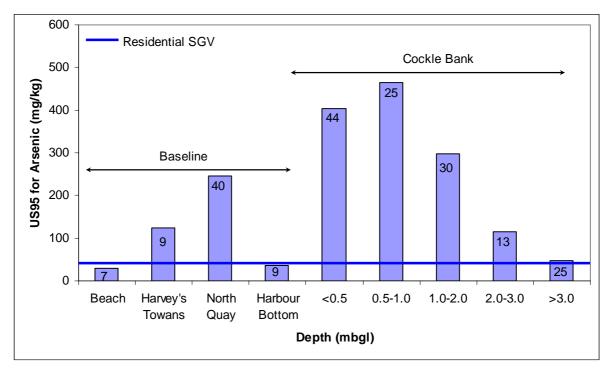


Chart 6-3 US95 values for arsenic (number of samples in each category shown on bar).

On the basis of the above, arsenic concentrations within Cocklebank are more commonly elevated within the finer grained materials (silty clay and silty sand) within the upper 2.0m. Concentrations of aresnic below this depth of 2m are similar to background concentrations (Charts 6-1, 6-3 and Figures 5 and 6).

6.3.4 Organic soil results

Fifteen soil samples during the August 2007 investigation and four soil samples during the recent investigations in 2008/2009 were analysed for organic determinands listed in Appendix A – Table A.3. All organic determinand concentrations were recorded below the laboratory detection limit in samples analysed during the August 2007 investigation. The detection limit for benzene, C8-C12 range aromatic hydrocarbons and naphthalene was however above the SGV for residential (without plant uptake) and the residential (with plant uptake) SGV for benzo(a)pyrene. Subsquent analysis in the 2008 and 2009 investigations confirmed that concentrations for these determinands were in fact below the relevant SGV/GACs.

6.4 Acute Risks to Human Health

There are no guidance values for assessing acute risk related to soil contamination. Because such risks are associated with short-term exposure, consideration of maximum concentrations (and not the "average" concentration which is relevant to chronic, or long-term, risk) is required. Comparison of these maximum

concentrations has been made with the various SGVs and other screening values which will provide a conservative benchmark for such short-term risks (as the SGVs etc are based upon a long-term exposure).

The maximum concentrations assessed to be most significant were arsenic and lead. The maximum recorded concentration of arsenic (recorded in as sample of silty clay) was 34 times the SGV for residential (without plant uptake) landuse and 1.8 times the SGV for commercial/industrial landuse. The second highest concentration of arsenic (recorded in a sample of silty sand) was 31 times the SGV for residential (without plant uptake) and 1.7 times the SGV for commercial/industrial landuse.

The maximum recorded concentration of lead (recorded in a sample of silty sand) was approximately four times the SGV for residential (without plant uptake) and just over two times the SGV for commercial/industrial landuse. This concentration appears to be isolated/localised with the next highest concentration recorded only marginally above the SGV for residential (without plant uptake). No other concentrations of lead were recorded above the SGV for residential or commercial/industrial landuse.

6.5 Risks to Flora

Phytotoxic effects with respect to *flora* have been assessed by statistical evaluation of the datasets of the phytotoxic elements copper and zinc from the August 2007, and recent 2008 and 2009 investigations. Results are summarised in Table 6-3, Chart 6-4 and within Appendix A – Table A.1.

The majority of samples recorded concentrations of zinc and copper above the DIV. As for arsenic, the number of exceedances for copper and zinc are greater in the finer grained sediments (Table 6-2, Chart 6-4) in particular the silty sands and silty clays noted in the upper 1.5m of Cocklebank. The two sand units (fine to medium grained sands and medium grained sands) recorded considerably less exceedances of copper and zinc. Maximum concentrations and number of exceedances were highest within the gravelly soils, which as for arsenic is likely to be associated with scoria block (slag from historical metal refining processes) within this material.

Concentrations of copper and zinc in all samples are however well below the relevant maximum permissible risk (MPR) value based on the Dutch Guidelines (ref 29).

Table 6-3 Phytotoxic determinands

Soil Type	Determinand	No of samples	Dutch Intervention Value (No. of Samples Exceeding DIVs)	Max	Min	US95
	Copper	10	190 (10) 100%	2100	450	1585.8
Silty Clay	Zinc	10	720 (4) 40%	2000	60	1131.1
Silty Sands	Copper	31	190 (14) 45%	1476	1	751.1
	Zinc	31	720 (4) 13%	1762	30	667.6
Fine- Med	Copper	65	190 (9) 14%	1063	<6	251.5
Sand	Zinc	65	720 (2) 3%	1196	35	260.1
Med Sands	Copper	20	190 (1) 5%	210	13	111.6
Wied Garids	Zinc	20	720 (0)	210	15.7	-
Other*	Copper	11	190 (2) 18%	3000	17.8	2129.5
Otilei	Zinc	11	720 (3) 27%	2100	71	1642.7

^{1.} All concentrations in mg/kg

The calculation of US95 average concentrations is not required for determinands where exceedences of the relevant Dutch Intervention Values (DIV) (ref 29) have not been identified.
 includes gravel material (made ground) and weathered natural gravels

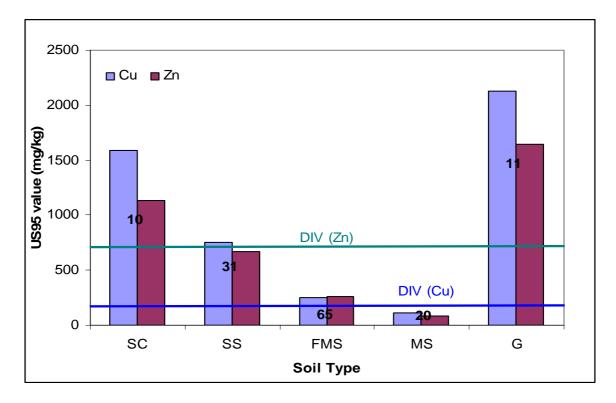


Chart 6-4 US95 value for copper and zinc based on soil type within Cocklebank. (Number of samples in each category shown on bar). SC- silty clay, SS- silty sand, FMS – fine to medium grained sand, MS- medium grained sand, G – gravel

6.6 Risks to buildings/structures

Classification of buried concrete against sulphate attack has been carried out through the assessment of chemical test results on various strata and various levels to the current guidance BRE SD1:2005 (ref 30). In summary the soil results for Cocklebank material at all depths give a design sulphate class of DS-1. The DS-Class converts into a classification of the aggressive chemical environment for concrete (ACEC) once the pH and mobility of groundwater are taken into consideration. The characteristic pH value soil has been taken as 8.5 for the Cocklebank material. For all foundations an ACEC classification of AC-1s has been determined assuming groundwater is static.

In order to assess the risks to conventional water pipe material from Cocklebank material, contaminant concentrations have been compared against threshold values derived by Water Regulations Advisory Scheme (WRAS) (ref 31). Where soil concentrations exceed these threshold values, it is likely that special consideration of material selection will be required. All pH values and the majority of arsenic concentrations exceeded the WRAS criteria. With reference to Table 3 of WRAS Information and Guidance Note: No 9-04-03 (ref 31),

suitable pipe materials for corrosive, toxic environments include wrapped iron, plastic coated copper pipe. The WRAS guidelines are however known to be conservative and are not risk based.

6.7 Leachability Data

Soil leachability testing has been undertaken on representative samples from the ground investigations under taken in August 2007, 2008 and 2009 following guidance within Environment Agency (2006) Remedial Targets Methodology (ref 32), specifically:

- BSEN 12457 Part 3 (Two Stage Test using a liquid to solid ratio of 2:1 in the first stage and a liquid to solid ratio of 8:1 in the second stage [Where 2:1 and 8:1 results are available for a sample the higher result of the two is used (which is generally the 2:1 result) in the following assessment]; and
- BSEN 12457 Part 2 (One Stage Test using a liquid to solid ratio of 10:1.

A total of 29 samples were submitted for leachability analysis, four from the August 2007 investigation, 23 from the 2008 investigation and two from the 2009 investigation. Determinands with one or more exceedance of relevant screening criteria are summarised in Table 6.4. The soil leachability data is presented as Table A5 in Appendix A.

Table 6-4 Determinands showing exceedences of thresholds

Determinand	No of samples	Adopted Screening Criteria (No. of samples exceeding adopted criteria)			Min
		Marine water EQS Standards	Relevant to Major Aquifer*		
Antimony	29		5 (7) 24%	38	<0.75
Arsenic	29	25(18) 62%	10(24) 83%	430	<0.75
Chromium	29	15 (2) 7%	50 (1) 3%	63	<1
Copper	29	5 (18) 62%	2000 (0)	47	<1.6
Zinc	29	40 (4) 14%		1200	<5
Chloride (mg/L)	29		250 (25) 86%	850	69

All results in µg/L, unless otherwise indicated

The leachate from over 60% of soil samples analysed recorded concentrations of arsenic and copper above relevant EQS for marine waters. Occasional samples of chromium and zinc were also elevated above EQS for marine waters in leachate analysed. The leachate from over 80% of samples analysed recorded concentrations of arsenic and chloride above UK DWS, with occasional concentrations of leachable antimony and chromium recorded above UK DWS.

6.8 Summary of analytical data

The main contaminants of concern within Cocklebank sediments are arsenic and to a lesser extent copper and zinc. Contaminant concentrations generally decrease with depth and increasing grain size with concentrations recorded in coarser sand, below the low tide level (i.e. >2m bgl) being comparable to background concentrations found in Hayle Harbour/ Estuary, Harvey's Towans and the nearby beach. Maximum

^{*} UK Drinking Water Standards and WHO where UK DWS not available

	1		
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concentrations are hig	ighly elevated, recorded within the finer g	rained materials (silty clay and silty sand).	
Arsenic, copper and z	zinc are highly leachable within all materia	als types.	
concentrations are highly elevated, recorded within the finer grained materials (sitty clay and sitty sand). Arsenic, copper and zinc are highly leachable within all materials types.			

7 Contaminated Land Risk Assessment

7.1 General approach

In the UK, the assessment of risk from contamination follows the source-pathway-target approach. If one of these three elements is absent it is considered that there is no risk of harm. If, however, there is considered to be a linkage between any given source and any given target/receptor then a risk-based approach is used to assess the significance or impact of any such linkage.

- **Source** The contaminants that have the potential to negatively affect human health and/or the health of the environment (i.e. the hazard).
- Pathway The potential route by which a receptor may come into contact with the source.
- **Receptor** The specific group of human beings or aspect of the environment (e.g. controlled waters) that could be affected by the source.

Risks are defined as the probability of an event occurring combined with the severity of the consequence of that event occurring. Particularly, to assess the risk to site end users posed by any given source, the sensitivity of each receptor is considered. For example, the concentration of contamination acceptable at a site to be developed as a residential property with a garden used to grow vegetables and accessible to young children is set lower than that for a commercial site where soil is exposed in minor areas of landscaping and the only long-term users of the site are adults. Similarly, a site overlying a major aquifer supplying potable water to a large population will be considered more stringently than a site overlying an impermeable geology with only minor seepages of groundwater.

7.2 Conceptual site model

The potential risks posed to human health and the environment by ground contamination at this site have been evaluated using a quantitative risk assessment which incorporates the 'source-pathway-receptor' identification and assessment methodology in accordance with CLR 11 (ref 1). The risk assessment process therefore involves the identification of each site specific source based on both desk based and chemical information obtained from the site investigation together with identification of each relevant exposure pathway and each potential receptor. The potential risks to the receptor are then assessed by considering the potential effect of the source on the receptor as well as the likelihood of a pathway linking the two, i.e. a pollutant linkage as discussed above.

7.2.1 Potential sources

The site of the proposed redevelopment is extensive and comprises much of Hayle Harbour. This report, however, deals solely with the area known as Cocklebank. Proposals include the removal of the Cocklebank

to create space for floating pontoons for yacht mooring. The objective of this investigation was therefore to ascertain the contaminative status and composition of Cocklebank.

Based on desk based and site investigation data obtained to date the potential sources of contamination that may reasonably affect receptors on the site are summarised in Table 9-1 below:

Table 9-1 Sources of Contamination

Potential Source(s)	Potential Contaminants of Concern/Comments
Metal contaminated material (Cocklebank)	Arsenic concentrations in soil > SGV for residential and commercial/industrial landuse. Numerous concentrations of copper and zinc > DIV. Contaminant concentrations generally decrease with depth and increasing grain size with concentrations recorded in coarser sand, below the low tide level (i.e. >2m bgl) being comparable to background concentrations. Maximum concentrations are highly elevated, recorded within the finer grained materials (silty clay and silty sand). Arsenic, copper and zinc are highly leachable within all materials types.

7.2.2 Potential receptors and pathways

Consideration is being given to re-using the excavated spoil from Cocklebank on other suitable areas of the proposed development. Site specific pathway receptor linkages have therefore been identified for the site (Table 9.2 overleaf) with respect to the sources outlined above and with respect to anticipated future uses of the site i.e. land raising (North Quay and dune replenishment) as described in Section 2.3.

Table 7-2 Site Specific Receptors & Pathways

Receptor		Pathway	Е	С	Р
Human Health	Construction workers	Direct contact and dermal uptake, soil and dust ingestion.		~	~
	Site end users (maintenance workers, site residents and the public including children, commercial users)	Direct contact and dermal uptake, soil and dust ingestion. Ingestion of contaminated water supplies.			•
Controlled Waters	Hayle Harbour	Leaching and groundwater transport/surface runoff	•	~	*
	Copperhouse Pool (SSSI)	Leaching and groundwater transport/surface runoff	•	~	~
	Carnsew Pool (SSSI)	Leaching and groundwater transport/surface runoff	~	~	
	Minor Aquifer	Leaching and groundwater transport.		~	~
Flora		Direct contact and up-take via root system.			~
Buildings/Services	On site structures (including water supply pipes)	Direct contact/ permeation of plastic pipe work by contaminants in soil and leachate.			~
	Offsite structures (including water supply pipes)	Direct contact/ permeation of plastic pipe work by contaminants in leachate.			~

E=existing condition C=construction P=Proposed end use

7.3 Presentation of risk assessment

The details of the Generic Quantitative Risk Assessment are presented in Tables 9-3 (existing site condition), 9-4 (enabling works/construction phase condition), and 9-5 (proposed development) and the results/conclusions discussed in Section 9.

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It should be noted this risk assessment has been completed without consideration of potential remedial measures however does assume use of standard site health and safety procedures and appropriate personal protective equipment (PPE) and site management practices (stockpile management, surface drainage etc). The risk assessment has been carried out for three scenarios:

- (i) Existing condition: Cocklebank remains insitu [Table 9.3];
- (ii) Enabling works/construction phase: Removal of Cocklebank and stockpiling onsite [Table 9.4]; and
- (ii) <u>Proposed development:</u> Reuse of material onsite as land raising material and dune replenishment [Table 9.5].

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Table 7-1 Generic Quantitative Risk Assessment - Existing Condition

Source			Receptor	Pathway	Risk assessment	following CIRIA	. C552	Comment
Origin	Zone Affected	Chemicals of Concern			Consequence	Probability	Risk	Description of source [bold text]. Comment on hazard realisation [normal text]
Metal contaminated soils	Cocklebank	Heavy metals (Arsenic, Copper and Zinc)						Arsenic concentrations in soil > SGV for residential and commercial/industrial landuse. Numerous concentrations of copper and zinc > DIV. Contaminant concentrations generally decrease with depth and increasing grain size with concentrations recorded in coarser sand, below the low tide level (i.e. >2m bgl) being comparable to background concentrations. Maximum concentrations are highly elevated, recorded within the finer grained materials (silty clay and silty sand). Arsenic, copper and zinc are highly leachable within all materials
			Hayle Harbour	Migration via leaching .	Medium	Low- likelihood	Moderate/	types. Cocklebank is regularly flushed by tides; hence there is potential for the migration of metal contamination via leaching. Dilution with sea water likely. Arsenic concentrations recorded in shellfish off the coast are considered unlikely to cause health problems (ref 5).
			Copperhouse Pool (SSSI)	Migration via leaching	Medium	Unlikely	Low	SSSI is adjacent to Cocklebank and of high ecological value. Used as intertidal habitat for some migratory birds. Background arsenic concentrations recorded in sediment within Copperhouse Pool are highly elevated. Cocklebank is regularly flushed by tides - dilution with seawater likely hence limited potential for the migration of metal contamination into Copperhouse Pool.
			Carnsew Pool (SSSI	Migration via leaching	Medium	Unlikely	Low	SSSI's is adjacent to Cocklebank and of high ecological value. Used as intertidal habitat for some migratory birds. Cocklebank is regularly flushed by tides - dilution with seawater likely hence limited potential for the migration of metal contamination into Carnsew Pool

Table 7—2 Generic Quantitative Risk Assessment – Enabling works/construction phase (Removal of Cocklebank)

Source			Receptor	Pathway	Risk assessment	following CIRIA	C552	Comment
Origin	Zone Affected	Chemicals of Concern			Consequence	Probability	Risk	Description of source [bold text]. Comment on hazard realisation [normal text]
Metal contaminated soils	Dune Rebuilding Areas	Heavy metals (Aresnic, Copper and Zinc)						Arsenic concentrations in soil > SGV for residential and commercial/industrial landuse. Numerous concentrations of copper and zinc > DIV. Contaminant concentrations generally decrease with depth and increasing grain size with concentrations recorded in coarser sand, below the low tide level (i.e. >2m bgl) being comparable to background concentrations. Maximum concentrations are highly elevated, recorded within the finer grained materials (silty clay and silty sand). Arsenic, copper and zinc are highly leachable within all materials types.
			Construction workers	Direct contact, soil / dust ingestion	Medium	Low- likelihood	Moderate/ Low	Potential for exposure during dredging / earthworks. Period of exposure relatively limited. Potential for maximum concentrations to produce acute effects. Standard health & safety precautions likely.
			Hayle Harbour	Migration caused by sediment disturbance during removal of Cocklebank	Medium	High- likelihood	High	Potential for increased leaching of contaminants and sediment during removal of Cocklebank. Modelling of plume dispersion shows some deposition of fines in lower Lelant Water, Carnsew and Copperhouse Pool (ref 7). Impacts from removal are likely to be temporary.
			Copperhouse Pool (SSSI)	Migration caused by sediment disturbance during removal of Cocklebank	Medium	Low- likelihood	Moderate/ Low	Potential for increased leaching of contaminants and sediment during removal of Cocklebank. Modelling of plume dispersion shows some deposition of fines in lower Lelant Water, Carnsew and Copperhouse Pool (ref 7). Impacts from removal are likely to be temporary. Background arsenic concentrations recorded in sediment within Copperhouse Pool are highly elevated (ref 5).
			Carnsew Pool (SSSI)	Migration caused by sediment disturbance during removal of Cocklebank	Severe	Low- likelihood	Moderate	Potential for increased leaching of contaminants and sediment during removal of Cocklebank. Modelling of plume dispersion shows some deposition of fines in lower Lelant Water, Carnsew and Copperhouse Pool (ref 7). Impacts from removal are likely to be temporary.
			Minor Aquifer	Migration of contamination via leaching from stockpiles	Medium	Low- likelihood	Moderate/ Low	Potential for leaching of contaminants from stockpiling of material. Groundwater is relatively shallow (~3m bgl) in the quay areas and is in direct hydraulic continuity with the harbour. Groundwater within the higher dune areas ranges from 5-17m bgl. The site does not lie within an EA source protection zone. The nearest potable abstraction is located 320m south of the site with the harbour breaking the pathway between the two.

Table 7-3 Generic Quantitative Risk Assessment - Proposed development (Reuse of material onsite)

Source			Receptor	Pathway	Risk assessmen	t following CIRIA	A C552	Comment
Origin	Zone Affected	Chemicals of Concern			Consequence	Probability	Risk	Description of source [bold text]. Comment on hazard realisation [normal text]
Metal contaminated soils		Heavy metals,						Arsenic concentrations in soil > SGV for residential and commercial/industrial landuse. Numerous concentrations of copper and zinc > DIV. Contaminant concentrations generally decrease with depth and increasing grain size with concentration recorded in coarser sand, below the low tide level (i.e. >2m bgl) being comparable to background concentrations. Maximum concentrations are highly elevated, recorded within the finer grained materials (silty clay and silty sand). Arsenic, copper and zinc are highly leachable within all materials types.
			Future construction/maintenance workers	Direct contact, soil / dust ingestion	Medium	Low- likelihood	Moderate/Low	Potential for exposure during future construction or maintenance work Period of exposure relatively limited. Potential for maximum concentrations to produce acute effects. Standard health & safety precautions likely.
			Future site users	Direct contact and dermal uptake, soil and dust ingestion, dust inhalation.	Medium	Likely	Moderate	A large proportion of site (i.e. North Quay) will be hardstanding preventing direct contact. Potential for contact in areas of soft landscaping - dune areas in particular which will be used for recreation purposes with regular contact by humans, including children.
			Hayle Harbour	Migration via leaching.	Mild	Low- likelihood	Low	Majority of site to be covered in hard standing limiting rainwater infiltration. Contaminants are reasonably mobile and present at high concentrations. Groundwater is relatively shallow (~3m bgl) in the qu areas and is in direct hydraulic continuity with the harbour. Groundwawithin the higher dune areas ranges from 5-17m bgl. Dilution with seawater likely.
			Copperhouse Pool (SSSI	Migration via leaching	Mild	Low- likelihood	Low	Majority of site to be covered in hard standing limiting rainwater infiltration. Contaminants are reasonably mobile and present at high concentrations. Groundwater is relatively shallow (~3m bgl) in the quareas and is in direct hydraulic continuity with the harbour. Groundwawithin the higher dune areas ranges from 5-17m bgl. Background arsenic concentrations recorded in sediment within Copperhouse Potare highly elevated. Cocklebank is regularly flushed by tides - dilution with seawater likely.
			Minor Aquifer	Migration via leaching	Mild	Low- likelihood	Low	Majority of site to be covered in hard standing limiting rainwater infiltration. Contaminants are reasonably mobile and present at high concentrations. Groundwater is relatively shallow (~3m bgl) in the quareas and is in direct hydraulic continuity with the harbour. Groundwa within the higher dune areas ranges from 5-17m bgl. The site does not lie within an EA source protection zone. The nearest potable abstract is located 320m south of the site with the harbour breaking the pathwoeld between the two.
			Flora	Direct root uptake	Medium	Likely	Moderate	Contaminants are reasonably mobile and present at high concentrations. Potential for uptake in areas of soft landscaping.
			Buildings/services	Direct Contact	Medium	Low- likelihood	Moderate/Low	Arsenic concentrations present at high concentrations. Potential for permeation of potable water supply pipelines.

8 Waste Management

8.1 Assessment criteria

Pending regulatory approval, it is planned that the majority of material removed from Cocklebank will be reused elsewhere on site as fill, subject to geotechnical and environmental suitability. In order to determine the likely waste classification, soil and leachate test results have been assessed using:

- Values indicating Hazardous Waste according the 'Environment Agency (2004) Framework for the Classification of Contaminated Soils as Hazardous Waste, Version 1, July 2004'(ref 33);
- Technical Guidance WM2 Hazardous Waste, Interpretation of the definition and classification of hazardous waste'(ref 34); and
- Waste Acceptance Criteria (WAC) limit values for inert and hazardous waste (ref 35).

Approximately 16% of soil samples (17 out of 106) located within Cocklebank were classified as Hazardous Waste according to the 'Framework for the Classification of Contaminated Soils as Hazardous Waste' and Technical Guidance WM2 (Table A6, Appendix A) due to elevated concentrations of metals. These 'hazardous' soil samples were comprised of the follow soil types:

- Silty clay: 9/10 samples (90%);
- Silty sand: 9/31 samples (29%)
- Fine to medium grained sand: 2/65 samples (3%); and
- Gravel: 2/11 samples (18%).

The elevated concentration of arsenic recorded within the gravel deposits is due to the high percentage of broken down scoria block (slag from local historical metal smelting processes) contained within this material. When assessing the depth that these hazardous samples were collected from; over half (59%) were collected from above 0.5m bgl, just over one third (35%) were collected between 0.5 and 1.0mbgl, and only one sample (0.06%) was collected between 1.0 and 1.5m bgl.

When compared to the Waste Acceptance Criteria (WAC) limit values (Table A7, Appendix A), all three samples analysed recorded concentrations of sulphate and total dissolved solids above the Inert WAC. Two samples also recorded concentrations of copper above the Inert WAC.

Based on the assumptions and data assessment in line with current guidance, any material from above 1.5mbgl (particularly finer grained material) not suitable for re-use is likely to be disposed of to a Hazardous waste landfill facility. Any material from below 1.5m bgl is likely to be disposed of to a Non-Hazardous waste landfill facility.

Buro Happold Should finer grained material within the upper 1.5m of Cocklebank be geotechnically suitable for reuse onsite, this material would require some form of pre-treatment. Any such re-use will need to be carried out under an exemption from Environmental Permitting, or in accordance with the recently published CL:AIRE/EA Code of Practice (ref 36). Further details on waste management should be supplied in the Remediation Strategy/Materials Management Plan.

9 Conclusions

9.1 Cocklebank

Recent investigation has showed Cocklebank to comprise alternating fine to medium grained sands and silty sands in the upper 1.5m, with lenses of silty clays noted throughout. This sequence is underlain by medium grained sands. The northwest and southeast ends of the bank feature gravel, boulders and cobbles at the surface. Gravel is also present at depth within the Bank. The main contaminants of concern within Cocklebank sediments are arsenic and to a lesser extent copper and zinc. Contaminant concentrations generally decrease with depth and increasing grain size with concentrations recorded in coarser sand, below the low tide level (i.e. >2m bgl) being comparable to background concentrations found in Hayle Harbour/ Estuary, Harvey's Towans and the nearby beach. Maximum concentrations are highly elevated, recorded within the finer grained materials (silty clay and silty sand). Arsenic, copper and zinc are highly leachable within all materials types.

9.2 Risk assessment

A summary of the risk assessment for each of the three scenarios (current, during development and proposed future use) is presented in Table 11.1 and discussed in more detail in the following text.

Table 9-1 Summary of risk assessment (pre-mitigation)

Receptor	Source	Current risk	Risk during construction	Future risk
Site users	Metal contaminated	n/a	n/a	Moderate
Construction/maintenance workers	SOII	n/a	Moderate/Low	Moderate/Low*
Hayle Harbour		Moderate/Low	High	Low
Copperhouse Pool		Low	Moderate/Low	Low
Carnsew Pool		Low	Moderate	n/a
Minor Aquifer		n/a	Moderate/Low	Low
Flora		n/a	n/a	Moderate
Buildings/Services		n/a	n/a	Moderate/Low

The generic quantitative risk assessment carried out on the basis of both existing and recently acquired data indicates that there are potentially moderate risks to the environment (Hayle Harbour and SSSIs) under the currently existing conditions. The proposed removal of Cocklebank will give rise to some temporary risks, most notably to Hayle Harbour and to a lesser extent Copperhouse Pool, Carnsew Pool and the Minor Aquifer due to remobilisation of metal contaminated sediment. The short-term risks to the Minor Aquifer are likely to increase during the excavation works primarily because of the potential for runoff and leaching from stockpiles.

Although the risks from sediment remobilisation can not be completely mitigated, they can be minimised through the implementation of a rigorous environmental management plan which would incorporate the adoption of appropriate methods, such as working at the correct stages of the tide, the use of silt traps etc. Risks to the Minor Aquifer can be mitigated by the adoption of safe working practices such as pre-planned stockpile management, measures to control run off, leachate collection etc. The potential risks to construction workers from soil contaminants are capable of mitigation by means of an appropriately rigorous health and safety/hygiene regime.

The proposed development anticipates the potential re-use of excavated material on other suitable areas of the site. Without mitigation, potential risks to future site users, *flora* and buildings/services could be realised. These risks are capable of mitigation by appropriate treatment and re-use of material subject to licensing (i.e. Environmental Permitting, CL:AIRE/EA Code of Practice). One option would be to reuse material containing contaminants at background concentrations (the lower portion of Cocklebank) in areas of soft landscaping, while pre-treating the upper portion of Cocklebank prior to placement beneath hardstanding.

Provided the appropriate mitigation measures are put in place and the recommendations in Section 10 adopted, the risks to people and the environment can all be mitigated to acceptably low levels.

9.2.1 Waste

The proposed approach to waste management, subject to regulator approval, is to reuse the majority of excavated materials on site as fill. The preliminary classification indicates that material in the top 1.5m of Cocklebank (generally silty sand and silty clay, but also some gravel) is likely to be classified as Hazardous Waste due to heavy metal concentrations. The majority of coarser grained materials (fine to medium and medium grained sand) below this depth are likely to be classified as Inert or Non-Hazardous waste.

Should finer grained material within the upper 1.5m of Cocklebank be geotechnically suitable for reuse onsite, this material would require some form of pre-treatment subsequent to discussions with the Environment Agency. Any such re-use will need to be carried out under an exemption from Environmental Permitting or in accordance with the recently published CL:AIRE/EA Code of Practice (ref 36). Further details on waste management should be supplied in the Remediation Strategy/Materials Management Plan.

10 Recommendations

It is recommended that the following measures are adopted to mitigate the potential risks related to the proposed development:

- 1. The implementation of a rigorous health & safety regime (including PPE and personal hygiene) by the construction work force;
- 2. Construction workers should remain vigilant of ground conditions at all times and should report any suspect areas of potential contamination;
- 3. Stockpiling of grossly contaminated soils should be avoided if possible and where necessary, stockpiles should be placed on impermeable material (i.e. hardstanding) and covered when not in use; and
- 4. Remedial works will be required for mitigation of risks during removal and re-use of Cocklebank material. Further assessment of remedial options is required.

In addition to these measures, it is recommended that:

- 5. A Remedial Options Appraisal is prepared accordance with the Model Procedures for the management of land contamination, 2004, CLR11 (ref.1);
- 6. Following approval of the preferred remedial option, a Remediation Strategy and Materials Management Plan will need to be prepared in accordance with the Model Procedures for the management of land contamination, 2004, CLR11 (ref.1) and/or the recently published CL:AIRE/EA Code of Practice (ref 36);
- 7. An Environmental Management Plan should be prepared and agreed with the regulatory authorities prior to commencement of the enabling works; and
- 8. Provision should be made for a Verification Report to be prepared following remediation. This Report will be prepared in general accordance with the Model Procedures for the management of land contamination, 2004, CLR11 (ref.1) and/or the recently published CL:AIRE/EA Code of Practice (ref 36). This provision will need to take into account both the amount of data that will be obtained over the course of the work, but also the longevity of the work programme.

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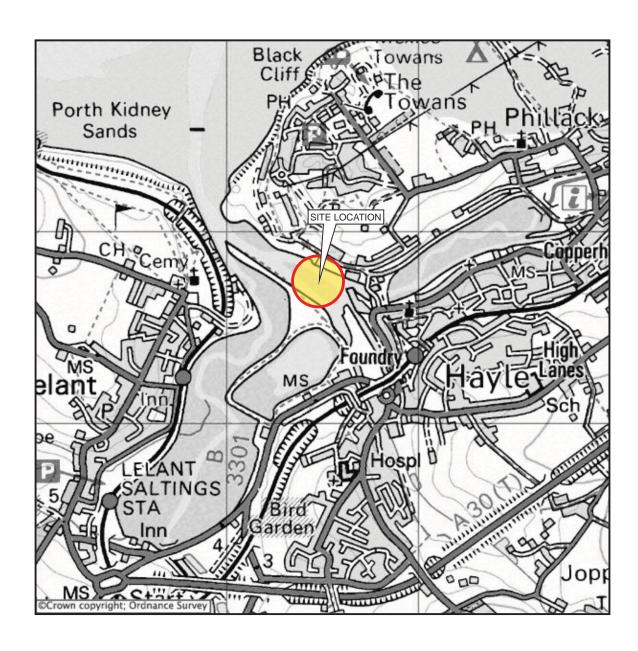
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Figures		
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Project: Hayle Harbour - Cockle Bank Generic Quantitative Risk Assessment

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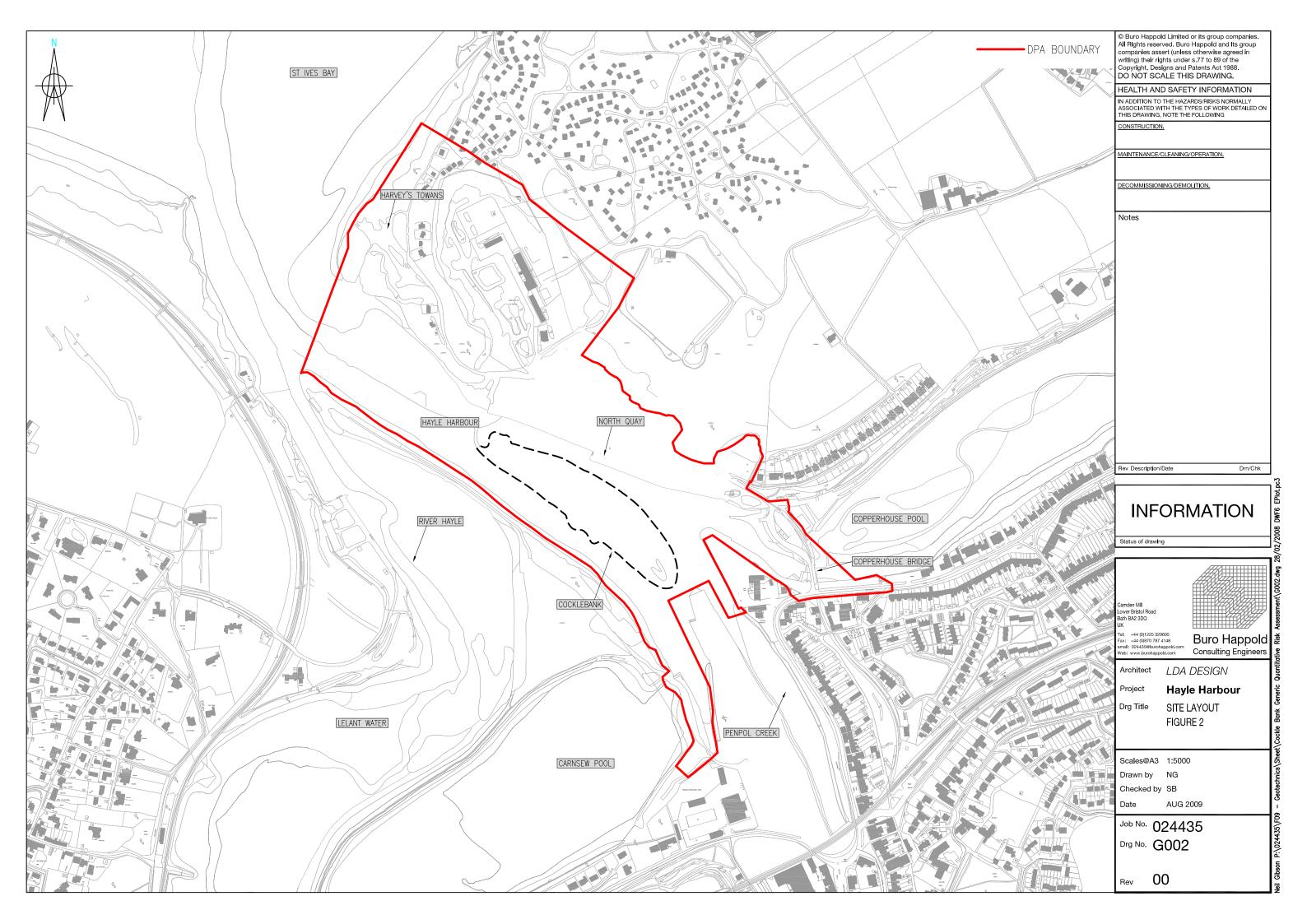
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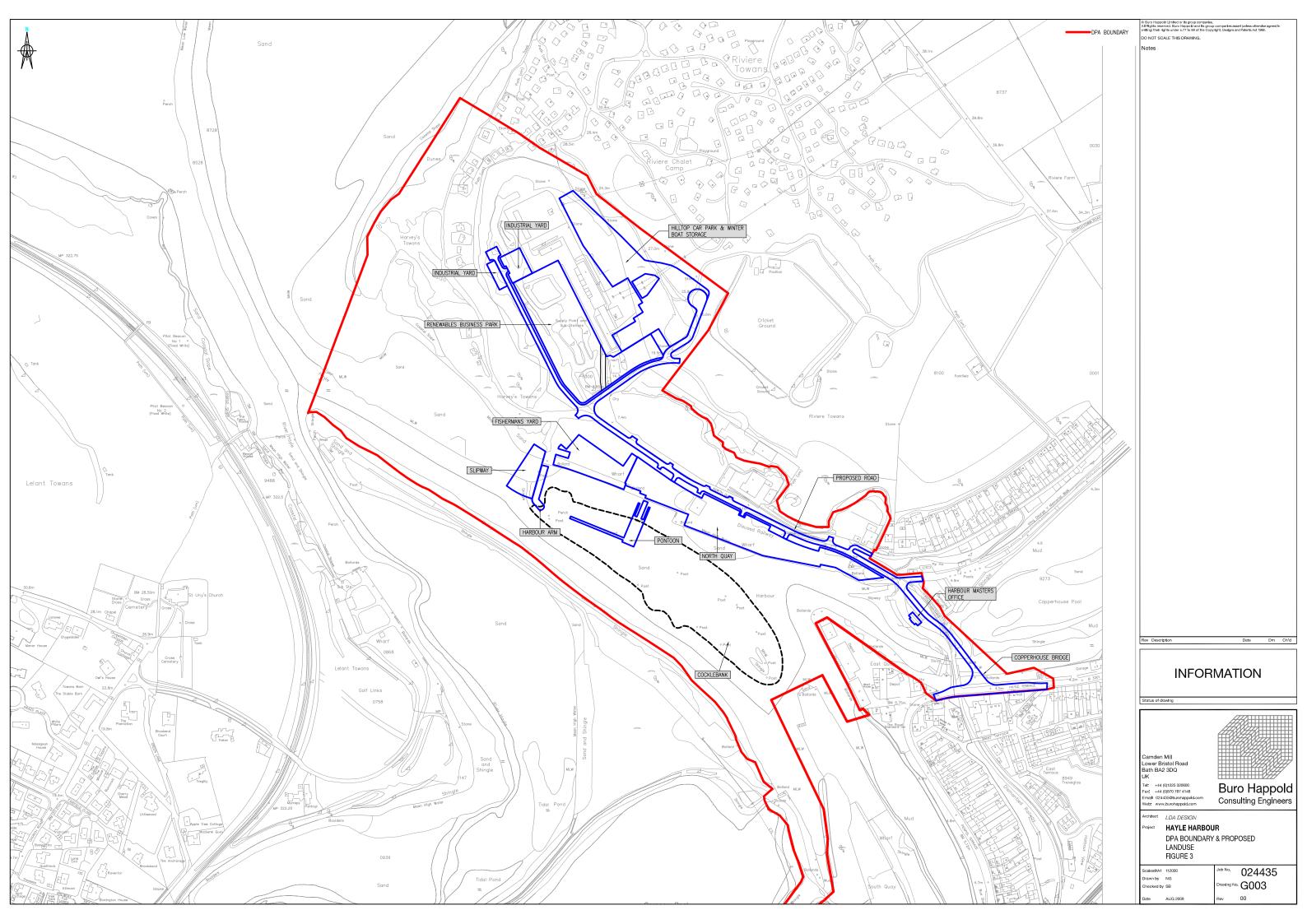
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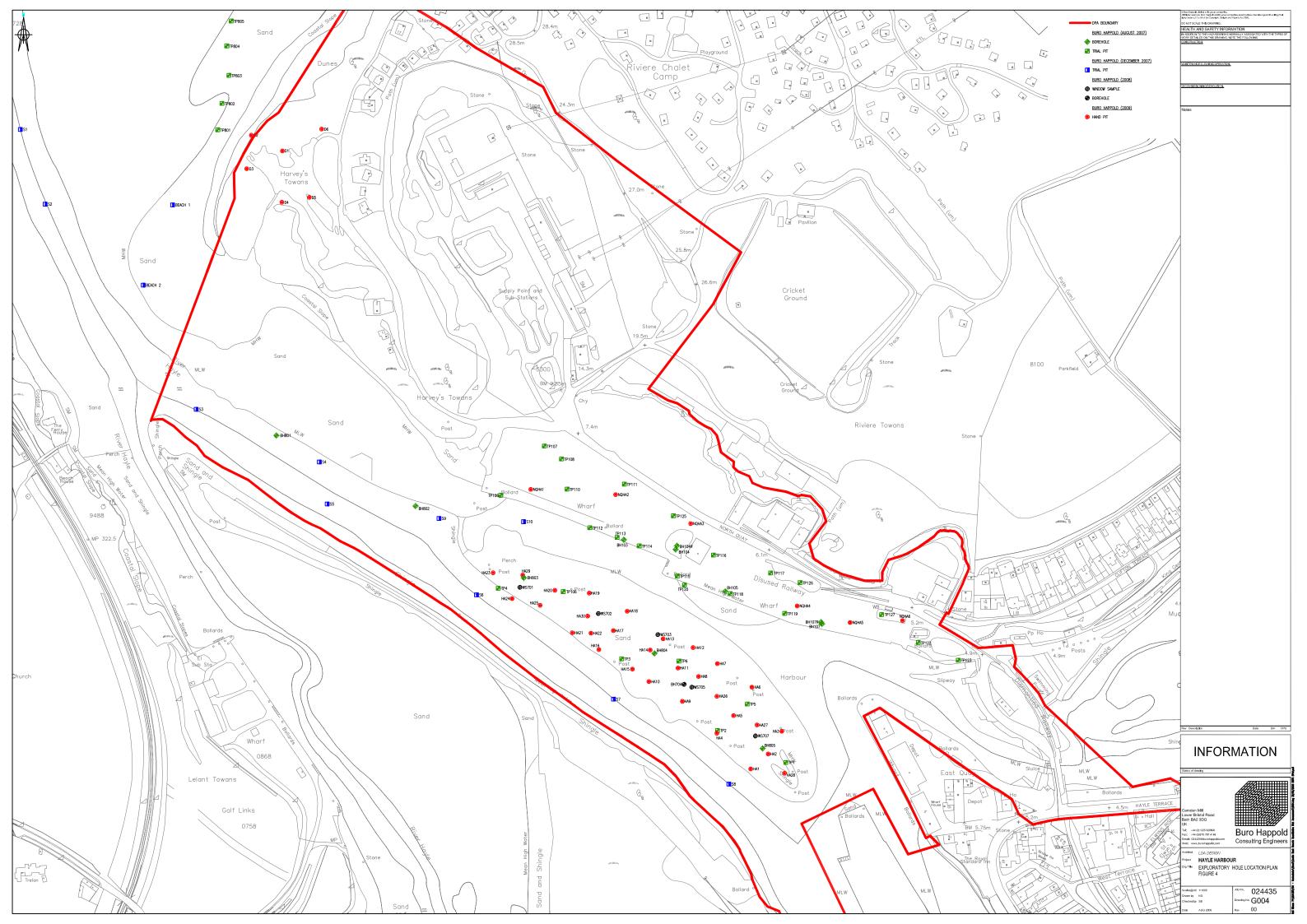
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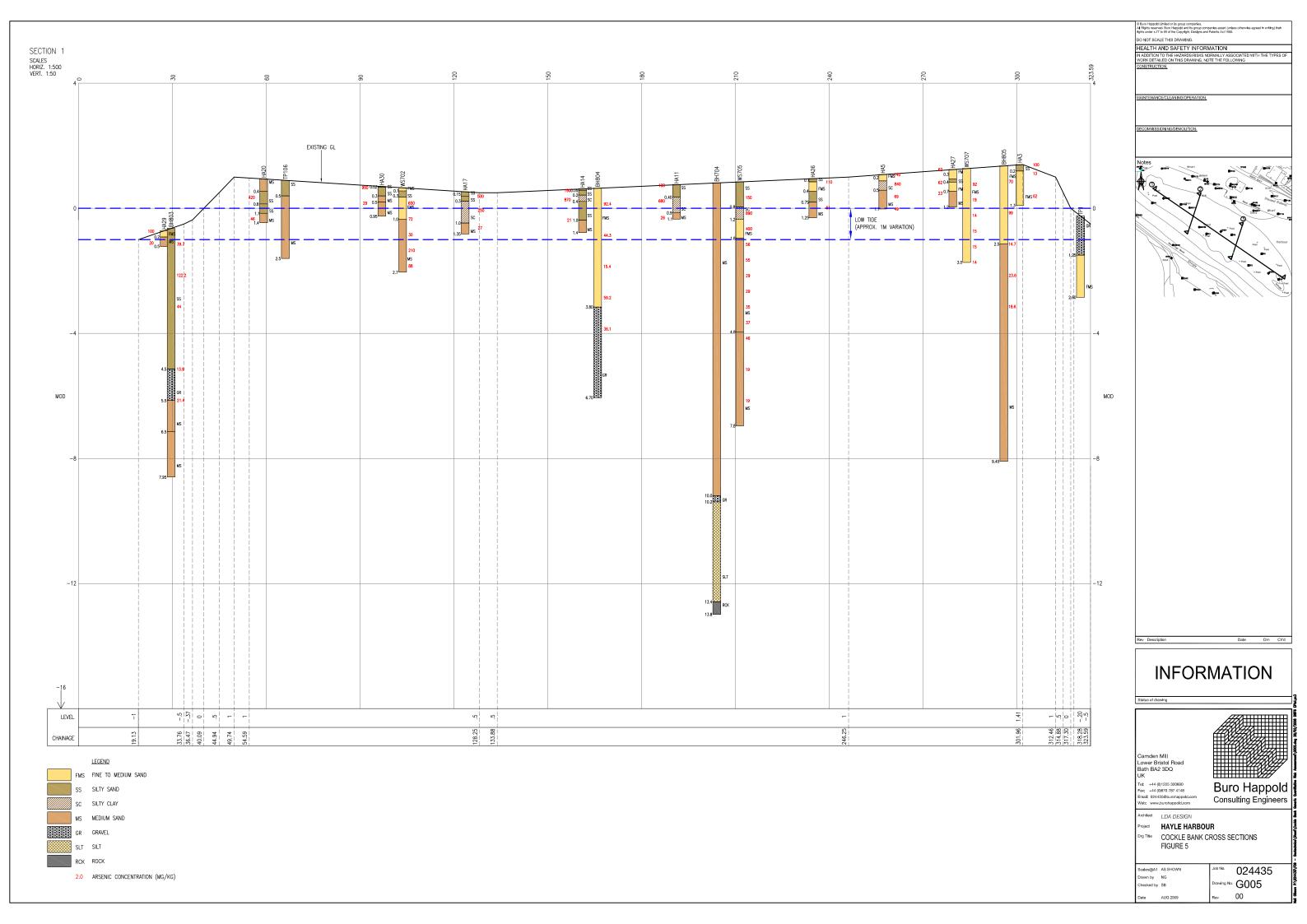
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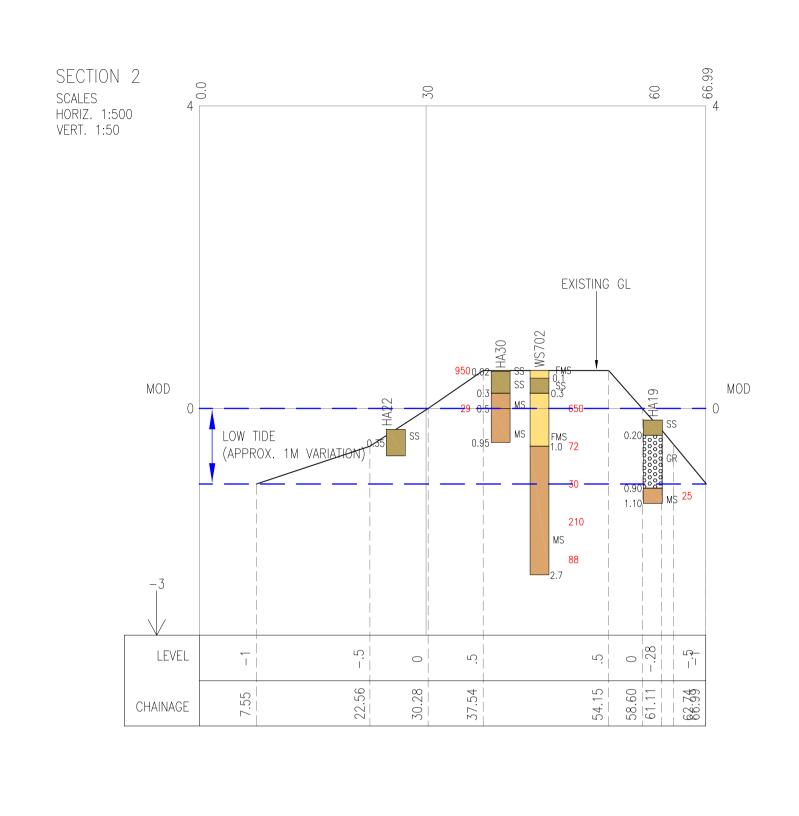
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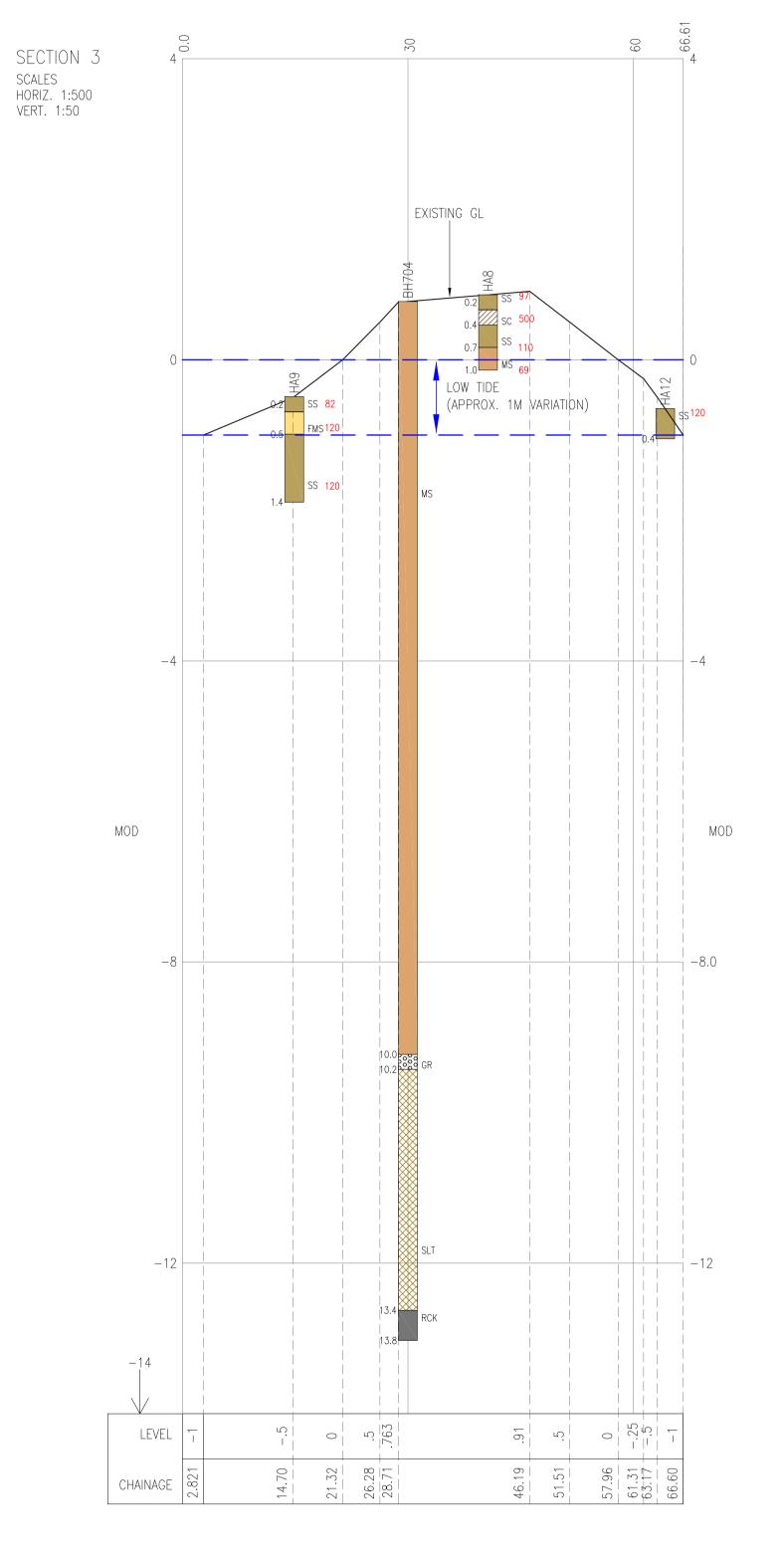














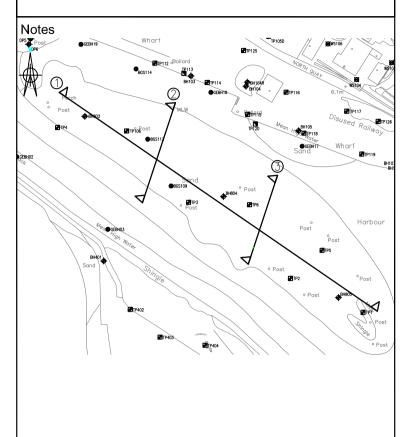
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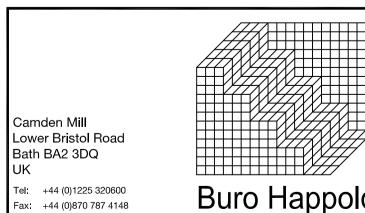
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Rev Description Date Drn Ch'd

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Buro Happold Consulting Engineers

Architect LDA DESIGN Project HAYLE HARBOUR Drg Title COCKLE BANK CROSS SECTIONS

Scales@A1 AS SHOWN Drawn by NG Checked by SB

AUG 2009

FIGURE 6

024435 Drawing No. G006

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Buro Happold Appendix A Analytical Tables

Contaminated Land	Generic Quantitation	ıα Riek Δeegeema	nt Cockle Bank	Hayle Harbour Redevelons	mont

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gamic Gambor	Chloride	mg/kg	4000.0	1800	3700	4400	4000	1900	3900.0	420	0 690	0 390	0 460	00 400	00 37	00 58	00 550	0 530	0 630	0 3800	1600	2100	1500	1200	360	850	4500	3200	-	7600	-	3900	-	5500	- 31	- 00	1600	3700	3900	4300.0	3600	3600	2900 3					
ands [Easily Liberated]	Soil Organic Matter	%	0.67	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	5 < 0.35	< 0.3	5 2.1	1.5	<0.	35 0.9	2 <0	.35 2	6 2.	<0.3	35 <0.3	85 < 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	-	-	-	-	- 1	-			-	-	-	0.6	< 0.35	< 0.35	< 0.35 <	0.35 <	< 0.35			
nes (over 10mm) % < 0.1 4.8 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.	Organic Carbon	%	0.4	< 0.2	0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	2 1.2	0.9	< 0.	2 0.5	5 <0	.2 1	5 1.	< 0.	2 <0.	2 <0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	-			-	-	-	0.3	< 0.2	< 0.2	< 0.2	<0.2 ⋅	<0.2			
Iphur mg/kg - - - - - - - - -	Cyanide (Easily Liberated)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<	<1	۱ ،	1 -	1 <	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	- 1	-			-	-	-	<1	<1	<1	<1	<1	<1 160	000 76	0 4.6	
action of Organic Carbon	Stones (over 10mm)	%	< 0.1	48	< 0.1	< 0.1	< 0.1	99	< 0.1	<0.1	1 <0.	1 <0.1	1 <0.	1 <0.	.1 <0	.1 <	.1 <0	1 <0.	1 <0.	1 <0.1	< 0.1	< 0.1	< 0.1	25	< 0.1	< 0.1	<0.1	< 0.1	-	100	-	100	-	100	- 10	. 00	50	100	100	< 0.1	< 0.1	< 0.1	<0.1	<0.1 ⋅	<0.1			
action of Organic Carbon	Sulphur	mg/kg	-	-	-	-	-	-	-	-	690	<70) <7	0 <7	0 <	70 32	00 12	0 <7	> <7	<70	<70	<70	<70	<70	<70	<70	<70	<70	-	-	-	-	-			. .	-	-	-	<70	<70	<70	<70 <	<70	<70			
Sisture at 30 deg C	Fraction of Organic Carbon				-	-	-	-	-	-	0.01	2 0.00	9 <0.0	0.00					02 <0.0	02 < 0.00	0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002	-	-	-	-	- 1	-		. -	-	-	-	0.0	< 0.002	< 0.002	<0.002 <0	0.002 <	0.002			
pH units 8.5 8.49 8.46 8.39 8.43 8.63 8.5 8.53 8.49 8.5 8.5 8.53 8.69 8.75 8.76 8.85 8.85 8.85 8.85 8.85 8.85 8.85 8.8	Moisture at 30 deg C	%			-	-	-		-	-			2	19				23				21					19	15	-	-	-	-	- 1	-	-	. -	-	-	-		19	21						
mmorical Nitrogen as N mg/kg 110 <15 <15 <15 <15 <15 <15 <15 <15 <15 <17 <18 <18 <18 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19 <19	pΗ	pH units	8.5	8.49	8.46	8.39	8.43	8.63	8.5	8.53			8.5	6 8.5	6 8.			2 8.6	4 8.6	4 8.65		8.75	8.76		8.63		8.82	8.85	8.5	8.3	8.66	8.68	8.63	8.69	8.7 8.	69 8.6	8.95	8.63	8.62		8.73	8.66	8.78 8	3.64	8.67			
	Ammonical Nitrogen as N												-		.			-	-	-	-	-	-	1 .	1.00														-	-								
	Sulphate (Total)					540	520	260					-	-		.	. .	-	-	_		-	-			-	-	-	-	580	-	290		370			120		270	-	-	-	-					
	Fluoride					540	020		000.0	020	· I .			1 -		.	. 1 -			1 -		1 -		1 .	Ι.		_			-50		_50					1.20	200	270	1 .	1	-						
	Cyanide (Free)				1 1				1 1		1 .	1 1		1 1		.	. 1]			1 1		1 1		1 :	1 1		_									. 1 .		1 1				-			. 16/	2000 76	20 44	
Single Core 100	CEC*		1.45	0.76	0.76	0.76	0.76		0.76	0.70	8 45	6 226		7 20	12 0	70 6	1 1	6 07		0 070	0.70	0.70	0.70	0.90	0.77	0.70	0.70	0.90	0.76	0.74	0.70	0.79	0.77	0.79	0.70	70 0 7	0 0 0 1	0.77	0.77	1 24	0.79	0.79	0.70					
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5020	g.kg	0	0.70	5.76	3.73	0.75	0.11	0.70	0.70	4.0	3.20	0.7	. 2.0	0.			0.7	0.7	0.70	0.70	0.75	3.73	3.00	5.77	5.75	5.75	0.00	5.76	0.74	5.76	5.76	0	0.70	0.70	0.71	0.01	0.77	3.77	24	5.76	0.70	0.75	,,,,,	0.70	70	7	

Table A1- Soil results - BH 2009 Hand Auger											Si	ample Loca	ion											Soil Screen	ing Values	
Sample Identity		HA1	HA2	HA2	HA2	HA3	HA3	HA3	HA4	HA4	HA4	HA5	HA5	HA5	HA5	HA6	HA6	HA7	HA8	HA8	HA8	HA8			-	E
Depth (mbgl)		0.0	0.0	0.0-0.1	0.5-0.7	0.0	0.2-0.4	1.0-1.3	0.0	0.3-0.5	0.7-0.8	0.0	0.3-0.5	0.7-0.9	1.0-1.3	0.0-0.2	0.3-0.5	0.0-0.1	0.0-0.1	0.30-0.55	0.6-0.7	0.7-1.0	≥ -	ᇛᄫ	Vitt	ές,
Unit (mOD)																							夏 童	e E	al /	Se Se
Sampled Date		24/02/2009	24/02/2009	24/02/2009	24/02/2009	24/02/2009	24/02/2009	24/02/2009	24/02/2009	24/02/2009	24/02/2009		24/02/2009	24/02/2009	24/02/2009	24/02/2009	24/02/2009	24/02/2009		24/02/2009		24/02/2009	e ts	die out	if if	ali je
Sample Number(s)		11	12	13	14	15	16	17	18	19	71	20	21	22	23	24	25	26	27	28	29	30	E E	te ses	ag tr	五百
Soil Type		FMS	FMS	FMS	FMS	SS	FMS	FMS	FMS	FMS	MS	FMS	SC	FMS	FMS	SS	FMS	FMS	SS	SC	SS	FMS	3 =	# §	Ses Plt	ag O
																									н	Q
Metals																										
Antimony mg	/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Arsenic mg	/kg	210	140	70	32	100	13	62	59	37	29	140	840	69	49	120	24	100	97	500	110	69	640	35	32	
Beryllium mg	/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Cadmium mg		1.1	0.5	0.3	0.3	0.4	< 0.2	0.3	0.4	0.3	0.3	0.6	7.8	0.6	0.4	0.4	0.2	0.6	0.5	2.6	0.4	0.5	300	30	22	
Chromium mg	/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	330	38	37	
Copper mg		120	260	140	98	160	60	190	83	100	59	170	2000	190	130	490	77	220	130	820	140	210				190
	/kg	14	43	28	13	40	4	17	9	10	10	36	300	18	15	110	8	35	35	180	37	27	750	450	450	
Mercury mg		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	0.4	0.4	
	/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1800	130	130	
Selenium mg		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13000	600	350	
Tin mg	/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Zinc mg	/kg	130	210	180	120	260	80	150	180	140	97	150	2000	260	140	980	93	290	280	530	200	180				720

Table A1- Soil results - BH 2009 Hand Auger											s	ample Locat	ion											Soil Screen	ing Values	
Sample Identity		HA9	HA9	HA9	HA10	HA10	HA11	HA11	HA11	HA12	HA13	HA14	HA14	HA14	HA15	HA16	HA16	HA17	HA17	HA17	HA18	HA19			-	5
Depth (mbgl)		0.0-0.5	0.30-0.45	1.0-1.4	0.0-0.1	0.30-0.55	0.0-0.1	0.45-0.80	1.0-1.4	0.0-0.1	0.0-0.2	0.00-0.05	0.2-0.3	1.0-1.3	0.0-0.1	0.0-0.1	0.25-0.60	0.15-0.25	0.60-0.75	1.0-1.3	0.0-0.1	1.0-1.1	à.,	ᇴᇴ	Nife (e₁	ĕ _n ,
Unit (mOD)																							真真	ig ig ig	al /	2 2
Sampled Date			9 24/02/2009		24/02/2009			25/02/2009			25/02/2009	25/02/2009	25/02/2009	25/02/2009	25/02/2009		25/02/2009	25/02/2009	25/02/2009	25/02/2009		25/02/2009	m ts	die ort	if if	원 등
Sample Number(s)		31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	73	50	돌호	E E	ag de	三 道 。
Soil Type		SS	SS	SS	SS	FMS	SS	SC	FMS	SS	SS	SS	SC	FMS	SS	FMS	FMS	SC	SS/SC	MS	FMS	MS	8 -	# §	Ses Pla	을 만
																									ш	
Metals																										4
Antimony	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				4
Arsenic	mg/kg	82	120	120	85	78	100	680	26	120	120	190	870	21	49	61	69	530	250	27	53	25	640	35	32	4
Beryllium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				4
Cadmium	mg/kg	0.4	0.6	0.7	0.5	0.5	0.5	3.3	0.3	0.6	0.5	0.8	3.6	0.2	0.3	0.3	0.4	2.2	1.1	0.2	0.3	< 0.2	300	30	22	4
Chromium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	330	38	37	4
Copper	mg/kg	110	320	200	110	210	110	2100	65	120	140	240	1300	62	83	120	140	760	450	57	71	52				190
Lead	mg/kg	32	59	40	33	31	36	250	6	35	31	45	180	6	21	23	31	90	72	5	31	6	750	450	450	4
Mercury	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	0.4	0.4	4
Nickel	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1800	130	130	
Selenium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13000	600	350	4
Tin	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Zinc	mg/kg	180	280	250	170	190	200	1300	72	190	180	230	640	68	140	150	140	580	260	60	120	55				720

Table A1- Soil results - BH 2009 Hand Auger											Si	ample Loca	tion											Soil Screen	ning Values	
Sample Identity		HA20	HA20	HA21	HA21	HA23	HA23	HA24	HA24	HA25	HA25	HA25	HA26	HA26	HA27	HA27	HA27	HA28	HA29	HA29	HA30	HA30			-	8
Depth (mbgl)		0.6-1.0	1.1-1.4	0.0-0.1	0.5-0.7	0.0-0.1	0.2-0.3	0.00-0.05	0.5-0.6	0.00-0.05	0.3-0.4	0.75-0.95	0.0-0.1	1.00-1.15	0.0-0.1	0.4-0.5	0.8-1.0	0.0-0.1	0.0-0.1	0.4-0.5	0.02-0.05	0.50-0.65	a -	ㅠㅌ	.e. }#	ž,
Unit (mOD)																							<u> </u>	## E F F F	# ±	2
Sampled Date		25/02/2009	25/02/2009	25/02/2009	9 25/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	me ustr	\$ ± \$	를 달	- de :
Sample Number(s)		76	77	78	51	80	81	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	통형	tes C d	ag te	量值
Soil Type		SS	MS	SS	G	G	SS/SC	FMS	FMS	FMS	SS	MS	SS	MS	FMS	MS	MS	FMS	SS	FMS	SS	MS	8 =	± ≥	Ses P.H.	욕
																									IL.	Δ
Metals																										
Antimony	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Arsenic	mg/kg	420	46	90	630	200	530	60	16	78	1100	27	110	61	62	31	23	89	100	20	950	29	640	35	32	
Beryllium	mg/kg	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-				
Cadmium	mg/kg	2.7	0.3	0.7	6.6	0.7	3.2	0.3	< 0.2	0.4	4.4	0.3	0.4	0.6	0.4	0.2	< 0.2	0.5	0.5	0.2	3.9	0.2	300	30	22	
Chromium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	330	38	37	
Copper	mg/kg	850	130	120	2400	3000	1000	73	45	110	1300	66	150	210	130	89	41	110	150	47	1200	72				190
Lead	mg/kg	89	13	32	260	150	69	23	5	23	170	2	38	19	21	19	6	40	430	38	160	6	750	450	450	
Mercury	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	0.4	0.4	
Nickel	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1800	130	130	
Selenium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13000	600	350	
Tin	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Zinc	ma/ka	440	130	190	2000	2100	520	180	55	150	700	89	190	210	210	120	57	330	190	61	650	69				720

Notes
All values above are in mg/kg
BOLD = SGV (EA, 2009)
Italics = Generic Accessment Criteria (GACs) derived inline with guidance published by the EA, 200!
Italics = Generic Accessment Criteria (GACs) derived inline with guidance published by the EA, 200!
Italics = Generic Accessment Criteria (GACs) derived inline with guidance published by the EA, 200!
Italics = Generic Accessment Criteria (SOM) is conservatively assumed to be 1% - GEFAULT VALUE IS 6%
Soil organic matter (SOM) is conservatively assumed to be sand - DEFAULT SOIL TYPE IS SANDY LOAM
Soil type is corresvatively assumed to be sand - DEFAULT SOIL TYPE IS SANDY LOAM
Soil type is corresvatively assumed to be a preal SOIL TYPE IS SANDY LOAM
For Commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
For classroom acconsider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m-3
NA: Not applicable

1 - Soil Guideline Values - Environment Agency 2009
2 - Dutch Intervention Values - Circular on Target Values and Intervention Values for Soil Remediation, Ministry of Housing, Spatial Planning and the Environment (2000)

Table A1- Soil results - BH August 2007 Trial Pits	s and Boreholes																															S	Soil Screen	ing Values
Sample Identity		TP1-D1	TP1-D3	TP2-D1	TP2-B4	TP2-D3	TP3-D1	TP4-D1	TP4-D5	TP5-D1	TP5-D4	TP6-D1	TP6-D3	TP7-D1	TP7-D3	TP7-D6	BH803	BH803	BH803	BH803	BH803	BH804	BH804	BH804	BH804	BH804	BH805	BH805	BH805	BH805	BH805			£
Depth (mbgl)		0.5	1.5	0.25	1.20	1.40	0.50	0.50	1.50	0.30	1.50	0.40	1.00	0.50	1.00	1.80	0.5	1.5	2.5	4.5	5.5	0.5	1.5	2.5	3.5	4.5	0.5	1.5	2.5	3.5	4.5	≥ _	_ E	E-6
Jnit (mOD)																																al cie	음을	ta N
Sampled Date		27.10.04	27.10.04	27.10.04	27.10.04	27.10.04	27.10.04	27.10.04	27.10.04	27.10.04	27.10.04	27.10.04	27.10.04	27.10.04	27.10.04	27.10.04																stri	들 등 품	풀 음
Sample Number(s)																																돌중	PSS of p	무는
Soil Type		G	FMS	SS	SS	FMS	SS	SS	SS	SS	SS/G	SC	FMS/G	G	SS	FMS	FMS	FMS	FMS	FMS	G	FMS	FMS	FMS	FMS	G	FMS	FMS	MS	MS	MS	ვ⊆	& ≦ ⊃	asi Na
Son Type			1 1110	- 00	- 00	1 1110	- 00	- 00	- 00	- 00	00/0	- 00	1 111070		- 00	1 1110	11110	11110	11110	11110		11110	1 1110	1 1110	1 1110		1 1110	1 1110	1110	III.O	IVIO		_	æ ··
Metals																																		
Antimony	mg/kg	1	- 1	1	1	1	1	1	1	- 1	1	1	1	1	1	1	0.2	0.6	0.1	0.1	0.1	0.8	0.3	0.1	0.5	0.2	0.6	0.5	0.1	0.1	0.3			
Arsenic	mg/kg	84.4	35.5		87.2	295.1	154.8	80.1	538.1	223.3	1.6	406.2	60.4	82.5	225.7	59.1	39.7	122.2	44	13.9	21.4	92.4	44.3	15.4	59.2	36.1	70	99	14.7	23.6	18.6	640	35	32
eryllium	mg/kg	1	33.3	043.4	07.2	200.1	154.0	00.1	330.1	220.0	1.0	400.2	00.4	02.0	225.1	38.1	33.1	122.2		13.5	21.74	02.4	44.5	13.4	35.2	30.1	70		14.7	23.0	10.0	640	33	32
Cadmium		1.2	0.5	10.5	1.4		2.4	0.9	9.1	3.3	0.5	5.6	0.7	0.8	2.9	0.6	0.21	0.3	0.22	0.22	0.17	0.13	0.15	0.1	0.13	0.13	0.15	0.16	0.1	0.1	0.14	000	00	22
	mg/kg	76			1.4	18					17		0.7	14	7.9	0.6				6.5			0.15	0.1				12.1		6.6		300	30	22 37
Chromium	mg/kg		13	19	, ,		12	17	124	21	1/	12	4			3	8.3	44	6.1		8.4	14.4		4	8.9 117.8	12.3	12.4		4.7		6.8	330	38	3/
Copper	mg/kg	32	1 1	984	82	1063	180	1476	1242	508	1_	480	63	52	223	43	71.3	92.1	76.3	24	17.8	167.1	165.4	29.1		40.6	131.7	219.1	25.6	19.2	16.3			
_ead	,g/kg	32	9	1761	24	141	47	149	281	119	35	96	19	23	41	15	16.8	31.6	22.8	6.1	7.9	36.4	16.4	4.6	25.5	11.4	32.1	37.4	4.7	4.2	5.7	750	450	450
Mercury	mg/kg	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.12	0.45	0.24	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.12	26	0.4	0.4
ickel	mg/kg	47	8	21	5	17	8	8	21	19	4	12	3	10	5	3	8.3	33.3	6.8	6.1	7.7	9.8	5.3	3.3	7.4	8.7	10.3	9.9	3.4	4.7	4.5	1800	130	130
elenium	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.9	0.5	0.5	0.5	0.5	0.5	1.07	0.94	1.2	1.43	0.93	1.11	1.62	0.63	1.46	1.22	1.13	1.8	1.69	1.47	1.85	13000	600	350
în	mg/kg	38	10	136	110	259	89	22	101	625	21	80	22	28	36	10	15.4	20	9.8	2.5	2.4	46.6	33.5	7.2	50.4	5.9	69.1	121.4	5.5	17	14.6			
Zinc	mg/kg	410	98	741	176	1196	228	1762	1041	551	30	386	184	235	206	171	76.3	199.3	96	38	51.8	130	91.3	22.6	112.6	55.2	126.6	138.7	15.7	25.5	23.3			
Other Inorganics																																		
Easily Liberated Sulphide	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloride	mg/kg	2294	2954	6172	3610	7114	5014	1902	6410	3906	3724	6108	6064	3388	4088	3728	3050	1550	2550	186	3110	3000	3760	4010	4170									
Soil Organic Matter	%	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-		-	-	-	_	-	-	-	-		-			
Fotal Organic Carbon	%		_	_		_	0.7		2.73		0.12	1.54			0.63		0.3	0.6	0.5	0.2	0.1	0.8	0.4	0.3	0.8	0.4	1.4	1.1	0.2	0.4	0.3			
Cyanide (Easily Liberated)	mg/kg			_	_	_	0.7	_			0.12	1.0-4	_	_	0.00		0.0	-	0.0	0.2	0.1	0.0	0.4	0.0	0.0	0.4			0.2	-	-	16000	760	4.5
Stones (over 10mm)	nig/kg	56.6	5.8	4.7	0.1	0.1	0.1	17.2	7.6	9.6	0.1	0.1	0.1	7.9	0.1	2.3	0.1	40.1	12.8	3.2	11.8	0.1	1.6	1.2	6.6	16.7	0.1	0.1	0.1	0.1	0.1	10000	700	4.5
	70	36.6	5.0	4.7	0.1	0.1		17.2			-	0.1				2.3	0.1				11.0	0.1	1.0		0.0		0.1		0.1					
culphur raction of Organic Carbon	mg/kg	-	-	-	-	-	-		-	-	-	-	-	-	-	1 -		-	-	-	-	-	-	-	1 -	-	-	-	-	-				
	01	-	45.7	-				40.7	-	-				40.7		-	40.7	47.0	-	7	45.0	40.0	1	40.0	40.4	47.5			400	47.0				
Natural Moisture Content Ratio	%	12.8	15.7	33.2	20.6	32.8	25.4	10.7	32.2	22.2	21.7	28.5	30.7	16.7	20.6	23.2	10.7	17.9	11.8		15.3	19.8	17.1	18.3	18.1	17.5	21.1	21.8	18.3	17.2	19			
DH .	pH units	8.46	8.38	8.17	8.32	7.96	8.24	8.34	7.74	8.27	8.26	8.32	8.24	8.3	8.06	8.25	9.2	9	9.1	9.5	9.2	8.9	9.2	9.3	9	9.1	9	9	9.4	9.2	9.3			
Ammonical Nitrogen as N	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Soluble Sulphate 2:1 Extract as SO4	g/I	0.207	0.234	0.537	0.31	0.569	0.365	0.175	1.13	0.333	0.284	0.415	0.425	0.279	0.542	0.266	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
ulphate (Total)	mg/kg	2715	6599	4426	6788	9324	5755	5194	12240	5213	7238	4131	9789	6153	6706	6767	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
luoride	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
yanide (Free)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CEC*	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-				
Asbestos Presence Screen	NONE	NFD	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001																	
Nibutyl Tin	mg/kg	5													1		2.007	2.507	2.301	2.307	2.301	0.02	2.507	2.507	2.007	2.007	0.03	0.03	2.307					
Fibutyl Tin	mg/kg		1 [1 .	1 :	1 1	1 [1	1		1 -	1	1 -		1 1		1					0.02	1			1 :	0.03	0.03	1					

Table A2- Metals concentrations in soil per grain size)													Sar	nple Location														Soil Screen	ing Criteri
Sample Identity				WS701					WS702					WS702					WS703					WS703					_
Soil Type			Fine to	Medium Gra	ined Sands				Silty Sands				Fine to I	Medium Graine	d Sands				Sandy Clay					Gravel			≥	_ E	e e
Grain Size		>2mm	0.6 - 2mm	0.212-0.6mm	0.063-0.212mm	<0.063mm	>2mm*	0.6 - 2mm	0.212-0.6mm	0.063-0.212mm	<0.063mm	>2mm	0.6 - 2mm	0.212-0.6mm	0.063-0.212mm	<0.063mm	>2mm	0.6 - 2mm	0.212-0.6mm	0.063-0.212mm	<0.063mm	>2mm	0.6 - 2mm	0.212-0.6mm	0.063-0.212mm	<0.063mm	道点	nfia Pla	dg Z
Depth (mbgl)				0.50					0.50					2.00					0.50					4.00			me ust	die cree	불그
Sampled Date	15	/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008	ΕĘ	8 & J	젊양
Sample Number(s)		1	4	3	2	2	5	11	9	7	7	6	12	10	8	8	13	19	17	15	15	14	20	18	16	16	8 -	± ≥	8 Z
Vt%		23	3	43	27	4	2	12	33	25	28	<1	4	82	13	1	4	4	32	31	29	40	5	51	4	0			ш.
Metals																													
Arsenic mg/k	g	190	110	61	440	680	2300	1200	320	650	1700	54	86	44	230	NDP	250	700	300	570	1700	44	23	14	51	NDP	640	35	32
Cadmium mg/k	g	0.8	0.7	0.5	2.3	3.3	13	7.4	2.3	4.3	9	< 0.2	0.7	0.4	1.4	NDP	1.5	4.2	2	3.5	8.5	<0.2	0.3	0.3	0.6	NDP	300	30	22
Chromium mg/k	g	30	12	5.8	18	22	19	19	7.9	21	40	<4.5	5.1	<4.5	16	NDP	76	28	8.8	20	39	19	4.7	<4.5	14	NDP	330	38	37
_ead mg/k	9	170	40	24	150	210	140	160	61	170	260	12	18	10	68	NDP	110	120	59	140	220	8	3	<2	10	NDP	750	450	450
Zinc mg/k	g	540	290	120	570	680	660	840	350	870	1200	86	160	110	440	NDP	930	920	340	750	1000	120	80	50	200	NDP			

Table A2- Metals concentrations in soil (per grain size)				WS705					WS705					WS707					WS707				Soil Screen	ing Values	
Sample Identity				Sandy Clay					Sandy Clay				M	edium Grained Sar	nds			Me	dium Grained Sa	nds					×
Soil Type		>2mm	0.6 - 2mm	0.212-0.6mm	0.063-0.212mm	< 0.063	>2mm*	0.6 - 2mm	0.212-0.6mm	0.063-0.212mm	<0.063mm	>2mm	0.6 - 2mm	0.212-0.6mm	0.063-0.212*	0.063-0.212*	>2mm*	0.6 - 2mm	0.212-0.6mm	0.063-0.212mm	<0.063mm	` ≱ _	= 5	e. Viii	₩
Grain Size	ze 1.00							2.00					0.50					2.00			- E	e Bati	ta a	96 Ve	
Depth (mbgl)	gl) 31/10/2008 31/10/2008 31/10/2008 31/10/2008 31/10/2008 31/10/2008				31/10/2008	31/10/2008	31/10/2008	31/10/2008	31/10/2008	31/10/2008	16/10/2008	16/10/2008	16/10/2008	16/10/2008	16/10/2008	16/10/2008	16/10/2008	16/10/2008	16/10/2008	16/10/2008	me ustr	da fa de	필요	le iii	
Sampled Date		21	27	25	23	23	22	28	26	24	24	29	35	33	31	31	30	36	34	32	32	통호	es of u	n de	- is
Sample Number(s)		2	9	32	20	37	0	3	86	11	0	5	5	78	11	1	0	5	81	13	1	ŏ =	~ ₹	Pla	5 0
Wt%																								œ	ă
Metals																									
Arsenic mg/k	9	380	1200	580	680	900	11	36	22	110	NDP	210	66	39	340	NDP	6	15	13	27	NDP	640	35	32	
Cadmium mg/k	9	2.1	7.3	3.7	4.7	5.4	< 0.2	0.4	0.3	0.6	NDP	0.8	0.5	0.4	1.7	NDP	0.3	0.3	0.2	0.3	NDP	300	30	22	
Chromium mg/k	a l	30	31	20	37	43	18	<4.5	<4.5	21	NDP	48	7.7	5.1	29	NDP	<4.5	<4.5	<4.5	8.9	NDP	330	38	37	
Lead mg/k		110	330	230	340	420	14	12	4	35	NDP	33	15	8	93	NDP	<2	5	3	23	NDP	750	450	450	
Zinc mg/k		880	1500	880	1300	1500	42	130	79	310	NDP	840	170	100	680	NDP	16	46	38	82	NDP				720
				l	1		1			l	l	l		l	l		ĺ			1	1				

Notes
All values above are in mg/kg
BOLD = SGV (EA, 2009)
Italics - Generic Acessment Criteria (GACs) derived inline with guidance published by the EA, 2009
Italics - Generic Acessment Criteria (GACs) derived inline with guidance published by the EA, 2009
Tyld dependent (SOM) is conservatively assumed to be 1% - DEFAULT VALUE IS 6%.
Soil type is conservatively assumed to be sand - DEFAULT SOLI. TYPE IS SANDY LOM
For residential, the building type is conservatively assumed to be a simal termon house-there the development includes bungalows change to more conservative bungalow setting in computer model
For residential, the building type is conservatively assumed to be a simal termon house-there the development includes bungalows change to more conservative bungalow setting in computer model
For classrooms consider increasing the dust loading fator in the 'Soil and Building Date of the CLEA 1.04 model from 50 to 100µg m-3

NA: Not applicable

1 - Soil Guideline Values - Environment Agency 2009
2 - Dutch Intervention Values - Circular on Target Values and Intervention Values for Soil Remediation, Ministry of Housing, Spatial Planning and the Environment (2000)

Table A3- Soil results (Organics))			<u> </u>					s	ample Loca	ation												ı1
			BH 20	008/2009								ВН	I, August 2	007							- *	oil Screening V	liues
Sample Identity		WS701	HA2	HA5	HA10	BH803	BH803	BH803	BH803	BH803	BH804	BH804	BH804	BH804	BH804	BH805	BH805	BH805	BH805	BH805	_	¥	£ a
Depth (mbgl)		1.00	0.0-0.1	0.3-0.5	0.30-0.55	0.5	1.5	2.5	4.5	5.5	0.5	1.5	2.5	3.5	4.5	0.5	1.5	2.5	3.5	4.5	rcia	ntia Plan	ntial With Uptake
Sampled Date		21/10/2008	24/02/2009	24/02/2009	24/02/2009																me	tesdie ithout Upta	ig 5
Sample Number(s)		13-14	13	21	35																Tio Zin	§ € ⊃	esider Plant I
Soil Type		SS	FMS	SC	FMS	FMS	FMS	FMS	FMS	G	FMS	FMS	FMS	FMS	G	FMS	FMS	MS	MS	MS	U	_ >	8 4
Hydrocarbons																							
MTBE	μg/kg	<10	-	-	-																		
Benzene	μg/kg	<10	-	-	-	<25	<25	<25	<25	<25	<10	<10	<10	<31	<10	<32	<32	<31	<10	<31	1,000	7	7
Toluene	μg/kg	<10	-	-	-	<25	<25	<25	<25	<25	<10	<10	<10	<31	<10	<32	<32	<31	<10	<31	199,000	1,300	1,300
Ethyl benzene	μg/kg	<10	-	-	-	<25	<25	<25	<25	<25	<10	<10	<10	<31	<10	<32	<32	<31	<10	<31	782,000	5,400	5,100
m & p Xylene	μg/kg	<10	-	-	-	<25	<25	<25	<25	<25	<10	<10	<10	<31	<10	<32	<32	<31	<10	<31	371,000	2,400	2,400
o Xylene	μg/kg	<10	-	-	-	<25	<25	<25	<25	<25	<10	<10	<10	<31	<10	<32	<32	<31	<10	<31			
PRO aromatic C6-C7	μg/kg	<35	-	-	-																1,000	7	7
PRO aromatic >C7-C8	μg/kg	<35	-	-	-																1,000	7	7
PRO aromatic >C8-C10	μg/kg	<35	-	-	-	<770	<840	<780	<740	<810	<12000	<12000	<12000	<12000	<12000	<13000	<13000	<12000	<12000	<12000	246,000	1,600	1,600
TPH aromatic >C10-C12	μg/kg	<35	-	-	-	<770	<840	<780	<740	<810	<12000	<12000	<12000	<12000	<12000	<13000	<13000	<12000	<12000	<12000	1,440,000		9,000
TPH aromatic >C12-C16	μg/kg	<35	-	-	-	<1550	<1680	<1560	<1480	<1630	<12000	<12000	<12000	<12000	<12000	<13000	<13000	<12000	<12000	<12000	6,950,000		40,000
TPH aromatic >C16-C21	μg/kg	<35	-	-	-	<1930	<3010	<1950	<1850	<2030	<12000	<12000	<12000	<12000	<12000	<13000	<13000	<12000	<12000	<12000	20,400,00	354,000	174,000
TPH aromatic >C21-C35	μg/kg	<35	-	-	-	<5400	<6750	<5460	<5180	<5690	<12000	<12000	<12000	<12000	<12000	<13000	<13000	<12000	<12000	<12000	28,400,00	1,319,00	882,000
PRO aliphatic C5- C6	μg/kg	<35	-	-	-	<500	<5000	<500	<500	<500	<200	<200	<200	<600	<200	<600	<600	<600	<600	<600	269,000	1,800	1800
PRO aliphatic >C6- C8	μg/kg	<35	-	-	-																624,000	4,100	4,100
PRO aliphatic >C8- C10	μg/kg	<35	-	-	-	<770	<840	<780	<740	<810	<12000	<12000	<12000	<12000	<12000	<13000	<13000	<12000	<12000	<12000	156,000	1,000	1,000
TPH aliphatic >C10-C12	μg/kg	<35	-	-	-	<770	<840	<780	<740	<810	<12000	<12000	<12000	<12000	<12000	<13000	<13000	<12000	<12000	<12000	906,000	6,000	6,000
TPH aliphatic >C12-C16	μg/kg	<35	-	-	-	1550	<1680	<1560	<1480	<1630	<12000	<12000	<12000	<12000	<12000	<13000	<13000	<12000	<12000	<12000	4,370,000	30,000	30,000
TPH aliphatic >C16-C21	μg/kg	<35	-	-	-	<1930	<2100	<1950	<1850	<2030	<12000	<12000	<12000	<12000	<12000	<13000	<13000	<12000	<12000	<12000	407,000,00	3,310,000	3,310,000
TPH aliphatic >C21-C35	μg/kg	<35	-	-	-	<5400	<5870	<5460	<5180	<5690	<12000	<12000	<12000	<12000	<12000	<13000	<13000	<12000	<12000	<12000	407,000,00	3,310,001	3,310,001
GRO C4-C10	μg/kg	<10	-	-	-																		
GRO C10-C12	μg/kg	<10	-	-	-																		
Total GRO						<500	<500	<500	<500	<500	<200	<200	<200	<600	<200	<600	<600	<600	<200	<600			
TPH C10-C40	μg/kg	<10	<35	240	42																		
PAH																							
PAH TOTAL(EPA16)	mg/kg	0.06	0.16	2.1	0.565																		
Naphthalene	µg/kg	<10	<9	170	24	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	114,000	700	700
Acenaphthylene	μg/kg μg/kg	<10 <5	<12	55	<12	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	114,000	700	700
Acenaphthene	μg/kg μg/kg	<14	<12 <8	36	<12 <8	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000			
Fluorene	μg/kg μg/kg	<12	<0 <10	110	<0 <10	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000			
Phenanthrene	μg/kg μg/kg	28	24	340	65	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000			
Anthracene	μg/kg μg/kg	20 <9	<16	120	<16	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000			
Fluoranthene	μg/kg μg/kg	<25	35	310	78	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000			
Pyrene		<25 <22	35	220	78 69	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000			
Benzo[a]anthracene	μg/kg μg/kg	23	29	170	78	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000			
Chrysene	μg/kg μg/kg	11	29	150	66	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000			
Benzo[b]fluoranthene	μg/kg	<16	20	120	43	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000			
Benzo[k]fluoranthene	μg/kg	<25	<14	69	29	<1000	<1000	<1000	<1000 <1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	14300	1000	900
Benzo[a]pyrene	μg/kg	<12	<15	120	43 33	<1000	<1000	<1000		<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	14300	1000	900
Dibenzo[a,h]anthracene	μg/kg	<11	<18	62		<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000			
Indeno[1,2,3-cd]pyrene	μg/kg	<8 <10	<23 <24	<23 72	<23 36	<1000 <1000																	
Benzo[g,h,i]perylene	μg/kg	<10	<24	12	30	<1000	< 1000	< 1000	<1000	< 1000	< 1000	<1000	<1000	< 1000	< 1000	<1000	<1000	< 1000	<1000	<1000			
Others																							
PCBs	μg/kg	-	<35	<35	<35																		
Phenols	mg/kg	-	< 0.15	< 0.15	< 0.15	l															968000	22100	403

Notes
All values above are in mg/kg
BOLD = SGV (EA, 2009)

BOLD = SGV (EA, 2009)

Italias = Generic Acessment Criteria (GACs) derived inline with guidance published by the EA, 2009

"pH dependent (8)

Soil organic matter (SOM) is conservatively assumed to be 1% - DEFAULT VALUE IS 6%

Soil type is conservatively assumed to be sand - DEFAULT SOIL TYPE IS SANDY LOAM

For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m-3

NA Not annipicable

NA: Not applicable

^{1 -} Soil Guideline Values - Environment Agency 2009

BEACH	0.5 0.3 0.4 905 27/11/2007 27/11/2007 27/11/2007 27/11/2007 1 1 1	Harbour Bottom S5 S6 S7 S8 S9 S10 0.3 0.6 0.5 0.4 0.5 0.5 27/11/2007 27/11/2007 27/11/2007 27/11/2007 27/11/2007 27/11/2007	Harvey's Towans	
1.2 1.2 1.2 1.2 1.007 2005 27/06/1905 27/06/	0.5 0.3 0.4 905 27/11/2007 27/11/2007 27/11/2007 27/11/2007 1 1 1	0.3 0.6 0.5 0.4 0.5 0.5	0.0-0.2 0.4-0.8 0.0-0.1 0.0-0.1 0.8-1.1 0.0-0.1 0.0-0.1 0.6-0.7 0.0-0.1	
07 2005 27/06/1905 27/	905 27/11/2007 27/11/2007 27/11/2007 27/1 1 1 1 1			
Beach Sand Beach Sand Beach Sand Beach Sand Beach Sand	1 1 1	27/11/2007 27/11/2007 27/11/2007 27/11/2007 27/11/2007 27/11/2007	25/02/2009 25/02/2009 25/02/2009 25/02/2009 25/02/2009 25/02/2009 25/02/2009 25/02/2009 25/02/2009	
Beach Sand	1 1 1 1 1 and Sands- Sand Sand S	1 1 1 1 1 1		19 <u>a c</u> <u>a d</u> <u>a d</u> <u>a d</u>
	and Sands- Sand Sand S		1 1 1 1 1 1 1 1 1 1	tr U intig
		Sand Sand Sand Sand Sand Sand	Sand Sand Sand Sand Sand Sand Sand Sand	
	4-5 6 7	8 9 10 11-12 13-14 15	4-5 6 7 8 9 10 11-12 13-14 15	P. P. Res
) <5 <5 <5 <5 <5		4500 4300 4100 4100 4500 5100		
		<3.5 <3.5 <3.5 <3.5 <3.5		
27 22.1 21.2 18.9 21.5		24 26 31 27 40 25	280 35 34 36 34 40 40 42 42	640 35 32
		<6 <6 6 <6 <6 <6	- - - - - - - - -	
		<0.4 <0.4 <0.4 <0.4 <0.4 <0.4		
0.8 0.15 0.3 0.11 0.11	1 <0.3 <0.3 <0.3	<0.3 <0.3 <0.3 <0.3 <0.3 <0.3	1.6 0.3 0.2 0.2 0.3 0.3 0.3 0.3 0.3	295 30 22
3.8 3.7 3.1 2.5 2.7		<4.5 <4.5 <4.5 <4.5 <4.5		330 38 37
17.1 18.4 14.8 12.6 14.1	1 23 21 20	17 24 23 24 23 22	490 23 24 27 31 27 27 28 32	19
6.7 9.1 6.8 6.8 6.8		6 9 9 7 11 7	100 7 8 10 9 11 11 9 10	750 450 450
0.1 0.1 0.1 0.1 0.1		<0.6 <0.6 <0.6 <0.6 <0.6 <0.6		584 25 8.4
3.6 3.4 2.7 2.6 2.3	1.2 3.6 1.1	1.4 1.6 2.2 1.5 2.4 1.5		989 113 108
1.1 0.9 1.1 1.0 1.1		3 3 3 3 3 3		5590 226 37
2.3 2.3 2.1 1.9 2.2		4 4 3 6 5 5	- - - - - - - - -	
33 27.9 49 23.7 26.6			750 54 48 66 63 58 51 49 63	72
			1 - - - - - - - - -	15900 756 4.5
	<15 <15 <15			
	3 27.9 49 23.7 26.6	3 27.9 49 23.7 26.6 42 51 42 <1 <1 <1	3 27.9 49 23.7 26.6 42 51 42 44 46 47 44 54 49	3 27.9 49 23.7 26.6 42 51 42 44 46 47 44 54 49 750 54 48 66 63 58 51 49 63

Table A4 - Soil results (E	ackground Sa	imples)																																									Screening	g Criteria	
Area																					North	Quay																					out	£	lo l
Sample Identity		Bl	H103	BH104	BHI	105	TP	106	TF	P107		TP108		TP	110	TPI	11		TP112		TP114	TPI	15	TP116	TP117	TP11	18	TP119	TP	122	TPI	25	TPI	26	TP127	NQHA1		NQHA2	NQHA4	NQHA5	NQHA6	rcial/	With take ¹	al Wi	vent
Depth		0-0.5	1.5	1	0.5	1.5	0.6	1	0.15	0.5	0.4	0.5	0.7	0.25	0.5	0.2	1	0.25	0.5	1.5	0.5	0.5	1	0.5	0.1	0.5	1	0.5	0.5	2.5	0.3	1.5	0.5	1	0.2	0.0-0.1 0.	.2-0.3	0.0-0.1	0.0-0.1	0.2-0.3	0.2-0.3	an ts	tial C Ti	ig D	원 등
Sampled Date																		August 2007	investigation	1																26/02/2009 26/0	02/2009	26/02/2009	26/02/2009	26/02/2009	26/02/2009	E D	ant	ant an	(最)
Batch																																				1	1	1	1	1	1	0 -	PS 4	% E	물 이
Sample Number(s)																																				4-5	6	82	7	8	94		~	/ T	/
	Units																																												=
Inorganics																																								4			/	/ /	
Arsenic	mg/kg	61.8	18.2	268.8	56.9	56.1	27.6	18.3	95.1	497	231.1	137	32.5	106.8	13.5	148.8	149.5	8.6	76.1	87	67.7	168.2	127.4	489	98.3	123.9	139	50.6	587.2	1330	375.6	89.8	354.6	154.4	215.3	51	130	120	100	120	1500	640	35	32	
Cadmium	mg/kg	0.34	0.1	14.37	0.53	0.22	0.1	0.1	0.39	45.44	0.97	0.62	0.1	2.29	0.17	0.78	0.79	0.13	0.23	0.37	0.21	0.58	1.08	39.45	0.9	0.57	0.4	0.16	7.57	2.37	1.63	0.3	0.9	0.9	0.92		0.9	1.1	0.6	1	13	295	30	22	
Chromium	mg/kg	43	22.4	45.8	18	45	3.2	5.7	15.2	38.4	15.7	20	34.9	19.5	5.6	25.1	14.2	2.4	27.8	15.9	8.6	52.5	29.2	10.3	19	36	38	42.3	24	32.3	20.7	41.3	25.9	19	18.8	-	-	-	-	-		330	38	37	
Copper	mg/kg	55	30.8	21500	211	50.4	17	8.2	80.2	24200	403.1	196.5	33.5	268.1	67.6	215.8	171.6	28	91.4	210.6	120.2	581.6	262.8	23100	397.2	174.1	514.2	73.3	2810	3590	553	219.2	357.3	253.3	567.6	490	23	170	24	27	3900		/	/ /	190
Lead	mg/kg	98.3	14.3	89.9	102.1	51.7	14.7	9.7	51.4	117	73	65.5	22.9	24.3	3.9	485.2	154	44.4	44.1	109.1	182.5	550.3	56.2	63.7	56.6	55.5	90.9	43	628.5	778.6	123	27.6	69.6	125.5	87.8	100	7	96	8	10	490	750	450	450	
Mercury	mg/kg	0.11	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.43	0.3	0.1	0.1	1.26	0.1	0.82	0.61	0.6	0.14	0.17	0.24	0.1	0.1	0.1	0.1	0.1	0.1	0.41	< 0.1	< 0.1	1	< 0.1	1.26	0.16	0.52	-	-	-		-	-	584	25	8.4	
Nickel	mg/kg	26.7	13.4	54.5	89.1	34	2.8	2.9	19.6	92	38.7	50	31.8	76	6	20	16.5	11.2	28.4	24	14	71.3	26.6	44.4	26.4	68	35.5	32.2	46.5	28.1	35.7	32.3	30.7	26.2	33.6	-	-	-	-	-	-	989	113	108	
Selenium	mg/kg	0.72	2.21	0.67	0.67	0.5	0.95	1.13	0.92	1.3	1.78	1.59	0.55	1.43	1.5	0.94	0.99	1.4	0.78	1.08	0.47	0.6	0.7	0.95	0.66	0.91	0.5	0.6	1.33	1.75	1.2	<0.5	1.01	1.09	1.03	-	-	-	-	-	-	5590	226	37	
Tin	mg/kg	99.8	6.5	125	33.3	12.4	5.9	6.1	31.5	57.1	21	35.8	11.2	33.9	2.6	69.6	212.5	2.5	23.3	58.8	217.4	43	311.8	43	59.4	34	208.3	9	204.9	39	756.3	50	5730	162.2	584.6	-	-	-	-		-		/	/ /	
Zinc	mg/kg	212.4	53.5	7670	245.9	220	34.3	21.2	214	21300	392	223.8	106.4	791.5	89.8	441.7	435.8	51.8	193.2	227	167.3	307.2	527.7	8740	388	283.5	627.6	141.1	3350	878.4	666.4	203	429.6	1040	324.4	750	54	250	48	66	1500				720
pH Value	pH Units	9.8	9.1	7.8	8.8	9	9	9.3	9	8.4	8	7.9	8.4	8	8.9	8.6	8.7	8.5	8.7	8.6	8.7	7.1	8.5	7.6	8.5	8.8	9.1	8.7	8.5	8.5	7.8	8.4	8.3	9.8	8.6										

Notes
All values above are in mg/kg
BOLD = SGV (EA, 2009
Tables = Generic Accessment Criteria (GACs) derived inline with guidance published by the EA, 2009
The dependent (8)
Soil organic matter (SOM) is conservatively assumed to be 1% DEFAULT VALUE IS 6%
Soil type is conservatively assumed to be sand DEFAULT SOIL TYPE IS SANDY LOAM
For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in
For commercial, the building type is conservatively assumed to be a pre 1976s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100 pg m-3
NA: Not applicable

1 - Soil Guideline Values - Environment Agency 2009
2 - Dutch Intervention Values - Circular on Target Values and Intervention Values for Soil Remediation, Ministry of Housing, Spatial Planning and the Environment (2000)

															s	ample Locati	on																		
Table A5- Leachate results		TP2-D1	TP2-D2	TP4-D1	TP4-D5		w	S701			WS702					WS703						ws	3705				WS707		HA11	HA25					
	Liquid-solid ratio	10:1	10:1	10:1	10:1	10:1	10:1C	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1C	10:1C	Marine Environmental		WHO Drinking	Adopted Criteria	Adopted Criteria
DETERMINAND	Depth (m/bgl)	0.25	1.4	0.5	1.5	1	1.5	2	3.5	0.5	1.5	2.5	0.50	1.50	2.50	3.50	4.50	6.00	8.00	0.50	1.50	2.50	3.50	4.50	6.00	0.5	1.5	2.5	0.45-0.80	0.3-0.4	Quality	Water Standards ²		(Marine water)	(Minor
DE LEMINO NO	Soil Type	SS	MS	SS	SS	FMS	MS	MS	MS	SS	FMS	FMS	SC	FMS	FMS	FMS	G	G	FMS	SS	FMS	FMS	FMS	FMS	FMS	FMS	FMS	MS	SC	SS	Standards ¹	Ottandardo	Citaridado		Aquifer)
	Depth mOD					-0.05	-0.55	-1.05	-2.55	-0.08	-1.08	-2.08	-0.15	-1.15	-2.15	-3.15	-4.15	-5.65	-7.65	0.45	-0.55	-1.55	-2.55	-3.55	-5.05	0.11	-0.89	-1.89		-					
Inorganics																																			
Chloride	mg/l	651	668	278	520	220	390	490	400	850	510	390	480	490	480	220	69	110	380	440	450	490	440	330	430	420	400	330	470	410		250			250
Fluoride (Dissolved)	mg/l					<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.7		15			15
ulphate	mg/l					39	58	77	61	140	78	63	130	74	72	38	14	21	58	66	68	250	65	52	63	67	64	54	76	68		250			250
Dissolved Organic Carbon	mg/l					<1	<3	3	<1	11	2	1	6	<1	<1	<1	4	<1	<1	1	<1	<1	<1	<1	<1	2	1	1	<3	<3					
Total Dissolved Solids @ 105C	mg/l					460	470	920	750	1500	950	760	930	940	920	430	170	230	730	810	830	1000	800	630	800	800	760	600	910	790					
Chemical Oxygen Demand	mg/l	163	75	55	61	<10	-	18	10	37	<10	<7	17	<10	<10	<10	12	<10	<10	10	12	13	10	11	10	<7	10	10	-	-					
Phenolics (as phenol)	mg/l					< 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	< 0.01	0.01	0.01	0.03 4			0.03	
Total Sulphur as SO4 (Dissolved)	mg/l	120	182	41	640																														
Conductivity uS/cm @ 25C	uS/cm	21.7	22.8	9.94	25.3																														
pH units		7.72	7.72	7.81	7.81																										6-8.5	>6.5		6-8.5	>6.5
Total Organic Carbon	mg/l	3	3	2	4																														
Ammoniacal Nitrogen as N	mg/l	0.2	0.2	0.2	0.2																											0.5			0.5
Metals																																			
Antimony	μg/l	12	14	5	5	4	4.7	2.4	1.3	38	7.2	3.9	1.2	15	< 0.75	1.8	< 0.75	< 0.75	< 0.75	13	3.7	12	3.8	1.7	0.98	2.4	3.4	1.3	6	2.7		5	20		5
Arsenic	μg/l	134	108	11	21	10	9	9.8	16	110	72	90	95	62	57	28	21	14	5.6	230	240	140	430	270	150	86	14	9.5	180	320	25	10	10	25	10
Barium	μg/l					1	64	12	4	5	1	6	3	4	3	3	1	4	3	2	<1	2	2	1	1	2	9	2	4	4					
Boron	μg/I	302	459	859	473	50	90	110	60	330	60	<20	240	100	110	30	<20	<20	120	140	100	120	80	50	70	90	50	20	390	420	7000	_	500	7000	500
Cadmium	μg/l	< 0.4	<0.4	< 0.4	<0.4	<0.22	<0.22	<0.22	<0.22	0.79	<0.22	<0.22	<0.22 <1	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	0.53	<0.22	<0.22	<0.22	0.54	<0.22	<0.22	<0.22	<0.22	2.5	50	50	2.5	5
Chromium	μg/I	2	2	4	2	<1	<1	6 13	<1	2	9.1	6.3		1	1	- 1	<1 1.9	3.5	<1	<1	<1	43	<1	<1	<1 1.9	2		<1	<1	<1	2000	50	50	15	50 2000
Copper Lead	μg/l	23	5	47	30	3.6 0.6	<1.6 <0.4	3.8	4.3 <0.4	3.6 1.7	0.5	<0.5	4 0.7	<0.4	6.1	5.1 <0.4	<0.4	<0.4	2.7 <0.4	7.8 0.9	1.9 <0.4	37 0.6	6.3 <0.4	5.3 <0.4	<0.4	25 0.8	6.3 1.5	7.1 0.5	7.3	9.1	2000	25	2000	25	2000
Molybdenum	μg/I μg/I	<1	1	1	1	<1	<0.4	3.6	<0.4	130	2.5	1	68	3	<1	2	2	1	5	2.9	<1	0.6	1	<0.4 <1	<0.4	1	<1	<1	30	20	25	25	10	25	25
Nickel	μg/l μg/l	2	<1	<1	1 4	<1.5	<1.5	<1.5	<1/5	1.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	5900	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	30	20	20	30	20
Selenium	µg/l	6	4	2	4	2	2	4	4	7	2	<1	5	<1	<1	<1	<1	<1	1	6	3	5	2	2	2	5	5	<1	5	4	1 55	10	10	10	10
Tin	μg/l		1	1 -	1	<1	-	<1	4	2	3	3	<1	3	<1	1	<1	<1	2	<1	<1	<1	<1	<1	<1	2	1	<1	-		1			10	10
Zinc	μg/I	31	19	23	63	<5	<5	6	<5	9	5	<5	1,200	<5	710	<5	<5	100	5	5	<5	180	<5	<5	<5	6	21	10	<5	<5	40			40	
Mercury	μg/l	0.06	0.15	0.14	0.07	<0.01	<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	<0.01	<0.01	0.3	1	1	0.3	1
	1	1		1			1	1		i	l		1				1	1	1	1			l		l	1	l		1	1	1		1		

SS = Silty Sand FMS = Fine to Medium Sand MS = Medium Sand SC = Silty Clay G = Gravel

Environment Agency: Internal Guidance on the Interpretation and Application of Regulation 15 of the Waste Management Licensing Regulations, 1995 (The Protection of Groundwater) with respect to Landfill 1999.
 Use Drinking Water Inspectorate: Water Supply (Water Quality) Regulations 2000.
 World Health Organisation (WHO): Guidelines for Drinking Water Quality, Third Edition, Volume 1, Recommendations 2004.
 Environment Agency Non-Statutory (Operational) Environmental Quality Standards

exceed both criteria
exceed drinking water guidelines
exceed marine water criteria

0.0797 0.000	Risk Phrase hold value in % aximum value Hazardous	and	Xyk Dim Cal	ed Land Generic Qu
G 1	R38 20 0.753	H4 - 'Infrant'	ylana marcury Dichloriida alcium Sulphiida oppar Sulphiida	
9.000 9.000	R23-25, R48 3 0.00	HE(HS) - Toxic	Benzene Phenol Naprhalene Arsenic Cadmium Oxide Calciur	
0.001 0.002 0.003 0.00	0.1 0.156	-	ic Tricoide m Cyanide car	ockle Bank, I
0.002 0.003	1 0.01	Ros-	skel- PRC	Hayle
0.004	0.0 0	-y j-maniagonj	DRO (C10-C25 or >C10 in absen of specific C10) information)	
0.000	0	PAH in whose oil whose oil H7 - 'Carci	Sum of carcinogenic services (PAHs For carcinogenic percentage of PAHs For carcinogenic percentage of PAHs in whole oil whole oil	
Gardin G	0.1 0.16 0.06		Arsenic Calcium Trioxide Chromase	
	0.000	, and card	Sum of PAH	
6.004000	0.004	g	Aromatic Trydrocarbons IBTEX)	
1000000000000000000000000000000000000	0.1 42×1 0.0014		Cadmium Oxide BpH	
5.5	R34 1.5 5 0.5 0.53	(8(H4) - 'Corrosive'	Phenol Zinc Chloride Arsenic Trioxide	
0.0000	R60 0.5 0.0000		Max PAH (seed. Naphthalana)	
0.0712 0.0012 0.0012 0.0001 0.	R61 0.5 0.264	10 - Toxic for reprod	Lead Max PA outphase Naphth	
G.0000 G.0010	R63 5 0.0000 0.3	luction'	H (excl. Lead 9	
0.0000	R46 0.1 0.0000	H11 - 7Mu	Asax PAH (exct. kaphthalana)	
0.0000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.000000	R68 1.0 0.0000	-	Phenol P	
0.0002 0.	R32 0.2 0.0002	release toxic gases in cont. with water air and acid	Eatcium Cyanida	
	0.005	seate should be considered as hazardous seate."	PCBs To maintain consistency with international and UK equilation and guidance, he agencies that the level of tilmping (0.00%), houst be the defining housed to the defining maintaining CCBs and PCTs; above hat concentration such assets ahould be considered as a sharandous containing.	
0.00	R52/53 2.5 0.024		TPH (full range - CS- 240 etc.)	
0.704 0.11 0.00 0.00 0.00 0.00 0.00 0.00 0.	R50-53 0.25 0.7534	H14 - 'Ecotoxic'	Max of R50-55's (Zinc Sulphate Cadmium Oxide Diarsanic Tricoide Selerium Calcium Chromate Lead sulphate Dimercury Dichloride Nickel Cathornate Calcium Cyanide Copper Sulphate PAHs, POBs	
12	R50-53/0.25 + R51- 53/2.5 + R52-53/25 1		Zinc Sulphate Cadmium Oxide Dianseric Trinside Selenium Selenium Calcium Chromate Lead sulphate Dimercury Dichlorida Nickel Carbonate Calcium Cyanida Copper Sulphate PAHs, PCBs	

Fable A7 Soil results against Waste Acceptar	nce Criteria		Sample Location				
Sample Identity		WS701	HA11	HA25		Stable non-	
Depth		1.5	0.45-0.80	0.3-0.4	Inert waste1	reactive	Hazardous
Strata		MS	SC	SS	more waster	hazardous	Waste ³
Sampled Date		21/10/2008	21/10/2008	21/10/2008		waste ²	
,	Units						
Leachate							
Metals							
Antimony Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	0.047	0.060	0.027	0.06	0.7	5
Arsenic Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	0.090	1.800	3.200	0.5	2	25
Boron Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	0.90	3.90	4.20			
Barium Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	0.64	0.04	0.04	20	100	300
Cadmium Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	< 0.0022	< 0.0022	< 0.0022	0.5	10	70
Chromium Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	<0.01	<0.01	<0.01	2	50	100
Copper Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	< 0.016	0.073	0.091	0.5	10	50
Lead Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	< 0.004	0.007	0.005	0.5	10	40
Mercury Dissolved (CEN 10:1C) (CVAA)	mg/kg	0.0001	< 0.0001	< 0.0001	0.01	0.2	2
Molybdenum Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	<0.01	0.03	0.02	0.5	10	30
Nickel Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	< 0.015	< 0.015	< 0.015	0.4	10	40
Selenium Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	0.02	0.05	0.04	0.1	0.5	7
Zinc Dissolved (CEN 10:1C) (ICP-MS)	mg/kg	<0.05	<0.05	<0.05	4	50	200
Inorganics							
Chloride (CEN 10:1C)	mg/kg	3,900	4,700	4,100	800	15,000	25,000
Fluoride (CEN 10:1C)	mg/kg	<5	7	7	10	150	500
Sulphate (CEN 10:1C)	mg/kg	580	760	680	1000 ⁴	20,000	50,000
Dissolved Organic Carbon (CEN 10:1C)	mg/kg	<30	<30	<30	500 ⁵	800	1000
Total Dissolved Solids ⁶ (by meter) (CEN 10:1C)	mg/kg	4700	9100	7900	4000	60,000	100.000
Phenols Monohydric (CEN 10:1C)	mg/kg	<0.1	0.1	0.1	1	,	,
Soild Phase							
Total Organic Carbon	w/w%	<0.5	-	-	3%		6%
BTEX	mg/kg	-	-	-	6		
PCBs (7 congeners)	mg/kg	-	-	-	1		
Mineral Oil	mg/kg	-	-	-	500		
ьН	pH units	8.46	-	-		>6	
PAHs -total 17 including coronene	mg/kg	-	-	-	100		

SS = Silty Sand, SC = Silty Clay, MS = Medium Grained Sand

Bold - value is above method detection limit

1 - Waste Acceptance Criteria Limiting values for contaminants in inert waste according to the GUIDANCE ON SAMPLING AND TESTING OF WASTES TO MEET LANDFILL WASTE ACCEPTANCE PROCEDURES

^{2 -} Waste Acceptance Criteria Limiting values for contaminants in stable non-reactive hazardous waste in non-hazardous landfill according to the GUIDANCE ON SAMPLING AND TESTING OF WASTES TO MEET LANDFILL WASTE ACCEPTANCE PROCEDURES

^{3 -} Waste Acceptance Criteria Limiting values for contaminants in hazardous waste according to the GUIDANCE ON SAMPLING AND TESTING OF WASTES TO MEET LANDFILL WASTE ACCEPTANCE PROCEDURES

⁴⁻ If an inert waste does not meet the SO₄ L/S10, alternative limit values of 1500 mg/l SO₄ at C₀ (initial eluate from the percolation test (prCENT/TS 14405:2003)) AND 6000mg/kg SO₄ at L/S10 (either from the percolation test or batch test BS EN 12457-3), can be used to demonstrate compliance with the acceptance criteria for inert wastes.

^{5 -} In the case of soils, a higher TOC limit value may be permitted by the Environment Agency at an inert waste landfill, provided the DOC value of 500 mg/kg is achieved at L/S 10 l/kg, either at the soil's own pH or at a pH value between 7.5 and 8.0.

^{6 -} The values for TDS can be used instead of values for Cl and SO₄

Buro Happold	
Appendix B	Hydrock Ground Investigation Factual Report
Appendix b	Trydrock dround investigation ractual report



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Proposed Foreshore Development, Hayle Harbour: Factual Ground Investigation

Final Report	
Prepared by	
Matthew Renshaw & Robert Smith	
for	
Buro Happold	
Hydrock Ref: R/SP08052/001	
November 2008	



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Hydrock Special Projects Limited has prepared this report in accordance with the instructions of the above named Client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.



CONTENTS

1.0	INTRODUCTION	3
1.1	Terms of Reference	3
1.2	Scope of Works	3
1.3	Limitations	4
1.4	Information Sources Provided by the Client	4
2.0	SITE DESCRIPTION	
2.1	Introduction	5
2.2	Former Fuel Depot Area	
2.3	Cockle Bank	
2.4	Copperhouse Pool Swing Bridge	5
2.5	Regional Geology	
3.0	GROUND INVESTIGATION	
3.1	Introduction	7
3.2	Rationale	7
3.3	Former Fuel Depot Area	7
3.4	The Cockle Bank	8
3.5	Copperhouse Pool Area	8
3.6	Geotechnical Testing	
4.0	PHYSICAL GROUND CONDITIONS	9
4.1	Made Ground	
4.2	Marine Deposits	9
4.3	Mylor Slates	
44	Groundwater	q

APPENDICES

- Appendix A SITE LOCATION PLAN AND BOREHOLE LOCATION PLAN
- Appendix B SITE WALKOVER PHOTOGRAPHS
- Appendix C EXPLORATORY HOLE LOGS & PHOTOGRAPHS
- Appendix D GEOTECHNICAL TEST RESULTS



1.0 INTRODUCTION

1.1 <u>Terms of Reference</u>

Hydrock Special Projects (Hydrock) was appointed by Buro Happold in October 2008 to undertake drilling works within the proposed Foreshore Development Area of Hayle Harbour in Hayle, Cornwall.

Specifically, three areas were targeted within the Harbour area;

- The Cockle Bank;
- Former fuel depot, adjacent to the eastern quay; and
- The Copperhouse Pool swing bridge.

A site location plan (Drawing SP08052/G001) is presented in Appendix A.

1.2 Scope of Works

The scope of this commission has been defined in Section 1.4 of the Buro Happold document entitled 'Specification for Ground Investigation Document' Rev. 01, dated September 2008, and is broadly outlined below;

- Six dynamic sampling boreholes (using a Comacchio MC205 tracked drilling rig) to a maximum depth of 10m below ground level (bgl), or refusal (whichever occured first) on Cockle Bank;
- In addition to the above, two rotary percussive boreholes (using a Comacchio MC205 and air compressor) were required to depths of 30m;
- A single Comacchio MC205 borehole (using a combination of dynamic sampling and rotary cored techniques) in the former fuel depot, adjacent to the existing tank farm.
 The borehole was to be progressed to 10m bgl or groundwater, whichever came first, and installed to full depth with a groundwater/gas monitoring well.
- Three Comacchio MC205 boreholes adjacent to the Copperhouse Pool swing bridge;
 - One adjacent to each of the existing bridge abutments;
 - a borehole as close to the centre of the river channel as reasonably practicable;
 and
 - a third borehole on the left bank of the Copperhouse Pool.
- Associated in-situ testing, logging, sampling and laboratory geotechnical and geochemical testing, as appropriate; and
- · Factual reporting.



1.3 <u>Limitations</u>

The report has been prepared for the exclusive benefit of Buro Happold and those parties designated by them for the purpose of providing geotechnical recommendations for the site. The report contents should only be used in that context.

The work has been carried out in general accordance with recognised best practice as detailed in guidance documents such as in BS5930:1999.

1.4 Information Sources Provided by the Client

- Buro Happold drawing 'Figure 2' entitled 'Proposed Exploratory Hole Location Plan' Rev 01, dated August 2008 – Presented in Appendix A.
- FSP Architects drawing 'C100' entitled 'Existing Services Layout Sheet 1' Rev 01, dated February 2005.
- Excerpt from Unknown Author document entitled 'The World's Knowledge' showing a
 map of Hayle Harbour indicating the location of seawater tunnel from Carnsew to the
 power station (below the Cockle Bank).



2.0 SITE DESCRIPTION

2.1 <u>Introduction</u>

The site encompasses the northern and eastern quay areas of Hayle Harbour. The site area also includes a sandbank which is exposed at low tide in the Hayle Estuary (the Cockle Bank), a former fuel depot yard and a disused swing bridge in the area of the Copperhouse Pool. The town centre of Hayle lies to the south of the site at approximate NGR 155645E 037600N.

A site location plan is presented in Appendix A. Photos of key site areas are presented in Appendix B.

2.2 Former Fuel Depot Area

This area is situated off the north quay area of Hayle Harbour and is accessed via the Copperhouse Pool swing bridge.

The depot area can be described as being an of area concrete and tarmac hardstanding used predominantly for the storage of lobster pots and aggregates. The depot area is roughly square in shape with plan dimensions of approx. 70m by 80m. The area is secure, being fenced off on its southern, eastern and, in part, northern margins and by a sheer cliff face in the northern and western margins. This area lies at an elevation of approximately 5m AOD.

2.3 Cockle Bank

The Cockle Bank is a longitudinal sand and shingle bank which is exposed at low tide and lies in the middle of Hayle Estuary. It is approximately 380m long and 80m wide and was historically used for shellfish farming. This area lies at an elevation of approximately 0 - 1m AOD.

2.4 Copperhouse Pool Swing Bridge

The swing bridge lies at the entrance to the harbour area and is adjacent the Harbour Master's office. The bridge is understood to be a former railway bridge. Below the bridge abutment and on the northern bank of the estuary is an area of shingle beach which is exposed at low tide.

The Copperhouse Pool is also understood to be of historical and archaeological significance and within an area of special scientific interest. This area lies at an elevation of approximately 1 - 2m AOD.



2.5 Regional Geology

The general geology of the site area is shown on the 1:50,000 geological map of Hayle (Sheet 351 & 358) which indicates the site to be underlain by Quaternary Sand over Mylor Slates of the Devonian period.



3.0 GROUND INVESTIGATION

3.1 Introduction

The ground investigation works were undertaken between 13 October and 31 October 2008. All drilling works were supervised by a Hydrock Engineer and a representative from Buro Happold.

No borehole coordinates were supplied by Buro Happold and the setting out of the boreholes was at the discretion of the Buro Happold representative. The elevation of each borehole location was calculated (via levelling techniques) by Hydrock. The exploratory hole logs and photographs of the cores are presented in Appendix C.

3.2 Rationale

The exploratory hole types and their locations were chosen by Buro Happold and set out by a Buro Happold engineer.

The investigation comprised the following:

- Dynamic sampled boreholes to confirm the geological succession and to obtain samples for contamination analysis;
- Rotary cored boreholes to confirm the deeper geological succession;
- Rotary percussive boreholes to identify the depth to bedrock on the Cockle Bank; and
- A gas and groundwater monitoring installation at the former fuel depot to identify contamination associated with former buried tanks in the area.

3.3 Former Fuel Depot Area

One borehole was dynamically sampled up to 1.30m depth bgl then rotary cored, to a maximum depth of 8.08m bgl (Borehole BH1001). This borehole was drilled between 13 October 2008 and 14 October 2008 and was drilled using a Comacchio MC205 drill rig. Dynamic sampling barrels were 1.5m in length and produced a core of 89mm diameter. An ODEX core barrel was used for the rotary coring which also produced a core of 89mm diameter, air mist flush was used for coring. All cores were extruded horizontally and laid out sequentially in wooden core boxes for logging and sampling. Disturbed and undisturbed samples were obtained at regular intervals and on encountering each stratum. This borehole was completed with a standard (63mm slotted HDPE) gas and water monitoring installation and a road weight cover.



3.4 The Cockle Bank

Five boreholes were dynamically sampled to a maximum depth of 8.0m on the Cockle Bank (WS701, 702, 703, 705 and 707). These boreholes were drilled between 15 October 2008 and 31 October 2008 and were drilled using a Comacchio MC205 drill rig. Dynamic sampling barrels were 1.5m in length and produced a core of 89mm diameter. All cores were extruded horizontally and laid out sequentially in wooden core boxes for logging and sampling. Disturbed and undisturbed samples were obtained at regular intervals and on encountering each stratum. All boreholes were cased to their full depth.

Drilling was particularly difficult owing to a very limited tidal window (when the Cockle Bank is exposed above sea level) and the saturated sand horizons that were encountered.

In addition, one borehole (BH704) was progressed using rotary percussive techniques using an air-mist flush. This borehole was advanced to 13.8m bgl in order to identify depth to the top of the underlying bedrock. Changes in the colour and constituents of the arisings were noted during the drilling process.

3.5 Copperhouse Pool Area

Two boreholes were progressed dynamic sampling techniques with rotary cored follow-on (BH1002 & BH1003). Borehole BH1004 could not be drilled owing to archaeological constraints and this borehole was terminated at the request of the local council.

The boreholes were progressed in order to confirm the deeper geology, to identify competent bearing strata and provide samples for contamination testing. These boreholes were drilled between 14 October 2008 and 27 October 2008 using a Comacchio MC205 drill rig.

Dynamic sampling barrels were 1.5m in length and produced a core of 89mm diameter. An ODEX overburden system with an air-mist flush was used for the rotary coring, which also produced a core of 89mm diameter. All cores were extruded horizontally and laid out sequentially in wooden core boxes for logging and sampling. Disturbed and undisturbed samples were obtained at regular intervals and on encountering each stratum.

3.6 Geotechnical Testing

3.6.1 In-Situ Testing

Standard penetration tests (SPT) were performed in the boreholes BH1002 and BH1003 at 0.5m centres, as instructed by Buro Happold. This data is presented with the logs in Appendix C.

3.6.2 Laboratory Testing

Geotechnical laboratory testing was scheduled by Buro Happold, the results of which are presented in Appendix D.



4.0 PHYSICAL GROUND CONDITIONS

The findings of the ground investigation are presented in the following sections.

4.1 Made Ground

Made Ground was encountered in boreholes BH1001, BH1002 and BH1003 and generally consisted of medium very loose to medium dense clayey sandy gravels and loose gravelly sand.

The gravel mainly comprised sub-angular to sub-rounded fine to coarse siltstone and clinker. This horizon extended from ground level and was 1.3m thick in BH1001 (base 1.28m AoD), 1.0m thick in BH1002 (base 0.5m AoD) and 3.7m thick in BH1003 (base 1.28m AoD).

SPT N values recorded within the Made Ground ranged from 0-14 in BH1003 and 0 in BH1002.

4.2 Marine Deposits

Marine Deposits were encountered in all boreholes with the exception of borehole BH1001 (at the former fuel depot). These deposits consisted of very loose to medium dense fine to medium sand and occasional firm reddish brown gravelly clays. Their base was recorded at a level of -12.1m AoD in BH701 on the Cockle Bank. At the Copperhouse Pool area, these deposits extended to a level of -7.2m AoD in BH1002 and -8.5m AoD in BH1003.

SPT N values recorded in the unsaturated zone ranged from 13 – 18 (in BH1002 & 1003).

4.3 Mylor Slates

Moderately strong siltstone was encountered in boreholes BH1001, BH1002, BH1003 and BH704 at depths of 3.5, -7.2, -8.5 and -12.1m AoD respectively. This horizon generally consisted of closely to medium bedded grey siltstone with very closely to medium spaced fractures. Many gravel sized quartzitic and pyritic inclusions were also encountered in each of the boreholes.

The base of the Mylor Slates was not proven.

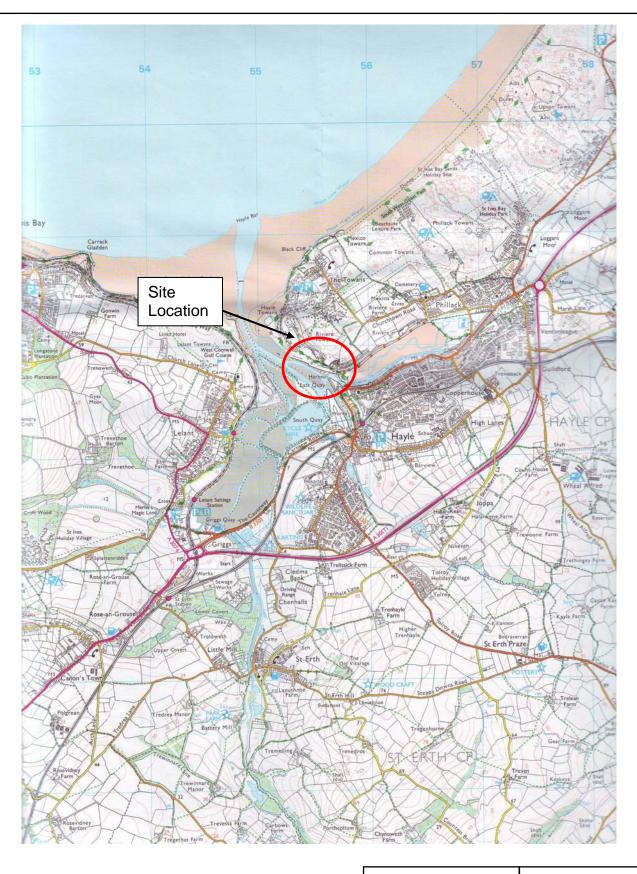
4.4 Groundwater

Groundwater in the former fuel depot was struck within the Mylor Slate horizon at a level of -1.75m AoD, rising to 2.1m AoD when dipped 24 hrs later.



Appendix A

SITE LOCATION PLAN & BOREHOLE LOCATION PLAN



Reproduced from Lands End *OS Explorer map* [102 *1:25 000*] by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright. All rights reserved. Licence number 100023353.

Client: Buro Happold

Site: Hayle Harbour, Cornwall

Drawing No: SP08052/G001

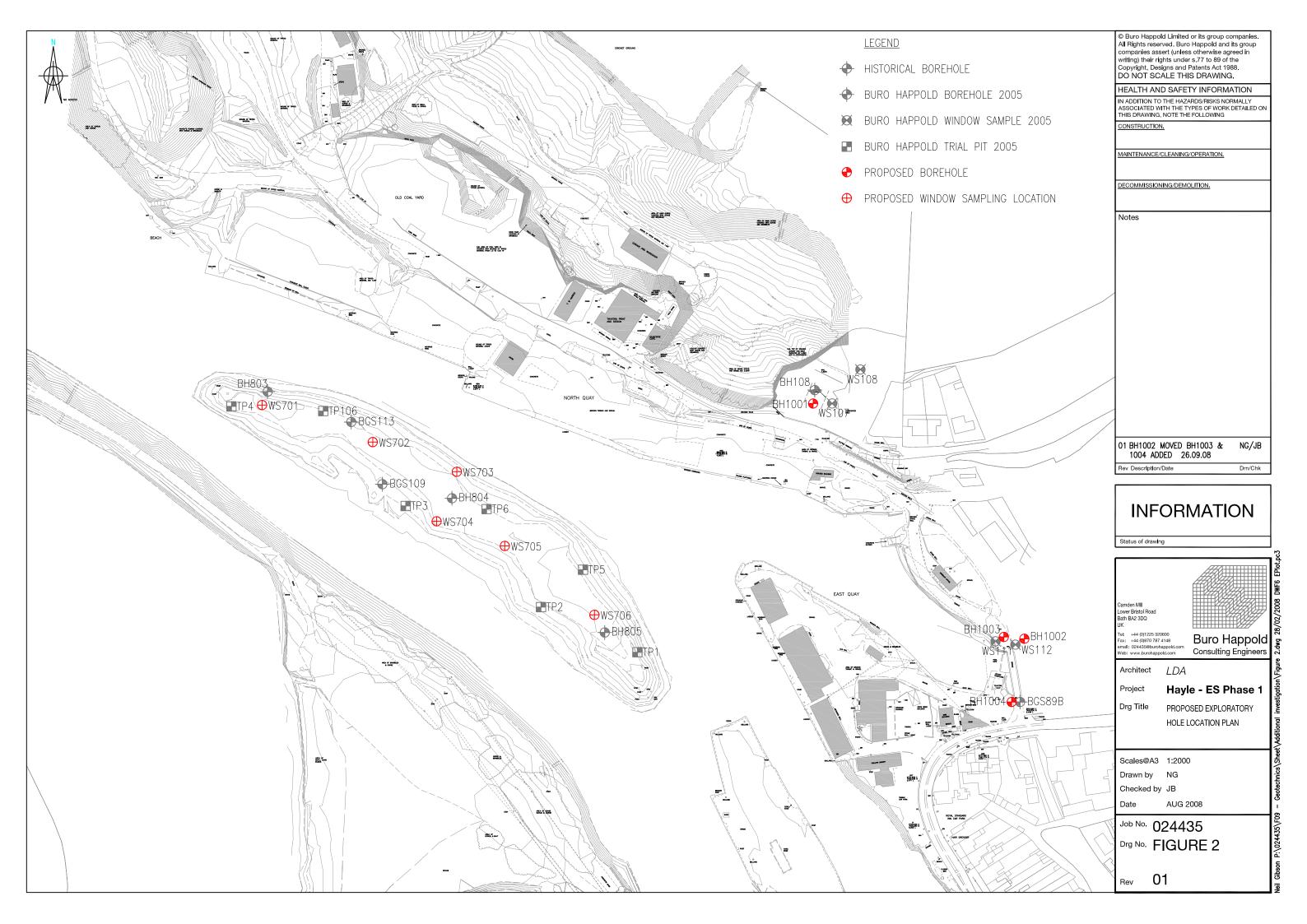
Title: Site Location Plan

Scale: 1:25,000



Over Court Barns Over Lane Almondsbury Bristol BS32 4DF

Tel: +44 (0)1454 619 533 Fax: +44 (0)1454 614 125





Appendix B

SITE WALKOVER PHOTOGRAPHS



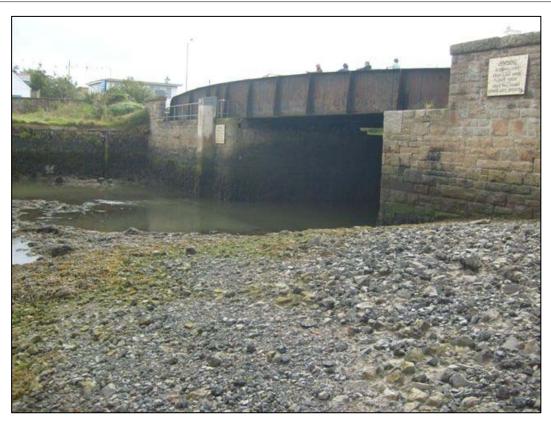


Plate 1: View of Copperhouse Pool looking south towards Hayle town centre.

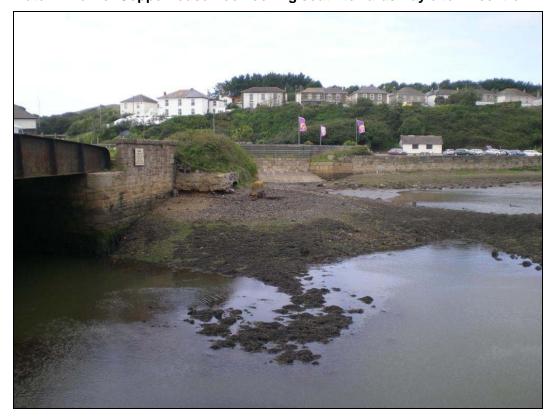


Plate 2: Looking north towards BH1002 at low tide





Plate 3: Looking south west towards Cockle Bank



Plate 4: Looking south east towards Cockle Bank and Hayle Harbour Quayside



Appendix C

EXPLORATORY HOLE LOGS & PHOTOGRAPHS



Tel: 01454 619 533 Fax: 01454 614 125 e-mail: bristol@hydrock.com

Dynamic Sample Borehole

Borehole No

WS701 Page No. 1 of 1

Hayle - ES Phase 1 Project No: SP08052 Project: Logged By: **RPS**

Location: Hayle Harbour, Cornwall Date: 15/10/2008 Checked By: ARC

1 06m 1 od

Progress Sample strain Type Rosults Strikes entation Stratum Description S
0.00-0.50 Omm Omm
0.00-0.50 Omm Omm

General Remarks

BH terminated at engineers request.

Key:

Cu - Undrained shear strength (kPa) - Hand Vane & Penetrometer
D - Disturbed Sample
PT - Plastic Tub Sample
AJ - Amber Jar
V - Vile
U - Undisturbed



Standing Water Level



Tel: 01454 619 533 Fax: 01454 614 125 e-mail: bristol@hydrock.com

Dynamic Sample Borehole

Borehole No

WS702 Page No. 1 of 1

Project No: Project: Hayle - ES Phase 1 SP08052 Logged By: MR

Location: Hayle Harbour, Cornwall Date: 17/10/2008 Checked By: ARC

Client:	Buro	Нар	pold			Co-ords: -	Level:	0.4	2mAo	d
Progress Sample Run		1	/ Tests	Water	Instrum-	Stratum Description	1	Depth	Level	Legend
Size (mm)	Depth	Туре	Results	Strikes	entation			ă		
0.00-1.00 100% rec						Uncompact dark grey sandy SILT.(MARINE DEPOSITS		1	0.32	××××
	0.50	Δι				Medium dense (inferred) brown mottled dark grey silty DEPOSITS)	SAND.(MARINE	4	0.12	
	0.50	AJ PT				Medium dense (inferred) brown SAND with dark grey la SAND.(MARINE DEPOSITS)	minations of silty	-		
1.00-2.00 90% rec	1.00	AJ PT				Medium dense (inferred) light brown SAND.(MARINE D	EPOSITS)	1	-0.58	
	1.50	AJ PT								
2.00-2.70 60% rec	2.00	AJ PT				layer of angular coarse siltstone GRAVEL at 2.0	n.	-2		0.00
	2.50	AJ PT				End of Borehole at 2:70		- [-2.28	
						end of Borenole at 2.70	n	-3		
								-		
								-4		
								[
								-		
								-5 -		
								-6		
								-		
								7		
								-		
								-8		
								-		
								ļ		

General Remarks

BH termination at 2.7m due to blowing sand in casing. No progress made in time available.

Key:

Cu - Undrained shear strength (kPa) - Hand Vane & Penetrometer
D - Disturbed Sample
PT - Plastic Tub Sample
AJ - Amber Jar
V - Vile
U - Undisturbed



Standing Water Level



Tel: 01454 619 533 Fax: 01454 614 125 e-mail: bristol@hydrock.com

Dynamic Sample Borehole

Borehole No

WS703 Page No. 1 of 1

Project No: Project: Hayle - ES Phase 1 SP08052 Logged By: MR

Location: Hayle Harbour, Cornwall Date: 20/10/2008 Checked By: ARC

Client:	Buro Happold Samples / Tests Water Instrum-			Co-o	ords: -		Level:	0.3	5mAoo	b		
Progress	Sa	mples	/ Tests	Water	Instrum-	Ctuati 5	Decembries		ı	ž	Level	
Sample Run Size (mm)	Depth	Туре	Results	Strikes	entation	Stratum L	Description			Dep	Level m AOD	Leger
0.00-1.00 100% rec	0.50	AJ				Uncomp	pact black mottled brown sandy SILT	T.(MARINE DEF	POSITS)	:		X X X X X X X X X X X X X X X X X X X
		PT				b	pecomes dark grey from 0.7m.			-		××××
1.00-2.00 90% rec	1.00	AJ PT				Medium	n dense (inferred) light brown SAND.	(MARINE DEP	OSITS)	-1	-0.55	
	1.50	AJ PT								-		
2.00-3.00 80% rec	2.00	AJ PT								-2		
	2.50	AJ PT				la	ayer of coarse grained sand with occ	casional fine GF	RAVEL between	-		0.0.
3.00-4.00 80% rec	3.00	AJ PT				2.7	7 - 3.0m.			-3		0:0
	3.50	AJ PT									-3.45	
4.00-5.00 60% rec	4.00	AJ PT				Loose (i angular DEPOS	(inferred) grey mottled brown slightly to subangular fine of quartz, siltston SITS)	sandy GRAVE le and schist.(M	L. Gravel is ARINE	-4	0.40	
	4.50	AJ PT				la	ayer of dense (inferred) slightly silty	gravelly SAND	between 4.7 -	-		××
5.00-6.00 50% rec	5.00	AJ PT				5.0		g. ,		-5 -5 -		××××
6.00-7.00 10% rec	6.00	AJ PT				Medium	n dense (inferred) light brown SAND.	(MARINE DEP	OSITS)	6	-5.65	
7.00-8.00 100% rec	7.00	AJ PT								-7		
100% FBC										-		
	8.00	AJ PT			11102110311		End	of Borehole at 8.00 m		- +8	-7.65	(*************************************
										-		

General Remarks

BH terminated at 8.0m due to time constraints associated with tide times.

Key:

Cu - Undrained shear strength (kPa) - Hand Vane & Penetrometer
D - Disturbed Sample

D - Disturbed Sample
PT - Plastic Tub Sample
AJ - Amber Jar
V - Vile
U - Undisturbed



Standing Water Level



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Dynamic Sample Borehole

Borehole No

WS705 Page No. 1 of 1

Project No: Project: Hayle - ES Phase 1 SP08052 Logged By: MR

Location: Hayle Harbour, Cornwall Date: 31/10/2008 Checked By: ARC

Client:	s Samples / Tests					Co-ords: -	Level:	0.9	5mAo	d	
Progress Sample Run	Sa Depth		/ Tests Results	Water Strikes	Instrum- entation	St	ratum Description	-	Depth	Level m AOD	Legeno
Size (mm) 0.00-0.80 100% rec	0.50	PT	Hesuits	Cumoo	S'itation		Loose (inferred) dark brown silty SAND.(MARINE DEPOS	ITS)			× × × × × × × × × × × × × × × × × × ×
0.80-1.80 100% rec	1.00	AJ PT AJ					Very soft light brown silty slightly gravelly CLAY. Gravel is angular fine to coarse siltstone.(MARINE DEPOSITS) Loose (inferred) dark grey mottled brown SAND.(MARINE		-1	0.15	
1.80-2.80 90% rec	1.50	PT AJ					Loose (inferred) dark grey motiled brown SAND.(MARINE Loose (inferred) light brown SAND.(MARINE DEPOSITS)	DEPOSITS)		-0.85	
90% rec	2.50	PT AJ PT							-2		
2.80-3.80 90% rec	3.00	AJ PT AJ							-3		
3.80-4.80	3.50	PT AJ									
60% rec	4.00	PT AJ					rare pieces of sandstone gravel from 3.8m.		-4		
4.80-5.80 100% rec	5.00	PT AJ PT AJ					Loose (inferred) light brown mottled grey gravelly SAND. (to sub angular fine to coarse siltstone, quartz and igneous material.(MARINE DEPOSITS)	Gravel is angular	-5	-3.85	
5.80-6.80 60% rec	6.00	PT AJ							-6		
6.80-7.80 10% rec	7.00	PT AJ							-7		
							End of Borehole at 7.80 m	·	-8	-6.85	
									-		

General Remarks

Borehole drilled using duplexer sampling equipment and a water flush. Borehole terminated at 7.8m bgl due to time constraints associated with tide times.

Key:

Cu - Undrained shear strength (kPa) - Hand Vane & Penetrometer
D - Disturbed Sample

PT - Plastic Tub Sample
AJ - Amber Jar
V - Vile
U - Undisturbed



Groundwater Strike



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Dynamic Sample Borehole

Borehole No WS707

Page No. 1 of 1

Project No: Project: Hayle - ES Phase 1 SP08052 Logged By: MR

Location: Hayle Harbour, Cornwall Date: 16/10/2008 Checked By: ARC

Client:	Buro	Нар	pold			Co-ords: -	Level:	0.6	1mAoc	t
Progress Sample Run Size (mm)	Sa Depth		/ Tests Results	Water Strikes	Instrum- entation	Stratum Description		Depth	Level m AOD	Legend
0.00-1.00 90% rec	0.50	AJ PT				Medium dense (inferred) light brown SAND.(MARINE DEFlayer of dark brown silty sandy between 0.5 - 1.08m		-		* * * * * * * * *
1.00-2.00 60% rec	1.00	AJ PT AJ PT						-1		X
2.00-3.00 50% rec	2.00	AJ PT				sand becomes coarse grained from 2.1m		-2		
	3.00	AJ PT AJ PT						3	-2.40	
		ΡI				End of Borehole at 3.00 m		-		
								-4		
								-5		
								-6		
								-7 -		
								-8		
								-		

General Remarks

BH termination at 3.0m due to blowing sand in casing. No progress made in time available.

Key:

Cu - Undrained shear strength (kPa) - Hand Vane & Penetrometer
D - Disturbed Sample
PT - Plastic Tub Sample
AJ - Amber Jar
V - Vile
U - Undisturbed

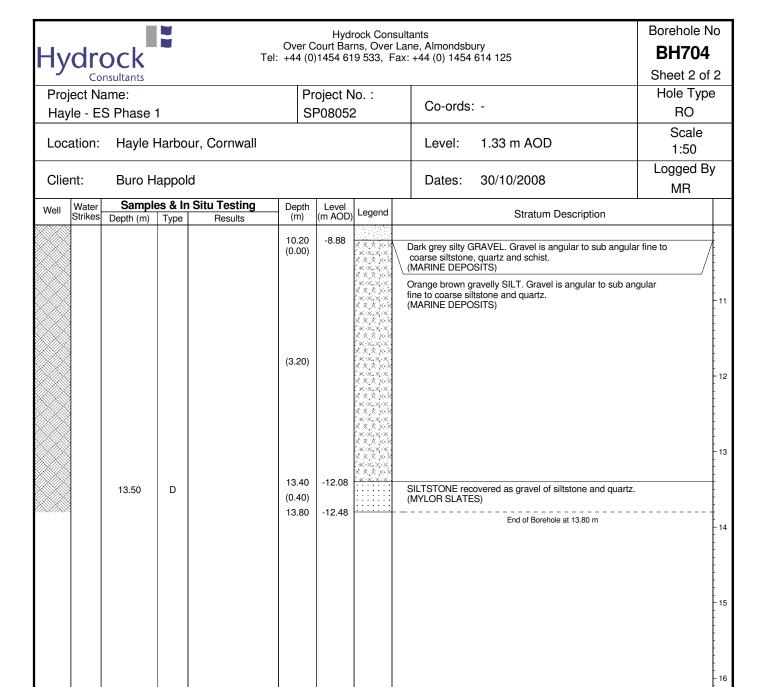


Groundwater Strike

Hydr	ock		Tel	Over C: +44 (0)	ourt Bar	rock Cons ns, Over I 9 533, Fa	ultants .ane, Almondsbury ıx: +44 (0) 1454 614 125	Borehole N BH704 Sheet 1 of	
Project Na					oject N P08052		Co-ords: -	Hole Type RO	
Location:	Hayle Ha	arbou	r, Cornwall	•			Level: 1.33 m AOD	Scale 1:50	
Client:	Buro Ha						Dates: 30/10/2008	Logged By MR	/
Well Water Strikes	Samples Depth (m)	Type	Situ Testing Results	Depth (m)	Level (m AOD)	Legend	Stratum Description		
	Deput (III)	Туре	nesulis				SAND. (MARINE DEPOSITS)		-1 -245
				(10.20)					-5
	-	Туре	Results				Continued next sheet		

Remarks: Borehole drilled using rotary open holed techniques. Rock encountered at 13.4 hr-situ Testing by Sample Types by Sample and number of blows Borehole terminated at 13.8m bgl at engineers request.

Sample Types Described at 13.4 hr-situ Testing Sample Types Described Sample and number of blows Borehole Sample Sample and number of blows Borehole Sample S



Results Type Remarks: Borehole drilled using rotary open holed techniques. Rock encountered at 13.4 pt. Sandard Penetration Test (Split Spoon) bgl. Borehole terminated at 13.8m bgl at engineers request.

Sample Types D Disturbed Sample
LB Large Bulk Sample
B Bulk Sample

18

19



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Dynamic Sampled and Rotary Cored

Borehole No BH1001

Page No. 1 of 1

Project No: SP08052 Project: Hayle - ES Phase 1 Logged By: **RPS**

Location: Hayle Harbour, Cornwall Date: 13/10/2008 Checked By: ARC

Client:	Burd	Нар	pold				Co-	ords:	-		Level:	4.75mAod	l
Progress	Sa	amples	/ Tests		Mecha	nical Lo	og	Water	Instrum-	Stratum Description	l	ž	Locara
Sample Run Size (mm)	Depth	Туре	Results	TCR	SCR	RQD	IF/ Min mean/ max	Strikes	entation	Stratum Description		Depth	Legen
0.30-1.00 100% rec	0.50	AJ PT								Cementaceous matrix supported GROUND) Grey slightly clayey SAND. Sand angular of mudstone and siltstone		,	
	0.75	AJ PT							0	Black slightly clayey gravelly SAI fine to coarse of siltstone and quantum (GROUND)		-1	
1.27-2.77	1.57	С		95	75	55	30 200 400	_		Moderately strong medium grey weathered with closely to mediur Fractures are open, planar, smoc joints. Fracture surfaces are open orange/brown. Many gravel sized inclusions.(MYLOR SLATES)	n spaced fractures. oth with sub-horizontal	J	
												-	
2.77-4.37	3.07	С		100	35	20	10 30 100					-3 - - - - - - -	
							30	_		many large gravel sized qu between 3.9 - 4.3m.	artzitic inclusions	-4 -1	
4.37-5.87				100	60	50	150 250					-5	
							- NI -					-	
												- 6 - - - -	
5.87-8.08	6.87	D		100	0	0	10 20 40	-				- - - 7 - -	
										End of £	Borehole at 8.08 m	-	
												-	

General Remarks

Strong visual and olfactory evidence of petroleum hydrocarbon contamination noted down to water table (at approximately 6.5m). BH terminated at engineers request.

Key:

(c)SPT - Standard Penetration Test
Cu - Undrained shear strength (kPa) from Hand Vane or penetrometer
D - Disturbed Sample
PT - Plastic Tub Sample

V - Vile Sample AJ - Amber Jar Sample U - Undisturbed Sample

Standing Water Level afer 20mins Groundwater Strike



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Dynamic Sampled and Rotary Cored

Borehole No

BH1002 Page No. 1 of 2

Project No: SP08052 Project: Hayle - ES Phase 1 Logged By: MR

Location: Hayle Harbour, Cornwall Date: 27/10/2008 Checked By: ARC

Buro Hannold 1 50m∆od

Client:	Burc	Hap	pold				Co-	ords:	-		Level:	1.50mAod	
Progress Sample Run	Sa	amples	/ Tests		Mecha	ınical L		Water	Instrum-	Stratum Description		Depth	_egend
Size (mm)	Depth	Туре	Results	TCR	SCR	RQD	IF/ Min mean/ max	Strikes	entation	-			- 3
0.00-0.50 100% rec 0.50-1.00 100% rec	0.50 0.50	SPT PT	N = 0 (2,2,							Very loose (saturated) reddish br slightly clayey sandy GRAVEL. G angular fine to coarse siltstone ar GROUND)	own mottled grey Gravel is angular to sub nd clinker.(MADE		
1.00-1.50 100% rec 1.50-2.00	1.00 1.00	SPT PT AJ SPT	0,0,0,0) N = 1 (0,1, 0,1,0,0) N = 13							Very loose (saturated) dark grey GRAVEL. Gravel is angular to su coarse siltstone.(MARINE DEPO	SITS)	1	
100% rec	1.50	PT AJ	(4,3, 4,3,3,3)							Medium dense light brown SAND DEPOSITS)).(MARINE		
	2.00	PT AJ								blowing sands in casing. Ac through sands to 7.2m	Ivanced casing	-2	
ı												-3	
												- 4 : - 4 : - :	
												-5	
												=	
												- 6 - 6 	
												-7	
7.20-8.70 90% rec	7.20	PT AJ								Medium dense (inferred) light bro SAND.(MARINE DEPOSITS)	own silty		× × × × × × × × × × × × × × × × × × ×
	8.00	PT AJ										- 8 ×	
	8.70	D					10 20 30			Moderately strong highly weather grey SILTSTONE. Fractures are	red medium bedded very closely to closely	- ×	* * * * * * *
												ļ <u> </u>	
	1	I		1	1	1	1	1	l	Kov. Continu	ued on next sheet		

General Remarks

Borehole commenced with dynamic sampling to 2.0m. Advanced casing to 7.2m due to blowing sands and unable to retrieve sample. Sample retrieved from 7.2m to 8.7m. Continued borehole with rotary coring into rock to a total depth of 15.88m. Borehole backfilled with arisings on completion. Groundwater encountered at 1.2m.

(c)SPT - Standard Penetration Test
Cu - Undrained shear strength (kPa) from Hand Vane or penetrometer
D - Disturbed Sample
PT - Plastic Tub Sample

V - Vile Sample AJ - Amber Jar Sample U - Undisturbed Sample

Standing Water Level afer 20mins Groundwater Strike



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Dynamic Sampled and Rotary Cored

Borehole No BH1002

Page No. 2 of 2

SP08052 Project: Hayle - ES Phase 1 Project No: Logged By: MR

Location: Hayle Harbour, Cornwall Date: 27/10/2008 Checked By: ARC

Buro Happold 1.50mAod Client: Co-ords: I evel:

Client:	Durc	нарр	Joid				Co-	ords:	-		Level: 1	.50mAoc)
Progress Sample Run	Sa	amples/	Tests		Mecha	nical L		Water	Instrum-	Stratum Description	L	Depth	Legend
Size (mm)	Depth	Туре	Results	TCR	SCR	RQD	IF/ Min mean/ max	Strikes	entation			Dep	Legeni
8.70-12.29				100	0	0				spaced dipping between 60 and planar with sub vertical joints. M quartzitic and pyritic inclusions.(N	70 degrees, open, any gravel sized //YLOR SLATES)	-10	
	11.70	D					30					- 12	
	12.50	С					30 80 250					- 13	
12.29-15.00				100	10	0						- 14	
15.00-15.80	15.50	С		100	60	50				Moderately strong partially weath grey SILTSTONE. Fractures are spaced dipping between 40 and to planar with sub vertical joints. Fra discoloured with oxidised deposit	nered medium bedded closely to medium 500 degrees, open, acture surfaces are is.(MYLOR SLATES)	15	
											orehole at 15.88 m	 - 16	
												-17	

General Remarks

Borehole commenced with dynamic sampling to 2.0m. Advanced casing to 7.2m due to blowing sands and unable to retrieve sample. Sample retrieved from 7.2m to 8.7m. Continued borehole with rotary coring into rock to a total depth of 15.88m. Borehole backfilled with arisings on completion. Groundwater encountered at 1.2m.

Key:

(c)SPT - Standard Penetration Test
 Cu - Undrained shear strength (kPa) from Hand Vane or penetrometer
 D - Disturbed Sample

T. Charles T. Charles

PT - Plastic Tub Sample

V - Vile Sample AJ - Amber Jar Sample U - Undisturbed Sample

Standing Water Level afer 20mins

Groundwater Strike



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Dynamic Sampled and Rotary Cored

Borehole No

BH1003 Page No. 1 of 2

SP08052 Project: Hayle - ES Phase 1 Project No: Logged By: MR

Location: Hayle Harbour, Cornwall Date: 14/10/2008 Checked By: ARC

Client: Buro Happold Co-ords: 4.98mAod

Client:	Burc	Happ	oold				Co-	ords:	-		Level:	4.98mAoc	t
Progress Sample Run	Sa	amples/	Tests		Mecha	nical L		Water	Instrum-	Stratum Description	1	Depth	Legeno
Size (mm)	Depth	Туре	Results	TCR	SCR	RQD	IF/ Min mean/ max	Strikes	entation			Dek	Legent
0.00-0.50 100% rec 0.50-1.00	0.50	SPT	N = 14							Medium dense reddish brown cla is angular to sub angular fine to siltstone.(MADE GROUND)	ayey GRAVEL. Gravel coarse	-	
90% rec	0.50	PT AJ	(3,4, 4,3,4,3)							Loose dark grey gravelly SAND. sub angular fine to coarse siltstomaterial.(MADE GROUND)	Gravel is angular to ne and igneous	-	
1.00-1.50 100% rec	1.00	SPT PT AJ	N = 4 (0,0, 1,1,1,1)							material (MADE GROUND)		-1	
1.50-2.00 80% rec	1.50 1.50	SPT PT AJ	N = 2 (1,0, 1,0,1,0)									-	
2.00-2.50 70% rec	2.00	SPT PT AJ	N = 2 (1,0, 1,0,1,0)									-2	
2.50-3.00 100% rec	2.50 2.50	SPT PT AJ	N = 3 (1,0, 1,1,1,0)							Loose dark grey mottled black gr angular to sub angular fine to coa siltstone.(MARINE DEPOSITS)	avelly SAND. Gravel is arse	:	
3.00-3.50 100% rec	3.00	SPT PT AJ	N = 3 (1,1, 1,1,1,0)									-3	
3.50-4.00 80% rec	3.50 3.50	SPT PT AJ	N = 9 (2,3, 3,2,2,2)							Firm reddish brown gravelly CLA sub angular fine to coarse siltsto	Y. Gravel is angular to		
4.00-4.50 20% rec	4.00	PT AJ								DEPOSITS)		-4	
4.50-5.00 50% rec	4.50	PT AJ								borehole collapse and blow casing. Advance casing to 11			
5.00-5.75 80% rec	5.00 5.00	SPT PT AJ	N = 18 (3,3, 4,4,4,6)							becomes stiff from 5.0m.		-5 - - - -	
5.75-11.75 0% rec	5.75 6.00	SPT PT	N = 17 (2,3, 3,3,3,8)							Medium dense light brown SANE DEPOSITS)	•	-6	
		AJ	0,0,0,0)							blowing sand in casing at 6 progressed casing to 11.75n	o.um therefore 1.	-	
	7.00	PT AJ										-7 -1	
												- - 8 - -	
												-	

General Remarks

Borehole terminated at 11.75m due to blowing sand in casing. Re-drilled borehole on Monday 20th with open holing to 13.5m bgl where rock was encountered. Continued borehole with rotary coring into rock to a total depth of 18.12m. Borehole backfilled with arisings on completion. Groundwater encountered at 4.9m bgl.

(c)SPT - Standard Penetration Test
Cu - Undrained shear strength (kPa) from Hand Vane or penetrometer
D - Disturbed Sample
PT - Plastic Tub Sample

V - Vile Sample
AJ - Amber Jar Sample
U - Undisturbed Sample

Standing Water Level afer 20mins



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Dynamic Sampled and Rotary Cored

Borehole No

BH1003 Page No. 2 of 2

SP08052 Project: Hayle - ES Phase 1 Project No: Logged By: MR

Location: Hayle Harbour, Cornwall Date: 14/10/2008 Checked By: ARC

Buro Happold 4.98mAod Client: Co-ords: Level:

			JOIG	1				-orus.			Level. 4.30m	,	
Progress Sample Run	Sa	amples	Tests		Mecha	nical L		Water	Instrum-	Stratum Description		Depth	Legen
Size (mm)	Depth	Туре	Results	TCR	SCR	RQD	IF/ Min mean/ max	Strikes	entation			De	
3.40-15.00	13.50	D	Results	fCR 60	SCR	RQD	10 20 40	Strikes	entation	Medium dense light brown SAND DEPOSITS) Moderately strong highly weather grey SILTSTONE. Fractures are spaced dipping between 40 and 5 planar with sub vertical joints. Ma quartzitic and pyritic inclusions.(Manufacture)	ed medium bedded very closely to closely 30 degrees, open, ny cravel sized		
15.00-16.00				80	0	0						- 15	
16.00-17.62				40	10	0	30 120 400	-		Moderately strong partially weath grey SILTSTONE. Fractures are spaced dipping between 40 and 5 planar with sub vertical joints. Fra discoloured with oxidised deposit	closely to medium 50 degrees, open, acture surfaces are	- 16	
17.62-18.12	17.60	С		100	60	40					ovehole at 18.12 m	-	
										End of B	леное а; 18.12 П	ŀ	
										Kov:		ſ	

General Remarks

Borehole terminated at 11.75m due to blowing sand in casing. Re-drilled borehole on Monday 20th with open holing to 13.5m bgl where rock was encountered. Continued borehole with rotary coring into rock to a total depth of 18.12m. Borehole backfilled with arisings on completion. Groundwater encountered at 4.9m bgl.

(c)SPT - Standard Penetration Test
Cu - Undrained shear strength (kPa) from Hand Vane or penetrometer
D - Disturbed Sample
PT - Plastic Tub Sample

V - Vile Sample AJ - Amber Jar Sample U - Undisturbed Sample

Standing Water Level afer 20mins Groundwater Strike





Plate 1: WS701 - 0m to 2.8m



Plate 2: WS701 - 2.5m to 4.0m





Plate 3: WS702 - 0m to 2.7m



Plate 4: WS703 - 0m to 8.0m





Plate 5: WS705 - 0.8m to 7.8m



Plate 6: WS707 - 0m to 3.0m





Plate 7: BH1001 - 0.3m to 1.0m



Plate 8: BH1001 - 1.27m to 4.37m





Plate 9: BH1001 - 4.37m to 8.08m



Plate 10: BH1002 - 0m to 8.7m





Plate 11: BH1002 - 8.7m to 12.29m



Plate 12: BH1002 - 12.29m to 15.08m





Plate 13: BH1002 - 15.08m to 15.88m



Plate 14: BH1003 - 0m to 2.5m





Plate 15: BH1003 - 2.5m to 5.75m



Plate 16: BH1003 - 5.75m to 7.25m



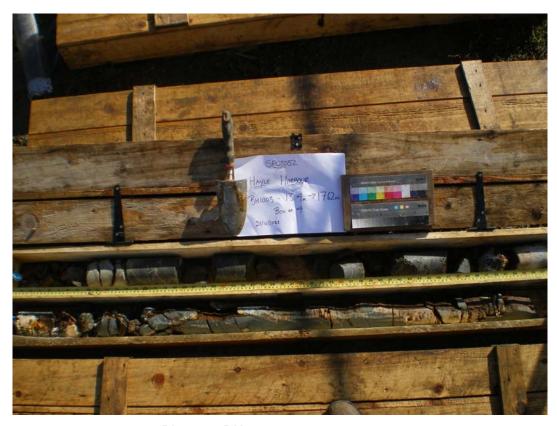


Plate 17: BH1003 - 13.4m to 17.62m



Plate 18: BH1003 - 17.62m to 18.12m



Appendix D

GEOTECHNICAL TEST RESULTS

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH TESTS

Rock Characterisation, Testing and Monitoring, International Society for Rock Mechanics: Brown: 1981.

Hole Reference	Sample No	Sample Type	Depth m	Moisture Content %	Bulk Density Mg/m³	Dry Density Mg/m³	Length mm	Diameter mm	Length: Diameter ratio	Test Duration min	Stress Rate kN/min	Load at Failure Mg/m³	UCS MPa	Mode of Failure	Description of Sample
BH1002		С	12.54	0.38	2.67	2.66	119.55	73.26	1.63	7	26	220.4	52.3	A	Grey SILTSTONE
BH1002		С	15.55	1.5	2.67	2.63	130.95	73.06	1.79	6.5	26	186.0	44.4	A	Grey SILTSTONE
BH1003		C	17.88	1.9	2.74	2.69	145.37	73.17	1.99	4.5	34	123.4	29.3	A	Grey SILTSTONE

Date

 $\label{eq:Key:Mode} \mbox{Key: Mode of Failure: } A = Axial \mbox{ cleavage, } E = Explosive, \\ P = Plastic, \\ S = Shear.$

Note: Axis of loading parallel to core axis.

Approved Signatories: D. TROWBRIDGE A. FROST F. HAMILTON L. MARTIN



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	Hayle Harbo	ur, Cornwall

Compiled By

Checked By	Date	Contract Ref:

740832

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Page



SUMMARY OF POINT LOAD INDEX TEST RESULTS

(International Society for Rock Mechanics: 1985)

Hole Reference	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D _e) (mm)	Point Load (I _s) (MN/m ²)	Size Factor (F)	Point Load Index (I _{s(50)}) (MN/m²)	Moisture Content (%)	Rock Type
BH1002	8.70	A	72	46	4.540	65	1.08	1.12	1.21	3.6	SILTSTONE
BH1002	8.70	A	72	36	1.675	57	0.51	1.06	0.54	3.5	SILTSTONE
BH1002	8.70	I	35	59	26.340	51	10.02	1.01	10.12	1.2	SILTSTONE
BH1002	11.70	A	72	48	13.020	66	2.96	1.14	3.37	1.0	SILTSTONE
BH1002	11.70	A	72	47	14.085	66	3.27	1.13	3.70	1.5	SILTSTONE
BH1002	11.70	A	72	38	11.220	59	3.22	1.08	3.48	0.76	SILTSTONE
BH1002	12.50	A	73	39	32.385	60	8.93	1.09	9.73	0.38	SILTSTONE
BH1002	12.58	A	73	44	16.375	64	4.00	1.12	4.48	0.38	SILTSTONE

Key : A = Axial, D = Diametral, I = Irregular

Approved Signatories: D. TROWBRIDGE A. FROST F. HAMILTON L. MARTIN

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of



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Bedminster
Bristol BS3 4EB

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	08.12.08			
Contract:				Page
	Hayle Harbo	ur, Cornwall		

SUMMARY OF POINT LOAD INDEX TEST RESULTS

(International Society for Rock Mechanics: 1985)

Hole Reference	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (De) (mm)	Point Load (I _s) (MN/m ²)	Size Factor (F)	Point Load Index (I _{s(50)}) (MN/m²)	Moisture Content (%)	Rock Type
BH1002	15.52	A	73	24	1.085	47	0.49	0.97	0.48	1.5	SILTSTONE
BH1002	15.52	A	73	39	10.240	60	2.82	1.09	3.07	1.5	SILTSTONE
BH1003	13.50	A	72	34	28.920	56	9.28	1.05	9.74	0.57	SILTSTONE
BH1003	13.50	A	72	42	24.635	62	6.40	1.10	7.04	0.64	SILTSTONE
BH1003	13.50	A	72	36	9.225	57	2.80	1.06	2.97	0.74	SILTSTONE
BH1003	17.81	D	67	73	6.410	73	1.20	1.19	1.43	1.9	SILTSTONE
BH1003	17.81	A	73	69	7.525	80	1.17	1.24	1.45	1.9	SILTSTONE

Key : A = Axial, D = Diametral, I = Irregular

Approved Signatories: D. TROWBRIDGE A. FROST F. HAMILTON L. MARTIN



STRUCTURAL SOILS
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Stillhouse Lane
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ς	Compiled By	Date	Checked By	Date	Contract Ref:
,		08.12.08			740832
	Contract:				Page
		Havle Harbo	ur. Cornwall		of I

Buro Happold Appendix C Laboratory Analytical Reports

ALcontrol Laboratories Analytical Services Sample Descriptions

Client: Buro Happold <0.063mm Very Fine

Client Ref: 024435 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
WS703/1	0.5	Brown	0.1mm - 0.063mm	Silty Clay with some Stones	3
WS703/2	1.00	Black	0.1mm - 0.063mm	Sandy Clay	3
WS703/3	1.50	Beige	n/a	Sandy Clay	3
WS703/4	2.00	Beige	n/a	Sandy Clay	3
WS703/5	2.50	Beige	n/a	Sandy Clay	3
WS703/6	3.00	Beige	<0.063mm	Sandy Clay	3
WS703/7	3.50	Beige	<0.063mm	Sandy Clay	3
WS703/8	4.00	Beige	0.1mm - 2mm	Sandy Clay with some Stones	3
WS703/9	4.50	Beige	0.1mm - 2mm	Sandy Clay with some Stones	3
WS703/10	5.00	Beige	0.1mm - 0.063mm	Sandy Clay with some Stones	3
WS703/11	6.00	Beige	0.1mm - 0.063mm	Sandy Clay with some Stones	3

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

Validated **Preliminary**

ALcontrol Laboratories Analytical Services * ISO 17025 accredited **Table Of Results**

M MCERTS accredited

* Subcontracted test » Shown on prev. report

Job Number: 08/17832/02/01 **Matrix: SOLID**

Hayle Cornwall **Location: Client:** Buro Happold 024435 **Client Contact:** Tom Smith **Client Ref. No.:**

Sample Identity	WS703/1	WS703/2	WS703/3	WS703/4	WS703/5	WS703/6	WS703/7	WS703/8	WS703/9		
Depth (m)	0.5	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	M	Ι
Sample Type	SOLID	etho	.oD								
Sampled Date	23.10.08	23.10.08	23.10.08	23.10.08	23.10.08	23.10.08	23.10.08	23.10.08	23.10.08	Method Code	LoD/Units
Sample Received Date	25.10.08	25.10.08	25.10.08	25.10.08	25.10.08	25.10.08	25.10.08	25.10.08	25.10.08	ode	ts
Batch	3	3	3	3	3	3	3	3	3		
Sample Number(s)	40-41	42-43	44-46	47-48	49-50	51-53	54-56	57-58	59-61		
Antimony	6.9	4.1	<1.5	<1.5	<1.5	2.1	<1.5	<1.5	<1.5	TM129	<1.5 mg/kg
Arsenic	1200	550	21	36	45	98	12	25	30	TM129 [#] _M	<3.0 mg/kg
Beryllium	2.0	1.3	<0.4	<0.4	<0.4	< 0.4	< 0.4	< 0.4	< 0.4	TM129	<0.4 mg/kg
Cadmium	7.2	4.6	0.3	0.5	0.5	1.0	0.2	0.3	0.4	TM129	<0.2 mg/kg
Chromium	21	13	<4.5	<4.5	<4.5	22	<4.5	10	9.8	TM129 [#] _M	<4.5 mg/kg
Copper	1300	710	38	63	69	180	15	31	25	TM129 [#] _M	<6 mg/kg
Lead	190	110	3	8	8	19	<2	6	9	TM129 [#] _M	<2 mg/kg
Mercury	< 0.4	<0.4	<0.4	<0.4	<0.4	< 0.4	< 0.4	< 0.4	< 0.4	TM129 [#] _M	<0.4 mg/kg
Nickel	25	18	2.0	3.4	3.6	16	2.4	9.5	8.1	TM129 [#] _M	<0.9 mg/kg
Selenium	<3	<3	<3	<3	<3	<3	<3	<3	<3	TM129 [#] _M	<3 mg/kg
Tin	150	91	3	9	7	74	<1	3	2	TM129#	<1 mg/kg
Zinc	820	570	55	110	110	310	36	74	84	TM129 [#] _M	<2.5 mg/kg
Easily Liberated Sulphide	640	440	<15	<15	37	<15	<15	<15	<15	TM180 [#]	<15 mg/kg
Chloride (soluble)	5800	5500	5300	6300	3800	1600	2100	1500	1200	TM097 [#] _M	<2 mg/kg
Soil Organic Matter	2.6	2.1	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	TM132 [#]	<0.35 %
Total Organic Carbon	1.5	1.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	TM132 [#] _M	<0.2 %
Easily Liberatable Cyanide	<1	<1	<1	<1	<1	<1	<1	<1	<1	TM153	<1 mg/kg
% Stones Greater then 10mm	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	25	TM008	<0.1 %
Elemental Sulphur	3200	1200	<70	<70	<70	<70	<70	<70	<70	TM136 [#] _M	<70 mg/kg
Fraction of Organic Carbon	0.015	0.012	< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	TM132 [#]	<0.002 NONE
Moisture Content	22	21	23	27	23	12	21	8.7	9.6	PM024	%
pH Value	8.45	8.32	8.64	8.64	8.65	8.69	8.75	8.76	8.86	TM133 [#] _M	<1.00 pH Units

All results expressed on a dry weight basis.

ALcontrol Laboratories Analytical Services * ISO 17025 accredited Validated **Table Of Results Preliminary**

M MCERTS accredited

* Subcontracted test » Shown on prev. report

Job Number: 08/17832/02/01 **Matrix: SOLID**

Hayle Cornwall **Location: Client:** Buro Happold 024435 **Client Contact:** Tom Smith Client Ref. No.:

Chefit Rei. 140	027733						
Sample Identity	WS703/10	WS703/11					
Depth (m)	5.00	6.00				M	I
Sample Type	SOLID	SOLID				etho	œ,
Sampled Date	23.10.08	23.10.08				ж С	LoD/Units
Sample Received Date	25.10.08	25.10.08				Method Code	its
Batch		3					
Sample Number(s)		65-67					
Antimony	<1.5	<1.5				TM129	<1.5 mg/kg
Arsenic	41	35				TM129 [#] _M	<3.0 mg/kg
Beryllium	<0.4	<0.4				TM129	<0.4 mg/kg
Cadmium	0.4	0.4				TM129	<0.2 mg/kg
Chromium	15	12				TM129 [#] _M	<4.5 mg/kg
Copper	54	25				TM129 [#] _M	<6 mg/kg
Lead	13	8				TM129 [#] _M	<2 mg/kg
Mercury	<0.4	<0.4				TM129 [#] _M	<0.4 mg/kg
Nickel	13	11				TM129 [#] _M	<0.9 mg/kg
Selenium	<3	<3				TM129 [#] _M	<3 mg/kg
Tin	40	4				TM129#	<1 mg/kg
Zinc	120	71				TM129 [#] _M	<2.5 mg/kg
Easily Liberated Sulphide	<15	<15				TM180 [#]	<15 mg/kg
Chloride (soluble)	360	850				TM097 [#] _M	<2 mg/kg
Soil Organic Matter	< 0.35	< 0.35				TM132 [#]	<0.35 %
Total Organic Carbon	< 0.2	< 0.2				TM132 [#] _M	<0.2 %
Easily Liberatable Cyanide	<1	<1				TM153	<1 mg/kg
% Stones Greater then 10mm	< 0.1	< 0.1				TM008	<0.1 %
Elemental Sulphur	<70	<70				TM136 [#] _M	<70 mg/kg
Fraction of Organic Carbon	< 0.002	< 0.002				TM132 [#]	<0.002 NONE
Moisture Content	38	39				PM024	%
pH Value	8.63	8.82				TM133 [#] _M	<1.00 pH Units

All results expressed on a dry weight basis.

WAC ANALYTICAL RESU	JLTS				REF:CEN12457-2				
Mass Sample taken (kg) =	0.09889		Moisture Content I	` '	9.83				
Mass of dry sample (kg) =	0.09		Dry Matter Conten	t Ratio (%) =	91.05				
Particle Size <4mm =	>95%								
Job Number		20	0817832		Landfill Was	te Acceptance C	Criteria Limit		
Batch			3						
Sample Number(s)			65-67		_	Stable Non-			
Sampled Date			3/10/08	Inert Waste	reactive Hazardous	Hazardous			
Sample Identity		W	S703/11		Landfill	Waste in Non-	Waste Landfi		
Depth (m)			6.00		1	Hazardous Landfill			
Solid Waste Analysis						Danuilli			
Total Organic Carbon (%)	< 0.2				-	-	-		
Loss on Ignition (%)	-				-	-	-		
Sum of BTEX (mg/kg)	-				-	-	-		
Sum of 7 PCBs (mg/kg)	-				-	-	-		
Mineral Oil (mg/kg)	-				-	-	-		
PAH Sum of 17(mg/kg) pH (pH Units)	- 9.92				-	-	-		
ANC to pH 7 (mol/kg)	8.82				-	-	-		
ANC to pH 4 (mol/kg)	-				-	_	_		
ANC to ph 4 (morkg)	Conc ⁿ in 10:1		1		-	-	-		
	eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using I		
Eluate Analysis	C_2		$\mathbf{A_2}$			12457-3 at L/S 10			
	mg/	1	mg	/kg	1				
Arsenic	0.014		0.14	_	-	-	-		
Barium	0.004		0.04		-	-	-		
Cadmium	< 0.00022		< 0.0022		-	-	-		
Chromium	0.002		0.02		-	-	-		
Copper	0.0035		0.035		-	-	-		
Mercury	< 0.00001		< 0.0001		-	-	-		
Molybdenum	0.001		0.01		-	-	-		
Nickel	< 0.0015		< 0.015		-	-	-		
Lead	< 0.0004		< 0.004		-	-	-		
Antimony	<0.00075		< 0.0075		-	-	-		
Selenium	<0.001		<0.01		-	-	-		
Zinc	0.10 110		1.0 1100		-	-	-		
Chloride Fluoride	<0.5		<5		-	-	-		
Sulphate as SO ₄	21		210		-	-	-		
Total Dissolved Solids	230		2300		-		-		
Phenols Monohydric	< 0.01		<0.1		 		_		
Dissolved Organic Carbon	<1		<10		-	-	-		
Leach Test Information	•		-		-				
Date Prepared	30/10/08	-	1						
pH (pH Units)	8.982								
Conductivity (µS/cm)	432	-							
Temperature (°C)	19.1	-							
Volume Leachant (Litres)	0.891	-							
Volume of Eluate VE1 (Litres)									

Mass Sample taken (kg) =	0.11671		Moisture Content l	` '		29.75	
Mass of dry sample (kg) =	0.09		Dry Matter Conten	t Ratio (%) =		77.07	
Particle Size <4mm =	>95%						
Job Number		20	0817832		I an Jell Wass	40 A 200m40m20 (Y
Batch			3		Landilli was	te Acceptance (<u>riteria Limits</u>
Sample Number(s)			44-46			Stable Non-	
Sampled Date		2	3/10/08		1	reactive	
Sample Identity		v	VS703/3		Inert Waste Landfill	Hazardous Waste in Non-	Hazardous Waste Landfill
Depth (m)		<u> </u>	1.50		Lanum	Hazardous	waste Landin
Solid Waste Analysis			1.00			Landfill	
Total Organic Carbon (%)	< 0.2				_	-	_
Loss on Ignition (%)	- 0.2						
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	_						_
PAH Sum of 17(mg/kg)							
pH (pH Units)	8.64						
ANC to pH 7 (mol/kg)	-				_	_	_
ANC to pH 4 (mol/kg)	_				_	_	_
(333.48)	Conc ⁿ in 10:1		10.1				
T	eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using BS
Eluate Analysis	$\mathbf{C_2}$		$\mathbf{A_2}$			12457-3 at L/S 10	
	mg	1	mg	/kg			
Arsenic	0.062		0.62		-	-	-
Barium	0.004		0.04		-	-	-
Cadmium	< 0.00022		< 0.0022		-	-	-
Chromium	0.001		0.01		-	-	-
Copper	0.0080		0.080		-	-	-
Mercury	< 0.00001		< 0.0001		-	-	-
Molybdenum	0.003		0.03		-	-	-
Nickel	< 0.0015		< 0.015		-	-	-
Lead	< 0.0004		< 0.004		-	-	-
Antimony	0.015		0.15		-	-	-
Selenium	< 0.001		< 0.01		-	-	-
Zinc	<0.005		< 0.05		-	-	-
Chloride	490		4900		-	-	-
T 1					-	-	-
Fluoride	<0.5		<5				
Sulphate as SO ₄	74		740		-	-	-
Sulphate as SO ₄ Total Dissolved Solids	74 940		740 9400		-	-	-
Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric	74 940 <0.01		740 9400 <0.1		-	-	-
Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon	74 940		740 9400		-	-	-
Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information	74 940 <0.01 <1		740 9400 <0.1		-	-	-
Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared	74 940 <0.01 <1	-	740 9400 <0.1		-	-	-
Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units)	74 940 <0.01 <1 30/10/08 9.146	-	740 9400 <0.1		-	-	-
Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm)	74 940 <0.01 <1 30/10/08 9.146 1706		740 9400 <0.1		-	-	-
Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units)	74 940 <0.01 <1 30/10/08 9.146	-	740 9400 <0.1		-	-	-

WAC ANALYTICAL RESU	ULTS			R	REF:CEN12457-2				
Mass Sample taken (kg) =	0.10826	Moisture Content	* *	20.15					
Mass of dry sample (kg) =	0.09	Dry Matter Conter	t Ratio (%) =		83.23				
Particle Size <4mm =	>95%								
	•			•					
Job Number		200817832		Landfill Was	te Acceptance (Criteria Limit			
Batch		3 54-56		G. 11 N					
Sample Number(s) Sampled Date		23/10/08		-	Stable Non- reactive				
Sample Identity		WS703/7	Inert Waste	Hazardous	Hazardous				
Depth (m)		3.50	Landfill	Waste in Non- Hazardous	Waste Landfi				
=		3.50		-	Landfill				
Solid Waste Analysis Fotal Organic Carbon (%)	< 0.2			_	-	_			
Loss on Ignition (%)	-			_	_	_			
Sum of BTEX (mg/kg)	-			-	-	-			
Sum of 7 PCBs (mg/kg)				-	-	-			
Mineral Oil (mg/kg)	-			-	-	-			
PAH Sum of 17(mg/kg)	-			-	-	-			
oH (pH Units)	8.75			-	-	-			
ANC to pH 7 (mol/kg)	-			-	-	-			
ANC to pH 4 (mol/kg)	Conc ⁿ in 10:1	1		-	-	-			
	eluate	10:1 conc ⁿ leached		Limit values for	compliance leach	ing tost using l			
Eluate Analysis	C_2	\mathbf{A}_2			12457-3 at L/S 10				
	mg/l	mg	/kg			<u></u>			
Arsenic	0.028	0.28		-	-	-			
Barium	0.003	0.03		-	-	-			
Cadmium	< 0.00022	< 0.0022		-	-	-			
Chromium	0.001	0.01		-	-	-			
Copper	0.0051	0.051		-	-	-			
Mercury	<0.00001	<0.0001		-	-	-			
Molybdenum Nickel	0.002 <0.0015	0.02 <0.015		-	-	-			
Lead	<0.0013	<0.013		-	-	-			
Antimony	0.0018	0.018		_	_	_			
Selenium	<0.001	< 0.01		_	-	-			
Zinc	< 0.005	< 0.05		-	-	-			
Chloride	220	2200		-	-	-			
fluoride	< 0.5	<5		-	-	-			
Sulphate as SO ₄	38	380		-	-	-			
Total Dissolved Solids	430	4300	-	-	-	-			
Phenols Monohydric	<0.01	<0.1		-	-	-			
Dissolved Organic Carbon	<1	<10		-	-	-			
Leach Test Information Date Prepared	30/10/08								
		-							
H (pH Units)	9.049 778								
oH (pH Units) Conductivity (μS/cm)	778	-							
oH (pH Units)									

WAC ANALYTICAL RESU	JLTS				R	REF:CEN12457-2				
Mass Sample taken (kg) =	0.09733		Moisture Content I	` '	8.16					
Mass of dry sample (kg) =	0.09		Dry Matter Conten	t Ratio (%) =		92.46				
Particle Size <4mm =	>95%									
Job Number		20	0817832		I andfill Wass	te Acceptance (Tritorio I imit			
Batch			3		Landini Was	ic Acceptance C	Zitteria Eliint			
Sample Number(s)			59-61			Stable Non-				
Sampled Date		2	3/10/08	- Inert Waste	reactive Hazardous	Hazardous				
Sample Identity		V	VS703/9		Landfill	Waste in Non-	Waste Landfi			
Depth (m)			4.50			Hazardous				
Solid Waste Analysis						Landfill				
Total Organic Carbon (%)	< 0.2				-	-	-			
Loss on Ignition (%)	-				-	-	-			
Sum of BTEX (mg/kg)	-				-	-	-			
Sum of 7 PCBs (mg/kg)	-				-	-	-			
Mineral Oil (mg/kg)	-				-	-	-			
PAH Sum of 17(mg/kg)	-				-	-	-			
pH (pH Units)	8.86				-	-	-			
ANC to pH 7 (mol/kg)	-				-	-	-			
ANC to pH 4 (mol/kg)	Conc ⁿ in 10:1				-	-	_			
	eluate		10:1 conc ⁿ leached		I imit values for	compliance leach	ing tost using I			
Eluate Analysis	C ₂		\mathbf{A}_2			12457-3 at L/S 10				
	mg/	/1	mg	/kσ		12 10				
Arsenic	0.021	· <u>-</u>	0.21	8	-	_	_			
Barium	0.001		0.01		_	_	_			
Cadmium	< 0.00022		< 0.0022		-	-	-			
Chromium	< 0.001		< 0.01		-	-	-			
Copper	0.0019		0.019		-	-	-			
Mercury	< 0.00001		< 0.0001		-	-	-			
Molybdenum	0.002		0.02		-	-	-			
Nickel	< 0.0015		< 0.015		-	-	-			
Lead	< 0.0004		< 0.004		-	-	-			
Antimony	< 0.00075		< 0.0075		-	-	-			
Selenium	< 0.001		< 0.01		-	-	-			
Zinc	<0.005		< 0.05		-	-	-			
Chloride	69		690		-	-	-			
Fluoride	<0.5		<5 140		-	-	-			
Sulphate as SO ₄ Total Dissolved Solids	14		140		-	-	-			
Phenols Monohydric	170 <0.01		1700 <0.1		-	-	-			
Dissolved Organic Carbon	<0.01 4		<0.1 40		-	-	-			
Leach Test Information	7		-10				_			
Date Prepared	30/10/08	-	1							
pH (pH Units)	9.071	-	1							
Conductivity (µS/cm)	295	-	1							
Γemperature (°C)	19.3	-	1							
	0.893	_	1							
Volume Leachant (Litres)	0.673									

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	S				REF:CEN12457-2				
Mass Sample taken (kg) = Mass of dry sample (kg) = Particle Size <4mm =	0.09889 0.09 >95%		Moisture Content Dry Matter Content			9.83 91.05			
ranticle Size <4min =	>93%								
Job Number		20	00817832						
Batch			3		Landfill Was	te Acceptance (<u>Criteria Limits</u>		
Sample Number(s)			65-67			Stable Non-			
Sampled Date			23/10/08		-	reactive			
_					Inert Waste	Hazardous	Hazardous		
Sample Identity		v	VS703/11		Landfill	Waste in Non-	Waste Landfill		
Depth (m)			6.00		4	Hazardous Landfill			
Solid Waste Analysis						Lanuini			
Total Organic Carbon (%)	-				-	-	-		
Loss on Ignition (%)	-				-	-	-		
Sum of BTEX (mg/kg) Sum of 7 PCBs (mg/kg)	-				-	-	-		
	-				-	-	-		
Mineral Oil (mg/kg) PAH Sum of 17(mg/kg)	-				-	-	-		
pH (pH Units)					-	-	-		
ANC to pH 7 (mol/kg)	-				-	-	-		
ANC to pH 4 (mol/kg)						_	_		
rive to pit + (morkg)	Conc ⁿ in 10:1				†				
	eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using BS		
Eluate Analysis	C_2		${f A_2}$			12457-3 at L/S 10			
	mg	/l	mg	/kg					
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-		
Boron Dissolved (CEN 10:1) (ICP-MS)	< 0.02		< 0.2		-	-	-		
Tin Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-		
COD (CEN 10:1)	<10		<100		-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
	+		+		-	-	-		
	+		1		-	-	_		
	+		1		-	-	_		
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
Leach Test Information			-						
Date Prepared	30/10/08	-	4						
pH (pH Units)	8.982	-	-						
Conductivity (µS/cm)	432	-	4						
Temperature (°C)	19.1	-	-						
Volume Leachant (Litres) Volume of Eluate VE1 (Litres)	0.891	-	J						

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.11671		Moisture Content	Ratio (%) =		29.75	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			77.07	
Particle Size <4mm =	>95%		,	(, , ,			
Job Number		20	00817832		T - Jen W	4	N
Batch			3		Landfill Was	te Acceptance (riteria Limits
Sample Number(s)			44-46			Stable Non-	
Sampled Date		2	23/10/08		- Inert Waste	reactive Hazardous	Hazardous
Sample Identity		7	WS703/3		Landfill	Waste in Non-	Waste Landfi
Depth (m)			1.50			Hazardous	
Solid Waste Analysis						Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
pH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1		10:1 conc ⁿ leached				
Eluate Analysis	eluate					compliance leach	
,	C_2	_	$\mathbf{A_2}$	<u> </u>	EN	12457-3 at L/S 10	<u>l/kg</u>
	mg	g/l	_	g/kg		1	T.
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)	0.10		1.0		-	-	-
Tin Dissolved (CEN 10:1) (ICP-MS)	0.003		0.03		-	-	-
COD (CEN 10:1)	<10		<100		-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
			1		-	-	-
			+		-	-	-
			1		-	-	-
			1		 	-	-
Leach Test Information	•		_	•	•	•	•
Date Prepared	30/10/08	-	_				
pH (pH Units)	9.146	-	_[
Conductivity (µS/cm)	1706	-					
Гетрегаture (°С)	19.2	-	_				
7.1 T. 1 (7.1)	0.873	-	1				
Volume Leachant (Litres) Volume of Eluate VE1 (Litres)	0.0.0						

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	~					EF:CEN12457			
Mass Sample taken (kg) =	0.10826		Moisture Content	Ratio (%) =		20.15			
Mass of dry sample (kg) =	0.09		Dry Matter Content		83.23				
Particle Size <4mm =	>95%					03.23			
Job Number		20	00817832		T - Jen W.	4	No.24 2 T 2 24		
Batch			3		Landfill Was	te Acceptance (riteria Limit		
Sample Number(s)			54-56			Stable Non-			
Sampled Date		2	23/10/08		T4 XX/4-	reactive Hazardous	Hazardous		
Sample Identity		7	WS703/7		Inert Waste Landfill	Waste in Non-	Waste Landfi		
Depth (m)			3.50			Hazardous			
Solid Waste Analysis						Landfill			
Гotal Organic Carbon (%)	-				-	-	-		
Loss on Ignition (%)	-				-	-	-		
Sum of BTEX (mg/kg)	-				-	-	-		
Sum of 7 PCBs (mg/kg)	-				-	-	-		
Mineral Oil (mg/kg)	-				-	-	-		
PAH Sum of 17(mg/kg)	-				-	-	-		
oH (pH Units)	-				-	-	-		
ANC to pH 7 (mol/kg)	-				-	-	-		
ANC to pH 4 (mol/kg)	-				-	-	-		
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		I imit values for	compliance leach	ing tost using P		
Eluate Analysis	C_2		\mathbf{A}_2			12457-3 at L/S 10			
	mş	or/I	_	g/kg	-	12107 0 at 1/5 10	<u> </u>		
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001	5/1	<0.01	J S	-	-	_		
Boron Dissolved (CEN 10:1) (ICP-MS)	0.03		0.3		_	_	-		
Γin Dissolved (CEN 10:1) (ICP-MS)	0.001		0.01		_	_	_		
COD (CEN 10:1)	<10		<100		_	_	_		
(CDI (10.1)	(10		(100		 -	_	_		
					_	_	_		
					_	_	_		
					_	_	_		
					_	_	_		
					_	_	_		
					_	-	_		
					_	-	_		
					-	-	-		
					-	-	-		
			1		-	-	-		
			1		-	-	-		
					-	-	-		
					-	-	-		
Leach Test Information	20/10/00		7						
Date Prepared	30/10/08	-	-1						
pH (pH Units)	9.049	-	-						
Conductivity (µS/cm)	778	-	4						
Γemperature (°C)	19.3	-	4						
Volume Leachant (Litres)	0.882	-							
Volume of Eluate VE1 (Litres)									

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	S				REF:CEN12457-2				
4 6 1 1 4 1	0.00722		W. C.	D :: (0()		0.16			
Mass Sample taken (kg) =	0.09733 0.09		Moisture Content		8.16				
Mass of dry sample (kg) = Particle Size <4mm =	0.09 Dry Matter Content Ratio (%) = >95%					92.46			
rarticle Size <4mm =	>93%								
Job Number		20	00817832		Landfill Was	te Acceptance (Criteria Limits		
Batch			3						
Sample Number(s)			59-61		_	Stable Non-			
Sampled Date		2	23/10/08		Inert Waste	reactive Hazardous	Hazardous		
Sample Identity		V	VS703/9		Landfill	Waste in Non-	Waste Landfi		
Depth (m)			4.50			Hazardous			
Solid Waste Analysis						Landfill			
Total Organic Carbon (%)	-				-	-	-		
Loss on Ignition (%)	-				-	-	-		
Sum of BTEX (mg/kg)	-				-	-	-		
Sum of 7 PCBs (mg/kg)	-				-	-	-		
Mineral Oil (mg/kg)	-				-	-	-		
PAH Sum of 17(mg/kg)	-				-	-	-		
H (pH Units) ANC to pH 7 (mol/kg)	-				-	-	-		
ANC to pH 4 (mol/kg)	-				-	-	-		
tive to pri 4 (morkg)	Conc ⁿ in 10:1		Ī	Ī		_			
	eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using B		
Eluate Analysis	C_2		$\mathbf{A_2}$			12457-3 at L/S 10			
	m	g/l	-	g/kg			 -		
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-		
Boron Dissolved (CEN 10:1) (ICP-MS)	< 0.02		< 0.2		-	-	-		
Tin Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-		
COD (CEN 10:1)	12		120		-	-	-		
					-	-	-		
					-	-	-		
			.		-	-	-		
					-	-	-		
			<u> </u>		<u> </u>	-	-		
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			1	Ì	-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
each Test Information		1	7						
	30/10/08	_							
Date Prepared	30/10/08 9.071	-	1						
Leach Test Information Date Prepared OH (pH Units) Conductivity (uS/cm)	9.071		1						
Oate Prepared OH (pH Units) Conductivity (µS/cm)	9.071 295	-							
Oate Prepared OH (pH Units)	9.071	-	1 - - -						

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :			ISO Accr	MC Accr	We San	Surr
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture content and description			WET	
TM008	BS 1377:Part 1977	Particle size distribution of solid samples			DRY	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro- chemical detection			NA	
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water			NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser			NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser	✓	✓	DRY	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser			NA	
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser			NA	
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit			NA	
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water			NA	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓		DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	
TM132	In - house Method	ELTRA CS800 Operators Guide	✓		DRY	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :				MC Acci	We Sar	Sur. Cor
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
TM132	In - house Method	ELTRA CS800 Operators Guide	✓	~	DRY	
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter	✓	√	WET	
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC	✓	√	DRY	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS			NA	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser			WET	
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)'	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique	✓		WET	
TM183	BS EN 23506:2002, (BS 6068- 2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry			NA	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Summary of Coolbox temperatures

Summary of Cool	
Batch No.	Coolbox Temperature (°C)
3	14.2

ALcontrol Laboratories Analytical Services Sample Descriptions

Job Number: 08/17832/02/01 **Grain sizes**

Client: Buro Happold <0.063mm Very Fine Client Ref: 024435 0.1mm - 0.063mm Fine

 0.1mm - 2mm
 Medium

 2mm - 10mm
 Coarse

 >10mm
 Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
WS702/1	0.5	Brown	0.1mm - 0.063mm	Silty Clay	1
WS702/2	1.0	Brown	0.1mm - 2mm	Sand	1
WS702/3	1.5	Light Brown	0.1mm - 2mm	Sand	1
WS702/4	2.0	Brown	0.1mm - 2mm	Sand	1
WS702/5	2.5	Brown	0.1mm - 2mm	Sand	1
WS707/1	0.5	Brown	0.1mm - 2mm	Sand	1
WS707/2	1.0	Light Brown	0.1mm - 2mm	Sand	1
WS707/3	1.5	Light Brown	0.1mm - 2mm	Sand	1
WS707/4	2.0	Light Brown	0.1mm - 2mm	Sand	1
WS707/5	2.5	Light Brown	0.1mm - 2mm	Sand	1
WS707/6	3.0	Light Brown	0.1mm - 2mm	Sand	1
					\vdash
					П

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

Validated **Preliminary**

ALcontrol Laboratories Analytical Services * ISO 17025 accredited **Table Of Results**

M MCERTS accredited

* Subcontracted test » Shown on prev. report

Job Number: **Matrix: SOLID** 08/17832/02/01

Hayle Cornwall **Location: Client:** Buro Happold 024435 **Client Contact:** Tom Smith Client Ref. No.:

Sample Identity	WS702/1	WS702/2	WS702/3	WS702/4	WS702/5	WS707/1	WS707/2	WS707/3	WS707/4		
Depth (m)	0.5	1.0	1.5	2.0	2.5	0.5	1.0	1.5	2.0	M	I
Sample Type	SOLID	etho	LoD/Units								
Sampled Date	21.10.08	21.10.08	21.10.08	21.10.08	21.10.08	21.10.08	21.10.08	21.10.08	21.10.08	у С	
Sample Received Date	24.10.08	24.10.08	24.10.08	24.10.08	24.10.08	24.10.08	24.10.08	24.10.08	24.10.08	Method Code	
Batch		1	1	1	1	1	1	1	1		
Sample Number(s)	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18		
Antimony	5.2	<1.5	<1.5	1.9	<1.5	<1.5	<1.5	<1.5	<1.5	TM129	<1.5 mg/kg
Arsenic	650	72	30	210	88	92	19	14	15	TM129 [#] _M	<3.0 mg/kg
Beryllium	2.1	0.6	<0.4	0.9	<0.4	0.4	< 0.4	<0.4	<0.4	TM129	<0.4 mg/kg
Cadmium	5.1	0.6	0.4	1.7	0.9	0.9	0.3	0.2	0.2	TM129	<0.2 mg/kg
Chromium	18	7.8	<4.5	8.0	<4.5	6.9	<4.5	<4.5	<4.5	TM129 [#] _M	<4.5 mg/kg
Copper	1200	110	37	470	120	280	48	30	29	TM129 [#] _M	<6 mg/kg
Lead	160	32	7	49	24	27	6	<2	2	TM129 [#] _M	<2 mg/kg
Mercury	< 0.4	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	TM129 [#] _M	<0.4 mg/kg
Nickel	22	7.3	2.6	9.4	4.8	7.5	2.7	2.5	2.5	TM129 [#] _M	<0.9 mg/kg
Selenium	<3	<3	<3	<3	<3	<3	<3	<3	<3	TM129 [#] _M	<3 mg/kg
Tin	160	37	6	67	23	37	6	4	1	TM129#	<1 mg/kg
Zinc	710	130	76	260	180	210	52	37	35	TM129 [#] _M	<2.5 mg/kg
Easily Liberated Sulphide	210	<15	<15	530	<15	<15	<15	<15	<15	TM180 [#]	<15 mg/kg
Chloride (soluble)	6900	3900	4600	4000	3700	4300	3600	3600	2900	TM097 [#] _M	<2 mg/kg
Soil Organic Matter	2.1	1.5	< 0.35	0.92	< 0.35	0.56	< 0.35	< 0.35	< 0.35	TM132 [#]	<0.35 %
Total Organic Carbon	1.2	0.9	< 0.2	0.5	< 0.2	0.3	< 0.2	< 0.2	< 0.2	TM132 [#] _M	<0.2 %
Easily Liberatable Cyanide	<1	<1	<1	<1	<1	<1	<1	<1	<1	TM153	<1 mg/kg
% Stones Greater then 10mm	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	TM008	<0.1 %
Elemental Sulphur	690	<70	<70	<70	<70	<70	<70	<70	<70	TM136 [#] _M	<70 mg/kg
Fraction of Organic Carbon	0.012	0.009	< 0.002	0.005	< 0.002	0.003	< 0.002	< 0.002	< 0.002	TM132 [#]	<0.002 NONE
Moisture Content	27	20	21	19	18	20	19	21	17	PM024	%
pH Value	8.49	8.50	8.56	8.56	8.76	8.66	8.73	8.66	8.78	$TM133^{\#}_{M}$	<1.00 pH Units

All results expressed on a dry weight basis.

Data	06 11 2008	

ALcontrol Laboratories Analytical Services # ISO 17025 accredited Validated **Table Of Results Preliminary**

M MCERTS accredited

* Subcontracted test » Shown on prev. report

Job Number: 08/17832/02/01 **Matrix: SOLID**

Client: Buro Happold **Location:** Hayle Cornwall **Client Contact:** Tom Smith **Client Ref. No.:** 024435

WS707/5 WS707/6 Sample Identity Depth (m) 2.5 3.0 Method Code LoD/Units Sample Type SOLID SOLID **Sampled Date** 21.10.08 21.10.08 **Sample Received Date** 24.10.08 24.10.08 1 Batch 21-22 19-20 Sample Number(s) Antimony <1.5 <1.5 TM129 <1.5 mg/kg TM129[#]_M 15 14 <3.0 mg/kg Arsenic <0.4 mg/kg Beryllium < 0.4 < 0.4 TM129 Cadmium < 0.2 0.2 TM129 <0.2 mg/kg TM129[#]_M <4.5 <4.5 <4.5 mg/kg Chromium TM129[#]_M 21 13 <6 mg/kg Copper <2 TM129[#]_M Lead <2 <2 mg/kg Mercury < 0.4 < 0.4 TM129[#]_M <0.4 mg/kg Nickel 2.5 2.2 TM129[#]_M <0.9 mg/kg <3 mg/kg Selenium <3 <3 TM129[#]_M Tin <1 <1 TM129# <1 mg/kg <2.5 mg/kg 33 TM129[#]_M Zinc 32 Easily Liberated Sulphide <15 <15 $TM180^{\#}$ <15 mg/kg 3700 3300 TM097[#]_M Chloride (soluble) <2 mg/kg <0.35 % Soil Organic Matter < 0.35 < 0.35 TM132# TM132[#]_M Total Organic Carbon < 0.2 <0.2 % Easily Liberatable Cyanide TM153 <1 <1 <1 mg/kg % Stones Greater then 10mm < 0.1 < 0.1 TM008 <0.1 % <70 mg/kg Elemental Sulphur < 70 < 70 TM136[#]_M <0.002 NONE Fraction of Organic Carbon < 0.002 < 0.002 $TM132^{\#}$ Moisture Content 17 PM024 18 % pH Value 8.64 8.67 TM133[#]_M <1.00 pH Unit

All results expressed on a dry weight basis.

Mass Sample taken (kg) =	0.12931	Moisture Content Ratio (%) =		43.77	
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =		69.56	
Particle Size <4mm =	>95%				
Job Number		200817832	I 10°11 XX/	4	7.4 T !
Batch		1	Landill Was	te Acceptance (<u> riteria Limits</u>
Sample Number(s)		1-2		Stable Non-	
Sampled Date		21/10/08		reactive	
Sample Identity		WS702/1	Inert Waste	Hazardous Waste in Non-	Hazardous Waste Landfill
		0.5	Landfill	Hazardous	waste Landiii
Depth (m)		0.3	_	Landfill	
Solid Waste Analysis	1.0				
Total Organic Carbon (%) Loss on Ignition (%)	1.2		-	-	-
Sum of BTEX (mg/kg)	-		-	-	-
Sum of 7 PCBs (mg/kg)				-	
Mineral Oil (mg/kg)	-		_	_	_
PAH Sum of 17(mg/kg)	-		_	_	_
pH (pH Units)	8.49		_	-	_
ANC to pH 7 (mol/kg)	-		-	-	-
ANC to pH 4 (mol/kg)	-		-	-	-
	Conc ⁿ in 10:1	10:1 conc ⁿ leached			
Eluate Analysis	eluate	A ₂		compliance leach	
Ziutte iiituiy sis	C ₂	EN 12457-3 at L/S 10 l/kg			
	mg/l	mg/kg		1	ı
Arsenic	0.11	1.1	-	-	-
Barium	0.005	0.05	-	-	-
Cadmium	0.00079 0.002	0.0079 0.02	-	-	-
Chromium Copper	0.002	0.02	-	-	-
Mercury	<0.00001	<0.0001		-	_
Molybdenum	0.13	1.3	_	_	_
Nickel	0.0016	0.016	_	-	_
Lead	0.0017	0.017	-	-	-
Antimony	0.038	0.38	-	-	-
Selenium	0.007	0.07	-	-	-
Zinc	0.009	0.09	-	-	-
Chloride	850	8500	-	-	-
Fluoride	0.7	7	-	-	-
Sulphate as SO ₄	140	1400	-	-	-
Total Dissolved Solids	1500	15000	-	-	-
Phenols Monohydric	<0.01	<0.1	-	-	-
Dissolved Organic Carbon Leach Test Information	11	110	-	-	-
Date Prepared	29/10/08 -				
pH (pH Units)	8.714				
Conductivity (µS/cm)	27000 -				
Temperature (°C)	19.4 -				
Volume Leachant (Litres)	0.861 -				

WAC ANALYTICAL RESU	JLTS			R	EF:CEN12457	-2
M G 1.1 (1)	0.11255	Miles Constant	D : (0/)		26.45	
Mass Sample taken (kg) =	0.11377 0.09	Moisture Content			26.47 79.07	
Mass of dry sample (kg) = Particle Size <4mm =	0.09 >95%	Dry Matter Conter	it Kano (%) =		79.07	
Farticle Size (4111111 –	<i>>937</i> 0					
Job Number		200817832	Landfill Was	te Acceptance (Criteria Limits	
Batch		1		Zunum Trus	te ricceptunee C	
Sample Number(s)		5-6			Stable Non-	
Sampled Date		21/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		WS702/3		Landfill	Waste in Non-	Waste Landfill
Depth (m)		1.5		_	Hazardous Landfill	
Solid Waste Analysis					Landin	
Total Organic Carbon (%)	< 0.2			-	-	-
Loss on Ignition (%)	-			-	-	-
Sum of BTEX (mg/kg)	-			-	-	-
Sum of 7 PCBs (mg/kg)	-			-	-	-
Mineral Oil (mg/kg)	-			-	-	-
PAH Sum of 17(mg/kg)	-			-	-	-
pH (pH Units)	8.56			-	-	-
ANC to pH 7 (mol/kg)	-			-	-	-
ANC to pH 4 (mol/kg)	-			-	-	-
	Conc ⁿ in 10:1	10:1 conc ⁿ leached				
Eluate Analysis	eluate				compliance leach	
Eluate Analysis	C_2	\mathbf{A}_2		EN	12457-3 at L/S 10	l/kg
	mg/l	mg	/kg			
Arsenic	0.072	0.72		-	-	-
Barium	0.001	0.01		-	-	-
Cadmium	< 0.00022	< 0.0022		-	-	-
Chromium	0.001	0.01		-	-	-
Copper	0.0091	0.091		-	-	-
Mercury	< 0.00001	< 0.0001		-	-	-
Molybdenum	0.002	0.02		-	-	-
Nickel	< 0.0015	< 0.015		-	-	-
Lead	0.0005	0.005		-	-	-
Antimony	0.0072	0.072		-	-	-
Selenium	0.002	0.02		-	-	-
Zinc	0.005	0.05		-	-	-
Chloride	520	5100		-	-	-
Fluoride	< 0.5	<5		-	-	-
Sulphate as SO ₄	78	780		-	-	-
Total Dissolved Solids	950	9500		-	-	-
Phenols Monohydric	< 0.01	<0.1		-	-	-
Dissolved Organic Carbon	2	20		-	-	-
Leach Test Information	00/40/00					
Date Prepared	29/10/08	-				
Date Prepared pH (pH Units)	9.154	-				
Date Prepared pH (pH Units) Conductivity (µS/cm)	9.154 1713	- -				
Date Prepared pH (pH Units) Conductivity (µS/cm) Temperature (°C)	9.154 1713 19.2					
Date Prepared pH (pH Units) Conductivity (µS/cm)	9.154 1713	-				

WAC ANALYTICAL RESU	ULTS			R	EF:CEN12457	-2
Mass Sample taken (kg) =	0.1081	Moisture Content l	Ratio (%) =		20.27	
Mass of dry sample (kg) =	0.09	Dry Matter Conten	nt Ratio (%) =		83.15	
Particle Size <4mm =	>95%					
Job Number		200817832		I andfill Was	te Acceptance (Tritorio I imite
Batch		1		Lanum was	te Acceptance C	THEITA LIIIIIS
Sample Number(s)		9-10			Stable Non-	
Sampled Date		21/10/08		1	reactive	
Sample Identity		WS702/5		 Inert Waste Landfill 	Hazardous Waste in Non-	Hazardous Waste Landfill
Depth (m)		2.5		Lanum	Hazardous	waste Landin
Solid Waste Analysis				-	Landfill	
Total Organic Carbon (%)	< 0.2			_	-	_
Loss on Ignition (%)						
Sum of BTEX (mg/kg)	-					
Sum of 7 PCBs (mg/kg)	-			-	-	-
Mineral Oil (mg/kg)				_	_	_
PAH Sum of 17(mg/kg)	_			_	_	_
pH (pH Units)	8.76			_	_	_
ANC to pH 7 (mol/kg)	-			_	-	-
ANC to pH 4 (mol/kg)	-			_	-	-
	Conc ⁿ in 10:1	10:1 conc ⁿ leached			•	•
Elecate Assalusia	eluate	10:1 conc leacned		Limit values for	compliance leach	ing test using BS
Eluate Analysis	C_2	${f A_2}$		EN	12457-3 at L/S 10	l/kg
	mg/l	mg	/kg			
Arsenic	0.090	0.90		-	-	-
Barium	0.006	0.06		-	-	-
Cadmium	< 0.00022	< 0.0022		-	-	-
Chromium	0.001	0.01		-	-	-
Copper	0.0063	0.063		-	-	-
Mercury	< 0.00001	< 0.0001		-	-	-
Molybdenum	0.001	0.01		-	-	-
Nickel	0.0016	0.016		-	-	-
Lead	< 0.0004	< 0.004		-	-	-
Antimony	0.0039	0.039		-	-	-
Selenium	<0.001	<0.01		-	-	-
Zinc	<0.005	< 0.05		-	-	-
Chloride	390	3900		-	-	-
Fluoride Sulphate as SO ₄	<0.5 63	<5 630		-	-	-
Total Dissolved Solids	760	7600		-	-	-
Phenols Monohydric	<0.01	<0.1		-	-	-
Dissolved Organic Carbon	1	10		-	-	
Leach Test Information	1	10				
Date Prepared	29/10/08	-				
	9.278	-				
ph (ph Units)						
pH (pH Units) Conductivity (μS/cm)	1323	-				
Conductivity (µS/cm)	1323 19.6	-				

Mass Sample taken (kg) =	0.10725		Moisture Content l	` '		19.41	
Mass of dry sample (kg) =	0.09		Dry Matter Conten	it Ratio (%) =		83.75	
Particle Size <4mm =	>95%						
Job Number		20	00817832		Landfil Was	to Assentance (Initonio I imito
Batch			1		Landilli was	te Acceptance (<u>riteria Limits</u>
Sample Number(s)			11-12			Stable Non-	
Sampled Date		2	21/10/08			reactive	
Sample Identity		V	VS707/1		Inert Waste Landfill	Hazardous Waste in Non-	Hazardous Waste Landfill
Depth (m)			0.5		Landini	Hazardous	waste Landin
Solid Waste Analysis						Landfill	
Total Organic Carbon (%)	0.3					-	_
Loss on Ignition (%)	-						
Sum of BTEX (mg/kg)	-					-	-
Sum of 7 PCBs (mg/kg)	 					-	-
Mineral Oil (mg/kg)							_
PAH Sum of 17(mg/kg)							
pH (pH Units)	8.66						
ANC to pH 7 (mol/kg)	8.00						
ANC to pH 4 (mol/kg)							_
ANC to pit 4 (mol/kg)	Conc ⁿ in 10:1					-	_
	eluate		10:1 conc ⁿ leached		I imit values for	compliance leach	ing tost using P
Eluate Analysis	C_2		\mathbf{A}_2			12457-3 at L/S 10	
	mg/	1		/lr a	EIV	12457-5 at L/5 10	I/Kg
Argania	0.086	1	0.86	/kg	_		
Arsenic Barium	0.002		0.02			-	-
Cadmium	0.002		0.0054				_
Chromium	0.002		0.02				
Copper	0.002		0.02				
Mercury	<0.0001		<0.0001		-	-	_
Molybdenum	0.001		0.01				
Nickel	< 0.001		< 0.015				
Lead	0.00013		0.008			_	_
Antimony	0.0024		0.024		_	-	_
Selenium	0.005		0.05		_	_	_
Zinc	0.006		0.06		-	-	_
	420		4200		_	_	_
Chloride							_
Chloride Fluoride					_	_	
Fluoride	< 0.5		<5		-	-	-
Fluoride Sulphate as SO ₄	<0.5 67		<5 670				-
Fluoride Sulphate as SO ₄ Total Dissolved Solids	<0.5 67 800		<5 670 8000		-	-	
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric	<0.5 67 800 <0.01		<5 670 8000 <0.1		-	-	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon	<0.5 67 800		<5 670 8000			- - -	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information	<0.5 67 800 <0.01 2		<5 670 8000 <0.1			- - -	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared	<0.5 67 800 <0.01 2	-	<5 670 8000 <0.1			- - -	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units)	<0.5 67 800 <0.01 2 29/10/08 9.107		<5 670 8000 <0.1			- - -	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm)	<0.5 67 800 <0.01 2 29/10/08 9.107 1443	-	<5 670 8000 <0.1			- - -	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units)	<0.5 67 800 <0.01 2 29/10/08 9.107	-	<5 670 8000 <0.1			- - -	-

WAC ANALYTICAL RESU	ULTS			R	EF:CEN12457	-2
Mass Sample taken (kg) =	0.1167	Moisture Content	t Ratio (%) -		30.47	
Mass of dry sample (kg) =	0.09	Dry Matter Conte			76.65	
Particle Size <4mm =	>95%	Bry Matter Conte	(70) =		70.03	
	7,50,70					
Job Number		200817832		Londell Woo	to Accomtance (Puitonio I imita
Batch		1		Landilli was	te Acceptance (riteria Limits
Sample Number(s)		15-16			Stable Non-	
Sampled Date		21/10/08		1	reactive	
Sample Identity		WS707/3		 Inert Waste Landfill 	Hazardous Waste in Non-	Hazardous Waste Landfill
Depth (m)		1.5			Hazardous	Y uses zunun
Solid Waste Analysis	<u> </u>				Landfill	
Total Organic Carbon (%)	< 0.2			_	-	-
Loss on Ignition (%)	-			_	-	-
Sum of BTEX (mg/kg)	-			_	_	_
Sum of 7 PCBs (mg/kg)	-			_	-	_
Mineral Oil (mg/kg)	 			_	_	_
PAH Sum of 17(mg/kg)	_			_	_	_
pH (pH Units)	8.66			_	_	_
ANC to pH 7 (mol/kg)	-			_	_	_
ANC to pH 4 (mol/kg)	_			_	_	_
Three to pit I (morkg)	Conc ⁿ in 10:1					
	eluate	10:1 conc ⁿ leached	1	Limit values for	compliance leach	ing test using RS
Eluate Analysis	C_2	\mathbf{A}_2			12457-3 at L/S 10	
	mg/l		g/kg		12 10 / 0 40 11/0 10	
Arsenic	0.014	0.14	8/ ** 8	_	_	
Barium	0.009	0.09	†	_	_	_
Cadmium	<0.00022	< 0.0022	†	_	_	_
Chromium	0.063	0.63	†	_	_	_
Copper	0.0063	0.063	1	_	_	_
Mercury	<0.00001	< 0.0001	1	_	_	_
Molybdenum	< 0.001	<0.01		_	_	_
Nickel	< 0.0015	< 0.015		_	_	_
Lead	0.0015	0.015		_	_	_
Antimony	0.0034	0.034	†	_	_	_
Selenium	0.005	0.05		_	_	_
Zinc	0.021	0.21		_	_	_
Chloride	400	4000	†	_	_	_
Fluoride	<0.5	<5	†	_	_	_
Sulphate as SO ₄	64	640		_	_	_
Total Dissolved Solids	760	7600	†	_	_	_
Phenols Monohydric	<0.01	<0.1	†	_	_	_
Dissolved Organic Carbon	1	10	1	_	-	_
Leach Test Information			•	_		
Date Prepared	29/10/08	-				
1	9.543	-				
pH (pH Units)						
pH (pH Units) Conductivity (uS/cm)	1350	-				
Conductivity (µS/cm)	1350 19.4	<u>-</u>				
	1350 19.4 0.873					

Mass Sample taken (kg) =	0.10853	Moisture Content Ratio (%)		21.26					
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%)=	82.47					
Particle Size <4mm =	>95%								
Job Number		200817832	Landfill Was	Landfill Waste Acceptance Criteria Limits					
Batch		1	<u>Lanum was</u>	te Acceptance (JITCHA LIIIICS				
Sample Number(s)		19-20		Stable Non-					
Sampled Date		21/10/08	Inert Waste	reactive Hazardous	Hazardous				
Sample Identity		WS707/5	Landfill	Waste in Non-	Waste Landfill				
Depth (m)		2.5		Hazardous					
Solid Waste Analysis				Landfill					
Total Organic Carbon (%)	< 0.2		-	-	-				
Loss on Ignition (%)	-		-	-	-				
Sum of BTEX (mg/kg)	-		-	-	-				
Sum of 7 PCBs (mg/kg)	-		-	-	-				
Mineral Oil (mg/kg)	-		-	-	-				
PAH Sum of 17(mg/kg)	-		-	-	-				
pH (pH Units)	8.64		-	-	-				
ANC to pH 7 (mol/kg)	-		-	-	-				
ANC to pH 4 (mol/kg)	- n		-	-	-				
	Conc ⁿ in 10:1 eluate	10:1 conc ⁿ leached							
Eluate Analysis	C ₂	A ₂		compliance leach					
	mg/l		EIN	12457-5 at L/S 10	7 1/Kg				
Arsenic	0.0095	mg/kg 0.095	_	<u> </u>	_				
Barium	0.0093	0.02			_				
Cadmium	<0.0022	<0.0022	_	-	_				
Chromium	< 0.001	<0.01	_	_	_				
Copper	0.0071	0.071	_	_	_				
Mercury	<0.00001	<0.0001	-	_	-				
Molybdenum	< 0.001	<0.01	-	-	-				
Nickel	< 0.0015	< 0.015	-	-	-				
Lead	0.0005	0.005	-	-	-				
Antimony	0.0013	0.013	-	-	_				
Selenium	< 0.001	< 0.01	-	-	-				
Zinc	0.010	0.10	-	-	-				
Chloride	330	3300	-	-	-				
Fluoride	< 0.5	<5	-	-	-				
Sulphate as SO ₄	54	540	-	-	-				
Total Dissolved Solids	600	6000	-	-	-				
Phenols Monohydric	<0.01	<0.1	-	-	-				
D: 1 10 : C 1	1	10	-	-	-				
Dissolved Organic Carbon									
Leach Test Information	20/10/09								
Leach Test Information Date Prepared	29/10/08	-							
Leach Test Information Date Prepared pH (pH Units)	9.478 -								
Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm)	9.478 - 1112 -								
Leach Test Information Date Prepared pH (pH Units)	9.478 -								

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.12931		Moisture Content	Ratio (%) =		43.77	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			69.56	
Particle Size <4mm =	>95%		,	(,,,		27.02	
Job Number		2	00817832		1011 117		N
Batch			1		Landfill Was	te Acceptance (<u> Criteria Limit</u>
Sample Number(s)			1-2			Stable Non-	
Sampled Date			21/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		,	WS702/1		Landfill	Waste in Non-	Waste Landfi
Depth (m)			0.5			Hazardous Landfill	
Solid Waste Analysis						Landini	
Total Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
pH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using B
Eluate Analysis	$\mathbf{C_2}$		\mathbf{A}_2			12457-3 at L/S 10	
	mg	·/I	_	g/kg		12 10 1 0 10 10	
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001	y -	< 0.01	5' 8	_	_	_
Boron Dissolved (CEN 10:1) (ICP-MS)	0.33		3.3		_	_	_
Γin Dissolved (CEN 10:1) (ICP-MS)	0.002		0.02		_	_	_
COD (CEN 10:1)	37		370		_	_	_
(===:					_	_	_
					_	_	_
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					-	-	-
					-	-	-
					-	-	-
Look Test Information					-	-	-
Leach Test Information Date Prepared	29/10/08		7				
bH (pH Units)	8.714	-	-				
Conductivity (µS/cm)	27000	-	-				
	19.4	-					
Γemperature (°C) Volume Leachant (Litres)	0.861	-	-1				
Volume of Eluate VE1 (Litres)	0.001	-	_				

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.11377		Moisture Content	Ratio (%) =		26.47	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			79.07	
Particle Size <4mm =	>95%		Diy maner come	(,0)		,,,,,,	
Job Number		20	00817832		T - 1011 XX	4	No.24 2 - T 2 24
Batch			1		Landfill Was	te Acceptance (<u> Triteria Limit</u>
Sample Number(s)			5-6			Stable Non-	
Sampled Date		2	21/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		V	VS702/3		Landfill	Waste in Non-	Waste Landfi
Depth (m)			1.5			Hazardous	
Solid Waste Analysis		•				Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		T		
Eluate Analysis	C ₂		$\mathbf{A_2}$			compliance leach 12457-3 at L/S 10	
		~/1	-	_/1	EN	12457-5 at L/5 10	1/Kg
D 11' D' 1 1 (CEN 10 1) (ICD MC)		g/l		g/kg		1	ı
Beryllium Dissolved (CEN 10:1) (ICP-MS)	<0.001		<0.01 0.6		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)			-		-	-	-
Fin Dissolved (CEN 10:1) (ICP-MS)	0.003		0.03		-	-	-
COD (CEN 10:1)	<10		<100		-	-	-
					-	-	-
			+		-	-	-
			+		-	-	-
			<u> </u>		-	-	-
			+		-	-	-
			1	 	-	-	-
			1	 			-
			1	 	-	-	-
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			 	 	-	-	_
			 	 	-	-	_
			1	 	-	-	_
			1	1	-	-	-
Leach Test Information			-	-	-	•	-
Date Prepared	29/10/08	-	4				
pH (pH Units)	9.154	-	4				
Conductivity (µS/cm)	1713	-					
^	19.2	-	1				
Геmperature (°С)							
Femperature (°C) Volume Leachant (Litres) Volume of Eluate VE1 (Litres)	0.876	-					

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	S				K	EF:CEN12457	-2
Mass Sample taken (kg) =	0.1081		Moisture Content			20.27	
Mass of dry sample (kg) =	0.09		Dry Matter Conter	it Ratio (%) =		83.15	
Particle Size <4mm =	>95%						
Job Number		20	0817832		Landfill Was	te Acceptance C	Criteria Limits
Batch			1		<u> </u>	- Treceptunce	
Sample Number(s)			9-10		_	Stable Non-	
Sampled Date		2	1/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		V	VS702/5		Landfill	Waste in Non-	Waste Landfi
Depth (m)			2.5			Hazardous Landfill	
Solid Waste Analysis		i				Lanuini	
Total Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg) oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)							_
Tre to pit 4 (morkg)	Conc ⁿ in 10:1				 	_	
	eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using F
Eluate Analysis	C_2		$\mathbf{A_2}$			12457-3 at L/S 10	
	m	g/l	mg	/kg	1		 -
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)	< 0.02		< 0.2		-	-	-
Tin Dissolved (CEN 10:1) (ICP-MS)	0.003		0.03		-	-	-
COD (CEN 10:1)	<7		< 70		-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
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					-	-	-
					-	-	-
ageh Test Information							- - -
	29/10/08		1		-	-	-
Date Prepared	29/10/08 9 278	-	1		-	-	-
Leach Test Information Date Prepared OH (pH Units) Conductivity (uS/cm)	9.278				-	-	-
Date Prepared DH (pH Units) Conductivity (μS/cm)	9.278 1323	-			-	-	-
Date Prepared	9.278				-	-	-

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	~					EF:CEN12457	
Mass Sample taken (kg) =	0.10725		Moisture Content	Ratio (%) =		19.41	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			83.75	
Particle Size <4mm =	>95%		,	(,			
Job Number		2	00817832		I an Jell Wass	40 1 0000100000	Yarida ania Timaida
Batch			1		Landfill Was	te Acceptance (riteria Limit
Sample Number(s)			11-12			Stable Non-	
Sampled Date			21/10/08		- Inert Waste	reactive Hazardous	Hazardous
Sample Identity		•	WS707/1		Landfill	Waste in Non-	Waste Landfi
Depth (m)			0.5			Hazardous	
Solid Waste Analysis						Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using B
Eluate Analysis	C_2		$\mathbf{A_2}$			12457-3 at L/S 10	
	mg	₅ /I	_	g/kg		12 10 / 0 40 11/0 10	<u> </u>
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001	9/ -	< 0.01	<u> </u>	_	_	_
Boron Dissolved (CEN 10:1) (ICP-MS)	0.09		0.9		-	_	_
Γin Dissolved (CEN 10:1) (ICP-MS)	0.002		0.02		_	_	_
COD (CEN 10:1)	<7		<70		_	_	_
56B (6B1, 10.1)	``		7,0		_	_	_
					_	_	_
					_	_	_
					_	_	_
					_	_	_
					_	_	_
					_	-	_
			1		-	-	-
			1		-	-	-
			1		-	-	-
			Ī		-	-	-
			Ī		-	-	-
					-	-	-
					-	-	-
Leach Test Information	20/10/09		7				
Date Prepared	29/10/08	-	4				
pH (pH Units)	9.107	-	4				
Conductivity (µS/cm)	1443	-	-1				
remperature (°C)	19.5	-	4				
Volume Leachant (Litres)	0.883	-					
Volume of Eluate VE1 (Litres)							

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	S .				K	EF:CEN12457	-2
4 0 1 (1 (4)	0.1167		Mile Control	D (' (0/)		20.47	
Mass Sample taken (kg) = Mass of dry sample (kg) =	0.1167 0.09		Moisture Content Dry Matter Content			30.47 76.65	
Particle Size <4mm =	>95%		Dry Matter Conter	iii Kaiio (%) =		70.03	
audic Size \frac{1}{2}inii -	<i>>737</i> 0						
Job Number		20	0817832				· · · · · · · · · · · · · · · · · · ·
Batch			1		Landfill Was	te Acceptance (Criteria Limits
Sample Number(s)			15-16			Stable Non-	
Sampled Date		2	1/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		V	VS707/3		Landfill	Waste in Non-	Waste Landfi
Depth (m)			1.5			Hazardous	
Solid Waste Analysis		_				Landfill	
Total Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-	ĺ			-	-	-
Sum of BTEX (mg/kg)	-	l			-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-	ł			-	-	-
PAH Sum of 17(mg/kg) oH (pH Units)		ł			-	-	-
ANC to pH 7 (mol/kg)	-	1			-	-	-
ANC to pH 4 (mol/kg)		1				<u> </u>	
ite to pit 4 (morkg)	Conc ⁿ in 10:1		,				I
	eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using B
Eluate Analysis	$\mathbf{C_2}$		$\mathbf{A_2}$			12457-3 at L/S 10	
	m	ig/l	mg	/kg	1		
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)	0.05		0.5		-	-	-
Fin Dissolved (CEN 10:1) (ICP-MS)	0.001		0.01		-	-	-
COD (CEN 10:1)	10		100		-	-	-
					-	-	-
					-	-	-
					-	-	-
			1		-	-	-
			1		-	-	-
			1		-		_
			1		_	_	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
Leach Test Information				l	-	-	-
Date Prepared	29/10/08	-					
oH (pH Units)	9.543	-					
Conductivity (µS/cm)	1350	-					
	19.4	-	_				
Геmperature (°С)							
Temperature (°C) Volume Leachant (Litres) Volume of Eluate VE1 (Litres)	0.873	-					

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	3				K	EF:CEN12457	<u>-2</u>
M C1- (-1 /1)	0.10052		Maiatana Cantant	D-4:- (0/)		21.26	
Mass Sample taken (kg) = Mass of dry sample (kg) =	0.10853 0.09		Moisture Content I Dry Matter Conter			82.47	
Particle Size <4mm =	>95%		Dry Matter Conter	it Katio (%) =		02.47	
	7,50,0						
Job Number		200	817832		1011 117		· · · · ·
Batch			1		Landfill Was	te Acceptance (<u> Criteria Limit</u>
Sample Number(s)		1	19-20			Stable Non-	
Sampled Date		21	/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		W	S707/5		Landfill	Waste in Non-	Waste Landfi
Depth (m)			2.5		_	Hazardous Landfill	
Solid Waste Analysis		•				Landin	
Total Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	Conc ⁿ in 10:1				-	-	-
	eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing tost using P
Eluate Analysis	C ₂		\mathbf{A}_2			12457-3 at L/S 10	
		g/l	mg	/kg		12.10. 0 40 10 10	
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001	, s, -	<0.01	· 8	_	_	_
Boron Dissolved (CEN 10:1) (ICP-MS)	< 0.02		<0.2		_	_	_
Γin Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
COD (CEN 10:1)	10		100		-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
Leach Test Information			 _				
Date Prepared	29/10/08	-					
pH (pH Units)	9.478	-					
Conductivity (µS/cm)	1112	-					
Γemperature (°C)	19.3	-					
Volume Leachant (Litres) Volume of Eluate VE1 (Litres)	0.881	-					
(- 1 # 1/14- \	i						

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

<u>Summa</u>	ary of Method Codes cont	tained within report :	ISO Accr	MC Accr	We San	Surı
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture content and description			WET	
TM008	BS 1377:Part 1977	Particle size distribution of solid samples			DRY	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro- chemical detection			NA	
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water			NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser			NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser	✓	✓	DRY	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser			NA	
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser			NA	
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit			NA	
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water			NA	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓		DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	
TM132	In - house Method	ELTRA CS800 Operators Guide	✓		DRY	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summa	ry of Method Codes cont	ained within report :	ISO Acci	MC Acci	We Sar	Sur. Cor
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample 1	Surrogate Corrected
TM132	In - house Method	ELTRA CS800 Operators Guide	✓	~	DRY	
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter	✓	√	WET	
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC	✓	√	DRY	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS			NA	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser			WET	
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)'	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique	✓		WET	
TM183	BS EN 23506:2002, (BS 6068- 2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry			NA	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Summary of Coolbox temperatures

Batch No.	Coolbox Temperature (°C)
1	10

ALcontrol Laboratories Analytical Services Sample Descriptions

Job Number: 08/17832/02/01 Grain sizes

Client: Buro Happold <0.063mm Very Fine Client Ref: 024435 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
WS703/1	0.50	Dark Brown	0.1mm - 2mm	Sandy Clay	2
WS703/5	2.50	Light Brown	0.1mm - 2mm	Sand	2
WS703/12	7.00	Light Brown	0.1mm - 2mm	Sand	2
WS703/13	8.00	Light Brown	0.1mm - 2mm	Sand	2

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

ALcontrol Laboratories Analytical Services * ISO 17025 accredited Validated **Table Of Results Preliminary**

M MCERTS accredited

* Subcontracted test » Shown on prev. report

Job Number: 08/17832/02/01 **Matrix: SOLID**

Hayle Cornwall **Location: Client:** Buro Happold 024435 **Client Contact:** Tom Smith Client Ref. No.:

Sample Identity	WS703/12	WS703/13					
Depth (m)	7.00	8.00				M	Ι
Sample Type	SOLID	SOLID				etho	_oD
Sampled Date	23.10.08	23.10.08				Method Code	LoD/Units
Sample Received Date	25.10.08	25.10.08				ode	its
Batch		2				1	
Sample Number(s)	34-36	37-39				1	
Antimony	<1.5	<1.5				TM129	<1.5 mg/kg
Arsenic	9	15				TM129 [#] _M	<3.0 mg/kg
Beryllium	< 0.4	< 0.4				TM129	<0.4 mg/kg
Cadmium	< 0.2	0.3				TM129	<0.2 mg/kg
Chromium	7.8	6.6				TM129 [#] _M	<4.5 mg/kg
Copper	<6	<6				TM129 [#] _M	<6 mg/kg
Lead	3	2				$TM129^{\#}_{M}$	<2 mg/kg
Mercury	< 0.4	< 0.4				$TM129^{\#}_{M}$	<0.4 mg/kg
Nickel	6.8	6.0				$TM129^{\#}_{M}$	<0.9 mg/kg
Selenium	<3	<3				$TM129^{\#}_{M}$	<3 mg/kg
Tin	1	1				TM129 [#]	<1 mg/kg
Zinc	47	43				TM129 [#] _M	<2.5 mg/kg
Easily Liberated Sulphide	<15	<15				TM180 [#]	<15 mg/kg
Chloride (soluble)	4500	3200				$TM097^{\#}_{M}$	<2 mg/kg
Soil Organic Matter	< 0.35	< 0.35				TM132 [#]	<0.35 %
Total Organic Carbon	< 0.2	< 0.2				TM132 [#] _M	<0.2 %
Easily Liberatable Cyanide	<1	<1				TM153	<1 mg/kg
% Stones Greater then 10mm	< 0.1	< 0.1				TM008	<0.1 %
Elemental Sulphur	<70	<70				TM136 [#] _M	<70 mg/kg
Fraction of Organic Carbon	< 0.002	< 0.002				TM132 [#]	<0.002 NONE
Moisture Content	19	15				PM024	%
pH Value	8.82	8.85				TM133 [#] _M	<1.00 pH Units

All results expressed on a dry weight basis.

Date	06.11.2008

Validated	√	ALcontro
Preliminary		

ol Laboratories Analytical Services * ISO 17025 accredited **Table Of Results**

M MCERTS accredited

* Subcontracted test » Shown on prev. report

Job Number: LIQUID 08/17832/02/01 **Matrix:**

Buro Happold Hayle Cornwall **Client: Location: Client Ref. No.:** 024435

Client Contact: Tom Smith

I						_	
Sample Identity	BH108	BH1001					
Depth (m)	1.40	1.60				ĭ	_
Sample Type	LIQUID	LIQUID				etho	CoD
Sampled Date	23.10.08	23.10.08				Method Code	LoD/Units
Sample Received Date	25.10.08	25.10.08				ode	its
Batch	2	2				()	
Sample Number(s)	23-25	26-28				i	
Antimony Dissolved (ICP-MS)	26	8.2				TM152 [#]	<0.75 ug/l
Arsenic Dissolved (ICP-MS)	33	140				TM152 [#]	<0.75 ug/l
Boron Dissolved (ICP-MS)	59	110				TM152 [#]	<20 ug/l
Cadmium Dissolved (ICP-MS)	1.4	<0.22				TM152#	<0.22 ug/l
Chromium Dissolved (ICP-MS)	2	1				TM152#	<1 ug/l
Copper Dissolved (ICP-MS)	54	14				TM152#	<1.6 ug/l
Lead Dissolved (ICP-MS)	1.0	<0.4				TM152 [#]	<0.4 ug/l
Nickel Dissolved (ICP-MS)	5.8	5.8				TM152 [#]	<1.5 ug/l
Selenium Dissolved (ICP-MS)	7	3				TM152 [#]	<1 ug/l
Zinc Dissolved (ICP-MS)	270	20				TM152 [#]	<5 ug/l
Mercury Dissolved (CVAF)	< 0.01	< 0.01				TM183 [#]	<0.01 ug/l
BOD	5	11				TM045 [#]	<1 mg/l
COD	370	210				TM107 [#]	<7 mg/l
Conductivity (at 20 deg.C)	1.2	0.76				TM120#	<0.014 mS/cm
Sulphate (soluble)	55	33				TM098#	<3 mg/l
Chloride	200	110				TM097#	<1 mg/l
Sulphide	< 0.1	< 0.1				TM101	<0.1 mg/l
Ammoniacal Nitrogen as N	< 0.2	< 0.2				TM099#	<0.2 mg/l
Total Organic Carbon	4	6				TM090 [#]	<3 mg/l
Phenols Monohydric	< 0.01	< 0.01				TM062 [#]	<0.01 mg/l
Total Cyanide	< 0.05	< 0.05				TM153 [#]	<0.05 mg/l
pH Value	7.49	7.48				TM133 [#]	<1.00 pH Units
EPH (DRO) (C10-C40) Aqueous	21	16000				TM172 [#]	<10 ug/l
GRO (C4-C10)	<10	68				TM089#	<10 ug/l
GRO (C10-C12)	<10	94				TM089 [#]	<10 ug/l
Benzene	<10	<10				TM089#	<10 ug/l
Toluene	<10	<10				TM089#	<10 ug/l
Ethyl benzene	<10	<10				TM089#	<10 ug/l
m & p Xylene	<10	<10				TM089#	<10 ug/l
o Xylene	<10	<10				TM089 [#]	<10 ug/l
Sum m&p and o Xylene	<10	<10				TM089#	<10 ug/l

Date	06.11.2008

Validated	✓	ALcontrol Laboratories Analytic
Preliminary		Table Of Results

cal Services # ISO 17025 accredited

M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 08/17832/02/01 **Matrix:** LIQUID

Client: Buro Happold Location: Hayle Cornwall Client Ref. No.: 024435 Client Contact: Tom Smith

Sample Identity	BH108	BH1001					
Depth (m)	1.40	1.60				Z	1
Sample Type		LIQUID				etho	_oD
Sampled Date		23.10.08				od (LoD/Units
Sample Received Date	25.10.08	25.10.08				Method Code	its
Batch		2					
Sample Number(s)		26-28					
Sum of BTEX	<10	<10				TM089 [#]	<10 ug/l
MTBE	<10	<10				TM089	<10 ug/l
MIDE	<10	<10				110009	<10 ug/1

Date	06.11.2008

Validated	✓	ALcontrol Laboratories Analy
Preliminary		Table Of Results

tical Services # ISO 17025 accredited

M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 08/17832/02/01 **Matrix:** LIQUID

Client: Buro Happold Location: Hayle Cornwall Client Ref. No.: 024435 Client Contact: Tom Smith

	027733			Chent				
Sample Identity	BH108	BH1001						
Depth (m)	1.40	1.60					M	I
Sample Type	LIQUID	LIQUID					etho	_oD
Sampled Date	23.10.08	23.10.08) d C	LoD/Units
Sample Received Date	25.10.08	25.10.08					Method Code	its
Batch	2	2						
Sample Number(s)		26-28						
PAH by GCMS								
Naphthalene Aqueous	<100	1300					TM178	<100 ng/l
Acenaphthylene Aqueous	<11	160					TM178	<11 ng/l
Acenaphthene Aqueous	<15	890					TM178	<15 ng/l
Fluorene Aqueous	<14	<14					TM178	<14 ng/l
Phenanthrene Aqueous	48	<22					TM178	<22 ng/l
Anthracene Aqueous	<15	<15					TM178	<15 ng/l
Fluoranthene Aqueous	24	25					TM178	<17 ng/l
Pyrene Aqueous	18	46					TM178	<15 ng/l
Benz(a)anthracene Aqueous	<17	<17					TM178	<17 ng/l
Chrysene Aqueous	<13	<13					TM178	<13 ng/l
Benzo(b)fluoranthene Aqueous	<23	<23					TM178	<23 ng/l
Benzo(k)fluoranthene Aqueous	<27	<27					TM178	<27 ng/l
Benzo(a)pyrene Aqueous	<9	<9					TM178	<9 ng/l
Indeno(123cd)pyrene Aqueous	<14	<14					TM178	<14 ng/l
Dibenzo(ah)anthracene Aqueous	<16	<16					TM178	<16 ng/l
Benzo(ghi)perylene Aqueous	<16	<16					TM178	<16 ng/l
PAH 16 Total Aqueous	<100	2400					TM178	<100 ng/l

Date	06.11.2008

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.11376 0.09		Moisture Content	` ′		26.61 78.98	
Mass of dry sample (kg) = Particle Size <4mm =	0.09 >95%		Dry Matter Conter	it Katio (%) =		78.98	
Particle Size <4mm =	>95%						
Job Number		2	200817832		I on dell XVon	te Acceptance (Yuitania Timita
Batch		2			Landini was	te Acceptance C	<u>THETIA LIIIIUS</u>
Sample Number(s)			30			Stable Non-	
Sampled Date			23/10/08		Inert Waste	reactive	Hazardous
Sample Identity			WS703/1		Landfill	Hazardous Waste in Non-	Waste Landfill
Depth (m)			0.50			Hazardous	
Solid Waste Analysis						Landfill	
Total Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
pH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached				
Eluate Analysis	C ₂		Α			compliance leach	
•			$\mathbf{A_2}$	/1	EN	12457-3 at L/S 10	<u> 1/kg</u>
A:	mg/	l .		/kg		1	1
Arsenic Barium	0.095 0.003		0.95 0.03		-	-	-
Cadmium	<0.003		<0.0022				-
Chromium	<0.001		<0.01				
Copper	0.0040		0.040		-		
Mercury	<0.0001		< 0.0001		-	-	_
Molybdenum	0.068		0.68		_	_	_
Nickel	< 0.0015		< 0.015		_	_	_
Lead	0.0007		0.007		_	_	_
Antimony	0.0012		0.012		_	_	_
Selenium	0.005		0.05		-	-	-
Zinc	1.2		12		-	-	-
Chloride	480		4800		-	-	-
Fluoride	0.6		6		-	-	-
Sulphate as SO ₄	130		1300		-	-	-
Total Dissolved Solids	930		9300		-	-	-
Phenols Monohydric	< 0.01		< 0.1		-	-	-
Dissolved Organic Carbon	6		60		-	-	-
Leach Test Information							
Date Prepared	01/11/08	-	_				
pH (pH Units)	8.697	-	_				
Conductivity (µS/cm)	1814.0	-	_				
Temperature (°C)	19.4	-					
Volume Leachant (Litres)	0.876	-					
Volume of Eluate VE1 (Litres)							

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.11063	Moisture Content Ratio (%) =		23.18	
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%)	=	81.18	
Particle Size <4mm =	>95%				
Job Number		200817832	Landfill Was	te Acceptance (Triteria I imits
Batch		2	Danum Was	te Acceptance v	oriteria Emints
Sample Number(s)		37-39		Stable Non-	
Sampled Date		23/10/08	Inert Waste	reactive Hazardous	Hazardous
Sample Identity		WS703/13	Landfill	Waste in Non-	Waste Landfill
Depth (m)		8.00		Hazardous	
Solid Waste Analysis				Landfill	
Total Organic Carbon (%)	<0.2		-	-	-
Loss on Ignition (%)	-		-	-	-
Sum of BTEX (mg/kg)	-		-	-	-
Sum of 7 PCBs (mg/kg)	-		-	-	-
Mineral Oil (mg/kg)	-		-	-	-
PAH Sum of 17(mg/kg)	- 0.07		-	-	-
pH (pH Units)	8.85		-	-	-
ANC to pH 7 (mol/kg)	-		-	-	-
ANC to pH 4 (mol/kg)	Conc ⁿ in 10:1		-	-	-
	eluate	10:1 conc ⁿ leached	I imit values for	compliance leach	ing toot voing Di
Eluate Analysis	C ₂	A_2		12457-3 at L/S 10	
	mg/l	mg/kg	EIN	12457-5 at L/5 10	7 1/ Kg
Arsenic	0.0056	0.056	_	-	_
Barium	0.003	0.03	_	_	_
Cadmium	<0.00022	<0.0022	_	-	_
Chromium	<0.001	<0.01	_	_	_
Copper	0.0027	0.027	-	-	-
Mercury	< 0.00001	< 0.0001	-	-	-
Molybdenum	0.005	0.05	-	-	-
Nickel	< 0.0015	< 0.015	-	-	-
Lead	< 0.0004	< 0.004	-	-	-
Antimony	< 0.00075	< 0.0075	-	-	-
Selenium	0.001	0.01	-	-	-
Zinc	< 0.005	< 0.05	-	-	-
Chloride	380	3800	-	-	-
Fluoride	<0.5	<5	-	-	-
Sulphate as SO ₄	58	580	-	-	-
Total Dissolved Solids	730	7300	-	-	-
Phenols Monohydric	<0.01	<0.1	-	-	-
Dissolved Organic Carbon Leach Test Information	<1	<10	-	-	-
Date Prepared	01/11/08 -				
pH (pH Units)	9.251 -				
Conductivity (µS/cm)	1293.0				
	19.4 -				
Temperature (°C) Volume Leachant (Litres)	19.4 - 0.879 -				

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.12065	Moisture Content	` ′		34.86	
Mass of dry sample (kg) =	0.09	Dry Matter Conter	nt Ratio (%) =		74.15	
Particle Size <4mm =	>95%					
Job Number		200817832		I on dell Woo	40 A 222242220	Yuitauia Tiuuita
Batch		2			te Acceptance (<u> riteria Limits</u>
Sample Number(s)		29			Stable Non-	
Sampled Date		23/10/08			reactive	
Sample Identity		WS703/5		Inert Waste Landfill	Hazardous Waste in Non-	Hazardous Waste Landfill
Depth (m)		2.50		Landini	Hazardous	waste Landin
Solid Waste Analysis				-	Landfill	
Total Organic Carbon (%)				_	-	_
Loss on Ignition (%)	 				<u> </u>	
Sum of BTEX (mg/kg)	-				-	-
Sum of 7 PCBs (mg/kg)	-				-	
Mineral Oil (mg/kg)	-				-	
PAH Sum of 17(mg/kg)	-					
pH (pH Units)	-					
ANC to pH 7 (mol/kg)	-					
ANC to pH 4 (mol/kg)					_	_
Are to pri 4 (morkg)	Conc ⁿ in 10:1				_	_
	eluate	10:1 conc ⁿ leached		I imit values for	compliance leach	ing tost using R
Eluate Analysis	C_2	$\mathbf{A_2}$			12457-3 at L/S 10	
	mg/l		/kg		12107 0 40 175 10	, 1/11 <u>5</u>
Arsenic	0.057	0.57	/15	_	_	l -
Barium	0.003	0.03		_	_	_
Cadmium	<0.00022	<0.0022		_	_	_
Chromium	0.001	0.01		_	_	_
Copper	0.0061	0.061		_	_	_
Mercury	<0.00001	< 0.0001		_	_	_
Molybdenum	< 0.001	< 0.01		_	_	_
Nickel	< 0.0015	< 0.015		_	_	_
Lead	0.0020	0.020		_	_	_
Antimony	< 0.00075	< 0.0075		_	_	_
Selenium	< 0.001	< 0.01		-	-	-
Zinc	0.71	7.1		-	-	-
Chloride	480	4800		-	-	-
Fluoride	< 0.5	<5		-	-	-
Sulphate as SO ₄	72	720		-	-	-
Total Dissolved Solids	920	9200		-	-	-
Phenols Monohydric	< 0.01	< 0.1		-	-	-
Dissolved Organic Carbon	<1	<10		-	-	_
Leach Test Information						
Date Prepared	01/11/08	-				
pH (pH Units)	9.204	-				
Conductivity (µS/cm)	1650.0	-				
Temperature (°C)	19.5	-				
	0.869					
Volume Leachant (Litres)	0.809					

CEN 10:1 ONE STAGE BATCH TEST

VAC ANALYTICAL RESULT	D .				IX.	EF:CEN12457	2
	0.11076		M	D : (0()		26.61	
Mass Sample taken (kg) =	0.11376		Moisture Content			26.61	
fass of dry sample (kg) = article Size <4mm =	0.09 >95%		Dry Matter Conter	nt Ratio (%) =		78.98	
article Size <4mm =	>95%						
ob Number		20	0817832		Landfill Was	te Acceptance (riteria Limits
atch			2				
ample Number(s)			30		1	Stable Non-	
ampled Date		2	3/10/08		Inert Waste	reactive Hazardous	Hazardous
ample Identity		V	VS703/1		Landfill	Waste in Non-	Waste Landfi
Depth (m)			0.50		_	Hazardous Landfill	
olid Waste Analysis		Ī				Lanum	
otal Organic Carbon (%)	-				-	-	-
oss on Ignition (%)	-				-	-	-
um of BTEX (mg/kg)	-				-	-	-
um of 7 PCBs (mg/kg)	-				-	-	-
fineral Oil (mg/kg)	-				-	-	-
AH Sum of 17(mg/kg)	-				-	-	-
H (pH Units) NC to pH 7 (mol/kg)	-				-	-	-
NC to pH 4 (mol/kg)	-				-	-	-
ive to pit 4 (mor/kg)	Conc ⁿ in 10:1					_	
	eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using B
Eluate Analysis	C_2		$\mathbf{A_2}$			12457-3 at L/S 10	
	m	g/l		y/kg			
eryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
oron Dissolved (CEN 10:1) (ICP-MS)	0.24		2.4		-	-	-
in Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
OD (CEN 10:1)	17		170		-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
	 		1		-	-	-
					-	-	
			1		-	-	
					-	_	-
					-	-	-
					-	-	-
each Test Information	01/11/00		7				
ate Prepared	01/11/08	-	-				
H (pH Units)	8.697 1814.0	-					
		-	1				
onductivity (μS/cm)	10.4		_				
emperature (°C) 'olume Leachant (Litres)	19.4 0.876	-	1				

Supplemental Report

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	-					EF:CEN12457	
Mass Sample taken (kg) =	0.11063		Moisture Content	Ratio (%) =		23.18	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			81.18	
Particle Size <4mm =	>95%		,	(,			
Job Number		20	00817832		I and Cil Was	40 A 0000400000	Suitania Timit
Batch		2			Landfill Was	te Acceptance (riteria Limit
Sample Number(s)			37-39			Stable Non-	
Sampled Date		2	23/10/08		T	reactive Hazardous	Hazardous
Sample Identity		W	/S703/13		Inert Waste Landfill	Waste in Non-	Waste Landfi
Depth (m)			8.00			Hazardous	
Solid Waste Analysis		•				Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached				
Eluate Analysis			Α			compliance leach	
Eluate Alialysis	C ₂		\mathbf{A}_2	<u> </u>	EN	12457-3 at L/S 10	<u>l/kg</u>
		g/l		g/kg		ı	1
Beryllium Dissolved (CEN 10:1) (ICP-MS)	<0.001		< 0.01		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)	0.12		1.2		-	-	-
Tin Dissolved (CEN 10:1) (ICP-MS)	0.002		0.02		-	-	-
COD (CEN 10:1)	<10		<100		-	-	-
					-	-	-
					-	-	-
			-		-	-	-
			<u> </u>		-	-	-
			-		 	-	-
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			1	 	-	-	_
			1	<u> </u>	_	-	_
			1		-	-	-
Leach Test Information			_	•	-	•	•
Date Prepared	01/11/08	-	3				
oH (pH Units)	9.251	-	_				
Conductivity (µS/cm)	1293.0	-					
	19.4	-					
Геmperature (°С)							
Γemperature (°C) Volume Leachant (Litres)	0.879	-					

Supplemental Report

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.12065		Moisture Content	Ratio (%) =		34.86	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			74.15	
Particle Size <4mm =	>95%		3				
Job Number		20	00817832		1011 117		N
Batch		2			Landfill Was	te Acceptance (<u> Priteria Limits</u>
Sample Number(s)			29			Stable Non-	
Sampled Date		2	23/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		7	WS703/5		Landfill	Waste in Non-	Waste Landfi
Depth (m)			2.50			Hazardous	
Solid Waste Analysis						Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
pH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		I imit values for	compliance leach	ing tost using B
Eluate Analysis	C ₂		$\mathbf{A_2}$			12457-3 at L/S 10	
	mş	-/I	_	/lza	EIN	12457-5 at L/5 10	1/Kg
Damilium Disselved (CEN 10:1) (ICD MC)	< 0.001	2/1		/kg			I
Beryllium Dissolved (CEN 10:1) (ICP-MS) Boron Dissolved (CEN 10:1) (ICP-MS)	0.11		<0.01		-	-	-
Fin Dissolved (CEN 10.1) (ICP-MS)	<0.011		<0.01		-	-	-
COD (CEN 10:1)	<10		<100				_
30D (CEN 10.1)	<10		<100		-		_
					-	_	_
					_	_	_
						_	_
					_	_	_
			1		 		_
			1		_	<u> </u>	_
			1		_	<u> </u>	-
					_	_	_
			Ī		_	_	_
			Î		_	_	_
					-	-	_
					-	-	-
					-	-	-
Leach Test Information			_				
Date Prepared	01/11/08	-					
pH (pH Units)	9.204	-	_				
Conductivity (µS/cm)	1650.0	-	J				
Γemperature (°C)	19.5	-	_				
	0.960	-					
Volume Leachant (Litres)	0.869						

Supplemental Report

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

<u>Summa</u>	ary of Method Codes cont	ained within report :	ISO Accr	MC Accr	We San	Surı
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample 1	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture content and description			WET	
TM008	BS 1377:Part 1977	Particle size distribution of solid samples			DRY	
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) by Oxygen Meter	✓		NA	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro- chemical detection			NA	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro- chemical detection	✓		NA	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)			NA	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓		NA	
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water			NA	
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water	✓		NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser			NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser	✓		NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser	✓	✓	DRY	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser			NA	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser	✓		NA	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summa	ry of Method Codes cont	tained within report :	ISO Accr	MCI Accr	Wet San	Surr
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample 1	Surrogate Corrected
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser	✓		NA	
TM101	Method 4500B & C, AWWA/APHA, 20th Ed., 1999	Determination of Sulphide in soil and water samples using the Kone Analyser			NA	
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser			NA	
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit			NA	
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit	✓		NA	
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter	✓		NA	
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water			NA	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓		DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	
TM132	In - house Method	ELTRA CS800 Operators Guide	✓		DRY	
TM132	In - house Method	ELTRA CS800 Operators Guide	✓	✓	DRY	
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter	✓		NA	
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter	✓	✓	WET	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summa	ry of Method Codes cont	ained within report :	ISO Accı	MC Acci	We Sar	Sur. Cor
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample 1	Surrogate Corrected
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC	✓	✓	DRY	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS			NA	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS	✓		NA	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser			WET	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser	✓		NA	
TM172		EPH in Waters	✓		NA	
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters			NA	
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)'	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique	✓		WET	
TM183	BS EN 23506:2002, (BS 6068- 2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry			NA	
TM183	BS EN 23506:2002, (BS 6068- 2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry	✓		NA	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Summary of Coolbox temperatures

Batch No.	Coolbox Temperature (°C)
2	10.4

Job Number: 09/02799/02/01 **Grain sizes**

Client: Buro Happold <0.063mm Very Fine **Client Ref:** 024435

0.1mm - 0.063mm Fine

0.1mm - 2mm Medium 2mm - 10mm Coarse >10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
BA1	0.0-0.1	Brown	0.1mm - 0.063mm	Silt Loam	1
D1	0.0-0.2	Dark Grey	0.1mm - 0.063mm	Silt Loam	1
D2	0.4-0.8	Light Grey	0.1mm - 0.063mm	Loamy Sand	1
D3	0.0-0.1	Light Grey	0.1mm - 0.063mm	Silt Loam with some Stones	1
D4	0.0-0.1	Light Brown	0.1mm - 0.063mm	Sand	1
D4	0.8-1.1	Beige	0.1mm - 0.063mm	Sand	1
D5	0.0-0.1	Beige	0.1mm - 2mm	Sand with some Vegetation	1
D6	0.0-0.1	Beige	0.1mm - 2mm	Sand with some Vegetation	1
D6	0.6-0.7	Beige	0.1mm - 2mm	Sand	1
D7	0.0-0.1	Beige	0.1mm - 2mm	Sand	1
HA1	0.0	Light Brown	0.1mm - 2mm	Sand with some Vegetation	1
HA2	0.0	Brown	0.1mm - 2mm	Sand with some Stones	1
HA2	0.0-0.1	Light Brown	0.1mm - 2mm	Sand	1
HA2	0.5-0.7	Beige	0.1mm - 2mm	Sand	1
HA3	0.0	Brown	0.1mm - 0.063mm	Silt Loam with some Stones	1
HA3	0.2-0.4	Beige	0.1mm - 2mm	Sand	1
HA3	1.0-1.3	Beige	0.1mm - 2mm	Sand	1
HA4	0.0	Light Brown	0.1mm - 2mm	Sand with some Stones	1
HA4	0.3-0.5	Beige	0.1mm - 2mm	Sand with some Stones	1
HA4	0.7-0.8	Light Brown	0.1mm - 2mm	Sand	1
HA5	0.0	Light Brown	0.1mm - 2mm	Sand with some Stones	1
HA5	0.3-0.5	Brown	0.1mm - 2mm	Sandy Clay Loam with some Stones	1
HA5	0.7-0.9	Light Brown	0.1mm - 2mm	Sand	1
HA5	1.0-1.3	Light Brown	0.1mm - 2mm	Sand	1
HA6	0.0-0.2	Brown	0.1mm - 2mm	Loamy Sand with some Stones	1
HA6	0.3-0.5	Light Brown	0.1mm - 2mm	Sand	1
HA7	0.0-0.1	Light Brown	0.1mm - 0.063mm	Loamy Sand	1
HA8	0.0-0.1	Dark Grey	0.1mm - 0.063mm	Loamy Sand	1
HA8	0.30-0.55	Brown	0.1mm - 0.063mm	Loamy Sand with some Stones	1
HA8	0.6-0.7	Brown	0.1mm - 0.063mm	Silt Loam with some Stones	1
HA8	0.7-1.0	Light Brown	0.1mm - 0.063mm	Sandy Loam	1
HA9	0.0-0.5	Brown	0.1mm - 2mm	Sand with some Stones	1
HA9	0.30-0.45	Brown	0.1mm - 2mm	Sand with some Stones	1

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

¹ Sample Description supplied by client

Job Number: 09/02799/02/01 Grain sizes

Client: Buro Happold <0.063mm Very Fine

Client Ref: 024435 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
HA9	1.0-1.4	Light Brown	0.1mm - 2mm	Loamy Sand with some Stones	1
HA10	0.0-0.1	Brown	0.1mm - 2mm	Sandy Loam with some Stones	1
HA10	0.30-0.55	Light Brown	0.1mm - 2mm	Loamy Sand	1
HA11	0.0-0.1	Brown	0.1mm - 0.063mm	Loamy Sand	1
HA11	0.45-0.80	Brown	0.1mm - 0.063mm	Sandy Silt Loam	1
HA11	1.0-1.4	Beige	0.1mm - 0.063mm	Sand	1
HA12	0.0-0.1	Brown	0.1mm - 0.063mm	Sandy Loam	1
HA13	0.0-0.2	Brown	<0.063mm	Loamy Sand	1
HA14	0.00-0.05	Brown	0.1mm - 2mm	Loamy Sand with some Stones	1
HA14	0.2-0.3	Brown	0.1mm - 2mm	Sandy Clay Loam	1
HA14	1.0-1.3	Light Brown	0.1mm - 2mm	Sand	1
HA15	0.0-0.1	Brown	0.1mm - 2mm	Loamy Sand	1
HA16	0.0-0.1	Brown	0.1mm - 2mm	Sand with some Stones	1
HA16	0.25-0.60	Brown	0.1mm - 0.063mm	Silt Loam	1
HA17	0.15-0.25	Brown	0.1mm - 0.063mm	Silt Loam	1
HA17	0.60-0.75	Brown	0.1mm - 0.063mm	Sand	1
HA17	1.0-1.3	Beige	0.1mm - 0.063mm	Sand	1
HA19	1.0-1.1	Beige	0.1mm - 0.063mm	Sand	1
HA21	0.5-0.7	Dark Grey	0.1mm - 0.063mm	Loamy Sand with some Stones	1
HA24	0.00-0.05	Grey	0.1mm - 0.063mm	Loamy Sand	1
HA24	0.5-0.6	Beige	0.1mm - 0.063mm	Silt Loam	1
HA25	0.00-0.05	Brown	0.1mm - 0.063mm	Loamy Sand with some Stones	1
HA25	0.3-0.4	Brown	0.1mm - 0.063mm	Loamy Sand	1
HA25	0.75-0.95	Light Brown	0.1mm - 2mm	Sand	1
HA26	0.0-0.1	Brown	0.1mm - 2mm	Loamy Sand	1
HA26	1.00-1.15	Light Brown	0.1mm - 2mm	Sand	1
HA27	0.0-0.1	Brown	0.1mm - 2mm	Sand with some Stones	1
HA27	0.4-0.5	Brown	0.1mm - 2mm	Sand with some Stones	1
HA27	0.8-1.0	Light Brown	0.1mm - 2mm	Sand	1
HA28	0.0-0.1	Brown	0.1mm - 2mm	Sand with some Vegetation	1
HA29	0.0-0.1	Brown	0.1mm - 2mm	Sand with some Stones	1
HA29	0.4-0.5	Light Brown	0.1mm - 2mm	Sand	1
HA30	0.02-0.05	Brown	0.1mm - 2mm	Sandy Silt Loam	1

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

¹ Sample Description supplied by client

Job Number: 09/02799/02/01 Grain sizes

Client: Buro Happold <0.063mm Very Fine Client Ref: 024435 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
HA30	0.50-0.65	Light Brown	0.1mm - 2mm	Sand	1
NQHA1	0.0-0.1	Brown	0.1mm - 2mm	Loamy Sand with some Stones	1
NQHA1	0.2-0.3	Dark Brown	0.1mm - 2mm	Loamy Sand with some Coal Fragments	1
NQHA4	0.0-0.1	Dark Brown	0.1mm - 2mm	Loamy Sand with some Coal Fragments	1
NQHA5	0.2-0.3	Dark Brown	0.1mm - 2mm	Loamy Sand with some Vegetation	1
					-
					-
					-
					-
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^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

¹ Sample Description supplied by client

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ntrol Laboratories Analytical Services # ISO 17025 accredited **Table Of Results**

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* Subcontracted test

» Shown on prev. report

09/02799/02/01 Job Number: **Matrix: SOLID** Buro Happold **Client: Location: HAYLE Client Contact:** James Boyle **Client Ref. No.:** 024435

Sample Identity	BA1	D1	D2	D3	D4	D4	D5	D6	D6		
Depth (m)	0.0-0.1	0.0-0.2	0.4-0.8	0.0-0.1	0.0-0.1	0.8-1.1	0.0-0.1	0.0-0.1	0.6-0.7	≤	
Sample Type		SOLID	eth	LoL							
Sampled Date	26.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	0d (LoD/Units
Sample Received Date	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	Method Code	its
Batch	1	1	1	1	1	1	1	1	1	"	
Sample Number(s)		2	3	4	5	6	7	8	9	1	
Arsenic	230	280	35	34	36	34	40	40	42	TM129 [#] _M	<3.0 mg/kg
Cadmium	1.4	1.6	0.3	0.2	0.2	0.3	0.3	0.3	0.3	TM129	<0.2 mg/kg
Copper	530	490	23	24	27	31	27	27	28	TM129 [#] _M	<6 mg/kg
Lead	120	100	7	8	10	9	11	11	9	TM129 [#] _M	
Zinc	820	750	54	48	66	63	58	51	49	TM129 [#] _M	
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* Subcontracted test

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Job Number: 09/02799/02/01 **Matrix: SOLID** Buro Happold **Client: Location: HAYLE Client Contact:** James Boyle **Client Ref. No.:** 024435

Sample Identity	D7	HA1	HA2	HA2	HA2	НА3	НА3	НА3	HA4		
Depth (m)	0.0-0.1	0.0	0.0	0.0-0.1	0.5-0.7	0.0	0.2-0.4	1.0-1.3	0.0	ĭ	_ I
Sample Type	SOLID	Method Code	LoD/Units								
Sampled Date		24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09		
Sample Received Date	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	10	11	12	13	14	15	16	17	18		
Arsenic	42	210	140	70	32	100	13	62	59	$TM129^{\#}_{\ M}$	<3.0 mg/kg
Cadmium	0.3	1.1	0.5	0.3	0.3	0.4	< 0.2	0.3	0.4	TM129	<0.2 mg/kg
Copper	32	120	260	140	98	160	60	190	83	TM129 [#] _M	<6 mg/kg
Lead	10	14	43	28	13	40	4	17	9	TM129 [#] _M	<2 mg/kg
Zinc	63	130	210	180	120	260	80	150	180	TM129 [#] _M	<2.5 mg/kg

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Laboratories Analytical Services # ISO 17025 accredited **Table Of Results**

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* Subcontracted test

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Job Number: 09/02799/02/01 **Matrix: SOLID** Buro Happold **Client: Location: HAYLE Client Contact:** James Boyle **Client Ref. No.:** 024435

Sample Identity	HA4	HA4	HA5	HA5	HA5	HA5	НА6	НА6	НА7		
Depth (m)	0.3-0.5	0.7-0.8	0.0	0.3-0.5	0.7-0.9	1.0-1.3	0.0-0.2	0.3-0.5	0.0-0.1	₹	I
Sample Type	SOLID	etho	,oD								
Sampled Date	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	Method Code	LoD/Units
Sample Received Date	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09		
Batch		1	1	1	1	1	1	1	1	1	
Sample Number(s)	19	71	20	21	22	23	24	25	26		
Arsenic	37	29	140	840	69	49	120	24	100	$TM129^{\#}_{M}$	<3.0 mg/kg
Cadmium	0.3	0.3	0.6	7.8	0.6	0.4	0.4	0.2	0.6	TM129	<0.2 mg/kg
Copper	100	59	170	2000	190	130	490	77	220	TM129 [#] _M	<6 mg/kg
Lead	10	10	36	300	18	15	110	8	35	TM129 [#] _M	<2 mg/kg
Zinc	140	97	150	2000	260	140	980	93	290	TM129 [#] _M	<2.5 mg/kg
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rol Laboratories Analytical Services # ISO 17025 accredited **Table Of Results**

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Job Number: 09/02799/02/01 **Matrix: SOLID** Buro Happold **Client: Location: HAYLE Client Contact:** James Boyle **Client Ref. No.:** 024435

					1	1		ı	1	1	
Sample Identity	HA8	HA8	HA8	HA8	HA9	HA9	HA9	HA10	HA10		
Depth (m)	0.0-0.1	0.30-0.55	0.6-0.7	0.7-1.0	0.0-0.5	0.30-0.45	1.0-1.4	0.0-0.1	0.30-0.55	≱	_
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	etho	Co.
Sampled Date	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	24.02.09	M C	LoD/Units
Sample Received Date	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	Method Code	its
Batch		1	1	1	1	1	1	1	1		
Sample Number(s)		28	29	30	31	32	33	34	35		
Arsenic	97	500	110	69	82	120	120	85	78	TM129 [#] _M	<3.0 mg/kg
Cadmium	0.5	2.6	0.4	0.5	0.4	0.6	0.7	0.5	0.5	TM129	<0.2 mg/kg
Copper	130	820	140	210	110	320	200	110	210	TM129 [#] _M	<6 mg/kg
Lead	35	180	37	27	32	59	40	33	31	TM129 [#] _M	<2 mg/kg
Zinc	280	530	200	180	180	280	250	170	190	TM129 [#] _M	<2.5 mg/kg

All results expressed	lona	dry	weight	haci
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Lcontrol Laboratories Analytical Services # ISO 17025 accredited **Table Of Results**

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* Subcontracted test

» Shown on prev. report

09/02799/02/01 **Matrix: SOLID** Job Number: Buro Happold **Client: Location: HAYLE Client Contact:** James Boyle **Client Ref. No.:** 024435

Depth Dept	Sample Identity	HA11	HA11	HA11	HA12	HA13	HA14	HA14	HA14	HA15		
Sample Type SOLID	Denth (m)	0.0-0.1	0.45-0.80	1.0-1.4	0.0-0.1	0.0-0.2	0.00-0.05	0.2-0.3	1.0-1.3	0.0-0.1	>	
Batch 1 <th>_</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>leth</th> <th>Lol</th>	_										leth	Lol
Batch 1 <th></th> <th>od</th> <th>J/C</th>											od	J/C
Batch 1 <th>_</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Cod</th> <th>nits</th>	_										Cod	nits
Sample Number(s) 36 37 38 39 40 41 42 43 44 Arsenic 100 680 26 120 120 190 870 21 49 TM129 [#] _M <3.0 mg/kg Cadmium 0.5 3.3 0.3 0.6 0.5 0.8 3.6 0.2 0.3 TM129 <0.2 mg/kg Copper 110 2100 65 120 140 240 1300 62 83 TM129 [#] _M <6 mg/kg Lead 36 250 6 35 31 45 180 6 21 TM129 [#] _M <2 mg/kg	_										e	
Arsenic 100 680 26 120 120 190 870 21 49 $TM129_{M}^{\#}$ <3.0 mg/kg Cadmium 0.5 3.3 0.3 0.6 0.5 0.8 3.6 0.2 0.3 $TM129_{M}^{\#}$ <6 mg/kg Copper 110 2100 65 120 140 240 1300 62 83 $TM129_{M}^{\#}$ <6 mg/kg Lead 36 250 6 35 31 45 180 6 21 $TM129_{M}^{\#}$ <2 mg/kg												
Cadmium 0.5 3.3 0.3 0.6 0.5 0.8 3.6 0.2 0.3 TM129 <0.2 mg/kg											TM120#	<3.0 mg/kg
Copper 110 2100 65 120 140 240 1300 62 83 $TM129_{M}^{\#}$ <6 mg/kg Lead 36 250 6 35 31 45 180 6 21 $TM129_{M}^{\#}$ <2 mg/kg												
Lead 36 250 6 35 31 45 180 6 21 $TM129_{M}^{\#}$ <2 mg/kg												
Laire 200 100 12 190 100 20 040 06 140 1M129 25 190												
	ZIIIC	200	1500	12	190	180	230	040	08	140	11V1129 M	<2.5 IIIg/Kg

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Job Number: 09/02799/02/01 **Matrix: SOLID** Buro Happold **Client: Location: HAYLE Client Contact:** James Boyle **Client Ref. No.:** 024435

Sample Identity	HA16	HA16	HA17	HA17	HA17	HA19	HA21	HA24	HA24		
Depth (m)	0.0-0.1	0.25-0.60	0.15-0.25	0.60-0.75	1.0-1.3	1.0-1.1	0.5-0.7	0.00-0.05	0.5-0.6	M	1
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	eth	_oD
Sampled Date	25.02.09	25.02.09	25.02.09	25.02.09	25.02.09	25.02.09	25.02.09	26.02.09	26.02.09	Method Code	LoD/Units
Sample Received Date	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	ode	ts
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	45	46	47	48	49	50	51	52	53		
Arsenic	61	69	530	250	27	25	630	60	16	$TM129^{\#}_{M}$	<3.0 mg/kg
Cadmium	0.3	0.4	2.2	1.1	0.2	< 0.2	6.6	0.3	< 0.2	TM129	<0.2 mg/kg
Copper	120	140	760	450	57	52	2400	73	45	TM129 [#] _M	<6 mg/kg
Lead	23	31	90	72	5	6	260	23	5	TM129 [#] _M	<2 mg/kg
Zinc	150	140	580	260	60	55	2000	180	55	TM129 [#] _M	<2.5 mg/kg

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Job Number: 09/02799/02/01 **Matrix: SOLID** Buro Happold **Client: Location: HAYLE Client Contact:** James Boyle **Client Ref. No.:** 024435

						1	•				
Sample Identity	HA25	HA25	HA25	HA26	HA26	HA27	HA27	HA27	HA28		
Depth (m)	0.00-0.05	0.3-0.4	0.75-0.95	0.0-0.1	1.00-1.15	0.0-0.1	0.4-0.5	0.8-1.0	0.0-0.1	≥	
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	eth	CoD
Sampled Date		26.02.09	26.02.09	26.02.09	26.02.09	26.02.09	26.02.09	26.02.09	26.02.09	Method Code	LoD/Units
Sample Received Date	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	ode	its
Batch		1	1	1	1	1	1	1	1		
Sample Number(s)		55	56	57	58	59	60	61	62	1	
Arsenic	78	1100	27	110	61	62	31	23	89	TM129 [#] _M	<3.0 mg/kg
Cadmium	0.4	4.4	0.3	0.4	0.6	0.4	0.2	<0.2	0.5	TM129	<0.2 mg/kg
Copper	110	1300	66	150	210	130	89	41	110	TM129 [#] _M	<6 mg/kg
Lead	23	170	2	38	19	21	19	6	40	TM129 [#] _M	<2 mg/kg
Zinc	150	700	89	190	210	210	120	57	330	TM129 [#] _M	

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* Subcontracted test

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Job Number: 09/02799/02/01 **Matrix: SOLID** Buro Happold **Client: Location: HAYLE Client Contact:** James Boyle **Client Ref. No.:** 024435

Sample Identity	HA29	HA29	HA30	HA30	NQHA1	NQHA1	NQHA4	NQHA5			
Depth (m)	0.0-0.1	0.4-0.5	0.02-0.05	0.50-0.65	0.0-0.1	0.2-0.3	0.0-0.1	0.2-0.3		≥	
Sample Type		SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		eth	LoL
Sampled Date	26.02.09	26.02.09	26.02.09	26.02.09	25.02.09	25.02.09	25.02.09	25.02.09		Method Code	LoD/Units
Sample Received Date	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09	28.02.09		ode	its
Batch	1	1	1	1	1	1	1	1			
Sample Number(s)	63	64	65	66	68	69	67	70		1	
Arsenic	100	20	950	29	51	130	100	120		TM129 [#] _M	<3.0 mg/kg
Cadmium	0.5	0.2	3.9	0.2	0.3	0.9	0.6	1.0		TM129	<0.2 mg/kg
Copper	150	47	1200	72	37	440	240	420		TM129 [#] _M	<6 mg/kg
Lead	430	38	160	6	21	2600	47	30		TM129 [#] _M	<2 mg/kg
Zinc	190	61	650	69	67	260	230	430		TM129 [#] _M	
<u> </u>								<u> </u>	1	<u> </u>	

Job Number: 09/02799/02/01

 Client: Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

ACM Asbestos Containing Materia » Result previously reported (Incremental reports only)

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EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summa	ary of Method Codes cont	ISO Accı	MCI Accr	We Sar	Suri	
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	√	DRY	

¹Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **WET** indicates samples analysed as submitted.

Job Number: 09/02799/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Summary of Coolbox temperatures

Batch No.	Coolbox Temperature (°C)
1	12

Job Number: 09/02799/02/01 Grain sizes

Client: Buro Happold <0.063mm Very Fine

Client Ref: 024435 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
HA11	0.45-0.80	Brown	0.1mm - 0.063mm	Sandy Silt Loam	1
HA25	0.3-0.4	Brown	0.1mm - 0.063mm	Loamy Sand	1
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^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

¹ Sample Description supplied by client

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULT	ΓS				R	EF:CEN12457	-3	
Mass Sample taken (kg) =	0.23593		Moisture Content	Ratio (%) =		35.04		
Mass of dry sample (kg) =	0.175		Dry Matter Conte	nt Ratio (%) =	74.05			
Particle Size <4mm =	>95%							
Job Number	T	200	0902799		T 10411 XX7			
Batch			1		Landfill Was	te Acceptance (Criteria Limits	
Sample Number(s)			37			Stable Non-		
Sampled Date		25	5/02/09		Inert Waste	reactive Hazardous	Hazardous	
Sample Identity]	HA11		Landfill	Waste in Non-	Waste Landfi	
Depth (m)		0.	45-0.80			Hazardous Landfill		
Solid Waste Analysis		·						
Total Organic Carbon (%)	-				3	5	6	
Loss on Ignition (%)	-				-	-	10	
Sum of BTEX (mg/kg)	-				6	-	-	
Sum of 7 PCBs (mg/kg)	-				1	-	-	
Mineral Oil (mg/kg)	-				500	-	-	
PAH Sum of 17(mg/kg)	-				100	-	-	
pH (pH Units)	-				-	>6	-	
ANC to pH 7 (mol/kg)	-				-	to be evaluated	to be evaluated	
ANC to pH 4 (mol/kg)	-				-	to be evaluated	to be evaluated	
	Conc ⁿ in 2:1 eluate	Conc ⁿ in 8:1 eluate	2:1 conc ⁿ leached	Cumulative conc ⁿ leached	Limit values for	compliance leach	ing test using R	
Eluate Analysis	$\mathbf{C_2}$	C ₈	\mathbf{A}_2	A ₂₋₁₀		12457-3 at L/S 10		
		g/l		g/kg				
Arsenic	0.099	0.19	0.20	1.8	0.5	2	25	
Barium	0.029	< 0.001	0.06	0.04	20	100	300	
Cadmium	< 0.00022	< 0.00022	< 0.00044	<0.0022	0.04	1	5	
Chromium	0.002	< 0.001	< 0.002	< 0.01	0.5	10	70	
Copper	0.011	0.0067	0.022	0.073	2	50	100	
Mercury	< 0.00001	< 0.00001	< 0.00002	< 0.0001	0.01	0.2	2	
Molybdenum	0.006	0.002	0.01	0.03	0.5	10	30	
7	0.006 <0.0015	0.002 <0.0015	0.01 <0.003	0.03 <0.015			30 40	
Nickel					0.5	10		
Nickel Lead	< 0.0015	< 0.0015	< 0.003	< 0.015	0.5 0.4	10 10	40	
Nickel Lead Antimony	<0.0015 0.0013	<0.0015 0.0006	<0.003 0.003	<0.015 0.007	0.5 0.4 0.5	10 10 10	40 50	
Nickel Lead Antimony Selenium	<0.0015 0.0013 0.0018	<0.0015 0.0006 0.0067	<0.003 0.003 0.0036	<0.015 0.007 0.060	0.5 0.4 0.5 0.06	10 10 10 0.7	40 50 5	
Nickel Lead Antimony Selenium Zinc	<0.0015 0.0013 0.0018 0.021	<0.0015 0.0006 0.0067 0.002	<0.003 0.003 0.0036 0.04	<0.015 0.007 0.060 0.05	0.5 0.4 0.5 0.06 0.1	10 10 10 0.7 0.5	40 50 5 7	
Nickel Lead Antimony Selenium Zinc Chloride	<0.0015 0.0013 0.0018 0.021 0.018	<0.0015 0.0006 0.0067 0.002 <0.005	<0.003 0.003 0.0036 0.04 0.04	<0.015 0.007 0.060 0.05 <0.05	0.5 0.4 0.5 0.06 0.1	10 10 10 0.7 0.5 50	40 50 5 7 200	
Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄	<0.0015 0.0013 0.0018 0.021 0.018 2500	<0.0015 0.0006 0.0067 0.002 <0.005 140	<0.003 0.003 0.0036 0.04 0.04 5000	<0.015 0.007 0.060 0.05 <0.05 4700	0.5 0.4 0.5 0.06 0.1 4 800	10 10 10 0.7 0.5 50 15000	40 50 5 7 200 25000	
Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄	<0.0015 0.0013 0.0018 0.021 0.018 2500 1.3	<0.0015 0.0006 0.0067 0.002 <0.005 140 0.6	<0.003 0.003 0.0036 0.04 0.04 5000 3	<0.015 0.007 0.060 0.05 <0.05 4700 7	0.5 0.4 0.5 0.06 0.1 4 800	10 10 10 0.7 0.5 50 15000	40 50 5 7 200 25000 500	
Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids	<0.0015 0.0013 0.0018 0.021 0.018 2500 1.3 370 4500 <0.01	<0.0015 0.0006 0.0067 0.002 <0.005 140 0.6 29	<0.003 0.003 0.0036 0.04 0.04 5000 3 730	<0.015 0.007 0.060 0.05 <0.05 4700 7 760	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 5000	
Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon	<0.0015 0.0013 0.0018 0.021 0.018 2500 1.3 370 4500	<0.0015 0.0006 0.00067 0.002 <0.005 140 0.6 29 320	<0.003 0.003 0.0036 0.04 0.04 5000 3 730 9100	<0.015 0.007 0.060 0.05 <0.05 4700 7 760 9100	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 10 0.7 0.5 50 15000 150 20000	40 50 5 7 200 25000 500 5000	
Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information	<0.0015 0.0013 0.0018 0.021 0.018 2500 1.3 370 4500 <0.01 <3	<0.0015 0.0006 0.0067 0.002 <0.005 140 0.6 29 320 0.01 <3	<0.003 0.003 0.0036 0.04 0.04 5000 3 730 9100 <0.02	<0.015 0.007 0.060 0.05 <0.05 4700 7 760 9100 0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 5000 50000 100000	
Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared	<0.0015 0.0013 0.0018 0.021 0.018 2500 1.3 370 4500 <0.01 <3	<0.0015 0.0006 0.0067 0.002 <0.005 140 0.6 29 320 0.01 <3	<0.003 0.003 0.0036 0.04 0.04 5000 3 730 9100 <0.02	<0.015 0.007 0.060 0.05 <0.05 4700 7 760 9100 0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 50000 100000	
Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units)	 <0.0015 0.0013 0.0018 0.021 0.018 2500 1.3 370 4500 <0.01 <3 16/03/09 8.170 	<0.0015 0.0006 0.0067 0.002 <0.005 140 0.6 29 320 0.01 <3	<0.003 0.003 0.0036 0.04 0.04 5000 3 730 9100 <0.02	<0.015 0.007 0.060 0.05 <0.05 4700 7 760 9100 0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 5000 50000 100000	
Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm)	<0.0015 0.0013 0.0018 0.021 0.018 2500 1.3 370 4500 <0.01 <3	<0.0015 0.0006 0.0067 0.002 <0.005 140 0.6 29 320 0.01 <3	<0.003 0.003 0.0036 0.04 0.04 5000 3 730 9100 <0.02	<0.015 0.007 0.060 0.05 <0.05 4700 7 760 9100 0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 50000 100000	
Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm) Temperature (°C)	 <0.0015 0.0013 0.0018 0.021 0.018 2500 1.3 370 4500 <0.01 <3 16/03/09 8.170 7.38 19.7 	<0.0015 0.0006 0.0067 0.002 <0.005 140 0.6 29 320 0.01 <3	<0.003 0.003 0.0036 0.04 0.04 5000 3 730 9100 <0.02	<0.015 0.007 0.060 0.05 <0.05 4700 7 760 9100 0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 50000 100000	
Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm)	<0.0015 0.0013 0.0018 0.021 0.018 2500 1.3 370 4500 <0.01 <3 16/03/09 8.170 7.38	<0.0015 0.0006 0.00067 0.002 <0.005 140 0.6 29 320 0.01 <3	<0.003 0.003 0.0036 0.04 0.04 5000 3 730 9100 <0.02	<0.015 0.007 0.060 0.05 <0.05 4700 7 760 9100 0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 50000 100000	

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULT	S				R	EF:CEN12457	7-3		
Mass Sample taken (kg) =	0.22336		Moisture Content	` ′		27.27			
Mass of dry sample (kg) = Particle Size <4mm =	0.175 >95%		Dry Matter Conter	nt Ratio (%) =	78.57				
	•								
Job Number		200	0902799		Landfill Waste Acceptance Criteria Limit				
Batch			1		•				
Sample Number(s)			55			Stable Non-			
Sampled Date		20	6/02/09			reactive			
Sample Identity		1	HA25		Inert Waste	Hazardous	Hazardous		
•					Landfill	Waste in Non- Hazardous	Waste Landfill		
Depth (m)		•	0.3-0.4			Landfill			
Solid Waste Analysis		1			2				
Total Organic Carbon (%)	-				3	5	6		
Loss on Ignition (%)	-				- 6	-	10		
Sum of BTEX (mg/kg)	-								
Sum of 7 PCBs (mg/kg) Mineral Oil (mg/kg)	-				500	-	-		
	-					-	-		
PAH Sum of 17(mg/kg)	-				100	>6	-		
pH (pH Units) ANC to pH 7 (mol/kg)	-					>0 to be evaluated	to be evaluated		
ANC to pH 4 (mol/kg)	-				-	to be evaluated	to be evaluated		
ANC to pH 4 (IIIoI/kg)	Conc ⁿ in 2:1	Conc ⁿ in 8:1	<u> </u>	Cumulative conc ⁿ		to be evaluated	to be evaluated		
	eluate	eluate	2:1 conc ⁿ leached	leached	I imit values for	compliance lead	ning test using BS		
Eluate Analysis	C ₂	C ₈	$\mathbf{A_2}$	A ₂₋₁₀		12457-3 at L/S 10			
		g/l		z/kg		1210. 0 40 2/5 10	<u> </u>		
Arsenic	0.14	0.34	0.28	3.2	0.5	2	25		
Barium	0.027	< 0.001	0.05	0.04	20	100	300		
Cadmium	<0.00022	< 0.00022	< 0.00044	<0.0022	0.04	1	5		
Chromium	0.001	< 0.001	< 0.002	< 0.01	0.5	10	70		
Copper	0.016	0.0080	0.031	0.091	2	50	100		
Mercury	< 0.00001	< 0.00001	< 0.00002	< 0.0001	0.01	0.2	2		
Molybdenum	0.005	0.001	0.01	0.02	0.5	10	30		
Nickel	< 0.0015	< 0.0015	< 0.003	< 0.015	0.4	10	40		
Lead	0.0008	0.0004	0.002	0.005	0.5	10	50		
Antimony	< 0.00075	0.0031	< 0.0015	0.027	0.06	0.7	5		
Selenium	0.016	0.002	0.03	0.04	0.1	0.5	7		
Zinc	0.026	< 0.005	0.05	< 0.05	4	50	200		
Chloride	2100	130	4300	4100	800	15000	25000		
Fluoride	1.2	0.6	2	7	10	150	500		
Sulphate as SO ₄	320	27	650	680	1000	20000	50000		
Total Dissolved Solids	3800	290	7700	7900	4000	60000	100000		
Phenols Monohydric	< 0.01	0.01	< 0.02	0.1	1	-	-		
Dissolved Organic Carbon	<3	<3	<6	<30	500	800	1000		
Leach Test Information		•	•						
Date Prepared	16/03/09	16/03/09							
pH (pH Units)	8.234	8.824	1						
Conductivity (µS/cm)	6.36	524							
Temperature (°C)	19.7	18.7	Į						
Volume Leachant (Litres)	0.302	1.4]						
Volume of Eluate VE1 (Litres)	0.245		_ '						

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable

Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepencies with current legislation

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

Mass Sample taken (kg) = Mass of dry sample (kg) = Particle Size <4mm =	0.23593 0.175 >95%		Moisture Content Dry Matter Content		35.04 74.05			
Job Number		200	0902799		I andfill Was	te Acceptance (ritorio I imito	
Batch			1		Landin was	te Acceptance (TICHA LIIIIC	
Sample Number(s)			37			Stable Non-		
Sampled Date		25	5/02/09			reactive		
Sample Identity			HA11		Inert Waste	Hazardous	Hazardous	
			45-0.80		Landfill	Waste in Non- Hazardous	Waste Landfi	
Depth (m)		υ.	45-0.00			Landfill		
Solid Waste Analysis Total Organic Carbon (%)	<u> </u>				_	-	_	
Loss on Ignition (%)	-				-	-	-	
Sum of BTEX (mg/kg)	-				-	-	-	
Sum of 7 PCBs (mg/kg)	-				-	-	-	
Mineral Oil (mg/kg)	-				-	-	-	
PAH Sum of 17(mg/kg)	-				-	-	-	
pH (pH Units)	-				-	-	-	
ANC to pH 7 (mol/kg) ANC to pH 4 (mol/kg)	-				-	-	-	
ANC to ph 4 (morkg)	Conc ⁿ in 2:1	Conc ⁿ in 8:1		Cumulative conc ⁿ	-	-	-	
	eluate	eluate	2:1 conc ⁿ leached	leached	Limit values for	compliance leach	ing test using B	
Eluate Analysis	$\mathbf{C_2}$	C_8	$\mathbf{A_2}$	A ₂₋₁₀	EN 12457-3 at L/S 10 l/kg			
	m	g/l	mg	/kg				
Boron Dissolved (CEN 10:1C) (ICP-MS)	1.1	0.28	2.2	3.9	-	-	-	
					-	-	-	
					-	-	-	
					-	-	-	
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Look Took Information					-	-	-	
Leach Test Information Date Prepared	16/03/09	16/03/09	1					
bH (pH Units)	8.170	9.035	i					
Conductivity (µS/cm)	7.38	563	1					
Femperature (°C)	19.7	18.0]					
Volume Leachant (Litres)	0.289	1.4	J					
Volume of Eluate VE1 (Litres)	0.245							

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

	S				K	EF:CEN12457	-3		
	0.0000			D		25.25			
Mass Sample taken (kg) = Mass of dry sample (kg) =	0.22336 0.175		Moisture Content Dry Matter Content			27.27 78.57			
Particle Size <4mm =	>95%		Dry Matter Conte	nt Rano (%) =		/8.5/			
atticie Size \4mm =	2J370								
					1				
Job Number		200	0902799		Landfill Waste Acceptance Criteria Limits				
Batch			1						
Sample Number(s)			55		l	Stable Non- reactive			
Sampled Date			5/02/09		Inert Waste	Hazardous	Hazardous		
Sample Identity			HA25		Landfill	Waste in Non-	Waste Landfil		
Depth (m)		0	0.3-0.4		l	Hazardous Landfill			
Solid Waste Analysis	•	•				Dandini			
Total Organic Carbon (%)	-				-	-	-		
Loss on Ignition (%)	-				-	-	-		
Sum of BTEX (mg/kg)	-				-	-	-		
Sum of 7 PCBs (mg/kg)	-				-	-	-		
Mineral Oil (mg/kg) PAH Sum of 17(mg/kg)	-				-	-	-		
pH (pH Units)	-				-	-	-		
ANC to pH 7 (mol/kg)	-					_			
ANC to pH 4 (mol/kg)									
inverte bit i (morkg)	Conc ⁿ in 2:1	Conc ⁿ in 8:1		Cumulative conc ⁿ		I.			
	eluate	eluate	2:1 conc ⁿ leached	leached	Limit values for	compliance leach	ing test using B		
Eluate Analysis	$\mathbf{C_2}$	C_8	${f A_2}$	A_{2-10}		12457-3 at L/S 10			
	m	g/l	mg	/kg	1				
Boron Dissolved (CEN 10:1C) (ICP-MS)	1.2	0.31	2.3	4.2	-	-	-		
					-	-	-		
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Leach Test Information					- - - - - - - - - -	- - - - - - - - -	- - - - - - - - - -		
Leach Test Information Date Prepared	16/03/09	16/03/09			- - - - - - - - - -	- - - - - - - - -	- - - - - - - - - -		
Date Prepared DH (pH Units)	8.234	8.824			- - - - - - - - - -	- - - - - - - - -	- - - - - - - - - -		
Date Prepared bH (pH Units) Conductivity (μS/cm)	8.234 6.36	8.824 524			- - - - - - - - - -	- - - - - - - - -	- - - - - - - - - -		
Date Prepared bH (pH Units) Conductivity (µS/cm) Femperature (°C)	8.234 6.36 19.7	8.824 524 18.7			- - - - - - - - - -	- - - - - - - - -	- - - - - - - - - -		
Date Prepared bH (pH Units) Conductivity (μS/cm)	8.234 6.36	8.824 524			- - - - - - - - - -	- - - - - - - - -	- - - - - - - - - -		

 Job Number:
 09/02799/02/01

 Client:
 Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

ACM Asbestos Containing Materia » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summa	ary of Method Codes cont	ISO Acc	MC Acc	We Sar	Surı	
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample 1	Surrogate Corrected
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro- chemical detection			NA	
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water			NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser			NA	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser			NA	
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser			NA	
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water			NA	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS			NA	
TM183	BS EN 23506:2002, (BS 6068- 2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry			NA	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable. **WET** indicates samples analysed as submitted.

Job Number: 09/02799/02/01
Client: Buro Happold

Client Ref. No.: 24435

Summary of Coolbox temperatures

Summary of Coolbox temperatures									
Batch No.	Coolbox Temperature (°C)								
1	12								

Unit 7-8 Hawarden Business Park Manor Road (off Manor Lane) Hawarden

Deeside CH5 3US

Tel: (01244) 528700 Fax: (01244) 528701 email: mkt@alcontrol.co.uk

website: www.alcontrol.co.uk

Buro Happold Camden Mill Lower Bristol Road Bath

BA2 3DQ ATTN: James Boyle

CERTIFICATE OF ANALYSIS

Date: 04 March, 2009 **Our Reference:** 09/00980/02/01

Your Reference:

Location: HAYLE HARBOUR

A total of 9 samples was received for analysis on Friday, 23 January 2009 and completed on Tuesday, 03 February 2009. Accredited laboratory tests are defined in the log sheet, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation. We are pleased to enclose our final report, it was a pleasure to be of service to you, and we look forward to our continuing association.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials- whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Asbestos testing - we are not accredited for screen testing of asbestos fibres. We are only accredited for asbestos containing materials found in bulk samples.

Signed

<u>Diane Whittlestone</u> <u>David O'Hare</u>

Tech. Support Manager Project Manager

Kim Harrison
Project Coordinator

Team Leader

Byron Hagan
Project Coordinator
Team Leader

Valid if signed by any of the above signatories.

Compiled By

Gemma Daly



ALcontrol Laboratories TEST SCHEDULE

JOB NUMBER: 09/980/02

CLIENT: Buro Happold

CONTACT: James Boyle

DATE OF RECEIPT: 23/01/09

LOCATION: HAYLE HARBOUR

BATCH NUMBER: 1

CLIENT REF/CODE:

ORDER NUMBER: 024435

TURNAROUND: 3 days

Numeric values indicate additional scheduling

* indicates test subcontracted

					1 1	1 1				1	
>	Zinc (S)	×	×	×	×	×	×	×	×	×	6
>	Lead (S)	×	×	×	×	×	×	×	×	×	6
>	Chromium (S)	×	×	×	×	×	×	×	×	×	6
	Cadmium (S)	×	×	×	×	×	×	×	×	×	6
>	Arsenic (S)	×	×	×	×	×	×	×	×	×	6
d ?	Sample Type	CID	吕	吕	吕	吕	吕		CID		S
redite	Gample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	f Tes
UKAS Accredited?										-	Total Number of Tests
UKA	Depth	0.50	0.50	2.00	0.50	4.00	1.00	2.00	0.50	2.00	I Nun
		0	O		O	7	_	7)	(7	Tota
	P/V	BAG	BAG	BAG	BAG	BAG	BAG	BAG	BAG	Ō	
	1,,	∕B	B/	B/	B/	B/	B/	B∕	₽	BAG	
	Sample Identity	WS701	WS702	WS702	WS703	WS703	WS705	WS705	WS707	WS707	
		8	>	>	>	>	>	8	M	>	
	Comple North		\vdash	\vdash						\dashv	
	Sample Number	_	2	က	4	2	9	7	8	6	

Printed: 03/03/09 17:21:46

Page 2 of 10

ISO 17025 Form	FORM NO:SQS 105
ALCONTROL LABORATORIES	SHEET 1 OF 1
ALCONTROL LABORATORIES	ISSUE NO: 2
	WRITTEN BY: DOH
Title of Form	ISSUE DATE: 27/01/05
Notification of NDP's (No determination possible).	APPROVED BY: DP

Job Number : 09/980

Client:

Sample Type : Solid

Job No.	Sample No.	Sample ID. Analyte(s) Reason		
	1	,	,	
09/980	7	W705 - 2.00	Metals	Insufficient Sample
09/980	5	WS703 - 4.0	Metals	Insufficient Sample
09/980	3	WS702 - 2.0	Metals	Insufficient Sample
00/000	0	W6707 0 F	Matala	Inc. officient Comple
09/980	8	WS707 - 0.5	Metals	Insufficient Sample
09/980	9	WS707 - 2.0	Metals	Insufficient Sample
00/000		110701 2.0	Motalo	Incumerative Campie
	_			
	_			<u> </u>

Job Number: 09/00980/02/01 Grain sizes

Client: Buro Happold <0.063mm Very Fine

Client Ref: 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	tity Depth (m) Colour		Grain Size	Description		
WS701	0.50	Brown	<0.063mm	Dry Sample Received	Batch 1	
WS702	0.50	Brown	<0.063mm	Dry Sample Received	1	
WS702	2.00	Brown	<0.063mm	Dry Sample Received	1	
WS703	0.50	Brown	<0.063mm	Dry Sample Received	1	
WS703	4.00	Brown	<0.063mm	Dry Sample Received	1	
WS705	1.00	Brown	<0.063mm	Dry Sample Received	1	
WS705	2.00	Brown	<0.063mm	Dry Sample Received	1	
WS707	0.50	Brown	<0.063mm	Dry Sample Received	1	
WS707	2.00	Light Brown	<0.063mm	Dry Sample Received	1	

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

¹ Sample Description supplied by client

Validated	✓	ALcontrol Laboratories Analytical Servi
Preliminary		Table Of Results

ices # ISO 17025 accredited

M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 09/00980/02/01 **Matrix:** SOLID

Client: Buro Happold Location: HAYLE HARBOUR

Client Ref. No.: Client Contact: James Boyle

	Onene contactivation Boyle											
Sample Identity	WS701	WS702	WS702	WS703	WS703	WS705	WS705	WS707	WS707			
Depth (m)	0.50	0.50	2.00	0.50	4.00	1.00	2.00	0.50	2.00	×		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	Method Code	etho	CoD
Sampled Date											LoD/Units	
Sample Received Date	23.01.09	23.01.09	23.01.09	23.01.09	23.01.09	23.01.09	23.01.09	23.01.09	23.01.09	ode	its	
Batch	1	1	1	1	1	1	1	1	1			
Sample Number(s)	1	2	3	4	5	6	7	8	9			
Arsenic	680	1700	NDP	1700	NDP	900	NDP	NDP	NDP	TM129#	<3.0 mg/kg	
Cadmium	3.3	9.0	NDP	8.5	NDP	5.4	NDP	NDP	NDP	TM129	<0.2 mg/kg	
Chromium	22	40	NDP	39	NDP	43	NDP	NDP	NDP	TM129#	<4.5 mg/kg	
Lead	210	260	NDP	220	NDP	420	NDP	NDP	NDP	TM129#	<2 mg/kg	
Zinc	680	1200	NDP	1000	NDP	1500	NDP	NDP	NDP	TM129#	<2.5 mg/kg	

Date	04 03 2009	

 Job Number:
 09/00980/02/01

 Client:
 Buro Happold

Client Ref. No.:

Results expressed as (e.g.) 1.03E-07 is equivalent to $1.03x10^{-7}$

NDP No Determination Possible * Subcontracted test

ACM Asbestos Containing Materia » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report:					We San	Surr
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample 1	Surrogate Corrected
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **WET** indicates samples analysed as submitted.

Job Number: 09/00980/02/01 **Client:** Buro Happold

Client Ref. No.:

Summary of Coolbox temperatures

Batch No.	Coolbox Temperature (°C)
1	15

APPENDIX

APPENDIX

- Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following:
 NRA Leach tests, flash point, ammonium as NH₄ by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and
 TOF-MS TICS.
- 2. Samples will be run in duplicate upon request, but an additional charge may be incurred.
- 3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. Alcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.
- 4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.
- 5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.
- 6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no analysis will be undertaken. At no point is the fibre content of the soil sample determined.
- 7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.
- 8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.
- 9. NDP No determination possible due to insufficient/unsuitable sample.
- 10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals total metals must be requested separately.
- 11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.
- 12. **Surrogate recoveries** Most of our organic methods include surrogates, the recovery of which is monitored, but not corrected or reported.
 - For EPH, MO, PAH and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted.
- 13. **Product analyses** Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.
- 14. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).
- 15. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).
- 16. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
- Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.
- 18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.
- 19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.
- 20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.
- 21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.
- 22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.
- 23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

LIQUID MATRICES EXTRACTION SUMMARY

Г		MATRICES EXTRACTION SUMMARY	
ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAH MS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GS MS
SVOC	DCM	LIQUID/LIQUID SHAKEN SVOC	GC MS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PEST OCP/OPP	DCM/EA	SOLID PHASE EXTRACTION	GC MS
TRIAZINE HERBS	DCM/EA	SOLID PHASE EXTRACTION	GC MS
PHENOLS MS	DCM	SOLID PHASE EXTRACTION	GC MS
TPH by INFRA RED (IR)	TCE	LIQUID/LIQUID EXTRACTION	HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID EXTRACTION	HPLC
SAPONIFIABLE	TCE	LIQUID/LIQUID EXTRACTION	HPLC
UNSAPONIFIABLE	TCE	LIQUID/LIQUID EXTRACTION	HPLC
GLYCOLS	DCM	LIQUID/LIQUID EXTRACTION	EZ FLASH

SOLID MATRICES EXTRACTION SUMMARY

		MATRICES EXTRACTION SUMMART		
ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
Solvent Extractable Matter	D&C	DCM	SOXTHERM	GRAVIMETRIC
Cyclohexane Ext. Matter	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
Thin Layer Chromatography	D&C	DCM	SOXTHERM	IATROSCAN
Elemental Sulphur	D&C	DCM	SOXTHERM	HPLC
Phenols by GCMS	WET	DCM	SOXTHERM	GC-MS
Herbicides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
Pesticides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (Min oil)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (Cleaned up)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH CWG by GC	D&C	HEXANE:ACETONE	END OVER END	GC-FID
PCB tot / PCB con	D&C	HEXANE:ACETONE	END OVER END	GC-MS
Polyaromatic Hydrocarbons (MS)	D&C	HEXANE:ACETONE	Microwave TM218.	GC-MS
C8-C40 (C6-C40)EZ Flash	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Polyaromatic Hydrocarbons Rapid GC	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Semi Volatile Organic Compounds	WET	DCM:ACETONE	SONICATE	GC-MS

ALcontrol Laboratories Analytical Services Sample Descriptions

Job Number: 09/00980/02/01 Grain sizes

Client: Buro Happold <0.063mm Very Fine

Client Ref: 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
WS701	0.50	Brown	<0.063mm	Dry Sample Received	1
WS702	0.50	Brown	<0.063mm	Dry Sample Received	1
WS702	2.00	Brown	<0.063mm	Dry Sample Received	1
WS703	0.50	Brown	<0.063mm	Dry Sample Received	1
WS703	4.00	Brown	<0.063mm	Dry Sample Received	1
WS705	1.00	Brown	<0.063mm	Dry Sample Received	1
WS705	2.00	Brown	<0.063mm	Dry Sample Received	1
WS707	0.50	Brown	<0.063mm	Dry Sample Received	1
WS707	2.00	Light Brown	<0.063mm	Dry Sample Received	1

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

Validated	√	ALcontrol Laboratories Analyt
Preliminary		Table Of Results

nalytical Services # ISO 17025 accredited

M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 09/00980/02/01 **Matrix:** SOLID

Client: Buro Happold Location: HAYLE HARBOUR

Client Ref. No.: Client Contact: James Boyle

				1		1	•				1
Sample Identity	WS701	WS702	WS702	WS703	WS703	WS705	WS705	WS707	WS707		
Depth (m)	0.50	0.50	2.00	0.50	4.00	1.00	2.00	0.50	2.00	≥	
Sample Type	SOLID	eth	LoD/Units								
Sampled Date										Method Code	
Sample Received Date	23.01.09	23.01.09	23.01.09	23.01.09	23.01.09	23.01.09	23.01.09	23.01.09	23.01.09	ode	
Batch	1	1	1	1	1	1	1	1	1	1	
Sample Number(s)	1	2	3	4	5	6	7	8	9		
Arsenic	680	1700	NDP	1700	NDP	900	NDP	NDP	NDP	TM129 [#] _M	<3.0 mg/kg
Cadmium	3.3	9.0	NDP	8.5	NDP	5.4	NDP	NDP	NDP	TM129	<0.2 mg/kg
Chromium	22	40	NDP	39	NDP	43	NDP	NDP	NDP	TM129 [#] _M	<4.5 mg/kg
Lead	210	260	NDP	220	NDP	420	NDP	NDP	NDP	TM129 [#] _M	<2 mg/kg
Zinc	680	1200	NDP	1000	NDP	1500	NDP	NDP	NDP	TM129 [#] _M	
]							1				

 Job Number:
 09/00980/02/01

 Client:
 Buro Happold

Client Ref. No.:

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

ACM Asbestos Containing Materia » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summa	ry of Method Codes cont	ISO Acc	MC Acc	Wo Sai	Sur	
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	

¹Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **WET** indicates samples analysed as submitted.

Job Number: 09/00980/02/01 **Client:** Buro Happold

Client Ref. No.:

Summary of Coolbox temperatures

Batch No.	Coolbox Temperature (°C)
1	15

ALcontrol Laboratories Analytical Services Sample Descriptions

Job Number: 09/00835/02/01 Grain sizes

Client: Buro Happold <0.063mm Very Fine

Client Ref: 22500 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
WS701 2mm	0.50	Brown	0.1mm - 2mm	Dry Sample Received with some Stones	1
WS701 63mic	0.50	Brown	<0.063mm	Dry Sample Received	1
WS701 212mic	0.50	Brown	0.1mm - 0.063mm	Dry Sample Received	1
WS701 600mic	0.50	Brown	0.1mm - 0.063mm	Dry Sample Received	1
WS702 2mm	0.50	Brown	0.1mm - 2mm	Dry Sample Received	1
WS702 2mm	2.00	Black	2mm - 10mm	Dry Sample Received	1
WS702 63mic	0.50	Brown	<0.063mm	Dry Sample Received	1
WS702 63mic	2.00	Brown	<0.063mm	Dry Sample Received	1
WS702 212mic	0.50	Brown	0.1mm - 0.063mm	Dry Sample Received	1
WS702 212mic	2.00	Light Brown	0.1mm - 0.063mm	Dry Sample Received	1
WS702 600mic	0.50	Brown	0.1mm - 0.063mm	Dry Sample Received	1
WS702 600mic	2.00	Brown	0.1mm - 0.063mm	Dry Sample Received	1
WS703 2mm	0.50	Brown	0.1mm - 2mm	Dry Sample Received with some Stones	1
WS703 2mm	4.00	Grey	2mm - 10mm	Dry Sample Received with some Stones	1
WS703 63mic	0.50	Dark Brown	<0.063mm	Dry Sample Received	1
WS703 63mic	4.00	Cream	<0.063mm	Dry Sample Received	1
WS703 212mic	0.50	Brown	0.1mm - 0.063mm	Dry Sample Received	1
WS703 212mic	4.00	Cream	0.1mm - 0.063mm	Dry Sample Received	1
WS703 600mic	0.50	Dark Brown	0.1mm - 2mm	Dry Sample Received	1
WS703 600mic	4.00	Cream	0.1mm - 2mm	Dry Sample Received	1
WS705 2mm	1.00	Brown	2mm - 10mm	Dry Sample Received with some Stones	1
WS705 2mm	2.00	Grey	0.1mm - 2mm	Dry Sample Received	1
WS705 63mic	1.00	Brown	<0.063mm	Dry Sample Received	1
WS705 63mic	2.00	Beige	0.1mm - 0.063mm	Dry Sample Received	1
WS705 212mic	1.00	Brown	0.1mm - 0.063mm	Dry Sample Received	1
WS705 212mic	2.00	Cream	0.1mm - 0.063mm	Dry Sample Received	1
WS705 600mic	1.00	Brown	0.1mm - 0.063mm	Dry Sample Received	1
WS705 600mic	2.00	Cream	0.1mm - 0.063mm	Dry Sample Received with some Stones	1
WS707 2mm	0.50	Brown	0.1mm - 2mm	Dry Sample Received with some Stones	1
WS707 2mm	2.00	White	2mm - 10mm	Dry Sample Received with some Stones	1
WS707 63mic	0.50	Brown	<0.063mm	Dry Sample Received	1
WS707 63mic	2.00	Cream	<0.063mm	Dry Sample Received	1
WS707 212mic	0.50	Light Brown	0.1mm - 0.063mm	Dry Sample Received	1

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

ALcontrol Laboratories Analytical Services Sample Descriptions

Job Number: 09/00835/02/01 Grain sizes

Client: Buro Happold <0.063mm Very Fine Client Ref: 22500 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium

2mm - 10mm Coarse >10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
WS707 212mic	2.00	Cream	0.1mm - 0.063mm	Dry Sample Received	1
WS707 600mic	0.50	Brown	0.1mm - 0.063mm	Dry Sample Received	1
WS707 600mic	2.00	Cream	0.1mm - 0.063mm	Dry Sample Received	1
					\perp
					\perp
					\perp
					\perp
					\perp
					\perp
					\perp
					$+\!-\!\!\!\!-$
					$+\!-\!\!\!\!-$
					\perp
					\perp
					\perp

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

Validated	✓	ALcontrol Laboratories Analyt
Preliminary		Table Of Results

lytical Services # ISO 17025 accredited

M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 09/00835/02/01 **Matrix:** SOLID

Client: Buro Happold Location: Hayle Harbour Client Ref. No.: 22500 Client Contact: James Boyle

-											
Sample Identity	WS701 2mm	WS701 63mic	WS701 212mic	WS701 600mic	WS702 2mm	WS702 2mm	WS702 63mic	WS702 63mic	WS702 212mic		
Depth (m)	0.50	0.50	0.50	0.50	0.50	2.00	0.50	2.00	0.50	≥	
Sample Type	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid	eth	LoD/Units
Sampled Date										op C	
Sample Received Date	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	Method Code	
Batch		1	1	1	1	1	1	1	1	1	
Sample Number(s)		2	3	4	5	6	7	8	9	1	
Arsenic	190	440	61	110	2300	54	650	230	320	TM129 [#] _M	<3.0 mg/kg
Cadmium	0.8	2.3	0.5	0.7	13	< 0.2	4.3	1.4	2.3	TM129	<0.2 mg/kg
Chromium	30	18	5.8	12	19	<4.5	21	16	7.9	TM129 [#] _M	<4.5 mg/kg
Lead	170	150	24	40	140	12	170	68	61	TM129 [#] _M	
Zinc	540	570	120	290	660	86	870	440	350	TM129 [#] _M	<2.5 mg/kg

Validated	✓	ALcontrol Laboratories Analy
Preliminary		Table Of Results

tical Services # ISO 17025 accredited

M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 09/00835/02/01 **Matrix:** SOLID

Client: Buro Happold Location: Hayle Harbour Client Ref. No.: 22500 Client Contact: James Boyle

					I			I			
Sample Identity	WS702 212mic	WS702 600mic	WS702 600mic	WS703 2mm	WS703 2mm	WS703 63mic	WS703 63mic	WS703 212mic	WS703 212mic		
Depth (m)	2.00	0.50	2.00	0.50	4.00	0.50	4.00	0.50	4.00	3	
Sample Type	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid	eth	LoD/Units
Sampled Date										Method Code	
	21.01.00	21.01.00	21.01.00	21.01.00	21.01.00	21.01.00	21.01.09	21.01.00	21.01.00	Cod	
Sample Received Date Batch		21.01.09	21.01.09	21.01.09	21.01.09	21.01.09		21.01.09	21.01.09	e	
Sample Number(s)	10	1 11	1 12	13	1 14	1 15	1 16	1 17	18		
Arsenic	44	1200	86	250	44	570	51	300	14	TM129 [#] _M	<3.0 mg/kg
Cadmium	0.4	7.4	0.7	1.5	<0.2	3.5	0.6	2.0	0.3	TM129 M	<0.2 mg/kg
Chromium	<4.5	19	5.1	76	19	20	14	8.8	<4.5	TM129 [#] _M	
Lead	10	160	18	110	8	140	10	59	<2	TM129 _M	
Zinc	110	840	160	930	120	750	200	340	50	TM129 _M	
Ziiic	110	040	100	730	120	730	200	340	30	11V1129 M	∠2.3 mg/kg
					1			l .			

Validated	✓	ALcontrol Laboratories Analyt
Preliminary		Table Of Results

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* Subcontracted test

» Shown on prev. report

Job Number: 09/00835/02/01 **Matrix:** SOLID

Client: Buro Happold Location: Hayle Harbour Client Ref. No.: 22500 Client Contact: James Boyle

Sample Identity	WS703 600mic	WS703 600mic	WS705 2mm	WS705 2mm	WS705 63mic	WS705 63mic	WS705 212mic	WS705 212mic	WS705 600mic		
Depth (m)	0.50	4.00	1.00	2.00	1.00	2.00	1.00	2.00	1.00	≥	
Sample Type	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid	etho	LoD/Units
Sampled Date										op C	
Sample Received Date	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	Method Code	
Batch	1	1	1	1	1	1	1	1	1	1	
Sample Number(s)	19	20	21	22	23	24	25	26	27		
Arsenic	700	23	380	11	680	110	580	22	1200	TM129 [#] _M	<3.0 mg/kg
Cadmium	4.2	0.3	2.1	< 0.2	4.7	0.6	3.7	0.3	7.3	TM129	<0.2 mg/kg
Chromium	28	4.7	30	18	37	21	20	<4.5	31	TM129 [#] _M	<4.5 mg/kg
Lead	120	3	110	14	340	35	230	4	330	TM129 [#] _M	
Zinc	920	80	880	42	1300	310	880	79	1500	TM129 [#] _M	<2.5 mg/kg

Validated	✓	ALcontrol Laboratories Analyt
Preliminary		Table Of Results

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* Subcontracted test

» Shown on prev. report

Job Number: 09/00835/02/01 **Matrix:** SOLID

Client: Buro Happold Location: Hayle Harbour Client Ref. No.: 22500 Client Contact: James Boyle

r											
Sample Identity	WS705 600mic	WS707 2mm	WS707 2mm	WS707 63mic	WS707 63mic	WS707 212mic	WS707 212mic	WS707 600mic	WS707 600mic		
Depth (m)	2.00	0.50	2.00	0.50	2.00	0.50	2.00	0.50	2.00	M	_
Sample Type	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	OTHER(Solid)	etho	CoD
Sampled Date										Method Code	LoD/Units
Sample Received Date	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	21.01.09	ʻode	its
Batch		1	1	1	1	1	1	1	1		
Sample Number(s)	28	29	30	31	32	33	34	35	36		
Arsenic	36	210	6	340	27	39	13	66	15	$TM129^{\#}_{M}$	<3.0 mg/kg
Cadmium	0.4	0.8	0.3	1.7	0.3	0.4	0.2	0.5	0.3	TM129	<0.2 mg/kg
Chromium	<4.5	48	<4.5	29	8.9	5.1	<4.5	7.7	<4.5	$TM129^{\#}_{M}$	<4.5 mg/kg
Lead	12	33	<2	93	23	8	3	15	5	TM129 [#] _M	<2 mg/kg
Zinc	130	840	16	680	82	100	38	170	46	TM129 [#] _M	<2.5 mg/kg

 Job Number:
 09/00835/02/01

 Client:
 Buro Happold

Client Ref. No.: 22500

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

ACM Asbestos Containing Materia » Result previously reported (Incremental reports only)

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EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summa	ary of Method Codes cont	ISO Accr	MC Accı	We Sar	Suri	
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	√	DRY	

¹Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **WET** indicates samples analysed as submitted.

Job Number: 09/00835/02/01 **Client:** Buro Happold

Client Ref. No.: 22500

Summary of Coolbox temperatures

Batch No.	Coolbox Temperature (°C)
Batch No.	Coolbox Temperature (C)
1	11.4

ALcontrol Laboratories Analytical Services Sample Descriptions

Job Number: 08/17832/02/01 Grain sizes

Client: Buro Happold <0.063mm Very Fine Client Ref: 024435 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
WS705/1	0.50	Brown	0.1mm - 2mm	Sand	6
WS705/2	1.00	Brown	<0.063mm	Silty Clay Loam	6
WS705/3	1.50	Brown	0.1mm - 2mm	Loamy Sand	6
WS705/4	2.00	Light Brown	0.1mm - 2mm	Sand	6
WS705/5	2.50	Light Brown	0.1mm - 2mm	Sand	6
WS705/6	3.00	Light Brown	0.1mm - 2mm	Sand	6
WS705/7	3.50	Light Brown	0.1mm - 2mm	Sand	6
WS705/8	4.00	Light Brown	0.1mm - 2mm	Sand	6
WS705/9	4.50	Light Brown	0.1mm - 2mm	Sand with some Stones	6
WS705/10	5.00	Light Brown	0.1mm - 2mm	Sand with some Stones	6
WS705/11	6.00	Light Brown	0.1mm - 2mm	Sand	6
WS705/12	7.00	Light Brown	0.1mm - 2mm	Sand	6

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

Validated	\checkmark	ALc
Preliminary		

control Laboratories Analytical Services # ISO 17025 accredited **Table Of Results**

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* Subcontracted test » Shown on prev. report

Job Number: 08/17832/02/01 **Matrix: SOLID**

Buro Happold Hayle Cornwall **Client: Location: Client Ref. No.:** 024435 **Client Contact:** Tom Smith

ir											
Sample Identity	WS705/1	WS705/2	WS705/3	WS705/4	WS705/5	WS705/6	WS705/7	WS705/8	WS705/9		
Depth (m)	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	M	
Sample Type	SOLID	eth	LoD/Units								
Sampled Date	31.10.08	31.10.08	31.10.08	31.10.08	31.10.08	31.10.08	31.10.08	31.10.08	31.10.08	Method Code	
Sample Received Date	05.11.08	05.11.08	05.11.08	05.11.08	05.11.08	05.11.08	05.11.08	05.11.08	05.11.08	ode	its
Batch	6	6	6	6	6	6	6	6	6		
Sample Number(s)	122-124	125-127	128-130	131-133	134-136	137-139	140-142	143-145	146-148		
Arsenic	150	890	400	56	55	29	29	35	37	TM129 [#] _M	<3.0 mg/kg
Cadmium	0.9	4.2	2.0	0.4	0.4	0.4	0.4	0.3	0.3	TM129	<0.2 mg/kg
Chromium	12	36	17	4.8	<4.5	<4.5	<4.5	<4.5	17	TM129 [#] _M	<4.5 mg/kg
Copper	200	2000	1000	94	100	71	47	66	71	TM129 [#] _M	<6 mg/kg
Lead	52	460	180	19	21	12	8	9	19	TM129 [#] _M	<2 mg/kg
Nickel	14	42	21	5.2	4.2	3.9	3.2	3.6	8.4	TM129 [#] _M	<0.9 mg/kg
Zinc	200	1200	780	140	140	100	96	87	100	TM129 [#] _M	<2.5 mg/kg
Water Soluble Sulphate as SO4 2:1 Extract	-	0.58	-	0.29	-	0.37	-	0.23	-	TM098 [#] _M	<0.003 g/l
Chloride (soluble)	-	7600	-	3900	-	5500	-	3100	-	TM097 [#] _M	<2 mg/kg
% Stones Greater then 10mm	-	100	-	100	-	100	-	100	-	TM008	<0.1 %
pH Value	8.46	8.30	8.66	8.68	8.63	8.69	8.67	8.69	8.66	TM133 [#] _M	<1.00 pH Units

Validated	✓	ALcontrol Laboratories Analytic
Preliminary		Table Of Results

cal Services # ISO 17025 accredited

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* Subcontracted test

» Shown on prev. report

Job Number: 08/17832/02/01 **Matrix:** SOLID

Client: Buro Happold Location: Hayle Cornwall Client Ref. No.: 024435 Client Contact: Tom Smith

Chefit Kei. No.:	024433			Chent	Contact	i i Oili Di	111111		
Sample Identity		WS705/11	WS705/12						
Depth (m)		6.00	7.00					Me	L
Sample Type	SOLID	SOLID	SOLID					etho	οD,
Sampled Date	31.10.08	31.10.08	31.10.08					Method Code	LoD/Units
Sample Received Date	05.11.08	05.11.08	05.11.08					ode	ts
Batch	6	6	6						
Sample Number(s)	149-151	152-154	155-157						
Arsenic	46	19	19					$TM129^{\#}_{M}$	<3.0 mg/kg
Cadmium	0.3	< 0.2	0.2					TM129	<0.2 mg/kg
Chromium	16	7.2	7.5					TM129 [#] _M	<4.5 mg/kg
Copper	63	17	14					TM129 [#] _M	<6 mg/kg
Lead	14	8	5					TM129 [#] _M	<2 mg/kg
Nickel	16	5.9	6.5					TM129 [#] _M	<0.9 mg/kg
Zinc	140	59	67					TM129 [#] _M	<2.5 mg/kg
Water Soluble Sulphate as SO4 2:1 Extract	0.12	0.26	0.27					TM098 [#] _M	<0.003 g/l
Chloride (soluble)	1600	3700	3900					TM097 [#] _M	<2 mg/kg
% Stones Greater then 10mm	50	100	100					TM008	<0.1 %
pH Value	8.95	8.63	8.62					TM133 [#] _M	<1.00 pH Units
]									

Mass Sample taken (kg) = Mass of dry sample (kg) =	0.11365 0.09	Moisture Content Ratio (%) = Dry Matter Content Ratio (%) =	=	26.47 79.07	
Particle Size <4mm =	>95%				
		200015022			
Job Number		200817832	Landfill Was	te Acceptance (Criteria Limits
Batch		6			
Sample Number(s)		122-124		Stable Non-	
Sampled Date		31/10/08	Y (XX)	reactive	
Sample Identity		WS705/1	Inert Waste Landfill	Hazardous Waste in Non-	Hazardous Waste Landfill
Depth (m)		0.50	Lanum	Hazardous	Waste Landin
=		0.20		Landfill	
Solid Waste Analysis Total Organic Carbon (%)			_	_	_
Loss on Ignition (%)	-		-		
Sum of BTEX (mg/kg)	-		-	_	_
Sum of 7 PCBs (mg/kg)	-		-	-	-
Mineral Oil (mg/kg)	-		-	-	-
PAH Sum of 17(mg/kg)	-		-	-	-
pH (pH Units)	8.46		-	-	-
ANC to pH 7 (mol/kg)	-		-	-	-
ANC to pH 4 (mol/kg)	-		-	-	-
	Conc ⁿ in 10:1 eluate	10:1 conc ⁿ leached	T ::4 f		1 4 Dí
Eluate Analysis	C ₂	A_2		compliance leach 12457-3 at L/S 10	
	mg/l	mg/kg	EIV	12437-3 at L/3 10	I/Kg
Arsenic	0.023	0.23		<u> </u>	I -
Barium	0.002	0.02	_	_	_
Cadmium	< 0.00022	<0.0022	_	_	-
Chromium	0.001	0.01	-	-	-
Copper	0.0078	0.078	-	-	-
Mercury	< 0.00001	< 0.0001	-	-	-
Molybdenum	0.002	0.02	-	-	-
Nickel	< 0.0015	< 0.015	-	-	-
Lead	0.0008	0.008	-	-	-
Antimony	0.013	0.13	-	-	-
Selenium Zinc	0.006 0.005	0.06 0.05	-	-	-
Chloride	440	4400	-	-	-
Fluoride	<0.5	<5	-	-	-
Sulphate as SO ₄	66	660	-	_	_
Total Dissolved Solids	810	8100	-	-	-
Phenols Monohydric	<0.01	<0.1	-	-	-
Dissolved Organic Carbon	1	10	-	-	-
Leach Test Information					
Date Prepared	06/11/08 -				
pH (pH Units)	8.5 -				
Conductivity (µS/cm)	1480 -				
Temperature (°C)	19 -				
Volume Leachant (Litres) Volume of Eluate VE1 (Litres)	0.876 -				
volume of Elliate VEL (Lifres)					

WAC ANALYTICAL RESU	REF:CEN12457-2						
			10.01				
Mass Sample taken (kg) =	0.10784	Moisture Content l	19.84				
Mass of dry sample (kg) =	0.09	Dry Matter Conten		83.44			
Particle Size <4mm =	>95%						
Job Number		200817832		Landfill Was	te Acceptance (Criteria Limit	
Batch		6		'	1		
Sample Number(s)		152-154		4	Stable Non- reactive		
Sampled Date		31/10/08		Inert Waste	Hazardous	Hazardous	
Sample Identity		WS705/11		Landfill	Waste in Non-	Waste Landf	
Depth (m)		6.00		4	Hazardous Landfill		
Solid Waste Analysis							
Total Organic Carbon (%)	-			-	-	-	
Loss on Ignition (%)	-			-	-	-	
Sum of BTEX (mg/kg) Sum of 7 PCBs (mg/kg)	-			-	- -	-	
Mineral Oil (mg/kg)	-			-	_	-	
PAH Sum of 17(mg/kg)	-			-	-	_	
pH (pH Units)	8.63			-	_	_	
ANC to pH 7 (mol/kg)	-			_	_	_	
ANC to pH 4 (mol/kg)	-			_	-	-	
8/	Conc ⁿ in 10:1	10.1 11.1					
Electe Accelerate	eluate	10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using I	
Eluate Analysis	C_2	$\mathbf{A_2}$			12457-3 at L/S 10		
	mg/l	mg	/kg				
Arsenic	0.015	0.15		-	-	-	
Barium	0.001	0.01		-	-	-	
Cadmium	< 0.00022	< 0.0022		-	-	-	
Chromium	< 0.001	< 0.01		-	-	-	
Copper	0.0019	0.019		-	-	-	
Mercury	<0.00001	<0.0001		-	-	-	
Molybdenum	<0.001	<0.01		-	-	-	
Nickel	<0.0015	< 0.015		-	-	-	
Lead Antimony	<0.0004 0.00098	<0.004 0.0098		-	-	-	
Selenium	0.002	0.0098		-	-	-	
Zinc	< 0.005	< 0.05		_	_	_	
Chloride	430	4300		-	-	-	
Fluoride	<0.5	<5		_	_	-	
Sulphate as SO ₄	63	630		_	_	-	
Total Dissolved Solids	800	8000		-	-	-	
Phenols Monohydric	< 0.01	< 0.1		-	-	-	
Dissolved Organic Carbon	<1	<10		-	-	-	
Leach Test Information							
Date Prepared	09/11/08	-					
pH (pH Units)	9.5	-					
Conductivity (µS/cm)	1430	-					
Γemperature (°C)	18	-					
Volume Leachant (Litres)	0.882	-					
Volume of Eluate VE1 (Litres)	_						

Mass Sample taken (kg) =	0.11126 0.09		Moisture Content	` '	23.60			
Mass of dry sample (kg) = Particle Size <4mm =	0.09 >95%		Dry Matter Conter	it Katio (%) =		80.91		
Particle Size <4mm =	>93%							
Job Number		2	200817832		1 1611 337-	4	1	
Batch			6		Landill Was	te Acceptance (<u>riteria Limits</u>	
Sample Number(s)			128-130			Stable Non-		
Sampled Date			31/10/08			reactive		
Sample Identity			WS705/3		Inert Waste Landfill	Hazardous Waste in Non-	Hazardous Waste Landfill	
Depth (m)			1.50			Hazardous		
Solid Waste Analysis					1	Landfill		
Total Organic Carbon (%)	-				-	-		
Loss on Ignition (%)						-	_	
Sum of BTEX (mg/kg)	-				-	-	-	
Sum of 7 PCBs (mg/kg)	-				-	-	-	
Mineral Oil (mg/kg)	-				-	-	-	
PAH Sum of 17(mg/kg)	-				-	-	-	
pH (pH Units)	8.66				-	-	-	
ANC to pH 7 (mol/kg)	-				-	-	-	
ANC to pH 4 (mol/kg)	-				-	-	-	
•	Conc ⁿ in 10:1		10:1 conc ⁿ leached				•	
Tiles As Assalasta	eluate		10:1 conc leacned		Limit values for	compliance leach	ing test using BS	
Eluate Analysis	C_2		$\mathbf{A_2}$			12457-3 at L/S 10		
	mg	/l	mg	/kg				
Arsenic	0.024		0.24		-	-	-	
Barium	< 0.001		< 0.01		-	-	-	
Cadmium	< 0.00022		< 0.0022		-	-	-	
Chromium	< 0.001		< 0.01		-	-	-	
Copper	0.0019		0.019		-	-	-	
Mercury	< 0.00001		< 0.0001		-	-	-	
Molybdenum	< 0.001		< 0.01		-	-	-	
Nickel	< 0.0015		< 0.015		-	-	-	
Lead	< 0.0004		< 0.004		-	-	-	
Antimony	0.0037		0.037		-	-	-	
Selenium	0.003		0.03		-	-	-	
Zinc	< 0.005		< 0.05		-	-	-	
Chloride	450		4500		-	-	-	
Fluoride	< 0.5		<5		-	-	-	
Sulphate as SO ₄	68		680		-	-	-	
Total Dissolved Solids	830		8300		-	-	-	
Phenols Monohydric	< 0.01		< 0.1		-	-	-	
Dissolved Organic Carbon	<1		<10		-	-	-	
Leach Test Information			_					
Date Prepared	06/11/08	-	4					
pH (pH Units)	8.8	-	4					
Conductivity (µS/cm)	1480	-	4					
Temperature (°C)	19.1	-	4					
Volume Leachant (Litres)	0.879	-						
Volume of Eluate VE1 (Litres)								

Mass Sample taken (kg) =	0.11471		isture Content I	` '	27.78				
Mass of dry sample (kg) =	0.09	Dry	Matter Conten	t Ratio (%) =		78.26			
Particle Size <4mm =	>95%								
Job Number		200817	7832		I and Ell Was	40 A 222242220	Yuitania Timita		
Batch		6			Landilli was	te Acceptance (<u>riteria Limits</u>		
Sample Number(s)		134-1	136			Stable Non-			
Sampled Date		31/10	/08		1	reactive			
Sample Identity		WS70	05/5		Inert Waste Landfill	Hazardous Waste in Non-	Hazardous Waste Landfill		
Depth (m)		2.50			Landini	Hazardous	waste Lanuini		
Solid Waste Analysis					-	Landfill			
Total Organic Carbon (%)					_	-	_		
Loss on Ignition (%)						<u> </u>			
Sum of BTEX (mg/kg)	-				-	-	-		
Sum of 7 PCBs (mg/kg)	-				-	-	-		
Mineral Oil (mg/kg)					<u> </u>		_		
PAH Sum of 17(mg/kg)					<u> </u>				
pH (pH Units)	8.63								
ANC to pH 7 (mol/kg)	-						_		
ANC to pH 4 (mol/kg)					_	_	_		
Arve to pri + (morkg)	Conc ⁿ in 10:1				_	_	_		
	eluate	10:	1 conc ⁿ leached		Limit values for	compliance leach	ing test using R		
Eluate Analysis	C_2		\mathbf{A}_2			12457-3 at L/S 10			
	mg/l		mg.	/ka		12107 0 40 175 10	<u> </u>		
Arsenic	0.014		0.14	- N-S	_	_	_		
Barium	0.002		0.02		_	_	_		
Cadmium	0.00053		0.0053		_	_	_		
Chromium	0.043		0.43		_	_	_		
Copper	0.037		0.37		_	_	_		
Mercury	< 0.00001		< 0.0001		_	_	_		
Molybdenum	0.002		0.02		_	_	_		
Nickel	5.9		59		_	_	_		
Lead	0.0006		0.006		_	_	_		
Antimony	0.012		0.12		_	_	_		
Selenium	0.005		0.05		-	-	_		
Zinc	0.18		1.8		-	-	_		
Chloride	490		4900		-	-	-		
Fluoride	1.0		10		-	-	-		
Sulphate as SO ₄	250		2500		-	-	-		
Total Dissolved Solids	1000		10000		-	-	-		
Phenols Monohydric	< 0.01		< 0.1		-	-	-		
Dissolved Organic Carbon	<1		<10		-	-	-		
Leach Test Information									
Date Prepared	09/11/08	-							
pH (pH Units)	4.6	-							
Conductivity (µS/cm)	1880	-							
	18.8	-							
Temperature (°C)									
Temperature (°C) Volume Leachant (Litres) Volume of Eluate VE1 (Litres)	0.875	-							

Mass Sample taken (kg) =	0.1098	Moisture Content	Ratio (%) =		22.46	
Mass of dry sample (kg) =	0.09	Dry Matter Conter	t Ratio (%) =		81.66	
Particle Size <4mm =	>95%					
Job Number	- 	200817832		I andfill Was	te Acceptance (Critorio I imita
Batch		6		Landini was	te Acceptance C	<u> riteria Limits</u>
Sample Number(s)		140-142			Stable Non-	
Sampled Date		31/10/08			reactive	
Sample Identity		WS705/7		Inert WasteLandfill	Hazardous Waste in Non-	Hazardous Waste Landfil
Depth (m)		3.50		Landini	Hazardous	waste Landin
=		3.30		4	Landfill	
Solid Waste Analysis Total Organic Carbon (%)	_			_	_	_
Loss on Ignition (%)	- - - 			-	-	-
Sum of BTEX (mg/kg)	-				-	_
Sum of 7 PCBs (mg/kg)				-	-	-
Mineral Oil (mg/kg)	-			-	-	_
PAH Sum of 17(mg/kg)	-			_	-	-
pH (pH Units)	8.67			_	-	-
ANC to pH 7 (mol/kg)	-			-	-	-
ANC to pH 4 (mol/kg)	-			-	-	-
	Conc ⁿ in 10:1	10:1 conc ⁿ leached				
Eluate Analysis	eluate				compliance leach	
Eluate Analysis	C_2	\mathbf{A}_2		EN	12457-3 at L/S 10	<u>l/kg</u>
	mg/l	mg	/kg			
Arsenic	0.043	0.43		-	-	-
Barium	0.002	0.02		-	-	-
Cadmium	<0.00022	<0.0022		-	-	-
Chromium	<0.001	<0.01		-	-	-
Copper Mercury	0.0063 <0.00001	0.063 <0.0001		-	-	-
Molybdenum	0.001	0.001		-	-	-
Nickel	<0.001	<0.015		-	-	-
Lead	<0.0013	<0.004		_	_	_
Antimony	0.0038	0.038		_	_	_
Selenium	0.002	0.02		-	-	-
Zinc	< 0.005	< 0.05		-	-	-
Chloride	440	4400		-	-	-
Fluoride	0.5	5		-	-	-
Sulphate as SO ₄	65	650		-	-	-
Total Dissolved Solids	800	8000		-	-	-
Phenols Monohydric	< 0.01	<0.1		-	-	-
Dissolved Organic Carbon	<1	<10		-	-	-
Leach Test Information						
Date Prepared	09/11/08	-				
Date Prepared pH (pH Units)	8.754	-				
Date Prepared pH (pH Units) Conductivity (µS/cm)	8.754 1468	-				
Date Prepared pH (pH Units)	8.754					

WAC ANALYTICAL RESU	JLTS				R	EF:CEN12457	-2					
					17 01							
Mass Sample taken (kg) =	0.10588		Moisture Content I	` '		17.81						
Mass of dry sample (kg) =	0.09		Dry Matter Conten	it Ratio (%) =		84.88						
Particle Size <4mm =	>95%											
					_							
Job Number		20	0817832		Landfill Was	te Acceptance (Criteria Limits					
Batch			6		<u> </u>	Ī	Ī					
Sample Number(s)			46-148		4	Stable Non- reactive						
Sampled Date			1/10/08		Inert Waste	Hazardous	Hazardous					
Sample Identity		·	/S705/9 4.50		Landfill	Waste in Non- Hazardous	Waste Landfi					
Depth (m)			4.50			Landfill						
Solid Waste Analysis												
Total Organic Carbon (%)	-				-	-	-					
Loss on Ignition (%)	-				-	-	-					
Sum of BTEX (mg/kg)	-				-	-	-					
Sum of 7 PCBs (mg/kg)	-				-	-	-					
Mineral Oil (mg/kg)	-				-	-	-					
PAH Sum of 17(mg/kg)					_	-	-					
pH (pH Units)	8.66				_	-	-					
ANC to pH 7 (mol/kg)	-				-	-	-					
ANC to pH 4 (mol/kg)	-				-	-	-					
Electe Accelerts	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using B					
Eluate Analysis	C_2		\mathbf{A}_2		EN	12457-3 at L/S 10	l/kg					
	mg	/ /I	mg.	/kg		1	1					
Arsenic	0.027		0.27		-	-	-					
Barium	0.001		0.01		-	-	-					
Cadmium	<0.00022		<0.0022		-	-	-					
Chromium	<0.001		<0.01		-	-	-					
Copper Mercury	0.0053 <0.00001		0.053 <0.0001		-	-	-					
Molybdenum	<0.001		<0.001		-	-	-					
Nickel	<0.001		<0.01		-	-	-					
Lead	<0.0013		<0.004									
Antimony	0.0017		0.017		-	-	-					
Selenium	0.0017		0.02		-							
Zinc	< 0.002		< 0.05		-	-	_					
Chloride	330		3300		-	-	-					
Fluoride	< 0.5		<5		_	-	_					
Sulphate as SO ₄	52		520		_	-	_					
Total Dissolved Solids	630		6300		_	_	_					
Phenols Monohydric	< 0.01		<0.1		_	-	_					
Dissolved Organic Carbon	<1		<10		-	-	-					
Leach Test Information			•									
Date Prepared	09/11/08	-	1									
pH (pH Units)	9.115	-	1									
Conductivity (µS/cm)	1154	-]									
Temperature (°C)	19.1	-]									
Temperature (C)			7									
Volume Leachant (Litres)	0.884	-										

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.11365		Moisture Content	Ratio (%) =		26.47	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			79.07	
Particle Size <4mm =	>95%		,				
Job Number		2	00817832		1011 117		Y • . T • • .
Batch			6		Landfill Was	te Acceptance (<u> Triteria Limits</u>
Sample Number(s)			122-124			Stable Non-	
Sampled Date			31/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		1	WS705/1		Landfill	Waste in Non-	Waste Landfi
Depth (m)			0.50			Hazardous	
Solid Waste Analysis						Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using B
Eluate Analysis	$\mathbf{C_2}$		${f A_2}$			12457-3 at L/S 10	
	m	<u>z</u> /l	mg	/kg	1		
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)	0.14		1.4		-	-	-
Γin Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
COD (CEN 10:1)	10		100		-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
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					-	-	-
					-	-	-
					-	-	-
Leach Test Information				l	-	-	-
Date Prepared	06/11/08	-					
pH (pH Units)	8.5	-					
Conductivity (µS/cm)	1480	-					
	19	-					
Γemperature (°C)							
Γemperature (°C) Volume Leachant (Litres)	0.876	-					

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.10784		Moisture Content	Ratio (%) =		19.84	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			83.44	
Particle Size <4mm =	>95%		,	(, , ,			
Job Number		2	00817832		T ICH XV-	()	No.24 1 1 14
Batch			6		Landfill Was	te Acceptance (Criteria Limits
Sample Number(s)			152-154			Stable Non-	
Sampled Date		;	31/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		V	VS705/11		Landfill	Waste in Non-	Waste Landfil
Depth (m)			6.00			Hazardous Landfill	
Solid Waste Analysis						Landilli	
Total Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
pH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				_	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using B
Eluate Analysis	C_2		$\mathbf{A_2}$			12457-3 at L/S 10	
	mg	₂ /I		g/kg		12 10 1 0 10 10	<u> </u>
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001	-	< 0.01	, 	_	_	_
Boron Dissolved (CEN 10:1) (ICP-MS)	0.07		0.7		_	_	_
Γin Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		_	_	_
COD (CEN 10:1)	10		100		_	_	_
(===:					_	_	_
					_	_	_
					_	_	_
					_	_	_
					-	-	-
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					-	-	-
					-	-	-
					-	-	-
Leach Test Information					-	-	-
Date Prepared	09/11/08	_	7				
pH (pH Units)	9.5	<u> </u>	┪				
Conductivity (µS/cm)	1430	<u> </u>	┪				
Femperature (°C)	18	<u> </u>	┨				
Volume Leachant (Litres)	0.882	<u>-</u>	┨				
Volume of Eluate VE1 (Litres)	0.002	-	_				

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	S .				K	EF:CEN12457	-2
(0 1 · 1 · 4 ·)	0.11126		Mile Green	D : (0()		22.60	
Mass Sample taken (kg) =	0.11126		Moisture Content			23.60	
Mass of dry sample (kg) = Particle Size <4mm =	0.09 >95%		Dry Matter Conte	nt Ratio (%) =		80.91	
raticle Size <4iiiii =	>93%						
Job Number		20	00817832		Landfill Was	te Acceptance (Criteria Limits
Batch			6				
Sample Number(s)			128-130		1	Stable Non-	
Sampled Date		3	31/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		V	VS705/3		Landfill	Waste in Non-	Waste Landfi
Depth (m)			1.50			Hazardous Landfill	
Solid Waste Analysis		•				Lanum	
Total Organic Carbon (%)	-	l			-	-	-
Loss on Ignition (%)	-	l			-	-	-
Sum of BTEX (mg/kg)	-	•			-	-	-
Sum of 7 PCBs (mg/kg)	-	l			-	-	-
Mineral Oil (mg/kg)	-	1			-	-	-
PAH Sum of 17(mg/kg) oH (pH Units)	_				-	-	-
ANC to pH 7 (mol/kg)	-	1			-	-	-
ANC to pH 4 (mol/kg)		1					
itte to pit 4 (morkg)	Conc ⁿ in 10:1				1	<u>I</u>	I
	eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using B
Eluate Analysis	$\mathbf{C_2}$		$\mathbf{A_2}$			12457-3 at L/S 10	
	m	g/l	m	g/kg	1		
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)	0.10		1.0		-	-	-
Tin Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
COD (CEN 10:1)	12		120		-	-	-
					-	-	-
			<u> </u>		-	-	-
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					-	-	-
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			1		-	_	-
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					-	-	-
					-	-	-
Leach Test Information			<u> </u>		-	-	-
I OUT IMMUUM	06/11/08	-	7				
Date Prepared		-	1				
Date Prepared DH (pH Units)	8.8	_					
H (pH Units)	8.8 1480	-	1				
oH (pH Units) Conductivity (μS/cm)							
Oate Prepared OH (pH Units) Conductivity (µS/cm) Cemperature (°C) Volume Leachant (Litres)	1480	-					

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.11471		Moisture Content	Ratio (%) =		27.78	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			78.26	
Particle Size <4mm =	>95%		Diy Maddel Colle	(/0)		70.20	
Job Number		2	00817832		T - 1011 XX		No. 24 22 - T 2 24
Batch			6		Landfill Was	te Acceptance (<u> Priteria Limit</u>
Sample Number(s)			134-136			Stable Non-	
Sampled Date		,	31/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity		1	WS705/5		Landfill	Waste in Non-	Waste Landfi
Depth (m)			2.50			Hazardous	
Solid Waste Analysis						Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using R
Eluate Analysis	C_2		\mathbf{A}_2			12457-3 at L/S 10	
	mg	p/l		g/kg			
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001	y -	< 0.01	, <u>s</u>	_	_	_
Boron Dissolved (CEN 10:1) (ICP-MS)	0.12		1.2		-	_	_
Γin Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		_	_	_
COD (CEN 10:1)	13		130		_	_	_
	_				_	_	_
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					-	-	-
		-			-	-	-
Leach Test Information					-	-	-
Date Prepared	09/11/08	_	7				
pH (pH Units)	4.6		┪				
Conductivity (µS/cm)	1880	<u> </u>	┪				
Temperature (°C)	18.8	<u> </u>	┨				
Volume Leachant (Litres)	0.875	<u>-</u>	┨				
	0.673	-	_				
Volume of Eluate VE1 (Litres)							

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	3				K	EF:CEN12457	-2
(0 1 1 4)	0.1000		With Garage	D : (0/)		22.46	
Mass Sample taken (kg) = Mass of dry sample (kg) =	0.1098 0.09		Moisture Content I Dry Matter Conter			22.46 81.66	
Particle Size <4mm =	>95%		Dry Matter Conter	it Katio (%) =		81.00	
article Size (Thinh =	> 75 70						
Job Number		200	0817832				
Batch			6		Landfill Was	te Acceptance (Criteria Limit
Sample Number(s)		14	40-142			Stable Non-	
Sampled Date		31	1/10/08		- Inert Waste	reactive Hazardous	Hazardous
Sample Identity		W	S705/7		Landfill	Waste in Non-	Waste Landfi
Depth (m)			3.50			Hazardous	
Solid Waste Analysis		-				Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	Conc ⁿ in 10:1				-	-	-
	eluate		10:1 conc ⁿ leached		I imit values for	compliance leach	ing tost using F
Eluate Analysis	C ₂		$\mathbf{A_2}$			12457-3 at L/S 10	
		g/l	mg	/kg		12 10 / 0 40 2/0 10	
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001	T	< 0.01	, 8	_	_	_
Boron Dissolved (CEN 10:1) (ICP-MS)	0.08		0.8		_	_	_
Γin Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
COD (CEN 10:1)	10		100		-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
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					-	-	-
					-	-	-
					-	-	-
Leach Test Information	00/11/20		1				
Date Prepared	09/11/08	-	I				
pH (pH Units)	8.754	-	ł				
Conductivity (µS/cm)	1468	-	ł				
Femperature (°C)	19.5	-	ł				
Volume Leachant (Litres) Volume of Eluate VE1 (Litres)	0.88	-	I				
	_						

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.10588		Moisture Content	Ratio (%) =		17.81	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			84.88	
Particle Size <4mm =	>95%		•	. ,			
Job Number		20	00817832		1011 117		N T
Batch			6		Landfill Was	te Acceptance (riteria Limits
Sample Number(s)			146-148			Stable Non-	
Sampled Date			31/10/08		- Inert Waste	reactive Hazardous	Hazardous
Sample Identity		7	WS705/9		Landfill	Waste in Non-	Waste Landfi
Depth (m)			4.50			Hazardous	
Solid Waste Analysis						Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached				
Eluate Analysis			Α.			compliance leach	
•	C_2	_	$\mathbf{A_2}$		<u>EN</u>	12457-3 at L/S 10	l/kg
	m	g/I		g/kg		1	
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)	0.05		0.5		-	-	-
Tin Dissolved (CEN 10:1) (ICP-MS)	< 0.001		<0.01		-	-	-
COD (CEN 10:1)	11		110		-	-	-
					-	-	-
					-	-	-
					-	-	-
					-	-	-
					 	-	-
					-	-	-
					-		
					-	-	
					_	_	_
			1		-	-	
			1		-	-	
					_	_	_
					-	-	-
Leach Test Information			<u>-</u>	•	-	•	
Date Prepared	09/11/08	-					
oH (pH Units)	9.115	-	_				
Conductivity (µS/cm)	1154	-					
Temperature (°C)	19.1	-					
	0.004						
Volume Leachant (Litres)	0.884	-					

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

<u>Summa</u>	ry of Method Codes cont	rained within report :	ISO Accr	MCI Accr	Wei San	Suri
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
TM008	BS 1377:Part 1977	Particle size distribution of solid samples			DRY	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro- chemical detection			NA	
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water			NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser			NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser	✓	✓	DRY	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser			NA	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser	✓	✓	DRY	
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser			NA	
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit			NA	
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water			NA	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter	✓	✓	WET	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS			NA	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

Job Number: 08/17832/02/01

 Client: Buro Happold

Client Ref. No.: 24435

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summa	ry of Method Codes cont	tained within report :	ISO Acci	MC Acci	We Sar	Sur. Cor			
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample 1	Surrogate Corrected			
TM183	BS EN 23506:2002, (BS 6068- 2.74:2002) ISBN 0 580 38924 3	BS EN 23506:2002, (BS 6068- Determination of Trace Level Mercury in Waters and Leachates							

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

Job Number: 08/17832/02/01 **Client:** Buro Happold

Client Ref. No.: 24435

Summary of Coolbox temperatures

oolbox Temperature (°C)
9.8



Unit 7-8 Hawarden Business Park Manor Road (off Manor Lane) Hawarden

> Deeside CH5 3US

Tel: (01244) 528700 Fax: (01244) 528701 email: mkt@alcontrol.co.uk

website: www.alcontrol.co.uk

Buro Happold Camden Mill Lower Bristol Road Bath

BA2 3DQ

ATTN: James Boyle

CERTIFICATE OF ANALYSIS

Date: 22 January, 2009

Our Reference: 08/17301/02/02

Your Reference:

Location: Hoyle Harbour

Supplement 002: to report number 08/17301/02/01.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials- whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Asbestos testing - we are not accredited for screen testing of asbestos fibres. We are only accredited for asbestos containing materials found in bulk samples.

Signed

Diane Whittlestone David O'Hare

Tech. Support Manager Project Manager

Kim Harrison
Project Coordinator

Team Leader

br Byron Hagan

Project Coordinator

Team Leader

Valid if signed by any of the above signatories.

Compiled By

Gemma Daly

ALcontrol Laboratories TEST SCHEDULE

JOB NUMBER: 08/17301/02

CLIENT: Buro Happold **CONTACT**: James Boyle

DATE OF RECEIPT: 17/10/08

LOCATION: Hoyle Harbour

BATCH NUMBER: 1 CLIENT REF/CODE: **ORDER NUMBER:** SD08052

TURNAROUND: 7 days

Numeric values indicate additional scheduling

* indicates test subcontracted

		_	_	_	_	_				_				_	_				_			_
	Molybdenum (CEN 10:1) (ICP-MS)				×	×		×			×											4
	Beryllium (CEN 10:1)				×	×		×			×											4
	Barium (CEN 10:1) (ICP- MS)				×	×		×			×											4
	Mercury (CEN 10:1)				×	×		×			×											4
	Metals ICP-MS 9 (CEN				×	×		×			×											4
	CEN Leach 10:1				×	×		×			×											4
>	Sulphate Total (S)	×											×	×	×	×	×	X	×	×		6
>	Ammoniacal Nitrogen				×	×	X	×	×	×	×	X									×	6
~	pH (S)				×	×	X	×	×	×	×	X									×	6
^	Chloride Soluble Kone	×											×	×	X	X	X	X	×	X		6
>	Sulphide Easily				×	×	X	×	×	×	×	X									×	6
	Cyanide Easily Liberatable (S)				×	×	×	×	×	×	×	×									×	6
>	Zinc (S)	×											×	×	X	×	×	X	×	×		6
^	Tin (S)	X											X	×	X	X	X	X	×	X		6
>	Nickel (S)	×											×	×	×	X	X	X	×	X		6
>	Lead (S)	X											X	×	X	X	X	X	×	X		6
^	Copper (S)	X											X	×	X	X	X	X	×	X		6
^	Chromium (S)	X											X	×	X	X	X	X	×	X		6
	Cadmium (S)	×											×	×	X	X	X	X	×	X		6
>	Arsenic (S)	×											×	×	×	×	×	×	×	×		6
>	TOC (S)	×	p	p									×	×	×	×	×	X	×	×		6
^	Soil Organic Matter (S)	X	on Hold	on Hold									X	×	X	X	X	X	×	X		6
	% Stones >10mm	×	Sample	Sample									X	×	×	X	X	X	×	X		6
	Miscellaneous		Ω̈́	Ω̈́																	3	-
UKAS Accredited ?	Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	r of Tests
UKAS A	Depth	0.75	0.50	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	0.50	Total Number of Tests
	P/V	JAR 250g	JAR 250g	1KGTub	1KGTub	1KGTub	1KGTub	1KGTub	1KGTub	1KGTub	1KGTub	1KGTub	JAR 250g	1KGTub								
	Sample Identity	BH1001	BH1001	BH1001	BH1001	WS701	WS701	WS701	WS701	WS701	WS701	WS701	WS701	WS701								
	Sample Number	1	2	3	4	2	9	7	8	6	10	11	12	13	14	15	16	17	18	19	20	

Printed: 22/01/09 13:16:39

Page 2 of 11

Printed: 22/01/09 13:16:39

ALcontrol Laboratories TEST SCHEDULE

JOB NUMBER: 08/17301/02

CLIENT: Buro Happold

CONTACT: James Boyle

LOCATION: Hoyle Harbour DATE OF RECEIPT: 17/10/08

BATCH NUMBER: 1 CLIENT REF/CODE:

ORDER NUMBER: SD08052

TURNAROUND: 7 days

Numeric values indicate additional scheduling

* indicates test subcontracted

_			_	_	_							_			_		_		_	_	_	_
	Mercury (CEN 8:1) (CVAF)				×		×															6
	Mercury (CEN 2:1)				X		×															2
	Molybdenum (CEN 10:1C) (ICP-MS)				×		×															2
	Molybdenum (CEN 8:1) (ICP-MS)				×		×															6
	Molybdenum (CEN 2:1) (ICP-MS)				×		×															2
	Barium (CEN 10:1C)				×		×															2
	Barium (CEN 8:1) (ICP- MS)				×		×															2
	Barium (CEN 2:1) (ICP-				×		×															2
	Metals ICP-MS 9 (CEN				X		×															2
	Metals ICP-MS 9 (CEN 8:1)				X		×															2
	Metals ICP-MS 9 (CEN 2:1)				×		×															6
	CEN Leach 8:1				×		×															2
	CEN Leach 2:1				×		×															2
>	Loss on Ignition (S)				×		×															2
>	Acid Neutralising	×													×							2
	COD (CEN 10:1)				×	×		×			×											4
	DOC (CEN 10:1)				×	×		×			×											4
	Phenois HPLC (CEN				×	×		×			×											4
	TDS (CEN 10:1)				×	×		×			×											4
	Sulphate Kone (CEN				×	×		×			×											4
	Fluoride Kone (CEN		9	9	×	×		×			×											4
	10:1) Chloride Kone (CEN 10:1)		on Hold	on Hold	×	×		×			×											4
	Tin (CEN 10:1) (ICP-MS)		Sample	Sample	×	×		×			×											4
	Antimony (CEN 10:1)		Sa	Sa	×	×		×			×											4
UKAS Accredited ?	Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	of Tests
KAS Acc		2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		Total Number of Tests
¬	Depth	0.75	0.50	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	0.50	Total N
	P/V	JAR 250g	250g	1KGTub	Tub	1KGTub	qnL	1KGTub	qnL	1KGTub	qnL	Tub	JAR 250g	250g	JAR 250g	250g	250g	250g	250g	250g	Tub	
	F/V	JAR 3	JAR 250g	1KG	1KGTub	1KG	1KGTub	1KG	1KGTub	1KG	1KGTub	1KGTub	JAR ;	JAR 250g	JAR ;	JAR 250g	1KGTub					
	Sample Identity	BH1001	BH1001	BH1001	BH1001	WS701	WS701	WS701	WS701	WS701	WS701	WS701	WS701	WS701								
	Sample Number	1	2	3	4	2	9	7	∞	6	10	11	12	13	4	15	16	17	18	19	20	

Page 3 of 11

Printed: 22/01/09 13:16:39

ALcontrol Laboratories TEST SCHEDULE

JOB NUMBER: 08/17301/02

CLIENT: Buro Happold

CONTACT: James Boyle DATE OF RECEIPT: 17/10/08

LOCATION: Hoyle Harbour

BATCH NUMBER: 1 CLIENT REF/CODE: **ORDER NUMBER:** SD08052

TURNAROUND: 7 days

Numeric values indicate additional scheduling

* indicates test subcontracted

	PAH 16 EPA GC-FID (S)																					U
>	EPH C10-40 GC Risk Band (S)	X												×								6
	TDS (CEN 10:1C)				X		X															6
	TDS (CEN 8:1)				×		X															6
	TDS (CEN 2:1)				×		×															6
	DOC (CEN 10:1C)				×		×															2
	DOC (CEN 8:1)				×		X															2
	DOC (CEN 2:1)				×		X															6
	Phenols HPLC (CEN 10·1C) Phenols HPLC (CEN				X		X															6
	8:1) Phenois HPLC (CEN				×		×															2 2
	2·1) Sulphate Kone (CEN				^ ×		×															2
	10:1C) Sulphate Kone (CEN				^ ×		×															2
	8:1) Sulphate Kone (CEN																					
	2:1) Fluoride Kone (CEN				×		×															2 2
	10·1C) Fluoride Kone (CEN				×		×															2
	8:1) Fluoride Kone (CEN				^ ×		×															2
	2:1) Chloride Kone (CEN				×		×															2
	10:1C) Chloride Kone (CEN				^ ×		×															2
	8-1) Chloride Kone (CEN				×		X															, ,
	2:1) Antimony (CEN 10:1C)				×		×															6
	(ICP-MS) Antimony (CEN 8:1)		on Hold	ploH uc	×		×															6
	Antimony (CEN 2:1)		Sample o		×		×															2
	Mercury (CEN 10:1C)		Sar	Sar	×		×															2
UKAS Accredited ?	Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	of Tests
UKAS Ac	Depth	0.75	0.50	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	0.50	Total Number of Tests
		ρC)d	ڡ	٩	ڡ	٩	٩	ڡ	ڡ	ڡ	ڡ)g)g	ЭG)g)g)g)g)g	٩	
	P/V	JAR 250g	JAR 250g	1KGTub	1KGTub	1KGTub	1KGTub	1KGTub	1KGTub	1KGTub	1KGTub	1KGTub	JAR 250g	1KGTub								
	Sample Identity	BH1001	BH1001	BH1001	BH1001	WS701	WS701	WS701		WS701												
	Sample Number	1	2	3	4	2	9	7	8	6	10	11	12	13	14	15	16	17	18	19	20	

Page 4 of 11

ALcontrol Laboratories TEST SCHEDULE

JOB NUMBER: 08/17301/02

CLIENT: Buro Happold
CONTACT: James Boyle

DATE OF RECEIPT: 17/10/08

LOCATION: Hoyle Harbour

BATCH NUMBER: 1 CLIENT REF/CODE:

ORDER NUMBER: SD08052

TURNAROUND: 7 days

Numeric values indicate additional scheduling

* indicates test subcontracted

			UKAS Ac	UKAS Accredited ?	>		<i>^</i>				
JAR 250g 0.75 SOLID 2 X JAR 250g 0.50 SOLID Sample on Hold 1 KGTub 0.50 SOLID X 1 KGTub 1.00 SOLID X 1 KGTub 2.00 SOLID X 1 KGTub 2.00 SOLID X 1 KGTub 2.50 SOLID X 1 KGTub 3.00 SOLID X 1 KGTub 3.50 SOLID X 1 AR 250g 1.00 SOLID X 1 AR 250g 2.50 SOLID X 1 AR 250g 2.50 SOLID X 1 AR 250g 2.50 SOLID X 1 AR 250g 3.00 SOLID X 1 AR 250g 3.00 SOLID X 1 AR 250g 3.00 </th <th>Sample Identity</th> <th>P/V</th> <th>Depth</th> <th>Sample Type</th> <th>PAH Spec MS (S)</th> <th></th> <th>(S)</th> <th></th> <th></th> <th></th> <th></th>	Sample Identity	P/V	Depth	Sample Type	PAH Spec MS (S)		(S)				
JAR 250g 0.50 SOLID Sample on Hold 1KGTub 0.50 SOLID X 1KGTub 0.75 SOLID X 1KGTub 1.00 SOLID X 1KGTub 2.00 SOLID X 1KGTub 2.00 SOLID X 1KGTub 3.00 SOLID X 1KGTub 3.50 SOLID X 1KGTub 3.50 SOLID X 1KGTub 4.00 SOLID X JAR 250g 1.50 SOLID X JAR 250g 2.00 SOLID X JAR 250g 2.50 SOLID X JAR 250g 2.50 SOLID X JAR 250g 3.00 SOLID <td>BH1001</td> <td>JAR 250g</td> <td>0.75</td> <td>SOLID</td> <td>2</td> <td>×</td> <td>×</td> <td></td> <td></td> <td></td> <td></td>	BH1001	JAR 250g	0.75	SOLID	2	×	×				
1KGTub 0.50 SOLID Sample on Hold 1KGTub 0.75 SOLID X 1KGTub 1.00 SOLID X 1KGTub 1.50 SOLID X 1KGTub 2.00 SOLID X 1KGTub 3.00 SOLID X 1KGTub 3.50 SOLID X 1KGTub 3.50 SOLID X JAR 250g 1.50 SOLID X JAR 250g 1.50 SOLID X JAR 250g 2.00 SOLID X JAR 250g 2.50 SOLID X JAR 250g 2.50 SOLID X JAR 250g 3.00 SOLID X JAR 250g 4.00 SOLID	BH1001	JAR 250g	0.50	SOLID	San	ple or	Plold (
1KGTub 0.75 SOLID X 1KGTub 1.00 SOLID X 1KGTub 1.50 SOLID X 1KGTub 2.00 SOLID X 1KGTub 3.00 SOLID X 1KGTub 3.00 SOLID X 1KGTub 4.00 SOLID X JAR 250g 0.50 SOLID X JAR 250g 1.50 SOLID X JAR 250g 2.00 SOLID X JAR 250g 2.00 SOLID X JAR 250g 2.00 SOLID X JAR 250g 2.50 SOLID X JAR 250g 3.00 SOLID X <td>BH1001</td> <td>1KGTub</td> <td>0.50</td> <td>SOLID</td> <td>San</td> <td>ple or</td> <td>Hold (</td> <td></td> <td></td> <td></td> <td></td>	BH1001	1KGTub	0.50	SOLID	San	ple or	Hold (
1KGTub 1.00 SOLID X 1KGTub 1.50 SOLID X 1KGTub 2.00 SOLID X 1KGTub 3.00 SOLID X 1KGTub 3.50 SOLID X 1KGTub 4.00 SOLID X JAR 250g 0.50 SOLID X JAR 250g 1.50 SOLID X JAR 250g 2.00 SOLID X JAR 250g 2.50 SOLID X JAR 250g 3.00 SOLID X<	BH1001	1KGTub	0.75	SOLID			×				
1KGTub 1.50 SOLID 1KGTub 2.00 SOLID 1KGTub 2.50 SOLID 1KGTub 3.50 SOLID 1KGTub 4.00 SOLID 1KGTub 4.00 SOLID JAR 250g 0.50 SOLID JAR 250g 1.00 SOLID JAR 250g 2.00 SOLID JAR 250g 2.50 SOLID JAR 250g 2.50 SOLID JAR 250g 3.00 SOLID JAR 250g 3.00 SOLID JAR 250g 3.00 SOLID JAR 250g 3.50 SOLID	WS701	1KGTub	1.00	SOLID			×				
1KGTub 2.00 SOLID Columnary 1KGTub 2.50 SOLID Columnary 1KGTub 3.00 SOLID Columnary 1KGTub 3.50 SOLID Columnary 1KGTub 4.00 SOLID Columnary JAR 250g 1.00 SOLID Columnary JAR 250g 2.00 SOLID Columnary JAR 250g 2.50 SOLID Columnary JAR 250g 3.00 SOLID Columnary JAR 250g 4.00 SOLID Columnary JAR 250g 4.00 SOLID Columnary	WS701	1KGTub	1.50	SOLID							
1KGTub 2.50 SOLID 1KGTub 3.00 SOLID 1KGTub 3.50 SOLID 1KGTub 4.00 SOLID JAR 250g 0.50 SOLID JAR 250g 1.50 SOLID JAR 250g 2.00 SOLID JAR 250g 2.50 SOLID JAR 250g 3.00 SOLID JAR 250g 4.00 SOLID JAR 250g 4.00 SOLID	WS701	1KGTub	2.00	SOLID							
1KGTub 3.00 SOLID 1KGTub 3.50 SOLID 1KGTub 4.00 SOLID JAR 250g 0.50 SOLID JAR 250g 1.50 SOLID JAR 250g 2.00 SOLID JAR 250g 2.00 SOLID JAR 250g 2.50 SOLID JAR 250g 3.00 SOLID JAR 250g 4.00 SOLID JAR 250g 4.00 SOLID	WS701	1KGTub	2.50	SOLID							
1KGTub 3.50 SOLID 1 1KGTub 4.00 SOLID 2 X JAR 250g 0.50 SOLID 2 X JAR 250g 1.50 SOLID 2 X JAR 250g 2.00 SOLID 2 X JAR 250g 2.50 SOLID 2 X JAR 250g 3.00 SOLID 2 X JAR 250g 3.50 SOLID 2 X JAR 250g 4.00 SOLID 2 X JAR 250g 3.50 SOLID X X JAR 250g 4.00 SOLID X X JAR 250g 4.00 SOLID X X JAR 250g 4.00 SOLID X X <t< td=""><td>WS701</td><td>1KGTub</td><td>3.00</td><td>SOLID</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	WS701	1KGTub	3.00	SOLID							
1KGTub 4.00 SOLID JAR 250g 0.50 SOLID JAR 250g 1.00 SOLID JAR 250g 1.50 SOLID JAR 250g 2.00 SOLID JAR 250g 2.50 SOLID JAR 250g 3.00 SOLID JAR 250g 3.50 SOLID	WS701	1KGTub	3.50	SOLID							
JAR 250g 0.50 SOLID 2 X JAR 250g 1.00 SOLID 2 X JAR 250g 2.00 SOLID X X JAR 250g 2.50 SOLID X X JAR 250g 3.00 SOLID X X JAR 250g 3.50 SOLID X X JAR 250g 4.00 SOLID X X	WS701	1KGTub	4.00	SOLID							
JAR 250g 1.00 SOLID 2 X JAR 250g 1.50 SOLID 2 X JAR 250g 2.00 SOLID 2 X JAR 250g 3.00 SOLID 3 X JAR 250g 3.50 SOLID 3 X JAR 250g 4.00 SOLID X X	WS701	JAR 250g	0.50	SOLID							
JAR 250g 1.50 SOLID JAR 250g 2.00 SOLID JAR 250g 2.50 SOLID JAR 250g 3.00 SOLID JAR 250g 3.00 SOLID JAR 250g 4.00 SOLID JAR 250g 4.00 SOLID JAR 250g 4.00 SOLID JAR 250g 4.00 SOLID	WS701	JAR 250g	1.00	SOLID	2	×	×				
JAR 250g 2.00 SOLID JAR 250g 2.50 SOLID JAR 250g 3.00 SOLID JAR 250g 3.50 SOLID JAR 250g 4.00 SOLID 1KGTub 0.50 SOLID Total Number of Tests 2 2 2	WS701	JAR 250g	1.50	SOLID							
JAR 250g 2.50 SOLID JAR 250g 3.00 SOLID JAR 250g 3.50 SOLID JAR 250g 4.00 SOLID 1KGTub 0.50 SOLID Total Number of Tests 2 2	WS701	JAR 250g	2.00	SOLID							
JAR 250g 3.00 SOLID JAR 250g 3.50 SOLID JAR 250g 4.00 SOLID 1KGTub 0.50 SOLID Total Number of Tests 2 2	WS701	JAR 250g	2.50	SOLID							
JAR 250g 3.50 SOLID JAR 250g 4.00 SOLID 1KGTub 0.50 SOLID Total Number of Tests 2 2	WS701	JAR 250g	3.00	SOLID							
JAR 250g 4.00 SOLID 1KGTub 0.50 SOLID Total Number of Tests 2 2	WS701	JAR 250g	3.50	SOLID							
1KGTub 0.50 SOLID Total Number of Tests 2 2 2	WS701	JAR 250g	4.00	SOLID							
2 2 2	WS701	1KGTub	0.50	SOLID							
ı			Total Number	of Tests	2	2	2 2				

Printed: 22/01/09 13:16:39

Page 5 of 11

ALcontrol Laboratories Analytical Services Sample Descriptions

Job Number: 08/17301/02/02 Grain sizes

Client: Buro Happold <0.063mm Very Fine

Client Ref: 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
WS701	0.50	Brown	0.1mm - 0.063mm	Silty Clay	1
					1
					1
					1
					\top
					_
					+
					+-
					-
					+
					₩
					$oldsymbol{oldsymbol{\perp}}$
					1
					1
					+
					+-
					+
					+
					-
					\bot
					
					\perp

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

Validated Preliminary	√	ALcontrol La	aboratories Analytic Table Of Results	cal Services	M	ISO 17025 accredited MCERTS accredited Subcontracted test
Ioh Number	(08/17301/02/02	Matriy•	SOLID	»	Shown on prev. report

Client:Buro HappoldLocation:Hoyle HarbourClient Ref. No.:Client Contact: James Boyle

				Contact			
Sample Identity	WS701						
Depth (m)	0.50					M	_
Sample Type	SOLID					etho	_oD
Sampled Date	15.10.08					od C	LoD/Units
Sample Received Date	17.10.08					Method Code	its
Batch							
Sample Number(s)							
Miscellaneous Analysis*	NDP						NONE
		1					,

Job Number: 08/17301/02/02 **Client:** Buro Happold

Client Ref. No.:

Summary of Coolbox temperatures

Batch No.	Coolbox Temperature (°C)
1	9.5

APPENDIX

APPENDIX

- Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following:
 NRA Leach tests, flash point, ammonium as NH₄ by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and
 TOF-MS TICS.
- 2. Samples will be run in duplicate upon request, but an additional charge may be incurred.
- 3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. Alcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.
- 4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.
- 5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.
- 6. When requested, the soil sample will be screened for the presence of fibres in-house and if no fibres are found will be reported as NFD no fibres detected. If fibres are detected, they will be removed and analysed by our documented in house method based on HSG 248(2005). If a sample is suspected of containing asbestos, then further preparation and analysis will be suspended on that sample until the asbestos result is known. If asbestos is present, then no further analysis will be undertaken.
- 7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.
- 8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.
- 9. NDP No determination possible due to insufficient/unsuitable sample.
- 10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals total metals must be requested separately.
- 11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.
- Surrogate recoveries Most of our organic methods include surrogates, the recovery of which is monitored, but not corrected or reported.
 - For EPH and PAH on soils the result is not surrogate corrected, but a percentage recovery is quoted.
- Product analyses Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.
- 14. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).
- 15. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14)
- 16. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
- 17. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.
- 18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.
- 19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.
- 20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.
- 21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.
- 22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.
- 23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAH MS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GS MS
SVOC	DCM	LIQUID/LIQUID SHAKEN SVOC	GC MS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PEST OCP/OPP	DCM/EA	SOLID PHASE EXTRACTION	GC MS
TRIAZINE HERBS	DCM/EA	SOLID PHASE EXTRACTION	GC MS
PHENOLS MS TPH by INFRA RED (IR)	DCM TCE	SOLID PHASE EXTRACTION LIQUID/LIQUID EXTRACTION	GC MS HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID EXTRACTION	HPLC
SAPONIFIABLE	TCE	LIQUID/LIQUID EXTRACTION	HPLC
UNSAPONIFIABLE	TCE	LIQUID/LIQUID EXTRACTION	HPLC
GLYCOLS	DCM	LIQUID/LIQUID EXTRACTION	EZ FLASH

SOLID MATRICES EXTRACTION SUMMARY

	002.2	WATRICES EXTRACTION SUMMART		
ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
Solvent Extractable Matter	D&C	DCM	SOXTHERM	GRAVIMETRIC
Cyclohexane Ext. Matter	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
Thin Layer Chromatography	D&C	DCM	SOXTHERM	IATROSCAN
Elemental Sulphur	D&C	DCM	SOXTHERM	HPLC
Phenols by GCMS	WET	DCM	SOXTHERM	GC-MS
Herbicides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
Pesticides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (Min oil)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (Cleaned up)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH CWG by GC	D&C	HEXANE:ACETONE	END OVER END	GC-FID
PCB tot / PCB con	D&C	HEXANE:ACETONE	END OVER END	GC-MS
Polyaromatic Hydrocarbons (MS)	D&C	HEXANE:ACETONE	END OVER END	GC-MS
C8-C40 (C6-C40)EZ Flash	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Polyaromatic Hydrocarbons Rapid GC	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Semi Volatile Organic compounds	WET	DCM:ACETONE	SONICATE	GC-MS

ALcontrol Laboratories Analytical Services Sample Descriptions

Job Number: 08/17301/02/01 Grain sizes

Client: Buro Happold <0.063mm Very Fine

Client Ref: 0.1mm - 0.063mm Fine

0.1mm - 2mm Medium
2mm - 10mm Coarse
>10mm Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
BH1001	0.75	Black	0.1mm - 0.063mm	Silty Clay with some Vegetation	1
WS701	0.50	Brown	0.1mm - 0.063mm	Silty Clay	1
WS701	1.00	Beige	0.1mm - 0.063mm	Sandy Clay with some Stones	1
WS701	1.50	Beige	0.1mm - 0.063mm	Sandy Loam	1
WS701	2.00	Beige	0.1mm - 0.063mm	Sandy Clay	1
WS701	2.50	Beige	0.1mm - 0.063mm	Sandy Clay	1
WS701	3.00	Beige	0.1mm - 2mm	Sandy Clay with some Stones	1
WS701	3.50	Beige	0.1mm - 2mm	Sandy Clay	1
WS701	4.00	Beige	0.1mm - 0.063mm	Sandy Clay	1
					\vdash

^{*} These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

Validated	√
Preliminary	

ALcontrol Laboratories Analytical Services * ISO 17025 accredited **Table Of Results**

M MCERTS accredited

* Subcontracted test » Shown on prev. report

Job Number: 08/17301/02/01 **Matrix: SOLID**

Buro Happold Hoyle Harbour **Client: Location:**

Client Ref. No.:

Client Contact: James Boyle

							1		T :		
Sample Identity	BH1001	WS701									
Depth (m)	0.75	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	ĭ	I
Sample Type	SOLID	etho	OD								
Sampled Date	13.10.08	15.10.08	15.10.08	15.10.08	15.10.08	15.10.08	15.10.08	15.10.08	15.10.08	Method Code	LoD/Units
Sample Received Date	17.10.08	17.10.08	17.10.08	17.10.08	17.10.08	17.10.08	17.10.08	17.10.08	17.10.08	ode	its
Batch		1	1	1	1	1	1	1	1		
Sample Number(s)	1,4	12,20	5,13	6,14	7,15	8,16	9,17	10,18	11,19		
Total Sulphate	2800	3800	2500	5300	5400	5200	2600	5500	5200	TM129 [#] _M	<100 mg/kg
Arsenic	1300	240	37	35	21	44	65	16	10	TM129 [#] _M	<3.0 mg/kg
Cadmium	10	1.2	0.3	0.3	0.2	0.3	0.5	<0.2	< 0.2	TM129	<0.2 mg/kg
Chromium	43	11	23	<4.5	<4.5	<4.5	14	<4.5	<4.5	TM129 [#] _M	<4.5 mg/kg
Copper	1200	460	64	110	45	90	110	30	20	TM129 [#] _M	<6 mg/kg
Lead	1200	80	7	34	10	14	18	6	6	TM129 [#] _M	<2 mg/kg
Nickel	17	14	17	4.7	2.7	4.1	9.5	3.3	2.9	TM129 [#] _M	<0.9 mg/kg
Tin	1500	59	12	19	5	12	61	13	4	TM129#	<1 mg/kg
Zinc	1200	330	240	100	61	120	160	46	37	TM129 [#] _M	<2.5 mg/kg
ANC at pH4	1.5	-	-	5.0	-	-	-	-	-	TM182#	<0.03 mol/kg
ANC at pH6	0.13	-	-	0.30	-	-	-	-	-	TM182#	<0.03 mol/kg
Easily Liberated Sulphide	<15	<15	<15	<15	<15	<15	<15	<15	<15	TM180 [#]	<15 mg/kg
Chloride (soluble)	36	4000	1800	3700	4400	4000	1900	3900	4200	TM097 [#] _M	<2 mg/kg
Soil Organic Matter	14	0.67	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	TM132 [#]	<0.35 %
Total Organic Carbon	8.1	0.4	< 0.2	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	TM132 [#] _M	<0.2 %
Phenols Monohydric	< 0.15	-	< 0.15	-	-	-	-	-	-	$TM062^{\#}_{M}$	<0.15 mg/kg
Easily Liberatable Cyanide	<1	<1	<1	<1	<1	<1	<1	<1	<1	TM153	<1 mg/kg
% Stones Greater then 10mm	< 0.1	< 0.1	48	< 0.1	< 0.1	< 0.1	99	< 0.1	< 0.1	TM008	<0.1 %
Ammoniacal Nitrogen as N	0.932.32	110	<15	<15	<15	<15	<15	<15	29	$TM024^{\#}_{M}$	<15 mg/kg
Loss on Ignition	9.5	-	-	1.8	-	-	-	-	-	$TM018^{\#}_{M}$	<0.3 %
pH Value	7.69	8.45	8.49	8.46	8.39	8.43	8.63	8.50	8.53	$TM133^{\#}_{M}$	<1.00 pH Units
EPH (DRO) (C10-C40)	180	-	<35	-	-	-	-	-	-	$TM061^{^\#}_{\ M}$	<35 mg/kg
EPH (DRO) (C10-C40) % Surrogate Recovery	95	-	96	-	-	-	-	-	-	$TM061^{^{\#}}_{M}}$	%
EPH C10-12	<35	-	<35	-	-	-	-	-	-	TM061 [#]	<35 mg/kg
EPH >C12-16	<35	-	<35	-	-	-	-	-	-	TM061 [#]	<35 mg/kg
EPH >C16-21	37	-	<35	-	-	-	-	-	-	TM061 [#]	<35 mg/kg
EPH >C21-35	93	-	<35	-	-	-	-	-	-	TM061 [#]	<35 mg/kg
EPH >C35-40	<35	-	<35	-	-	-	-	-	-	TM061 [#]	<35 mg/kg
GRO (C4-C10)	<10	-	<10	-	-	-	-	-	-	TM089	<10 ug/kg
GRO (C10-C12)	<10	-	<10	-	-	-	-	-	-	TM089	<10 ug/kg
Benzene	<10	-	<10	-	-	-	-	-	-	TM089 [#] _M	<10 ug/kg

Validated	\checkmark	ALcontrol Labor
Preliminary		Ta

ratories Analytical Services # ISO 17025 accredited ble Of Results

M MCERTS accredited

* Subcontracted test » Shown on prev. report

Job Number: 08/17301/02/01 **Matrix: SOLID**

Buro Happold Hoyle Harbour **Client: Location: Client Contact:** James Boyle **Client Ref. No.:**

Sample Identity	BH1001	WS701									
Depth (m)	0.75	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	×	_
Sample Type	SOLID	etho	e e								
Sampled Date	13.10.08	15.10.08	15.10.08	15.10.08	15.10.08	15.10.08	15.10.08	15.10.08	15.10.08	Method Code	LoD/Units
Sample Received Date	17.10.08	17.10.08	17.10.08	17.10.08	17.10.08	17.10.08	17.10.08	17.10.08	17.10.08)ode	its
Batch		1	1	1	1	1	1	1	1		
Sample Number(s)		12,20	5,13	6,14	7,15	8,16	9,17	10,18	11,19		
Toluene	<10	-	<10	-	-	-	-	-	-	TM089 [#] _M	<10 ug/kg
Ethyl benzene	<10	-	<10	-	-	-	-	-	-	TM089 [#] _M	<10 ug/kg
m & p Xylene	<10	-	<10	-	-	-	-	-	-	TM089 [#] _M	<10 ug/kg
o Xylene	<10	-	<10	-	-	-	-	-	-	TM089 [#] _M	<10 ug/kg
Sum m&p and o Xylene	<10	-	<10	-	-	-	-	-	-	TM089	<10 ug/kg
Sum of BTEX	<10	-	<10	-	-	-	-	-	-	TM089	<10 ug/kg
MTBE	<10	-	<10	-	-	-	-	-	-	TM089 [#]	<10 ug/kg
Coronene	12	-	<2	-	-	-	-	-	-	TM213	<2 mg/kg
		<u> </u>									

Validated	\checkmark
Preliminary	

ALcontrol Laboratories Analytical Services # ISO 17025 accredited **Table Of Results**

M MCERTS accredited

* Subcontracted test » Shown on prev. report

Job Number: 08/17301/02/01 **Matrix: SOLID**

Buro Happold **Client: Location:** Hoyle Harbour **Client Ref. No.: Client Contact:** James Boyle

BH1001 WS701 WS701 WS701 WS701 WS701 WS701 WS701 Sample Identity WS701 0.75 0.50 1.00 2.00 3.00 3.50 Depth (m) 1.50 2.50 4.00 **Method Code** LoD/Units Sample Type SOLID SOLID SOLID SOLID SOLID SOLID SOLID SOLID SOLID 15.10.08 Sampled Date 13.10.08 15.10.08 15.10.08 15.10.08 15.10.08 15.10.08 15.10.08 15.10.08 17.10.08 17.10.08 17.10.08 17.10.08 17.10.08 17.10.08 17.10.08 17.10.08 17.10.08 Sample Received Date 1 1 1 1 1 1 1 1 Batch 1 Sample Number(s) 10,18 11,19 12,20 5,13 6,14 7,15 8,16 9,17 1,4 PAH by GCMS Naphthalene TM074[#]_M <10 ug/kg <10 TM074[#]_M Acenaphthylene 74 <5 <5 ug/kg Acenaphthene 38 <14 $TM074^{\#}_{M}$ <14 ug/kg 200 <12 TM074[#]_M <12 ug/kg Fluorene Phenanthrene 1500 28 $TM074^{\#}_{M}$ <21 ug/kg 170 TM074[#]_M Anthracene <9 -<9 ug/kg Fluoranthene 1300 <25 $TM074^{\#}_{M}$ <25 ug/kg 910 <22 $TM074^{\#}_{M}$ <22 ug/kg Pyrene TM074[#]_M <12 ug/kg Benz(a)anthracene 730 23 <10 ug/kg 1100 11 $TM074^{\#}_{M}$ Chrysene Benzo(b)fluoranthene 1200 <16 $TM074^{\#}_{M}$ <16 ug/kg Benzo(k)fluoranthene 530 <25 $TM074^{\#}_{M}$ <25 ug/kg TM074[#]_M <12 ug/kg Benzo(a)pyrene 520 <12 Indeno(123cd)pyrene 300 <11 TM074[#]_M <11 ug/kg Dibenzo(ah)anthracene 130 <8 $TM074^{\#}_{M}$ <8 ug/kg TM074[#]_M <10 <10 ug/kg Benzo(ghi)perylene 340 PAH 16 Total 9700 62 $TM074^{\#}_{M}$ <25 ug/kg

Mass Sample taken (kg) =	0.1195	Moisture Content Ratio (%)	=	32.72	
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%)		75.35	
Particle Size <4mm =	>95%	· ·	,		
Job Number	<u> </u>	200817301	Londfil Woo	te Acceptance (Cuitavia I imita
Batch		1	Landini was	te Acceptance C	<u> Fiteria Liinus</u>
Sample Number(s)		1,4		Stable Non-	
Sampled Date		13/10/08		reactive	
Sample Identity		BH1001	Inert Waste	Hazardous	Hazardous
		0.75	Landfill	Waste in Non- Hazardous	Waste Landfil
Depth (m)		0.75		Landfill	
Solid Waste Analysis	0 1				
Total Organic Carbon (%) Loss on Ignition (%)	8.1 9.5		-	-	-
Sum of BTEX (mg/kg)	<0.01		-	-	-
Sum of 7 PCBs (mg/kg)	-		-	-	-
Mineral Oil (mg/kg)	-		-	-	-
PAH Sum of 17(mg/kg)	-		-	-	-
pH (pH Units)	7.69		-	-	-
ANC to pH 6 (mol/kg)	0.13		-	-	-
ANC to pH 4 (mol/kg)	1.5		-	-	-
Eluate Analysis	Conc ⁿ in 10:1	10:1 conc ⁿ leached		compliance leach	
•	C ₂	A ₂	EN	12457-3 at L/S 10	<u>) l/kg</u>
Arsenic	mg/l 0.094	0.94		_	_
Barium	0.028	0.28		-	
Cadmium	0.00036	0.0036	_	_	_
Chromium	0.001	0.01	-	-	-
Copper	0.019	0.19	-	-	-
Mercury	< 0.00001	< 0.0001	-	-	-
Molybdenum	0.004	0.04	-	-	-
Nickel	< 0.0015	< 0.015	-	-	-
Lead	0.0016	0.016	-	-	-
Antimony	0.028	0.29	-	-	-
Selenium Z:	0.004	0.04	-	-	-
Zinc Chloride	0.011	0.11	-	-	-
Fluoride	0.5	5		-	-
Sulphate as SO ₄	15	150	_	-	_
Total Dissolved Solids	89	890	-	-	-
Phenols Monohydric	<0.01	<0.1	-	-	-
Dissolved Organic Carbon	3	30	-	-	-
Leach Test Information					
Date Prepared	09/11/08	<u>-</u>			
pH (pH Units)	8.1	-			
Conductivity (µS/cm)	160	<u>-</u>			
Temperature (°C)	19.1	-			
Volume Leachant (Litres)	0.871	-			
Volume of Eluate VE1 (Litres)					

Mass Sample taken (kg) =	0.10348		sture Content I	` '		14.05	
Mass of dry sample (kg) =	0.09	Dry	Matter Conten	t Ratio (%) =		87.68	
Particle Size <4mm =	>95%						
Job Number		2008173	301		I an Jell Wass	to A company of C	Y
Batch		1			Landilli was	te Acceptance (<u>riteria Limits</u>
Sample Number(s)		5,13				Stable Non-	
Sampled Date		15/10/	08		-	reactive	
Sample Identity		WS70	1		Inert Waste Landfill	Hazardous Waste in Non-	Hazardous Waste Landfill
Depth (m)		1.00			Lanum	Hazardous	waste Landin
Solid Waste Analysis		2,00				Landfill	
Total Organic Carbon (%)	< 0.2				_	-	_
Loss on Ignition (%)	- 0.2					<u>-</u>	
Sum of BTEX (mg/kg)	<0.01						-
Sum of 7 PCBs (mg/kg)	-				<u> </u>		
Mineral Oil (mg/kg)	_				_	_	_
PAH Sum of 17(mg/kg)	_				_	_	_
pH (pH Units)	8.49				_	_	_
ANC to pH 6 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
•	Conc ⁿ in 10:1	10.1	conc ⁿ leached				
Eleata Amalesia	eluate	10:1	conc leached		Limit values for	compliance leach	ing test using BS
Eluate Analysis	$\mathbf{C_2}$		\mathbf{A}_2		EN	12457-3 at L/S 10	l/kg
	mg/l		mg	/kg			
Arsenic	0.010		0.10		-	-	-
Barium	0.001		0.01		-	-	-
Cadmium	< 0.00022		< 0.0022		-	-	-
Chromium	< 0.001		< 0.01		-	-	-
Copper	0.0036		0.036		-	-	-
Mercury	<0.00001		< 0.0001		-	-	-
Molybdenum	< 0.001		< 0.01		-	-	-
Nickel	<0.0015		<0.015		-	-	-
Lead	0.0006		0.006		-	-	-
Antimony	0.0040		0.040		-	-	-
Selenium Zinc	0.002 <0.005		0.02 <0.05		-	-	-
Chloride	220		2200		-	-	-
Fluoride	<0.5		<5				
Sulphate as SO ₄	39		390			<u> </u>	-
Total Dissolved Solids	460		4600		-		-
Phenols Monohydric	<0.01		<0.1		_	_	_
Dissolved Organic Carbon	<1		<10		-	-	-
Leach Test Information		-			- 4		
Date Prepared	09/11/08	-					
pH (pH Units)	8.742	_					
	93.2	-					
Conductivity (µS/cm)							
Conductivity (µS/cm) Temperature (°C)	18.8	-					
	18.8 0.887	<u>-</u>					

Mass Sample taken (kg) =	0.11678	Moisture Content	Ratio (%) -		30.45	
Mass of dry sample (kg) =	0.09	Dry Matter Conten	` '		76.66	
Particle Size <4mm =	>95%	,	(,			
Job Number		200817301				
Batch		1		<u>Landfill Was</u>	te Acceptance (<u>Criteria Limits</u>
Sample Number(s)		7,15			Stable Non-	
Sampled Date		15/10/08		-	reactive	
Sample Identity		WS701		Inert Waste	Hazardous	Hazardous
Depth (m)		2.00		Landfill	Waste in Non- Hazardous	Waste Landfill
_		2.00		-	Landfill	
Solid Waste Analysis Total Organic Carbon (%)	< 0.2			_	_	_
Loss on Ignition (%)	- 0.2				-	-
Sum of BTEX (mg/kg)	-			-	<u>-</u>	-
Sum of 7 PCBs (mg/kg)				-	-	-
Mineral Oil (mg/kg)	_			_	_	_
PAH Sum of 17(mg/kg)	-			_	-	-
pH (pH Units)	8.39			-	-	-
ANC to pH 6 (mol/kg)	-			-	-	-
ANC to pH 4 (mol/kg)	-			-	-	-
	Conc ⁿ in 10:1	10:1 conc ⁿ leached				
Eluate Analysis	eluate				compliance leach	
Eluate Analysis	C_2	\mathbf{A}_2		EN	12457-3 at L/S 10	<u>l/kg</u>
	mg/l	mg	/kg			
Arsenic	0.0098	0.098		-	-	-
Barium	0.012	0.12		-	-	-
Cadmium	<0.00022	<0.0022		-	-	-
Chromium	0.006	0.06		-	-	-
Copper	0.013	0.13 0.0002		-	-	-
Mercury Molybdenum	0.00002 0.002	0.0002		-	-	-
Nickel	<0.002	<0.015		-	-	-
Lead	0.0038	0.038		-	-	
Antimony	0.0024	0.024		 	-	_
Selenium	0.004	0.04		_	_	_
Zinc	0.006	0.06		_	_	_
Chloride	490	4900		-	-	_
Fluoride	< 0.5	<5		-	-	-
Sulphate as SO ₄	77	770		-	-	-
Total Dissolved Solids	920	9200		-	-	-
Phenols Monohydric	< 0.01	< 0.1		-	-	-
Dissolved Organic Carbon	3	30		-	-	-
Leach Test Information						
Date Prepared	09/11/08	-				
pH (pH Units)	9.6	-				
Conductivity (µS/cm)	1690	-				
Temperature (°C)	18.8	-				
Volume Leachant (Litres)	0.873	-				
Volume of Eluate VE1 (Litres)						

Mass Sample taken (kg) = Mass of dry sample (kg) =	0.10845 0.09	Moisture Content Ratio (%) = Dry Matter Content Ratio (%) =		19.79 83.48	
Particle Size <4mm =	>95%	,			
Job Number		200817301			~
Batch		1	Landfill Was	te Acceptance (<u>riteria Limits</u>
Sample Number(s)		10,18		Stable Non-	
Sampled Date		15/10/08		reactive	
Sample Identity		WS701	Inert Waste Landfill	Hazardous Waste in Non-	Hazardous Waste Landfill
Depth (m)		3.50	Lanum	Hazardous	Waste Landin
_		3.30		Landfill	
Solid Waste Analysis Total Organic Carbon (%)	<0.2		_	-	_
Loss on Ignition (%)	-				_
Sum of BTEX (mg/kg)	-		_	_	_
Sum of 7 PCBs (mg/kg)	-		-	-	-
Mineral Oil (mg/kg)	-		-	-	-
PAH Sum of 17(mg/kg)	-		-	-	-
pH (pH Units)	8.50		-	-	-
ANC to pH 6 (mol/kg)	-		-	-	-
ANC to pH 4 (mol/kg)	-		-	-	-
	Conc ⁿ in 10:1 eluate	10:1 conc ⁿ leached	Limit values for	compliance leach	ing test using RS
Eluate Analysis	C_2	A ₂		12457-3 at L/S 10	
	mg/l	mg/kg			_
Arsenic	0.016	0.16	-	-	-
Barium	0.004	0.04	-	-	-
Cadmium	< 0.00022	<0.0022	-	-	-
Chromium	< 0.001	<0.01	-	-	-
Copper	0.0043	0.043	-	-	-
Mercury	<0.00001	<0.0001	-	-	-
Molybdenum	<0.001	<0.01	-	-	-
Nickel Lead	<0.0015 <0.0004	<0.015 <0.004		-	-
Antimony	0.0013	0.004		-	_
Selenium	0.0013	0.013	-		_
Zinc	<0.005	<0.05	-	-	_
Chloride	410	4000	-	-	-
Fluoride	<0.5	<5	-	-	-
Sulphate as SO ₄	61	610	-	-	_
Total Dissolved Solids	750	7500	-	-	-
Phenols Monohydric	< 0.01	<0.1	-	-	-
Dissolved Organic Carbon	<1	<10	-	-	-
Leach Test Information	00/11/00				
Date Prepared	09/11/08 -				
pH (pH Units)	9.017 - 1348 -				
Conductivity (uS/cm)		—			
Conductivity (µS/cm)	18 Q I =				
Conductivity (µS/cm) Temperature (°C) Volume Leachant (Litres)	18.9 - 0.882 -				

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULT	2				R	EF:CEN12457	-3
Mass Sample taken (kg) =	0.23159		Moisture Content	Patio (%) -		32.72	
Mass of dry sample (kg) =	0.23139		Dry Matter Conten			75.35	
Particle Size <4mm =	>95%		Dry Matter Conter	it Ratio (70) =		75.55	
Job Number		200	0817301		T 16°11 XX/	4	N
Batch			1		Landfill Was	te Acceptance C	riteria Limits
Sample Number(s)			1,4			Stable Non-	
Sampled Date		13/10/08 reactive Inert Waste Hazardous					Hazardous
Sample Identity		В	H1001		Landfill	Waste in Non-	Waste Landfi
Depth (m)			0.75			Hazardous	
Solid Waste Analysis		•				Landfill	
Total Organic Carbon (%)	8.1				3	5	6
Loss on Ignition (%)	9.5				-	-	10
Sum of BTEX (mg/kg)	< 0.01				6	-	-
Sum of 7 PCBs (mg/kg)	-				1	-	-
Mineral Oil (mg/kg)	-				500	-	-
PAH Sum of 17(mg/kg)	-				100	-	-
pH (pH Units)	7.69				-	>6	-
ANC to pH 6 (mol/kg)	0.13				-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	1.5				-	to be evaluated	to be evaluated
	Conc ⁿ in 2:1 eluate	Conc ⁿ in 8:1 eluate	2:1 conc ⁿ leached	Cumulative conc ⁿ leached	Limit values for	compliance leach	ing test using R
Eluate Analysis	C_2	C ₈	\mathbf{A}_2	A ₂₋₁₀		12457-3 at L/S 10	-
		g/l		/kg			<u></u>
Arsenic	0.19	0.16	0.37	1.6	0.5	2	25
Barium	0.49	0.036	0.99	1.1	20	100	300
Cadmium	< 0.00022	<0.00022	< 0.00044	< 0.0022	0.04	1	5
Chromium	0.002	< 0.001	< 0.002	< 0.01	0.5	10	70
	0.028	0.016	0.056	0.18	2	50	100
Copper			< 0.00002	< 0.0001	0.01	0.2	2
	< 0.00001	< 0.00001	\U.UUUU2		(7.07)		
Mercury	<0.00001 0.011	<0.00001	0.02	0.03			30
Mercury				0.03 <0.015	0.5	10 10	30 40
Mercury Molybdenum Nickel	0.011 0.0036	0.001 <0.0015	0.02		0.5	10	40
Mercury Molybdenum Nickel Lead	0.011	0.001	0.02 0.007	< 0.015	0.5	10	
Mercury Molybdenum Nickel Lead Antimony	0.011 0.0036 0.0010	0.001 <0.0015 0.0012	0.02 0.007 0.002	<0.015 0.012	0.5 0.4 0.5	10 10 10	40 50
Mercury Molybdenum Nickel Lead Antimony Selenium	0.011 0.0036 0.0010 0.022	0.001 <0.0015 0.0012 0.010	0.02 0.007 0.002 0.044	<0.015 0.012 0.12	0.5 0.4 0.5 0.06	10 10 10 0.7	40 50 5
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc	0.011 0.0036 0.0010 0.022 <0.001	0.001 <0.0015 0.0012 0.010 <0.001	0.02 0.007 0.002 0.044 <0.002	<0.015 0.012 0.12 <0.01	0.5 0.4 0.5 0.06 0.1	10 10 10 0.7 0.5	40 50 5 7
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride	0.011 0.0036 0.0010 0.022 <0.001 0.068	0.001 <0.0015 0.0012 0.010 <0.001 <0.005	0.02 0.007 0.002 0.044 <0.002 0.14	<0.015 0.012 0.12 <0.01 0.11	0.5 0.4 0.5 0.06 0.1 4	10 10 10 0.7 0.5 50	40 50 5 7 200
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride	0.011 0.0036 0.0010 0.022 <0.001 0.068	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1	0.02 0.007 0.002 0.044 <0.002 0.14 18	<0.015 0.012 0.12 <0.01 0.11 14	0.5 0.4 0.5 0.06 0.1 4 800	10 10 10 0.7 0.5 50 15000	40 50 5 7 200 25000
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8	0.02 0.007 0.002 0.044 <0.002 0.14 18	<0.015 0.012 0.12 <0.01 0.11 14 8	0.5 0.4 0.5 0.06 0.1 4 800 10	10 10 10 0.7 0.5 50 15000	40 50 5 7 200 25000 500
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0 64	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8 14	0.02 0.007 0.002 0.044 <0.002 0.14 18 2 130	<0.015 0.012 0.12 <0.01 0.11 14 8 220	0.5 0.4 0.5 0.06 0.1 4 800 10 1000	10 10 0.7 0.5 50 15000 150 20000	40 50 5 7 200 25000 500 5000
Copper Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0 64 220	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8 14	0.02 0.007 0.002 0.044 <0.002 0.14 18 2 130 450	<0.015 0.012 0.12 <0.01 0.11 14 8 220 920	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000	40 50 5 7 200 25000 500 5000
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0 64 220 <0.01	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8 14 67 <0.01	0.02 0.007 0.002 0.044 <0.002 0.14 18 2 130 450 <0.02	<0.015 0.012 0.12 <0.01 0.11 14 8 220 920 <0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 50000 100000
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0 64 220 <0.01	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8 14 67 <0.01	0.02 0.007 0.002 0.044 <0.002 0.14 18 2 130 450 <0.02	<0.015 0.012 0.12 <0.01 0.11 14 8 220 920 <0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 5000 100000
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0 64 220 <0.01 10	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8 14 67 <0.01 <3	0.02 0.007 0.002 0.044 <0.002 0.14 18 2 130 450 <0.02	<0.015 0.012 0.12 <0.01 0.11 14 8 220 920 <0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 5000 100000
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units)	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0 64 220 <0.01 10 07/11/08 8.4 390	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8 14 67 <0.01 <3 09/11/08 8.3 110	0.02 0.007 0.002 0.044 <0.002 0.14 18 2 130 450 <0.02	<0.015 0.012 0.12 <0.01 0.11 14 8 220 920 <0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 50000 100000
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm) Temperature (°C)	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0 64 220 <0.01 10	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8 14 67 <0.01 <3	0.02 0.007 0.002 0.044 <0.002 0.14 18 2 130 450 <0.02	<0.015 0.012 0.12 <0.01 0.11 14 8 220 920 <0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 50000 100000
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm) Temperature (°C) Volume Leachant (Litres)	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0 64 220 <0.01 10 07/11/08 8.4 390 18.9 0.293	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8 14 67 <0.01 <3 09/11/08 8.3 110	0.02 0.007 0.002 0.044 <0.002 0.14 18 2 130 450 <0.02	<0.015 0.012 0.12 <0.01 0.11 14 8 220 920 <0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 50000 100000
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm) Temperature (°C)	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0 64 220 <0.01 10 07/11/08 8.4 390 18.9	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8 14 67 <0.01 <3 09/11/08 8.3 110 19	0.02 0.007 0.002 0.044 <0.002 0.14 18 2 130 450 <0.02	<0.015 0.012 0.12 <0.01 0.11 14 8 220 920 <0.1	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 50000 100000
Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm) Temperature (°C) Volume Leachant (Litres)	0.011 0.0036 0.0010 0.022 <0.001 0.068 9 1.0 64 220 <0.01 10 07/11/08 8.4 390 18.9 0.293 0.275	0.001 <0.0015 0.0012 0.010 <0.001 <0.005 <1 0.8 14 67 <0.01 <3 09/11/08 8.3 110 19 1.4	0.02 0.007 0.002 0.044 <0.002 0.14 18 2 130 450 <0.02 20	<0.015 0.012 0.12 <0.01 0.11 14 8 220 920 <0.1 <30	0.5 0.4 0.5 0.06 0.1 4 800 10 1000 4000 1 500	10 10 0.7 0.5 50 15000 150 20000 60000	40 50 5 7 200 25000 500 50000 100000

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

Mass Sample taken (kg) = Mass of dry sample (kg) = Particle Size <4mm = Job Number Batch Sample Number(s) Sampled Date Sample Identity Depth (m)	0.22012 0.175 >95%		Moisture Content Dry Matter Content 0817301 1 6,14	` '	Landfill Was	25.59 79.62 te Acceptance C	Suitonio I imito
Mass of dry sample (kg) = Particle Size <4mm = Job Number Batch Sample Number(s) Sampled Date Sample Identity	0.175		Dry Matter Conter 0817301	` '	Landfill Was	79.62	Suitouio T insit
Particle Size <4mm = Job Number Batch Sample Number(s) Sampled Date Sample Identity			0817301 1	it Ratio (70) =	Landfill Was		'uitouio I imit
Job Number Batch Sample Number(s) Sampled Date Sample Identity			1		Landfill Was	te Acceptance C	'uitouio I imit
Batch Sample Number(s) Sampled Date Sample Identity			1		Landfill Was	te Acceptance C	'nitonio I imita
Sample Number(s) Sampled Date Sample Identity					Landilli Was	te Acceptance C	
Sampled Date Sample Identity			6 1 /				THEFIA LIIIIIS
Sample Identity			0,14			Stable Non-	
		15	5/10/08		Inert Waste	reactive Hazardous	Hazardous
Denth (m)		V	VS701		Landfill	Waste in Non-	Waste Landfi
Depui (III)			1.50			Hazardous	
Solid Waste Analysis						Landfill	
Total Organic Carbon (%)	0.2				3	5	6
Loss on Ignition (%)	1.8				-	-	10
Sum of BTEX (mg/kg)	-				6	-	-
Sum of 7 PCBs (mg/kg)	-				1	-	-
Mineral Oil (mg/kg)	-				500	-	-
PAH Sum of 17(mg/kg)	-				100	-	-
pH (pH Units)	8.46				-	>6	-
ANC to pH 6 (mol/kg)	0.30				-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	5.0				-	to be evaluated	to be evaluated
	Conc ⁿ in 2:1 eluate	Conc ⁿ in 8:1 eluate	2:1 conc ⁿ leached	Cumulative conc ⁿ leached	I imit values for	compliance leach	ing tost using R
Eluate Analysis	C ₂	C ₈	\mathbf{A}_2	A ₂₋₁₀		12457-3 at L/S 10	-
		g/l		g/kg	211	12107 0 41 12/5 10	<u> </u>
Arsenic	0.015	0.0078	0.030	0.090	0.5	2	25
Barium	0.37	< 0.001	0.74	0.64	20	100	300
Cadmium	0.00034	<0.00022	0.0007	< 0.0022	0.04	1	5
Chromium	0.002	< 0.001	< 0.002	< 0.01	0.5	10	70
Copper	0.0056	< 0.0016	0.011	< 0.016	2	50	100
Mercury	< 0.00001	0.00001	< 0.00002	0.0001	0.01	0.2	2
Molybdenum	0.002	< 0.001	< 0.002	< 0.01	0.5	10	30
Nickel	< 0.0015	< 0.0015	< 0.003	< 0.015	0.4	10	40
Lead	0.0009	< 0.0004	0.002	< 0.004	0.5	10	50
Antimony	0.0059	0.0045	0.012	0.047	0.06	0.7	5
Selenium	0.012	< 0.001	0.02	0.02	0.1	0.5	7
Zinc	0.016	< 0.005	0.03	< 0.05	4	50	200
	1900	79	3800	3900	800	15000	25000
Chloride		< 0.5	2	<5	10	150	500
Chloride Fluoride	1.0		520	580	1000	20000	50000
	1.0 270	15	530				
Fluoride		15 180	3800	4700	4000	60000	100000
Fluoride Sulphate as SO ₄	270			4700 <0.1	4000 1	60000	100000
Fluoride Sulphate as SO ₄ Total Dissolved Solids	270 1900	180	3800			60000 - 800	100000 - 1000
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric	270 1900 <0.01	180 <0.01	3800 <0.02	<0.1	1	-	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon	270 1900 <0.01	180 <0.01	3800 <0.02	<0.1	1	-	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information	270 1900 <0.01 <3 07/11/08 8.081	180 <0.01 <3	3800 <0.02	<0.1	1	-	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared	270 1900 <0.01 <3 07/11/08 8.081 5700	180 <0.01 <3 09/11/08 9.5 310	3800 <0.02	<0.1	1	-	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm) Temperature (°C)	270 1900 <0.01 <3 07/11/08 8.081	180 <0.01 <3 09/11/08 9.5	3800 <0.02	<0.1	1	-	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm) Temperature (°C) Volume Leachant (Litres)	270 1900 <0.01 <3 07/11/08 8.081 5700 19 0.305	180 <0.01 <3 09/11/08 9.5 310	3800 <0.02	<0.1	1	-	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm) Temperature (°C)	270 1900 <0.01 <3 07/11/08 8.081 5700 19	180 <0.01 <3 09/11/08 9.5 310 19.1	3800 <0.02	<0.1	1	-	-
Fluoride Sulphate as SO ₄ Total Dissolved Solids Phenols Monohydric Dissolved Organic Carbon Leach Test Information Date Prepared pH (pH Units) Conductivity (µS/cm) Temperature (°C) Volume Leachant (Litres)	270 1900 <0.01 <3 07/11/08 8.081 5700 19 0.305 0.3	180 <0.01 <3 09/11/08 9.5 310 19.1 1.4	3800 <0.02 <6	<0.1	1 500	-	-

CEN 10:1 ONE STAGE BATCH TEST

Mass Sample taken (kg) =	0.1195		Moisture Content	Ratio (%) =		32.72	
Mass of dry sample (kg) =	0.09	Moisture Content Ratio (%) = Dry Matter Content Ratio (%) =				75.35	
Particle Size <4mm =	>95%		Diy matter come.	11 114110 (70)		75.55	
Job Number		2	00817301		T - 1641 XX	()	No.24 2 - T 2 24
Batch			1		Landfill Was	te Acceptance (<u> Priteria Limit</u>
Sample Number(s)			1,4			Stable Non-	
Sampled Date			13/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity			BH1001		Landfill	Waste in Non-	Waste Landfi
Depth (m)			0.75			Hazardous	
Solid Waste Analysis						Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
Fluoto Analysis	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached			compliance leach	
Eluate Analysis	C_2		$\mathbf{A_2}$		EN	12457-3 at L/S 10	l/kg
	m	g/l	mg	/kg			
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)	0.02		0.2		-	-	-
Γin Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
COD (CEN 10:1)	10		100		-	-	-
					-	-	-
					-	-	-
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					-	-	-
Leach Test Information			_				
Date Prepared	09/11/08	-	4				
pH (pH Units)	8.1	-	4				
Conductivity (µS/cm)	160	-	_				
Гетрегаture (°С)	19.1	-					
Volume Leachant (Litres)	0.871	-	1				
Volume of Eluate VE1 (Litres)							

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	~					EF:CEN12457	
Mass Sample taken (kg) =	0.10348		Moisture Content	Ratio (%) =		14.05	
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =				87.68	
Particle Size <4mm =	>95%		,				
Job Number		20	0817301		I an Jell Was	40 A 0000400000	Suitania Timita
Batch			1		Landfill Was	te Acceptance (riteria Limits
Sample Number(s)			5,13			Stable Non-	
Sampled Date		1	5/10/08		T4 XX/4	reactive Hazardous	Hazardous
Sample Identity		,	WS701		Inert Waste Landfill	Waste in Non-	Waste Landfi
Depth (m)			1.00			Hazardous	
Solid Waste Analysis						Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		T 1 6		
Eluate Analysis	C ₂		$\mathbf{A_2}$			compliance leach	
•		7		<u></u>	EN	12457-3 at L/S 10	<u> </u>
		g/l		g/kg	.	1	1
Beryllium Dissolved (CEN 10:1) (ICP-MS)	<0.001		<0.01		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)	0.05		0.5		-	-	-
Tin Dissolved (CEN 10:1) (ICP-MS)	<0.001		<0.01		-	-	-
COD (CEN 10:1)	<10		<100		-	-	-
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					-	-	-
Leach Test Information			_	•	-	•	•
Date Prepared	09/11/08	-					
oH (pH Units)	8.742	-	_				
Conductivity (µS/cm)	93.2	-					
Γemperature (°C)	18.8	-					
remperature (C)	_		1				
Volume Leachant (Litres)	0.887	-					

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT							
Mass Sample taken (kg) =	0.11678		Moisture Content	Ratio (%) =		30.45	
Mass of dry sample (kg) =	0.09		Dry Matter Conte			76.66	
Particle Size <4mm =	>95%		Diy Matter Conte	(/0)		70.00	
Job Number		20	00817301		T - 1641 XX		No. 24 22 - T 2 24
Batch			1		Landfill Was	te Acceptance (riteria Limits
Sample Number(s)			7,15			Stable Non-	
Sampled Date		1	15/10/08		Inert Waste	reactive Hazardous	Hazardous
Sample Identity			WS701		Landfill	Waste in Non-	Waste Landfi
Depth (m)			2.00			Hazardous	
Solid Waste Analysis		i				Landfill	
Гotal Organic Carbon (%)	-				-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units)	-				-	1	-
ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
	Conc ⁿ in 10:1 eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using P
Eluate Analysis	C_2		\mathbf{A}_2			12457-3 at L/S 10	
	m	σ/1	_	g/kg	<u> </u>	12107 0 40 175 10	<u> </u>
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001	5/1	<0.01	, Kg	_	_	_
Boron Dissolved (CEN 10:1) (ICP-MS)	0.11		1.1		-	-	_
Γin Dissolved (CEN 10:1) (ICP-MS)	<0.001		<0.01		-	<u> </u>	
COD (CEN 10:1)	18		180				
50D (CLIV 10.1)	10		100				_
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Leach Test Information							
Date Prepared	09/11/08	-	4				
oH (pH Units)	9.6	-	_				
Conductivity (µS/cm)	1690	-					
Гетрегаture (°С)	18.8	-					
	0.873	_	1				
Volume Leachant (Litres) Volume of Eluate VE1 (Litres)	0.073						

CEN 10:1 ONE STAGE BATCH TEST

WAC ANALYTICAL RESULT	S				K	EF:CEN12457	-2
Acce Countly talon (Ice)	0.10945		Maiatana Gantant	D-4:- (0/)		19.79	
Mass Sample taken (kg) = Mass of dry sample (kg) =	0.10845 0.09	Moisture Content Ratio (%) = Dry Matter Content Ratio (%) =					
Particle Size <4mm =	>95%		Dry Matter Conter	iii Kaiio (%) =		83.48	
audic Size \frac{1}{2}inii -	<i>>737</i> 0						
Job Number		20	0817301		I 10°11 XX7	4	Y*4* T * *4
Batch			1		Landfill Was	te Acceptance (<u>Criteria Limits</u>
Sample Number(s)			10,18			Stable Non-	
Sampled Date		1	5/10/08		- Inert Waste	reactive Hazardous	Hazardous
Sample Identity		1	WS701		Landfill	Waste in Non-	Waste Landfi
Depth (m)			3.50			Hazardous	
Solid Waste Analysis						Landfill	
Total Organic Carbon (%)	-]			-	-	-
Loss on Ignition (%)	-				-	-	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-	ł			-	-	-
PAH Sum of 17(mg/kg) oH (pH Units)	-	ł			-	-	-
ANC to pH 7 (mol/kg)	-	1			-	-	-
ANC to pH 4 (mol/kg)		1				<u> </u>	
ite to pit 4 (morkg)	Conc ⁿ in 10:1						
	eluate		10:1 conc ⁿ leached		Limit values for	compliance leach	ing test using B
Eluate Analysis	$\mathbf{C_2}$		$\mathbf{A_2}$			12457-3 at L/S 10	
	m	ıg/l	mg	g/kg	1		
Beryllium Dissolved (CEN 10:1) (ICP-MS)	< 0.001		< 0.01		-	-	-
Boron Dissolved (CEN 10:1) (ICP-MS)	0.06		0.6		-	-	-
Fin Dissolved (CEN 10:1) (ICP-MS)	0.004		0.04		-	-	-
COD (CEN 10:1)	10		100		-	-	-
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Leach Test Information		1	_	<u> </u>	<u> </u>	<u>-</u>	
Date Prepared	09/11/08	-	1				
oH (pH Units)	9.017	-	1				
Conductivity (µS/cm)	1348	-	4				
	18.9	-	1				
Temperature (°C)							
Femperature (°C) Volume Leachant (Litres) Volume of Eluate VE1 (Litres)	0.882	-	J				

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

				REF:CEN12457-3			
Mass Sample taken (kg) = Mass of dry sample (kg) = Particle Size <4mm =	0.23159 0.175 >95%	Moisture Content Ratio (%) = Dry Matter Content Ratio (%) =				32.72 75.35	
Job Number		200	0817301		I an dell Was	40 A 222242220	Y
Batch			1		Landini was	te Acceptance (riteria Liinus
Sample Number(s)	1		1,4			Stable Non-	
Sampled Date		13	3/10/08		1	reactive	
Sample Identity	1	R	H1001		Inert Waste	Hazardous	Hazardous
Depth (m)			0.75		Landfill	Waste in Non- Hazardous	Waste Landfill
Solid Waste Analysis			0.73			Landfill	
Fotal Organic Carbon (%)	_				_	_	_
Loss on Ignition (%)	-					_	-
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
pH (pH Units)	-				-	-	-
ANC to pH 7 (mol/kg) ANC to pH 4 (mol/kg)	-				-	-	-
ane to ph 4 (moi/kg)	Conc ⁿ in 2:1	Conc ⁿ in 8:1		Cumulative conc ⁿ	-	-	-
	eluate	eluate	2:1 conc ⁿ leached	leached	Limit values for	compliance leach	ing test using BS
Eluate Analysis	$\mathbf{C_2}$	C ₈	$\mathbf{A_2}$	A_{2-10}		12457-3 at L/S 10	-
	m	g/l	mg	g/kg			
Boron Dissolved (CEN 10:1C) (ICP-MS)	0.15	< 0.02	0.3	0.2	-	-	-
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Look Took Informed to					-	-	-
Leach Test Information Date Prepared	07/11/08	09/11/08	1				
pH (pH Units)	8.4	8.3	1				
Conductivity (µS/cm)	390	110	1				
Femperature (°C)	18.9	19]				
Volume Leachant (Litres)	0.293	1.4]				
	0.275		_				
Volume of Eluate VE1 (Litres)	0.273						
Volume of Eluate VE1 (Litres) Solid Results are expressed on a dry we		correction for	moisture conten	t where applicabl	le		

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULT	S				R	EF:CEN12457	'-3
Mass Sample taken (kg) = Mass of dry sample (kg) =	0.22012 0.175	Moisture Content Ratio (%) = Dry Matter Content Ratio (%) =				25.59 79.62	
Particle Size <4mm =	>95%	-					
Job Number		200	0817301		Londell Woo	te Acceptance (Cuitouio I imit
Batch			1		Landilli was	te Acceptance C	<u> riteria Limit</u>
Sample Number(s)			6,14			Stable Non-	
Sampled Date		1:	5/10/08			reactive	
Sample Identity		7	WS701		Inert Waste	Hazardous	Hazardous
Depth (m)		<u> </u>	1.50		Landfill	Waste in Non- Hazardous	Waste Landfi
Solid Waste Analysis			1.50			Landfill	
Fotal Organic Carbon (%)	_				_	_	_
Loss on Ignition (%)	-					-	_
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	-				-	-	-
Mineral Oil (mg/kg)	-				-	-	-
PAH Sum of 17(mg/kg)	-				-	-	-
oH (pH Units) ANC to pH 7 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)					<u> </u>	-	_
	Conc ⁿ in 2:1	Conc ⁿ in 8:1	2:1 conc ⁿ leached	Cumulative conc ⁿ			
Eluate Analysis	eluate	eluate		leached		compliance leach	
Situate Minipolis	C_2	C ₈	$\mathbf{A_2}$	A ₂₋₁₀	EN	12457-3 at L/S 10	<u>l/kg</u>
Boron Dissolved (CEN 10:1C) (ICP-MS)	0.55	g/l <0.02	1.1	y/kg 0.9		_	_
Boroli Dissolved (CEN 10:1C) (ICF-IVIS)	0.33	<0.02	1.1	0.9	-	_	_
					_	-	_
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					-	-	-
Leach Test Information							
Date Prepared	07/11/08	09/11/08					
	8.081	9.5	1				
oH (pH Units)		310					
oH (pH Units) Conductivity (μS/cm)	5700	310 19.1					
oH (pH Units) Conductivity (μS/cm) Comperature (°C) Volume Leachant (Litres)		310 19.1 1.4					

 Job Number:
 08/17301/02/01

 Client:
 Buro Happold

Client Ref. No.:

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

<u>Summa</u>	ry of Method Codes cont	cained within report :	ISO Accr	MCI Accr	Wet Sam	Surr Corr
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample 1	Surrogate Corrected
TM008	BS 1377:Part 1977	Particle size distribution of solid samples			DRY	
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		✓	WET	
TM024	Method 4500A & B, AWWA/APHA, 20th Ed., 1999	Determination of Exchangeable Ammonium in soil samples	✓	✓	WET	
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)	✓		DRY	
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		✓	DRY	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro- chemical detection	y HPLC with electro-		NA	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro- chemical detection	h electro-		WET	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS. MCERTS Accreditation on Soils for Naphthalene except when Kerosene present.			DRY	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS. MCERTS Accreditation on Soils for Naphthalene except when Kerosene present.	✓	✓	DRY	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)			WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓		WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓	✓	WET	
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water			NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser			NA	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

 Job Number:
 08/17301/02/01

 Client:
 Buro Happold

Client Ref. No.:

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summa	ry of Method Codes cont	rained within report :	ISO Accr	MCF Accre	Wet San	Surr
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser	✓	✓	DRY	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser			NA	
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser			NA	
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit			NA	
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water			NA	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓		DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	
TM132	In - house Method	ELTRA CS800 Operators Guide	✓		DRY	
TM132	In - house Method	ELTRA CS800 Operators Guide	✓	✓	DRY	
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter	✓	✓	WET	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS			NA	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser			WET	
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)'	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique	✓		WET	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

 Job Number:
 08/17301/02/01

 Client:
 Buro Happold

Client Ref. No.:

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP No Determination Possible * Subcontracted test

NFD No Fibres Detected » Result previously reported (Incremental reports only)

ISO 17025 accredited M MCERTS Accredited

PFD Possible Fibres Detected EC Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summa	ry of Method Codes cont	ISO Accı	MC Acci	We Sai	Sur Cor	
Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample 1	Surrogate Corrected
TM182		Determination of Acid Neutralisation Capacity (ANC) Using Autotitration	✓		DRY	
TM183	BS EN 23506:2002, (BS 6068- 2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry			NA	
TM213	In-house Method	Rapid Determination of PAHs by GC-FID			WET	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

Job Number: 08/17301/02/01 **Client:** Buro Happold

Client Ref. No.:

Summary of Coolbox temperatures

Batch No.	Coolbox Temperature (°C)
1	9.5

ALcontrol Laboratories

Extractable Petroleum Hydrocarbons (EPH) By GC-FID

Carbon Range C10-C40

Job Number: 08/17301/02/01 Client: Buro Happold

Client Ref:

Matrix [Units] : SOLID [mg/kg]

Sample No	Sample Identity	Depth	ЕРН	Interpretation
1	BH1001	0.75	180	possible biodegraded diesel /PAHs/ humics
13	WS701	1.00	<35	no identification possible



22500

Your Ref:

024435



Buro Happold Ltd Camden Mill Lower Bristol Road Bath

BA2 3DQ

For the attention of James Boyle

024435 W.Adamis J. Boyle & enc 20 JAN 2009

16 January 2009

Dear Sirs

Hayle Harbour

Please find enclosed the laboratory test results for the samples provided by yourselves from the above site.

Testing was carried out as per your written instructions and the results presented in the attached figures.

We have also taken this opportunity to enclose our invoice for the work carried out. Please note samples will be stored for a period of **one month** from the invoice date and then disposed of unless otherwise instructed.

Yours faithfully

Geotechnical Engineering Limited

Mark Adams

Deputy Laboratory Manager

Directors: A. B. Milne BSc MSc DIC CEng MICE A. L. M. Milne

J.C.W. Hanson BSc MSc CGeol FGS EurGeol N.V. Parry BEng MSc CEng MICE MIHT SiLC

Registered Office: Centurion House, Olympus Park, Quedgeley, Gloucester GL2 4NF

Registered No. 700739, England VAT Number: 682 5857 89

Payments: Geotechnical Engineering Ltd.

Geotechnical Engineering Ltd

Centurion House Olympus Park, Quedgeley Gloucester GL2 4NF

telephone: (01452) 527743 facsimile: (01452) 729314 e-mail: geotech@geoeng.co.uk

www.geoeng.co.uk

PARTICLE SIZE DISTRIBUTION

BS.1377: Part 2: 1990: 9

CLIENT

BURO HAPPOLD LTD

SITE

HAYLE HARBOUR

BH/TP No.

WS701

SAMPLE No./TYPE

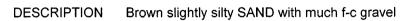
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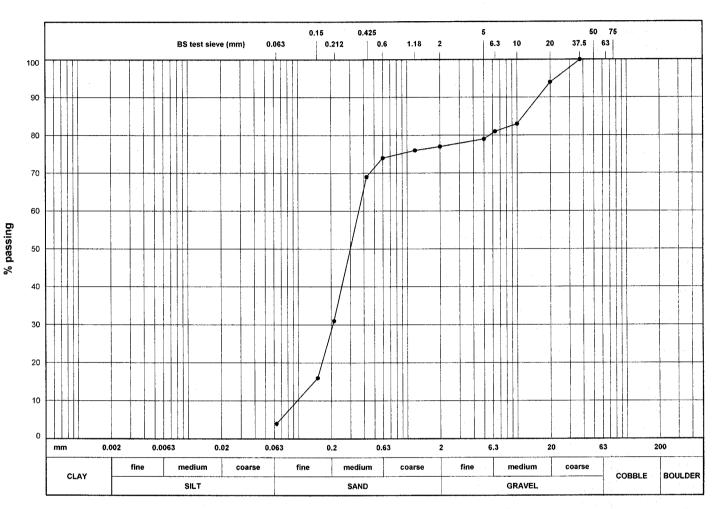
SAMPLE DEPTH (m)

0.50

SPECIMEN DEPTH (m)

0.50





soil type	% fraction	BS test sieve (mm)	% passing	BS test sieve (mm)	% passing	particle size (μm)	% finer
CLAY				·			
SILT		150		5	79	20	
SILT & CLAY SAND	4 73	75		2	77	6	
GRAVEL COBBLE & BOULDER	23 0	63		1.18	76	2	
test method(s)	9.3	50		0.6	74		
		37.5	100	0.425	69		
test method: 9.2 - wet sieving		20	94	0.212	31		
9.3 - dry sieving		10	83	0.15	16		ORIGINATOR
9.4 - sedimentation by pipette 9.5 - sedimentation by hydrol		6.3	81	0.063	4		MB
remarks: # denotes sample tested is s	maller than that whic	ch is recommended	d in accordance	with BS1377		22500	CHECKED

Geotechnical Engineering Ltd, Centurion House, Olympus Park, Quedgeley, Gloucester. GL2 4NF. Tel. 01452 527743 22500. GPJ 19/01/2009 09:10:15

PARTICLE SIZE DISTRIBUTION

BS.1377: Part 2: 1990: 9

CLIENT

BURO HAPPOLD LTD

SITE

HAYLE HARBOUR

BH/TP No.

WS702

SAMPLE No./TYPE

D

SAMPLE DEPTH (m)

0.50

SPECIMEN DEPTH (m)

0.50

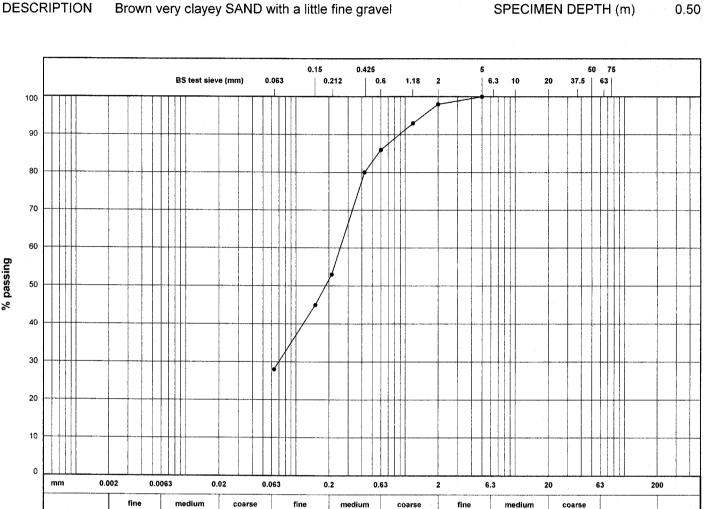
COBBLE

22500

MM

GRAVEL

BOULDER



soil type	% fraction	BS test sieve (mm)	% passing	BS test sieve (mm)	% passing	particle size (μm)	% finer
CLAY							
SILT		150		5	100	20	
SILT & CLAY	28	7-					
SAND	70	75		2	98	6	
GRAVEL	2	63		1.18	93	2	1
COBBLE & BOULDER	0			1,10	33	-	
test method(s)	9.3	50		0.6	86	·	
	9.0	37.5		0.425	80		
test method:							
9.2 - wet sieving		20		0.212	53		
9.3 - dry sieving		10		0.15	45		ORIGINATOR
9.4 - sedimentation by pipette	•			0.000	00		
9.5 - sedimentation by hydror	meter	6.3		0.063	28		WB.
remarks:						CONTRACT	CHECKED
# denotes sample tested is si	maller than that which	ch is recommended	in accordance	e with BS1377		00500	

SAND

Engineering Ltd, Centurion House, Olympus Park, Quedgeley, Gloucester. GL2 4NF. Tet. 01452 527743 22500 GPJ 19/01/2009 09:10:18

CLAY

SILT

PARTICLE SIZE DISTRIBUTION

BS.1377: Part 2: 1990: 9

CLIENT

BURO HAPPOLD LTD

SITE

HAYLE HARBOUR

BH/TP No.

WS702

SAMPLE No./TYPE

D

SAMPLE DEPTH (m)

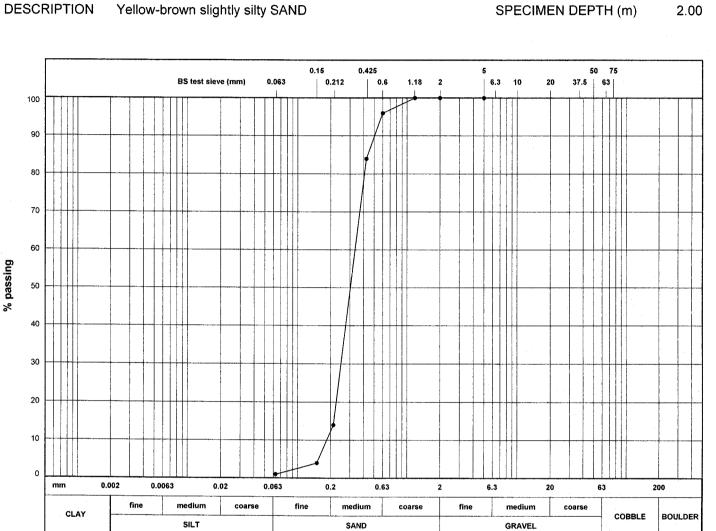
2.00

SPECIMEN DEPTH (m)

2.00

AUA

22500



soil type	% fraction	BS test sieve (mm)	% passing	BS test sieve (mm)	% passing	particle size (μm)	% finer
CLAY							
SILT		150		5	100	20	
SILT & CLAY	1						
SAND	99	75		2	100	6	
GRAVEL COBBLE & BOULDER	0	63		1.18	100	2 2	
test method(s)	9.3	50		0.6	96		
		37.5		0.425	84		
test method:							
9.2 - wet sieving		20		0.212	14		
9.3 - dry sieving		10		0.15	4		ORIGINATOR
9.4 - sedimentation by pipett	е						
9.5 - sedimentation by hydro	meter	6.3		0.063	1		W B
remarks: # denotes sample tested is s	maller than that whic	h is recommended	d in accordance	with BS1377		CONTRACT	CHECKED

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PARTICLE SIZE DISTRIBUTION

BS.1377: Part 2: 1990: 9

CLIENT

BURO HAPPOLD LTD

SITE

HAYLE HARBOUR

BH/TP No.

WS703

SAMPLE No./TYPE

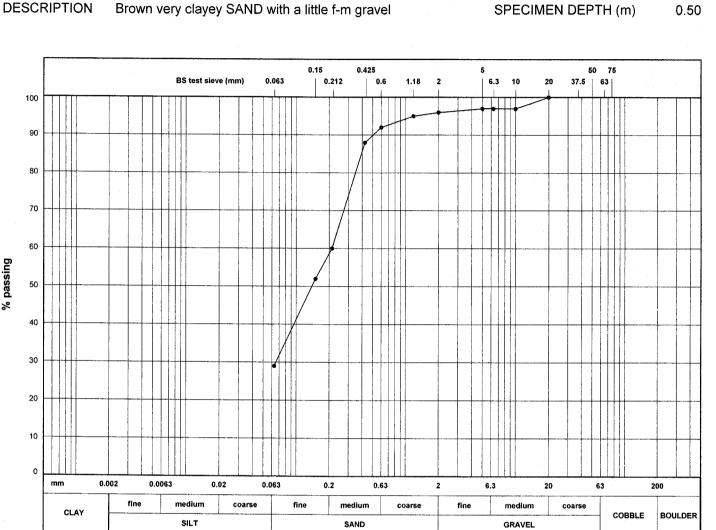
D

SAMPLE DEPTH (m)

0.50

SPECIMEN DEPTH (m)

0.50



soil type	% fraction	BS test sieve (mm)	% passing	BS test sieve (mm)	% passing	particle size (μm)	% finer
CLAY							
SILT		150		5	97	20	
SILT & CLAY	29						
SAND	67	75		2	96	6	
GRAVEL	4	63		1 40	0.5		
COBBLE & BOULDER	0	63		1.18	95	2	
test method(s)	9.3	50		0.6	92		
		37.5		0.425	88		
test method:		20	400				
9.2 - wet sieving		20	100	0.212	60		
9.3 - dry sieving		10	97	0.15	52		ORIGINATOR
9.4 - sedimentation by pipette	•						
9.5 - sedimentation by hydror	neter	6.3	97	0.063	29		MB
remarks:						CONTRACT	CHECKED

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denotes sample tested is smaller than that which is recommended in accordance with BS1377

22500

PARTICLE SIZE DISTRIBUTION

BS.1377: Part 2: 1990: 9

CLIENT

DESCRIPTION

BURO HAPPOLD LTD

SITE

HAYLE HARBOUR

BH/TP No.

WS703

SAMPLE No./TYPE

D

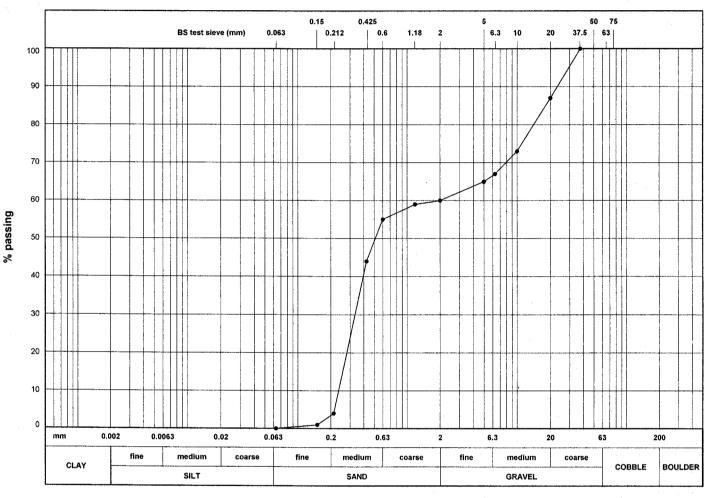
SAMPLE DEPTH (m)

4.00

Yellow-brown SAND with much f-c gravel

SPECIMEN DEPTH (m) 4.00

22500



soil type	% fraction	BS test sieve (mm)	% passing	BS test sieve (mm)	% passing	particle size (μm)	% finer
CLAY							
SILT	*	150		5	65	20	
SILT & CLAY	0						
SAND	60	75		2	60	6	
GRAVEL COBBLE & BOULDER	40 0	63		1.18	59	2	
- CONSTRUCTION OF THE CONTRACT		50		0.6	55		
test method(s)	9.3	37.5	100	0.425	44		
test method:		37.5	100	0.425	44		
9.2 - wet sieving		20	87	0.212	4	·	
9.3 - dry sieving		10	73	0.15	4		· · · · · · · · · · · · · · · · · · ·
,		10	13	0.15	. 1		ORIGINATOR
9.4 - sedimentation by pipette		6.3	67	0.063	0		
9.5 - sedimentation by hydron	neter	3.0	٠,	1 5.500	v		M
remarks:						CONTRACT	CHECKED
# denotes sample tested is sr	naller than that whic	th is recommended	l in accordance	e with BS1377			1.0

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PARTICLE SIZE DISTRIBUTION

Brown sandy CLAY with a little fine gravel

BS.1377: Part 2: 1990: 9

CLIENT

DESCRIPTION

BURO HAPPOLD LTD

SITE

HAYLE HARBOUR

BH/TP No.

WS705

SAMPLE No./TYPE

D

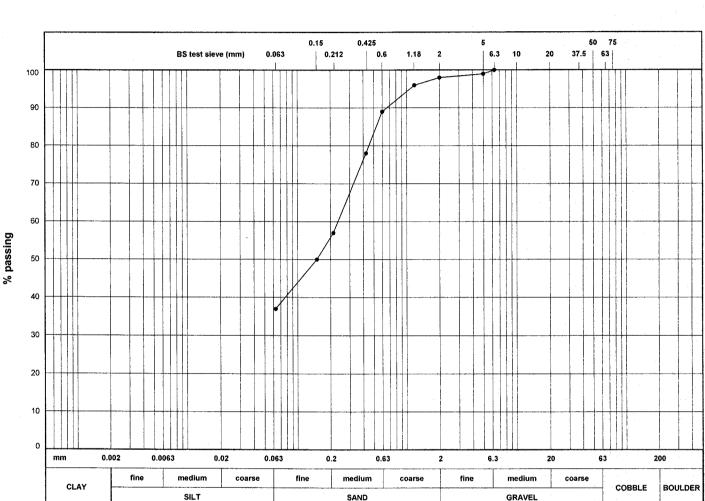
SAMPLE DEPTH (m)

1.00

SAMI LE DEI III (III)

SPECIMEN DEPTH (m) 1.00

22500



soil type	% fraction	BS test sieve (mm)	% passing	BS test sieve (mm)	% passing	particle size	% finer
CLAY					:	7	
SILT		150		5	99	20	
SILT & CLAY	37	75		2	98	6	
SAND	61	'3			30		
GRAVEL COBBLE & BOULDER	2 0	63		1.18	96	2	
test method(s)	9.3	50	•	0.6	89		1
(0)		37.5		0.425	78		
test method:		20		0.212	E 7		
9.2 - wet sieving		20		0.212	57		
9.3 - dry sieving		10		0.15	50		ORIGINATOR
9.4 - sedimentation by pipette			400	0.000	0.7		1.0
9.5 - sedimentation by hydromet	ter	6.3	100	0.063	37		MB
remarks:						CONTRACT	CHECKED
# denotes sample tested is sma	ller than that which	ch is recommended	in accordance	with BS1377		00500	. 41.4

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PARTICLE SIZE DISTRIBUTION

BS.1377: Part 2: 1990: 9

CLIENT

BURO HAPPOLD LTD

SITE

% passing

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HAYLE HARBOUR

BH/TP No.

WS705

SAMPLE No./TYPE

D

SAMPLE DEPTH (m)

2.00

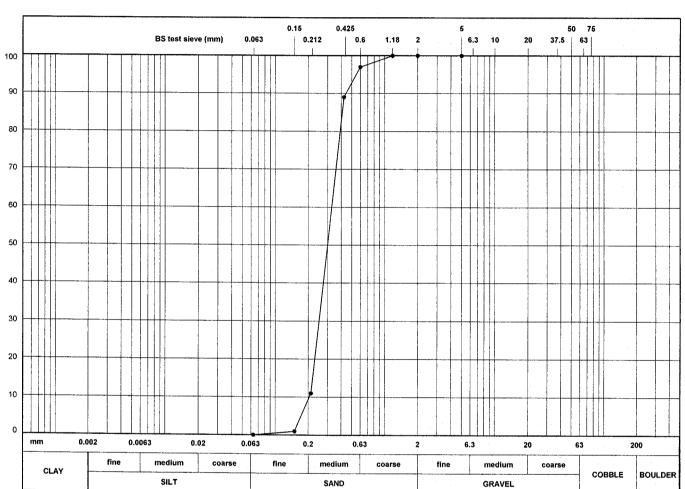
SPECIMEN DEPTH (m)

2.00

 $\mathcal{A}\mathcal{M}$

22500





soil type	% fraction	BS test sieve (mm)	% passing	BS test sieve (mm)	% passing	particle size (μm)	% finer
CLAY	-						
SILT		150		5	100	20	·
SILT & CLAY SAND	0 100	75		2	100	6	
GRAVEL COBBLE & BOULDER	0	63		1.18	100	2	
test method(s)	9.3	50		0.6	97		
		37.5		0.425	89		
test method: 9.2 - wet sieving		20		0.212	11		
9.3 - dry sieving		10		0.15	1		ORIGINATOR
9.4 - sedimentation by pipette	е						Citionation
9.5 - sedimentation by hydro	meter	6.3		0.063	0		WB
remarks: # denotes sample tested is s	maller than that whic	ch is recommended	d in accordance	with BS1377		CONTRACT	CHECKED

PARTICLE SIZE DISTRIBUTION

BS.1377: Part 2: 1990: 9

CLIENT

BURO HAPPOLD LTD

SITE

HAYLE HARBOUR

BH/TP No.

WS707

SAMPLE No./TYPE

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SAMPLE DEPTH (m)

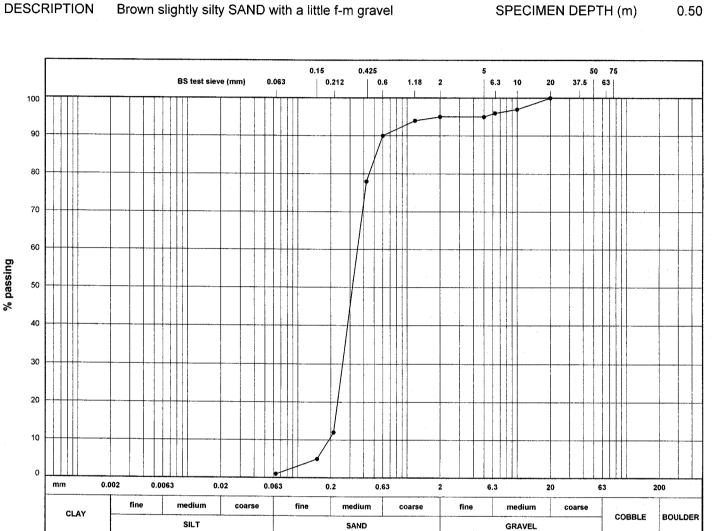
0.50

SPECIMEN DEPTH (m)

22500

AW

0.50



soil type	% fraction	BS test sieve (mm)	% passing	BS test sieve (mm)	% passing	particle size (μm)	% finer
CLAY							
SILT		150		5	95	20	
SILT & CLAY	1						
SAND	94	75		2	95	6	
GRAVEL COBBLE & BOULDER	5 0	63		1.18	94	2	
test method(s)	9.3	50		0.6	90		
		37.5		0.425	78		
test method:							
9.2 - wet sieving		20	100	0.212	12		
9.3 - dry sieving		10	97	0.15	5		ORIGINATOR
9.4 - sedimentation by pipette	e						
9.5 - sedimentation by hydror	meter	6.3	96	0.063	1		MB
remarks:						CONTRACT	CHECKED
# denotes sample tested is s	maller than that whic	h is recommende	d in accordance	with BS1377			X

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PARTICLE SIZE DISTRIBUTION

Yellow-brown slightly silty SAND

BS.1377: Part 2: 1990: 9

CLIENT

DESCRIPTION

BURO HAPPOLD LTD

SITE

HAYLE HARBOUR

BH/TP No.

WS707

SAMPLE No./TYPE

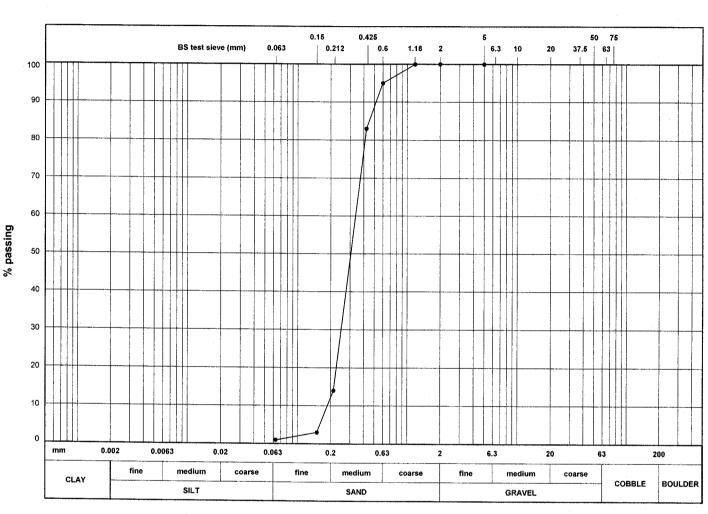
D

SAMPLE DEPTH (m)

2.00

SPECIMEN DEPTH (m)

2.00



soil type	% fraction	BS test sieve (mm)	% passing	BS test sieve (mm)	% passing	particle size (µm)	% finer
CLAY			110000				
SILT		150		5	100	20	
SILT & CLAY	1	7.				_	
SAND	99	75		2	100	6	
GRAVEL COBBLE & BOULDER	0	63		1.18	100	2	
test method(s)	9.3	50		0.6	95		
	9.5	37.5		0.425	83		
test method:		20		0.040			
9.2 - wet sieving		20		0.212	14		
9.3 - dry sieving		10		0.15	3		ORIGINATOR
9.4 - sedimentation by pipette	•	0.0				1.	
9.5 - sedimentation by hydror	meter	6.3		0.063	1		MB
remarks:						CONTRACT	CHECKED
# denotes sample tested is sr	maller than that whic	ch is recommended	in accordance	e with BS1377			X 1.x
						22500	AW

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Buro Happold Appendix D Photographs



Photo 1 (left): Looking north from the southern edge of Cockle Bank.





Photo 3 (left): Looking South, mooring point on southern edge of Cockle Bank.

Buro Happold

Sarah Bear

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