Welsh Government

M4 Corridor around Newport

Environmental Statement Supplement Land Contamination Assessment Report Annex D - CL-26 Llanwern Steelworks - Volume 1 - Reedbed No. 1 & Metal Recovery Area

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CVJV/AAR
3rd Floor
Longross Court,
47 Newport Road,
Cardiff
CF24 0AD

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1 Introduction

1.1 Background

1.1.1 This report relates to the western part of an area of land potentially affected by contamination (CL-26) known as the 'Llanwern Steelworks'.

1.1.2 Llanwern Steelworks comprises a number of features to include from west to east: Reedbed No.1, Metal Recovery Area, Lagoon 12, Lagoon 25, Lagoon 27 and Lagoon 26. These are shown in Figure 3.

1.1.3 This report, CL-26 Volume 1, encompasses Reedbed No.1 and the Metal Recovery Area, herein referred to as the 'Site'. The remaining areas of CL-26 affected by the Scheme are reported within Volume 2, which includes Lagoons 12, 25, 27 and 26.

1.1.4 The Site is located between chainage 13,900 and 14,900 (see Figure 1), upon the south western part of Llanwern Steelworks (south of the A4810) including, Reedbed No. 1 and the Metal Recovery Area.

1.2 Reporting Context

1.1.1 The Site has been assessed as part of ground investigations and monitoring associated with the wider works for the M4 Corridor around Newport (M4CaN) (hereafter referred to as the 'Scheme') and informs the baseline for the environmental impact assessment (EIA) for the Scheme. The EIA is reported in the M4CaN Environmental Statement (ES) published in March 2016 and the Land Contamination Assessment Reports formed an annex to Appendix 11.1 of the chapter on Geology and Soils.

1.1.2 A subsequent phase of investigation has been undertaken since the publication of the March 2016 ES. The additional data, herein referred to as the 2016 Additional Ground Investigation, have been incorporated into the summary tables, risk assessment, conceptual site model and associated text of this report where relevant. The conclusions and recommendations have also been refined to reflect the improved understanding of status of the site and associated risk. Therefore this report replaces the original CL-26 Volume 1 report published in Appendix 11.1 of the March 2016 ES.

1.1.3 In 2014, a Preliminary Sources Study Report (PSSR) was prepared as an initial land contamination appraisal (Ove Arup & Partners, 2014) as part of Design Manual for Roads and Bridges (DMRB) Stage 2 Assessments for a number of potential route options. This identified a number of individual areas that may have been affected by contamination as a result of historical activities at the Site. In addition, this report draws upon the 2015 Supplementary Ground Investigation report on behalf of the Welsh Government (Geotechnical Engineering, 2015) and the 2016 Additional Ground Investigation. This report relates to the area defined on the Site Plan Figure 1a (Reedbed No.1) and Figure 1b (Metal Recovery Area).

1.1.4 The overarching rationale and approach for the assessment of areas of land along the proposed new section of motorway with potential contamination is detailed in the Land Contamination Assessment Report (Appendix 11.1 of the March 2016 ES).

1.3 Objectives

1.3.1 The key objectives of this report are set out below.

- Undertake an assessment of the Site and determine whether potential risks to human health or controlled waters could exist based upon the Scheme.
- Identify the need for further assessment and investigation in order to refine potential land contamination risks and inform the need for remediation/mitigation.
- To provide the information required under DMRB HD22/08 (Highways Agency, 2008).

1.4 Report Structure

1.4.1 The subsequent report structure is as follows.

- Section 2: Site Location and Description – This section summarises the Site description.
- Section 3: The Scheme – This section details the new section of motorway alignment and associated features at the Site.
- Section 4: Site History – This section summarises the history of the Site based on historical maps and historical land photographs.
- Section 5: Environmental Setting – This section summarises the Site description, published geology, hydrology and hydrogeology and any relevant environmental information presented in the 2014 PSSR.
- Section 6: Scope of Investigations – This section describes the previous and supplementary ground investigation data available for the Site.
- Section 7: Ground Conditions - This section describes the main findings of the intrusive site investigation including the ground conditions encountered and any visual or olfactory evidence of contamination identified.
- Section 8: Contamination Assessment – This section describes the findings of the Tier 1 and Tier 2 contamination risk assessment based upon potential contamination sources, potential receptors and potential contamination linkages and presents the human health and controlled waters screening assessments.
- Section 9: Refined Conceptual Site Model – This section presents the Conceptual Site Model (CSM) for the Site and identifies potential contaminant linkages, based upon the findings of the data presented within Sections 2 to 7.
- Section 10: Conclusions and Recommendations – This section provides conclusions concerning the likelihood of land contaminant associated with the Site affecting the Scheme and requirements for remediation/mitigation.
- Section 11: References – This section details the key reference documents referred to within the text.
- Section 12: Glossary – This section details the key terms and acronyms used throughout this report.

2 Site Location and Description

2.1.1 The Llanwern Steelworks area is located approximately 3 km to the east of Newport city centre and is centred on National Grid Reference ST 376 858. It forms part of the still operational steelworks operated by Tata Steel, which are located directly to the north across the A4810 as shown in Figure 1.

2.1.2 The Site is bound to the north by the A4810, to the east by Blackwall Reen and Monks Ditch, to the west by fields and to the south by fields and a large electrical substation. East of Blackwall Reen and Monks Ditch lie the lagoons of Llanwern Steelworks which are discussed in Volume 2 of the Land Contamination Report for CL-26.

2.1.3 The Site comprises areas known as Reedbed No. 1 and the Metal Recovery Area. Figure 5 shows the topography of the Site based upon LiDAR data.

2.1.4 Review of the on site processes has indicated potential contamination sources associated with industrial waste water treatment and waste management/disposal areas associated with the Steelworks within the new section of motorway route corridor, as shown on Figure 1a and Figure 1b. These are discussed further in Section 4.

2.1.5 Table 1 describes the two key Site features.

Table 1: Site Description (within the route corridor)

Area	Description
Reedbed No.1	The area known as Reedbed No.1 measures approximately 600 m by 300 m. It is split into three rectangular areas; two reedbeds in the north orientated approximately north - south and one in the south orientated northeast - southwest. The southern area is further divided into rectangular sections measuring approximately 150 m by 35 m forming the reedbed system. Reedbed No. 1 is surrounded by wetland to the south, east and west, and is largely vegetated, and the A4810 is to the North of Reedbed No. 1. Infilling and vegetation growth within the reedbed has resulted in little difference in ground level between the bed and the top of the Steelwork's bunds that form the edges of the reedbeds. The bunds have been constructed from slag from the Steelworks. The site lies within the northern fringes of a Site of Special Scientific Interest (SSSI). Effluent is understood to filter through the southern area of reedbeds and then flow through the two northern ones prior to being discharged into the estuary via pumping. Following discussions with Tata Steel, Reedbed No 1 is understood to be a backup system to Reedbed No. 2 which is located to the east of the Lagoons areas (CL26 Volume 2). It is also understood that Reedbed No. 1 is rarely used but is important infrastructure to the operation of the Steelworks.

Area	Description
Metal Recovery Area	The Metal Recovery Area is located between Reedbed No.1 and the Lagoons. It is currently an industrial site operated by Tarmac and Civil & Marine for activities including tarmac and slag recycling and asphalt manufacturing. The former fragmentation area/plant, operated by Harsco, was located in the eastern part of the site. The ground in this area has reportedly undergone little compaction. A bunded area, located centrally, is used for surface water collection. A white sheen can be seen on the 2014 aerial photographs, considered to be precipitation of lime leached out from the slag material present below ground level.

2.1.6 During site visits in 2016 no white sheen was observed on the surface water collection pond (location shown in Figure 6) however white deposits were noted on the bottom of the pond and at the pond edges. Figure 6 also shows the discharge pipe (understood to be in Tarmac ownership) considered to be a surface water overflow.

2.1.7 A triangular shape zone with ponds is located between these two areas and is considered to be an area of wetland as shown in Figure 1a. This area is not within the footprint of the new section of motorway and no previous ground investigation data are available for this area. It is proposed to redevelop part of this zone into new reedbeds to compensate for the loss of part of Reedbed No. 1 from the permanent land take.

3 The Scheme

3.1.1 The Site is located at approximate chainage 13,900 and 14,900. Refer to Figures 1a & 1b for the site location in relation to the Scheme.

3.1.2 The new section of motorway alignment within the Site would be positioned on an embankment some 2 to 3 metres high. A junction (Glan Llyn junction) is proposed linking the new section of motorway to the A4810 at approximately 14,200 to 14,900 (including slip roads). The link road joining the motorway and the A4810 is currently proposed to pass through the Metal Recovery Area and join the A4810 at an existing roundabout. The junction would be founded on piled embankment whilst the main alignment and link road would initially be surcharged with settlement enhanced by the installation of band drains. An access road for Tata adjoining the link road is proposed in the eastern area of the Metal Recovery Area.

3.1.3 The area impacted by the new section of motorway comprises the south western corner of Reedbed No.1 and the south eastern corner of the Metal Recovery Area of the Site as shown on Figures 1a and 1b.

3.1.4 A Water Treatment Area (WTA) to collect road drainage from the new section of motorway and link road is proposed within the eastern area of the Metal Recovery Area, north of the main alignment and just east of the link road to the A4810. The proposed WTA is anticipated to comprise a lined storage/dilution lagoon to an approximate depth of 1.5 m below current ground level.

3.1.5 As part of the Scheme, a new/replacement maintenance depot (Glan Llyn Depot) is to be constructed in the north western corner of the Metal Recovery Area of the site.

3.1.6 The Scheme design proposes to reconstruct the southern area of Reedbed No. 1 that is within the permanent land take to an approximately equal sized area to the north east (see Figure 3). This is to maintain the functionality of Reedbed No. 1.

4 Site History

4.1.1 The 2014 PSSR historical searches have been based on Ordnance Survey plans, literature reviews, information provided by Natural Resources Wales (NRW) (formerly Environment Agency Wales) and Newport City Council and interpretation of historical aerial photography. This is supplemented by a review of historical maps obtained in 2015 from the Welsh Government. Relevant extracts and historical aerial photography are presented in Appendix 7.

4.1.2 A summary of the Site's history is presented in Table 2.

Table 2: Site History

Date	Use	Source of information
1843 - 1893	Reedbed No. 1 and the Metal Recovery Area comprise of a number of agricultural fields traversed by ditches and reens.	1:10,560 historical mapping
1891 - 1912	No significant change.	1:10,560 Historical mapping
1904 - 1939	No significant change.	1:10,560 historical mapping
1920	No significant change.	1920 OS map
1962	Llanwern Steelworks operation commenced.	2014 PSSR
1964 - 1965	**Spencer Steelworks** has been developed within the Metal Recovery area (northern half), including **slag heaps, slag processing plant, conveyors, tanks and hoppers**. Agricultural fields are shown in the southern half of the Metal Recovery area and Reedbed No.1. A drain forms the eastern, southern and western boundaries of this area. The triangular shape zone in the centre of the Site is shown to be wetland/marsh.	1:10,560 historical mapping
1969	**Bare ground, probable infilling or land raising and stockpiles** identified in the Metal Recovery Area (northern half).	Aerial photography
1970 - 1973	Spencer Steelworks described as '**Slag Processing Plant**'.	1:10,000 historical map
1979	**Expansion of earthworks/slag heaps** in the Metal Recovery Area/Slag Processing Plant. The triangular shape zone in the centre of the wetland between the Reedbed No.1 and the Metal Recovery Area appears to have been split into rectangular sections. This may represent reedbeds associated with the industrial works, prior to the use of Reedbed No.1 however this is not confirmed.	Aerial photography
1981	A track runs along the eastern boundary of Reedbed No.1	Aerial photography
1985	Bare ground/discolouration of vegetation in the central area of the Site, perhaps associated with reedbed activity in this area. A track is present, central to the north.	Aerial photography
1985 - 1996	A pond is identified in the central area of the triangular shape area between Reedbed No.1 and the Metal Recovery Area, adjacent to the northern boundary.	1:10,000 historical mapping

Date	Use	Source of information
	The slag stockpiles are covering much of the Metal Recovery Area. Reedbed No.1 still shown as agricultural fields.	
1991	Bare ground/spoil heaps are identified in the central area of the Site, adjacent to the pond. **Bunds/ditches appear to have been constructed across Reedbed No.1**, splitting the area into sections. **An area of bare ground** is identified within the southernmost reedbed in the south-western corner which indicates that Reedbed No 1 had not yet been constructed in the area. Building infrastructure, broadly similar to the current layout, identified in the south western corner of the Metal Recovery Area.	Aerial Photography
2006	Further **buildings and tanks** in the south-western area of the Metal Recovery Area. Pond water and disturbed ground observed in the central triangular area. No significant changes in Reedbed No. 1, other than the southern tip appears now to be part of the reedbed system.	Aerial photography
2013/2014	Buildings associated with the former Spencer Steelworks in the north-western area of the Metal Recover Area have been **demolished, concrete slabs and foundations remain.**	Aerial Photography

Note: Potential sources of contamination underlined. Those within the temporary and permanent land take are shown in **bold**.

4.1.3 The additional sources of information presented above supplement those used in the 2014 PSSR. Of particular note is that the slag processing works in the Metal Recovery Area have been identified as early as 1964 as opposed to 1981 reported in the PSSR.

4.1.4 The Site was used as bombing decoy site during World War II which is described in detail within the 2014 PSSR (Ove Arup & Partners, 2014) and the Explosive Ordnance Threat Assessment Report (Bactec, 2014). There is thus a risk from unexploded ordnance at the Site which is categorised as a medium risk site however no known incidents of buried unexploded ordnance at the Site have been identified.

5 Environmental Setting

5.1 Geology

5.1.1 British Geological Survey (BGS) records show Tidal Flat Deposits (TFD), comprising layers of sand, gravel and peat underlying the site. The underlying solid geology is that of the Mercia Mudstone Group comprising weathered mottled and often fractured mudstones.

5.1.2 It is anticipated that Made Ground (fill) materials associated with arisings from the Steelworks are present within the areas of Reedbed No.1 and the Metal Recovery Area.

5.2 Hydrology

5.2.1 The Site is situated within a low lying area known as the Gwent Levels, with many surface water reens and ditches traversing through the Site. Blackwall Reen and Monks Ditch flow from north to south beyond the eastern boundary of the Site. Ellen Reen and Middle Reen flow into Blackwall Reen to the south of the Site. These reens and other surface waters are shown on Figure 3. They connect with the Gwent Levels SSSI wider network of reens and ditches, located south and west of the new section of motorway.

5.3 Hydrogeology

5.3.1 NRW records indicate that the clay rich TFD are classified as non-productive strata (negligibly permeable). The Mercia Mudstone Group strata are classified as a Secondary B aquifer (variably permeable).

5.3.2 Groundwater is anticipated to be present between the interface of the bedrock strata and TFD. Further, perched water may be encountered at shallow depth within the Made Ground, above the clay strata or the TFD.

5.4 Environmental Information

5.4.1 This section summarises the information held by NRW relating to the Site and its vicinity.

5.4.2 There are no environmental permits associated with Reedbed No.1 and the Metal Recovery Area. Those located within the vicinity are shown in Table 3.

Table 3: Environmental Permit (off site)

Licence	Year	Release Environment	Substances Released	Comments
Company: Cambrian Stone Ltd Industry: Metal Process: Ferrous metals				East of Metal Recovery Area
AD1925	1998 to 2001	Air	Particulate matter – total sulphur oxides	
Company: Air Products (GB) Ltd and (BR) Ltd Industry: Fuel and Power Process: Gratification and refining etc.				East of Metal Recovery Area
AF7002 and BL2459IC	1998 to 2012	Reuse	Special waste (7000 g)	
		Disposal-incineration	Special waste (100 g)	
		Disposal-landfill	Special waste (59.64 t)	
		Air	Carbon dioxide, carbon monoxide and nitrogen oxides (as NO_2)	
Company: Tata Steelworks UK Limited Industry: Metal Process: Ferrous metals				Main Steelworks works area, to the north, across the A4810.
BS3905IP	2004 to 2012	Air	Particulate matter – total sulphur oxides, carbon monoxide, carbon dioxide, methane, nitrous oxides, VOCs inorganic chlorine	
		Water	Heavy metals, cyanides, nitrogen, phenols, TOC	

5.4.3 Two companies located within 300 m to the north of the site hold industrial pollution licences. These are Koppers UK LTD which had a licence for landfill disposal and air pollution until 2000; and, Multiserv (ASR) LTD which had two air pollution licences until 2002.

5.4.4 Two authorised landfill sites and one under closure have been recorded to the east as detailed in Table 4 below and shown on Figure 3. These three permitted areas are discussed in detail in Volume 2 of Land Contamination Assessment Report CL-26.

Table 4: Authorised Landfills Outside the Site Boundary

Landfill Name and Address	Location	Licence Type [Licence Reference]	Licence Status
Corus Strip Products PPC Llanwern Landfill, South Side of the A4810	Covering the central section of CL-26 including Lagoons 12, 25 and 26 – adjacent and to the east of the Site.	Industrial waste landfill (Factory curtilage)	Modified (under closure)
Tata Steelworks UK Limited, South Side of the A4810 Llanwern Landfill	Covering Lagoon 26 – 950 m east of the Site	Waste Landfilling; >10 T/D with capacity >25,000T excluding inert waste	Effective
Tata Steelworks UK Limited, Llanwern Works	Covering Lagoon 27	Industrial waste landfill (Factory curtilage) [EPR/BS3905IP]	Effective

5.4.5 One historic landfill was recorded to the east of CL-26, as detailed in Table 5 and shown on Figure 3.

Table 5: Historic Landfills within Site Boundary

Landfill Name and Address	Location	Material Type	Date Waste First and Last Received
Llanwern Steelworks Land adjacent to 1-3 Blast Furnacre Corus, Llanwern Works (CL-27 site)	Adjacent to the eastern boundary of CL-26 encompassing Reedbed No.2 – 1.5 km east of the Site	Industrial waste and liquid sludge	Nov 1981 – June 1984

5.4.6 The environmental information held by NRW confirms the various off site land activities and in particular the metal steel works to the north and waste lagoons to the east could represent potential contamination sources that require due consideration in relation to the Scheme.

6 Scope of Investigations

6.1 General

6.1.1 Seven ground investigations have been undertaken at the Site since 2002 and these have been summarised in the following sections. No data are available for the triangular shape zone between Reedbed No.1 and the Metal Recovery Area.

6.2 Scope of Works

6.2.1 The various intrusive ground investigations undertaken within the Site are summarised in Table 6. A number of boreholes have also been drilled prior to the 2016 Additional Ground Investigation to the south of the Site but within the Scheme land take. These have been considered in order to support understanding of the groundwater quality and gas regime if relevant.

6.2.2 Three boreholes, BHM4CANA015, BHM4CANA016 and BHM4CAN034, and one trial pit, TPM4CANA006, were advanced to the south of the Site during the 2016 Additional Ground Investigation to investigate the Glan Llyn Junction. These boreholes did not encounter Made Ground and are therefore not presented in detail within the following sections.

6.2.3 The sampling locations are shown on Figures 1a and 1b.

Table 6: Site Investigation Summary

Site Location	Date	Contractor	Boreholes	Window Sampler	Trial Pits	Sampling
Reedbed No. 1	2002	Exploration Associates	RBBH6-10	-	RBTP1-12	Soil & groundwater
	2008	Norwest Holst	SBHJ01 CP	SWSJ01, SWSJ01A, SWSJ01B, SWSJ02, SWSJ03, SWSJ04, SWSJ05, SWSJ06, SWSJ06A, SWSJ06B, SWSJ07, SWSJ08	-	Soil, groundwater & leachate
	2015	Geotechnical Engineering Limited	BH508, BH509	-	-	Soil, groundwater & leachate
	2016	RPS	BHM4CAN033	-	-	Soil, groundwater

Site Location	Date	Contractor	Boreholes	Window Sampler	Trial Pits	Sampling
Metal Recovery Area	2002	Exploration Associates	CABH1-3	-	MRTP1-5 CATP1-2, 5-10	Soil, groundwater & leachate
	Jan 2005	Exploration Associates	-	-	TP2-6 TP8-13	None recorded
	Aug 2005	Exploration Associates	BH1-5	WS2, WS3, WS4, WS5, WS5A, WS6, WS7, WS8, WS9, WS10	TP1-6	Groundwater
	Jul 2006	Exploration Associates	BH06-09 BH12-21	-	-	Groundwater
	2015	Geotechnical Engineering Limited	BH510 (off site) BH511, BH512	-	TP504	Soil, groundwater & leachate
	2016	RPS	BHM4CAN035, BHM4CAN035a, BHM4CAN035b, BHM4CAN036, BHM4CAN037, BHM4CAN038, BHM4CAN038a, BHM4CAN039	WSM4CAN023, WSM4CAN024	TPM4CAN016, TPM4CAN017, TPM4CAN018	Soil & groundwater

6.2.4 The 2016 Additional Ground Investigation undertaken by RPS specifically targeted some of the previously identified data gaps as well as enabling verification of the risk levels of the Site and need for remedial measures. The scope of the 2016 Additional Ground Investigation included the following.

- A borehole installed within the Mercia Mudstone aquifer within Reedbed No.1.
- Investigation of the footprint of the proposed link road between the A4810 and the Glan Llyn junction and proposed Water Treatment Area including borehole wells installed within the Mercia Mudstone.
- Further monitoring wells installed within the Made Ground and TFD within the Metal Recovery Area for further ground gas risk assessment.

6.2.5 The construction details of all boreholes installed with monitoring wells on the Site are summarised in Table 7. Boreholes with monitoring wells are shown on Figures 1a and 1b.

Table 7: Summary of Borehole Construction Details

Site Area	Borehole ID	Diameter (mm)	Total Drilled Depth (m)	Top of Slotted Well Casing / Gravel Pack (m bGL)	Base of Slotted Well Casing / Gravel Pack (m bGL)	Targeted Geology
Reedbed No. 1	RBBH6	50	7	0.8	7	Made Ground / TFD (Peat)
	RBBH7	50	7	0.8	7	Made Ground / TFD (Peat)

Site Area	Borehole ID	Diameter (mm)	Total Drilled Depth (m)	Top of Slotted Well Casing / Gravel Pack (m bGL)	Base of Slotted Well Casing / Gravel Pack (m bGL)	Targeted Geology
	RBBH8	50	7	1	7	Made Ground / TFD (Peat)
	RBBH9	50	7	1	7	Made Ground / TFD (Peat)
	RBBH10	50	7	1	7	Made Ground / TFD
	SWSJ08	50	4	0.3	3.3	Made Ground / TFD
	SBHJ01CP	50	14.5	5.8	7.5	TFD (Peat)
	BH509	35		4.3	7.7	TFD
		50	20.5	10.8	13.2	TFD
	BHM4CAN 033	50	13	11.8	13	Mercia Mudstone
Metal Recovery Area	CABH1	50	6.0	2.9	6.0	TFD
	CABH2	50	6.0	0.5	3.0	Made Ground
	CABH3	50	6.0	0.8	3.2	Made Ground
	BH1	50	3.3	0.8	3.3	Made Ground / TFD
	BH2	-	2.3	0.5	2.3	Made Ground / TFD
	BH3	50	3.2	1.0	3.2	Made Ground / TFD
	BH4	50	3.5	1	3.5	Made Ground / TFD
	BH5	50	3.2	1	2.6	Made Ground
	BH06	-	2.5	0.5	2.5	Made Ground / TFD
	BH07	-	3.3	0.5	3.0	Made Ground / TFD
	BH08	-	2.5	0.5	2.5	Made Ground / TFD
	BH09	-	2.5	0.5	2.5	Made Ground / TFD
	BH12	-	1.7	0.5	1.7	Made Ground / TFD
	BH13	-	2.5	0.5	1.6	Made Ground
	BH14	-	2.5	0.5	1.8	Made Ground
	BH15	-	1.2	0.5	1.2	Made Ground
	BH16	-	3.5	0.5	3.5	TFD
	BH17	-	2.5	0.5	2.5	Made Ground / TFD
	BH18	-	3.5	0.5	3.5	Made Ground / TFD
	BH19	-	3.0	0.5	3.0	Made Ground / TFD
	BH20	-	3.0	0.5	3.0	Made Ground / TFD
	BH21	-	3.8	0.5	3.8	Made Ground / TFD
	SBHJ03 CP	50	13.0	3.4	5.2	TFD (Peat)

Site Area	Borehole ID	Diameter (mm)	Total Drilled Depth (m)	Top of Slotted Well Casing / Gravel Pack (m bGL)	Base of Slotted Well Casing / Gravel Pack (m bGL)	Targeted Geology
	(off site)					
	BH510 (off site)	35	22.3	3	6.0	TFD (Peat)
		50		9.5	12	TFD / TFD (Peat) / MM
	BH512	35	25.2	0.85	2.1	Made Ground
		50		6.8	11.2	TFD
	BHM4CAN 035b	50	15.9	1	3.7	Made Ground
		50		13.1	15.9	MM
	BHM4CAN 036	50	14.6	7.5	9	TFD
	BHM4CAN 037	50	15.6	1	3.4	Made Ground
		50		12.6	15.6	MM
	BHM4CAN 038a	35	13.8	1	2.6	MG
		50		12	13.8	MM
	BHM4CAN 039	50	14.3	3	7	TFD (Including Peat)
		35		11.3	14.3	TFD / MM
	WSM4CAN 023	35	6	0.3	2.3	Made Ground

Notes: TFD = Tidal Flat Deposits. MM = Mercia Mudstone.

6.3 Surface Water Quality Monitoring

6.3.1 Surface water quality monitoring has been undertaken at a number of locations surrounding the Site which are shown in Figure 3 and summarised in Table 8. Sampling has previously been undertaken in 2002, 2004 and 2005 by Enviros Consulting (Enviros, 2006) and between 2007 and 2008 as part of the Titan surface water sampling regime (Titan, 2008) as well as the more recent supplementary Ground Investigation (Geotechnical Engineering, 2015). Sampling has also been undertaken by RPS as part of the supplementary works commissioned by Welsh Government as part of the Baseline Water Environment Report (Appendix 16.2 of the March 2016 ES) which presents the baseline water quality monitoring programme of watercourses located near the new section of motorway.

Table 8: Surface water monitoring locations

Surface Water Location ID	Location Description	Comments
EL reen 1	Located 500 m south-west of the Site on Chapel Reen	-
MDSWN	Unknown	-
MDSWS	Located 140 m south of the Site on Monks Ditch	-
R10/ IDB 69-10	Located 280 m south of the site on a drainage ditch	Flow was recorded as slack and slightly turbid.
R11 / IDB 68	Located 540 m south of the site on Ellen Reen	-
R12 / EA 26	Located 400 m south of the site on Blackwall Reen	-

Surface Water Location ID	Location Description	Comments
SW501	Located 580 m west of the site on drainage ditch opposite Julian's Reen.	-
SW502	Located on drainage ditch in the north-west corner of the site on the boundary	-
SW503	Located on drainage ditch in south-west corner of the site on the boundary	-
SW504	Located 60 m north of the site on Monks Ditch	-
14.2	Located approximately 550 m south of the site on Chapel Reen	-
15.3	Located 488 m south of the site on Monks Ditch	-

6.4 Field Testing

6.4.1 Photo Ionisation Detector (PID) monitoring for Volatile Organic Compounds (VOCs) was undertaken on samples from both Reedbed No. 1 and the Metal Recovery Area. The samples monitored and results are presented in Table 9. Locations and depth ranges from which all PID readings are of 0.0ppm have been omitted from the results in Table 9.

Table 9: PID monitoring results

Location	Samples Monitored	Results
Reedbed No. 1	SBHJ01, SWSJ01, SWSJ02, SWSJ04, SWSJ05, SWSJ06, SWSJ06B, SWSJ07, SWSJ08, BH508 and BH509	SWSJ01 0.3 m @ 70.9 ppm SWSJ07 4.0-6.0 m @ 1.9-4.8 ppm BH508 0.0-8.5m @ 0.5-17.5 ppm BH509 0.5-6.5m @ 0.2-1.0 ppm
Metal Recovery Area	SBHJ03 (off site), BH511 and BH512	SBHJ03 3.0-4.0m @ 0.6-0.9 ppm BH511 3.0m @ 0.9 ppm, 4.5m @ 1.0 ppm

6.4.2 Flame Ionisation Detector (FID) monitoring was undertaken on samples from the Metal Recovery Area. The samples monitored and results are presented in Table 10.

Table 10: FID monitoring results

Location	Samples Monitored	Results
Metal Recovery Area	TP1, TP2, TP3, TP4, TP5, TP6 (Aug 2005) WS2, WS3, WS4, WS5, WS6, WS7, WS8, and WS9.	TP1 0.3 m @ 1 ppm, 1.0 m @ 8 ppm TP2 1.7 m @ 8 ppm TP3 0.9 m @ 5ppm, 1.2 m @ 30 ppm TP4 0.6-1.6 m @ 12-20 ppm TP5 0.4-1.3 m @ 2-15 ppm TP6 0.5 m @ 4 ppm, 1.3 m @ 20 ppm WS2 1.5 m @ 27 ppm WS3 0.7-4.0 m @ 2-90 ppm WS6 3.6 m @ 15 ppm WS8 1.7-3.0 m @ 3-49 ppm WS9 1.0-1.5 m @ 12-40 ppm

6.5 Groundwater Monitoring

6.5.1 A summary of the groundwater sampling and monitoring and ground gas monitoring rounds is shown in Table 11.

Table 11: Summary of Monitoring Rounds

Site Area	Location Ref.	Total number of monitoring rounds (date of sampling rounds)	Monitoring details	Notes
Reedbed No. 1	RBBH6	3 no. (2002 – dates unknown)	Groundwater sampling	Monthly groundwater level monitoring understood to have been undertaken from Nov 2003 – Jan 2005 however data is unavailable for review.
	RBBH7	5 no. (3 no. in 2002 – dates unknown, 27th February 2008, 19th March 2008)	Groundwater sampling	Monthly groundwater level monitoring understood to have been undertaken from Nov 2003 – Jan 2005 however data is unavailable for review.
	RBBH8	3 no. (2002 – dates unknown)	Groundwater sampling	-
	RBBH9	5 no. (3 no. in 2002 – dates unknown, 27th February 2008, 19th March 2008)	Groundwater sampling	-
	RBBH10	5 no. (3 no. in 2002 – dates unknown, 27th February 2008, 19th March 2008)	Groundwater sampling	-
	SWSJ08	6 no. (1st February 2008, 21st February 2008, 6th March 2008, 19th March 2008, 3rd April 2008, 17th April 2008)	Groundwater level & sampling	-
	SBHJ01CP	6 no. (1st February 2008, 21st February 2008, 6th March 2008, 19th March 2008, 3rd April 2008, 17th April 2008)	Groundwater level & sampling	-
	BH509 (shallow)	4 no. (4th March 2015, 11th March 2015, 18th March 2015, 6th May 2015)	Groundwater level & sampling, ground gas	-

Site Area	Location Ref.	Total number of monitoring rounds (date of sampling rounds)	Monitoring details	Notes
	BH509 (deep)	4 no. (4th March 2015, 11th March 2015, 18th March 2015, 6th May 2015)	Groundwater level & sampling	-
	BHM4CAN033	3 no. 6th May 2016, 19th May 2016, 2nd June 2016	Groundwater level and sampling Ground Gas	
Metal Recovery Area	CABH1	5 no. (14th March 2002, unknown date, 17th April 2002, 1st February 2003, 1st June 2004)	Groundwater sampling	Monthly groundwater level monitoring understood to have been undertaken from Nov 2003 – Nov 2004 however data is unavailable for review.
	CABH2	3 no. (14th March 2002, unknown date, 17th April 2002)	Groundwater sampling	-
	CABH3	2 no. (14th March 2002, 17th April 2002)	Groundwater sampling	-
	BH1-5	1 no. (June 2005)	Groundwater sampling	Further monitoring rounds may have been undertaken however no further data is available.
	BH06-09, 12-21	1 no. (June 2006)	Groundwater sampling	Further monitoring rounds may have been undertaken however no further data is available.
	SBHJ03 CP	6 no. (1st February 2008, 27th February 2008, 7th March 2008, 19th March 2008, 3rd April 2008, 17th April 2008)	Groundwater level & sampling	-
	BH510 (shallow)	4 no. (4th March 2015, 12th March 2015, 18th March 2015, 7th May 2015)	Groundwater level, ground gas	-
	BH510 (deep)	4 no. (4th March 2015, 12th March 2015, 18th March 2015, 7th May 2015)	Groundwater level & sampling	-
	BH512 (shallow)	4 no. (21st April 2015, 28th April 2015, 6th May 2015, 14th May 2015)	Groundwater level, ground gas	-

Site Area	Location Ref.	Total number of monitoring rounds (date of sampling rounds)	Monitoring details	Notes
	BH512 (deep)	4 no. (21st April 2015, 28th April 2015, 6th May 2015, 14th May 2015)	Groundwater level & sampling	-
	BHM4CAN035b (Deep & Shallow)	3 no. 3rd May 2016, 17th May 2016, 26th May 2016	Groundwater level & sampling Ground gas	-
	BHM4CAN036	3 no. 3rd May 2016, 17th May 2016, 26th May 2016	Groundwater level & sampling Ground gas	-
	BHM4CAN037 (Deep & Shallow)	3 no. 3rd May 2016, 17th May 2016, 26th May 2016	Groundwater level & sampling Ground gas	-
	BHM4CAN038a (Deep & Shallow)	3 no. 3rd May 2016, 17th May 2016, 26th May 2016	Groundwater level & sampling Ground gas	-
	BHM4CAN039 (Deep & Shallow)	3 no. 3rd May 2016, 17th May 2016, 26th May 2016	Groundwater level & sampling Ground gas	-
	WSM4CAN023	3 no. 3rd May 2016, 17th May 2016, 26th May 2016	Groundwater level & sampling Ground gas	-

6.6 Laboratory Chemical Testing

6.6.1

A summary of all the laboratory analysis undertaken on soil, groundwater, leachate and surface water from the previous site investigations is shown in Table 12.

Table 12: Summary of Previous Investigation Sampling

Site Area	Site Investigation Date	No. of Soil Samples	No. of Leachate Samples	No. of Water Samples	Suites of Testing
Reedbed No. 1	2002	21	-	21	Metals, pH, phenol, sulphate, chloride, cyanide, ammoniacal N.
	2008	18	9	4	Metals, pH, phenol, sulphate, sulphide, chloride, cyanide, asbestos, ammoniacal N, TPH, PAH, polychlorinated biphenyl (PCBs), BTEX, VOCs and SVOCs

Site Area	Site Investigation Date	No. of Soil Samples	No. of Leachate Samples	No. of Water Samples	Suites of Testing
	2015	2	1	6	Metals, pH, phenol, sulphate, sulphide, chloride, cyanide, asbestos, ammoniacal N, TPH, PAH, PCBs, BTEX, VOCs and SVOCs
	2016	1	1	3	Metals, cyanide, asbestos, pH, phenols, PCBs, BTEX, TPH, PAH, SVOCs, phthalates, VOCs
Metal Recovery Area	2002	45	5	11	Metals, pH, phenol, sulphate, chloride, cyanide, ammoniacal N, phosphorus, fluoride, phenols, TPH, PAH, VOCs
	Jan 2005	-	-	-	None
	Aug 2005	-	-	5	TPH, PAH
	2006	-	-	13	TPH, PAH
	2008	2 soil samples from SBHJ03 CP. Not included within this assessment as not within the Scheme area.	-	2	Metals, pH, alkalinity, hardness, BOD, COD, potassium, sodium, sulphate, chloride, sulphide, ammoniacal N, nitrate, phenol, TPH, PAH, PCBs, BTEX, VOCs and SVOCs
	2015	8	1	12	Metals, pH, phenol, sulphate, sulphide, chloride, cyanide, asbestos, ammoniacal N, TPH, PAH, PCBs, BTEX, VOCs and SVOCs
	2016	10	5	30	Metals, cyanide, asbestos, pH, Phenols, BTEX, PCBs, TPH, PAH, SVOcs, VOCs

Soil Analysis

6.6.2 The following sections summarise the laboratory analytical results for soil samples collected during the various intrusive investigation phases. The available data set has been tabulated and is presented in Appendix 3. Supporting laboratory certificates are available in the relevant original ground investigation reports (see Table 6).

6.6.3 To help inform the conceptual ground model, the analytical data from the Made Ground has been assessed separately from those of the natural soils (Tidal Flat Deposits specifically).

6.6.4 For the purpose of meeting the requirements of Volume 4, Section 1, Part 2 of the DMRB (HD22/08 – Managing Geotechnical Risk – 2008 (Highway Agency, 2008), the historical data used to support the PSSR and the additional 2015 information (Geotechnical Engineering, 2015) and 2016 Additional Ground Investigation have been differentiated in the following sections.

6.6.5 The available information has been summarised in Table 13.

Table 13: Summary of Soil Analytical Data

Site Area	Formation Unit	Number of Soil Analysis per Analytical Suite								
		Metals & Inorganics	Asbestos	PAH	TPH	Phenol	BTEX	VOCs	SVOCs	Polychlorinated Biphenyl
Reedbed No.1	***Pre-2015 Data***									
	Made Ground	25	11	11	11	25	11	12	12	11
	Natural Soils	14	7	7	7	14	7	7	7	7
	2015 Data									
	Made Ground	1	1	1	1	1	1	0	0	0
	Natural Soils	1	0	1	1	0	0	0	0	0
	2016 Data									
	Made Ground	1	1	1	1	1	1	1	1	1
	Total Reedbed No. 1 Data									
	Total	42	20	21	21	41	20	20	20	19
Metal Recovery Area	***Pre-2015 Data***									
	Made Ground	26	3	11	13	26	2	2	2	0
	Natural Soils	15	0	7	6	15	1	1	1	0
	Field Logs Unavailable to Confirm	4	1	1	3	4	0	0	0	0
	2015 Data									
	Made Ground	7	7	7	5	4	2	0	0	4
	Natural Soils	1	1	1	1	1	0	0	0	0
	2016 Data									
	Made Ground	10	9	9	9	6	9	3	3	3
	Total Metal Recovery Area Data									
	Total	63	21	36	37	56	14	6	6	7
	Total Data									
	Total	105	40	58	58	97	35	26	26	26

Soil Leaching Analysis

6.6.6 Similarly to the soils data, the soil leachate results have been considered for the Made Ground and natural soils separately. The available information is presented in Appendix 6 and summarised in Table 14.

Table 14: Summary of Soil Leaching Analytical Data

Site Area	Formation Unit	Number of Soil Leachate Analysis per Analytical Suite							
		Metals & Inorganics	PAH	TPH	Phenol	BTEX	Polychlorinated Biphenyl	SVOCs	VOCs
Reedbed No. 1	***Pre-2015 Data***								
	Made Ground	7	0	0	0	0	0	0	0
	Natural Soils	2	0	0	0	0	0	0	0
	2015 Data								
	Made Ground	1	1	1	1	1	0	0	0
	2016 Data								
	Made Ground	1	1	1	1	1	1	1	1
	Total Reedbed No. 1 Data								
	Total	11	2	2	2	2	1	1	1
Metal Recovery Area	***Pre-2015 Data***								
	Made Ground	3	0	0	0	0	0	0	0
	Natural Soils	2	0	0	0	0	0	0	0
	2015 Data								
	Made Ground	1	1	1	1	1	0	0	0
	2016 Data								
	Made Ground	5	5	5	3	5	2	2	2
	Total Metal Recovery Area Data								
	Total	11	6	6	4	6	2	2	2
	Total Data								
	Total	22	8	8	6	8	3	3	3

Groundwater Analysis

6.6.7 The laboratory analytical results for groundwater samples collected during the various intrusive investigation phases have been tabulated in a table format and are presented in Appendix 4.

6.6.8 The available data relate to water samples taken from wells installed within the Made Ground and the groundwater of the Glaciofluvial Deposits are summarised in Table 15.

Table 15: Summary of Analytical Groundwater Data

Site Area	Groundwater Unit (geological formation)	Number of Groundwater Analysis per Analytical Suite (number of well locations)							
		Metals & Inorganics	PAH	TPH	Phenol	BTEX	VOC	SVOC	Polychlorinated Biphenyl
Reed bed No.1	***Pre-2015 Data***								
	Perched (Made Ground / Tidal Flat Deposits)	26 (7)	7 (7)	13 (7)	2 (7)	23 (7)	10 (7)	8 (7)	0(7)
	Perched (Tidal Flat Deposits)	2 (1)	0 (1)	2 (1)	2 (1)	2 (1)	2 (1)	2 (1)	0 (1)
	2015 Data								
	Perched (Tidal Flat Deposits)	6 (1)	6 (1)	6 (1)	6 (1)	6 (1)	0 (1)	0 (1)	6 (1)
	2016 Data								
	Aquifer (Mercia Mudstone)	3 (1)	3 (1)	3 (1)	0 (1)	3 (1)	3 (1)	3 (1)	2 (1)
	Total Reedbed No. 1 Data								
	Total	37 (10)	16 (10)	24 (10)	13 (10)	24(10)	15 (10)	13 (10)	8 (10)
Metal Recovery Area	***Pre-2015 Data***								
	Perched (Made Ground)	3 (4)	3 (4)	4 (4)	3 (4)	1 (4)	1 (4)	0 (4)	0 (4)
	Perched (Made Ground / Tidal Flat Deposits)	2 (15)	12 (15)	16 (15)	2 (15)	2 (15)	2 (15)	0 (15)	0 (15)
	Perched (Tidal Flat Deposits)	6 (3)	6 (3)	6 (3)	6 (3)	7 (3)	7 (3)	2 (3)	0 (3)
	2015 Data								
	Perched (Tidal Flat Deposits)	6 (2)	6 (2)	6 (2)	3 (2)	6 (2)	6 (2)	3 (2)	3 (2)
	Aquifer (Mercia Mudstone)	3 (1)	3 (1)	3 (1)	0 (1)	3 (1)	3 (1)	0 (1)	0 (1)
	2016 Data								
	Perched (Made Ground)	12 (4)	12 (4)	12 (4)	0 (4)	12 (4)	12 (4)	12 (4)	8 (4)
	Perched (Tidal Flat Deposits)	6 (2)	6 (2)	6 (2)	0 (2)	6 (2)	6 (2)	6 (2)	4 (2)
	Aquifer (Mercia Mudstone)	12 (4)	12 (4)	12 (4)	0 (4)	12 (4)	12 (4)	12 (4)	8 (4)
	Total Metal Recovery Area Data								
	Total	50 (35)	60	65	14 (35)	49	49	35	24 (34)

Site Area	Groundwater Unit (geological formation)	Number of Groundwater Analysis per Analytical Suite (number of well locations)							
		Metals & Inorganics	PAH	TPH	Phenol	BTEX	VOC	SVOC	Polychlorinated Biphenyl
			(35)	(35)		(35)	(35)	(35)	
	Total Data								
	Total	87 (45)	76 (45)	89 (45)	27(45)	73(45)	64 (45)	48 (44)	32 (44)

Surface Water Analysis

6.6.9 Table 16 summarises the laboratory analytical results for surface water samples collected during the various intrusive investigation phases. The available data set has been tabulated and is presented in Appendix 5.

Table 16: Summary of Analytical Surface Water Data

Surface Water System	Number of Water Analysis per Analytical Suite (number of locations)						
	Metals & Inorganics	Water Quality Parameters	PAH	TPH	BTEX	Phenols	PCBs
Pre-2015 Data							
Blackwall Reen	4 (1)	4 (1)	0 (0)	4 (1)	0 (0)	0 (0)	0 (0)
Ellen Reen	4 (1)	4 (1)	0 (0)	4 (1)	0 (0)	0 (0)	0 (0)
Monks Ditch	4 (1)	4 (1)	2 (1)	1 (1)	0 (0)	4 (1)	0 (0)
Chapel Reen	4 (1)	4 (1)	0 (0)	0 (0)	0 (0)	4 (1)	0 (0)
Drainage Ditch S	4 (1)	4 (1)	0 (0)	4 (1)	0 (0)	0 (0)	0 (0)
2015 Data							
Julian's Reen	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)
Monks Ditch	4 (2)	4 (2)	4 (2)	4 (2)	4 (2)	3 (1)	3 (1)
Chapel Reen	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	0 (0)	0 (0)
Drainage Ditch NW	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)
Drainage Ditch SW	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)
Total Data							
Total	34 (11)	34 (11)	16 (7)	27 (10)	14 (6)	20 (6)	12 (4)

6.7 Review of Available Data

Reedbed No. 1

6.7.1 Ground investigation data are available from both the northern and southern areas of Reedbed No.1 and is particularly concentrated in the south within the new section of motorway land take area.

6.7.2 All shallow response zones in this area of the Site are either installed within the Tidal Flat Deposits or cross the boundary between the Made Ground and Tidal Flat Deposits. There are no monitoring well installations within the Made Ground alone and thus the presence and contamination status of perched water within the Made Ground is not known.

6.7.3 Ground gas data are available from one location (BH509) from within the Tidal Flat Deposits just beyond the southern boundary of Reedbed No. 1 and one location (BHM4CAN033) from within the Mercia Mudstone beyond the south western boundary of Reedbed No. 1. Thus, there are neither ground gas data relating to shallow Made Ground nor data on peat deposits in this area.

Metal Recovery Area

6.7.4 Ground investigation data are concentrated along the western side of the Metal Recovery Area. Previous ground investigations undertaken along the southern boundary, within the footprint of the proposed new section of motorway alignment, are limited.

6.7.5 No data are available for the central area of the Site, between the eastern boundary of Reedbed No.1 (as defined within the 2014 PSSR) and the Metal Recovery Area, in the area to be used as replacement reedbeds to mitigate the loss of the southern tip of Reedbed No. 1.

7 Ground Conditions

7.1 General

7.1.1 The geological logs for all available exploratory holes excavated on or in close proximity to the Site are provided in Appendix 1. The observed sequence of natural and Made Ground material is consistent with those discussed in the 2014 PSSR report and is summarised in the following sections. Information from the supplementary Ground Investigation (Geotechnical Engineering, 2015) and the 2016 Additional Ground Investigation has also been used.

7.1.2 The geological sequence has been discussed for each area of interest, being Reedbed No.1 and the Metal Recovery Area.

7.2 Geology – Reedbed No. 1

Made Ground

7.2.1 The individual rectangular sections within Reedbed No. 1 are contained within bunds of mixed coarse and slurry slag material.

7.2.2 The previous ground investigations advanced boreholes on these bunds in the two north–south orientated sections (RBBH06, RBBH07 and RBBH 08) and on bunds/tracks surrounding the southern, east–west orientated area (RBBH09, RBBH10, SBHJ01, BH508, BH509 and BHM4CAN033). These investigations confirmed the presence of slag gravel within these bunds, up to a maximum thickness of 3.5 m within RBBH07. Within RBBH07, RBBH08, RBBH09 and BH508, this coarse slag material was underlain by Made Ground of slightly gravelly clay with slag, up to 3.2 m in thickness (RBBH09). The base of the bunds which may be inferred from available logs vary widely between 0.8 and 4.67 m AOD.

7.2.3 Within the reedbeds, there is generally 1 to 2.4 m of Made Ground (sediment) identified as brown to black slightly sandy clay with many rootlets. Coarse slag inclusions were identified within SWSJ01 and SWSJ02. Within SWSJ05, the clay Made Ground was underlain by 100 mm of coarse slag.

7.2.4 The original ground level, prior to construction of the reedbed system, may be estimated to be at around 5 to 5.5 m AOD, using nearby exploratory locations from outside Reedbed No.1. Given the base of the Made Ground (bunds and sediment) is generally between 4 to 5.0 m AOD, this would infer no significant excavation of natural materials took place prior to Made Ground accumulation in the reedbed system.

7.2.5 BH509 appears to be located on the peripheral track running along the southern boundary. Made Ground was identified at this location up to 1.20 m bGL (5.25 m AOD), comprising gravel of limestone. No slag was identified at this location.

Superficial Deposits

7.2.6 Unconsolidated superficial deposits were encountered beneath the Made Ground within all boreholes. These comprised Tidal Flat Deposits comprising generally firm

grey/brown, frequently mottled orange brown silty Clay with occasional fragments of organic material, becoming soft or very soft with depth.

7.2.7 The deposits included a 1.5 to 3.2 m thick layer of peat, at between 2.5 and 5.7 m bGL (0.8-2.95 m AOD). This peat seems to be continuous beneath Reedbed No. 1 and extend beyond its footprint. The layer of peat was found to be directly beneath the Made Ground in RBBH07 and RBBH09 along the eastern boundary of Reedbed No. 1. A second thinner layer of peat of 0.3 m thickness was encountered within BHM4CAN033 at the base of the TFD.

7.2.8 The coarse Glaciofluvial Deposits known to be present in the general area were encountered within BHM4CAN033 within Reedbed No.1at a thickness of 0.4m, comprising sandy gravelly clay.

Solid Geology

7.2.9 Below the Superficial Deposits the Mercia Mudstone formation was encountered at depths of 11.7 to 14.61 m bGL (-5.84 to -8.2 m AOD). The Mercia Mudstone was typically described as very stiff / hard reddish brown sandy slightly gravelly clay becoming weak to extremely weak mudstone from between -9.65 to -13.80 m AOD.

Geological Sequence Summary

7.2.10 The general geological sequence identified during the previous ground investigations is summarised in Table 17.

Table 17: Summary of Geological Sequence – Reedbed No. 1

Unit	Description	Thickness Range (m)	Depth of Stratum (m AOD)
Made Ground (bunds)	Coarse slag commonly overlying fine material, forming retaining bunds around the reedbed system. Material becoming grey clay with slag gravel with depth	0.8 to 4.7	0.8 to 5.06
Made Ground within bunds (sediment)	Brown/grey/mottled orange occasionally sandy clay with frequent rootlets.	0.3 to 2.4	5.67 to 3.56
Superficial Deposits (Tidal Flat Deposits)	Silty clay, organic in places with one main peat layer (see below)	<12.05	-5.44 to -8.2
Superficial Deposits (Tidal Flat Deposits)	Peat	1.5 to 3.2	0.8 to 3.36
Superficial Deposits (Glaciofluvial Deposits)	Light grey slightly gravelly sandy clay	0.4	-5.84
Mercia Mudstone (Mudstone)	Very stiff clay becoming weak Mudstone	>7.5	Unproven

7.3 Geology – Metal Recovery Area

Made Ground

7.3.1 Made Ground containing slag has been identified within all investigation locations across the Metal Recovery Area with the exception of BH16, which is located at the south western corner.

7.3.2 The composition of the Made Ground is variable across the area, however, ash, clinker, concrete and brick are commonly observed within a slag matrix. Observed thicknesses ranges from between 1.2 and 5.6 m (although typically 2.5 m), with a basal level range of between 1.6 to 4.79 m AOD, although datum levels are not available for all sampling locations.

7.3.3 The majority of the Made Ground is coarse (gravel and cobbles) with the exception of a gravelly clay observed within BH12, BH13, BH14,BH21, BHM4CAN035b and BHM4CAN038a between 0.2 and 1.7 m in thickness.

Superficial Deposits

7.3.4 Unconsolidated superficial deposits were encountered beneath the Made Ground in all locations, with the exception of those terminated within the Made Ground. They comprised Tidal Flat Deposits consisting of generally firm to stiff grey clay, occasionally mottled brown and occasionally sandy, becoming soft with depth.

7.3.5 The deposits included a layer of peat which was identified within nine locations and between 2.2 and 2.4 m thick within boreholes BH511, BH512, BHM4CAN035b, BHM4CAN037, BHM4CAN038a and BHM4CAN039. A second thinner layer of peat of 0.5 m thickness was encountered within BHM4CAN038a near the base of the TFD. Soft black brown peaty clay was reported within boreholes BH12 BH13 and BH14, directly beneath the Made Ground.

7.3.6 Glaciofluvial Deposits were identified below the Tidal Flat Deposits within only one borehole, BHM4CAN038a, at a thickness of 0.1m and comprised a grey clayey sandy gravel.

Solid Geology

7.3.7 The Mercia Mudstone Formation was encountered beneath the Tidal Flat Deposits (or Glaciofluvial Deposits) in the south eastern area of the Site at depths of between 11.5 to 12.6 m bGL (-4.51 to -5.6 m AOD). The elevation of the top formation of the Mercia Mudstone is comparable but slightly lower than seen within Reedbed No.1. The elevation in this location is consistent with the levels seen in Lagoon 12 to the east of the Site.

7.3.8 The Mercia Mudstone was typically described as very firm to very stiff reddish brown slightly gravelly to very gravelly clay, becoming extremely weak mudstone (from -7.73 m AOD within BHM4CAN037).

Geological Sequence Summary

7.3.9 The general geological sequence identified during the previous ground investigations is summarised in Table 18.

Table 18: Summary of Geological Sequence – Metal Recovery Area

Geological Unit	Description	Thickness Range (m)	Basal depth[(1)] (m AOD)
Made Ground	Variable - mostly coarse gravel comprising slag with occasional ash, clinker, brick concrete and other extraneous materials	1.2 to 5.6	1.6 to 4.79
Superficial Deposits (Tidal Flat Deposits)	Generally firm to stiff, occasionally sandy clay. Organic in places with at least one peat layer (see below)	1.2 to 9.3	-4.51 to -5.08
Superficial Deposits (Tidal Flat Deposits)	Typically spongy brown pseudo-fibrous peat.	2.2 to 2.4 (where proven)	0.32 to -4.38
Superficial Deposits (Glaciofluvial Deposits)	Grey clayey sandy gravel.	0.1	-5.18
Mercia Mudstone (Mudstone)	Very stiff reddish brown clay with lithorelicts of mudstone becoming weak fractured mudstone	>13.3	Not proven

Note: [(1)] survey data based on limited exploratory location coverage.

7.4 Visual and Olfactory Evidence of Contamination

7.4.1 A summary of visual and olfactory evidence of potential contamination encountered during the previous ground investigations is summarised in Table 19.

Table 19: Visual and Olfactory Evidence of Contamination Summary

Site Area	Location ID	Depth (m bGL)	Strata	Evidence of Potential Contamination
Reedbed No.1	RBBH06, RBBH07, RBBH08, RBBH09, RBBH10, SWSJ01 SWSJ02, SWSJ05, SBHJ01, BH508, BHM4CAN033	Various	Made Ground (CS)	Containing slag
	RBBH7	GL-3.5	Made Ground (CS)	Driller reports concrete
	RBBH8	GL-1.6	Made Ground (CS)	Driller reports contamination – no further details known
		1.6-4.1	Made Ground (SS)	Driller reports contamination, becoming less contaminated with depth – no further details known
	BH508	0.4-2.05	Made Ground (SS)	Containing gravel of tarmacadam
Metal Recovery Area	All locations excluding BH16 (outside Metal Recovery Area boundary)	Various	Made Ground (CS)	Containing slag
	CABH2	0.2-2.2	Made Ground	Ash

Site Area	Location ID	Depth (m bGL)	Strata	Evidence of Potential Contamination
		2.2-2.9	Made Ground	Strong oily smell
		1.2-2.5	Made Ground (CS)	Brick and iron ore
	MRTP5	GL-2.5	Made Ground (CS)	Ash and clinker
	CATP1	GL-2.6	Made Ground (CS)	Asphalt boulders in slag. Hydrocarbon odour below 2.5 m
	CATP7	0.4-2.4	Made Ground (CS)	Brick & concrete. Hydrocarbon odour below 2.2 m
	CATP8	0.25-2.1	Made Ground (CS)	Hydrocarbon oil sheen on surface of gravel (beneath 0.15 m thickness of asphalt)
		2.5-2.7	Tidal Flat Deposits	Hydrocarbon oil pockets (<20 mm)
	TP2 (2004)	1.2-base	Made Ground (CS)	Hydrocarbon odour once water struck. Visible brown hydrocarbon floating on surface
	TP3 (2004)	0.2-0.4	Made Ground (CS)	Slag gravel stained black – strong hydrocarbon odour
		0.4-1.3	Made Ground (CS)	Concrete rubble, bricks and furnace bricks. Slightly blackened with hydrocarbon odour.
		1.3-base	Made Ground (CS)	Brown hydrocarbon flowing in from sides of pit once water struck at 1.3 m
	TP4 (2004)	0.3-base	Made Ground (CS)	Slag containing bricks, wood, metal and plastic. Strong hydrocarbon odour. Dark brown hydrocarbon flowing in from sides of pit once water struck at 1.4 m
	TP5 (2004)	1.5-base	Made Ground (CS)	Hydrocarbon odour once water struck. Water yellow and slightly oily (light brown lube oil)
	TP6 (2004)	1.6-base	Made Ground (CS)	Brown hydrocarbon seeping in at sides
	TP8 (2004)	1.7-base	Made Ground (CS)	Strong hydrocarbon odour
	TP9 (2004)	GL-0.3	Made Ground (CS)	Blackened slag gravel and cobbles. Furnace and house bricks
		0.75-0.85	Made Ground (CS)	Slag fused with black tarmac type material
		1.2-base	Made Ground (CS)	Visible hydrocarbon on water at 1.2 m
	TP10 (2004)	0.5-2.1	Made Ground (CS)	Slag blackened in areas. (Location area used historically as a soakaway for steam cleaning process)

Site Area	Location ID	Depth (m bGL)	Strata	Evidence of Potential Contamination
	TP11 (2004)	1.3-base	Made Ground (CS)	Slight hydrocarbon sheen on water
	TP12 (2004)	0.5-1.6	Made Ground (CS)	Railway sleepers, concrete rubble and metal. Hydrocarbon odour on water from 1.2 m
		1.6-base	Made Ground (possible reworked TFD)	Clay blackened with hydrocarbon
	TP13 (2004)	0.2-base	Made Ground (CS)	Blackened slag. Thick black tarry deposit with hydrocarbon odour between 0.35-0.45 m bGL. Walls of the pit seeping with thick light brown oily material and black oily deposit. Strong hydrocarbon odour and water blackened. Compacted concrete slab at base
	TP1 (2005)	0.4-2.1	Made Ground (CS)	Brick. Strong odour of hydrocarbon and free product visible on groundwater
	TP2 (2005)	1.7-base	Made Ground (CS)	Strong odour of hydrocarbon from 1.7 m. Slight sheen on groundwater
	TP3 (2005)	0.5-1	Made Ground (CS)	Strong odour of hydrocarbon
		1-1.4	Made Ground	Dense oily gravel. Much black oil in arisings
	TP4-6 (2005)	GL-base	Made Ground (CS	Concrete and ash and furnace bricks within slag. Slight to strong odour of. Free product on groundwater. Black tarry staining visible on sides of pit in TP4
	BH1	GL-2.8	Made Ground (CS)	Concrete brick and hardcore within slag
	BH2	GL-1.8	Made Ground (CS)	Concrete and ash within slag. Strong odour of hydrocarbon from 1.4 m associated with water strike
	BH3	GL-2.7	Made Ground (CS)	Concrete, brick and metal within slag. Strong odour of hydrocarbon from 1.6 m associated with water strike
	BH4	GL-3.0	Made Ground (CS)	Steelworks and brick within slag
	BH5	GL-2.7	Made Ground (CS)	Strong odour of hydrocarbon from 1.6 m associated with water strike
	WS2-6, WS8-10	GL-base of Made Ground	Made Ground (CS)	Concrete, ash and occasional cement within slag. Slight to strong odour of hydrocarbon associated with water strike in each. Slight oily sheen on arisings in WS3

Site Area	Location ID	Depth (m bGL)	Strata	Evidence of Potential Contamination
	WS7	GL-2.6	Made Ground (CS)	Concrete within slag
	BH09	0.3	Made Ground (CS)	Hydrocarbon odour from 0.3 m
	BH17	GL-0.4	Made Ground (CS)	Concrete within slag. Hydrocarbon odour observed in groundwater.
	BH21	2.2	Made Ground (CS)	Kerosene odour at 2.2 m. Oily sheen on groundwater
	BHM4CAN038a	0.2 - 1.9	Made Ground (CS)	Brick, wood, metal and aggregate within slag.

Note: CS – Coarse Slag

7.4.2 Hydrocarbon contamination has been observed within the Made Ground and shallow Tidal Flat Deposits at most locations on the western side of the Metal Recovery Area where the new Glan Llyn Depot is being proposed. Hydrocarbon odour and free product was commonly associated with water strikes during the investigations in this area.

7.5 Gas Monitoring

7.5.1 The ground gas monitoring dataset collected during the three monitoring rounds of the 2015 and 2016 investigations is summarised on the field data sheets provided in Appendix 2. The maximum gas concentrations (minimum for oxygen) are presented in Table 20.

Table 20: Summary of Gas Monitoring Data

Site Area	Location ID	Flow (l/hr)	VOCs (ppm)	CH_4 (%/vol)	Peak LEL (%)	CO_2 (%/vol)	O_2 (%/vol)	CO (ppm)	H_2S (ppm)
		Max.	Max.	Max.	Max.	Max.	Min.	Max.	Max.
Reedbed No.1	BH509 (shallow)	0.4	0.8	4.4	99.9	2.9	15.1	0	0
	BHM4CAN033	-4.5	-	32.6	54	6.5	13.7	1	0
Metal Recovery (off site)	BH510 (shallow)	0.8	5.3	28.4	> 100%	6.1	11.2	0	0
Metal Recovery area	BH512 (shallow)	0	4.5	0.2	4	0.7	18.7	1	0
	BHM4CAN035b (Shallow)	0.3	-	4.3		0.1	18.5	1	0
	BHM4CAN035b (Deep)	-3.8	-	77.2	>>	14.8	4.4	3	0

Site Area	Location ID	Flow (l/hr)	VOCs (ppm)	CH_4 (%/vol)	Peak LEL (%)	CO_2 (%/vol)	O_2 (%/vol)	CO (ppm)	H_2S (ppm)
		Max.	Max.	Max.	Max.	Max.	Min.	Max.	Max.
	BHM4CAN036	0	-	41.7	>>	4	8.8	0	0
	BHM4CAN037 (Shallow)	0.5	-	5.4	39	0.1	16	5	0
	BHM4CAN037 (Deep)	0.4	-	1.6	14	0.1	19.8	1	0
	BHM4CAN038a (Shallow)	0	-	0.7		0.1	20.4	0	0
	BHM4CAN038a (Deep)	0.5	-	71.6	>>	10.1	4.1	1	1
	BHM4CAN039 (Shallow)	0.6	-	6.4	>>	0.1	17.4	0	0
	BHM4CAN039 (Deep)	0.6	-	9.9		0.6	18	1	0
	WSM4CAN023	0.6	-	0.7	3	0.3	16.1	2	0

7.5.2 During intrusive works, the drilling of borehole BHM4CAN038a was halted as a result of significant methane degassing (initial recording of 77%) considered to be related to peat horizons within the Tidal Flat Deposits.

7.6 Groundwater Monitoring

Groundwater Encountered During Investigation

7.6.1 Groundwater strikes were encountered during the investigation phases, as detailed on the geological logs provided in Appendix 1. These are summarised in Table 21.

Table 21: Summary of Groundwater Level Data During Investigation

Site Area	Location	Strike Depth m bGL (m AOD)	Geological Formation	Level After 20 Minutes m bGL (m AOD)	Remarks
Reedbed No.1	RBBH6	0.8 (4.09)	Made Ground	No rise	Seepage
	RBBH7	0.8 (4.22)	Made Ground	No rise	Slow inflow
	RBBH8	0.8 (4.10)	Made Ground	0.2 (4.70)	Medium inflow
	RBBH9	1.4 (4.99)	Made Ground	1.1 (4.69)	Medium inflow
	RBBH10	1.1 (4.28)	Made Ground	0.9 (4.48)	Medium inflow
	RBTP1	0.3 (4.28)	Made Ground	-	Fast seepage
	RBTP10	0.1 (5.37)	Made Ground	-	Fast seepage
	RBTP11	0.2 (4.87)	Made Ground	-	Fast seepage
	SBHJ01 CP	13.4 (-6.83)	Mercia Mudstone Group	No rise	Seepage
	SWSJ02,03, 05-08	0.1-0.5 (5.46-6.55)	Made Ground	No rise	Seepage
	SWSJ04	0.4 (5.57)	Tidal Flat Deposits	No rise	Seepage
	BH508	3.0 (2.9)	Tidal Flat Deposits (Peat)	1.8 (4.1)	
		12.5 (-6.6)	Tidal Flat Deposits	7.9 (-2.0)	Fast flow
		14.2 (-8.3)	Mercia Mudstone Group	7.6 (-1.7)	Fast flow
	BH509	2.0 (4.45)	Tidal Flat Deposits	1.3 (5.15)	Medium flow
		14.5 (-8.05)	Mercia Mudstone Group	5.2 (1.25)	Fast flow
	BHM4CAN033	0.3 (5.46)	Made Ground	0.1 (5.06)	Water cloudy
Metal Recovery Area	MRTP1	3.0	Made Ground	-	Fast seepage
	MRTP2, MRTP4	2.3	Made Ground	-	Moderate seepage
	MRTP3	1.5	Made Ground	-	Fast seepage
	CATP7	2.2	Made Ground	-	Fast seepage
	CATP8	1.75 (3.90)	Made Ground	-	Fast seepage

Site Area	Location	Strike Depth m bGL (m AOD)	Geological Formation	Level After 20 Minutes m bGL (m AOD)	Remarks
	CATP9	0.5 (5.14)	Made Ground	-	Slow seepage
	CATP10	1.2 (4.18)	Made Ground	-	Fast seepage
	CABH2	1.1 (4.62)	Made Ground	0.8 (4.92)	Moderate inflow
	CABH3	1.3 (4.36)	Made Ground	0.0 (5.66)	
	TP2-6, 8-18 (Jan 2005)	0.85-1.8	Made Ground	-	Free product on water commonly observed
	TP1-6 (Aug 2005)	1.1-2.0	Made Ground	-	Free product on water commonly observed
	BH1-5	1.4-1.7	Made Ground	-	Hydrocarbon odour associated with groundwater
	WS2-10	1.5-1.8	Made Ground	-	Hydrocarbon odour associated with groundwater
	BH06,16 & 20	2.0-3.0	Tidal Flat Deposits	-	
	BH07, 12-15, 17-19, 21	0.9-2.5	Made Ground	-	BH13 Sulphurous odour BH17 Hydrocarbon odour BH21 Sheen on water
	BH510 (off site)	2.0 (3.45)	Tidal Flat Deposits	1.95 (3.4)	
	SBHJ03 CP (off site)	5.2 (0.17)	Tidal Flat Deposits	No rise	Seepage
	BH512	1.7 (4.8)	Made Ground	No rise	Slow flow
		2.0 (4.5)	Made Ground	2.5 (4.0)	
	BHM4CAN035b	14.1 (-7.12)	Mercia Mudstone	9.4 (-2.42)	
	BHM4CAN037	2.6 (-4.17)	Made Ground	2.1 (-4.67)	
		13.7 (-7)	Mercia Mudstone	9.1 (-2.33)	

Site Area	Location	Strike Depth m bGL (m AOD)	Geological Formation	Level After 20 Minutes m bGL (m AOD)	Remarks
	BHM4CAN038a	2 (4.33)	Made Ground	1.7 (4.63)	
		12.8 (-6.47)	Mercia Mudstone	4.8 (1.53)	
	BHM4CAN039	11.3 (-4.11)	Tidal Flat Deposits	10.5 (-3.31)	
	WSM4CAN023	1.6 (5.1)	Made Ground	-	
	TPM4CAN016	2 (4.89)	Made Ground	-	Rapid ingress
	TPM4CAN017	1.7 (5.02)	Made Ground	-	Rapid ingress
	TPM4CAN018	1.6 (5.12)	Made Ground / Tidal Flat Deposits	-	Rapid ingress

7.6.2 Groundwater was not recorded in any other boreholes or trial pits during the previous investigations.

Groundwater Levels During Monitoring Rounds

7.6.3 The entire groundwater level dataset gathered on Site is provided in Appendix 2 and summarised in Table 22.

Table 22: Summary of Groundwater Level Data During Monitoring

Area	Location	Installation[1] Diameter (mm)	Depth of response zone (m bGL) and Geological Formation	No. Measurements	Min Depth (m bGL)	Max Depth (m bGL)
Reedbed No. 1	RBBH7	50	1 – 7 (Made Ground / Peat)	5	0.66	1.1
	RBBH8	50	1 – 7 (Made Ground / Peat)	n/a	n/a	n/a
	RBBH9	50	1 – 7 (Made Ground / TFD / Peat)	5	1.18	1.25
	RBBH10	50	1 – 7 (Made Ground / TFD / Peat)	5	0.68	0.82
	SWSJ08	50	0.3 – 3.3 (Made Ground / TFD)	6	0.37	0.46
	SBHJ01CP	50	5.8 – 7.5 (Peat)	6	1.34	5.98
	BH509	35 (S)	4.3 – 7.7 TFD	4	0.74	2.74
		50 (D)	10.8 – 13.2 TFD	4	1.95	3.74
	BHM4CAN033	50	11.8 - 13 (Mercia Mudstone)	3	0.92	1.33
Metal Recovery Area	SBHJ03CP (off site)	50	3.4 - 5.2 (Peat)	6	0.54	0.82
	BH510 (off site)	35 (S)	3 - 6 Peat	4	0.44	2.28
		50 (D)	9.5 - 12 TFD / MMG	4	0.87	2.7
	BH512	35 (S)	0.85 – 2.1 Made Ground	4	1.3	1.64
		50 (D)	6.8 – 11.2 TFD	4	2.32	3.63
	BHM4CAN035b	50 (S)	1 - 3.7 Made Ground	3	1.7	1.79
		50 (D)	13.1 - 15.9 MMG	3	2.68	2.78
	BHM4CAN036	50	7.5 - 9 TFD	3	2.54	2.98
	BHM4CAN037	50 (S)	1 - 3.4 Made Ground	3	1.51	1.57

Area	Location	Installation[1] Diameter (mm)	Depth of response zone (m bGL) and Geological Formation	No. Measurements	Min Depth (m bGL)	Max Depth (m bGL)
		50 (D)	12.6 - 15.6 MMG	3	2.21	2.42
	BHM4CA N038a	50 (S)	1 - 2.6 Made Ground	3	1.11	1.18
		50 (D)	12 - 13.8 MMG	3	1.96	2.48
	BHM4CA N039	50 (S)	3 - 7 TFD	3	2.52	2.73
		35 (D)	11.3 - 14.3 TFD / MM	3	2.77	2.8
	WSM4CA N023	35	0.3 - 2.3 Made Ground	3	1.41	1.5

Note: (1) S denotes a shallow installation and D denotes deep installation.

Groundwater Summary

7.6.4 The main groundwater body is within the Mercia Mudstone formation which is confined by the overlying Tidal Flat Deposits. The Tidal Flat Deposits represent an aquitard to vertical groundwater flow based upon groundwater level in the Mercia Mudstone Formation aquifer observations during drilling. Monitoring groundwater level data indicate resting level to be shallow at 0.9 to 2.8 m bGL.

7.6.5 Discontinuous perched groundwaters are seen within the Tidal Flat Deposits, particularly associated with peat horizons. These are considered to represent discrete bodies with little vertical or lateral flow. Resting groundwater levels are similar to those identified in the Mercia Mudstone at 0.54 to 5.98 m bGL.

7.6.6 Water bodies were identified by the previous ground investigations within the peripheral bunds (coarse slag Made Ground) and also within the reedbeds of Reedbed No. 1. These are described as seepages to a medium inflow and are likely to be perched water over the underlying cohesive soils of the Tidal Flat Deposits.

7.6.7 Across the Metal Recovery Area, water bodies were identified by the ground investigations within the Made Ground. These are described as moderate to high inflow and are likely to be perched water over the underlying cohesive soils of the Tidal Flat Deposits. Strikes were observed generally between 0.5 and 2.6 m bGL.

7.6.8 Perched water was also identified within the Made Ground during subsequent monitoring. The water levels measured within the Made Ground are greater than water levels within the underlying groundwater baring units. This confirms the perched nature of groundwaters within the Made Ground and demonstrates a perennial, downward vertical hydraulic gradient.

7.6.9 The groundwater conditions encountered are consistent with the hydrogeological conceptual model presented in the Baseline Water Environment Report (Appendix 16.2 in the March 2016 ES).

8 Contamination Assessment

8.1 Introduction

8.1.1 The following sections provide details of the assessment of land contamination at the Site.

8.1.2 The Conceptual Site Model (CSM) presented within the 2014 PSSR has been reviewed and updated based on data from the Supplementary Ground Investigation (Geotechnical Engineering, 2015) and the 2016 Additional Ground investigation. The main alterations to the PSSR model are summarised below.

- New contamination sources identified (perched water body within the Made Ground).
- Additional ground gas source (methane and/or carbon dioxide) considered from Made Ground and TFD including peat.
- Proposed use of band drains to accelerate surcharging of soft soils during construction. These are anticipated to be vertical drains installed in a grid pattern through the Made Ground and underlying Tidal Flat Deposits and to the top of the Mercia Mudstone.
- Piled foundations proposed for the link road junction; and
- Update of the source-pathway-receptor linkages taking account of the above and more detailed assessments.

8.2 Preliminary Risk Assessments

Potential Sources

8.2.1 The Made Ground was identified in the PSSR as a potential source of contamination (slag within the Metal Recovery Area and bunds and sediments in Reedbed No. 1). These sources are confirmed by the new data.

8.2.2 The transient perched water body within the Made Ground is considered to represent a potential contaminant source rather than a receptor.

8.2.3 The Made Ground and organic clays and peat deposits of the TFD may represent a potential source of ground gas. Ground gas flow from the TFD may increase following consolidation associated with the surcharge loading of the embankment.

8.2.4 In addition to the above sources, the quality of surface waters, perched groundwater and the deeper aquifer within the Glaciofluvial Deposits and Mercia Mudstone may influence or impact the quality of the others (for instance the groundwater within the Mercia Mudstone is saline whilst the surface water is not). Surface water, perched groundwater and deeper aquifer are therefore regarded as a possible source of contaminants as well as receptors.

Potential Receptors

8.2.5 The following receptors during the construction and the operational stages of the Scheme have been considered.

Construction

- Construction workers during site development works.
- General public/workers adjacent to construction works.
- Deep groundwater (aquifer) within the Mercia Mudstone.
- Nearby surface waters including the reens and existing surface water ditches bordering the surrounding fields.

Operational

- General public end users, including users of the proposed Glan Llyn Highways Depot.
- General public/workers outside permanent land take (e.g. land tenants of Tata Steel).
- Maintenance workers.
- Deep groundwater (aquifer) within the Mercia Mudstone.
- Nearby surface waters including the reens and existing and/or proposed surface water ditches bordering the surrounding fields.

Potential Pathways

8.2.6 The following pathways during the construction and the operational stages of the Scheme have been considered.

- Dermal contact, ingestion, inhalation pathways of potentially contaminated soils during construction and maintenance works.
- Dermal contact, ingestion, inhalation pathways for general public end users and adjacent general public/workers.
- Contaminated surface water run-off into land drainage surface waters.
- Downward vertical migration of impacted leachate and/or impacted perched water within the Made Ground into the main groundwater bodies.
- Downward vertical migration of impacted leachate and/or impacted perched water within the Made Ground into the main groundwater bodies and subsequent lateral migration to surface waters.
- Vertical or lateral migration of ground gas associated with organic materials in Made Ground and natural soils including peat.
- Creation of new pathways for shallow contamination to migrate along piles and foundations from the Made Ground, through the Tidal Flat Deposits and into Glaciofluvial Deposits and/or Mercia Mudstone.
- Accumulation of ground gas within confined spaces during construction and operational phases.
- Migration of ground gases along band drains/piles.

8.2.7 The groundwater level dataset suggests that upward, vertical migration from the deeper aquifers into Made Ground is not an active pathway within the site.

8.2.8 Although perched water contained within the Made Ground is unlikely to be laterally continuous across the Site, owing to the lithological and depth variability

of this unit across the Site, it has been considered a possible generic pathway for this assessment.

8.3 Risk Evaluation

8.3.1 Source-pathway-receptor linkages were considered in the 2014 PSSR using the historical data available up to 2008. With review of the other data described herein, the following risk evaluation has been reconsidered and included the below.

- The new section of motorway is to be constructed at the Site on an embankment which will act as a barrier reducing pathways to future motorway users and maintenance workers from contaminated soils beneath;
- The motorway embankment will be typically 2.5 to 3 m above the original surrounding ground level through the Reedbed No. 1 area. The junction within the south-eastern corner of the Metal Recovery Area is to be some 14 m above the original ground level.
- Tidal Flat Deposits are classified as non-productive and overlie a secondary aquifer associated with the Mercia Mudstone.
- The low permeability Tidal Flat Deposits separate the Made Ground and aquifer.
- Perched groundwater within the Tidal Flat Deposits is not considered a water resource due to its low to negligible vertical hydraulic connectivity with the aquifer beneath.
- There are no nearby abstractions used for potable water.
- Hardstanding on the motorway will limit infiltration.
- The proposed use of band drains could create pathways from any potentially contaminated soils within or under the motorway embankment to the lower aquifer in the Mercia Mudstone.
- Leachability of contaminants from the Made Ground.
- Presence of free product within perched groundwaters.
- The proposed drainage system may increase leaching of any contaminants from the Made Ground with an associated increase in the risk for migration into surface waters.
- Motorway users will be within an open environment with no proposed structures or other confined spaces.
- Risk of increased flux of ground gas emission due to induced consolidation of the TFD including peat from the proposed surcharge loading.
- The proposed WTA is to receive surface water from the highway and will be lined to prevent downward infiltration. Discharge of waters are to be controlled under a discharge consent and therefore the WTA is neither considered as a source or receptor in this report.
- The Made Ground is to be entirely encapsulated by the hardstanding of the proposed Glan Llyn Depot minimising the risk of all dermal, ingestion and inhalation of soil dust pathways to future site users and visitors. These pathways are therefore dismissed in the Conceptual Site Model.

8.4 Human Health Risk Assessment

8.4.1 The rationale and approach for the human health (Tier 2) screening assessment is detailed in the Land Contamination Assessment Report (Appendix 11.1 of the March 2016 ES). Soil chemical analysis results are presented in Appendix 3. All exceedances to the relevant generic risk assessment criteria are summarised in Tables 23, 24, 25, 26 and 27. For the purposes of this report, Made Ground and natural ground have been considered separately in each Site area.

Reedbed No.1

8.4.2 Exceedances of the soil chemical analysis results within the Reedbed No. 1 to the relevant generic risk assessment criteria are summarised in Tables 23 and 24.

Table 23: Summary of Human Health Soil Screening Exceedances Reedbed No.1 (Made Ground)

Determinant	Units	Range	Screening Criteria	No. Samples Exceeding Screening Criteria (Total Number of Results)	Location of Exceedances
Chromium	mg/kg	5.1 - 761	33	22 (27)	RBBH06, RBBH07 (x2), RBBH08 (x3), RBBH09 (x2), RBBH10, RBTP06, RBTP07, RBTP09, RBTP10, RBTP11, SWSJ01 (x2), SWSJ02, SWSJ03, SWSJ04, SWSJ06B (x2), SWSJ07, SWSJ08 (x2), SBHJ01CP, BH508, BHM4CAN033
pH	pH units	4.93 - 12.8	6-9	15 (27)	RBBH06, RBBH07 (x2), RBBH08 (x3), RBBH09 (x2), RBBH10, SWSJ04, SWSJ07, SWSJ08, SBHJ01CP, BH508, BHM4CAN033
Benzo(b)fluoranthene	mg/kg	<LOD - 42	13	1 (27)	SWSJ06B
Dibenzo(ah)anthracene	mg/kg	<LOD - 3.5	1.1	1 (27)	SWSJ06B

Table 24: Summary of Human Health Soil Screening Exceedances Reedbed No.1 (Natural Ground)

Determinant	Units	Range	Screening Criteria	No. Samples Exceeding Screening Criteria (Total Number of Results)	Location of Exceedances
Chromium	mg/kg	4.7 - 460	33	10 (15)	RBBH05 (x3), RBBH07, RBBH08 (x2), RBBH10, SWSJ02, SWSJ03, SWSJ04, SWSJ05 (x2), SWSJ07, SBHJ01CP, BH508
pH	pH units	7.1 - 11.6	6-9	5 (15)	RBBH07, RBBH08, RBBH10, SBHJ01CP, BH508

8.4.3 The exceedances for pH and chromium identified within the Made Ground cover the predominantly slag material as well as the sediments within the reedbeds.

8.4.4 Elevated alkaline soil conditions have been identified in over half of the samples within the Made Ground, mostly within samples of the coarse slag of the bunds and tracks. Alkaline conditions are also identified within the Tidal Flat Deposits material. Acidic conditions are identified within three of the samples from the sediment within the southern area of Reedbed No. 1.

8.4.5 Although exceedances of chromium are identified throughout the Made Ground (slag material and sediment) and natural soils, the criterion relates to the hexavalent form. Some of the results are considered to be above normal background data range (<95 mg/kg) and therefore may be considered to represent a potential contaminant source. Thirteen of the forty two analyses exceed this background with a maximum concentration of up to 761 mg/kg. It is likely that the elevated chromium concentrations are related to the slag used to construct access roads and from the slag particles within the sediment. A sample of Made Ground obtained from around the southern tip of Reedbed No.1 containing slag materials was tested for hexavalent chromium. Hexavalent chromium of 1.61 mg/kg (total chromium of 761 mg/kg) is well below the screening criterion. Further consideration of chromium is provided in the Land Contamination Assessment Report (Appendix 11.1 of the March 2016 ES).

8.4.6 A single sample of Made Ground (SWSJ06B) was found to have two PAH compounds (benzo(b)fluoranthene and dibenzo(ah)anthracene) marginally in exceedance to the criteria, at 0.1 m bGL. This relates to sediment material within the reedbeds and may represent discrete raised contamination that may require improved delineation. Overall PAH is not considered to pose a significant risk to human health.

8.4.7 All phenols, PCBs and BTEX were at levels below the laboratory limit of detection. VOCs, SVOCs and TPH were identified at low levels and were below the assessment criteria.

8.4.8 No asbestos fibres were detected in the 20 soil samples analysed.

8.4.9 Fifteen samples were collected which targeted the fine Made Ground material within Reedbed No. 1. All samples were taken within the top 1 m and the majority (87 %) are within the top 0.5 m. Considering the sediment within the reedbeds was encountered to 2.4 mbGL, it would be beneficial for the data set to expand on the vertical coverage of the total thickness. It is possible some stratification of the reedbed sediment and thus contamination levels may have occurred to reflect leaching or sedimentation processes as well as alteration to the Steelworks production processes over the years. No obvious trend with depth from those contaminants in exceedance is being identified in the current data set.

Metal Recovery Area

8.4.10 Exceedances of the soil chemical analysis results within the Metal Recovery Area to the relevant generic risk assessment criteria are summarised in Tables 25, 26 and 27.

Table 25: Summary of Human Health Soil Screening Exceedances – Metal Recovery Area (Made Ground)

Determinant	Units	Range	Screening Criteria	No. Samples Exceeding Screening Criteria (Total Number of Results)	Location of Exceedances
Chromium	mg/kg	0.0316 – 1,800	33	42 (43)	CABH02, CABH03 (x2), CATP01 (x2), CATP02 (x2), CATP05, CATP06 (x2), CATP07 (x2), CATP08, CATP09 (x2), CATP10 (x2), MRTP01 (x2), MRTP02 (x2), MRTP03 (x2), MRTP04 (x2), MRTP05, BH511 (x3), BH512 (x4), BHM4CAN036, BHM4CAN037, BHM4CAN038, BHM4CAN039, TPM4CAN016, TPM4CAN017, TPM4CAN018, WSM4CAN023, WSM4CAN024
Nickel	mg/kg	0.0184 – 18,000	980	1 (43)	BH512
TPH	mg/kg	<10 – 29,130	2,000	7 (23)	CATP02, CATP06 (x2), CATP07, CATP08, CATP09 (x2)
pH	pH units	9.4 – 12.9	6-9	42 (42)	CABH02, CABH03 (x2), CATP01 (x2), CATP02 (x2), CATP05, CATP06

Determinant	Units	Range	Screening Criteria	No. Samples Exceeding Screening Criteria (Total Number of Results)	Location of Exceedances
					(x2), CATP07 (x2), CATP08, CATP09 (x2), CATP10 (x2), MRTP01 (x2), MRTP02 (x2), MRTP03 (x2), MRTP04 (x2), MRTP05, BH511 (x3), BH512 (x4), BHM4CAN036, BHM4CAN037, BHM4CAN038, BHM4CAN039, TPM4CAN016, TPM4CAN017, TPM4CAN018, WSM4CAN023, WSM4CAN024

Table 26: Summary of Human Health Soil Screening Exceedances – Metal Recovery Area (Natural Ground)

Determinant	Units	Range	Screening Criteria	No. Samples Exceeding Screening Criteria (Total Number of Results)	Location of Exceedances
Chromium	mg/kg	3.8 – 55	33	10 (16)	CABH01, CABH02, CABH03 (x2), CATP01, CATP05, CATP07, CATP010, MRTP03, MRTP04
pH	pH units	7.5 – 11.4	6-9	9 (16)	CABH01, CABH02, CABH03 (x2), CATP01, CATP05 (x2), CATP10, MRTP03

Table 27: Summary of Human Health Soil Screening Exceedances – Metal Recovery Area (Unknown strata)

Determinant	Units	Range	Screening Criteria	No. Samples Exceeding Screening Criteria (Total Number of Results)	Location of Exceedances
Chromium	mg/kg	30 – 432	33	3 (4)	CATP03, CATP04 (x2)
pH	pH units	8.9 – 12.9	6-9	3 (4)	CATP03, CATP04 (x2)

8.4.11 Elevated alkaline soil conditions have been identified within all samples taken from the Made Ground. Alkaline conditions are also identified within the Tidal Flat Deposits, with over half of samples exceeding the screening criteria of pH 9.

8.4.12 As per the Reedbed No.1 area a further six samples of Made Ground were tested for hexavalent chromium. All results were reported at <LOD indicating chromium concentrations are presented in a less toxic form. Further consideration of chromium is provided in the Land Contamination Assessment Report (Appendix 11.1 of the March 2016 ES).

8.4.13 A single sample of Made Ground at BH512 (0.3 to 0.5 m bGL) was found to have a nickel concentration in exceedance of the screening criteria by an order of magnitude. No exceedances were identified in samples taken in the Made Ground at greater depths at this location, or within nearby BH511. Overall nickel is not considered to pose a significant risk to human health across the Site.

8.4.14 Exceedances of TPH were encountered in approximately one third of the Made Ground samples analysed. These are specific to the former defragmentation area of the Site where the Glan Llyn Depot is proposed. Due to the un-speciated nature of the analytical data obtained in this area, the most stringent TPH criterion has been used (2,000 mg/kg for aliphatic >C8-C10). Whilst this is considered a conservative approach, the presence of hydrocarbon was widely identified within the exploratory records.

8.4.15 Whilst presence of hydrocarbon is identified within the shallow natural soils, these remain below the screening criteria and are of lower magnitude to concentrations seen in the Made Ground. This strongly suggests limited penetration of the contaminant into the Tidal Flat Deposits which is thus acting as a barrier to vertical migration to the deep soils and the aquifer.

8.4.16 The absence of speciation prevents detailed identification of the specific hydrocarbon type, although on the basis of the exploratory records, it is anticipated to be a heavy oil or weathered diesel product. In either case, these would be of mid to heavy carbon range, the lesser mobile and volatile types. Speciated TPH of analytical results of groundwater samples (see Section 8.5) have identified predominance in the carbon range C12 to C35 to be present and it is reasonable to assume the hydrocarbon in soils are similar.

8.4.17 Samples taken from trial pits CATP03 and CATP04 have been considered separately as no field logs are available to confirm if these are from Made Ground or from natural strata and from which depth. It is considered from review of the data, and comparison of the Made Ground and natural strata datasets, that the exceedances within the three soil samples described above are likely to represent samples taken from within the Made Ground, between 0.5 and 1.6 m bGL.

8.4.18 No other exceedances of the assessment criteria were identified.

8.4.19 PCBs are at levels below the laboratory limit of detection, although the analysis relates to soil samples within the area of proposed Water Treatment Area with no analysis within the proposed Glan Llyn Depot.

8.4.20 Full extent of hydrocarbon contamination has not been confirmed, although its extent is not anticipated to impact the main alignment running south of the Site and across its eastern boundary.

8.4.21 Some VOCs are identified above laboratory limit of detection although no screening criteria are available. These were benzene and toluene related compounds with maximum concentration of 5.14 mg/kg (1.4.4-trimethylbenzene). These are considered to represent a low risk to human health given the low concentrations. Whilst all maximum concentrations relate to CATP08 (also has the highest TPH concentration), it is noted the data set is very limited and includes for three samples only.

8.4.22 Fibres of chrysotile were detected in two samples of the nineteen analysed, both were from within Made Ground inBHM4CAN039 located on the northern edge of the proposed Glan Llyn link road. Further quantification of the deeper soil sample identified fibres at <0.001 %.

8.5 Controlled Waters Screening Assessment

8.5.1 The rationale and approach for the controlled waters (Tier 1) screening assessment is detailed in the Land Contamination Assessment Report (Appendix 11.1 of the March 2016 ES) and the groundwater chemical results are presented in Appendix 4, surface water chemical results in Appendix 5 and leachate chemical results in Appendix 6 of this CL report. All exceedances to the relevant criteria are summarised in Tables 28 and 29 for soil leachate, Tables 30 and 31 for groundwater and Table 32 for surface waters.

8.5.2 Where an Environmental Quality Standard (EQS) is dependent on water hardness, i.e. heavy metals, the hardness of the surface water receptor would normally be used. The Baseline Water Environment Report (Appendix 16.2 of the March 2016 ES) indicates surface water to be generally moderately hard with hardness in a range of 100 to 150 mg/l as calcium carbonate. Therefore EQSs within this water hardness range have been used for screening purposes.

Soil Leachate Results

Reedbed No. 1

8.5.3 Nine soil samples from the Made Ground and two from the Tidal Flat Deposits were subjected to leachate analysis. Soil leachate results from the Tidal Flat Deposits were all below the applied screening criteria. Exceedances of the contaminants summarised in Table 28 were observed within the Made Ground.

Table 28: Controlled Waters Screening Exceedances – Reedbed No. 1 Soil Leachate

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location (formation)	No. Exceeded DWS Screening Criteria (Total Number of Results)	Location (Formation)
Chromium	µg/l	<1 - 94	-	50	-	-	1 (11)	BHM4CAN033 (Made Ground)

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location (formation)	No. Exceeded DWS Screening Criteria (Total Number of Results)	Location (Formation)
Chromium VI	µg/l	97.9	3.4	-	1 (1)	BHM4CAN033 (Made Ground)	-	-
Cadmium	µg/l	<0.08 - 1.2	0.15	5	1 (11)	SWSJ01 (Made Ground)	-	-
Copper	µg/l	<1-18	6	2,000	1 (11)	SBHJ01CP (Made Ground)	-	-
Iron	µg/l	<5-3700	1000	200	1 (9)	SWSJ01 (Made Ground)	2 (9)	SWSJ01 (Made Ground)
Nickel	µg/l	<1-11	4	20	3 (11)	SBHJ01CP, SWSJ01 (Made Ground)	-	-
Lead	µg/l	<1-4	1.2	10	2 (11)	SWSJ01, SWSJ07 (Made Ground)	-	-
Selenium	µg/l	<1-18	-	10	-	-	1 (11)	SWSJ01 (Made Ground)
Total Cyanide	µg/l	<0.05-9.4	0.001	0.05	4 (9)	SWSJ01, SWSJ02, SWSJ07 (Made Ground)	4 (9)	SWSJ01, SWSJ02, SWSJ07 (Made Ground)
pH	pH units	8.6 - 12	6-9	6.5-10	1 (2)	BHM4CAN033 (Made Ground)	1 (2)	BHM4CAN033 (Made Ground)

8.5.4 The leaching analysis of Made Ground indicates that some metals are leachable such that concentrations exceeded EQSs on a limited number of samples. The leachable concentrations exceeding EQSs are generally associated with the coarse slag forming the reedbed bunds/tracks rather than the sediments within the reedbeds. Surface water sampling has identified similar concentrations, particularly for cadmium, copper, lead and nickel which indicates a possible impact to surface water quality and pathway linkages from the Made Ground to surface waters.

8.5.5 The exceedance of DWS by selenium and chromium is not considered a contaminant source as there are no potable water supplies at or near the Site as the groundwater is saline.

8.5.6 The laboratory detection levels for leaching tests for cadmium, mercury and cyanide, phenols and several PAH are higher than the screening criterion for some tests. However it is considered unlikely that these potential contaminants would cause a risk to controlled waters given the low concentrations. Notwithstanding this, future surface water monitoring programmes should include these parameters.

Metal Recovery Area

8.5.7 Nine soil samples from the Made Ground and two from the Tidal Flat Deposits were subjected to leachate analysis. The majority of the soil leachate results were all below the screening criteria, with the exception of the contaminants summarised in Table 29 below.

Table 29: Controlled Waters Screening Exceedances – Metal Recovery Area Soil Leachate

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location (Formation)	No. Exceeded DWS Screening Criteria (Total Number of Results)	Location (Formation)
Ammoniacal Nitrogen as N	mg/l	0.2-1.1	0.6	-	1 (5)	CATP10 (TFD)	-	-
Iron	µg/l	<10-220	1000	200	-	-	1 (7)	CATP10 (TFD)
Nickel	µg/l	<1-9.02	4	20	4 (11)	MRTP02 (Made Ground), TPM4CAN016 (MG), TPM4CAN017 (MG), WSM4CAN023 (MG)	-	-
Lead	µg/l	<1-5.84	1.2	10	6 (11)	CATP08, MRTP02 (Made Ground), BHM4CAN039 (MG), TPM4CAN016 (MG), TPM4CAN017 (MG), WSM4CAN023 (MG)	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location (Formation)	No. Exceeded DWS Screening Criteria (Total Number of Results)	Location (Formation)
Selenium	µg/l	<0.39-46	-	10	-	-	1 (11)	MRTP02 (Made Ground)
pH	pH units	8.8-12.9	6-9	6.5-10	9 (11)	CATP008 (MG), MRTP02 (MG), MRTP03 (Made Ground) , BHM4CAN037 (MG), BHM4CAN039 (MG), TPM4CAN016 (MG), TPM4CAN017 (MG), WSM4CAN023 (MG), MRTP03 (TFD)	8 (11)	CATP008 (MG), MRTP02, MRTP03 (Made Ground), BHM4CAN037 (MG), BHM4CAN039 (MG), TPM4CAN016 (MG), TPM4CAN017 (MG), WSM4CAN023 (MG)
Anthracene	µg/l	<0.1 - 0.117	0.1	-	2 (6)	BHM4CAN039, TPM4CAN017 (MG)	-	-
Benzo(b)fluoranthene	µg/l	<0.23 - 0.0491	0.017	0.1	4 (6)	BHM4CAN037, TPM4CAN016, TPM4CAN017, WSM4CAN023 (MG)	0 (6)	-
Fluoranthene	µg/l	<0.1 - 2.63	0.0063	-	5 (6)	BHM4CAN037, BHM4CAN039, TPM4CAN016, TPM4CAN017, WSM4CAN023 (MG)	-	-

Note: TFD – Tidal Flat Deposits, MG - Made Ground

8.5.8 The leachability of contaminants seen in the Metal Recovery area is similar to that identified in the Reedbed No.1 and therefore similar conclusions may be drawn albeit elevated cadmium, chromium, copper and total cyanide above screening criteria were not observed.

8.5.9 Whilst of the eleven samples analysed, only one pH test was undertaken which was not above screening criteria it is possible for leachable alkaline pH to be present in leachate from the Tidal Flat Deposits.

8.5.10 Leachable PAH compounds were detected above the EQS in a number of locations within the proposed Glan Llyn link road.

8.6 Groundwater Results

Reedbed No. 1

8.6.1 Groundwater analysis results have been assessed for samples collected from the Reedbed No.1 area which includes data from monitoring rounds undertaken in 2002, 2008, 2015 and 2016. All groundwater samples were taken from the perched water within the Made Ground, Tidal Flat Deposits or the Mercia Mudstone at the Site. Samples are predominantly from monitoring well response zones which span the boundary between the Made Ground and Tidal Flat Deposits. Only two boreholes (BH509 and SBHJ01) are installed with response zones which solely target perched groundwater within natural ground and one borehole (BHM4CAN033) targeting the deeper aquifer.

8.6.2 A summary of the exceedances of the assessment criteria from all available groundwater results relating to the Site is presented in Table 30.

Table 30: Controlled Waters Screening Exceedances – Reedbed No. 1 Groundwater

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Perched Water: Made Ground/Tidal Flat Deposits								
Cadmium	µg/l	<1-1	0.15	5	1 (3)	RBBH10	-	-
Copper	µg/l	1-66	10	2000	8 (25)	RBBH07 (x2), RBBH08 (x4), RBBH09 (x2)	-	-
Iron	µg/l	<10-860	1000	200	-	-	2 (26)	SWSJ08 (x2)
Lead	µg/l	<0.4-8	1.2	10	5 (26)	RBBH07 (x3), RBBH08 (x2)	-	-
Manganese	µg/l	<1-2,100	30	50	3 (11)	RBBH10, SWSJ08 (x2)	2 (11)	SWSJ08 (x2)
Mercury	µg/l	<0.1-0.4	0.07	1	2 (3)	RBBH07, RBBH10	-	-
Nickel	µg/l	2-22	4	20	20 (26)	RBBH06, RBBH07 (x6), RBBH08 (x4), RBBH09 (x5), RBBH10 (x2), SWSJ08 (x2)	1 (26)	SWSJ08
Selenium	µg/l	<1-15	-	10	-	-	4 (26)	RBBH07 (x2), RBBH08, RBBH09
Cadmium	µg/l	<0.1-9.7	0.15	5	4 (23)	RBBH07 (x2), SWSJ08 (x2)	2 (23)	SWSJ08 (x2)
Zinc	µg/l	3-950	75	-	6 (23)	RBBH07, RBBH09, RBBH10 (x2), SWSJ08 (x2)	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Mercury	µg/l	<0.01-0.1	0.07	1	1 (23)	SWSJ08	-	-
BOD	mg/l	<1-26	5	-	3 (8)	RBBH07, RBBH09, RBBH10	-	-
Sodium	mg/l	0.4-240	-	200	-	-	2 (16)	SWSJ08 (x2)
Sulphate	mg/l	0.1-1,200	400	250	4 (26)	RBBH07, RBBH10, SWSJ08	7 (26)	RBBH07 (x2), RBBH10 (x3), SWSJ08 (x2)
Chloride	mg/l	0.4-932	250	250	1 (19)	RBBH08	1 (19)	RBBH08
Ammoniacal Nitrogen as N	mg/l	0.4-30.1	0.6	-	22 (23)	RBBH06 (x3), RBBH07 (x5), RBBH08 (x2), RBBH09 (x5), RBBH10 (x5), SWSJ08 (x2)	-	-
Total Ammonium as NH_4	mg/l	1.8	-	0.5	-	-	1 (1)	SWSJ08
Total Cyanide	mg/l	<0.05-0.78	0.001	0.05	6 (23)	RBBH08, RBBH09 (x3), SWSJ08 (x2)	6 (23)	RBBH08, RBBH09 (x3), SWSJ08 (x2)
pH	pH units	7.02-13.1	6-9	6.5-10	23 (26)	RBBH06 (x2), RBBH07 (x6), RBBH08 (x4), RBBH09 (x5), RBBH10 (x6)	22 (26)	RBBH06 (x2), RBBH07 (x6), RBBH08 (x4), RBBH09 (x5, RBBH10 (x5)
4-Methylphenol	µg/l	<1-1,300	100	-	1 (8)	RBBH07	-	-
Phenol	µg/l	<1-36,000	7.7	-	4 (8)	RBBH07 (x2), RBBH09 (x2)	-	-
Anthracene	µg/l	<1-0.3	0.1	-	2 (15)	RBBH07, RBBH08	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Fluoranthene	µg/l	<1-0.156	0.0063	-	2 (15)	RBBH07, RBBH08	-	-
Naphthalene	µg/l	<1-2,200	2	-	6 (15)	RBBH07 (x4), RBBH08, RBBH10	-	-
Bis(2-ethylhexyl) phthalate	µg/l	<2-4,200	1.3	-	3 (8)	RBBH07 (x2), SWSJ08	-	-
Benzene	µg/l	<1-4	10	1	-	-	1 (10)	RBBH08
Perched Groundwater: Tidal Flat Deposits								
Arsenic	µg/l	12-77	50	10	2 (8)	BH509 Deep (x2)	8 (8)	SBHJ01 (x2), BH509 Deep (x3), BH509 Shallow (x3)
Boron	µg/l	350-1,300	2000	1000	-	-	1 (6)	BH509 Shallow
Chromium	µg/l	18-310	-	50	-	-	6 (8)	BH509 Deep (x3), BH509 Shallow (x3)
Copper	µg/l	2.6-330	10	2000	6 (8)	BH509 Deep (x3), BH509 Shallow (x3)	-	-
Iron	µg/l	470-5,400	1000	200	1 (2)	SBHJ01	2 (2)	SBHJ01 (x2)
Lead	µg/l	1.2-6.5	1.2	10	1 (8)	SBHJ01	-	-
Manganese	µg/l	1,300-1,600	30	50	2 (2)	SBHJ01 (x2)	2 (2)	SBHJ01 (x2)
Mercury	µg/l	<0.5-0.5	0.07	1	1 (6)	BH509 Deep	-	-
Nickel	µg/l	5.2-13	4	20	8 (8)	SBHJ01 (x2), BH509 Deep (x3), BH509 Shallow	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Selenium	µg/l	25-120	-	10	-	-	8 (8)	SBHJ01 (x2), BH509 Deep (x3), BH509 Shallow (x3)
Cadmium	µg/l	5.1-40	0.15	5	2 (2)	SBHJ01 (x2)	2 (2)	SBHJ01 (x2)
Zinc	µg/l	4.6-4,400	75	-	2 (8)	SBHJ01 (x2)	-	-
BOD	mg/l	5-8	5	-	1 (2)	SBHJ01	-	-
Sodium	mg/l	2,700-2,900	-	200	-	-	2 (2)	SBHJ01 (x2)
Sulphate	mg/l	180-460	400	250	1 (2)	SBHJ01	1 (2)	SBHJ01
Chloride	mg/l	220-6,200	250	250	7 (8)	SBHJ01 (x2), BH509 Deep (x3), BH509 Shallow	7 (8)	SBHJ01 (x2), BH509 (x5)
Ammoniacal Nitrogen as N	mg/l	3.9-33	0.6	-	8 (8)	SBHJ01 (x2), BH509 Deep (x3), BH509 Shallow (x3)	-	-
Total Ammonium as NH_4	mg/l	19	-	0.5	-	-	1 (1)	SBHJ01
Phenols	mg/l	<0.03-0.12	0.0077	-	2 (6)	BH509 Shallow (x2)	-	-
Aquifer : Mercia Mudstone								
Arsenic	µg/l	28.2 - 60.1	50	10	1 (3)	BHM4CAN033	3 (3)	BHM4CAN033 (x3)
Cadmium	µg/l	<0.1 - 0.598	0.15	5	2 (3)	BHM4CAN033 (x2)	0 (3)	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Lead	µg/l	0.925 - 1.6	1.2	10	1 (3)	BHM4CAN033	0 (3)	-
Nickel	µg/l	8.68 - 15	4	20	3 (3)	BHM4CAN033 (x3)	0 (3)	-
Selenium	µg/l	21.7 - 26	-	10	-	-	3 (3)	BHM4CAN033 (x3)
Chloride	mg/l	2170 - 2410	250	250	3 (3)	BHM4CAN033 (x3)	3 (3)	BHM4CAN033 (x3)
Ammoniacal Nitrogen as N	mg/l	19.8 - 21	0.6	-	3 (3)	BHM4CAN033 (x3)	-	-
Benzo(a)pyrene	µg/l	<0.009 - 0.0167	0.00017	0.01	2 (3)	BHM4CAN033 (x2)	2 (3)	BHM4CAN033 (x2)
Benzo(b)fluoranthene	µg/l	<0.023 - 0.0234	0.017	0.1	2 (3)	BHM4CAN033 (x2)	0 (3)	-
Benzo(ghi)perylene	µg/l	0.0162 - 0.0743	0.0082	0.1	3 (3)	BHM4CAN033 (x3)	0 (3)	-
Fluoranthene	µg/l	<0.017 - 0.0393	0.063	-	2 (3)	BHM4CAN033 (x2)	0 (3)	-
Bis(2-ethylhexyl)phthalate	µg/l	<2 - 4.21	1.3	-	1 (3)	BHM4CAN033	0 (3)	-

8.6.3 Within the perched waters of the Made Ground/Tidal Flat Deposits exceedances of the EQSs of dissolved metals cadmium, copper, lead, manganese, mercury and in particular nickel are observed across the Site. Exceedances of total cadmium, mercury and zinc are also observed where total concentrations have been are compared against EQS values which used dissolved concentrations and this is therefore considered a conservative approach.

8.6.4 Dissolved manganese concentrations within SWSJ08 are seen to exceed the EQS by up to 700 times.

8.6.5 Certain inorganic parameters are seen to exceed screening criteria, including Biological Oxygen Demand (BOD), sulphate, chloride, ammoniacal nitrogen and cyanide.

8.6.6 The majority of samples were found to be alkaline, with values ranging between pH 7.02 and 13.1. Twenty three of twenty six samples exceed the EQS of pH 9 indicating the perched water is alkaline.

8.6.7 Certain PAH compounds (anthracene, fluoranthene and napthalene) and VOCs (bis(2-ethylhexyl) phthalate) are found to exceed the EQS in both the northern and southern areas of the Site, in RBBH07, RBBH08, RBBH10 and SWSJ08.

8.6.8 Phenols are observed to be present within six of the eight samples analysed, particularly within RBBH07 in which a phenol concentration of 36 mg/l is recorded.

8.6.9 Certain laboratory detection limits for mercury, lead, cyanide, some PAHs, VOCs and SVOCs are higher than the screening criterion within the data set.

8.6.10 Samples taken from perched water within the Made Ground and Tidal Flat Deposits gave exceedances of iron, manganese, nickel, selenium, cadmium (total), sodium, sulphate, chloride, cyanide, total ammonium, pH and benzene when considering DWS criteria. These exceedances by themselves are not considered to represent contaminant sources, as there are no potable water supplies at or near the Site, and the groundwater is expected to be saline.

8.6.11 Perched groundwater data is available from two boreholes (SBHJ01 CP and BH509), both located on the bund/track beyond the southern extent of the southern reedbed area. Exceedances of most parameters observed within the Made Ground/Tidal Flat Deposits are also observed from samples taken from perched water within the Tidal Flat Deposits alone. The main difference seen in the water quality is a more neutral pH and a more noticeable high chloride concentration (likely to be associated with saline intrusion) in the Tidal Flat Deposits perched waters.

8.6.12 Samples taken from perched water within Tidal Flat Deposits alone gave exceedances of arsenic, boron, chromium, iron, manganese, selenium, cadmium (total), sodium, sulphate, chloride and total ammonium when considering DWS criteria. These exceedances by themselves are not considered to represent contaminant sources, as there are no potable water supplies at or near the Site, and the groundwater is expected to be saline.

8.6.13 From the eight water samples from the Made Ground/Tidal Flat Deposits, three gave TPH concentrations above the laboratory limit of detection, ranging from 0.6 to 1.1 mg/l (maximum in RBBH08, in 2002). Total aliphatic TPH was identified

above the limit of detection within one sample (maximum of 0.12 mg/l within RBBH07, in 2008).

8.6.14 From the eight water samples from the Tidal Flat Deposits alone, two gave TPH concentrations above the laboratory limit of detection, ranging from 0.16 to 0.34 mg/l (maximum in BH509 shallow, in 2015 round 3).

8.6.15 The data suggests that the perched water in the Made Ground has hydraulic connectivity to the perched water within the Tidal Flat Deposits. A possible linkage between soil and perched water quality within the Made Ground is identified when considering the leachate data.

8.6.16 Groundwater aquifer data are available from one borehole (BHM4CAN033) located on the bund/track beyond the south western extent of the southern reedbed. Exceedance of most parameters observed within the Mercia Mudstone can also be observed within perched waters of the Made Ground/Tidal Flat Deposits and the Tidal Flat Deposits alone. A more neutral pH and greater chloride concentration is consistent with the water quality observed for the perched waters of the Tidal Flat Deposits.

8.6.17 Similar to perched waters within the Made Ground/Tidal Flat Deposits certain PAH compounds (benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)preylene and fluoranthene) and VOCs (bis(2-ethylhexyl) phthalate) are found to exceed the EQS in the southern area of the Site.

8.6.18 A possible linkage between the perched waters and the deeper aquifer is identified albeit with generally lower concentrations of contaminants observed within the deeper aquifer demonstrating the low permeability of the Tidal Flat deposits likely acting as an aquitard to downward migration of contaminants.

Metal Recovery Area

8.6.19 The groundwater results for the Metal Recovery Area include a number of rounds of groundwater monitoring undertaken in 2002, 2005, 2008, 2015 and 2016. Samples are predominantly from response zones which span the boundary between the Made Ground and Tidal Flat Deposits. Ten boreholes are installed within response zones (CABH02, CABH03, BH13, BH14, BH15, BH512, BHM4CAN035B(S), BHM4CAN037(S), BHM4CAN038A(S) and WSM4CAN023) which solely target perched water within Made Ground, and seven (CABH01, BH16, SBHJ03, BH510, BH512, BHM4CAN036 and BHM4CAN039(S)) target Tidal Flat Deposits. Two boreholes BHM4CAN039(D) and off site borehole (BH510) installations target the zone between the Tidal Flat Deposits and Mercia Mudstone Group with three further borehole installations (BHM4CAN035B(D), BHM4CAN037(D) and BHM4CAN038A(D)) targeting the Mercia Mudstone.

8.6.20 The summary of the exceedances of the applied assessment criteria is presented in Table 31.

Table 31: Controlled Waters Screening Exceedances – Metal Recovery Area Groundwater

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Perched Water: Made Ground								
Arsenic	µg/l	0.829 - 50.8	50	10	1 (17)	BHM4CAN035b	2 (17)	BHM4CAN035b, BHM4CAN037
Cadmium	µg/l	<0.1 - 2.21	0.15	5	4 (17)	BHM4CAN035b (x2), BHM4CAN037, BHM4CAN038a	0 (17)	-
Copper	µg/l	<1 - 31.8	10	2000	5 (17)	BHM4CAN035b (x3), BHM4CAN038a, WSM4CAN023	0 (17)	0
Lead	µg/l	<1 - 3.29	1.2	10	6 (17)	BHM4CAN035b (x2), BHM4CAN038a, WSM4CAN023	0 (17)	-
Nickel	µg/l	5-27.7	4	20	14 (17)	CABH02 (x3)	4 (17)	BHM4CAN035b, BHM4CAN038a (x3)
Selenium	µg/l	5-21.7	-	10	-	-	5 (17)	CABH02, BHM4CAN035b, BHM4CAN037, BHM4CAN038a (x2)

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Zinc	µg/l	7-198	75	-	1 (17)	CABH02	-	-
Chloride	µg/l	13.8 - 360	250	250	1 (14)	BHM4CAN035b	1 (14)	BHM4CAN035b
Ammoniacal Nitrogen as N	mg/l	2.1-33	0.6	-	14 (15)	CABH02 (x3), BHM4CAN035b (x3), BHM4CAN037 (x2), BHM4CAN038a (x3), WSM4CAN023 (x3)	-	-
Phenols	mg/l	0.00833-0.2	0.0077	-	12 (15)	CABH02 (x3), BHM4CAN035b (x2), BHM4CAN037, BHM4CAN038a (x3), WSM4CAN023 (x3)	-	-
Anthracene	µg/l	<0.05 - 2.26	0.1	-	9 (15)	BHM4CAN035b (x3), BHM4CAN037 (x3), WSM4CAN023 (x3)	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Benzo(a)pyrene	µg/l	<0.05 -30.3	0.00017	0.01	9 (15)	BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN038a, WSM4CAN023 (x2)	9 (15)	BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN038a, WSM4CAN023 (x2)
Benzo(b)fluoranthene	µg/l	<0.05 - 40.6	0.017	0.1	9 (15)	BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN038a, WSM4CAN023 (x2)	8 (15)	BHM4CAN035b (x3), BHM4CAN037 (x2), BHM4CAN038a, WSM4CAN023
Benzo(ghi)perylene	µg/l	<0.016 - 21.2	0.0082	0.1	9 (15)	BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN038a, WSM4CAN023 (x2)	6 (15)	BHM4CAN035b (x3), BHM4CAN037 (x2), BHM4CAN038a
Benzo(k)fluoranthene	µg/l	<0.027 - 15.8	0.017	0.1	9 (15)	BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN038a, WSM4CAN023 (x2)	6 (15)	BHM4CAN035b (x3), BHM4CAN037 (x2), BHM4CAN038a,

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Indeno(123-cd)pyrene	µg/l	<0.014 - 17.9	-	0.1	-	-	6 (15)	BHM4CAN035b (x3), BHM4CAN037 (x2), BHM4CAN038a,
Fluoranthene	µg/l	<0.05-21.6	0.0063	-	13 (15)	BH14, BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN038a (x3), WSM4CAN023 (x3)	-	-
Naphthalene	µg/l	<0.05-2,909	2	-	5 (16)	CABH02, BHM4CAN035b, BHM4CAN037 (x3),	-	-
pH	pH units	11.8-12.8	6-9	-	15 (15)	CABH02 (x3), BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN038a (x3), WSM4CAN023 (x3)	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Bis(2-ethylhexyl)phthalate	µg/l	<2 - 62.9	1.3	-	5 (12)	BHM4CAN035b (x2), BHM4CAN037 (x2), BHM4CAN038a	-	-
Perched Water: Made Ground/Tidal Flat Deposits								
Selenium	µg/l	7-15	-	10	-	-	1 (2)	CABH03
Ammoniacal Nitrogen as N	mg/l	1.5	0.6	-	2 (2)	CABH03 (x2)	-	-
Phenols	mg/l	0.12-0.19	0.0077	-	2 (2)	CABH03 (x2)	-	-
Benzene	µg/l	<5-2	10	1	-	-	1 (2)	CABH03
m&p xylene	µg/l	28-45	30	-	1 (2)	CABH03	-	-
o xylene	µg/l	21-35	30	-	1 (2)	CABH03	-	-
Anthracene	µg/l	0.098-18.865	0.1	-	3 (12)	BH17, BH18, BH20	-	-
Benzo(a) pyrene	µg/l	<0.05-0.129	0.00017	0.01	1 (12)	BH6	1 (12)	BH6
Benzo(b) fluoranthene	µg/l	<0.05-0.145	0.017	0.1	1 (12)	BH6	1 (12)	BH6
Benzo(ghi) perylene	µg/l	<0.05-0.19	0.0082	0.1	1 (12)	BH6	1 (12)	BH6

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Benzo(k) fluoranthene	µg/l	<0.05-0.077	0.017	0.1	1 (12)	BH6	-	-
Fluoranthene	µg/l	0.051-33.836	0.0063	-	12 (12)	CABH03, BH4, BH6, BH7, BH8, BH9, BH12, BH17, BH18, BH19, BH20, BH21	-	-
Indeno(123cd)pyrene	µg/l	<0.05-0.222	-	0.1	-	-	1 (12)	
Naphthalene	µg/l	<0.05-787.015	2	-	8 (12)	CABH03 (x2), BH4, BH7, BH9, BH18, BH20, BH21	-	-
Trichloro-ethene	µg/l	9-11	10	10	1 (2)	CABH03	1 (2)	CABH03
pH	pH units	12.5-12.6	6-9	-	2 (2)	CABH03 (x2)	-	-
Perched groundwater: Tidal Flat Deposits								
Arsenic	µg/l	<1 - 22	50	10	0 (18)	-	4 (18)	BH510 (x2), BHM4CAN036 (x2)
Cadmium	µg/l	<0.1 - 18	0.15	5	5 (18)	SBHJ03 (x2), BHM4CAN036 (x2), BHM4CAN039	1 (18)	SBHJ03
Boron	µg/l	84-2,300	2000	1000	1 (10)	BH510	4 (10)	CABH01, BH512 Deep, BH512 (x2)

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Chromium (Dissolved)	µg/l	5-58	-	50	-	-	3 (18)	CABH01, BH510, BHM4CAN036
Copper (Dissolved)	µg/l	<0.1 - 39	10	2,000	2 (18)	BH510 (x2)	0 (18)	-
Lead	µg/l	<0.4 - 5.52	1.2	10	1 (18)	BHM4CAN036	0 (18)	-
Iron	µg/l	210-7,700	1000	200	2 (6)	SBHJ03 (x2)	6 (6)	CABH01 (x4), SBHJ03 (x2)
Manganese	µg/l	850-2,750	30	50	6 (6)	CABH01 (x4), SBHJ03 (x2)	6 (6)	CABH01 (x4), SBHJ03 (x2)
Nickel	µg/l	<1-56	4	20	10 (18)	CABH01 (x3), BH512 Deep, BH510, BHM4CAN039 (x2), BHM4CAN036 (x3)	1 (18)	CABH01
Selenium	µg/l	4-32.3	-	10	-	-	7 (18)	CABH01, BH510 (X2), BHM4CAN036 (x3), BHM4CAN039
Zinc	µg/l	1.7-1,800	75	-	2 (18)	SBHJ03 (x2)	-	-
BOD	mg/l	56-78	5	-	2 (2)	SBHJ03 (x2)	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Sodium	mg/l	15-1,600	-	200	-	-	4 (5)	CABH01 (x3), SBHJ03
Chloride	mg/l	370-2,540	250	250	12 (15)	CABH01 (x4), SBHJ03 (x2), BH512 Deep (x3), BHM4CAN036 (x3)	12 (15)	CABH01 (x4), SBHJ03 (x2), BH512 Deep (x3), BHM4CAN036 (x3)
Ammoniacal Nitrogen as N	mg/l	2.9-24.8	0.6	-	14 (14)	CABH01 (x3), SBHJ03 (x2), BH512 Deep (x3), BHM4CAN036 (x3), BHM4CAN039 (x3)	-	-
Total Ammonium as NH4	mg/l	21	-	0.5	-	-	1 (1)	SBHJ03
Anthracene	µg/l	<0.015 - 1.26	0.1	-	1 (18)	BHM4CAN036	-	-
Benzo(a)pyrene	µg/l	<0.05 -32.9	0.00017	0.01	6 (18)	BHM4CAN036 (x3), BHM4CAN039 (x3)	5 (18)	BHM4CAN036 (x3), BHM4CAN039 (x2)
Benzo(b)fluoranthene	µg/l	<0.05 -40.6	0.0017	0.1	5 (18)	BHM4CAN036 (x3), BHM4CAN039 (x2)	5 (18)	BHM4CAN036 (x3), BHM4CAN039 (x2)

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Benzo(ghi)perylene	µg/l	<0.05 - 25	0.0082	0.1	5 (18)	BHM4CAN036 (x3), BHM4CAN039 (x2)	4 (18)	BHM4CAN036 (x3), BHM4CAN039
Benzo(k)fluoranthene	µg/l	<0.05 - 16.8	0.0017	0.1	5 (18)	BHM4CAN036 (x3), BHM4CAN039 (x2)	3 (18)	BHM4CAN036 (x2), BHM4CAN039
Fluoranthene	µg/l	<0.1 - 13.9	0.0063	-	6 (18)	BHM4CAN036 (x3), BHM4CAN039 (x3)	-	-
Indeno(123-cd)pyrene	µg/l	<0.014 - 18.5	-	0.1	-	-	4 (18)	BHM4CAN036 (x3), BHM4CAN039
Naphthalene	µg/l	<0.01-32	2	-	1 (18)	CABH01	-	-
Bis(2-ethylhexyl)phthalate	µg/l	<2 - 194	1.3	-	3 (6)	BHM4CAN036, BHM4CAN039 (x2)	-	-
Groundwater: Mercia Mudstone Group								
Arsenic	µg/l	2.09 -- 43	50	10	0 (15)	-	10 (15)	BH510 (x3), BHM4CAN039, BHM4CAN037 (x3), BHM4CAN035b (x2)

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Cadmium	µg/l	<0.08 - 3.59	0.15	5	6 (15)	BHM4CAN039, BHM4CAN037 (x3), BHM4CAN035b (x2)	0 (15)	-
Chromium	µg/l	56 - 120	-	50	-	-	3 (15)	BH510 (x3)
Copper	µg/l	24 - 150	10	2,000	3 (15)	BH510 (x3)	0 (15)	-
Lead	µg/l	<1 - 2.78	1.2	10	7 (15)	BHM4CAN035b (x3), BHM4CAN037 (x2), BHM4CAN039 (x2)	0 (15)	-
Nickel	µg/l	4.5 - 13	4	20	9 (15)	BH510 (x3), BHM4CAN035b (x3), BHM4CAN038a, BHM4CAN039 (x2)	0 (15)	-
Selenium	µg/l	29 - 56	-	10	-	-	3 (15)	BH510 (x3), BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN039 (x2)

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Chloride	mg/l	196 - 5520	250	250	9 (12)	BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN039 (x3)	9 (12)	BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN039 (x3)
Ammoniacal Nitrogen as N	mg/l	5.06 - 33.8	0.6	-	12 (12)	BHM4CAN035b (x3), BHM4CAN037 (x3), BHM4CAN038a (x3) BHM4CAN039 (x3)	-	-
Benzo(a)pyrene	µg/l	<0.05 - 0.144	0.00017	0.01	8 (15)	BHM4CAN035b (x2), BHM4CAN037, BHM4CAN038a (x3), BHM4CAN039 (x2)	7 (15)	BHM4CAN035b (x2), BHM4CAN038a (x3), BHM4CAN039 (x2)
Benzo(b)fluoranthene	µg/l	<0.05 - 0.221	0.0017	0.1	7 (15)	BHM4CAN035b (x2), BHM4CAN038a (x3), BHM4CAN039 (x2)	4 (15)	BHM4CAN038a (x2), BHM4CAN039 (x2)

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Benzo(ghi)perylene	µg/l	<0.016 - 0.16	0.082	0.1	6 (15)	BHM4CAN035b, BHM4CAN038a (x3), BHM4CAN039 (x2)	4 (15)	BHM4CAN038a (x2), BHM4CAN039 (x2)
Benzo(k)fluoranthene	µg/l	<0.027 - 0.079	0.0017	0.1	4 (15)	BHM4CAN038a (x2), BHM4CAN039 (x2)	0 (15)	-
Fluoranthene	µg/l	<0.1 - 0.157	0.0063	-	8 (15)	BHM4CAN035b (x2), BHM4CAN037, BHM4CAN038a (x3), BHM4CAN039 (x2)	-	-
Indeno(123-cd)pyrene	µg/l	<0.014 - 0.118	-	0.1	-	-	2 (15)	BHM4CAN039 (x2)

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS (Total Number of Results)	Location of Exceedances	No. Exceeded DWS (Total Number of Results)	Location of Exceedances
Bis(2-ethylhexyl)phthalate	µg/l	<2 - 17.6	1.3	-	5 (12)	BHM4CAN035b, BHM4CAN037, BHM4CAN038a (x2), BHM4CAN039	-	-

8.6.21 Metal concentrations from the various investigations are analysed as both total and dissolved concentrations. Within the following sections total concentrations have also been compared against dissolved EQS values and this is therefore considered a conservative approach.

8.6.22 The majority of samples are taken from monitoring well response zones which span Made Ground and the Tidal Flat Deposits, however only organic parameters (TPH and PAH) were analysed from the majority of these locations.

8.6.23 Exceedances to EQS criteria of inorganic parameters arsenic, cadmium, copper, lead, nickel (dissolved) and zinc (total) are observed within the Made Ground. Ammoniacal nitrogen within both the Made Ground and Made Ground/Tidal Flat Deposits exceeds the EQS criteria.

8.6.24 All samples were found to be alkaline, with values ranging between 11.7 and 12.8 which exceed the EQS of pH 9.

8.6.25 Total phenols were found to be present in two samples analysed above a screening criterion of 0.0077 mg/l. Concentrations have been compared against the screening criterion for phenol which is considered a conservative approach.

8.6.26 EQS exceedances of m&p xylene, o xylene and trichloroethene were identified within the perched groundwater at CABH03 in March 2002. Elevated concentrations of these parameters were observed at this location in the following monitoring round, however, they were marginally below the EQS.

8.6.27 PAH compounds are observed within the majority of locations. Exceedances of the EQS are observed for anthracene benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)preylene, benzo(k)fluoranthene, fluoranthene, and naphthalene.

8.6.28 Certain laboratory detection levels for mercury, cyanide, some BTEX, PAHs, VOCs and SVOCs are higher than the screening criterion within the data set.

8.6.29 Samples taken from perched water within the Made Ground and Made Ground/Tidal Flat Deposits gave exceedances of the DWS screening criteria for selenium, benzene, trichloroethene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and Indeno(123cd)pyrene. These exceedances by themselves are not considered to represent a contaminant source as there are no potable water supplies at or near the Site and the groundwater is expected to be saline.

8.6.30 Data is available from five boreholes on Site with monitoring well response zones wholly within the Tidal Flat Deposits. These are CABH01, BH16 and BH512, located in the north-western, south-eastern and south-western corners of the Site respectively and BHM4CAN036 and BHM4CAN039(S) located within the proposed Glan Llyn link road. Data is also available from SBHJ03 CP which is located approximately 60 m beyond the boundary of the Site to the south-east.

8.6.31 EQS exceedances of manganese, nickel, cadmium are observed as well as, but to lesser extent, boron, copper, lead, iron and zinc.

8.6.32 BOD, chloride and ammoniacal nitrogen exceed EQS screening criteria in the majority of samples. Elevated chloride concentrations are observed with a maximum of 2,540 mg/l recorded within BHM4CAN036. This indicates saline conditions within the perched water in the Tidal Flat Deposits.

8.6.33 Neutral to slightly alkaline pH was recorded ranging between 7.0 and 8.5.

8.6.34 Exceedances of the EQS for anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)preylene, benzo(k)fluoranthene and fluoranthene were identified within two boreholes located on the proposed Glan Llyn link road, along with bis(2-ethylhexyl)phthalate. A single exceedance of the EQS for naphthalene, analysed as part of the VOCs suite, was observed within CABH01 in 2003. PAH compounds including naphthalene, phenanthrene and acenaphthene were also identified at low concentrations within BH16 although these remained below screening criteria.

8.6.35 Samples taken from perched water within Tidal Flat Deposits alone gave exceedances of boron, chromium, iron, manganese, nickel, selenium, cadmium (total), sodium, chloride and total ammonium when considering DWS criteria. These DWS exceedances by themselves are not considered to result in unacceptable risks as there are no potable water supplies at or near the Site and the perched water is saline.

8.6.36 From the 23 water samples from the Made Ground and Made Ground / Tidal Flat Deposits, all had TPH concentrations above the laboratory limit of detection ranging from 0.063 to 156 mg/l (maximum in BH3, in 2005).

8.6.37 From the nine water samples from the Tidal Flat Deposits alone, three had TPH concentrations above the laboratory limit of detection, ranging from <0.01 to 2.2 mg/l. The maximum concentration relates to SBHJ03 in 2008 (round 2) however no TPH was detected at this location in round 1, less than one month before round 2.

8.6.38 The quality of perched water appears different within the Made Ground and Tidal Flat Deposits, with exceedances of a greater number of organic parameters observed within samples associated with the Made Ground, and a greater number of inorganic parameters including metals within the Tidal Flat Deposits. The presence of wide spread organics in the proposed area of Glan Llyn Depot is consistent with the observations made in the exploratory records with presence of hydrocarbon as free product and/or dissolved phase.

8.6.39 Based upon the visual and olfactory evidence from the exploratory records, an area of contamination is present in the western part of the Metal Recovery Area as shown on Figure 4.

8.6.40 The available water data confirms the visual and olfactory evidence with the highest concentration located some 70 m south of the former defrag plant footprint (BH3). It is unclear whether the distribution of the hydrocarbon contamination a single source or from multiple sources. The chromatographs presented within the 2006 analytical data (Enviros, 2006) indicate that the contamination is representative of a mixed fuel and mineral oil fingerprints.

8.6.41 The perched water may be being affected by the leaching of contaminants from Made Ground.

8.6.42 Samples were taken from the deeper aquifer within four boreholes. The groundwater was shown to be impacted by metals including cadmium, copper, lead and nickel when compared to EQS criteria. Chloride and ammoniacal nitrogen were also identified as exceeding the EQSs along with organic contaminants (certain PAHs and VOC bis(2-ethylhexyl)phthalate. The

exceedances of organic parameters seen within the perched waters in the Made Ground and perched groundwater of the Tidal Flat Deposits are also generally mirrored within the deeper aquifer albeit at lower concentrations demonstrating the low permeability of the Tidal Flat Deposits likely acting as an aquitard to downward migration of contaminants. An exception is BHM4CAN039 in rounds 2 and 3 though it is notable that the deeper aquifer unit for this borehole is screened within both the Tidal Flat Deposits and the Mercia Mudstone.

Surface Water

8.6.43 Thirty eight surface water samples were taken and analysed from the reens surrounding the Site including analysis of water quality of drainage ditches within the Site boundary (SW501 and SW503). A summary of the identified exceedances from the screening assessment are shown in Table 32.

8.6.44 The results for all the sample locations are also presented in the Baseline Water Environment Report (Appendix 16.2 of the March 2016 ES).

Table 32: Summary Surface Water Exceedances

Parameter	Unit	No. Analyses	No. Analyses Above LOD	Min. Conc.[1]	Max. Conc.	Round & Location with Max. Conc.	EQS	No. Exceeding EQS	DWS	No. Exceeding DWS	CCW Trigger Levels	No Exceeding CCW Trigger Levels
Boron	µg/l	24	13	24	1,300	2 / SW502	2,000	0	1,000	3	-	-
Copper	µg/l	24	16	1.5	19	E1 / R10	10	4	2,000	0	-	-
Lead	µg/l l	26	6	0.081	27	E1 / R10	1.2	5	10	1	250	0
Nickel	µg/l l	26	10	1	15	E3 / R12	4	4	20	0	100	0
Cadmium	µg/l	38	15	0.098	1.6	3 / SW501	0.15	11	5	0	5	0
Manganese	µg/l	10	7	4	2640	EL reen 1	30	2	50	0	-	-
Iron	µg/l	12	5	10	940	EL reen 1	1000	0	200	1	-	-
Zinc	µg/l l	24	21	7	360	E4 / R11	75	5	-	-	1,000	0
Sodium	µg/l	2	2	13400	12300	MDSWN	-	-	200	2	-	-
BOD	mg/l	18	12	2	33	E4 / R11	5	8	-	-	18	3
Phosphorus	mg/l	2	2	92.5	245	Q1 / 14.2	120	1	-	-	-	-
Ammoniacal Nitrogen	mg/l	38	34	0.02	2.1	EL reen 1	0.6	4	-	-	1	3
Dissolved Oxygen	%	12	12	0	109.6	E2 / R12	60	3	-	-	-	-
Nitrate as N	mg/l	22	11	0.4	4.4	MDSWN	-	-	50	0	1	9
Nitrate as NO_3	mg/l	14	7	1.3	13.733	E4 / R12	-	-	50	0	1	7
TON	mg/l	14	5	0.9	3.2	E4 / R12	-	-	50	0	2	4
Phosphate	mg/l	24	17	0.06	2.6	E3 / R11	-	-	-	-	1	2
pH	pH units	36	36	7	8.7	1 / SW503	6-9	0	6.5-10	0	6.8-8.5	4

[1]conc. refers to concentration

8.6.45 From the 2008 data, water quality within the drainage ditches and reens flowing south from the Site (Ellen Reen and Middle Reen) are of the poorest quality within the data set (R10, R11 and R12). At those locations, exceedances of the respective EQSs for cadmium, zinc, nickel, copper and lead at multiple locations were observed. These exceedances are not seen in the 2002-2005 data (Enviros Consulting, 2006) indicating a possible deterioration of the quality since 2005 (sample reference EL Reen 1).

8.6.46 The 2008 R10 and R11 locations also recorded Total Petroleum Hydrocarbons concentrations of up to 422 µg/l. At other surface water sampling locations the typical levels have generally remained below the limit of detection at surrounding locations within the Gwent Levels. This may indicate a possible linkage with the presence of hydrocarbon contamination within the Metal Recovery Area. There are no sampling locations for the 2015 period to confirm if elevated organics have persisted.

8.6.47 Water quality at Monks Ditch (locations 15.3 and SW504) from 2015 is of good quality, with only a single exceedance of cadmium (0.16 µg/l at SW504 round 2) recorded above its respective EQS (0.15 µg/l). The 2002-2005 data (Enviros Consulting, 2006) indicated exceedances on a single event of nickel and zinc (MDSWS) which have not been replicated since. The presence of organics was identified in 2002 (MDSWS) with a TPH concentration of 140 µg/l. Whilst the remaining 2002-2005 data did not include TPH analysis, the more recent 2015 information proved concentrations below laboratory limit of detection (<10 µg/l).

8.6.48 Chapel Reen to the south of the Site shows similarly good water quality with only one sampling event recording an exceedance for phosphorous above the EQS. Chapel Reen is separated from the Site by the Blackwall Reen.

8.6.49 Of the 2015 data for the land ditch running along the western boundary of the Reedbed No. 1 (SW502 and SW503), cadmium was encountered just below or marginally above EQS criteria for one of the three rounds at both locations, with the other two below the limit of detection. Thus, this is not considered to represent a contaminant of concern.

8.6.50 Organics were consistently found below the limit of detection. Evidence of pollution by organic contamination from the reedbeds impacting the water quality within the ditch is therefore not identified along the western boundary of the Site.

8.6.51 All surface water analytical results are presented in the Baseline Water Environment Report (Appendix 16.2 of the March 2016 ES).

8.7 Gas Risk Assessment

8.7.1 Ground gas data available for the Site relate to eight on site boreholes (BH509, BH512, BHM4CAN036b (S, D), BHM4CAN036, BHM4CAN037 (S, D), BHM4CAN038a (S, D), BHM4CAN039 (S, D) and WSM4CAN023). These have monitoring well response zones within the Made Ground (BH512, BHM4CAN035b(S), BHM4CAN037(S), BHM4CAN038a(S) and WSM4CAN023), Tidal Flat Deposits including peat (BH509, BHM4CAN036 and BHM4CAN039(S)) and Mercia Mudstone (BHM4CAN033, BHM4CAN035b(D), BHM4CAN037(D), BHM4CAN038a(D) and BHM4CAN039(D). Of the three to four monitoring rounds available the below observations have been made.

- No monitoring was undertaken during low barometric pressures (<1000 mb) with the lowest conditions being 1006 mb (recorded pre-2016 investigation). As such, worst case atmospheric conditions for potential ground gas generation may not have been monitored.
- Gas flow within TFD including peat deposits was generally low or absent (up to 0.6 l/hr). Within the Made Ground and the bedrock aquifer gas flow was low or absent (up to 0.6 l/hr).
- Methane has been recorded above the 1 % screening criterion in all boreholes screened within the Tidal Flat Deposits (including peat) up to 41.7 % (BHM4CAN0036). This peak CH_4 concentration was recorded within BHM4CAN036 during the first monitoring round with subsequent CH_4 concentrations of <1 % reported.
- Within the Made Ground, methane was recorded above the 1 % screening criterion in three boreholes located within the proposed Glan Llyn link road up to 5.4 % (BHM4CAN037(S)). CH_4 was recorded above the screening criterion in BHM4CAN037(S) on all monitoring rounds and the remaining two boreholes during one monitoring round only.
- Elevated CH_4 was identified within all borehole wells installed within the Mercia Mudstone. These boreholes are located principally along the proposed Glan Llyn link road with a single borehole located within reedbed No.1 (BHM4CAN033). It is of note that significantly elevated CH_4 was recorded during the drilling of BHM4CAN038a on encountering a peat horizon between 10.25 and 10.7 m bGL. The top of the response zone for this borehole is just below the base of the TFD at 12 m bGL. Highly elevated CH_4 concentrations were reported during all three monitoring rounds for BHM4CAN038a(D) and within the second monitoring round for BHM4CAN033. No discernible pattern is noted with regard to the concentrations within the boreholes and the rounds / number of rounds of monitoring however generally greatest CH_4 concentrations were reported to show a reduction over the monitoring period.
- Carbon dioxide within the Tidal Flat Deposits (peat) ranged from absent to 4 % below the 5 % screening criterion.
- Within the Made Ground, carbon dioxide concentrations were generally nil up to 0.7 %.
- Carbon dioxide within the Mercia Mudstone was identified above the screening criterion of 5 % within BHM4CAN038a in all monitoring rounds up to 12.6 %, within BHM4CAN035b in two monitoring rounds up to 14.8 % and within BHM4CAN033 in one monitoring round at .6.5 %.
- Low levels Volatile Organic Compounds of up to 5.3 ppm have been recorded in both the peat and Made Ground. It is noted that all three available monitoring wells are located outside the zone of hydrocarbon contamination specific of the Metal Recovery Area (see Figure 4).
- Hydrogen sulphide was not detected during the monitoring with the exception of a single monitoring round within BHM4CAN038a with a result of 1 ppm below the screening criterion of 5 ppm.
- Carbon monoxide was recorded as generally absent but up to a peak of 5 ppm (BHM4CAN037) below the screening criterion of 30 ppm.

- Ambient or slightly depleted oxygen levels were recorded in many boreholes. Significantly depleted O_2 was recorded within BHM4CAN038a(D) on 3 occasions (minimum 1.8 %), BHM4CAN035b(D) on 2 occasions (minimum 4.4 %) and BHM4CAN036 on 1 occasion (minimum 8.8 %)..

8.7.2 Elevated CH_4 identified within wells installed within the Made Ground may be related to the presence of slag materials.

8.7.3 Ground gas concentrations identified within wells installed within the Tidal Flat Deposits are attributed to the organic soils inducing peat typified by high CH_4 concentrations and low or absent flows.

8.7.4 Elevated CH_4 and to a lesser extent CO_2 was identified within many of the deep wells screened within the Mercia Mudstone.

8.7.5 It is of note that significantly elevated CH_4 was recorded during the drilling of BHM4CAN038a on encountering a peat horizon between 10.2 and 10.7 m bGL. The top of the response zone for this borehole is just below the base of the TFD at 12 m bGL. Highly elevated CH_4 concentrations were reported during all four monitoring rounds for BHM4CAN038(D).

8.7.6 The boreholes screened within the Mercia Mudstone generally have sub artesian groundwater levels of approximately 2.5 m bGL, the response zones therefore within the saturated zone. The source of the ground gas is unknown.

8.7.7 A gas risk assessment for soils encountered across the proposed new section of motorway has been undertaken and is set out within the Land Contamination Assessment Report (Appendix 11.1 of the Marcgh 2016 ES).

8.7.8 It is noted there are no gas data within the area impacted by hydrocarbon contamination. In this area Volatile Organic Compounds may be expected. However, the heavy carbon range of the hydrocarbons and the age of the contamination (at least 11 years) are factors which may mean only modest levels of VOCs are present. Further VOCs and gas monitoring prior to construction is recommended to confirm the risks and the need for and detailed design of gas protection measures in the proposed buildings at the Glan Llyn Depot.

8.8 Summary

Reedbed No. 1

8.8.1 Made Ground has been shown to have elevated chromium concentrations above background with a maximum of up to 761 mg/kg and is likely to be associated with slag material. This material could represent a potential human health risk to future site workers and remediation may be necessary. Above background chromium concentrations within the natural soils are also identified on a limited number of samples. The sample of Made Ground for which the maximum chromium concentration was identified was tested for hexavalent chromium which was proven to be well below the screening criterion. Further sampling and analysis of these soils is recommended to verify this.

8.8.2 Elevated alkaline soil conditions have been identified in the majority of the samples, mainly within the Made Ground material but also in some samples of the Tidal Flat Deposits material.

8.8.3 Overall PAH is not considered to pose a significant risk to human health, although marginal exceedances on a single sample of the sediment material were identified.

8.8.4 Made Ground tested at the Site was identified to have leachable contaminants with EQS exceedances of nickel and cyanide. Leachable cadmium, copper, and lead are also identified more sporadically across the Site.

8.8.5 Perched water within the Made Ground has high levels of metals (mainly nickel), inorganics (mainly pH and ammoniacal nitrogen) and organics (TPH and PAHs) exceeding EQS criteria.

8.8.6 The perched groundwater within the Tidal Flat Deposits has elevated levels of metal and inorganics above EQSs. The presence of organic contaminants has also been identified, although elevated levels are noted to be intermittent and inconsistent. The perched water within the Tidal Flat Deposits is noted to be saline.

8.8.7 The bedrock aquifer, as monitored within a single borehole, has elevated metals and inorganics as well as certain PAHs and VOC.

8.8.8 A possible linkage between the perched groundwaters and the deeper aquifer is inferred.

8.8.9 The water quality within the majority of the adjacent reens and ditches is considered to be of good quality.

8.8.10 The ground gas regime is considered to be in line with the proven ground conditions with low flow high methane conditions within the peat bands of the Tidal Flat Deposits.

8.8.11 Elevated methane and to a lesser extent carbon dioxide was also identified within the bedrock within a single borehole although the source of this is unclear.

Metal Recovery Area

8.8.12 Made Ground has been shown to have elevated chromium concentrations above background with a maximum of up to 1,800 mg/kg and is likely to be associated with slag material. This material could represent a potential human health risk to future site workers and remediation may be necessary. Further sampling and analysis of these soils identified hexavalent chromium to be <LOD and therefore chromium is not considered to pose unacceptable risk to human health.

8.8.13 Elevated alkaline soil conditions have been identified in the majority of the samples, mainly within the Made Ground material but also in some samples of the Tidal Flat Deposits material.

8.8.14 The presence of elevated hydrocarbon contamination (a mixed fuel and mineral oil fingerprints) has been confirmed within the area of the proposed Glan Llyn Depot. The data relates to a 2006 investigation and holds no speciation of hydrocarbons preventing robust, site specific quantitative risk assessment. It is recommended that a supplementary investigation is undertaken to confirm soil and water contamination status. The origin of the hydrocarbon contamination is currently unknown.

8.8.15 Made Ground tested at the Site was identified to have low level leachable contaminants (metals, pH, ammoniacal nitrogen and certain PAHs) against EQS criteria.

8.8.16 Perched water within the Made Ground has high levels of metals and pH. The presence of organics (TPH and PAHs) were also identified in the location of the Glyn Llyn Depot and support the visual and olfactory evidence of hydrocarbon contamination during the 2005-2006 ground investigation as well as along the proposed Glan Llyn link road during the 2016 Additional Ground Investigation.

8.8.17 The perched groundwater within the Tidal Flat Deposits has elevated levels of metal and inorganics above EQSs. The presence of organic contaminants has also been identified beneath the Glyn Llyn Depot area and off Site (SBHJ03), although elevated levels in these locations are noted to be intermittent and inconsistent. More persistently elevated organics were identified within boreholes along the proposed Glan Llyn link road. The groundwater quality seen within the Mercia Mudstone shows similar metal and inorganic concentrations to the perched body within the Tidal Flat Deposits. The perched groundwater within the Tidal Flat Deposits is saline in line with the deeper aquifer.

8.8.18 The water quality within the Monks Ditch and Chapel Reen is considered to be of good quality. A number of EQS exceedances in metals and organics were identified in Ellen and Middle Reen. The presence of organics as seen in the 2008 monitoring within both reens may be linked with the hydrocarbon contamination present within the Metal Recovery Area although this cannot be confirmed.

8.8.19 The ground gas regime is considered to be in line with the proven ground conditions with low flow high methane conditions within the peat bands of the Tidal Flat Deposits and high methane within the Made Ground considered to be related to the slag materials. Elevated methane and to a lesser extent carbon dioxide was also recorded within the Mercia Mudstone though the source of the gas is unclear.

8.8.20 Whilst no gas data are available within the zone of hydrocarbon contamination of the Metal Recovery Area, the age and type of the contamination are considered unlikely to be generating high levels of VOCs.

8.8.21 However further monitoring is recommended to enable risks to be confirmed and to determine the need to incorporate gas protective measures into the proposed Glan Llyn Depot building.

9 Refined Conceptual Site Model

9.1.1 Data from the 2015 Supplementary Ground Investigation and the 2016 Additional Ground Investigation has enabled the original CSM presented in the 2014 PSSR to be updated. The assessment is based on the current Scheme during construction and operational phases.

9.1.2 A CSM representing general ground conditions, overall Scheme layout and relevant source-pathway-receptors (each of which having a specific alpha-numerical symbol attached) are presented in Figure 2 and is described in Table 33.

Table 33: Conceptual Site Model

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
Onsite: Elevated pH originating from the Made Ground (slag material) and sediments (in Reedbed No. 1). Plus hydrocarbon contaminated soils in part of the Metal Recovery Area	**Construction**					
	Construction Workers (B)	Direct dermal (1)	Likely	Moderate	Moderate	Construction workers will possibly be exposed to Made Ground materials during site construction works, however exposure duration will be short term only. Prior to construction, a specific risk assessment will be required in line with health and safety legislation. This will enable safe methods of work methodology and appropriate levels of PPE to be put in place. As such all risks will be duly considered and suitably mitigated to protect construction workers. Current data set identify limited exceedances to the selected screening criteria. Current contamination status is not foreseen to represent abnormal constraints to construction workers health and safety over and above those
		Ingestion (3)	Likely	Moderate	Moderate	

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
		Inhalation of soil dust (2)	Likely	Moderate	Moderate	typical of a brownfield site. Asbestos fibres were detected at a single location north of the Glan Lyn link road which will require management should materials be disturbed in this area. Construction works around the proposed motorway junction associated with piling will require construction mats to be in place. This will reduce potential for exposure to contaminated soils and dust; and dermal, ingestion and inhalation pathways will effectively be broken once mats are placed.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
		Inhalation of vapours (2)	Likely	Low	Low	Made Ground generally granular and may represent a possible pathway for vertical and lateral migration. No putrescible material identified within the Made Ground. Significant abnormal gas regime not anticipated and low concentration of VOCs and SVOCs recorded. Surcharge of superficial soils may temporarily increase gas flux. Construction to be largely within open space. Any earthworks within confined space would require specific risk assessment, control measures and appropriate PPE. Gap in the data has been identified within the area of hydrocarbon contamination and further -investigation may be required to assess any potential gas and confirm the risks.
	Offsite users during construction works (C)	Dermal contact with dust (1)	Low	Low	Very low	During construction there is the possibility of dermal contact and inhalation of soil dust, short term exposure only. Dust suppression measures are recommended during construction works. Receptors limited as surrounding land in this area is not highly populated adjacent to the proposed earthworks.
		Ingestion of dust (3)	Low	Low	Very low	
		Inhalation of soil dust (2)	Low	Low	Very low	

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
		Inhalation of vapours (2)	Unlikely	Low	Very low	No putrescible material identified within the Made Ground. Significant abnormal gas regime not anticipated and low concentration of VOCs and SVOCs recorded. Made Ground generally granular and may represent a possible pathway for vertical and lateral migration. Surcharge of superficial soils may temporarily increase gas flux. Off site migration into confined spaces or into adjacent buildings considered unlikely due to ground conditions and lack of receptors. Gap in the data has been identified within the area of hydrocarbon contamination and further investigation may be required to assess any potential gas and confirm the risks.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
Onsite: Elevated pH originating from the Made Ground (slag material) and sediments (in Reedbed No. 1). Plus hydrocarbon contaminated soils in part of the Metal Recovery Area	Groundwater - Aquifer (Da) within the Glaciofluvial Deposits and/or Mercia Mudstone Group	Leaching/migration (4)	Unlikely	Moderate	Low	Displacement of contaminants in soils and perched water in Made Ground is possible during piling. This is subject to selected piling technique and a piling risk assessment will be required. Thick deposit of predominantly soft low permeability Tidal Flat Deposits overlies the aquifer, reducing risk of downward migration. Potential increased vertical pathways between possible contaminant and receptor with construction of band drains and piles. However, soft clays of the Tidal Flats Deposits likely to 'heal' along pile pathways mitigating this route. The aquifer has elevated metal and inorganic contaminants but the levels appear similar to levels in the perched waters in the TFD and Made Ground and are considered to be at background levels. Perched waters within the Made Ground also include organics shown to be present in the deeper aquifer albeit at lower concentrations. The perched water and aquifer are saline. Low leaching potential identified from soil materials. Hydrostatic pressures shown to be below or at base of the Made Ground. Possible increase in risk of Made Ground to become saturated during construction. Further investigation is needed in the area of hydrocarbon contamination in the former area of the metal defragmentation plant.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
Onsite: Elevated pH originating from the Made Ground (slag material) and sediments (in Reedbed No. 1). Plus hydrocarbon contaminated soils in part of the Metal Recovery Area	Surface water (land drainage, reens) part of Gwent Levels SSSI (E)	Saturated flow of contaminated perched water (4)	Unlikley	Moderate	Low	Perched (shallow) groundwater is likely to be intercepted by the land drainage. The quality of perched groundwater may become impacted by contamination during the construction works, particularly in the area of excavation (new drains). Increase in water flux and leachate from Made Ground during surcharge loading. Water quality adjacent to Site considered to be of relatively good quality. Further investigation and amendment is needed in the area of hydrocarbon contamination in the area of the former metal defragmentation plant.
		Surface water run-off (5)	Likely	High	High	Surface water run-off may be detrimental to the quality of surface water and thus the construction process may need to adopt surface water control and management. Leachable metals have been identified within the soils in limited samples and hydrocarbon contaminated Made Ground present in the former metal defragmentation plant area. Application of appropriate surface water run-off control measures during the works is considered sufficient to break this potential pollutant linkage. Water quality adjacent to Site considered to be of relatively good quality.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
Ground gas from Tidal Flat Deposits, including peat, Made Ground and bedrock	Construction Workers (B)	Inhalation of ground gas / explosion (2)	Low likelihood	High	Moderate	High CH_4 and CO_2 concentrations associated with peat/organic clays, Made Ground (related to slag materials) and bedrock (source unknown) but with low or absent flux. Gas flux likely to increase during surcharge loading for motorway embankment. New pathways could be created with band drains and piles. Construction to be largely within open space. Any earthworks within confined space would require specific risk assessment, control measures and PPE.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
	Offsite users during construction works (C)	Inhalation of ground gas / explosion (2)	Unlikely	High	Moderate to low	Low permeability of Tidal Flat Deposits will inhibit lateral migration. Piling and band drain installations could result in explosive risks during operations and risk assessment and gas mitigation measures will be needed. Ground gas management will be required during construction.
Potential Source	**Potential Receptor**	**Possible Pathway**	**Likelihood**	**Severity**	**Risk**	**Comment**
Onsite Elevated pH originating from the Made Ground (slag material) and sediments (in Reedbed No. 1). Plus hydrocarbon contaminated soils in part of the Metal Recovery Area	**Operational**					
	Maintenance Workers (B)	Direct dermal (1)	Unlikely	Low	Very low	Made Ground to be largely encapsulated by the embankment or removed and therefore the exposure to contamination will be limited outside the motorway embankment. Areas outside the motorway hardstanding will receive topsoil and/or subsoil cover for planting further reducing pathways. Exposure duration will be short term only. Site specific risk assessment will be required in line with health and safety legislation. This will enable safe working methods and appropriate levels of PPE to be put in place, for instance during future excavations required during maintenance. As such all risks will be duly considered and
		Ingestion (3)	Unlikely	Low	Very low	

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
		Inhalation of soil dust (2)	Unlikely	Low	Very low	suitably mitigated. Current data set identifies limited exceedances above the selected generic screening criteria. Temporary in increase gas flux due to surcharge of superficial soils would have mostly ceased. Maintenance works to be largely within open space. Any works within confined space would require specific risk assessment, control measures and PPE to meet legislative requirements.
		Inhalation of vapours (2)	Unlikely	Low	Very low	
	Motorway users (A) & Off site users (C)	Dermal contact with dust (1)	Unlikely	Low	Very low	Potential contamination sources in soil are limited to the presence of slag within the Made Ground and the sediments within the lagoon are to be largely encapsulated by the embankment or removed. Areas outside the motorway hardstanding will receive topsoil and/or subsoil cover for planting further reducing pathways. Exposure duration will be short term only for Motorway users. The human health screening criteria is considered conservative when considering exposure and pathway mechanisms to future Site users.
		Ingestion of dust (3)	Unlikely	Low	Very low	
		Inhalation of soil dust (2)	Unlikely	Low	Very low	

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
		Inhalation of soil gas or vapours (2)	Low likelihood	Moderate	Moderate to low	Limited potential for lateral gas migration given the presence of low permeability Tidal Flat Deposits to shallow depth. Temporary increase in gas flux due to surcharge of superficial soils would have mostly ceased. Gap in the data has been identified and further investigations are required to delineate any potential contamination and confirm the risks associated with the link road and also the hydrocarbon
Hydrocarbon contamination in part of the Metal Recovery Area	Glan Llyn Depot Workers (A)	Dermal contact (1)	Unlikely	Low	Very low	Made Ground to be entirely encapsulated by the hardstanding removing all dermal, ingestion and inhalation of soil dust pathways.
		Ingestion (3)	Unlikely	Low	Very low	
		Inhalation of vapours (2)	Likely	Moderate	Moderate	Made Ground to be entirely encapsulated by the hardstanding removing all dermal, ingestion and inhalation of soil dust pathways. No VOC gas data from Made Ground formation. Significant VOCs gas not anticipated given the nature of the hydrocarbon (mid to heavy carbon range). Gap in the data has been identified and further investigations are required to

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
On Site: Elevated pH originating from the Made Ground (slag material) and sediments (in Reedbed No. 1). Plus hydrocarbon contaminated soils in part of the Metal Recovery Area	Groundwater - Aquifer (Da)	Leaching/migration (4)	Unlikely	Moderate	Low	Thick deposit of predominantly soft low permeability Tidal Flat Deposits overlies the aquifer, reducing risk of downward migration. Increased vertical pathways between possible contaminant and receptor with construction of band drains and piles. However, soft clays of the Tidal Flat Deposits likely to 'heal' along pile pathways mitigating this route. The aquifer has elevated metal and inorganic contaminants but the levels appear similar to levels in the perched waters in the Made Ground and in the perched groundwaters in the TFD. These are considered to be at background levels. Perched waters within the Made Ground and the perched groundwaters and deeper aquifer also include organics and, in the former defragmentation plant area, free products. Low leaching potential identified from soil materials. Further investigation is needed in the area of hydrocarbon contamination in the former area of the metal defragmentation plant.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
	Surface water (land drainage, reens) part of Gwent Levels SSSI (E)	Saturated flow of contaminated perched water (4)	Unlikley	Moderate	Low	Perched (shallow) groundwater is likely to be intercepted by the land drainage. Contaminants in perched water, especially hydrocarbons in the former metal defragmentation area, could migrate into surrounding surface waters. Temporary increase in water flux due to surcharge of superficial soils would have mostly ceased. Water quality adjacent to Site considered to be of relatively good quality. Further investigation is needed in the area of hydrocarbon contamination in the former area of the metal defragmentation plant.
Ground gas from Tidal Flat Deposits, including peat, Made Ground and bedrock	Maintenance Workers (B)	Inhalation of ground gas / explosion (2)	Unlikely	High	Moderate to low	Although elevated methane concentrations are known within the natural soils of the Tidal Flat Deposits, the low permeability soils will result in limited gas generation post construction. Elevated CH_4 has also been identified within the Made Ground and CH_4 and CO_2 within the bedrock. Risks to maintenance workers are low but entry into any confined spaces will need to adhere to health and safety legislation requirements. Pathways along piles likely to 'heal' with increase in soil contact along pile shaft preventing gas migration. However band drains could still allow localised gas migration. Gap in the data has been identified and further investigations are required to assess any potential gas and confirm the risks.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
	Depot Workers (B)	Inhalation of ground gas / explosion (2)	Low likelihood	High	Moderate	Although elevated methane concentrations are known within the natural soils of the Tidal Flat Deposits, the low permeability soils will result in limited gas generation post construction. Elevated CH_4 has also been identified within the Made Ground and CH_4 and CO_2 within the bedrock. Pathways along piles likely to 'heal' with increase in soil contact along pile shaft preventing gas migration. Gap in the data has been identified and further investigations are required to assess any potential gas and confirm the risks and the need for gas protection and need for gas protection and control measures to be incorporated into the proposed new buildings at the Glan Llyn Depot.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
	Motorway users (A) / Off site users (C)	Inhalation of soil gas / explosion (2)	Unlikely	High	Moderate to low	Ground gas data from the peat horizons within the superficial deposits identify concentrations of methane, carbon dioxide and trace VOCs. Elevated methane concentrations have also been identified within the Made Ground and bedrock. New pathways to be created with piles and band drains. Limited potential for lateral gas migration given the presence of low permeability Tidal Flat Deposits to shallow depth. Motorway to be built on raised embankment providing a further barrier to migration of gases. Pathways along piles likely to 'heal' with increase in soil contact along pile shaft preventing gas migration. However band drains could still allow localised gas migration. Gap in the data has been identified and further investigations are required to assess any potential gas and confirm the risks.

10 Conclusions and Recommendations

10.1 Conclusions

10.1.1 Ground investigations have been undertaken at the Site to assess risks from land contamination associated with the construction and operation of the Scheme. This has included human health and controlled waters risk assessments. The risk assessment has identified that some residual risks to human health and controlled waters could exist and control measures are required to facilitate the construction and ongoing operation of the Scheme.

10.1.2 Hydrocarbon contamination in soils and perched water has been identified in the former Metal Recovery Area including the proposed Glan Llyn Depot. Further ground investigation is required to better establish risks to future site users and controlled waters and determine any remediation required. Additional mitigation measures may also be required for the operational phase such as inclusion of gas barrier beneath the proposed depot buildings.

10.1.3 The laboratory testing results from previous ground investigations confirmed the onsite observations and field testing, and showed that the materials encountered within the new section of motorway alignment are at tolerable levels of risk to human health both during construction and operational phases. Materials are likely to be suitable for reuse subject to compliance of reuse criteria under a Material Management Plan. Within the proposed Glan Llyn Depot, reuse of hydrocarbon impacted soils may require some treatment of soils to enable reuse in the Scheme.

10.1.4 Asbestos fibres were detected within soils located in the northern part of the proposed Glan Llyn link road. Further testing and assessment will be required in this area should materials be disturbed.

10.1.5 During the construction phase, specific mitigation measures will be required to prevent inhalation pathways of dust to off site and work force receptors, although such measures would be no more than typically expected on a construction site.

10.1.6 Contaminated perched waters in Made Ground, particularly TPH contaminated perched water in the Metal Recovery Area, may be in continuity with land drainage/reen system and will require a suitable water management strategy to prevent potential impact to surface waters as well as protection against any contaminated run-off during construction. During the operational phase, the motorway hardstanding will significantly limit the infiltration of rainwater through the soils and therefore leaching any soil contaminants in Made Ground into the water will be very limited. A remediation strategy will need to be developed to ensure risks associated with TPH in soils and perched water within the proposed Glyn Llyn Depot are mitigated both during construction and during operational phases of the Scheme.

10.1.7 Surface waters at the boundary of the Site are generally of good quality albeit with possible evidence of impact which may be associated with the Site's historical use. There is insufficient data to verify this currently.

10.1.8 The use of piles may provide new pathways which may lead to water within the Tidal Flat Deposits and possibly any perched water within the Made Ground to

enter the currently confined aquifer within the Glaciofluvial Deposits and Mercia Mudstone. A piling risk assessment will be required prior to construction.

10.1.9 Elevated ground gas has been identified within the Made Ground related to the slag deposits, Tidal Flat Deposits related to the peat/organic clay and bedrock. The source of the elevated ground gas within the bedrock is unclear however during construction a gas management strategy will be required, particularly during piling installation. Gas protection measues may be required to be incorporated into the proposed depot.

10.1.10 Post construction, the permanent land take, including the embankment itself, will have topsoil and subsoil cover for landscaping purposes and potential human health pathways to end users and maintenance workers becoming exposed to contaminated soils will be broken. However, topsoil materials will need to be checked for contamination against suitable for reuse criteria.

10.2 Recommendations

10.2.1 The ground investigation data have indicated that potential contamination is present that could cause an unacceptable risk to the identified receptors. This will require appropriate remedial mitigation measures to be implemented. These measures would be identified within a remediation strategy for the Scheme. The remediation strategy is anticipated to include but is not limited to the following.

- Trial pits and boreholes to collect soil samples including further delineation of the extent of hydrocarbon contamination at the proposed Glan Llyn Depot Installation of groundwater monitoring wells to collect groundwater samples, enable gas monitoring and development of approaprite remedial solutions
- Safe methods of working to mitigate UXO risks.
- Risk assessment of piles/band drains and associated construction works creating potential pathways enabling contaminants migration, with due consideration of relevant EA guidance (EA, 2001 and EA, 2002).
- Dealing with unexpected contamination.
- Verification sampling strategy to confirm suitability for soils for retention/reuse.
- Control measures to prevent risks to construction workers and the general public during construction.
- Verification of imported topsoils for suitability of use.

10.2.2 The remediation strategy should include a remediation options appraisal, remediation implementation plan and remediation verification plan. The remediation strategy should be supported by a Scheme wide Material Management Plan prepared in accordance with CL:AIRE Code of Practice (CL:AIRE, 2011).

11 References

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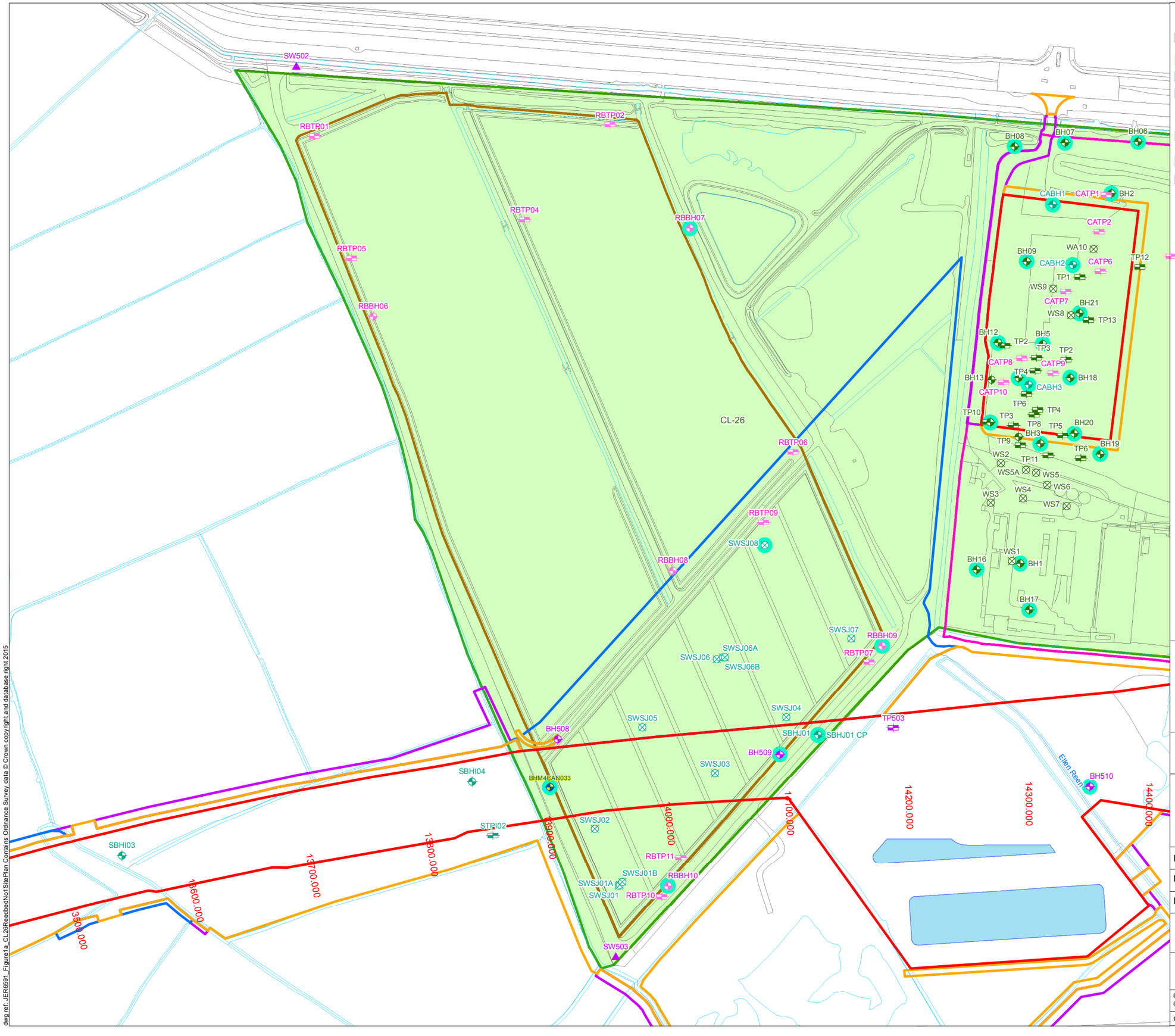
12 Glossary

BF	Blast Furnace
BGS	British Geological Survey
BOD	Biochemical Oxygen Demand
BOS	Basic Oxygen Slag
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CAT	Cable Avoidance Tool
CDM	Construction Design Management
CH4	Methane
CLEA	Contaminated Land Exposure Assessment
CO2	Carbon Dioxide
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CSM	Conceptual Site Model
DMRB	Design Manual for Roads and Bridges
DO	Dissolved Oxygen
DQRA	Detailed Quantitative Risk Assessment
DWS	Drinking Water Standard
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESG	Environmental Scientifics Group
EQS	Environmental Quality Standard
FTIR	Fourier Transform Infrared (spectroscopy)
GAC	Generic Assessment Criteria
GRO	Gasoline Range Organics
LEL	Lower Explosive Limit
LOD	Limit of Detection
mAOD	Metres Above Ordnance Datum
mb	Millibars
mbGL	Metres below Ground Level

MTBE	Methyl Tert-butyl Ether
NRW	Natural Resources Wales
ORP	Oxidation Reduction Potential
O2	Oxygen
OS	Ordnance Survey
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCSM	Preliminary Conceptual Site Model
PID	Photo Ionisation Detector
PPE	Personnel Protection Equipment
PSSR	Preliminary Sources Study Report
SGVs	Soil Guideline Values
SSAC	Site Specific Assessment Criteria
SSSI	Site of Special Scientific Interest
SVOCs	Semi-Volatile Organic Compounds
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbon
TPH CWG	Total Petroleum Hydrocarbon Criteria Working Group
UKAS	United Kingdom Accreditation Service
VOCs	Volatile Organic Compounds
WFD	Water Framework Directive
UXO	Unexploded Ordnance Survey

Figures



Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Proposed Water Treatment Area (WTA)
- Potential Area of Land Contamination based on 2014 PSSR
- Reedbed No. 1
- Metal Recovery Area

Investigation Locations

2015-2016 (RPS)
- Borehole

2015 (Geotechnical Engineering)
- Borehole
- Trial Pit
- Surface Water Monitoring Location

2007 (Norwest Holst)
- Borehole
- Trial Pit
- Window Sample

2004-2006 (Enviros)
- Borehole
- Trial Pit
- Window Sample

2002 (Exploration Associates)
- Borehole
- Trial Pit
- Monitoring Well Installation

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Appendix R11.1 Annex D CL-26

Site Plan for CL-26 (Reedbed No. 1)

Figure: 1a	Revision: 1
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked: FB

Scale: A3 @ 1:3,000
0 50 100 m

N

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dwg ref: JER6591_Figure1a_CL26ReedbedNo1SitePlan

dwg ref: JER6591_Figure1a_CL26ReedbedNo1SitePlan Contains Ordnance Survey data © Crown copyright and database right 2015

Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Proposed Water Treatment Area (WTA)
- Potential Area of Land Contamination based on 2014 PSSR
- Reedbed No. 1
- Metal Recovery Area
- Lagoon

Investigation Locations

2015-2016 (RPS)
- Borehole
- Window Sample
- Trial Pit

2015 (Geotechnical Engineering)
- Borehole
- Trial Pit
- Surface Water Monitoring Location

2007 (Norwest Holst)
- Borehole
- Trial Pit
- Window Sample

2004-2006 (Enviros)
- Borehole
- Trial Pit
- Window Sample

2002 (Exploration Associates)
- Borehole
- Trial Pit
- Monitoring Well Installation

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Appendix R11.1 Annex D CL-26

Site Plan for CL-26 (Metal Recovery Area)

Figure: 1b	Revision: 1
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked: FB

Scale: A3 @ 1:2,500
0 40 80m

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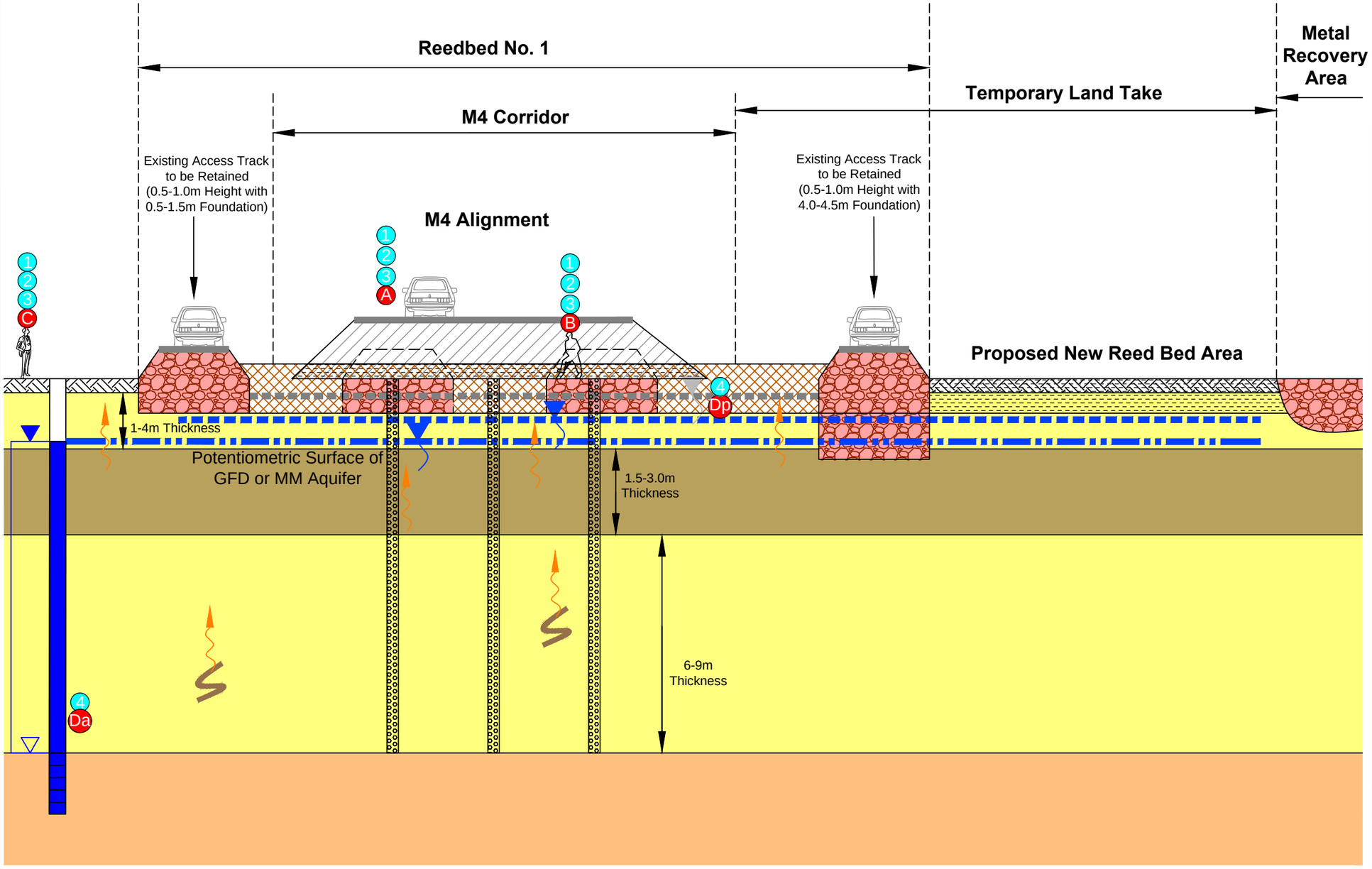
dwg ref: JER6591_Figure1b_CL26MRASitePlan Contains Ordnance Survey data © Crown copyright and database right 2015

CL- 26 Llanwern Steelworks (Reedbed No.1)



Legend

- Topsoil
- Reedbed (Made Ground: Clay with Roots)
- Made Ground (Slag)
- Tidal Flat Deposits - TFD
- Organic Matter within TFD
- Peat
- Mercia Mudstone - MM
- Proposed Embankment
- Proposed Cutting
- Proposed Band Drain
- Perched Water (MG)
- Perched Groundwater (TFD)
- Groundwater (GFD and MM)
- Water Strike
- Rest Water Level
- Gas Migration Pathway

Potential Receptors

- Humans On-Site (M4 User)
- Humans On-Site (Construction/Maintenance)
- Humans Off-Site (Site Neighbours)
- Groundwater (Aquifer)
- Groundwater (Perched)
- Surface Water

Potential Pathways

- Dermal Contact
- Inhalation
- Ingestion
- Leaching / Migration
- Surface Run Off

~~Potential~~ Sources of Contamination

Possible contamination present on site associated with :

On-Site

- Reedbed to Llanwern Steelworks surface water process

Off-Site

- Main Llanwern Steelworks
- Lagoons (CL-26)
- Metal Recovery Area (former slag process area)
- Hydrocarbon impacted soils and water in part of Metal Recovery Area

Ground gas originating from the natural organic peat soils / Made Ground

NOTE
Drawing refined from PFSR Drawing Reference M4-[illegible]-00DR-Z-X-[illegible]9 (February 2014)

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Appendix R11.1 Annex D CL-26

Conceptual Site Model for CL-26 (Reedbed No. 1)

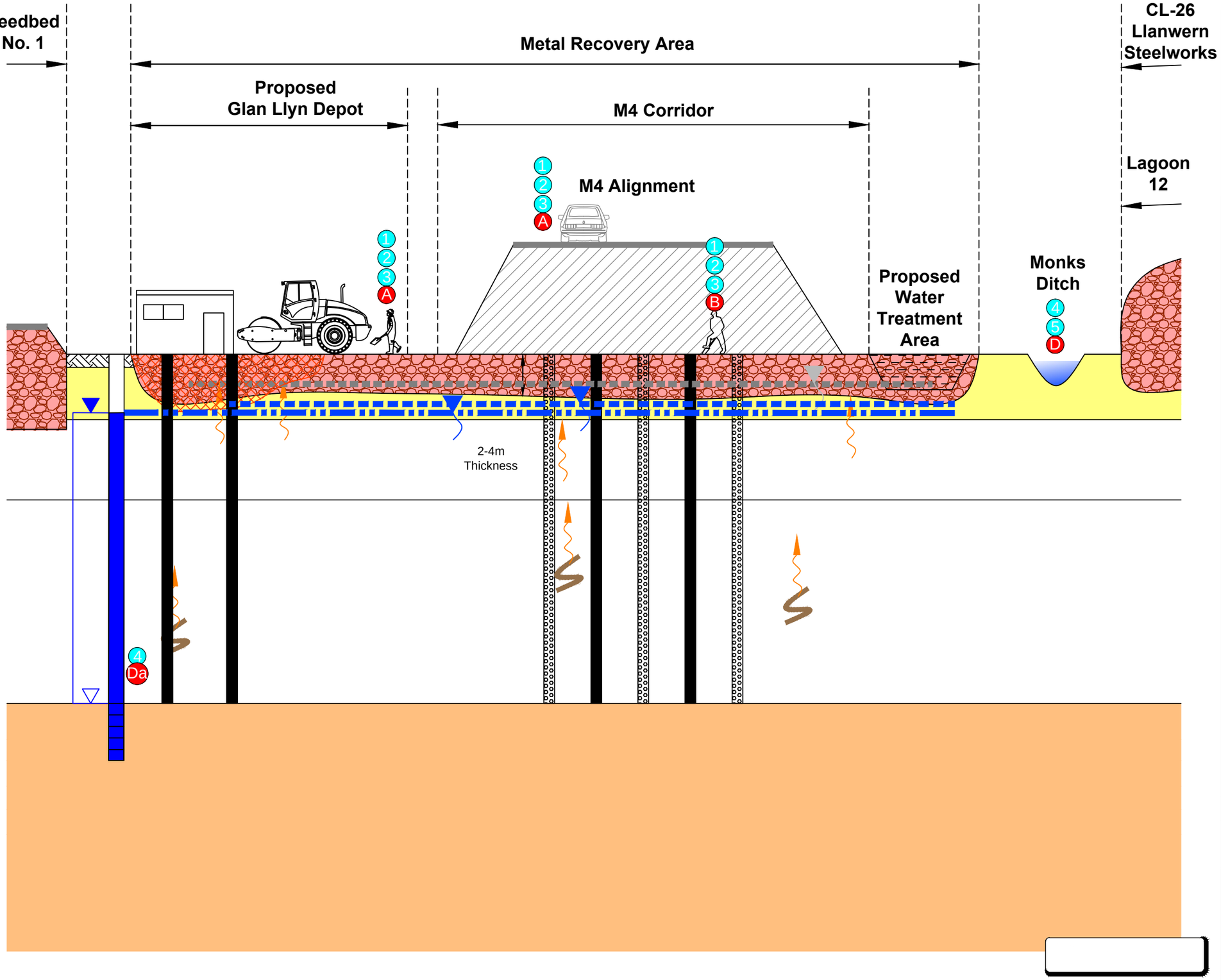
Figure: 2	Revision:
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked:
Not to Scale	FB

dwg ref:JER6591_Figure2_CL26ReedbedNo1ConceptualSiteModel

dwg ref: JER6591_Figure2_CL26ReedbedNo1ConceptualSiteModel

Ground conditions based

CL- 26 Llanwern Steelworks (Metal Recovery Area)



Legend

- Topsoil
- Evidence of Hydrocarbon Contamination
- Made Ground (Slag)
- Tidal Flat Deposits - TFD
- Organic Matter within TFD
- Peat
- Mercia Mudstone - MM
- Proposed Embankment
- Proposed Pile
- Proposed Band Drain
- Perched Water (MG)
- Perched Groundwater (TFD)
- Groundwater (GFD and MM)
- Water Strike
- Rest Water Level
- Gas Migration Pathway

Potential Receptors

- Humans On-Site (M4/Glan Llyn Depot User)
- Humans On-Site (Construction/Maintenance)
- Humans Off-Site (Site Neighbours)
- Groundwater (Aquifer)
- Groundwater (Perched)
- Surface Water

Potential Pathways

- Dermal Contact
- Inhalation
- Ingestion
- Leaching / Migration
- Surface Run Off

Potential Sources of Contamination

Possible contamination present on site associated with :

Off-Site

- Reedbed to Llanwern Steelworks surface water process
- Main Llanwern Steelworks
- Lagoons (CL-26)
- Metal Recovery Area (former slag process area)
- Hydrocarbon impacted soils and water in part of Metal Recovery Area
- Ground gas originating from the natural organic deposits / Made Ground

NOTE
Drawing defined from PDSR Drawing Reference M4-PR-Y4-00DR-Z-XX-0019 (February 2014)

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Appendix R11.1 Annex D CL-26

Conceptual Site Model for CL-26 (Metal Recovery Area)

Figure: 2	Revision:
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked:
Not to Scale	FB

dwg ref:JER6591_Figure2_CL26MRAConceptualSiteModel

Ground conditions based

dwg ref: JER6591_Figure2_CL26MRAConceptualSiteModel

Potential Area of Land Contamination based on 2014 PSSR
Volume 1 Site: Reedbed & Metal Recovery Area
Volume 2 Site: Lagoons

SW502
SW504
SW503
SW505
SW506
Monks Ditch
Blackwall Reen
Middle Reen
Ellen Reen
Chapel Reen
Common Reen
Parish Reen
Bowleaze Reen
Monkscroft Reen
Crabtree Reen
Elver Pill Reen
MC Reen 1
EL Reen 1
MDSWS
R10
R11
R12
R13
14.1
14.2
15.3
16.1
16.2
CL-24 Llanwern Electricity Substation Area of FIII
CL-25 Llanwern Electricity Substation
CL-27 Green Moor Historical Landfill

Permit Boundaries

- Tata Steel Strip products UK (Llanwern Steelworks) - Active Permission
- Llanwern South Side of Queensway Landill - Working Towards a State of Closure
- South Side Queensway Non-hazardous Landfill - Active Permission
- Llanwern Steelworks Land Adjacent to 1 - 3 Blast Furnace, Corus, Llanwern Works
- Lagoons
- Reedbed
- Metal Recovery Area
- Proposed Area to be Used for Reconstructing/Replacing Reedbed No. 1

Reedbed No. 1
Metal Recovery Area
Reedbed No. 2
Lagoon 12
Lagoon 25
Lagoon 26
Lagoon 27
NW
NE
SW
SE

Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Proposed Water Treatment Area (WTA)
- Potential Area of Land Contamination based on 2014 PSSR
- Other Potential Area of Land Contamination

Surface Water Monitoring Locations

- 2015 (RPS) - Q2
- 2015 (RPS) - Q1
- 2015 (Geotechnical Engineering)
- 2008-2009 (Titan Surveys)
- 2006 (Enviros)

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Appendix R11.1 Annex D CL-26

Overview Site Plan for CL-26 with Permit Boundaries

Figure: 3	Revision: -
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked: FB

Scale: A3 @ 1:10,859
0 180 360m

N

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dwg ref: JER6591_Figure3_CL26Overview

dwg ref: JER6591_Figure3_CL26Overview Contains Ordnance Survey data © Crown copyright and database right 2015

WATER ANALYTICAL DATA FOR TOTAL PETROLEUM HYDROCARBONS (TPH)

VISUAL EVIDENCE OF HYDROCARBON CONTAMINATION

BH08
BH07 1.3
BH06 0.9
BH2 51
CABH1 0.39
BH09 2.5
CABH2 14
BH21 9.7
BH12 0.9
BH5 47
BH13
BH4 9.3
CABH3 26
BH18 4.6
0.5
BH14 0.4
BH20 46.1
BH3 156
BH19 1.3
BH16 0.5
BH1 0.8
BH17 0.3
RBBH09
Ellen Reen

< 1 mg/l
1 -< 25 mg/l
25 -< 55 mg/l
> 55 mg/l
TPH Concentration

CATP1
CATP2
CATP5
TP12
CATP6
TP1
CATP7
TP13
TP2
CATP8
TP3
TP2
TP4
CATP9
CATP10
TP6
TP4
TP8
TP10
TP3
TP5
TP9
TP11
TP6
MRTP5
RBTP07
Ellen Reen

No Visual/Olfactory Evidence
Sheen/Olfactory Evidence
Free Product Identified

Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Potential Area of Land Contamination based on 2014 PSSR
- Reedbed No. 1
- Metal Recovery Area
- Monitoring Well Location
- Trial Pit Location

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Appendix R11.1 Annex D CL-26

Hydrocarbon Contamination Distribution for CL-26 (Metal Recovery Area)

Figure: 4	Revision: -
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked: FB

Scale: A3 @ 1:2,000
0 30 60 m

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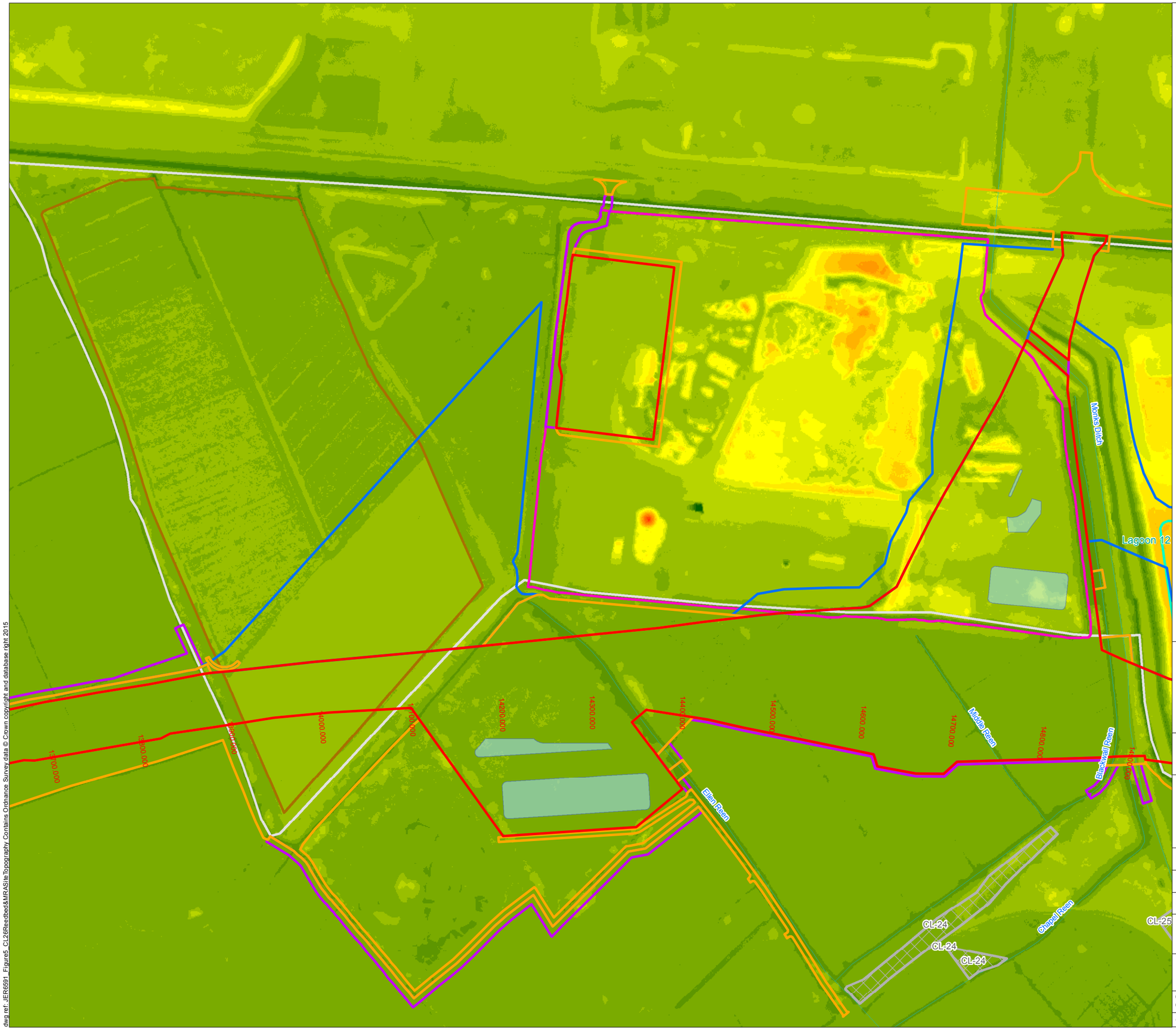
dwg ref: JER6591_Figure4_CL26MRAHydrocarbonsWater Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Proposed Water Treatment Area (WTA)
- Potential Area of Land Contamination based on 2014 PSSR
- Other Potential Area of Land Contamination
- Reedbed No. 1
- Metal Recovery Area
- Lagoon

LiDAR Digital Terrain Model

- 1 -< 2 mAOD
- 2 -< 3 mAOD
- 3 -< 4 mAOD
- 4 -< 5 mAOD
- 5 -< 6 mAOD
- 6 -< 7 mAOD
- 7 -< 8 mAOD
- 8 -< 9 mAOD
- 9 -< 10 mAOD
- 10 -< 11 mAOD
- 11 -< 12 mAOD
- 12 -< 13 mAOD
- 13 -< 14 mAOD
- 14 -< 15 mAOD
- 15 -< 16 mAOD
- 16 -< 17 mAOD
- 17 -< 18 mAOD

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Appendix R11.1 Annex D CL-26

Site Topography for CL-26 (Reedbed No. 1 & Metal Recovery Area)

Figure: 5	Revision: -
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked: FB

Scale: A3 @ 1:4,000
0 100 200 m

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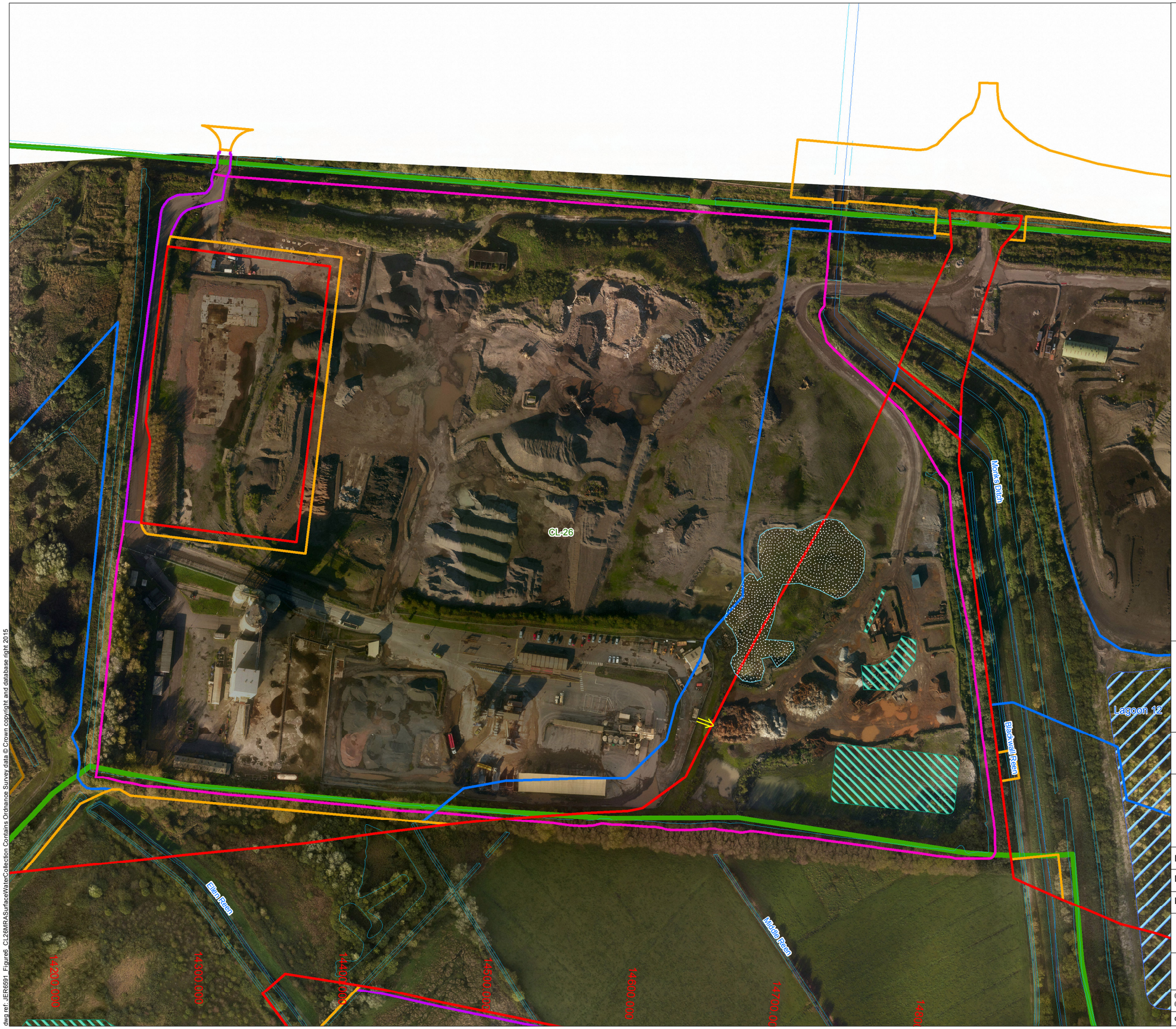
dwg ref: JER6591_Figure5_CL26Reedbed&MRASiteTopography

dwg ref: JER6591_Figure5_CL26Reedbed&MRASiteTopography Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Proposed Water Treatment Area
- Potential Area of Land Contamination based on 2014 PSSR
- Reedbed No. 1
- Metal Recovery
- Lagoon
- Surface Water Collection Pond
- Discharge Point Outfall

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Appendix R11.1 Annex D CL-26

Surface Water Collection: CL-26 (Metal Recovery Area)

Figure: 6	Revision: -
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked: EW

Scale: A3 @ 1:2,500
0 40 80m

N

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dwg ref: JER6591_Figure6_CL26MRASurfaceWaterCollection

dwg ref: JER6591_Figure6_CL26MRASurfaceWaterCollection Contains Ordnance Survey data © Crown copyright and database right 2015

Appendices

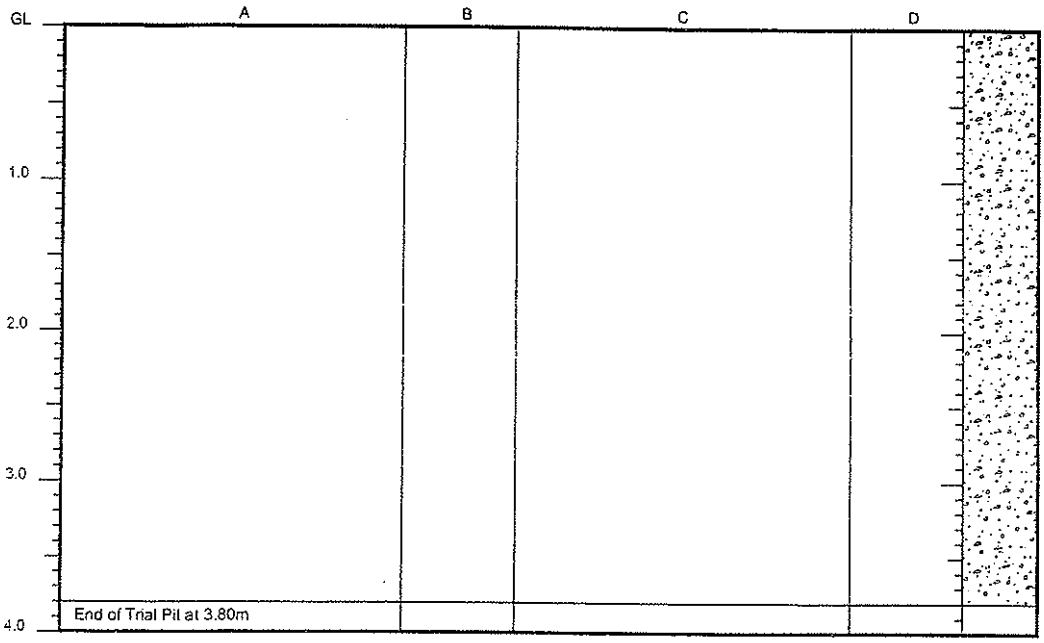
Appendix 1

Exploratory Records

Trial Pit Log

Exploration Associates

Logged by DE Checked by	Equipment and Methods Trial Pit/Trench from 0.00m to 3.80m.Pit dug using Hydraulic wheeled excavator.	Ground Level National Grid Coordinates



Dimensions 4.00m x 2.00m
Excavation date 18/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.50	ES1	
2.00	ES2	
3.80	ES3	

Strata

Depth (m)	No.	Description
0.00-3.80	1	MADE GROUND: Grey sandy GRAVEL with some cobbles. Gravel is fine to coarse.Gravel and cobbles are angular and subangular of slag.

Groundwater
Struck at 3.00m-Fast seepage.

Remarks
Pit terminated at 3.80m due to extensive quantities of groundwater. Unable to remove due to fast inflow.
Stratum 1-lightly compacted.
Machine dug to 3.8m using JCB with bucket and duck with pecker.
Breaking out with pecker 30 mins.
Hole backfill : 0.00m to 3.80m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

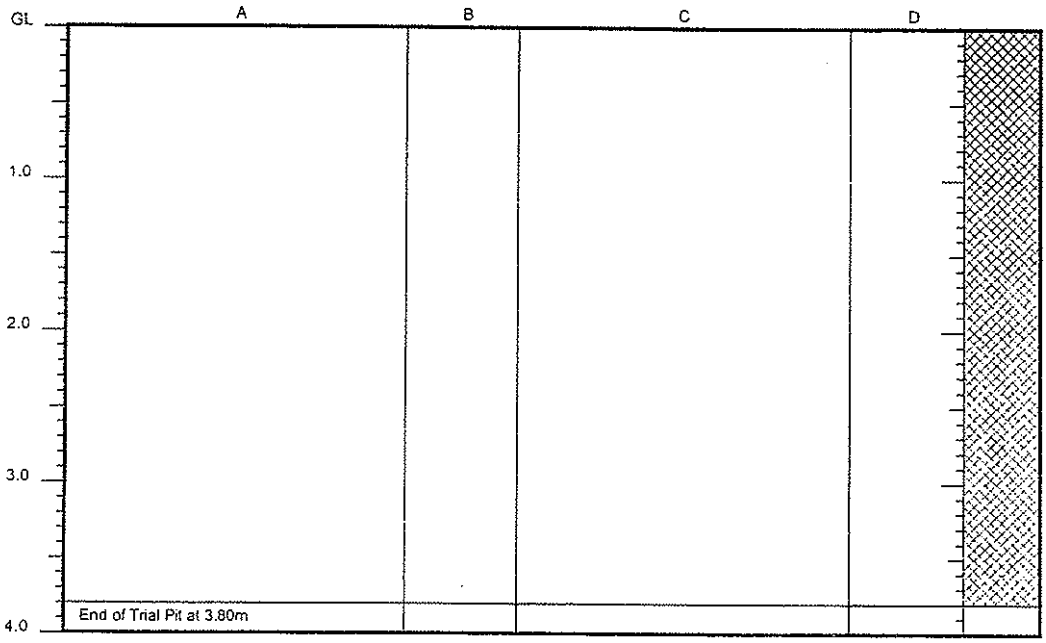
Trial Pit
MRTP1
Sheet 1 of 1

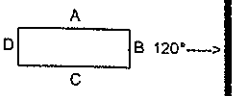
03/05/2002 11:12:16 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by DE Checked by	**Equipment and Methods** Machine dug Trial Pit from 0.00m to 3.80m using JCB with bucket and Rubber Duck with pecker.	**Ground Level** **National Grid Coordinates**





Dimensions 5.10m x 1.90m
Excavation date 19/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.50	ES1	
3.80	ES2	

Strata

Depth (m)	No.	Description
0.00-3.80	1	MADE GROUND: Grey sandy GRAVEL with occasional cobbles. Gravel is fine to coarse. Gravel and cobbles are angular and subangular of slag.

Groundwater
Moderate seepage at 2.30m.

Remarks
Stratum 1 - Highly compacted.
Trial Pit terminated at 3.80m due to large quantities of groundwater in pit.
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 3.80m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

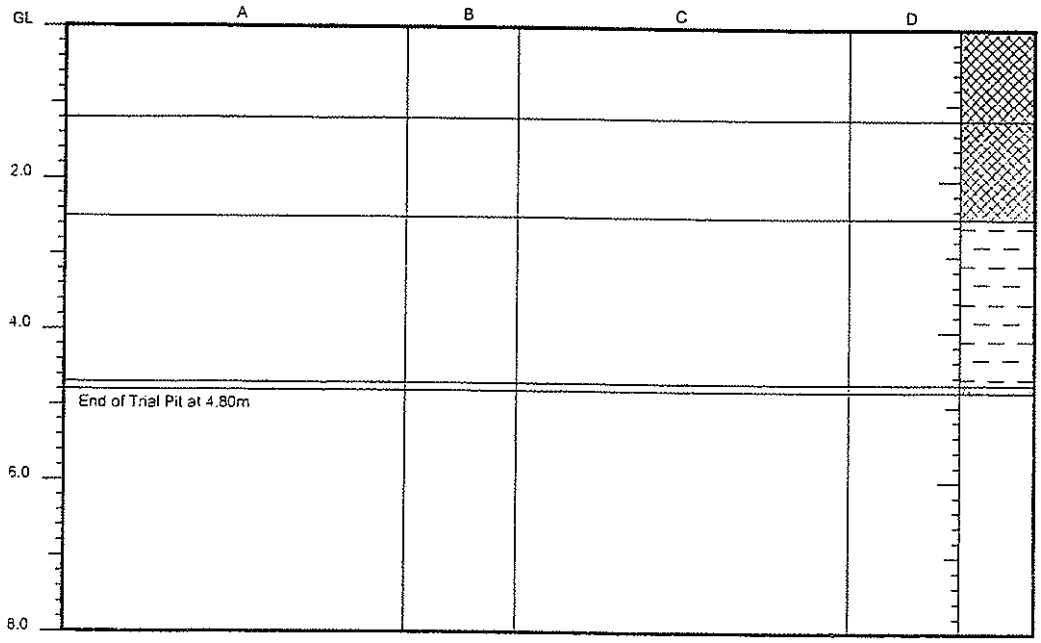
Trial Pit
MRTP2
Sheet 1 of 1

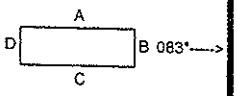
03/05/2002 11:12:21 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by DE Checked by	**Equipment and Methods** Machine dug Trial Pit from 0.00m to 4.80m using JCB with bucket and Rubber Duck with pecker.	**Ground Level** **National Grid Coordinates**





Dimensions 4.60m x 1.80m
Excavation date 19/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.50	ES1	
2.00	ES2	
3.50	ES3	

Strata

Depth (m)	No.	Description
0.00-1.20	1	MADE GROUND: Brown sandy GRAVEL with some cobbles. Gravel is fine to coarse. Gravel and cobbles are angular and subangular of slag and brick. Rare fagments of metal wire.
1.20-2.50	2	MADE GROUND: Grey slightly sandy GRAVEL with some cobbles. Gravel is fine to coarse. Gravel and cobbles are angular and subangular of slag, brick and iron ore.
2.50-4.70	3	Firm grey CLAY with occasional rootlets.
4.70-4.80	4	Brown spongy fibrous PEAT.

Groundwater
Fast seepage at 1.50m.

Remarks
Stratum 1 and 2 - Highly compacted.
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 4.80m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 100

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

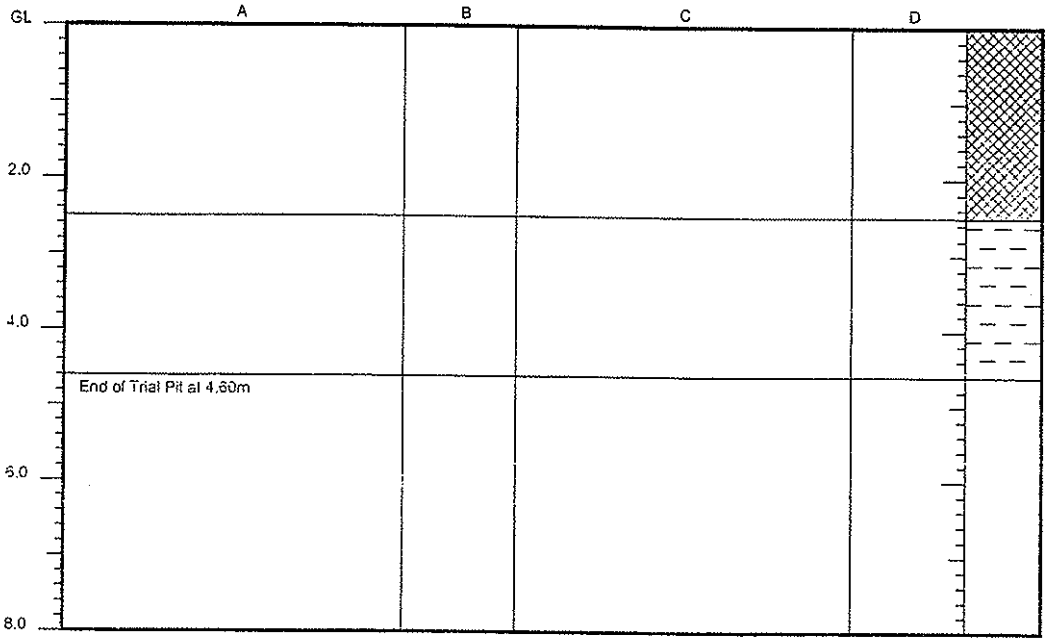
Trial Pit
MRTP3
Sheet 1 of 1

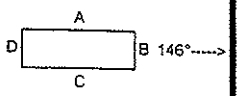
03/05/2002 11:12:25 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by DE Checked by	**Equipment and Methods** Machine dug Trial Pit from 0.00m to 4.60m using JCB with bucket and Rubber Duck with pecker.	**Ground Level** **National Grid Coordinates**





Dimensions 4.70m x 1.50m
Excavation date 19/02/2002

Samples and Tests			Strata		
Depth (m)	Type & No.	Records	Depth (m)	No.	Description
0.50 2.30	ES1 ES2		0.00-2.50	1	MADE GROUND: Black and grey sandy GRAVEL with some cobbles and occasional boulders. Gravel is fine to coarse. Gravel, cobbles and boulders are angular and subangular of brick and slag.
3.50	ES3		2.50-4.60	2	Stiff grey mottled orange brown CLAY.

Groundwater
Moderate seepage at 2.30m.

Remarks
Stratum 1 - Compacted.

Stability : Stable, Shoring : None
Hole backfill : 0.00m to 4.60m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 100

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

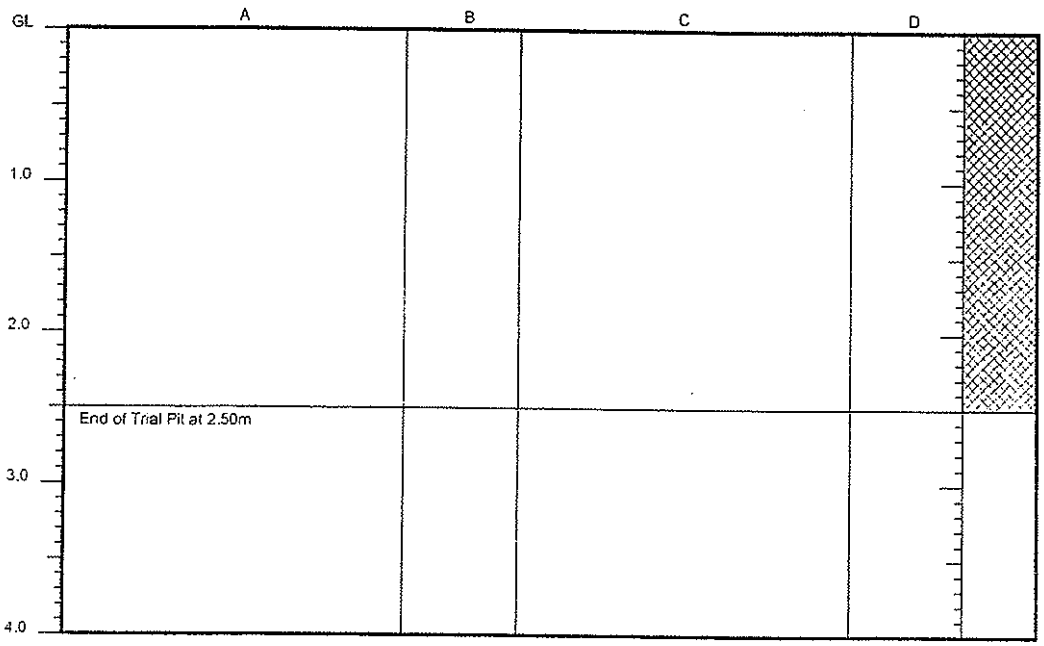
Trial Pit
MRTP4
Sheet 1 of 1

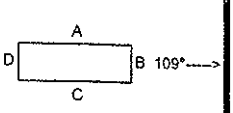
03/05/2002 11:12:29 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by JL Checked by	**Equipment and Methods** Trial Pit/Trench from 0.00m to 2.50m.Pit dug using Hydraulic wheeled excavator.	**Ground Level** **National Grid Coordinates**





Dimensions 3.50m x 1.00m
Excavation date 14/02/2002

Samples and Tests

Strata

Depth (m)	Type & No.	Records	Depth (m)	No.	Description
0.40	ES1		0.00-2.50	1	MADE GROUND: Brown dark green slightly silty sandy angular to sub rounded fine to coarse GRAVEL of slag ash and clinker.

Groundwater
No groundwater encountered.

Remarks
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 2.50m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

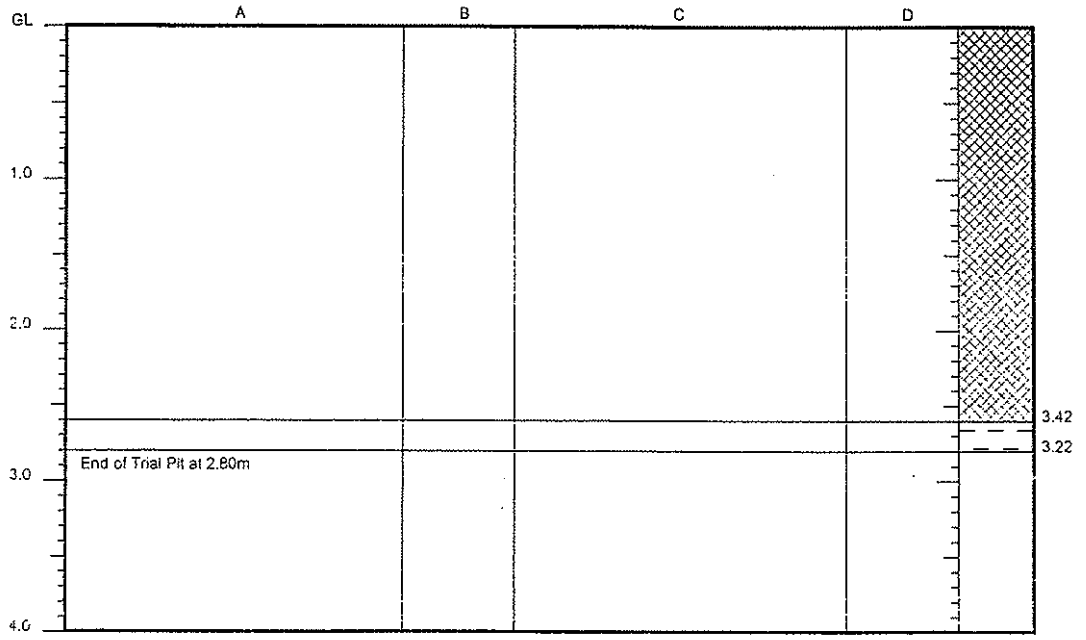
Trial Pit
MRTP5
Sheet 1 of 1

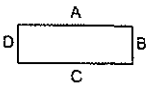
03/05/2002 11:12:33 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by JSN Checked by	Equipment and Methods Trial Pit/Trench from 0.00m to 2.80m.Pit dug using Hydraulic wheeled excavator.	Ground Level + 6.02 m OD National Grid Coordinates E 336349.61 N 186249.72





Dimensions 2.75m x 0.95m
Excavation date 18/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.50	ES1	
0.80-2.80	ES3	
2.50	ES2	

Strata

Depth (m)	No.	Description
0.00-2.60	1	MADE GROUND: Black very sandy fine to coarse angular of limestone and slag with rare angular cobbles and boulders of slag and asphalt. Below 2.50m hydrocarbon smell.
2.60-2.80	2	Firm grey clay with occasional rootlets.

Groundwater
No groundwater encountered.

Remarks
Hole backfill : 0.00m to 2.80m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

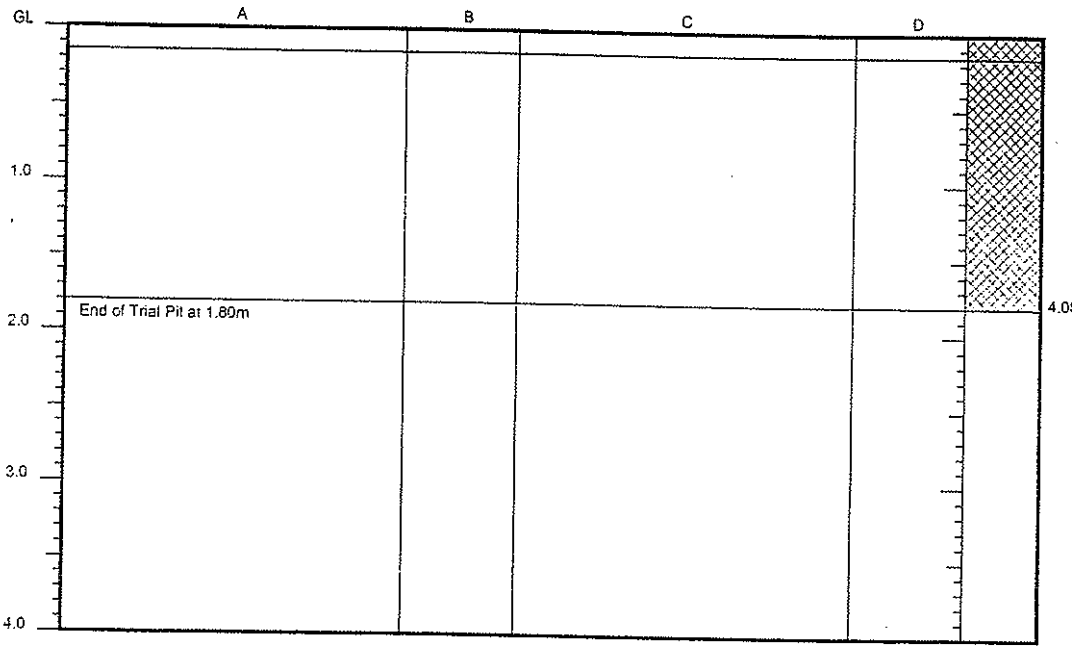
Trial Pit
CATP1
Sheet 1 of 1

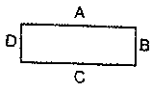
03/05/2002 11:04:28 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by JSN Checked by	Equipment and Methods Trial Pit/Trench from 0.00m to 1.80m.Pit dug using Hydraulic wheeled excavator.	Ground Level + 5.88 m OD National Grid Coordinates E 336346.33 N 185219.69





Dimensions 2.15m x 1.10m
Excavation date 15/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.75	ES1	
1.20	ES2	

Strata

Depth (m)	No.	Description
0.00-0.15	1	MADE GROUND: Ashphalt.
0.15-1.80	2	MADE GROUND: Black very sandy fine to coarse angular GRAVEL of limestone and slag with occasional angular cobbles and boulders.

Groundwater
No groundwater encountered.

Remarks
Hole backfill : 0.00m to 1.80m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

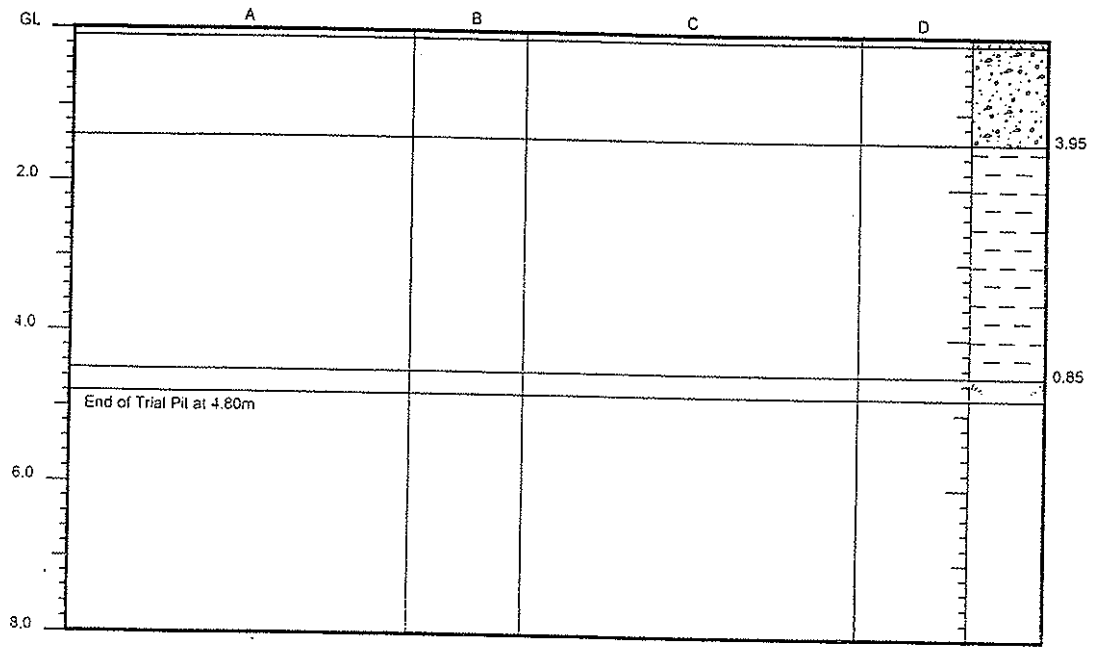
Trial Pit
CATP2
Sheet 1 of 1

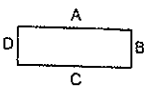
03/05/2002 11:04:34 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by DE Checked by	**Equipment and Methods** Trial Pit/Trench from 0.00m to 2.50m.Pit dug using Hydraulic wheeled excavator.	Ground Level + 5.35 m OD National Grid Coordinates E 336402.86 N 186196.81





Dimensions 4.60m x 1.60m
Excavation date 18/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.50	ES1	
1.30	ES2	
2.50	ES3	

Strata

Depth (m)	No.	Description
0.00-0.10	1	MADE GROUND: Tarmac.
0.10-1.40	2	MADE GROUND: Grey brown sandy GRAVEL with many cobbles. Gravel is fine to coarse. Gravel and cobbles are angular and subangular of slag.
1.40-4.50	3	Stiff grey mottled orange/brown CLAY.
4.50-4.80	4	Dark brown spongy fibrous PEAT.

Groundwater

Remarks
Machine dug to 4.8m using JCB with bucket and duck with pecker.
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 4.80m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 100

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

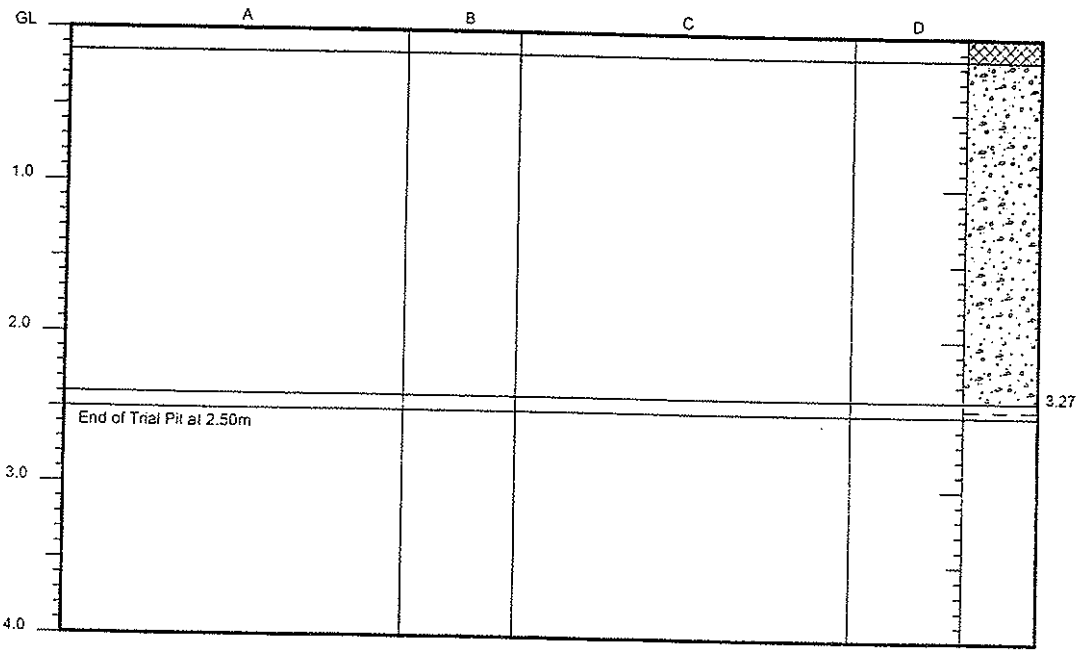
Trial Pit
CATP5
Sheet 1 of 1

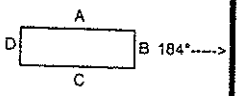
03/05/2002 11:04:43 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by GW Checked by	**Equipment and Methods** Trial Pit/Trench from 0.00m to 2.50m.Pit dug using Hydraulic wheeled excavator.	Ground Level + 5.67 m OD National Grid Coordinates E 336344.78 N 186192.45





Dimensions 2.50m x 1.20m
Excavation date 18/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.75	ES1	
2.04	ES2	
2.50	ES3	

Strata

Depth (m)	No.	Description
0.00-0.15	1	MADE GROUND: Black asphalt.
0.15-2.40	2	MADE GROUND: Black very sandy fine to coarse anguar GRAVEL of slag with occasional angular cobbles and boulders of slag.
2.40-2.50	3	Soft to firm CLAY.

Groundwater
No groundwater encountered.

Remarks
One hour breaking out
Hole backfill : 0.00m to 2.40m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

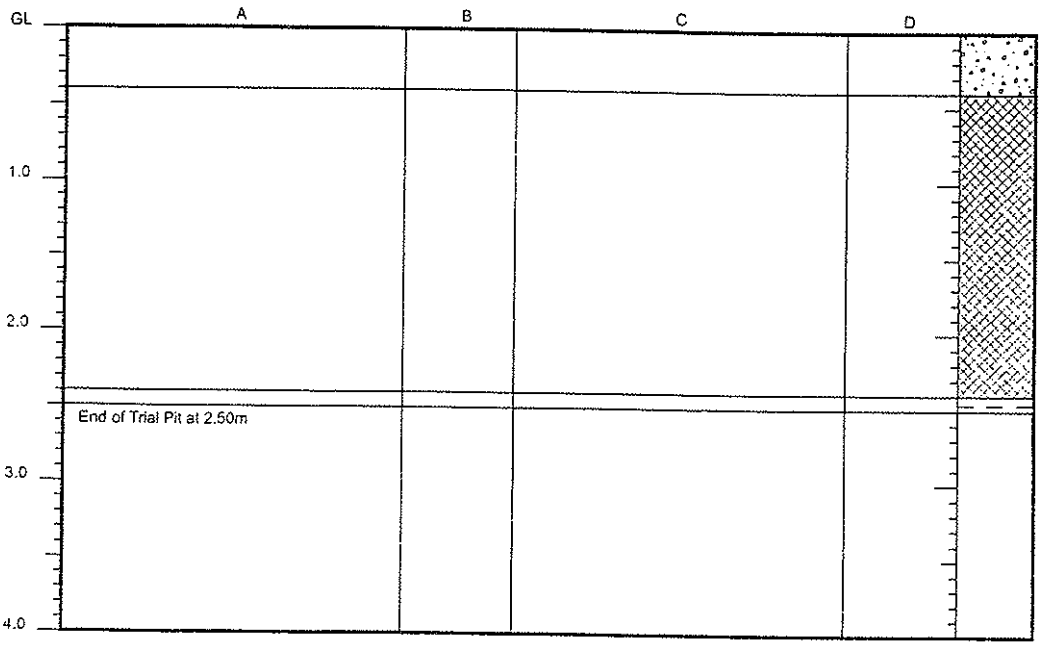
Trial Pit
CATP6
Sheet 1 of 1

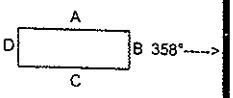
03/05/2002 11:04:46 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by JN Checked by	Equipment and Methods Machine dug Trial Pit from 0.00m to 2.50m using JCB with bucket and pecker.	Ground Level National Grid Coordinates





Dimensions 2.20m x 1.40m
Excavation date 19/02/2002

Samples and Tests			Strata		
Depth (m)	Type & No.	Records	Depth (m)	No.	Description
			0.00-0.40	1	MADE GROUND: Reinforced CONCRETE. At 0.40m: Clear visqueen.
0.75 2.00	ES1 ES2		0.40-2.40	2	MADE GROUND: Dark red brown very sandy GRAVEL. Gravel is angular fine to coarse of slag, brick and concrete. Below 2.20m: Becoming slightly sandy with hydrocarbon oudor.
2.45	ES3		2.40-2.50	3	Soft friable dark blue grey CLAY with frequent rootlets.

Groundwater
Fast seepage at 2.20m.

Remarks
Hydrocarbon oudor from groundwater.
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 2.50m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

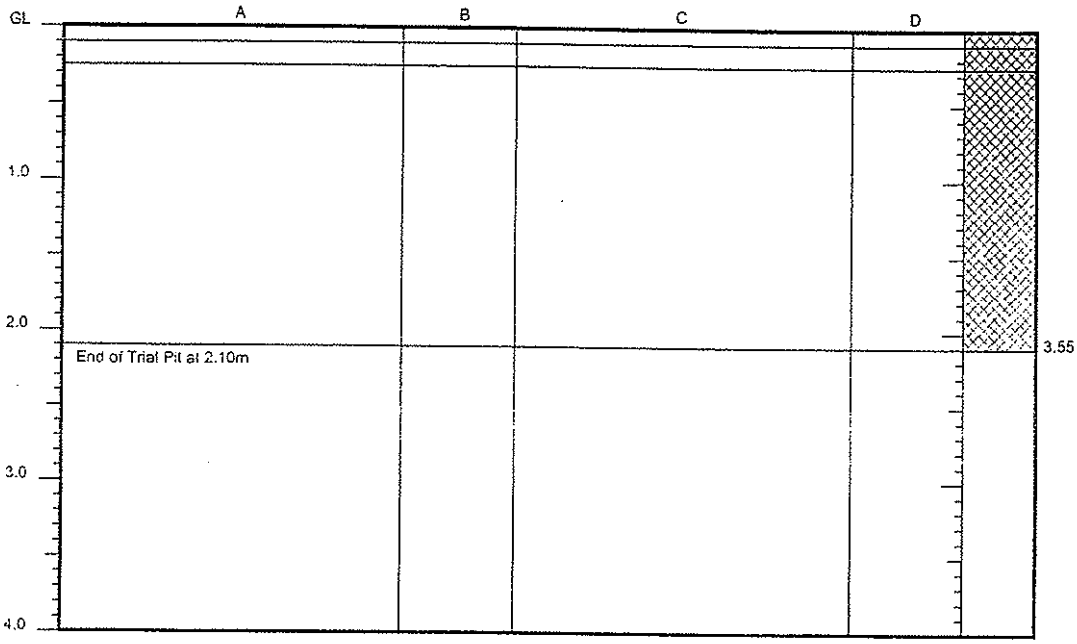
Trial Pit
CATP7
Sheet 1 of 1

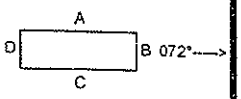
03/05/2002 11:04:49 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by JN Checked by	**Equipment and Methods** Machine dug Trial Pit from 0.00m to 2.10m using JCB with bucket and breaker.	Ground Level + 5.65 m OD National Grid Coordinates E 336285.49 N 186123.84.





Dimensions 2.20m x 1.20m
Excavation date 19/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
1.00	ES1	
2.10	ES2	

Strata

Depth (m)	No.	Description
0.00-0.10	1	MADE GROUND: Red brown very sandy GRAVEL. Gravel is angular fine to coarse of limestone.
0.10-0.25	2	MADE GROUND: Dark grey ASPHALT.
0.25-2.10	3	MADE GROUND: Black very sandy GRAVEL with occasional cobbles and boulders. Gravel is fine to coarse. Gravel, cobbles and boulders are angular of slag. Hydrocarbon oil sheen on surface of gravel.

Groundwater
Fast seepage at 1.75m.

Remarks
Trial Pit terminated on encountering 3 inch wire cable at 2.10m.
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 2.10m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

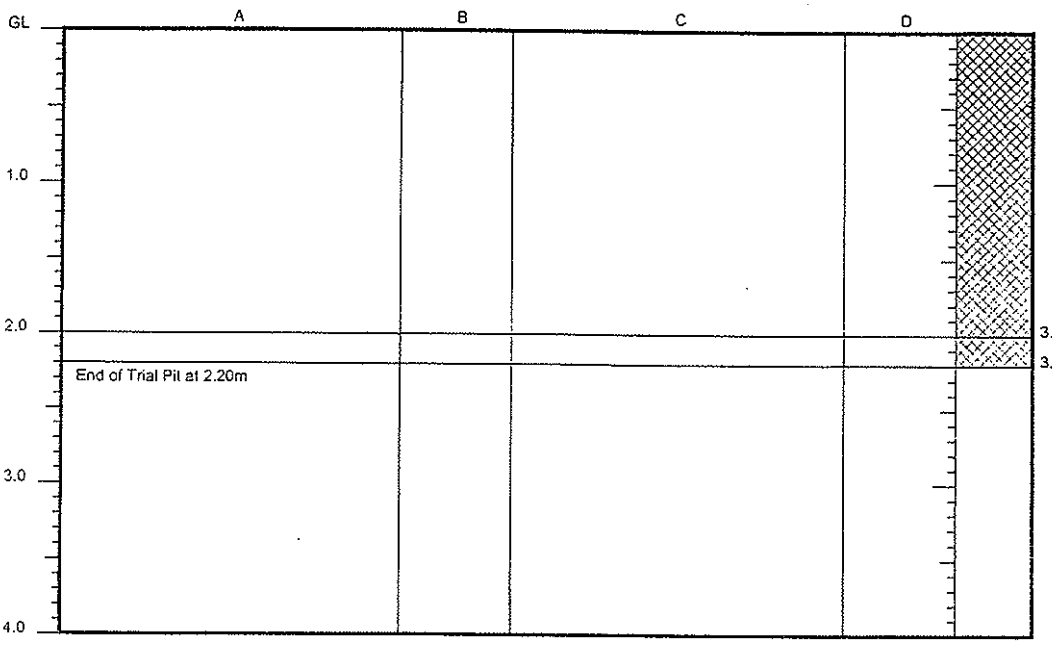
Trial Pit
CATP8
Sheet 1 of 1

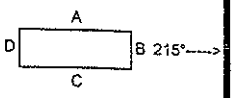
03/05/2002 11:04:52 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by JN Checked by	**Equipment and Methods** Machine dug Trial Pit from 0.00m to 2.20m using JCB with bucket and pecker.	**Ground Level** + 5.64 m OD **National Grid Coordinates** E 336295.18 N 186108.83





Dimensions 2.50m x 1.15m
Excavation date 19/02/2002

Samples and Tests

Strata

Depth (m)	Type & No.	Records	Depth (m)	No.	Description
1.00	ES1		0.00-2.00	1	MADE GROUND: Dark brown very sandy GRAVEL with occasional cobbles and boulders. Gravel is fine to coarse. Gravel, cobbles and boulders are angular and subangular of slag and brick.
2.10	ES2		2.00-2.20	2	MADE GROUND: Light yellow grey GRAVEL. Gravel is angular and subangular fine and medium of unidentifiable stone.

Groundwater
Slow seepage at 0.50m.

Remarks
Trial Pit terminated at 2.20m due to large quantities of groundwater in pit.
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 2.20m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

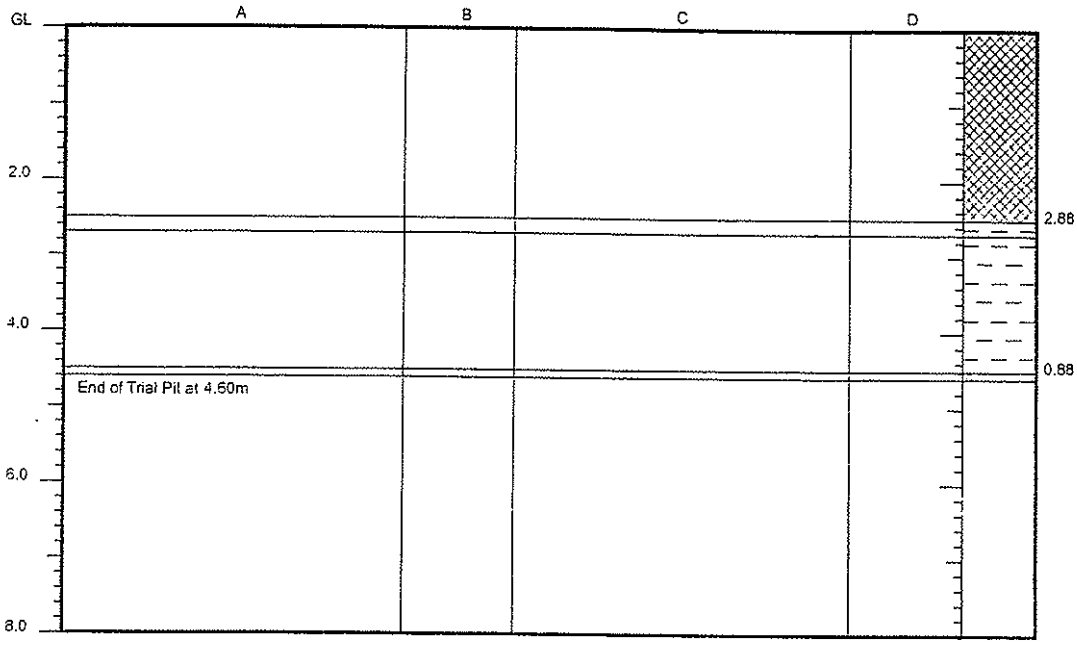
Trial Pit
CATP9
Sheet 1 of 1

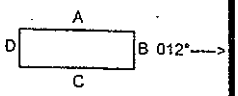
03/05/2002 11:04:56 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by DE Checked by	**Equipment and Methods** Machine dug Trial Pit from 0.00m to 4.60m using JCB with bucket and Rubber Duck with pecker.	Ground Level + 5.38 m OD National Grid Coordinates E 336265.22 N 186098.33





Dimensions 4.30m x 1.50m
Excavation date 19/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.50	ES1	
2.40	ES2	
2.60	ES3	
3.50	ES4	

Strata

Depth (m)	No.	Description
0.00-2.50	1	MADE GROUND: Grey and brown slightly sandy GRAVEL with occasional cobbles and boulders. Gravel is fine to coarse. Gravel, cobbles and boulders are angular and subangular of slag and brick.
2.50-2.70	2	Soft black CLAY with abundant rootlets and hydrocarbon oil pockets (<20mm).
2.70-4.50	3	Stiff grey mottled orange brown CLAY.
4.50-4.60	4	Dark brown spongy fibrous PEAT.

Groundwater
Fast seepage at 1.20m.

Remarks
Stratum 1 - Highly compacted.

Stability : Stable, Shoring : None
Hole backfill : 0.00m to 4.60m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 100

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Trial Pit
CATP10
Sheet 1 of 1

03/05/2002 11:04:31 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by GW Logged by DE Checked by	**Equipment and Methods** Inspection Pit from 0.00m to 0.50m. Cable Percussion 150 mm diameter from 0.50m to 6.00m.	Ground Level + 5.20m OD National Grid Coordinates E 336310.34 N 186243.26

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
0.50	ES1		15/02/2002	:
			15/02/2002 2.50	
			18/02/2002 2.50	0.90
3.00	ES2			
			18/02/2002 2.50	
6.00 6.00	ES3	kRH		

Strata

Description	Depth,Level (Thickness)	Legend
Soft grey brown slightly sandy gravelly CLAY. Gravel is angular and subangular fine and medium of slag.	(2.50)	a
Soft green grey mottled orange brown CLAY.	2.50 +2.70 (2.60)	b
Brown spongy fibrous PEAT.	5.10 +0.10 (0.90pen)	
EXPLORATORY HOLE ENDS AT 6.00 m.	6.00 –0.80	

Groundwater

Remarks

Chiselling : 0.50m to 2.50m 300minutes
Hole backfill : 0.00m to 2.50m Arisings (a), 2.50m to 2.90m Bentonite (b).
Standpipe installed, 50mm diameter, response zone from 2.90m to 6.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
CABH1
Sheet 1 of 1

03/05/2002 11:04:17 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	NF	Equipment and Methods	Ground Level + 5.72 m OD
Logged by	DE	Cable Percussion 150 mm diameter from 0.00m to 6.00m.	National Grid Coordinates E 336322.12 N 186188.19
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
			15/02/2002	
1.00	ES1			
3.00	ES2	kRH		
3.00				
			15/02/2002	
			6.00	dry

Strata

Description	Depth,Level (Thickness)
MADE GROUND: CONCRETE.	0.20 +5.52
Ash and slag (DRILLERS DESCRIPTION).	(2.00)
Soft grey silty CLAY with strong oily smell (DRILLERS DESCRIPTION).	2.20 +3.52 (0.70)
Firm green grey CLAY.	2.90 +2.82 (2.00)
PEAT (DRILLERS DESCRIPTION).	4.90 +0.82 (1.10pen)
EXPLORATORY HOLE ENDS AT 6.00 m.	6.00 -0.28

Legend: c, b, 1, 1, b, a

Groundwater

No.	Struck	Behaviour
1	1.10m	Rising to 0.80m after 20 mins. Sealed 3.80. Moderate inflow

Remarks

Chiselling : 0.00m to 1.00m 90minutes, 1.20m to 1.60m 90minutes
Hole backfill : 0.00m to 0.30m Concrete (c), 0.30m to 0.50m Bentonite (b), 3.00m to 4.00m Bentonite (b), 4.00m to 6.00m Arisings (a). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 0.50m to 3.00m.

...s : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project: ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no. 152002
Carried out for Corus plc

Borehole: CABH2
Sheet 1 of 1

03/05/2002 11:04:21 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	JR	Equipment and Methods	Ground Level + 5.66 m OD
Logged by	DE	Inspection Pit from 0.00m to 1.20m. Cable Percussion 150 mm diameter from 1.20m to 6.00m.	National Grid Coordinates E 336287.33 N 186098.50
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
0.50	ES1		15/02/2002	
2.80	ES2			
3.20		kRH	15/02/2002 3.50	
3.50	ES3		18/02/2002 3.50	1.75
6.00	ES4		18/02/2002 3.50	

Strata

Description	Depth,Level (Thickness)
MADE GROUND: Grey and grey brown locally sandy GRAVEL. Gravel is angular and subangular fine to coarse of slag and shale.	(3.10)
Soft green grey mottled orange brown CLAY. Driller reports bands of peat.	3.10 +2.56 (2.90pen)
EXPLORATORY HOLE ENDS AT 6.00 m.	6.00 −0.34

Legend: c, b, 1, g

Groundwater

No.	Struck	Behaviour
1	1.30m	Rising to 0.00m after 20 mins.

Remarks

Chiselling : 0.40m to 1.40m 180minutes, 1.40m to 2.60m 150minutes
Hole backfill : 0.00m to 0.30m Concrete (c), 0.30m to 0.80m Bentonite (b), 3.20m to 6.00m Grout (g). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 0.80m to 3.20m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
CABH3
Sheet 1 of 1

03/05/2002 11:04:25 ESGLog v2.10

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ03 CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	336844.19 E
Project	New M4 - Second Preliminary Ground Investigation				185775.81 N
		Drilling Rig	Dando	Ground Level	5.37m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	17/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	21/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
17/01/2008	1730	5.00	4.50	DRY	End of Shift
18/01/2008	0730	5.00	4.50	DRY	Start of Shift
18/01/2008	1730	11.50	11.50	10.80	End of Shift
21/01/2008	0730	11.50	11.50	5.20	Start of Shift
21/01/2008	1730	13.00	12.00	9.00	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
12.70	13.00	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
150	13.00	150	12.00

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
18/01/2008		5.20	5.20	20	Seepage	5.00	NS

GENERAL NOTES

1.Cable Percussive boring from GL to 13.00m.
2.50mm standpipe installed, slotted from 3.40m to 5.20m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.50	S	N=13 (2,3,3,3,3,4)	1.00	DRY
3.50	S	N=11 (2,2,3,2,2,4)	3.00	DRY
5.50	S	N=2 (1,1,0,1,0,1)	5.00	5.20
7.50	S	N=2 (1,0,1,0,1,0)	7.00	6.80
9.50	S	N=2 (1,1,0,1,0,1)	9.00	8.90
12.50	S	50/180mm (9,14,19,19,12)	12.00	7.00
13.00	S	50/30mm (25,50)	12.00	9.00

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL CP HEADER
Version	3.05
Revised	17/12/2007

NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ03 CP
Sheet 1 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	336844.19 E
Project	New M4 - Second Preliminary Ground Investigation				185775.81 N
		Drilling Rig	Dando	Ground Level	5.37m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	17/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	21/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
TOPSOIL.									
		0.30	5.07	ES1	0.30				
Firm very low strength grey mottled orangish brown silty slightly sandy CLAY. Sand is coarse. (Estuarine Alluvium)				ES2	1.00	(15)			
				D3	1.00				
				U4	1.00 - 1.45				
				D5	1.50	S13	S	1.50	
				D6	1.50 - 1.95			1.95	
				ES7	2.00				
				B8	2.00 - 2.50				
		2.50	2.87	D9	2.50				
Soft to firm grey silty CLAY with closely spaced coarse gravel sized pockets of brown amorphous peat. (Estuarine Alluvium)				ES10	3.00	(14)			
				U11	3.00 - 3.45				
		3.31	2.06						
Spongy black pseudofibrous PEAT. (Peat)				D12	3.50	S11	S	3.50	
				D13	3.50 - 3.95			3.95	
				ES14	4.00				
				B15	4.00 - 4.50				
				D16	4.50				
		5.05	0.32	ES17	5.00	(11)			
Very soft grey silty CLAY. (Estuarine Alluvium)				U18	5.00 - 5.45				
---at 5.05m 1no cobble sized fragment of wood.									
---from 5.05m to 6.50m with closely to medium spaced coarse gravel sized pockets of brown fibrous peat				D19	5.50	S2	S	5.50	
				D20	5.50			5.95	
				D21	6.50				
---from 6.50m with closely spaced coarse gravel sized pockets of black pseudofibrous peat				U22	7.00 - 7.45	(5)			
				D23	7.50	S2	S	7.50	
				D24	7.50			8.03	
				D25	8.50				
				U26	9.00 - 9.45	(6)			
				D27	9.50	S2	S	9.50	
				D28	9.50			9.95	

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	3.09
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ03 CP
Sheet 2 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	336844.19 E
Project	New M4 - Second Preliminary Ground Investigation				185775.81 N
		Drilling Rig	Dando	Ground Level	5.37m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	17/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	21/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
Very soft grey silty CLAY. (Estuarine Alluvium)				D29	10.50				
				U30	11.00 - 11.45	(12)			
		11.38	-6.01						
Firm to stiff reddish brown mottled grey slightly gravelly clay. Gravel is angular fine to medium (Weathered Mudstone). (Mercia Mudstone)				D31	11.45				
				D32	12.00	(120)			
				U33	12.00				
				D34	12.50	S50/180mm	S	12.50	
---from 12.50m very stiff				D35	12.50			12.83	
		13.00	-7.63	D36	13.00	S50/30mm	S	13.00	
Cable Percussion boring complete at 13.00 m.				D37	13.00			13.07	

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	3.09
Revised	17/12/2007

Geotechnical Engineering Limited

BOREHOLE LOG

BH510

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 26 January 2015 — Easting 336334.9 — Scale 1 : 50

End Date 27 January 2015 — Northing 185762.4 — Ground level 5.45mOD — Depth 22.30 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
26/01/15 1245hrs	1B	0.00	0.30						Soft brown silty CLAY with frequent roots and rootlets. (TOP)	0.30	5.15	
	2D*	0.00	0.30		Vo 0.90							
	3D*	0.30	0.70		Vo 1.40				Firm light brown locally mottled orange silty CLAY with frequent plant fragments (up to 30mm). (TFD)			
	4B	0.50	0.70									
	5D*	0.70	1.00		Vo 3.90							
	6B	1.00	1.20									
	7UT	1.20	1.65	Nil								
	9X	1.20	2.20							1.70	3.75	
	8D	1.70	2.15	Nil	S 2				Very soft bluish grey silty CLAY with rare rootlets (up to 30mm). (TFD)			
	10D*	1.80	2.00									
	11UT	2.20	2.65	Nil								
	14X	2.20	3.20									
	12D	2.65	2.70									
	13D	2.70	3.15	Nil	S 2							
	15D*	2.80	3.00									
	16UT	3.20	3.65	Nil								
	18X	3.20	4.20							3.70	1.75	
	17D	3.70	4.15	Nil	S 5				Firm black fibrous PEAT. Slight organic odour. (PEAT)			
	19UT	4.20	4.65	Nil								
	21X	4.20	5.20									
	20D	4.70	5.15	Nil	S 3							
	22UT	5.20	5.65	5.20								
	24X	5.20	6.70							5.70	-0.25	
	23D	5.70	6.15	5.20	S 6				Soft becoming very soft light grey locally mottled orangish brown silty CLAY. (TFD)			
	25UT	6.70	7.15	6.70					6.70m: Tending to slightly sandy silt.			
	28X	6.70	8.20									
	26D	7.15	7.20									
	27D	7.20	7.65	6.70	S<1							
									Continued Next Page	{8.00}		

EQUIPMENT: Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.20m. Dynamic sampled (128mm) 1.20-12.00m. Waterflush rotary core drilled (116mm) 12.00-22.30m.

CASING: 168mm diam to 11.60m.

BACKFILL: On completion, borehole backfilled with bentonite pellets 22.30-12.00m. A slotted standpipe (50mm) with geosock was installed to 12.00m, granular response zone 12.00-9.00m and bentonite seal 9.00-6.00m. A second slotted standpipe (35mm) with geosock was installed to 6.00m, granular response zone 6.00-3.00m, bentonite seal 3.00-0.20m, concrete and stopcock cover 0.20-0.00m.

REMARKS: Downhole magnetometry for UXO risk mitigation undertaken 0.00-12.00m. No anomalies encountered.

MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
2.00	Nil	1.95	20	

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30238	EC

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Geotechnical Engineering Limited

BOREHOLE LOG

BH510

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 26 January 2015 — Easting 336334.9 — Scale 1 : 50

End Date 27 January 2015 — Northing 185762.4 — Ground level 5.45mOD — Depth 22.30 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	29D 30X	8.20 - 8.65 8.20 - 9.70	8.20	S<1							
26/01/15 1630hrs 0.40m											
27/01/15 0855hrs 0.50m	31D 32X	9.70 - 10.15 9.70 - 11.20	9.70	S<1							
								Firm black fibrous PEAT. Slight organic odour. (PEAT)	10.30 10.60	-4.85 -5.15	
	33D 34X	11.20 - 11.65 11.20 - 12.00	11.20	S 26				Soft grey sandy slightly gravelly silty CLAY with frequent plant fragments (up to 30mm). Gravel is subrounded fine and medium sandstone. (TFD)	11.40	-5.95	
								Firm reddish brown slightly sandy gravelly CLAY. Gravel is subangular and subrounded fine and medium sandstone and siliceous. (MMG) 11.80 - 12.00m: Stiff.	12.00	-6.55	
	35D 36C	12.00 - 12.24 12.00 - 13.50	11.20 11.60	S*120	100	NA		Stiff fissured reddish brown slightly sandy gravelly CLAY. Gravel is subangular and subrounded fine and medium lithorelicts of very stiff clay to extremely weak mudstone. Localised relict fissures are randomly orientated extremely closely spaced planar smooth. (MMG) (Grade III/IVa)			
	37C	13.50 - 15.00	11.60		90			Stiff fissured reddish brown locally mottled greenish grey slightly sandy slightly gravelly CLAY light greenish grey reduction spots (up to 30mm). Gravel is subangular to rounded fine lithorelicts of very stiff clay to extremely weak mudstone. (MMG) (Grade IVa)	13.50	-8.05	
	38C	15.00 - 16.30	11.60		100 0 0	NI		Extremely weak and very weak thinly laminated to very thinly bedded reddish brown locally calcareous MUDSTONE. Fractures are subhorizontal to 20° and subvertical very closely spaced planar and smooth rarely stained black and locally with a veneer of clay. (MMG) (Grade II)	14.90	-9.45	
	39C	16.30 - 17.80	11.60		80 0 0			16.30 - 16.60m: Limited recovery of subangular fine and medium siltstone gravel.			
	40C	17.80 - 19.30	11.60		100						
								Continued Next Page	{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

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BOREHOLE LOG

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CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 26 January 2015 — Easting 336334.9 — Scale 1 : 50

End Date 27 January 2015 — Northing 185762.4 — Ground level 5.45mOD — Depth 22.30 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
					0 0						
						NA		Stiff fissured reddish brown slightly sandy gravelly CLAY. Gravel is subangular and subrounded fine and medium lithorelicts of very stiff clay to extremely weak mudstone. Localised relict fissures are randomly orientated extremely closely spaced planar smooth. (MMG) (Grade III/IVa)	18.30	-12.85	
	41C	19.30 - 20.80	11.60		100 0 0						
								Very stiff fissured reddish brown gravelly to very gravelly CLAY. Gravel is subangular and subrounded fine to coarse lithorelicts of extremely weak mudstone. Fissures are subhorizontal to 20° and subvertical very closely spaced planar smooth locally stained black and locally infilled (up to 3mm) with clay. (MMG) (Grade III)	19.90	-14.45	
	42C	20.80 - 22.30	11.60		100 0 0						
27/01/15 1403hrs 1.30m									22.30	-16.85	
								Borehole completed at 22.30m.	{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

AGS

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BOREHOLE LOG

BH511

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 24 February 2015 — Easting 336694.2 — Scale 1 : 50

End Date 2 March 2015 — Northing 185862.9 — Ground level 7.00mOD — Depth 21.20 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
24/02/15 1330hrs	1D*	0.00 - 0.50		Vo 0.0				Black clayey very sandy angular and subangular fine to coarse slag GRAVEL with medium slag cobble content. (MG)			
	2B	0.50 - 1.00									
24/02/15 1700hrs Dry	3D*	0.50 - 1.00		Vo 0.0							
		1.00 - 1.45	1.00	C 29							
	4B	1.00 - 2.00									
25/02/15 0800hrs Dry	5D*	1.00 - 1.50		Vo 0.0				1.00 - 1.45m: Medium dense.			
		1.50 - 1.80	1.00	C*104							
	6D*	1.50 - 2.00		Vo 0.0				1.50 - 1.80m: Very dense.			
		2.00 - 2.45	2.00	C 31							
	7B	2.00 - 3.00						2.00 - 2.45m: Dense.			
	8D*	2.00 - 2.50		Vo 0.0							
		2.50 - 2.95	2.00	C 22							
	9D*	2.50 - 3.00		Vo 0.0				2.50 - 2.80m: Medium dense.			
	10D	2.80							2.80	4.20	
	11D*	3.00 - 3.50		Vo 0.9				Firm dark grey mottled brown slightly sandy slightly gravelly CLAY. Gravel is angular and subangular fine to coarse slag. (MG)			
	12UT	3.00 - 3.45	2.90								
	13D	3.50									
	14D	3.50 - 3.95	3.00	S 8							
	15B	3.50 - 4.00									
	16D*	3.50 - 4.00		Vo 0.0							
	17UT	4.00 - 4.45	3.90								
25/02/15 1700hrs Dry	18D	4.50							4.20	2.80	
	19D	4.50 - 4.95	4.50	S 6				Soft dark grey mottled brown silty CLAY. (TFD)			
26/02/15 0800hrs 3.00m	20B	4.50 - 5.00									
	21D*	4.50 - 4.70		Vo 1.0							
	22UT	5.00 - 5.45	5.00								
	24D*	5.00 - 5.20		Vo 0.0							
	23D	5.50									
	25D	6.00									
	26D*	6.00 - 6.20		Vo 0.0							
	28D	6.50 - 6.95	6.50	S 8							
	27B	6.50 - 7.00							6.70	0.30	
	29D	6.80						Firm black clayey fibrous PEAT. (PEAT)			
	30D*	7.00 - 7.20		Vo 0.0							
	31D	7.50									
								Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.00m. Cable percussion (200mm) 1.00-4.00m and (150mm) 4.00-15.00m. Dynamic sampled (113mm) 15.00-15.20m (not retained). Waterflush rotary coring (116mm) 15.20-21.20m.

CASING: 200mm to 3.00m and 150mm diam to 14.70m.

BACKFILL: On completion, hole backfilled with bentonite pellets 21.20-0.40m and gravel 0.40-0.00m.

REMARKS: Downhole magnetometry for UXO risk mitigation undertaken 0.00-1.50m. No anomalies encountered.

Hole advanced by chiselling 1.00-2.80m (6.5hrs), 14.50-15.00m (1hr).

Bentonite seal for aquifer protection installed during drilling 4.00-2.50m, prior to reduction in casing diameter. Falling head permeability test undertaken at 9.00m- 9.50m. MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered prior to use of water flush.

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BOREHOLE LOG

BH511

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 24 February 2015 — Easting 336694.2 — Scale 1 : 50

End Date 2 March 2015 — Northing 185862.9 — Ground level 7.00mOD — Depth 21.20 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	32UT	8.00 - 8.45	8.00								
	34D*	8.00 - 8.20		Vo 0.0							
	35D	8.40									
	33D	8.50									
									8.90	-1.90	
	36D	9.00						Soft dark grey slightly sandy silty CLAY. (TFD)			
	37D	9.50 - 9.95	9.20	S 7							
	38B	9.50 - 10.00						9.50 - 12.60m: Soft.			
	39D	10.50									
	40UT	11.00 - 11.45	10.90					11.00m: Tending to sandy silt.			
	41D	11.50 - 11.60						11.40 - 11.80m: Black slightly sandy clayey peat.			
	42D	11.50									
	43D	12.00									
	44D	12.50 - 12.95	12.50	S 13							
	45B	12.50 - 13.00							12.60	-5.60	
								Firm reddish brown and dark grey slightly gravelly CLAY. Gravel is subangular and subrounded fine and medium mudstone lithorelicts. (MMG)			
	46D	13.40							13.30	-6.30	
	47D	13.50 - 13.95	13.50	S 27				Stiff reddish brown and light greenish grey slightly gravelly CLAY. Gravel is subangular fine and medium mudstone lithorelicts. (MMG)			
	48B	13.50 - 14.00									
26/02/15 1700hrs 10.00m	49D	14.50 - 14.77	14.50	S*123							
27/02/15 0800hrs 11.70m	50B	14.50 - 15.00									
	51D	15.00 - 15.17	14.70	S*161							
02/03/15 1000hrs 13.34m	X	15.00 - 15.20							15.20	-8.20	
	52C	15.20 - 16.70	14.70		100	NA		Very stiff fissured reddish brown very gravelly CLAY. Gravel is subangular and subrounded fine to coarse lithorelicts of extremely weak mudstone. Fissures are subhorizontal to 20° and subvertical extremely closely spaced planar smooth. (MMG) (Grade III)			
									16.50	-9.50	
						NA		Stiff fissured reddish brown gravelly CLAY. Gravel is subangular and subrounded fine to coarse lithorelicts of extremely weak mudstone. Fissures are subhorizontal to 20° and subvertical extremely closely spaced planar smooth. (MMG) (Grade III)			
	53C	16.70 - 18.20	14.70		100						
								Continued Next Page	{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered prior to use of water flush.

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BOREHOLE LOG

BH511

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 24 February 2015 — Easting 336694.2 — Scale 1 : 50

End Date 2 March 2015 — Northing 185862.9 — Ground level 7.00mOD — Depth 21.20 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	54C	18.20	19.70	14.70		100			17.90 - 18.00m: Light greenish grey.			
	55C	19.70	21.20	14.70		100						
02/03/15 1305hrs 2.53m									20.60 - 20.70m: Light greenish grey.			
										21.20	-14.20	
									Borehole completed at 21.20m.			
										{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered prior to use of water flush.

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BOREHOLE LOG

BH512

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 2 March 2015 — Easting 336772.2 — Scale 1 : 50

End Date 6 March 2015 — Northing 185854.1 — Ground level 6.50mOD — Depth 25.20 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
02/03/15 0800hrs	1B	0.30 - 0.50						Medium dense to very dense dark grey subangular fine to coarse slag GRAVEL. (MG)			
	2D*	0.30 - 0.50		Vo 0.0							
		0.50 - 0.95	Nil	C 52					0.50	6.00	
	3B	0.50 - 2.50						Subangular slag COBBLES with much sandy subangular fine to coarse slag gravel. (MG)			
		1.00 - 1.45	Nil	C 29							
	4D*	1.00 - 1.50		Vo 0.0							
		1.50 - 1.95	Nil	C 41							
02/03/15 1700hrs 1.70m	5D*	1.50 - 2.00		Vo 0.0							
		2.00 - 2.45	2.00	C 28							
03/03/15 0800hrs 1.70m	6B	2.00 - 2.50									
	7D*	2.00 - 2.50		Vo 0.0					2.40	4.10	
	8D	2.50 - 2.95	2.50	S 8				Soft dark greyish brown sandy gravelly silty CLAY. Gravel is angular fine to coarse slag. (MG)			
	11D	2.50									
	10B	2.50 - 3.00									
	12D*	2.50 - 2.70		Vo 0.0					2.95	3.55	
	13UT	3.00 - 3.45	3.00					Soft dark brown locally mottled grey slightly sandy silty CLAY with frequent subangular fine to coarse slag gravel and rare coarse gravel sized fibrous peat fragments. (MG)			
	14D	3.50									
	15D*	3.00 - 3.20		Vo 0.0							
	16B	3.50 - 4.00									
	17D*	3.50 - 3.70		Vo 0.0							
	18D	3.50 - 3.95	3.00	S 6							
	19UT	4.00 - 4.45	3.50								
	21D*	4.00 - 4.20		Vo 0.0							
	20D	4.50									
	22B	4.50 - 5.00	4.00	S 3							
	24D	4.50 - 4.95		Vo 0.0							
	23D*	4.50 - 4.70							4.90	1.60	
	25UT	5.00 - 5.44	4.50					Firm black slightly clayey slightly sandy fibrous PEAT with frequent roots (up to 4mm diam) and frequent rootlets (up to 1mm diam). (PEAT)			
	27D*	5.00 - 5.20		Vo 0.0							
	28D	5.50									
	29D	6.00									
	30D*	6.00 - 6.20		Vo 0.0							
	31D	6.50 - 6.95	6.50	S 10							
	32B	6.50 - 7.00									
	33D*	7.00 - 7.20							7.30	-0.80	
	34D	7.50						Very soft and soft dark grey very sandy silty CLAY with localised rare fragments of organic material. (TFD)			
								Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-0.50m. Cable percussion (200mm) 0.50-3.00m and (150mm) 3.00-15.00m. Dynamic sampled (113mm) 15.00-15.10m. Waterflush rotary core drilled (116mm) 15.10-25.20m. CASING: 200mm diam to 2.50m and 150mm diam to 14.70m.

BACKFILL: On completion, borehole backfilled with bentonite 25.20-11.20m. A slotted standpipe (50mm) with geo-sock was installed to 11.00m, granular response zone 11.20-6.80m and bentonite seal 6.80-2.10m. A second slotted standpipe (35mm) with geo-sock was installed to 2.00m, granular response zone 2.10-0.85m, bentonite seal 0.85-0.25m, concrete and stopcock cover 0.25-0.00m. REMARKS: Hole advanced by chiselling 0.50-2.40m (2h 30mins) and 14.60-15.00m (1hr). Downhole magnetometry for UXO risk mitigation undertaken 0.00-13.00m. No anomalies encountered. Bentonite seal for aquifer protection installed during drilling 3.00-1.50m, prior to reduction in casing diameter.

MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
1.70	Nil	1.70	20	Slow flow.
2.00	2.00	2.50	20	

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BOREHOLE LOG

BH512

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 2 March 2015 — Easting 336772.2 — Scale 1 : 50

End Date 6 March 2015 — Northing 185854.1 — Ground level 6.50mOD — Depth 25.20 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	35UT	8.00 - 8.45	7.80								
	37D*	8.00 - 8.20									
	36D	8.50									
	38D	9.00									
	39D	9.50 - 9.95	9.40	S<1							
	40B	9.50 - 10.20									
	41D	10.50									
	42UT	11.00 - 11.45									
								Soft dark grey very sandy silty CLAY with rare subrounded tabular coarse sandstone gravel. (TFD)	11.20	-4.70	
03/03/15 1700hrs Dry	43D	11.50									
	44D	12.00 - 12.45	12.00	S 21					11.90	-5.40	
04/03/15 0800hrs 7.20m	45B	12.00 - 12.50						Stiff fissured reddish brown slightly gravelly silty CLAY. Gravel is subangular fine and medium lithorelicts of extremely weak mudstone. (MMG)			
	46D	12.00									
	47D	13.00									
	48D	13.50 - 13.95	13.00	S 46				13.50 - 13.95m: Very stiff.			
	49B	13.50 - 14.00									
04/03/15 1200hrs 10.00m	50D	14.60 - 14.75	14.50	S*140							
	51D	14.60									
06/03/15 0945hrs 3.62m	53D	15.00 - 15.65	14.70	S*246		NA			15.00	-8.50	
	52X	15.00 - 15.10						Stiff fissured reddish brown sandy gravelly CLAY. Gravel is angular and subangular tabular fine to coarse lithorelicts of very stiff clay to extremely weak mudstone. Localised relict fissures are subhorizontal to 20° closely spaced. (MMG) (Grade III)			
	54C	15.10 - 16.20	14.70		100						
	55C	16.20 - 17.70	14.70		100			16.65 - 16.70m: Bluish green reduction spots (up to 3mm).			
									17.20	-10.70	
								Very stiff reddish brown slightly sandy CLAY with rare light greenish grey reduction spots (up to 2mm). (MMG) (Grade IVb)	17.70	-11.20	
	56C	17.70 - 19.20	14.70		100 0						
								Continued Next Page	{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

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BOREHOLE LOG

BH512

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 2 March 2015 — Easting 336772.2 — Scale 1 : 50

End Date 6 March 2015 — Northing 185854.1 — Ground level 6.50mOD — Depth 25.20 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
					0			Stiff fissured reddish brown sandy gravelly CLAY with rare greenish grey reduction spots (up to 2mm). Gravel is angular and subangular fine to coarse lithorelicts of very stiff clay to extremely weak mudstone. (MMG) (Grade III)			
						NI		18.00 - 18.20m: Light greenish grey.	18.60	-12.10	
	57C	19.20 - 20.70	14.70		100 0 0			Extremely weak and very weak reddish brown and dark bluish grey MUDSTONE locally tending to claybound angular and subangular fine to coarse gravel sized mudstone lithorelicts. Fractures are randomly orientated extremely closely and very closely spaced planar smooth and rough infilled (up to 5mm) with reddish brown clay. (MMG) (II/III)			
								19.94m: 20° fracture planar rough infilled (up to 2mm) with reddish brown clay.			
								20.35m: 20° fracture planar rough infilled (up to 2mm) with reddish brown clay.			
	58C	20.70 - 22.20	14.70		100 0 0			20.85m: 20° fracture planar rough infilled (up to 2mm) with reddish brown clay.			
								21.35m: 20° fracture planar rough infilled (up to 2mm) with reddish brown clay.			
								21.55m: 20° fracture planar rough infilled (up to 2mm) with reddish brown clay.			
	59C	22.20 - 23.70	14.70		100 0 0			22.10m: 20° fracture planar rough infilled (up to 2mm) with reddish brown clay.			
								22.40 - 22.55m: Light greenish grey.			
								23.10m: 20° fracture planar rough infilled (up to 2mm) with reddish brown clay.			
						NA					
	60C	23.70 - 25.20	14.70		100				24.10	-17.60	
06/03/15 1415hrs 3.47m								Stiff fissured reddish brown sandy gravelly CLAY. Gravel is subhorizontal angular and subangular fine to coarse lithorelicts of very stiff clay to extremely weak mudstone. (MMG) (Grade III) 24.60 - 24.95m: Bluish grey silty clay.			
									25.20	-18.70	
								Borehole completed at 25.20m.			
									{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

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TRIAL PIT LOG

TP504

CLIENT	WELSH GOVERNMENT					Sheet	1 of 1
SITE	M4 CORRIDOR AROUND NEWPORT					Scale	1 : 25
Start Date	20 February 2015	Easting	336733.7			Depth	1.70 m
End Date	20 February 2015	Northing	185858.9	Ground level	6.60mOD		

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
	1B	Vo 6.8	0.00- 0.10	Dark grey sandy angular and subangular fine to coarse brick, timber and slag GRAVEL with low red brick and slag cobble content. (MG)			
	2D*		0.00- 0.10				
	3B	Vo 30.5	0.60- 0.80				
	4D*		0.60- 0.80				
	5B	Vo 7.2	1.20- 1.40				
	6D*		1.20- 1.40				
Rapid ingress at 1.45m							
1.45m				Trial pit completed at 1.70m.	1.70	4.90	

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater encountered at 1.45m.
Trial pit sides remained stable and vertical.
Trial pit dimensions 0.80x2.40x1.70m.
On completion, the trial pit was backfilled with materials arising.
Trial pit terminated at 1.70m due to the strength of the ground.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

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BOREHOLE LOG

Borehole No.
BHM4CAN035
Sheet 1 of 1

Project Name:	M4 CaN Additional GI	Co-ordinates:	Date(s): 14/12/2015		Final Depth:
Project No:	JFR8703	Easting:	Drilling Method:		1.60m
Location:	Newport	Northing:	Dando 2000	Casing Diameter (mm) 200 / Casing Depth (m) 1.60	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	Logged By: ERH		1:50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00	(0.40)			Grey fine sandy GRAVEL of slag. (MADE GROUND)	
		0.80	ES		0.40	(1.20)			Very dense blackish brown sandy slightly clayey GRAVEL with occasional cobbles. Gravel is subrounded to angular of slag, aggregate and occasional fine angular brick fragments. (MADE GROUND)	1
		1.20	SPT(C)	11 (64 for 135mm/11 for 50mm)					End of Borehole at 1.60m	2
										3
										4
										5
										6
										7
										8
										9
										10

DRAFT

Remarks:
Borehole terminated at 1.6m due to impenetrable slag. Moved 2m east and renamed BHM4CAN035a.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
			01:30	1.20	1.60

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN035a**

Sheet 1 of 1

Project Name:	M4 CaN Additional GI	Co-ordinates:	Date(s): 14/12/2015 - 15/12/2015		Final Depth:
Project No:	JFR8703	Easting:	Drilling Method:		2.80m
Location:	Newport	Northing:	Dando 2000	Casing Diameter (mm): 200 / Casing Depth (m): 2.80	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	Logged By: EH		1:50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00	(0.20)			Reddish brown/grey sandy slightly clayey GRAVEL with frequent cobbles and rare boulders. Gravel, cobbles and boulders are subrounded to angular of slag, aggregate and brick with occasional metal fragments, plastic and wood pieces. (MADE GROUND)	
					0.20	(0.30)			Reddish brown clayey gravelly coarse SAND. Gravel is rounded to angular of slag aggregate and occasional brick. (MADE GROUND)	
		0.50	ES		0.50	(0.40)			Black clayey sandy GRAVEL with occasional cobbles, and small brick fragments (<10mm). Gravel is subrounded to angular of slag. (MADE GROUND)	
		0.80	ES		0.90	(0.50)			Gravelly sandy CLAY with frequent cobbles of slag up to 120mm. Gravels are angular to sub- angular of slag. (MADE GROUND)	
		1.20	SPT(C)	50 (25 for 50mm/50 for 10mm)	1.40				*Larger cobbles of slag up to 150 mm at 1.3-1.4 m*	
		1.50 - 2.00	B			(1.40)			Very dense coarse grained GRAVEL of slag. (MADE GROUND)	
		2.00	SPT(C)	50 (7,18/50 for 80mm)						
		2.80	SPT(C)	50 (25 for 15mm/50 for 20mm)					End of Borehole at 2.80m	

DRAFT

Remarks:
Borehole terminated due to impenetrable slag. Borehole moved and renamed BHM4CAN035b.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
			03:00	0.60	1.20
			03:00	1.20	2.00
			01:45	2.00	2.40
			03:00	2.60	2.80

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN035b**

Sheet 1 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 06/01/2016 - 07/01/2016	Final Depth:
Project No:	JFR8703	Easting:	336637	Drilling Method: Pipe Diameter: 50mm	15.90m
Location:	Newport	Northing:	185871	Dando 2000	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.98	Logged By: ERH	1:50

Casing Diameter (mm)	Casing Depth (m)
150	15.20
200	5.50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00		6.98		Black GRAVEL with many cobbles. Gravel and cobbles are angular to subangular of slag. (MADE GROUND)	
		2.00 - 3.00	ES			(3.70)				1
										2
										3
		3.70 - 4.45	B		3.70		3.28		Soft grey gravelly CLAY with occasional small plant fibres. Gravel is angular to rounded of slag. (MADE GROUND)	
		3.90	ES			(0.80)				4
		4.30	SPT(S)	N=5 (1,0/1,1,1,2)						
		4.50 - 4.95	B		4.50		2.48		Soft dark grey CLAY, with occasional rare plant fibres and frequent pockets of black organic matter. (TIDAL FLAT DEPOSITS)	
		5.50	ES			(1.90)				5
		5.90	D							
		6.00	SPT(S)	N=4 (1,0/1,1,1,1)					*Becoming firm at 6 mbGL.*	6
		6.00 - 6.45	B							
		6.40	D		6.40		0.58		Spongy reddish brown fibrous PEAT. (PEAT)	
		6.50	ES							7
		7.50	SPT(S)	N=6 (1,1/1,2,1,2)		(2.20)				
		7.50 - 7.95	B							8
		8.20	ES							
		8.60	D		8.60		-1.62		Soft grey slightly sandy, silty CLAY, with frequent black organic matter. (TIDAL FLAT DEPOSITS)	
		9.00	SPT(S)	N=3 (1,0/1,0,1,1)						9
		9.00 - 9.45	B							
		10.00	ES						Continued on next sheet	10

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Rotary open holed 1.2 - 4.0m due to impenetrable slag. Cable percussion 1.20m - 15.90m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 13.1 - 3.9m and 1.0 - 0.2m, gravel 15.9 - 13.1m and 3.9 - 1.0m and concrete 0.2 - 0.0m. One standpipe (50mm) was installed with slotted section between 13.1 - 15.9m and a second standpipe (50mm) was installed with slotted section between 1.0 - 3.7m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (5.5 - 3.5m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 4.5 - 11.8m. Unable to undertake between 1.2 - 4.5m within Made Ground due to interference from metals. No anomalies encountered. Moved from BHM4CAN35a as hit a large boulder of slag. Installed with raised cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
14.10	13.80	9.40	01:00	2.50	2.80
			00:30	3.00	3.70
			01:00	15.70	15.90

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN035b**

Sheet 2 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 06/01/2016 - 07/01/2016		Final Depth:
Project No:	JFR8703	Easting:	336637	Drilling Method:	Pipe Diameter: 50mm	15.90m
Location:	Newport	Northing:	185871	Dando 2000	Casing Diameter (mm) / Casing Depth (m): 150 / 15.20; 200 / 5.50	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.98	Logged By: ERH		1:50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
		10.50	SPT(S)	0 (0 for 450mm/0 for 0mm)		(3.20)				11
		10.50 - 10.95	B							
		11.80	D		11.80		-4.82		Soft to firm reddish brown slightly sandy gravelly CLAY. Gravel is subangular to rounded of mudstone (Weathering Grade IVa). (WEATHERED MERCIA MUDSTONE)	12
		12.00	SPT(S)	N=10 (2,3/2,2,3,3)						
		12.00 - 12.45	B			(1.30)				
		13.10	D		13.10		-6.12		Stiff red slightly silty CLAY. (Weathering Grade V) (WEATHERED MERCIA MUDSTONE)	13
		13.50	SPT(S)	N=41 (3,6/6,8,9,18)						
		13.50 - 13.95	B			(1.90)				14
		15.00	SPT(S)	50 (25 for 115mm/50 for 115mm)	15.00		-8.02		Recovered as angular gravel of reddish brown weathered MUDSTONE. (Weathering Grade IVa) (WEATHERED MERCIA MUDSTONE)	15
		15.00 - 15.45	B			(0.90)				
		15.70 - 15.90	B							
		15.90	SPT(S)	50 (25 for 75mm/50 for 50mm)					End of Borehole at 15.90m	16
										17
										18
										19
										20

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Rotary open holed 1.2 - 4.0m due to impenetrable slag. Cable percussion 1.20m - 15.90m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 13.1 - 3.9m and 1.0 - 0.2m, gravel 15.9 - 13.1m and 3.9 - 1.0m and concrete 0.2 - 0.0m. One standpipe (50mm) was installed with slotted section between 13.1 - 15.9m and a second standpipe (50mm) was installed with slotted section between 1.0 - 3.7m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (5.5 - 3.5m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 4.5 - 11.8m. Unable to undertake between 1.2 - 4.5m within Made Ground due to interference from metals. No anomalies encountered. Moved from BHM4CAN35a as hit a large boulder of slag. Installed with raised cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
14.10	13.80	9.40	01:00	2.50	2.80
			00:30	3.00	3.70
			01:00	15.70	15.90

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN036**

Sheet 1 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 09/12/2015 - 06/01/2016	Final Depth:
Project No:	JFR8703	Easting:	336683	Drilling Method: Dando 2000	Pipe Diameter: 50mm / 14.60m
Location:	Newport	Northing:	185957	Casing Diameter (mm): 150, 200 / Casing Depth (m): 14.00, 6.30	Scale: 1:50
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	7.69	Logged By: EJH	

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00	(1.00)	7.69		Blackish grey sandy GRAVEL. Gravel is angular to subangular of slag. (MADE GROUND)	
		0.60	ES							
		1.00	B		1.00		6.69		Very dense dark brownish grey clayey GRAVEL. Gravel is angular to subangular of slag. Becoming denser with depth. (MADE GROUND)	1
		1.20	SPT(C)	17 (58 for 130mm/17 for 30mm)						
		1.50	B			(1.70)				
		2.00	D							2
		2.00	SPT(C)	50 (25 for 5mm/50 for 5mm)						
		2.80	SPT(C)	50 (25 for 5mm/50 for 5mm)	2.70		4.99		Very dense dark grey fine GRAVEL of slag. (MADE GROUND)	3
						(2.90)				4
										5
					5.60		2.09		Soft grey gravelly CLAY with rare pockets of fibrous peat. (TIDAL FLAT DEPOSITS)	
		6.00	D			(0.90)				6
		6.00	ES							
		6.50	SPT(S)	N=7 (1,1/1,2,2,2)	6.50		1.19		Very soft grey CLAY with frequent pockets of spongy fibrous peat. (TIDAL FLAT DEPOSITS)	7
		7.30	D							
		7.50	SPT(S)	N=6 (1,1/2,1,2,1)		(2.20)			*Becoming slightly gravelly at 7.5m.*	
		8.00	D							8
		8.50	SPT(S)	N=8 (1,2/2,2,2,2)						
					8.70		-1.01		Very soft grey CLAY. (TIDAL FLAT DEPOSITS)	9
		9.50	SPT(S)	N=3 (1,0/1,0,1,1)						
		10.00	D						Continued on next sheet	10

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 2.70m. Rotary open holed 2.7 - 5.7m due to impenetrable slag. Cable percussion 5.7 - 14.6m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 14.3 - 9.5m and 7.2 - 0.2m, gravel 9.5 - 7.2m and concrete 0.2 - 0.0m. One standpipe (50mm) was installed with slotted section between 7.5 - 9.0m
REMARKS: Bentonite seal for aquifer protection installed during drilling (6.5 - 4.5m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 5.6 - 14.6m. No anomalies encountered. Installed with raised cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
			02:30	0.20	0.50
			03:30	0.50	1.20
			00:30	1.40	1.60
			06:30	1.60	2.80

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN036**

Sheet 2 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 09/12/2015 - 06/01/2016	Final Depth:
Project No:	JFR8703	Easting:	336683	Drilling Method: Dando 2000	Pipe Diameter: 50mm / 14.60m
Location:	Newport	Northing:	185957	Casing Diameter (mm): 150, 200 / Casing Depth (m): 14.00, 6.30	Scale: 1:50
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	7.69	Logged By: EJH	

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
		10.50	SPT(S)	3 (1 for 225mm/3 for 225mm)						
		11.00	B			(3.80)				11
		11.50	SPT(S)	N=7 (1,1/1,2,2,2)						
		12.00	ES							12
		12.50	SPT(S)	N=6 (1,1/1,0,2,3)	12.50		-4.81		Soft grey slightly gravelly CLAY. Gravel is angular of red mudstone. (TIDAL FLAT DEPOSITS)	
		13.00	SPT(S)	N=42 (5,7/9,9,12,12)						13
		13.50	D			(2.10)				
		14.20	SPT(S)	50 (5,9/50 for 295mm)						14
									End of Borehole at 14.60m	15
										16
										17
										18
										19
										20

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 2.70m. Rotary open holed 2.7 - 5.7m due to impenetrable slag. Cable percussion 5.7 - 14.6m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 14.3 - 9.5m and 7.2 - 0.2m, gravel 9.5 - 7.2m and concrete 0.2 - 0.0m. One standpipe (50mm) was installed with slotted section between 7.5 - 9.0m
REMARKS: Bentonite seal for aquifer protection installed during drilling (6.5 - 4.5m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 5.6 - 14.6m. No anomalies encountered. Installed with raised cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
			02:30	0.20	0.50
			03:30	0.50	1.20
			00:30	1.40	1.60
			06:30	1.60	2.80

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN037**

Sheet 1 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 09/12/2015 - 11/12/2015		Final Depth:
Project No:	JFR8703	Easting:	336753	Drilling Method:	Pipe Diameter: 50mm	15.60m
Location:	Newport	Northing:	186018	Dando 2000	Casing Diameter (mm) / Casing Depth (m): 150 / 15.20; 200 / 3.20	Scale: 1:50
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.77	Logged By: ERH		

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00		6.77		Blackish brown gravelly clayey SAND of slag. (MADE GROUND)	
		0.45	B							
		0.50	D			(1.20)				
		0.60	ES							
		1.00 - 1.20	B							1
		1.20	SPT(C)	N=47 (12,12/13,10,10,14)	1.20		5.57		Dense black sandy GRAVEL of slag with frequent yellow brick fragments and occasional yellow cobbles of slag and bricks. Sand is coarse, gravel is angular medium to coarse. (MADE GROUND)	
		1.20 - 1.65	B							
						(1.40)				2
		2.20	ES							
		2.20	SPT(C)	50 (10,14/50 for 265mm)						
		2.60	D		2.60		4.17		Medium dense light grey sandy GRAVEL . Gravel (yellow, white, black and grey) is angular fine to medium of slag material. (MADE GROUND)	
						(0.60)				3
		3.20	SPT(C)	N=12 (6,7/3,3,3,3)	3.20		3.57		Black sandy angular GRAVEL with frequent angular cobbles and boulders of slag. (MADE GROUND)	
		3.20 - 3.65	B			(0.20)				
		3.40	ES		3.40		3.37		Soft grey slightly sandy CLAY with occasional organic matter inclusions. (TIDAL FLAT DEPOSITS)	
		3.70 - 4.00	B							
										4
		4.20	SPT(S)	N=4 (1,1/1,1,1,1)						
		4.20 - 4.65	B							
						(2.70)				
										5
		5.20	SPT(S)	0 (0 for 450mm/0 for 0mm)						
		5.20 - 5.65	B							
										6
		6.10	D		6.10		0.67		Spongy brown pseudo-fibrous PEAT with strong organic odour. (PEAT)	
		6.20	ES							
		6.25	SPT(S)	N=21 (3,3/5,5,6,5)						
		6.25 - 6.65	B							
		6.25 - 6.65	D							
						(1.80)				7
		7.20	SPT(S)	N=8 (1,2/2,2,2,2)						
		7.20 - 7.65	B							
		7.20 - 7.65	D							
		7.90	D		7.90		-1.13		Very soft bluish grey silty CLAY with occasional black pockets of organic matter. (TIDAL FLAT DEPOSITS)	8
		8.20	SPT(S)	N=3 (1,0/1,0,1,1)						
		8.20 - 8.65	B							
		8.20 - 8.65	D							
						(3.90)				9
		9.20	SPT(S)	0 (0 for 450mm/0 for 0mm)						
		9.20 - 9.65	B							
		9.20 - 9.65	D							
		10.00	D						Continued on next sheet	10

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 15.60m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 12.6 - 3.4m and 1.0 - 0.2m, gravel 15.6 - 12.6m and 3.4 - 1.0m and concrete 0.2 - 0.0m. One standpipe (50mm) was installed with slotted section between 15.6 - 12.6m and a second standpipe (50mm) was installed with slotted section between 3.4 - 1.0m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (3.5 - 1.5m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 3.4 - 11.8m. Unable to undertake between 1.2 - 3.4m within Made Ground due to interference from metals. No anomalies encountered. Installed with raised cover

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
2.60	2.50	2.10	02:30	0.50	1.20
13.70	13.30	9.10	01:30	2.20	2.60
			01:00	15.30	15.60

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN037**

Sheet 2 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 09/12/2015 - 11/12/2015	Final Depth:
Project No:	JFR8703	Easting:	336753	Drilling Method: Dando 2000	Pipe Diameter: 50mm / 15.60m
Location:	Newport	Northing:	186018	Casing Diameter (mm): 150, 200 / Casing Depth (m): 15.20, 3.20	Scale: 1:50
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.77	Logged By: ERH	

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
		10.20	SPT(S)	0 (0 for 450mm/0 for 0mm)						
		10.20 - 10.65	B							
		10.20 - 10.65	D							
		11.20	SPT(S)	N=13 (1,1/2,3,4,4)						
		11.20 - 11.65	B							
		11.20 - 11.65	D							
		11.80	D		11.80		-5.03		Stiff reddish brown slightly silty CLAY. (Weathering Grade IVb). (WEATHERED MERCIA MUDSTONE)	
		12.20	SPT(S)	N=34 (3,4/5,8,9,12)						
		12.20 - 12.65	B							
		12.20 - 12.65	D							
						(2.30)				
		13.20	SPT(S)	N=31 (5,5/6,7,9,9)						
		13.20 - 13.65	B							
		13.20 - 13.65	D							
		14.10	D		14.10		-7.33		Extremely weak red MUDSTONE recovered as angular gravels. (Weathering Grade II). (MERCIA MUDSTONE)	
		14.20	SPT(C)	N=36 (6,7/7,8,10,11)						
		14.20 - 14.65	B							
						(1.50)				
		15.20	SPT(C)	50 (9,13/50 for 125mm)						
		15.20 - 15.60	B							
		15.60	SPT(C)	50 (25 for 95mm/50 for 50mm)					End of Borehole at 15.60m	

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 15.60m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 12.6 - 3.4m and 1.0 - 0.2m, gravel 15.6 - 12.6m and 3.4 - 1.0m and concrete 0.2 - 0.0m. One standpipe (50mm) was installed with slotted section between 15.6 - 12.6m and a second standpipe (50mm) was installed with slotted section between 3.4 - 1.0m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (3.5 - 1.5m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 3.4 - 11.8m. Unable to undertake between 1.2 - 3.4m within Made Ground due to interference from metals. No anomalies encountered. Installed with raised cover

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
2.60	2.50	2.10	02:30	0.50	1.20
13.70	13.30	9.10	01:30	2.20	2.60
			01:00	15.30	15.60

AGS

BOREHOLE LOG

Borehole No.
BHM4CAN038
Sheet 1 of 1

Project Name:	M4 CaN Additional GI	Co-ordinates:	Date(s): 14/12/2015			Final Depth:
Project No:	JFR8703	Easting:	Drilling Method:			0.70m
Location:	Newport	Northing:	Dando 2000	Casing Diameter (mm)	Casing Depth (m)	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	Logged By: ERH			1:50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
		0.00 - 0.15	B		0.00	(0.40)			Brownish grey sandy clayey GRAVEL of slag, with occasional angular to subangular cobbles of slag. (MADE GROUND)	
		0.20	D							
		0.25 - 0.70	B		0.40	(0.30)			Soft grey sandy very gravelly CLAY with occasional cobbles. Gravel and cobbles are angular to subrounded of slag. (MADE GROUND)	
		0.40	ES						*Below 0.6m, becoming brownish grey.*	
									End of Borehole at 0.70m	

DRAFT

Remarks:
Hole moved 1m north after refusal on large boulder of slag at 0.7m. New borehole location is BHM4CAN038a.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
			01:00	0.70	0.70

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN038a**

Sheet 1 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 14/12/2015 - 17/12/2015	Final Depth:
Project No:	JFR8703	Easting:	336746	Drilling Method: Pipe Diameter: 35mm	13.80m
Location:	Newport	Northing:	186090	Dando 2000	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.33	Logged By: ERH	1:50

Casing Diameter (mm)	Casing Depth (m)
150	13.60
200	3.20

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00	(0.20)	6.32		Brownish grey sandy clayey GRAVEL of angular slag. (MADE GROUND)	
					0.20		6.12		Soft grey sandy gravelly CLAY with frequent cobbles and boulders. Gravel, cobbles and boulders are subangular to angular composed of slag with rare brick, aggregate, wood and metal fragments. (MADE GROUND)	
		0.80	ES							
		0.80 - 1.20	B			(1.70)				1
		1.20	SPT(C)	50 (25 for 105mm/50 for 125mm)						
		1.20 - 1.65	B							
					1.90		4.42		Dense dark grey clayey GRAVEL. Gravel is angular to subangular fine to medium of slag. (MADE GROUND)	2
		2.10	D							
		2.20	SPT(C)	N=41 (11,13/15,19,4,3)		(0.70)				
		2.20 - 2.65	B							
		2.60	D		2.60		3.72		Soft to firm grey sandy CLAY with occasional inclusions of black organic matter. (TIDAL FLAT DEPOSITS)	
		2.60 - 3.10	B							3
		2.70	ES							
		3.20	SPT(S)	N=5 (3,2/1,1,1,2)						
		3.20 - 3.65	B			(1.40)				
		3.70	D							
		4.00	D		4.00		2.33		Spongy brown pseudo-fibrous PEAT. (PEAT)	4
		4.20	SPT(S)	N=3 (1,0/1,0,1,1)						
		4.20 - 4.65	B							
						(2.00)				5
		5.20	SPT(S)	0 (0 for 450mm/0 for 0mm)						
		5.20 - 5.65	B							
		6.00	D		6.00		0.32		Soft to firm grey CLAY with occasional pockets of black organic matter. (TIDAL FLAT DEPOSITS)	6
		6.20	SPT(S)	N=4 (1,1/1,1,1,1)						
		6.20 - 6.65	B							
		7.20	SPT(S)	0 (0 for 450mm/0 for 0mm)						7
		7.20 - 7.65	B							
						(4.20)				8
		8.20	SPT(S)	N=6 (1,2/1,2,2,1)						
		8.20 - 8.65	B							
		9.20	SPT(S)	2 (2 for 225mm/2 for 225mm)						9
		9.20 - 9.65	B							
									Continued on next sheet	10

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 13.8m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 12 - 2.6m and 1.0 - 0.2m, gravel 13.8 - 12.0m and 2.6 - 1.0m and concrete 0.2 - 0.0m. One standpipe (50mm) was installed with slotted section between 12 - 13.8m and a second standpipe (35mm) was installed with slotted section between 1.0 - 2.6m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (3.5 - 1.5m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 2.6 - 11.4m. Unable to undertake between 1.2 - 2.6m within Made Ground due to interference from metals. No anomalies encountered. Methane present at 77% within peat at 10.2-10.7m, encountered on 15/12/15. Borehole allowed to vent until 17/12/15 when methane concentrations < 5%. Installed with raised cover.

Groundwater

Depth Strike (m)	Depth Casing (m)	Level After 20 Mins
2.00	1.80	1.70
12.80	12.50	4.80

Chiselling

Duration (hh:mm)	Top Depth (m)	Base Depth (m)
02:30	1.20	2.00
01:00	2.00	2.20
01:00	13.20	14.20

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN038a**

Sheet 2 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 14/12/2015 - 17/12/2015		Final Depth:
Project No:	JFR8703	Easting:	336746	Drilling Method:	Pipe Diameter: 35mm	13.80m
Location:	Newport	Northing:	186090	Dando 2000	Casing Diameter (mm) / Casing Depth (m): 150 / 13.60; 200 / 3.20	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.33	Logged By: ERH		1:50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
		10.20	SPT(S)	N=10 (2,2/2,3,2,3)	10.20		-3.88			
		10.20 - 10.65	B			(0.50)			Spongy brown pseudo-fibrous PEAT (PEAT)	
		10.70	D		10.70		-4.38			
						(0.70)			Firm grey CLAY with occasional pockets of black organic matter and plant fragments. (TIDAL FLAT DEPOSITS)	11
		11.20	SPT(S)	N=15 (2,3/3,4,4,4)						
		11.20 - 11.65	B		11.40	(0.10)	-5.08		Grey clayey sandy GRAVEL. Gravel is medium to coarse subrounded to subangular of sandstone. (GLACIOFLUVIAL DEPOSITS)	
					11.50		-5.18		Stiff red slightly silty CLAY. (Weathering Grade IVb) (MERCIA MUDSTONE)	12
		12.20	SPT(S)	N=24 (2,3/4,5,6,9)						
		12.20 - 12.65	B			(2.30)				13
		13.20	SPT(S)	50 (5,7/50 for 275mm)						
		13.20 - 13.65	B							
		13.60 - 13.80	D							
		13.80	SPT(C)	50 (25 for 115mm/50 for 115mm)					End of Borehole at 13.80m	14
										15
										16
										17
										18
										19
										20

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 13.8m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 12 - 2.6m and 1.0 - 0.2m, gravel 13.8 - 12.0m and 2.6 - 1.0m and concrete 0.2 - 0.0m. One standpipe (50mm) was installed with slotted section between 12 - 13.8m and a second standpipe (35mm) was installed with slotted section between 1.0 - 2.6m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (3.5 - 1.5m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 2.6 - 11.4m. Unable to undertake between 1.2 - 2.6m within Made Ground due to interference from metals. No anomalies encountered. Methane present at 77% within peat at 10.2-10.7m, encountered on 15/12/15. Borehole allowed to vent until 17/12/15 when methane concentrations < 5%. Installed with raised cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
2.00	1.80	1.70	02:30	1.20	2.00
12.80	12.50	4.80	01:00	2.00	2.20
			01:00	13.20	14.20

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN039**

Sheet 1 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 08/01/2016 - 13/01/2016	Final Depth:
Project No:	JFR8703	Easting:	336809	Drilling Method: Dando 2000	Pipe Diameter: 50mm; Casing Diameter (mm): 150, 200; Casing Depth (m): 14.00, 3.00	14.30m
Location:	Newport	Northing:	186239			Scale: 1:50
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	7.19	Logged By: ERH		

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
		0.10 - 0.50	B		0.00		7.19		Very dense dark brownish black sandy clayey GRAVEL. Gravel is fine to medium angular to subangular of slag. (MADE GROUND)	
		0.50	ES							
		0.55 - 1.00	B			(1.60)				1
		1.20	ES							
		1.50	SPT(C)	50 (9,8/50 for 255mm)	1.60		5.59		Black sandy GRAVEL with occasional cobbles. Gravel and cobbles are angular to subangular of slag and brick. (MADE GROUND)	
		1.50 - 1.95	B							
		2.00	ES			(0.80)				2
		2.40	D		2.40		4.79		Firm to soft dark grey slightly gravelly slightly sandy CLAY with occasional pockets of organic matter. Gravel is fine angular of slag and only present within top 0.5m of the stratum. (TIDAL FLAT DEPOSITS)	
		2.50	ES							
		2.50 - 2.95	B			(0.60)				
		3.00	SPT(S)	N=4 (1,0/1,1,1,1)	3.00		4.19		Grey soft silty CLAY with frequent plant fibres and pockets of black organic matter. (TIDAL FLAT DEPOSITS)	3
		3.00 - 3.45	B							
										4
						(2.70)				
		4.50	ES							
		4.50	SPT(S)	N=3 (1,0/1,0,1,1)						
		4.50 - 4.95	B							5
		5.70	D		5.70		1.49		Brown spongy pseudo fibrous PEAT. (PEAT)	
		5.80	ES							
		6.00	SPT(S)	3 (1 for 225mm/3 for 225mm)						6
		6.00 - 6.45	B							
						(2.00)				
		6.90	D							7
		7.50	SPT(S)	N=3 (1,0/1,0,1,1)						
		7.50 - 7.95	B		7.70		-0.51		Soft grey slightly sandy CLAY with frequent plant fibres and pockets of black organic matter. Sand is fine. (TIDAL FLAT DEPOSITS)	
		7.70	ES							8
						(2.60)				
		9.00	SPT(S)	0 (0 for 450mm/0 for 0mm)						9
		9.00 - 9.45	B							
									Continued on next sheet	10

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 14.3m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 11.3 - 7.0m and 3.0 - 0.2m, gravel 14.3 - 11.3m and 7.0 - 3.0m and concrete 0.2 - 0.0m. One standpipe (35mm) was installed with slotted section between 14.3 - 11.3m and a second standpipe (50mm) was installed with slotted section between 7.0 - 3.0m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (3.5 - 1.5m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 2.4 - 11.7m. Unable to undertake between 1.2 - 2.4m within Made Ground due to interference from metals. No anomalies encountered. Installed with raised cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
11.30	10.70	10.50	01:30	1.70	2.00
			01:00	2.00	2.30
			01:00	14.00	14.30

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN039**

Sheet 2 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 08/01/2016 - 13/01/2016		Final Depth:
Project No:	JFR8703	Easting:	336809	Drilling Method:	Pipe Diameter: 50mm	14.30m
Location:	Newport	Northing:	186239	Dando 2000	Casing Diameter (mm) / Casing Depth (m): 150 / 14.00; 200 / 3.00	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	7.19	Logged By: ERH		1:50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					10.30		-3.11		Very soft grey silty CLAY with rare fibrous peat. (TIDAL FLAT DEPOSITS)	
		10.50	SPT(S)	0 (0 for 450mm/0 for 0mm)						
		10.50 - 10.95	B			(1.00)				11
		11.30	D		11.30		-4.11		Firm brown silty CLAY. (TIDAL FLAT DEPOSITS)	
						(0.40)				
		11.70	D		11.70		-4.51		Firm grey sandy CLAY with frequent laminations of stiff red clay. (Loose matrix due to water). (Weathering Grade IVa). (MERCIA MUDSTONE)	
		12.00	SPT(S)	N=28 (2,4/5,7,8,8)						12
		12.00 - 12.45	B							
						(2.60)				13
		13.50	SPT(S)	N=27 (3,3/5,5,7,10)						
		13.50 - 13.95	B							
		14.00 - 14.30	B							14
		14.30	SPT(C)	50 (8,13/50 for 135mm)					End of Borehole at 14.30m	
										15
										16
										17
										18
										19
										20

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 14.3m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 11.3 - 7.0m and 3.0 - 0.2m, gravel 14.3 - 11.3m and 7.0 - 3.0m and concrete 0.2 - 0.0m. One standpipe (35mm) was installed with slotted section between 14.3 - 11.3m and a second standpipe (50mm) was installed with slotted section between 7.0 - 3.0m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (3.5 - 1.5m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 2.4 - 11.7m. Unable to undertake between 1.2 - 2.4m within Made Ground due to interference from metals. No anomalies encountered. Installed with raised cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
11.30	10.70	10.50	01:30	1.70	2.00
			01:00	2.00	2.30
			01:00	14.00	14.30

WINDOW SAMPLE LOG

Borehole No. **WSM4CAN023**

Sheet 1 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 23/02/2016 - 24/02/2016		Final Depth:
Project No:	JFR8703	Easting:	336763	Drilling Method:	Pipe Diameter: 35mm	6.00m
Location:	Newport	Northing:	185984	Dando Terrier	Casing Diameter (mm) 200 / Casing Depth (m) 2.00	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.70	Logged By: JA		1:25

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00	(0.30)	6.70		Dark brown slightly clayey, sandy, angular to sub-rounded GRAVEL of mudstone, concrete, brick and slag. (MADE GROUND)	
		0.30	ES		0.30		6.40		Medium dense dark brownish grey, sandy angular to sub-angular GRAVEL of slag. (MADE GROUND)	
		0.50	B							
		0.50	ES							
		1.00	SPT(C)	N=26 (3,3/4,4,8,10)						1
		1.20 - 2.00	Core	100% Recovery		(2.00)				
	▼	1.50	ES						*Wood fragments present at 1.7m.*	
		2.00 - 3.00	Core	100% Recovery						2
					2.30		4.39		Firm to soft bluish grey mottled brown silty, CLAY. (TIDAL FLAT DEPOSITS)	
		2.50	ES							
		3.00 - 4.00	Core	100% Recovery						3
						(2.70)				
		4.00 - 5.00	Core	100% Recovery						4
		5.00 - 6.00	Core	0% Recovery	5.00		1.70		Continued on next sheet	5

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Window sampled 1.2 - 6.0m. Terminated upon achieving proposed depth.
BACKFILL: On completion hole backfilled with gravel 2.3 - 0.3m, bentonite 6.0 - 2.3m and 0.3 - 0.2m and concrete 0.2 - 0.0m. One standpipe (50mm) installed with slotted section 0.3 - 2.3m.
REMARKS: Installed with raised cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
1.60					

AGS

WINDOW SAMPLE LOG

Borehole No.
WSM4CAN023
Sheet 2 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 23/02/2016 - 24/02/2016		Final Depth:
Project No:	JFR8703	Easting:	336763	Drilling Method:	Pipe Diameter: 35mm	6.00m
Location:	Newport	Northing:	185984	Dando Terrier	Casing Diameter (mm): 200 / Casing Depth (m): 2.00	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.70	Logged By: JA		1:25

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
						(1.00)			No recovery. Geology is inferred. (TIDAL FLAT DEPOSITS)	
									End of Borehole at 6.00m	6
										7
										8
										9
										10

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Window sampled 1.2 - 6.0m. Terminated upon achieving proposed depth.
BACKFILL: On completion hole backfilled with gravel 2.3 - 0.3m, bentonite 6.0 - 2.3m and 0.3 - 0.2m and concrete 0.2 - 0.0m. One standpipe (50mm) installed with slotted section 0.3 - 2.3m.
REMARKS: Installed with raised cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
1.60					

AGS

WINDOW SAMPLE LOG

Borehole No.
WSM4CAN024
Sheet 1 of 1

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 24/02/2016		Final Depth:
Project No:	JFR8703	Easting:	336781	Drilling Method:		0.80m
Location:	Newport	Northing:	186202	Dando Terrier	Casing Diameter (mm) / Casing Depth (m)	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.91	Logged By: JA		1:25

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00		6.90		Greyish dark brown slightly clayey, sandy angular to sub-rounded, GRAVEL of slag. (MADE GROUND)	
		0.50 0.50	B ES			(0.80)				
									End of Borehole at 0.80m	

DRAFT

Remarks:
Unable to progress hand-dug pit due to very dense fill at 0.8 mbGL. No groundwater encountered.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)

AGS

TRIAL PIT LOG

Pit No. **TPM4CAN016**

Sheet 1 of 1

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 01/03/2016	Final Depth:
Project No:	JFR8703	Easting:	336674	Equipment:	3.30m
Location:	Newport	Northing:	185898	8 Tonne Excavator	Pit Length: 2.50 m / Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.89	Logged By: ERH	Pit Width: 0.65 m / 1:25

Backfill	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00		6.89		Dark greyish black sandy GRAVEL with occasional boulders and cobbles and frequent metal fragments. Gravel is very angular to sub-angular of slag and brick. (MADE GROUND)	
		0.50	B							
		0.50	D							
		0.50	ES							
						(2.30)				1
		2.00	ES							2
									Entire tractor tyre pulled out of TP at 2.1m.	
					2.30		4.59		Soft to firm dark grey silty CLAY with frequent plant fibres. (TIDAL FLAT DEPOSITS)	
		2.50	B							
		2.50	D							
		2.50	IVN1	3.4, 7.6, 20.7kPa						
						(1.00)				3
		3.00	IVN2	1.4, 1.2, 1.6kPa						
									End of Pit at 3.30m	4
										5

DRAFT

Remarks: Terminated due to water ingress causing potential destabilisation.

Groundwater: Groundwater ingress at 2 m (Rapid filling hole)

Stability: Stable

TRIAL PIT LOG

Pit No. **TPM4CAN017**

Sheet 1 of 1

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 29/02/2016	Final Depth:
Project No:	JFR8703	Easting:	336756	Equipment:	2.70m
Location:	Newport	Northing:	185940	8 Tonne Excavator	Pit Length: 2.50 m / Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.72	Logged By: ERH	Pit Width: 0.65 m / 1:25

Backfill	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00	(0.20)	6.72		Reddish brown slightly clayey sandy GRAVEL of slag and brick. (MADE GROUND)	
					0.20		6.52		*Large fragments of scrap metal in top 0.2 m of stratum.* Grey sandy GRAVEL with frequent cobbles and metal fragments. Gravel is sub-angular to very angular of slag and brick. (MADE GROUND)	
		0.50	B							
		0.50	D							
		0.50	ES							
						(2.40)				
		2.00	D							
		2.00	ES						*Large wire and metal fragments preventing excavation in north of hole. at 2.1m.*	
		2.60	B		2.60	(0.10)	4.12		Dark grey soft CLAY with occasional plant fibres. (TIDAL FLAT DEPOSITS)	
		2.60	D							
		2.60	ES							
									End of Pit at 2.70m	

DRAFT

Remarks: Terminated due to rapid water ingress causing difficulty excavating.

Groundwater: 1.7m rapid ingress of water

Stability: Stable

TRIAL PIT LOG

Pit No. **TPM4CAN018**

Sheet 1 of 1

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 29/02/2016	Final Depth:
Project No:	JFR8703	Easting:	336784	Equipment:	4.00m
Location:	Newport	Northing:	186056	8 Tonne Excavator	Pit Length: 2.50 m / Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.72	Logged By: ERH	Pit Width: 0.65 m / 1:25

Backfill	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00		6.72		Dark grey (white on the surface) slightly clayey sandy very angular to sub-angular GRAVEL of slag and rare brick with occasional metal fragments. Occasional cobbles of brick and slag. (MADE GROUND)	
		0.20	ES							
		0.30	B							
		0.40	D							
						(1.60)				1
					1.60		5.12		Soft dark grey slightly sandy CLAY with occasional plant fibres. (TIDAL FLAT DEPOSITS)	
		1.80	B							
		1.80	D							
		1.80	ES							
		2.00	IVN1	0.8, 0.2, 0.6kPa						2
						(2.40)			*Black plastic amorphous peat inclusions with strong organic smell at 2.7m.*	
		3.00	B							
		3.00	D							
		3.00	ES							
		3.00	IVN2	0.4, 0.2, 0.6kPa						3
		4.00	IVN3	0.1, 0.6kPa					End of Pit at 4.00m	4
										5

DRAFT

Remarks: Terminated upon achieving proposed depth.

Groundwater: 1.6 m rapid water ingress filling tiral pit

Stability: Stable

AGS

SUPPLEMENTARY HOLE INFORMATION

BHM4CAN035

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
14/12/2015 07:30:00	0.00	0.00	
14/12/2015 18:00:00	1.60	1.60	

Sample Information

Type/Ref	Depth (m)	Date
ES	0.80	

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.20	C	11 (64 for 135mm/11 for 50mm)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

DRAFT

SUPPLEMENTARY HOLE INFORMATION

BHM4CAN035a

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
14/12/2015 07:30:00	0.00	0.00	
14/12/2015 18:00:00	0.60	0.00	
15/12/2016 07:30:00	0.60	0.00	
15/12/2016 18:00:00	2.40	2.40	
16/12/2016 07:30:00	2.40	2.40	
16/12/2016 18:00:00	2.80	2.80	

Sample Information

Type/Ref	Depth (m)	Date
ES	0.50	
ES	0.80	
B	1.50 - 2.00	

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.20	C	50 (25 for 50mm/50 for 10mm)
2.00	C	50 (7,18/50 for 80mm)
2.80	C	50 (25 for 15mm/50 for 20mm)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

DRAFT

SUPPLEMENTARY HOLE INFORMATION

BHM4CAN035b

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
05/01/2016 07:30:00	0.00	0.00	
05/01/2016 18:00:00	4.50	0.00	
06/01/2016 07:30:00	4.50	0.00	
06/01/2016 18:00:00	5.50	5.50	
07/01/2016 07:30:00	5.50	5.50	
07/01/2016 18:00:00	15.90	15.20	12.2

Sample Information

Type/Ref	Depth (m)	Date
W1S		03-05-2016
W1D		03-05-2016
W2S		17-05-2016
W2D		17-05-2016
W3S		26-05-2016
W3D		26-05-2016
ES	2.00 - 3.00	
B	3.70 - 4.45	
ES	3.90	
B	4.50 - 4.95	
ES	5.50	
D	5.90	
B	6.00 - 6.45	
D	6.40	
ES	6.50	
B	7.50 - 7.95	
ES	8.20	
D	8.60	
B	9.00 - 9.45	
ES	10.00	
B	10.50 - 10.95	
D	11.80	
B	12.00 - 12.45	
D	13.10	
B	13.50 - 13.95	
B	15.00 - 15.45	
B	15.70 - 15.90	

Standard Penetration Tests

Depth (m)	Type	Reported Result
4.30	S	N=5 (1,0/1,1,1,2)
6.00	S	N=4 (1,0/1,1,1,1)
7.50	S	N=6 (1,1/1,2,1,2)
9.00	S	N=3 (1,0/1,0,1,1)
10.50	S	0 (0 for 450mm/0 for 0mm)
12.00	S	N=10 (2,3/2,2,3,3)
13.50	S	N=41 (3,6/6,8,9,18)
15.00	S	50 (25 for 115mm/50 for 115mm)
15.90	S	50 (25 for 75mm/50 for 50mm)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)
03/05/2016 10:00:00	1D	2.72
03/05/2016 10:00:00	1S	1.70
17/05/2016 09:20:00	2S	1.77
17/05/2016 09:30:00	2D	2.78
26/05/2016 00:00:00	3D	2.68
26/05/2016 00:00:00	3S	1.79

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

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SUPPLEMENTARY HOLE INFORMATION

BHM4CAN036

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
09/12/2015 07:30:00	0.00	0.00	
09/12/2015 18:00:00	0.30	0.00	
10/12/2015 07:30:00	0.30	0.00	
10/12/2015 18:00:00	1.60	1.60	
11/12/2015 07:30:00	1.60	1.60	
11/12/2015 18:00:00	2.80	2.80	
05/01/2016 07:30:00	2.80	2.80	
05/01/2016 18:00:00	6.00	6.00	
06/01/2016 07:30:00	6.00	6.00	
06/01/2016 18:00:00	14.60	14.00	

Sample Information

Type/Ref	Depth (m)	Date
W1		04-05-2016
W2		17-05-2016
W3		26-05-2016
ES	0.60	10-12-2015
B	1.00	
B	1.50	
D	2.00	
D	6.00	
ES	6.00	
D	7.30	
D	8.00	
D	10.00	
B	11.00	
ES	12.00	
D	13.50	

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.20	C	17 (58 for 130mm/17 for 30mm)
2.00	C	50 (25 for 5mm/50 for 5mm)
2.80	C	50 (25 for 5mm/50 for 5mm)
6.50	S	N=7 (1,1/1,2,2,2)
7.50	S	N=6 (1,1/2,1,2,1)
8.50	S	N=8 (1,2/2,2,2,2)
9.50	S	N=3 (1,0/1,0,1,1)
10.50	S	3 (1 for 225mm/3 for 225mm)
11.50	S	N=7 (1,1/1,2,2,2)
12.50	S	N=6 (1,1/1,0,2,3)
13.00	S	N=42 (5,7/9,9,12,12)
14.20	S	50 (5,9/50 for 295mm)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)
03/05/2016 10:45:00	1	2.54
17/05/2016 00:00:00	2	2.98
26/05/2016 14:00:00	3	2.78

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

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SUPPLEMENTARY HOLE INFORMATION

BHM4CAN037

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
09/12/2015 07:30:00	0.00	0.00	
09/12/2015 18:00:00	0.50	0.00	
10/12/2015 07:30:00	0.50	0.00	
10/12/2015 18:00:00	7.00	6.20	
11/12/2015 07:30:00	7.00	6.20	
11/12/2015 18:00:00	15.60	15.20	

Sample Information

Type/Ref	Depth (m)	Date
W1S		03-05-2016
W1D		03-05-2016
W2D		17-05-2016
W2S		17-05-2016
W3D		26-05-2016
W3S		26-05-2016
B	0.45	
D	0.50	
ES	0.60	
B	1.00 - 1.20	
B	1.20 - 1.65	
ES	2.20	10-12-2015
D	2.60	
B	3.20 - 3.65	
ES	3.40	
B	3.70 - 4.00	
B	4.20 - 4.65	
B	5.20 - 5.65	
D	6.10	
ES	6.20	
D	6.25 - 6.65	
B	6.25 - 6.65	
D	7.20 - 7.65	
B	7.20 - 7.65	
D	7.90	
D	8.20 - 8.65	
B	8.20 - 8.65	
D	9.20 - 9.65	
B	9.20 - 9.65	
D	10.00	
D	10.20 - 10.65	
B	10.20 - 10.65	
D	11.20 - 11.65	
B	11.20 - 11.65	
D	11.80	
D	12.20 - 12.65	
B	12.20 - 12.65	
B	13.20 - 13.65	
D	13.20 - 13.65	
D	14.10	
B	14.20 - 14.65	
B	15.20 - 15.60	

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.20	C	N=47 (12,12/13,10,10,14)
2.20	C	50 (10,14/50 for 265mm)
3.20	C	N=12 (6,7/3,3,3,3)
4.20	S	N=4 (1,1/1,1,1,1)
5.20	S	0 (0 for 450mm/0 for 0mm)
6.25	S	N=21 (3,3/5,5,6,5)
7.20	S	N=8 (1,2/2,2,2,2)
8.20	S	N=3 (1,0/1,0,1,1)
9.20	S	0 (0 for 450mm/0 for 0mm)
10.20	S	0 (0 for 450mm/0 for 0mm)
11.20	S	N=13 (1,1/2,3,4,4)
12.20	S	N=34 (3,4/5,8,9,12)
13.20	S	N=31 (5,5/6,7,9,9)
14.20	C	N=36 (6,7/7,8,10,11)
15.20	C	50 (9,13/50 for 125mm)
15.60	C	50 (25 for 95mm/50 for 50mm)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)
03/05/2016 00:00:00	1D	2.21
04/05/2016 00:00:00	1S	1.51
17/05/2016 12:45:00	2S	1.55
17/05/2016 12:50:00	2D	2.40
26/05/2016 00:00:00	3D	2.42
26/05/2016 00:00:00	3S	1.57

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

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SUPPLEMENTARY HOLE INFORMATION

BHM4CAN038

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
14/12/2015 07:30:00	0.00	0.00	
14/12/2015 18:00:00	0.70	0.00	

Sample Information

Type/Ref	Depth (m)	Date
B	0.00 - 0.15	
D	0.20	
B	0.25 - 0.70	
ES	0.40	15-12-2015

Standard Penetration Tests

Depth (m)	Type	Reported Result

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

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SUPPLEMENTARY HOLE INFORMATION

BHM4CAN038a

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
14/12/2015 07:30:00	0.00	0.00	
14/12/2015 18:00:00	2.00	2.00	1.7
15/12/2015 07:30:00	2.00	2.00	1.2
15/12/2015 18:00:00	10.40	10.20	7.8
17/12/2015 07:30:00	10.40	10.20	7.4
17/12/2015 18:00:00	13.80	13.60	6.1

Sample Information

Type/Ref	Depth (m)	Date
W1S		03-05-2016
W1D		03-05-2016
W2S		17-05-2016
W2D		17-05-2016
W3S		26-05-2016
W3D		26-05-2016
ES	0.80	
B	0.80 - 1.20	
B	1.20 - 1.65	
D	2.10	
B	2.20 - 2.65	
D	2.60	
B	2.60 - 3.10	
ES	2.70	
B	3.20 - 3.65	
D	3.70	
D	4.00	
B	4.20 - 4.65	
B	5.20 - 5.65	
D	6.00	
B	6.20 - 6.65	
B	7.20 - 7.65	
B	8.20 - 8.65	
B	9.20 - 9.65	
B	10.20 - 10.65	
D	10.70	
B	11.20 - 11.65	
B	12.20 - 12.65	
B	13.20 - 13.65	
D	13.60 - 13.80	

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.20	C	50 (25 for 105mm/50 for 125mm)
2.20	C	N=41 (11,13/15,19,4,3)
3.20	S	N=5 (3,2/1,1,1,2)
4.20	S	N=3 (1,0/1,0,1,1)
5.20	S	0 (0 for 450mm/0 for 0mm)
6.20	S	N=4 (1,1/1,1,1,1)
7.20	S	0 (0 for 450mm/0 for 0mm)
8.20	S	N=6 (1,2/1,2,2,1)
9.20	S	2 (2 for 225mm/2 for 225mm)
10.20	S	N=10 (2,2/2,3,2,3)
11.20	S	N=15 (2,3/3,4,4,4)
12.20	S	N=24 (2,3/4,5,6,9)
13.20	S	50 (5,7/50 for 275mm)
13.80	C	50 (25 for 115mm/50 for 115mm)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)
03/05/2016 14:30:00	1D	2.48
03/05/2016 14:30:00	1S	1.11
17/05/2016 00:00:00	2S	1.18
17/05/2016 00:00:00	2D	1.99
26/05/2016 00:00:00	3D	1.96
26/05/2016 00:00:00	3S	1.16

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

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SUPPLEMENTARY HOLE INFORMATION

BHM4CAN039

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
08/01/2016 07:30:00	0.00	0.00	
08/01/2016 18:00:00	2.00	1.80	
11/01/2016 07:30:00	2.00	1.80	
11/01/2016 18:00:00	13.50	13.00	12.2
13/01/2016 07:30:00	13.50	13.00	3
13/01/2016 12:00:00	14.30	14.00	4.6

Sample Information

Type/Ref	Depth (m)	Date
W1S		04-05-2016
W1D		04-05-2016
W2D		17-05-2016
W2S		17-05-2016
W3S		26-05-2016
W3D		26-05-2016
B	0.10 - 0.50	
ES	0.50	08-01-2016
B	0.55 - 1.00	
ES	1.20	08-01-2016
B	1.50 - 1.95	
ES	2.00	
D	2.40	
B	2.50 - 2.95	
ES	2.50	11-01-2016
B	3.00 - 3.45	
B	4.50 - 4.95	
ES	4.50	
D	5.70	
ES	5.80	
B	6.00 - 6.45	
D	6.90	
B	7.50 - 7.95	
ES	7.70	
B	9.00 - 9.45	
B	10.50 - 10.95	
D	11.30	
D	11.70	
B	12.00 - 12.45	
B	13.50 - 13.95	
B	14.00 - 14.30	

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.50	C	50 (9,8/50 for 255mm)
3.00	S	N=4 (1,0/1,1,1,1)
4.50	S	N=3 (1,0/1,0,1,1)
6.00	S	3 (1 for 225mm/3 for 225mm)
7.50	S	N=3 (1,0/1,0,1,1)
9.00	S	0 (0 for 450mm/0 for 0mm)
10.50	S	0 (0 for 450mm/0 for 0mm)
12.00	S	N=28 (2,4/5,7,8,8)
13.50	S	N=27 (3,3/5,5,7,10)
14.30	C	50 (8,13/50 for 135mm)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)
03/05/2016 15:00:00	1S	2.73
03/05/2016 15:00:00	1D	2.80
17/05/2016 15:30:00	2S	2.52
26/05/2016 00:00:00	3S	2.52
26/05/2016 00:00:00	3D	2.77

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

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Borehole Log

Exploration Associates

Drilled by	DO	Equipment and Methods	Ground Level + 4.89 m OD
Logged by		Cable Percussion 150 mm diameter from 0.00m to 7.00m.	National Grid Coordinates E 335772.22 N 186062.34
Checked by			

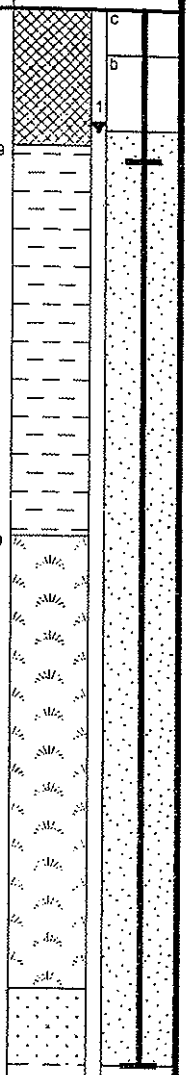
Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
			29/01/2002	
0.50	ES1			
0.90	ES2			
3.50	ES3			
6.50	ES4			
7.00		kRH	29/01/2002 7.00	

Strata

Description	Depth,Level (Thickness)
Compact slag fill (DRILLERS DESCRIPTION).	(0.90)
	0.90 +3.99
Stiff grey brown mottled CLAY (DRILLERS DESCRIPTION).	(2.60)
	3.50 +1.39
PEAT (DRILLERS DESCRIPTION).	(3.00)
	6.50 --1.61
Soft grey SILT (DRILLERS DESCRIPTION).	(0.50pen)
	7.00 --2.11
EXPLORATORY HOLE ENDS AT 7.00 m.	

Legend



Groundwater

No.	Struck	Behaviour
1	0.80m	Rising to 0.80m after 20 mins. Sealed 1.20. Seepage

Remarks

Chiselling : 0.30m to 0.50m 60minutes
Hole backfill : 0.00m to 0.30m Concrete (c), 0.30m to 0.80m Bentonite (b). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 0.80m to 7.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
RBBH6
Sheet 1 of 1

03/05/2002 11:16:26 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	DO	Equipment and Methods	Ground Level + 5.02 m OD
Logged by	JN	Cable Percussion 150 mm diameter from 0.00m to 7.00m.	National Grid Coordinates E 336043.99 N 186144.72
Checked by			

Samples and Tests

Strata

Depth	Type & No.	Records	Date / Casing	Time / Water	Description	Depth,Level (Thickness)	Legend
			29/01/2002				
0.50	ES1				MADE GROUND : Grey brown very sandy GRAVEL. Gravel is angular and subangular fine to coarse of slag. Driller reports concrete.	(3.50)	
3.50	ES2				MADE GROUND: Soft grey slightly gravelly CLAY. Gravel is angular and fine.	3.50 +1.52	
3.70	ES3					3.70 +1.32	
					Dark brown spongy pseudofibrous PEAT.	(3.30pen)	
			29/01/2002				
			0.00				
					EXPLORATORY HOLE ENDS AT 7.00 m.	7.00 -1.98	

Groundwater

No.	Struck	Behaviour
1	0.80m	Rising to 0.80m after 20 mins. Sealed 4.00. Slow inflow

Remarks

Chiselling : 0.50m to 0.75m 60minutes, 1.30m to 1.50m 45minutes
Hole backfill : 0.00m to 0.30m Concrete (c), 0.30m to 0.80m Bentonite (b). Surface protection : Stop Cock Cover Standpipe installed, 50mm diameter, response zone from 0.80m to 7.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
RBBH7
Sheet 1 of 1

03/05/2002 11:16:32 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	DO	Equipment and Methods	Ground Level + 4.90 m OD
Logged by	JN	Cable Percussion 150 mm diameter from 0.00m to 7.00m.	National Grid Coordinates E 335990.18 N 185929.21
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date / Time Casing / Water
			30/01/2002
0.50	ES1		
1.00	ES2		
1.50	ES3		
4.50	ES4		
6.50	ES5		
7.00		kRH	30/01/2002 7.00

Strata

Description	Depth,Level (Thickness)
MADE GROUND: Grey brown very sandy GRAVEL. Gravel is angular and subangular fine and medium of slag. Driller reports contamination. At 1.00m: Soft grey slightly gravelly CLAY. Gravel is angular fine of slag.	(1.60)
MADE GROUND: Firm to stiff slightly gravelly CLAY. Gravel is angular and fine. Driller reports contamination - becoming less contaminated with depth.	1.60 +3.30 (2.50)
Black spongy pseudofibrous PEAT.	4.10 +0.80 (2.10)
Soft grey CLAY with bands of black spongy pseudofibrous PEAT.	6.20 -1.30 (0.80pen)
EXPLORATORY HOLE ENDS AT 7.00 m.	7.00 -2.10

Legend: 1 c; 1 b; 1

Groundwater

No.	Struck	Behaviour
1	0.80m	Rising to 0.20m after 20 mins. Sealed 2.00. Medium inflow

Remarks

Chiselling : 0.40m to 1.00m 150minutes
Hole backfill : 0.00m to 0.50m Concrete (c), 0.50m to 1.00m Bentonite (b). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 1.00m to 7.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole **RBBH8**
Sheet 1 of 1

03/05/2002 11:16:39 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	NF	Equipment and Methods	Ground Level + 5.79 m OD
Logged by	LM	Cable Percussion 150 mm diameter from 0.00m to 7.00m.	National Grid Coordinates E 336167.86 N 185870.61
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
1.00	ES1		29/01/2002	
2.60	ES2			
7.00		kRH	29/01/2002 7.00	

Strata

Description	Depth,Level (Thickness)
MADE GROUND: Dark brown to black clayey SAND AND GRAVEL. Gravel is angular to subrounded fine to coarse of slag.	(1.50)
	1.50 +4.29
Soft to firm grey and brown sandy slightly gravelly CLAY. Gravel is subangular and subrounded fine and medium of slag.	(3.20)
	4.70 +1.09
PEAT (DRILLERS DESCRIPTION).	(2.30pen)
EXPLORATORY HOLE ENDS AT 7.00 m.	7.00 -1.21

Legend: c, b, 1, 1

Groundwater

No.	Struck	Behaviour
1	1.40m	Rising to 1.10m after 20 mins. Sealed 1.80. Medium inflow

Remarks

Chiselling : 0.50m to 0.80m 60minutes, 1.20m to 1.50m 60minutes
Hole backfill : 0.00m to 0.30m Concrete (c). 0.30m to 1.00m Bentonite (b). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 1.00m to 7.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole **RBBH9**
Sheet 1 of 1

03/05/2002 11:16:46 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	NF	Equipment and Methods	Ground Level + 5.38 m OD
Logged by	LM	Cable Percussion 150 mm diameter from 0.00m to 7.00m.	National Grid Coordinates E 335984.28 N 185668.31
Checked by			

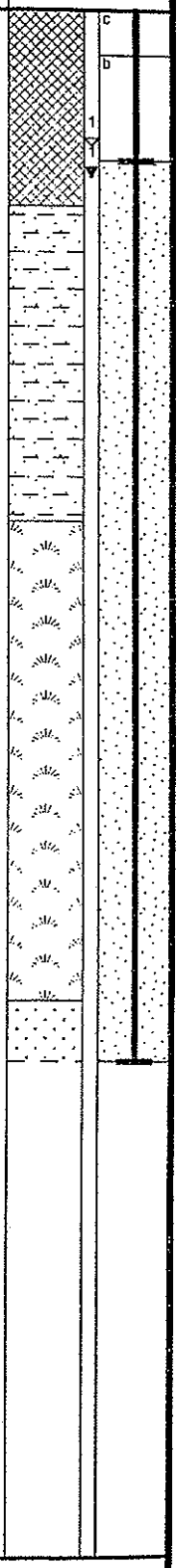
Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
1.00	ES1			
2.30	ES2			
			29/01/2002 7.00	

Strata

Description	Depth,Level (Thickness)
MADE GROUND: Dark grey slightly clayey SAND AND GRAVEL. Gravel is subangular and subrounded fine and medium of slag.	(1.30)
	1.30 +4.08
Soft dark grey mottled orange brown slightly sandy CLAY.	(2.10)
	3.40 +1.98
PEAT (DRILLERS DESCRIPTION).	(3.20)
	6.60 --1.22
Very soft grey sandy SILT (DRILLERS DESCRIPTION).	(0.40pen)
	7.00 --1.62
EXPLORATORY HOLE ENDS AT 7.00 m.	

Legend



Groundwater

No.	Struck	Behaviour
1	1.10m	Rising to 0.90m after 20 mins. Sealed 1.50. Medium inflow

Remarks

Chiselling : 0.70m to 1.00m 60minutes
Hole backfill : 0.00m to 0.30m Concrete (c), 0.30m to 1.00m Bentonite (b). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 1.00m to 7.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

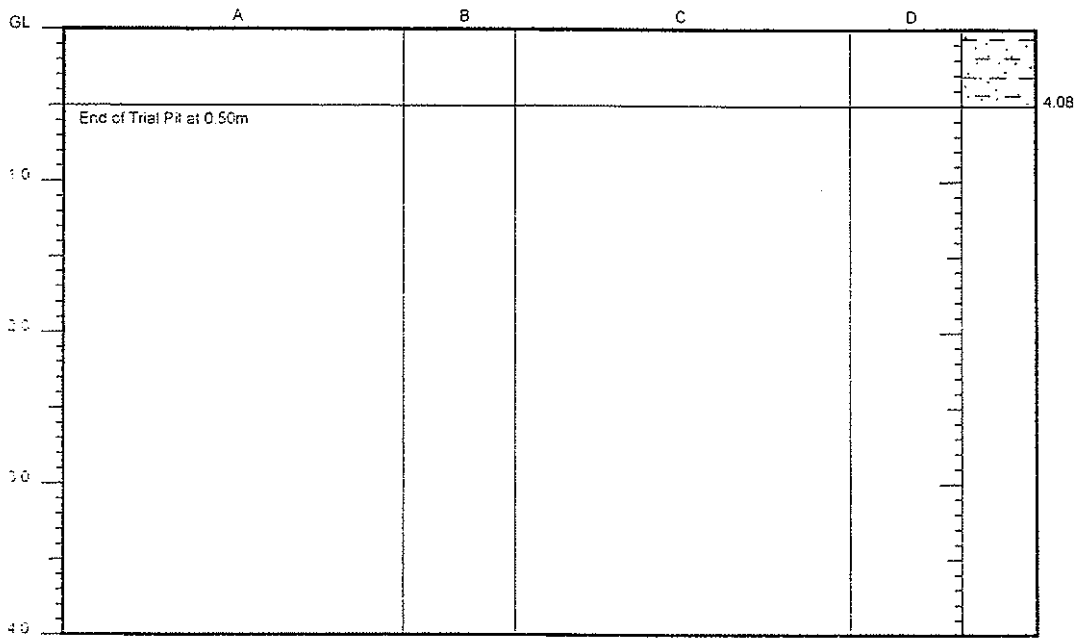
Borehole
RBBH10
Sheet 1 of 1

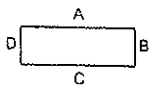
07/05/2002 11:57:17 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by JL Checked by	**Equipment and Methods** Trial Pit/Trench from 0.00m to 0.50m.Pit dug using Hydraulic wheeled excavator	Ground Level + 4.58 m OD National Grid Coordinates E 335698.68 N 186295.64





Dimensions 0.50m x 0.50m
Excavation date 12/02/2002

Samples and Tests

Strata

Depth (m)	Type & No	Records	Depth (m)	No	Description
0.50	ES1		0.00-0.50	1	MADEGROUND: Brown mottled grey slightly sandy CLAY with many rootlets

Groundwater
Fast seepage at 0.30m.

Remarks
Trial Pit ended and all samples were obtained.
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 0.50m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

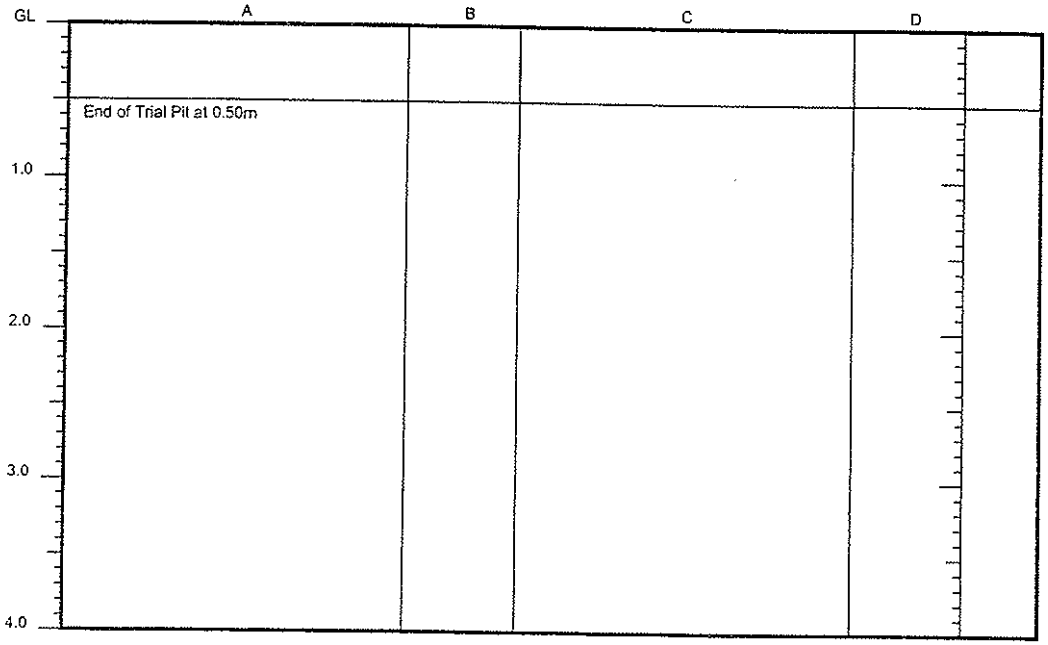
Trial Pit
RBTP1
Sheet 1 of 1

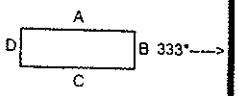
03/05/2002 14.23.26 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by JL Checked by	Equipment and Methods Machine dug Trial Pit from 0.00m to 0.50m using JCB with bucket.	Ground Level National Grid Coordinates





Dimensions 0.80m x 0.80m
Excavation date 12/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.50	ES1	

Strata

Depth (m)	No.	Description
0.00-0.50	1	MADE GROUND: Brown black peaty CLAY.

Groundwater
Groundwater at ground level.

Remarks
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 0.50m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

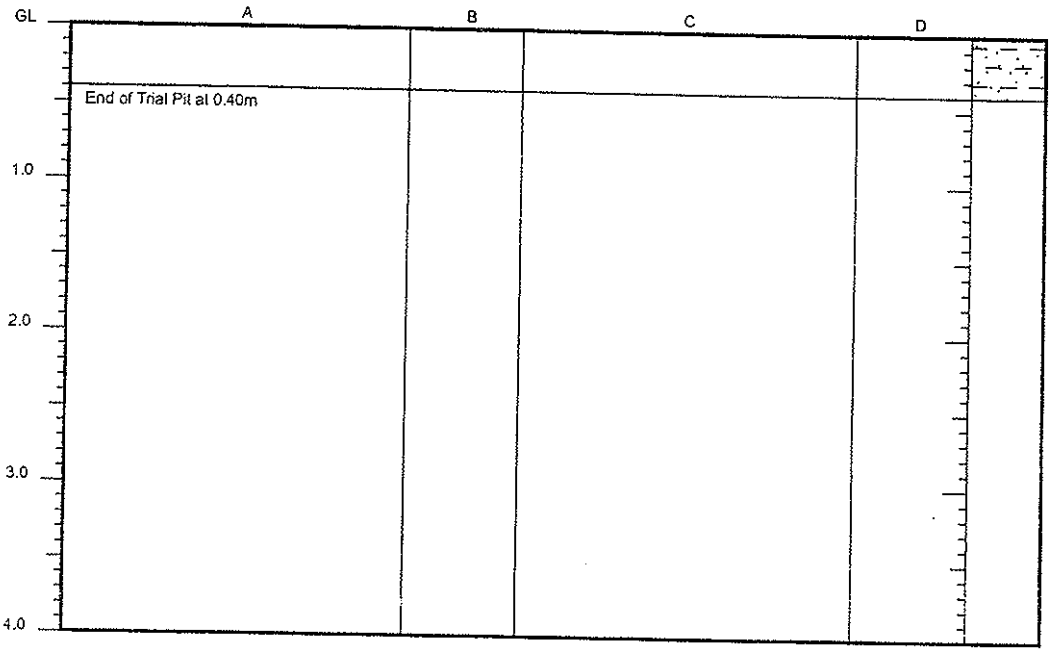
Trial Pit
RBTP2
Sheet 1 of 1

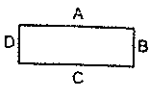
03/05/2002 11:17:05 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by J.L. Checked by	Equipment and Methods Trial Pit/Trench from 0.00m to 0.40m.Pit dug using Hydraulic wheeled excavator	Ground Level + 4.46 m OD National Grid Coordinates E 335868.97 N 186226.97





Excavation date 12/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.40	ES1	

Strata

Depth (m)	No.	Description
0.00-0.40	1	MADEGROUND: Soft dark grey slightly sandy CLAY with many rootlets.

Groundwater
No. Struck Behaviour

Remarks
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 0.40m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

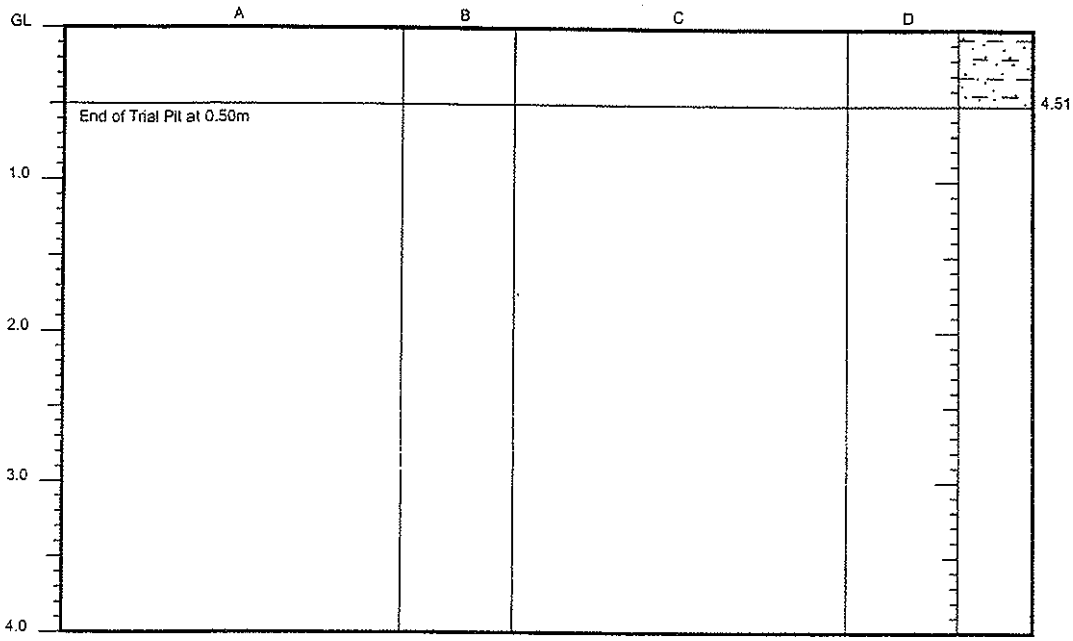
Trial Pit
RBTP4
Sheet 1 of 1

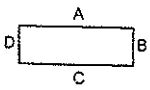
03/05/2002 11:17:08 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by J.L. Checked by	Equipment and Methods Trial Pit/Trench from 0.00m to 0.50m.Pit dug using Hydraulic wheeled excavator.	Ground Level + 5.01 m OD National Grid Coordinates E 335726.66 N 186195.23





Dimensions 0.80m x 0.80m
Excavation date 12/02/2002

Samples and Tests			Strata		
Depth (m)	Type & No.	Records	Depth (m)	No.	Description
0.50	ES1		0.00-0.50	1	MADEGROUND: Brown slightly sandy CLAY with many rootlets

Groundwater	Remarks
No. Struck Behaviour	Stability : Stable, Shoring : None Hole backfill : 0.00m to 0.50m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

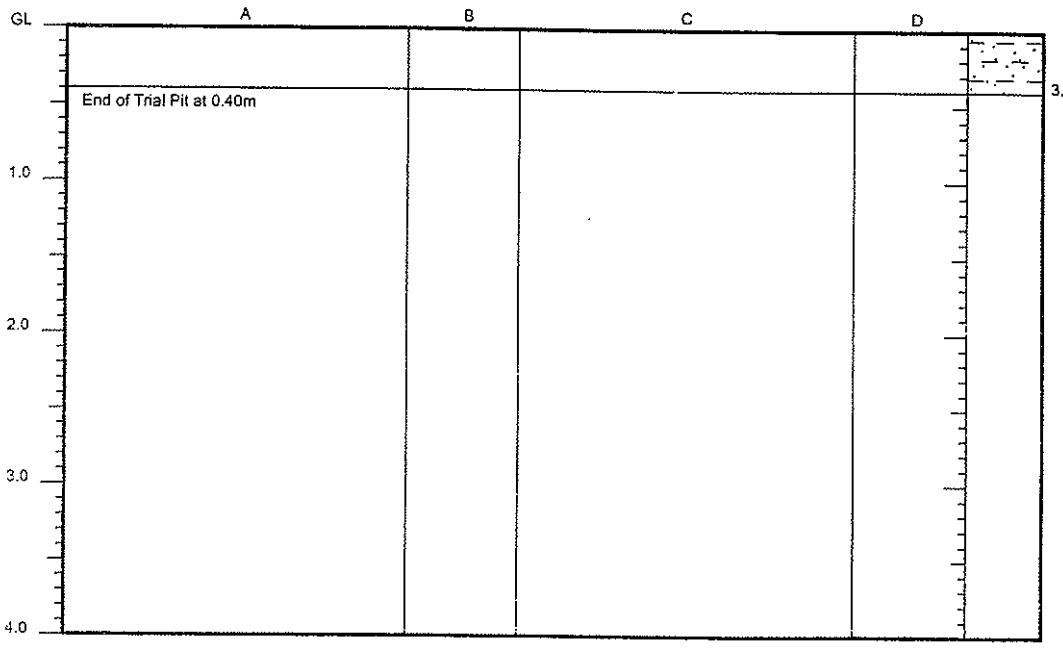
Trial Pit
RBTP5
Sheet 1 of 1

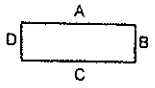
03/05/2002 11:17:12 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by J.L. Checked by	Equipment and Methods Trial Pit/Trench from 0.00m to 0.40m.Pit dug using Hydraulic wheeled excavator.	Ground Level + 4.33 m OD National Grid Coordinates E 336092.35 N 186036.16





Dimensions 1.00m x 1.00m
Excavation date 12/02/2002

Samples and Tests			Strata		
Depth (m)	Type & No.	Records	Depth (m)	No.	Description
0.40	ES1		0.00-0.40	1	MADEGROUND: Slightly sandy CLAY with many rootlets.

Groundwater
No. Struck Behaviour

Remarks
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 0.40m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

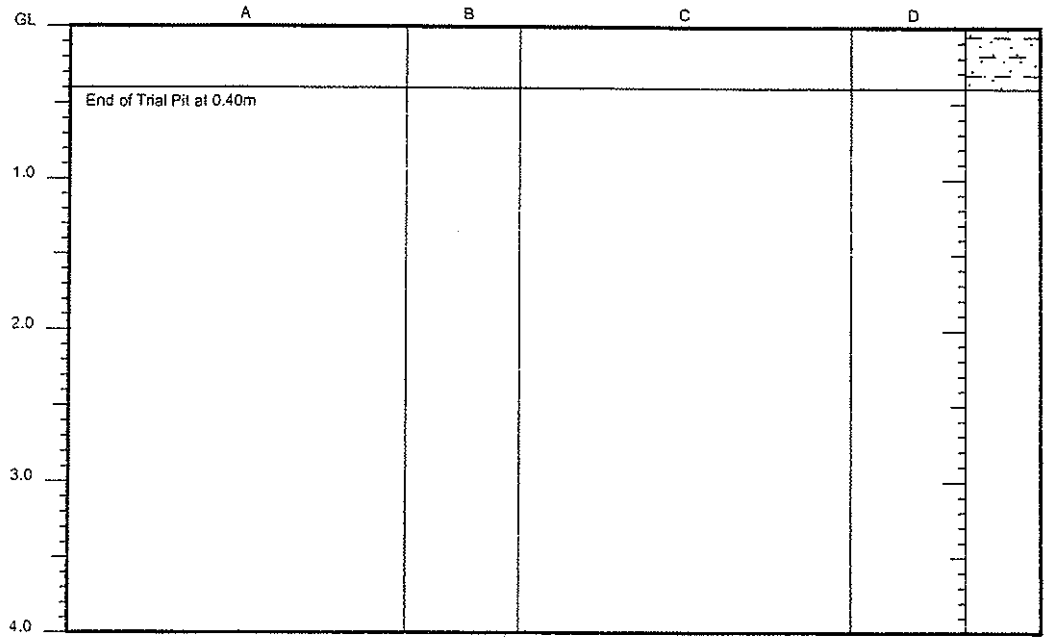
Trial Pit
RBTP6
Sheet 1 of 1

03/05/2002 11:17:15 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by J.L. Checked by	Equipment and Methods Trial Pit/Trench from 0.00m to 0.40m.Pit dug using Hydraulic wheeled excavator	Ground Level + 5.08 m OD National Grid Coordinates E 335943.16 N 186056.60



Dimensions 1.00m x 1.00m
Excavation date 12/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.40	ES1	

Strata

Depth (m)	No.	Description
0.00-0.40	1	MADEGROUND: Grey mottled brown slightly sandy CLAY with many rootlets.

Groundwater
No. Struck Behaviour

Remarks
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 0.40m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

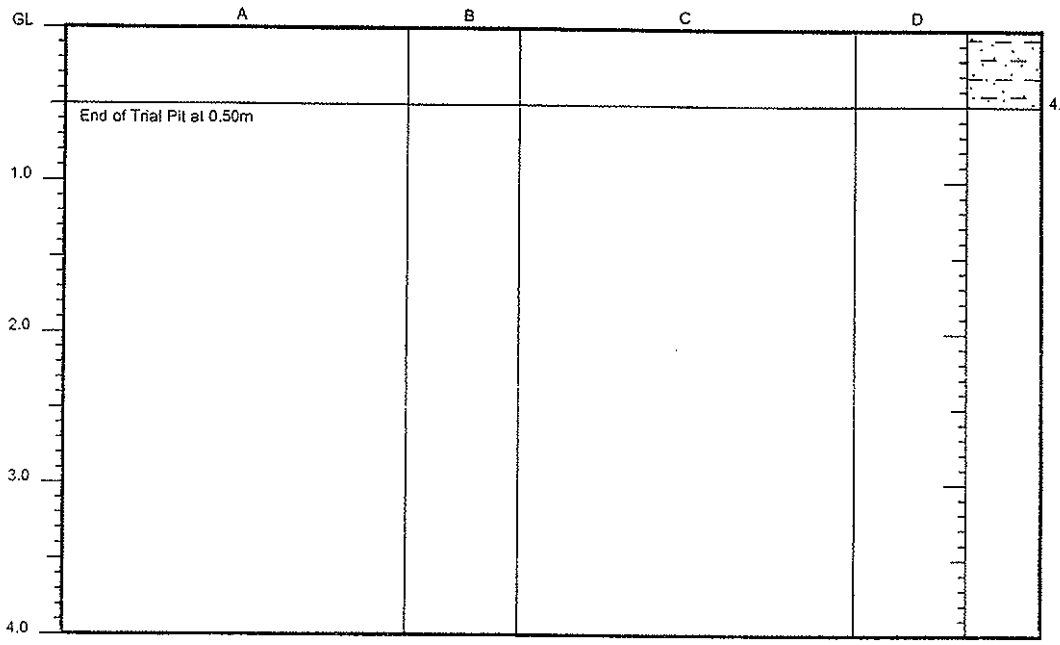
Trial Pit
RBTP7
Sheet 1 of 1

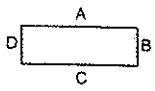
03/05/2002 11:17:20 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by J.L Checked by	Equipment and Methods Trial Pit/Trench from 0.00m to 0.50m.Pit dug using Hydraulic wheeled excavator.	Ground Level + 4.85 m OD National Grid Coordinates E 336065.25 N 185980.77





Excavation date 12/02/2002

Samples and Tests

Depth (m)	Type & No.	Records
0.50	ES1	

Strata

Depth (m)	No.	Description
0.00-0.50	1	MADEGROUND: Soft dark grey slightly sandy CLAY with many rootlets.

Groundwater
No. Struck Behaviour

Remarks
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 0.50m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

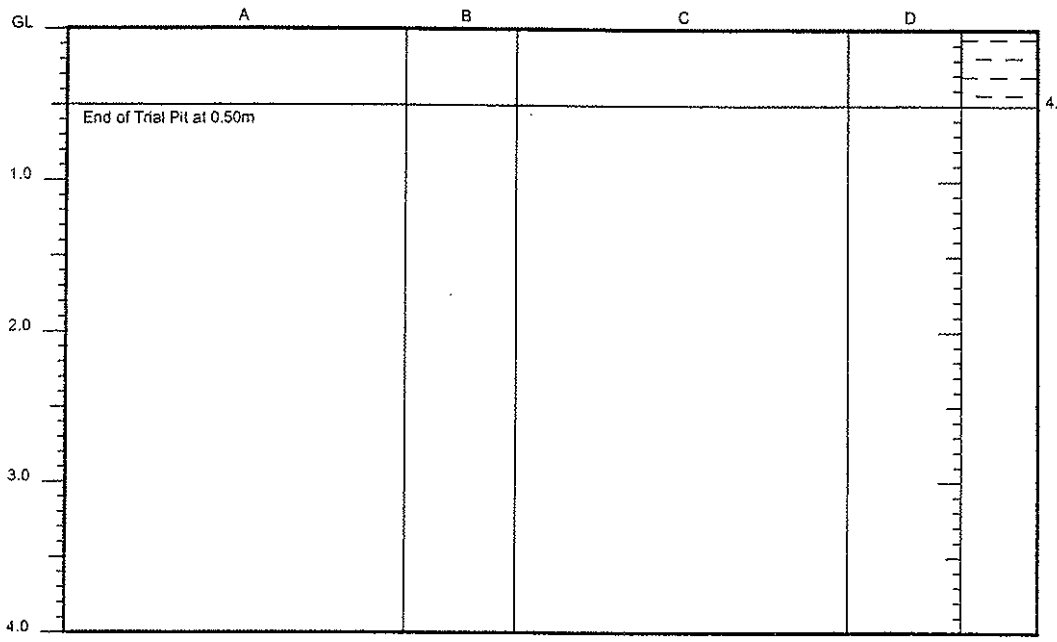
Trial Pit
RBTP9
Sheet 1 of 1

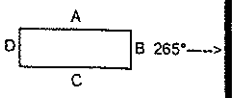
03/05/2002 11:17:24 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by JL Checked by	**Equipment and Methods** Machine dug Trial Pit from 0.00m to 0.50m using JCB with bucket.	Ground Level + 5.38 m OD National Grid Coordinates E 335984.28 N 185668.31





Dimensions 0.80m x 0.80m
Excavation date 12/02/2002

Samples and Tests

Strata

Depth (m)	Type & No.	Records	Depth (m)	No.	Description
0.50	ES1		0.00-0.50	1	MADE GROUND: Soft to firm grey CLAY with abundant rootlets.

Groundwater
Fast seepage at 0.10m.

Remarks
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 0.50m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no. 152002
Carried out for Corus plc

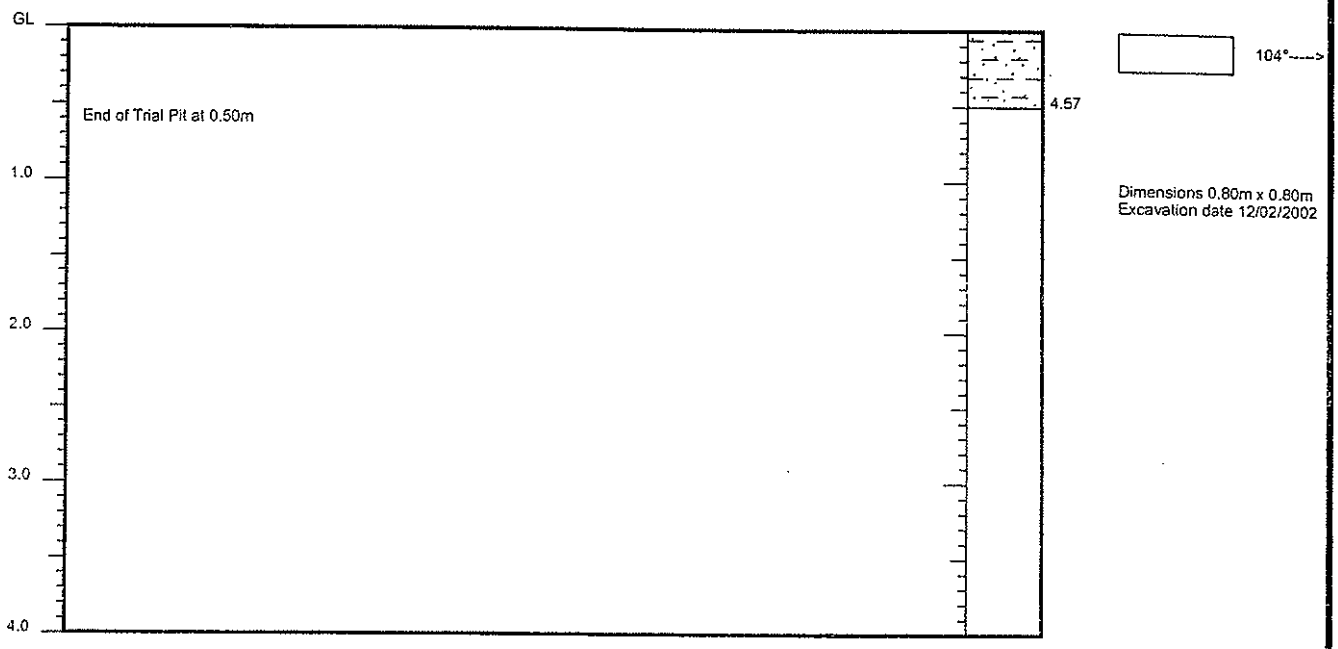
Trial Pit
RBTP10
Sheet 1 of 1

03/05/2002 11:16:53 ESGLog v2.10

Trial Pit Log

Exploration Associates

Logged by JL Checked by	Equipment and Methods Machine dug Trial Pit from 0.00m to 0.50m using JCB with bucket.	Ground Level + 5.07 m OD National Grid Coordinates E 335997.41 N 185705.59



Dimensions 0.80m x 0.80m
Excavation date 12/02/2002

Samples and Tests

Strata

Depth (m)	Type & No.	Records	Depth (m)	No.	Description
0.50	ES1		0.00-0.50	1	MADE GROUND: Soft dark grey slightly sandy CLAY with many rootlets.

Groundwater
Fast seepage at 0.20m.

Remarks
Stability : Stable, Shoring : None
Hole backfill : 0.00m to 0.50m Arisings (a).

Notes : For explanation of symbols and abbreviations see key sheet. All depths in metres.

Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Trial Pit
RBTP11
Sheet 1 of 1

03/05/2002 11:17:01 ESGLog v2.10

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ01 CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	336111.62 E
Project	New M4 - Second Preliminary Ground Investigation				185804.98 N
		Drilling Rig	Dando	Ground Level	6.57m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	14/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
13/12/2007	1730	7.00	6.50	DRY	End of Shift
14/12/2007	0730	7.00	6.50	DRY	Start of Shift
14/12/2007	1730	14.00	13.50	DRY	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
1.20	1.90	2.00	Chiselling
14.10	14.50	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	14.00	200	13.50

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
14/12/2007		13.40	13.40	20	Seepage	13.40	NR

GENERAL NOTES

1. Cable Percussive boring complete at 14.50m.
2. Insitu permeability test carried out from 14.10m to 14.50m.
3. 50mm standpipe installed, slotted from 5.80m to 7.50m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.20	C	50/225mm (9,14,18,6,19,7)	1.20	DRY
2.50	S	N=17 (2,3,4,4,4,5)	2.00	DRY
4.50	S	N=10 (2,2,2,2,3,3)	4.00	DRY
6.50	S	N=11 (1,2,2,3,2,4)	6.00	DRY
8.50	S	N=1 (1,0,0,1,0,0)	8.00	DRY
10.50	S	N=2 (1,0,1,0,1,0)	10.00	DRY
12.50	S	N=11 (1,2,2,3,3,3)	12.00	DRY
14.10	S	75/80mm - Abandoned	13.50	3.00
14.50	S	75/20mm - Abandoned	13.50	3.00

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL CP HEADER
Version	3.05
Revised	17/12/2007

NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ01 CP
S□ee□1 o□□

Contract No.	F15056	Method	Cable Percussion	Coordinates	336111.62 E
Project	New M4 - Second Preliminary Ground Investigation				185804.98 N
		Drilling Rig	Dando	Ground Level	6.57m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	14/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Dark greyish brown sandy gravelly clay. Sand sized fragments are fine to coarse. Gravel sized fragments are angular to subangular fine to coarse of mudstone, shale and slag.				ES1	0.30				
				ES2	1.00				
				D3	1.00				
				B4	1.20 - 1.50	C50/225mm	C	1.20	1.58
Firm to stiff grey mottled orangish brown slightly grtavelly CLAY. Gravel is angular fine to medium of mudstone. (Estuarine Alluvium)		1.90	4.67	D5	2.00	(24)			
				ES6	2.00				
				U7	2.00 - 2.45				
				D8	2.50	S17	S	2.50	
				D9	2.50 - 2.95				2.95
Soft to firm grey CLAY (Organic odour). (Estuarine Alluvium)		3.00	3.57	ES10	3.00				
				D11	3.50				
				ES12	4.00	(16)			
---from 4.12m soft				U13	4.00 - 4.45				
				D14	4.50	S10	S	4.50	
				D15	4.50				4.95
				ES16	5.00				
				D17	5.50				
Spongy black fibrous PEAT. (Peat)		5.80	0.77	D18	6.00	(12)			
				U19	6.00 - 6.45				
				D20	6.50	S11	S	6.50	
				D21	6.50 - 6.95				6.95
Very soft extremely low strength grey silty CLAY. (Esturaine Alluvium) ---from 7.40m to 8.50m with coarse gravel sized pockets of brown fibrous peat		7.40	-0.83	D22	7.50				
				U23	8.00	(5)			
				D24	8.50	S1	S	8.50	
				D25	8.50				9.03
				D26	9.50				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	3.09
Revised	17/12/2007

NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ01 CP
Sheet o

Contract No.	F15056	Method	Cable Percussion	Coordinates	336111.62 E
Project	New M4 - Second Preliminary Ground Investigation				185804.98 N
		Drilling Rig	Dando	Ground Level	6.57m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	14/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
Very soft extremely low strength grey silty CLAY. (Esturaine Alluvium)				U27	10.00 - 10.45	(5)			
				D28	10.50	S2	S	10.50	
				D29	10.50			11.03	
				D30	11.50				
				U31	12.00 - 12.45	(12)			
---from 12.00m to 12.24m with very closely spaced white shell fragments and fine to medium gravel sized pockets of brown fibrous peat ---12.43m to 12.45m light brown fine sand. ---from 12.50m becomes firm				D32	12.50	S11	S	12.50	
				D33	12.50			12.95	
		13.40	-6.83						
Very stiff reddish brown slightly sandy slightly gravelly CLAY. Gravel is angular fine to medium (Weathered Mudstone). (Mercia Mudstone Group)				D34	13.50				
				D35	14.00				
				D36	14.10	S75/80mm - Abandoned	S	14.10	
				D37	14.30			14.18	
		14.50	-7.93	D38	14.50	S75/20mm - Abandoned	S	14.50	
Cable Percussion boring complete at 14.50 m.								14.52	

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	3.09
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ01
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	335947.70 E
Project	New M4 - Second Preliminary Ground Investigation				185680.95 N
		Sampling Rig	Hydraulic Hammer	Ground Level	5.82m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	11/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	11/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Dark grey and black angular to subangular medium gravel sized fragments of slag.				D1 ES2 ES3 L4 L6	0.00 - 0.10 0.10 0.30 0.40 - 1.00 0.50 - 1.80	From: 0.00 To: 1.00 Diameter: 100mm Recovery : 100% Blows: 9	
Firm grey mottled orangish brown CLAY with occasional rootlets. (Estuarine Alluvium)		0.95	4.87			From: 1.00 To: 1.80 Diameter: 90mm Recovery : 100% Blows: 10	
Sampling complete at 1.80 m.		1.80	4.02	ES5	1.80		

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 1.80m.
2. Window Sampling terminated at 1.80m due to collapse.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ01A
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	335948.36 E
Project	New M4 - Second Preliminary Ground Investigation				185681.66 N
		Sampling Rig	Hydraulic Hammer	Ground Level	5.87m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	11/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	11/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Grey slightly gravelly clay with frequent rootlets (upto 3mm diameter). Gravel sized fragments are angular to subangular medium of slag.				L1	0.00 - 1.00	From: 0.00 To: 1.00 Diameter: 100mm Recovery : 100% Blows: 10	
		0.30	5.57				
MADE GROUND: Dark grey and black angular to subangular medium gravel sized fragments of slag.		0.60	5.27	L2	0.50 - 1.50		
Firm grey mottled orangish brown CLAY with occasional rootlets. (Estuarine Alluvium)						From: 1.00 To: 1.50 Diameter: 90mm Recovery : 40% Blows: 9	
		1.50	4.37				
Sampling complete at 1.50 m.							

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 1.50m.
2. Window Sampling terminated at 1.50m due to collapse.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ01B
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	335950.48 E
Project	New M4 - Second Preliminary Ground Investigation				185684.04 N
		Sampling Rig	Hydraulic Hammer	Ground Level	5.88m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	11/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	11/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Grey slightly gravelly clay with frequent rootlets (upto 4mm). Gravel sized fragments are angular to subangular medium of slag.				L1	0.00 - 1.00	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 50% Blows: 10	
		1.00	4.88				
Sampling complete at 1.00 m.							

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 1.00m.
2. Window Sampling terminated at 1.00m due to collapse.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ02
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	335927.82 E
Project	New M4 - Second Preliminary Ground Investigation				185727.60 N
		Sampling Rig	Hydraulic Hammer	Ground Level	5.88m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	09/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	09/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Dark brown light brown mottled slightly gravelly clay with frequent rootlets. Gravel sized fragments are angular to subangular medium of slag.				L1	0.00 - 1.00	From: 0.00 To: 1.00 Diameter: 100mm Recovery : 60% Blows: 7	
		0.40	5.48				
MADE GROUND: Grey clayey angular to subangular medium gravel sized fragments of slag.				ES2	1.00	From: 1.00 To: 2.00	
				L3	1.00 - 2.00	Diameter: 90mm Recovery : 100% Blows: 9	
		1.20	4.68				
Firm grey mottled orangish brown CLAY. (Estuarine Alluvium)							
---from 1.80m becomes soft				ES4	2.00	From: 2.00 To: 3.00	
				L5	2.00 - 3.00	Diameter: 80mm Recovery : 100% Blows: 10	
---at 2.20m with occasional fine to medium gravel sized pockets of peat							
				ES6	3.00	From: 3.00 To: 3.20	
		3.20	2.68	ES7	3.20	Diameter: 70mm Recovery : 100% Blows: 9	
Sampling complete at 3.20 m.							

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
09/12/2007		0.10	0.10	20	Seepage	NR	NR

GENERAL NOTES

1. Window Sampling from GL to 3.20m.
2. Window Sampling terminated at 3.20m due to refusal on peat.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ03
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336026.69 E
Project	New M4 - Second Preliminary Ground Investigation				185773.54 N
		Sampling Rig	Hydraulic Hammer	Ground Level	5.92m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	08/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	08/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Brownish grey clay with frequent rootlets (upto 4mm).				L1	0.00 - 1.00	From: 0.00 To: 1.00 Diameter: 100mm Recovery : 100% Blows: 9	
		0.75	5.17				
MADE GROUND: Grey mottled orangish brown clay with occasional rootlets.		1.00	4.92	ES2 L3	1.00 1.00 - 2.00	From: 1.00 To: 2.00 Diameter: 90mm Recovery : 100% Blows: 8	
MADE GROUND: Grey slightly sandy clay with occasional rootlets. Sand is coarse.		1.40	4.52				
Firm grey mottled orangish brown CLAY. (Estuarine Alluvium)		2.00	3.92	ES4 L5	2.00 2.00 - 3.00	From: 2.00 To: 3.00 Diameter: 70mm Recovery : 100% Blows: 6	
Soft greyish brown silty CLAY. (Estuarine Alluvium)		2.40	3.52				
Soft grey silty CLAY (Organic odour). (Estuarine Alluvium)				ES6	3.00	From: 3.00 To: 3.60 Diameter: 60mm Recovery : 100% Blows: 5	
		3.50	2.42				
Brown pseudofibrous PEAT. (Peat)		3.60	2.32	ES7	3.60		
Sampling complete at 3.60 m.							

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
08/12/2007		0.15	0.15	20	Seepage	NR	NR

GENERAL NOTES

1. Window Sampling from GL to 3.60m.
2. Window Sampling terminated at 3.60m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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WINDOW SAMPLING LOG

Hole ID.
SWSJ04
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336085.43 E
Project	New M4 - Second Preliminary Ground Investigation				185819.50 N
		Sampling Rig	Hydraulic Hammer	Ground Level	5.97m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	08/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	08/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Grey locally mottled orangish brown and reddish brown siltyt slightly gravelly clay with frequent rootlets. Gravel sized fragments are angular fine to medium of mudstone.		0.30	5.67	L1	0.00 - 1.00	From: 0.00 To: 1.00 Diameter: 100mm Recovery : 100% Blows: 7	
Firm grey locally mottled orangish brown CLAY with occasional rootlets. (Estuarine Alluvium)		0.50	5.47			From: 0.40 To: 2.10 Diameter: 90mm Recovery : 0% Blows: 5	
Firm grey mottled orangish brown CLAY. (Estuarine Alluvium)				ES2	1.00	From: 0.50 To: 2.00 Diameter: 90mm Recovery : 0% Blows: 7	
		2.10	3.87				
Sampling complete at 2.10 m.							

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
08/12/2007		0.40	0.40	20	Seepage	NR	NR

GENERAL NOTES

1. Window Sampling from GL to 2.10m.
2. Window Sampling terminated at 2.10m due to collapse.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ05
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	335966.97 E
Project	New M4 - Second Preliminary Ground Investigation				185811.26 N
		Sampling Rig	Hydraulic Hammer	Ground Level	5.82m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	09/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	09/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Greyish brown clay.		0.10	5.72	L1	0.00 - 1.00	From: 0.00 To: 1.00 Diameter: 100mm Recovery : 100% Blows: 7	
MADE GROUND: Brown clay with frequent rootlets.		0.60	5.22				
MADE GROUND: Dark grey angular to subangular medium gravel of slag.		0.70	5.12				
Soft to firm grey mottled orangish brown CLAY. (Estuarine Alluvium)				ES2 L3	1.00 1.00 - 2.00	From: 1.00 To: 2.00 Diameter: 90mm Recovery : 100% Blows: 8	
Soft grey silty CLAY (Organic odour). (Estuarine Alluvium)		2.00	3.82	ES4 L5	2.00 2.00 - 3.00	From: 2.00 To: 3.00 Diameter: 80mm Recovery : 100% Blows: 8	
PEAT (Driller's description). (Peat)		3.10	2.72	ES6	3.00	From: 3.00 To: 3.30 Diameter: 70mm Recovery : 100% Blows: 12	
Sampling complete at 3.30 m.		3.30	2.52	ES7	3.30		

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
09/12/2007		0.10	0.10	20	Seepage	NR	NR

GENERAL NOTES

1. Window Sampling from GL to 3.30m.
2. Window Sampling terminated at 3.30m.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ06
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336028.12 E
Project	New M4 - Second Preliminary Ground Investigation				185866.88 N
		Sampling Rig	Hydraulic Hammer	Ground Level	6.03m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	09/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	09/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Brown clay with occasional rootlets (upto 5mm diameter).				L3 ES1 ES2	0.00 - 1.00 0.10 0.30	From: 0.00 To: 1.00 Diameter: 100mm Recovery : 100% Blows: 9	
		0.32	5.71				
MADE GROUND: Grey mottled orangish brown clay with occasional rootlets.							
		1.00	5.03	ES4	1.00	From: 1.00 To: 1.30 Diameter: 90mm Recovery : 0% Blows: 12	
Firm greyish blue organic CLAY (Driller's description). (Estuarine Alluvium)		1.30	4.73				
Stiff grey mottled bluish grey CLAY (Drillers Description). (Estuarine Alluvium)		1.50	4.53			From: 1.30 To: 1.50 Diameter: 60mm Recovery : 0% Blows: 12	
Sampling complete at 1.50 m.							

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
09/12/2007		0.15	0.15	20	Seepage	NR	NR

GENERAL NOTES

1. Window Sampling from GL to 1.50m.
1. Window Sampling terminated at 1.50m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ06B
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336034.70 E
Project	New M4 - Second Preliminary Ground Investigation				185868.64 N
		Sampling Rig	Hydraulic Hammer	Ground Level	5.96m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	09/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	09/12/2007

Description of Strata	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Grey mottled orangish brown silty clay.			L1	0.00 - 1.00	From: 0.00 To: 1.00	
			ES2	0.10	Diameter: 100mm	
			ES3	0.30	Recovery : 80%	
---from 0.40m becomes firm					Blows: 8	
			ES4	1.00	From: 1.00 To: 1.30	
					Diameter: 90mm	
					Recovery : 0%	
					Blows: 9	
					From: 1.30 To: 2.00	
					Diameter: 50mm	
					Recovery : 100%	
					Blows: 9	
Soft brownish grey silty CLAY. (Estuarine Alluvium)	2.00	3.96	ES5	2.00	From: 2.00 To: 3.00	
			L6	2.00 - 3.00	Diameter: 50mm	
					Recovery : 100%	
Soft brown very silty CLAY. (Estuarine Alluvium)	2.30	3.66			Blows: 9	
			ES7	3.00	From: 3.00 To: 4.00	
Very soft brown silty CLAY. (Estuarine Aluuvium)	3.10	2.86	L8	3.00 - 4.00	Diameter: 50mm	
	3.20	2.76			Recovery : 100%	
Soft to very soft dark grey silty CLAY. (Estuarine Alluvium)					Blows: 7	
---from 3.20m becomes soft						
			ES9	4.00	From: 4.00 To: 4.50	
					Diameter: 50mm	
	4.20	1.76			Recovery : 100%	
PEAT (Driller's description). (Peat)					Blows: 11	
	4.50	1.46	ES10	4.50		
Sampling complete at 4.50 m.						

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
09/12/2007		0.50	0.50	20	Seepage	NR	NR

GENERAL NOTES

1. Window Sampling from GL to 4.50m.
2. Window Sampling terminated at 4.50m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ06A
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336032.99 E
Project	New M4 - Second Preliminary Ground Investigation				185868.63 N
		Sampling Rig	Hydraulic Hammer	Ground Level	6.05m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	09/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	09/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Brown clay with occasional rootlets (upto 5mm).						From: 0.00 To: 1.00 Diameter: 90mm Recovery : 100% Blows: 9	
		0.35	5.70				
MADE GROUND: Grey mottled orangish brown clay with occasional rootlets.							
		1.00	5.05	D1	1.00	From: 1.00 To: 1.30 Diameter: 80mm Recovery : 0% Blows: 12	
Firm greyish blue organic CLAY. (Estuarine Alluvium)		1.30	4.75				
Stiff grey mottled bluish grey CLAY. (Estuarine Alluvium)		1.50	4.55			From: 1.30 To: 1.50 Diameter: 60mm Recovery : 100% Blows: 12	
Sampling complete at 1.50 m.							

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
09/12/2007		0.15	0.15	20	Seepage	NR	NR

GENERAL NOTES

1. Window Sampling from GL to 1.50m.
2. Window Sampling terminated at 1.50m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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WINDOW SAMPLING LOG

Hole ID.
SWSJ07
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336138.72 E
Project	New M4 - Second Preliminary Ground Investigation				185883.86 N
		Sampling Rig	Hydraulic Hammer	Ground Level	5.96m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	10/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	10/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Grey mottled orangish brown clay with rare rootlets. ---from GL to 0.20m with frequent rootlets				D1 ES2 ES3 L4	0.00 - 0.10 0.10 0.30 0.40 - 0.70	From: 0.00 To: 1.00 Diameter: 100mm Recovery : 100% Blows: 9	
MADE GROUND: Grey mottled orangish brown clay with occasional fine gravel sized pockets of fine sand. ---from 1.20m becomes soft to firm		1.00	4.96	ES5 L6	1.00 1.00 - 1.80	From: 1.00 To: 2.00 Diameter: 90mm Recovery : 80% Blows: 9	
				ES7 L8	2.00 2.00 - 2.80	From: 2.00 To: 3.00 Diameter: 80mm Recovery : 100% Blows: 8	
Soft grey silty CLAY with occasional fragments of organic material (Organic odour). (Estuarine Alluvium)		2.40	3.56				
				ES9 L10	3.00 3.00 - 3.60	From: 3.00 To: 4.00 Diameter: 70mm Recovery : 100% Blows: 8	
Very soft brownish grey slightly sandy silty CLAY. (Estuarine Alluvium)		4.00	1.96	ES11 L12	4.00 4.00 - 4.50	From: 4.00 To: 4.80 Diameter: 60mm Recovery : 100% Blows: 10	
PEAT (Driller's description). (Peat)		4.50	1.46				
Sampling complete at 4.80 m.		4.80	1.16	ES13	4.80		

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
10/12/2007		0.10	0.10	20	Seepage	NR	NR

GENERAL NOTES

1. Window Sampling from GL to 4.80m.
2. Window Sampling terminated at 4.80m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ08
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336067.68 E
Project	New M4 - Second Preliminary Ground Investigation				185960.60 N
		Sampling Rig	Hydraulic Hammer	Ground Level	6.75m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	12/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	12/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Grey locally mottled orangish brown slightly sandy clay with frequent rootlets (upto 6mm). Sand is medium to coarse.				D1 ES2 ES3	0.00 - 0.10 0.10 0.30	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 100%	
		0.40	6.35	L4	0.40 - 1.00	Blows: 12	
MADE GROUND: Grey silty clay with occasional rootlets.							
		1.10	5.65	L5	1.10 - 1.70	From: 1.00 To: 2.00 Diameter: 90mm Recovery : 10% Blows: 13	
MADE GROUND: Grey mottled orangish brown clay with occasional fine to medium gravel sized pockets of fine sand. ---from 1.60m becomes soft						From: 1.00 To: 2.00 Diameter: 80mm Recovery : 100% Blows: 10	
		2.00	4.75	ES6	2.00	From: 2.00 To: 3.00	
Soft greyish brown CLAY with occasional coarse gravel sized pockets of brown amorphous peat. (Estuarine Alluvium)		2.20	4.55	L7	2.00 - 2.70	Diameter: 70mm Recovery : 100% Blows: 8	
Soft grey silty CLAY. (Estuarine Alluvium)							
		3.00	3.75	ES8 L9	3.00 3.00 - 3.70	From: 3.00 To: 3.70 Diameter: 70mm Recovery : 100% Blows: 12	
Soft to very soft grey silty CLAY with occasional fine to coarse gravel sized pockets of brown amorphous peat and fragments of organic material. (Estuarine Alluvium)							
		3.80	2.95	ES10	3.80	From: 3.80 To: 4.00	
PEAT (Driller's description). (Peat)		4.00	2.75			Diameter: 50mm Recovery : 100% Blows: 10	
Sampling complete at 4.00 m.							

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
12/12/2007		0.20	0.20	20	Seepage	NR	NR

GENERAL NOTES

1. Window Sampling from GL to 4.00m.
2. Window Sampling terminated at 4.00m.
3. 50mm standpipe installed, slotted from 0.30m to 3.30m.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Geotechnical Engineering Limited

BOREHOLE LOG

BH508

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 27 January 2015 — Easting 335897.4 — Scale 1 : 50

End Date 2 February 2015 — Northing 185801.4 — Ground level 5.90mOD — Depth 20.50 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
27/01/15 0800hrs	1B	0.00	1.20		Vo 0.50				Brown clayey sandy angular and subangular fine to coarse slag GRAVEL. (MG)			
	2D*	0.00	0.30							0.40	5.50	
	3D*	0.50	0.60						Very soft dark greyish brown slightly sandy gravelly silty CLAY. Gravel is angular to subangular fine to coarse tarmacadam and slag. (MG)			
	4D*	1.00	1.10									
	5D	1.20	1.65	1.20	S 3							
	6B	1.20	1.65		Vo 1.00				1.20 - 1.65m: Subrounded fine and medium gravel.			
	7D*	1.50	1.60							1.60	4.30	
	8UT	1.65	2.10	1.50					Very soft dark grey slightly sandy slightly gravelly silty CLAY. Gravel is subangular and subrounded fine to coarse slag, limestone and tarmacadam. (MG)			
	9B	1.65	2.25		Vo 0.70					2.05	3.85	
	10D	2.05	2.50	1.50	S 4							
	11B	2.05	2.50		Vo 5.20				Soft grey mottled brown silty CLAY with rare dark brown staining. (TFD)			
	14B	2.50	3.10		Vo 3.10							
	12UT	2.50	2.95	2.00								
	13D	2.90	3.10									
	15D*	2.50	2.60							3.00	2.90	
	16D*	2.60	3.00						Spongy black locally tending to brown clayey fibrous PEAT. (PEAT)			
	17D*	3.00	4.00									
	18D	3.10	3.55	3.00	S 2							
	19B	3.10	3.55		Vo 2.60							
	20UT	3.55	4.00	3.00								
	21B	3.55	4.20		Vo 1.70							
	22D	4.00	4.20									
	23D*	4.00	5.00									
	24D	4.20	4.65	4.00	S 1				4.25 - 4.65m: Frequent fine gravel sized seeds. 4.35 - 4.65m: Rare fine and medium gravel sized wood fragments (up to 2mm).			
	25B	4.20	4.65		Vo 4.30							
	26UT	4.65	5.10	4.50								
27/01/15 1630hrs 4.70m	27B	4.65	5.25		Vo 0.70					4.90	1.00	
	28D*	5.00	6.00						Very soft grey mottled dark brown silty peaty CLAY. (TFDP)			
	29D	5.05	5.25							5.20	0.70	
28/01/15 0800hrs 3.40m	30D	5.25	5.70	5.00	S 2				Very soft grey silty CLAY. (TFD)			
	31B	5.25	5.70		Vo 1.00							
	32UT	5.70	6.15	5.70								
	33D	6.10	6.30									
	34B	5.70	7.50		Vo 1.40							
	35D*	6.00	7.00						6.05 - 6.35m: Rare roots and plant material (up to 2mm).			
	36D	7.50	7.95	7.50	S 4					7.50	-1.60	
	37B	7.50	8.00		Vo 15.50				Very soft grey silty amorphous peaty CLAY with frequent decomposed plant material (up to 3mm). (TFDP)			
									Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.20m. Cable percussion (200mm) 1.20-6.00m and (150mm) 6.00-14.10m. Dynamic sampled (113mm) 14.10-14.50m. Waterflush rotary core drilled (116mm) 14.50-20.50m.

CASING: 200mm diam to 6.00m, 150mm diam to 13.00m and 140mm diam to 14.40m.

BACKFILL: On completion, hole backfilled with bentonite pellets 20.50-0.70m, granular fill 0.70-0.20m and arisings 0.20-0.00m.

REMARKS: Hole advanced by chiselling 14.20-14.40m (1hr). Water added to assist boring throughout borehole (90 litres).

Downhole magnetometry for UXO risk mitigation undertaken 0.00-11.89m. No anomalies encountered.

Bentonite seal for aquifer protection installed during drilling 6.00-5.00m, prior to reduction in casing diameter.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
3.00		1.80	20	

AGS

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BOREHOLE LOG

BH508

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 27 January 2015 — Easting 335897.4 — Scale 1 : 50

End Date 2 February 2015 — Northing 185801.4 — Ground level 5.90mOD — Depth 20.50 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	38UT 39B 40D*	8.00 - 8.45 8.00 - 8.50 8.00 - 8.50	7.50	Vo 17.50				8.00 - 8.50m: Rare wood fragments (up to 5mm) and rare roots (up to 3mm diam).			
	41D 42B	8.50 - 8.95 8.50 - 10.00	8.00	S 1				Very soft grey silty CLAY. (TFD)	8.50	-2.60	
	43UT 44D 45B	10.00 - 10.45 10.45 - 10.65 10.00 - 11.50	10.00								
28/01/15 1630hrs Dry											
29/01/15 0800hrs 7.90m	46D 47B	11.50 - 11.89 11.50 - 12.50	11.50	S*66				11.50 - 11.60m: Black spongy slightly clayey peat. Very stiff black mottled brown and grey slightly sandy slightly gravelly peaty CLAY with frequent plant fragments (up to 7mm). Gravel is subangular to rounded fine and medium sandstone and rare quartz. (TFDP)	11.60 12.50	-5.70 -6.60	
	48D 49B	12.50 - 12.95 12.50 - 13.00	12.50	S 36				Stiff grey slightly sandy slightly gravelly CLAY with frequent wood fragments (up to 30mm). Gravel is subrounded and rounded fine and medium sandstone. (TFD)	13.00	-7.10	
	50D 51B	13.00 - 13.32 13.00 - 14.20	13.00	S*88				Very stiff reddish grey slightly sandy CLAY locally tending to hard brown clayey silt with rare plant fragments (up to 5mm). (TFD)			
29/01/15 1600hrs 7.60m		14.10 - 14.40 14.30 - 14.54	13.00 13.00	C*100 C*167					14.10	-8.20	
02/02/15 1150hrs 1.46m	52X	14.10 - 14.50 14.40 - 14.64	13.00	C*167				Hard fissured reddish brown slightly sandy silty CLAY with rare greenish grey reduction spots (up to 3mm). (MMG. Weathering Grade IVb). (MMG) (Grade IVb)	14.55	-8.65	
	53C	14.50 - 16.00	14.40		97 15 15	NA		14.40 - 14.50m: Hard reddish brown sandy clayey silt. Stiff fissured reddish brown slightly sandy slightly gravelly CLAY with frequent greenish grey reduction spots (up to 20mm). Gravel is subangular to rounded fine and medium lithorelicts of very stiff clay to very weak siltstone. (MMG. Weathering Grade III) (MMG) (Grade III) 14.90 - 15.05m: 80° planar smooth fissure. 15.20 - 15.35m: Tending to claybound mudstone lithorelicts. 15.35 - 15.55m: Extremely weak fractured reddish brown mudstone.	15.55	-9.65	
	54C	16.00 - 17.50	14.40		100 3 0	NI NA		Stiff fissured reddish brown slightly gravelly sandy CLAY with rare light greenish grey reduction spots (up to 5mm). Gravel is subangular and subrounded fine to coarse lithorelicts of very stiff clay tending to hard clayey silt to very weak mudstone. Fissures are randomly orientated extremely closely spaced planar smooth. Surfaces frequently stained brownish grey locally with a veneer of clay. (MMG. Weathering Grade III) (MMG) (Grade III) 16.05 - 16.10m: Very weak reddish brown mudstone.	17.20 17.60	-11.30 -11.70	
	55C	17.50 - 19.00	14.40		100	NA					
								Continued Next Page	{18.00}		

water strike (m)	casing (m)	rose to (m)	time to rise (m)	remarks
12.50		7.90	20	Fast flow.
14.20		7.60	20	Fast flow.

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CONTRACT **30238**

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BOREHOLE LOG

BH508

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 27 January 2015 — Easting 335897.4 — Scale 1 : 50

End Date 2 February 2015 — Northing 185801.4 — Ground level 5.90mOD — Depth 20.50 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
									16.60 - 16.75m: Mottled black very sandy clay with medium gravel sized pockets of gypsum crystals (up to 2mm). 16.75 - 17.20m: Slightly sandy.			
	56C	19.00	20.50	14.40		100 0 0	NI NA		Hard fissured reddish brown and greenish grey slightly sandy clayey SILT with rare gypsum crystals (up to 2mm). Fissures are randomly orientated extremely closely spaced planar smooth. (MMG. Weathering Grade IVa) (MMG) (Grade IVa)	19.15	-13.25	
							NI		Stiff fissured reddish brown slightly gravelly sandy CLAY with rare greenish grey reduction spots (up to 10mm). Gravel is subangular and subrounded fine and medium lithorelicts of very stiff clay to extremely weak mudstone. (MMG) (Grade III/IVa) 17.90 - 18.10m: Extremely weak reddish brown mudstone. 18.25 - 18.40m: 70° planar rough fissure with clay veneer. 18.70 - 18.90m: Rare fine and medium gravel sized pockets of gypsum crystals (up to 2mm). 19.05 - 19.15m: Extremely weak mudstone. Subhorizontal to 20° fractures intersecting 80° fracture.	19.70	-13.80	
02/02/15 1519hrs 3.16m									Stiff fissured reddish brown slightly sandy gravelly clayey SILT locally silty CLAY with rare greenish grey reduction spots (up to 3mm). Gravel is subangular to rounded fine to coarse lithorelicts of hard silt to extremely weak mudstone. (MMG) (Grade III)	20.50	-14.60	
									Extremely weak reddish brown MUDSTONE disintegrated to slightly sandy subrounded and rounded fine to coarse gravel. (MMG) (Grade II/III) 20.20 - 20.25m: Slightly sandy clay.			
									Borehole completed at 20.50m.	{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

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BOREHOLE LOG

BH509

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 30 January 2015 — Easting 336079.9 — Scale 1 : 50

End Date 4 February 2015 — Northing 185789.0 — Ground level 6.45mOD — Depth 20.50 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
30/01/15 0800hrs	1B	0.00	0.50						Dark grey clayey sandy subrounded fine and medium limestone GRAVEL with low subrounded limestone cobble content. (MG)			
	2B	0.50	1.20	Nil								
	3D*	0.50	1.00		Vo 1							
	4D	1.20	1.65	1.20	S 3							
	5B	1.20	1.65									
	6D*	1.00	1.50		Vo 0.4					1.20	5.25	
	7UT	1.65	2.10	1.50					Very soft dark grey slightly gravelly slightly sandy mottled light brown and black organic silty CLAY with frequent plant fragments (up to 3mm). (TFD)	1.70	4.75	
	8B	1.65	2.00									
	9D*	1.50	2.00		Vo 0.3				Very soft dark grey mottled light brown and black gravelly organic silty CLAY with frequent plant fragments (up to 3mm). Gravel is subangular fine to coarse limestone and crystalline. (TFD)			
		2.00	2.45	2.00	S 2							
	10B	2.00	2.50									
	11D*	2.00	2.50		Vo 0.2							
	12UT	2.50	2.95	2.50								
	13B	2.50	3.20									
	14D*	2.50	3.00		Vo 0.4							
	15D	2.65	3.15									
	16D*	3.00	3.50		Vo 0.5							
	17D	3.20	3.65	3.00	S 6							
	18B	3.20	3.65									
	19D*	3.50	4.00		Vo 0.5							
30/01/15 1630hrs Dry	20UT	3.65	4.10	3.50								
	21D	4.05	4.15									
	22B	3.65	4.20							4.20	2.25	
02/02/15 0800hrs 1.80m	23D	4.20	4.65	4.00	S 1				Very soft dark grey mottled black organic silty CLAY with frequent plant fragments (up to 5mm). (TFD)			
	24B	4.20	4.65									
	25D*	4.50	5.00		V0 0.5							
	26UT	4.65	5.10	4.50								
	28B	4.65	5.25							5.00	1.45	
	27D	5.05	5.25						Spongy dark brown and black fibrous PEAT. (PEAT)			
	29D	5.25	5.65	4.50	S 4							
	30B	5.25	6.00									
	31UT	6.00	6.45	6.00								
	32B	6.00	6.50									
	33D*	6.00	6.50		Vo 0.5					6.50	-0.05	
	34D	6.50	6.95	6.50	S 2				Very soft dark grey mottled black organic slightly sandy silty CLAY with frequent plant fragments (up to 5mm). (TFD)			
	35B	6.50	8.00									
										8.00	-1.55	
									Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.20m. Cable percussion (200mm) 1.20-6.00m and (150mm) 6.00-14.50m. Dynamic sampled (113mm) 14.50-14.80m. Waterflush rotary core drilled (116mm) 14.80-20.50m. CASING: 200mm diam to 6.00m, 150mm diam to 14.50m and 140mm diam to 14.70m.

BACKFILL: On completion borehole backfilled with bentonite 20.50-13.20m. A slotted standpipe (50mm) was installed to 13.00m, granular response zone 13.20-10.80m, bentonite seal 10.80-7.20m. A second slotted standpipe (35mm) was installed to 7.50m, granular response zone 7.70-4.30m, bentonite seal 4.30-0.35, gravel drain 0.35-0.25m, concrete and stopcock cover 0.25-0.00m. REMARKS: Hole advanced by chiselling 14.40-14.50m (1hr). Downhole magnetometry for UXO risk mitigation undertaken 0.00-13.00m. No anomalies encountered. Bentonite seal for aquifer protection installed during drilling 6.00-5.00m, prior to reduction in casing diameter. Permeability test undertaken at 8.00-8.50m. MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
2.00	1.50	1.30	20	Medium flow.

AGS

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BOREHOLE LOG

BH509

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 30 January 2015 — Easting 336079.9 — Scale 1 : 50

End Date 4 February 2015 — Northing 185789.0 — Ground level 6.45mOD — Depth 20.50 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	36UT 37D 38B	8.00 - 8.45 8.40 - 8.60 8.00 - 9.50	8.00					Very soft dark grey mottled black slightly sandy silty CLAY with rare subangular fine and medium sandstone gravel. (TFD)			
	39D 40B	9.50 - 9.95 9.50 - 11.00	9.50	S<1					9.50	-3.05	
02/02/15 1630hrs 8.70m								Very soft dark grey sandy gravelly organic CLAY. Gravel is subangular fine and medium sandstone and limestone. (TFD)			
03/02/15 0800hrs 8.80m	41UT 42D 43B	11.00 - 11.45 11.40 - 11.60 11.00 - 12.50	11.00								
	44D 45B	12.50 - 12.95 12.50 - 13.00	12.50	S 27					12.60	-6.15	
	46D 47B	13.00 - 13.45 13.00 - 13.50	13.00	S 50				Stiff dark grey mottled light brown sandy gravelly clayey SILT. Gravel is subangular fine and medium sandstone and limestone. (TFD)	13.00	-6.55	
	48B	13.50 - 13.88 13.50 - 14.50	13.50	C 67				Very stiff reddish brown mottled greenish grey sandy gravelly CLAY with low subrounded sandstone cobble content. Gravel is subangular fine and medium mudstone. (MMG)	14.00	-7.55	
	49X	14.50 - 14.67 14.50 - 14.80	14.50	C*200	100	NA		Reddish brown mottled greenish grey clayey sandy subrounded fine to coarse mudstone and sandstone GRAVEL. (MMG)	14.50	-8.05	
	50C	14.80 - 16.00	14.70					Very stiff fissured reddish brown gravelly CLAY with rare greenish grey reduction spots (up to 5mm). Gravel is subangular fine and medium lithorelicts of extremely weak mudstone. Fissures are subhorizontal up to 20° very closely spaced planar rough. (MMG) (Grade III)			
	51C	16.00 - 17.50	14.70		100 0 0	NI NA NI		Extremely weak and very weak thinly laminated to very thinly bedded reddish brown MUDSTONE with frequent greenish grey reduction spots (up to 10mm). Fractures are subhorizontal up to 20° and subvertical very closely spaced planar rough. (MMG) (Grade II)	16.10 16.25 16.60	-9.65 -9.80 -10.15	
03/02/15 1735hrs 2.70m						200 650		Very stiff fissured reddish brown gravelly CLAY with rare greenish grey reduction spots (up to 5mm). Gravel is subangular fine and medium lithorelicts of extremely weak mudstone. Fissures are subhorizontal to 20° very closely spaced planar rough. (MMG) (Grade III)			
04/02/15 0920hrs 1.60m	52C	17.50 - 19.00	14.70		100 8 8						
								Continued Next Page	{18.00}		

water strike (m)	casing (m)	rose to (m)	time to rise (m)	remarks
14.50		5.20	20	Fast flow.

AGS

CONTRACT 30238

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BOREHOLE LOG

BH509

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 30 January 2015 — Easting 336079.9 — Scale 1 : 50

End Date 4 February 2015 — Northing 185789.0 — Ground level 6.45mOD — Depth 20.50 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
									Extremely weak and very weak thinly laminated to very thinly bedded reddish brown MUDSTONE with frequent greenish grey reduction spots (up to 10mm). Fractures are subhorizontal up to 20° and subvertical extremely closely to medium spaced planar rough. (MMG) (Grade II)			
	53C	19.00	20.50	14.70		100 53 50			16.60 - 16.70m: 70° fracture infilled (up to 2mm) with greenish grey clay. 18.50 - 18.60m: 70° fracture infilled (up to 2mm) with greenish grey clay. 19.80 - 20.00m: 70° fracture stained black and infilled with greenish grey clay up to 2mm.			
04/02/15 1035hrs 3.58m							NA			20.30	-13.85	
									Very stiff fissured reddish brown gravelly CLAY with rare greenish grey reduction spots (up to 5mm). Gravel is subangular fine and medium lithorelicts of extremely weak mudstone. Fissures are subhorizontal to 20° extremely closely spaced planar rough. (MMG) (Grade III)	20.50	-14.05	
									Borehole completed at 20.50m.	{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

AGS

CONTRACT **30238**

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BOREHOLE LOG

Borehole No. **BHM4CAN033**

Sheet 1 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 01/02/2016 - 03/02/2016	Final Depth:
Project No:	JFR8703	Easting:	335891	Drilling Method: Pipe Diameter: 50mm	13.00m
Location:	Newport	Northing:	185762	Dando 2000	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	5.86	Logged By: EJH	1:50

Casing Diameter (mm)	Casing Depth (m)
150	12.50
200	1.60

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00	(0.10)	5.86		GRAVEL of slag.	
					0.10	(0.10)	5.76		(MADE GROUND)	
					0.20	(0.30)	5.66		Solid grey SLAG, recovered as gravels.	
		0.50	ES		0.50		5.36		(MADE GROUND)	
						(0.30)			Dark grey GRAVEL of slag with rare lime fragments.	
					0.80		5.06		(MADE GROUND)	
									Dark grey slightly cobbly fine to medium GRAVEL of slag. Gravel is fine to medium. Cobbles are light grey of slag.	1
		1.20	SPT(C)	N=5 (1,1/1,1,1,2)					(MADE GROUND)	
		1.20 - 1.62	D						Soft grey CLAY.	
		1.20 - 1.70	B						(TIDAL FLAT DEPOSITS)	
		1.50	ES			(1.70)				2
		2.50 - 3.00	B		2.50		3.36		Black pseudo fibrous PEAT.	
		2.50 - 3.00	ES						(PEAT)	
		3.00	SPT(C)	1 (1 for 300mm/1 for 150mm)						3
		3.00 - 3.45	D			(1.90)				4
		4.40	ES		4.40		1.46		Soft grey silty CLAY with rare rootlets.	
		4.50 - 5.00	B						(TIDAL FLAT DEPOSITS)	
		5.00	SPT(C)	0 (1 for 450mm/0 for 0mm)						5
		5.00 - 5.45	D							6
		7.00	SPT(C)	3 (1 for 225mm/3 for 225mm)		(6.60)				7
		7.50 - 8.00	B							8
		9.00	SPT(C)	0 (1 for 450mm/0 for 0mm)						9
		9.00 - 9.45	D							
									Continued on next sheet	10

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Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 13.00m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 11.8 - 0.3m, gravel 11.8 - 13.0m and concrete 0.3 - 0.0m. One standpipe (50mm) was installed with slotted section between 13.0 - 11.8m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (2.0 - 1.0m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 1.2 - 11.3m. No anomalies encountered. Groundwater strike at 0.3 mbGL., water cloudy with no odour. Resting groundwater at 6 mbGL overnight. Heavy rain overnight. Installed with flush cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
0.30		0.10	00:30	0.00	0.10
			00:30	11.90	12.00

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN033**

Sheet 2 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 01/02/2016 - 03/02/2016	Final Depth:
Project No:	JFR8703	Easting:	335891	Drilling Method: Dando 2000	Pipe Diameter: 50mm / 13.00m
Location:	Newport	Northing:	185762	Casing Diameter (mm): 150, 200 / Casing Depth (m): 12.50, 1.60	Scale: 1:50
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	5.86	Logged By: EJH	

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
										11
		11.00	SPT(C)	N=19 (2,3/4,5,5,5)	11.00		-5.14		Black pseudo fibrous PEAT. (PEAT)	
		11.00 - 11.50	B			(0.30)				
					11.30		-5.44		Light grey sandy CLAY with rare gravels. (GLACIOFLUVIAL DEPOSITS)	
		11.45	D			(0.40)				
		11.50 - 12.00	B							
					11.70		-5.84		Reddish brown CLAY. (Weathering Grade V). (WEATHERED MERCIA MUDSTONE)	12
						(0.90)				
		12.60 - 13.00	B		12.60		-6.74		Reddish grey weathered MUDSTONE. (Weathering Grade V). (WEATHERED MERCIA MUDSTONE)	
						(0.40)				13
		13.00	SPT(C)	50 (7,11/50 for 170mm)					End of Borehole at 13.00m	
		13.00 - 13.32	D							
										14
										15
										16
										17
										18
										19
										20

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 13.00m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 11.8 - 0.3m, gravel 11.8 - 13.0m and concrete 0.3 - 0.0m. One standpipe (50mm) was installed with slotted section between 13.0 - 11.8m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (2.0 - 1.0m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 1.2 - 11.3m. No anomalies encountered. Groundwater strike at 0.3 mbGL., water cloudy with no odour. Resting groundwater at 6 mbGL overnight. Heavy rain overnight. Installed with flush cover.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
0.30		0.10	00:30 00:30	0.00 11.90	0.10 12.00

AGS

SUPPLEMENTARY HOLE INFORMATION

BHM4CAN033

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
01/02/2016 07:30:00	0.00	0.00	
01/02/2016 18:00:00	1.00	1.00	
02/02/2016 07:30:00	1.00	1.00	
02/02/2016 18:00:00	11.50	11.50	6
03/02/2016 07:30:00	10.00	11.50	6
03/02/2016 13:00:00	13.00	12.50	

Sample Information

Type/Ref	Depth (m)	Date
W1		06-05-2016
W2		19-05-2016
W3		02-06-2016
ES	0.50	01-02-2016
D	1.20 - 1.62	
B	1.20 - 1.70	
ES	1.50	
ES	2.50 - 3.00	
B	2.50 - 3.00	
D	3.00 - 3.45	
ES	4.40	
B	4.50 - 5.00	
D	5.00 - 5.45	
B	7.50 - 8.00	
D	9.00 - 9.45	
B	11.00 - 11.50	
D	11.45	
B	11.50 - 12.00	
B	12.60 - 13.00	
D	13.00 - 13.32	

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.20	C	N=5 (1,1/1,1,1,2)
3.00	C	1 (1 for 300mm/1 for 150mm)
5.00	C	0 (1 for 450mm/0 for 0mm)
7.00	C	3 (1 for 225mm/3 for 225mm)
9.00	C	0 (1 for 450mm/0 for 0mm)
11.00	C	N=19 (2,3/4,5,5,5)
13.00	C	50 (7,11/50 for 170mm)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)
06/05/2016 10:45:00	1	0.92
19/05/2016 09:00:00	2	1.23
02/06/2016 10:05:00	3	1.33

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

DRAFT

Appendix 2

Gas and Groundwater Monitoring Data

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH512	21/04/15 12:30:00	1037	-0.45								0.0	14		0 litres purged, base depth 2.00m. Not enough water to collect sample. Very muddy/silty.
BH512	21/04/15 12:31:00										0.0			
BH512	21/04/15 12:32:00										0.0			
BH512	21/04/15 12:33:00										0.0			
BH512	21/04/15 12:34:00										0.0			
BH512	21/04/15 12:35:00			0.0	0.1	20.2	1.0	0	0	4.5				
BH512	21/04/15 12:36:00			0.0	0.1	20.2	1.0	0	0	4.0				
BH512	21/04/15 12:37:00			0.0	0.1	20.1	1.0	0	0	4.0				
BH512	21/04/15 12:38:00			0.1	0.1	20.0	1.0	0	0	3.8				
BH512	21/04/15 12:39:00			0.2	0.1	20.0	1.0	0	0	3.3				
BH512	21/04/15 12:40:00			0.4	0.1	20.0	1.0	0	0	2.9				
BH512	21/04/15 12:41:00			0.6	0.1	19.9	1.0	0	0	2.7				
BH512	21/04/15 12:42:00			0.6	0.1	19.9	1.0	0	0	2.7				
BH512	21/04/15 12:43:00			0.7	0.1	19.9	1.0	0	0	2.6				
BH512	21/04/15 12:44:00			0.7	0.1	19.9	1.0	0	0	2.6			1.52	
BH512	28/04/15 09:45:00	1016	0								0.0	10		0 litres purged, base depth 2.00m. Not enough water in install to collect sample.

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT **30238**

CHECKED **EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH512	28/04/15 09:46:00										0.0			
BH512	28/04/15 09:47:00										0.0			
BH512	28/04/15 09:48:00										0.0			
BH512	28/04/15 09:49:00										0.0			
BH512	28/04/15 09:50:00			0.0	0.0	20.5	0.0	0	0	0.7				
BH512	28/04/15 09:51:00			0.0	0.0	20.5	0.0	0	0	0.6				
BH512	28/04/15 09:52:00			0.0	0.0	20.5	0.0	0	0	0.5				
BH512	28/04/15 09:53:00			0.0	0.0	20.5	0.0	0	0	0.5				
BH512	28/04/15 09:54:00			0.0	0.0	20.5	0.0	0	0	0.5				
BH512	28/04/15 09:55:00			0.0	0.0	20.5	0.0	0	0	0.5				
BH512	28/04/15 09:56:00			0.0	0.0	20.5	0.0	0	0	0.5				
BH512	28/04/15 09:57:00			0.0	0.0	20.5	0.0	0	0	0.5				
BH512	28/04/15 09:58:00			0.0	0.0	20.5	0.0	0	0	0.5				
BH512	28/04/15 09:59:00			0.0	0.0	20.5	0.0	0	0	0.6			1.64	
BH512	06/05/15 15:00:00	1006	-0.71								0.0	14		0 litres purged, base depth 2.00m. Not enough water in installation to obtain sample.
BH512	06/05/15 15:01:00										0.0			
BH512	06/05/15 15:02:00										0.0			

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH512	06/05/15 15:03:00										0.0			
BH512	06/05/15 15:04:00										0.0			
BH512	06/05/15 15:05:00			0.0	0.2	18.8	4.0	0	1	2.7				
BH512	06/05/15 15:06:00			0.0	0.2	18.7	4.0	0	1	4.2				
BH512	06/05/15 15:07:00			0.0	0.2	18.7	4.0	0	1	3.9				
BH512	06/05/15 15:08:00			0.0	0.2	18.7	4.0	0	1	4.2				
BH512	06/05/15 15:09:00			0.0	0.2	19.4	3.0	0	0	3.6				
BH512	06/05/15 15:10:00			0.0	0.2	19.7	3.0	0	1	3.0				
BH512	06/05/15 15:11:00			0.0	0.2	19.8	3.0	0	1	3.0				
BH512	06/05/15 15:12:00			0.0	0.2	19.9	3.0	0	0	3.0				
BH512	06/05/15 15:13:00			0.0	0.1	20.0	2.0	0	1	2.7				
BH512	06/05/15 15:14:00			0.0	0.1	20.1	2.0	0	1	2.6			1.59	Not enough water in installation to obtain sample.
BH512	14/05/15 12:02:00	1025	0								0.0	14		
BH512	14/05/15 12:03:00										0.0			
BH512	14/05/15 12:04:00										0.0			
BH512	14/05/15 12:05:00										0.0			
BH512	14/05/15 12:06:00										0.0			
BH512	14/05/15 12:07:00			0.0	0.0	19.9	0.0	0	0	0.0				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH512	14/05/15 12:08:00			0.0	0.0	19.8	0.0	0	0	0.0				
BH512	14/05/15 12:09:00			0.0	0.0	19.8	0.0	0	0	0.1				
BH512	14/05/15 12:10:00			0.0	0.0	19.8	0.0	0	0	0.2				
BH512	14/05/15 12:11:00			0.0	0.0	19.8	0.0	0	0	0.3				
BH512	14/05/15 12:12:00			0.0	0.0	19.9	0.0	0	0	0.3				
BH512	14/05/15 12:13:00			0.0	0.0	19.9	0.0	0	0	0.3				
BH512	14/05/15 12:14:00			0.0	0.0	19.9	0.0	0	0	0.4				
BH512	14/05/15 12:15:00			0.0	0.0	19.9	0.0	0	0	0.4				
BH512	14/05/15 12:16:00			0.0	0.0	20.0	0.0	0	0	0.4				
BH512	14/05/15 12:17:00												1.30	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT **30238**

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GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH512	21/04/15 12:44:00												2.32	Only 20ltrs purged. Purging dry. Slow recharge. Very silty. Base depth 11.00m.
BH512	28/04/15 09:59:00												2.32	Only 20ltrs purged as running dry and very silty/muddy. Base depth 11.00m.
BH512	06/05/15 15:14:00												2.32	Only 20ltrs purged. Running dry with slow recharge. Base depth 11.00m.
BH512	14/05/15 12:18:00												3.63	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Deep install.

CONTRACT	CHECKED
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GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH510	04/03/15 12:30:00	1034	0								0.4	8		
BH510	04/03/15 12:31:00										0.4			
BH510	04/03/15 12:32:00										0.0			
BH510	04/03/15 12:33:00										0.0			
BH510	04/03/15 12:34:00										0.0			
BH510	04/03/15 12:35:00			3.6	3.6	11.2	82.5	0	0	5.3				
BH510	04/03/15 12:36:00			3.5	3.6	11.3	81.6	0	0	5.2				
BH510	04/03/15 12:37:00			3.5	3.5	11.4	81.0	0	0	4.7				
BH510	04/03/15 12:38:00			3.4	3.5	11.5	81.6	0	0	4.2				
BH510	04/03/15 12:39:00			3.4	3.6	11.6	83.0	0	0	3.9				
BH510	04/03/15 12:40:00			3.3	3.8	11.6	88.3	0	0	3.6				
BH510	04/03/15 12:41:00			3.3	4.0	11.7	92.0	0	0	3.2				
BH510	04/03/15 12:42:00			3.2	4.1	11.7	95.5	0	0	3.9				
BH510	04/03/15 12:43:00			3.2	4.2	11.7	97.3	0	0	4.0				
BH510	04/03/15 12:44:00			3.2	4.3	11.7	99.3	0	0	3.8			0.68	
BH510	12/03/15 08:15:00	1026	0								0.0	10		25 litres purged, base depth 6.00m.
BH510	12/03/15 08:16:00										0.0			
BH510	12/03/15 08:17:00										0.0			

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT **30238**

CHECKED **EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH510	12/03/15 08:18:00										0.0			
BH510	12/03/15 08:19:00										0.0			
BH510	12/03/15 08:20:00			0.0	0.0	20.3	0.0	0	0	0.4				
BH510	12/03/15 08:21:00			0.0	0.0	20.3	0.0	0	0	0.3				
BH510	12/03/15 08:22:00			2.0	7.5	17.7	#	0	0	0.0				
BH510	12/03/15 08:23:00			6.1	28.4	17.7	#	0	0	0.0			0.44	Upsurge at 4min 20sec. Unable to obtain further readings.
BH510	18/03/15 10:30:00	1037	0								0.0	5		23 litres purged, base depth 6.00m.
BH510	18/03/15 10:31:00										0.0			
BH510	18/03/15 10:32:00										0.0			
BH510	18/03/15 10:33:00										0.0			
BH510	18/03/15 10:34:00										0.0			
BH510	18/03/15 10:35:00			2.2	4.1	18.5	#	0	0	0.0				
BH510	18/03/15 10:36:00			1.9	4.0	18.7	#	0	0	0.0				
BH510	18/03/15 10:37:00			1.5	3.2	19.0	69.4	0	0	0.0				
BH510	18/03/15 10:38:00			0.3	2.6	19.2	46.2	0	0	0.0				
BH510	18/03/15 10:39:00			0.8	3.4	19.3	50.4	0	0	0.0				
BH510	18/03/15 10:40:00			1.4	2.6	19.1	73.7	0	0	0.0				
BH510	18/03/15 10:41:00			1.8	4.5	18.6	#	0	0	0.0				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH510	18/03/15 10:42:00			1.5	4.2	18.8	97.9	0	0	0.0				
BH510	18/03/15 10:43:00			1.5	5.0	18.7	#	0	0	0.0				
BH510	18/03/15 10:44:00			1.5	5.5	18.6	#	0	0	0.0			0.83	
BH510	07/05/15 09:40:00	1014	1								0.4	17		
BH510	07/05/15 09:41:00										0.8			
BH510	07/05/15 09:42:00										0.4			
BH510	07/05/15 09:43:00										0.4			
BH510	07/05/15 09:44:00										0.4			
BH510	07/05/15 09:45:00			2.4	8.7	18.1	#	0	0	0.0				
BH510	07/05/15 09:46:00			1.6	5.9	18.7	#	0	0	0.0				
BH510	07/05/15 09:47:00			1.4	4.6	19.0	#	0	0	0.0				
BH510	07/05/15 09:48:00			1.1	3.9	19.2	85.9	0	0	0.0				
BH510	07/05/15 09:49:00			0.9	3.2	19.4	72.9	0	0	0.0				
BH510	07/05/15 09:50:00			0.7	2.7	19.5	60.1	0	0	0.0				
BH510	07/05/15 09:51:00			0.6	2.5	19.6	55.0	0	0	0.0				
BH510	07/05/15 09:52:00			0.6	2.2	19.7	48.4	0	0	0.0				
BH510	07/05/15 09:53:00			0.4	2.0	19.7	44.9	0	0	0.0				
BH510	07/05/15 09:54:00			0.3	1.6	19.8	40.2	0	0	0.0				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH510	07/05/15 09:55:00												2.28	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH510	04/03/15 12:44:00												0.87	
BH510	12/03/15 08:29:00												1.60	62 litres purged, base depth 12.00m.
BH510	18/03/15 10:44:00												1.22	64 litres purged, base depth 12.00m.
BH510	07/05/15 09:56:00												2.70	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Deep install.

CONTRACT **30238**

CHECKED **EC**

M4CAN
Gas Monitoring
CL-26 Metal Recovery Area

Loc. Ref.	Install Ref. *1	Reading Ref. *2	Location Notes	Gas Monitoring																	al Notes / C
				Date	Time	Min	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak LEL	Flow Rate (l/hr)	Differential Pressure (pa)	Air Pressure (mb)	Air Temperature (°C)	
						Oxygen (O_2) %		Carbon Dioxide (CO_2) %		Carbon Monoxide (CO) ppm		Hydrogen Sulphide (H_2S) ppm		Methane (CH_4) %							
BHM4CAN035b	2	1	Deep	04/05/16	02:30 PM	13.80	16.70	4.90	2.20	0.00	0.00	0.00	0.00	26.00	12.20	>>	-0.20	0.16	1025.00		
BHM4CAN035b	1	2	Shallow	17/05/16	09:20 AM	20.80	21.00	0.10	0.10	1.00	0.00	0.00	0.00	0.30	0.30	0.00	0.00				
BHM4CAN035b	2	2	Deep	17/05/16	09:30 AM	4.40	7.70	14.80	10.60	3.00	1.00	0.00	0.00	77.20	49.90		0.60				
BHM4CAN035b	1	3	Shallow	26/05/16		18.50	18.50	0.10	0.00	1.00	0.00	0.00	0.00	4.30	4.30		0.30	0.09	1019.00		
BHM4CAN035b	2	3	Deep	26/05/16		19.90	19.90	0.10	0.10	3.00	2.00	0.00	0.00	0.80	0.80	0.00	-3.80	0.05	1027.00		
BHM4CAN036	1	1		04/05/16	03:00 PM	8.80	9.80	4.00	2.70	0.00	0.00	0.00	0.00	41.70	37.80	>>	0.00	0.35	1025.00		
BHM4CAN036	1	2		17/05/16		20.40	20.40	0.10	0.10	0.00	0.00	0.00	0.00	0.50	0.40	0.00					
BHM4CAN036	1	3		26/05/16		18.30	18.30	0.30	0.30	2.00	2.00	0.00	0.00	0.70	0.70	0.00	0.40	0.02	1016.00		
BHM4CAN037	1	1	Shallow	04/05/16	03:20 PM	17.30	17.30	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	39.00	-0.30	0.49	1025.00		
BHM4CAN037	2	1	Deep	04/05/16	03:30 PM	20.20	20.20	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.60	14.00	0.10	0.49	1025.00		
BHM4CAN037	1	2	Shallow	17/05/16	12:45 PM	18.70	18.70	0.00	0.00	2.00	2.00	0.00	0.00	2.10	2.10						
BHM4CAN037	2	2	Deep	17/05/16	12:50 PM	19.80	19.80	0.00	0.00	1.00	1.00	0.00	0.00	1.50	1.40						
BHM4CAN037	1	3	Shallow	26/05/16		16.00	16.00	0.10	0.00	5.00	4.00	0.00	0.00	5.40	5.30		0.50	-0.03	1024.00		
BHM4CAN037	2	3	Deep	26/05/16		20.10	20.10	0.10	0.10	0.00	0.00	0.00	0.00	1.60	1.60	0.00	0.40	-0.02	1024.00		
BHM4CAN038a	2	1	Deep	04/05/16		4.10	12.70	10.10	4.60	0.00	0.00	0.00	0.00	71.60	33.00	>>	0.10	0.50	1025.00		
BHM4CAN038a	1	2	Shallow	17/05/16		20.40	20.40	0.10	0.10	0.00	0.00	0.00	0.00	0.70	0.70	0.00					
BHM4CAN038a	2	2	Deep	17/05/16		5.30	9.40	8.50	6.10	1.00	0.00	1.00	1.00	70.20	44.70						
BHM4CAN038a	2	3	Deep	26/05/16		11.50	13.40	6.80	4.90	0.00	0.00	0.00	0.00	44.00	31.20		0.50	0.14	1022.00		
BHM4CAN039	1	1	Shallow	04/05/16		17.40	18.00	0.10	0.10	0.00	0.00	0.00	0.00	6.40	4.50	>>	0.00	0.11	1025.00		
BHM4CAN039	1	2	Shallow	17/05/16	03:30 PM	19.20	19.40	0.10	0.10	0.00	0.00	0.00	0.00	1.30	1.20						
BHM4CAN039	2	2	Deep	17/05/16	03:40 PM	20.10	20.10	0.60	0.50	1.00	0.00	0.00	0.00	1.60	1.20						
BHM4CAN039	1	3	Shallow	26/05/16		19.10	19.50	0.10	0.10	0.00	0.00	0.00	0.00	0.60	0.40	0.00	0.60	-0.31	1028.00		
BHM4CAN039	2	3	Deep	26/05/16		18.00	18.30	0.10	0.10	0.00	0.00	0.00	0.00	9.90	8.10		0.60	0.03	1017.00		

M4CAN
Groundwater Monitoring
CL-26
Metal Recovery Area

Legend

DO	Dissolved Oxygen	ORP	Oxidation Reduction Potential	mAOD	meters Above Ordnance Datum
RWL	Resting Water Level	mbGL	meters below Ground Level		

Loc. Ref.	Install Ref. *1	Monitoring Round *2	Location Notes	Groundwater & Product Levels							Water Quality									Additional Notes / Comments
				Date	Time	Depth to Product (mbGL)	Groundwater Level (mbGL)	Depth to Base (mbGL)	Ground Level (mAOD)	RWL (mAOD)	Measurement Approach *3	Temperature (°C)	pH	Electrical Conductivity (µS/cm)	DO (%)	ORP (mV)	Stabilised Water Level (mbGL)	Time (min)	Logged Data Available (Y/N)	
BHM4CAN035b	1	1	Shallow	03/05/16	10:00 AM		1.70	3.70	6.98	5.28	GS	14.22	7.7	18	32	-69	2.59			Recovery rate good.
BHM4CAN035b	2	1	Deep	03/05/16	10:00 AM		2.72	15.50	6.98	4.26	GS	15.46	6.9	15252	11	-40	3.01			Salinity 11.2 psu. Recovery rate good.
BHM4CAN035b	1	2	Shallow	17/05/16	09:20 AM		1.77	4.27	6.98	5.21	GS	14.95	12.6	5323	28.50	-55.50	1.89			3 well volumes (14 l) purged prior to sampling.
BHM4CAN035b	2	2	Deep	17/05/16	09:30 AM		2.78	15.49	6.98	4.20	GS	12.76	6.9	15107	20.30	-59.40	3.41			Good recovery. Strong sulphurous odour. Groundwater murky in appearance. 3 well volumes (74.86 l) purged prior to sampling.
BHM4CAN035b	1	3	Shallow	26/05/16			1.79	3.74	6.98	5.19	GS	16.38	12.5	5840	46.20	-63.30	1.77			Good recovery rate. Faint sulphurous odour. 3 well volumes (11.5 l) purged prior to sampling.
BHM4CAN035b	2	3	Deep	26/05/16			2.68	15.24	6.98	4.30	GS	15.08	7.3	10642	30.40	-77.30	2.94			3 well volumes (75 l) purged prior to sampling.
BHM4CAN036	1	1		03/05/16	10:45 AM		2.54	8.67	7.69	5.15	GS	15.75	7.0	7397	2	-106	7.68			Salinity 5 psu. Recovery rate slow.
BHM4CAN036	1	2		17/05/16			2.98	8.98	7.69	4.71	GS	14.07	7.1	7485	2.70	-106.70	7.98			Poor recovery. Sample reacted heavily with acid preserves. 3 well volumes (35 l) purged before taking sample.
BHM4CAN036	1	3		26/05/16	02:00 PM		2.78	9.01	7.69	4.91	GS	14.21	7.0	6537	2.10	-144.70	8.02			3 well volumes (36.9 l) purged prior to sampling.
BHM4CAN037	1	1	Shallow	04/05/16			1.51	3.25	6.77	5.26	GS	14.25	12.7	4517	38	-163	1.49			Salinity 3.1 psu.
BHM4CAN037	2	1	Deep	03/05/16			2.21	12.61	6.77	4.56	GS	13.90	7.5	5208	11	-119	2.50			Salinity 3.6 psu. Recovery rate good.
BHM4CAN037	1	2	Shallow	17/05/16	12:45 PM		1.55	3.25	6.77	5.22	GS	12.77	12.53	4124.1	28.9	-174.3	1.63			3 well volumes (10 l) purged prior to sampling. Good recovery, bailer used.
BHM4CAN037	2	2	Deep	17/05/16	12:50 PM		2.40	12.36	6.77	4.37	GS	13.61	7.4	5212	16.70	-75.70	1.56			3 well volumes (58.66 l) purged prior to sampling. Good recovery rate.
BHM4CAN037	1	3	Shallow	26/05/16			1.57	3.24	6.77	5.20	GS	12.42	12.7	5935	25.20	-196.50	1.57			3 well volumes (9.9 l) purged prior to sampling. Salinity 4.3 psu. Faint solvent odour.
BHM4CAN037	2	3	Deep	26/05/16			2.42	12.37	6.77	4.35	GS	13.33	7.7	5172	23.40	-127.50	2.48			3 well volumes (59 l) purged prior to sampling. Salinity3.6 psu.

M4CAN
Groundwater Monitoring
CL-26
Metal Recovery Area

Legend

DO	Dissolved Oxygen	ORP	Oxidation Reduction Potential	mAOD	meters Above Ordnance Datum
RWL	Resting Water Level	mbGL	meters below Ground Level		

Loc. Ref.	Install Ref. *1	Monitoring Round *2	Location Notes	Groundwater & Product Levels							Water Quality									Additional Notes / Comments
				Date	Time	Depth to Product (mbGL)	Groundwater Level (mbGL)	Depth to Base (mbGL)	Ground Level (mAOD)	RWL (mAOD)	Measurement Approach *3	Temperature (°C)	pH	Electrical Conductivity (µS/cm)	DO (%)	ORP (mV)	Stabilised Water Level (mbGL)	Time (min)	Logged Data Available (Y/N)	
BHM4CAN038a	1	1	Shallow	03/05/16	02:30 PM		1.11	1.64	6.33	5.22	GS	13.97	12.5	3420	17	-204	1.28			Salinity 2.3 psu. Very high sediment load. Recovery rate OK.
BHM4CAN038a	2	1	Deep	03/05/16	02:30 PM		2.48	13.42	6.33	3.85	GS	13.49	7.3	2183	8	-92	2.21			Salinity 1.5 psu. Sulphurous odour. Recovery rate good.
BHM4CAN038a	1	2	Shallow	17/05/16			1.18	2.25	6.33	5.15	GS	13.63	12.6	4584	39.50	-144.80	1.35			Clear. Good recovery. 3 well volumes (3.08 l) purged prior to smapling.
BHM4CAN038a	2	2	Deep	17/05/16			1.99	13.61	6.33	4.34	GS	14.00	7.2	2226	9.60	-93.80	2.13			Red murky water. Very good recovery. 3 well volumes (68.45 l) purged prior to sampling.
BHM4CAN038a	1	3	Shallow	26/05/16			1.16	2.30	6.33	5.17	GS	13.18	12.6	5144	18.50	-202.80	1.25			3 well volumes (3 l) purged prior to sampling. Salinity 3.6 psu.
BHM4CAN038a	2	3	Deep	26/05/16			1.96	13.53	6.33	4.37	GS	13.77	7.2	2230	5.00	-90.50	2.21			3 well volumes (68 l) purged prior to sampling. Salinity 1.5 psu.
BHM4CAN039	1	1	Shallow	03/05/16	03:00 PM		2.73	6.05	7.19	4.46	GS	13.27	8.1	770	1	-145	4.54			Salinity 0.5 psu. Recovery rate OK.
BHM4CAN039	2	1	Deep	03/05/16	03:00 PM		2.80	12.39	7.19	4.39	GS	13.36	7.9	4447	1	-155	12.39			Purged dry in 13L. Base depth changed to 14.6mTBHC, water level at 14.22mTBHC. Returned afer 20 mins WL at 13.95mTBHC. Returned 4/5/16 WL at 4.5mTBHC - sample taken after 1L purge. Recovery rate poor.
BHM4CAN039	1	2	Shallow	17/05/16	03:30 PM		2.52	6.15	7.19	4.67	LFS	13.68	7.7	919	97.50	-72.00	3.23			Poor recovery, sample obtained by peristaltic low flow sampling at stabilisation of 3.53mbTOC.
BHM4CAN039	2	2	Deep	17/05/16	03:45 PM		2.79	14.17	7.19	4.40	GS	13.07	7.5	2516	-0.30	-129.30	2.79			3 well volumes purged prior to sampling (32.8 l).
BHM4CAN039	1	3	Shallow	26/05/16			2.52	6.17	7.19	4.67	GS	12.17	7.8	883	20.80	-125.60	4.09			3 well volumes (21.6 l) purged prior to sampling. Salinity 0.6 psu.
BHM4CAN039	2	3	Deep	26/05/16			2.77	14.19	7.19	4.42	GS	12.61	7.7	3683	-0.10	-150.20	3.49			3 well volumes (32 l) purged prior to sampling. Salinity 2.6 psu.
WSM4CAN023	1	1		03/05/16			1.41	2.24	6.70	5.29	GS	14.59	12.9	8042	22	-64	1.91			Salinity 5.7 psu. Recovery rate good.
WSM4CAN023	1	2		17/05/16	12:00 PM		1.49	2.24	6.70	5.21	LFS	14.24	12.7	7246	50.30	-54.70	1.56			Very clear groundwater. Stabilised at flow rate before sample taken.
WSM4CAN023	1	3		26/05/16			1.50	2.23	6.70	5.20	GS	12.40	12.8	5674	31.10	-63.10	1.60			3 well volumes (2.1 l) purged prior to sampling. Salinity 4.1 psu.

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH509	04/03/15 11:00:00	1034	0								0.0	7		
BH509	04/03/15 11:01:00										0.0			
BH509	04/03/15 11:02:00										0.0			
BH509	04/03/15 11:03:00										0.0			
BH509	04/03/15 11:04:00										0.0			
BH509	04/03/15 11:05:00			1.8	4.4	15.1	99.9	0	0	0.6				
BH509	04/03/15 11:06:00			1.7	4.2	15.2	96.3	0	0	0.6			0.74	Upsurge at 2min 30sec. Unable to take further readings.
BH509	11/03/15 11:30:00	1028	0								0.0	10		28 litres purged, base depth 7.70m.
BH509	11/03/15 11:31:00										0.0			
BH509	11/03/15 11:32:00										0.0			
BH509	11/03/15 11:33:00										0.0			
BH509	11/03/15 11:34:00										0.0			
BH509	11/03/15 11:35:00			0.2	0.7	19.8	7.6	0	0	0.8				
BH509	11/03/15 11:36:00			0.0	0.0	20.0	1.2	0	0	0.6				
BH509	11/03/15 11:37:00			0.0	0.0	20.0	0.0	0	0	0.5				
BH509	11/03/15 11:38:00			0.0	0.0	20.0	0.0	0	0	0.4				
BH509	11/03/15 11:39:00			0.0	0.0	20.0	0.0	0	0	0.3				
BH509	11/03/15 11:40:00			0.0	0.0	20.1	0.0	0	0	0.3				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH509	11/03/15 11:41:00			0.0	0.0	20.0	0.0	0	0	0.2				
BH509	11/03/15 11:42:00			0.0	0.0	20.1	0.0	0	0	0.2				
BH509	11/03/15 11:43:00			0.0	0.0	20.1	0.0	0	0	0.1				
BH509	11/03/15 11:44:00			0.0	0.0	20.0	0.0	0	0	0.1			1.12	
BH509	18/03/15 09:00:00	1038	0								0.0	6		29 litres purged, base depth 7.70m.
BH509	18/03/15 09:01:00										0.0			
BH509	18/03/15 09:02:00										0.0			
BH509	18/03/15 09:03:00										0.0			
BH509	18/03/15 09:04:00										0.0			
BH509	18/03/15 09:05:00			0.0	0.0	19.8	0.0	0	0	0.2				
BH509	18/03/15 09:06:00			0.0	0.0	19.8	0.0	0	0	0.0				
BH509	18/03/15 09:07:00			0.0	0.0	19.7	0.0	0	0	0.0				
BH509	18/03/15 09:08:00			0.0	0.0	19.7	0.0	0	0	0.0				
BH509	18/03/15 09:09:00			0.0	0.0	19.8	0.0	0	0	0.0				
BH509	18/03/15 09:10:00			0.0	0.0	19.8	0.0	0	0	0.0				
BH509	18/03/15 09:11:00			0.0	0.0	19.8	0.0	0	0	0.0				
BH509	18/03/15 09:12:00			0.0	0.0	19.8	0.0	0	0	0.0				
BH509	18/03/15 09:13:00			0.0	0.0	19.8	0.0	0	0	0.0				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH509	18/03/15 09:14:00			0.0	0.0	19.8	0.0	0	0	0.0			0.86	
BH509	06/05/15 13:04:00	1015	0								0.4	14		
BH509	06/05/15 13:05:00										0.0			
BH509	06/05/15 13:06:00										0.0			
BH509	06/05/15 13:07:00										0.0			
BH509	06/05/15 13:08:00										0.0			
BH509	06/05/15 13:09:00			2.9	3.6	18.2	60.1	0	0	0.0				
BH509	06/05/15 13:10:00			1.0	1.3	19.4	28.5	0	0	0.0				
BH509	06/05/15 13:11:00			0.6	0.8	19.7	14.2	0	0	0.0				
BH509	06/05/15 13:12:00			0.3	0.4	19.9	8.4	0	0	0.0				
BH509	06/05/15 13:13:00			0.1	0.2	19.9	5.6	0	0	0.0				
BH509	06/05/15 13:14:00			0.1	0.2	19.9	3.4	0	0	0.0				
BH509	06/05/15 13:15:00			0.0	0.0	20.0	1.9	0	0	0.0				
BH509	06/05/15 13:16:00			0.0	0.0	20.0	0.8	0	0	0.0				
BH509	06/05/15 13:17:00			0.0	0.0	20.0	0.0	0	0	0.0				
BH509	06/05/15 13:18:00			0.0	0.0	20.0	0.0	0	0	0.0				
BH509	06/05/15 13:19:00												2.37	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT **30238**

CHECKED **EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH509	04/03/15 11:14:00												1.95	
BH509	11/03/15 11:44:00												2.30	64 litres purged, base depth 13.20m.
BH509	18/03/15 09:14:00												2.11	66 litres purged, base depth 13.20m.
BH509	06/05/15 13:20:00												3.74	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Deep install.

CONTRACT **30238**

CHECKED **EC**

M4CAN
Gas Monitoring
CL-26 Reedbed No.1

Loc. Ref.	Install Ref. *1	Reading Ref. *2	Location Notes	Gas Monitoring																	al Notes / C
				Date	Time	Min	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak LEL	Flow Rate (l/hr)	Differential Pressure (pa)	Air Pressure (mb)	Air Temperature (°C)	
						Oxygen (O_2) %		Carbon Dioxide (CO_2) %		Carbon Monoxide (CO) ppm		Hydrogen Sulphide (H_2S) ppm		Methane (CH_4) %							
BHM4CAN033	1	1		06/05/16		16.70	16.70	0.10	0.00	1.00	1.00	0.00	0.00	2.70	2.70	54.00	-4.50	-0.47	1011.00		
BHM4CAN033	1	2		19/05/16		13.70	15.00	6.50	4.50	0.00	0.00	0.00	0.00	32.60	22.70						
BHM4CAN033	1	3		02/06/16	10:04 AM	21.10	21.10	0.10	0.10	0.00	0.00	0.00	0.00	0.30	0.30	0.00	0.50				

M4CAN
Groundwater Monitoring
CL-26
Reedbed No. 1

Legend

DO	Dissolved Oxygen	ORP	Oxidation Reduction Potential	mAOD	meters Above Ordnance Datum
RWL	Resting Water Level	mbGL	meters below Ground Level		

Loc. Ref.	Install Ref. *1	Monitoring Round *2	Location Notes	Groundwater & Product Levels							Water Quality									Additional Notes / Comments
				Date	Time	Depth to Product (mbGL)	Groundwater Level (mbGL)	Depth to Base (mbGL)	Ground Level (mAOD)	RWL (mAOD)	Measurement Approach *3	Temperature (°C)	pH	Electrical Conductivity (µS/cm)	DO (%)	ORP (mV)	Stabilised Water Level (mbGL)	Time (min)	Logged Data Available (Y/N)	
BHM4CAN033	1	1		06/05/16	10:45 AM		0.92	12.63	5.86	4.94	GS	12.72	7.0	4554	0	-72	2.55			Murky. Slight odour from well H2S.
BHM4CAN033	1	2		19/05/16	09:00 AM		1.23	12.62	5.86	4.63	GS	12.62	7.1	7734	3.20	-76.30	14??			3 well volumes (67.09 l) purged prior to sampling.
BHM4CAN033	1	3		02/06/16	10:05 AM		1.33	12.45	5.86	4.53	GS	12.14	7.2	8150	42.90	-50.90	7.94			Poor recovery. Slight odour. 3 well volumes (66 l) purged prior to sampling.

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		01

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		30/01/2008	09:50	2.45	25/02/2008	14:34	2.48	07/03/2008	14:25	2.60
SBHD03 CP	SPIE	10.00		30/01/2008	11:01	0.47	25/02/2008	14:52	0.43	07/03/2008	14:05	0.56
SBHD05 RC	SPIE	12.00		31/01/2008	09:00	1.02	25/02/2008	15:35	1.05	07/03/2008	13:50	1.77
SBHD06 RC	SP	15.00		30/01/2008	13:00	1.13	21/02/2008	10:30	1.39	07/03/2008	13:30	1.39
SBHD08 RC	SPIE	29.50		30/01/2008	13:50	1.20	25/02/2008	15:58	2.02	07/03/2008	13:35	1.40
SBHE02RD	SPIE	25.00		31/01/2008	09:25	2.18	25/02/2008	16:20	2.09	07/03/2008	13:10	2.48
SBHE04 RC	SPIE	17.20		31/01/2008	09:15	2.31	25/02/2008	16:11	2.51	07/03/2008	13:20	2.59
SBHF01 RC	SPIE	19.00		31/01/2008	09:40	5.69	25/02/2008	16:32	5.72	07/03/2008	12:50	5.43
SBHF02A CP	SPIE	17.00		01/02/2008	14:40	7.61	25/02/2008	17:13	7.57	07/03/2008	12:30	9.00
SBHF03 RC	SPIE	18.00		31/01/2008	10:35	6.97	26/02/2008	08:55	6.77	07/03/2008	12:15	7.22
SBHH01 RC	SPIE	25.00		31/01/2008	11:15	3.45	26/02/2008	09:39	3.42	07/03/2008	11:28	3.65
SBHH02 RC	SPIE	14.90		31/01/2008	11:10	3.42	26/02/2008	09:20	3.88	07/03/2008	11:35	3.64
SBHH05 RC	SPIE	21.50		31/01/2008	11:30	2.22	26/02/2008	10:01	2.13	07/03/2008	11:05	3.10
SBHH06 CP	SP	12.30		30/01/2008	15:30	3.75	21/02/2008	08:00	3.76	07/03/2008	11:10	3.87
SBHH07A RC	SPIE	24.85		30/01/2008	14:50	1.70	26/02/2008	10:40	1.34	07/03/2008	11:00	1.07
SBHJ01 CP	SP	7.50		01/02/2008	12:20	1.34	21/02/2008	11:45	5.98	06/03/2008	12:28	1.82
SBHJ03 CP	SP	5.20		01/02/2008	08:00	0.54	27/02/2008	16:15	0.70	07/03/2008	10:45	0.68
SBHJ04	SP	13.10		01/02/2008	11:55	6.61	22/02/2008	13::55	6.67	06/03/2008	11:46	6.75
SBHJ05	SP	11.50		01/02/2008	11:10	8.91	22/02/2008	09:00	9.07	06/03/2008	11:23	9.16
SBHJ06 CP	SP	4.10		01/02/2008	11:45	1.31	21/02/2008	15:30	1.32	06/03/2008	10:50	1.33
SBHJ07 CP	SP	10.40		01/02/2008	11:43	1.35	21/02/2008	14:40	1.40	06/03/2008	12:05	1.56
SBHJ08A CP	SP	7.40		01/02/2008	11:35	3.49	21/02/2008	13:05	2.31	06/03/2008	10:57	2.67
SBHJ09 CP	SP	2.20		01/02/2008	11:30	0.65	21/02/2008	12:25	0.85	06/03/2008	11:00	0.90
SBHJ10 CP	SP	10.00		01/02/2008	10:40	2.30	21/02/2008	13:45	2.24	06/03/2008	10:40	2.16
SBHK01 CP	SP	6.80		01/02/2008	10:55	0.70	25/02/2008	10:30	1.00	06/03/2008	14:24	1.06
SBHK02 CP	SP	11.20		01/02/2008	10:50	1.34	25/02/2008	11:20	1.33	06/03/2008	14:18	1.47
SBHK03 CP	SP	5.90		01/02/2008	10:45	0.87	25/02/2008	12:00	0.89	06/03/2008	14:15	1.00
SBHK04 CP	SP	12.20		01/02/2008	10:25	1.45	25/02/2008	12:30	1.60	06/03/2008	12:30	1.60
SBHL02 RC	SPIE	15.20		01/02/2008	10:35	2.27	25/02/2008	12:49	2.31	06/03/2008	14:00	2.42
SBHL03 RC	SPIE	15.00		31/01/2008	16:20	0.61	26/02/2008	11:15	0.51	07/03/2008	10:25	0.66
SBHM01 RC	SPIE	21.00		01/01/1900	08:20	-0.26	26/02/2008	11:30	-0.26	07/03/2008	10:17	0.05
SBHM02 RC	SPIE	20.00		01/02/2008	08:25	0.19	26/02/2008	11:41	0.49	07/03/2008	10:14	0.68
SBHN01A RC	SPIE	14.90		01/02/2008	15:20	8.49	27/02/2008	17:15	12.23	07/03/2008	14:45	13.18
SBHN02 RC	SPIE	20.40		31/01/2008	15:55	3.67	26/02/2008	11:57	4.19	07/03/2008	10:05	4.84
SBHN03 RC	SPIE	15.00		31/01/2008	15:45	1.07	26/02/2008	12:03	1.73	07/03/2008	09:55	2.34
SBHN04 RC	SPIE	10.00		31/01/2008	15:30	9.99	26/02/2008	14:42	DRY	07/03/2008	09:45	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	30/01/08-07/03/08	Date:	16/04/2008	Date:	17/04/2008
Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		02

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		31/01/2008	14:50	DRY	26/02/2008	14:12	DRY	07/03/2008	09:35	DRY
SBHP02 RC	SPIE	9.80		31/01/2008	13:55	7.20	26/02/2008	13:59	8.09	07/03/2008	09:10	8.25
SBHP03 RC	SPIE	5.00		31/01/2008	13:40	4.09	26/02/2008	13:48	4.76	07/03/2008	09:05	4.78
SBHQ01 RC	SPIE	11.80		31/01/2008	14:20	5.76	26/02/2008	12:46	6.74	07/03/2008	09:30	7.20
SBHQ02 RC	SPIE	6.00		31/01/2008	14:15	4.98	26/02/2008	12:59	5.16	07/03/2008	09:25	5.98
SBHQ03 RC	SPIE	11.00		31/01/2008	13:20	6.04	26/02/2008	13:29	7.22	07/03/2008	08:38	7.59
SBHQ04 RC	SPIE	8.00		31/01/2008	13:05	4.35	26/02/2008	13:36	6.18	07/03/2008	08:55	6.94
SBHQ06 RC	SPIE	7.35		31/01/2008	13:00	3.89	26/02/2008	13:16	4.40	07/03/2008	08:25	4.63
SWSJ08	SP	3.30		01/02/2008	12:30	0.42	21/02/2008	11:45	0.37	06/03/2008	12:35	0.41
SWSJ13	SP	2.50		01/02/2008	12:00	DRY	22/02/2008	13:45	DRY	06/03/2008	11:50	DRY
SWSJ21	SP	6.00		01/02/2008	11:20	3.87	22/02/2008	09:30	5.72	06/03/2008	11:27	6.59
SWSJ23	SP	7.80		01/02/2008	11:22	5.92	22/02/2008	09:55	6.62	06/03/2008	11:30	6.97
SWSJ34	SP	6.00		01/02/2008	11:05	2.52	22/02/2008	10:55	3.33	06/03/2008	11:10	3.08
SWSJ37	SP	5.60		01/02/2008	11:25	0.46	22/02/2008	11:30	0.55	06/03/2008	11:15	0.61
LGBH02	SP	8.88					22/02/2008	14:35	7.50	06/03/2008	11:40	7.52
LGBH03	SP	8.90					22/02/2008	14:21	7.20	06/03/2008	11:44	7.28
LGBH04	SP	10.50					22/02/2008	10:30	8.87	06/03/2008	11:20	9.00
LGBH09	SP	7.00					22/02/2008	12:40	1.13	06/03/2008	10:48	1.56
LGBH10	SP	14.60					27/02/2008	14:30	8.15	06/03/2008	11:12	8.21
LGBH11	SP	11.20					27/02/2008	10:00	7.05	06/03/2008	11:03	7.07
LGBH12	SP	7.05					22/02/2008	13:10	1.40	06/03/2008	10:45	1.40
RBBH07	SP	6.25					27/02/2008	12.15	0.69	06/03/2008	12:20	0.71
RBBH09	SP	7.05					27/02/2008	13:40	1.25	06/03/2008	12:25	1.21
RBBH10	SP	6.85					27/02/2008	13:00	0.68	06/03/2008	12:30	0.82

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	30/01/08-07/03/08	Date:	16/04/2008	Date:	17/04/2008
Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		03

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		20/03/2008	16:30	2.57	04/04/2008	08:00	2.59	18/04/2008	07:40	2.66
SBHD03 CP	SPIE	10.00		20/03/2008	16:45	0.58	04/04/2008	08:13	0.53	18/04/2008	08:00	0.60
SBHD05 RC	SPIE	12.00		20/03/2008	16:00	1.08	04/04/2008	09:15	1.22	18/04/2008	08:30	1.32
SBHD06 RC	SP	15.00		20/03/2008	17:55	1.20	04/04/2008	09:30	1.33	18/04/2008	08:40	1.44
SBHD08 RC	SPIE	29.50		19/03/2008	18:30	1.28	04/04/2008	10:00	1.39	18/04/2008	08:52	1.52
SBHE02RD	SPIE	25.00		20/03/2008	16:20	2.23	04/04/2008	08:50	2.46	18/04/2008	09:00	2.54
SBHE04 RC	SPIE	17.20		20/03/2008	15:45	2.20	04/04/2008	09:00	1.80	18/04/2008	08:15	1.80
SBHF01 RC	SPIE	19.00		20/03/2008	15:30	5.50	04/04/2008	08:40	5.55	18/04/2008	13:58	5.58
SBHF02A CP	SPIE	17.00		20/03/2008	15:10	5.60	04/04/2008	10:28	5.70	18/04/2008	13:45	5.77
SBHF03 RC	SPIE	18.00		20/03/2008	14:55	7.20	04/04/2008	10:36	7.38	18/04/2008	13:40	7.42
SBHH01 RC	SPIE	25.00		20/03/2008	14:25	3.60	04/04/2008	15:00	3.60	18/04/2008	13:10	3.62
SBHH02 RC	SPIE	14.90		20/03/2008	14:30	4.27	04/04/2008	15:05	3.64	18/04/2008	13:13	3.70
SBHH05 RC	SPIE	21.50		20/03/2008	17:30	2.17	04/04/2008	15:15	2.78	18/04/2008	11:34	2.90
SBHH06 CP	SP	12.30		17/03/2008	15:20	3.88	04/04/2008	15:20	3.89	17/04/2008	14:15	3.90
SBHH07A RC	SPIE	24.85		20/03/2008	13:55	1.33	04/04/2008	15:28	1.92	18/04/2008	11:43	0.88
SBHJ01 CP	SP	7.50		19/03/2008	14:15	1.81	03/04/2008	16:05	1.90	17/04/2008	12:40	1.80
SBHJ03 CP	SP	5.20		19/03/2008	16:40	0.78	03/04/2008	18:25	0.82	17/04/2008	15:55	0.80
SBHJ04	SP	13.10		17/03/2008	13:35	6.64	03/04/2008	18:10	6.74	17/04/2008	13:08	6.80
SBHJ05	SP	11.50		18/03/2008	13:50	9.02	03/04/2008	17:39	9.10	17/04/2008	13:31	9.11
SBHJ06 CP	SP	4.10		17/03/2008	12:55	1.29	03/04/2008	17:43	1.33	17/04/2008	15:05	1.20
SBHJ07 CP	SP	10.40		17/03/2008	10:25	1.59	03/04/2008	17:47	1.50	17/04/2008	13:58	1.47
SBHJ08A CP	SP	7.40		18/03/2008	10:00	2.50	03/04/2008	17:55	2.50	17/04/2008	15:33	2.50
SBHJ09 CP	SP	2.20		18/03/2008	10:25	0.69	03/04/2008	17:58	0.82	17/04/2008	15:22	0.90
SBHJ10 CP	SP	10.00		17/03/2008	09:15	2.10	03/04/2008	17:50	2.00	17/04/2008	13:55	2.00
SBHK01 CP	SP	6.80		19/03/2008	10:45	0.88	03/04/2008	16:40	1.00	17/04/2008	11:40	0.94
SBHK02 CP	SP	11.20		19/03/2008	11:15	1.46	03/04/2008	16:45	1.48	17/04/2008	11:43	1.46
SBHK03 CP	SP	5.90		19/03/2008	11:45	1.04	03/04/2008	16:48	1.07	17/04/2008	11::46	0.98
SBHK04 CP	SP	12.20		19/03/2008	12:15	1.64	03/04/2008	16:52	1.67	17/04/2008	12:05	1.60
SBHL02 RC	SPIE	15.20		19/03/2008	12:50	2.44	03/04/2008	17:00	2.45	17/04/2008	12:00	2.45
SBHL03 RC	SPIE	15.00		20/03/2008	13:25	0.76	08/04/2008	15:40	0.64	18/04/2008	09:50	0.62
SBHM01 RC	SPIE	21.00		20/03/2008	13:05	-0.21	08/04/2008	15:48	-0.45	18/04/2008	11:55	0.01
SBHM02 RC	SPIE	20.00		20/03/2008	13:10	0.61	08/04/2008	15:52	0.61	18/04/2008	11:50	0.61
SBHN01A RC	SPIE	14.90		20/03/2008	12:55	12.14	08/04/2008	16:05	12.58	18/04/2008	12:48	13.27
SBHN02 RC	SPIE	20.40		20/03/2008	12:45	4.26	08/04/2008	16:12	2.64	18/04/2008	12:45	4.85
SBHN03 RC	SPIE	15.00		20/03/2008	12:30	1.60	08/04/2008	16:17	2.07	18/04/2008	12:35	2.37
SBHN04 RC	SPIE	10.00		20/03/2008	12:10	DRY	08/04/2008	16:28	DRY	18/04/2008	10:55	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	17/03/08-17/04/08	Date:	21/04/2008	Date:	21/04/2008
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NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		04

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		20/03/2008	12:00	DRY	08/04/2008	16:40	DRY	18/04/2008	10:45	DRY
SBHP02 RC	SPIE	9.80		20/03/2008	11:45	5.59	08/04/2008	16:55	7.98	18/04/2008	10:30	8.20
SBHP03 RC	SPIE	5.00		20/03/2008	11:40	2.80	08/04/2008	16:50	DRY	18/04/2008	10:25	4.93
SBHQ01 RC	SPIE	11.80		20/03/2008	10:40	6.72	08/04/2008	17:13	7.24	18/04/2008	10:10	7.48
SBHQ02 RC	SPIE	6.00		20/03/2008	10:45	4.91	08/04/2008	17:10	DRY	18/04/2008	10:05	DRY
SBHQ03 RC	SPIE	11.00		20/03/2008	10:50	6.76	08/04/2008	17:05	7.69	18/04/2008	10:15	8.00
SBHQ04 RC	SPIE	8.00		20/03/2008	11:30	6.97	08/04/2008	17:02	DRY	18/04/2008	10:40	DRY
SBHQ06 RC	SPIE	7.35		20/03/2008	11:20	4.47	08/04/2008	17:20	6.63	18/04/2008	12:20	4.79
SWSJ08	SP	3.30		19/03/2008	15:10	0.44	03/04/2008	16:00	0.46	17/04/2008	12:35	0.42
SWSJ13	SP	2.50		17/03/2008	13:25	DRY	03/04/2008	18:12	DRY	17/04/2008	13:12	DRY
SWSJ21	SP	6.00		18/03/2008	14:30	4.42	03/04/2008	17:33	5.89	17/04/2008	13:32	6.50
SWSJ23	SP	7.80		18/03/2008	15:05	7.58	03/04/2008	17:35	7.20	17/04/2008	13:35	7.20
SWSJ34	SP	6.00		19/03/2008	08:55	2.36	03/04/2008	17:23	3.26	17/04/2008	13:46	DRY
SWSJ37	SP	5.60		18/03/2008	11:15	0.55	03/04/2008	17:25	0.67	17/04/2008	13:42	0.63
LGBH02	SP	8.88		17/03/2008	12:55	7.48	03/04/2008	18:05	7.46	17/04/2008	13:00	7.48
LGBH03	SP	8.90		17/03/2008	13:15	7.24	03/04/2008	18:08	7.32	17/04/2008	13:03	7.30
LGBH04	SP	10.50		18/03/2008	13:20	8.87	03/04/2008	17:40	8.90	17/04/2008	13:29	8.94
LGBH09	SP	7.00		17/03/2008	11:00	1.08	03/04/2008	17:45	1.15	17/04/2008	15:08	1.05
LGBH10	SP	14.60		18/03/2008	15:20	8.31	03/04/2008	17:27	8.20	17/04/2008	13:40	8.70
LGBH11	SP	11.20		18/03/2008	11:40	6.88	03/04/2008	17:18	7.00	17/04/2008	15:38	7.08
LGBH12	SP	7.05		17/03/2008	10:00	1.30	03/04/2008	17:49	1.47	17/04/2008	15:15	1.36
RBBH07	SP	6.25		19/03/2008	13:25	0.66	03/04/2008	15:50	0.68	17/04/2008	12:30	1.10
RBBH09	SP	7.05		19/03/2008	14:40	1.18	03/04/2008	16:07	1.21	17/04/2008	12:42	1.25
RBBH10	SP	6.85		19/03/2008	13:45	0.70	03/04/2008	16:03	0.75	17/04/2008	12:39	0.78

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	17/03/08-17/04/08	Date:	21/04/2008	Date:	21/04/2008
Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Appendix 3

Soil Laboratory Data

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
21/06/2016

Screening Values and Assessment

	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion
	Asbestos Detected

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Metals								
Arsenic	mg/kg	51	30	54	0.00236	BH512 @ 2 - 2.5mbGL	170	0
Barium	mg/kg	11	3	11	4	MRTP003 @ 3.5mbGL		
Boron	mg/kg	26	21	45.1	0.6	TPM4CAN016 @ 2mbGL	46000	0
Boron Water Soluble	mg/kg	28	24	18	0.5	BH512 @ 5 - 5.2mbGL		
Cadmium	mg/kg	63	20	7	0.13	MRTP003 @ 2mbGL	190	0
Chromium	mg/kg	63	63	1800	0.0316	BH511 @ 1 - 1.5mbGL	33	19
Chromium VI	mg/kg	6	0	None > LOD	None > LOD		33	0
Chromium III	mg/kg	2	0	None > LOD	None > LOD		8600	0
Copper	mg/kg	63	62	76	0.012	BH512 @ 0.3 - 0.5mbGL	44000	0
Lead	mg/kg	63	58	87	0.0486	CATP004 @ 0.5mbGL	1300	0
Mercury	mg/kg	62	7	1.4	0.11	BH512 @ 0.3 - 0.5mbGL	30	0
Nickel	mg/kg	63	55	18000	0.0185	BH512 @ 0.3 - 0.5mbGL	980	0
Selenium	mg/kg	63	55	15.5	0.00532	WSM4CAN023 @ 1.5mbGL	1800	0
Vanadium	mg/kg	10	10	2350	0.0233	WSM4CAN023 @ 1.5mbGL	5000	0
Zinc	mg/kg	63	63	688	0.153	WSM4CAN024 @ 0.5mbGL	170000	0
Iron	mg/kg	49	49	284000	135	MRTP003 @ 0.5mbGL		
Manganese	mg/kg	29	29	50800	271	CABH002 @ 1mbGL		
Other								
Asbestos Presence Screen	None	17	0	None > LOD	None > LOD			
Asbestos by Gravimetry	%	5	0	None > LOD	None > LOD			
Asbestos Quantification - PCOM Evaluation	%	1	0	None > LOD	None > LOD			
Asbestos Quantification - Total	%	1	1	0.001	0.001	BHM4CAN039 @ 1.2mbGL		
Analysts Comments		2	0	None > LOD	None > LOD			
Cyanide (total)	mg/kg	54	13	7	1	MRTP003 @ 0.5mbGL		
Cyanide (free)	mg/kg	13	0	None > LOD	None > LOD			
Thiocyanate	mg/kg	45	41	12.7	0.6	CATP010 @ 2.6mbGL		
Ammoniacal Nitrogen as N	mg/kg	45	45	133	1	CABH001 @ 6mbGL		
Total Phosphorous	mg/kg	25	25	23600	705	CATP004 @ 1.6mbGL		
Acid Soluble Sulphate	mg/kg	25	25	16600	985	CATP006 @ 0.75mbGL		
Fluoride	mg/kg	3	3	25	6.5	CATP005 @ 0.5mbGL		
Chloride	mg/kg	45	45	6760	36.2	CABH001 @ 6mbGL		
pH Value	pH Units	62	62	12.9	7.5	CABH002 @ 1mbGL	6-9	54
Organics								
Phenols								
Phenols Monohydric	mg/kg	6	0	None > LOD	None > LOD		440	0
Phenols (total)	mg/kg	56	18	360	0.5	BH511 @ 2 - 2.5mbGL	440	0
Cresols	mg/kg	6	0	None > LOD	None > LOD			
Xylenols	mg/kg	6	0	None > LOD	None > LOD			
BTEX								
Methyl Tertiary Butyl Ether	mg/kg	9	0	None > LOD	None > LOD			
Benzene	mg/kg	14	0	None > LOD	None > LOD		27	0
Toluene	mg/kg	14	5	0.308	0.00238	CATP008 @ 1mbGL	56000	0
Ethylbenzene	mg/kg	14	3	0.53	0.00448	CATP008 @ 1mbGL	5700	0
p/m-Xylene	mg/kg	14	4	2.002	0.00896	CATP008 @ 1mbGL		
o-Xylene	mg/kg	14	4	1.623	0.00336	CATP008 @ 1mbGL	6600	0
Sum of Detected BTEX	mg/kg	9	0	None > LOD	None > LOD			
Sum of Detected Xylenes	mg/kg	9	1	0.0123	0.0123	BHM4CAN039 @ 1.2mbGL		
GRO TOT (Moisture Corrected)	mg/kg	9	3	2.3	0.075	BHM4CAN039 @ 1.2mbGL		
PCBs								
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg	7	1	0.0046	0.0046	WSM4CAN024 @ 0.5mbGL	0.24	0
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg	7	0	None > LOD	None > LOD		0.24	0
Sum of detected WHO 12 PCBs	mg/kg	3	0	None > LOD	None > LOD		0.24	0
TPH								
TPH >C6-C8.	mg/kg	4	3	0	0	BH512 @ 1 - 1.5mbGL	7800	0
TPH >C8-C10.	mg/kg	4	3	0	0	BH512 @ 1 - 1.5mbGL	2000	0
TPH >C10-C12.	mg/kg	4	3	0	0	BH512 @ 1 - 1.5mbGL	9200	0
TPH >C12-C16.	mg/kg	4	3	47	0	BH512 @ 2 - 2.5mbGL	10000	0
TPH >C16-C21.	mg/kg	4	3	0	0	BH512 @ 1 - 1.5mbGL	7600	0
TPH >C21-C35.	mg/kg	4	3	0	0	BH512 @ 1 - 1.5mbGL	7800	0
Aliphatics C5-C6	mg/kg	11	2	0.0345	0.0246	TPM4CAN018 @ 0.2mbGL	3200	0
Aliphatics >C6-C8	mg/kg	11	2	0.084	0.0333	BHM4CAN039 @ 1.2mbGL	7800	0
Aliphatics >C8-C10	mg/kg	11	2	0.251	0.0121	BHM4CAN039 @ 1.2mbGL	2000	0
Aliphatics >C10-C12	mg/kg	11	4	1.05	0.0189	BHM4CAN039 @ 1.2mbGL	9700	0
Aliphatics >C12-C16	mg/kg	11	9	42.2	0.183	BHM4CAN039 @ 1.2mbGL	25000	0
Aliphatics >C16-C21	mg/kg	11	10	96.1	2.8	BHM4CAN039 @ 1.2mbGL	450000	0
Aliphatics >C21-C35	mg/kg	11	10	689	27.4	TPM4CAN017 @ 0.5mbGL	450000	0
Aliphatics >C35-44	mg/kg	11	10	105	1.5	TPM4CAN017 @ 0.5mbGL	450000	0
Aromatics C5-C7	mg/kg	11	0	None > LOD	None > LOD		26000	0
Aromatics >C7-C8	mg/kg	11	0	None > LOD	None > LOD		56000	0
Aromatics >EC8-EC10	mg/kg	11	1	0.184	0.184	BHM4CAN039 @ 1.2mbGL	3500	0
Aromatics >EC10-EC12	mg/kg	11	4	0.701	0.0122	BHM4CAN039 @ 1.2mbGL	9200	0
Aromatics >EC12-EC16	mg/kg	11	6	9.22	0.261	BHM4CAN039 @ 1.2mbGL	10000	0
Aromatics >EC16-EC21	mg/kg	11	9	37.3	0.569	BHM4CAN039 @ 1.2mbGL	7600	0
Aromatics >EC21-EC35	mg/kg	11	10	176	5.6	TPM4CAN017 @ 0.5mbGL	7800	0
Aromatics >C35-44	mg/kg	11	9	59.6	0.688	BHM4CAN039 @ 1.2mbGL	7800	0
Aromatics >EC40-EC44	mg/kg	9	8	26.1	2.3	BHM4CAN039 @ 1.2mbGL	7800	0
Total Aliphatics & Aromatics >C5-C44	mg/kg	9	9	1140	51.4	TPM4CAN017 @ 0.5mbGL	2000	0
Total Aliphatic TPH	mg/kg	11	10	876	38	TPM4CAN017 @ 0.5mbGL	2000	0
Total Aromatic hydrocarbons	mg/kg	11	10	259	6.59	TPM4CAN017 @ 0.5mbGL	3500	0
Total petroleum hydrocarbons	mg/kg	24	21	29130	16	CATP008 @ 1mbGL	2000	0
PAH								
Acenaphthene	mg/kg	33	16	32.6	0.0238	CATP009 @ 2.1mbGL	29000	0

M4CAN
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Notes

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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Acenaphthylene	mg/kg	33	6	1.1	0.0237	MRTP005 @ 0.4mbGL	29000	0
Anthracene	mg/kg	33	16	6.3	0.0201	CABH002 @ 3mbGL	150000	0
Benzo(a)anthracene	mg/kg	33	17	4.5	0.108	MRTP005 @ 0.4mbGL	49	0
Benzo(a)pyrene	mg/kg	33	16	4.2	0.0157	MRTP005 @ 0.4mbGL	11	0
Benzo(b)fluoranthene	mg/kg	33	18	4.8	0.0387	MRTP005 @ 0.4mbGL	13	0
Benzo(ghi)perylene	mg/kg	33	14	7	0.111	BH511 @ 2 - 2.5mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	33	16	2.7	0.014	BH511 @ 2 - 2.5mbGL	370	0
Chrysene	mg/kg	33	18	4.8	0.0284	BH511 @ 2 - 2.5mbGL	93	0
Dibenzo(ah)anthracene	mg/kg	33	11	0.65	0.0271	BH511 @ 2 - 2.5mbGL	1.1	0
Fluoranthene	mg/kg	33	26	11.5	0.054	CATP002 @ 1.2mbGL	6300	0
Fluorene	mg/kg	33	14	20	0.012	CATP002 @ 1.2mbGL	20000	0
Indeno(123cd)pyrene	mg/kg	33	15	3.1	0.0762	BH511 @ 2 - 2.5mbGL	150	0
Naphthalene	mg/kg	36	21	32.8	0.0127	CATP009 @ 2.1mbGL	190	0
Phenanthrene	mg/kg	33	27	21.2	0.0247	CATP002 @ 1.2mbGL	6200	0
Pyrene	mg/kg	33	23	10.3	0.0453	CATP002 @ 1.2mbGL	15000	0
PAH 16 Total	mg/kg	32	14	47	0.124	BH511 @ 2 - 2.5mbGL		
SVOCs								
Phenols								
2-Chlorophenol	mg/kg	3	0	None > LOD	None > LOD			
2-Methylphenol	mg/kg	3	0	None > LOD	None > LOD			
2-Nitrophenol	mg/kg	3	0	None > LOD	None > LOD			
2,4-Dichlorophenol	mg/kg	3	0	None > LOD	None > LOD			
2,4-Dimethylphenol	mg/kg	3	0	None > LOD	None > LOD			
2,4,5-Trichlorophenol	mg/kg	3	0	None > LOD	None > LOD			
2,4,6-Trichlorophenol	mg/kg	3	0	None > LOD	None > LOD			
4-Chloro-3-methylphenol	mg/kg	3	0	None > LOD	None > LOD			
4-Methylphenol	mg/kg	3	0	None > LOD	None > LOD			
4-Nitrophenol	mg/kg	3	0	None > LOD	None > LOD			
Pentachlorophenol	mg/kg	3	0	None > LOD	None > LOD			
Phenol	mg/kg	3	0	None > LOD	None > LOD		440	0
PAHs								
2-Chloronaphthalene	mg/kg	3	0	None > LOD	None > LOD			
2-Methylnaphthalene	mg/kg	3	0	None > LOD	None > LOD			
Acenaphthene	mg/kg	3	0	None > LOD	None > LOD		29000	0
Acenaphthylene	mg/kg	3	0	None > LOD	None > LOD		29000	0
Anthracene	mg/kg	3	1	0.119	0.119	TPM4CAN016 @ 2mbGL	150000	0
Benzo(a)anthracene	mg/kg	3	2	0.894	0.495	TPM4CAN016 @ 2mbGL	49	0
Benzo(a)pyrene	mg/kg	3	2	1.29	0.789	TPM4CAN016 @ 2mbGL	11	0
Benzo(b)fluoranthene	mg/kg	3	2	0.971	0.739	TPM4CAN016 @ 2mbGL	13	0
Benzo(ghi)perylene	mg/kg	3	2	0.914	0.688	TPM4CAN016 @ 2mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	3	2	1.03	0.409	TPM4CAN016 @ 2mbGL	370	0
Chrysene	mg/kg	3	2	1.13	0.626	TPM4CAN016 @ 2mbGL	93	0
Dibenzo(a,h)anthracene	mg/kg	3	1	0.152	0.152	TPM4CAN016 @ 2mbGL		
Fluoranthene	mg/kg	3	0	None > LOD	None > LOD		6300	0
Fluorene	mg/kg	3	0	None > LOD	None > LOD		20000	0
Indeno(1,2,3-cd)pyrene	mg/kg	3	2	0.99	0.727	TPM4CAN016 @ 2mbGL		
Naphthalene	mg/kg	3	0	None > LOD	None > LOD		190	0
Phenanthrene	mg/kg	3	3	0.738	0.112	TPM4CAN016 @ 2mbGL	6200	0
Pyrene	mg/kg	3	3	1.38	0.117	TPM4CAN016 @ 2mbGL	15000	0
Pthalates								
Bis(2-ethylhexyl) phthalate	mg/kg	3	0	None > LOD	None > LOD			
Butylbenzyl phthalate	mg/kg	3	0	None > LOD	None > LOD			
Di-n-butyl phthalate	mg/kg	3	0	None > LOD	None > LOD			
Di-n-Octyl phthalate	mg/kg	3	0	None > LOD	None > LOD			
Diethyl phthalate	mg/kg	3	0	None > LOD	None > LOD			
Dimethyl phthalate	mg/kg	3	0	None > LOD	None > LOD			
Other Semi-Volatiles								
1,2-Dichlorobenzene	mg/kg	6	0	None > LOD	None > LOD			
1,2,4-Trichlorobenzene	mg/kg	6	0	None > LOD	None > LOD		220	0
1,3-Dichlorobenzene	mg/kg	6	0	None > LOD	None > LOD			
1,4-Dichlorobenzene	mg/kg	6	0	None > LOD	None > LOD			
2-Nitroaniline	mg/kg	3	0	None > LOD	None > LOD			
2,4-Dinitrotoluene	mg/kg	3	0	None > LOD	None > LOD			
2,6-Dinitrotoluene	mg/kg	3	0	None > LOD	None > LOD			
3-Nitroaniline	mg/kg	3	0	None > LOD	None > LOD			
4-Bromophenylphenylether	mg/kg	3	0	None > LOD	None > LOD			
4-Chloroaniline	mg/kg	3	0	None > LOD	None > LOD			
4-Chlorophenylphenylether	mg/kg	3	0	None > LOD	None > LOD			
4-Nitroaniline	mg/kg	3	0	None > LOD	None > LOD			
Azobenzene	mg/kg	3	0	None > LOD	None > LOD			
Bis(2-chloroethoxy)methane	mg/kg	3	0	None > LOD	None > LOD			
Bis(2-chloroethyl)ether	mg/kg	3	0	None > LOD	None > LOD			
Carbazole	mg/kg	3	0	None > LOD	None > LOD			
Dibenzofuran	mg/kg	3	0	None > LOD	None > LOD			
Hexachlorobenzene	mg/kg	3	0	None > LOD	None > LOD		30	0
Hexachlorobutadiene	mg/kg	6	0	None > LOD	None > LOD		31	0
Hexachlorocyclopentadiene	mg/kg	3	0	None > LOD	None > LOD			
Hexachloroethane	mg/kg	3	0	None > LOD	None > LOD			
Isophorone	mg/kg	3	0	None > LOD	None > LOD			
N-nitrosodi-n-propylamine	mg/kg	3	0	None > LOD	None > LOD			
Nitrobenzene	mg/kg	3	0	None > LOD	None > LOD			
VOCs								
Methyl Tertiary Butyl Ether	ug/kg	3	0	None > LOD	None > LOD			
Benzene	ug/kg	3	0	None > LOD	None > LOD		27000	0
Toluene	ug/kg	3	0	None > LOD	None > LOD		56000000	0
Ethylbenzene	ug/kg	3	0	None > LOD	None > LOD		5700000	0
p/m-Xylene	ug/kg	3	0	None > LOD	None > LOD			
o-Xylene	ug/kg	3	0	None > LOD	None > LOD		6600000	0
Naphthalene	ug/kg	3	0	None > LOD	None > LOD		190000	0
Hexachlorobutadiene	ug/kg	3	0	None > LOD	None > LOD		31000	0
1.1.1.2-Tetrachloroethane	ug/kg	6	0	None > LOD	None > LOD			
1.1.1-Trichloroethane	ug/kg	6	0	None > LOD	None > LOD			
1.1.2.2-Tetrachloroethane	ug/kg	6	0	None > LOD	None > LOD			

M4CAN
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1.1.2-Trichloroethane	ug/kg	6	0	None > LOD	None > LOD			
1.1-Dichloropropene	ug/kg	6	0	None > LOD	None > LOD			
1.1-Dichloroethane	ug/kg	6	0	None > LOD	None > LOD			
1.1-Dichloroethene	ug/kg	6	0	None > LOD	None > LOD			
1.2.3-Trichlorobenzene	ug/kg	6	0	None > LOD	None > LOD		102000	0
1.2.3-Trichloropropane	ug/kg	6	0	None > LOD	None > LOD			
1.2.4-Trichlorobenzene	ug/kg	3	0	None > LOD	None > LOD		220000	0
1.2.4-Trimethylbenzene	ug/kg	6	3	5139	71	CATP008 @ 1mbGL		
1.2-Dibromo-3-chloropropane	ug/kg	6	0	None > LOD	None > LOD			
1,2-Dichlorobenzene	mg/kg	3	0	None > LOD	None > LOD			
1,3-Dichlorobenzene	mg/kg	3	0	None > LOD	None > LOD			
1,4-Dichlorobenzene	mg/kg	3	0	None > LOD	None > LOD			
1.2-Dichloroethane	ug/kg	6	0	None > LOD	None > LOD			
cis-1-2-Dichloroethene	ug/kg	6	0	None > LOD	None > LOD			
1.2-Dibromoethane	ug/kg	6	0	None > LOD	None > LOD			
1.2-Dichloropropane	ug/kg	6	0	None > LOD	None > LOD			
1.3.5-Trimethylbenzene	ug/kg	6	3	1928	19	CATP008 @ 1mbGL		
cis-1-3-Dichloropropene	ug/kg	6	0	None > LOD	None > LOD			
1.3-Dichloropropane	ug/kg	6	0	None > LOD	None > LOD			
2.2-Dichloropropane	ug/kg	6	0	None > LOD	None > LOD			
2-Chlorotoluene	ug/kg	6	0	None > LOD	None > LOD			
4-Chlorotoluene	ug/kg	6	0	None > LOD	None > LOD			
p-Isopropyltoluene	ug/kg	3	3	812	12	CATP008 @ 1mbGL		
4-isopropyltoluene	ug/kg	3	0	None > LOD	None > LOD			
Bromobenzene	ug/kg	6	0	None > LOD	None > LOD			
Bromochloromethane	ug/kg	6	0	None > LOD	None > LOD			
Bromomethane	ug/kg	6	0	None > LOD	None > LOD			
Bromoform	ug/kg	6	0	None > LOD	None > LOD			
Bromodichloromethane	ug/kg	6	0	None > LOD	None > LOD			
Chlorobenzene	ug/kg	6	0	None > LOD	None > LOD		56000	0
Carbon Disulphide	ug/kg	3	0	None > LOD	None > LOD		11000	0
Chloroethane	ug/kg	6	0	None > LOD	None > LOD			
Chloroform	ug/kg	6	0	None > LOD	None > LOD		99000	0
Chloromethane	ug/kg	6	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	6	0	None > LOD	None > LOD			
Dibromomethane	ug/kg	6	0	None > LOD	None > LOD			
Dichlorodifluoromethane	ug/kg	6	0	None > LOD	None > LOD			
Dibromochloromethane	ug/kg	6	0	None > LOD	None > LOD			
Dichloromethane	ug/kg	3	0	None > LOD	None > LOD			
Isopropylbenzene	ug/kg	6	2	573	6	CATP008 @ 1mbGL		
n-Butylbenzene	ug/kg	6	0	None > LOD	None > LOD			
Propylbenzene	ug/kg	6	2	1317	11	CATP008 @ 1mbGL		
sec-Butylbenzene	ug/kg	6	3	959	7	CATP008 @ 1mbGL		
Styrene	ug/kg	6	0	None > LOD	None > LOD			
trans-1-2-Dichloroethene	ug/kg	6	0	None > LOD	None > LOD			
trans-1-3-Dichloropropene	ug/kg	6	0	None > LOD	None > LOD			
Trichlorofluoromethane	ug/kg	6	0	None > LOD	None > LOD			
tert-Butylbenzene	ug/kg	6	0	None > LOD	None > LOD			
Tetrachloroethene	ug/kg	6	0	None > LOD	None > LOD		19000	0
Trichloroethene	ug/kg	6	2	265	9	CATP008 @ 1mbGL	1200	0
Vinyl Chloride	ug/kg	6	0	None > LOD	None > LOD		59	0

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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CABH002	CABH003	CABH003	CATP001	CATP001	CATP002	CATP002	CATP005	CATP006
Specimen Depth (m)		1	0.5	2.8	0.5	2.5	0.75	1.2	0.5	0.75
OD Level (m)										
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002
Metals										
Arsenic	mg/kg	<3	<3	<3	<3	4	<3	<3	<3	<3
Barium	mg/kg									
Boron	mg/kg	0.8			2.6	2.2	<0.5	0.8	1.2	2.4
Boron Water Soluble	mg/kg		1.3	<0.5						
Cadmium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/kg	380	358	225	119	50	67	90	36	66
Chromium VI	mg/kg									
Chromium III	mg/kg									
Copper	mg/kg	19	25	4	14	6	3	9	6	9
Lead	mg/kg	67	65	<5	58	10	<5	49	<5	52
Mercury	mg/kg	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	mg/kg	3	5	<2	4	7	<2	2	<2	3
Selenium	mg/kg	2.06	2.26	4.28	4.71	4.35	5.66	5.23	4.95	4.99
Vanadium	mg/kg									
Zinc	mg/kg	25	68	7	23	37	10	23	37	29
Iron	mg/kg	164000	114000	74100	68700	21900	30400	43000	17100	33600
Manganese	mg/kg	50800			19700	7210	12800	15400	4990	12500
Other										
Asbestos Presence Screen	None									
Asbestos by Gravimetry	%						<0.001		<0.001	
Asbestos Quantification - PCOM Evaluation	%									
Asbestos Quantification - Total	%									
Analysts Comments										
Cyanide (total)	mg/kg	<1	<1	3	<1	<1	<1	<1	1	<1
Cyanide (free)	mg/kg									
Thiocyanate	mg/kg	0.9	<0.5	1.2	1	5.6	6	1.5	3.7	1.9
Ammoniacal Nitrogen as N	mg/kg	2	1.4	1.4	1.2	14.2	1.4	1.7	2.6	2.2
Total Phosphorous	mg/kg	22100			7550	2430	3850	4810	1020	3350
Acid Soluble Sulphate	mg/kg	5660			13100	6360	11500	13200	15600	16600
Fluoride	mg/kg								25	
Chloride	mg/kg	197	45.6	136	107	652	818	142	492	241
pH Value	pH Units	12.9	12.6	12.2	12	11.3	12	12.4	11.6	11.8
Organics										
Phenols										
Phenols Monohydric	mg/kg									
Phenols (total)	mg/kg	<0.5	0.8	1	<0.5	4.5	3	0.9	<0.5	0.5
Cresols	mg/kg									
Xylenols	mg/kg									
BTEX										
Methyl Tertiary Butyl Ether	mg/kg									
Benzene	mg/kg					<0.005				
Toluene	mg/kg					<0.005				
Ethylbenzene	mg/kg					<0.005				
p/m-Xylene	mg/kg					0.014				
o-Xylene	mg/kg					0.01				
Sum of Detected BTEX	mg/kg									
Sum of Detected Xylenes	mg/kg									
GRO TOT (Moisture Corrected)	mg/kg									
PCBs										
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg									
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg									
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg									
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg									
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg									
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg									
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg									
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg									
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg									
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg									
Sum of detected WHO 12 PCBs	mg/kg									
TPH										
TPH >C6-C8.	mg/kg									
TPH >C8-C10.	mg/kg									
TPH >C10-C12.	mg/kg									
TPH >C12-C16.	mg/kg									
TPH >C16-C21.	mg/kg									
TPH >C21-C35.	mg/kg									
Aliphatics C5-C6	mg/kg									
Aliphatics >C6-C8	mg/kg									
Aliphatics >C8-C10	mg/kg									
Aliphatics >C10-C12	mg/kg									
Aliphatics >C12-C16	mg/kg									
Aliphatics >C16-C21	mg/kg									
Aliphatics >C21-C35	mg/kg									
Aliphatics >C35-44	mg/kg									
Aromatics C5-C7	mg/kg									
Aromatics >C7-C8	mg/kg									
Aromatics >EC8-EC10	mg/kg									
Aromatics >EC10-EC12	mg/kg									
Aromatics >EC12-EC16	mg/kg									
Aromatics >EC16-EC21	mg/kg									
Aromatics >EC21-EC35	mg/kg									

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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CATP006	CATP007	CATP007	CATP008	CATP009	CATP009	CATP010	CATP010	MRTP001
Specimen Depth (m)		2	0.75	2	1	1	2.1	0.5	2.4	0.5
OD Level (m)										
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002
Metals										
Arsenic	mg/kg	<3	6	<3	<3	<3	<3	<3	<3	
Barium	mg/kg									<3
Boron	mg/kg	<0.5	0.8	2.3	<0.5	<0.5	<0.5			
Boron Water Soluble	mg/kg							2.7	<0.5	1.4
Cadmium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/kg	97	105	41	394	423	172	98	71	126
Chromium VI	mg/kg									
Chromium III	mg/kg									
Copper	mg/kg	3	38	11	12	21	10	37	3	10
Lead	mg/kg	5	37	48	22	66	<5	60	<5	9
Mercury	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	mg/kg	<2	14	3	<2	5	<2	8	<2	6
Selenium	mg/kg	4.73	4.4	6.47	2.55	3.21	5.03	3.19	3.47	3.87
Vanadium	mg/kg									
Zinc	mg/kg	7	39	23	90	50	7	101	5	33
Iron	mg/kg	44300	72900	21000	163000	103000	63100	39700	27100	89900
Manganese	mg/kg	17700	13200	6720	43400	32700	20600	8600	9890	
Other										
Asbestos Presence Screen	None									
Asbestos by Gravimetry	%		<0.001							
Asbestos Quantification - PCOM Evaluation	%									
Asbestos Quantification - Total	%									
Analysts Comments										
Cyanide (total)	mg/kg	<1	2	1	1	<1	4	<1	2	1
Cyanide (free)	mg/kg									
Thiocyanate	mg/kg	2.8	2.1	1.4	0.9	3.9	3.9	1.5	4.3	2.2
Ammoniacal Nitrogen as N	mg/kg	1.7	2.3	1.6	1.6	4.1	1.2	2.2	1.3	1.2
Total Phosphorous	mg/kg	5470	4690	1930	15900	11400	7410			
Acid Soluble Sulphate	mg/kg	11500	9540	13200	6280	13600	15200			
Fluoride	mg/kg		6.7							
Chloride	mg/kg	400	309	156	93.1	489	488	176	588	277
pH Value	pH Units	11.9	12.3	11.4	12.4	12.4	12.4	11.9	12.2	11.7
Organics										
Phenols										
Phenols Monohydric	mg/kg									
Phenols (total)	mg/kg	3.5	<0.5	0.9	2.1	<0.5	0.6	0.5	<0.5	<0.5
Cresols	mg/kg									
Xylenols	mg/kg									
BTEX										
Methyl Tertiary Butyl Ether	mg/kg									
Benzene	mg/kg				<0.05					
Toluene	mg/kg				0.308					
Ethylbenzene	mg/kg				0.53					
p/m-Xylene	mg/kg				2.002					
o-Xylene	mg/kg				1.623					
Sum of Detected BTEX	mg/kg									
Sum of Detected Xylenes	mg/kg									
GRO TOT (Moisture Corrected)	mg/kg									
PCBs										
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg									
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg									
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg									
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg									
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg									
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg									
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg									
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg									
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg									
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg									
Sum of detected WHO 12 PCBs	mg/kg									
TPH										
TPH >C6-C8.	mg/kg									
TPH >C8-C10.	mg/kg									
TPH >C10-C12.	mg/kg									
TPH >C12-C16.	mg/kg									
TPH >C16-C21.	mg/kg									
TPH >C21-C35.	mg/kg									
Aliphatics C5-C6	mg/kg									
Aliphatics >C6-C8	mg/kg									
Aliphatics >C8-C10	mg/kg									
Aliphatics >C10-C12	mg/kg									
Aliphatics >C12-C16	mg/kg									
Aliphatics >C16-C21	mg/kg									
Aliphatics >C21-C35	mg/kg									
Aliphatics >C35-44	mg/kg									
Aromatics C5-C7	mg/kg									
Aromatics >C7-C8	mg/kg									
Aromatics >EC8-EC10	mg/kg									
Aromatics >EC10-EC12	mg/kg									
Aromatics >EC12-EC16	mg/kg									
Aromatics >EC16-EC21	mg/kg									
Aromatics >EC21-EC35	mg/kg									

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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	MRTP001	MRTP002	MRTP002	MRTP003	MRTP003	MRTP004	MRTP004	MRTP005	BH511	BH511
Specimen Depth (m)		3.8	0.5	3.8	0.5	2	0.5	2.3	0.4	0 - 0.5	1 - 1.5
OD Level (m)										7	6
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2015 GI	2015 GI
Metals											
Arsenic	mg/kg									43	50
Barium	mg/kg	<3	<3	<3	<3	<3	<3	<3	4		
Boron	mg/kg										
Boron Water Soluble	mg/kg	<0.5	1	0.6	0.5	0.7	1.3	<0.5	0.9	2.7	2.8
Cadmium	mg/kg	<1	<1	<1	<1	7	5	5	<1	0.44	0.48
Chromium	mg/kg	385	707	621	717	542	922	802	100	1500	1800
Chromium VI	mg/kg										
Chromium III	mg/kg										
Copper	mg/kg	6	7	11	31	42	39	21	24	58	67
Lead	mg/kg	14	15	16	57	71	69	51	44	25	60
Mercury	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1	1.3
Nickel	mg/kg	4	4	2	15	15	9	5	8	72	76
Selenium	mg/kg	2.08	1.62	1.77	1.62	1.94	1.22	1.83	2.99	<0.2	<0.2
Vanadium	mg/kg										
Zinc	mg/kg	20	48	21	100	61	93	53	69	81	90
Iron	mg/kg	205000	162000	190000	284000	200000	165000	150000	46100		
Manganese	mg/kg										
Other											
Asbestos Presence Screen	None									NAD	NAD
Asbestos by Gravimetry	%										
Asbestos Quantification - PCOM Evaluation	%										
Asbestos Quantification - Total	%										
Analysts Comments											
Cyanide (total)	mg/kg	<1	<1	<1	7	<1	<1	<1	3	<0.5	<0.5
Cyanide (free)	mg/kg									<0.5	<0.5
Thiocyanate	mg/kg	0.6	<0.5	<0.5	1.7	1.4	<0.5	0.6	7		
Ammoniacal Nitrogen as N	mg/kg	1.1	1.2	1.2	1.4	1	1	1.2	1.7		
Total Phosphorous	mg/kg										
Acid Soluble Sulphate	mg/kg										
Fluoride	mg/kg										
Chloride	mg/kg	71.7	40.1	67.1	36.2	98.8	67.5	126	733		
pH Value	pH Units	12.8	12.5	12.6	12.4	12.7	12.7	12.7	11.4	12	12
Organics											
Phenols											
Phenols Monohydric	mg/kg										
Phenols (total)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5		
Cresols	mg/kg										
Xylenols	mg/kg										
BTEX											
Methyl Tertiary Butyl Ether	mg/kg										
Benzene	mg/kg									<1	
Toluene	mg/kg									<1	
Ethylbenzene	mg/kg									<1	
p/m-Xylene	mg/kg									<1	
o-Xylene	mg/kg									<1	
Sum of Detected BTEX	mg/kg										
Sum of Detected Xylenes	mg/kg										
GRO TOT (Moisture Corrected)	mg/kg										
PCBs											
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg										
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg										
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg										
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg										
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg										
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg										
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg										
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg										
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg										
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg										
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg										
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg										
Sum of detected WHO 12 PCBs	mg/kg										
TPH											
TPH >C6-C8.	mg/kg										
TPH >C8-C10.	mg/kg										
TPH >C10-C12.	mg/kg										
TPH >C12-C16.	mg/kg										
TPH >C16-C21.	mg/kg										
TPH >C21-C35.	mg/kg										
Aliphatics C5-C6	mg/kg									<0.1	
Aliphatics >C6-C8	mg/kg									<0.1	
Aliphatics >C8-C10	mg/kg									<0.1	
Aliphatics >C10-C12	mg/kg									<1	
Aliphatics >C12-C16	mg/kg									<1	
Aliphatics >C16-C21	mg/kg									<1	
Aliphatics >C21-C35	mg/kg									<1	
Aliphatics >C35-44	mg/kg									<1	
Aromatics C5-C7	mg/kg									<0.1	
Aromatics >C7-C8	mg/kg									<0.1	
Aromatics >EC8-EC10	mg/kg									<0.1	
Aromatics >EC10-EC12	mg/kg									<1	
Aromatics >EC12-EC16	mg/kg									<1	
Aromatics >EC16-EC21	mg/kg									<1	
Aromatics >EC21-EC35	mg/kg									<1	

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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	BH511	BH512	BH512	BH512	BH512		CATP003	CATP004	CATP004	CATP004		CABH001
Specimen Depth (m)		2 - 2.5	0.3 - 0.5	1 - 1.5	2 - 2.5	3.5 - 3.7		1.1	0.5	1.6	2.4		3
OD Level (m)		5	6.2	5.5	4.5	3							
Sample Type		ES	ES	ES	ES	ES		ES	ES	ES	ES		ES
Geology Code		MG	MG	MG	MG	MG		No Log	No Log	No Log	No Log		TFD
Cluster Code		2015 GI	2015 GI	2015 GI	2015 GI	2015 GI		2002	2002	2002	2002		2002
Metals													
Arsenic	mg/kg	35	41	38	54	23		<3	<3	<3	11		7
Barium	mg/kg												
Boron	mg/kg							0.9	0.7	0.6	1.5		2
Boron Water Soluble	mg/kg	1.1	1.8	2.2	2.4	1.5							
Cadmium	mg/kg	0.19	0.81	0.58	0.31	0.13		<1	<1	<1	<1		<1
Chromium	mg/kg	1100	870	770	1400	38		332	359	432	30		40
Chromium VI	mg/kg												
Chromium III	mg/kg												
Copper	mg/kg	22	76	74	34	14		21	25	10	10		7
Lead	mg/kg	25	16	9	24	11		77	87	34	37		39
Mercury	mg/kg	0.4	1.4	1.1	0.95	0.11		<0.5	<0.5	<0.5	<0.5		<0.5
Nickel	mg/kg	27	18000	60	26	37		4	6	<2	28		14
Selenium	mg/kg	<0.2	0.49	0.54	<0.2	<0.2		2.74	8.22	3.13	0.81		2.43
Vanadium	mg/kg												
Zinc	mg/kg	52	130	92	90	110		58	69	37	82		43
Iron	mg/kg							116000	136000	165000	28600		31600
Manganese	mg/kg							31300	35200	40200	897		4110
Other													
Asbestos Presence Screen	None	NAD	NAD	NAD	NAD	NAD							
Asbestos by Gravimetry	%									<0.001			
Asbestos Quantification - PCOM Evaluation	%												
Asbestos Quantification - Total	%												
Analysts Comments													
Cyanide (total)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5		<1	1	<1	<1		2
Cyanide (free)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5							
Thiocyanate	mg/kg							0.9	0.6	1.2	1.4		3.4
Ammoniacal Nitrogen as N	mg/kg							5.1	1.1	2.6	46.3		10.3
Total Phosphorous	mg/kg							16300	19900	23600	1990		2180
Acid Soluble Sulphate	mg/kg							10600	9630	11300	1950		3930
Fluoride	mg/kg												6.5
Chloride	mg/kg							104	51.4	156	379		442
pH Value	pH Units	12.5	12.1	11.8	12.1	9.4		12.7	12.9	12.8	8.9		11.4
Organics													
Phenols													
Phenols Monohydric	mg/kg												
Phenols (total)	mg/kg	360	<300		<300	<300		<0.5	<0.5	<0.5	<0.5		<0.5
Cresols	mg/kg												
Xylenols	mg/kg												
BTEX													
Methyl Tertiary Butyl Ether	mg/kg												
Benzene	mg/kg		<1										
Toluene	mg/kg		<1										
Ethylbenzene	mg/kg		<1										
p/m-Xylene	mg/kg		<1										
o-Xylene	mg/kg		<1										
Sum of Detected BTEX	mg/kg												
Sum of Detected Xylenes	mg/kg												
GRO TOT (Moisture Corrected)	mg/kg												
PCBs													
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg	<0.01	<0.01	<0.01		<0.01							
Sum of detected WHO 12 PCBs	mg/kg												
TPH													
TPH >C6-C8.	mg/kg			0	0	0							
TPH >C8-C10.	mg/kg			0	0	0							
TPH >C10-C12.	mg/kg			0	0	0							
TPH >C12-C16.	mg/kg			27	47	0							
TPH >C16-C21.	mg/kg			0	0	0							
TPH >C21-C35.	mg/kg			0	0	0							
Aliphatics C5-C6	mg/kg		<0.1										
Aliphatics >C6-C8	mg/kg		<0.1										
Aliphatics >C8-C10	mg/kg		<0.1										
Aliphatics >C10-C12	mg/kg		<1										
Aliphatics >C12-C16	mg/kg		<1										
Aliphatics >C16-C21	mg/kg		2.8										
Aliphatics >C21-C35	mg/kg		40										
Aliphatics >C35-44	mg/kg		1.5										
Aromatics C5-C7	mg/kg		<0.1										
Aromatics >C7-C8	mg/kg		<0.1										
Aromatics >EC8-EC10	mg/kg		<0.1										
Aromatics >EC10-EC12	mg/kg		<1										
Aromatics >EC12-EC16	mg/kg		<1										
Aromatics >EC16-EC21	mg/kg		2.2										
Aromatics >EC21-EC35	mg/kg		5.6										

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Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
21/06/2016

Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CABH001	CABH002	CABH003	CABH003	CABH003	CATP001	CATP005	CATP005	CATP006
Specimen Depth (m)		6	3	3.5	6	7	2.7	1.3	2.5	2.45
OD Level (m)										
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		TFD	TFD	TFD	TFD	TFD	TFD	TFD	TFD	TFD
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002
Metals										
Arsenic	mg/kg	<3	10	9	7	9	9	15	10	16
Barium	mg/kg									
Boron	mg/kg	18	2				2.9	3	1	0.9
Boron Water Soluble	mg/kg			0.9	14	1.3				
Cadmium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/kg	5	55	35	53	17	36	38	33	32
Chromium VI	mg/kg									
Chromium III	mg/kg									
Copper	mg/kg	2	12	8	11	8	14	9	11	10
Lead	mg/kg	5	61	22	37	13	43	49	39	29
Mercury	mg/kg	<0.5	<0.5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5
Nickel	mg/kg	4	27	22	22	17	28	6	26	33
Selenium	mg/kg	0.59	1.22	1.08	1.19	0.72	2.33	1.55	0.85	1.06
Vanadium	mg/kg									
Zinc	mg/kg	14	136	72	78	59	91	21	82	101
Iron	mg/kg	7630	36300	31300	35100	19600	29800	23400	32400	38100
Manganese	mg/kg	280	2750				1330	4760	1240	816
Other										
Asbestos Presence Screen	None									
Asbestos by Gravimetry	%									
Asbestos Quantification - PCOM Evaluation	%									
Asbestos Quantification - Total	%									
Analysts Comments										
Cyanide (total)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cyanide (free)	mg/kg									
Thiocyanate	mg/kg	8.2	2	1	2.9	1.5	2.7	6.3	0.9	1.9
Ammoniacal Nitrogen as N	mg/kg	133	36.6	25.1	27.6	15	121	9	22.1	106
Total Phosphorous	mg/kg	705	2280				1490	2130	2580	1220
Acid Soluble Sulphate	mg/kg	2160	2540				1760	14000	1340	985
Fluoride	mg/kg									
Chloride	mg/kg	6760	478	270	1730	187	69.4	746	294	102
pH Value	pH Units	7.5	10.9	10.2	8.2	9.5	9.3	11.3	9.5	8.8
Organics										
Phenols										
Phenols Monohydric	mg/kg									
Phenols (total)	mg/kg	<0.5	0.9	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	0.9
Cresols	mg/kg									
Xylenols	mg/kg									
BTEX										
Methyl Tertiary Butyl Ether	mg/kg									
Benzene	mg/kg									
Toluene	mg/kg									
Ethylbenzene	mg/kg									
p/m-Xylene	mg/kg									
o-Xylene	mg/kg									
Sum of Detected BTEX	mg/kg									
Sum of Detected Xylenes	mg/kg									
GRO TOT (Moisture Corrected)	mg/kg									
PCBs										
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg									
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg									
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg									
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg									
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg									
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg									
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg									
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg									
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg									
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg									
Sum of detected WHO 12 PCBs	mg/kg									
TPH										
TPH >C6-C8.	mg/kg									
TPH >C8-C10.	mg/kg									
TPH >C10-C12.	mg/kg									
TPH >C12-C16.	mg/kg									
TPH >C16-C21.	mg/kg									
TPH >C21-C35.	mg/kg									
Aliphatics C5-C6	mg/kg									
Aliphatics >C6-C8	mg/kg									
Aliphatics >C8-C10	mg/kg									
Aliphatics >C10-C12	mg/kg									
Aliphatics >C12-C16	mg/kg									
Aliphatics >C16-C21	mg/kg									
Aliphatics >C21-C35	mg/kg									
Aliphatics >C35-44	mg/kg									
Aromatics C5-C7	mg/kg									
Aromatics >C7-C8	mg/kg									
Aromatics >EC8-EC10	mg/kg									
Aromatics >EC10-EC12	mg/kg									
Aromatics >EC12-EC16	mg/kg									
Aromatics >EC16-EC21	mg/kg									
Aromatics >EC21-EC35	mg/kg									

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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CATP007	CATP010	CATP010	MRTP003	MRTP004	BH512	BHM4CAN036	BHM4CAN037	BHM4CAN038
Specimen Depth (m)		2.45	2.6	3.5	3.5	3.5	5 - 5.2	0.6	2.2	0.4
OD Level (m)							1.5	7.66	4.57	5.97
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		TFD	TFD	TFD	TFD	TFD	PEAT	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2015 GI	2016 GI	2016 GI	2016 GI
Metals										
Arsenic	mg/kg	12	6	11			3.9	2.98	<0.0012	7.77
Barium	mg/kg				11	7				
Boron	mg/kg	2.6								
Boron Water Soluble	mg/kg		1.6	2	0.8	1.4	18			
Cadmium	mg/kg	<1	<1	<1	<1	<1	<0.1	0.702	6.17	1
Chromium	mg/kg	39	18	36	47	37	3.8	1000	332	439
Chromium VI	mg/kg							<0.6	<0.3	<0.6
Chromium III	mg/kg								<0.3	
Copper	mg/kg	18	15	8	10	10	2.7	8.52	0.012	25.1
Lead	mg/kg	56	41	20	30	27	0.8	19.3	8.83	82.8
Mercury	mg/kg	<0.5	<0.5	<5	<0.5	<0.5	<0.1	<0.14	<0.14	<0.14
Nickel	mg/kg	28	9	18	31	28	4.2	9.37	26.8	43.7
Selenium	mg/kg	0.97	5.55	1.65	0.71	0.85	0.24	12.1	0.00532	7.38
Vanadium	mg/kg							475	1420	697
Zinc	mg/kg	103	92	63	96	92	13	112	26.3	110
Iron	mg/kg	29900	17800	30700	39900	32400		178	175	239
Manganese	mg/kg	271	1740	3220						
Other										
Asbestos Presence Screen	None						NAD	NAD	NAD	
Asbestos by Gravimetry	%									
Asbestos Quantification - PCOM Evaluation	%									
Asbestos Quantification - Total	%									
Analysts Comments										
Cyanide (total)	mg/kg	<1	<1	<1	<1	1	<0.5			
Cyanide (free)	mg/kg						<0.5			<1
Thiocyanate	mg/kg	5.4	12.7	2.4	1.6	1				
Ammoniacal Nitrogen as N	mg/kg	116	77.8	22.5	50.6	30.8				
Total Phosphorous	mg/kg	2140								
Acid Soluble Sulphate	mg/kg	2720								
Fluoride	mg/kg									
Chloride	mg/kg	338	673	398	37.4	225				
pH Value	pH Units	8	8.9	11	9.6	8.8	7.5	12.8	11.8	10.7
Organics										
Phenols										
Phenols Monohydric	mg/kg									<0.035
Phenols (total)	mg/kg	1.2	3.9	<0.5	<0.5	<0.5	<300			<0.01
Cresols	mg/kg									<0.01
Xylenols	mg/kg									<0.015
BTEX										
Methyl Tertiary Butyl Ether	mg/kg							<0.005	<0.005	<0.005
Benzene	mg/kg		<0.005					<0.01	<0.01	<0.01
Toluene	mg/kg		0.009					0.00312	<0.002	<0.002
Ethylbenzene	mg/kg		0.011					<0.003	<0.003	<0.003
p/m-Xylene	mg/kg		0.032					<0.006	<0.006	<0.006
o-Xylene	mg/kg		0.032					<0.003	<0.003	<0.003
Sum of Detected BTEX	mg/kg							<0.024	<0.024	<0.024
Sum of Detected Xylenes	mg/kg							<0.009	<0.009	<0.009
GRO TOT (Moisture Corrected)	mg/kg							<0.044	0.0902	<0.044
PCBs										
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg									
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg									
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg									
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg									
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg									
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg									
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg									
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg									
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg									
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg									
Sum of detected WHO 12 PCBs	mg/kg									
TPH										
TPH >C6-C8.	mg/kg						< 1.0			
TPH >C8-C10.	mg/kg						< 1.0			
TPH >C10-C12.	mg/kg						< 1.0			
TPH >C12-C16.	mg/kg						< 1.0			
TPH >C16-C21.	mg/kg						< 1.0			
TPH >C21-C35.	mg/kg						< 1.0			
Aliphatics C5-C6	mg/kg							<0.01	<0.01	<0.01
Aliphatics >C6-C8	mg/kg							<0.01	<0.01	<0.01
Aliphatics >C8-C10	mg/kg							<0.01	0.0121	<0.01
Aliphatics >C10-C12	mg/kg							<0.01	0.0352	<0.01
Aliphatics >C12-C16	mg/kg							0.371	0.554	2.49
Aliphatics >C16-C21	mg/kg							3.58	4.33	18.4
Aliphatics >C21-C35	mg/kg							27.4	39.2	154
Aliphatics >C35-44	mg/kg							6.62	10.7	40.3
Aromatics C5-C7	mg/kg							<0.01	<0.01	<0.01
Aromatics >C7-C8	mg/kg							<0.01	<0.01	<0.01
Aromatics >EC8-EC10	mg/kg							<0.01	<0.01	<0.01
Aromatics >EC10-EC12	mg/kg							<0.01	0.0242	<0.01
Aromatics >EC12-EC16	mg/kg							<0.1	<0.1	0.423
Aromatics >EC16-EC21	mg/kg							0.569	1.07	5.06
Aromatics >EC21-EC35	mg/kg							7.57	10.5	37.9

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Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	BHM4CAN039	BHM4CAN039	TPM4CAN016	TPM4CAN017	TPM4CAN018	WSM4CAN023	WSM4CAN024
Specimen Depth (m)		0.5	1.2	2	0.5	0.2	1.5	0.5
OD Level (m)		6.69	5.99	4.89	6.22	6.52	5.2	6.41
Sample Type		ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG
Cluster Code		2016 GI	2016 GI	2016 GI	2016 GI	2016 GI	2016 GI	2016 GI
Metals								
Arsenic	mg/kg		0.00236	6.83	0.00598	1.92	8.74	<6
Barium	mg/kg							
Boron	mg/kg			45.1				
Boron Water Soluble	mg/kg							
Cadmium	mg/kg	1	1.76	1.58	1.83	0.946	2.14	1.96
Chromium	mg/kg	0.0316	375	616	538	338	778	441
Chromium VI	mg/kg		<0.3				<0.3	<0.6
Chromium III	mg/kg	<0.3						
Copper	mg/kg	0.0444	30.9	25	43.1	36.4	38.8	<14
Lead	mg/kg	0.0486	37.9	12.5	14.1	19.5	18.7	47.6
Mercury	mg/kg		<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Nickel	mg/kg	0.0185	24.4	20.3	29.6	11.5	37.9	10.1
Selenium	mg/kg	0.00609	14.2	<10	<10	1.19	15.5	<10
Vanadium	mg/kg	0.0233	443	1000	1010	172	2350	441
Zinc	mg/kg	0.153	87.9	54.1	67.2	133	47	688
Iron	mg/kg	135						
Manganese	mg/kg							
Other								
Asbestos Presence Screen	None	AD	AD	NFD	NFD	NFD	NFD	NFD
Asbestos by Gravimetry	%		<0.001					
Asbestos Quantification - PCOM Evaluation	%		<0.001					
Asbestos Quantification - Total	%		0.001					
Analysts Comments		Chrysotile	Chrysotile					
Cyanide (total)	mg/kg				<1			
Cyanide (free)	mg/kg		<1	<1			<1	<1
Thiocyanate	mg/kg							
Ammoniacal Nitrogen as N	mg/kg							
Total Phosphorous	mg/kg							
Acid Soluble Sulphate	mg/kg							
Fluoride	mg/kg							
Chloride	mg/kg							
pH Value	pH Units		12.6	12.3	12.5	12.4	12.7	12.4
Organics								
Phenols								
Phenols Monohydric	mg/kg		<0.035	<0.035	<0.035		<0.035	<0.035
Phenols (total)	mg/kg		<0.01	<0.01	<0.01		<0.01	<0.01
Cresols	mg/kg		<0.01	<0.01	<0.01		<0.01	<0.01
Xylenols	mg/kg		<0.015	<0.015	<0.015		<0.015	<0.015
BTEX								
Methyl Tertiary Butyl Ether	mg/kg		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzene	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	mg/kg		0.0024	<0.002	<0.002	0.00238	<0.002	<0.002
Ethylbenzene	mg/kg		0.00448	<0.003	<0.003	<0.003	<0.003	<0.003
p/m-Xylene	mg/kg		0.00896	<0.006	<0.006	<0.006	<0.006	<0.006
o-Xylene	mg/kg		0.00336	<0.003	<0.003	<0.003	<0.003	<0.003
Sum of Detected BTEX	mg/kg		<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Sum of Detected Xylenes	mg/kg		0.0123	<0.009	<0.009	<0.009	<0.009	<0.009
GRO TOT (Moisture Corrected)	mg/kg		2.3	<0.044	<0.044	0.075	<0.044	<0.044
PCBs								
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg			<0.003			<0.003	0.0046
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg			<0.003			<0.003	<0.003
Sum of detected WHO 12 PCBs	mg/kg			<0.003			<0.003	<0.003
TPH								
TPH >C6-C8.	mg/kg							
TPH >C8-C10.	mg/kg							
TPH >C10-C12.	mg/kg							
TPH >C12-C16.	mg/kg							
TPH >C16-C21.	mg/kg							
TPH >C21-C35.	mg/kg							
Aliphatics C5-C6	mg/kg		0.0246	<0.01	<0.01	0.0345	<0.01	<0.01
Aliphatics >C6-C8	mg/kg		0.084	<0.01	<0.01	0.0333	<0.01	<0.01
Aliphatics >C8-C10	mg/kg		0.251	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C10-C12	mg/kg		1.05	<0.01	0.02	<0.01	0.0189	<0.01
Aliphatics >C12-C16	mg/kg		42.2	1.95	12.8	0.183	1.1	2.47
Aliphatics >C16-C21	mg/kg		96.1	12.7	69.5	4.54	5.89	20.8
Aliphatics >C21-C35	mg/kg		271	111	689	41	72.3	145
Aliphatics >C35-44	mg/kg		55.5	30.3	105	1.71	52.2	18.7
Aromatics C5-C7	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >C7-C8	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC8-EC10	mg/kg		0.184	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC10-EC12	mg/kg		0.701	<0.01	0.0137	<0.01	0.0122	<0.01
Aromatics >EC12-EC16	mg/kg		9.22	0.87	3.38	<0.1	0.502	0.261
Aromatics >EC16-EC21	mg/kg		37.3	7.61	24.8	<0.1	2.89	5.33
Aromatics >EC21-EC35	mg/kg		143	53.4	176	5.9	29.6	35.5

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
21/06/2016

Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CABH002	CABH003	CABH003	CATP001	CATP001	CATP002	CATP002	CATP005	CATP006
Specimen Depth (m)		1	0.5	2.8	0.5	2.5	0.75	1.2	0.5	0.75
OD Level (m)										
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002
Aromatics >C35-44	mg/kg									
Aromatics >EC40-EC44	mg/kg									
Total Aliphatics & Aromatics >C5-C44	mg/kg									
Total Aliphatic TPH	mg/kg									
Total Aromatic hydrocarbons	mg/kg									
Total petroleum hydrocarbons	mg/kg	1880		146	764	237		19500	837	4180
PAH										
Acenaphthene	mg/kg				1.2			27	<0.2	<1
Acenaphthylene	mg/kg				<1			<10	<0.2	<1
Anthracene	mg/kg				<1			<10	<0.2	<1
Benzo(a)anthracene	mg/kg				1.1			<10	<0.2	<1
Benzo(a)pyrene	mg/kg				<1			<10	<0.2	<1
Benzo(b)fluoranthene	mg/kg				1.2			<10	<0.2	<1
Benzo(ghi)perylene	mg/kg				<1			<10	<0.2	<1
Benzo(k)fluoranthene	mg/kg				<1			<10	<0.2	<1
Chrysene	mg/kg				1.3			<10	<0.2	<1
Dibenzo(ah)anthracene	mg/kg				<1			<10	<0.2	<1
Fluoranthene	mg/kg				3.2			11.5	2.3	1.6
Fluorene	mg/kg				<1			20	<0.2	<1
Indeno(123cd)pyrene	mg/kg				<1			<10	<0.2	<1
Naphthalene	mg/kg				<1	0.687		<10	<0.2	<1
Phenanthrene	mg/kg				3.3			21.2	2.1	1.4
Pyrene	mg/kg				2.2			10.3	<0.2	2.6
PAH 16 Total	mg/kg				<22.4			<200	<32.4	<18.6
SVOCs										
Phenols										
2-Chlorophenol	mg/kg									
2-Methylphenol	mg/kg									
2-Nitrophenol	mg/kg									
2,4-Dichlorophenol	mg/kg									
2,4-Dimethylphenol	mg/kg									
2,4,5-Trichlorophenol	mg/kg									
2,4,6-Trichlorophenol	mg/kg									
4-Chloro-3-methylphenol	mg/kg									
4-Methylphenol	mg/kg									
4-Nitrophenol	mg/kg									
Pentachlorophenol	mg/kg									
Phenol	mg/kg									
PAHs										
2-Chloronaphthalene	mg/kg									
2-Methylnaphthalene	mg/kg									
Acenaphthene	mg/kg									
Acenaphthylene	mg/kg									
Anthracene	mg/kg									
Benzo(a)anthracene	mg/kg									
Benzo(a)pyrene	mg/kg									
Benzo(b)fluoranthene	mg/kg									
Benzo(ghi)perylene	mg/kg									
Benzo(k)fluoranthene	mg/kg									
Chrysene	mg/kg									
Dibenzo(a,h)anthracene	mg/kg									
Fluoranthene	mg/kg									
Fluorene	mg/kg									
Indeno(1,2,3-cd)pyrene	mg/kg									
Naphthalene	mg/kg									
Phenanthrene	mg/kg									
Pyrene	mg/kg									
Pthalates										
Bis(2-ethylhexyl) phthalate	mg/kg									
Butylbenzyl phthalate	mg/kg									
Di-n-butyl phthalate	mg/kg									
Di-n-Octyl phthalate	mg/kg									
Diethyl phthalate	mg/kg									
Dimethyl phthalate	mg/kg									
Other Semi-Volatiles										
1,2-Dichlorobenzene	mg/kg					<0.005				
1,2,4-Trichlorobenzene	mg/kg					<0.025				
1,3-Dichlorobenzene	mg/kg					<0.05				
1,4-Dichlorobenzene	mg/kg					<0.05				
2-Nitroaniline	mg/kg									
2,4-Dinitrotoluene	mg/kg									
2,6-Dinitrotoluene	mg/kg									
3-Nitroaniline	mg/kg									
4-Bromophenylphenylether	mg/kg									
4-Chloroaniline	mg/kg									
4-Chlorophenylphenylether	mg/kg									
4-Nitroaniline	mg/kg									
Azobenzene	mg/kg									
Bis(2-chloroethoxy)methane	mg/kg									
Bis(2-chloroethyl)ether	mg/kg									
Carbazole	mg/kg									
Dibenzofuran	mg/kg									
Hexachlorobenzene	mg/kg									
Hexachlorobutadiene	mg/kg					<0.025				
Hexachlorocyclopentadiene	mg/kg									

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
21/06/2016

Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CATP006	CATP007	CATP007	CATP008	CATP009	CATP009	CATP010	CATP010	MRTP001
Specimen Depth (m)		2	0.75	2	1	1	2.1	0.5	2.4	0.5
OD Level (m)										
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002
Aromatics >C35-44	mg/kg									
Aromatics >EC40-EC44	mg/kg									
Total Aliphatics & Aromatics >C5-C44	mg/kg									
Total Aliphatic TPH	mg/kg									
Total Aromatic hydrocarbons	mg/kg									
Total petroleum hydrocarbons	mg/kg	9510		2670	29130	7970	4900			
PAH										
Acenaphthene	mg/kg			11.5			32.6	<2	8.8	
Acenaphthylene	mg/kg			0.3			<2	<2	<1	
Anthracene	mg/kg			2.7			<2	<2	1	
Benzo(a)anthracene	mg/kg			1.3			<2	<2	<1	
Benzo(a)pyrene	mg/kg			0.7			<2	<2	<1	
Benzo(b)fluoranthene	mg/kg			0.9			<2	<2	<1	
Benzo(ghi)perylene	mg/kg			0.3			<2	<2	<1	
Benzo(k)fluoranthene	mg/kg			0.5			<2	<2	<1	
Chrysene	mg/kg			1.2			<2	<2	<1	
Dibenzo(ah)anthracene	mg/kg			<0.2			<2	<2	<1	
Fluoranthene	mg/kg			7.6			2.4	<2	2.2	
Fluorene	mg/kg			7.9			16.6	<2	4.5	
Indeno(123cd)pyrene	mg/kg			0.3			<2	<2	<1	
Naphthalene	mg/kg			1.8	11.733		32.8	<2	28.6	
Phenanthrene	mg/kg			10.5			15.7	<2	8.1	
Pyrene	mg/kg			8.3			<2	<2	2	
PAH 16 Total	mg/kg			<55.8			<122.1	<32	<64.2	
SVOCs										
Phenols										
2-Chlorophenol	mg/kg									
2-Methylphenol	mg/kg									
2-Nitrophenol	mg/kg									
2,4-Dichlorophenol	mg/kg									
2,4-Dimethylphenol	mg/kg									
2,4,5-Trichlorophenol	mg/kg									
2,4,6-Trichlorophenol	mg/kg									
4-Chloro-3-methylphenol	mg/kg									
4-Methylphenol	mg/kg									
4-Nitrophenol	mg/kg									
Pentachlorophenol	mg/kg									
Phenol	mg/kg									
PAHs										
2-Chloronaphthalene	mg/kg									
2-Methylnaphthalene	mg/kg									
Acenaphthene	mg/kg									
Acenaphthylene	mg/kg									
Anthracene	mg/kg									
Benzo(a)anthracene	mg/kg									
Benzo(a)pyrene	mg/kg									
Benzo(b)fluoranthene	mg/kg									
Benzo(ghi)perylene	mg/kg									
Benzo(k)fluoranthene	mg/kg									
Chrysene	mg/kg									
Dibenzo(a,h)anthracene	mg/kg									
Fluoranthene	mg/kg									
Fluorene	mg/kg									
Indeno(1,2,3-cd)pyrene	mg/kg									
Naphthalene	mg/kg									
Phenanthrene	mg/kg									
Pyrene	mg/kg									
Pthalates										
Bis(2-ethylhexyl) phthalate	mg/kg									
Butylbenzyl phthalate	mg/kg									
Di-n-butyl phthalate	mg/kg									
Di-n-Octyl phthalate	mg/kg									
Diethyl phthalate	mg/kg									
Dimethyl phthalate	mg/kg									
Other Semi-Volatiles										
1,2-Dichlorobenzene	mg/kg				<0.05					
1,2,4-Trichlorobenzene	mg/kg				<0.25					
1,3-Dichlorobenzene	mg/kg				<0.5					
1,4-Dichlorobenzene	mg/kg				<0.5					
2-Nitroaniline	mg/kg									
2,4-Dinitrotoluene	mg/kg									
2,6-Dinitrotoluene	mg/kg									
3-Nitroaniline	mg/kg									
4-Bromophenylphenylether	mg/kg									
4-Chloroaniline	mg/kg									
4-Chlorophenylphenylether	mg/kg									
4-Nitroaniline	mg/kg									
Azobenzene	mg/kg									
Bis(2-chloroethoxy)methane	mg/kg									
Bis(2-chloroethyl)ether	mg/kg									
Carbazole	mg/kg									
Dibenzofuran	mg/kg									
Hexachlorobenzene	mg/kg									
Hexachlorobutadiene	mg/kg				<0.25					
Hexachlorocyclopentadiene	mg/kg									

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Soil Analysis Results & Screening Assessment
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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	MRTP001	MRTP002	MRTP002	MRTP003	MRTP003	MRTP004	MRTP004	MRTP005	BH511	BH511
Specimen Depth (m)		3.8	0.5	3.8	0.5	2	0.5	2.3	0.4	0 - 0.5	1 - 1.5
OD Level (m)										7	6
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2015 GI	2015 GI
Aromatics >C35-44	mg/kg									<1	
Aromatics >EC40-EC44	mg/kg										
Total Aliphatics & Aromatics >C5-C44	mg/kg										
Total Aliphatic TPH	mg/kg									<5	
Total Aromatic hydrocarbons	mg/kg									<5	
Total petroleum hydrocarbons	mg/kg								650	<10	
PAH											
Acenaphthene	mg/kg								0.3	<0.1	<0.1
Acenaphthylene	mg/kg								1.1	<0.1	<0.1
Anthracene	mg/kg								3.3	<0.1	<0.1
Benzo(a)anthracene	mg/kg								4.5	<0.1	<0.1
Benzo(a)pyrene	mg/kg								4.2	<0.1	<0.1
Benzo(b)fluoranthene	mg/kg								4.8	<0.1	<0.1
Benzo(ghi)perylene	mg/kg								2.4	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg								2.4	<0.1	<0.1
Chrysene	mg/kg								4.4	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg								0.6	<0.1	<0.1
Fluoranthene	mg/kg								10	<0.1	<0.1
Fluorene	mg/kg								1.4	<0.1	<0.1
Indeno(123cd)pyrene	mg/kg								2.4	<0.1	<0.1
Naphthalene	mg/kg								0.9	<0.1	<0.1
Phenanthrene	mg/kg								9.7	<0.1	<0.1
Pyrene	mg/kg								8.5	<0.1	<0.1
PAH 16 Total	mg/kg									<2	<2
SVOCs											
Phenols											
2-Chlorophenol	mg/kg										
2-Methylphenol	mg/kg										
2-Nitrophenol	mg/kg										
2,4-Dichlorophenol	mg/kg										
2,4-Dimethylphenol	mg/kg										
2,4,5-Trichlorophenol	mg/kg										
2,4,6-Trichlorophenol	mg/kg										
4-Chloro-3-methylphenol	mg/kg										
4-Methylphenol	mg/kg										
4-Nitrophenol	mg/kg										
Pentachlorophenol	mg/kg										
Phenol	mg/kg										
PAHs											
2-Chloronaphthalene	mg/kg										
2-Methylnaphthalene	mg/kg										
Acenaphthene	mg/kg										
Acenaphthylene	mg/kg										
Anthracene	mg/kg										
Benzo(a)anthracene	mg/kg										
Benzo(a)pyrene	mg/kg										
Benzo(b)fluoranthene	mg/kg										
Benzo(ghi)perylene	mg/kg										
Benzo(k)fluoranthene	mg/kg										
Chrysene	mg/kg										
Dibenzo(a,h)anthracene	mg/kg										
Fluoranthene	mg/kg										
Fluorene	mg/kg										
Indeno(1,2,3-cd)pyrene	mg/kg										
Naphthalene	mg/kg										
Phenanthrene	mg/kg										
Pyrene	mg/kg										
Pthalates											
Bis(2-ethylhexyl) phthalate	mg/kg										
Butylbenzyl phthalate	mg/kg										
Di-n-butyl phthalate	mg/kg										
Di-n-Octyl phthalate	mg/kg										
Diethyl phthalate	mg/kg										
Dimethyl phthalate	mg/kg										
Other Semi-Volatiles											
1,2-Dichlorobenzene	mg/kg										
1,2,4-Trichlorobenzene	mg/kg										
1,3-Dichlorobenzene	mg/kg										
1,4-Dichlorobenzene	mg/kg										
2-Nitroaniline	mg/kg										
2,4-Dinitrotoluene	mg/kg										
2,6-Dinitrotoluene	mg/kg										
3-Nitroaniline	mg/kg										
4-Bromophenylphenylether	mg/kg										
4-Chloroaniline	mg/kg										
4-Chlorophenylphenylether	mg/kg										
4-Nitroaniline	mg/kg										
Azobenzene	mg/kg										
Bis(2-chloroethoxy)methane	mg/kg										
Bis(2-chloroethyl)ether	mg/kg										
Carbazole	mg/kg										
Dibenzofuran	mg/kg										
Hexachlorobenzene	mg/kg										
Hexachlorobutadiene	mg/kg										
Hexachlorocyclopentadiene	mg/kg										

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Soil Analysis Results & Screening Assessment
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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	BH511	BH512	BH512	BH512	BH512		CATP003	CATP004	CATP004	CATP004		CABH001
Specimen Depth (m)		2 - 2.5	0.3 - 0.5	1 - 1.5	2 - 2.5	3.5 - 3.7		1.1	0.5	1.6	2.4		3
OD Level (m)		5	6.2	5.5	4.5	3							
Sample Type		ES	ES	ES	ES	ES		ES	ES	ES	ES		ES
Geology Code		MG	MG	MG	MG	MG		No Log	No Log	No Log	No Log		TFD
Cluster Code		2015 GI	2015 GI	2015 GI	2015 GI	2015 GI		2002	2002	2002	2002		2002
Aromatics >C35-44	mg/kg		<1										
Aromatics >EC40-EC44	mg/kg												
Total Aliphatics & Aromatics >C5-C44	mg/kg												
Total Aliphatic TPH	mg/kg		44										
Total Aromatic hydrocarbons	mg/kg		8.7										
Total petroleum hydrocarbons	mg/kg		53					88	590		<10		
PAH													
Acenaphthene	mg/kg	0.1	<0.1	0.15	<0.1	<0.1			< 0.2				
Acenaphthylene	mg/kg	0.36	<0.1	0.37	<0.1	<0.1			< 0.2				
Anthracene	mg/kg	0.39	0.21	0.12	0.14	<0.1			<0.2				
Benzo(a)anthracene	mg/kg	4.3	2.6	0.72	1.1	<0.1			0.8				
Benzo(a)pyrene	mg/kg	2.9	1.4	1.1	1.2	<0.1			1.1				
Benzo(b)fluoranthene	mg/kg	3.5	2.1	1.2	1.3	<0.1			1.2				
Benzo(ghi)perylene	mg/kg	7	3.5	2	2.1	<0.1			0.9				
Benzo(k)fluoranthene	mg/kg	2.7	1.2	0.84	0.82	<0.1			0.6				
Chrysene	mg/kg	4.8	1.6	1.3	1.2	<0.1			0.9				
Dibenzo(ah)anthracene	mg/kg	0.65	0.4	0.31	0.32	<0.1			<0.2				
Fluoranthene	mg/kg	6.8	2.6	2.2	2.2	<0.1			1.3				
Fluorene	mg/kg	0.12	<0.1	<0.1	<0.1	<0.1			< 0.2				
Indeno(123cd)pyrene	mg/kg	3.1	1.6	0.79	0.69	<0.1			0.8				
Naphthalene	mg/kg	0.42	<0.1	0.12	<0.1	<0.1			< 0.2				
Phenanthrene	mg/kg	4.3	1.6	1.4	1.3	<0.1			0.8				
Pyrene	mg/kg	5.1	2.6	2.1	2.2	<0.1			1.2				
PAH 16 Total	mg/kg	47	21	15	15	<2			<10.8				
SVOCs													
Phenols													
2-Chlorophenol	mg/kg												
2-Methylphenol	mg/kg												
2-Nitrophenol	mg/kg												
2,4-Dichlorophenol	mg/kg												
2,4-Dimethylphenol	mg/kg												
2,4,5-Trichlorophenol	mg/kg												
2,4,6-Trichlorophenol	mg/kg												
4-Chloro-3-methylphenol	mg/kg												
4-Methylphenol	mg/kg												
4-Nitrophenol	mg/kg												
Pentachlorophenol	mg/kg												
Phenol	mg/kg												
PAHs													
2-Chloronaphthalene	mg/kg												
2-Methylnaphthalene	mg/kg												
Acenaphthene	mg/kg												
Acenaphthylene	mg/kg												
Anthracene	mg/kg												
Benzo(a)anthracene	mg/kg												
Benzo(a)pyrene	mg/kg												
Benzo(b)fluoranthene	mg/kg												
Benzo(ghi)perylene	mg/kg												
Benzo(k)fluoranthene	mg/kg												
Chrysene	mg/kg												
Dibenzo(a,h)anthracene	mg/kg												
Fluoranthene	mg/kg												
Fluorene	mg/kg												
Indeno(1,2,3-cd)pyrene	mg/kg												
Naphthalene	mg/kg												
Phenanthrene	mg/kg												
Pyrene	mg/kg												
Pthalates													
Bis(2-ethylhexyl) phthalate	mg/kg												
Butylbenzyl phthalate	mg/kg												
Di-n-butyl phthalate	mg/kg												
Di-n-Octyl phthalate	mg/kg												
Diethyl phthalate	mg/kg												
Dimethyl phthalate	mg/kg												
Other Semi-Volatiles													
1,2-Dichlorobenzene	mg/kg												
1,2,4-Trichlorobenzene	mg/kg												
1,3-Dichlorobenzene	mg/kg												
1,4-Dichlorobenzene	mg/kg												
2-Nitroaniline	mg/kg												
2,4-Dinitrotoluene	mg/kg												
2,6-Dinitrotoluene	mg/kg												
3-Nitroaniline	mg/kg												
4-Bromophenylphenylether	mg/kg												
4-Chloroaniline	mg/kg												
4-Chlorophenylphenylether	mg/kg												
4-Nitroaniline	mg/kg												
Azobenzene	mg/kg												
Bis(2-chloroethoxy)methane	mg/kg												
Bis(2-chloroethyl)ether	mg/kg												
Carbazole	mg/kg												
Dibenzofuran	mg/kg												
Hexachlorobenzene	mg/kg												
Hexachlorobutadiene	mg/kg												
Hexachlorocyclopentadiene	mg/kg												

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Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CABH001	CABH002	CABH003	CABH003	CABH003	CATP001	CATP005	CATP005	CATP006
Specimen Depth (m)		6	3	3.5	6	7	2.7	1.3	2.5	2.45
OD Level (m)										
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		TFD	TFD	TFD	TFD	TFD	TFD	TFD	TFD	TFD
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002
Aromatics >C35-44	mg/kg									
Aromatics >EC40-EC44	mg/kg									
Total Aliphatics & Aromatics >C5-C44	mg/kg									
Total Aliphatic TPH	mg/kg									
Total Aromatic hydrocarbons	mg/kg									
Total petroleum hydrocarbons	mg/kg		78		107	16		280	<10	
PAH										
Acenaphthene	mg/kg		12.9		0.3	<0.2		<0.2		
Acenaphthylene	mg/kg		<0.2		<0.2	<0.2		<0.2		
Anthracene	mg/kg		6.3		0.4	<0.2		<0.2		
Benzo(a)anthracene	mg/kg		0.7		0.4	<0.2		<0.2		
Benzo(a)pyrene	mg/kg		<0.3		0.3	<0.2		<0.2		
Benzo(b)fluoranthene	mg/kg		0.2		0.3	<0.2		<0.2		
Benzo(ghi)perylene	mg/kg		<0.6		<0.2	<0.2		<0.2		
Benzo(k)fluoranthene	mg/kg		<0.2		0.3	<0.2		<0.2		
Chrysene	mg/kg		0.8		0.4	<0.2		<0.2		
Dibenzo(ah)anthracene	mg/kg		<0.5		<0.2	<0.2		<0.2		
Fluoranthene	mg/kg		5.5		1.3	0.3		0.5		
Fluorene	mg/kg		9.9		0.5	<0.2		<0.2		
Indeno(123cd)pyrene	mg/kg		<0.4		0.2	<0.2		<0.2		
Naphthalene	mg/kg		11.8		0.4	<0.2		<0.2		
Phenanthrene	mg/kg		15.3		1.6	0.3		0.2		
Pyrene	mg/kg		3.8		0.8	<0.2		0.3		
PAH 16 Total	mg/kg		<68.3		<7.8	<0.34		<3.6		
SVOCs										
Phenols										
2-Chlorophenol	mg/kg									
2-Methylphenol	mg/kg									
2-Nitrophenol	mg/kg									
2,4-Dichlorophenol	mg/kg									
2,4-Dimethylphenol	mg/kg									
2,4,5-Trichlorophenol	mg/kg									
2,4,6-Trichlorophenol	mg/kg									
4-Chloro-3-methylphenol	mg/kg									
4-Methylphenol	mg/kg									
4-Nitrophenol	mg/kg									
Pentachlorophenol	mg/kg									
Phenol	mg/kg									
PAHs										
2-Chloronaphthalene	mg/kg									
2-Methylnaphthalene	mg/kg									
Acenaphthene	mg/kg									
Acenaphthylene	mg/kg									
Anthracene	mg/kg									
Benzo(a)anthracene	mg/kg									
Benzo(a)pyrene	mg/kg									
Benzo(b)fluoranthene	mg/kg									
Benzo(ghi)perylene	mg/kg									
Benzo(k)fluoranthene	mg/kg									
Chrysene	mg/kg									
Dibenzo(a,h)anthracene	mg/kg									
Fluoranthene	mg/kg									
Fluorene	mg/kg									
Indeno(1,2,3-cd)pyrene	mg/kg									
Naphthalene	mg/kg									
Phenanthrene	mg/kg									
Pyrene	mg/kg									
Pthalates										
Bis(2-ethylhexyl) phthalate	mg/kg									
Butylbenzyl phthalate	mg/kg									
Di-n-butyl phthalate	mg/kg									
Di-n-Octyl phthalate	mg/kg									
Diethyl phthalate	mg/kg									
Dimethyl phthalate	mg/kg									
Other Semi-Volatiles										
1,2-Dichlorobenzene	mg/kg									
1,2,4-Trichlorobenzene	mg/kg									
1,3-Dichlorobenzene	mg/kg									
1,4-Dichlorobenzene	mg/kg									
2-Nitroaniline	mg/kg									
2,4-Dinitrotoluene	mg/kg									
2,6-Dinitrotoluene	mg/kg									
3-Nitroaniline	mg/kg									
4-Bromophenylphenylether	mg/kg									
4-Chloroaniline	mg/kg									
4-Chlorophenylphenylether	mg/kg									
4-Nitroaniline	mg/kg									
Azobenzene	mg/kg									
Bis(2-chloroethoxy)methane	mg/kg									
Bis(2-chloroethyl)ether	mg/kg									
Carbazole	mg/kg									
Dibenzofuran	mg/kg									
Hexachlorobenzene	mg/kg									
Hexachlorobutadiene	mg/kg									
Hexachlorocyclopentadiene	mg/kg									

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
21/06/2016

Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CATP007	CATP010	CATP010	MRTP003	MRTP004	BH512	BHM4CAN036	BHM4CAN037	BHM4CAN038
Specimen Depth (m)		2.45	2.6	3.5	3.5	3.5	5 - 5.2	0.6	2.2	0.4
OD Level (m)							1.5	7.66	4.57	5.97
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		TFD	TFD	TFD	TFD	TFD	PEAT	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2015 GI	2016 GI	2016 GI	2016 GI
Aromatics >C35-44	mg/kg							5.19	4.22	18.6
Aromatics >EC40-EC44	mg/kg							2.3	2.6	7.83
Total Aliphatics & Aromatics >C5-C44	mg/kg							51.4	70.7	277
Total Aliphatic TPH	mg/kg							38	54.8	215
Total Aromatic hydrocarbons	mg/kg							13.3	15.8	61.9
Total petroleum hydrocarbons	mg/kg	31								
PAH										
Acenaphthene	mg/kg			<0.2	<0.2		0.12	<0.008	<0.008	0.0238
Acenaphthylene	mg/kg			<0.2	<0.2		0.15	<0.012	<0.012	<0.012
Anthracene	mg/kg			<0.2	<0.2		0.44	<0.016	0.0201	0.0511
Benzo(a)anthracene	mg/kg			<0.2	<0.2		<0.1	<0.014	0.137	0.488
Benzo(a)pyrene	mg/kg			<0.2	<0.2		<0.1	0.0157	0.148	0.606
Benzo(b)fluoranthene	mg/kg			<0.2	<0.2		<0.1	0.0387	0.237	1.01
Benzo(ghi)perylene	mg/kg			<0.2	<0.2		<0.1	<0.024	0.122	0.534
Benzo(k)fluoranthene	mg/kg			<0.2	<0.2		<0.1	0.014	0.0773	0.344
Chrysene	mg/kg			<0.2	<0.2		<0.1	0.0284	0.146	0.558
Dibenzo(ah)anthracene	mg/kg			<0.2	<0.2		<0.1	<0.023	0.0271	0.121
Fluoranthene	mg/kg			<0.2	<0.2		1.3	0.054	0.262	0.592
Fluorene	mg/kg			<0.2	<0.2		0.25	<0.01	<0.01	0.012
Indeno(123cd)pyrene	mg/kg			<0.2	<0.2		<0.1	<0.018	0.0967	0.426
Naphthalene	mg/kg		1.045	<0.2	<0.2		1.4	0.0204	0.0127	0.0456
Phenanthrene	mg/kg			<0.2	<0.2		0.7	0.051	0.202	0.286
Pyrene	mg/kg			<0.2	<0.2		0.23	0.0453	0.203	0.66
PAH 16 Total	mg/kg			<3.2	<3.2		4.6	0.253	1.69	5.76
SVOCs										
Phenols										
2-Chlorophenol	mg/kg									
2-Methylphenol	mg/kg									
2-Nitrophenol	mg/kg									
2,4-Dichlorophenol	mg/kg									
2,4-Dimethylphenol	mg/kg									
2,4,5-Trichlorophenol	mg/kg									
2,4,6-Trichlorophenol	mg/kg									
4-Chloro-3-methylphenol	mg/kg									
4-Methylphenol	mg/kg									
4-Nitrophenol	mg/kg									
Pentachlorophenol	mg/kg									
Phenol	mg/kg									
PAHs										
2-Chloronaphthalene	mg/kg									
2-Methylnaphthalene	mg/kg									
Acenaphthene	mg/kg									
Acenaphthylene	mg/kg									
Anthracene	mg/kg									
Benzo(a)anthracene	mg/kg									
Benzo(a)pyrene	mg/kg									
Benzo(b)fluoranthene	mg/kg									
Benzo(ghi)perylene	mg/kg									
Benzo(k)fluoranthene	mg/kg									
Chrysene	mg/kg									
Dibenzo(a,h)anthracene	mg/kg									
Fluoranthene	mg/kg									
Fluorene	mg/kg									
Indeno(1,2,3-cd)pyrene	mg/kg									
Naphthalene	mg/kg									
Phenanthrene	mg/kg									
Pyrene	mg/kg									
Pthalates										
Bis(2-ethylhexyl) phthalate	mg/kg									
Butylbenzyl phthalate	mg/kg									
Di-n-butyl phthalate	mg/kg									
Di-n-Octyl phthalate	mg/kg									
Diethyl phthalate	mg/kg									
Dimethyl phthalate	mg/kg									
Other Semi-Volatiles										
1,2-Dichlorobenzene	mg/kg		<0.005							
1,2,4-Trichlorobenzene	mg/kg		<0.025							
1,3-Dichlorobenzene	mg/kg		<0.05							
1,4-Dichlorobenzene	mg/kg		<0.05							
2-Nitroaniline	mg/kg									
2,4-Dinitrotoluene	mg/kg									
2,6-Dinitrotoluene	mg/kg									
3-Nitroaniline	mg/kg									
4-Bromophenylphenylether	mg/kg									
4-Chloroaniline	mg/kg									
4-Chlorophenylphenylether	mg/kg									
4-Nitroaniline	mg/kg									
Azobenzene	mg/kg									
Bis(2-chloroethoxy)methane	mg/kg									
Bis(2-chloroethyl)ether	mg/kg									
Carbazole	mg/kg									
Dibenzofuran	mg/kg									
Hexachlorobenzene	mg/kg									
Hexachlorobutadiene	mg/kg		<0.025							
Hexachlorocyclopentadiene	mg/kg									

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
21/06/2016

Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	BHM4CAN039	BHM4CAN039	TPM4CAN016	TPM4CAN017	TPM4CAN018	WSM4CAN023	WSM4CAN024
Specimen Depth (m)		0.5	1.2	2	0.5	0.2	1.5	0.5
OD Level (m)		6.69	5.99	4.89	6.22	6.52	5.2	6.41
Sample Type		ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG
Cluster Code		2016 GI	2016 GI	2016 GI	2016 GI	2016 GI	2016 GI	2016 GI
Aromatics >C35-44	mg/kg		59.6	19.9	54.4	0.688	17.6	13.1
Aromatics >EC40-EC44	mg/kg		26.1	7.34	16.6	<0.1	7.7	5.51
Total Aliphatics & Aromatics >C5-C44	mg/kg		715	238	1140	54.1	182	241
Total Aliphatic TPH	mg/kg		464	156	876	47.4	131	187
Total Aromatic hydrocarbons	mg/kg		249	81.8	259	6.59	50.6	54.2
Total petroleum hydrocarbons	mg/kg							
PAH								
Acenaphthene	mg/kg		0.104	0.0579	0.118	<0.008	0.054	<0.008
Acenaphthylene	mg/kg		<0.012	<0.012	0.0237	<0.012	<0.012	<0.012
Anthracene	mg/kg		0.159	0.0724	0.146	<0.016	0.054	<0.016
Benzo(a)anthracene	mg/kg		1.43	0.764	1.09	<0.014	0.829	0.108
Benzo(a)pyrene	mg/kg		1.69	1.07	1.08	<0.015	1.38	0.0863
Benzo(b)fluoranthene	mg/kg		2.6	1.49	2.47	<0.015	2.05	0.179
Benzo(ghi)perylene	mg/kg		1.71	0.818	1.27	<0.024	1.12	0.111
Benzo(k)fluoranthene	mg/kg		0.907	0.506	0.879	<0.014	0.698	0.0493
Chrysene	mg/kg		1.5	0.908	1.62	<0.01	1.13	0.128
Dibenzo(ah)anthracene	mg/kg		0.274	0.146	0.264	<0.023	0.252	<0.023
Fluoranthene	mg/kg		2.55	1.2	3.68	<0.017	0.947	0.196
Fluorene	mg/kg		0.0299	0.0285	0.0458	<0.01	0.0192	<0.01
Indeno(123cd)pyrene	mg/kg		1.19	0.668	1.03	<0.018	0.923	0.0762
Naphthalene	mg/kg		0.0419	0.0742	0.19	0.099	0.0347	0.0348
Phenanthrene	mg/kg		1.05	0.614	3.2	0.0247	0.343	0.207
Pyrene	mg/kg		2.43	1.14	2.67	<0.015	1.23	0.221
PAH 16 Total	mg/kg		17.7	9.56	19.8	0.124	11.1	1.4
SVOCs								
Phenols								
2-Chlorophenol	mg/kg			<0.1			<0.1	<0.1
2-Methylphenol	mg/kg			<0.1			<0.1	<0.1
2-Nitrophenol	mg/kg			<0.1			<0.1	<0.1
2,4-Dichlorophenol	mg/kg			<0.1			<0.1	<0.1
2,4-Dimethylphenol	mg/kg			<0.1			<0.1	<0.1
2,4,5-Trichlorophenol	mg/kg			<0.1			<0.1	<0.1
2,4,6-Trichlorophenol	mg/kg			<0.1			<0.1	<0.1
4-Chloro-3-methylphenol	mg/kg			<0.1			<0.1	<0.1
4-Methylphenol	mg/kg			<0.1			<0.1	<0.1
4-Nitrophenol	mg/kg			<0.1			<0.1	<0.1
Pentachlorophenol	mg/kg			<0.1			<0.1	<0.1
Phenol	mg/kg			<0.1			<0.1	<0.1
PAHs								
2-Chloronaphthalene	mg/kg			<0.1			<0.1	<0.1
2-Methylnaphthalene	mg/kg			<0.1			<0.1	<0.1
Acenaphthene	mg/kg			<0.1			<0.1	<0.1
Acenaphthylene	mg/kg			<0.1			<0.1	<0.1
Anthracene	mg/kg			0.119			<0.1	<0.1
Benzo(a)anthracene	mg/kg			0.894			0.495	<0.1
Benzo(a)pyrene	mg/kg			1.29			0.789	<0.1
Benzo(b)fluoranthene	mg/kg			0.971			0.739	<0.1
Benzo(ghi)perylene	mg/kg			0.914			0.688	<0.1
Benzo(k)fluoranthene	mg/kg			1.03			0.409	<0.1
Chrysene	mg/kg			1.13			0.626	<0.1
Dibenzo(a,h)anthracene	mg/kg			0.152			<0.1	<0.1
Fluoranthene	mg/kg			<0.1			<0.1	<0.1
Fluorene	mg/kg			<0.1			<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg			0.99			0.727	<0.1
Naphthalene	mg/kg			<0.1			<0.1	<0.1
Phenanthrene	mg/kg			0.738			0.209	0.112
Pyrene	mg/kg			1.38			0.805	0.117
Pthalates								
Bis(2-ethylhexyl) phthalate	mg/kg			<0.1			<0.1	<0.1
Butylbenzyl phthalate	mg/kg			<0.1			<0.1	<0.1
Di-n-butyl phthalate	mg/kg			<0.1			<0.1	<0.1
Di-n-Octyl phthalate	mg/kg			<0.1			<0.1	<0.1
Diethyl phthalate	mg/kg			<0.1			<0.1	<0.1
Dimethyl phthalate	mg/kg			<0.1			<0.1	<0.1
Other Semi-Volatiles								
1,2-Dichlorobenzene	mg/kg			<0.1			<0.1	<0.1
1,2,4-Trichlorobenzene	mg/kg			<0.1			<0.1	<0.1
1,3-Dichlorobenzene	mg/kg			<0.1			<0.1	<0.1
1,4-Dichlorobenzene	mg/kg			<0.1			<0.1	<0.1
2-Nitroaniline	mg/kg			<0.1			<0.1	<0.1
2,4-Dinitrotoluene	mg/kg			<0.1			<0.1	<0.1
2,6-Dinitrotoluene	mg/kg			<0.1			<0.1	<0.1
3-Nitroaniline	mg/kg			<0.1			<0.1	<0.1
4-Bromophenylphenylether	mg/kg			<0.1			<0.1	<0.1
4-Chloroaniline	mg/kg			<0.1			<0.1	<0.1
4-Chlorophenylphenylether	mg/kg			<0.1			<0.1	<0.1
4-Nitroaniline	mg/kg			<0.1			<0.1	<0.1
Azobenzene	mg/kg			<0.1			<0.1	<0.1
Bis(2-chloroethoxy)methane	mg/kg			<0.1			<0.1	<0.1
Bis(2-chloroethyl)ether	mg/kg			<0.1			<0.1	<0.1
Carbazole	mg/kg			<0.1			<0.1	<0.1
Dibenzofuran	mg/kg			<0.1			<0.1	<0.1
Hexachlorobenzene	mg/kg			<0.1			<0.1	<0.1
Hexachlorobutadiene	mg/kg			<0.1			<0.1	<0.1
Hexachlorocyclopentadiene	mg/kg			<0.1			<0.1	<0.1

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
21/06/2016

Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CABH002	CABH003	CABH003	CATP001	CATP001	CATP002	CATP002	CATP005	CATP006
Specimen Depth (m)		1	0.5	2.8	0.5	2.5	0.75	1.2	0.5	0.75
OD Level (m)										
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002
Hexachloroethane	mg/kg									
Isophorone	mg/kg									
N-nitrosodi-n-propylamine	mg/kg									
Nitrobenzene	mg/kg									
VOCs										
Methyl Tertiary Butyl Ether	ug/kg									
Benzene	ug/kg									
Toluene	ug/kg									
Ethylbenzene	ug/kg									
p/m-Xylene	ug/kg									
o-Xylene	ug/kg									
Naphthalene	ug/kg									
Hexachlorobutadiene	ug/kg									
1.1.1.2-Tetrachloroethane	ug/kg					<5				
1.1.1-Trichloroethane	ug/kg					<5				
1.1.2.2-Tetrachloroethane	ug/kg					<5				
1.1.2-Trichloroethane	ug/kg					<5				
1.1-Dichloropropene	ug/kg					<5				
1.1-Dichloroethane	ug/kg					<5				
1.1-Dichloroethene	ug/kg					<5				
1.2.3-Trichlorobenzene	ug/kg					<25				
1.2.3-Trichloropropane	ug/kg					<5				
1.2.4-Trichlorobenzene	ug/kg									
1.2.4-Trimethylbenzene	ug/kg					71				
1.2-Dibromo-3-chloropropane	ug/kg					<25				
1,2-Dichlorobenzene	mg/kg									
1,3-Dichlorobenzene	mg/kg									
1,4-Dichlorobenzene	mg/kg									
1.2-Dichloroethane	ug/kg					<5				
cis-1-2-Dichloroethene	ug/kg					<5				
1.2-Dibromoethane	ug/kg					<5				
1.2-Dichloropropane	ug/kg					<5				
1.3.5-Trimethylbenzene	ug/kg					19				
cis-1-3-Dichloropropene	ug/kg					<5				
1.3-Dichloropropane	ug/kg					<5				
2.2-Dichloropropane	ug/kg					<5				
2-Chlorotoluene	ug/kg					<5				
4-Chlorotoluene	ug/kg					<5				
p-Isopropyltoluene	ug/kg					12				
4-isopropyltoluene	ug/kg									
Bromobenzene	ug/kg					<5				
Bromochloromethane	ug/kg					<5				
Bromomethane	ug/kg					<5				
Bromoform	ug/kg					<5				
Bromodichloromethane	ug/kg					<5				
Chlorobenzene	ug/kg					<5				
Carbon Disulphide	ug/kg									
Chloroethane	ug/kg					<5				
Chloroform	ug/kg					<5				
Chloromethane	ug/kg					<5				
Carbontetrachloride	ug/kg					<5				
Dibromomethane	ug/kg					<5				
Dichlorodifluoromethane	ug/kg					<5				
Dibromochloromethane	ug/kg					<5				
Dichloromethane	ug/kg									
Isopropylbenzene	ug/kg					<5				
n-Butylbenzene	ug/kg					<5				
Propylbenzene	ug/kg					<5				
sec-Butylbenzene	ug/kg					7				
Styrene	ug/kg					<5				
trans-1-2-Dichloroethene	ug/kg					<5				
trans-1-3-Dichloropropene	ug/kg					<5				
Trichlorofluoromethane	ug/kg					<5				
tert-Butylbenzene	ug/kg					<5				
Tetrachloroethene	ug/kg					<5				
Trichloroethene	ug/kg					<5				
Vinyl Chloride	ug/kg					<5				

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
21/06/2016

Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	**Units**	**CATP006**	**CATP007**	**CATP007**	**CATP008**	**CATP009**	**CATP009**	**CATP010**	**CATP010**	**MRTP001**
Specimen Depth (m)		2	0.75	2	1	1	2.1	0.5	2.4	0.5
OD Level (m)										
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002
Hexachloroethane	mg/kg									
Isophorone	mg/kg									
N-nitrosodi-n-propylamine	mg/kg									
Nitrobenzene	mg/kg									
VOCs										
Methyl Tertiary Butyl Ether	ug/kg									
Benzene	ug/kg									
Toluene	ug/kg									
Ethylbenzene	ug/kg									
p/m-Xylene	ug/kg									
o-Xylene	ug/kg									
Naphthalene	ug/kg									
Hexachlorobutadiene	ug/kg									
1.1.1.2-Tetrachloroethane	ug/kg				<50					
1.1.1-Trichloroethane	ug/kg				<50					
1.1.2.2-Tetrachloroethane	ug/kg				<50					
1.1.2-Trichloroethane	ug/kg				<50					
1.1-Dichloropropene	ug/kg				<50					
1.1-Dichloroethane	ug/kg				<50					
1.1-Dichloroethene	ug/kg				<50					
1.2.3-Trichlorobenzene	ug/kg				<250					
1.2.3-Trichloropropane	ug/kg				<50					
1.2.4-Trichlorobenzene	ug/kg									
1.2.4-Trimethylbenzene	ug/kg				5139					
1.2-Dibromo-3-chloropropane	ug/kg				<250					
1,2-Dichlorobenzene	mg/kg									
1,3-Dichlorobenzene	mg/kg									
1,4-Dichlorobenzene	mg/kg									
1.2-Dichloroethane	ug/kg				<50					
cis-1-2-Dichloroethene	ug/kg				<50					
1.2-Dibromoethane	ug/kg				<50					
1.2-Dichloropropane	ug/kg				<50					
1.3.5-Trimethylbenzene	ug/kg				1928					
cis-1-3-Dichloropropene	ug/kg				<50					
1.3-Dichloropropane	ug/kg				<50					
2.2-Dichloropropane	ug/kg				<50					
2-Chlorotoluene	ug/kg				<50					
4-Chlorotoluene	ug/kg				<50					
p-Isopropyltoluene	ug/kg				812					
4-isopropyltoluene	ug/kg									
Bromobenzene	ug/kg				<50					
Bromochloromethane	ug/kg				<50					
Bromomethane	ug/kg				<50					
Bromoform	ug/kg				<50					
Bromodichloromethane	ug/kg				<50					
Chlorobenzene	ug/kg				<50					
Carbon Disulphide	ug/kg									
Chloroethane	ug/kg				<50					
Chloroform	ug/kg				<50					
Chloromethane	ug/kg				<50					
Carbontetrachloride	ug/kg				<50					
Dibromomethane	ug/kg				<50					
Dichlorodifluoromethane	ug/kg				<50					
Dibromochloromethane	ug/kg				<50					
Dichloromethane	ug/kg									
Isopropylbenzene	ug/kg				573					
n-Butylbenzene	ug/kg				<50					
Propylbenzene	ug/kg				1317					
sec-Butylbenzene	ug/kg				959					
Styrene	ug/kg				<50					
trans-1-2-Dichloroethene	ug/kg				<50					
trans-1-3-Dichloropropene	ug/kg				<50					
Trichlorofluoromethane	ug/kg				<50					
tert-Butylbenzene	ug/kg				<50					
Tetrachloroethene	ug/kg				<50					
Trichloroethene	ug/kg				265					
Vinyl Chloride	ug/kg				<50					

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
21/06/2016

Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	**Units**	**MRTP001**	**MRTP002**	**MRTP002**	**MRTP003**	**MRTP003**	**MRTP004**	**MRTP004**	**MRTP005**	**BH511**	**BH511**
Specimen Depth (m)		3.8	0.5	3.8	0.5	2	0.5	2.3	0.4	0 - 0.5	1 - 1.5
OD Level (m)										7	6
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2015 GI	2015 GI
Hexachloroethane	mg/kg										
Isophorone	mg/kg										
N-nitrosodi-n-propylamine	mg/kg										
Nitrobenzene	mg/kg										
VOCs											
Methyl Tertiary Butyl Ether	ug/kg										
Benzene	ug/kg										
Toluene	ug/kg										
Ethylbenzene	ug/kg										
p/m-Xylene	ug/kg										
o-Xylene	ug/kg										
Naphthalene	ug/kg										
Hexachlorobutadiene	ug/kg										
1.1.1.2-Tetrachloroethane	ug/kg										
1.1.1-Trichloroethane	ug/kg										
1.1.2.2-Tetrachloroethane	ug/kg										
1.1.2-Trichloroethane	ug/kg										
1.1-Dichloropropene	ug/kg										
1.1-Dichloroethane	ug/kg										
1.1-Dichloroethene	ug/kg										
1.2.3-Trichlorobenzene	ug/kg										
1.2.3-Trichloropropane	ug/kg										
1.2.4-Trichlorobenzene	ug/kg										
1.2.4-Trimethylbenzene	ug/kg										
1.2-Dibromo-3-chloropropane	ug/kg										
1,2-Dichlorobenzene	mg/kg										
1,3-Dichlorobenzene	mg/kg										
1,4-Dichlorobenzene	mg/kg										
1.2-Dichloroethane	ug/kg										
cis-1-2-Dichloroethene	ug/kg										
1.2-Dibromoethane	ug/kg										
1.2-Dichloropropane	ug/kg										
1.3.5-Trimethylbenzene	ug/kg										
cis-1-3-Dichloropropene	ug/kg										
1.3-Dichloropropane	ug/kg										
2.2-Dichloropropane	ug/kg										
2-Chlorotoluene	ug/kg										
4-Chlorotoluene	ug/kg										
p-Isopropyltoluene	ug/kg										
4-isopropyltoluene	ug/kg										
Bromobenzene	ug/kg										
Bromochloromethane	ug/kg										
Bromomethane	ug/kg										
Bromoform	ug/kg										
Bromodichloromethane	ug/kg										
Chlorobenzene	ug/kg										
Carbon Disulphide	ug/kg										
Chloroethane	ug/kg										
Chloroform	ug/kg										
Chloromethane	ug/kg										
Carbontetrachloride	ug/kg										
Dibromomethane	ug/kg										
Dichlorodifluoromethane	ug/kg										
Dibromochloromethane	ug/kg										
Dichloromethane	ug/kg										
Isopropylbenzene	ug/kg										
n-Butylbenzene	ug/kg										
Propylbenzene	ug/kg										
sec-Butylbenzene	ug/kg										
Styrene	ug/kg										
trans-1-2-Dichloroethene	ug/kg										
trans-1-3-Dichloropropene	ug/kg										
Trichlorofluoromethane	ug/kg										
tert-Butylbenzene	ug/kg										
Tetrachloroethene	ug/kg										
Trichloroethene	ug/kg										
Vinyl Chloride	ug/kg										

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	BH511	BH512	BH512	BH512	BH512		CATP003	CATP004	CATP004	CATP004		CABH001
Specimen Depth (m)		2 - 2.5	0.3 - 0.5	1 - 1.5	2 - 2.5	3.5 - 3.7		1.1	0.5	1.6	2.4		3
OD Level (m)		5	6.2	5.5	4.5	3							
Sample Type		ES	ES	ES	ES	ES		ES	ES	ES	ES		ES
Geology Code		MG	MG	MG	MG	MG		No Log	No Log	No Log	No Log		TFD
Cluster Code		2015 GI	2015 GI	2015 GI	2015 GI	2015 GI		2002	2002	2002	2002		2002
Hexachloroethane	mg/kg												
Isophorone	mg/kg												
N-nitrosodi-n-propylamine	mg/kg												
Nitrobenzene	mg/kg												
VOCs													
Methyl Tertiary Butyl Ether	ug/kg												
Benzene	ug/kg												
Toluene	ug/kg												
Ethylbenzene	ug/kg												
p/m-Xylene	ug/kg												
o-Xylene	ug/kg												
Naphthalene	ug/kg												
Hexachlorobutadiene	ug/kg												
1.1.1.2-Tetrachloroethane	ug/kg												
1.1.1-Trichloroethane	ug/kg												
1.1.2.2-Tetrachloroethane	ug/kg												
1.1.2-Trichloroethane	ug/kg												
1.1-Dichloropropene	ug/kg												
1.1-Dichloroethane	ug/kg												
1.1-Dichloroethene	ug/kg												
1.2.3-Trichlorobenzene	ug/kg												
1.2.3-Trichloropropane	ug/kg												
1.2.4-Trichlorobenzene	ug/kg												
1.2.4-Trimethylbenzene	ug/kg												
1.2-Dibromo-3-chloropropane	ug/kg												
1,2-Dichlorobenzene	mg/kg												
1,3-Dichlorobenzene	mg/kg												
1,4-Dichlorobenzene	mg/kg												
1.2-Dichloroethane	ug/kg												
cis-1-2-Dichloroethene	ug/kg												
1.2-Dibromoethane	ug/kg												
1.2-Dichloropropane	ug/kg												
1.3.5-Trimethylbenzene	ug/kg												
cis-1-3-Dichloropropene	ug/kg												
1.3-Dichloropropane	ug/kg												
2.2-Dichloropropane	ug/kg												
2-Chlorotoluene	ug/kg												
4-Chlorotoluene	ug/kg												
p-Isopropyltoluene	ug/kg												
4-isopropyltoluene	ug/kg												
Bromobenzene	ug/kg												
Bromochloromethane	ug/kg												
Bromomethane	ug/kg												
Bromoform	ug/kg												
Bromodichloromethane	ug/kg												
Chlorobenzene	ug/kg												
Carbon Disulphide	ug/kg												
Chloroethane	ug/kg												
Chloroform	ug/kg												
Chloromethane	ug/kg												
Carbontetrachloride	ug/kg												
Dibromomethane	ug/kg												
Dichlorodifluoromethane	ug/kg												
Dibromochloromethane	ug/kg												
Dichloromethane	ug/kg												
Isopropylbenzene	ug/kg												
n-Butylbenzene	ug/kg												
Propylbenzene	ug/kg												
sec-Butylbenzene	ug/kg												
Styrene	ug/kg												
trans-1-2-Dichloroethene	ug/kg												
trans-1-3-Dichloropropene	ug/kg												
Trichlorofluoromethane	ug/kg												
tert-Butylbenzene	ug/kg												
Tetrachloroethene	ug/kg												
Trichloroethene	ug/kg												
Vinyl Chloride	ug/kg												

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
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Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CABH001	CABH002	CABH003	CABH003	CABH003	CATP001	CATP005	CATP005	CATP006
Specimen Depth (m)		6	3	3.5	6	7	2.7	1.3	2.5	2.45
OD Level (m)										
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		TFD	TFD	TFD	TFD	TFD	TFD	TFD	TFD	TFD
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002
Hexachloroethane	mg/kg									
Isophorone	mg/kg									
N-nitrosodi-n-propylamine	mg/kg									
Nitrobenzene	mg/kg									
VOCs										
Methyl Tertiary Butyl Ether	ug/kg									
Benzene	ug/kg									
Toluene	ug/kg									
Ethylbenzene	ug/kg									
p/m-Xylene	ug/kg									
o-Xylene	ug/kg									
Naphthalene	ug/kg									
Hexachlorobutadiene	ug/kg									
1.1.1.2-Tetrachloroethane	ug/kg									
1.1.1-Trichloroethane	ug/kg									
1.1.2.2-Tetrachloroethane	ug/kg									
1.1.2-Trichloroethane	ug/kg									
1.1-Dichloropropene	ug/kg									
1.1-Dichloroethane	ug/kg									
1.1-Dichloroethene	ug/kg									
1.2.3-Trichlorobenzene	ug/kg									
1.2.3-Trichloropropane	ug/kg									
1.2.4-Trichlorobenzene	ug/kg									
1.2.4-Trimethylbenzene	ug/kg									
1.2-Dibromo-3-chloropropane	ug/kg									
1,2-Dichlorobenzene	mg/kg									
1,3-Dichlorobenzene	mg/kg									
1,4-Dichlorobenzene	mg/kg									
1.2-Dichloroethane	ug/kg									
cis-1-2-Dichloroethene	ug/kg									
1.2-Dibromoethane	ug/kg									
1.2-Dichloropropane	ug/kg									
1.3.5-Trimethylbenzene	ug/kg									
cis-1-3-Dichloropropene	ug/kg									
1.3-Dichloropropane	ug/kg									
2.2-Dichloropropane	ug/kg									
2-Chlorotoluene	ug/kg									
4-Chlorotoluene	ug/kg									
p-Isopropyltoluene	ug/kg									
4-isopropyltoluene	ug/kg									
Bromobenzene	ug/kg									
Bromochloromethane	ug/kg									
Bromomethane	ug/kg									
Bromoform	ug/kg									
Bromodichloromethane	ug/kg									
Chlorobenzene	ug/kg									
Carbon Disulphide	ug/kg									
Chloroethane	ug/kg									
Chloroform	ug/kg									
Chloromethane	ug/kg									
Carbontetrachloride	ug/kg									
Dibromomethane	ug/kg									
Dichlorodifluoromethane	ug/kg									
Dibromochloromethane	ug/kg									
Dichloromethane	ug/kg									
Isopropylbenzene	ug/kg									
n-Butylbenzene	ug/kg									
Propylbenzene	ug/kg									
sec-Butylbenzene	ug/kg									
Styrene	ug/kg									
trans-1-2-Dichloroethene	ug/kg									
trans-1-3-Dichloropropene	ug/kg									
Trichlorofluoromethane	ug/kg									
tert-Butylbenzene	ug/kg									
Tetrachloroethene	ug/kg									
Trichloroethene	ug/kg									
Vinyl Chloride	ug/kg									

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
21/06/2016

Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	CATP007	CATP010	CATP010	MRTP003	MRTP004	BH512	BHM4CAN036	BHM4CAN037	BHM4CAN038
Specimen Depth (m)		2.45	2.6	3.5	3.5	3.5	5 - 5.2	0.6	2.2	0.4
OD Level (m)							1.5	7.66	4.57	5.97
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		TFD	TFD	TFD	TFD	TFD	PEAT	MG	MG	MG
Cluster Code		2002	2002	2002	2002	2002	2015 GI	2016 GI	2016 GI	2016 GI
Hexachloroethane	mg/kg									
Isophorone	mg/kg									
N-nitrosodi-n-propylamine	mg/kg									
Nitrobenzene	mg/kg									
VOCs										
Methyl Tertiary Butyl Ether	ug/kg									
Benzene	ug/kg									
Toluene	ug/kg									
Ethylbenzene	ug/kg									
p/m-Xylene	ug/kg									
o-Xylene	ug/kg									
Naphthalene	ug/kg									
Hexachlorobutadiene	ug/kg									
1.1.1.2-Tetrachloroethane	ug/kg		<5							
1.1.1-Trichloroethane	ug/kg		<5							
1.1.2.2-Tetrachloroethane	ug/kg		<5							
1.1.2-Trichloroethane	ug/kg		<5							
1.1-Dichloropropene	ug/kg		<5							
1.1-Dichloroethane	ug/kg		<5							
1.1-Dichloroethene	ug/kg		<5							
1.2.3-Trichlorobenzene	ug/kg		<25							
1.2.3-Trichloropropane	ug/kg		<5							
1.2.4-Trichlorobenzene	ug/kg									
1.2.4-Trimethylbenzene	ug/kg		103							
1.2-Dibromo-3-chloropropane	ug/kg		<25							
1,2-Dichlorobenzene	mg/kg									
1,3-Dichlorobenzene	mg/kg									
1,4-Dichlorobenzene	mg/kg									
1.2-Dichloroethane	ug/kg		<5							
cis-1-2-Dichloroethene	ug/kg		<5							
1.2-Dibromoethane	ug/kg		<5							
1.2-Dichloropropane	ug/kg		<5							
1.3.5-Trimethylbenzene	ug/kg		34							
cis-1-3-Dichloropropene	ug/kg		<5							
1.3-Dichloropropane	ug/kg		<5							
2.2-Dichloropropane	ug/kg		<5							
2-Chlorotoluene	ug/kg		<5							
4-Chlorotoluene	ug/kg		<5							
p-Isopropyltoluene	ug/kg		16							
4-isopropyltoluene	ug/kg									
Bromobenzene	ug/kg		<5							
Bromochloromethane	ug/kg		<5							
Bromomethane	ug/kg		<5							
Bromoform	ug/kg		<5							
Bromodichloromethane	ug/kg		<5							
Chlorobenzene	ug/kg		<5							
Carbon Disulphide	ug/kg									
Chloroethane	ug/kg		<5							
Chloroform	ug/kg		<5							
Chloromethane	ug/kg		<5							
Carbontetrachloride	ug/kg		<5							
Dibromomethane	ug/kg		<5							
Dichlorodifluoromethane	ug/kg		<5							
Dibromochloromethane	ug/kg		<5							
Dichloromethane	ug/kg									
Isopropylbenzene	ug/kg		6							
n-Butylbenzene	ug/kg		<5							
Propylbenzene	ug/kg		11							
sec-Butylbenzene	ug/kg		10							
Styrene	ug/kg		<5							
trans-1-2-Dichloroethene	ug/kg		<5							
trans-1-3-Dichloropropene	ug/kg		<5							
Trichlorofluoromethane	ug/kg		<5							
tert-Butylbenzene	ug/kg		<5							
Tetrachloroethene	ug/kg		<5							
Trichloroethene	ug/kg		9							
Vinyl Chloride	ug/kg		<5							

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Metal Recovery
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Geological Formation Legend

Made Ground	MG
Peat	PEAT
Tidal Flat Deposits	TFD

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening crit	X
Asbestos Detected	

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	BHM4CAN039	BHM4CAN039	TPM4CAN016	TPM4CAN017	TPM4CAN018	WSM4CAN023	WSM4CAN024
Specimen Depth (m)		0.5	1.2	2	0.5	0.2	1.5	0.5
OD Level (m)		6.69	5.99	4.89	6.22	6.52	5.2	6.41
Sample Type		ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG
Cluster Code		2016 GI	2016 GI	2016 GI	2016 GI	2016 GI	2016 GI	2016 GI
Hexachloroethane	mg/kg			<0.1			<0.1	<0.1
Isophorone	mg/kg			<0.1			<0.1	<0.1
N-nitrosodi-n-propylamine	mg/kg			<0.1			<0.1	<0.1
Nitrobenzene	mg/kg			<0.1			<0.1	<0.1
VOCs								
Methyl Tertiary Butyl Ether	ug/kg			<100			<100	<100
Benzene	ug/kg			<90			<90	<90
Toluene	ug/kg			<70			<70	<70
Ethylbenzene	ug/kg			<40			<40	<40
p/m-Xylene	ug/kg			<100			<100	<100
o-Xylene	ug/kg			<100			<100	<100
Naphthalene	ug/kg			<130			<130	<130
Hexachlorobutadiene	ug/kg			<200			<200	<200
1.1.1.2-Tetrachloroethane	ug/kg			<100			<100	<100
1.1.1-Trichloroethane	ug/kg			<70			<70	<70
1.1.2.2-Tetrachloroethane	ug/kg			<100			<100	<100
1.1.2-Trichloroethane	ug/kg			<100			<100	<100
1.1-Dichloropropene	ug/kg			<100			<100	<100
1.1-Dichloroethane	ug/kg			<80			<80	<80
1.1-Dichloroethene	ug/kg			<100			<100	<100
1.2.3-Trichlorobenzene	ug/kg			<200			<200	<200
1.2.3-Trichloropropane	ug/kg			<160			<160	<160
1.2.4-Trichlorobenzene	ug/kg			<200			<200	<200
1.2.4-Trimethylbenzene	ug/kg			<90			<90	<90
1.2-Dibromo-3-chloropropane	ug/kg			<140			<140	<140
1,2-Dichlorobenzene	mg/kg			<100			<100	<100
1,3-Dichlorobenzene	mg/kg			<80			<80	<80
1,4-Dichlorobenzene	mg/kg			<50			<50	<50
1.2-Dichloroethane	ug/kg			<50			<50	<50
cis-1-2-Dichloroethene	ug/kg			<60			<60	<60
1.2-Dibromoethane	ug/kg			<100			<100	<100
1.2-Dichloropropane	ug/kg			<100			<100	<100
1.3.5-Trimethylbenzene	ug/kg			<80			<80	<80
cis-1-3-Dichloropropene	ug/kg			<100			<100	<100
1.3-Dichloropropane	ug/kg			<70			<70	<70
2.2-Dichloropropane	ug/kg			<100			<100	<100
2-Chlorotoluene	ug/kg			<100			<100	<100
4-Chlorotoluene	ug/kg			<100			<100	<100
p-Isopropyltoluene	ug/kg							
4-isopropyltoluene	ug/kg			<100			<100	<100
Bromobenzene	ug/kg			<100			<100	<100
Bromochloromethane	ug/kg			<100			<100	<100
Bromomethane	ug/kg			<100			<100	<100
Bromoform	ug/kg			<100			<100	<100
Bromodichloromethane	ug/kg			<70			<70	<70
Chlorobenzene	ug/kg			<50			<50	<50
Carbon Disulphide	ug/kg			<70			<70	<70
Chloroethane	ug/kg			<100			<100	<100
Chloroform	ug/kg			<80			<80	<80
Chloromethane	ug/kg			<70			<70	<70
Carbontetrachloride	ug/kg			<100			<100	<100
Dibromomethane	ug/kg			<90			<90	<90
Dichlorodifluoromethane	ug/kg			<60			<60	<60
Dibromochloromethane	ug/kg			<100			<100	<100
Dichloromethane	ug/kg			<100			<100	<100
Isopropylbenzene	ug/kg			<50			<50	<50
n-Butylbenzene	ug/kg			<110			<110	<110
Propylbenzene	ug/kg			<100			<100	<100
sec-Butylbenzene	ug/kg			<100			<100	<100
Styrene	ug/kg			<100			<100	<100
trans-1-2-Dichloroethene	ug/kg			<100			<100	<100
trans-1-3-Dichloropropene	ug/kg			<100			<100	<100
Trichlorofluoromethane	ug/kg			<60			<60	<60
tert-Butylbenzene	ug/kg			<140			<140	<140
Tetrachloroethene	ug/kg			<50			<50	<50
Trichloroethene	ug/kg			<90			<90	<90
Vinyl Chloride	ug/kg			<60			<60	<60

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Notes

NFD = No Fibres Detected
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Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Metals								
Antimony	mg/kg	18	11	24	1.9	SBHJ01CP@1mbGL		
Arsenic	mg/kg	41	23	71	3	RBBH006@3.5mbGL	170	0
Barium	mg/kg	19	19	560	11	SWSJ01@0.3mbGL		
Boron Water Soluble	mg/kg	41	26	160	0.88	SWSJ03@3mbGL		
Cadmium	mg/kg	42	13	1.3	0.3	SBHJ01CP@1mbGL	190	0
Chromium	mg/kg	42	42	761	4.7	BHM4CAN033@0.5mbGL	33	32
Chromium hexavalent	mg/kg	1	1	1.61	1.61	BHM4CAN033@0.5mbGL		
Copper	mg/kg	42	37	26	3	SWSJ05@2mbGL	44000	0
Lead	mg/kg	42	41	170	2	SBHJ01CP@1mbGL	1300	0
Mercury	mg/kg	41	2	0.83	0.7	BH508@0.0-0.3mbGL	30	0
Molybdenum	mg/kg	18	7	2.4	0.6	SWSJ03@3mbGL		
Nickel	mg/kg	42	41	44	1.3	BH508@0.0-0.3mbGL	980	0
Selenium	mg/kg	42	19	10.6	0.74	BHM4CAN033@0.5mbGL	1800	0
Zinc	mg/kg	42	41	3100	16	SBHJ01CP@1mbGL	170000	0
Beryllium	mg/kg	18	11	1.6	0.8	SWSJ02@1mbGL	12	0
Iron	mg/kg	39	39	554000	3300	RBBH007@3.7mbGL		
Vanadium	mg/kg	19	19	518	5.8	BHM4CAN033@0.5mbGL	5000	0
Other								
Asbestos Presence Screen	None	20	0	None>LOD	None>LOD			
Cyanide (total)	mg/kg	41	16	2100	1	SWSJ01@0.1mbGL		
Cyanide (free)	mg/kg	7	1	1	1	SWSJ01@0.1mbGL		
Complex Cyanide	mg/kg	4	3	2100	23	SWSJ01@0.1mbGL		
Thiocyanate	mg/kg	25	22	40.4	0.9	RBTP007@0.4mbGL		
Sulphate (soluble)	g/l	23	23	9650	0.003	RBBH006@3.5mbGL		
Elemental/Free Sulphur	mg/kg	18	5	810	87	SWSJ01@0.3mbGL		
Easily Liberated Sulphide	mg/kg	2	0	None>LOD	None>LOD			
Acid Soluble Sulphide	mg/kg	16	3	590	110	SWSJ01@0.3mbGL		
Ammoniacal Nitrogen as N	mg/kg	39	24	1990	1.1	RBTP009@0.5mbGL		
Chloride	mg/kg	23	23	6850	14	RBBH006@3.5mbGL		
Loss on Ignition	%	9	9	10	1	SWSJ08@0.1mbGL		
Total Organic Carbon	%	11	10	43	0.6	SWSJ07@4.8mbGL		
Organic Matter	%	3	3	1.9	0.8	SWSJ04@0mbGL		
pH Value	pH Uni	42	42	12.8	4.93	RBBH006@0.5mbGL	6-9	20
Material >2mm	%	3	0	None>LOD	None>LOD			
Organics								
Phenols (total)	mg/kg	23	5	0.0008	0.0005	RBTP009@0.5mbGL	440	0
Phenols Monohydric	mg/kg	19	1	0.25	0.25	SWSJ02@1mbGL	440	0
Cresols	mg/kg	1	0	None>LOD	None>LOD			
Xylenols	mg/kg	1	0	None>LOD	None>LOD			
PCBs								
PCBs (vs Aroclor 1254)	mg/kg	18	0	None>LOD	None>LOD		0.24	0
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg	1	0	None>LOD	None>LOD		0.24	0
Sum of detected WHO 12 PCBs	mg/kg	1	0	None>LOD	None>LOD		0.24	0
BTEX								
GRO (C4-C12)	mg/kg	18	1	0.081	0.081	SWSJ05@1mbGL		
GRO TOT (Moisture Corrected)	mg/kg	1	0	None>LOD	None>LOD			
MTBE	mg/kg	19	0	None>LOD	None>LOD			
Benzene	mg/kg	20	0	None>LOD	None>LOD		27	0
Toluene	mg/kg	20	0	None>LOD	None>LOD		56000	0
Ethyl benzene	mg/kg	20	0	None>LOD	None>LOD		5700	0
m & p Xylene	mg/kg	20	0	None>LOD	None>LOD		5900	0
o Xylene	mg/kg	20	0	None>LOD	None>LOD		6600	0
Sum of detected BTEX	mg/kg	1	0	None>LOD	None>LOD			
Sum of detected xylenes	mg/kg	1	0	None>LOD	None>LOD			
TPH								
TPH >C6-C8.	mg/kg	1	0	None>LOD	None>LOD		7800	0
TPH >C8-C10.	mg/kg	1	0	None>LOD	None>LOD		2000	0
TPH >C10-C12.	mg/kg	1	0	None>LOD	None>LOD		9200	0
TPH >C12-C16.	mg/kg	1	0	None>LOD	None>LOD		10000	0
TPH >C16-C21.	mg/kg	1	0	None>LOD	None>LOD		7600	0
TPH >C21-C35.	mg/kg	1	0	None>LOD	None>LOD		7800	0
Aliphatics C5-C6	mg/kg	20	0	None>LOD	None>LOD		3200	0
Aliphatics >C6-C8	mg/kg	20	0	None>LOD	None>LOD		7800	0
Aliphatics >C8-C10	mg/kg	20	0	None>LOD	None>LOD		2000	0
Aliphatics >C10-C12	mg/kg	20	1	0.032	0.032	SWSJ05@1mbGL	9700	0
Aliphatics >C12-C16	mg/kg	20	10	22	0.14	SWSJ06B@0.1mbGL	25000	0
Aliphatics >C16-C21	mg/kg	20	13	14	0.57	SWSJ03@1mbGL	450000	0
Aliphatics >C21-C35	mg/kg	20	19	260	0.96	SWSJ07@4.8mbGL	450000	0
Total Aliphatics C5-C35	mg/kg	18	17	270	1.8	SWSJ07@4.8mbGL	2000	0
Aliphatics >C35-44	mg/kg	2	1	0.624	0.624	BHM4CAN033@0.5mbGL	450000	0
Total Aliphatics >C12-C44	mg/kg	1	1	16.9	16.9	BHM4CAN033@0.5mbGL	25000	0

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Elemental Mercury criteria used
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Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Aromatics C5-C7	mg/kg	2	0	None>LOD	None>LOD		26000	0
Aromatics C6-C7	mg/kg	18	0	None>LOD	None>LOD		7800	0
Aromatics >C7-C8	mg/kg	20	0	None>LOD	None>LOD		56000	0
Aromatics >EC8-EC10	mg/kg	20	0	None>LOD	None>LOD		3500	0
Aromatics >EC10-EC12	mg/kg	20	1	0.049	0.049	SWSJ05@1mbGL	9200	0
Aromatics >EC12-EC16	mg/kg	20	11	5.4	0.13	SWSJ01@0.1mbGL	10000	0
Aromatics >EC16-EC21	mg/kg	20	12	12	0.14	SWSJ06B@0.1mbGL	7600	0
Aromatics >EC21-EC35	mg/kg	20	18	1100	2.6	SWSJ07@4.8mbGL	7800	0
Total Aromatics C6-C35	mg/kg	18	17	1100	2.9	SWSJ07@4.8mbGL	3500	0
Aromatics >C35-44	mg/kg	2	1	1.59	1.59	BHM4CAN033@0.5mbGL	7800	0
Aromatics >EC40-EC44	mg/kg	1	1	0.662	0.662	BHM4CAN033@0.5mbGL	7800	0
Total Aromatics >EC12-EC44	mg/kg	1	1	6.65	6.65	BHM4CAN033@0.5mbGL	7600	0
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	18	18	1400	7.7	SWSJ07@4.8mbGL	2000	0
Total Aliphatics & Aromatics >C5-C44	mg/kg	1	1	23.5	23.5	BHM4CAN033@0.5mbGL	2000	0
Total Aliphatic TPH	mg/kg	1	0	None>LOD	None>LOD		2000	0
Total Aromatic hydrocarbons	mg/kg	1	0	None>LOD	None>LOD		3500	0
Total petroleum hydrocarbons	mg/kg	1	0	None>LOD	None>LOD		2000	0
PAH								
Acenaphthene	mg/kg	21	6	0.051	0.015	SWSJ06B@0.1mbGL	29000	0
Acenaphthylene	mg/kg	21	15	1.9	0.007	SWSJ06B@0.1mbGL	29000	0
Anthracene	mg/kg	21	14	1.8	0.01	SWSJ06B@0.1mbGL	150000	0
Benzo(a)anthracene	mg/kg	21	17	16	0.041	SWSJ06B@0.1mbGL	49	0
Benzo(a)pyrene	mg/kg	21	17	2.8	0.024	SWSJ01@0.1mbGL	11	0
Benzo(b)fluoranthene	mg/kg	21	17	42	0.046	SWSJ06B@0.1mbGL	13	1
Benzo(ghi)perylene	mg/kg	21	17	17	0.018	SWSJ06B@0.1mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	21	17	17	0.026	SWSJ06B@0.1mbGL	370	0
Chrysene	mg/kg	21	17	18	0.031	SWSJ06B@0.1mbGL	93	0
Dibenzo(ah)anthracene	mg/kg	21	16	3.5	0.008	SWSJ06B@0.1mbGL	1.1	1
Fluoranthene	mg/kg	21	17	16	0.037	SWSJ06B@0.1mbGL	6300	0
Fluorene	mg/kg	21	9	0.44	0.019	SWSJ06B@0.1mbGL	20000	0
Indeno(123cd)pyrene	mg/kg	21	17	14	0.016	SWSJ06B@0.1mbGL	150	0
Naphthalene	mg/kg	21	17	0.57	0.0149	SWSJ05@1mbGL	190	0
Phenanthrene	mg/kg	21	17	1.1	0.037	SWSJ06B@0.1mbGL	6200	0
Pyrene	mg/kg	21	17	13	0.033	SWSJ06B@0.1mbGL	15000	0
PAH 16 Total	mg/kg	21	17	180	0.2	SWSJ06B@0.1mbGL		
SVOCs								
Phenols								
2-Chlorophenol	mg/kg	19	0	None>LOD	None>LOD			
2-Methylphenol	mg/kg	19	0	None>LOD	None>LOD			
2-Nitrophenol	mg/kg	18	0	None>LOD	None>LOD			
2,4-Dichlorophenol	mg/kg	19	0	None>LOD	None>LOD			
2,4-Dimethylphenol	mg/kg	19	0	None>LOD	None>LOD			
2,4,5-Trichlorophenol	mg/kg	19	0	None>LOD	None>LOD			
2,4,6-Trichlorophenol	mg/kg	19	0	None>LOD	None>LOD			
4-Chloro-3-methylphenol	mg/kg	19	0	None>LOD	None>LOD			
4-Methylphenol	mg/kg	19	0	None>LOD	None>LOD			
4-Nitrophenol	mg/kg	19	0	None>LOD	None>LOD			
Pentachlorophenol	mg/kg	19	0	None>LOD	None>LOD			
Phenol	mg/kg	19	0	None>LOD	None>LOD		440	0
PAHs								
2-Chloronaphthalene	mg/kg	19	0	None>LOD	None>LOD			
2-Methylnaphthalene	mg/kg	19	0	None>LOD	None>LOD			
Acenaphthene	mg/kg	4	0	None>LOD	None>LOD		29000	0
Acenaphthylene	mg/kg	4	1	0.33	0.33	SWSJ01@0.3mbGL	29000	0
Anthracene	mg/kg	4	1	0.19	0.19	SWSJ01@0.3mbGL	150000	0
Benzo(a)anthracene	mg/kg	4	1	1.8	1.8	SWSJ01@0.3mbGL	49	0
Benzo(a)pyrene	mg/kg	4	1	2.3	2.3	SWSJ01@0.3mbGL	11	0
Benzo(b)fluoranthene	mg/kg	4	1	2.7	2.7	SWSJ01@0.3mbGL	13	0
Benzo(ghi)perylene	mg/kg	4	1	1.8	1.8	SWSJ01@0.3mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	4	1	1.9	1.9	SWSJ01@0.3mbGL	370	0
Chrysene	mg/kg	4	1	2.3	2.3	SWSJ01@0.3mbGL	93	0
Dibenzo(a,h)anthracene	mg/kg	4	1	0.38	0.38	SWSJ01@0.3mbGL		
Fluoranthene	mg/kg	4	1	1.8	1.8	SWSJ01@0.3mbGL	6300	0
Fluorene	mg/kg	3	0	None>LOD	None>LOD		20000	0
Indeno(1,2,3-cd)pyrene	mg/kg	4	1	2.6	2.6	SWSJ01@0.3mbGL		
Naphthalene	mg/kg	3	0	None>LOD	None>LOD		190	0
Phenanthrene	mg/kg	4	1	0.28	0.28	SWSJ01@0.3mbGL	6200	0
Pyrene	mg/kg	4	1	1.6	1.6	SWSJ01@0.3mbGL	15000	0
Pthalates								
Bis(2-ethylhexyl) phthalate	mg/kg	19	16	9800	0.21	SWSJ03@1mbGL		
Butylbenzyl phthalate	mg/kg	19	1	200	200	SWSJ07@0.3mbGL		
Di-n-butyl phthalate	mg/kg	19	1	480	480	SWSJ06B@0.3mbGL		
Di-n-Octyl phthalate	mg/kg	19	1	250	250	SWSJ07@0.3mbGL		
Diethyl phthalate	mg/kg	19	0	None>LOD	None>LOD			
Dimethyl phthalate	mg/kg	19	0	None>LOD	None>LOD			
Other Semi-Volatiles								
1,2-Dichlorobenzene	mg/kg	20	0	None>LOD	None>LOD			
1,2,4-Trichlorobenzene	mg/kg	20	0	None>LOD	None>LOD		220	0
1,3-Dichlorobenzene	mg/kg	20	0	None>LOD	None>LOD			
1,4-Dichlorobenzene	mg/kg	20	0	None>LOD	None>LOD			
2-Nitroaniline	mg/kg	19	0	None>LOD	None>LOD			
2,4-Dinitrotoluene	mg/kg	19	0	None>LOD	None>LOD			
2,6-Dinitrotoluene	mg/kg	19	0	None>LOD	None>LOD			

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3-Nitroaniline	mg/kg	19	0	None>LOD	None>LOD			
4-Bromophenylphenylether	mg/kg	19	0	None>LOD	None>LOD			
4-Chloroaniline	mg/kg	19	0	None>LOD	None>LOD			
4-Chlorophenylphenylether	mg/kg	19	0	None>LOD	None>LOD			
4-Nitroaniline	mg/kg	19	0	None>LOD	None>LOD			
Azobenzene	mg/kg	19	0	None>LOD	None>LOD			
Bis(2-chloroethoxy)methane	mg/kg	19	0	None>LOD	None>LOD			
Bis(2-chloroethyl)ether	mg/kg	19	0	None>LOD	None>LOD			
Carbazole	mg/kg	19	1	450	450	SWSJ06B@0.1mbGL		
Dibenzofuran	mg/kg	19	1	220	220	SWSJ06B@0.1mbGL		
Hexachlorobenzene	mg/kg	19	0	None>LOD	None>LOD		30	0
Hexachlorobutadiene	mg/kg	20	0	None>LOD	None>LOD		31	0
Hexachlorocyclopentadiene	mg/kg	19	0	None>LOD	None>LOD			
Hexachloroethane	mg/kg	19	0	None>LOD	None>LOD			
Isophorone	mg/kg	19	1	170	170	SWSJ07@0.3mbGL		
N-nitrosodi-n-propylamine	mg/kg	19	0	None>LOD	None>LOD			
Nitrobenzene	mg/kg	19	0	None>LOD	None>LOD			
VOCs								
Methyl Tertiary Butyl Ether	ug/kg	19	0	None>LOD	None>LOD			
Benzene	ug/kg	20	1	293	293	RBTP005@0.5mbGL	27000	0
Toluene	ug/kg	20	1	37	37	RBTP005@0.5mbGL	56000000	0
Ethylbenzene	ug/kg	20	0	None>LOD	None>LOD		5700000	0
m,p xylenes	ug/kg	20	1	15	15	RBTP005@0.5mbGL	5900000	0
o-Xylene	ug/kg	20	0	None>LOD	None>LOD		6600000	0
Naphthalene	ug/kg	20	2	1849	320	RBTP005@0.5mbGL	190000	0
Hexachlorobutadiene	ug/kg	20	0	None>LOD	None>LOD		31000	0
1.2.4-Trichlorobenzene	ug/kg	20	0	None>LOD	None>LOD		220000	0
1.2-Dichlorobenzene	ug/kg	20	0	None>LOD	None>LOD			
1.3-Dichlorobenzene	ug/kg	20	0	None>LOD	None>LOD			
1.4-Dichlorobenzene	ug/kg	20	0	None>LOD	None>LOD			
1.1.1.2-Tetrachloroethane	ug/kg	20	0	None>LOD	None>LOD			
1.1.1-Trichloroethane	ug/kg	20	0	None>LOD	None>LOD			
1.1.2.2-Tetrachloroethane	ug/kg	20	0	None>LOD	None>LOD			
1.1.2-Trichloroethane	ug/kg	20	0	None>LOD	None>LOD			
1.1-Dichloropropene	ug/kg	20	0	None>LOD	None>LOD			
1.1-Dichloroethane	ug/kg	20	0	None>LOD	None>LOD			
1.1-Dichloroethene	ug/kg	20	0	None>LOD	None>LOD			
1.2.3-Trichlorobenzene	ug/kg	20	0	None>LOD	None>LOD		102000	0
1.2.3-Trichloropropane	ug/kg	20	0	None>LOD	None>LOD			
1.2.4-Trimethylbenzene	ug/kg	20	0	None>LOD	None>LOD			
1.2-Dibromo-3-chloropropane	ug/kg	20	0	None>LOD	None>LOD			
1.2-Dichloroethane	ug/kg	20	0	None>LOD	None>LOD			
cis-1-2-Dichloroethene	ug/kg	20	0	None>LOD	None>LOD			
1.2-Dibromoethane	ug/kg	20	0	None>LOD	None>LOD			
1.2-Dichloropropane	ug/kg	20	0	None>LOD	None>LOD			
1.3.5-Trimethylbenzene	ug/kg	20	0	None>LOD	None>LOD			
cis-1-3-Dichloropropene	ug/kg	20	0	None>LOD	None>LOD			
1.3-Dichloropropane	ug/kg	20	0	None>LOD	None>LOD			
2.2-Dichloropropane	ug/kg	20	0	None>LOD	None>LOD			
2-Chlorotoluene	ug/kg	20	0	None>LOD	None>LOD			
4-Chlorotoluene	ug/kg	20	0	None>LOD	None>LOD			
4-Isopropyltoluene	ug/kg	20	0	None>LOD	None>LOD			
Bromobenzene	ug/kg	20	0	None>LOD	None>LOD			
Bromochloromethane	ug/kg	20	0	None>LOD	None>LOD			
Bromoform	ug/kg	20	0	None>LOD	None>LOD			
Bromomethane	ug/kg	20	0	None>LOD	None>LOD			
Bromodichloromethane	ug/kg	20	0	None>LOD	None>LOD			
Chlorobenzene	ug/kg	20	1	10	10	SWSJ01@0.1mbGL	56000	0
Carbon Disulphide	ug/kg	19	1	100	100	SWSJ03@3mbGL	11000	0
Chloroethane	ug/kg	20	0	None>LOD	None>LOD			
Chloroform	ug/kg	20	0	None>LOD	None>LOD		99000	0
Chloromethane	ug/kg	20	1	760	760	SWSJ01@0.1mbGL		
Carbontetrachloride	ug/kg	20	0	None>LOD	None>LOD			
Dibromomethane	ug/kg	20	0	None>LOD	None>LOD			
Dichlorodifluoromethane	ug/kg	20	0	None>LOD	None>LOD			
Dibromochloromethane	ug/kg	20	0	None>LOD	None>LOD			
Dichloromethane	ug/kg	19	0	None>LOD	None>LOD			
Isopropylbenzene	ug/kg	20	0	None>LOD	None>LOD			
n-Butylbenzene	ug/kg	20	0	None>LOD	None>LOD			
Propylbenzene	ug/kg	20	0	None>LOD	None>LOD			
sec-Butylbenzene	ug/kg	20	0	None>LOD	None>LOD			
Styrene	ug/kg	20	0	None>LOD	None>LOD			
trans-1-2-Dichloroethene	ug/kg	20	0	None>LOD	None>LOD			
trans-1-3-Dichloropropene	ug/kg	20	0	None>LOD	None>LOD			
Trichlorofluoromethane	ug/kg	20	0	None>LOD	None>LOD			
tert-amyl methyl ether	ug/kg	1	0	None>LOD	None>LOD			
tert-Butylbenzene	ug/kg	20	0	None>LOD	None>LOD			
Tetrachloroethene	ug/kg	20	0	None>LOD	None>LOD		19000	0
Trichloroethene	ug/kg	20	0	None>LOD	None>LOD		1200	0
Vinyl Chloride	ug/kg	20	0	None>LOD	None>LOD		59	0

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	RBBH006	RBBH007	RBBH007	RBBH008	RBBH008	RBBH008	RBBH009	RBBH009
Specimen Depth (m)		0.5	0.5	3.5	0.5	1	1.8	1	2.6
OD Level (m)									
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002
Metals									
Antimony	mg/kg								
Arsenic	mg/kg	<3	<3	5	<3	<3	8	<3	5
Barium	mg/kg								
Boron Water Soluble	mg/kg	2	1	2	1	1	2	1	1
Cadmium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/kg	372	390	312	543	640	150	546	269
Chromium hexavalent	mg/kg								
Copper	mg/kg	12	13	11	11	10	13	3	12
Lead	mg/kg	61	57	24	54	20	45	13	38
Mercury	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum	mg/kg								
Nickel	mg/kg	8	6	22	13	13	29	4	17
Selenium	mg/kg	1.89	1.45	0.74	1.85	1.06	1.16	1.29	1.31
Zinc	mg/kg	64	86	112	30	76	93	48	57
Beryllium	mg/kg								
Iron	mg/kg	143000	119000	97400	148000	129000	52800	155000	65900
Vanadium	mg/kg								
Other									
Asbestos Presence Screen	None								
Cyanide (total)	mg/kg	4	<1	<1	1	1	<1	<1	<1
Cyanide (free)	mg/kg								
Complex Cyanide	mg/kg								
Thiocyanate	mg/kg	1.8	<0.5	4.5	5.4	6.3	3.4	<0.5	1
Sulphate (soluble)	g/l	4160	2940	3310					
Elemental/Free Sulphur	mg/kg								
Easily Liberated Sulphide	mg/kg								
Acid Soluble Sulphide	mg/kg								
Ammoniacal Nitrogen as N	mg/kg	2.2	1.2	1.8	1.1	<0.1	9.4	1.3	5.8
Chloride	mg/kg	81.8	135	752					
Loss on Ignition	%								
Total Organic Carbon	%								
Organic Matter	%								
pH Value	pH Uni	12.8	12.8	11.9	12.8	12.4	11.6	12.7	12
Material >2mm	%								
Organics									
Phenols (total)	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Phenols Monohydric	mg/kg								
Cresols	mg/kg								
Xylenols	mg/kg								
PCBs									
PCBs (vs Aroclor 1254)	mg/kg								
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg								
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg								
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg								
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg								
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg								
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg								
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg								
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg								
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg								
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg								
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg								
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg								
Sum of detected WHO 12 PCBs	mg/kg								
BTEX									
GRO (C4-C12)	mg/kg								
GRO TOT (Moisture Corrected)	mg/kg								
MTBE	mg/kg								
Benzene	mg/kg								
Toluene	mg/kg								
Ethyl benzene	mg/kg								
m & p Xylene	mg/kg								
o Xylene	mg/kg								
Sum of detected BTEX	mg/kg								
Sum of detected xylenes	mg/kg								
TPH									
TPH >C6-C8.	mg/kg								
TPH >C8-C10.	mg/kg								

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	RBBH010	RBTP005	RBTP006	RBTP007	RBTP009	RBTP010	RBTP011	SWSJ01
Specimen Depth (m)		1	0.5	0.4	0.4	0.5	0.5	0.5	0.1
OD Level (m)									5.72
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2007GI
Metals									
Antimony	mg/kg								3.9
Arsenic	mg/kg	3		12	11	<3	9	13	<3
Barium	mg/kg								480
Boron Water Soluble	mg/kg	2		1	1	1	<0.5	1	<3.5
Cadmium	mg/kg	<1		<1	<1	<1	<1	<1	0.7
Chromium	mg/kg	55		38	33	37	24	46	8.8
Chromium hexavalent	mg/kg								
Copper	mg/kg	8		11	14	5	5	19	<6
Lead	mg/kg	21		44	50	44	25	73	2
Mercury	mg/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.6
Molybdenum	mg/kg								0.8
Nickel	mg/kg	7		34	31	15	15	27	1.3
Selenium	mg/kg	2.74		0.91	3.01	0.79	1.01	3.42	<3
Zinc	mg/kg	60		95	114	132	80	167	33
Beryllium	mg/kg								<0.4
Iron	mg/kg	24500		34600	34900	40200	32200	41600	5100
Vanadium	mg/kg								7.8
Other									
Asbestos Presence Screen	None								NFD
Cyanide (total)	mg/kg	4		<1	20	18	<1	12	2100
Cyanide (free)	mg/kg								1
Complex Cyanide	mg/kg								2100
Thiocyanate	mg/kg	5.7		1.6	40.4	36	4.9	25.8	7
Sulphate (soluble)	g/l								0.13
Elemental/Free Sulphur	mg/kg								770
Easily Liberated Sulphide	mg/kg								<15
Acid Soluble Sulphide	mg/kg								
Ammoniacal Nitrogen as N	mg/kg	2.1		201	1730	1990	658	1850	<15
Chloride	mg/kg								200
Loss on Ignition	%								1
Total Organic Carbon	%								0.7
Organic Matter	%								
pH Value	pH Uni	11.6		8	8.6	8.2	8.5	7.4	7.1
Material >2mm	%								
Organics									
Phenols (total)	mg/kg	0.0006		<0.0005	<0.0005	0.0008	<0.0005	<0.0005	
Phenols Monohydric	mg/kg								<0.15
Cresols	mg/kg								
Xylenols	mg/kg								
PCBs									
PCBs (vs Aroclor 1254)	mg/kg								<0.02
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg								
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg								
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg								
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg								
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg								
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg								
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg								
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg								
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg								
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg								
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg								
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg								
Sum of detected WHO 12 PCBs	mg/kg								
BTEX									
GRO (C4-C12)	mg/kg								<0.01
GRO TOT (Moisture Corrected)	mg/kg								
MTBE	mg/kg								<0.01
Benzene	mg/kg								<0.01
Toluene	mg/kg								<0.01
Ethyl benzene	mg/kg								<0.01
m & p Xylene	mg/kg								<0.01
o Xylene	mg/kg								<0.01
Sum of detected BTEX	mg/kg								
Sum of detected xylenes	mg/kg								
TPH									
TPH >C6-C8.	mg/kg								
TPH >C8-C10.	mg/kg								

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SWSJ01	SWSJ02	SWSJ03	SWSJ04	SWSJ06B	SWSJ06B	SWSJ07	SWSJ08	SWSJ08
Specimen Depth (m)		0.3	1	1	0	0.1	0.3	0.3	0.1	0.3
OD Level (m)		5.52	4.88	4.92	5.97	5.86	5.66	5.66	6.65	6.45
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed
Cluster Code		2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI
Metals										
Antimony	mg/kg	3.7	1.9	<1.5	2.5	<1.5	<1.5	<1.5	7	5.7
Arsenic	mg/kg	<3	<3	<3	8	<3	<3	8	20	21
Barium	mg/kg	560	70	48	110	170	150	97	110	100
Boron Water Soluble	mg/kg	<3.5	<3.5	90	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5
Cadmium	mg/kg	0.5	<0.3	0.6	0.4	0.6	0.4	0.3	0.7	0.5
Chromium	mg/kg	8.1	48	5.1	41	51	47	45	53	57
Chromium hexavalent	mg/kg									
Copper	mg/kg	<6	<6	15	18	14	13	9	16	9
Lead	mg/kg	2	16	48	40	56	41	39	34	26
Mercury	mg/kg	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Molybdenum	mg/kg	0.6	<0.6	1.9	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Nickel	mg/kg	<0.9	32	5.6	27	23	22	26	26	22
Selenium	mg/kg	<3	<3	<3	<3	<3	<3	<3	<3	<3
Zinc	mg/kg	24	120	31	150	170	160	140	180	140
Beryllium	mg/kg	<0.4	1.6	<0.4	1	1.6	1.5	1.3	1.2	0.8
Iron	mg/kg	3300	41000	4600	35000	44000	41000	41000	43000	42000
Vanadium	mg/kg	6.1	65	5.8	57	74	69	63	63	56
Other										
Asbestos Presence Screen	None	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD
Cyanide (total)	mg/kg	470	40	<1	120	<1	13	77	110	23
Cyanide (free)	mg/kg							<1		<1
Complex Cyanide	mg/kg							77		23
Thiocyanate	mg/kg							5		3
Sulphate (soluble)	g/l	0.081	0.14	0.065	0.009	0.16	0.12	0.098	0.031	0.052
Elemental/Free Sulphur	mg/kg	810	<70	<70	<70	<700	<70	<70	<70	<70
Easily Liberated Sulphide	mg/kg				<15					
Acid Soluble Sulphide	mg/kg	590	150	<50		<50	<50	<50	<50	<50
Ammoniacal Nitrogen as N	mg/kg	<15	71	<15	<15	<15	<15	<15	<15	<15
Chloride	mg/kg	440	14	90	20	34	34	18	26	30
Loss on Ignition	%		6.3	2.3		4.4		4.8	10	
Total Organic Carbon	%		0.6	0.8		4.5		2.9	1	2.8
Organic Matter	%		0.8		1.9					
pH Value	pH Uni	7.15	7.4	8.17	5.44	7.7	7.52	5.02	4.93	6.03
Material >2mm	%		<0.1		<0.1					
Organics										
Phenols (total)	mg/kg									
Phenols Monohydric	mg/kg	<0.15	0.25	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Cresols	mg/kg									
Xylenols	mg/kg									
PCBs										
PCBs (vs Aroclor 1254)	mg/kg	<0.02	<0.02	<0.02	<0.035	<0.2	<0.02	<0.02	<0.02	<0.02
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg									
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg									
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg									
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg									
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg									
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg									
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg									
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg									
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg									
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg									
Sum of detected WHO 12 PCBs	mg/kg									
BTEX										
GRO (C4-C12)	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GRO TOT (Moisture Corrected)	mg/kg									
MTBE	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethyl benzene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
m & p Xylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
o Xylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of detected BTEX	mg/kg									
Sum of detected xylenes	mg/kg									
TPH										
TPH >C6-C8.	mg/kg									
TPH >C8-C10.	mg/kg									

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SBHJ01CP	BH508		RBBH006	RBBH006	RBBH006	RBBH007	RBBH008	RBBH008	RBBH0010
Specimen Depth (m)		1	0.0-0.3		0.9	3.5	6.5	3.7	4.5	6.5	2.3
OD Level (m)		5.57	5.9								
Sample Type		ES	ES		ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-slag		TFD	TFD (Peat)	TFD	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD
Cluster Code		2007GI	2015GI		2002	2002	2002	2002	2002	2002	2002
Metals											
Antimony	mg/kg	24									
Arsenic	mg/kg	<3	28			71	11	<3	8	10	14
Barium	mg/kg	140			11						
Boron Water Soluble	mg/kg	4.1	1.7		1	57	1	3	16	2	2
Cadmium	mg/kg	1.3	<0.1		<1	<1	<1	<1	<1	<1	<1
Chromium	mg/kg	410	570		44	16	30	256	44	38	33
Chromium hexavalent	mg/kg										
Copper	mg/kg	8	13		12	8	11	10	8	12	10
Lead	mg/kg	170	12		34	18	21	27	25	22	45
Mercury	mg/kg	<0.6	0.83		<0.5	<0.5	<0.5		<0.5	<0.5	0.7
Molybdenum	mg/kg	2.3									
Nickel	mg/kg	7.3	44		37	21	30	10	19	36	27
Selenium	mg/kg	<3	<0.2		<0.50	1.08	<0.50	0.89	0.89	<0.50	1.36
Zinc	mg/kg	3100	92		123	36	92	43	59	108	84
Beryllium	mg/kg	<0.4									
Iron	mg/kg	140000			44800	45200	30800	554000	28400	33000	33600
Vanadium	mg/kg	340									
Other											
Asbestos Presence Screen	None	NFD	NFD								
Cyanide (total)	mg/kg	<1	<0.5		<1	<2	<1	<1	<1	<1	<1
Cyanide (free)	mg/kg		<0.5								
Complex Cyanide	mg/kg										
Thiocyanate	mg/kg				1.8	2	8.4	11.9	4.3	37.5	0.9
Sulphate (soluble)	g/l	0.005			417	9650	1900				
Elemental/Free Sulphur	mg/kg	<70									
Easily Liberated Sulphide	mg/kg										
Acid Soluble Sulphide	mg/kg	110									
Ammoniacal Nitrogen as N	mg/kg	<15			67.5	18.6	78.8	24.1	10.7	45.2	15.4
Chloride	mg/kg	28			65.5	6850	3350				
Loss on Ignition	%	1.5									
Total Organic Carbon	%	<0.2									
Organic Matter	%										
pH Value	pH Uni	12.71	11.8		8.1	7.1	8.7	9.7	9.2	8.5	9.1
Material >2mm	%										
Organics											
Phenols (total)	mg/kg		<0.0003		<0.0005	0.0008	<0.0005	0.0008	<0.0005	<0.0005	0.0005
Phenols Monohydric	mg/kg	<0.15									
Cresols	mg/kg										
Xylenols	mg/kg										
PCBs											
PCBs (vs Aroclor 1254)	mg/kg	<0.02									
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg										
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg										
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg										
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg										
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg										
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg										
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg										
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg										
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg										
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg										
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg										
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg										
Sum of detected WHO 12 PCBs	mg/kg										
BTEX											
GRO (C4-C12)	mg/kg	<0.01									
GRO TOT (Moisture Corrected)	mg/kg										
MTBE	mg/kg	<0.01									
Benzene	mg/kg	<0.01	<0.001								
Toluene	mg/kg	<0.01	<0.001								
Ethyl benzene	mg/kg	<0.01	<0.001								
m & p Xylene	mg/kg	<0.01	<0.001								
o Xylene	mg/kg	<0.01	<0.001								
Sum of detected BTEX	mg/kg										
Sum of detected xylenes	mg/kg										
TPH											
TPH >C6-C8.	mg/kg										
TPH >C8-C10.	mg/kg										

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SWSJ02	SWSJ03	SWSJ04	SWSJ05	SWSJ05	SWSJ07	SBHJ01CP	BH508	BHM4CAN033
Specimen Depth (m)		2	3	1	1	2	4.8	2	2.5-2.6	0.5
OD Level (m)		3.88	2.92	4.97	4.82	3.82	1.16	4.57	3.4	5.86
Sample Type		ES	ES	ES	ES	ES	ES	U	ES	ES
Geology Code		TFD	TFD	TFD	TFD	TFD	PEAT	TFD	TFD	MG - slag
Cluster Code		2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2015GI	2016 GI
Metals										
Antimony	mg/kg	<1.5	2.2	4.9	5.7	<1.5	<1.5	19		
Arsenic	mg/kg	10	16	18	19	<3	<3	<3	11	<6
Barium	mg/kg	55	39	59	81	51	22	110		
Boron Water Soluble	mg/kg	<3.5	160	<3.5	<3.5	<3.5	77	<3.5	0.88	
Cadmium	mg/kg	<0.3	0.4	<0.3	<0.3	<0.3	0.4	<0.3	<0.1	0.473
Chromium	mg/kg	37	6.7	50	45	34	4.7	460	84	761
Chromium hexavalent	mg/kg									1.61
Copper	mg/kg	14	7	9	7	26	6	<6	10	<14
Lead	mg/kg	43	19	11	10	70	15	29	22	<7
Mercury	mg/kg	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.1	<1.4
Molybdenum	mg/kg	<0.6	2.4	<0.6	<0.6	<0.6	1.7	1.7		
Nickel	mg/kg	28	11	35	35	27	5	13	28	22
Selenium	mg/kg	<3	<3	<3	<3	<3	<3	<3	<0.2	10.6
Zinc	mg/kg	110	29	130	120	100	16	250	86	<19
Beryllium	mg/kg	1.2	<0.4	1.2	1.1	1	<0.4	<0.4		
Iron	mg/kg	36000	34000	35000	37000	31000	4200	89000		
Vanadium	mg/kg	49	12	49	48	45	6	320		518
Other										
Asbestos Presence Screen	None	NFD	NFD	NFD	NFD	NFD	NFD	NFD		NFD
Cyanide (total)	mg/kg	<1	<1	<1	4	<1	<1	<1	<0.5	
Cyanide (free)	mg/kg						<1		<0.5	<0.5
Complex Cyanide	mg/kg						<1			
Thiocyanate	mg/kg						<1			
Sulphate (soluble)	g/l	0.27	0.11	0.17	0.32	0.51		0.003		
Elemental/Free Sulphur	mg/kg	<70	87	<70	160	<70	120	<70		
Easily Liberated Sulphide	mg/kg									
Acid Soluble Sulphide	mg/kg	<50	<50	<50	<50	<50	<50	<50		
Ammoniacal Nitrogen as N	mg/kg	<15	<15	64	390	<15	69	<15		
Chloride	mg/kg	72	300	100	42	140		16		
Loss on Ignition	%			1.9	2.2					
Total Organic Carbon	%			0.8	0.9		43			
Organic Matter	%					1.4				
pH Value	pH Uni	8.24	8.21	8.13	8.17	8.22	8.07	11.6	10	12.1
Material >2mm	%					<0.1				
Organics										
Phenols (total)	mg/kg									<0.01
Phenols Monohydric	mg/kg	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15		<0.035
Cresols	mg/kg									<0.01
Xylenols	mg/kg									<0.015
PCBs										
PCBs (vs Aroclor 1254)	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg									<0.003
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg									<0.003
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg									<0.003
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg									<0.003
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg									<0.003
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg									<0.003
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg									<0.003
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									<0.003
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg									<0.003
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg									<0.003
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg									<0.003
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg									<0.003
Sum of detected WHO 12 PCBs	mg/kg									<0.036
BTEX										
GRO (C4-C12)	mg/kg	<0.01	<0.01	<0.01	0.081	<0.01	<0.01	<0.01		
GRO TOT (Moisture Corrected)	mg/kg									<0.044
MTBE	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.005
Benzene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
Toluene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.002
Ethyl benzene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.003
m & p Xylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.006
o Xylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.003
Sum of detected BTEX	mg/kg									<0.024
Sum of detected xylenes	mg/kg									<0.009
TPH										
TPH >C6-C8.	mg/kg								<1	
TPH >C8-C10.	mg/kg								<1	

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Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	RBBH006	RBBH007	RBBH007	RBBH008	RBBH008	RBBH008	RBBH009	RBBH009
Specimen Depth (m)		0.5	0.5	3.5	0.5	1	1.8	1	2.6
OD Level (m)									
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002
TPH >C10-C12.	mg/kg								
TPH >C12-C16.	mg/kg								
TPH >C16-C21.	mg/kg								
TPH >C21-C35.	mg/kg								
Aliphatics C5-C6	mg/kg								
Aliphatics >C6-C8	mg/kg								
Aliphatics >C8-C10	mg/kg								
Aliphatics >C10-C12	mg/kg								
Aliphatics >C12-C16	mg/kg								
Aliphatics >C16-C21	mg/kg								
Aliphatics >C21-C35	mg/kg								
Total Aliphatics C5-C35	mg/kg								
Aliphatics >C35-44	mg/kg								
Total Aliphatics >C12-C44	mg/kg								
Aromatics C5-C7	mg/kg								
Aromatics C6-C7	mg/kg								
Aromatics >C7-C8	mg/kg								
Aromatics >EC8-EC10	mg/kg								
Aromatics >EC10-EC12	mg/kg								
Aromatics >EC12-EC16	mg/kg								
Aromatics >EC16-EC21	mg/kg								
Aromatics >EC21-EC35	mg/kg								
Total Aromatics C6-C35	mg/kg								
Aromatics >C35-44	mg/kg								
Aromatics >EC40-EC44	mg/kg								
Total Aromatics >EC12-EC44	mg/kg								
TPH (Aliphatics and Aromatics C5-C35)	mg/kg								
Total Aliphatics & Aromatics >C5-C44	mg/kg								
Total Aliphatic TPH	mg/kg								
Total Aromatic hydrocarbons	mg/kg								
Total petroleum hydrocarbons	mg/kg								
PAH									
Acenaphthene	mg/kg								
Acenaphthylene	mg/kg								
Anthracene	mg/kg								
Benzo(a)anthracene	mg/kg								
Benzo(a)pyrene	mg/kg								
Benzo(b)fluoranthene	mg/kg								
Benzo(ghi)perylene	mg/kg								
Benzo(k)fluoranthene	mg/kg								
Chrysene	mg/kg								
Dibenzo(ah)anthracene	mg/kg								
Fluoranthene	mg/kg								
Fluorene	mg/kg								
Indeno(123cd)pyrene	mg/kg								
Naphthalene	mg/kg								
Phenanthrene	mg/kg								
Pyrene	mg/kg								
PAH 16 Total	mg/kg								
SVOCs									
Phenols									
2-Chlorophenol	mg/kg								
2-Methylphenol	mg/kg								
2-Nitrophenol	mg/kg								
2,4-Dichlorophenol	mg/kg								
2,4-Dimethylphenol	mg/kg								
2,4,5-Trichlorophenol	mg/kg								
2,4,6-Trichlorophenol	mg/kg								
4-Chloro-3-methylphenol	mg/kg								
4-Methylphenol	mg/kg								
4-Nitrophenol	mg/kg								
Pentachlorophenol	mg/kg								
Phenol	mg/kg								
PAHs									
2-Chloronaphthalene	mg/kg								
2-Methylnaphthalene	mg/kg								
Acenaphthene	mg/kg								
Acenaphthylene	mg/kg								
Anthracene	mg/kg								

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CL-26 Reedbed No.1
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Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	RBBH010	RBTP005	RBTP006	RBTP007	RBTP009	RBTP010	RBTP011	SWSJ01
Specimen Depth (m)		1	0.5	0.4	0.4	0.5	0.5	0.5	0.1
OD Level (m)									5.72
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2007GI
TPH >C10-C12.	mg/kg								
TPH >C12-C16.	mg/kg								
TPH >C16-C21.	mg/kg								
TPH >C21-C35.	mg/kg								
Aliphatics C5-C6	mg/kg								<0.01
Aliphatics >C6-C8	mg/kg								<0.01
Aliphatics >C8-C10	mg/kg								<0.01
Aliphatics >C10-C12	mg/kg								<0.01
Aliphatics >C12-C16	mg/kg								<0.1
Aliphatics >C16-C21	mg/kg								<0.1
Aliphatics >C21-C35	mg/kg								5.1
Total Aliphatics C5-C35	mg/kg								5.1
Aliphatics >C35-44	mg/kg								
Total Aliphatics >C12-C44	mg/kg								
Aromatics C5-C7	mg/kg								
Aromatics C6-C7	mg/kg								<0.01
Aromatics >C7-C8	mg/kg								<0.01
Aromatics >EC8-EC10	mg/kg								<0.01
Aromatics >EC10-EC12	mg/kg								<0.01
Aromatics >EC12-EC16	mg/kg								5.4
Aromatics >EC16-EC21	mg/kg								1.1
Aromatics >EC21-EC35	mg/kg								46
Total Aromatics C6-C35	mg/kg								53
Aromatics >C35-44	mg/kg								
Aromatics >EC40-EC44	mg/kg								
Total Aromatics >EC12-EC44	mg/kg								
TPH (Aliphatics and Aromatics C5-C35)	mg/kg								58
Total Aliphatics & Aromatics >C5-C44	mg/kg								
Total Aliphatic TPH	mg/kg								
Total Aromatic hydrocarbons	mg/kg								
Total petroleum hydrocarbons	mg/kg								
PAH									
Acenaphthene	mg/kg								0.02
Acenaphthylene	mg/kg								0.5
Anthracene	mg/kg								0.5
Benzo(a)anthracene	mg/kg								1.9
Benzo(a)pyrene	mg/kg								2.8
Benzo(b)fluoranthene	mg/kg								4.4
Benzo(ghi)perylene	mg/kg								2.7
Benzo(k)fluoranthene	mg/kg								1.5
Chrysene	mg/kg								2.4
Dibenzo(ah)anthracene	mg/kg								0.67
Fluoranthene	mg/kg								2.1
Fluorene	mg/kg								0.092
Indeno(123cd)pyrene	mg/kg								2.4
Naphthalene	mg/kg								0.12
Phenanthrene	mg/kg								0.32
Pyrene	mg/kg								1.8
PAH 16 Total	mg/kg								24
SVOCs									
Phenols									
2-Chlorophenol	mg/kg								<0.1
2-Methylphenol	mg/kg								<0.1
2-Nitrophenol	mg/kg								<0.1
2,4-Dichlorophenol	mg/kg								<0.1
2,4-Dimethylphenol	mg/kg								<0.1
2,4,5-Trichlorophenol	mg/kg								<0.1
2,4,6-Trichlorophenol	mg/kg								<0.1
4-Chloro-3-methylphenol	mg/kg								<0.1
4-Methylphenol	mg/kg								<0.1
4-Nitrophenol	mg/kg								<0.1
Pentachlorophenol	mg/kg								<0.1
Phenol	mg/kg								<0.1
PAHs									
2-Chloronaphthalene	mg/kg								<0.1
2-Methylnaphthalene	mg/kg								<0.1
Acenaphthene	mg/kg								
Acenaphthylene	mg/kg								
Anthracene	mg/kg								

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Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SWSJ01	SWSJ02	SWSJ03	SWSJ04	SWSJ06B	SWSJ06B	SWSJ07	SWSJ08	SWSJ08
Specimen Depth (m)		0.3	1	1	0	0.1	0.3	0.3	0.1	0.3
OD Level (m)		5.52	4.88	4.92	5.97	5.86	5.66	5.66	6.65	6.45
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed
Cluster Code		2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI
TPH >C10-C12.	mg/kg									
TPH >C12-C16.	mg/kg									
TPH >C16-C21.	mg/kg									
TPH >C21-C35.	mg/kg									
Aliphatics C5-C6	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C6-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C8-C10	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C10-C12	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C12-C16	mg/kg	<0.1	<0.1	2.1	<0.1	22	10	0.31	<0.1	<0.1
Aliphatics >C16-C21	mg/kg	<0.1	0.57	14	<0.1	2.2	1.1	1.2	<0.1	<0.1
Aliphatics >C21-C35	mg/kg	3.3	1.5	130	15	13	7.1	26	12	9.7
Total Aliphatics C5-C35	mg/kg	3.3	2.1	150	15	37	18	28	12	9.7
Aliphatics >C35-44	mg/kg									
Total Aliphatics >C12-C44	mg/kg									
Aromatics C5-C7	mg/kg									
Aromatics C6-C7	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >C7-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC8-EC10	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC10-EC12	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC12-EC16	mg/kg	1.7	<0.1	1.2	1	3.2	0.47	0.2	<0.1	<0.1
Aromatics >EC16-EC21	mg/kg	1.5	<0.1	4.5	0.27	12	0.71	<0.1	0.59	<0.1
Aromatics >EC21-EC35	mg/kg	55	5.6	770	50	470	67	55	48	41
Total Aromatics C6-C35	mg/kg	58	5.6	770	51	480	68	56	49	41
Aromatics >C35-44	mg/kg									
Aromatics >EC40-EC44	mg/kg									
Total Aromatics >EC12-EC44	mg/kg									
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	61	7.7	920	66	520	87	84	61	50
Total Aliphatics & Aromatics >C5-C44	mg/kg									
Total Aliphatic TPH	mg/kg									
Total Aromatic hydrocarbons	mg/kg									
Total petroleum hydrocarbons	mg/kg									
PAH										
Acenaphthene	mg/kg	0.016	<0.014	<0.014	<0.014	0.051	0.019	<0.014	<0.014	<0.014
Acenaphthylene	mg/kg	0.32	<0.005	0.065	0.05	1.9	0.18	0.046	0.045	0.016
Anthracene	mg/kg	0.41	<0.009	0.078	0.033	1.8	0.13	0.023	0.027	0.011
Benzo(a)anthracene	mg/kg	1.9	<0.012	0.47	0.26	16	1	0.27	0.27	0.078
Benzo(a)pyrene	mg/kg	2.2	<0.012	0.32	0.22	0.101	1.3	0.25	0.23	0.082
Benzo(b)fluoranthene	mg/kg	4.3	<0.016	0.45	0.25	42	2.2	0.6	0.44	0.095
Benzo(ghi)perylene	mg/kg	2	<0.01	0.26	0.19	17	1.1	0.26	0.25	0.084
Benzo(k)fluoranthene	mg/kg	1.9	<0.025	0.19	0.21	17	1.1	0.26	0.21	0.077
Chrysene	mg/kg	2.4	<0.01	0.43	0.32	18	1.3	0.29	0.31	0.09
Dibenzo(ah)anthracene	mg/kg	0.42	<0.008	0.1	0.041	3.5	0.25	0.062	0.099	0.017
Fluoranthene	mg/kg	2	<0.025	0.47	0.24	16	1	0.16	0.22	0.098
Fluorene	mg/kg	0.078	<0.012	0.023	0.026	0.44	0.068	<0.012	<0.012	<0.012
Indeno(123cd)pyrene	mg/kg	1.8	<0.011	0.22	0.16	14	0.95	0.21	0.22	0.064
Naphthalene	mg/kg	0.081	<0.01	0.042	0.15	0.4	0.52	0.21	0.18	0.23
Phenanthrene	mg/kg	0.32	<0.021	0.11	0.12	1.1	0.29	0.054	0.075	0.045
Pyrene	mg/kg	1.6	<0.022	0.44	0.19	13	0.79	0.12	0.18	0.077
PAH 16 Total	mg/kg	22	<0.025	3.7	2.5	180	12	2.8	2.8	1.1
SVOCs										
Phenols										
2-Chlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Nitrophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dimethylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,5-Trichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,6-Trichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Chloro-3-methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Nitrophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pentachlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAHs										
2-Chloronaphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1								
Acenaphthylene	mg/kg	0.33								
Anthracene	mg/kg	0.19								

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SBHJ01CP	BH508		RBBH006	RBBH006	RBBH006	RBBH007	RBBH008	RBBH008	RBBH0010
Specimen Depth (m)		1	0.0-0.3		0.9	3.5	6.5	3.7	4.5	6.5	2.3
OD Level (m)		5.57	5.9								
Sample Type		ES	ES		ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-slag		TFD	TFD (Peat)	TFD	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD
Cluster Code		2007GI	2015GI		2002	2002	2002	2002	2002	2002	2002
TPH >C10-C12.	mg/kg										
TPH >C12-C16.	mg/kg										
TPH >C16-C21.	mg/kg										
TPH >C21-C35.	mg/kg										
Aliphatics C5-C6	mg/kg	<0.01	<0.1								
Aliphatics >C6-C8	mg/kg	<0.01	<0.1								
Aliphatics >C8-C10	mg/kg	<0.01	<0.1								
Aliphatics >C10-C12	mg/kg	<0.01	<1								
Aliphatics >C12-C16	mg/kg	<0.1	<1								
Aliphatics >C16-C21	mg/kg	4.1	<1								
Aliphatics >C21-C35	mg/kg	22	2.4								
Total Aliphatics C5-C35	mg/kg	26									
Aliphatics >C35-44	mg/kg		<1								
Total Aliphatics >C12-C44	mg/kg										
Aromatics C5-C7	mg/kg		<0.1								
Aromatics C6-C7	mg/kg	<0.01									
Aromatics >C7-C8	mg/kg	<0.01	<0.1								
Aromatics >EC8-EC10	mg/kg	<0.01	<0.1								
Aromatics >EC10-EC12	mg/kg	<0.01	<1								
Aromatics >EC12-EC16	mg/kg	<0.1	<1								
Aromatics >EC16-EC21	mg/kg	0.3	<1								
Aromatics >EC21-EC35	mg/kg	2.6	<1								
Total Aromatics C6-C35	mg/kg	2.9									
Aromatics >C35-44	mg/kg		<1								
Aromatics >EC40-EC44	mg/kg										
Total Aromatics >EC12-EC44	mg/kg										
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	29									
Total Aliphatics & Aromatics >C5-C44	mg/kg										
Total Aliphatic TPH	mg/kg		<5								
Total Aromatic hydrocarbons	mg/kg		<5								
Total petroleum hydrocarbons	mg/kg		<10								
PAH											
Acenaphthene	mg/kg	<0.014	<0.1								
Acenaphthylene	mg/kg	<0.005	<0.1								
Anthracene	mg/kg	0.033	<0.1								
Benzo(a)anthracene	mg/kg	0.11	<0.1								
Benzo(a)pyrene	mg/kg	0.068	<0.1								
Benzo(b)fluoranthene	mg/kg	0.14	<0.1								
Benzo(ghi)perylene	mg/kg	0.065	<0.1								
Benzo(k)fluoranthene	mg/kg	0.049	<0.1								
Chrysene	mg/kg	0.14	<0.1								
Dibenzo(ah)anthracene	mg/kg	0.019	<0.1								
Fluoranthene	mg/kg	0.26	0.17								
Fluorene	mg/kg	0.019	<0.1								
Indeno(123cd)pyrene	mg/kg	0.04	<0.1								
Naphthalene	mg/kg	0.033	<0.1								
Phenanthrene	mg/kg	0.19	0.21								
Pyrene	mg/kg	0.21	0.13								
PAH 16 Total	mg/kg	1.4	<2								
SVOCs											
Phenols											
2-Chlorophenol	mg/kg	<0.1									
2-Methylphenol	mg/kg	<0.1									
2-Nitrophenol	mg/kg	<0.1									
2,4-Dichlorophenol	mg/kg	<0.1									
2,4-Dimethylphenol	mg/kg	<0.1									
2,4,5-Trichlorophenol	mg/kg	<0.1									
2,4,6-Trichlorophenol	mg/kg	<0.1									
4-Chloro-3-methylphenol	mg/kg	<0.1									
4-Methylphenol	mg/kg	<0.1									
4-Nitrophenol	mg/kg	<0.1									
Pentachlorophenol	mg/kg	<0.1									
Phenol	mg/kg	<0.1									
PAHs											
2-Chloronaphthalene	mg/kg	<0.1									
2-Methylnaphthalene	mg/kg	<0.1									
Acenaphthene	mg/kg	<0.1									
Acenaphthylene	mg/kg	<0.1									
Anthracene	mg/kg	<0.1									

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Notes

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Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SWSJ02	SWSJ03	SWSJ04	SWSJ05	SWSJ05	SWSJ07	SBHJ01CP	BH508	BHM4CAN033
Specimen Depth (m)		2	3	1	1	2	4.8	2	2.5-2.6	0.5
OD Level (m)		3.88	2.92	4.97	4.82	3.82	1.16	4.57	3.4	5.86
Sample Type		ES	ES	ES	ES	ES	ES	U	ES	ES
Geology Code		TFD	TFD	TFD	TFD	TFD	PEAT	TFD	TFD	MG - slag
Cluster Code		2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2015GI	2016 GI
TPH >C10-C12.	mg/kg								<1	
TPH >C12-C16.	mg/kg								<1	
TPH >C16-C21.	mg/kg								<1	
TPH >C21-C35.	mg/kg								<1	
Aliphatics C5-C6	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
Aliphatics >C6-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
Aliphatics >C8-C10	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
Aliphatics >C10-C12	mg/kg	<0.01	<0.01	<0.01	0.032	<0.01	<0.01	<0.01		<0.01
Aliphatics >C12-C16	mg/kg	<0.1	1	0.23	0.14	0.22	1.8	2.5		<0.1
Aliphatics >C16-C21	mg/kg	<0.1	2.5	0.85	0.68	1.2	7.8	5		1.37
Aliphatics >C21-C35	mg/kg	<0.1	110	1.2	0.96	2.2	260	6.8		14.9
Total Aliphatics C5-C35	mg/kg	<0.1	120	2.2	1.8	3.6	270	14		
Aliphatics >C35-44	mg/kg									0.624
Total Aliphatics >C12-C44	mg/kg									16.9
Aromatics C5-C7	mg/kg									<0.01
Aromatics C6-C7	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Aromatics >C7-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
Aromatics >EC8-EC10	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
Aromatics >EC10-EC12	mg/kg	<0.01	<0.01	<0.01	0.049	<0.01	<0.01	<0.01		<0.01
Aromatics >EC12-EC16	mg/kg	0.13	0.82	<0.1	<0.1	0.48	0.86	<0.1		<0.1
Aromatics >EC16-EC21	mg/kg	0.14	2.7	<0.1	<0.1	0.52	4.3	<0.1		<0.1
Aromatics >EC21-EC35	mg/kg	11	500	12	11	12	1100	<0.1		5.06
Total Aromatics C6-C35	mg/kg	12	500	12	11	13	1100	<0.1		
Aromatics >C35-44	mg/kg									1.59
Aromatics >EC40-EC44	mg/kg									0.662
Total Aromatics >EC12-EC44	mg/kg									6.65
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	12	620	14	13	16	1400	14		
Total Aliphatics & Aromatics >C5-C44	mg/kg									23.5
Total Aliphatic TPH	mg/kg									
Total Aromatic hydrocarbons	mg/kg									
Total petroleum hydrocarbons	mg/kg									
PAH										
Acenaphthene	mg/kg	<0.014	0.015	<0.014	<0.014	<0.014	<0.014	0.035	<0.1	<0.008
Acenaphthylene	mg/kg	0.011	0.019	<0.005	0.009	0.013	0.03	0.007	<0.1	<0.012
Anthracene	mg/kg	0.012	0.066	<0.009	<0.009	0.031	0.01	<0.009	<0.1	<0.016
Benzo(a)anthracene	mg/kg	0.091	0.37	0.041	0.068	0.13	0.046	0.067	<0.1	<0.014
Benzo(a)pyrene	mg/kg	0.06	0.26	0.025	0.052	0.088	0.024	0.13	<0.1	<0.015
Benzo(b)fluoranthene	mg/kg	0.14	0.43	0.046	0.09	0.14	0.5	0.15	<0.1	<0.015
Benzo(ghi)perylene	mg/kg	0.041	0.23	0.018	0.037	0.052	0.95	0.098	<0.1	<0.024
Benzo(k)fluoranthene	mg/kg	0.052	0.14	0.026	0.043	0.085	0.22	0.07	<0.1	<0.014
Chrysene	mg/kg	0.094	0.38	0.031	0.066	0.14	0.037	0.05	<0.1	<0.01
Dibenzo(ah)anthracene	mg/kg	0.008	0.1	<0.008	0.008	0.008	0.027	0.02	<0.1	<0.023
Fluoranthene	mg/kg	0.093	0.51	<0.025	0.052	0.2	0.037	<0.025	0.18	<0.017
Fluorene	mg/kg	<0.012	0.039	<0.012	<0.012	<0.012	<0.012	0.03	<0.1	<0.01
Indeno(123cd)pyrene	mg/kg	0.031	0.18	0.016	0.03	0.039	0.029	0.071	<0.1	<0.018
Naphthalene	mg/kg	0.017	0.053	<0.01	0.57	0.038	0.03	0.26	<0.1	0.0149
Phenanthrene	mg/kg	0.043	0.29	<0.021	<0.021	0.15	0.037	0.059	0.18	<0.015
Pyrene	mg/kg	0.075	0.41	<0.022	0.043	0.16	0.033	<0.022	0.14	<0.015
PAH 16 Total	mg/kg	0.77	3.5	0.2	1.1	1.3	2	1	<2	<0.118
SVOCs										
Phenols										
2-Chlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
2-Methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
2-Nitrophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
2,4-Dichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
2,4-Dimethylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
2,4,5-Trichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
2,4,6-Trichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
4-Chloro-3-methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
4-Methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
4-Nitrophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
Pentachlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
Phenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
PAHs										
2-Chloronaphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
2-Methylnaphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
Acenaphthene	mg/kg							<0.1		<0.1
Acenaphthylene	mg/kg							<0.1		<0.1
Anthracene	mg/kg							<0.1		<0.1

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CL-26 Reedbed No.1
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Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	RBBH006	RBBH007	RBBH007	RBBH008	RBBH008	RBBH008	RBBH009	RBBH009
Specimen Depth (m)		0.5	0.5	3.5	0.5	1	1.8	1	2.6
OD Level (m)									
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002
Benzo(a)anthracene	mg/kg								
Benzo(a)pyrene	mg/kg								
Benzo(b)fluoranthene	mg/kg								
Benzo(ghi)perylene	mg/kg								
Benzo(k)fluoranthene	mg/kg								
Chrysene	mg/kg								
Dibenzo(a,h)anthracene	mg/kg								
Fluoranthene	mg/kg								
Fluorene	mg/kg								
Indeno(1,2,3-cd)pyrene	mg/kg								
Naphthalene	mg/kg								
Phenanthrene	mg/kg								
Pyrene	mg/kg								
Pthalates									
Bis(2-ethylhexyl) phthalate	mg/kg								
Butylbenzyl phthalate	mg/kg								
Di-n-butyl phthalate	mg/kg								
Di-n-Octyl phthalate	mg/kg								
Diethyl phthalate	mg/kg								
Dimethyl phthalate	mg/kg								
Other Semi-Volatiles									
1,2-Dichlorobenzene	mg/kg								
1,2,4-Trichlorobenzene	mg/kg								
1,3-Dichlorobenzene	mg/kg								
1,4-Dichlorobenzene	mg/kg								
2-Nitroaniline	mg/kg								
2,4-Dinitrotoluene	mg/kg								
2,6-Dinitrotoluene	mg/kg								
3-Nitroaniline	mg/kg								
4-Bromophenylphenylether	mg/kg								
4-Chloroaniline	mg/kg								
4-Chlorophenylphenylether	mg/kg								
4-Nitroaniline	mg/kg								
Azobenzene	mg/kg								
Bis(2-chloroethoxy)methane	mg/kg								
Bis(2-chloroethyl)ether	mg/kg								
Carbazole	mg/kg								
Dibenzofuran	mg/kg								
Hexachlorobenzene	mg/kg								
Hexachlorobutadiene	mg/kg								
Hexachlorocyclopentadiene	mg/kg								
Hexachloroethane	mg/kg								
Isophorone	mg/kg								
N-nitrosodi-n-propylamine	mg/kg								
Nitrobenzene	mg/kg								
VOCs									
Methyl Tertiary Butyl Ether	ug/kg								
Benzene	ug/kg								
Toluene	ug/kg								
Ethylbenzene	ug/kg								
m,p xylenes	ug/kg								
o-Xylene	ug/kg								
Naphthalene	ug/kg								
Hexachlorobutadiene	ug/kg								
1.2.4-Trichlorobenzene	ug/kg								
1.2-Dichlorobenzene	ug/kg								
1.3-Dichlorobenzene	ug/kg								
1.4-Dichlorobenzene	ug/kg								
1.1.1.2-Tetrachloroethane	ug/kg								
1.1.1-Trichloroethane	ug/kg								
1.1.2.2-Tetrachloroethane	ug/kg								
1.1.2-Trichloroethane	ug/kg								
1.1-Dichloropropene	ug/kg								
1.1-Dichloroethane	ug/kg								
1.1-Dichloroethene	ug/kg								
1.2.3-Trichlorobenzene	ug/kg								
1.2.3-Trichloropropane	ug/kg								
1.2.4-Trimethylbenzene	ug/kg								
1.2-Dibromo-3-chloropropane	ug/kg								

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Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	RBBH010	RBTP005	RBTP006	RBTP007	RBTP009	RBTP010	RBTP011	SWSJ01
Specimen Depth (m)		1	0.5	0.4	0.4	0.5	0.5	0.5	0.1
OD Level (m)									5.72
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2007GI
Benzo(a)anthracene	mg/kg								
Benzo(a)pyrene	mg/kg								
Benzo(b)fluoranthene	mg/kg								
Benzo(ghi)perylene	mg/kg								
Benzo(k)fluoranthene	mg/kg								
Chrysene	mg/kg								
Dibenzo(a,h)anthracene	mg/kg								
Fluoranthene	mg/kg								
Fluorene	mg/kg								
Indeno(1,2,3-cd)pyrene	mg/kg								
Naphthalene	mg/kg								
Phenanthrene	mg/kg								
Pyrene	mg/kg								
Pthalates									
Bis(2-ethylhexyl) phthalate	mg/kg								350
Butylbenzyl phthalate	mg/kg								<100
Di-n-butyl phthalate	mg/kg								<100
Di-n-Octyl phthalate	mg/kg								<100
Diethyl phthalate	mg/kg								<100
Dimethyl phthalate	mg/kg								<100
Other Semi-Volatiles									
1,2-Dichlorobenzene	mg/kg		<0.005						<100
1,2,4-Trichlorobenzene	mg/kg		<0.025						<100
1,3-Dichlorobenzene	mg/kg		<0.05						<100
1,4-Dichlorobenzene	mg/kg		<0.05						<100
2-Nitroaniline	mg/kg								<100
2,4-Dinitrotoluene	mg/kg								<100
2,6-Dinitrotoluene	mg/kg								<100
3-Nitroaniline	mg/kg								<100
4-Bromophenylphenylether	mg/kg								<100
4-Chloroaniline	mg/kg								<100
4-Chlorophenylphenylether	mg/kg								<100
4-Nitroaniline	mg/kg								<100
Azobenzene	mg/kg								<100
Bis(2-chloroethoxy)methane	mg/kg								<100
Bis(2-chloroethyl)ether	mg/kg								<100
Carbazole	mg/kg								<100
Dibenzofuran	mg/kg								<100
Hexachlorobenzene	mg/kg								<100
Hexachlorobutadiene	mg/kg		<0.025						<100
Hexachlorocyclopentadiene	mg/kg								<100
Hexachloroethane	mg/kg								<100
Isophorone	mg/kg								<100
N-nitrosodi-n-propylamine	mg/kg								<100
Nitrobenzene	mg/kg								<100
VOCs									
Methyl Tertiary Butyl Ether	ug/kg								<11
Benzene	ug/kg		293						<9
Toluene	ug/kg		37						<5
Ethylbenzene	ug/kg		<5						<4
m,p xylenes	ug/kg		15						<11
o-Xylene	ug/kg		<5						<10
Naphthalene	ug/kg		1849						<13
Hexachlorobutadiene	ug/kg		<25						<12
1.2.4-Trichlorobenzene	ug/kg		<25						<6
1.2-Dichlorobenzene	ug/kg		<5						<12
1.3-Dichlorobenzene	ug/kg		<5						<6
1.4-Dichlorobenzene	ug/kg		<5						<5
1.1.1.2-Tetrachloroethane	ug/kg		<5						<10
1.1.1-Trichloroethane	ug/kg		<5						<7
1.1.2.2-Tetrachloroethane	ug/kg		<5						<10
1.1.2-Trichloroethane	ug/kg		<5						<10
1.1-Dichloropropene	ug/kg		<5						<11
1.1-Dichloroethane	ug/kg		<5						<8
1.1-Dichloroethene	ug/kg		<5						<10
1.2.3-Trichlorobenzene	ug/kg		<25						<11
1.2.3-Trichloropropane	ug/kg		<5						<17
1.2.4-Trimethylbenzene	ug/kg		<5						<9
1.2-Dibromo-3-chloropropane	ug/kg		<25						<14

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SWSJ01	SWSJ02	SWSJ03	SWSJ04	SWSJ06B	SWSJ06B	SWSJ07	SWSJ08	SWSJ08
Specimen Depth (m)		0.3	1	1	0	0.1	0.3	0.3	0.1	0.3
OD Level (m)		5.52	4.88	4.92	5.97	5.86	5.66	5.66	6.65	6.45
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed
Cluster Code		2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI
Benzo(a)anthracene	mg/kg	1.8								
Benzo(a)pyrene	mg/kg	2.3								
Benzo(b)fluoranthene	mg/kg	2.7								
Benzo(ghi)perylene	mg/kg	1.8								
Benzo(k)fluoranthene	mg/kg	1.9								
Chrysene	mg/kg	2.3								
Dibenzo(a,h)anthracene	mg/kg	0.38								
Fluoranthene	mg/kg	1.8								
Fluorene	mg/kg									
Indeno(1,2,3-cd)pyrene	mg/kg	2.6								
Naphthalene	mg/kg									
Phenanthrene	mg/kg	0.28								
Pyrene	mg/kg	1.6								
Pthalates										
Bis(2-ethylhexyl) phthalate	mg/kg	1000	<100	9800	420	680	200	700	460	<100
Butylbenzyl phthalate	mg/kg	<100	<100	<100	<100	<100	<100	200	<100	<100
Di-n-butyl phthalate	mg/kg	<100	<100	<100	<100	<100	480	<100	<100	<100
Di-n-Octyl phthalate	mg/kg	<100	<100	<100	<100	<100	<100	250	<100	<100
Diethyl phthalate	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Dimethyl phthalate	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Other Semi-Volatiles										
1,2-Dichlorobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
1,2,4-Trichlorobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
1,3-Dichlorobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
1,4-Dichlorobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
2-Nitroaniline	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
2,4-Dinitrotoluene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
2,6-Dinitrotoluene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
3-Nitroaniline	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
4-Bromophenylphenylether	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
4-Chloroaniline	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
4-Chlorophenylphenylether	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
4-Nitroaniline	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Azobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Bis(2-chloroethoxy)methane	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Bis(2-chloroethyl)ether	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Carbazole	mg/kg	<100	<100	<100	<100	450	<100	<100	<100	<100
Dibenzofuran	mg/kg	<100	<100	<100	<100	220	<100	<100	<100	<100
Hexachlorobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Hexachlorobutadiene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Hexachlorocyclopentadiene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Hexachloroethane	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Isophorone	mg/kg	<100	<100	<100	<100	<100	<100	170	<100	<100
N-nitrosodi-n-propylamine	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
Nitrobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100
VOCs										
Methyl Tertiary Butyl Ether	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11
Benzene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9	<9
Toluene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	ug/kg	<4	<4	<4	<4	<4	<4	<4	<4	<4
m,p xylenes	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11
o-Xylene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
Naphthalene	ug/kg	<13	<13	<13	<13	<13	<13	<13	<13	<13
Hexachlorobutadiene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12
1.2.4-Trichlorobenzene	ug/kg	<6	<6	<6	<6	<6	<6	<6	<6	<6
1.2-Dichlorobenzene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12
1.3-Dichlorobenzene	ug/kg	<6	<6	<6	<6	<6	<6	<6	<6	<6
1.4-Dichlorobenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5
1.1.1.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
1.1.1-Trichloroethane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7	<7
1.1.2.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
1.1.2-Trichloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
1.1-Dichloropropene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11
1.1-Dichloroethane	ug/kg	<8	<8	<8	<8	<8	<8	<8	<8	<8
1.1-Dichloroethene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
1.2.3-Trichlorobenzene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11
1.2.3-Trichloropropane	ug/kg	<17	<17	<17	<17	<17	<17	<17	<17	<17
1.2.4-Trimethylbenzene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9	<9
1.2-Dibromo-3-chloropropane	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SBHJ01CP	BH508		RBBH006	RBBH006	RBBH006	RBBH007	RBBH008	RBBH008	RBBH0010
Specimen Depth (m)		1	0.0-0.3		0.9	3.5	6.5	3.7	4.5	6.5	2.3
OD Level (m)		5.57	5.9								
Sample Type		ES	ES		ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-slag		TFD	TFD (Peat)	TFD	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD
Cluster Code		2007GI	2015GI		2002	2002	2002	2002	2002	2002	2002
Benzo(a)anthracene	mg/kg	<0.1									
Benzo(a)pyrene	mg/kg	<0.1									
Benzo(b)fluoranthene	mg/kg	<0.1									
Benzo(ghi)perylene	mg/kg	<0.1									
Benzo(k)fluoranthene	mg/kg	<0.1									
Chrysene	mg/kg	<0.1									
Dibenzo(a,h)anthracene	mg/kg	<0.1									
Fluoranthene	mg/kg	<0.1									
Fluorene	mg/kg	<0.1									
Indeno(1,2,3-cd)pyrene	mg/kg	<0.1									
Naphthalene	mg/kg	<0.1									
Phenanthrene	mg/kg	<0.1									
Pyrene	mg/kg	<0.1									
Pthalates											
Bis(2-ethylhexyl) phthalate	mg/kg	120									
Butylbenzyl phthalate	mg/kg	<100									
Di-n-butyl phthalate	mg/kg	<100									
Di-n-Octyl phthalate	mg/kg	<100									
Diethyl phthalate	mg/kg	<100									
Dimethyl phthalate	mg/kg	<100									
Other Semi-Volatiles											
1,2-Dichlorobenzene	mg/kg	<100									
1,2,4-Trichlorobenzene	mg/kg	<100									
1,3-Dichlorobenzene	mg/kg	<100									
1,4-Dichlorobenzene	mg/kg	<100									
2-Nitroaniline	mg/kg	<100									
2,4-Dinitrotoluene	mg/kg	<100									
2,6-Dinitrotoluene	mg/kg	<100									
3-Nitroaniline	mg/kg	<100									
4-Bromophenylphenylether	mg/kg	<100									
4-Chloroaniline	mg/kg	<100									
4-Chlorophenylphenylether	mg/kg	<100									
4-Nitroaniline	mg/kg	<100									
Azobenzene	mg/kg	<100									
Bis(2-chloroethoxy)methane	mg/kg	<100									
Bis(2-chloroethyl)ether	mg/kg	<100									
Carbazole	mg/kg	<100									
Dibenzofuran	mg/kg	<100									
Hexachlorobenzene	mg/kg	<100									
Hexachlorobutadiene	mg/kg	<100									
Hexachlorocyclopentadiene	mg/kg	<100									
Hexachloroethane	mg/kg	<100									
Isophorone	mg/kg	<100									
N-nitrosodi-n-propylamine	mg/kg	<100									
Nitrobenzene	mg/kg	<100									
VOCs											
Methyl Tertiary Butyl Ether	ug/kg	<11									
Benzene	ug/kg	<9									
Toluene	ug/kg	<5									
Ethylbenzene	ug/kg	<4									
m,p xylenes	ug/kg	<11									
o-Xylene	ug/kg	<10									
Naphthalene	ug/kg	<13									
Hexachlorobutadiene	ug/kg	<12									
1.2.4-Trichlorobenzene	ug/kg	<6									
1.2-Dichlorobenzene	ug/kg	<12									
1.3-Dichlorobenzene	ug/kg	<6									
1.4-Dichlorobenzene	ug/kg	<5									
1.1.1.2-Tetrachloroethane	ug/kg	<10									
1.1.1-Trichloroethane	ug/kg	<7									
1.1.2.2-Tetrachloroethane	ug/kg	<10									
1.1.2-Trichloroethane	ug/kg	<10									
1.1-Dichloropropene	ug/kg	<11									
1.1-Dichloroethane	ug/kg	<8									
1.1-Dichloroethene	ug/kg	<10									
1.2.3-Trichlorobenzene	ug/kg	<11									
1.2.3-Trichloropropane	ug/kg	<17									
1.2.4-Trimethylbenzene	ug/kg	<9									
1.2-Dibromo-3-chloropropane	ug/kg	<14									

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SWSJ02	SWSJ03	SWSJ04	SWSJ05	SWSJ05	SWSJ07	SBHJ01CP	BH508	BHM4CAN033
Specimen Depth (m)		2	3	1	1	2	4.8	2	2.5-2.6	0.5
OD Level (m)		3.88	2.92	4.97	4.82	3.82	1.16	4.57	3.4	5.86
Sample Type		ES	ES	ES	ES	ES	ES	U	ES	ES
Geology Code		TFD	TFD	TFD	TFD	TFD	PEAT	TFD	TFD	MG - slag
Cluster Code		2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2015GI	2016 GI
Benzo(a)anthracene	mg/kg							<0.1		<0.1
Benzo(a)pyrene	mg/kg							<0.1		<0.1
Benzo(b)fluoranthene	mg/kg							<0.1		<0.1
Benzo(ghi)perylene	mg/kg							<0.1		<0.1
Benzo(k)fluoranthene	mg/kg							<0.1		<0.1
Chrysene	mg/kg							<0.1		<0.1
Dibenzo(a,h)anthracene	mg/kg							<0.1		<0.1
Fluoranthene	mg/kg							<0.1		<0.1
Fluorene	mg/kg							<0.1		<0.1
Indeno(1,2,3-cd)pyrene	mg/kg							<0.1		<0.1
Naphthalene	mg/kg							<0.1		<0.1
Phenanthrene	mg/kg							<0.1		<0.1
Pyrene	mg/kg							<0.1		<0.1
Pthalates										
Bis(2-ethylhexyl) phthalate	mg/kg	150	690	1000	1800	1200	690	0.21		<0.1
Butylbenzyl phthalate	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Di-n-butyl phthalate	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Di-n-Octyl phthalate	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Diethyl phthalate	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Dimethyl phthalate	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Other Semi-Volatiles										
1,2-Dichlorobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
1,2,4-Trichlorobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
1,3-Dichlorobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
1,4-Dichlorobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
2-Nitroaniline	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
2,4-Dinitrotoluene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
2,6-Dinitrotoluene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
3-Nitroaniline	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
4-Bromophenylphenylether	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
4-Chloroaniline	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
4-Chlorophenylphenylether	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
4-Nitroaniline	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Azobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Bis(2-chloroethoxy)methane	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Bis(2-chloroethyl)ether	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Carbazole	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Dibenzofuran	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Hexachlorobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Hexachlorobutadiene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Hexachlorocyclopentadiene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Hexachloroethane	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Isophorone	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
N-nitrosodi-n-propylamine	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
Nitrobenzene	mg/kg	<100	<100	<100	<100	<100	<100	<0.1		<0.1
VOCs										
Methyl Tertiary Butyl Ether	ug/kg	<11	<11	<11	<11	<11	<11	<11		<100
Benzene	ug/kg	<9	<9	<9	<9	<9	<9	<9		<90
Toluene	ug/kg	<5	<5	<5	<5	<5	<5	<5		<70
Ethylbenzene	ug/kg	<4	<4	<4	<4	<4	<4	<4		<40
m,p xylenes	ug/kg	<11	<11	<11	<11	<11	<11	<11		<100
o-Xylene	ug/kg	<10	<10	<10	<10	<10	<10	<10		<100
Naphthalene	ug/kg	<13	<13	<13	320	<13	<13	<13		<130
Hexachlorobutadiene	ug/kg	<12	<12	<12	<12	<12	<12	<12		<200
1.2.4-Trichlorobenzene	ug/kg	<6	<6	<6	<6	<6	<6	<6		<200
1.2-Dichlorobenzene	ug/kg	<12	<12	<12	<12	<12	<12	<12		<100
1.3-Dichlorobenzene	ug/kg	<6	<6	<6	<6	<6	<6	<6		<80
1.4-Dichlorobenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5		<50
1.1.1.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10		<100
1.1.1-Trichloroethane	ug/kg	<7	<7	<7	<7	<7	<7	<7		<70
1.1.2.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10		<100
1.1.2-Trichloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10		<100
1.1-Dichloropropene	ug/kg	<11	<11	<11	<11	<11	<11	<11		<100
1.1-Dichloroethane	ug/kg	<8	<8	<8	<8	<8	<8	<8		<80
1.1-Dichloroethene	ug/kg	<10	<10	<10	<10	<10	<10	<10		<100
1.2.3-Trichlorobenzene	ug/kg	<11	<11	<11	<11	<11	<11	<11		<200
1.2.3-Trichloropropane	ug/kg	<17	<17	<17	<17	<17	<17	<17		<160
1.2.4-Trimethylbenzene	ug/kg	<9	<9	<9	<9	<9	<9	<9		<90
1.2-Dibromo-3-chloropropane	ug/kg	<14	<14	<14	<14	<14	<14	<14		<140

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

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Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	RBBH006	RBBH007	RBBH007	RBBH008	RBBH008	RBBH008	RBBH009	RBBH009
Specimen Depth (m)		0.5	0.5	3.5	0.5	1	1.8	1	2.6
OD Level (m)									
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag	MG-slag
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002
1.2-Dichloroethane	ug/kg								
cis-1-2-Dichloroethene	ug/kg								
1.2-Dibromoethane	ug/kg								
1.2-Dichloropropane	ug/kg								
1.3.5-Trimethylbenzene	ug/kg								
cis-1-3-Dichloropropene	ug/kg								
1.3-Dichloropropane	ug/kg								
2.2-Dichloropropane	ug/kg								
2-Chlorotoluene	ug/kg								
4-Chlorotoluene	ug/kg								
4-Isopropyltoluene	ug/kg								
Bromobenzene	ug/kg								
Bromochloromethane	ug/kg								
Bromoform	ug/kg								
Bromomethane	ug/kg								
Bromodichloromethane	ug/kg								
Chlorobenzene	ug/kg								
Carbon Disulphide	ug/kg								
Chloroethane	ug/kg								
Chloroform	ug/kg								
Chloromethane	ug/kg								
Carbontetrachloride	ug/kg								
Dibromomethane	ug/kg								
Dichlorodifluoromethane	ug/kg								
Dibromochloromethane	ug/kg								
Dichloromethane	ug/kg								
Isopropylbenzene	ug/kg								
n-Butylbenzene	ug/kg								
Propylbenzene	ug/kg								
sec-Butylbenzene	ug/kg								
Styrene	ug/kg								
trans-1-2-Dichloroethene	ug/kg								
trans-1-3-Dichloropropene	ug/kg								
Trichlorofluoromethane	ug/kg								
tert-amyl methyl ether	ug/kg								
tert-Butylbenzene	ug/kg								
Tetrachloroethene	ug/kg								
Trichloroethene	ug/kg								
Vinyl Chloride	ug/kg								

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

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Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	RBBH010	RBTP005	RBTP006	RBTP007	RBTP009	RBTP010	RBTP011	SWSJ01
Specimen Depth (m)		1	0.5	0.4	0.4	0.5	0.5	0.5	0.1
OD Level (m)									5.72
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2007GI
1.2-Dichloroethane	ug/kg		<5						<5
cis-1-2-Dichloroethene	ug/kg		<5						<5
1.2-Dibromoethane	ug/kg		<5						<12
1.2-Dichloropropane	ug/kg		<5						<12
1.3.5-Trimethylbenzene	ug/kg		<5						<8
cis-1-3-Dichloropropene	ug/kg		<5						<14
1.3-Dichloropropane	ug/kg		<5						<7
2.2-Dichloropropane	ug/kg		<5						<12
2-Chlorotoluene	ug/kg		<5						<9
4-Chlorotoluene	ug/kg		<5						<12
4-Isopropyltoluene	ug/kg		<5						<11
Bromobenzene	ug/kg		<5						<10
Bromochloromethane	ug/kg		<5						<14
Bromoform	ug/kg		<5						<10
Bromomethane	ug/kg		<5						<13
Bromodichloromethane	ug/kg		<5						<7
Chlorobenzene	ug/kg		<5						10
Carbon Disulphide	ug/kg								<7
Chloroethane	ug/kg		<5						<14
Chloroform	ug/kg		<5						<8
Chloromethane	ug/kg		<5						760
Carbontetrachloride	ug/kg		<5						<14
Dibromomethane	ug/kg		<5						<9
Dichlorodifluoromethane	ug/kg		<5						<4
Dibromochloromethane	ug/kg		<5						<13
Dichloromethane	ug/kg								<10
Isopropylbenzene	ug/kg		<5						<5
n-Butylbenzene	ug/kg		<5						<10
Propylbenzene	ug/kg		<5						<11
sec-Butylbenzene	ug/kg		<5						<10
Styrene	ug/kg		<5						<10
trans-1-2-Dichloroethene	ug/kg		<5						<11
trans-1-3-Dichloropropene	ug/kg		<5						<14
Trichlorofluoromethane	ug/kg		<5						<6
tert-amyl methyl ether	ug/kg								
tert-Butylbenzene	ug/kg		<5						<12
Tetrachloroethene	ug/kg		<5						<5
Trichloroethene	ug/kg		<5						<9
Vinyl Chloride	ug/kg		<5						<10

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

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Chromium VI criteria used
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Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SWSJ01	SWSJ02	SWSJ03	SWSJ04	SWSJ06B	SWSJ06B	SWSJ07	SWSJ08	SWSJ08
Specimen Depth (m)		0.3	1	1	0	0.1	0.3	0.3	0.1	0.3
OD Level (m)		5.52	4.88	4.92	5.97	5.86	5.66	5.66	6.65	6.45
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed	MG-sed
Cluster Code		2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI
1.2-Dichloroethane	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1-2-Dichloroethene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5
1.2-Dibromoethane	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12
1.2-Dichloropropane	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12
1.3.5-Trimethylbenzene	ug/kg	<8	<8	<8	<8	<8	<8	<8	<8	<8
cis-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14
1.3-Dichloropropane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7	<7
2.2-Dichloropropane	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12
2-Chlorotoluene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9	<9
4-Chlorotoluene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12
4-Isopropyltoluene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11
Bromobenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bromochloromethane	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14
Bromoform	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bromomethane	ug/kg	<13	<13	<13	<13	<13	<13	<13	<13	<13
Bromodichloromethane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7	<7
Chlorobenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Disulphide	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7	<7
Chloroethane	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14
Chloroform	ug/kg	<8	<8	<8	<8	<8	<8	<8	<8	<8
Chloromethane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7	<7
Carbontetrachloride	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14
Dibromomethane	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9	<9
Dichlorodifluoromethane	ug/kg	<4	<4	<4	<4	<4	<4	<4	<4	<4
Dibromochloromethane	ug/kg	<13	<13	<13	<13	<13	<13	<13	<13	<13
Dichloromethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
Isopropylbenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5
n-Butylbenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
Propylbenzene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11
sec-Butylbenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
Styrene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
trans-1-2-Dichloroethene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11
trans-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14
Trichlorofluoromethane	ug/kg	<6	<6	<6	<6	<6	<6	<6	<6	<6
tert-amyl methyl ether	ug/kg									
tert-Butylbenzene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12
Tetrachloroethene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9	<9
Vinyl Chloride	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	Units	SBHJ01CP	BH508		RBBH006	RBBH006	RBBH006	RBBH007	RBBH008	RBBH008	RBBH0010
Specimen Depth (m)		1	0.0-0.3		0.9	3.5	6.5	3.7	4.5	6.5	2.3
OD Level (m)		5.57	5.9								
Sample Type		ES	ES		ES	ES	ES	ES	ES	ES	ES
Geology Code		MG-slag	MG-slag		TFD	TFD (Peat)	TFD	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD
Cluster Code		2007GI	2015GI		2002	2002	2002	2002	2002	2002	2002
1.2-Dichloroethane	ug/kg	<5									
cis-1-2-Dichloroethene	ug/kg	<5									
1.2-Dibromoethane	ug/kg	<12									
1.2-Dichloropropane	ug/kg	<12									
1.3.5-Trimethylbenzene	ug/kg	<8									
cis-1-3-Dichloropropene	ug/kg	<14									
1.3-Dichloropropane	ug/kg	<7									
2.2-Dichloropropane	ug/kg	<12									
2-Chlorotoluene	ug/kg	<9									
4-Chlorotoluene	ug/kg	<12									
4-Isopropyltoluene	ug/kg	<11									
Bromobenzene	ug/kg	<10									
Bromochloromethane	ug/kg	<14									
Bromoform	ug/kg	<10									
Bromomethane	ug/kg	<13									
Bromodichloromethane	ug/kg	<7									
Chlorobenzene	ug/kg	<5									
Carbon Disulphide	ug/kg	<7									
Chloroethane	ug/kg	<14									
Chloroform	ug/kg	<8									
Chloromethane	ug/kg	<7									
Carbontetrachloride	ug/kg	<14									
Dibromomethane	ug/kg	<9									
Dichlorodifluoromethane	ug/kg	<4									
Dibromochloromethane	ug/kg	<13									
Dichloromethane	ug/kg	<10									
Isopropylbenzene	ug/kg	<5									
n-Butylbenzene	ug/kg	<10									
Propylbenzene	ug/kg	<11									
sec-Butylbenzene	ug/kg	<10									
Styrene	ug/kg	<10									
trans-1-2-Dichloroethene	ug/kg	<11									
trans-1-3-Dichloropropene	ug/kg	<14									
Trichlorofluoromethane	ug/kg	<6									
tert-amyl methyl ether	ug/kg										
tert-Butylbenzene	ug/kg	<12									
Tetrachloroethene	ug/kg	<5									
Trichloroethene	ug/kg	<9									
Vinyl Chloride	ug/kg	<10									

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Reedbed No.1
20/06/2016

Notes

NFD = No Fibres Detected
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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground	MG
Sediment	Sed
Tidal Flat Deposits	TFD
Peat	PEAT

Sample Reference	**Units**	**SWSJ02**	**SWSJ03**	**SWSJ04**	**SWSJ05**	**SWSJ05**	**SWSJ07**	**SBHJ01CP**	**BH508**	**BHM4CAN033**
Specimen Depth (m)		2	3	1	1	2	4.8	2	2.5-2.6	0.5
OD Level (m)		3.88	2.92	4.97	4.82	3.82	1.16	4.57	3.4	5.86
Sample Type		ES	ES	ES	ES	ES	ES	U	ES	ES
Geology Code		TFD	TFD	TFD	TFD	TFD	PEAT	TFD	TFD	MG - slag
Cluster Code		2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2007GI	2015GI	2016 GI
1.2-Dichloroethane	ug/kg	<5	<5	<5	<5	<5	<5	<5		<50
cis-1-2-Dichloroethene	ug/kg	<5	<5	<5	<5	<5	<5	<5		<60
1.2-Dibromoethane	ug/kg	<12	<12	<12	<12	<12	<12	<12		<100
1.2-Dichloropropane	ug/kg	<12	<12	<12	<12	<12	<12	<12		<100
1.3.5-Trimethylbenzene	ug/kg	<8	<8	<8	<8	<8	<8	<8		<80
cis-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14	<14	<14	<14		<100
1.3-Dichloropropane	ug/kg	<7	<7	<7	<7	<7	<7	<7		<70
2.2-Dichloropropane	ug/kg	<12	<12	<12	<12	<12	<12	<12		<100
2-Chlorotoluene	ug/kg	<9	<9	<9	<9	<9	<9	<9		<90
4-Chlorotoluene	ug/kg	<12	<12	<12	<12	<12	<12	<12		<100
4-Isopropyltoluene	ug/kg	<11	<11	<11	<11	<11	<11	<11		<100
Bromobenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10		<100
Bromochloromethane	ug/kg	<14	<14	<14	<14	<14	<14	<14		<100
Bromoform	ug/kg	<10	<10	<10	<10	<10	<10	<10		<100
Bromomethane	ug/kg	<13	<13	<13	<13	<13	<13	<13		<100
Bromodichloromethane	ug/kg	<7	<7	<7	<7	<7	<7	<7		<70
Chlorobenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5		<50
Carbon Disulphide	ug/kg	<7	100	<7	<7	<7	<7	<7		<70
Chloroethane	ug/kg	<14	<14	<14	<14	<14	<14	<14		<100
Chloroform	ug/kg	<8	<8	<8	<8	<8	<8	<8		<80
Chloromethane	ug/kg	<7	<7	<7	<7	<7	<7	<7		<70
Carbontetrachloride	ug/kg	<14	<14	<14	<14	<14	<14	<14		<100
Dibromomethane	ug/kg	<9	<9	<9	<9	<9	<9	<9		<90
Dichlorodifluoromethane	ug/kg	<4	<4	<4	<4	<4	<4	<4		<60
Dibromochloromethane	ug/kg	<13	<13	<13	<13	<13	<13	<13		<100
Dichloromethane	ug/kg	<10	<10	<10	<10	<10	<10	<10		<100
Isopropylbenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5		<50
n-Butylbenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10		<110
Propylbenzene	ug/kg	<11	<11	<11	<11	<11	<11	<11		<100
sec-Butylbenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10		<100
Styrene	ug/kg	<10	<10	<10	<10	<10	<10	<10		<100
trans-1-2-Dichloroethene	ug/kg	<11	<11	<11	<11	<11	<11	<11		<100
trans-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14	<14	<14	<14		<100
Trichlorofluoromethane	ug/kg	<6	<6	<6	<6	<6	<6	<6		<60
tert-amyl methyl ether	ug/kg									<100
tert-Butylbenzene	ug/kg	<12	<12	<12	<12	<12	<12	<12		<140
Tetrachloroethene	ug/kg	<5	<5	<5	<5	<5	<5	<5		<50
Trichloroethene	ug/kg	<9	<9	<9	<9	<9	<9	<9		<90
Vinyl Chloride	ug/kg	<10	<10	<10	<10	<10	<10	<10		<60

Appendix 4

Groundwater Laboratory Data

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria	
Round			
Sample Type			
Sample Received Date			
Sampled Date			
Response Zone (RZ) Details		EQS	DWS
Depth			
Installation Details			
Metals			
Arsenic	ug/l	50	10
Beryllium Dissolved	ug/l		
Boron	ug/l	2000	1000
Cadmium Dissolved	ug/l	0.15	5
Calcium Dissolved	ug/l		
Chromium Dissolved	ug/l		50
Copper Dissolved	ug/l	10	2000
Iron Dissolved	ug/l	1000	200
Lead Dissolved	ug/l	1.2	10
Mercury Dissolved	ug/l	0.07	1
Magnesium Dissolved	ug/l		
Manganese Dissolved	ug/l	30	50
Nickel Dissolved	ug/l	4	20
Selenium Dissolved	ug/l		10
Vanadium Dissolved	ug/l		
Cadmium Total	ug/l	0.15	5
Zinc Total	ug/l	75	
Mercury Total	ug/l	0.07	1
Molybdenum	ug/l		
Non-Metal Inorganics			
Hardness Total	mg/l		
Total Alkalinity as CaCO3	mg/l		
Conductivity uS/cm @25C	uS/cm		
BOD	mg/l	5	
COD	mg/l		
Potassium Dissolved	mg/l		
Sodium Dissolved	mg/l		200
Nitrate as NO3	mg/l		50
Nitrite as NO2	mg/l		
Sulphate (soluble)	mg/l	400	250
Chloride	mg/l	250	250
Sulphide	mg/l		
Phosphate	mg/l		
Fluoride	mg/l	5000	1500
Ammoniacal Nitrogen as N	mg/l	0.6	
Total Ammonium as NH4	mg/l		0.5
Total Cyanide	mg/l	0.001	0.05
Free Cyanide	mg/l		
Carbon Dioxide Dissolved	ug/l		
pH Value	pH units	6-9	6.5-10
Total Sulphur as SO4	mg/l		
Toluene Extractable Material	mg/l		
Conductivity	uS/cm		
Thiocyanite	mg/l		
TOC	mg/l		
Bicarbonate Alkalinity as CaCo3	mg/l		
Phenols			
Phenols Monohydric	ug/l		
Phenols	mg/l	0.0077	
Phenol Index	mg/l		
Organics			
GRO (C4-C12)	ug/l		
GRO Surrogate % recovery**	%		
Benzene	ug/l	10	1
Toluene	ug/l	50	
Ethyl benzene	ug/l	20	
m & p Xylene	ug/l	30	
o Xylene	ug/l	30	
Methyl tert-butyl ether (MTBE)	ug/l		
TPH			
Aliphatics C5-C6	ug/l		
Aliphatics >C6-C8	ug/l		
Aliphatics >C8-C10	ug/l		
Aliphatics >C10-C12	ug/l		
Aliphatics >C12-C16	ug/l		
Aliphatics >C16-C21	ug/l		
Aliphatics >C21-C35	ug/l		
Total Aliphatics C5-C35 Aqueous	ug/l		
Aliphatics >C35-44	ug/l		
Aromatics >C5-C7	ug/l		
Aromatics >C6-C7	ug/l		
Aromatics >C7-C8	ug/l		
Aromatics >EC8-EC10	ug/l		
Aromatics >EC10-EC12	ug/l		
Aromatics >EC12-EC16	ug/l		
Aromatics >EC16-EC21	ug/l		
Aromatics >EC21-EC35	ug/l		
Total Aromatics C6-C35 Aqueous	ug/l		
Aromatics >C35-44	ug/l		
Total Aliphatic TPH	ug/l		
Total Aromatic TPH	ug/l		
>C8-C10	ug/l		
>C10-C12	ug/l		
>C12-C16	ug/l		
>C16-C21	ug/l		
>C21-C35	ug/l		
Diesel Range Hydrocarbons	ug/l		
Total petroleum hydrocarbons	ug/l		
PAH			
Acenaphthene	ug/l		

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Installation Details of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
50	49	50.8	0.829	BHM4CAN035b @ Shallow	1	15
2	0	None > LOD	None > LOD			
18	15	2300	50	BH510 @ Shallow	1	4
48	15	3.59	0.131	BHM4CAN035b @ Deep	13	0
7	7	378000	77000	CABH003 @ Single		
50	44	120	0.31	BH510 @ Deep		6
50	35	150	0.875	BH510 @ Deep	10	0
11	10	7700	20	SBHJ03 @ Single	2	6
50	30	5.52	0.063	BHM4CAN036 @ Single	14	0
42	3	0.0204	0.0111	BHM4CAN038a @ Shallow	0	0
7	5	187000	88000	CABH001 @ Single		
8	7	2750	12	CABH001 @ Single	6	6
50	47	56	0.735	CABH001 @ Single	33	5
50	50	56	2.65	BH510 @ Deep		24
32	32	39.5	0.619	BHM4CAN035b @ Shallow		
2	2	18	1.6	SBHJ03 @ Single	2	1
50	49	1800	0.584	SBHJ03 @ Single	3	
8	0	None > LOD	None > LOD		0	0
4	4	6	1	CABH003 @ Single		
2	2	580	550	SBHJ03 @ Single		
40	40	18700	146	BHM4CAN036 @ Single		
30	30	13800	515	BHM4CAN035b @ Deep		
2	2	78	56	SBHJ03 @ Single	2	
4	4	1000	110	SBHJ03 @ Single		
7	7	159	36	CABH003 @ Single		
7	7	1600	15	CABH001 @ Single		4
38	3	0.6	0.46	CABH003 @ Single		0
30	15	1.36	0.088	BHM4CAN035b @ Shallow		0
2	2	130	67	SBHJ03 @ Single	0	0
41	41	5520	13.8	BHM4CAN035b @ Deep	22	22
7	4	11.8	0.3	CABH003 @ Single		
9	4	4.9	0.17	CABH001 @ Single		
5	5	5.5	0.9	CABH003 @ Single	0	0
44	44	35.3	0.438	BHM4CAN036 @ Single	43	
1	1	21	21	SBHJ03 @ Single		1
20	0	None > LOD	None > LOD		0	0
9	0	None > LOD	None > LOD			
1	1	79	79	SBHJ03 @ Single		
50	50	12.8	6.96	BHM4CAN035b @ Shallow	0	0
9	9	1630	7.8	CABH003 @ Single		0
9	7	1400	6	CABH002 @ Single		0
9	9	9100	1640	CABH001 @ Single		0
9	9	1.9	0.5	CABH001 @ Single		0
8	8	64	13	CABH001 @ Single		0
3	3	1760	1630	CABH001 @ Single		0
2	0	None > LOD	None > LOD			
6	0	None > LOD	None > LOD		0	
9	5	0.2	0.1	CABH002 @ Single		
32	7	219	63	BHM4CAN038a @ Shallow		0
30	30	101	61	BHM4CAN038a @ Deep		0
49	1	2	2	CABH003 @ Single	0	1
49	5	17	4	CABH003 @ Single	0	
49	2	13	8	CABH003 @ Single	0	
49	2	45	28	CABH003 @ Single	1	
49	2	35	21	CABH003 @ Single	1	
35	0	None > LOD	None > LOD			
41	0	None > LOD	None > LOD			
41	5	18	10	BHM4CAN035b @ Shallow		
41	5	38	15	BHM4CAN038a @ Shallow		
41	11	80	13	BHM4CAN038a @ Shallow		
41	3	350	10	SBHJ03 @ Single		
41	14	245	10	BHM4CAN035b @ Shallow		
41	16	2170	18	BHM4CAN035b @ Shallow		
32	17	2470	18	BHM4CAN035b @ Shallow		0
9	0	None > LOD	None > LOD			
39	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
41	0	None > LOD	None > LOD			
41	5	26	12	BHM4CAN038a @ Shallow		
41	7	54	15	BHM4CAN038a @ Shallow		
41	12	590	10	SBHJ03 @ Single		
41	13	610	13	SBHJ03 @ Single		
41	16	1440	15	BHM4CAN035b @ Shallow		
32	19	1750	15	BHM4CAN035b @ Shallow		0
9	0	None > LOD	None > LOD			
9	0	None > LOD	None > LOD			
9	0	None > LOD	None > LOD			
6	5	799	13	BH3 @ Single		0
6	5	8420	73	BH3 @ Single		0
6	5	45900	181	BH3 @ Single		0
6	5	54300	290	BH3 @ Single		0
6	5	44100	274	BH3 @ Single		0
1	1	10	10	CABH001 @ Single		0
64	46	156000	18	BH3 @ Single		
60	30	419.001	0.0175	BH20 @ Single		

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Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria	
Round			
Sample Type			
Sample Received Date			
Sampled Date			
Response Zone (RZ) Details			
Depth			
Installation Details		EQS	DWS
Acenaphthylene	ug/l		
Anthracene	ug/l	0.1	
Benz(a)anthracene	ug/l		
Benzo(a)pyrene	ug/l	0.00017	0.01
Benzo(b)fluoranthene	ug/l	0.017	0.1
Benzo(ghi)perylene	ug/l	0.0082	0.1
Benzo(k)fluoranthene	ug/l	0.017	0.1
Chrysene	ug/l		
Dibenzo(ah)anthracene	ug/l		
Fluoranthene	ug/l	0.0063	
Fluorene	ug/l		
Indeno(123cd)pyrene	ug/l	N/A	0.1
Naphthalene	ug/l	2	
Phenanthrene	ug/l		
Pyrene	ug/l		
PAH 16 Total	ug/l		
VOCs			
1,1,1,2-Tetrachloroethane	ug/l		
1,1,1-Trichloroethane	ug/l	100	
1.1.2.2-Tetrachloroethane	ug/l		
1,1,2-Trichloroethane	ug/l	400	
1,1-Dichloroethane	ug/l		
1,1-Dichloroethene	ug/l		
1,1-Dichloropropene	ug/l		
1,2,3-Trichlorobenzene	ug/l	0.4	
1,2,3-Trichloropropane	ug/l		
1,2,4-Trichlorobenzene	ug/l	0.4	
1,2,4-Trimethylbenzene	ug/l		
1,2-Dibromo-3-Chloropropane	ug/l		
1,2-Dibromoethane	ug/l		
1,2-Dichlorobenzene	ug/l	20	
1,2-Dichloroethane	ug/l	10	3
1,2-Dichloropropane	ug/l		
1,3,5-Trimethylbenzene	ug/l		
1.3-Dichlorobenzene	ug/l	20	
1,3-Dichloropropane	ug/l		
1,4-Dichlorobenzene	ug/l	20	
2.2-Dichloropropane	ug/l		
2-Chlorotoluene	ug/l		
4-Bromofluorobenzene**	%		
4-Chlorotoluene	ug/l		
4-Isopropyltoluene	ug/l		
Benzene	ug/l	10	1
Bromobenzene	ug/l		
Bromochloromethane	ug/l		100
Bromodichloromethane	ug/l		
Bromoform	ug/l		
Bromomethane	ug/l		
Carbon Disulphide	ug/l		
Carbontetrachloride	ug/l	12	3
Chlorobenzene	ug/l		
Chloroethane	ug/l		
Chloroethene	ug/l		
Chloroform	ug/l	2.5	100
Chloromethane	ug/l		
cis-1,2-Dichloroethene	ug/l		
cis-1,3-Dichloropropene	ug/l		
Dibromochloromethane	ug/l		100
Dibromofluoromethane**	%		
Dibromomethane	ug/l		
Dichlorodifluoromethane	ug/l		
Dichloromethane	ug/l	20	
Ethylbenzene	ug/l	20	
Hexachlorobutadiene (HCBD)	ug/l	0.6	
Isopropylbenzene	ug/l		
m,p xylenes	ug/l	30	
Methyl tert-butyl ether (MTBE)	ug/l		
Naphthalene	ug/l	2	
n-Butylbenzene	ug/l		
n-propylbenzene	ug/l		
O-Xylene	ug/l	30	
Sec-Butylbenzene	ug/l		
Styrene	ug/l	50	
Tert-Butylbenzene	ug/l		
Tetrachloroethene	ug/l	10	10
Tetrachloromethane (Carbon Tetra Cl	ug/l	12	3
Toluene	ug/l	50	
Toluene-d8**	%		
trans-1,2-Dichloroethene	ug/l		
trans-1,3-Dichloropropene	ug/l		
Tribromomethane	ug/l		100
Trichloroethene	ug/l	10	10
Trichlorofluoromethane	ug/l		
Vinyl Chloride	ug/l	0	0.5
SVOCs			
PAHs			
Acenaphthene	ug/l		
Acenaphthylene	ug/l		
Anthracene	ug/l	0.1	
Benzo(a)anthracene	ug/l		
Benzo(a)pyrene	ug/l	0.00017	0.01

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Installation Details of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
60	21	4.223	0.01	BH21 @ Single		
60	20	18.865	0.0154	BH20 @ Single	13	
60	30	21.7	0.0192	BHM4CAN035b @ Shallow		
60	23	32.9	0.01	BHM4CAN036 @ Single	23	22
60	22	40.6	0.0433	BHM4CAN035b @ Shallow	22	17
60	21	25	0.0233	BHM4CAN036 @ Single	21	15
60	19	16.8	0.0285	BHM4CAN036 @ Single	19	9
60	29	20	0.0142	BHM4CAN035b @ Shallow		
60	13	6.03	0.0206	BHM4CAN036 @ Single		
60	39	33.836	0.0215	BH20 @ Single	39	
60	30	235.823	0.0187	BH20 @ Single		
60	22	18.5	0.0192	BHM4CAN036 @ Single	0	13
60	30	1027	0.113	CABH002 @ Single	12	
60	35	329.099	0.0234	BH20 @ Single		
60	39	20.841	0.0168	BH20 @ Single		
58	24	231	0.383	BHM4CAN035b @ Shallow		
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD		0	
40	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD		0	
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD		0	
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD		0	
43	2	57	40	CABH003 @ Single		
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD		0	
43	0	None > LOD	None > LOD		0	0
43	0	None > LOD	None > LOD			
43	2	15	12	CABH003 @ Single		
38	0	None > LOD	None > LOD		0	
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD		0	
38	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			
30	30	103	84	WSM4CAN023 @ Single		0
43	0	None > LOD	None > LOD			
43	1	3	3	CABH003 @ Single		
41	0	None > LOD	None > LOD		0	0
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			0
43	0	None > LOD	None > LOD			
40	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			
32	3	1.52	1.1	BHM4CAN036 @ Single		
38	0	None > LOD	None > LOD		0	0
43	1	1.79	1.79	WSM4CAN023 @ Single		
43	0	None > LOD	None > LOD			
33	0	None > LOD	None > LOD			
43	1	1	1	CABH003 @ Single	0	0
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			0
30	30	119	0.46	BHM4CAN035b @ Deep		0
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			
32	0	None > LOD	None > LOD		0	
41	0	None > LOD	None > LOD		0	
43	0	None > LOD	None > LOD		0	
43	1	4	4	CABH003 @ Single		
41	1	1.04	1.04	BHM4CAN039 @ Shallow	0	
35	0	None > LOD	None > LOD			
38	10	2909	1.06	CABH002 @ Single	6	
43	1	6	6	CABH003 @ Single		
35	0	None > LOD	None > LOD			
35	0	None > LOD	None > LOD		0	
49	1	3	3	CABH003 @ Single		
43	0	None > LOD	None > LOD		0	
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD		0	0
35	0	None > LOD	None > LOD		0	0
41	14	6.47	1.74	BHM4CAN037 @ Deep	0	
30	30	109	94.1	BHM4CAN039 @ Deep		0
43	0	None > LOD	None > LOD			
43	0	None > LOD	None > LOD			
33	0	None > LOD	None > LOD			0
43	2	11	9	CABH003 @ Single	1	1
43	0	None > LOD	None > LOD			
40	0	None > LOD	None > LOD		0	0
30	2	1.35	1.04	BHM4CAN037 @ Shallow		
30	0	None > LOD	None > LOD			
30	1	1.55	1.55	BHM4CAN035b @ Shallow	1	
30	2	10.4	1.18	BHM4CAN035b @ Shallow		
30	2	10.2	1.48	BHM4CAN035b @ Shallow	2	2

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X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
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X Offsite borehole location

Sample Reference	Units	Screening Criteria	
Round			
Sample Type			
Sample Received Date			
Sampled Date			
Response Zone (RZ) Details			
Depth			
Installation Details		EQS	DWS

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Installation Details of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
Benzo(b)fluoranthene	ug/l	0.017	0.1	30	4	15.2	1.41	BHM4CAN035b @ Shallow	4	4
Benzo(ghi)perylene	ug/l	0.0082	0.1	30	2	7.96	1.25	BHM4CAN035b @ Shallow	2	2
Benzo(k)fluoranthene	ug/l	0.017	0.1	30	1	5.22	5.22	BHM4CAN035b @ Shallow	1	1
Chrysene	ug/l			30	4	9.21	1.03	BHM4CAN035b @ Shallow		
Dibenzo(ah)anthracene	ug/l			30	1	1.96	1.96	BHM4CAN035b @ Shallow		
Fluoranthene	ug/l	0.0063		30	5	15.3	1.38	BHM4CAN035b @ Shallow	5	
Fluorene	ug/l			30	0	None > LOD	None > LOD			
Indeno(123cd)pyrene	ug/l	N/A	0.1	30	2	6.66	1.1	BHM4CAN035b @ Shallow	0	2
Naphthalene	ug/l	2		30	7	3.11	1.07	BHM4CAN037 @ Shallow	4	
Phenanthrene	ug/l			30	7	6.33	1.09	BHM4CAN035b @ Shallow		
Pyrene	ug/l			30	5	13.1	1.05	BHM4CAN035b @ Shallow		
Other SVOCs										
1,2-Dichlorobenzene	ug/l	20		35	0	None > LOD	None > LOD		0	
1,2,4-Trichlorobenzene	ug/l			32	0	None > LOD	None > LOD			0
1,3-Dichlorobenzene	ug/l			32	0	None > LOD	None > LOD			0
1,4-Dichlorobenzene	ug/l			32	0	None > LOD	None > LOD			0
2,4,5-Trichlorophenol	ug/l			35	0	None > LOD	None > LOD			
2,4,6-Trichlorophenol	ug/l			35	0	None > LOD	None > LOD			
2,4-Dichlorophenol	ug/l	20		35	0	None > LOD	None > LOD		0	
2,4-Dimethylphenol	ug/l			35	0	None > LOD	None > LOD			
2,4-Dinitrotoluene	ug/l			35	0	None > LOD	None > LOD			
2,6-Dinitrotoluene	ug/l			35	0	None > LOD	None > LOD			
2-Chloronaphthalene	ug/l			35	0	None > LOD	None > LOD			
2-Chlorophenol	ug/l	50		35	0	None > LOD	None > LOD		0	
2-Methyl-4,6-Dinitrophenol	ug/l			3	0	None > LOD	None > LOD			
2-Methylnaphthalene	ug/l			35	4	2.78	1.03	BHM4CAN037 @ Shallow		
2-Methylphenol	ug/l	100		35	1	1.78	1.78	BHM4CAN038a @ Shallow	0	
2-Nitroaniline	ug/l			35	0	None > LOD	None > LOD			
2-Nitrophenol	ug/l			35	0	None > LOD	None > LOD			
3-Nitroaniline	ug/l			35	0	None > LOD	None > LOD			
4-Bromophenyl Phenyl Ether	ug/l			35	0	None > LOD	None > LOD			
4-Chloro-3-Methylphenol	ug/l	40		35	0	None > LOD	None > LOD		0	
4-Chloroaniline	ug/l			35	0	None > LOD	None > LOD			
4-Chlorophenyl Phenyl Ether	ug/l			35	0	None > LOD	None > LOD			
4-Methylphenol	ug/l	100		35	1	9.37	9.37	BHM4CAN038a @ Shallow	0	
4-Nitroaniline	ug/l			35	0	None > LOD	None > LOD			
Azobenzene	ug/l			35	0	None > LOD	None > LOD			
Bis(2-chloroethoxy)methane	ug/l			35	0	None > LOD	None > LOD			
Bis(2-chloroethyl)ether	ug/l			35	0	None > LOD	None > LOD			
Bis(2-chloroisopropyl)ether	ug/l			3	0	None > LOD	None > LOD			
Bis(2-ethylhexyl)phthalate	ug/l	1.3		35	13	194	3.14	BHM4CAN036 @ Single	13	
Butylbenzylphthalate	ug/l	20		35	0	None > LOD	None > LOD		0	
Carbazole	ug/l			35	4	1.95	1.74	BHM4CAN037 @ Shallow		
Dibenzofuran	ug/l			35	2	1.28	1.1	BHM4CAN037 @ Shallow		
Diethylphthalate	ug/l	200		35	0	None > LOD	None > LOD		0	
Dimethylphthalate	ug/l	800		35	0	None > LOD	None > LOD		0	
Di-N-Butyl Phthalate	ug/l	8		35	0	None > LOD	None > LOD		0	
Di-N-Octyl Phthalate	ug/l	20		35	0	None > LOD	None > LOD		0	
Hexachlorobenzene (HCB)	ug/l	0.05		35	0	None > LOD	None > LOD		0	
Hexachlorobutadiene	ug/l			32	0	None > LOD	None > LOD			0
Hexachlorocyclopentadiene	ug/l			35	0	None > LOD	None > LOD			
Hexachloroethane	ug/l			35	0	None > LOD	None > LOD			
Isophorone	ug/l			35	0	None > LOD	None > LOD			
Nitrobenzene	ug/l			35	0	None > LOD	None > LOD			
n-nitrosodimethylamine	ug/l			3	0	None > LOD	None > LOD			
N-Nitroso-Di-N-Propylamine	ug/l			35	0	None > LOD	None > LOD			
Pentachlorophenol (PCP)	ug/l	0.4		35	0	None > LOD	None > LOD		0	
Phenol	ug/l	7.7		35	11	57.1	3.24	BHM4CAN038a @ Shallow	9	
PCBs										
Pcb-101 2,2',4,5,5' - Pentachlorobiphe	ug/l	0	0	3	0	None > LOD	None > LOD		0	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphe	ug/l	0	0	3	0	None > LOD	None > LOD		0	0
Pcb-138 2,2',3,4,4',5' - Hexachlorobiph	ug/l	0	0	3	0	None > LOD	None > LOD		0	0
Pcb-153 2,2',4,4',5,5' - Hexachlorobiph	ug/l	0	0	3	0	None > LOD	None > LOD		0	0
Pcb-180 2,2',3,4,4',5,5' - Heptachlorob	ug/l	0	0	3	0	None > LOD	None > LOD		0	0
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0	3	0	None > LOD	None > LOD		0	0
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0	3	0	None > LOD	None > LOD		0	0
PCB congener 105	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 114	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 118	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 123	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 126	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 156	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 157	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 167	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 169	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 189	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 77	ug/l			20	0	None > LOD	None > LOD			0
PCB congener 81	ug/l			20	0	None > LOD	None > LOD			0

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		CABH002	CABH002	CABH002	BH5	BH13	BH14	CABH003	CABH003	BH1	BH2	BH3	BH4	BH4	BH6	BH7	BH8
Round				Round 1	Round 2	Round 3				Round 1	Round 2								
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date											26/04/2002								
Sampled Date				14/03/2002		17/04/2002	29/06/2005	06/07/2006	06/07/2006	14/03/2002	17/04/2002	29/06/2005	04/07/2005	29/06/2005	29/06/2005	07/07/2006	06/07/2006	06/07/2006	06/07/2006
Response Zone (RZ) Details				MG	MG	MG	MG	MG	MG	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD
Depth																			
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single
Metals																			
Arsenic	ug/l	50	10	2	2	3				1	1								
Beryllium Dissolved	ug/l																		
Boron	ug/l	2000	1000	<50	50	130				<50	<50								
Cadmium Dissolved	ug/l	0.15	5	<0.1	<0.1	<0.1				<0.1	<0.1								
Calcium Dissolved	ug/l									369000	378000								
Chromium Dissolved	ug/l		50	5	<1	<1				2	<1								
Copper Dissolved	ug/l	10	2000	<1	<1	<1				<1	<1								
Iron Dissolved	ug/l	1000	200	50	100	20				70	<10								
Lead Dissolved	ug/l	1.2	10	<1	<1	<1				<1	<1								
Mercury Dissolved	ug/l	0.07	1	<0.1	<0.1	<0.1				<0.1	<0.1								
Magnesium Dissolved	ug/l									<30	<30								
Manganese Dissolved	ug/l	30	50							12	<2								
Nickel Dissolved	ug/l	4	20	5	9	5				3	2								
Selenium Dissolved	ug/l		10	19	8	5				15	7								
Vanadium Dissolved	ug/l																		
Cadmium Total	ug/l	0.15	5																
Zinc Total	ug/l	75		7	16	198				4	24								
Mercury Total	ug/l	0.07	1																
Molybdenum	ug/l									6	4								
Non-Metal Inorganics																			
Hardness Total	mg/l																		
Total Alkalinity as CaCO3	mg/l									739	788								
Conductivity uS/cm @25C	uS/cm																		
BOD	mg/l	5																	
COD	mg/l				240	220													
Potassium Dissolved	mg/l									159	139								
Sodium Dissolved	mg/l		200							33.9	32.5								
Nitrate as NO3	mg/l		50	g/l						<0.5	0.6								
Nitrite as NO2	mg/l																		
Sulphate (soluble)	mg/l	400	250																
Chloride	mg/l	250	250							46	56								
Sulphide	mg/l									11.8	4								
Phosphate	mg/l			<0.1	<0.1	<0.1				<0.1	<0.1								
Fluoride	mg/l	5000	1500							5.5	1.5								
Ammoniacal Nitrogen as N	mg/l	0.6		2.2	2.1	2.5				1.5	1.5								
Total Ammonium as NH4	mg/l		0.5																
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05				<0.05	<0.05								
Free Cyanide	mg/l																		
Carbon Dioxide Dissolved	ug/l																		
pH Value	pH units	6-9	6.5-10	12.3	11.8	11.9				12.5	12.6								
Total Sulphur as SO4	mg/l			902	507	1020				1630	1390								
Toluene Extractable Material	mg/l			123	221	1400				166	71								
Conductivity	uS/cm			2440	1750	1640				3850	4220								

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH9	BH12	BH17	BH18	BH19	BH20	BH21	CABH001	CABH001	CABH001	CABH001	CABH001	BH16	SBHJ03	SBHJ03	BH512	BH512
Round											Round 1	Round 2	Round 3	Round 4	Round 5		Round 1	Round 2	Round 1	Round 2
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	EW	EW
Sample Received Date																				
Sampled Date				07/07/2006	06/07/2006	06/07/2006	07/07/2006	06/07/2006	06/07/2006	07/07/2006	14/03/2002	Apr-02	17/04/2002	01/02/2003	01/06/2004	07/07/2006	27/02/2008	17/03/2008	21/04/2015	28/04/2015
Response Zone (RZ) Details				MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD	TFD (Peat)	TFD (Peat)	TFD	TFD
Depth																	0.70	5.20	6.59	7.12
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Deep	Deep
Metals																				
Arsenic	ug/l	50	10								2	<1	6		4		8	7.9	4.2	5.6
Beryllium Dissolved	ug/l																<1	<1		
Boron	ug/l	2000	1000								84	1100	1000		800				160	160
Cadmium Dissolved	ug/l	0.15	5								<0.1	<0.1	<0.1		<0.1				<0.08	<0.08
Calcium Dissolved	ug/l										178000	192000	189000				77000	77000		
Chromium Dissolved	ug/l		50								42	<1	<1		58		19	5	13	16
Copper Dissolved	ug/l	10	2000								3	2	2		<0.1		<1.6	2.6	5.8	2.5
Iron Dissolved	ug/l	1000	200								450	210	830		880		7700	4900		
Lead Dissolved	ug/l	1.2	10								<1	<1	<1		<0.1		<0.5	<0.4	<1	<1
Mercury Dissolved	ug/l	0.07	1								<0.1	<0.1	<0.1		<0.1				**<0.5**	**<0.5**
Magnesium Dissolved	ug/l										187000	186000	162000				94000	88000		
Manganese Dissolved	ug/l	30	50								2100	1650	2750		1760		1600	850		
Nickel Dissolved	ug/l	4	20								56	6	8		2		2.9	3.2	2.7	3.3
Selenium Dissolved	ug/l		10								11	10	7		4		8	6	5.3	4.9
Vanadium Dissolved	ug/l																5	3		
Cadmium Total	ug/l	0.15	5														18	1.6		
Zinc Total	ug/l	75									15	15	40		16		1800	160	3.5	1.7
Mercury Total	ug/l	0.07	1														<0.01	<0.01		
Molybdenum	ug/l										1		1							
Non-Metal Inorganics																				
Hardness Total	mg/l																580	550		
Total Alkalinity as CaCO3	mg/l										1760	1630	1660				2000	1300	720	1300
Conductivity uS/cm @25C	uS/cm																			
BOD	mg/l	5															78	56		
COD	mg/l																1000	110		
Potassium Dissolved	mg/l										68.1	65.4	65.5				41	36		
Sodium Dissolved	mg/l		200								1600	1350	1310				1200	15		
Nitrate as NO3	mg/l		50								<0.5	<0.5	<0.5		<0.3		<0.3	<0.3		
Nitrite as NO2	mg/l																			
Sulphate (soluble)	mg/l	400	250														67	130		
Chloride	mg/l	250	250								2270	1820	1950		2150		820	670	370	610
Sulphide	mg/l										0.4	<0.2	0.3				<0.5	<0.5		
Phosphate	mg/l										4.9	1.5	0.9		0.17					
Fluoride	mg/l	5000	1500								1.6	1.4	0.9							
Ammoniacal Nitrogen as N	mg/l	0.6									24.8	19.3	19.1		26		17	16	2.9	7.8
Total Ammonium as NH4	mg/l		0.5														21			
Total Cyanide	mg/l	0.001	0.05								<0.05	<0.05	<0.05		<0.05		**<0.05**	**<0.05**	**<0.05**	**<0.05**
Free Cyanide	mg/l																		<0.05	<0.05
Carbon Dioxide Dissolved	ug/l																79			
pH Value	pH units	6-9	6.5-10								7.2	7	7.1		7		7.5	7.77	8.2	8.5
Total Sulphur as SO4	mg/l										116	122	70.2		7.8					
Toluene Extractable Material	mg/l										<5	10	6		<6					
Conductivity	uS/cm										9090	7860	7930		9100					

M4CAN
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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH512	BH510	BH510	BH510	BH510	BH510	BH510	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN036	BHM4CAN036	BHM4CAN036
Round				Round 3	Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				EW	EW	EW	EW	EW	EW	EW	W	W	W	W	W	W	W	W	W
Sample Received Date																			
Sampled Date				06/05/2015	04/03/2015		12/03/2015		18/03/2015		03/05/2016		17/05/2016		26/05/2016		04/05/2016	17/05/2016	26/05/2016
Response Zone (RZ) Details		EQS	DWS	TFD	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	MMG	MG	MMG	MG	MMG	MG	TFD	TFD	TFD
Depth				8.48	0.68	0.87	2.52	7.34	2.82	5.84	2.72	1.7	2.78	1.77	2.68	1.79	2.54	2.98	2.78
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Deep	Shallow	Deep	Shallow	Deep	Shallow	Single	Single	Single
Metals																			
Arsenic	ug/l	50	10	9.8	6.7	17	22	43	18	27	27	4.95	30.6	50.8	7.92	3.22	12.1	14.2	6.69
Beryllium Dissolved	ug/l																		
Boron	ug/l	2000	1000	1300	760	340	2300	600	1400	940									
Cadmium Dissolved	ug/l	0.15	5	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1.43	0.152	3.59	2.21	<0.1	<0.1	<0.1	0.475	1.12
Calcium Dissolved	ug/l																		
Chromium Dissolved	ug/l		50	10	20	56	36	62	57	120	33.6	0.663	32.1	6.98	15.6	0.584	27.2	53.4	21.3
Copper Dissolved	ug/l	10	2000	7.3	5	52	23	24	39	150	3.12	29.7	4.79	22.1	1.13	31.8	<0.85	0.892	1.2
Iron Dissolved	ug/l	1000	200																
Lead Dissolved	ug/l	1.2	10	<1	<1	<1	<1	<1	<1	<1	2.3	2.67	2.62	0.767	2.78	2.93	1.05	5.52	1.01
Mercury Dissolved	ug/l	0.07	1	**<0.5**							<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Magnesium Dissolved	ug/l																		
Manganese Dissolved	ug/l	30	50																
Nickel Dissolved	ug/l	4	20	8	2.2	12	<1	4.5	13	13	12.4	27.7	12.1	15.7	10.1	14.4	4.46	8.7	6.5
Selenium Dissolved	ug/l		10	6.4	8.4	29	24	36	23	56	53.3	6.71	46.5	21.7	21.7	6.68	22	32.3	21.6
Vanadium Dissolved	ug/l										11.1	1.25	10.3	39.5	4.6	1.15	7.93	14.1	0.664
Cadmium Total	ug/l	0.15	5																
Zinc Total	ug/l	75		4.1	1.4	4	7.5	3.8	6	12	45.4	4.39	48.6	0.584	11.1	6.61	2.35	1.27	4.63
Mercury Total	ug/l	0.07	1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5									
Molybdenum	ug/l																		
Non-Metal Inorganics																			
Hardness Total	mg/l																		
Total Alkalinity as CaCO3	mg/l			1400							1520	2210	1440	1920	2110	3480	18700	6170	6300
Conductivity uS/cm @25C	uS/cm										13200	6180	13800	6390	8340	5580	7300	6830	7530
BOD	mg/l	5																	
COD	mg/l																		
Potassium Dissolved	mg/l																		
Sodium Dissolved	mg/l		200																
Nitrate as NO3	mg/l		50								<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Nitrite as NO2	mg/l										<0.05	1.36	<0.05	0.343	<0.05	0.26	<0.05	<0.05	<0.05
Sulphate (soluble)	mg/l	400	250																
Chloride	mg/l	250	250	700							5520	360	5270	144	4200	202	2540	2360	2350
Sulphide	mg/l																		
Phosphate	mg/l																		
Fluoride	mg/l	5000	1500																
Ammoniacal Nitrogen as N	mg/l	0.6		10							33.6	5.14	33.8	33	26.3	6.41	35.3	2.34	33.8
Total Ammonium as NH4	mg/l		0.5																
Total Cyanide	mg/l	0.001	0.05	**<0.05**	**<0.05**	<0.05	<0.05	<0.05	<0.05	<0.05									
Free Cyanide	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05									
Carbon Dioxide Dissolved	ug/l																		
pH Value	pH units	6-9	6.5-10	7.6	7.6	8	7.8	7.8	7.6	8.4	7.43	12.5	7.26	12.8	6.96	12.6	7.15	7.28	7.1
Total Sulphur as SO4	mg/l																		
Toluene Extractable Material	mg/l																		
Conductivity	uS/cm																		

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN039	BHM4CAN039
Round				Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date																	
Sampled Date				03/05/2016		17/05/2016		26/05/2016		03/05/2016		17/05/2016		26/05/2016		04/05/2016	
Response Zone (RZ) Details				MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	TFD / MMG	TFD
Depth				2.21	1.51	2.4	1.55	2.42	1.57	2.48	1.11	1.99	1.18	1.96	1.16	2.80	2.73
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow
Metals																	
Arsenic	ug/l	50	10	24.3	1.18	36.9	16.4	11.7	0.829	5.28	1.93	4	2.93	2.54	2.09	8.06	5.81
Beryllium Dissolved	ug/l																
Boron	ug/l	2000	1000														
Cadmium Dissolved	ug/l	0.15	5	0.527	<0.1	0.479	0.36	0.513	<0.1	<0.1	<0.1	0.131	0.326	<0.1	<0.1	<0.1	<0.1
Calcium Dissolved	ug/l																
Chromium Dissolved	ug/l		50	31.7	1.34	37	0.868	20.8	0.31	24.6	<0.22	22.5	0.487	11.6	0.375	16.1	8.41
Copper Dissolved	ug/l	10	2000	1.3	5.09	<0.85	3.31	<0.85	2.14	2.9	4.32	1.89	11.1	1.51	3.91	<0.85	<0.85
Iron Dissolved	ug/l	1000	200														
Lead Dissolved	ug/l	1.2	10	1.48	0.264	2.32	1.01	0.65	0.063	0.395	0.335	0.959	1.35	0.701	0.232	0.099	0.353
Mercury Dissolved	ug/l	0.07	1	<0.01	<0.01	<0.01	<0.01	<0.01	0.0112	<0.01	0.0111	<0.01	<0.01	<0.01	0.0204	<0.01	<0.01
Magnesium Dissolved	ug/l																
Manganese Dissolved	ug/l	30	50														
Nickel Dissolved	ug/l	4	20	2.97	6.53	2.97	<0.15	1.89	9.49	11.3	24.1	<0.15	25.1	2.55	21.2	15.5	9.14
Selenium Dissolved	ug/l		10	11.3	2.65	20.7	13.3	10.3	8.4	6.41	3.96	5.6	32.4	2.65	18.7	6.76	4.56
Vanadium Dissolved	ug/l			14.3	8.81	14.1	25.2	3.98	6.57	12	5.24	7.14	2.8	4.28	1.71	5.53	3.29
Cadmium Total	ug/l	0.15	5														
Zinc Total	ug/l	75		5.07	2.09	1.05	<0.41	7.55	5.04	43.1	1.07	1.74	3.48	16.7	5.97	24.2	1.32
Mercury Total	ug/l	0.07	1														
Molybdenum	ug/l																
Non-Metal Inorganics																	
Hardness Total	mg/l																
Total Alkalinity as CaCO3	mg/l			1860	2070	1810	1150	1780	1660	1130	5430	1060	840	1110	1330	870	1340
Conductivity uS/cm @25C	uS/cm			4650	4060	4420	3520	4950	5490	1930	3530	2070	4230	1940	4650	2170	1290
BOD	mg/l	5															
COD	mg/l																
Potassium Dissolved	mg/l																
Sodium Dissolved	mg/l		200														
Nitrate as NO3	mg/l		50	<0.3	0.524	<0.3	<0.4	<1.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.46	<0.3
Nitrite as NO2	mg/l			<0.05	0.553	<0.05	0.497	<0.25	0.387	<0.05	0.137	0.343	0.572	<0.05	0.355	<0.05	<0.05
Sulphate (soluble)	mg/l	400	250														
Chloride	mg/l	250	250	991	15.4	953	13.8	940	19.1	205	22	208	22.2	196	22.5	343	167
Sulphide	mg/l																
Phosphate	mg/l																
Fluoride	mg/l	5000	1500														
Ammoniacal Nitrogen as N	mg/l	0.6		10.5	0.709	11.5	0.635	11.4	0.438	11.8	3.78	11.4	2.49	11	3.03	5.06	5.82
Total Ammonium as NH4	mg/l		0.5														
Total Cyanide	mg/l	0.001	0.05														
Free Cyanide	mg/l																
Carbon Dioxide Dissolved	ug/l																
pH Value	pH units	6-9	6.5-10	7.59	11.7	7.67	12.6	7.54	12.7	7.37	12.1	7.39	12.7	7.29	12	7.58	7.39
Total Sulphur as SO4	mg/l																
Toluene Extractable Material	mg/l																
Conductivity	uS/cm																

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN039	BHM4CAN039	BHM4CAN039	BHM4CAN039	WSM4CAN023	WSM4CAN023	WSM4CAN023
Round				Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				W	W	W	W	W	W	W
Sample Received Date										
Sampled Date				17/05/2016		26/05/2016		04/05/2016		26/05/2016
Response Zone (RZ) Details		EQS	DWS	TFD / MMG	TFD	TFD / MMG	TFD	MG	MG	MG
Depth				2.79	2.52	2.77	2.52	1.41	1.49	1.50
Installation Details				Deep	Shallow	Deep	Shallow	Single	Single	Single
Metals										
Arsenic	ug/l	50	10	9.49	9.91	16.3	5.38	2.5	2.46	3.11
Beryllium Dissolved	ug/l									
Boron	ug/l	2000	1000							
Cadmium Dissolved	ug/l	0.15	5	0.327	0.174	<0.1	<0.1	<0.1	0.135	<0.1
Calcium Dissolved	ug/l									
Chromium Dissolved	ug/l		50	35.4	2.65	15	6.75	1.21	4.18	0.496
Copper Dissolved	ug/l	10	2000	<0.85	<0.85	0.875	<0.85	13.3	8.44	9.6
Iron Dissolved	ug/l	1000	200							
Lead Dissolved	ug/l	1.2	10	1.9	0.751	1.7	0.225	2.15	3.29	1.55
Mercury Dissolved	ug/l	0.07	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Magnesium Dissolved	ug/l									
Manganese Dissolved	ug/l	30	50							
Nickel Dissolved	ug/l	4	20	0.735	3.27	6.93	6.55	11.5	10.9	9.61
Selenium Dissolved	ug/l		10	13.9	28.2	11.8	7.4	4.72	3.08	3.75
Vanadium Dissolved	ug/l			9.93	12.2	6.12	2.38	0.619	9.15	2.39
Cadmium Total	ug/l	0.15	5							
Zinc Total	ug/l	75		1.64	1.88	9.69	6.14	1.61	3.57	1.8
Mercury Total	ug/l	0.07	1							
Molybdenum	ug/l									
Non-Metal Inorganics										
Hardness Total	mg/l									
Total Alkalinity as CaCO3	mg/l			1730	146	1940	670	2150	2060	1810
Conductivity uS/cm @25C	uS/cm			4300	515	3770	995	6100	5960	6060
BOD	mg/l	5								
COD	mg/l									
Potassium Dissolved	mg/l									
Sodium Dissolved	mg/l		200							
Nitrate as NO3	mg/l		50	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Nitrite as NO2	mg/l			<0.05	0.235	0.088	<0.05	0.53	0.402	0.339
Sulphate (soluble)	mg/l	400	250							
Chloride	mg/l	250	250	757	40.7	701	100	29.2	51.9	98
Sulphide	mg/l									
Phosphate	mg/l									
Fluoride	mg/l	5000	1500							
Ammoniacal Nitrogen as N	mg/l	0.6		6.44	2.99	6.12	2.99	3.12	1.65	2.19
Total Ammonium as NH4	mg/l		0.5							
Total Cyanide	mg/l	0.001	0.05							
Free Cyanide	mg/l									
Carbon Dioxide Dissolved	ug/l									
pH Value	pH units	6-9	6.5-10	7.67	8.24	7.53	7.59	12.6	12.7	12.7
Total Sulphur as SO4	mg/l									
Toluene Extractable Material	mg/l									
Conductivity	uS/cm									

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		CABH002	CABH002	CABH002	BH5	BH13	BH14	CABH003	CABH003	BH1	BH2	BH3	BH4	BH4	BH6	BH7	BH8
Round				Round 1	Round 2	Round 3				Round 1	Round 2								
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date											26/04/2002								
Sampled Date				14/03/2002		17/04/2002	29/06/2005	06/07/2006	06/07/2006	14/03/2002	17/04/2002	29/06/2005	04/07/2005	29/06/2005	29/06/2005	07/07/2006	06/07/2006	06/07/2006	06/07/2006
Response Zone (RZ) Details				MG	MG	MG	MG	MG	MG	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD
Depth																			
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single
Thiocyanite	mg/l			1.1	1.8	0.9				1.3	1								
TOC	mg/l			29	31	54				13	13								
Bicarbonate Alkalinity as CaCo3	mg/l																		
Phenols																			
Phenols Monohydric	ug/l																		
Phenols	mg/l	0.0077																	
Phenol Index	mg/l			0.1	0.2	0.2				0.12	0.19								
Organics																			
GRO (C4-C12)	ug/l																		
GRO Surrogate % recovery**	%																		
Benzene	ug/l	10	1			<200				2	<5								
Toluene	ug/l	50				<200				17	10								
Ethyl benzene	ug/l	20				<200				13	8								
m & p Xylene	ug/l	30				<200				45	28								
o Xylene	ug/l	30				<200				35	21								
Methyl tert-butyl ether (MTBE)	ug/l																		
TPH																			
Aliphatics C5-C6	ug/l																		
Aliphatics >C6-C8	ug/l																		
Aliphatics >C8-C10	ug/l																		
Aliphatics >C10-C12	ug/l																		
Aliphatics >C12-C16	ug/l																		
Aliphatics >C16-C21	ug/l																		
Aliphatics >C21-C35	ug/l																		
Total Aliphatics C5-C35 Aqueous	ug/l																		
Aliphatics >C35-44	ug/l																		
Aromatics >C5-C7	ug/l																		
Aromatics >C6-C7	ug/l																		
Aromatics >C7-C8	ug/l																		
Aromatics >EC8-EC10	ug/l																		
Aromatics >EC10-EC12	ug/l																		
Aromatics >EC12-EC16	ug/l																		
Aromatics >EC16-EC21	ug/l																		
Aromatics >EC21-EC35	ug/l																		
Total Aromatics C6-C35 Aqueous	ug/l																		
Aromatics >C35-44	ug/l																		
Total Aliphatic TPH	ug/l																		
Total Aromatic TPH	ug/l																		
>C8-C10	ug/l						278					13	192	799	145				
>C10-C12	ug/l						2400					73	2720	8420	1130				
>C12-C16	ug/l						9700					181	23300	45900	2450				
>C16-C21	ug/l						11000					290	22200	54300	3230				
>C21-C35	ug/l						22000					274	2200	44100	2180				
Diesel Range Hydrocarbons	ug/l																		

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH9	BH12	BH17	BH18	BH19	BH20	BH21	CABH001	CABH001	CABH001	CABH001	CABH001	BH16	SBHJ03	SBHJ03	BH512	BH512
Round											Round 1	Round 2	Round 3	Round 4	Round 5		Round 1	Round 2	Round 1	Round 2
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	EW	EW
Sample Received Date																				
Sampled Date				07/07/2006	06/07/2006	06/07/2006	07/07/2006	06/07/2006	06/07/2006	07/07/2006	14/03/2002	Apr-02	17/04/2002	01/02/2003	01/06/2004	07/07/2006	27/02/2008	17/03/2008	21/04/2015	28/04/2015
Response Zone (RZ) Details				MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD	TFD (Peat)	TFD (Peat)	TFD	TFD
Depth																	0.70	5.20	6.59	7.12
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Deep	Deep
Thiocyanite	mg/l										1.1	0.5	0.7		1.9					
TOC	mg/l										64	44	48							
Bicarbonate Alkalinity as CaCo3	mg/l										1760	1630	1660							
Phenols																				
Phenols Monohydric	ug/l																<0.01	<0.01		
Phenols	mg/l	0.0077									<0.05	<0.05	<0.05						**<0.03**	**<0.03**
Phenol Index	mg/l										<0.05	<0.05	<0.05		<0.05					
Organics																				
GRO (C4-C12)	ug/l																<10	<10		
GRO Surrogate % recovery**	%																			
Benzene	ug/l	10	1								<1	<1	<1	<1	<1		<10	<10	<1	<1
Toluene	ug/l	50									<1	<1	<1	<1	<1		<10	<10	<1	<1
Ethyl benzene	ug/l	20									<1	<1	<1	<1	<1		<10	<10	<1	<1
m & p Xylene	ug/l	30									<1	<1	<1	<1	<1		<10	<10	<1	<1
o Xylene	ug/l	30									<1	<1	<1	<1	<1		<10	<10	<1	<1
Methyl tert-butyl ether (MTBE)	ug/l																<10	<10	<1	<1
TPH																				
Aliphatics C5-C6	ug/l																<10	<10	<0.1	<0.1
Aliphatics >C6-C8	ug/l																<10	<10	<0.1	<0.1
Aliphatics >C8-C10	ug/l																<10	<10	<0.1	<0.1
Aliphatics >C10-C12	ug/l																<10	<10	<0.1	<0.1
Aliphatics >C12-C16	ug/l																<10	350	<0.1	<0.1
Aliphatics >C16-C21	ug/l																<10	140	<0.1	<0.1
Aliphatics >C21-C35	ug/l																<10	<10	<0.1	<0.1
Total Aliphatics C5-C35 Aqueous	ug/l																<10	500		
Aliphatics >C35-44	ug/l																		<0.1	<0.1
Aromatics >C5-C7	ug/l																		<0.1	<0.1
Aromatics >C6-C7	ug/l																<10	<10		
Aromatics >C7-C8	ug/l																<10	<10	<0.1	<0.1
Aromatics >EC8-EC10	ug/l																<10	<10	<0.1	<0.1
Aromatics >EC10-EC12	ug/l																<10	<10	<0.1	<0.1
Aromatics >EC12-EC16	ug/l																<10	590	<0.1	<0.1
Aromatics >EC16-EC21	ug/l																<10	610	<0.1	<0.1
Aromatics >EC21-EC35	ug/l																<10	510	<0.1	<0.1
Total Aromatics C6-C35 Aqueous	ug/l																<10	1700		
Aromatics >C35-44	ug/l																		<0.1	<0.1
Total Aliphatic TPH	ug/l																		<5	<5
Total Aromatic TPH	ug/l																		<5	<5
>C8-C10	ug/l														<100					
>C10-C12	ug/l														<100					
>C12-C16	ug/l														<100					
>C16-C21	ug/l														<100					
>C21-C35	ug/l														<100					
Diesel Range Hydrocarbons	ug/l													10						

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH512	BH510	BH510	BH510	BH510	BH510	BH510	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN036	BHM4CAN036	BHM4CAN036
Round				Round 3	Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				EW	EW	EW	EW	EW	EW	EW	W	W	W	W	W	W	W	W	W
Sample Received Date																			
Sampled Date				06/05/2015	04/03/2015		12/03/2015		18/03/2015		03/05/2016		17/05/2016		26/05/2016		04/05/2016	17/05/2016	26/05/2016
Response Zone (RZ) Details				TFD	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	MMG	MG	MMG	MG	MMG	MG	TFD	TFD	TFD
Depth				8.48	0.68	0.87	2.52	7.34	2.82	5.84	2.72	1.7	2.78	1.77	2.68	1.79	2.54	2.98	2.78
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Deep	Shallow	Deep	Shallow	Deep	Shallow	Single	Single	Single
Thiocyanite	mg/l																		
TOC	mg/l																		
Bicarbonate Alkalinity as CaCo3	mg/l																		
Phenols																			
Phenols Monohydric	ug/l																		
Phenols	mg/l	0.0077		<0.03															
Phenol Index	mg/l																		
Organics																			
GRO (C4-C12)	ug/l										<50	171	<50	100	<50	102	<50	<50	<50
GRO Surrogate % recovery**	%										75	79	78	87	65	90	61	74	64
Benzene	ug/l	10	1	<1	<1	<1	<1	<1	<1	<1	<7	<7	<7	<7	<7	<7	<7	<7	<7
Toluene	ug/l	50		<1	<1	<1	<1	<1	<1	<1	<4	<4	<4	<4	<4	<4	<4	<4	<4
Ethyl benzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5
m & p Xylene	ug/l	30		<1	<1	<1	<1	<1	<1	<1	<8	<8	<8	<8	<8	<8	<8	<8	<8
o Xylene	ug/l	30		<1	<1	<1	<1	<1	<1	<1	<3	<3	<3	<3	<3	<3	<3	<3	<3
Methyl tert-butyl ether (MTBE)	ug/l			<1							<3	<3	<3	<3	<3	<3	<3	<3	<3
TPH																			
Aliphatics C5-C6	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	18	<10	11	<10	10	<10	<10	<10
Aliphatics >C8-C10	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	30	<10	20	<10	17	<10	<10	<10
Aliphatics >C10-C12	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	57	<10	30	<10	33	<10	<10	<10
Aliphatics >C12-C16	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	53	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C16-C21	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	245	<10	32	<10	37	18	<10	20
Aliphatics >C21-C35	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	146	2170	<10	386	<10	534	158	<10	148
Total Aliphatics C5-C35 Aqueous	ug/l										146	2470	<10	418	<10	571	176	<10	168
Aliphatics >C35-44	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1									
Aromatics >C5-C7	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aromatics >C6-C7	ug/l																		
Aromatics >C7-C8	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	20	<10	13	<10	13	<10	<10	<10
Aromatics >EC10-EC12	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	38	<10	20	<10	22	<10	<10	<10
Aromatics >EC12-EC16	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	58	<10	33	<10	30	<10	<10	13
Aromatics >EC16-EC21	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	247	<10	72	<10	86	<10	<10	16
Aromatics >EC21-EC35	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	1440	<10	310	<10	434	26	<10	115
Total Aromatics C6-C35 Aqueous	ug/l										<10	1750	<10	415	<10	550	26	<10	144
Aromatics >C35-44	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1									
Total Aliphatic TPH	ug/l			<5	<5	<5	<5	<5	<5	<5									
Total Aromatic TPH	ug/l			<5	<5	<5	<5	<5	<5	<5									
>C8-C10	ug/l																		
>C10-C12	ug/l																		
>C12-C16	ug/l																		
>C16-C21	ug/l																		
>C21-C35	ug/l																		
Diesel Range Hydrocarbons	ug/l																		

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN039	BHM4CAN039
Round				Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date																	
Sampled Date				03/05/2016		17/05/2016		26/05/2016		03/05/2016		17/05/2016		26/05/2016		04/05/2016	
Response Zone (RZ) Details		**EQS**	**DWS**	MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	TFD / MMG	TFD
Depth				2.21	1.51	2.4	1.55	2.42	1.57	2.48	1.11	1.99	1.18	1.96	1.16	2.80	2.73
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow
Thiocyanite	mg/l																
TOC	mg/l																
Bicarbonate Alkalinity as CaCo3	mg/l																
Phenols																	
Phenols Monohydric	ug/l																
Phenols	mg/l	0.0077															
Phenol Index	mg/l																
Organics																	
GRO (C4-C12)	ug/l			<50	<50	<50	<50	<50	<50	<50	219	<50	66	<50	63	<50	<50
GRO Surrogate % recovery**	%			79	90	87	86	80	88	101	99	74	86	80	86	81	86
Benzene	ug/l	10	1	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
Toluene	ug/l	50		4	4	6	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Ethyl benzene	ug/l	20		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
m & p Xylene	ug/l	30		<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
o Xylene	ug/l	30		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Methyl tert-butyl ether (MTBE)	ug/l			<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
TPH																	
Aliphatics C5-C6	ug/l			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	ug/l			<10	<10	<10	<10	<10	<10	<10	12	<10	<10	<10	<10	<10	<10
Aliphatics >C8-C10	ug/l			<10	<10	<10	<10	<10	<10	<10	38	<10	<10	<10	<10	<10	<10
Aliphatics >C10-C12	ug/l			<10	13	<10	13	<10	<10	<10	80	<10	27	<10	23	<10	<10
Aliphatics >C12-C16	ug/l			<10	<10	<10	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	<10
Aliphatics >C16-C21	ug/l			<10	32	<10	<10	<10	<10	24	38	28	<10	<10	<10	<10	45
Aliphatics >C21-C35	ug/l			<10	271	<10	68	<10	<10	488	385	406	<10	18	<10	<10	309
Total Aliphatics C5-C35 Aqueous	ug/l			<10	303	<10	68	<10	<10	512	433	434	<10	18	<10	<10	354
Aliphatics >C35-44	ug/l																
Aromatics >C5-C7	ug/l			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aromatics >C6-C7	ug/l																
Aromatics >C7-C8	ug/l			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	ug/l			<10	<10	<10	<10	<10	<10	<10	26	<10	<10	<10	<10	<10	<10
Aromatics >EC10-EC12	ug/l			<10	<10	<10	<10	<10	<10	<10	54	<10	18	<10	15	<10	<10
Aromatics >EC12-EC16	ug/l			<10	26	<10	40	<10	42	<10	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC16-EC21	ug/l			<10	103	<10	65	<10	37	<10	13	<10	<10	<10	<10	<10	<10
Aromatics >EC21-EC35	ug/l			<10	316	<10	108	<10	<10	83	91	74	<10	<10	<10	<10	46
Total Aromatics C6-C35 Aqueous	ug/l			<10	445	<10	213	<10	79	83	104	74	<10	<10	<10	<10	46
Aromatics >C35-44	ug/l																
Total Aliphatic TPH	ug/l																
Total Aromatic TPH	ug/l																
>C8-C10	ug/l																
>C10-C12	ug/l																
>C12-C16	ug/l																
>C16-C21	ug/l																
>C21-C35	ug/l																
Diesel Range Hydrocarbons	ug/l																

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN039	BHM4CAN039	BHM4CAN039	BHM4CAN039	WSM4CAN023	WSM4CAN023	WSM4CAN023
Round				Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				W	W	W	W	W	W	W
Sample Received Date										
Sampled Date				17/05/2016		26/05/2016		04/05/2016		26/05/2016
Response Zone (RZ) Details				TFD / MMG	TFD	TFD / MMG	TFD	MG	MG	MG
Depth				2.79	2.52	2.77	2.52	1.41	1.49	1.50
Installation Details		EQS	DWS	Deep	Shallow	Deep	Shallow	Single	Single	Single
Thiocyanite	mg/l									
TOC	mg/l									
Bicarbonate Alkalinity as CaCo3	mg/l									
Phenols										
Phenols Monohydric	ug/l									
Phenols	mg/l	0.0077								
Phenol Index	mg/l									
Organics										
GRO (C4-C12)	ug/l			<50	<50	<50	<50	<50	88	<50
GRO Surrogate % recovery**	%			79	80	81	84	93	98	93
Benzene	ug/l	10	1	<7	<7	<7	<7	<7	<7	<7
Toluene	ug/l	50		<4	<4	<4	<4	<4	<4	<4
Ethyl benzene	ug/l	20		<5	<5	<5	<5	<5	<5	<5
m & p Xylene	ug/l	30		<8	<8	<8	<8	<8	<8	<8
o Xylene	ug/l	30		<3	<3	<3	<3	<3	<3	<3
Methyl tert-butyl ether (MTBE)	ug/l			<3	<3	<3	<3	<3	<3	<3
TPH										
Aliphatics C5-C6	ug/l			<10	<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	ug/l			<10	<10	<10	<10	<10	12	<10
Aliphatics >C8-C10	ug/l			<10	<10	<10	<10	<10	15	<10
Aliphatics >C10-C12	ug/l			<10	<10	<10	<10	14	26	13
Aliphatics >C12-C16	ug/l			<10	<10	<10	<10	<10	<10	<10
Aliphatics >C16-C21	ug/l			16	<10	10	11	<10	<10	<10
Aliphatics >C21-C35	ug/l			136	<10	67	81	<10	<10	<10
Total Aliphatics C5-C35 Aqueous	ug/l			152	<10	77	92	<10	<10	<10
Aliphatics >C35-44	ug/l									
Aromatics >C5-C7	ug/l			<10	<10	<10	<10	<10	<10	<10
Aromatics >C6-C7	ug/l									
Aromatics >C7-C8	ug/l			<10	<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	ug/l			<10	<10	<10	<10	<10	12	<10
Aromatics >EC10-EC12	ug/l			<10	<10	<10	<10	<10	17	<10
Aromatics >EC12-EC16	ug/l			<10	<10	<10	10	126	28	38
Aromatics >EC16-EC21	ug/l			<10	<10	<10	14	144	28	33
Aromatics >EC21-EC35	ug/l			33	<10	15	36	23	<10	<10
Total Aromatics C6-C35 Aqueous	ug/l			33	<10	15	60	293	56	71
Aromatics >C35-44	ug/l									
Total Aliphatic TPH	ug/l									
Total Aromatic TPH	ug/l									
>C8-C10	ug/l									
>C10-C12	ug/l									
>C12-C16	ug/l									
>C16-C21	ug/l									
>C21-C35	ug/l									
Diesel Range Hydrocarbons	ug/l									

M4CAN
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CL-26 Metal Rec Area
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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		CABH002	CABH002	CABH002	BH5	BH13	BH14	CABH003	CABH003	BH1	BH2	BH3	BH4	BH4	BH6	BH7	BH8
Round				Round 1	Round 2	Round 3				Round 1	Round 2								
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date											26/04/2002								
Sampled Date				14/03/2002		17/04/2002	29/06/2005	06/07/2006	06/07/2006	14/03/2002	17/04/2002	29/06/2005	04/07/2005	29/06/2005	29/06/2005	07/07/2006	06/07/2006	06/07/2006	06/07/2006
Response Zone (RZ) Details				MG	MG	MG	MG	MG	MG	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD
Depth																			
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single
Total petroleum hydrocarbons	ug/l					14000	47000	500	400		26000	800	51000	156000	9300	5700	900	1300	200
PAH																			
Acenaphthene	ug/l					95		<0.05	0.242		37					99.793	0.135	8.498	<0.05
Acenaphthylene	ug/l					<20		<0.05	<0.05		<2					2.532	0.095	0.26	<0.05
Anthracene	ug/l	0.1				<20		<0.05	<0.05		<2					<0.05	0.098	<0.05	<0.05
Benz(a)anthracene	ug/l					<20		<0.05	<0.05		<2					<0.05	0.086	<0.05	0.061
Benzo(a)pyrene	ug/l	0.00017	0.01			<20		<0.05	<0.05		<2					<0.05	0.129	<0.05	<0.05
Benzo(b)fluoranthene	ug/l	0.017	0.1			<20		<0.05	<0.05		<2					<0.05	0.145	<0.05	<0.05
Benzo(ghi)perylene	ug/l	0.0082	0.1			<20		<0.05	<0.05		<2					<0.05	0.19	<0.05	<0.05
Benzo(k)fluoranthene	ug/l	0.017	0.1			<20		<0.05	<0.05		<2					<0.05	0.077	<0.05	<0.05
Chrysene	ug/l					<20		<0.05	<0.05		<2					<0.05	0.101	<0.05	0.069
Dibenzo(ah)anthracene	ug/l					<20		<0.05	<0.05		<2					<0.05	<0.05	<0.05	<0.05
Fluoranthene	ug/l	0.0063				<20		<0.05	0.056		3					0.982	0.287	0.401	0.087
Fluorene	ug/l					42		<0.05	0.17		19					33.878	0.069	4.011	<0.05
Indeno(123cd)pyrene	ug/l	N/A	0.1			<20		<0.05	<0.05		<2					<0.05	0.222	<0.05	<0.05
Naphthalene	ug/l	2				1027		<0.05	1.17		28					787.015	0.113	16.54	<0.05
Phenanthrene	ug/l					53		<0.05	0.168		20					18.596	0.108	1.229	<0.05
Pyrene	ug/l					<20		<0.05	0.052		3					0.867	0.246	0.387	0.097
PAH 16 Total	ug/l					<1456		<0.8	<2.358		<129					<944.113	<2.151	<31.776	<0.0914
VOCs																			
1,1,1,2-Tetrachloroethane	ug/l					<200				<1	<5								
1,1,1-Trichloroethane	ug/l	100				<200				<1	<5								
1.1.2.2-Tetrachloroethane	ug/l					<200				<1	<5								
1,1,2-Trichloroethane	ug/l	400				<200				<1	<5								
1,1-Dichloroethane	ug/l					<200				<1	<5								
1,1-Dichloroethene	ug/l					<200				<1	<5								
1,1-Dichloropropene	ug/l					<200				<1	<5								
1,2,3-Trichlorobenzene	ug/l	0.4				<1000				<5	<25								
1,2,3-Trichloropropane	ug/l					<200				<1	<5								
1,2,4-Trichlorobenzene	ug/l	0.4				<1000				<5	<25								
1,2,4-Trimethylbenzene	ug/l					<200				57	40								
1,2-Dibromo-3-Chloropropane	ug/l					<1000				<5	<25								
1,2-Dibromoethane	ug/l					<200				<1	<5								
1,2-Dichlorobenzene	ug/l	20				<200				<1	<5								
1,2-Dichloroethane	ug/l	10	3			<200				<1	<5								
1,2-Dichloropropane	ug/l					<200				<1	<5								
1,3,5-Trimethylbenzene	ug/l					<200				15	12								
1.3-Dichlorobenzene	ug/l	20				<200				<1	<5								
1,3-Dichloropropane	ug/l					<200				<1	<5								
1,4-Dichlorobenzene	ug/l	20				<200				<1	<5								
2.2-Dichloropropane	ug/l					<200				<1	<5								
2-Chlorotoluene	ug/l					<200				<1	<5								
4-Bromofluorobenzene**	%																		
4-Chlorotoluene	ug/l					<200				<1	<5								

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH9	BH12	BH17	BH18	BH19	BH20	BH21	CABH001	CABH001	CABH001	CABH001	CABH001	BH16	SBHJ03	SBHJ03	BH512	BH512
Round											Round 1	Round 2	Round 3	Round 4	Round 5		Round 1	Round 2	Round 1	Round 2
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	EW	EW
Sample Received Date																				
Sampled Date				07/07/2006	06/07/2006	06/07/2006	07/07/2006	06/07/2006	06/07/2006	07/07/2006	14/03/2002	Apr-02	17/04/2002	01/02/2003	01/06/2004	07/07/2006	27/02/2008	17/03/2008	21/04/2015	28/04/2015
Response Zone (RZ) Details				MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD	TFD (Peat)	TFD (Peat)	TFD	TFD
Depth																	0.70	5.20	6.59	7.12
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Deep	Deep
Total petroleum hydrocarbons	ug/l			2500	900	300	4600	1300	46100	9700			390		100	500	<10	2200	<10	<10
PAH																				
Acenaphthene	ug/l			155.236	<0.05	8.301	76.706	0.552	419.001	205.114			<2	0.11	<0.05	0.123	<1	<1	<0.1	<0.1
Acenaphthylene	ug/l			2.542	<0.05	0.249	0.485	<0.05	<0.05	4.223			<2	0.01	<1	<0.05	<1	<1	<0.1	<0.1
Anthracene	ug/l	0.1		<0.05	<0.05	0.42	12.29	<0.05	18.865	<0.066			<2	<0.01	<0.05	<0.05	**<1**	**<1**	<0.1	<0.1
Benz(a)anthracene	ug/l			<0.05	<0.05	<0.05	1.79	0.11	6.336	0.227			<2	<0.01	<0.05	<0.05	<1	<1	<0.1	<0.1
Benzo(a)pyrene	ug/l	0.00017	0.01	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.066**			**<2**	**<0.01**	**<0.05**	**<0.05**	**<1**	**<1**	**<0.1**	**<0.1**
Benzo(b)fluoranthene	ug/l	0.017	0.1	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.066**			**<2**	<0.01	**<0.05**	**<0.05**	**<1**	**<1**	<0.1	<0.1
Benzo(ghi)perylene	ug/l	0.0082	0.1	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.066**			**<2**	**<0.01**	**<0.05**	**<0.05**	**<1**	**<1**	**<0.1**	**<0.1**
Benzo(k)fluoranthene	ug/l	0.017	0.1	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.066**			**<2**	**<0.01**	**<0.05**	**<0.05**	**<1**	**<1**	<0.1	<0.1
Chrysene	ug/l			<0.05	<0.05	<0.05	1.852	0.135	7.576	0.192			<2	<0.01	<0.05	<0.05	<1	<1	<0.1	<0.1
Dibenzo(ah)anthracene	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.066			<2	<0.01	<0.05	<0.05	<1	<1	<0.1	<0.1
Fluoranthene	ug/l	0.0063		3.031	0.051	0.736	22.018	0.485	33.836	5.3			**<2**	**<0.01**	**<0.05**	**<0.05**	<1	<1	**<0.1**	**<0.1**
Fluorene	ug/l			75.161	<0.05	2.524	49.603	0.535	235.823	104.16			<2	0.05	<0.05	0.067	<1	<1	<0.1	<0.1
Indeno(123cd)pyrene	ug/l	N/A	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.066			<2	<0.01	<0.05	<0.05	<1	<1	<0.1	<0.1
Naphthalene	ug/l	2		380.597	0.212	1.962	63.869	0.844	82.11	563.872			<2	0.84	<0.5	0.515	<1	<1	<0.1	<0.1
Phenanthrene	ug/l			37.751	<0.05	2.95	124.297	1.207	329.099	78.513			<2	<0.01	<0.05	0.106	<1	<1	<0.1	<0.1
Pyrene	ug/l			1.893	0.102	0.434	15.477	0.418	20.841	2.406			<2	<0.01	<0.05	<0.05	<1	<1	<0.1	<0.1
PAH 16 Total	ug/l			<656.661	<1.015	<17.976	<368.689	<4.686	<1153.844	<964.469			<32	1.02	<2.2	<1.411			<2	<2
VOCs																				
1,1,1,2-Tetrachloroethane	ug/l										<1	<1	<1	<1	<1		<1	<1	<2	<2
1,1,1-Trichloroethane	ug/l	100									<1	<1	<1	<1	<1		<1	<1	<1	<1
1.1.2.2-Tetrachloroethane	ug/l										<1	<1	<1	<1	<1		<1	<1		
1,1,2-Trichloroethane	ug/l	400									<1	<1	<1	<1	<1		<1	<1	<10	<10
1,1-Dichloroethane	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
1,1-Dichloroethene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
1,1-Dichloropropene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/l	0.4									<5	<5	<5	<1	<1		**<1**	**<1**	**<2**	**<2**
1,2,3-Trichloropropane	ug/l										<1	<1	<1	<1	<1		<1	<1	<50	<50
1,2,4-Trichlorobenzene	ug/l	0.4									<5	<5	<5	<1	<1		**<1**	**<1**	**<1**	**<1**
1,2,4-Trimethylbenzene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
1,2-Dibromo-3-Chloropropane	ug/l										<5	<5	<5	<1	<1		<1	<1	<50	<50
1,2-Dibromoethane	ug/l										<1	<1	<1	<1	<1		<1	<1	<5	<5
1,2-Dichlorobenzene	ug/l	20									<1	<1	<1	<1	<1		<1	<1	<1	<1
1,2-Dichloroethane	ug/l	10	3								<1	<1	<1	<1	<1		**<1**	**<1**	<2	<2
1,2-Dichloropropane	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
1.3-Dichlorobenzene	ug/l	20									<1	<1	<1	<1	<1					
1,3-Dichloropropane	ug/l										<1	<1	<1	<1	<1		<1	<1	<2	<2
1,4-Dichlorobenzene	ug/l	20									<1	<1	<1	<1	<1		<1	<1	<1	<1
2.2-Dichloropropane	ug/l										<1	<1	<1	<1	<1					
2-Chlorotoluene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
4-Bromofluorobenzene**	%																			
4-Chlorotoluene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH512	BH510	BH510	BH510	BH510	BH510	BH510	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN036	BHM4CAN036	BHM4CAN036
Round				Round 3	Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				EW	EW	EW	EW	EW	EW	EW	W	W	W	W	W	W	W	W	W
Sample Received Date																			
Sampled Date				06/05/2015	04/03/2015		12/03/2015		18/03/2015		03/05/2016		17/05/2016		26/05/2016		04/05/2016	17/05/2016	26/05/2016
Response Zone (RZ) Details		EQS	DWS	TFD	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	MMG	MG	MMG	MG	MMG	MG	TFD	TFD	TFD
Depth				8.48	0.68	0.87	2.52	7.34	2.82	5.84	2.72	1.7	2.78	1.77	2.68	1.79	2.54	2.98	2.78
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Deep	Shallow	Deep	Shallow	Deep	Shallow	Single	Single	Single
Total petroleum hydrocarbons	ug/l			<10	<10	<10	<10	<10	<10	<10	160	4380	<10	933	<10	1220	211	<10	313
PAH																			
Acenaphthene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.015	0.64	<0.015	0.257	<0.015	0.439	1.19	0.0378	0.0806
Acenaphthylene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.011	0.21	<0.011	0.0709	<0.011	0.117	0.227	<0.011	0.0191
Anthracene	ug/l	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.015	2.26	<0.015	0.576	<0.015	1.66	1.26	0.016	0.0592
Benz(a)anthracene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0485	21.7	0.0267	3.47	<0.017	11.1	13.3	0.109	0.476
Benzo(a)pyrene	ug/l	0.00017	0.01	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	0.0441	30.3	0.0217	4.4	<0.009	14.6	32.9	0.144	0.731
Benzo(b)fluoranthene	ug/l	0.017	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0667	40.6	0.0433	6.8	<0.023	17.9	40.6	0.225	0.922
Benzo(ghi)perylene	ug/l	0.0082	0.1	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	0.0366	21.2	<0.016	2.9	<0.016	9.57	25	0.119	0.441
Benzo(k)fluoranthene	ug/l	0.017	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.027	15.8	<0.027	2.27	<0.027	6.96	16.8	0.0859	0.293
Chrysene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0324	20	0.0218	3.16	<0.013	9.38	14.9	0.101	0.513
Dibenzo(ah)anthracene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.016	5.41	<0.016	0.755	<0.016	2.76	6.03	0.0251	0.118
Fluoranthene	ug/l	0.0063		**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	0.0511	21.6	0.0245	5.14	<0.017	14.3	13.9	0.112	0.68
Fluorene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.014	0.878	<0.014	0.276	<0.014	0.595	2.69	0.0414	0.118
Indeno(123cd)pyrene	ug/l	N/A	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0288	17.9	0.0192	3.79	<0.014	10.6	18.5	0.108	0.501
Naphthalene	ug/l	2		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.2	<0.1	1.59	<0.1	1.81	<1	0.127	0.57
Phenanthrene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0287	9.17	0.0234	2.72	<0.022	6.54	10.2	0.122	0.482
Pyrene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0465	18.9	0.0196	4.44	<0.015	12.5	12	0.0979	0.601
PAH 16 Total	ug/l			<2	<2	<2	<2	<2	<2	<2	0.383	231	<0.344	42.6	<0.344	121	209	1.47	6.6
VOCs																			
1,1,1,2-Tetrachloroethane	ug/l			<2							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/l	100		<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
1.1.2.2-Tetrachloroethane	ug/l										<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/l	400		<10							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/l	0.4		**<2**							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/l			<50							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/l	0.4		**<1**							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-Chloropropane	ug/l			<50							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	ug/l			<5							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/l	20		<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/l	10	3	<2							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
1.3-Dichlorobenzene	ug/l	20									<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/l			<2							<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/l	20		<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
2.2-Dichloropropane	ug/l										<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Bromofluorobenzene**	%										99.8	97.5	94.4	93	99.4	98	88.6	84	92
4-Chlorotoluene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN039	BHM4CAN039
Round				Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date																	
Sampled Date				03/05/2016		17/05/2016		26/05/2016		03/05/2016		17/05/2016		26/05/2016		04/05/2016	
Response Zone (RZ) Details				MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	TFD / MMG	TFD
Depth				2.21	1.51	2.4	1.55	2.42	1.57	2.48	1.11	1.99	1.18	1.96	1.16	2.80	2.73
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow
Total petroleum hydrocarbons	ug/l			<10	793	<10	321	<10	103	596	756	536	66	18	63	<10	405
PAH																	
Acenaphthene	ug/l			<0.015	1.16	<0.015	1.39	<0.015	1.64	<0.015	0.0564	<0.015	0.0652	<0.015	0.183	<0.015	0.0175
Acenaphthylene	ug/l			<0.011	0.0468	<0.011	0.0564	<0.011	0.0637	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	0.0131
Anthracene	ug/l	0.1		<0.015	0.828	<0.015	0.975	<0.015	0.497	<0.015	0.0354	<0.015	0.0184	<0.015	<0.015	<0.015	0.0382
Benz(a)anthracene	ug/l			<0.017	1.33	<0.017	1.37	<0.017	0.154	0.12	0.375	0.0798	0.0192	0.0612	0.0361	<0.017	0.26
Benzo(a)pyrene	ug/l	0.00017	0.01	<0.009	1.32	<0.009	0.947	<0.009	0.0453	0.144	0.732	0.0974	<0.009	0.0621	<0.009	<0.009	0.444
Benzo(b)fluoranthene	ug/l	0.017	0.1	<0.023	2.38	<0.023	1.62	<0.023	0.0744	0.176	0.746	0.119	<0.023	0.0731	<0.023	<0.023	0.612
Benzo(ghi)perylene	ug/l	0.0082	0.1	<0.016	0.986	<0.016	0.646	<0.016	0.0233	0.122	0.499	0.104	<0.016	0.0518	<0.016	<0.016	0.45
Benzo(k)fluoranthene	ug/l	0.017	0.1	<0.027	0.901	<0.027	0.633	<0.027	0.0285	0.0649	0.315	0.055	<0.027	<0.027	<0.027	<0.027	0.21
Chrysene	ug/l			<0.013	1.51	<0.013	1.33	<0.013	0.124	0.0987	0.34	0.0566	<0.013	0.0359	<0.013	<0.013	0.272
Dibenzo(ah)anthracene	ug/l			<0.016	0.201	<0.016	0.153	<0.016	<0.016	0.0255	0.0998	0.0225	<0.016	<0.016	<0.016	<0.016	0.0709
Fluoranthene	ug/l	0.0063		0.0215	5.46	<0.017	6.29	<0.017	1.68	0.143	0.409	0.079	0.0232	0.0376	0.0434	<0.017	0.423
Fluorene	ug/l			<0.014	0.671	<0.014	0.751	<0.014	0.7	<0.014	0.0407	<0.014	0.0341	<0.014	0.056	<0.014	0.0187
Indeno(123cd)pyrene	ug/l	N/A	0.1	<0.014	0.766	<0.014	0.533	<0.014	0.0251	0.1	0.439	0.0771	<0.014	0.0506	<0.014	<0.014	0.275
Naphthalene	ug/l	2		<0.1	2.82	<0.1	3.34	<0.1	4.75	<0.1	0.365	<0.1	0.58	<0.1	1.39	<0.1	<0.1
Phenanthrene	ug/l			<0.022	6.28	<0.022	7.04	<0.022	4.27	0.0488	0.237	<0.022	0.109	<0.022	0.155	<0.022	0.178
Pyrene	ug/l			0.0178	4.41	<0.015	5.54	<0.015	1.29	0.128	0.423	0.0813	0.0168	0.0408	0.0299	<0.015	0.393
PAH 16 Total	ug/l			<0.344	31.1	<0.344	32.6	<0.344	15.4	1.17	5.11	0.772	0.866	0.413	1.89	<0.344	3.67
VOCs																	
1,1,1,2-Tetrachloroethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/l	100		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.1.2.2-Tetrachloroethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/l	400		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/l	0.4		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/l	0.4		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-Chloropropane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/l	10	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.3-Dichlorobenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2.2-Dichloropropane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Bromofluorobenzene**	%			95.3	98.6	94.8	93.7	100	101	100	102	95.9	95.7	100	102	99.4	96.5
4-Chlorotoluene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN039	BHM4CAN039	BHM4CAN039	BHM4CAN039	WSM4CAN023	WSM4CAN023	WSM4CAN023
Round				Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				W	W	W	W	W	W	W
Sample Received Date										
Sampled Date				17/05/2016		26/05/2016		04/05/2016		26/05/2016
Response Zone (RZ) Details		EQS	DWS	TFD / MMG	TFD	TFD / MMG	TFD	MG	MG	MG
Depth				2.79	2.52	2.77	2.52	1.41	1.49	1.50
Installation Details				Deep	Shallow	Deep	Shallow	Single	Single	Single
Total petroleum hydrocarbons	ug/l			185	<10	92	152	339	144	114
PAH										
Acenaphthene	ug/l			<0.3	<0.015	<0.015	<0.015	0.422	0.494	0.397
Acenaphthylene	ug/l			<0.22	<0.011	<0.011	0.011	0.033	0.0314	0.0247
Anthracene	ug/l	0.1		<0.3	<0.015	0.0154	<0.015	0.171	0.217	0.119
Benz(a)anthracene	ug/l			0.107	<0.017	0.092	0.0905	0.0289	0.049	0.0951
Benzo(a)pyrene	ug/l	0.00017	0.01	0.154	0.01	0.107	0.0924	0.0536	<0.009	0.0784
Benzo(b)fluoranthene	ug/l	0.017	0.1	0.221	<0.023	0.173	0.145	0.098	<0.023	0.124
Benzo(ghi)perylene	ug/l	0.0082	0.1	0.16	<0.016	0.116	0.0803	0.0454	<0.016	0.0673
Benzo(k)fluoranthene	ug/l	0.017	0.1	0.079	<0.027	0.0581	0.0493	0.0363	<0.027	0.056
Chrysene	ug/l			0.0863	0.0142	0.0825	0.0736	0.124	0.0517	0.129
Dibenzo(ah)anthracene	ug/l			<0.032	<0.016	0.0206	<0.016	<0.016	<0.016	<0.016
Fluoranthene	ug/l	0.0063		0.157	0.0272	0.108	0.126	0.777	0.606	0.686
Fluorene	ug/l			<0.028	<0.014	<0.014	<0.014	0.12	0.131	0.109
Indeno(123cd)pyrene	ug/l	N/A	0.1	0.118	<0.014	0.102	0.0766	0.0349	<0.014	0.0651
Naphthalene	ug/l	2		<0.2	0.126	<0.1	<0.1	1.4	1.53	1.19
Phenanthrene	ug/l			0.0731	<0.022	0.0604	0.0697	1.43	1.47	1.28
Pyrene	ug/l			0.152	0.0283	0.104	0.117	0.65	0.516	0.619
PAH 16 Total	ug/l			1.37	<0.344	1.04	0.932	5.43	5.1	5.04
VOCs										
1,1,1,2-Tetrachloroethane	ug/l			<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/l	100		<1	<1	<1	<1	<1	<1	<1
1.1.2.2-Tetrachloroethane	ug/l			<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/l	400		<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/l			<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/l			<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/l			<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/l	0.4		<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/l			<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/l	0.4		<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-Chloropropane	ug/l			<1	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	ug/l			<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/l	10	3	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/l			<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
1.3-Dichlorobenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/l			<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1
2.2-Dichloropropane	ug/l			<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/l			<1	<1	<1	<1	<1	<1	<1
4-Bromofluorobenzene**	%			95.1	95.1	100	99.8	100	103	95
4-Chlorotoluene	ug/l			<1	<1	<1	<1	<1	<1	<1

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		CABH002	CABH002	CABH002	BH5	BH13	BH14	CABH003	CABH003	BH1	BH2	BH3	BH4	BH4	BH6	BH7	BH8
Round				Round 1	Round 2	Round 3				Round 1	Round 2								
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date											26/04/2002								
Sampled Date				14/03/2002		17/04/2002	29/06/2005	06/07/2006	06/07/2006	14/03/2002	17/04/2002	29/06/2005	04/07/2005	29/06/2005	29/06/2005	07/07/2006	06/07/2006	06/07/2006	06/07/2006
Response Zone (RZ) Details				MG	MG	MG	MG	MG	MG	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD
Depth																			
Installation Details		**EQS**	**DWS**	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single
4-Isopropyltoluene	ug/l					<200				3	<5								
Benzene	ug/l	10	1																
Bromobenzene	ug/l					<200				<1	<5								
Bromochloromethane	ug/l		100			<200				<1	<5								
Bromodichloromethane	ug/l					<200				<1	<5								
Bromoform	ug/l					<200				<1	<5								
Bromomethane	ug/l					<200				<1	<5								
Carbon Disulphide	ug/l																		
Carbontetrachloride	ug/l	12	3			<200				<1	<5								
Chlorobenzene	ug/l					<200				<1	<5								
Chloroethane	ug/l					<200				<1	<5								
Chloroethene	ug/l																		
Chloroform	ug/l	2.5	100			<200				1	<5								
Chloromethane	ug/l					<200				<1	<5								
cis-1,2-Dichloroethene	ug/l					<200				<1	<5								
cis-1,3-Dichloropropene	ug/l					<200				<1	<5								
Dibromochloromethane	ug/l		100			<200				<1	<5								
Dibromofluoromethane**	%																		
Dibromomethane	ug/l					<200				<1	<5								
Dichlorodifluoromethane	ug/l					<200				<1	<5								
Dichloromethane	ug/l	20																	
Ethylbenzene	ug/l	20																	
Hexachlorobutadiene (HCBD)	ug/l	0.6				<1000				<5	<25								
Isopropylbenzene	ug/l					<200				4	<5								
m,p xylenes	ug/l	30																	
Methyl tert-butyl ether (MTBE)	ug/l																		
Naphthalene	ug/l	2				2909				410	130								
n-Butylbenzene	ug/l					<200				6	<5								
n-propylbenzene	ug/l																		
O-Xylene	ug/l	30																	
Sec-Butylbenzene	ug/l					<200				3	<5								
Styrene	ug/l	50				<200				<1	<5								
Tert-Butylbenzene	ug/l					<200				<1	<5								
Tetrachloroethene	ug/l	10	10			<200				<1	<5								
Tetrachloromethane (Carbon Tetra Ch	ug/l	12	3																
Toluene	ug/l	50																	
Toluene-d8**	%																		
trans-1,2-Dichloroethene	ug/l					<200				<1	<5								
trans-1,3-Dichloropropene	ug/l					<200				<1	<5								
Tribromomethane	ug/l		100																
Trichloroethene	ug/l	10	10			<200				11	9								
Trichlorofluoromethane	ug/l					<200				<1	<5								
Vinyl Chloride	ug/l	0	0.5			<200				<1	<5								
SVOCs																			

M4CAN
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CL-26 Metal Rec Area
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Geological Formation Legend

MG	Made Ground
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MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH9	BH12	BH17	BH18	BH19	BH20	BH21	CABH001	CABH001	CABH001	CABH001	CABH001	BH16	SBHJ03	SBHJ03	BH512	BH512
Round											Round 1	Round 2	Round 3	Round 4	Round 5		Round 1	Round 2	Round 1	Round 2
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	EW	EW
Sample Received Date																				
Sampled Date				07/07/2006	06/07/2006	06/07/2006	07/07/2006	06/07/2006	06/07/2006	07/07/2006	14/03/2002	Apr-02	17/04/2002	01/02/2003	01/06/2004	07/07/2006	27/02/2008	17/03/2008	21/04/2015	28/04/2015
Response Zone (RZ) Details				MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD	TFD (Peat)	TFD (Peat)	TFD	TFD
Depth																	0.70	5.20	6.59	7.12
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Deep	Deep
4-Isopropyltoluene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
Benzene	ug/l	10	1														<1	<1	<1	<1
Bromobenzene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
Bromochloromethane	ug/l		100								<1	<1	<1	<1	<1		<1	<1	<5	<5
Bromodichloromethane	ug/l										<1	<1	<1	<1	<1		<1	<1	<5	<5
Bromoform	ug/l										<1	<1	<1	<1	<1		<1	<1		
Bromomethane	ug/l										<1	<1	<1	<1	<1		<1	<1	<5	<5
Carbon Disulphide	ug/l																<1	<1		
Carbontetrachloride	ug/l	12	3								<1	<1	<1	<1	<1					
Chlorobenzene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
Chloroethane	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
Chloroethene	ug/l																		<1	<1
Chloroform	ug/l	2.5	100								<1	<1	<1	<1	<1		<1	<1	<1	<1
Chloromethane	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/l										<1	<1	<1	<1	<1		<1	<1	<10	<10
Dibromochloromethane	ug/l		100								<1	<1	<1	<1	<1		<1	<1	<10	<10
Dibromofluoromethane**	%																			
Dibromomethane	ug/l										<1	<1	<1	<1	<1		<1	<1	<10	<10
Dichlorodifluoromethane	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
Dichloromethane	ug/l	20															<1	<1		
Ethylbenzene	ug/l	20															<1	<1	<1	<1
Hexachlorobutadiene (HCBD)	ug/l	0.6									<5	<5	<5	<1	<1		<1	<1	<1	<1
Isopropylbenzene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
m,p xylenes	ug/l	30															<1	<1	<1	<1
Methyl tert-butyl ether (MTBE)	ug/l																<1	<1	<1	<1
Naphthalene	ug/l	2									<5	<5	<5	32	<1					
n-Butylbenzene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
n-propylbenzene	ug/l																<1	<1	<1	<1
O-Xylene	ug/l	30															<1	<1	<1	<1
Sec-Butylbenzene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
Styrene	ug/l	50									<1	<1	<1	<1	<1		<1	<1	<1	<1
Tert-Butylbenzene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
Tetrachloroethene	ug/l	10	10								<1	<1	<1	<1	<1		<1	<1	<1	<1
Tetrachloromethane (Carbon Tetra Ch	ug/l	12	3														<1	<1	<1	<1
Toluene	ug/l	50															2	<1	<1	<1
Toluene-d8**	%																			
trans-1,2-Dichloroethene	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/l										<1	<1	<1	<1	<1		<1	<1	<10	<10
Tribromomethane	ug/l		100																<1	<1
Trichloroethene	ug/l	10	10								<1	<1	<1	<1	<1		<1	<1	<1	<1
Trichlorofluoromethane	ug/l										<1	<1	<1	<1	<1		<1	<1	<1	<1
Vinyl Chloride	ug/l	0	0.5								<1	<1	<1	<1	<1		<1	<1		
SVOCs																				

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH512	BH510	BH510	BH510	BH510	BH510	BH510	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN036	BHM4CAN036	BHM4CAN036
Round				Round 3	Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				EW	EW	EW	EW	EW	EW	EW	W	W	W	W	W	W	W	W	W
Sample Received Date																			
Sampled Date				06/05/2015	04/03/2015		12/03/2015		18/03/2015		03/05/2016		17/05/2016		26/05/2016		04/05/2016	17/05/2016	26/05/2016
Response Zone (RZ) Details				TFD	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	MMG	MG	MMG	MG	MMG	MG	TFD	TFD	TFD
Depth				8.48	0.68	0.87	2.52	7.34	2.82	5.84	2.72	1.7	2.78	1.77	2.68	1.79	2.54	2.98	2.78
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Deep	Shallow	Deep	Shallow	Deep	Shallow	Single	Single	Single
4-Isopropyltoluene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	ug/l	10	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/l		100	<5							<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l			<5							<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	ug/l										<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/l			<5							<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Disulphide	ug/l										<1	<1	<1	<1	<1	<1	1.1	1.52	<1
Carbontetrachloride	ug/l	12	3								<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	2.5	100	<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/l			<10							<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	ug/l		100	<10							<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromofluoromethane**	%										113	0.51	110	0.464	119	0.47	112	109	113
Dibromomethane	ug/l			<10							<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	ug/l	20									<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene (HCBD)	ug/l	0.6		<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
m,p xylenes	ug/l	30		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methyl tert-butyl ether (MTBE)	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	2									<1	1.34	<1	1.06	<1	<1	<1	<1	<1
n-Butylbenzene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
n-propylbenzene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
O-Xylene	ug/l	30		<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Sec-Butylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/l	50		<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Tert-Butylbenzene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/l	10	10	<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloromethane (Carbon Tetra Ch	ug/l	12	3	<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	50		<1	<1	<1	<1	<1	<1	<1	<1	3.95	<1	2.9	<1	3.8	<1	<1	<1
Toluene-d8**	%										97.1	99.4	97.6	96.9	108	102	94.4	96.2	106
trans-1,2-Dichloroethene	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/l			<10							<1	<1	<1	<1	<1	<1	<1	<1	<1
Tribromomethane	ug/l		100	<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	10	10	<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/l			<1							<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	ug/l	0	0.5								<1	<1	<1	<1	<1	<1	<1	<1	<1
SVOCs																			

M4CAN
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CL-26 Metal Rec Area
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Geological Formation Legend

MG	Made Ground
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MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN039	BHM4CAN039
Round				Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date																	
Sampled Date				03/05/2016		17/05/2016		26/05/2016		03/05/2016		17/05/2016		26/05/2016		04/05/2016	
Response Zone (RZ) Details				MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	TFD / MMG	TFD
Depth				2.21	1.51	2.4	1.55	2.42	1.57	2.48	1.11	1.99	1.18	1.96	1.16	2.80	2.73
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow
4-Isopropyltoluene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	ug/l	10	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/l		100	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Disulphide	ug/l			<1	1.36	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbontetrachloride	ug/l	12	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	2.5	100	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	ug/l		100	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromofluoromethane**	%			113	0.51	110	0.477	115	0.48	110	0.52	111	0.491	117	0.47	112	113
Dibromomethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene (HCBD)	ug/l	0.6		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m,p xylenes	ug/l	30		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methyl tert-butyl ether (MTBE)	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	2		<1	<1	<1	2.56	<1	2.08	<1	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-propylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
O-Xylene	ug/l	30		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sec-Butylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/l	50		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tert-Butylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/l	10	10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloromethane (Carbon Tetra Ch	ug/l	12	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	50		5.2	5.23	6.47	3.13	3.75	1.74	<1	4.71	<1	3.2	<1	3.14	<1	<1
Toluene-d8**	%			95.2	100	97.8	96.7	107	102	101	101	98.4	98	107	103	95.5	94.1
trans-1,2-Dichloroethene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tribromomethane	ug/l		100	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	10	10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	ug/l	0	0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
SVOCs																	

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN039	BHM4CAN039	BHM4CAN039	BHM4CAN039	WSM4CAN023	WSM4CAN023	WSM4CAN023
Round				Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				W	W	W	W	W	W	W
Sample Received Date										
Sampled Date				17/05/2016		26/05/2016		04/05/2016		26/05/2016
Response Zone (RZ) Details				TFD / MMG	TFD	TFD / MMG	TFD	MG	MG	MG
Depth				2.79	2.52	2.77	2.52	1.41	1.49	1.50
Installation Details		EQS	DWS	Deep	Shallow	Deep	Shallow	Single	Single	Single
4-Isopropyltoluene	ug/l			<1	<1	<1	<1	<1	<1	<1
Benzene	ug/l	10	1	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/l		100	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l			<1	<1	<1	<1	<1	<1	<1
Bromoform	ug/l			<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/l			<1	<1	<1	<1	<1	<1	<1
Carbon Disulphide	ug/l			<1	<1	<1	<1	<1	<1	<1
Carbontetrachloride	ug/l	12	3	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/l			<1	<1	<1	<1	<1	<1	1.79
Chloroethane	ug/l			<1	<1	<1	<1	<1	<1	<1
Chloroethene	ug/l			<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	2.5	100	<1	<1	<1	<1	<1	<1	<1
Chloromethane	ug/l			<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/l			<1	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/l			<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	ug/l		100	<1	<1	<1	<1	<1	<1	<1
Dibromofluoromethane**	%			109	112	115	112	0.46	0.482	0.51
Dibromomethane	ug/l			<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/l			<1	<1	<1	<1	<1	<1	<1
Dichloromethane	ug/l	20		<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene (HCBD)	ug/l	0.6		<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
m,p xylenes	ug/l	30		<1	1.04	<1	<1	<1	<1	<1
Methyl tert-butyl ether (MTBE)	ug/l			<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	2		<1	<1	<1	<1	1.27	1.11	<1
n-Butylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
n-propylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
O-Xylene	ug/l	30		<1	<1	<1	<1	<1	<1	<1
Sec-Butylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
Styrene	ug/l	50		<1	<1	<1	<1	<1	<1	<1
Tert-Butylbenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/l	10	10	<1	<1	<1	<1	<1	<1	<1
Tetrachloromethane (Carbon Tetra Ch	ug/l	12	3	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	50		<1	<1	<1	<1	<1	2.41	<1
Toluene-d8**	%			97.7	98	109	107	100	98	103
trans-1,2-Dichloroethene	ug/l			<1	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/l			<1	<1	<1	<1	<1	<1	<1
Tribromomethane	ug/l		100	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	10	10	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/l			<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	ug/l	0	0.5	<1	<1	<1	<1	<1	<1	<1
SVOCs										

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		CABH002	CABH002	CABH002	BH5	BH13	BH14	CABH003	CABH003	BH1	BH2	BH3	BH4	BH4	BH6	BH7	BH8
Round				Round 1	Round 2	Round 3				Round 1	Round 2								
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date											26/04/2002								
Sampled Date				14/03/2002		17/04/2002	29/06/2005	06/07/2006	06/07/2006	14/03/2002	17/04/2002	29/06/2005	04/07/2005	29/06/2005	29/06/2005	07/07/2006	06/07/2006	06/07/2006	06/07/2006
Response Zone (RZ) Details				MG	MG	MG	MG	MG	MG	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD
Depth																			
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single
PAHs																			
Acenaphthene	ug/l																		
Acenaphthylene	ug/l																		
Anthracene	ug/l	0.1																	
Benzo(a)anthracene	ug/l																		
Benzo(a)pyrene	ug/l	0.00017	0.01																
Benzo(b)fluoranthene	ug/l	0.017	0.1																
Benzo(ghi)perylene	ug/l	0.0082	0.1																
Benzo(k)fluoranthene	ug/l	0.017	0.1																
Chrysene	ug/l																		
Dibenzo(ah)anthracene	ug/l																		
Fluoranthene	ug/l	0.0063																	
Fluorene	ug/l																		
Indeno(123cd)pyrene	ug/l	N/A	0.1																
Naphthalene	ug/l	2																	
Phenanthrene	ug/l																		
Pyrene	ug/l																		
Other SVOCs																			
1,2-Dichlorobenzene	ug/l	20																	
1,2,4-Trichlorobenzene	ug/l																		
1,3-Dichlorobenzene	ug/l																		
1,4-Dichlorobenzene	ug/l																		
2,4,5-Trichlorophenol	ug/l																		
2,4,6-Trichlorophenol	ug/l																		
2,4-Dichlorophenol	ug/l	20																	
2,4-Dimethylphenol	ug/l																		
2,4-Dinitrotoluene	ug/l																		
2,6-Dinitrotoluene	ug/l																		
2-Chloronaphthalene	ug/l																		
2-Chlorophenol	ug/l	50																	
2-Methyl-4,6-Dinitrophenol	ug/l																		
2-Methylnaphthalene	ug/l																		
2-Methylphenol	ug/l	100																	
2-Nitroaniline	ug/l																		
2-Nitrophenol	ug/l																		
3-Nitroaniline	ug/l																		
4-Bromophenyl Phenyl Ether	ug/l																		
4-Chloro-3-Methylphenol	ug/l	40																	
4-Chloroaniline	ug/l																		
4-Chlorophenyl Phenyl Ether	ug/l																		
4-Methylphenol	ug/l	100																	
4-Nitroaniline	ug/l																		
Azobenzene	ug/l																		
Bis(2-chloroethoxy)methane	ug/l																		

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH9	BH12	BH17	BH18	BH19	BH20	BH21	CABH001	CABH001	CABH001	CABH001	CABH001	BH16	SBHJ03	SBHJ03	BH512	BH512
Round											Round 1	Round 2	Round 3	Round 4	Round 5		Round 1	Round 2	Round 1	Round 2
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	EW	EW
Sample Received Date																				
Sampled Date				07/07/2006	06/07/2006	06/07/2006	07/07/2006	06/07/2006	06/07/2006	07/07/2006	14/03/2002	Apr-02	17/04/2002	01/02/2003	01/06/2004	07/07/2006	27/02/2008	17/03/2008	21/04/2015	28/04/2015
Response Zone (RZ) Details				MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD	TFD (Peat)	TFD (Peat)	TFD	TFD
Depth																	0.70	5.20	6.59	7.12
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Deep	Deep
PAHs																				
Acenaphthene	ug/l																			
Acenaphthylene	ug/l																			
Anthracene	ug/l	0.1																		
Benzo(a)anthracene	ug/l																			
Benzo(a)pyrene	ug/l	0.00017	0.01																	
Benzo(b)fluoranthene	ug/l	0.017	0.1																	
Benzo(ghi)perylene	ug/l	0.0082	0.1																	
Benzo(k)fluoranthene	ug/l	0.017	0.1																	
Chrysene	ug/l																			
Dibenzo(ah)anthracene	ug/l																			
Fluoranthene	ug/l	0.0063																		
Fluorene	ug/l																			
Indeno(123cd)pyrene	ug/l	N/A	0.1																	
Naphthalene	ug/l	2																		
Phenanthrene	ug/l																			
Pyrene	ug/l																			
Other SVOCs																				
1,2-Dichlorobenzene	ug/l	20															<1	<1	<0.5	<0.5
1,2,4-Trichlorobenzene	ug/l																<1	<1		
1,3-Dichlorobenzene	ug/l																<1	<1		
1,4-Dichlorobenzene	ug/l																<1	<1		
2,4,5-Trichlorophenol	ug/l																<1	<1	<0.5	<0.5
2,4,6-Trichlorophenol	ug/l																<1	<1	<0.5	<0.5
2,4-Dichlorophenol	ug/l	20															<1	<1	<0.5	<0.5
2,4-Dimethylphenol	ug/l																<1	<1	<0.5	<0.5
2,4-Dinitrotoluene	ug/l																<1	<1	<0.5	<0.5
2,6-Dinitrotoluene	ug/l																<1	<1	<0.5	<0.5
2-Chloronaphthalene	ug/l																<1	<1	<0.5	<0.5
2-Chlorophenol	ug/l	50															<1	<1	<0.5	<0.5
2-Methyl-4,6-Dinitrophenol	ug/l																		<0.5	<0.5
2-Methylnaphthalene	ug/l																<1	<1	<0.5	<0.5
2-Methylphenol	ug/l	100															<1	<1	<0.5	<0.5
2-Nitroaniline	ug/l																<1	<1	<0.5	<0.5
2-Nitrophenol	ug/l																<1	<1	<0.5	<0.5
3-Nitroaniline	ug/l																<1	<1	<0.5	<0.5
4-Bromophenyl Phenyl Ether	ug/l																<1	<1	<0.5	<0.5
4-Chloro-3-Methylphenol	ug/l	40															<1	<1	<0.5	<0.5
4-Chloroaniline	ug/l																<1	<1	<0.5	<0.5
4-Chlorophenyl Phenyl Ether	ug/l																<1	<1	<0.5	<0.5
4-Methylphenol	ug/l	100															<1	<1	<0.5	<0.5
4-Nitroaniline	ug/l																<1	<1	<0.5	<0.5
Azobenzene	ug/l																<1	<1	<0.5	<0.5
Bis(2-chloroethoxy)methane	ug/l																<1	<1	<0.5	<0.5

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH512	BH510	BH510	BH510	BH510	BH510	BH510	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN036	BHM4CAN036	BHM4CAN036
Round				Round 3	Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				EW	EW	EW	EW	EW	EW	EW	W	W	W	W	W	W	W	W	W
Sample Received Date																			
Sampled Date				06/05/2015	04/03/2015		12/03/2015		18/03/2015		03/05/2016		17/05/2016		26/05/2016		04/05/2016	17/05/2016	26/05/2016
Response Zone (RZ) Details				TFD	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	MMG	MG	MMG	MG	MMG	MG	TFD	TFD	TFD
Depth				8.48	0.68	0.87	2.52	7.34	2.82	5.84	2.72	1.7	2.78	1.77	2.68	1.79	2.54	2.98	2.78
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Deep	Shallow	Deep	Shallow	Deep	Shallow	Single	Single	Single
PAHs																			
Acenaphthene	ug/l										<1	<1	<1	<5	<1	<1	<80	<1	<2
Acenaphthylene	ug/l										<1	<1	<1	<5	<1	<1	<80	<1	<2
Anthracene	ug/l	0.1									<1	1.55	<1	<5	<1	<1	<80	<1	<2
Benzo(a)anthracene	ug/l										<1	10.4	<1	<5	<1	1.18	<80	<1	<2
Benzo(a)pyrene	ug/l	0.00017	0.01								<1	10.2	<1	<5	<1	<1	<80	<1	<2
Benzo(b)fluoranthene	ug/l	0.017	0.1								<1	15.2	<1	<5	<1	1.5	<80	<1	<2
Benzo(ghi)perylene	ug/l	0.0082	0.1								<1	7.96	<1	<5	<1	<1	<80	<1	<2
Benzo(k)fluoranthene	ug/l	0.017	0.1								<1	5.22	<1	<5	<1	<1	<80	<1	<2
Chrysene	ug/l										<1	9.21	<1	<5	<1	1.03	<80	<1	<2
Dibenzo(ah)anthracene	ug/l										<1	1.96	<1	<5	<1	<1	<80	<1	<2
Fluoranthene	ug/l	0.0063									<1	15.3	<1	<5	<1	1.94	<80	<1	<2
Fluorene	ug/l										<1	<1	<1	<5	<1	<1	<80	<1	<2
Indeno(123cd)pyrene	ug/l	N/A	0.1								<1	6.66	<1	<5	<1	<1	<80	<1	<2
Naphthalene	ug/l	2									<1	2.15	<1	<5	<1	<1	<80	<1	<2
Phenanthrene	ug/l										<1	6.33	<1	<5	<1	1.14	<80	<1	<2
Pyrene	ug/l										<1	13.1	<1	<5	<1	1.69	<80	<1	<2
Other SVOCs																			
1,2-Dichlorobenzene	ug/l	20		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
1,2,4-Trichlorobenzene	ug/l										<1	<1	<1	<5	<1	<1	<80	<1	<2
1,3-Dichlorobenzene	ug/l										<1	<1	<1	<5	<1	<1	<80	<1	<2
1,4-Dichlorobenzene	ug/l										<1	<1	<1	<5	<1	<1	<80	<1	<2
2,4,5-Trichlorophenol	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
2,4,6-Trichlorophenol	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
2,4-Dichlorophenol	ug/l	20		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
2,4-Dimethylphenol	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
2,4-Dinitrotoluene	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
2,6-Dinitrotoluene	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
2-Chloronaphthalene	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
2-Chlorophenol	ug/l	50		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
2-Methyl-4,6-Dinitrophenol	ug/l			<0.5															
2-Methylnaphthalene	ug/l			<0.5							<1	1.03	<1	<5	<1	<1	<80	<1	<2
2-Methylphenol	ug/l	100		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
2-Nitroaniline	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
2-Nitrophenol	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
3-Nitroaniline	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
4-Bromophenyl Phenyl Ether	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
4-Chloro-3-Methylphenol	ug/l	40		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
4-Chloroaniline	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
4-Chlorophenyl Phenyl Ether	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
4-Methylphenol	ug/l	100		<0.5							<1	<1	<1	<5	<1	<1	<80	<6	<5
4-Nitroaniline	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Azobenzene	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Bis(2-chloroethoxy)methane	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN039	BHM4CAN039
Round				Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date																	
Sampled Date				03/05/2016		17/05/2016		26/05/2016		03/05/2016		17/05/2016		26/05/2016		04/05/2016	
Response Zone (RZ) Details				MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	TFD / MMG	TFD
Depth				2.21	1.51	2.4	1.55	2.42	1.57	2.48	1.11	1.99	1.18	1.96	1.16	2.80	2.73
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow
PAHs																	
Acenaphthene	ug/l			<1	<1	<1	1.04	<1	1.35	<1	<1	<1	<1	<1	<1	<1	<1
Acenaphthylene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Anthracene	ug/l	0.1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(a)anthracene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	ug/l	0.00017	0.01	<1	<1	<1	1.48	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(b)fluoranthene	ug/l	0.017	0.1	<1	1.41	<1	2.42	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(ghi)perylene	ug/l	0.0082	0.1	<1	<1	<1	1.25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	ug/l	0.017	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chrysene	ug/l			<1	1.23	<1	1.77	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibenzo(ah)anthracene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	ug/l	0.0063		<1	4.01	<1	6.12	<1	1.38	<1	<1	<1	<1	<1	<1	<1	<1
Fluorene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Indeno(123cd)pyrene	ug/l	N/A	0.1	<1	<1	<1	1.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	2		<1	2.21	<1	2.32	<1	3.11	<1	<1	<1	<1	<1	1.08	<1	<1
Phenanthrene	ug/l			<1	4.88	<1	6.07	<1	3.44	<1	<1	<1	<1	<1	<1	<1	<1
Pyrene	ug/l			<1	3.38	<1	5.64	<1	1.05	<1	<1	<1	<1	<1	<1	<1	<1
Other SVOCs																	
1,2-Dichlorobenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,4,5-Trichlorophenol	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,4,6-Trichlorophenol	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,4-Dichlorophenol	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,4-Dimethylphenol	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,4-Dinitrotoluene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,6-Dinitrotoluene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Chloronaphthalene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorophenol	ug/l	50		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Methyl-4,6-Dinitrophenol	ug/l																
2-Methylnaphthalene	ug/l			<1	1.63	<1	1.94	<1	2.78	<1	<1	<1	<1	<1	<1	<1	<1
2-Methylphenol	ug/l	100		<1	<1	<1	<1	<1	<1	<1	<1	<1	1.78	<1	<1	<1	<1
2-Nitroaniline	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Nitrophenol	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3-Nitroaniline	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Bromophenyl Phenyl Ether	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Chloro-3-Methylphenol	ug/l	40		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Chloroaniline	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Chlorophenyl Phenyl Ether	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Methylphenol	ug/l	100		<2	<1	<5	<5	<1	<1	<1	<1	<5	9.37	<1	<1	<1	<1
4-Nitroaniline	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Azobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bis(2-chloroethoxy)methane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN039	BHM4CAN039	BHM4CAN039	BHM4CAN039	WSM4CAN023	WSM4CAN023	WSM4CAN023
Round				Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				W	W	W	W	W	W	W
Sample Received Date										
Sampled Date				17/05/2016		26/05/2016		04/05/2016		26/05/2016
Response Zone (RZ) Details				TFD / MMG	TFD	TFD / MMG	TFD	MG	MG	MG
Depth				2.79	2.52	2.77	2.52	1.41	1.49	1.50
Installation Details		EQS	DWS	Deep	Shallow	Deep	Shallow	Single	Single	Single
PAHs										
Acenaphthene	ug/l			<1	<1	<1	<1	<1	<1	<1
Acenaphthylene	ug/l			<1	<1	<1	<1	<1	<1	<1
Anthracene	ug/l	0.1		<1	<1	<1	<1	<1	<1	<1
Benzo(a)anthracene	ug/l			<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	ug/l	0.00017	0.01	<1	<1	<1	<1	<1	<1	<1
Benzo(b)fluoranthene	ug/l	0.017	0.1	<1	<1	<1	<1	<1	<1	<1
Benzo(ghi)perylene	ug/l	0.0082	0.1	<1	<1	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	ug/l	0.017	0.1	<1	<1	<1	<1	<1	<1	<1
Chrysene	ug/l			<1	<1	<1	<1	<1	<1	<1
Dibenzo(ah)anthracene	ug/l			<1	<1	<1	<1	<1	<1	<1
Fluoranthene	ug/l	0.0063		<1	<1	<1	<1	<1	<1	<1
Fluorene	ug/l			<1	<1	<1	<1	<1	<1	<1
Indeno(123cd)pyrene	ug/l	N/A	0.1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	2		<1	<1	<1	<1	1.12	1.07	<1
Phenanthrene	ug/l			<1	<1	<1	<1	1.21	1.09	<1
Pyrene	ug/l			<1	<1	<1	<1	<1	<1	<1
Other SVOCs										
1,2-Dichlorobenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
2,4,5-Trichlorophenol	ug/l			<1	<1	<1	<1	<1	<1	<1
2,4,6-Trichlorophenol	ug/l			<1	<1	<1	<1	<1	<1	<1
2,4-Dichlorophenol	ug/l	20		<1	<1	<1	<1	<1	<1	<1
2,4-Dimethylphenol	ug/l			<1	<1	<1	<1	<1	<1	<1
2,4-Dinitrotoluene	ug/l			<1	<1	<1	<1	<1	<1	<1
2,6-Dinitrotoluene	ug/l			<1	<1	<1	<1	<1	<1	<1
2-Chloronaphthalene	ug/l			<1	<1	<1	<1	<1	<1	<1
2-Chlorophenol	ug/l	50		<1	<1	<1	<1	<1	<1	<1
2-Methyl-4,6-Dinitrophenol	ug/l									
2-Methylnaphthalene	ug/l			<1	<1	<1	<1	<1	<1	<1
2-Methylphenol	ug/l	100		<1	<1	<1	<1	<1	<1	<1
2-Nitroaniline	ug/l			<1	<1	<1	<1	<1	<1	<1
2-Nitrophenol	ug/l			<1	<1	<1	<1	<1	<1	<1
3-Nitroaniline	ug/l			<1	<1	<1	<1	<1	<1	<1
4-Bromophenyl Phenyl Ether	ug/l			<1	<1	<1	<1	<1	<1	<1
4-Chloro-3-Methylphenol	ug/l	40		<1	<1	<1	<1	<1	<1	<1
4-Chloroaniline	ug/l			<1	<1	<1	<1	<1	<1	<1
4-Chlorophenyl Phenyl Ether	ug/l			<1	<1	<1	<1	<1	<1	<1
4-Methylphenol	ug/l	100		<5	<5	<1	<1	<1	<5	<1
4-Nitroaniline	ug/l			<1	<1	<1	<1	<1	<1	<1
Azobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
Bis(2-chloroethoxy)methane	ug/l			<1	<1	<1	<1	<1	<1	<1

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		CABH002	CABH002	CABH002	BH5	BH13	BH14	CABH003	CABH003	BH1	BH2	BH3	BH4	BH4	BH6	BH7	BH8
Round				Round 1	Round 2	Round 3				Round 1	Round 2								
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date											26/04/2002								
Sampled Date				14/03/2002		17/04/2002	29/06/2005	06/07/2006	06/07/2006	14/03/2002	17/04/2002	29/06/2005	04/07/2005	29/06/2005	29/06/2005	07/07/2006	06/07/2006	06/07/2006	06/07/2006
Response Zone (RZ) Details				MG	MG	MG	MG	MG	MG	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD
Depth																			
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single
Bis(2-chloroethyl)ether	ug/l																		
Bis(2-chloroisopropyl)ether	ug/l																		
Bis(2-ethylhexyl)phthalate	ug/l	1.3																	
Butylbenzylphthalate	ug/l	20																	
Carbazole	ug/l																		
Dibenzofuran	ug/l																		
Diethylphthalate	ug/l	200																	
Dimethylphthalate	ug/l	800																	
Di-N-Butyl Phthalate	ug/l	8																	
Di-N-Octyl Phthalate	ug/l	20																	
Hexachlorobenzene (HCB)	ug/l	0.05																	
Hexachlorobutadiene	ug/l																		
Hexachlorocyclopentadiene	ug/l																		
Hexachloroethane	ug/l																		
Isophorone	ug/l																		
Nitrobenzene	ug/l																		
n-nitrosodimethylamine	ug/l																		
N-Nitroso-Di-N-Propylamine	ug/l																		
Pentachlorophenol (PCP)	ug/l	0.4																	
Phenol	ug/l	7.7																	
PCBs																			
Pcb-101 2,2',4,5,5' - Pentachlorobiphe	ug/l																		
Pcb-118 2,3',4,4',5 - Pentachlorobiphe	ug/l																		
Pcb-138 2,2',3,4,4',5' - Hexachlorobiph	ug/l																		
Pcb-153 2,2',4,4',5,5' - Hexachlorobiph	ug/l																		
Pcb-180 2,2',3,4,4',5,5' - Heptachlorob	ug/l																		
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l																		
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l																		
PCB congener 105	ug/l																		
PCB congener 114	ug/l																		
PCB congener 118	ug/l																		
PCB congener 123	ug/l																		
PCB congener 126	ug/l																		
PCB congener 156	ug/l																		
PCB congener 157	ug/l																		
PCB congener 167	ug/l																		
PCB congener 169	ug/l																		
PCB congener 189	ug/l																		
PCB congener 77	ug/l																		
PCB congener 81	ug/l																		

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH9	BH12	BH17	BH18	BH19	BH20	BH21	CABH001	CABH001	CABH001	CABH001	CABH001	BH16	SBHJ03	SBHJ03	BH512	BH512
Round											Round 1	Round 2	Round 3	Round 4	Round 5		Round 1	Round 2	Round 1	Round 2
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	EW	EW
Sample Received Date																				
Sampled Date				07/07/2006	06/07/2006	06/07/2006	07/07/2006	06/07/2006	06/07/2006	07/07/2006	14/03/2002	Apr-02	17/04/2002	01/02/2003	01/06/2004	07/07/2006	27/02/2008	17/03/2008	21/04/2015	28/04/2015
Response Zone (RZ) Details		**EQS**	**DWS**	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	MG / TFD	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD/(Peat)	TFD	TFD (Peat)	TFD (Peat)	TFD	TFD
Depth																	0.70	5.20	6.59	7.12
Installation Details				Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Deep	Deep
Bis(2-chloroethyl)ether	ug/l																<1	<1	<0.5	<0.5
Bis(2-chloroisopropyl)ether	ug/l																		<0.5	<0.5
Bis(2-ethylhexyl)phthalate	ug/l	1.3															<2	<2	<0.5	<0.5
Butylbenzylphthalate	ug/l	20															<1	<1	<0.5	<0.5
Carbazole	ug/l																<1	<1	<0.5	<0.5
Dibenzofuran	ug/l																<1	<1	<0.5	<0.5
Diethylphthalate	ug/l	200															<1	<1	<0.5	<0.5
Dimethylphthalate	ug/l	800															<1	<1	<0.5	<0.5
Di-N-Butyl Phthalate	ug/l	8															<1	<1	<0.5	<0.5
Di-N-Octyl Phthalate	ug/l	20															<5	<5	<0.5	<0.5
Hexachlorobenzene (HCB)	ug/l	0.05															<1	<1	**<0.5**	**<0.5**
Hexachlorobutadiene	ug/l																<1	<1		
Hexachlorocyclopentadiene	ug/l																<1	<1	<0.5	<0.5
Hexachloroethane	ug/l																<1	<1	<0.5	<0.5
Isophorone	ug/l																<1	<1	<0.5	<0.5
Nitrobenzene	ug/l																<1	<1	<0.5	<0.5
n-nitrosodimethylamine	ug/l																		<0.5	<0.5
N-Nitroso-Di-N-Propylamine	ug/l																<1	<1	<0.5	<0.5
Pentachlorophenol (PCP)	ug/l	0.4															<1	<1	**<0.5**	**<0.5**
Phenol	ug/l	7.7															<1	<1	<0.5	<0.5
PCBs																				
Pcb-101 2,2',4,5,5' - Pentachlorobiphe	ug/l																		<0.01	<0.01
Pcb-118 2,3',4,4',5 - Pentachlorobiphe	ug/l																		<0.01	<0.01
Pcb-138 2,2',3,4,4',5' - Hexachlorobiph	ug/l																		<0.01	<0.01
Pcb-153 2,2',4,4',5,5' - Hexachlorobiph	ug/l																		<0.01	<0.01
Pcb-180 2,2',3,4,4',5,5' - Heptachlorob	ug/l																		<0.01	<0.01
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l																		<0.01	<0.01
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l																		<0.01	<0.01
PCB congener 105	ug/l																			
PCB congener 114	ug/l																			
PCB congener 118	ug/l																			
PCB congener 123	ug/l																			
PCB congener 126	ug/l																			
PCB congener 156	ug/l																			
PCB congener 157	ug/l																			
PCB congener 167	ug/l																			
PCB congener 169	ug/l																			
PCB congener 189	ug/l																			
PCB congener 77	ug/l																			
PCB congener 81	ug/l																			

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BH512	BH510	BH510	BH510	BH510	BH510	BH510	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN035b	BHM4CAN036	BHM4CAN036	BHM4CAN036
Round				Round 3	Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				EW	EW	EW	EW	EW	EW	EW	W	W	W	W	W	W	W	W	W
Sample Received Date																			
Sampled Date				06/05/2015	04/03/2015		12/03/2015		18/03/2015		03/05/2016		17/05/2016		26/05/2016		04/05/2016	17/05/2016	26/05/2016
Response Zone (RZ) Details				TFD	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	TFD (Peat)	TFD/MMG	MMG	MG	MMG	MG	MMG	MG	TFD	TFD	TFD
Depth				8.48	0.68	0.87	2.52	7.34	2.82	5.84	2.72	1.7	2.78	1.77	2.68	1.79	2.54	2.98	2.78
Installation Details				Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Deep	Shallow	Deep	Shallow	Deep	Shallow	Single	Single	Single
Bis(2-chloroethyl)ether	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Bis(2-chloroisopropyl)ether	ug/l			<0.5															
Bis(2-ethylhexyl)phthalate	ug/l	1.3		<0.5							3.25	62.9	<2	<10	<2	5	194	<2	<4
Butylbenzylphthalate	ug/l	20		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Carbazole	ug/l			<0.5							<1	1.74	<1	<5	<1	<1	<80	<1	<2
Dibenzofuran	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Diethylphthalate	ug/l	200		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Dimethylphthalate	ug/l	800		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Di-N-Butyl Phthalate	ug/l	8		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Di-N-Octyl Phthalate	ug/l	20		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Hexachlorobenzene (HCB)	ug/l	0.05		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Hexachlorobutadiene	ug/l										<1	<1	<1	<5	<1	<1	<80	<1	<2
Hexachlorocyclopentadiene	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Hexachloroethane	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Isophorone	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Nitrobenzene	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
n-nitrosodimethylamine	ug/l			<0.5															
N-Nitroso-Di-N-Propylamine	ug/l			<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Pentachlorophenol (PCP)	ug/l	0.4		<0.5							<1	<1	<1	<5	<1	<1	<80	<1	<2
Phenol	ug/l	7.7		<0.5							<1	28.3	<1	<5	<1	15.9	<80	<1	<2
PCBs																			
Pcb-101 2,2',4,5,5' - Pentachlorobiphe	ug/l			<0.01															
Pcb-118 2,3',4,4',5 - Pentachlorobiphe	ug/l			<0.01															
Pcb-138 2,2',3,4,4',5' - Hexachlorobiph	ug/l			<0.01															
Pcb-153 2,2',4,4',5,5' - Hexachlorobiph	ug/l			<0.01															
Pcb-180 2,2',3,4,4',5,5' - Heptachlorob	ug/l			<0.01															
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l			<0.01															
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l			<0.01															
PCB congener 105	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 114	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 118	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 123	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 126	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 156	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 157	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 167	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 169	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 189	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 77	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	
PCB congener 81	ug/l										<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	Units	Screening Criteria		BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN037	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN038a	BHM4CAN039	BHM4CAN039
Round				Round 1		Round 2		Round 3		Round 1		Round 2		Round 3		Round 1	
Sample Type				W	W	W	W	W	W	W	W	W	W	W	W	W	W
Sample Received Date																	
Sampled Date				03/05/2016		17/05/2016		26/05/2016		03/05/2016		17/05/2016		26/05/2016		04/05/2016	
Response Zone (RZ) Details				MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	MMG	MG	TFD / MMG	TFD
Depth				2.21	1.51	2.4	1.55	2.42	1.57	2.48	1.11	1.99	1.18	1.96	1.16	2.80	2.73
Installation Details		EQS	DWS	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow
Bis(2-chloroethyl)ether	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bis(2-chloroisopropyl)ether	ug/l																
Bis(2-ethylhexyl)phthalate	ug/l	1.3		3.14	36.7	<2	12.9	<2	<2	3.57	11.3	17.6	<2	<2	<2	<2	5.73
Butylbenzylphthalate	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbazole	ug/l			<1	1.95	<1	1.84	<1	1.89	<1	<1	<1	<1	<1	<1	<1	<1
Dibenzofuran	ug/l			<1	<1	<1	1.1	<1	1.28	<1	<1	<1	<1	<1	<1	<1	<1
Diethylphthalate	ug/l	200		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dimethylphthalate	ug/l	800		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Di-N-Butyl Phthalate	ug/l	8		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Di-N-Octyl Phthalate	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hexachlorobenzene (HCB)	ug/l	0.05		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hexachlorocyclopentadiene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hexachloroethane	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isophorone	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nitrobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-nitrosodimethylamine	ug/l																
N-Nitroso-Di-N-Propylamine	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Pentachlorophenol (PCP)	ug/l	0.4		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phenol	ug/l	7.7		<1	8.33	<1	3.24	<1	5.66	<1	57.1	<1	17	<1	35.6	<1	<1
PCBs																	
Pcb-101 2,2',4,5,5' - Pentachlorobiphe	ug/l																
Pcb-118 2,3',4,4',5 - Pentachlorobiphe	ug/l																
Pcb-138 2,2',3,4,4',5' - Hexachlorobiph	ug/l																
Pcb-153 2,2',4,4',5,5' - Hexachlorobiph	ug/l																
Pcb-180 2,2',3,4,4',5,5' - Heptachlorob	ug/l																
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l																
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l																
PCB congener 105	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 114	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 118	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 123	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 126	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 156	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 157	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 167	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 169	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 189	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 77	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015
PCB congener 81	ug/l			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015	<0.015	<0.015			<0.015	<0.015

M4CAN
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CL-26 Metal Rec Area
08/07/2015

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03
X Offsite borehole location

Sample Reference	**Units**	**Screening Criteria**		**BHM4CAN039**	**BHM4CAN039**	**BHM4CAN039**	**BHM4CAN039**	**WSM4CAN023**	**WSM4CAN023**	**WSM4CAN023**
Round				Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				W	W	W	W	W	W	W
Sample Received Date										
Sampled Date				17/05/2016		26/05/2016		04/05/2016		26/05/2016
Response Zone (RZ) Details				TFD / MMG	TFD	TFD / MMG	TFD	MG	MG	MG
Depth				2.79	2.52	2.77	2.52	1.41	1.49	1.50
Installation Details		**EQS**	**DWS**	Deep	Shallow	Deep	Shallow	Single	Single	Single
Bis(2-chloroethyl)ether	ug/l			<1	<1	<1	<1	<1	<1	<1
Bis(2-chloroisopropyl)ether	ug/l									
Bis(2-ethylhexyl)phthalate	ug/l	1.3		8.66	<2	<2	4.69	<2	<2	<2
Butylbenzylphthalate	ug/l	20		<1	<1	<1	<1	<1	<1	<1
Carbazole	ug/l			<1	<1	<1	<1	<1	<1	<1
Dibenzofuran	ug/l			<1	<1	<1	<1	<1	<1	<1
Diethylphthalate	ug/l	200		<1	<1	<1	<1	<1	<1	<1
Dimethylphthalate	ug/l	800		<1	<1	<1	<1	<1	<1	<1
Di-N-Butyl Phthalate	ug/l	8		<1	<1	<1	<1	<1	<1	<1
Di-N-Octyl Phthalate	ug/l	20		<1	<1	<1	<1	<1	<1	<1
Hexachlorobenzene (HCB)	ug/l	0.05		<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/l			<1	<1	<1	<1	<1	<1	<1
Hexachlorocyclopentadiene	ug/l			<1	<1	<1	<1	<1	<1	<1
Hexachloroethane	ug/l			<1	<1	<1	<1	<1	<1	<1
Isophorone	ug/l			<1	<1	<1	<1	<1	<1	<1
Nitrobenzene	ug/l			<1	<1	<1	<1	<1	<1	<1
n-nitrosodimethylamine	ug/l									
N-Nitroso-Di-N-Propylamine	ug/l			<1	<1	<1	<1	<1	<1	<1
Pentachlorophenol (PCP)	ug/l	0.4		<1	<1	<1	<1	<1	<1	<1
Phenol	ug/l	7.7		<1	<1	<1	<1	20.8	14.7	20.2
PCBs										
Pcb-101 2,2',4,5,5' - Pentachlorobiphe	ug/l									
Pcb-118 2,3',4,4',5 - Pentachlorobiphe	ug/l									
Pcb-138 2,2',3,4,4',5' - Hexachlorobiph	ug/l									
Pcb-153 2,2',4,4',5,5' - Hexachlorobiph	ug/l									
Pcb-180 2,2',3,4,4',5,5' - Heptachlorob	ug/l									
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l									
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l									
PCB congener 105	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 114	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 118	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 123	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 126	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 156	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 157	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 167	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 169	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 189	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 77	ug/l			<0.015	<0.015			<0.015	<0.015	
PCB congener 81	ug/l			<0.015	<0.015			<0.015	<0.015	

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Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference / Round / Sample Type / Sample Received Date / Sampled Date / Depth / Response Zone (RZ) Details / Installation Details / Location	Units	Screening Criteria EQS	Screening Criteria DWS	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Installation Details of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
Metals										
Arsenic Dissolved	ug/l	50	10	37	35	77	0	BH509 @ Deep	3	11
Boron Dissolved	ug/l	2000	1000	9	8	1300	50	BH509 @ Shallow	0	1
Beryllium Dissolved	ug/l			10	0	None > LOD	None > LOD			
Cadmium Dissolved	ug/l	0.15	5	12	3	1	0.587	RBBH10 @ Single	3	0
Calcium Dissolved	ug/l			18	18	861000	802	RBBH009 @ Single		
Chromium Dissolved	ug/l		50	37	25	310	1	BH509 @ Deep		6
Copper Dissolved	ug/l	10	2000	36	34	330	1	BH509 @ Deep	14	0
Iron Dissolved	ug/l	1000	200	28	17	5400	10	SBHJ01 @ Single	1	4
Lead Dissolved	ug/l	1.2	10	37	18	8	0.4	RBBH007 @ Single	7	0
Magnesium Dissolved	ug/l			18	8	250000	0.1	SBHJ01 @ Single		
Manganese Dissolved	ug/l	30	50	13	7	21000	1	SWSJ08 @ Single	5	4
Mercury Dissolved	ug/l	0.07	1	12	3	0.5	0.2	BH509 @ Deep	3	0
Nickel Dissolved	ug/l	4	20	37	37	22	2	SWSJ08 @ Single	31	1
Selenium Dissolved	ug/l		10	37	36	120	3	BH509 @ Deep		15
Vanadium Dissolved	ug/l			13	12	36	1	RBBH10 @ Single		
Zinc Dissolved	ug/l	75		6	6	27	3.69	RBBH008 @ Single	0	
Cadmium Total	ug/l	0.15	5	25	6	40	0.4	SBHJ01 @ Single	6	4
Zinc Total	ug/l	75		31	31	4400	3	SBHJ01 @ Single	8	
Mercury Total	ug/l	0.07	1	25	5	0.1	0.01	SWSJ08 @ Single	1	0
Non-Metal Inorganics										
Hardness Total	mg/l			10	10	2200	550	RBBH09 @ Single		
Total Alkalinity as CaCO3	mg/l			25	25	2900	320	SBHJ01 @ Single		
Conductivity uS/cm @25C	uS/cm			3	3	7400	6650	BHM4CAN033 @ Single		
BOD	mg/l	5		10	5	26	5	RBBH07 @ Single	4	
COD	mg/l			10	10	1700	38	SBHJ01 @ Single		
Potassium Dissolved	mg/l			18	18	80	1.7	SBHJ01 @ Single		
Phosphate				15	10	0.4	0.1	RBBH006 @ Single		
Sodium Dissolved	mg/l		200	18	18	2900	0.4	SBHJ01 @ Single		4
Nitrate as NO3	mg/l		50	21	15	38.3	0.4	RBBH006 @ Single		0
Nitrite as NO2	mg/l		0.5	3	0	None > LOD	None > LOD			0
Sulphate (soluble)	mg/l	400	250	28	28	1200	0.4	SWSJ08 @ Single	5	8
Chloride	mg/l	250	250	30	30	6200	0.4	BH509 @ Deep	11	11
Sulphide	mg/l			19	5	2.2	0.4	RBBH007 @ Single		
Ammoniacal Nitrogen as N	mg/l	0.6		34	34	33	0.4	BH509 @ Deep	33	
unionised ammonia	mg/l			10	10	8.591	0.003	RBBH07 @ Single		
Total Ammonium as NH4	mg/l		0.5	2	2	19	1.8	SBHJ01 @ Single		2
Hexavalent Chromium	mg/l		50	2	0	None > LOD	None > LOD			0
Phenols Monohydric	mg/l			25	10	0.12	0.01	RBBH007 @ Single		
Total Cyanide	mg/l	0.001	0.05	31	6	0.78	0.16	SWSJ08 @ Single	6	6
Cyanide (Free)	mg/l			6	0	None > LOD	None > LOD			
Carbon Dioxide Dissolved	ug/l			2	2	110	100	SBHJ01 @ Single		
pH Value	pH units	6-9	6.5-10	37	37	13.1	7.02	RBBH007 @ Single	0	0
Fluoride		5000	1500	8	8	2.8	0.2	RBBH007 @ Single	0	0
Organics										
GRO (C4-C12)	ug/l			13	0	None > LOD	None > LOD			
MTBE	ug/l			13	0	None > LOD	None > LOD			
Benzene	ug/l	10	1	19	0	None > LOD	None > LOD		0	0
Toluene	ug/l	50		34	1	22	22	RBBH010 @ Single	0	
Ethyl benzene	ug/l	20		19	0	None > LOD	None > LOD		0	
m & p Xylene	ug/l	30		19	0	None > LOD	None > LOD		0	
o Xylene	ug/l	30		19	0	None > LOD	None > LOD		0	
Phenols										
Phenols Monohydric	mg/l	0.0077		4	0	None > LOD	None > LOD		0	0
Phenols	mg/l	0.0077		6	2	0.12	0.08	BH509 @ Shallow	2	
TPH										
TPH GC (C10-C37)	ug/l			5	3	1100	600	RBBH008 @ Single		
Aliphatics C5-C6	ug/l			19	0	None > LOD	None > LOD			
Aliphatics >C6-C8	ug/l			19	0	None > LOD	None > LOD			
Aliphatics >C8-C10	ug/l			19	0	None > LOD	None > LOD			
Aliphatics >C10-C12	ug/l			19	0	None > LOD	None > LOD			
Aliphatics >C12-C16 Aqueous	ug/l			19	0	None > LOD	None > LOD			
Aliphatics >C16-C21 Aqueous	ug/l			19	4	21	1.2	BHM4CAN033 @ Single		
Aliphatics >C21-C35 Aqueous	ug/l			19	5	581	140	BHM4CAN033 @ Single		
Total Aliphatics C5-C35 Aqueous	ug/l			10	0	None > LOD	None > LOD			
Total Aliphatics >C12-C35 Aqueous	ug/l			3	3	602	184	BHM4CAN033 @ Single		
Aliphatics >C35-44	ug/l			6	2	20	2.6	BH509 @ Shallow		
Aromatics C5-C7	ug/l			9	0	None > LOD	None > LOD			
Aromatics C6-C7	ug/l			10	0	None > LOD	None > LOD			
Aromatics >C7-C8	ug/l			19	0	None > LOD	None > LOD			
Aromatics >EC8-EC10	ug/l			19	0	None > LOD	None > LOD			
Aromatics >EC10-EC12	ug/l			19	0	None > LOD	None > LOD			
Aromatics >EC12-EC16 Aqueous	ug/l			19	0	None > LOD	None > LOD			
Aromatics >EC16-EC21 Aqueous	ug/l			19	2	3.7	0.93	BH509 @ Shallow		
Aromatics >EC21-EC35 Aqueous	ug/l			19	5	195	18	BHM4CAN033 @ Single		
Total Aromatics C6-C35 Aqueous	ug/l			10	0	None > LOD	None > LOD			
Total Aromatics >EC12-EC35 Aqueous	ug/l			3	3	195	50	BHM4CAN033 @ Single		
Aromatics >C35 - 44	ug/l			6	2	13	2.3	BH509 @ Shallow		
TPH (Aliphatics and Aromatics C5-C35) Aqueous	ug/l			3	3	797	245	BHM4CAN033 @ Single		
Total Aliphatic TPH	ug/l			16	3	270	12	BH509 @ Shallow		
Total Aromatic TPH	ug/l			6	2	63	21	BH509 @ Shallow		
Total petroleum hydrocarbons	ug/l			6	2	340	160	BH509 @ Shallow		
PAHs										
Acenaphthene	ug/l			16	7	6	0.0208	RBBH010 @ Single		
Acenaphthylene	ug/l			16	3	0.857	0.0113	RBBH008 @ Single		
Anthracene	ug/l	0.1		16	2	0.3	0.286	RBBH007 @ Single	2	
Benzo(a)anthracene	ug/l			16	1	0.058	0.058	RBBH008 @ Single		
Benzo(a)pyrene	ug/l	0.00017	0.01	16	2	0.0167	0.0156	BHM4CAN033 @ Single	2	2
Benzo(b)fluoranthene	ug/l	0.017	0.1	16	2	0.0234	0.0233	BHM4CAN033 @ Single	2	0
Benzo(k)fluoranthene	ug/l	0.017	0.1	16	0	None > LOD	None > LOD		0	0

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Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
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Sample Reference / Round / Sample Type / Sample Received Date / Sampled Date / Depth / Response Zone (RZ) Details / Installation Details / Location	Units	Screening Criteria EQS	Screening Criteria DWS	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Installation Details of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
Benzo(ghi)perylene	ug/l	0.0082	0.1	16	3	0.0743	0.0162	BHM4CAN033 @ Single	3	0
Indeno(1,2,3-cd)pyrene	ug/l		0.1	16	1	0.0171	0.0171	BHM4CAN033 @ Single		0
Chrysene	ug/l			16	2	0.026	0.0172	RBBH008 @ Single		
Dibenzo(a,h)anthracene	ug/l			16	0	None > LOD	None > LOD			
Fluoranthene	ug/l	0.0063		16	4	0.156	0.0203	RBBH008 @ Single	4	
Fluorene	ug/l			16	7	6	0.0162	RBBH008 @ Single		
Naphthalene	ug/l	2		16	6	45	0.144	RBBH007 @ Single	4	
Phenanthrene	ug/l			16	7	8	0.0365	RBBH008 @ Single		
Pyrene	ug/l			16	5	0.121	0.0159	RBBH008 @ Single		
Total PAHs (USEPA 16)	ug/l			16	2	16.446	9.194	RBBH007 @ Single		
PCBs										
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0	8	0	None > LOD	None > LOD		0	0
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-156 2,3,3',4,4',5-Hexachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ug/l	0	0	2	0	None > LOD	None > LOD		0	0
SVOC by GCMS										
Phenols										
2-Chlorophenol	ug/l	50		13	0	None > LOD	None > LOD		0	
2-Methylphenol	ug/l	100		13	0	None > LOD	None > LOD		0	
2-Nitrophenol	ug/l			13	1	1900	1900	RBBH07 @ Single		
2,4-Dichlorophenol	ug/l	20		13	0	None > LOD	None > LOD		0	
2,4-Dimethylphenol	ug/l			13	0	None > LOD	None > LOD			
2,4,5-Trichlorophenol	ug/l			13	0	None > LOD	None > LOD			
2,4,6-Trichlorophenol	ug/l			13	0	None > LOD	None > LOD			
4-Chloro-3-methylphenol	ug/l	40		13	0	None > LOD	None > LOD		0	
4-Methylphenol	ug/l	100		13	2	1300	3	RBBH07 @ Single	1	
4-Nitrophenol	ug/l			13	1	3000	3000	RBBH07 @ Single		
Pentachlorophenol	ug/l	0.4		13	0	None > LOD	None > LOD		0	
Phenol	ug/l	7.7		13	6	36000	6	RBBH07 @ Single	4	
PAHs										
2-Chloronaphthalene	ug/l			13	2	1	1	RBBH07 @ Single		
2-Methylnaphthalene	ug/l			13	2	2700	1	RBBH07 @ Single		
Acenaphthene	ug/l			12	4	3500	1	RBBH07 @ Single		
Acenaphthylene	ug/l			12	0	None > LOD	None > LOD			
Anthracene	ug/l	0.1		12	0	None > LOD	None > LOD		0	
Benzo(a)anthracene	ug/l			12	0	None > LOD	None > LOD			
Benzo(a)pyrene	ug/l	0.00017	0.01	12	0	None > LOD	None > LOD		0	0
Benzo(b)fluoranthene	ug/l	0.017	0.1	12	0	None > LOD	None > LOD		0	0
Benzo(k)fluoranthene	ug/l	0.017	0.1	12	0	None > LOD	None > LOD		0	0
Benzo(ghi)perylene	ug/l	0.0082	0.1	12	0	None > LOD	None > LOD		0	0
Indeno(1,2,3-cd)pyrene	ug/l		0.1	12	0	None > LOD	None > LOD			0
Chrysene	ug/l			12	0	None > LOD	None > LOD			
Dibenzo(a,h)anthracene	ug/l			12	0	None > LOD	None > LOD			
Fluoranthene	ug/l	0.0063		12	0	None > LOD	None > LOD		0	
Fluorene	ug/l			12	1	1	1	RBBH10 @ Single		
Naphthalene	ug/l	2		12	3	22000	1	RBBH07 @ Single	2	
Phenanthrene	ug/l			12	2	1	1	RBBH10 @ Single		
Pyrene	ug/l			12	0	None > LOD	None > LOD			
Phthalates										
Bis(2-ethylhexyl) phthalate	ug/l	1.3		13	4	4200	2	RBBH07 @ Single	4	
Butylbenzyl phthalate	ug/l	20		13	0	None > LOD	None > LOD		0	
Di-n-butyl phthalate	ug/l	8		13	0	None > LOD	None > LOD		0	
Di-n-Octyl phthalate	ug/l	20		13	2	5	5	RBBH07 @ Single	0	
Diethyl phthalate	ug/l	200		13	0	None > LOD	None > LOD		0	
Dimethyl phthalate	ug/l	800		13	0	None > LOD	None > LOD		0	
Other Semi-Volatiles										
1,2-Dichlorobenzene	ug/l	20		13	0	None > LOD	None > LOD		0	
1,2,4-Trichlorobenzene	ug/l	0.4		13	0	None > LOD	None > LOD		0	
1,3-Dichlorobenzene	ug/l	20		13	0	None > LOD	None > LOD		0	
1,4-Dichlorobenzene	ug/l	20		13	0	None > LOD	None > LOD		0	
2-Nitroaniline	ug/l			13	0	None > LOD	None > LOD			
2,4-Dinitrotoluene	ug/l			13	0	None > LOD	None > LOD			
2,6-Dinitrotoluene	ug/l			13	0	None > LOD	None > LOD			
3-Nitroaniline	ug/l			13	0	None > LOD	None > LOD			
4-Bromophenylphenylether	ug/l			13	0	None > LOD	None > LOD			
4-Chloroaniline	ug/l			13	0	None > LOD	None > LOD			
4-Chlorophenylphenylether	ug/l			13	0	None > LOD	None > LOD			
4-Nitroaniline	ug/l			13	0	None > LOD	None > LOD			
Azobenzene	ug/l			13	0	None > LOD	None > LOD			
Bis(2-chloroethoxy)methane	ug/l			13	0	None > LOD	None > LOD			
Bis(2-chloroethyl)ether	ug/l			13	0	None > LOD	None > LOD			
Carbazole	ug/l			13	1	1000	1000	RBBH07 @ Single		
Dibenzofuran	ug/l			13	0	None > LOD	None > LOD			
Hexachlorobenzene	ug/l	0.05		13	0	None > LOD	None > LOD		0	
Hexachlorobutadiene	ug/l	0.6		13	0	None > LOD	None > LOD		0	

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Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria	
Round			
Sample Type			
Sample Received Date			
Sampled Date			
Depth			
Response Zone (RZ) Details			
Installation Details			
Location		EQS	DWS
Hexachlorocyclopentadiene	ug/l		
Hexachloroethane	ug/l		
Isophorone	ug/l		
N-nitrosodi-n-propylamine	ug/l		
Nitrobenzene	ug/l		
VOCs			
Dichlorodifluoromethane	ug/l		
Chloromethane	ug/l		
Vinyl Chloride	ug/l	0	0.5
Bromomethane	ug/l		
Chloroethane	ug/l		
Trichlorofluoromethane	ug/l		
trans-1-2-Dichloroethene	ug/l		
Dichloromethane	ug/l	20	
Carbon Disulphide	ug/l		
1.1-Dichloroethene	ug/l		
1.1-Dichloroethane	ug/l		
Methyl Tertiary Butyl Ether	ug/l		
cis-1-2-Dichloroethene	ug/l		
Bromochloromethane	ug/l		100
Chloroform	ug/l	2.5	100
2.2-Dichloropropane	ug/l		
1.2-Dichloroethane	ug/l	10	3
1.1.1-Trichloroethane	ug/l	100	
1.1-Dichloropropene	ug/l		
Benzene	ug/l	10	1
Carbontetrachloride	ug/l	12	3
Dibromomethane	ug/l		
1.2-Dichloropropane	ug/l		
Bromodichloromethane	ug/l		
Trichloroethene	ug/l	10	10
cis-1-3-Dichloropropene	ug/l		
trans-1-3-Dichloropropene	ug/l		
1.1.2-Trichloroethane	ug/l	400	
Toluene	ug/l	50	
1.3-Dichloropropane	ug/l		
Dibromochloromethane	ug/l		100
1.2-Dibromoethane	ug/l		
Tetrachloroethene	ug/l	10	10
1.1.1.2-Tetrachloroethane	ug/l		
Chlorobenzene	ug/l		
Ethylbenzene	ug/l	20	
p/m-Xylene	ug/l	30	
Bromoform	ug/l		
Styrene	ug/l	50	
1.1.2.2-Tetrachloroethane	ug/l		
o-Xylene	ug/l	30	
1.2.3-Trichloropropane	ug/l		
Isopropylbenzene	ug/l		
Bromobenzene	ug/l		
2-Chlorotoluene	ug/l		
Propylbenzene	ug/l		
4-Chlorotoluene	ug/l		
1.2.4-Trimethylbenzene	ug/l		
4-Isopropyltoluene	ug/l		
1,3,5-Trichlorobenzene	ug/l		
1.3.5-Trimethylbenzene	ug/l		
1.2-Dichlorobenzene	ug/l	20	
1.4-Dichlorobenzene	ug/l	20	
sec-Butylbenzene	ug/l		
tert-Butylbenzene	ug/l		
1.3-Dichlorobenzene	ug/l	20	
n-Butylbenzene	ug/l		
1.2-Dibromo-3-chloropropane	ug/l		
1.2.4-Trichlorobenzene	ug/l	0.4	
Naphthalene	ug/l	2	
1.2.3-Trichlorobenzene	ug/l	0.4	
Hexachlorobutadiene	ug/l	0.6	
tert-Amyl methyl ether	ug/l		

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Installation Details of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
13	0	None > LOD	None > LOD			
13	0	None > LOD	None > LOD			
13	0	None > LOD	None > LOD			
13	0	None > LOD	None > LOD			
13	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD		0	0
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
13	0	None > LOD	None > LOD		0	
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
13	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD		0	0
15	0	None > LOD	None > LOD		0	
15	0	None > LOD	None > LOD		0	0
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD		0	
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD		0	0
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD		0	
15	1	10	10	SWSJ08 @ Single	0	
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD		0	
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD		0	
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
13	1	5	5	RBBH07 @ Single		
15	1	2	2	RBBH008 @ Single		
3	0	None > LOD	None > LOD			0
15	1	3	3	RBBH008 @ Single		
15	0	None > LOD	None > LOD		0	
15	1	3	3	RBBH008 @ Single		
15	0	None > LOD	None > LOD		0	
15	0	None > LOD	None > LOD			
15	1	1	1	RBBH008 @ Single		
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD		0	
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD			
15	0	None > LOD	None > LOD		0	
15	3	35	24	RBBH07 @ Single	3	
15	0	None > LOD	None > LOD		0	
15	0	None > LOD	None > LOD		0	
15	0	None > LOD	None > LOD		1	

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH006	RBBH006	RBBH006	RBBH007	RBBH007	RBBH007	RBBH007
Round				2002 Round 1	2002 Round 2	2002 Round 3	2002 Round 1	2002 Round 2	2002 Round 3	2004
Sample Type				W	W	W	W	W	W	W
Sample Received Date										
Sampled Date										11/06/2004
Depth										
Response Zone (RZ) Details		EQS	DWS	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location										
Metals										
Arsenic Dissolved	ug/l	50	10	2	3	5	2	2	3	1
Boron Dissolved	ug/l	2000	1000							<50
Beryllium Dissolved	ug/l									
Cadmium Dissolved	ug/l	0.15	5							<1
Calcium Dissolved	ug/l			475000			802			
Chromium Dissolved	ug/l		50	8	7	3	<1	<1	<1	<1
Copper Dissolved	ug/l	10	2000	6	7	4	3	23	22	1
Iron Dissolved	ug/l	1000	200	<10	<10	<10	10	<10	20	<10
Lead Dissolved	ug/l	1.2	10	<1	<1	<1	<1	4	8	2
Magnesium Dissolved	ug/l			0.15			0.1			
Manganese Dissolved	ug/l	30	50							<10
Mercury Dissolved	ug/l	0.07	1							0.4
Nickel Dissolved	ug/l	4	20	4	4	10	6	8	6	5
Selenium Dissolved	ug/l		10	4	6	4	6	8	13	4
Vanadium Dissolved	ug/l									
Zinc Dissolved	ug/l	75								21
Cadmium Total	ug/l	0.15	5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Zinc Total	ug/l	75		3	6	15	6	12	7	
Mercury Total	ug/l	0.07	1	<1	<1	<1	<0.1	<0.1	<0.1	
Non-Metal Inorganics										
Hardness Total	mg/l									
Total Alkalinity as CaCO3	mg/l			1130			2320			
Conductivity uS/cm @25C	uS/cm									
BOD	mg/l	5								
COD	mg/l									
Potassium Dissolved	mg/l			10.7			30			
Phosphate				<0.1	0.4	0.2	<0.1	0.1	0.4	
Sodium Dissolved	mg/l		200	16.8			14.7			
Nitrate as NO3	mg/l		50	38.3			6			
Nitrite as NO2	mg/l		0.5							
Sulphate (soluble)	mg/l	400	250	27.3	27.3	30.9	73.7	327	76.9	485
Chloride	mg/l	250	250	44			9			126
Sulphide	mg/l				<0.2	<0.2		2.2		
Ammoniacal Nitrogen as N	mg/l	0.6		4.3	1.6	7.7	7	14	10.6	
unionised ammonia	mg/l									
Total Ammonium as NH4	mg/l		0.5							
Hexavalent Chromium	mg/l		50							
Phenols Monohydric	mg/l			<0.05	<0.05	<0.05	0.07	0.12	0.1	
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Cyanide (Free)	mg/l									
Carbon Dioxide Dissolved	ug/l									
pH Value	pH units	6-9	6.5-10	11.6	12.8	7.8	12.7	12.9	13.1	12.8
Fluoride		5000	1500	1.3			2.8			
Organics										
GRO (C4-C12)	ug/l									
MTBE	ug/l									
Benzene	ug/l	10	1							
Toluene	ug/l	50		<5	<5	<5	<5	<5	<5	
Ethyl benzene	ug/l	20								
m & p Xylene	ug/l	30								
o Xylene	ug/l	30								
Phenols										
Phenols Monohydric	mg/l	0.0077								
Phenols	mg/l	0.0077								
TPH										
TPH GC (C10-C37)	ug/l					<10		600		
Aliphatics C5-C6	ug/l									
Aliphatics >C6-C8	ug/l									
Aliphatics >C8-C10	ug/l									
Aliphatics >C10-C12	ug/l									
Aliphatics >C12-C16 Aqueous	ug/l									
Aliphatics >C16-C21 Aqueous	ug/l									
Aliphatics >C21-C35 Aqueous	ug/l									
Total Aliphatics C5-C35 Aqueous	ug/l									
Total Aliphatics >C12-C35 Aqueous	ug/l									
Aliphatics >C35-44	ug/l									
Aromatics C5-C7	ug/l									
Aromatics C6-C7	ug/l									
Aromatics >C7-C8	ug/l									
Aromatics >EC8-EC10	ug/l									
Aromatics >EC10-EC12	ug/l									
Aromatics >EC12-EC16 Aqueous	ug/l									
Aromatics >EC16-EC21 Aqueous	ug/l									
Aromatics >EC21-EC35 Aqueous	ug/l									
Total Aromatics C6-C35 Aqueous	ug/l									
Total Aromatics >EC12-EC35 Aqueous	ug/l									
Aromatics >C35 - 44	ug/l									
TPH (Aliphatics and Aromatics C5-C35) Aqueous	ug/l									

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH07	RBBH07	RBBH008	RBBH008	RBBH008	RBBH008	RBBH009
Round				2008 Round 1	2008 Round 2	2002 Round 1	2002 Round 2	2002 Round 3	2004	2002 Round 1
Sample Type				W	W	W	W	W	W	W
Sample Received Date				29/02/2008	20/03/2008					
Sampled Date				27/02/2008	19/03/2008				11/06/2004	
Depth										
Response Zone (RZ) Details		EQS	DWS	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location				UPSTREAM OF CORUS REEDBED						
Metals										
Arsenic Dissolved	ug/l	50	10	<1	1.5	2	2	2	2	2
Boron Dissolved	ug/l	2000	1000						50	
Beryllium Dissolved	ug/l			<1	<1					
Cadmium Dissolved	ug/l	0.15	5						<1	
Calcium Dissolved	ug/l			710000	730000		552000	536000		
Chromium Dissolved	ug/l		50	<1	<1	<1	<1	<1	3	28
Copper Dissolved	ug/l	10	2000	1.6	4.9	66	16	20	29	8
Iron Dissolved	ug/l	1000	200	53	120	<10	10	<10	<10	40
Lead Dissolved	ug/l	1.2	10	0.5	0.4	1	<1	2	4	1
Magnesium Dissolved	ug/l			40	40		<0.03	<0.03		
Manganese Dissolved	ug/l	30	50	<1	2				<10	
Mercury Dissolved	ug/l	0.07	1						<0.1	
Nickel Dissolved	ug/l	4	20	8.1	13	5	6	11	8	6
Selenium Dissolved	ug/l		10	4	15	7	11	8	4	8
Vanadium Dissolved	ug/l			1	2					
Zinc Dissolved	ug/l	75							27	
Cadmium Total	ug/l	0.15	5	0.4	0.4	<0.1	<0.1	<0.1		<0.1
Zinc Total	ug/l	75		110	51	4	11	10		9
Mercury Total	ug/l	0.07	1	0.01	0.01	<0.1	<0.1	<0.1		<0.1
Non-Metal Inorganics										
Hardness Total	mg/l			1900	1800					
Total Alkalinity as CaCO3	mg/l			1700	1900					
Conductivity uS/cm @25C	uS/cm									
BOD	mg/l	5		<1	26					
COD	mg/l			280	72					
Potassium Dissolved	mg/l			32	27		8.45	8.23		
Phosphate						<0.1	0.4	0.1		<0.1
Sodium Dissolved	mg/l		200	77	57		0.4	35.3		
Nitrate as NO3	mg/l		50	1.3	0.6		0.4	6.3		
Nitrite as NO2	mg/l		0.5							
Sulphate (soluble)	mg/l	400	250	8	7	52.3	0.4	47.3	28.4	75.7
Chloride	mg/l	250	250	170	170		0.4	932	39	
Sulphide	mg/l			0.5	0.5	<0.2	0.4			
Ammoniacal Nitrogen as N	mg/l	0.6		8.6	6.7	30.1	0.4	29		1.8
unionised ammonia	mg/l			8.591	6.691					
Total Ammonium as NH4	mg/l		0.5							
Hexavalent Chromium	mg/l		50							
Phenols Monohydric	mg/l			0.09	0.12	<0.05	<0.05	0.06		<0.05
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	0.29		0.22
Cyanide (Free)	mg/l									
Carbon Dioxide Dissolved	ug/l									
pH Value	pH units	6-9	6.5-10	12.71	12.61	12.7	12.9	12.7	12.6	12.2
Fluoride		5000	1500				0.6	0.8		
Organics										
GRO (C4-C12)	ug/l			<10	<10					
MTBE	ug/l			<10	<10					
Benzene	ug/l	10	1	<10	<10					
Toluene	ug/l	50		<10	<10	<5	<5	<5		<5
Ethyl benzene	ug/l	20		<10	<10					
m & p Xylene	ug/l	30		<10	<10					
o Xylene	ug/l	30		<10	<10					
Phenols										
Phenols Monohydric	mg/l	0.0077								
Phenols	mg/l	0.0077								
TPH										
TPH GC (C10-C37)	ug/l							1100		
Aliphatics C5-C6	ug/l			<10	<10					
Aliphatics >C6-C8	ug/l			<10	<10					
Aliphatics >C8-C10	ug/l			<10	<10					
Aliphatics >C10-C12	ug/l			<10	<10					
Aliphatics >C12-C16 Aqueous	ug/l			<10	<10					
Aliphatics >C16-C21 Aqueous	ug/l			<10	<10					
Aliphatics >C21-C35 Aqueous	ug/l			<10	<10					
Total Aliphatics C5-C35 Aqueous	ug/l			<10	<10					
Total Aliphatics >C12-C35 Aqueous	ug/l									
Aliphatics >C35-44	ug/l									
Aromatics C5-C7	ug/l									
Aromatics C6-C7	ug/l			<10	<10					
Aromatics >C7-C8	ug/l			<10	<10					
Aromatics >EC8-EC10	ug/l			<10	<10					
Aromatics >EC10-EC12	ug/l			<10	<10					
Aromatics >EC12-EC16 Aqueous	ug/l			<10	<10					
Aromatics >EC16-EC21 Aqueous	ug/l			<10	<10					
Aromatics >EC21-EC35 Aqueous	ug/l			<10	<10					
Total Aromatics C6-C35 Aqueous	ug/l			<10	<10					
Total Aromatics >EC12-EC35 Aqueous	ug/l									
Aromatics >C35 - 44	ug/l									
TPH (Aliphatics and Aromatics C5-C35) Aqueous	ug/l									

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CL-26 Reedbed No.1
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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH009	RBBH009	RBBH09	RBBH09	RBBH010	RBBH010	RBBH010
Round				2002 Round 2	2002 Round 3	2008 Round 1	2008 Round 2	2002 Round 1	2002 Round 2	2002 Round 3
Sample Type				W	W	W	W	W	W	W
Sample Received Date						29/02/2008	20/03/2008			
Sampled Date						27/02/2008	19/03/2008			
Depth										
Response Zone (RZ) Details		EQS	DWS	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location										
Metals										
Arsenic Dissolved	ug/l	50	10	3	3	<1	1.3	3	2	0
Boron Dissolved	ug/l	2000	1000							
Beryllium Dissolved	ug/l					<1	<1			
Cadmium Dissolved	ug/l	0.15	5							
Calcium Dissolved	ug/l			861000	444000	790000	810000		290000	169000
Chromium Dissolved	ug/l		50	25	7	8	9	<1	1	<1
Copper Dissolved	ug/l	10	2000	11	23	10	9.8	3	4	
Iron Dissolved	ug/l	1000	200	60	<10	66	120	<10	20	20
Lead Dissolved	ug/l	1.2	10	1	<1	<0.5	1	<1	<1	<1
Magnesium Dissolved	ug/l			<0.03	<0.03	<40	<40		<30	<30
Manganese Dissolved	ug/l	30	50			<1	1			
Mercury Dissolved	ug/l	0.07	1							
Nickel Dissolved	ug/l	4	20	7	18	9.6	16	3	3	7
Selenium Dissolved	ug/l		10	13	5	<1	3	7	10	7
Vanadium Dissolved	ug/l					1	<1			
Zinc Dissolved	ug/l	75								
Cadmium Total	ug/l	0.15	5	<0.1	<0.1	<0.4	<0.4	<0.1	<0.1	<0.1
Zinc Total	ug/l	75		8	10	80	29	5	19	6
Mercury Total	ug/l	0.07	1	<0.1	<0.1	<0.01	<0.01	<0.1	<0.1	<0.1
Non-Metal Inorganics										
Hardness Total	mg/l					2200	2000			
Total Alkalinity as CaCO3	mg/l			1980	917	1900	1900		589	1096
Conductivity uS/cm @25C	uS/cm									
BOD	mg/l	5				<1	12			
COD	mg/l					260	38			
Potassium Dissolved	mg/l			13.8	13.8	10	10		30.8	49.5
Phosphate				0.4	0.3			<0.1	0.4	0.1
Sodium Dissolved	mg/l		200	31.1	86.8	25	27		23.1	26.3
Nitrate as NO3	mg/l		50	31.9	24.2	1.9	1.8		5.4	0.5
Nitrite as NO2	mg/l		0.5							
Sulphate (soluble)	mg/l	400	250	70.6	63.9	6	5	349	295	656
Chloride	mg/l	250	250	8	104	34	36		4	29
Sulphide	mg/l			<0.2	<0.2	<0.5	<0.5		<0.2	0.5
Ammoniacal Nitrogen as N	mg/l	0.6		3.3	6.6	2.7	2.6	5.6	12.2	18.4
unionised ammonia	mg/l					2.698	2.597			
Total Ammonium as NH4	mg/l		0.5							
Hexavalent Chromium	mg/l		50							
Phenols Monohydric	mg/l			<0.05	<0.05	0.04	0.05	<0.05	<0.05	<0.05
Total Cyanide	mg/l	0.001	0.05	0.16	0.25	<0.05	<0.05	<0.05	<0.05	<0.05
Cyanide (Free)	mg/l									
Carbon Dioxide Dissolved	ug/l									
pH Value	pH units	6-9	6.5-10	13	12.6	12.79	12.61	11.4	12.4	11
Fluoride		5000	1500	0.3	0.2				1.4	1.4
Organics										
GRO (C4-C12)	ug/l					<10	<10			
MTBE	ug/l					<10	<10			
Benzene	ug/l	10	1			<10	<10			
Toluene	ug/l	50		<5	<5	<10	<10	<5	<5	22
Ethyl benzene	ug/l	20				<10	<10			
m & p Xylene	ug/l	30				<10	<10			
o Xylene	ug/l	30				<10	<10			
Phenols										
Phenols Monohydric	mg/l	0.0077								
Phenols	mg/l	0.0077								
TPH										
TPH GC (C10-C37)	ug/l				<10					700
Aliphatics C5-C6	ug/l					<10	<10			
Aliphatics >C6-C8	ug/l					<10	<10			
Aliphatics >C8-C10	ug/l					<10	<10			
Aliphatics >C10-C12	ug/l					<10	<10			
Aliphatics >C12-C16 Aqueous	ug/l					<10	<10			
Aliphatics >C16-C21 Aqueous	ug/l					<10	<10			
Aliphatics >C21-C35 Aqueous	ug/l					<10	<10			
Total Aliphatics C5-C35 Aqueous	ug/l					<10	<10			
Total Aliphatics >C12-C35 Aqueous	ug/l									
Aliphatics >C35-44	ug/l									
Aromatics C5-C7	ug/l									
Aromatics C6-C7	ug/l					<10	<10			
Aromatics >C7-C8	ug/l					<10	<10			
Aromatics >EC8-EC10	ug/l					<10	<10			
Aromatics >EC10-EC12	ug/l					<10	<10			
Aromatics >EC12-EC16 Aqueous	ug/l					<10	<10			
Aromatics >EC16-EC21 Aqueous	ug/l					<10	<10			
Aromatics >EC21-EC35 Aqueous	ug/l					<10	<10			
Total Aromatics C6-C35 Aqueous	ug/l					<10	<10			
Total Aromatics >EC12-EC35 Aqueous	ug/l									
Aromatics >C35 - 44	ug/l									
TPH (Aliphatics and Aromatics C5-C35) Aqueous	ug/l									

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22/06/2016

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH10	RBBH10	RBBH10	SWSJ08	SWSJ08	SBHJ01	SBHJ01	BH509
Round		EQS	DWS		2008 Round 1	2008 Round 2	2008 Round 1	2008 Round 2	2008 Round 1	2008 Round 2	Rou
Sample Type					W	W	W	W	W	W	EW
Sample Received Date					29/02/2008	20/03/2008	21/02/2008	20/03/2008	21/02/2008	20/03/2008	
Sampled Date				11/06/2004	27/02/2008	19/03/2008	21/02/2008	19/03/2008	21/02/2008	19/03/2008	04/03
Depth							0.37	3.3	5.98	7.5	0.74
Response Zone (RZ) Details					MG/TFD (peat)	MG/TFD (peat)	MG/TFD	MG/TFD	TFD/ (Peat)	TFD/ (Peat)	TFD
Installation Details				Single	Single	Single	Single	Single	Single	Single	Shallow
Location											
Metals											
Arsenic Dissolved	ug/l	50	10	5	6	2.7	6	5.7	12	16	18
Boron Dissolved	ug/l	2000	1000	220							610
Beryllium Dissolved	ug/l				<1	<1	<1	<1	<1	<1	
Cadmium Dissolved	ug/l	0.15	5	1							<0.08
Calcium Dissolved	ug/l				210000	240000	470000	440000	110000	96000	
Chromium Dissolved	ug/l		50	5	3	<1	6	5	18	23	72
Copper Dissolved	ug/l	10	2000	3	2.1	4	8.7	4.1	5	2.6	110
Iron Dissolved	ug/l	1000	200	40	<50	55	370	860	5400	470	
Lead Dissolved	ug/l	1.2	10	<1	<0.5	<0.4	0.9	1	6.5	1.2	<1
Magnesium Dissolved	ug/l				<40	<40	94000	88000	250000	240000	
Manganese Dissolved	ug/l	30	50	50	<1	<1	21000	18000	1600	1300	
Mercury Dissolved	ug/l	0.07	1	0.2							<0.5
Nickel Dissolved	ug/l	4	20	2	2.9	4.5	20	22	7.4	5.2	5.9
Selenium Dissolved	ug/l		10	4	6	8	8	6	34	25	25
Vanadium Dissolved	ug/l				21	36	2	3	2	12	
Zinc Dissolved	ug/l	75		20							
Cadmium Total	ug/l	0.15	5		<0.4	<0.4	6.9	9.7	5.1	40	
Zinc Total	ug/l	75			86	98	640	950	560	4400	5.1
Mercury Total	ug/l	0.07	1		<0.01	0.01	0.07	0.1	<0.01	<0.01	
Non-Metal Inorganics											
Hardness Total	mg/l				550	570	1500	1500	1200	1100	
Total Alkalinity as CaCO3	mg/l				320	510	840	630	2100	2900	860
Conductivity uS/cm @25C	uS/cm										
BOD	mg/l	5			<1	14	<1	<1	8	5	
COD	mg/l				44	150	700	480	340	1700	
Potassium Dissolved	mg/l				12	10	1.7	2.6	48	80	
Phosphate											
Sodium Dissolved	mg/l		200		25	27	240	240	2900	2700	
Nitrate as NO3	mg/l		50		0.4	<0.3	0.4	0.7	<0.3	<0.3	
Nitrite as NO2	mg/l		0.5								
Sulphate (soluble)	mg/l	400	250	247	36	31	1200	1200	460	180	
Chloride	mg/l	250	250	159	48	53	110	110	3000	2700	220
Sulphide	mg/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Ammoniacal Nitrogen as N	mg/l	0.6			4.2	3.6	1.4	1.1	15	16	3.9
unionised ammonia	mg/l				4.183	3.542	0.003	0.022	0.088	1.482	
Total Ammonium as NH4	mg/l		0.5				1.8		19		
Hexavalent Chromium	mg/l		50						<0.30	<0.03	
Phenols Monohydric	mg/l				0.01	0.02	<0.01	<0.01	<0.01	<0.01	
Total Cyanide	mg/l	0.001	0.05		<0.05	<0.05	0.78	0.6	<0.05	<0.05	<0.05
Cyanide (Free)	mg/l										<0.05
Carbon Dioxide Dissolved	ug/l						100		110		
pH Value	pH units	6-9	6.5-10	9.7	12.12	11.52	7.02	8.04	7.5	8.74	8
Fluoride		5000	1500								
Organics											
GRO (C4-C12)	ug/l				<10	<10	<10	<10	<10	<10	
MTBE	ug/l				<10	<10	<10	<10	<10	<10	
Benzene	ug/l	10	1		<10	<10	<10	<10	<10	<10	<1
Toluene	ug/l	50			<10	<10	<10	<10	<10	<10	<1
Ethyl benzene	ug/l	20			<10	<10	<10	<10	<10	<10	<1
m & p Xylene	ug/l	30			<10	<10	<10	<10	<10	<10	<1
o Xylene	ug/l	30			<10	<10	<10	<10	<10	<10	<1
Phenols											
Phenols Monohydric	mg/l	0.0077					<0.01	<0.01	<0.01	<0.01	
Phenols	mg/l	0.0077									0.12
TPH											
TPH GC (C10-C37)	ug/l										
Aliphatics C5-C6	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aliphatics >C6-C8	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aliphatics >C8-C10	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aliphatics >C10-C12	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aliphatics >C12-C16 Aqueous	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aliphatics >C16-C21 Aqueous	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aliphatics >C21-C35 Aqueous	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Total Aliphatics C5-C35 Aqueous	ug/l				<10	<10	<10	<10	<10	<10	
Total Aliphatics >C12-C35 Aqueous	ug/l										
Aliphatics >C35-44	ug/l										<0.1
Aromatics C5-C7	ug/l										<0.1
Aromatics C6-C7	ug/l				<10	<10	<10	<10	<10	<10	
Aromatics >C7-C8	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aromatics >EC8-EC10	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aromatics >EC10-EC12	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aromatics >EC12-EC16 Aqueous	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aromatics >EC16-EC21 Aqueous	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Aromatics >EC21-EC35 Aqueous	ug/l				<10	<10	<10	<10	<10	<10	<0.1
Total Aromatics C6-C35 Aqueous	ug/l				<10	<10	<10	<10	<10	<10	
Total Aromatics >EC12-EC35 Aqueous	ug/l										
Aromatics >C35 - 44	ug/l										<0.1
TPH (Aliphatics and Aromatics C5-C35) Aqueous	ug/l										

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		BH509	BH509	BH509	BH509	BH509	BHM4CAN033	BHM4CAN033	BHM4CAN033
Round				nd 1	Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				EW	EW	EW	EW	EW	W	W	W
Sample Received Date											
Sampled Date				/2015	11/03/2015		18/03/2015		06/05/2016	19/05/2016	02/06/2016
Depth				1.95	4.47	5.09	4.20	4.52	0.92	1.23	1.33
Response Zone (RZ) Details				TFD	TFD	TFD	TFD	TFD	MMG	MMG	MMG
Installation Details				Deep	Shallow	Deep	Deep	Shallow	Single	Single	Single
Location											
Metals											
Arsenic Dissolved	ug/l	50	10	37	15	53	77	14	28.2	43.1	60.1
Boron Dissolved	ug/l	2000	1000	350	950	710	830	1300			
Beryllium Dissolved	ug/l										
Cadmium Dissolved	ug/l	0.15	5	<0.08	<0.08	<0.08	<0.08	<0.08	<0.1	0.587	0.598
Calcium Dissolved	ug/l										
Chromium Dissolved	ug/l		50	150	65	190	310	73	34.9	35.4	34.5
Copper Dissolved	ug/l	10	2000	330	16	57	80	14	<0.85	1.77	<0.85
Iron Dissolved	ug/l	1000	200								
Lead Dissolved	ug/l	1.2	10	<1	<1	<1	<1	<1	1.6	0.925	0.976
Magnesium Dissolved	ug/l										
Manganese Dissolved	ug/l	30	50								
Mercury Dissolved	ug/l	0.07	1	<0.5	<0.5	<0.5	0.5	<0.5	<0.01	<0.01	<0.01
Nickel Dissolved	ug/l	4	20	13	5.8	11	12	8.6	8.68	15	13.9
Selenium Dissolved	ug/l		10	52	28	100	120	32	22.9	26	21.7
Vanadium Dissolved	ug/l								12.5	19.7	18.6
Zinc Dissolved	ug/l	75							4.17	3.84	3.69
Cadmium Total	ug/l	0.15	5								
Zinc Total	ug/l	75		15	6.2	17	22	4.6			
Mercury Total	ug/l	0.07	1								
Non-Metal Inorganics											
Hardness Total	mg/l										
Total Alkalinity as CaCO3	mg/l			2000	900	2000	2300	1200	1900	1730	2050
Conductivity uS/cm @25C	uS/cm								7270	7400	6650
BOD	mg/l	5									
COD	mg/l										
Potassium Dissolved	mg/l										
Phosphate											
Sodium Dissolved	mg/l		200								
Nitrate as NO3	mg/l		50						<0.3	<0.3	<0.3
Nitrite as NO2	mg/l		0.5						<0.05	<0.05	<0.05
Sulphate (soluble)	mg/l	400	250								
Chloride	mg/l	250	250	3800	1500	6200	6200	1300	2290	2170	2410
Sulphide	mg/l										
Ammoniacal Nitrogen as N	mg/l	0.6		20	11	29	33	12	20.1	19.8	21
unionised ammonia	mg/l										
Total Ammonium as NH4	mg/l		0.5								
Hexavalent Chromium	mg/l		50								
Phenols Monohydric	mg/l										
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Cyanide (Free)	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05			
Carbon Dioxide Dissolved	ug/l										
pH Value	pH units	6-9	6.5-10	7.4	8	7.6	7.8	7.9	7.12	7.12	7.35
Fluoride		5000	1500								
Organics											
GRO (C4-C12)	ug/l								<50	<50	<50
MTBE	ug/l								<3	<3	<3
Benzene	ug/l	10	1	<1	<1	<1	<1	<1	<7	<7	<7
Toluene	ug/l	50		<1	<1	<1	<1	<1	<4	<4	<4
Ethyl benzene	ug/l	20		<1	<1	<1	<1	<1	<5	<5	<5
m & p Xylene	ug/l	30		<1	<1	<1	<1	<1	<8	<8	<8
o Xylene	ug/l	30		<1	<1	<1	<1	<1	<3	<3	<3
Phenols											
Phenols Monohydric	mg/l	0.0077									
Phenols	mg/l	0.0077		<0.03	0.08	<0.03	<0.03	<0.03			
TPH											
TPH GC (C10-C37)	ug/l										
Aliphatics C5-C6	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10
Aliphatics >C6-C8	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10
Aliphatics >C8-C10	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10
Aliphatics >C10-C12	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10
Aliphatics >C12-C16 Aqueous	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10
Aliphatics >C16-C21 Aqueous	ug/l			<0.1	1.2	<0.1	<0.1	5.3	21	17	<10
Aliphatics >C21-C35 Aqueous	ug/l			<0.1	140	<0.1	<0.1	250	581	367	184
Total Aliphatics C5-C35 Aqueous	ug/l										
Total Aliphatics >C12-C35 Aqueous	ug/l								602	384	184
Aliphatics >C35-44	ug/l			<0.1	2.6	<0.1	<0.1	20			
Aromatics C5-C7	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10
Aromatics C6-C7	ug/l										
Aromatics >C7-C8	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10
Aromatics >EC8-EC10	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10
Aromatics >EC10-EC12	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10
Aromatics >EC12-EC16 Aqueous	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10
Aromatics >EC16-EC21 Aqueous	ug/l			<0.1	0.93	<0.1	<0.1	3.7	<10	<10	<10
Aromatics >EC21-EC35 Aqueous	ug/l			<0.1	18	<0.1	<0.1	46	195	109	50
Total Aromatics C6-C35 Aqueous	ug/l										
Total Aromatics >EC12-EC35 Aqueous	ug/l								195	109	50
Aromatics >C35 - 44	ug/l			<0.1	2.3	<0.1	<0.1	13			
TPH (Aliphatics and Aromatics C5-C35) Aqueous	ug/l								797	493	245

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH006	RBBH006	RBBH006	RBBH007	RBBH007	RBBH007	RBBH007
Round				2002 Round 1	2002 Round 2	2002 Round 3	2002 Round 1	2002 Round 2	2002 Round 3	2004
Sample Type				W	W	W	W	W	W	W
Sample Received Date										
Sampled Date										11/06/2004
Depth										
Response Zone (RZ) Details		EQS	DWS	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location										
Total Aliphatic TPH	ug/l									
Total Aromatic TPH	ug/l									
Total petroleum hydrocarbons	ug/l									
PAHs										
Acenaphthene	ug/l			<2			4			4.371
Acenaphthylene	ug/l			<2			<2			0.133
Anthracene	ug/l	0.1		<2			<2			0.3
Benzo(a)anthracene	ug/l			<2			<2			<0.01
Benzo(a)pyrene	ug/l	0.00017	0.01	<2			<2			<0.01
Benzo(b)fluoranthene	ug/l	0.017	0.1	<2			<2			<0.01
Benzo(k)fluoranthene	ug/l	0.017	0.1	<2			<2			<0.01
Benzo(ghi)perylene	ug/l	0.0082	0.1	<2			<2			<0.01
Indeno(1,2,3-cd)pyrene	ug/l		0.1	<2			<2			<0.01
Chrysene	ug/l			<2			<2			<0.01
Dibenzo(a,h)anthracene	ug/l			<2			<2			<0.01
Fluoranthene	ug/l	0.0063		<2			<2			0.105
Fluorene	ug/l			<2			<2			0.944
Naphthalene	ug/l	2		<2			45			10.059
Phenanthrene	ug/l			<2			<2			0.455
Pyrene	ug/l			<2			<2			0.079
Total PAHs (USEPA 16)	ug/l			<32			<77			16.446
PCBs										
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0							
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0							
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	ug/l	0	0							
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	ug/l	0	0							
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0							
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	ug/l	0	0							
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	ug/l	0	0							
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0							
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	ug/l	0	0							
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	ug/l	0	0							
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0							
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0							
Pcb-156 2,3,3',4,4',5-Hexachlorobiphenyl	ug/l	0	0							
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	ug/l	0	0							
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0							
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0							
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0							
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ug/l	0	0							
SVOC by GCMS										
Phenols										
2-Chlorophenol	ug/l	50								
2-Methylphenol	ug/l	100								
2-Nitrophenol	ug/l									
2,4-Dichlorophenol	ug/l	20								
2,4-Dimethylphenol	ug/l									
2,4,5-Trichlorophenol	ug/l									
2,4,6-Trichlorophenol	ug/l									
4-Chloro-3-methylphenol	ug/l	40								
4-Methylphenol	ug/l	100								
4-Nitrophenol	ug/l									
Pentachlorophenol	ug/l	0.4								
Phenol	ug/l	7.7								
PAHs										
2-Chloronaphthalene	ug/l									
2-Methylnaphthalene	ug/l									
Acenaphthene	ug/l									
Acenaphthylene	ug/l									
Anthracene	ug/l	0.1								
Benzo(a)anthracene	ug/l									
Benzo(a)pyrene	ug/l	0.00017	0.01							
Benzo(b)fluoranthene	ug/l	0.017	0.1							
Benzo(k)fluoranthene	ug/l	0.017	0.1							
Benzo(ghi)perylene	ug/l	0.0082	0.1							
Indeno(1,2,3-cd)pyrene	ug/l		0.1							
Chrysene	ug/l									
Dibenzo(a,h)anthracene	ug/l									
Fluoranthene	ug/l	0.0063								
Fluorene	ug/l									
Naphthalene	ug/l	2								
Phenanthrene	ug/l									
Pyrene	ug/l									
Phthalates										
Bis(2-ethylhexyl) phthalate	ug/l	1.3								
Butylbenzyl phthalate	ug/l	20								
Di-n-butyl phthalate	ug/l	8								
Di-n-Octyl phthalate	ug/l	20								

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH07	RBBH07	RBBH008	RBBH008	RBBH008	RBBH008	RBBH009
Round				2008 Round 1	2008 Round 2	2002 Round 1	2002 Round 2	2002 Round 3	2004	2002 Round 1
Sample Type				W	W	W	W	W	W	W
Sample Received Date				29/02/2008	20/03/2008					
Sampled Date				27/02/2008	19/03/2008				11/06/2004	
Depth										
Response Zone (RZ) Details				MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location				UPSTREAM OF CORUS REEDBED						
Total Aliphatic TPH	ug/l			12	<10					
Total Aromatic TPH	ug/l									
Total petroleum hydrocarbons	ug/l									
PAHs										
Acenaphthene	ug/l					<2		1.128		<20
Acenaphthylene	ug/l					<2		0.857		<20
Anthracene	ug/l	0.1				<2		0.286		<20
Benzo(a)anthracene	ug/l					<2		0.058		<20
Benzo(a)pyrene	ug/l	0.00017	0.01			<2		<0.01		<20
Benzo(b)fluoranthene	ug/l	0.017	0.1			<2		<0.01		<20
Benzo(k)fluoranthene	ug/l	0.017	0.1			<2		<0.01		<20
Benzo(ghi)perylene	ug/l	0.0082	0.1			<2		<0.01		<20
Indeno(1,2,3-cd)pyrene	ug/l		0.1			<2		<0.01		<20
Chrysene	ug/l					<2		0.026		<20
Dibenzo(a,h)anthracene	ug/l					<2		<0.01		<20
Fluoranthene	ug/l	0.0063				<2		0.156		<20
Fluorene	ug/l					6		2.428		<20
Naphthalene	ug/l	2				26		1.19		<20
Phenanthrene	ug/l					8		2.943		<20
Pyrene	ug/l					<2		0.121		<20
Total PAHs (USEPA 16)	ug/l					<66		9.194		<320
PCBs										
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0							
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0							
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	ug/l	0	0							
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	ug/l	0	0							
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0							
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	ug/l	0	0							
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	ug/l	0	0							
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0							
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	ug/l	0	0							
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	ug/l	0	0							
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0							
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0							
Pcb-156 2,3,3',4,4',5-Hexachlorobiphenyl	ug/l	0	0							
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	ug/l	0	0							
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0							
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0							
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0							
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ug/l	0	0							
SVOC by GCMS										
Phenols										
2-Chlorophenol	ug/l	50		<1	<1					
2-Methylphenol	ug/l	100		<1	<1					
2-Nitrophenol	ug/l			<1	1900					
2,4-Dichlorophenol	ug/l	20		<1	<1					
2,4-Dimethylphenol	ug/l			<1	<1					
2,4,5-Trichlorophenol	ug/l			<1	<1					
2,4,6-Trichlorophenol	ug/l			<1	<1					
4-Chloro-3-methylphenol	ug/l	40		<1	<1					
4-Methylphenol	ug/l	100		3	1300					
4-Nitrophenol	ug/l			<1	3000					
Pentachlorophenol	ug/l	0.4		<1	<1					
Phenol	ug/l	7.7		53	36000					
PAHs										
2-Chloronaphthalene	ug/l			1	1					
2-Methylnaphthalene	ug/l			1	2700					
Acenaphthene	ug/l			4	3500					
Acenaphthylene	ug/l			<1	<1					
Anthracene	ug/l	0.1		<1	<1					
Benzo(a)anthracene	ug/l			<1	<1					
Benzo(a)pyrene	ug/l	0.00017	0.01	<1	<1					
Benzo(b)fluoranthene	ug/l	0.017	0.1	<1	<1					
Benzo(k)fluoranthene	ug/l	0.017	0.1	<1	<1					
Benzo(ghi)perylene	ug/l	0.0082	0.1	<1	<1					
Indeno(1,2,3-cd)pyrene	ug/l		0.1	<1	<1					
Chrysene	ug/l			<1	<1					
Dibenzo(a,h)anthracene	ug/l			<1	<1					
Fluoranthene	ug/l	0.0063		<1	<1					
Fluorene	ug/l			<1	<1					
Naphthalene	ug/l	2		22	22000					
Phenanthrene	ug/l			<1	<1					
Pyrene	ug/l			<1	<1					
Phthalates										
Bis(2-ethylhexyl) phthalate	ug/l	1.3		2	4200					
Butylbenzyl phthalate	ug/l	20		<1	<1					
Di-n-butyl phthalate	ug/l	8		<1	<1					
Di-n-Octyl phthalate	ug/l	20		5	5					

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Reedbed No.1
22/06/2016

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH009	RBBH009	RBBH09	RBBH09	RBBH010	RBBH010	RBBH010
Round		EQS	DWS	2002 Round 2	2002 Round 3	2008 Round 1	2008 Round 2	2002 Round 1	2002 Round 2	2002 Round 3
Sample Type				W	W	W	W	W	W	W
Sample Received Date						29/02/2008	20/03/2008			
Sampled Date						27/02/2008	19/03/2008			
Depth										
Response Zone (RZ) Details				MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location										
Total Aliphatic TPH	ug/l					<10	<10			
Total Aromatic TPH	ug/l									
Total petroleum hydrocarbons	ug/l									
PAHs										
Acenaphthene	ug/l							6		
Acenaphthylene	ug/l							<2		
Anthracene	ug/l	0.1						<2		
Benzo(a)anthracene	ug/l							<2		
Benzo(a)pyrene	ug/l	0.00017	0.01					<2		
Benzo(b)fluoranthene	ug/l	0.017	0.1					<2		
Benzo(k)fluoranthene	ug/l	0.017	0.1					<2		
Benzo(ghi)perylene	ug/l	0.0082	0.1					<2		
Indeno(1,2,3-cd)pyrene	ug/l		0.1					<2		
Chrysene	ug/l							<2		
Dibenzo(a,h)anthracene	ug/l							<2		
Fluoranthene	ug/l	0.0063						<2		
Fluorene	ug/l							3		
Naphthalene	ug/l	2						4		
Phenanthrene	ug/l							3		
Pyrene	ug/l							<2		
Total PAHs (USEPA 16)	ug/l							<41		
PCBs										
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0							
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0							
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	ug/l	0	0							
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	ug/l	0	0							
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0							
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	ug/l	0	0							
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	ug/l	0	0							
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0							
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	ug/l	0	0							
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	ug/l	0	0							
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0							
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0							
Pcb-156 2,3,3',4,4',5-Hexachlorobiphenyl	ug/l	0	0							
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	ug/l	0	0							
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0							
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0							
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0							
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ug/l	0	0							
SVOC by GCMS										
Phenols										
2-Chlorophenol	ug/l	50				<1	<1			
2-Methylphenol	ug/l	100				<1	<1			
2-Nitrophenol	ug/l					<1	<1			
2,4-Dichlorophenol	ug/l	20				<1	<1			
2,4-Dimethylphenol	ug/l					<1	<1			
2,4,5-Trichlorophenol	ug/l					<1	<1			
2,4,6-Trichlorophenol	ug/l					<1	<1			
4-Chloro-3-methylphenol	ug/l	40				<1	<1			
4-Methylphenol	ug/l	100				<1	<1			
4-Nitrophenol	ug/l					<1	<1			
Pentachlorophenol	ug/l	0.4				<1	<1			
Phenol	ug/l	7.7				16	11			
PAHs										
2-Chloronaphthalene	ug/l					<1	<1			
2-Methylnaphthalene	ug/l					<1	<1			
Acenaphthene	ug/l					<1	<1			
Acenaphthylene	ug/l					<1	<1			
Anthracene	ug/l	0.1				<1	<1			
Benzo(a)anthracene	ug/l					<1	<1			
Benzo(a)pyrene	ug/l	0.00017	0.01			<1	<1			
Benzo(b)fluoranthene	ug/l	0.017	0.1			<1	<1			
Benzo(k)fluoranthene	ug/l	0.017	0.1			<1	<1			
Benzo(ghi)perylene	ug/l	0.0082	0.1			<1	<1			
Indeno(1,2,3-cd)pyrene	ug/l		0.1			<1	<1			
Chrysene	ug/l					<1	<1			
Dibenzo(a,h)anthracene	ug/l					<1	<1			
Fluoranthene	ug/l	0.0063				<1	<1			
Fluorene	ug/l					<1	<1			
Naphthalene	ug/l	2				<1	1			
Phenanthrene	ug/l					<1	<1			
Pyrene	ug/l					<1	<1			
Phthalates										
Bis(2-ethylhexyl) phthalate	ug/l	1.3				<2	<2			
Butylbenzyl phthalate	ug/l	20				<1	<1			
Di-n-butyl phthalate	ug/l	8				<1	<1			
Di-n-Octyl phthalate	ug/l	20				<5	<5			

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 Reedbed No.1
22/06/2016

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH10	RBBH10	RBBH10	SWSJ08	SWSJ08	SBHJ01	SBHJ01	BH509
Round		EQS	DWS		2008 Round 1	2008 Round 2	2008 Round 1	2008 Round 2	2008 Round 1	2008 Round 2	Rou
Sample Type					W	W	W	W	W	W	EW
Sample Received Date					29/02/2008	20/03/2008	21/02/2008	20/03/2008	21/02/2008	20/03/2008	
Sampled Date				11/06/2004	27/02/2008	19/03/2008	21/02/2008	19/03/2008	21/02/2008	19/03/2008	04/03
Depth							0.37	3.3	5.98	7.5	0.74
Response Zone (RZ) Details					MG/TFD (peat)	MG/TFD (peat)	MG/TFD	MG/TFD	TFD/ (Peat)	TFD/ (Peat)	TFD
Installation Details				Single	Single	Single	Single	Single	Single	Single	Shallow
Location											
Total Aliphatic TPH	ug/l				<10	<10	<10	<10	<10	<10	<5
Total Aromatic TPH	ug/l										<5
Total petroleum hydrocarbons	ug/l										<10
PAHs											
Acenaphthene	ug/l										<0.1
Acenaphthylene	ug/l										<0.1
Anthracene	ug/l	0.1									<0.1
Benzo(a)anthracene	ug/l										<0.1
Benzo(a)pyrene	ug/l	0.00017	0.01								**<0.1**
Benzo(b)fluoranthene	ug/l	0.017	0.1								**<0.1**
Benzo(k)fluoranthene	ug/l	0.017	0.1								**<0.1**
Benzo(ghi)perylene	ug/l	0.0082	0.1								<0.1
Indeno(1,2,3-cd)pyrene	ug/l		0.1								<0.1
Chrysene	ug/l										<0.1
Dibenzo(a,h)anthracene	ug/l										<0.1
Fluoranthene	ug/l	0.0063									**<0.1**
Fluorene	ug/l										<0.1
Naphthalene	ug/l	2									<0.1
Phenanthrene	ug/l										<0.1
Pyrene	ug/l										<0.1
Total PAHs (USEPA 16)	ug/l										<2
PCBs											
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0								<0.01
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0								<0.01
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	ug/l	0	0								
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	ug/l	0	0								
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0								<0.01
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	ug/l	0	0								
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	ug/l	0	0								
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0								<0.01
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	ug/l	0	0								
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	ug/l	0	0								
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0								<0.01
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0								<0.01
Pcb-156 2,3,3',4,4',5-Hexachlorobiphenyl	ug/l	0	0								
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	ug/l	0	0								
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0								
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0								
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0								<0.01
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ug/l	0	0								
SVOC by GCMS											
Phenols											
2-Chlorophenol	ug/l	50			<1	<1	<1	<1	<1	<1	
2-Methylphenol	ug/l	100			<1	<1	<1	<1	<1	<1	
2-Nitrophenol	ug/l				<1	<1	<1	<1	<1	<1	
2,4-Dichlorophenol	ug/l	20			<1	<1	<1	<1	<1	<1	
2,4-Dimethylphenol	ug/l				<1	<1	<1	<1	<1	<1	
2,4,5-Trichlorophenol	ug/l				<1	<1	<1	<1	<1	<1	
2,4,6-Trichlorophenol	ug/l				<1	<1	<1	<1	<1	<1	
4-Chloro-3-methylphenol	ug/l	40			<1	<1	<1	<1	<1	<1	
4-Methylphenol	ug/l	100			<1	<1	<1	<1	<1	<1	
4-Nitrophenol	ug/l				<1	<1	<1	<1	<1	<1	
Pentachlorophenol	ug/l	0.4			**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
Phenol	ug/l	7.7			6	7	<1	<1	<1	<1	
PAHs											
2-Chloronaphthalene	ug/l				<1	<1	<1	<1	<1	<1	
2-Methylnaphthalene	ug/l				<1	<1	<1	<1	<1	<1	
Acenaphthene	ug/l				2	1	<1	<1	<1	<1	
Acenaphthylene	ug/l				<1	<1	<1	<1	<1	<1	
Anthracene	ug/l	0.1			**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
Benzo(a)anthracene	ug/l				<1	<1	<1	<1	<1	<1	
Benzo(a)pyrene	ug/l	0.00017	0.01		**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
Benzo(b)fluoranthene	ug/l	0.017	0.1		**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
Benzo(k)fluoranthene	ug/l	0.017	0.1		**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
Benzo(ghi)perylene	ug/l	0.0082	0.1		**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
Indeno(1,2,3-cd)pyrene	ug/l		0.1		**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
Chrysene	ug/l				<1	<1	<1	<1	<1	<1	
Dibenzo(a,h)anthracene	ug/l				<1	<1	<1	<1	<1	<1	
Fluoranthene	ug/l	0.0063			**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
Fluorene	ug/l				1	<1	<1	<1	<1	<1	
Naphthalene	ug/l	2			<1	<1	<1	<1	<1	<1	
Phenanthrene	ug/l				1	1	<1	<1	<1	<1	
Pyrene	ug/l				<1	<1	<1	<1	<1	<1	
Phthalates											
Bis(2-ethylhexyl) phthalate	ug/l	1.3			**<2**	**<2**	**<2**	20	**<2**	**<2**	
Butylbenzyl phthalate	ug/l	20			<1	<1	<1	<1	<1	<1	
Di-n-butyl phthalate	ug/l	8			<1	<1	<1	<1	<1	<1	
Di-n-Octyl phthalate	ug/l	20			<5	<5	<5	<5	<5	<5	

M4CAN
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22/06/2016

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		BH509	BH509	BH509	BH509	BH509	BHM4CAN033	BHM4CAN033	BHM4CAN033
Round				nd 1	Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				EW	EW	EW	EW	EW	W	W	W
Sample Received Date											
Sampled Date				/2015	11/03/2015		18/03/2015		06/05/2016	19/05/2016	02/06/2016
Depth				1.95	4.47	5.09	4.20	4.52	0.92	1.23	1.33
Response Zone (RZ) Details				TFD	TFD	TFD	TFD	TFD	MMG	MMG	MMG
Installation Details				Deep	Shallow	Deep	Deep	Shallow	Single	Single	Single
Location											
Total Aliphatic TPH	ug/l			<5	140	<5	<5	270			
Total Aromatic TPH	ug/l			<5	21	<5	<5	63			
Total petroleum hydrocarbons	ug/l			<10	160	<10	<10	340			
PAHs											
Acenaphthene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	0.0208	0.0215	0.0319
Acenaphthylene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.011	0.0113	<0.011
Anthracene	ug/l	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.015	<0.015	<0.015
Benzo(a)anthracene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.017	<0.017	<0.017
Benzo(a)pyrene	ug/l	0.00017	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	0.0167	0.0156	<0.009
Benzo(b)fluoranthene	ug/l	0.017	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0233	0.0234	<0.023
Benzo(k)fluoranthene	ug/l	0.017	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.027	<0.027	<0.027
Benzo(ghi)perylene	ug/l	0.0082	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0743	0.0276	0.0162
Indeno(1,2,3-cd)pyrene	ug/l		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.014	0.0171	<0.014
Chrysene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	0.0172	<0.013	<0.013
Dibenzo(a,h)anthracene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.016	<0.016	<0.016
Fluoranthene	ug/l	0.0063		<0.1	<0.1	<0.1	<0.1	<0.1	0.0393	0.0203	<0.017
Fluorene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	0.0305	0.0162	0.0366
Naphthalene	ug/l	2		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.144
Phenanthrene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	0.0654	0.0365	0.0518
Pyrene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	0.0413	0.0228	0.0159
Total PAHs (USEPA 16)	ug/l			<2	<2	<2	<2	<2	<0.344	<0.344	<0.344
PCBs											
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0	<0.01	<0.01	<0.01	<0.01	<0.01			
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0	<0.01	<0.01	<0.01	<0.01	<0.01			
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0	<0.01	<0.01	<0.01	<0.01	<0.01			
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0	<0.01	<0.01	<0.01	<0.01	<0.01	<00.15	<0.015	
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0	<0.01	<0.01	<0.01	<0.01	<0.01			
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0	<0.01	<0.01	<0.01	<0.01	<0.01			
Pcb-156 2,3,3',4,4',5-Hexachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0	<0.01	<0.01	<0.01	<0.01	<0.01			
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ug/l	0	0						<00.15	<0.015	
SVOC by GCMS											
Phenols											
2-Chlorophenol	ug/l	50							<1	<8	<1
2-Methylphenol	ug/l	100							<1	<8	<1
2-Nitrophenol	ug/l								<1	<8	<1
2,4-Dichlorophenol	ug/l	20							<1	<8	<1
2,4-Dimethylphenol	ug/l								<1	<8	<1
2,4,5-Trichlorophenol	ug/l								<1	<8	<1
2,4,6-Trichlorophenol	ug/l								<1	<8	<1
4-Chloro-3-methylphenol	ug/l	40							<1	<8	<1
4-Methylphenol	ug/l	100							<1	<8	<1
4-Nitrophenol	ug/l								<1	<8	<1
Pentachlorophenol	ug/l	0.4							<1	<8	<1
Phenol	ug/l	7.7							<1	<8	<1
PAHs											
2-Chloronaphthalene	ug/l								<1	<8	<1
2-Methylnaphthalene	ug/l								<1	<8	<1
Acenaphthene	ug/l								<1	<8	
Acenaphthylene	ug/l								<1	<8	
Anthracene	ug/l	0.1							<1	<8	
Benzo(a)anthracene	ug/l								<1	<8	
Benzo(a)pyrene	ug/l	0.00017	0.01						<1	<8	
Benzo(b)fluoranthene	ug/l	0.017	0.1						<1	<8	
Benzo(k)fluoranthene	ug/l	0.017	0.1						<1	<8	
Benzo(ghi)perylene	ug/l	0.0082	0.1						<1	<8	
Indeno(1,2,3-cd)pyrene	ug/l		0.1						<1	<8	
Chrysene	ug/l								<1	<8	
Dibenzo(a,h)anthracene	ug/l								<1	<8	
Fluoranthene	ug/l	0.0063							<1	<8	
Fluorene	ug/l								<1	<8	
Naphthalene	ug/l	2							<1	<8	
Phenanthrene	ug/l								<1	<8	
Pyrene	ug/l								<1	<8	
Phthalates											
Bis(2-ethylhexyl) phthalate	ug/l	1.3							4.21	<16	<2
Butylbenzyl phthalate	ug/l	20							<1	<8	<1
Di-n-butyl phthalate	ug/l	8							<1	<8	<1
Di-n-Octyl phthalate	ug/l	20							<5	<40	<5

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH006	RBBH006	RBBH006	RBBH007	RBBH007	RBBH007	RBBH007
Round				2002 Round 1	2002 Round 2	2002 Round 3	2002 Round 1	2002 Round 2	2002 Round 3	2004
Sample Type				W	W	W	W	W	W	W
Sample Received Date										
Sampled Date										11/06/2004
Depth										
Response Zone (RZ) Details		EQS	DWS	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location										
Diethyl phthalate	ug/l	200								
Dimethyl phthalate	ug/l	800								
Other Semi-Volatiles										
1,2-Dichlorobenzene	ug/l	20								
1,2,4-Trichlorobenzene	ug/l	0.4								
1,3-Dichlorobenzene	ug/l	20								
1,4-Dichlorobenzene	ug/l	20								
2-Nitroaniline	ug/l									
2,4-Dinitrotoluene	ug/l									
2,6-Dinitrotoluene	ug/l									
3-Nitroaniline	ug/l									
4-Bromophenylphenylether	ug/l									
4-Chloroaniline	ug/l									
4-Chlorophenylphenylether	ug/l									
4-Nitroaniline	ug/l									
Azobenzene	ug/l									
Bis(2-chloroethoxy)methane	ug/l									
Bis(2-chloroethyl)ether	ug/l									
Carbazole	ug/l									
Dibenzofuran	ug/l									
Hexachlorobenzene	ug/l	0.05								
Hexachlorobutadiene	ug/l	0.6								
Hexachlorocyclopentadiene	ug/l									
Hexachloroethane	ug/l									
Isophorone	ug/l									
N-nitrosodi-n-propylamine	ug/l									
Nitrobenzene	ug/l									
VOCs										
Dichlorodifluoromethane	ug/l									
Chloromethane	ug/l									
Vinyl Chloride	ug/l	0	0.5							
Bromomethane	ug/l									
Chloroethane	ug/l									
Trichlorofluoromethane	ug/l									
trans-1-2-Dichloroethene	ug/l									
Dichloromethane	ug/l	20								
Carbon Disulphide	ug/l									
1.1-Dichloroethene	ug/l									
1.1-Dichloroethane	ug/l									
Methyl Tertiary Butyl Ether	ug/l									
cis-1-2-Dichloroethene	ug/l									
Bromochloromethane	ug/l		100							
Chloroform	ug/l	2.5	100							
2.2-Dichloropropane	ug/l									
1.2-Dichloroethane	ug/l	10	3							
1.1.1-Trichloroethane	ug/l	100								
1.1-Dichloropropene	ug/l									
Benzene	ug/l	10	1							
Carbontetrachloride	ug/l	12	3							
Dibromomethane	ug/l									
1.2-Dichloropropane	ug/l									
Bromodichloromethane	ug/l									
Trichloroethene	ug/l	10	10							
cis-1-3-Dichloropropene	ug/l									
trans-1-3-Dichloropropene	ug/l									
1.1.2-Trichloroethane	ug/l	400								
Toluene	ug/l	50								
1.3-Dichloropropane	ug/l									
Dibromochloromethane	ug/l		100							
1.2-Dibromoethane	ug/l									
Tetrachloroethene	ug/l	10	10							
1.1.1.2-Tetrachloroethane	ug/l									
Chlorobenzene	ug/l									
Ethylbenzene	ug/l	20								
p/m-Xylene	ug/l	30								
Bromoform	ug/l									
Styrene	ug/l	50								
1.1.2.2-Tetrachloroethane	ug/l									
o-Xylene	ug/l	30								
1.2.3-Trichloropropane	ug/l									
Isopropylbenzene	ug/l									
Bromobenzene	ug/l									
2-Chlorotoluene	ug/l									
Propylbenzene	ug/l									
4-Chlorotoluene	ug/l									
1.2.4-Trimethylbenzene	ug/l									
4-Isopropyltoluene	ug/l									
1,3,5-Trichlorobenzene	ug/l									
1.3.5-Trimethylbenzene	ug/l									
1.2-Dichlorobenzene	ug/l	20								

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH07	RBBH07	RBBH008	RBBH008	RBBH008	RBBH008	RBBH009
Round				2008 Round 1	2008 Round 2	2002 Round 1	2002 Round 2	2002 Round 3	2004	2002 Round 1
Sample Type				W	W	W	W	W	W	W
Sample Received Date				29/02/2008	20/03/2008					
Sampled Date				27/02/2008	19/03/2008				11/06/2004	
Depth										
Response Zone (RZ) Details		EQS	DWS	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location				UPSTREAM OF CORUS REEDBED						
Diethyl phthalate	ug/l	200		<1	<1					
Dimethyl phthalate	ug/l	800		<1	<1					
Other Semi-Volatiles										
1,2-Dichlorobenzene	ug/l	20		<1	<1					
1,2,4-Trichlorobenzene	ug/l	0.4		<1	<1					
1,3-Dichlorobenzene	ug/l	20		<1	<1					
1,4-Dichlorobenzene	ug/l	20		<1	<1					
2-Nitroaniline	ug/l			<1	<1					
2,4-Dinitrotoluene	ug/l			<1	<1					
2,6-Dinitrotoluene	ug/l			<1	<1					
3-Nitroaniline	ug/l			<1	<1					
4-Bromophenylphenylether	ug/l			<1	<1					
4-Chloroaniline	ug/l			<1	<1					
4-Chlorophenylphenylether	ug/l			<1	<1					
4-Nitroaniline	ug/l			<1	<1					
Azobenzene	ug/l			<1	<1					
Bis(2-chloroethoxy)methane	ug/l			<1	<1					
Bis(2-chloroethyl)ether	ug/l			<1	<1					
Carbazole	ug/l			<1	1000					
Dibenzofuran	ug/l			<1	<1					
Hexachlorobenzene	ug/l	0.05		<1	<1					
Hexachlorobutadiene	ug/l	0.6		<1	<1					
Hexachlorocyclopentadiene	ug/l			<1	<1					
Hexachloroethane	ug/l			<1	<1					
Isophorone	ug/l			<1	<1					
N-nitrosodi-n-propylamine	ug/l			<1	<1					
Nitrobenzene	ug/l			<1	<1					
VOCs										
Dichlorodifluoromethane	ug/l			<1	<1	<1				
Chloromethane	ug/l			<1	<1	<1				
Vinyl Chloride	ug/l	0	0.5	<1	<1	<1				
Bromomethane	ug/l			<1	<1	<1				
Chloroethane	ug/l			<1	<1	<1				
Trichlorofluoromethane	ug/l			<1	<1	<1				
trans-1-2-Dichloroethene	ug/l			<1	<1	<1				
Dichloromethane	ug/l	20		<1	<1					
Carbon Disulphide	ug/l			<1	<1					
1.1-Dichloroethene	ug/l			<1	<1	<1				
1.1-Dichloroethane	ug/l			<1	<1	<1				
Methyl Tertiary Butyl Ether	ug/l			<1	<1					
cis-1-2-Dichloroethene	ug/l			<1	<1	<1				
Bromochloromethane	ug/l		100	<1	<1	<1				
Chloroform	ug/l	2.5	100	<1	<1	<1				
2.2-Dichloropropane	ug/l			<1	<1	<1				
1.2-Dichloroethane	ug/l	10	3	<1	<1	<1				
1.1.1-Trichloroethane	ug/l	100		<1	<1	<1				
1.1-Dichloropropene	ug/l			<1	<1	<1				
Benzene	ug/l	10	1	<1	<1	4				
Carbontetrachloride	ug/l	12	3	<1	<1	<1				
Dibromomethane	ug/l			<1	<1	<1				
1.2-Dichloropropane	ug/l			<1	<1	<1				
Bromodichloromethane	ug/l			<1	<1	<1				
Trichloroethene	ug/l	10	10	<1	<1	<1				
cis-1-3-Dichloropropene	ug/l			<1	<1	<1				
trans-1-3-Dichloropropene	ug/l			<1	<1	<1				
1.1.2-Trichloroethane	ug/l	400		<1	<1	<1				
Toluene	ug/l	50		<1	<1	<1				
1.3-Dichloropropane	ug/l			<1	<1	<1				
Dibromochloromethane	ug/l		100	<1	<1	<1				
1.2-Dibromoethane	ug/l			<1	<1	<1				
Tetrachloroethene	ug/l	10	10	<1	<1	<1				
1.1.1.2-Tetrachloroethane	ug/l			<1	<1	<1				
Chlorobenzene	ug/l			<1	<1	<1				
Ethylbenzene	ug/l	20		<1	<1	<1				
p/m-Xylene	ug/l	30		<1	<1	<1				
Bromoform	ug/l			<1	<1	<1				
Styrene	ug/l	50		<1	<1	<1				
1.1.2.2-Tetrachloroethane	ug/l			<1	<1	<1				
o-Xylene	ug/l	30		<1	<1	<1				
1.2.3-Trichloropropane	ug/l			<1	<1	<1				
Isopropylbenzene	ug/l			<1	<1	<1				
Bromobenzene	ug/l			<1	<1	<1				
2-Chlorotoluene	ug/l			<1	<1	<1				
Propylbenzene	ug/l			<1	<1	<1				
4-Chlorotoluene	ug/l			<1	<1	<1				
1.2.4-Trimethylbenzene	ug/l			<1	5					
4-Isopropyltoluene	ug/l			<1	<1	2				
1,3,5-Trichlorobenzene	ug/l									
1.3.5-Trimethylbenzene	ug/l			<1	<1	3				
1.2-Dichlorobenzene	ug/l	20		<1	<1	<1				

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH009	RBBH009	RBBH09	RBBH09	RBBH010	RBBH010	RBBH010
Round		EQS	DWS	2002 Round 2	2002 Round 3	2008 Round 1	2008 Round 2	2002 Round 1	2002 Round 2	2002 Round 3
Sample Type				W	W	W	W	W	W	W
Sample Received Date						29/02/2008	20/03/2008			
Sampled Date						27/02/2008	19/03/2008			
Depth										
Response Zone (RZ) Details				MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location										
Diethyl phthalate	ug/l	200				<1	<1			
Dimethyl phthalate	ug/l	800				<1	<1			
Other Semi-Volatiles										
1,2-Dichlorobenzene	ug/l	20				<1	<1			
1,2,4-Trichlorobenzene	ug/l	0.4				<1	<1			
1,3-Dichlorobenzene	ug/l	20				<1	<1			
1,4-Dichlorobenzene	ug/l	20				<1	<1			
2-Nitroaniline	ug/l					<1	<1			
2,4-Dinitrotoluene	ug/l					<1	<1			
2,6-Dinitrotoluene	ug/l					<1	<1			
3-Nitroaniline	ug/l					<1	<1			
4-Bromophenylphenylether	ug/l					<1	<1			
4-Chloroaniline	ug/l					<1	<1			
4-Chlorophenylphenylether	ug/l					<1	<1			
4-Nitroaniline	ug/l					<1	<1			
Azobenzene	ug/l					<1	<1			
Bis(2-chloroethoxy)methane	ug/l					<1	<1			
Bis(2-chloroethyl)ether	ug/l					<1	<1			
Carbazole	ug/l					<1	<1			
Dibenzofuran	ug/l					<1	<1			
Hexachlorobenzene	ug/l	0.05				<1	<1			
Hexachlorobutadiene	ug/l	0.6				<1	<1			
Hexachlorocyclopentadiene	ug/l					<1	<1			
Hexachloroethane	ug/l					<1	<1			
Isophorone	ug/l					<1	<1			
N-nitrosodi-n-propylamine	ug/l					<1	<1			
Nitrobenzene	ug/l					<1	<1			
VOCs										
Dichlorodifluoromethane	ug/l					<1	<1	<1		
Chloromethane	ug/l					<1	<1	<1		
Vinyl Chloride	ug/l	0	0.5			<1	<1	<1		
Bromomethane	ug/l					<1	<1	<1		
Chloroethane	ug/l					<1	<1	<1		
Trichlorofluoromethane	ug/l					<1	<1	<1		
trans-1-2-Dichloroethene	ug/l					<1	<1	<1		
Dichloromethane	ug/l	20				<1	<1			
Carbon Disulphide	ug/l					<1	<1			
1.1-Dichloroethene	ug/l					<1	<1	<1		
1.1-Dichloroethane	ug/l					<1	<1	<1		
Methyl Tertiary Butyl Ether	ug/l					<1	<1			
cis-1-2-Dichloroethene	ug/l					<1	<1	<1		
Bromochloromethane	ug/l		100			<1	<1	<1		
Chloroform	ug/l	2.5	100			<1	<1	<1		
2.2-Dichloropropane	ug/l					<1	<1	<1		
1.2-Dichloroethane	ug/l	10	3			<1	<1	<1		
1.1.1-Trichloroethane	ug/l	100				<1	<1	<1		
1.1-Dichloropropene	ug/l					<1	<1	<1		
Benzene	ug/l	10	1			<1	<1	<1		
Carbontetrachloride	ug/l	12	3			<1	<1	<1		
Dibromomethane	ug/l					<1	<1	<1		
1.2-Dichloropropane	ug/l					<1	<1	<1		
Bromodichloromethane	ug/l					<1	<1	<1		
Trichloroethene	ug/l	10	10			<1	<1	<1		
cis-1-3-Dichloropropene	ug/l					<1	<1	<1		
trans-1-3-Dichloropropene	ug/l					<1	<1	<1		
1.1.2-Trichloroethane	ug/l	400				<1	<1	<1		
Toluene	ug/l	50				<1	<1	<1		
1.3-Dichloropropane	ug/l					<1	<1	<1		
Dibromochloromethane	ug/l		100			<1	<1	<1		
1.2-Dibromoethane	ug/l					<1	<1	<1		
Tetrachloroethene	ug/l	10	10			<1	<1	<1		
1.1.1.2-Tetrachloroethane	ug/l					<1	<1	<1		
Chlorobenzene	ug/l					<1	<1	<1		
Ethylbenzene	ug/l	20				<1	<1	<1		
p/m-Xylene	ug/l	30				<1	<1	<1		
Bromoform	ug/l					<1	<1	<1		
Styrene	ug/l	50				<1	<1	<1		
1.1.2.2-Tetrachloroethane	ug/l					<1	<1	<1		
o-Xylene	ug/l	30				<1	<1	<1		
1.2.3-Trichloropropane	ug/l					<1	<1	<1		
Isopropylbenzene	ug/l					<1	<1	<1		
Bromobenzene	ug/l					<1	<1	<1		
2-Chlorotoluene	ug/l					<1	<1	<1		
Propylbenzene	ug/l					<1	<1	<1		
4-Chlorotoluene	ug/l					<1	<1	<1		
1.2.4-Trimethylbenzene	ug/l					<1	<1			
4-Isopropyltoluene	ug/l					<1	<1	<1		
1,3,5-Trichlorobenzene	ug/l									
1.3.5-Trimethylbenzene	ug/l					<1	<1	<1		
1.2-Dichlorobenzene	ug/l	20				<1	<1	<1		

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH10	RBBH10	RBBH10	SWSJ08	SWSJ08	SBHJ01	SBHJ01	BH509
Round					2008 Round 1	2008 Round 2	2008 Round 1	2008 Round 2	2008 Round 1	2008 Round 2	Rou
Sample Type					W	W	W	W	W	W	EW
Sample Received Date					29/02/2008	20/03/2008	21/02/2008	20/03/2008	21/02/2008	20/03/2008	
Sampled Date				11/06/2004	27/02/2008	19/03/2008	21/02/2008	19/03/2008	21/02/2008	19/03/2008	04/03
Depth							0.37	3.3	5.98	7.5	0.74
Response Zone (RZ) Details					MG/TFD (peat)	MG/TFD (peat)	MG/TFD	MG/TFD	TFD/ (Peat)	TFD/ (Peat)	TFD
Installation Details				Single	Single	Single	Single	Single	Single	Single	Shallow
Location											
Diethyl phthalate	ug/l	200			<1	<1	<1	<1	<1	<1	
Dimethyl phthalate	ug/l	800			<1	<1	<1	<1	<1	<1	
Other Semi-Volatiles											
1,2-Dichlorobenzene	ug/l	20			<1	<1	<1	<1	<1	<1	
1,2,4-Trichlorobenzene	ug/l	0.4			<1	<1	<1	<1	<1	<1	
1,3-Dichlorobenzene	ug/l	20			<1	<1	<1	<1	<1	<1	
1,4-Dichlorobenzene	ug/l	20			<1	<1	<1	<1	<1	<1	
2-Nitroaniline	ug/l				<1	<1	<1	<1	<1	<1	
2,4-Dinitrotoluene	ug/l				<1	<1	<1	<1	<1	<1	
2,6-Dinitrotoluene	ug/l				<1	<1	<1	<1	<1	<1	
3-Nitroaniline	ug/l				<1	<1	<1	<1	<1	<1	
4-Bromophenylphenylether	ug/l				<1	<1	<1	<1	<1	<1	
4-Chloroaniline	ug/l				<1	<1	<1	<1	<1	<1	
4-Chlorophenylphenylether	ug/l				<1	<1	<1	<1	<1	<1	
4-Nitroaniline	ug/l				<1	<1	<1	<1	<1	<1	
Azobenzene	ug/l				<1	<1	<1	<1	<1	<1	
Bis(2-chloroethoxy)methane	ug/l				<1	<1	<1	<1	<1	<1	
Bis(2-chloroethyl)ether	ug/l				<1	<1	<1	<1	<1	<1	
Carbazole	ug/l				<1	<1	<1	<1	<1	<1	
Dibenzofuran	ug/l				<1	<1	<1	<1	<1	<1	
Hexachlorobenzene	ug/l	0.05			<1	<1	<1	<1	<1	<1	
Hexachlorobutadiene	ug/l	0.6			<1	<1	<1	<1	<1	<1	
Hexachlorocyclopentadiene	ug/l				<1	<1	<1	<1	<1	<1	
Hexachloroethane	ug/l				<1	<1	<1	<1	<1	<1	
Isophorone	ug/l				<1	<1	<1	<1	<1	<1	
N-nitrosodi-n-propylamine	ug/l				<1	<1	<1	<1	<1	<1	
Nitrobenzene	ug/l				<1	<1	<1	<1	<1	<1	
VOCs											
Dichlorodifluoromethane	ug/l				<1	<1	<1	<1	<1	<1	
Chloromethane	ug/l				<1	<1	<1	<1	<1	<1	
Vinyl Chloride	ug/l	0	0.5		<1	<1	<1	<1	<1	<1	
Bromomethane	ug/l				<1	<1	<1	<1	<1	<1	
Chloroethane	ug/l				<1	<1	<1	<1	<1	<1	
Trichlorofluoromethane	ug/l				<1	<1	<1	<1	<1	<1	
trans-1-2-Dichloroethene	ug/l				<1	<1	<1	<1	<1	<1	
Dichloromethane	ug/l	20			<1	<1	<1	<1	<1	<1	
Carbon Disulphide	ug/l				<1	<1	<1	<1	<1	<1	
1.1-Dichloroethene	ug/l				<1	<1	<1	<1	<1	<1	
1.1-Dichloroethane	ug/l				<1	<1	<1	<1	<1	<1	
Methyl Tertiary Butyl Ether	ug/l				<1	<1	<1	<1	<1	<1	
cis-1-2-Dichloroethene	ug/l				<1	<1	<1	<1	<1	<1	
Bromochloromethane	ug/l		100		<1	<1	<1	<1	<1	<1	
Chloroform	ug/l	2.5	100		<1	<1	<1	<1	<1	<1	
2.2-Dichloropropane	ug/l				<1	<1	<1	<1	<1	<1	
1.2-Dichloroethane	ug/l	10	3		<1	<1	<1	<1	<1	<1	
1.1.1-Trichloroethane	ug/l	100			<1	<1	<1	<1	<1	<1	
1.1-Dichloropropene	ug/l				<1	<1	<1	<1	<1	<1	
Benzene	ug/l	10	1		<1	<1	<1	<1	<1	<1	
Carbontetrachloride	ug/l	12	3		<1	<1	<1	<1	<1	<1	
Dibromomethane	ug/l				<1	<1	<1	<1	<1	<1	
1.2-Dichloropropane	ug/l				<1	<1	<1	<1	<1	<1	
Bromodichloromethane	ug/l				<1	<1	<1	<1	<1	<1	
Trichloroethene	ug/l	10	10		<1	<1	<1	<1	<1	<1	
cis-1-3-Dichloropropene	ug/l				<1	<1	<1	<1	<1	<1	
trans-1-3-Dichloropropene	ug/l				<1	<1	<1	<1	<1	<1	
1.1.2-Trichloroethane	ug/l	400			<1	<1	<1	<1	<1	<1	
Toluene	ug/l	50			<1	<1	<1	<1	<1	5	
1.3-Dichloropropane	ug/l				<1	<1	<1	<1	<1	<1	
Dibromochloromethane	ug/l		100		<1	<1	<1	<1	<1	<1	
1.2-Dibromoethane	ug/l				<1	<1	<1	<1	<1	<1	
Tetrachloroethene	ug/l	10	10		<1	<1	<1	<1	<1	<1	
1.1.1.2-Tetrachloroethane	ug/l				<1	<1	<1	<1	<1	<1	
Chlorobenzene	ug/l				<1	<1	<1	<1	<1	<1	
Ethylbenzene	ug/l	20			<1	<1	<1	<1	<1	<1	
p/m-Xylene	ug/l	30			<1	<1	<1	10	<1	<1	
Bromoform	ug/l				<1	<1	<1	<1	<1	<1	
Styrene	ug/l	50			<1	<1	<1	<1	<1	<1	
1.1.2.2-Tetrachloroethane	ug/l				<1	<1	<1	<1	<1	<1	
o-Xylene	ug/l	30			<1	<1	<1	<1	<1	<1	
1.2.3-Trichloropropane	ug/l				<1	<1	<1	<1	<1	<1	
Isopropylbenzene	ug/l				<1	<1	<1	<1	<1	<1	
Bromobenzene	ug/l				<1	<1	<1	<1	<1	<1	
2-Chlorotoluene	ug/l				<1	<1	<1	<1	<1	<1	
Propylbenzene	ug/l				<1	<1	<1	<1	<1	<1	
4-Chlorotoluene	ug/l				<1	<1	<1	<1	<1	<1	
1.2.4-Trimethylbenzene	ug/l				<1	<1	<1	<1	<1	<1	
4-Isopropyltoluene	ug/l				<1	<1	<1	<1	<1	<1	
1,3,5-Trichlorobenzene	ug/l										
1.3.5-Trimethylbenzene	ug/l				<1	<1	<1	<1	<1	<1	
1.2-Dichlorobenzene	ug/l	20			<1	<1	<1	<1	<1	<1	

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		BH509	BH509	BH509	BH509	BH509	BHM4CAN033	BHM4CAN033	BHM4CAN033
Round				nd 1	Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				EW	EW	EW	EW	EW	W	W	W
Sample Received Date											
Sampled Date				/2015	11/03/2015		18/03/2015		06/05/2016	19/05/2016	02/06/2016
Depth				1.95	4.47	5.09	4.20	4.52	0.92	1.23	1.33
Response Zone (RZ) Details				TFD	TFD	TFD	TFD	TFD	MMG	MMG	MMG
Installation Details				Deep	Shallow	Deep	Deep	Shallow	Single	Single	Single
Location											
Diethyl phthalate	ug/l	200							<1	<8	<1
Dimethyl phthalate	ug/l	800							<1	<8	<1
Other Semi-Volatiles											
1,2-Dichlorobenzene	ug/l	20							<1	<8	<1
1,2,4-Trichlorobenzene	ug/l	0.4							<1	<8	<1
1,3-Dichlorobenzene	ug/l	20							<1	<8	<1
1,4-Dichlorobenzene	ug/l	20							<1	<8	<1
2-Nitroaniline	ug/l								<1	<8	<1
2,4-Dinitrotoluene	ug/l								<1	<8	<1
2,6-Dinitrotoluene	ug/l								<1	<8	<1
3-Nitroaniline	ug/l								<1	<8	<1
4-Bromophenylphenylether	ug/l								<1	<8	<1
4-Chloroaniline	ug/l								<1	<8	<1
4-Chlorophenylphenylether	ug/l								<1	<8	<1
4-Nitroaniline	ug/l								<1	<8	<1
Azobenzene	ug/l								<1	<8	<1
Bis(2-chloroethoxy)methane	ug/l								<1	<8	<1
Bis(2-chloroethyl)ether	ug/l								<1	<8	<1
Carbazole	ug/l								<1	<8	<1
Dibenzofuran	ug/l								<1	<8	<1
Hexachlorobenzene	ug/l	0.05							<1	<8	<1
Hexachlorobutadiene	ug/l	0.6							<1	<8	<1
Hexachlorocyclopentadiene	ug/l								<1	<8	<1
Hexachloroethane	ug/l								<1	<8	<1
Isophorone	ug/l								<1	<8	<1
N-nitrosodi-n-propylamine	ug/l								<1	<8	<1
Nitrobenzene	ug/l								<1	<8	<1
VOCs											
Dichlorodifluoromethane	ug/l								<1	<1	<1
Chloromethane	ug/l								<1	<1	<1
Vinyl Chloride	ug/l	0	0.5						<1	<1	<1
Bromomethane	ug/l								<1	<1	<1
Chloroethane	ug/l								<1	<1	<1
Trichlorofluoromethane	ug/l								<1	<1	<1
trans-1-2-Dichloroethene	ug/l								<1	<1	<1
Dichloromethane	ug/l	20							<1	<1	<1
Carbon Disulphide	ug/l								<1	<1	<1
1.1-Dichloroethene	ug/l								<1	<1	<1
1.1-Dichloroethane	ug/l								<1	<1	<1
Methyl Tertiary Butyl Ether	ug/l								<1	<1	<1
cis-1-2-Dichloroethene	ug/l								<1	<1	<1
Bromochloromethane	ug/l		100						<1	<1	<1
Chloroform	ug/l	2.5	100						<1	<1	<1
2.2-Dichloropropane	ug/l								<1	<1	<1
1.2-Dichloroethane	ug/l	10	3						<1	<1	<1
1.1.1-Trichloroethane	ug/l	100							<1	<1	<1
1.1-Dichloropropene	ug/l								<1	<1	<1
Benzene	ug/l	10	1						<1	<1	<1
Carbontetrachloride	ug/l	12	3						<1	<1	<1
Dibromomethane	ug/l								<1	<1	<1
1.2-Dichloropropane	ug/l								<1	<1	<1
Bromodichloromethane	ug/l								<1	<1	<1
Trichloroethene	ug/l	10	10						<1	<1	<1
cis-1-3-Dichloropropene	ug/l								<1	<1	<1
trans-1-3-Dichloropropene	ug/l								<1	<1	<1
1.1.2-Trichloroethane	ug/l	400							<1	<1	<1
Toluene	ug/l	50							<1	<1	<1
1.3-Dichloropropane	ug/l								<1	<1	<1
Dibromochloromethane	ug/l		100						<1	<1	<1
1.2-Dibromoethane	ug/l								<1	<1	<1
Tetrachloroethene	ug/l	10	10						<1	<1	<1
1.1.1.2-Tetrachloroethane	ug/l								<1	<1	<1
Chlorobenzene	ug/l								<1	<1	<1
Ethylbenzene	ug/l	20							<1	<1	<1
p/m-Xylene	ug/l	30							<1	<1	<1
Bromoform	ug/l								<1	<1	<1
Styrene	ug/l	50							<1	<1	<1
1.1.2.2-Tetrachloroethane	ug/l								<1	<1	<1
o-Xylene	ug/l	30							<1	<1	<1
1.2.3-Trichloropropane	ug/l								<1	<1	<1
Isopropylbenzene	ug/l								<1	<1	<1
Bromobenzene	ug/l								<1	<1	<1
2-Chlorotoluene	ug/l								<1	<1	<1
Propylbenzene	ug/l								<1	<1	<1
4-Chlorotoluene	ug/l								<1	<1	<1
1.2.4-Trimethylbenzene	ug/l								<1	<1	<1
4-Isopropyltoluene	ug/l								<1	<1	<1
1,3,5-Trichlorobenzene	ug/l								<1	<1	<1
1.3.5-Trimethylbenzene	ug/l								<1	<1	<1
1.2-Dichlorobenzene	ug/l	20							<1	<1	<1

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH006	RBBH006	RBBH006	RBBH007	RBBH007	RBBH007	RBBH007
Round				2002 Round 1	2002 Round 2	2002 Round 3	2002 Round 1	2002 Round 2	2002 Round 3	2004
Sample Type				W	W	W	W	W	W	W
Sample Received Date										
Sampled Date										11/06/2004
Depth										
Response Zone (RZ) Details		EQS	DWS	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location										
1.4-Dichlorobenzene	ug/l	20								
sec-Butylbenzene	ug/l									
tert-Butylbenzene	ug/l									
1.3-Dichlorobenzene	ug/l	20								
n-Butylbenzene	ug/l									
1.2-Dibromo-3-chloropropane	ug/l									
1.2.4-Trichlorobenzene	ug/l	0.4								
Naphthalene	ug/l	2								
1.2.3-Trichlorobenzene	ug/l	0.4								
Hexachlorobutadiene	ug/l	0.6								
tert-Amyl methyl ether	ug/l									

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH07	RBBH07	RBBH008	RBBH008	RBBH008	RBBH008	RBBH009
Round				2008 Round 1	2008 Round 2	2002 Round 1	2002 Round 2	2002 Round 3	2004	2002 Round 1
Sample Type				W	W	W	W	W	W	W
Sample Received Date				29/02/2008	20/03/2008					
Sampled Date				27/02/2008	19/03/2008				11/06/2004	
Depth		EQS	DWS							
Response Zone (RZ) Details				MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location				UPSTREAM OF CORUS REEDBED						
1.4-Dichlorobenzene	ug/l	20		<1	<1	<1				
sec-Butylbenzene	ug/l			<1	<1	1				
tert-Butylbenzene	ug/l			<1	<1	<1				
1.3-Dichlorobenzene	ug/l	20		<1	<1	<1				
n-Butylbenzene	ug/l			<1	<1	<1				
1.2-Dibromo-3-chloropropane	ug/l			<1	<1	<5				
1.2.4-Trichlorobenzene	ug/l	0.4		<1	<1	<5				
Naphthalene	ug/l	2		26	35	24				
1.2.3-Trichlorobenzene	ug/l	0.4		<1	<1	<5				
Hexachlorobutadiene	ug/l	0.6		<1	<1	<5				
tert-Amyl methyl ether	ug/l									

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH009	RBBH009	RBBH09	RBBH09	RBBH010	RBBH010	RBBH010
Round				2002 Round 2	2002 Round 3	2008 Round 1	2008 Round 2	2002 Round 1	2002 Round 2	2002 Round 3
Sample Type				W	W	W	W	W	W	W
Sample Received Date						29/02/2008	20/03/2008			
Sampled Date						27/02/2008	19/03/2008			
Depth										
Response Zone (RZ) Details				MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)	MG/TFD (peat)
Installation Details				Single	Single	Single	Single	Single	Single	Single
Location										
1.4-Dichlorobenzene	ug/l	20				<1	<1	<1		
sec-Butylbenzene	ug/l					<1	<1	<1		
tert-Butylbenzene	ug/l					<1	<1	<1		
1.3-Dichlorobenzene	ug/l	20				<1	<1	<1		
n-Butylbenzene	ug/l					<1	<1	<1		
1.2-Dibromo-3-chloropropane	ug/l					<1	<1	<5		
1.2.4-Trichlorobenzene	ug/l	0.4				**<1**	**<1**	**<5**		
Naphthalene	ug/l	2				<1	<1	**<5**		
1.2.3-Trichlorobenzene	ug/l	0.4				**<1**	**<1**	**<5**		
Hexachlorobutadiene	ug/l	0.6				**<1**	**<1**	**<5**		
tert-Amyl methyl ether	ug/l									

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Geological Formation Legend

MG	Made Ground
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MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		RBBH10	RBBH10	RBBH10	SWSJ08	SWSJ08	SBHJ01	SBHJ01	BH509
Round					2008 Round 1	2008 Round 2	2008 Round 1	2008 Round 2	2008 Round 1	2008 Round 2	Rou
Sample Type					W	W	W	W	W	W	EW
Sample Received Date					29/02/2008	20/03/2008	21/02/2008	20/03/2008	21/02/2008	20/03/2008	
Sampled Date				11/06/2004	27/02/2008	19/03/2008	21/02/2008	19/03/2008	21/02/2008	19/03/2008	04/03
Depth							0.37	3.3	5.98	7.5	0.74
Response Zone (RZ) Details					MG/TFD (peat)	MG/TFD (peat)	MG/TFD	MG/TFD	TFD/ (Peat)	TFD/ (Peat)	TFD
Installation Details				Single	Single	Single	Single	Single	Single	Single	Shallow
Location											
1.4-Dichlorobenzene	ug/l	20			<1	<1	<1	<1	<1	<1	
sec-Butylbenzene	ug/l				<1	<1	<1	<1	<1	<1	
tert-Butylbenzene	ug/l				<1	<1	<1	<1	<1	<1	
1.3-Dichlorobenzene	ug/l	20			<1	<1	<1	<1	<1	<1	
n-Butylbenzene	ug/l				<1	<1	<1	<1	<1	<1	
1.2-Dibromo-3-chloropropane	ug/l				<1	<1	<1	<1	<1	<1	
1.2.4-Trichlorobenzene	ug/l	0.4			**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
Naphthalene	ug/l	2			<1	<1	<1	<1	<1	<1	
1.2.3-Trichlorobenzene	ug/l	0.4			**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
Hexachlorobutadiene	ug/l	0.6			**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	
tert-Amyl methyl ether	ug/l										

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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits
MMG	Mercia Mudstone Group

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nic
^Unionised ammonia = total ammonia/(1+10^10.055-(0.03)

Sample Reference	Units	Screening Criteria		BH509	BH509	BH509	BH509	BH509	BHM4CAN033	BHM4CAN033	BHM4CAN033
Round				nd 1	Round 2		Round 3		Round 1	Round 2	Round 3
Sample Type				EW	EW	EW	EW	EW	W	W	W
Sample Received Date											
Sampled Date				/2015	11/03/2015		18/03/2015		06/05/2016	19/05/2016	02/06/2016
Depth				1.95	4.47	5.09	4.20	4.52	0.92	1.23	1.33
Response Zone (RZ) Details				TFD	TFD	TFD	TFD	TFD	MMG	MMG	MMG
Installation Details				Deep	Shallow	Deep	Deep	Shallow	Single	Single	Single
Location											
1.4-Dichlorobenzene	ug/l	20							<1	<1	<1
sec-Butylbenzene	ug/l								<1	<1	<1
tert-Butylbenzene	ug/l								<1	<1	<1
1.3-Dichlorobenzene	ug/l	20							<1	<1	<1
n-Butylbenzene	ug/l								<1	<1	<1
1.2-Dibromo-3-chloropropane	ug/l								<1	<1	<1
1.2.4-Trichlorobenzene	ug/l	0.4							<1	<1	<1
Naphthalene	ug/l	2							<1	<1	<1
1.2.3-Trichlorobenzene	ug/l	0.4							<1	<1	<1
Hexachlorobutadiene	ug/l	0.6							<1	<1	<1
tert-Amyl methyl ether	ug/l								<1	<1	<1

Appendix 5

Surface Water Laboratory Data

ANCAN
Surface Water Sample Analysis & Screening Assessment
FLOR
15/09/2015

Screening Values and Assessment

EQS	Environmental Quality Standards
MRV	Minimum Reporting values
	Exceeds EQS
100	Exceeds DWS
CCW	Laboratory
BOLDITA	Exceeds CCW

Notes
EQS calcium carbonate 100-150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
NDP - No determination possible

Monitoring Round / Location		Screening Criteria			E1 / R10	E2 / R10	E3 / R10	E4 / R10	E1 / R11	E2 / R11	E3 / R11	E4 / R11	E1 / R12	E2 / R12	E3 / R12	E4 / R12	1 / SW501	2 / SW501	3 / SW501	1 / SW502	2 / SW502	3 / SW502	1 / SW503	2 / SW503	3 / SW503	1 / SW504	2 / SW504	3 / SW504	Q1 / 14.3	Q2 / 15.3	1 / EL exam1	2 / EL exam1	3 / EL exam1	4 / EL exam1	1 / MD5WN	2 / MD5WN	3 / MD5WN	4 / MD5WN	1 / MD5WS	2 / MD5WS	3 / MD5WS	4 / MD5WS
Date Sampled	**Units**	**EQS**	**DWS**	**CCW**	**11/12/2007**	**18/03/2008**	**24/09/2008**	**24/09/2008**	**11/12/2007**	**18/03/2008**	**24/09/2008**	**24/09/2008**	**11/12/2007**	**17/03/2008**	**24/09/2008**	**24/09/2008**	**01/04/2015**	**15/04/2015**	**22/04/2015**	**01/04/2015**	**15/04/2015**	**22/04/2015**	**01/04/2015**	**15/04/2015**	**22/04/2015**	**01/04/2015**	**15/04/2015**	**22/04/2015**	**01/09/2015**	**03/09/2015**	**15/06/2004**	**20/09/2004**	**06/05/2005**	**18/04/2002**	**18/04/2002**	**15/08/2004**	**06/05/2005**	**18/04/2002**	**18/04/2002**	**15/06/2004**	**06/05/2005**
Metals & Non-Metal Inorganics																																									
Hardness Total	mg/l				250	266	242	480	224	338	314	447	206	203	270	208													149		143		151	116							
Total Alkalinity	mg/l																												149	143			151	116							
Bicarbonate Alkalinity as CaCO3	mg/l																												149	143			151	116							
Boron Dissolved	ug/l	50	10														5.5	4.2	6.9	4.2	3.4	2	1.4	1.6	<1	1.8	<1	<1	1.88	1.37	<1	1	1	2	149	143	<1	<1	<50	<50	<50	<50	<50	<50
Boron Dissolved	ug/l	2000	1000														990	76	74	1200	1400	140	1100	910	69	970	990	24	64.6	49.9	60	<50	<50	<50	1300	24	<50	<50	<50	<50	<50	<50	<50
Calcium Dissolved	ug/l			100000	76	82	4.2	101	67	101	5.5	110	68	62	3.5	61													53.7	49.6												
Sulfate Dissolved	ug/l		250																										21000	21000												
Potassium Dissolved	ug/l																												2260	1320												
Lithium Dissolved	ug/l	0.15	5	5													0.13	<0.08	1.6	0.098	<0.08	<0.08	0.2	<0.08	<0.08	0.16	<0.08	<0.08	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium Dissolved	ug/l		50														13	1.1	<1	15	2.5	<1	16	1.6	<1	18	<1	<1	2.6	1.41	<1	<1	<1	<1	12	<1	<1	<1	<1	<1	<1	<1	11
Copper Dissolved	ug/l	10	2000		23	<0.85	9	<0.85	12	<0.85	10	<0.85	14	<0.85	11	<0.85	2.4	<0.85	2.1	3.3	1.5	1.7	1.5	<0.85	<0.85	1.8	<0.85	<0.85	<0.85	<0.85	<0.85	<1	<1	<1	<1	2	<1	<1	<1	8	<1	<1	2
Lead Dissolved	ug/l	1.2	10	250	17	<0.02	8	<0.02	10	<0.02	6	<0.02	9	<0.02	<0.02	<0.02	<0.02												<0.02	0.081	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium Dissolved	ug/l				15	14	1.1	15	11	13	1.5	16	13	16	1.1	16													15.3	15.3												
Nickel Dissolved	ug/l	4	20	100	10	<1	<1	<1	<1	<1	7	<1	<1	<1	15	<1													1.7	1.17	2	<1	2	1	<1	<1	<1	<1	10	<1	<1	<1
Selenium Dissolved	ug/l		10														<1	1.6	4.5	2.2	3.1	2.3	1.9	1.6	1.8	<1	<1	<1	0.68	0.829	<1	<1	<1	<1	<1	<1	<1	<1	8	<1	<1	<1
Zinc Dissolved	ug/l	75		1000																									7	9	10	10	7	<2	9	10	9	<2	11	30	9	<2
Manganese Dissolved	ug/l	123	50																										110	110	<3	9	10	9	<3	9	10	9	<3	7	9	<3
Iron Dissolved	ug/l	1000	200																										<100	140	<100	<100	<100	<100	100	<100	<100	<100	100	<100	<100	<100
Mercury Dissolved	ug/l	0.07	1																										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum Dissolved	ug/l																												2	<1												
Cadmium Total	ug/l	0.15	5	5	0.3	<0.5	0.5	0.5	0.3	0.7	0.6	0.8	0.5	0.6	<0.5	<0.5	<0.5																									
Zinc Total	ug/l	75		1000	10	20	14	110	11	30	50	150	41	15	42	7																									
COD	mg/l																												<5	<5					<5	<5					
BOD	mg/l	5		10	21	2	4	17	7	12	27	33	6	<1	3	<1													<1	<1					<2.0						
TOC	mg/l																												4.5	<2.0					5	<2.0					
Nitrate as N	mg/l		50	1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	2.4	2.1	0.7	3.1													1.6	3.3					1.8	4.2					
Nitrate as NO3	mg/l		50	1	1.3	<0.3	<0.3	<0.3	<0.3	<0.3	1.2	<0.3	10.6	9.3	3.1	13.733													<0.03	0.72												
Nitrite as N	mg/l		0.5137783	1	<0.1	0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1													<0.05	<0.05												
Nitrite as NO2	mg/l		0.5	1																									<0.05	<0.05												
Nitrogen, Total Oxidised as N	mg/l		50	2	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	2.4	2.1	0.9	3.2													<0.03	0.72												
Phosphate, Ortho as P	mg/l		0.2	<0.1	<0.1	<0.1	0.1	0.2	<0.1	2.4	1.8	<0.1	<0.1	<0.1	<0.1	<0.1													0.07	0.24	0.14	0.71	0.5	0.1	0.11	0.08	0.5	0.1	0.1	0.1	0.1	0.05		
Sulphate (soluble)	mg/l	120																											245	92.5												
Sulphate (soluble)	mg/l	400	250	300																									11.8	23.5												
Sulphate as SO4	mg/l	400	250	300	12	16	<5	<5	9	10	<5	9	21	21	25	21													25.6	21.6	5.35	225	12	28.5	27.8	26.9	26.7	25	27.1	26		
Toluene Extractable Material	mg/l																												<6	<6	<6	<6	<6	<5	<5	<5	<5	<5	<5	<6		
Chloride	mg/l	250	250	300	35	62	17	28	21	17	23	21	17	14	22	16													31.3	24.6	49	23	28	33	19	26	21	23		21	23		
Fluoride	mg/l	5000	1500																																4.4	1.6						
Sulphide	mg/l																																								
Ammoniacal Nitrogen as N	mg/l	0.6		1	0.49	0.43	0.22	1.04	0.26	0.23	0.22	0.92	<0.2	0.05	<0.2	<0.2	0.17	0.7	0.48	0.066	0.11	0.12	0.52	0.034	0.041	0.078	0.13	0.06	0.266	0.237	0.3	0.5	0.17	2.1	0.2	0.2	0.1	<0.03	0.2	0.1	0.06	0.02
Cyanide Total	mg/l	0.001	0.05																										<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Cyanide Free	mg/l																<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05														
Thiocyanate as SCN	mg/l																												0.1	<0.1	0.2	0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.2	0.1		
Dissolved Oxygen	mg/l				0	4.56	1.87	1.01	6.6	5.67	0.47	3.23	7.65	12.72	0.93	7.9													7.41	14												
Dissolved Oxygen (Saturation)	mg/l	60			0	37.5	17.5	10.2	46.6	47.3	4.9	31	65.5	109.9	6.6	73.5																										
pH	pH Units	6.5	6.5-10	6.8-8.5	7.3	7	7.1	7.1	7.3	7.4	7.1	7	7.5	8	7.8	7.8	8.6	7.7	8	8.5	8.3	8.1	8.7	8.5	9	8.6	8.6	8.6	8.3			7.4	7.6	7	7.4	7.5	8	7.7	7.8	7.6	8.1		
Conductivity	us/cm																												725	690	564	522	639	639	687	479	642	395	683	682		
Organics																																									
GRO (C5-C12)	ug/l																												<50	<50												
MTBE	ug/l																<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3												
Benzene	ug/l	10	1														<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7												
Toluene	ug/l	50															<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4												
Ethyl benzene	ug/l	20															<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5												
m & p Xylene	ug/l	30															<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8												
o Xylene	ug/l	30															<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3												
TPH																																									
Aliphatics C5-C6	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C6-C8	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C8-C10	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C10-C12	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C12-C16 Aqueous	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C16-C21 Aqueous	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C21-C35 Aqueous	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Total Aliphatics C12-C35 Aqueous	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aromatics >C5-C7	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aromatics >C7-C8	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aromatics >C8-EC10	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aromatics >EC10-EC12	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aromatics >EC12-EC16 Aqueous	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aromatics >EC16-EC21 Aqueous	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aromatics >EC21-EC35 Aqueous	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Total Aromatics C12-C35 Aqueous	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Total Aliphatic TPH	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
TPH >C5-C6	ug/l		<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80																								
TPH >C6-C8	ug/l		<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80																								
TPH >C8-C10	ug/l		<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80																								
TPH >C10-C24	ug/l		43	<80	<80	<80	<80	<80	115	136	<80	<80	<80	<80	<80	<80	<80																								
TPH >C24-C40	ug/l		255	<200	<200	<200	52	220	206	284	159	<200	<200	<200	<200	<200	<200																								
TPH >C5-C40	ug/l		298	<200	<200	<200	52	220	320	410	159	<200	<200	<200	<200	<200	<200																								
Total petroleum hydrocarbons	ug/l																<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Phenols																																									
2-Chlorophenol	ug/l	50															<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
2- Methyl-4,6-Dinitrophenol	ug/l																<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
2-Methylphenol	ug/l	100															<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
2-Nitrophenol	ug/l																<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
2,4-Dichlorophenol	ug/l	20															<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
2,4-Dimethylphenol	ug/l																<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
2,4,5-Trichlorophenol	ug/l																<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
2,4,6-Trichlorophenol	ug/l																<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
2-Chloro-3-methylphenol	ug/l	40															<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
3-Methylphenol	ug/l	600															<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
Pentachlorophenol	ug/l	0.4															<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
Phenol	ug/l	7.7															<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
Phenols	ug/l	#N/A															<0.03	0.28	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03												
Phenol Index	mg/l																												<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
PAHs																																									
2-Chloronaphthalene	ug/l																<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
2-Methylnaphthalene	ug/l																<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
Acenaphthene	ug/l																<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015														
Acenaphthylene	ug/l																<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
Anthracene	ug/l	0.1															<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015														
Benzo(a)anthracene	ug/l																<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017														
Benzo(a)pyrene	ug/l	0.00017	0.01														<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Benzo(b)fluoranthene	ug/l	0.017	0.1														<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Benzo(k)fluoranthene	ug/l	0.017	0.1														<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Benzo(ghi)perylene	ug/l	0.0082	0.1														<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Benzo(j,k,)-fluorene	ug/l		0.1														<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Chrysene	ug/l																<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Dibenz(a,h)anthracene	ug/l																<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Fluoranthene	ug/l	0.0063															<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Fluorene	ug/l																<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Naphthalene	ug/l	2															<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Phenanthrene	ug/l																<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Pyrene	ug/l																<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
Total PAHs (USEPA 16)	ug/l																<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1														
VOCs																																									
1,1,1,2-Tetrachloroethane	ug/l																<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2														
1,1,1-Trichloroethane	ug/l	100															<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1														
1,1,2-Trichloroethane	ug/l	400															<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10														
1,1-Dichloroethane	ug/l																<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3														
1,1-Dichloroethene	ug/l																<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3														
1,1-Dichloropropene	ug/l																<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3														
1,2,3-Trichlorobenzene	ug/l	0.4															<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2														
1,2,3-Trichloropropane	ug/l																<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50														
1,2,4-Trichlorobenzene	ug/l	0.4															<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5														
1,2,4-Trimethylbenzene	ug/l																<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3														
1,2-Dibromo-3-Chloropropane	ug/l																<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50														
1,2-Dibromoethane	ug/l																<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5														
1,2-Dichlorobenzene	ug/l	20															<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5														
1,2-Dichloroethane	ug/l	10	3														<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3														
1,2-Dichloropropane	ug/l																<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3														
1,3,5-Trimethylbenzene	ug/l																<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3														
1,3-Dichloropropane	ug/l				

Appendix 6

Soil Leachate Laboratory Data

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Metal Recovery Area
21/06/2016

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria	
Specimen Depth (m)			
OD Level (m)			
Sample Type			
Geology Code			
Cluster Code		EQS	DWS
2:1 Results			
Arsenic Dissolved	ug/l	50	10
Boron Dissolved	ug/l	2000	1000
Barium Dissolved	ug/l		
Beryllium Dissolved	ug/l		
Cadmium Dissolved	ug/l	0.15	5
Chromium Dissolved	ug/l		50
Chromium III Dissolved	ug/l	4.7	
Chromium VI Dissolved	ug/l	3.4	
Copper Dissolved	ug/l	10	2000
Iron Dissolved	ug/l	1000	200
Mercury as Hg Dissolved	ug/l	0.07	1
Molybdenum Dissolved	ug/l		
Nickel Dissolved	ug/l	4	20
Lead Dissolved	ug/l	1.2	10
Antimony Dissolved	ug/l		5
Selenium Dissolved	ug/l		10
Vanadium Dissolved	ug/l		
Zinc Dissolved	ug/l	75	
Ammoniacal Nitrogen as N	mg/l	0.6	
Conductivity uS/m @ 25c	uS/cm		
pH	pH units	6-9	6.5-10
Chloride as Cl	mg/l	250	250
Total Sulphur as S04 Dissolved	mg/l		
Thiocyanate as SCN	mg/l		
Phosphate as P	mg/l		
Total Cyanide	mg/l	0.001	0.05
Cyanide Free	mg/l		
Phenols			
Phenols	mg/l	0.0077	
Phenols Monohydric	mg/l		
Xylenols	mg/l		
Cresols	mg/l		
BTEX			
GRO (C5-C12)	ug/l		
Benzene	ug/l	10	1
Toluene	ug/l	50	
Ethylbenzene	ug/l	20	
m,p xylenes	ug/l	30	
O-Xylene	ug/l	30	
MTBE	ug/l		
Sum of detected BTEX	ug/l		
Sum of detected Xylene	ug/l		
TPH			
Aliphatics >C5-C6	ug/l		
Aliphatics >C6-C8	ug/l		
Aliphatics >C8-C10	ug/l		
Aliphatics >C10-C12	ug/l		
Aliphatics >C12-C16	ug/l		
Aliphatics >C16-C21	ug/l		
Aliphatics >C21-C35	ug/l		
Aliphatics >C35-44	ug/l		
Aromatics >C5-C7	ug/l		
Aromatics >C7-C8	ug/l		
Aromatics >C8-C10	ug/l		
Aromatics >C10-C12	ug/l		
Aromatics >C12-C16	ug/l		
Aromatics >C16-C21	ug/l		
Aromatics >C21-C35	ug/l		
Aromatics >C35-44	ug/l		
Total Aliphatic TPH	ug/l		
Total Aromatic TPH	ug/l		
TPH (Aliphatics and Aromatics C5-C35	ug/l		
Total petroleum hydrocarbons	ug/l		
PAH			
Acenaphthene	ug/l		
Acenaphthylene	ug/l		
Anthracene	ug/l	0.1	
Benzo(a)anthracene	ug/l		
Benzo(a)pyrene	ug/l	0.00017	0.01
Benzo(b)fluoranthene	ug/l	0.017	0.1
Benzo(ghi)perylene	ug/l	0.0082	0.1
Benzo(k)fluoranthene	ug/l	0.017	0.1
Chrysene	ug/l		
Dibenzo(ah)anthracene	ug/l		
Fluoranthene	ug/l	0.0063	
Fluorene	ug/l		
Indeno(123cd)pyrene	ug/l	N/A	0.1
Naphthalene	ug/l	2	
Phenanthrene	ug/l		
Pyrene	ug/l		
PAH 16 Total	ug/l		
PCBs			
Pcb-105 2,3,3',4,4'-Pentachlorobipher	ug/l	0	0
Pcb-114 2,3,4,4',5-Pentachlorobiphen	ug/l	0	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphe	ug/l	0	0
Pcb-123 2,3',4,4',5'-Pentachlorobiphe	ug/l	0	0
Pcb-126 3,3',4,4',5-Pentachlorobipher	ug/l	0	0
Pcb-156 2,3,3',4,4',5-Hexachlorobiphe	ug/l	0	0
Pcb-157 2,3,3',4,4',5'-Hexachlorobiph	ug/l	0	0
Pcb-167 2,3',4,4',5,5'-Hexachlorobiph	ug/l	0	0
Pcb-169 3,3',4,4',5,5'-Hexachlorobiph	ug/l	0	0
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobi	ug/l	0	0

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
11	6	8.2	0.145	BH512 @ 3.5 - 3.7mbGL	0	0
7	3	90	60	CATP010 @ 3.5mbGL	0	0
4	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD			
9	0	None > LOD	None > LOD		0	0
11	10	17	0.1	MRTP003 @ 0.5mbGL		0
2	0	None > LOD	None > LOD		0	
3	0	None > LOD	None > LOD		0	
11	10	10	1.2	MRTP002 @ 0.5mbGL	0	0
7	4	220	10	CATP010 @ 3.5mbGL	0	1
11	0	None > LOD	None > LOD		0	0
4	0	None > LOD	None > LOD			
11	10	9.02	1	TPM4CAN016 @ 2mbGL	4	0
11	7	5.84	0.879	TPM4CAN016 @ 2mbGL	6	0
4	1	4	4	MRTP002 @ 0.5mbGL		0
11	9	46	0.532	MRTP002 @ 0.5mbGL		1
9	5	19.8	0.242	BHM4CAN037 @ 2.2mbGL		
11	11	46	0.654	MRTP002 @ 0.5mbGL	0	
5	5	1.1	0.2	CATP010 @ 3.5mbGL	1	
5	5	8000	135	MRTP002 @ 0.5mbGL		
11	11	12.9	8.8	MRTP002 @ 0.5mbGL	9	8
5	2	8	2	CATP010 @ 3.5mbGL	0	0
5	5	57	11.7	CATP008 @ 1mbGL		
5	1	0.2	0.2	MRTP003 @ 0.5mbGL		
5	3	0.3	0.1	MRTP003 @ 3.5mbGL		
6	0	None > LOD	None > LOD		0	0
4	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD		0	
3	0	None > LOD	None > LOD			0
3	0	None > LOD	None > LOD			0
3	0	None > LOD	None > LOD			0
5	1	54	54	BHM4CAN039 @ 1.2mbGL		
6	0	None > LOD	None > LOD		0	0
6	0	None > LOD	None > LOD		0	
6	0	None > LOD	None > LOD		0	
6	0	None > LOD	None > LOD		0	
6	0	None > LOD	None > LOD		0	
5	0	None > LOD	None > LOD			0
5	0	None > LOD	None > LOD			0
5	0	None > LOD	None > LOD			0
6	0	None > LOD	None > LOD			
6	0	None > LOD	None > LOD			
6	0	None > LOD	None > LOD			
6	1	18	18	BHM4CAN039 @ 1.2mbGL		
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
6	0	None > LOD	None > LOD			
6	0	None > LOD	None > LOD			
6	0	None > LOD	None > LOD			
6	1	12	12	BHM4CAN039 @ 1.2mbGL		
3	1	10	10	BHM4CAN037 @ 2.2mbGL		
6	2	35	18	TPM4CAN017 @ 0.5mbGL		
3	1	12	12	BHM4CAN037 @ 2.2mbGL		
1	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	1	40	40	BHM4CAN037 @ 2.2mbGL		
2	2	54	40	BHM4CAN039 @ 1.2mbGL		
1	0	None > LOD	None > LOD			
6	5	0.147	0.0581	BHM4CAN039 @ 1.2mbGL		
6	2	0.0213	0.0134	BHM4CAN039 @ 1.2mbGL		
6	5	0.117	0.0269	TPM4CAN017 @ 0.5mbGL	2	
6	4	0.0959	0.0188	BHM4CAN037 @ 2.2mbGL		
6	0	None > LOD	None > LOD		0	0
6	4	0.0491	0.0244	TPM4CAN017 @ 0.5mbGL	4	0
6	0	None > LOD	None > LOD		0	0
6	0	None > LOD	None > LOD		0	0
6	5	0.159	0.056	TPM4CAN017 @ 0.5mbGL		
6	0	None > LOD	None > LOD			
6	5	2.63	0.728	TPM4CAN017 @ 0.5mbGL	5	
6	5	0.0654	0.0211	TPM4CAN017 @ 0.5mbGL		
6	0	None > LOD	None > LOD		0	0
6	4	0.595	0.108	TPM4CAN017 @ 0.5mbGL	0	
6	5	8.84	0.976	TPM4CAN017 @ 0.5mbGL		
6	5	1.24	0.53	TPM4CAN017 @ 0.5mbGL		
6	5	13.9	2.94	TPM4CAN017 @ 0.5mbGL		
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Metal Recovery Area
21/06/2016

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria	
Specimen Depth (m)			
OD Level (m)			
Sample Type			
Geology Code			
Cluster Code		EQS	DWS
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	ug/l	0	0
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	ug/l	0	0
SVOCs			
Phenols			
2-Chlorophenol	ug/l	50	
2-Methylphenol	ug/l	100	
2-Nitrophenol	ug/l		
2,4-Dichlorophenol	ug/l	20	
2,4-Dimethylphenol	ug/l		
2,4,5-Trichlorophenol	ug/l		
2,4,6-Trichlorophenol	ug/l		
4-Chloro-3-methylphenol	ug/l	40	
4-Methylphenol	ug/l	100	
4-Nitrophenol	ug/l		
Pentachlorophenol	ug/l	0.4	
Phenol	ug/l	7.7	
PAHs			
2-Chloronaphthalene	ug/l		
2-Methylnaphthalene	ug/l		
Acenaphthene	ug/l		
Acenaphthylene	ug/l		
Anthracene	ug/l	0.1	
Benzo(a)anthracene	ug/l		
Benzo(a)pyrene	ug/l	0.00017	0.01
Benzo(b)fluoranthene	ug/l	0.017	0.1
Benzo(ghi)perylene	ug/l	0.0082	0.1
Benzo(k)fluoranthene	ug/l	0.017	0.1
Chrysene	ug/l		
Dibenzo(a,h)anthracene	ug/l		
Fluoranthene	ug/l	0.0063	
Fluorene	ug/l		
Indeno(1,2,3-cd)pyrene	ug/l		0.1
Naphthalene	ug/l	2	
Phenanthrene	ug/l		
Pyrene	ug/l		
Pthalates			
Bis(2-ethylhexyl) phthalate	ug/l	1.3	
Butylbenzyl phthalate	ug/l	20	
Di-n-butyl phthalate	ug/l	8	
Di-n-Octyl phthalate	ug/l	20	
Diethyl phthalate	ug/l	200	
Dimethyl phthalate	ug/l	800	
Other Semi-Volatiles			
1,2-Dichlorobenzene	ug/l	20	
1,2,4-Trichlorobenzene	ug/l	0.4	
1,3-Dichlorobenzene	ug/l	20	
1,4-Dichlorobenzene	ug/l	20	
2-Nitroaniline	ug/l		
2,4-Dinitrotoluene	ug/l		
2,6-Dinitrotoluene	ug/l		
3-Nitroaniline	ug/l		
4-Bromophenylphenylether	ug/l		
4-Chloroaniline	ug/l		
4-Chlorophenylphenylether	ug/l		
4-Nitroaniline	ug/l		
Azobenzene	ug/l		
Bis(2-chloroethoxy)methane	ug/l		
Bis(2-chloroethyl)ether	ug/l		
Bis(2-chloroisopropyl)ether	ug/l		
Carbazole	ug/l		
Dibenzofuran	ug/l		
Hexachlorobenzene	ug/l	0.05	
Hexachlorobutadiene	ug/l	0.6	
Hexachlorocyclopentadiene	ug/l		
Hexachloroethane	ug/l		
Isophorone	ug/l		
N-nitrosodi-n-propylamine	ug/l		
Nitrobenzene	ug/l		
VOCs			
Methyl Tertiary Butyl Ether	ug/l		
Benzene	ug/l	10	1
Toluene	ug/l	50	
Ethylbenzene	ug/l	20	
p/m-Xylene	ug/l	30	
o-Xylene	ug/l	30	
Naphthalene	ug/l	2	
Hexachlorobutadiene	ug/l	0.6	
1.2.4-Trichlorobenzene	ug/l	0.4	
1.2-Dichlorobenzene	ug/l	20	
1.3-Dichlorobenzene	ug/l	20	
1.4-Dichlorobenzene	ug/l	20	
1.1.1.2-Tetrachloroethane	ug/l		
1.1.1-Trichloroethane	ug/l	100	
1.1.2.2-Tetrachloroethane	ug/l		
1.1.2-Trichloroethane	ug/l	400	
1.1-Dichloropropene	ug/l		
1.1-Dichloroethane	ug/l		
1.1-Dichloroethene	ug/l		
1.2.3-Trichlorobenzene	ug/l	0.4	
1.2.3-Trichloropropane	ug/l		
1.2.4-Trimethylbenzene	ug/l		
1.2-Dibromo-3-chloropropane	ug/l		
1.2-Dichloroethane	ug/l	10	3

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			0
2	0	None > LOD	None > LOD		0	
2	1	1.51	1.51	TPM4CAN016 @ 2mbGL		
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	0

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Metal Recovery Area
21/06/2016

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria	
Specimen Depth (m)			
OD Level (m)			
Sample Type			
Geology Code			
Cluster Code		EQS	DWS
cis-1-2-Dichloroethene	ug/l		
1.2-Dibromoethane	ug/l		
1.2-Dichloropropane	ug/l		
1.3.5-Trichlorobenzene	ug/l		
1.3.5-Trimethylbenzene	ug/l		
cis-1-3-Dichloropropene	ug/l		
1.3-Dichloropropane	ug/l		
2.2-Dichloropropane	ug/l		
2-Chlorotoluene	ug/l		
4-Chlorotoluene	ug/l		
4-Isopropyltoluene	ug/l		
Bromobenzene	ug/l		
Bromochloromethane	ug/l		100
Bromoform	ug/l		
Bromomethane	ug/l		
Bromodichloromethane	ug/l		
Chlorobenzene	ug/l		
Carbon Disulphide	ug/l		
Chloroethane	ug/l		
Chloroform	ug/l	2.5	100
Chloromethane	ug/l		
Carbontetrachloride	ug/l	12	3
Dibromomethane	ug/l		
Dichlorodifluoromethane	ug/l		
Dibromochloromethane	ug/l		100
Dichloromethane	ug/l	20	
Isopropylbenzene	ug/l		
n-Butylbenzene	ug/l		
Propylbenzene	ug/l		
sec-Butylbenzene	ug/l		
Styrene	ug/l	50	
Tert-amyl methyl ether	ug/l		
trans-1-2-Dichloroethene	ug/l		
trans-1-3-Dichloropropene	ug/l		
Trichlorofluoromethane	ug/l		
tert-Butylbenzene	ug/l		
Tetrachloroethene	ug/l	10	10
Trichloroethene	ug/l	10	10
Vinyl Chloride	ug/l	0	0.5

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			0
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			0
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			0
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	0

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Metal Recovery Area
21/06/2016

Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria		CATP008	MRTP002	MRTP003	BH512	MRTP003	CATP010	BHM4CAN037	BHM4CAN039	TPM4CAN016	TPM4CAN017	WSM4CAN023
Specimen Depth (m)				1	0.5	0.5	3.5 - 3.7	3.5	3.5	2.2	1.2	2	0.5	1.5
OD Level (m)							3			4.57	5.99	4.89	6.22	5.2
Sample Type							ES			ES	ES	ES	ES	ES
Geology Code		EQS	DWS	MG	MG	MG	MG	TFD	TFD	MG	MG	MG	MG	MG
Cluster Code				2002	2002	2002	2015 GI	2002	2002	2016 GI	2016 GI	2016 GI	2016 GI	2016 GI
2:1 Results														
Arsenic Dissolved	ug/l	50	10	<1	<1	<1	8.2	8	2	<0.12	0.236	<0.12	0.598	0.145
Boron Dissolved	ug/l	2000	1000	<50	60	<50	60	<50	90			<9.4		
Barium Dissolved	ug/l													
Beryllium Dissolved	ug/l													
Cadmium Dissolved	ug/l	0.15	5		<0.1	<0.1	<0.08	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Chromium Dissolved	ug/l		50	<1	1	17	6.1	0.1	1	0.608	3.16	5.95	6.18	5.31
Chromium III Dissolved	ug/l	4.7								<30	<30			
Chromium VI Dissolved	ug/l	3.4								<30	<30			<30
Copper Dissolved	ug/l	10	2000	2	10	3	2.1	4	<1	1.2	4.44	3.23	2.87	1.55
Iron Dissolved	ug/l	1000	200	<10	10	110		180	220	<19	<19			
Mercury as Hg Dissolved	ug/l	0.07	1	<0.1	**<0.1**	**<0.1**	**<0.5**	**<0.1**	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum Dissolved	ug/l													
Nickel Dissolved	ug/l	4	20	1	5	1	1.2	1	<1	2.17	1.85	9.02	5.84	9
Lead Dissolved	ug/l	1.2	10	2	4	<1	<1	<1	<1	0.879	4.86	5.84	2.16	2.4
Antimony Dissolved	ug/l		5		4									
Selenium Dissolved	ug/l		10	1	46	1	4.6	<1	1	0.532	0.609	0.844	1.18	<0.39
Vanadium Dissolved	ug/l									19.8	2.33	0.677	2.04	0.242
Zinc Dissolved	ug/l	75		10	46	20	4	16	18	1.23	15.3	1.34	0.91	0.654
Ammoniacal Nitrogen as N	mg/l	0.6		0.3	0.2	0.2		0.6	1.1					
Conductivity uS/m @ 25c	uS/cm			1460	8000	1740		135	264					
pH	pH units	6-9	6.5-10	12.2	12.9	12.2	9	9.8	8.8	12.3	12	12.2	12	12.4
Chloride as Cl	mg/l	250	250	<2	<2	<2		2	8					
Total Sulphur as S04 Dissolved	mg/l			57	24.5	12.2		11.7	56.2					
Thiocyanate as SCN	mg/l			<0.1	<0.1	0.2		<0/1	<0.1					
Phosphate as P	mg/l			<0.1	0.1	0.1		0.3	<0.1					
Total Cyanide	mg/l	0.001	0.05	<0.05	**<0.05**	**<0.05**	**<0.05**	**<0.05**	<0.05					
Cyanide Free	mg/l						**<0.05**				<0.05	<0.05	<0.05	
Phenols														
Phenols	mg/l	0.0077					<0.03				<0.002	<0.002	<0.002	
Phenols Monohydric	mg/l										<0.016	<0.016	<0.016	
Xylenols	mg/l										<0.008	<0.008	<0.008	
Cresols	mg/l										<0.006	<0.006	<0.006	
BTEX														
GRO (C5-C12)	ug/l									<50	54	<50	<50	<50
Benzene	ug/l	10	1				<1			<7	<7	<7	<7	<7
Toluene	ug/l	50					<1			<4	<4	<4	<4	<4
Ethylbenzene	ug/l	20					<1			<5	<5	<5	<5	<5
m,p xylenes	ug/l	30					<1			<8	<8	<8	<8	<8
O-Xylene	ug/l	30					<1			<3	<3	<3	<3	<3
MTBE	ug/l									<3	<3	<3	<3	<3
Sum of detected BTEX	ug/l									<28	<28	<28	<28	<28
Sum of detected Xylene	ug/l									<11	<11	<11	<11	<11
TPH														
Aliphatics >C5-C6	ug/l						<0.1			<10	<10	<10	<10	<10
Aliphatics >C6-C8	ug/l						<0.1			<10	<10	<10	<10	<10
Aliphatics >C8-C10	ug/l						<0.1			<10	<10	<10	<10	<10
Aliphatics >C10-C12	ug/l						<0.1			<10	18	<10	<10	<10
Aliphatics >C12-C16	ug/l						<0.1			<10	<10			
Aliphatics >C16-C21	ug/l						<0.1			<10	<10			
Aliphatics >C21-C35	ug/l						<0.1			<10	<10			
Aliphatics >C35-44	ug/l						<0.1							
Aromatics >C5-C7	ug/l						<0.1			<10	<10	<10	<10	<10
Aromatics >C7-C8	ug/l						<0.1			<10	<10	<10	<10	<10
Aromatics >C8-C10	ug/l						<0.1			<10	<10	<10	<10	<10
Aromatics >C10-C12	ug/l						<0.1			<10	12	<10	<10	<10
Aromatics >C12-C16	ug/l						<0.1			10	<10			
Aromatics >C16-C21	ug/l						<0.1			18	<10	<10	35	<10
Aromatics >C21-C35	ug/l						<0.1			12	<10			
Aromatics >C35-44	ug/l						<0.1							
Total Aliphatic TPH	ug/l						<5			<10	<10			
Total Aromatic TPH	ug/l						<5			40	<10			
TPH (Aliphatics and Aromatics C5-C35	ug/l									40	54			
Total petroleum hydrocarbons	ug/l						<10							
PAH														
Acenaphthene	ug/l						<0.1			0.0628	0.147	0.0809	0.0979	0.0581
Acenaphthylene	ug/l						<0.1			<0.011	0.0213	<0.011	0.0134	<0.011
Anthracene	ug/l	0.1					<0.1			0.0529	0.105	0.0794	0.117	0.0269
Benzo(a)anthracene	ug/l						<0.1			0.0959	<0.017	0.047	0.0925	0.0188
Benzo(a)pyrene	ug/l	0.00017	0.01				<0.1			<0.009	<0.009	<0.009	<0.009	<0.009
Benzo(b)fluoranthene	ug/l	0.017	0.1				<0.1			0.0317	<0.023	0.0244	0.0491	0.0247
Benzo(ghi)perylene	ug/l	0.0082	0.1				<0.1			<0.016	<0.016	<0.016	<0.016	<0.016
Benzo(k)fluoranthene	ug/l	0.017	0.1				<0.1			<0.027	<0.027	<0.027	<0.027	<0.027
Chrysene	ug/l						<0.1			0.102	0.056	0.0963	0.159	0.125
Dibenzo(ah)anthracene	ug/l						<0.1			<0.016	<0.016	<0.016	<0.016	<0.016
Fluoranthene	ug/l	0.0063					<0.1			1.14	0.728	1.22	2.63	0.973
Fluorene	ug/l						<0.1			0.0281	0.0567	0.0271	0.0654	0.0211
Indeno(123cd)pyrene	ug/l	N/A	0.1				<0.1			<0.014	<0.014	<0.014	<0.014	<0.014
Naphthalene	ug/l	2					<0.1			0.108	0.212	0.174	0.595	<0.1
Phenanthrene	ug/l						<0.1			2.46	1.4	1.91	8.84	0.976
Pyrene	ug/l						<0.1			0.677	0.53	0.825	1.24	0.715
PAH 16 Total	ug/l						<2			4.76	3.26	4.49	13.9	2.94
PCBs														
Pcb-105 2,3,3',4,4'-Pentachlorobipher	ug/l	0	0									<0.015		<0.015
Pcb-114 2,3,4,4',5-Pentachlorobiphen	ug/l	0	0									<0.015		<0.015
Pcb-118 2,3',4,4',5 - Pentachlorobiphe	ug/l	0	0									<0.015		<0.015
Pcb-123 2,3',4,4',5'-Pentachlorobiphe	ug/l	0	0									<0.015		<0.015
Pcb-126 3,3',4,4',5-Pentachlorobipher	ug/l	0	0									<0.015		<0.015
Pcb-156 2,3,3',4,4',5-Hexachlorobiphe	ug/l	0	0									<0.015		<0.015
Pcb-157 2,3,3',4,4',5'-Hexachlorobiph	ug/l	0	0									<0.015		<0.015
Pcb-167 2,3',4,4',5,5'-Hexachlorobiph	ug/l	0	0									<0.015		<0.015
Pcb-169 3,3',4,4',5,5'-Hexachlorobiph	ug/l	0	0									<0.015		<0.015
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobi	ug/l	0	0									<0.015		<0.015
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	ug/l	0	0									<0.015		<0.015
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	ug/l	0	0									<0.015		<0.015
SVOCs														
Phenols														

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CL-26 - Leachate - Metal Recovery Area
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Geological Formation Legend

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Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

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Specimen Depth (m)				1	0.5	0.5	3.5 - 3.7	3.5	3.5	2.2	1.2	2	0.5	1.5
OD Level (m)							3			4.57	5.99	4.89	6.22	5.2
Sample Type							ES			ES	ES	ES	ES	ES
Geology Code		EQS	DWS	MG	MG	MG	MG	TFD	TFD	MG	MG	MG	MG	MG
Cluster Code				2002	2002	2002	2015 GI	2002	2002	2016 GI	2016 GI	2016 GI	2016 GI	2016 GI
2-Chlorophenol	ug/l	50										<1		<1
2-Methylphenol	ug/l	100										<1		<1
2-Nitrophenol	ug/l											<1		<1
2,4-Dichlorophenol	ug/l	20										<1		<1
2,4-Dimethylphenol	ug/l											<1		<1
2,4,5-Trichlorophenol	ug/l											<1		<1
2,4,6-Trichlorophenol	ug/l											<1		<1
4-Chloro-3-methylphenol	ug/l	40										<1		<1
4-Methylphenol	ug/l	100										<1		<1
4-Nitrophenol	ug/l											<1		<1
Pentachlorophenol	ug/l	0.4										<1		<1
Phenol	ug/l	7.7										<1		<1
PAHs														
2-Chloronaphthalene	ug/l											<1		<1
2-Methylnaphthalene	ug/l											<1		<1
Acenaphthene	ug/l											<1		<1
Acenaphthylene	ug/l											<1		<1
Anthracene	ug/l	0.1										<1		<1
Benzo(a)anthracene	ug/l											<1		<1
Benzo(a)pyrene	ug/l	0.00017	0.01									<1		<1
Benzo(b)fluoranthene	ug/l	0.017	0.1									<1		<1
Benzo(ghi)perylene	ug/l	0.0082	0.1									<1		<1
Benzo(k)fluoranthene	ug/l	0.017	0.1									<1		<1
Chrysene	ug/l											<1		<1
Dibenzo(a,h)anthracene	ug/l											<1		<1
Fluoranthene	ug/l	0.0063										<1		<1
Fluorene	ug/l											<1		<1
Indeno(1,2,3-cd)pyrene	ug/l		0.1									<1		<1
Naphthalene	ug/l	2										<1		<1
Phenanthrene	ug/l											1.51		<1
Pyrene	ug/l											<1		<1
Pthalates														
Bis(2-ethylhexyl) phthalate	ug/l	1.3										<2		<2
Butylbenzyl phthalate	ug/l	20										<1		<1
Di-n-butyl phthalate	ug/l	8										<1		<1
Di-n-Octyl phthalate	ug/l	20										<5		<5
Diethyl phthalate	ug/l	200										<1		<1
Dimethyl phthalate	ug/l	800										<1		<1
Other Semi-Volatiles														
1,2-Dichlorobenzene	ug/l	20										<1		<1
1,2,4-Trichlorobenzene	ug/l	0.4										<1		<1
1,3-Dichlorobenzene	ug/l	20										<1		<1
1,4-Dichlorobenzene	ug/l	20										<1		<1
2-Nitroaniline	ug/l											<1		<1
2,4-Dinitrotoluene	ug/l											<1		<1
2,6-Dinitrotoluene	ug/l											<1		<1
3-Nitroaniline	ug/l											<1		<1
4-Bromophenylphenylether	ug/l											<1		<1
4-Chloroaniline	ug/l											<1		<1
4-Chlorophenylphenylether	ug/l											<1		<1
4-Nitroaniline	ug/l											<1		<1
Azobenzene	ug/l											<1		<1
Bis(2-chloroethoxy)methane	ug/l											<1		<1
Bis(2-chloroethyl)ether	ug/l											<1		<1
Bis(2-chloroisopropyl)ether	ug/l											<2		<2
Carbazole	ug/l											<1		<1
Dibenzofuran	ug/l											<1		<1
Hexachlorobenzene	ug/l	0.05										<1		<1
Hexachlorobutadiene	ug/l	0.6										<1		<1
Hexachlorocyclopentadiene	ug/l											<1		<1
Hexachloroethane	ug/l											<1		<1
Isophorone	ug/l											<1		<1
N-nitrosodi-n-propylamine	ug/l											<1		<1
Nitrobenzene	ug/l											<1		<1
VOCs														
Methyl Tertiary Butyl Ether	ug/l											<1		<1
Benzene	ug/l	10	1									<1		<1
Toluene	ug/l	50										<1		<1
Ethylbenzene	ug/l	20										<1		<1
p/m-Xylene	ug/l	30										<1		<1
o-Xylene	ug/l	30										<1		<1
Naphthalene	ug/l	2										<1		<1
Hexachlorobutadiene	ug/l	0.6										<1		<1
1.2.4-Trichlorobenzene	ug/l	0.4										<1		<1
1.2-Dichlorobenzene	ug/l	20										<1		<1
1.3-Dichlorobenzene	ug/l	20										<1		<1
1.4-Dichlorobenzene	ug/l	20										<1		<1
1.1.1.2-Tetrachloroethane	ug/l											<1		<1
1.1.1-Trichloroethane	ug/l	100										<1		<1
1.1.2.2-Tetrachloroethane	ug/l											<1		<1
1.1.2-Trichloroethane	ug/l	400										<1		<1
1.1-Dichloropropene	ug/l											<1		<1
1.1-Dichloroethane	ug/l											<1		<1
1.1-Dichloroethene	ug/l											<1		<1
1.2.3-Trichlorobenzene	ug/l	0.4										<1		<1
1.2.3-Trichloropropane	ug/l											<1		<1
1.2.4-Trimethylbenzene	ug/l											<1		<1
1.2-Dibromo-3-chloropropane	ug/l											<1		<1
1.2-Dichloroethane	ug/l	10	3									<1		<1
cis-1-2-Dichloroethene	ug/l											<1		<1
1.2-Dibromoethane	ug/l											<1		<1
1.2-Dichloropropane	ug/l											<1		<1
1.3.5-Trichlorobenzene	ug/l											<1		<1
1.3.5-Trimethylbenzene	ug/l											<1		<1
cis-1-3-Dichloropropene	ug/l											<1		<1
1.3-Dichloropropane	ug/l											<1		<1
2.2-Dichloropropane	ug/l											<1		<1

M4CAN
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Geological Formation Legend

MG	Made Ground
TFD	Tidal Flat Deposits

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria		CATP008	MRTP002	MRTP003	BH512	MRTP003	CATP010	BHM4CAN037	BHM4CAN039	TPM4CAN016	TPM4CAN017	WSM4CAN023
Specimen Depth (m)				1	0.5	0.5	3.5 - 3.7	3.5	3.5	2.2	1.2	2	0.5	1.5
OD Level (m)							3			4.57	5.99	4.89	6.22	5.2
Sample Type							ES			ES	ES	ES	ES	ES
Geology Code		EQS	DWS	MG	MG	MG	MG	TFD	TFD	MG	MG	MG	MG	MG
Cluster Code				2002	2002	2002	2015 GI	2002	2002	2016 GI	2016 GI	2016 GI	2016 GI	2016 GI
2-Chlorotoluene	ug/l											<1		<1
4-Chlorotoluene	ug/l											<1		<1
4-Isopropyltoluene	ug/l											<1		<1
Bromobenzene	ug/l											<1		<1
Bromochloromethane	ug/l		100									<1		<1
Bromoform	ug/l											<1		<1
Bromomethane	ug/l											<1		<1
Bromodichloromethane	ug/l											<1		<1
Chlorobenzene	ug/l											<1		<1
Carbon Disulphide	ug/l											<1		<1
Chloroethane	ug/l											<1		<1
Chloroform	ug/l	2.5	100									<1		<1
Chloromethane	ug/l											<1		<1
Carbontetrachloride	ug/l	12	3									<1		<1
Dibromomethane	ug/l											<1		<1
Dichlorodifluoromethane	ug/l											<1		<1
Dibromochloromethane	ug/l		100									<1		<1
Dichloromethane	ug/l	20										<1		<1
Isopropylbenzene	ug/l											<1		<1
n-Butylbenzene	ug/l											<1		<1
Propylbenzene	ug/l											<1		<1
sec-Butylbenzene	ug/l											<1		<1
Styrene	ug/l	50										<1		<1
Tert-amyl methyl ether	ug/l											<1		<1
trans-1-2-Dichloroethene	ug/l											<1		<1
trans-1-3-Dichloropropene	ug/l											<1		<1
Trichlorofluoromethane	ug/l											<1		<1
tert-Butylbenzene	ug/l											<1		<1
Tetrachloroethene	ug/l	10	10									<1		<1
Trichloroethene	ug/l	10	10									<1		<1
Vinyl Chloride	ug/l	0	0.5									<1		<1

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Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria	
Specimen Depth (m)			
OD Level (m)			
Sample Type		EQS	DWS
Geology Code			
Cluster Code			

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
11	5	1	0.228	SWSJ01 @ 0.3mbGL	0	0
10	7	200	56	SWSJ02 @ 1mbGL	0	0
10	9	6900	6	SBHJ01CP @ 1mbGL		
10	1	2	2	SWSJ01 @ 0.1mbGL		
11	1	1.2	1.2	SWSJ01 @ 0.1mbGL	1	0
11	4	94	1	BHM4CAN033 @ 0.5mbGL		1
1	1	97.9	97.9	BHM4CAN033 @ 0.5mbGL	1	
11	9	18	1	SBHJ01CP @ 1mbGL	1	0
9	6	3700	26	SWSJ01 @ 0.3mbGL	1	2
2	0	None > LOD	None > LOD		0	0
10	5	5	1	SWSJ01 @ 0.3mbGL		
11	10	11	2	SBHJ01CP @ 1mbGL	3	0
11	4	4	0.159	SWSJ01 @ 0.1mbGL	2	0
10	0	None > LOD	None > LOD			0
11	5	18	1	SWSJ01 @ 0.3mbGL		1
11	3	7.2	1	BHM4CAN033 @ 0.5mbGL		
11	6	40	4	SWSJ01 @ 0.1mbGL	0	
9	4	9.4	0.1	SWSJ01 @ 0.3mbGL	4	4
2	2	12	8.6	BHM4CAN033 @ 0.5mbGL	1	1
1	1	1740	1740	BHM4CAN033 @ 0.5mbGL		
1	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD		0	
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0

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Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	Screening Criteria EQS	Screening Criteria DWS	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
Pcb-156 2,3,3',4,4',5-Hexachlorobiph	ug/l	0	0	1	0	None > LOD	None > LOD		0	0
Pcb-157 2,3,3',4,4',5'-Hexachlorobip	ug/l	0	0	1	0	None > LOD	None > LOD		0	0
Pcb-167 2,3',4,4',5,5'-Hexachlorobip	ug/l	0	0	1	0	None > LOD	None > LOD		0	0
Pcb-169 3,3',4,4',5,5'-Hexachlorobip	ug/l	0	0	1	0	None > LOD	None > LOD		0	0
Pcb-189 2,3,3',4,4',5,5'-Heptachloro	ug/l	0	0	1	0	None > LOD	None > LOD		0	0
SVOCs										
Phenols										
2-Chlorophenol	ug/l	50		1	0	None > LOD	None > LOD		0	
2-Methylphenol	ug/l	100		1	0	None > LOD	None > LOD		0	
2-Nitrophenol	ug/l			1	0	None > LOD	None > LOD			
2,4-Dichlorophenol	ug/l	20		1	0	None > LOD	None > LOD		0	
2,4-Dimethylphenol	ug/l			1	0	None > LOD	None > LOD			
2,4,5-Trichlorophenol	ug/l			1	0	None > LOD	None > LOD			
2,4,6-Trichlorophenol	ug/l			1	0	None > LOD	None > LOD			
4-Chloro-3-methylphenol	ug/l	40		1	0	None > LOD	None > LOD		0	
4-Methylphenol	ug/l	100		1	0	None > LOD	None > LOD		0	
4-Nitrophenol	ug/l			1	0	None > LOD	None > LOD			
Pentachlorophenol	ug/l	0.4		1	0	None > LOD	None > LOD		0	
Phenol	ug/l	7.7		1	0	None > LOD	None > LOD		0	
PAHs										
2-Chloronaphthalene	ug/l			1	0	None > LOD	None > LOD			0
2-Methylnaphthalene	ug/l			1	0	None > LOD	None > LOD			0
Acenaphthene	ug/l			1	0	None > LOD	None > LOD			0
Acenaphthylene	ug/l			1	0	None > LOD	None > LOD			0
Anthracene	ug/l			1	0	None > LOD	None > LOD			0
Benzo(a)anthracene	ug/l			1	0	None > LOD	None > LOD			0
Benzo(a)pyrene	ug/l			1	0	None > LOD	None > LOD			0
Benzo(b)fluoranthene	ug/l			1	0	None > LOD	None > LOD			0
Benzo(ghi)perylene	ug/l			1	0	None > LOD	None > LOD			0
Benzo(k)fluoranthene	ug/l			1	0	None > LOD	None > LOD			0
Chrysene	ug/l			1	0	None > LOD	None > LOD			0
Dibenzo(a,h)anthracene	ug/l			1	0	None > LOD	None > LOD			0
Fluoranthene	ug/l			1	0	None > LOD	None > LOD			0
Fluorene	ug/l			1	0	None > LOD	None > LOD			0
Indeno(1,2,3-cd)pyrene	ug/l			1	0	None > LOD	None > LOD			0
Naphthalene	ug/l			1	0	None > LOD	None > LOD			0
Phenanthrene	ug/l			1	0	None > LOD	None > LOD			0
Pyrene	ug/l			1	0	None > LOD	None > LOD			0
Pthalates										
Bis(2-ethylhexyl) phthalate	ug/l	1.3		1	0	None > LOD	None > LOD		0	
Butylbenzyl phthalate	ug/l	20		1	0	None > LOD	None > LOD		0	
Di-n-butyl phthalate	ug/l	8		1	0	None > LOD	None > LOD		0	
Di-n-Octyl phthalate	ug/l	20		1	0	None > LOD	None > LOD		0	
Diethyl phthalate	ug/l	200		1	0	None > LOD	None > LOD		0	
Dimethyl phthalate	ug/l	800		1	0	None > LOD	None > LOD		0	
Other Semi-Volatiles										
1,2-Dichlorobenzene	ug/l	20		1	0	None > LOD	None > LOD		0	
1,2,4-Trichlorobenzene	ug/l	0.4		1	0	None > LOD	None > LOD		0	
1,3-Dichlorobenzene	ug/l	20		1	0	None > LOD	None > LOD		0	
1,4-Dichlorobenzene	ug/l	20		1	0	None > LOD	None > LOD		0	
2-Nitroaniline	ug/l			1	0	None > LOD	None > LOD			
2,4-Dinitrotoluene	ug/l			1	0	None > LOD	None > LOD			
2,6-Dinitrotoluene	ug/l			1	0	None > LOD	None > LOD			
2-Chloronapthalene	ug/l			1	0	None > LOD	None > LOD			0
2-Methylnapthalene	ug/l			1	0	None > LOD	None > LOD			0
3-Nitroaniline	ug/l			1	0	None > LOD	None > LOD			
4-Bromophenylphenylether	ug/l			1	0	None > LOD	None > LOD			
4-Chloroaniline	ug/l			1	0	None > LOD	None > LOD			
4-Chlorophenylphenylether	ug/l			1	0	None > LOD	None > LOD			
4-Nitroaniline	ug/l			1	0	None > LOD	None > LOD			
Azobenzene	ug/l			1	0	None > LOD	None > LOD			
Bis(2-chloroethoxy)methane	ug/l			1	0	None > LOD	None > LOD			
Bis(2-chloroethyl)ether	ug/l			1	0	None > LOD	None > LOD			
Bis(2-chloroisopropyl)ether	ug/l			0	0	None > LOD	None > LOD			
Carbazole	ug/l			1	0	None > LOD	None > LOD			
Dibenzofuran	ug/l			1	0	None > LOD	None > LOD			
Hexachlorobenzene	ug/l	0.05		1	0	None > LOD	None > LOD		0	
Hexachlorobutadiene	ug/l	0.6		1	0	None > LOD	None > LOD		0	
Hexachlorocyclopentadiene	ug/l			1	0	None > LOD	None > LOD			
Hexachloroethane	ug/l			1	0	None > LOD	None > LOD			
Isophorone	ug/l			1	0	None > LOD	None > LOD			
N-nitrosodimethylamine	ug/l			0	0	None > LOD	None > LOD			
N-nitrosodi-n-propylamine	ug/l			1	0	None > LOD	None > LOD			
Nitrobenzene	ug/l			1	0	None > LOD	None > LOD			
VOCs										
Methyl Tertiary Butyl Ether	ug/l			1	0	None > LOD	None > LOD			
Benzene	ug/l	10	1	1	0	None > LOD	None > LOD		0	0
Toluene	ug/l	50		1	0	None > LOD	None > LOD		0	
Ethylbenzene	ug/l	20		1	0	None > LOD	None > LOD		0	
p/m-Xylene	ug/l	30		1	0	None > LOD	None > LOD		0	
o-Xylene	ug/l	30		1	0	None > LOD	None > LOD		0	
Naphthalene	ug/l	2		1	0	None > LOD	None > LOD		0	
Hexachlorobutadiene	ug/l	0.6		1	0	None > LOD	None > LOD		0	
1.2.4-Trichlorobenzene	ug/l	0.4		1	0	None > LOD	None > LOD		0	

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Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	Screening Criteria EQS	Screening Criteria DWS	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
1.2-Dichlorobenzene	ug/l	20		1	0	None > LOD	None > LOD		0	
1.3-Dichlorobenzene	ug/l	20		1	0	None > LOD	None > LOD		0	
1.4-Dichlorobenzene	ug/l	20		1	0	None > LOD	None > LOD		0	
1.1.1.2-Tetrachloroethane	ug/l			1	0	None > LOD	None > LOD			
1.1.1-Trichloroethane	ug/l	100		1	0	None > LOD	None > LOD		0	
1.1.2.2-Tetrachloroethane	ug/l			1	0	None > LOD	None > LOD			
1.1.2-Trichloroethane	ug/l	400		1	0	None > LOD	None > LOD		0	
1.1-Dichloropropene	ug/l			1	0	None > LOD	None > LOD			
1.1-Dichloroethane	ug/l			1	0	None > LOD	None > LOD			
1.1-Dichloroethene	ug/l			1	0	None > LOD	None > LOD			
1.2.3-Trichlorobenzene	ug/l	0.4		1	0	None > LOD	None > LOD		0	
1.2.3-Trichloropropane	ug/l			1	0	None > LOD	None > LOD			
1.2.4-Trimethylbenzene	ug/l			1	0	None > LOD	None > LOD			
1.2-Dibromo-3-chloropropane	ug/l			1	0	None > LOD	None > LOD			
1.2-Dichloroethane	ug/l	10	3	1	0	None > LOD	None > LOD		0	0
cis-1-2-Dichloroethene	ug/l			1	0	None > LOD	None > LOD			
1.2-Dibromoethane	ug/l			1	0	None > LOD	None > LOD			
1.2-Dichloropropane	ug/l			1	0	None > LOD	None > LOD			
1,3,5-Trichlorobenzene	ug/l			1	0	None > LOD	None > LOD			0
1.3.5-Trimethylbenzene	ug/l			1	0	None > LOD	None > LOD			
cis-1-3-Dichloropropene	ug/l			1	0	None > LOD	None > LOD			
1.3-Dichloropropane	ug/l			1	0	None > LOD	None > LOD			
2.2-Dichloropropane	ug/l			1	0	None > LOD	None > LOD			
2-Chlorotoluene	ug/l			1	0	None > LOD	None > LOD			
4-Chlorotoluene	ug/l			1	0	None > LOD	None > LOD			
4-Isopropyltoluene	ug/l			1	0	None > LOD	None > LOD			
Bromobenzene	ug/l			1	0	None > LOD	None > LOD			
Bromochloromethane	ug/l		100	1	0	None > LOD	None > LOD			0
Bromoform	ug/l			1	0	None > LOD	None > LOD			
Bromomethane	ug/l			1	0	None > LOD	None > LOD			
Bromodichloromethane	ug/l			1	0	None > LOD	None > LOD			
Chlorobenzene	ug/l			1	0	None > LOD	None > LOD			
Carbon Disulphide	ug/l			1	0	None > LOD	None > LOD			
Chloroethane	ug/l			1	0	None > LOD	None > LOD			
Chloroform	ug/l	2.5	100	1	0	None > LOD	None > LOD		0	0
Chloromethane	ug/l			1	0	None > LOD	None > LOD			
Carbontetrachloride	ug/l	12	3	1	0	None > LOD	None > LOD		0	0
Dibromomethane	ug/l			1	0	None > LOD	None > LOD			
Dichlorodifluoromethane	ug/l			1	0	None > LOD	None > LOD			
Dibromochloromethane	ug/l		100	1	0	None > LOD	None > LOD			0
Dichloromethane	ug/l	20		1	0	None > LOD	None > LOD		0	
Isopropylbenzene	ug/l			1	0	None > LOD	None > LOD			
n-Butylbenzene	ug/l			1	0	None > LOD	None > LOD			
Propylbenzene	ug/l			1	0	None > LOD	None > LOD			
sec-Butylbenzene	ug/l			1	0	None > LOD	None > LOD			
Styrene	ug/l	50		1	0	None > LOD	None > LOD		0	
Tert-amyl methyl ether	ug/l			1	0	None > LOD	None > LOD			
trans-1-2-Dichloroethene	ug/l			1	0	None > LOD	None > LOD			
trans-1-3-Dichloropropene	ug/l			1	0	None > LOD	None > LOD			
Trichlorofluoromethane	ug/l			1	0	None > LOD	None > LOD			
tert-Butylbenzene	ug/l			1	0	None > LOD	None > LOD			
Tetrachloroethene	ug/l	10	10	1	0	None > LOD	None > LOD		0	0
Trichloroethene	ug/l	10	10	1	0	None > LOD	None > LOD		0	0
Vinyl Chloride	ug/l	0	0.5	1	0	None > LOD	None > LOD		0	0

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Geological Formation Legend

Made Ground	MG
Sediment	sed
Tidal Flat Deposits	TFD

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria		SBHJ01CP	SWSJ01	SWSJ01	SWSJ02	SWSJ03	SWSJ06B	SWSJ07	BH508	SWSJ04	SWSJ05	BHM4CAN033
Specimen Depth (m)				1	0.1	0.3	1	1	0.1	0.3	0 - 0.3	1	1	0.5
OD Level (m)				5.57	5.72	5.52	4.88	4.92	5.86	5.66	5.9	4.97	4.82	5.36
Sample Type				D	ES	ES	ES	L	ES	ES	ES	ES	L	ES
Geology Code				MG-slag	MG-slag	MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag	TFD	TFD	MG - slag
Cluster Code		**EQS**	**DWS**	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2007 GI	2007 GI	2016 GI
2:1 Results														
Arsenic Dissolved	ug/l	50	10	<1	<1	1	1	1	1	<1	<1	<1	<1	0.228
Boron Dissolved	ug/l	2000	1000	<10	56	<10	200	120	110	110	<20	80	80	
Barium Dissolved	ug/l			6900	39	25	25	6	54	11		8	14	
Beryllium Dissolved	ug/l			<1	2	<1								
Cadmium Dissolved	ug/l	0.15	5	<0.4	1.2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.08	<0.4	<0.4	<0.1
Chromium Dissolved	ug/l		50	<1	1	<1	<1	<1	<1	2	5.8	<1	<1	94
Chromium VI Dissolved	ug/l	3.4												97.9
Copper Dissolved	ug/l	10	2000	18	1	3	<1	3	5	2	7.6	<1	3	5.13
Iron Dissolved	ug/l	1000	200	<5	340	3700	<5	66	<5	160		26	39	
Mercury Dissolved	ug/l	0.07	1								<0.5			<0.01
Molybdenum Dissolved	ug/l			2	<1	5	1	<1	<1	<1		2	4	
Nickel Dissolved	ug/l	4	20	11	5	7	3	4	3	3	<1	2	3	2.73
Lead Dissolved	ug/l	1.2	10	1	4	<1	<1	<1	<1	2	<1	<1	<1	0.159
Antimony Dissolved	ug/l		5	<5	<5	<5	<5	<5	<5	<5		<5	<5	
Selenium Dissolved	ug/l		10	<1	1	18	<1	2	2	<1	<1	<1	<1	1.14
Vanadium Dissolved	ug/l			<1	<1	<1	<1	<1	4	1		<1	<1	7.2
Zinc Dissolved	ug/l	75		<3	40	<3	4	4	6	11	18	<3	<3	<0.41
Total Cyanide	mg/l	0.001	0.05	<0.05	0.48	9.4	0.1	<0.05	<0.05	0.29		<0.05	<0.05	
pH	pH units	6-9	6.5-10								8.6			12
Conductivity uS/m @ 25c	uS/cm													1740
Cyanide	mg/l										<0.05			
Cyanide Free	mg/l										<0.05			<0.05
Phenols														
Phenols	mg/l	0.0077									<0.03			<0.002
Cresols	mg/l													<0.006
Phenols monohydric	mg/l													<0.016
Xylenols	mg/l													<0.008
BTEX														
GRO >C5-C12	ug/l													<50
Benzene	ug/l	10	1								<1			<7
Toluene	ug/l	50									<1			<4
Ethylbenzene	ug/l	20									<1			<5
m,p xylenes	ug/l	30									<1			<8

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Reedbed No. 1
21/06/2016

Geological Formation Legend

Made Ground	MG
Sediment	sed
Tidal Flat Deposits	TFD

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria		SBHJ01CP	SWSJ01	SWSJ01	SWSJ02	SWSJ03	SWSJ06B	SWSJ07	BH508	SWSJ04	SWSJ05	BHM4CAN033
Specimen Depth (m)				1	0.1	0.3	1	1	0.1	0.3	0 - 0.3	1	1	0.5
OD Level (m)				5.57	5.72	5.52	4.88	4.92	5.86	5.66	5.9	4.97	4.82	5.36
Sample Type				D	ES	ES	ES	L	ES	ES	ES	ES	L	ES
Geology Code		**EQS**	**DWS**	MG-slag	MG-slag	MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag	TFD	TFD	MG - slag
Cluster Code				2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2007 GI	2007 GI	2016 GI
O-Xylene	ug/l	30									<1			<3
MTBE	ug/l													<3
Sum of Detected BTEX	ug/l													<28
Sum of Detected Xylenes	ug/l													<11
TPH														
Aliphatics >C5-C6	ug/l										<0.1			<10
Aliphatics >C6-C8	ug/l										<0.1			<10
Aliphatics >C8-C10	ug/l										<0.1			<10
Aliphatics >C10-C12	ug/l										<0.1			<10
Aliphatics >C12-C16	ug/l										<0.1			
Aliphatics >C16-C21	ug/l										<0.1			
Aliphatics >C21-C35	ug/l										<0.1			
Aliphatics >C35-44	ug/l										<0.1			
Aromatics >C5-C7	ug/l										<0.1			<10
Aromatics >C7-C8	ug/l										<0.1			<10
Aromatics >C8-C10	ug/l										<0.1			<10
Aromatics >C10-C12	ug/l										<0.1			<10
Aromatics >C12-C16	ug/l										<0.1			
Aromatics >C16-C21	ug/l										<0.1			<10
Aromatics >C21-C35	ug/l										<0.1			
Aromatics >C35-44	ug/l										<0.1			
Total Aliphatic TPH	ug/l										<5			
Total Aromatic TPH	ug/l										<5			
Total petroleum hydrocarbons	ug/l										<10			
PAH														
Acenaphthene	ug/l										<0.1			<0.015
Acenaphthylene	ug/l										<0.1			<0.011
Anthracene	ug/l	0.1									<0.1			<0.015
Benzo(a)anthracene	ug/l										<0.1			<0.017
Benzo(a)pyrene	ug/l	0.00017	0.01								**<0.1**			<0.009
Benzo(b)fluoranthene	ug/l	0.017	0.1								**<0.1**			<0.023
Benzo(ghi)perylene	ug/l	0.0082	0.1								**<0.1**			<0.016
Benzo(k)fluoranthene	ug/l	0.017	0.1								**<0.1**			<0.027
Chrysene	ug/l										<0.1			<0.013

M4CAN
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CL-26 - Leachate - Reedbed No. 1
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OD Level (m)				5.57	5.72	5.52	4.88	4.92	5.86	5.66	5.9	4.97	4.82	5.36
Sample Type				D	ES	ES	ES	L	ES	ES	ES	ES	L	ES
Geology Code		**EQS**	**DWS**	MG-slag	MG-slag	MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag	TFD	TFD	MG - slag
Cluster Code				2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2007 GI	2007 GI	2016 GI
Dibenzo(ah)anthracene	ug/l										<0.1			<0.016
Fluoranthene	ug/l	0.0063									<0.1			<0.017
Fluorene	ug/l										<0.1			<0.014
Indeno(123cd)pyrene	ug/l	N/A	0.1								<0.1			<0.014
Naphthalene	ug/l	2									<0.1			<0.1
Phenanthrene	ug/l										<0.1			<0.022
Pyrene	ug/l										<0.1			<0.015
PAH 16 Total	ug/l										<2			<0.344
PCBs														
Pcb-77 3,3',4,4'-Tetrachlorobipheny	ug/l	0	0											<0.015
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	ug/l	0	0											<0.015
Pcb-105 2,3,3',4,4'-Pentachlorobiph	ug/l	0	0											<0.015
Pcb-114 2,3,4,4',5-Pentachlorobiphe	ug/l	0	0											<0.015
Pcb-118 2,3',4,4',5 - Pentachlorobipl	ug/l	0	0											<0.015
Pcb-123 2,3',4,4',5'-Pentachlorobiph	ug/l	0	0											<0.015
Pcb-126 3,3',4,4',5-Pentachlorobiph	ug/l	0	0											<0.015
Pcb-156 2,3,3',4,4',5-Hexachlorobipl	ug/l	0	0											<0.015
Pcb-157 2,3,3',4,4',5'-Hexachlorobip	ug/l	0	0											<0.015
Pcb-167 2,3',4,4',5,5'-Hexachlorobip	ug/l	0	0											<0.015
Pcb-169 3,3',4,4',5,5'-Hexachlorobip	ug/l	0	0											<0.015
Pcb-189 2,3,3',4,4',5,5'-Heptachloro	ug/l	0	0											<0.015
SVOCs														
Phenols														
2-Chlorophenol	ug/l	50												<2
2-Methylphenol	ug/l	100												<2
2-Nitrophenol	ug/l													<2
2,4-Dichlorophenol	ug/l	20												<2
2,4-Dimethylphenol	ug/l													<2
2,4,5-Trichlorophenol	ug/l													<2
2,4,6-Trichlorophenol	ug/l													<2
4-Chloro-3-methylphenol	ug/l	40												<2
4-Methylphenol	ug/l	100												<2
4-Nitrophenol	ug/l													<2
Pentachlorophenol	ug/l	0.4												<2

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Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Reedbed No. 1
21/06/2016

Geological Formation Legend

Made Ground	MG
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Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
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Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

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Specimen Depth (m)				1	0.1	0.3	1	1	0.1	0.3	0 - 0.3	1	1	0.5
OD Level (m)				5.57	5.72	5.52	4.88	4.92	5.86	5.66	5.9	4.97	4.82	5.36
Sample Type				D	ES	ES	ES	L	ES	ES	ES	ES	L	ES
Geology Code		EQS	DWS	MG-slag	MG-slag	MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag	TFD	TFD	MG - slag
Cluster Code				2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2007 GI	2007 GI	2016 GI
Phenol	ug/l	7.7												<2
PAHs														
2-Chloronaphthalene	ug/l													<2
2-Methylnaphthalene	ug/l													<2
Acenaphthene	ug/l													<2
Acenaphthylene	ug/l													<2
Anthracene	ug/l													<2
Benzo(a)anthracene	ug/l													<2
Benzo(a)pyrene	ug/l													<2
Benzo(b)fluoranthene	ug/l													<2
Benzo(ghi)perylene	ug/l													<2
Benzo(k)fluoranthene	ug/l													<2
Chrysene	ug/l													<2
Dibenzo(a,h)anthracene	ug/l													<2
Fluoranthene	ug/l													<2
Fluorene	ug/l													<2
Indeno(1,2,3-cd)pyrene	ug/l													<2
Naphthalene	ug/l													<2
Phenanthrene	ug/l													<2
Pyrene	ug/l													<2
Pthalates														
Bis(2-ethylhexyl) phthalate	ug/l	1.3												<4
Butylbenzyl phthalate	ug/l	20												<2
Di-n-butyl phthalate	ug/l	8												<2
Di-n-Octyl phthalate	ug/l	20												<10
Diethyl phthalate	ug/l	200												<2
Dimethyl phthalate	ug/l	800												<2
Other Semi-Volatiles														
1,2-Dichlorobenzene	ug/l	20												<2
1,2,4-Trichlorobenzene	ug/l	0.4												<2
1,3-Dichlorobenzene	ug/l	20												<2
1,4-Dichlorobenzene	ug/l	20												<2
2-Nitroaniline	ug/l													<2
2,4-Dinitrotoluene	ug/l													<2

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Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Reedbed No. 1
21/06/2016

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Made Ground	MG
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Screening Values & Assessment

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OD Level (m)				5.57	5.72	5.52	4.88	4.92	5.86	5.66	5.9	4.97	4.82	5.36
Sample Type				D	ES	ES	ES	L	ES	ES	ES	ES	L	ES
Geology Code		**EQS**	**DWS**	MG-slag	MG-slag	MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag	TFD	TFD	MG - slag
Cluster Code				2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2007 GI	2007 GI	2016 GI
2,6-Dinitrotoluene	ug/l													<2
2-Chloronapthalene	ug/l													<2
2-Methylnapthalene	ug/l													<2
3-Nitroaniline	ug/l													<2
4-Bromophenylphenylether	ug/l													<2
4-Chloroaniline	ug/l													<2
4-Chlorophenylphenylether	ug/l													<2
4-Nitroaniline	ug/l													<2
Azobenzene	ug/l													<2
Bis(2-chloroethoxy)methane	ug/l													<2
Bis(2-chloroethyl)ether	ug/l													<2
Bis(2-chloroisopropyl)ether	ug/l													
Carbazole	ug/l													<2
Dibenzofuran	ug/l													<2
Hexachlorobenzene	ug/l	0.05												<2
Hexachlorobutadiene	ug/l	0.6												<2
Hexachlorocyclopentadiene	ug/l													<2
Hexachloroethane	ug/l													<2
Isophorone	ug/l													<2
N-nitrosodimethylamine	ug/l													
N-nitrosodi-n-propylamine	ug/l													<2
Nitrobenzene	ug/l													<2
VOCs														
Methyl Tertiary Butyl Ether	ug/l													<1
Benzene	ug/l	10	1											<1
Toluene	ug/l	50												<1
Ethylbenzene	ug/l	20												<1
p/m-Xylene	ug/l	30												<1
o-Xylene	ug/l	30												<1
Naphthalene	ug/l	2												<1
Hexachlorobutadiene	ug/l	0.6												<1
1.2.4-Trichlorobenzene	ug/l	0.4												<1
1.2-Dichlorobenzene	ug/l	20												<1
1.3-Dichlorobenzene	ug/l	20												<1

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Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Reedbed No. 1
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Screening Values & Assessment

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Specimen Depth (m)				1	0.1	0.3	1	1	0.1	0.3	0 - 0.3	1	1	0.5
OD Level (m)				5.57	5.72	5.52	4.88	4.92	5.86	5.66	5.9	4.97	4.82	5.36
Sample Type				D	ES	ES	ES	L	ES	ES	ES	ES	L	ES
Geology Code		EQS	DWS	MG-slag	MG-slag	MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag	TFD	TFD	MG - slag
Cluster Code				2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2007 GI	2007 GI	2016 GI
1.4-Dichlorobenzene	ug/l	20												<1
1.1.1.2-Tetrachloroethane	ug/l													<1
1.1.1-Trichloroethane	ug/l	100												<1
1.1.2.2-Tetrachloroethane	ug/l													<1
1.1.2-Trichloroethane	ug/l	400												<1
1.1-Dichloropropene	ug/l													<1
1.1-Dichloroethane	ug/l													<1
1.1-Dichloroethene	ug/l													<1
1.2.3-Trichlorobenzene	ug/l	0.4												<1
1.2.3-Trichloropropane	ug/l													<1
1.2.4-Trimethylbenzene	ug/l													<1
1.2-Dibromo-3-chloropropane	ug/l													<1
1.2-Dichloroethane	ug/l	10	3											<1
cis-1-2-Dichloroethene	ug/l													<1
1.2-Dibromoethane	ug/l													<1
1.2-Dichloropropane	ug/l													<1
1,3,5-Trichlorobenzene	ug/l													<1
1.3.5-Trimethylbenzene	ug/l													<1
cis-1-3-Dichloropropene	ug/l													<1
1.3-Dichloropropane	ug/l													<1
2.2-Dichloropropane	ug/l													<1
2-Chlorotoluene	ug/l													<1
4-Chlorotoluene	ug/l													<1
4-Isopropyltoluene	ug/l													<1
Bromobenzene	ug/l													<1
Bromochloromethane	ug/l		100											<1
Bromoform	ug/l													<1
Bromomethane	ug/l													<1
Bromodichloromethane	ug/l													<1
Chlorobenzene	ug/l													<1
Carbon Disulphide	ug/l													<1
Chloroethane	ug/l													<1
Chloroform	ug/l	2.5	100											<1
Chloromethane	ug/l													<1

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OD Level (m)				5.57	5.72	5.52	4.88	4.92	5.86	5.66	5.9	4.97	4.82	5.36
Sample Type				D	ES	ES	ES	L	ES	ES	ES	ES	L	ES
Geology Code		EQS	DWS	MG-slag	MG-slag	MG-slag	MG-sed	MG-sed	MG-sed	MG-sed	MG-slag	TFD	TFD	MG - slag
Cluster Code				2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2007 GI	2007 GI	2016 GI
Carbontetrachloride	ug/l	12	3											<1
Dibromomethane	ug/l													<1
Dichlorodifluoromethane	ug/l													<1
Dibromochloromethane	ug/l		100											<1
Dichloromethane	ug/l	20												<1
Isopropylbenzene	ug/l													<1
n-Butylbenzene	ug/l													<1
Propylbenzene	ug/l													<1
sec-Butylbenzene	ug/l													<1
Styrene	ug/l	50												<1
Tert-amyl methyl ether	ug/l													<1
trans-1-2-Dichloroethene	ug/l													<1
trans-1-3-Dichloropropene	ug/l													<1
Trichlorofluoromethane	ug/l													<1
tert-Butylbenzene	ug/l													<1
Tetrachloroethene	ug/l	10	10											<1
Trichloroethene	ug/l	10	10											<1
Vinyl Chloride	ug/l	0	0.5											<1

Appendix 7

Relevant Extract from Additional Environmental Data

Plate 01: Extract of 1969 Aerial Photograph.

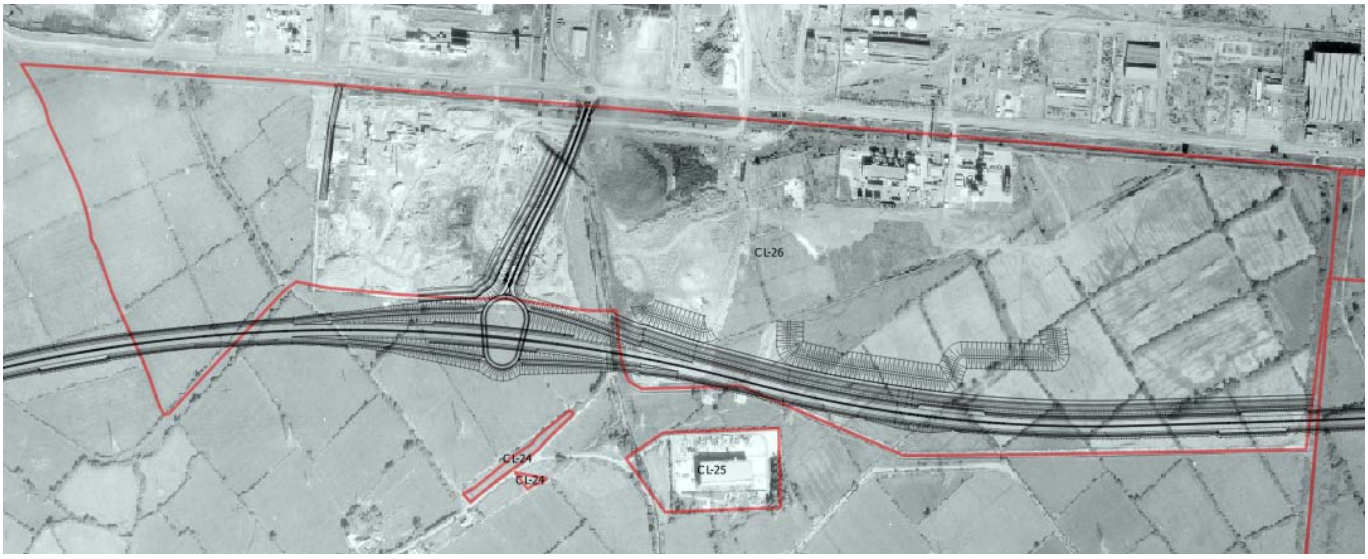

Plate 02: Extract of 1979 Aerial Photograph.

Client:	Welsh Government		
Project:	M4CaN		
Job Ref:	JER6591	Checked By:	Date: Oct 2015

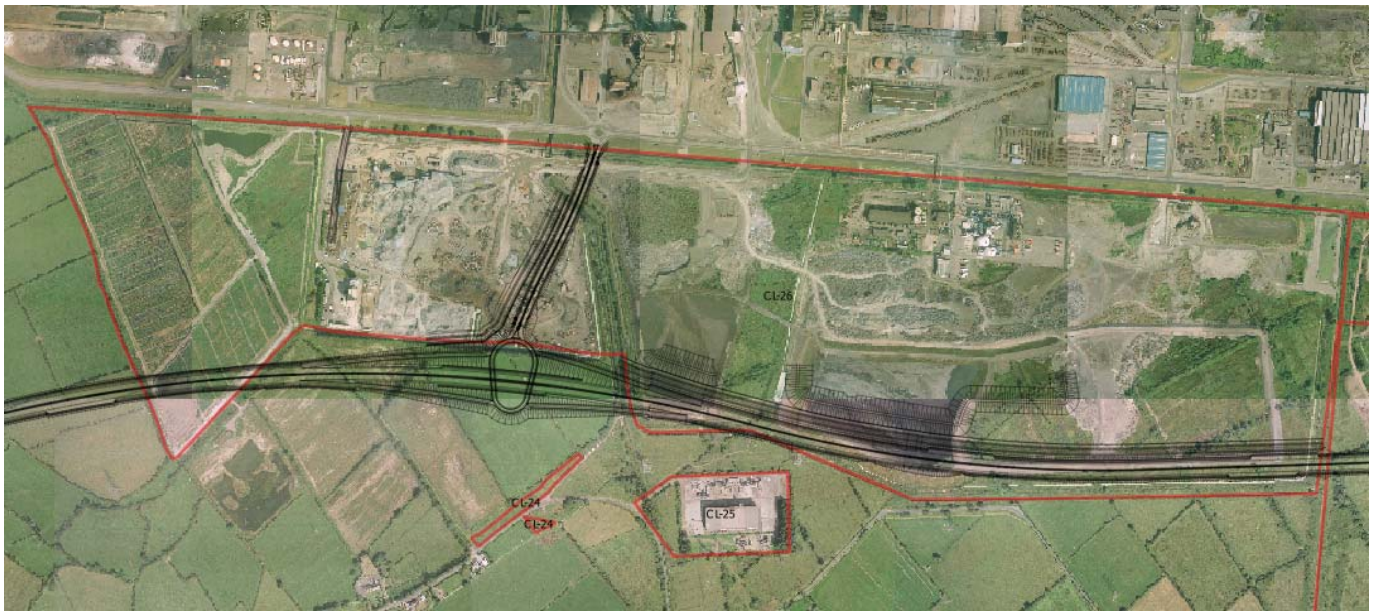

Plate 03: Extract of 1991 Aerial Photograph.

Plate 04: Extract of 2006 Aerial Photograph.

Client:	Welsh Government
Project:	M4CaN
Job Ref:	JER6591 Checked By: Date: Oct 2015

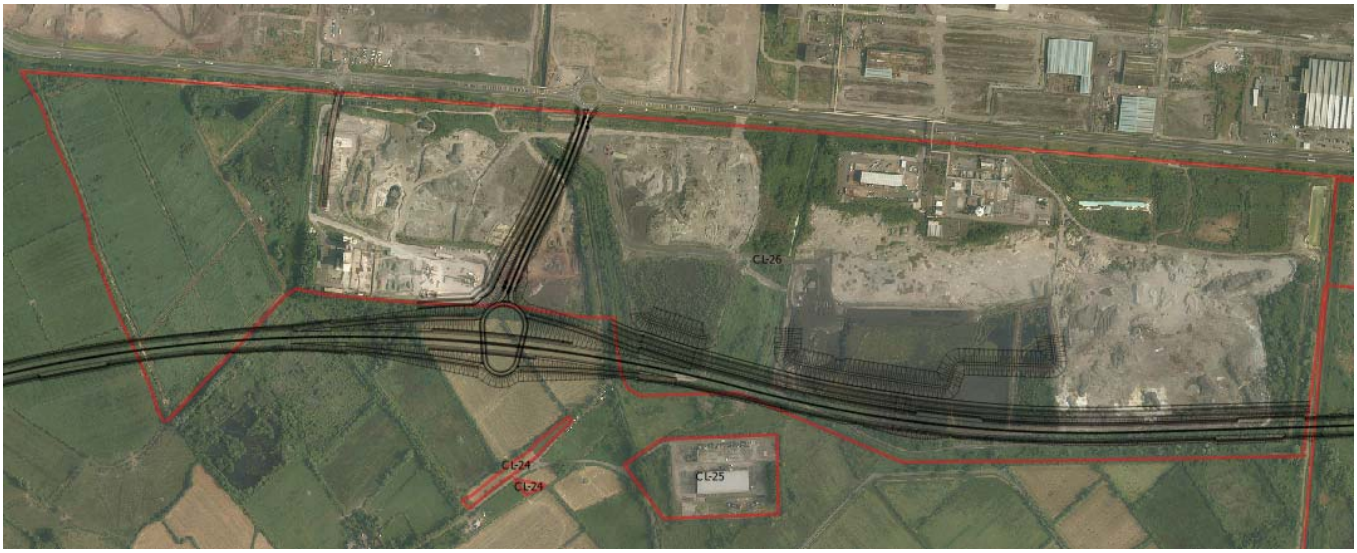

Plate 05: Extract of 2013/14 Aerial Photograph.

Plate 06: Extract of 2014 High-Resolution Aerial Photograph.

Client:	Welsh Government			
Project:	M4CaN			
Job Ref:	JER6591	Checked By:	Date:	Oct 2015

Welsh Government

M4 Corridor around Newport

Land Contamination Assessment Report Annex D CL-26, Llanwern Steel Works – Volume 2 - Lagoon Areas

M4CaN-DJV-EGT-ZG_GEN-RP-EN-0018

At Issue | September 2016

CVJV/AAR
3rd Floor
Longross Court,
47 Newport Road,
Cardiff
CF24 0AD

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1 Introduction

1.1 Background

1.1.1 This report relates to an area of land occupied by a series of lagoon areas associated with the Llanwern Steel Works and hereinafter referred to as the 'Site'. The site forms part of an area of land potentially affected by contamination identified as CL26 in the 2014 PSSR (Ove Arup and Partners, 2014). The remaining areas of CL-26 affected by the Scheme are reported within Volume 1 which includes the Reed beds and Metal Recovery Area.

1.1.2 The Site is located between chainage 14,900 and 16,800 (See Figure 3), upon the southern part of Llanwern Steel Works (south of the A4810).

1.2 Reporting Context

1.2.1 The Site has been assessed as part of ground investigations and monitoring associated with the wider works for the M4 Corridor around Newport (M4CaN) (hereafter referred to as the 'Scheme') and informs the baseline for the environmental impact assessment (EIA) for the Scheme. The EIA is reported in the M4CaN Environmental Statement (ES) published in March 2016 and the Land Contamination Assessment Reports formed an annex to Appendix 11.1 of the chapter on Geology and Soils.

1.2.2 A subsequent phase of investigation has been undertaken since the publication of the March 2016 ES. The additional data, herein referred to as the 2016 Additional Ground Investigation, have been incorporated into the summary tables, risk assessment, conceptual site model and associated text of this report where relevant. The conclusions and recommendations have also been refined to reflect the improved understanding of status of the site and associated risk. Therefore this report replaces the original CL-26 Volume 2 report published in Appendix 11.1 of the March 2016 ES.

1.2.3 In 2014, a Preliminary Sources Study Report (PSSR) was prepared as an initial land contamination appraisal (Ove Arup & Partners, 2014) as part of Design Manual for Roads and Bridges (DMRB) Stage 2 Assessments for a number of potential route options. This identified a number of individual areas that may have been affected by contamination as a result of historical activities at the Site. In addition, this report draws upon the 2015 Supplementary Ground Investigation report on behalf of the Welsh Government (Geotechnical Engineering, 2015) and the 2016 Additional Ground Investigation. This report relates to the area defined on the Site Plan Figure 3.

1.3 Objectives

1.3.1 The key objectives of this report are as the below.

- Undertake an assessment of the Site and determine whether potential risks to human health or controlled waters could exist based upon the Scheme
- Identify the need for further assessment and investigation in order to refine potential land contamination risks and inform the need for remediation/mitigation;

- To provide the information required under DMRB HD22/08 (Highways Agency, 2008).

1.4 Report Structure

1.4.1 The subsequent report structure is as follows.

- Section 2: Site Location and Description.
- Section 3: The Scheme – This section details the new section of motorway alignment and associated features at the Site;
- Section 4: Site History – This section summarises the history of the Site based on historical maps and historical land photographs.
- Section 5: Environmental Setting – This section summarises the Site description, published geology, hydrology and hydrogeology and relevant environmental information presented in the 2014 PSSR.
- Section 6: Scope of Investigations – This section describes the previous and supplementary ground investigation data available for the Site;
- Section 7: Ground Conditions – This section describes the main findings of the intrusive site investigations including the ground conditions encountered and significant visual or olfactory evidence of contamination identified;
- Section 8: Contamination Assessment – This section describes the findings of the Tier 1 and Tier 2 contamination risk assessment based upon potential contamination sources, potential receptors and potential contaminant linkages and presents the human health and controlled waters assessment.
- Section 9: Refined Conceptual Site Model – This section presents the Conceptual Site Model (CSM) for the Site and identifies contaminant linkages, based upon the findings of the data presented within Sections 2 to 7.
- Section 10: Conclusions and Recommendations - This section provides conclusions concerning the likelihood of land contamination associated with the Site affecting the Scheme and subsequent requirements for remediation / mitigation.
- Section 11: References – This section details the key reference documents referred to within the text; and
- Section 12: Glossary – This section details the key terms and acronyms used throughout the report.

2 Site Location and Description

2.1.1 The Llanwern Steel Works former lagoons area is located approximately 3 km to the east of Newport City centre and is centred on National Grid Reference ST 376 858. It forms part of the still operational Tata Steel Works, which is located directly to the north across the A4810 as shown in Figure 3.

2.1.2 The Site is bound to the north by the A4810, to the east by CL-27 Green Moor Lane Landfill, part of land potentially affected by contamination CL-26 to the west by Monks Ditch beyond which is the Metal Recovery area of Llanwern Steel Works (Volume 1). The south is bounded by a drainage ditch with fields and an electrical sub-station and agricultural land beyond.chris

2.1.3 The Site is associated with the active steelworks presently operated by TATA Steel.

2.1.4 Review of the onsite processes has indicated potential contamination sources associated with these industrial waste management and disposal areas within the proposed route corridor, as shown on Figure 3.

2.1.5 Lagoons 12, 25, 27 and 26 (also known as Llanwern south tips), are located in the southern half of a roughly rectangular area, and are approximately 1500 m by 600 m in size. The lagoons lie north of and adjacent to an area designated as an SSSI (Gwent Levels). The lagoons are formed with slag bunds up to approximately 8m high. Lagoon 27 is split into quadrants, referred to here as 27NE, 27NW, 27SE and 27SW.

2.1.6 To the north of the lagoons is an industrial plant site (occupied by BOC) and smaller drainage lagoons. In 2010, Tata Steel was granted an Environmental Permit for non-hazardous waste disposal (Permit No. EPR/GP3331SV) in Lagoon 26, although at the time of writing, the landfill has not yet been constructed. The site also has two other environmental permits associated with waste disposal operations. The permitting regime of the Site is detailed further in Section 5 with details of permit boundaries shown on Figure 3.

2.1.7 It is understood that the lagoons were filled with washings from the Basic Oxygen Steelmaking (BOS) processes and blast furnaces (BF). Other materials that may have been disposed at the lagoons include palm oil from the strip mill (specific to Lagoon 27NW).

2.1.8 Site observations from various walkover surveys indicated material to be fine sediment with visual evidence of hydrocarbons in lagoons 27NW and 27NE.

2.1.9 Site walkover photographs are presented within Appendix 8.

2.1.10 The use and current state of each lagoon is summarised in Table 1 below.

Table 1: History, Use and Current State of Lagoons

Area	Use / Current state
Lagoon 12	Construction c. early 1960s. Last filled late 1980s. Approximately 200,000 m^3 of BOS/BF slurry contained within BOS slag bunds. Firm ground surface overgrown with rough vegetation and small trees.
	Area north of Lagoon 12 – Old Metal Recovery Area. Mainly BOS slag deposited in dry form. Slag crushing and de-metalling area.
Lagoon 25	Operational from late 1980s to closure. Approximately 570,000 m^3 of BOS/BF slurry contained within BOS slag bunds. Material reported to be relatively consistent in chemical composition with the possible exception of zinc. Firm ground surface starting to be become vegetated.
Lagoon 27SW	BOS/BF slurry contained within BOS slag bunds. Firm ground surface.
Lagoon 27SE	Empty lagoon (never used). Eastern slag bund removed. Contains some rough vegetation and small trees.
Lagoon 27NW	Approximately 3/4 full of oily mill scale/hot mill sludge (75,000 m^3) contained within slag bunds. Surface water with free product evident
Lagoon 27NE	Lagoon never used but does contain some surface water with oily sheen. Traces of reens in original ground surface visible at base.
Lagoon 26	Empty lagoon (never used as a lagoon). Slag bunds removed. Figure 4 shows the existing site elevations based upon LIDAR survey imagery. Surface covered by slag based materials. Area has been used by Tarmac for slag processing / weathering.

2.1.11 During the 2016 Additional Ground Investigation anecdotal evidence regarding the composition of the lagoons and the area surrounding them was obtained. Informal discussions with Tata staff indicate that the entire area (89 ha) was originally covered in a nominally one metre thick slag layer to form a working platform, from which the lagoons were then constructed by forming the peripheral bunds. Lagoon 12 was constructed first and was filled with fine metallic dust washed from the flues of the BOS plant suspended in water. Lagoon 25 was then constructed in the same manner as Lagoon 12 and continued to receive similar materials. It has also been indicated that the south western quarter of Lagoon 27 (27SW) was used as an overflow for Lagoon 25 and hence it is considered this is also likely to contain similar BOS flue slurry as Lagoons 12 and 25. Lagoon 12 was full to capacity by the mid-1980s and Lagoons 25 and 27SW recieved wastes up to 2002 when the steel making processes at Llanwern ceased.

2.1.12 During this period the areas to the north and east of Lagoons 12 and 25 received coarse granular slag materials to a thickness similar to that of the two lagoons (approx. 7-8 m). The majority of this material located to the north of Lagoon 25 has now been reused. It is understood however that a five metre thickness still remains in place locally to the north of Lagoon 12, which was evident on site during the recent ground investigation.

3 The Scheme

3.1.1 The Site is located within the new section of motorway footprint at approximate chainage 14,900 and 16,400 as shown in Figure 3.

3.1.2 At the Site, the Scheme consists of the proposed new section of motorway to be positioned on an embankment some 2 m to 3 m high. A new junction (Glan Llyn junction) is proposed to the west of the Site, linking the new section of motorway to the A4810 way slip roads. The junction is located within the Metal Recovery Area of Llanwern Steel Works (Volume 1) at approximately 14,900 to 15,100.

3.1.3 The area affected by the Scheme comprises Lagoons 12, 25, 27SE, 27SW and 26, as shown on Figure 3. Lagoons 27 NE and NW are not affected by the Scheme and are to remain unaltered. The engineering design of the construction of the motorway through the Tata Lagoons is as below.

- Excavate and treat lagoon waste and create a material suitable for reuse as a construction material within the motorway embankment subject to compliance with environmental and geotechnical acceptability criteria.
- The existing lagoon bunds will be excavated and reconstructed north of the motorway.
- The dirty and clean ditches will be reconstructed to replicate the existing arrangements.

3.1.4 The boundaries of the existing permit (licence) boundaries will be revised such that the permanent land take that will be owned by Welsh Government will be outside the revised permit boundaries. Land previously within permitted areas will be surrendered.

3.1.5 The proposed lagoon material waste treatment is expected to be via cement stabilisation. Sampling and leaching trials are currently being undertaken to enable an assessment and definition of acceptability of use criteria. The approach being taken to design has been agreed in principle with Natural Resources Wales (NRW).

3.1.6 The Conceptual Site Model (Figure 2) shows the anticpated new section of motorway.

4 Site History

4.1.1 The 2014 PSSR historical searches have been based on Ordnance Survey plans, literature reviews, information provided by NRW (formerly Environment Agency Wales) and Newport City Council and interpretation of aerial photography.

4.1.2 This is supplemented by a review of historical maps obtained in 2015 from Welsh Government. Relevant extracts are presented in Appendix 7.

4.1.3 A summary of the Site's history is presented in Table 2 below.

Table 2: Site History

Date	Use	Source of information
1843 - 1893	The site comprises a number of agricultural fields traversed by ditches and reens. A road crosses through the southern area of Lagoons 25 and 27 and along the western boundary. A number of buildings are located within the western boundary of Lagoon 12.	1:10,560 historical map
1891 - 1912	No significant change	1:10,560
1904-1939	No significant change	1:10,560 historical map
1920	No significant change	1920 OS map
1962	Llanwern Steel Works operation commenced.	2014 PSSR
1964 - 1965	A possible residential property 'Moorview' is located within Lagoon 27. BOC plant partially developed to	1,250 historical map
1979	Construction of **Lagoon 12**. Expansion of BOC plant works.	Aerial photography
1979	**Llanwern Landfill** (covering the whole of the Site area)	Environment Agency
1985 - 1991	**Settling ponds** identified in Lagoons 12 and 25. **Construction of bunds** for Lagoons 26 and 27.	Aerial photography 1:10,000 historical map
1991 - 2001	**Earthworks / infilling** activity ongoing in Lagoons 12, 25, 26 and 27	Aerial photography
2006	No significant change. Earthwork activity particularly evident within Lagoon 26	Aerial photography
2014	A number of (central settling ponds) Lagoons 12, 25 and Lagoon 27SW appear vegetated.	Aerial photography

Note : Potential contamination sources are underlined. Those within the temporary and permanent land take are shown in bold.

4.1.4 The sources of information presented above supplement those used in the 2014 PSSR. Relevant extract of the photographs are presented in Appendix 7.

4.1.5 The construction of the lagoons and associated waste disposal are considered to represent the main source of contamination at the Site. Their locations are detailed in Figure 1.

4.1.6 Historically the Site was also used as a bombing decoy site during World War II which is described in detail within the 2014 PSSR (Ove Arup, 2014) and the Explosive Ordnance Threat Assessment Report (Bactec, 2014). There is a resultant risk from buried unexploded ordnance at the Site which is categorised as a medium risk site in the Explosive Ordnance Threat Assessment Report.

5 Environmental Setting

5.1 Geology

5.1.1 British Geological Survey (BGS) data indicate that the Site is underlain by Tidal Flat Deposits, comprising layers of sand, gravel and peat. The underlying solid geology is the Mercia Mudstone Group comprising weathered mottled and often fractured mudstones.

5.2 Hydrology

5.2.1 The Site is situated within the low lying area known as the Gwent Levels which has many surface water reens and ditches. The Bowleaze Reen and Parish Reen are located adjacent to the southern boundary of the Site, south of Lagoons 25 and 27. Monks Ditch flows from north to south beyond the western boundary of the Site.

5.2.2 To the south west, south and east of the Tata Steelworks lagoons area are two ditches known as the “dirty ditch”, which is adjacent to the lagoons, and the “clean ditch” which is immediately to its west, south and east. The “dirty ditch” currently collects any surface run off and any leachate that manages to flow out of the lagoons. The “clean ditch” acts as a final barrier of any water bourne contamination migrating from the lagoons that manages to escape from the “dirty ditch” for instance in an emergency. Both of the ditches flow into Tata Steel’s effluent treatment systems and, once treated waters are discharged into the Severn Estuary via Tata’s pipeline in accordance with their authorised discharge consent (APR/BS3905IP). Thus Tata’s lagoon systems are designed such that any surface run off or leachate is prevented from entering the sensitive Gwent Levels.

5.3 Hydrogeology

5.3.1 NRW records indicate that the Tidal Flat Deposits are classified as non-productive strata (negligibly permeable). The Mercia Mudstone Group strata are classified as a Secondary B aquifer (variable permeability).

5.3.2 Groundwater is anticipated to be present between the interface of the Mercia Mudstone Group and Tidal Flat Deposits. Furthermore, perched water may be encountered at shallow depth within any made ground, above the clay strata of the Tidal Flat Deposits.

5.4 Environmental Information

5.4.1 The following section provides an overview of NRW information associated with the Sites.

5.4.2 Three companies located within the Site or its vicinity hold an industrial pollution licence. Details are provided in Table 3.

Table 3: Industrial pollution licences

Licence	Year	Release environment	Substances Released	Comments
Company: Cambrian Stone LTD. **Industry**: Metal. **Process**: Ferrous metals				150 m north of the Site
AD1925	1998 to 2001	Air	Particulate matter – total Sulphur oxides	
Company: Air Products (GB) Ltd and (BR) Ltd **Industry**: Fuel and Power **Process**: Gratification and refining etc				150 m north of the Site
AF7002 and BL2459IC	1998 to 2012	Reuse	Special waste (7000g)	
		Disposal- incineration	Special waste (100g)	
		Disposal- landfill	Special waste (59.64t)	
		Air	Carbon dioxide, carbon monoxide and nitrogen oxides (as NO2)	
Company: Tata Steel UK Limited **Industry**: Metal **Process**: Ferrous metals				Main steel works area, to the north, across the A4810
BS3905IP	2004 - 2012	Air	Particulate matter – total sulphur oxides, carbon monoxide, carbon dioxide, methane, nitrous oxides, VOCs inorganic chlorine compounds, hydrogen chloride	
		Water	Heavy metals, cyanides, nitrogen, phenols, TOC	

- Two companies located within 300 m to the north of the site held industrial pollution licences. These are Koppers UK LTD which held a licence for landfill disposal and air pollution until 2000 and Multiserv (ASR) LTD which held two air pollution licences until 2002.
- No abstraction licences are identified within the Site boundary.
- Three authorised landfill sites including one under closure have been recorded within the Site boundary as detailed in Table 4 below. All three environmental regulated facility boundaries will be impacted by the motorway alignment and a proportion of the land falls within the proposed land take as shown on Figure 4.

Table 4: Authorised Environmental Regulated Facilities Within Site Boundary

Landfill and Address	Location	Licence type	Licence Status
Corus UK Limited PPC, Llanwern South Side of Queensway Landfill	Covering the central section of the site including Lagoons 12, 25 and 26	Industrial waste landfill (Factory curtilage) EPR/HP3899FC	Modified (under closure)
Tata Steel UK Limited, Llanwern Works	Covering Lagoon 27	Industrial waste landfill (Factory curtilage) EPR/BS3905IP	Effective
Tata Steel UK Limited South Side Of Queensway Llanwern Landfill	Covering Lagoon 26	Waste Landfilling; >10 T/D with capacity >25,000T excluding inert waste EPR/GP3331SV (superseding EAWML 30009)	Effective

- One historic landfill was recorded adjacent to the east of the site boundary but also encompassed Reedbed No.2, as detailed in Table 5 and shown on Figure 4.

Table 5: Historical Landfills Outside Site Boundary

Landfill name and address	Location	Material type	Date waste first and last received
Llanwern Steelworks Land adjacent to 1-3 Blast Furnacre Corus, Llanwern Works (CL-27 site)	Adjacent to the eastern site boundary encompassing Reedbed No.2.	Industrial waste and liquid sludge	Nov 1981 – June 1984

5.4.3 Regulated land taken as part of the Compulsory Purchase Order for this Scheme will lead to partial permit surrender for the facilities. The partial surrender applications will need to demonstrate that the land does not pose a risk to the environment, that the Site's condition has not deteriorated from that at the time of the permit issue in the case of industrial installations, and is not and will not cause a significant risk to the environment. The permit boundaries will be re-drawn as part of the process, removing the permanent land take from the confines of the regulated facility.

5.4.4 The new section of motorway alignment will cross through Lagoons 12, and 25, which form part of the closed landfill (EPR/GP3331SV). The site is operated, maintained, monitored and controlled in line with the requirements laid out in the accepted site Closure Report "Geotechnology report 664.1/0/0708" (Geotecnology, 2008) and supporting information.

5.4.5 Llanwern Steel Works (EPR/BS3905IP) produces 2,000,000 tonnes of hot rolled coil per year in various sizes and a variety of finishes for the manufacturing sector. The regulated facility consists of hot rolling, cold rolling, pickling and

galvanising activities. The process waters from the facility is treated to remove solids and oils, combined with drainage from a lagoon before discharging into the Severn Estuary via a Mid Effluent Outfall.

5.4.6 Lagoon 27 forms part of the on-site treatment facility. Divided into four equal quarters, accepting waste from the hot milll activity. The new section of motorway alignment will pass through the two southerly quarters of the lagoon. The lagoon waste will be excavated to make way for the new section of motorway. The excavated waste will likely require treatment before reuse within the Scheme. The alignment will also pass the southern tip of Reedbed No.2, with the underpass from the A4810 impacted the eastern permitted boundary, please see Figure 4.

5.4.7 South Side of Queensway Non-Hazardous Landfill (EPR/GP3331SV) is part of an historical landfill; the current permission operating at the site exceeds EAWML 30009. The Non-Hazardous Landfill is an in-house disposal facility for the Llanwern steel plant. The permit regulates the disposal of a maximum 13,500 tonnes per annum of waste in the fully re-engineered cell, of that 10,000 tonnes Non-Hazardous and 3,500 tonnes of Inert Waste. However it is known the site is not and has not been actively accepting waste. The new section of motorway will pass the southern section of the landfill.

5.4.8 The environmental information confirms the various site usages could represent potential contamination sources that requires due consideration in relation to the Scheme.

5.4.9 The new section of motorway will cross through the lagoons which will partially be excavated. The new section of motorway will also comprise creation of new bunds and drainage channels. The permits operating across the site EPR/HP3899FC, EPR/BS3905IP and EPR/GP3331SV will require a partial surrender application to remove the permanent land take required for the new section of motorway. Surrender applications will be submitted post construction works, demonstrating that the land, following remedial works, no longer poses a risk to the environment. Details of the environmental permit strategy are provided outside this report.

6 Scope of Investigations

6.1 General

6.1.1 Six previous intrusive ground investigations have been undertaken at the Site.

6.2 Scope of Works

6.2.1 The various intrusive ground investigations undertaken within the Site are summarised in Table 6 and Figure 1. Those located outside the lagoon's footprints have been identified within the table.

Table 6: Ground Investigation Summary

Site Location	Date	Contractor	Boreholes	Window Sampler	Trial Pits	Sampling
Lagoon 12	2002	Exploration Associates	LGBH1-3	-	-	Soil & groundwater
	2005/ 2006	Enviros	BH14a, BH14b	-	-	-
	2008	Norwest Holst	SBHJ04	SWSJ09, SWSJ09A, SWSJ10, SWSJ11, SWSJ12, SWSJ13, SWSJ14, SWSJ15, SWSJ16, SWSJ17, SWSJ17A	-	-
	2015	Geotechnical Engineering Limited	BH513, BH514/514A, BH515 (outside lagoon), BH516	-	TP506	Soil, groundwater & gas
	2016	RPS	BHM4CAN040	-	-	Soil & gas
Lagoon 25	2002	Exploration Associates	LGBH4, LGBH5 (outside lagoon), LGBH7, LGBH9 (outside lagoon)	-	-	Soil & groundwater
	2005/ 2006	Enviros	BH24 (outside lagoon)	-	-	-
	2008	Norwest Holst	SBHJ05	SWSJ18, SWSJ19, SWSJ20, SWSJ21,	-	-

Site Location	Date	Contractor	Boreholes	Window Sampler	Trial Pits	Sampling
				SWSJ22, SWSJ22A, SWSJ22B, SWSJ23, SWSJ24, SWSJ24A, SWSJ25, SWSJ26, SWSJ27, SWSJ28, SWSJ29, SWSJ30		
	2015	Geotechnical Engineering Limited	BH518 (outside lagoon), BH519 (outside lagoon)	WS501	-	-
	2016	RPS	BHM4CANA011, BHM4CANA012, BHM4CAN041	-	-	Soil & gas
Lagoon 27SW	2002	Exploration Associates	LGBH10	-	-	Soil & groundwater
	2005/ 2006	Enviros	BH17 (outside lagoon)	-	-	-
	2008	Norwest Holst	SBHJ06, SBHJ06CP, SBHJ07CP, SBHJ07RC, SBHJ07ARC, SBHJ07BRC	SWSJ31, SWSJ32, SWSJ33, SWSJ34,	-	-
	2015	Geotechnical Engineering Limited	BH520	-	-	-
Lagoon 27SE	2002	Exploration Associates	LGBH12	-	-	Soil & groundwater
	2004/ 2005/ 2006	Enviros	BH19 (outside lagoon)	-	TP4 (outside lagoon)	No logs for TP4
	2008	Norwest Holst	-	SWSJ35, SWSJ35A, SWSJ36, SWSJ37, SWSJ38	-	-
	2015	Geotechnical Engineering Limited	BH521 (outside lagoon)		TP508 (outside lagoon)	Soil, groundwater & gas
Lagoon 26	2005	Enviros	BH20 (outside lagoon), BH21,	-	TP1, TP2 (outside	No logs for TP1, TP2 and

Site Location	Date	Contractor	Boreholes	Window Sampler	Trial Pits	Sampling
			BH23		lagoon), TP3	TP3
	2008	Norwest Holst	SBHJ08CP, SBHJ08ACP, SBHJ09CP, SBHJ10CP	-	STPJ01, STPJ02, STPJ03, STPJ04, STPJ05, STPJ06	-
	2015	Geotechnical Engineering Limited	BH522, BH523, BH524, BH525	-	TP509 (outside lagoon)	Soil, groundwater & gas
	2016	RPS	BHM4CAN043	-	-	Soil, groundwater & gas

6.2.2 The construction details of all monitoring wells installed in boreholes on the Site are summarised in Table 7 their locations are shown on figures 1a-1d.

Table 7: Summary of Borehole Construction Details

Site Area	Borehole ID	Diameter (mm)	Total Drilled Depth (m)	Top of Slotted Well Casing / Gravel Pack (m bGL)	Base of Slotted Well Casing / Gravel Pack (m bGL)	Targeted Geology
Lagoon 12	LGBH2	50	9	0.9	9	Made Ground (CS) / TFD
	LGBH3	50	9	0.9	9	Made Ground (CS) / TFD
	SWSJ13	50	2.55	0.5	2.5	Made Ground (SS)
	LGBH1	50	10.5	8.5	10.5	TFD
	SBHJ04CP	50	18.5	12.1	13.1	TFD (Peat)
	BH515	35		0.85	5.2	Made Ground (CS)
		50		9.8	13.2	TFD (Peat)
	BHM4CAN040	50	16	1	8	Made Ground (SS)
Lagoon 25	LGBH4	50	12.5	1	11	Made Ground (CS)
	LGBH7	50	12.2	1	12.2	Made Ground (CS)
	LGBH9	50	7	1.5	7	Made Ground / TFD
	SBHJ05	50	20.5	9.5	11.5	Made Ground (slag type not identified)
	SWSJ21	50	6	4	6	Made Ground (SS)
	SWSJ23	50	8.35	5.8	7.8	Made Ground (SS)
	LGBH5	50	7	1.8	7	Made Ground (CS) / TFD

Site Area	Borehole ID	Diameter (mm)	Total Drilled Depth (m)	Top of Slotted Well Casing / Gravel Pack (m bGL)	Base of Slotted Well Casing / Gravel Pack (m bGL)	Targeted Geology
	BH519	35	18.8	0.85	4.2	Made Ground (CS) / TFD
		50		6.8	11.2	TFD
	BH24	Not known	15	11.5	15	Mercia Mudstone
	BHM4CANA012	50	7.5	1	7.5	Made Ground (SS)
	BHM4CAN041	50	9	1	8	Made Ground (SS)
Lagoon 27SW	SWSJ34	50	6.45	3	6	Made Ground (CS)
	LGBH10	50	15	11	15	TFD
	BH17	Not known	11.5	4.2	6.2	TFD (Peat)
	SBHJ06CP	50	14.9	3.1	4.1	TFD (Peat)
	SBHJ07CP	50	13.3	8.4	10.4	TFD / Mercia Mudstone
Lagoon 27SE	BH18	Not known	12	0.5	3	Made Ground (CS)
		Not known	12	5.8	7.2	TFD (Peat)
	SWSJ37	50	6.45	4.1	5.6	TFD
	LGBH12	50	7	6	10	Made Ground / TFD
	BH521	35	19	4.3	6.2	TFD (peat)
		50	19	8.8	11.2	TFD
Lagoon 26	SBHJ09CP	50	13.2	1	2.2	Made Ground
	BH525	35	22.7	0.5	2.8	Made Ground
		50		9.8	11.8	TFD
	SBHJ10CP	50	13	9	10	TFD
	SBHJ08ACP	50	13.7	6.4	7.4	TFD (Peat)
	BHM4CAN043	50	11.8	1	6	Made Ground (CS)
		35		8.7	11.7	TFD / Mercia Mudstone

Note: CS: Coarse Slag
SS: Slurry Slag
TFD: Tidal Flat Deposits

6.3 Surface Water Quality Monitoring

6.3.1 Surface water quality monitoring has been undertaken at multiple locations between 2007 and 2015. Surface water samples from locations SW505 and SW506 have been collected from within the Site boundary whilst the remaining locations were sampled on reens surrounding the Site. Sampling locations are shown on Figure 1 and are described further in Table 8.

Table 8: Surface Water Monitoring Locations

Surface water location ID	Sampling Location description	Comments
R13/ ID B63	Located approximately 180m south of Lagoon 27 at Bowleaze Reen	Flow was recorded as slack and slightly turbid.
15.3	Collected from Monks Ditch down gradient of CL26	____
16.2	Sampled from Bowleaze Reen. Reen with south easterly flow direction from CL26.	____
SW504	Located 70m north of the Site on Monks Ditch	____
SW505	Located to the south west of the lagoons on the boundary of the Site	____
SW506	Located on a drainage ditch in the southeast corner of the Site	____
MC Reen1	Located 150 m south of the Site on Monkscroft Reen	____
MDSWS	Located 150 m south of the Site on Monks Ditch	____
MDSWN	Understood to be located on Monks Ditch, north of the Site. Specific location unknown	____

6.4 Field Testing

6.4.1 Photo Ionisation Detector (PID) monitoring was undertaken on samples from the lagoons. The samples monitored and their respective results are presented in Table 9. Locations and depth ranges from which all PID readings are of 0.0 ppm have been omitted from the results in Table 9.

Table 9: PID Monitoring Results

Location	Samples Monitored	Results
Lagoon 12	SBHJ04, SWSJ09, SWSJ09A, SWSJ10 to SWSJ17A, BH513, BH514, BH514A, BH515, BH516, TP506.	SWSJ10 4-4.5m @ 6.2-29.8ppm SWSJ11 1m @ 0.5ppm, 3.2m @ 7.2ppm SWSJ16 2.3m @ 6.3ppm BH513 0-2.55m @ 0.1-0.2ppm, 3-3.5m @ 0.1ppm, 4.5-5m @ 0.1ppm, 7.5-9m @ 0.2ppm, 11-12.5m @ 0.3ppm BH514 1.5-6.0m @ 0.1-0.3ppm BH514A 0-0.5@ 0.9ppm, 2-3.7m @ 0.3-0.7ppm BH515 0.2-1.6m @ 0.5-3.7ppm BH516 0-3.5m @ 0.6-2.0ppm TP506 1-4m @ 1.3-9.1ppm

Location	Samples Monitored	Results
Lagoon 25	SBHJ05, SWSJ18 to SWSJ26, SWSJ28 to SWSJ30, BH518, WS501.	SBHJ05 11.5-14.5m @ 0.6-1.7ppm SWSJ20 4-6m @ 1.2-29.4ppm SWSJ21 3-4m @ 0.4-1.6ppm SWSJ22B 2-3m @ 3-3.7ppm SWSJ23 1--7.9m @ 0.9-25ppm SWSJ24 1-2m @ 0.7-13.8ppm SWSJ25 1-5m @ 2.2-8.2ppm SWSJ28 1-5m @ 1.1-15ppm SWSJ29 4m @ 2.2ppm SWSJ30 5m @ 0.4ppm BH518 3-4.5m @ 0.1-0.9ppm
Lagoon 27SW	SBHJ07, SWSJ31 to SWSJ34.	SWSJ31 2-5m @ 1.2-10.3ppm SWSJ32 3-8m @ 2.8-11.1ppm SWSJ33 1-4m @ 0.8-7.3ppm SWSJ34 4-6m @ 3.8-10.4ppm
Lagoon 27SE	SWSJ35A to 38, BH521, TP508.	SWSJ35 3-6m @ 0.8-6.2ppm SWSJ36 3-5m @ 3.8-17.3ppm SWSJ37 1-6m @ 1.9-13.1ppm SWSJ38 0.3-6m @ 0.1-35.5ppm BH521 1-6.5m @ 0.1-1.7ppm TP508 0.5-3m @ 0.1-0.7ppm
Lagoon 26	SBHJ09 and 10, STPJ02 to 06, BH522, BH523, BH524, BH525, TP509.	SBHJ10 0.3-5m @ 0.9-3.1ppm BH522 0.5-5.2m @ 0.2-0.3ppm BH523 1.5-1.7m @ 0.1ppm BH524 4-4.2m @ 0.7ppm BH525 1-2.2m @ 0.2ppm

6.5 Groundwater Monitoring

6.5.1 A summary of the groundwater sampling, groundwater monitoring and ground gas monitoring rounds is shown in Table 10.

Table 10: Summary of Monitoring Rounds

Site Area	Location Ref.	Total number of monitoring rounds (date of sampling rounds)	Monitoring details	Notes
Lagoon 12	LGBH2	**7 no**. (2 no. in 2002-date unknown, 22nd February 2008, 17th March 2008)	Groundwater level & sampling	——
	LGBH3	**8 no**. (2 no. in 2002-date unknown, 22nd February 2008, 17th March 2008)	Groundwater level & sampling	——
	SWSJ13	**6 no** (No data-dry)	Groundwater level	——
	LGBH1	**2 no**. (2 no. in 2002-date unknown)	Groundwater sampling	——
	SBHJ04CP	**6 no**. (22nd February 2008, 17th March 2008)	Groundwater level & sampling	——
	BH515 (shallow)	**4 no.** (6th March 2015, 13th March 2015, 18th March 2015, 7th May 2015)	Groundwater level, ground Gas	Outside of lagoon to the north
	BH515 (Deep)	**4 no.** (6th March 2015, 13th March 2015, 18th March 2015, 7th May	Groundwater level & sampling	Outside of Lagoon to

Site Area	Location Ref.	Total number of monitoring rounds (date of sampling rounds)	Monitoring details	Notes
		2015)		the north
	BHM4CAN040	**3 no.** 4th May 2016, 26th May 2016, 3rd June 2016	Groundwater level, Ground Gas	
Lagoon 25	LGBH4	**7 no**. (2 no. in 2002-date unknown, 22nd February 2008, 18th March 2008)	Groundwater level & sampling	——
	LGBH9	**8 no**. (3 no. in 2002-date unknown, 22nd February 2008, 17th March 2008)	Groundwater level & sampling	——
	LGBH7	**1 no**. (1 no. in 2002-date unknown)	Groundwater sampling	——
	SBHJ05	**6 no**. (22nd February 2008, 18th March 2008)	Groundwater sampling	——
	SWSJ21	**6 no**. (27th February 2008, 18th March 2008)	Groundwater level & sampling	——
	SWSJ23	**6 no**. (February 2008)	Groundwater level & sampling	——
	LGBH5	**3 no**. (3 no. in 2002-date unknown)	Groundwater sampling	——
	BH519 (shallow)	**4 no**. (19th March 2015, 26th March 2015, 2nd April 2015, 7th May 2015)	Groundwater level & sampling, ground gas	——
	BH519 (deep)	**3 4 no**. (19th March 2015, 26th March 2015, 2nd April 2015, 7th May 2015)	Groundwater level & sampling	——
	BH24	**No data**	——	——
	BHM4CAN041	27th May 2016	Ground gas	
	BHM4CANA012	27th May 2016	Ground gas	
Lagoon 27SW	SWSJ34	**6 no**. (27th February 2008, 19th March 2008)	Groundwater level & sampling	——
	LGBH10	**7 no**. (27th February 2002, 7th March 2002, 27th February 2008, 18th March 2008)	Groundwater level & sampling	——
	SBHJ06CP	**6 no**. (21st February 2008, 17th March 2008)	Groundwater level & sampling	——
	SBHJ07CP	**6 no**. (22nd February 2008, 17th March 2008)	Groundwater level & sampling	——
	BH17	**No data**	——	——
Lagoon 27SE	SWSJ37	**6 no**. (22nd February 2008, 19th March 2008)	Groundwater level & sampling	——
	LGBH12	**7 no**. (2 no. in 2002-date unknown, 27th February 2008, 13th March 2008)	Groundwater level & sampling	——
	BH521 (shallow)	**3 no**. (19th March 2015, 26th March 2015, 2nd April 2015, 7th May 2015)	Groundwater level & sampling, ground gas	——
	BH521 (deep)	**3 no**. (19th March 2015, 26th March 2015, 2nd April 2015, 7th May 2015)	Groundwater level & sampling	——
	BH18	**No data**	——	——

Site Area	Location Ref.	Total number of monitoring rounds (date of sampling rounds)	Monitoring details	Notes
Lagoon 26	SBHJ09CP	**6 no.** (21st February 2008, 18th March 2008)	Groundwater level & sampling	——
	BH525 (shallow)	**3 no.** (19th March 2015, 26th March 2015, 2nd April 2015, 7th May 2015)	Groundwater level & sampling, ground gas	Shallow / deep installation details not known for 26th March 2015 sampling round
	BH525 (deep)	**3 no.** (19th March 2015, 26th March 2015, 2nd April 2015, 7th May 2015)	Groundwater level & sampling	Shallow / deep installation details not known for 26th March 2015 sampling round
	SBHJ10CP	**6 no.** (22nd February 2008, 17th March 2008)	Groundwater level & sampling	——
	SBHJ08ACP	**6 no.** (22nd February 2008, 18th March 2008)	Groundwater level & sampling	——
	BHM4CAN043	**3 no.** 12th May 2016, 25th May 2016, 2nd June 2016	Groundwater level & sampling, Ground gas	

6.6 Laboratory Chemical Testing

6.6.1 A summary of all laboratory analysis undertaken on soil, groundwater, leachate and surface water from the previous site investigations is summarised in Table 11 to Table 15 below.

Table 11: Summary of Previous Investigation Sampling

Site Area	Site Investigation date	No. of soil samples	No. of leachate samples	No. of water samples	Suites of testing
Lagoon 12	2002	8	0	6	Metals, pH, phenols, ammoniacal nitrogen, chloride, cyanide, PAH, total TPH
	2004/2005/2006	0	0	0	-
	2008	21	2	6	Metals, pH, phenols, sulphate, ammoniacal nitrogen, chloride, cyanide, PAH, BTEX, SVOCs, VOCs, aliphatic and aromatic TPH, asbestos screen
	2015	11	3	3	Metals, pH, phenols, cyanide, PAH, BTEX, aliphatic and aromatic TPH, carbon banded TPH, PCB, asbestos screen

Site Area	Site Investigation date	No. of soil samples	No. of leachate samples	No. of water samples	Suites of testing
	2016	1	1	0	Metals, pH, BTEX, Phenols, PAH, TPH,
Lagoon 25	2002	15	2	9	Metals, inorganics, phenol, PAH, VOCs
	2004/2005/2006	0	0	0	-
	2008	25	13	7	Metals, pH, phenols, sulphate, ammoniacal nitrogen, chloride, cyanide, PAH, BTEX, SVOCs, VOCs, aliphatic and aromatic TPH, asbestos screen
	2015	9	4	6	Metals, pH, phenols, cyanide, PAH, BTEX, SVOCs, VOCs, aliphatic and aromatic TPH, PCB, asbestos screen
	2016	2	2	0	Metals, phenols, BTEX, TPH, PAH, pH
Lagoon 27SW	2002	4	1	2	Metals, pH, phenols, cyanide, inorganics, TPH, PAH, VOCs
	2004/2005/2006	0	0	0	-
	2008	16	5	6	Metals, pH, phenols, sulphate, ammoniacal nitrogen, chloride, cyanide, PAH, BTEX, SVOCs, VOCs, aliphatic and aromatic TPH, asbestos screen
	2015	5	1	0	Metals, pH, phenols, cyanide, PAH, BTEX, aliphatic and aromatic TPH, carbon banded TPH, PCB, asbestos screen
Lagoon 27SE	2002	0	0	2	Metals, pH, phenols, cyanide, inorganics, TPH, PAH, VOCs
	2004/2005/2006	0	0	0	-
	2008	11	4	4	Metals, pH, phenols, sulphate, ammoniacal nitrogen, chloride, cyanide, PAH, BTEX, SVOCs, VOCs, aliphatic and aromatic TPH, asbestos screen

Site Area	Site Investigation date	No. of soil samples	No. of leachate samples	No. of water samples	Suites of testing
	2015	5	1	3	Metals, pH, phenols, cyanide, PAH, BTEX, aliphatic and aromatic TPH, carbon banded TPH, PCB, asbestos screen
Lagoon 26	2002	4	2	0	Metals, pH, phenols, cyanide, inorganics, TPH, PAH, VOCs
	2008	31	9	6	Metals, pH, phenols, sulphate, ammoniacal nitrogen, chloride, cyanide, PAH, BTEX, SVOCs, VOCs, aliphatic and aromatic TPH, asbestos screen
	2015	13	2	6	Metals, pH, phenols, cyanide, PAH, BTEX, aliphatic and aromatic TPH, carbon banded TPH, PCB, asbestos screen
	2016	1	1	6	Metals, BTEX, TPH, PAH, pH, SVOCs, VOCs, PCBs

Soil Analysis

6.6.2 The following sections summarise the laboratory analytical results for soil samples collected during the various intrusive investigation phases. The available data set has been tabulated and is presented in Appendix 3.

6.6.3 To help inform the conceptual ground model, the analytical data from the Made Ground have been assessed separately from those of the natural soils (Tidal Flat Deposits specifically).

6.6.4 For the purpose of meeting the requirements of Volume 4, Section 1, Part 2 of the DMRB (HD22/08 – Managing Geotechnical Risk – 2008) (Highway Agency, 2008), the historical data used to support the PSSR, the additional 2015 information (Geotechnical Engineering, 2015) and 2016 information have been differentiated in the following sections.

6.6.5 The available information has been summarised in Table 12.

Table 12: Summary of Analytical Soil Data

Site Area	Formation Unit	Number of Soil Analysis per Analytical Suite								
		Metals & Inorganics	Asbestos	PAH	TPH	Phenol	BTEX	VOCs	SVOCs	Polychlorinated Biphenyl
Lagoon 12	***Pre-2015 Data***									
	Made Ground	22	18	20	18	22	18	18	18	18
	Natural Soils	6	2	2	2	6	2	2	2	2
	2015 Data									
	Made Ground	11	8	11	10	8	2	2	0	1
	2016 Data									
	Made Ground	1	0	1	1	1	1	0	0	0
	Total Lagoon 12 Data									
	Total	40	28	34	31	37	23	21	20	21
Lagoon 25	***Pre-2015 Data***									
	Made Ground	32	23	25	23	31	23	23	23	23
	Natural Soils	8	2	2	2	8	2	2	2	2
	2015 Data									
	Made Ground	5	5	5	3	5	3	0	0	2
	Natural Soils	4	2	4	2	3	2	0	0	3
	2016 Data									
	Made Ground	2	0	2	2	1	2	0	0	0
	Total Lagoon 25 Data									
	Total	51	32	38	32	48	32	25	25	30
Lagoon 27SW	***Pre-2015 Data***									
	Made Ground	13	11	11	11	13	11	9	9	11
	Natural	3	1	1	1	3	1	1	1	1

Site Area	Formation Unit	Number of Soil Analysis per Analytical Suite								
		Metals & Inorganics	Asbestos	PAH	TPH	Phenol	BTEX	VOCs	SVOCs	Polychlorinated Biphenyl
	Soils									
	2015 Data									
	Made Ground	5	3	5	3	5	3	0	0	1
	Total Lagoon 27SW Data									
	Total	21	15	17	15	21	15	10	10	13
Lagoon 27SE	***Pre-2015 Data***									
	Made Ground	4	2	4	4	2	2	4	4	4
	Natural Soils	4	4	3	3	4	4	4	4	4
	2015 Data									
	Made Ground	4	3	4	4	2	1	0	0	0
	Natural Soils	1	0	1	1	0	0	0	0	0
	Total Lagoon 27SE Data									
	Total	13	9	12	12	8	7	8	8	8
Lagoon 26	***Pre-2015 Data***									
	Made Ground	13	13	13	13	13	13	13	13	13
	Natural Soils	5	5	5	5	5	5	5	5	5
	2015 Data									
	Made Ground	13	10	13	11	6	8	0	0	5
	2016 Data									
	Made Ground	1	0	1	1	0	1	0	0	0
	Total Lagoon 26 Data									
	Total	32	28	32	30	24	27	18	18	23
Total Data (All Lagoons)		**157**	**112**	**133**	**120**	**138**	**104**	**82**	**81**	**95**

Soil Leaching Analysis

6.6.6 Similarly to the soils data, the soil leachate results have been considered for the Made Ground and natural soils separately. The available information is presented in Appendix 6 and summarised in Table 13.

Table 13: Summary of Soil Leaching Analytical Data

Site Area	Formation Unit	Number of Soil Leachate Analysis per Analytical Suite					
		Metals & inorganics	PAH	TPH	Phenol	BTEX	Polychlorinated Biphenyl
Lagoon 12	***Pre-2015 Data***						
	Made Ground	11	0	0	0	0	0
	Natural Soils	1	0	0	0	0	0
	2015 Data						
	Made Ground	3	3	3	3	3	1
	2016 Data						
	Made Ground	1	1	1	1	1	0
	Total Lagoon 12 Data						
	Total	16	4	4	4	4	1
Lagoon 25	***Pre-2015 Data***						
	Made Ground	14	0	0	0	0	0 0
	Natural Soils	1	0	0	0	0	0 0
	2015 Data						
	Made Ground	1	1	1	1	1	0
	Natural Soils	3	3	3	2	3	0
	2016 Data						
	Made Ground	2	2	2	1	2	0
	Total Lagoon 25 Data						
	Total	21	6	6	4	6	0
Lagoon 27SW	***Pre-2015 Data***						
	Made Ground	6	0	0	0	0	0
	2015 Data						
	Made Ground	1	1	1	1	1	0
	Total Lagoon 27SW Data						
	Total	7	1	1	1	1	0
Lagoon 27SE	***Pre-2015 Data***						
	Made Ground	4	0	0	0	0	0
	Natural Soils	2	0	0	0	0	0
	2015 Data						
	Made Ground	1	1	0	1	1	0
	Total Lagoon 27SE Data						
	Total	7	1	0	1	1	0
Lagoon 26	***Pre-2015 Data***						
	Made Ground	9	0	0	0	0	0
	2015 Data						

Site Area	Formation Unit	Number of Soil Leachate Analysis per Analytical Suite					
		Metals & inorganics	PAH	TPH	Phenol	BTEX	Polychlorinated Biphenyl
	Made Ground	2	2	2	2	2	1
	2016 Data						
	Made Ground	1	1	1	0	1	0
	Total Lagoon 26 Data						
	Total	12	3	3	2	3	1
Total Data (All Lagoons)		**63**	**15**	**14**	**12**	**15**	**2**

Groundwater Analysis

6.6.7 The following sections summarise the laboratory analytical results for groundwater samples collected during the various intrusive investigation phases. The available data set has been tabulated in a table format and is presented in Appendix 4 with supporting laboratory certificates available in the relevant original ground investigation reports.

6.6.8 The available data relating to water samples taken from wells installed within the Made Ground and the groundwater of the Glaciofluvial Deposits are summarised in Table 14.

Table 14: Summary of Analytical Groundwater Data

Groundwater Unit (geological formation)	Number of Groundwater Analysis per Analytical Suite (number of well locations)							
	Metals & inorganics	PAH	TPH	Phenol	BTEX	VOCs	SVOCs	Polychlorinated Biphenyl
Pre-2015 Data								
Perched (Made Ground)	40(11)	27 (11)	27 (11)	20 (11)	28 (11)	26 (11)	25 (11)	0 (0)
Perched (Tidal Flat Deposits)	13 (3)	11 (3)	11 (3)	12 (3)	10 (3)	14 (3)	55 (3)	0 (0)
Aquifer (Mercia Mudstone	2 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	0 (0)
2015 Data								
Perched (Made Ground)	6 (2)	6 (2)	6 (2)	6 (2)	6 (2)	3 (2)	3 (2)	2 (1)
Perched (Tidal Flat Deposits)	15 (4)	16 (4)	16 (4)	15 (4)	16 (4)	10 (4)	10 (4)	6 (2)
2016 Data								
Perched (Made Ground)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	2 (1)
Perched (Tidal Flat Deposits)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	2 (1)

Groundwater Unit (geological formation)	Number of Groundwater Analysis per Analytical Suite (number of well locations)							
	Metals & inorganics	PAH	TPH	Phenol	BTEX	VOCs	SVOCs	Polychlorinated Biphenyl
Total Data								
Total	82 (23)	67 (23)	67 (23)	60 (23)	67 (23)	60 (23)	100 (23)	12 (5)

Surface Water Analysis

6.6.9 Table 15 summarises the laboratory analytical results for surface water samples collected during the various intrusive investigation phases. The available data set has been tabulated and is presented in Appendix 5 with the supporting laboratory certificates available in the relevant original ground investigation reports.

Table 15: Summary of Analytical Surface Water Data

Surface Water System	Number of Water Analysis per Analytical Suite (number of locations) – 2015 data / All GI data				
	Metals & inorganics	Water quality parameters	PAH	TPH	BTEX
Pre-2015 Data					
Bowleaze Reen	4 (1)	4 (1)	0 (1)	4 (10)	0 (1)
Monks Ditch	8 (2)	8 (2)	4 (2)	3 (2)	0 (2)
Monkscroft Reen	4 (1)	4 (1)	0 (1)	0 (1)	0 (1)
2015 Data					
Drainage Ditches Onsite	6 (2)	6 (2)	6 (2)	6 (2)	6 (2)
Bowleaze Reen	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
Monks Ditch	4 (2)	4 (2)	4 (2)	4 (2)	4 (2)
Total Data					
Total	27 (9)	27 (9)	15 (9)	18 (18)	11(9)

6.7 Review of Available Data

6.7.1 The distribution of investigation data available for the Site is considered to be reasonable in terms of the historical activities identified on the Site and the hydrogeological units sampled. The analytical testing covers a comprehensive range of parameters that includes speciated PCBs, PAHs and TPH and asbestos screening. Physical and chemical groundwater and ground gas data have also been obtained for all key units on the site (i.e. Made Ground, Tidal Flat Deposits and underlying groundwater bearing units).

6.7.2 Groundwater and ground gas data are available for one borehole within Lagoon 27SE, two locations within Lagoon 25, Lagoon 26 and Lagoon 12 (eight in total).

6.7.3 The general structure of the Lagoons 12, 25 and 26 has been identified following the 2016 Additional Ground Investigation.

6.7.4 It should be noted that during drilling of BHM4CANA012 and BHM4CAN041 during the 2016 Additional Ground Investigation gaseous releases of elevated hydrogen sulphide and carbon monoxide were recorded. This has precluded ground water monitoring from these wells. This potential for elevated levels of hydrogen sulphide and carbon monoxide is discussed further in Section 7.8 of this report.

7 Ground Conditions

7.1 General

7.1.1 The geological logs for all available exploratory holes excavated on or in close proximity to the Site are provided in Appendices 1a, 1b, 1c, 1d and 1e. The observed sequence of natural and Made Ground material is consistent with those discussed in the 2014 PSSR and is summarised in the following sections. Information from the Supplementary Ground Investigation (Geotechnical Engineering, 2015) and the 2016 Additional Ground Investigation has also been used.

7.1.2 The geological sequence is discussed for Lagoons 12, 25, 27SW, 27SE, and 26.

7.2 Geology – Lagoon 12

Made Ground

7.2.1 Lagoon 12 consists of an approximately 6 m high raised bunded lagoon infilled with waste materials reported to comprise Blast Furnace (BF) and/or Basic Oxygen Slag (BOS) slurry. A coarse fraction of the slag was used to construct the peripheral bund in order to contain the slurry material.

7.2.2 The previous ground investigations have confirmed coarse slag (mainly gravel with infrequent cobble) forms an outer bund with fine material (slurry typically described as silt or clay) placed on top of coarse slag within the lagoon itself. The top of the slurry is generally level with the top of the bund. The slurry was found to be of 3 to 5.7 m in thickness at least before the exploratory refused on top of dense coarse slag. It is understood that the slurry may be interbedded with layers of coarse slag. A basal layer of coarse slag was identified during the 2016 Additional Ground Investigation to 7.8 m bGL.

7.2.3 The thickness of the coarse slag in the bund ranged between 7.2 and 9.3 m, inferring a basal elevation at 1.51 to 3.5 m AOD.

7.2.4 The base of the lagoon is also reported to comprise a layer of coarse slag although this has not been fully proven by the previous ground investigations. Evidence of this is noted in BH514A, various refusals in window sample boreholes drilled in the main lagoon and BHM4CAN040 where no material was recovered but drilling was difficult and dense gravel is inferred.

7.2.5 The original ground level (pre-lagoon construction) may be estimated to be at around 5 m AOD, using nearby exploratory locations from outside the lagoon. This would infer the base of the lagoon to be 1.9 to 3.7 m AOD.

Superficial Deposits

7.2.6 Unconsolidated superficial deposits were encountered beneath the slag in all locations. These comprised Tidal Flat Deposits consisting of, generally firm bluish grey clays becoming soft or very soft with depths.

7.2.7 The deposits included a main 1.5 m thick layer of peat, at about 0 m AOD. This peat seems to be continuous beneath Lagoon 12 and extends beyond its footprint. A discrete shallower and thinner layer was found in borehole SBHJ04 at

1.2 m AOD with a recorded thickness of 0.5 m and in BHM4CAN040 at 0.57 m AOD with 0.1m thickness.

7.2.8 Sand and gravel material considered to represent Glaciofluvial Deposits was found to underlie the predominantly fine and cohesive Tidal Flat Deposits at a depth of -4.7 m AOD (i.e. 16 m below the top of the lagoon). These coarse deposits were discontinuous and were present in borehole SBHJ04 only with thickness of 1.4 m. This material was absent in boreholes BH513 and BH516.

Solid Geology

7.2.9 Below the Tidal Flat Deposits or Glaciofluvial Deposits, the Mercia Mudstone Formation was encountered at depth of 11 to 14.6 m bGL (-6.16 to -5.9 m AOD). The Mercia Mudstone was typically described as very stiff reddish brown clay.

Geological Sequence Summary

7.2.10 The general geological sequence identified during the previous ground investigations is summarised inTable 16.

Table 16: Summary of Geological Sequence – Lagoon 12

Unit	Description	Thickness Range (m)	Basal depth (m AOD)
Made Ground (above original ground level)	Coarse slag forming a retaining peripheral bund which contains slag slurry within.	About 7	Assume 5
Made Ground (below original ground level)	Coarse slag forming a retaining peripheral bund which contains slag slurry within.	1.5 to 4.3	1.9 to 3.7
Superficial Deposits (Tidal Flat Deposits)	Silty clay, organic in places with at least one main peat layer (see below)	7 to 9.6	-5.9 to -6.9
Superficial Deposits (Tidal Flat Deposits)	Peat layer	1.2-1.5	-1.76 to – 1.23
Superficial Deposits (Glaciofluvial Deposits)	Sand and gravel	Absent to 1.4	-6.16
Mercia Mudstone	Very stiff becoming weak completely fractured mudstone	>10	< -18.3

7.3 Geology – Lagoon 25

Made Ground

7.3.1 Lagoon 25 consists of an approximately 7 to 8 m high raised bunded lagoon infilled with waste materials reported to comprise Blast Furnace (BF) and/or Basic Oxygen Slag (BOS). As for Lagoon 12, the coarse fraction of the slag was used to construct the peripheral bund in order to contain the slurry material.

7.3.2 The thickness of the coarse slag of the bund ranged from 11.5 to over 12.2 m, inferring a basal elevation at 0.45 - 1.74 m AOD.

7.3.3 The full depth of the waste slurry within the lagoon was proven during the 2016 Additional Ground Investigation. It was proven to 3.19 m AOD within BHM4CAN041 terminating on a basal layer of coarse slag and to 2.66 m AOD within BHM4CANA011 where it comprised a coarse slurry with a layer of coarse slag identified near the base

7.3.4 The original ground level pre-lagoon construction is estimated to be at around 5 m AOD, using nearby exploratory locations from outside the lagoon. This would infer the base of the lagoon to be at a similar albeit slightly greater depth to Lagoon 12.

7.3.5 Made Ground consisting of a clay material with slag content was encountered (0.5 to 2.5 m in thickness) outside and immediately beyond to the south of Lagoon 12 within boreholes LGBH5, BH518, BH519, BH24 and LGBH9.

Superficial Deposits

7.3.6 Unconsolidated superficial deposits were encountered beneath the Made Ground in all locations. These comprised Tidal Flat Deposits, generally firm bluish grey clays becoming soft or very soft with depth.

7.3.7 The deposits included a 1.3 m thick layer of peat, at about -0.26 m AOD in borehole SBHJ05, which appears to be in continuity with the one peat band encountered in Lagoon 12. The top of the peat is shown to rise eastwards up to an elevation of 4.85 m AOD centrally (borehole BH519) and at least 4.78 m AOD at the eastern end (borehole BH24) making the stratum near or in direct contact with the overlying slag. The thickness of the peat also increases eastwards up to 4.15 m centrally (BH519). Boreholes further east of BH519 show the peat to continue being directly beneath the Made Ground although of lesser thickness.

7.3.8 The coarse Glaciofluvial Deposits were not encountered in any of the boreholes sunk within Lagoon 25, although their presence cannot be ruled out given their predicted discontinuous nature.

Solid Geology

7.3.9 Below the Tidal Flat Deposits the Mercia Mudstone Formation was encountered at depth of 16.5 - 18.9 m bGL beneath the Lagoon 25 and at depths of 10 to 5-12 m bGL outside the lagoon. In terms of elevation, the top of the mudstone was found to be at -6.15 to -5.6 m AOD, which remains consistent with the levels seen in Lagoon 12. The Mercia Mudstone was typically described as very stiff reddish brown clay.

Geological Sequence Summary

7.3.10 The general geological sequence identified during the previous ground investigations is summarised inTable 17.

Table 17: Summary of Geological Sequence – Lagoon 25

Unit	Description	Thickness Range (m)	Basal depth (m AOD)
Made Ground (above original ground level)	Coarse slag forming a retaining peripheral bund which contains slag slurry within.	About 7 to 8.5	Assume 5
Made Ground (below original ground level)	Coarse slag forming a retaining peripheral bund which contains slag slurry within.	3.24 to >4.55	<0.45 to 1.74
Superficial Deposits (Tidal Flat Deposits)	Silty clay, organic in places with at least one main peat layer (see below)	10 to 11.15	-5.9 to -6.9
Superficial Deposits (Tidal Flat Deposits)	Peat Layer (apparent dip)	1.2 to 11	-2 to 1.56
Superficial Deposits (Glaciofluvial Deposits)	Sand and gravel	Absent	Absent
Mercia Mudstone	Very stiff becoming weak completely fractured mudstone	>10	< -13.3

7.4 Geology – Lagoon 27SW

Made Ground

7.4.1 Lagoon 27SW consists of an approximately 5 - 7 m high raised bunded lagoon infilled with waste materials to comprise BF and/or BOS slurry. Similar to Lagoons 12 and 25, the coarse fraction of the slag was used to construct a peripheral bund in order to contain the slurry material.

7.4.2 Based on boreholes LGBH10 and BH520, the thickness of the coarse slag of the bund range between 10.6 m and 12.2 m, inferring a basal elevation at 0.65 to 1.64 m AOD.

7.4.3 No intrusive boreholes proved the full sequence of the slurry within the lagoon. It is understood that the slurry may be interbedded with layers of coarse slag as per Lagoons 12 and 25.

7.4.4 The original ground level pre-lagoon construction is estimated to be at around 5 m AOD, based upon nearby exploratory locations outside the lagoon. This would infer the base of the lagoon to be a similar depth to Lagoons 12 and 25.

7.4.5 Made Ground consisting of a clay material with slag content of over a 0.5 m in thickness was identified outside and immediately beyond to the south of the Lagoon in SHBJ06 and BH17. At SHBJ07, the thickness of Made Ground was found substantially thicker by up to 4 m depth, (basal elevation of 1.79 m AOD). At this location, the Made Ground was described as “with frequent pocket of peat below 2 m”.

Superficial Deposits

7.4.6 Unconsolidated superficial deposits were encountered beneath the Made Ground in all locations. These comprised Tidal Flat Deposits which were encountered as generally firm bluish grey clays becoming soft or very soft with depth.

7.4.7 The peat layer near or directly beneath the Made Ground in Lagoon 25 was also found beneath Lagoon 27SW. This was found to be generally 2 m in thickness with a basal elevation of 0.89 to – 2.76 m AOD. At borehole SBHJ07 the thickness of the peat layer may be up to 3.86 m when considering the inclusion of peat material within the base of Made Ground.

7.4.8 Similarly to Lagoon 25, the coarse Glaciofluvial Deposits were not encountered in any of the boreholes within Lagoon 27SW, although their presence cannot be ruled out given their discontinuous nature.

Solid Geology

7.4.9 Below the Tidal Flat Deposits the Mercia Mudstone Formation was encountered at depth of 17.5 m bGL beneath the lagoon and at depths of 10.5 to 12.5 m bGL outside the lagoon. The top of the mudstone was found to be at -6.32 to -4.21 m AOD, which remains consistent with the levels seen in Lagoons 12 and 25. The Mercia Mudstone was typically described as very stiff reddish brown clay.

Geological Sequence Summary

7.4.10 The general geological sequence identified during the previous ground investigations is summarised in Table 18.

Table 18: Summary of Geological Sequence – Lagoon 27SW

Unit	Description	Thickness Range (m)	Basal depth (m AOD)
Made Ground (above original ground level)	Coarse slag forming a retaining peripheral bund which contains slag slurry within.	About 5 to 7	Assume 5
Made Ground (below original ground level)	Infill described above extend below original ground level	3 to 4	0.65 to 1.64
Superficial Deposits (Tidal Flat Deposits)	Silty clay, organic in places with at least one main peat layer (see below)	6 to 10	-6.32 to -4.21
Superficial Deposits (Tidal Flat Deposits)	Peat Layer	1.2 to 11	0.89 to -1.45
Superficial Deposits (Glaciofluvial Deposits)	Sand and gravel	Absent	-
Mercia Mudstone	Very stiff becoming weak completely fractured mudstone	>3.3	< - 7.51

7.5 Geology – Lagoon 27SE

Made Ground

7.5.1 Similar to Lagoons 12 and 25 and 27SW a bund surrounds Lagoon 27SE. The bunds have been engineered on the northern (shared with Lagoon 27NE) and western (shared with Lagoon 27SW) boundaries. The bund on its southern boundary has not yet been constructed and instead some stockpiles of coarse slag have been awaiting placement. There are no bunds or stockpiled bund material along the eastern boundary of Lagoon 27SE (shared with Lagoon 26).

7.5.2 Lagoon 27SE is reported to be empty and ground level within the partial bund perimeter is found at or close to original ground level.

7.5.3 However, the boreholes within the cell itself proved 0.9 to 1.5 m thick of slurry slag. In SWSJ35 the slurry was underlain by 0.5 m thick of coarse slag. Elsewhere the slurry was found to overly directly the Tidal Flat Deposits. The base of the slurry slag was found to range between 4.05 to 5.05 m AOD.

7.5.4 Outside and immediately to the south of Lagoon 27SE, Made Ground was found to include clay material with slag content to depth of 1.8 to 3 m bGL (3.66 - 4.6 m AOD) in boreholes BH18 and LGBH12 and trial pit TP508. At borehole BH521, a similar material was encountered although this extended to 2.55 m AOD (4.6 m in thickness) which is lower than the basal depth of Made Ground within the cell.

Superficial Deposits

7.5.5 Unconsolidated superficial deposits were encountered beneath the Made Ground in all locations. These comprised Tidal Flat Deposits consisting of, generally firm bluish grey clays becoming soft or very soft with depth.

7.5.6 The peat layer beneath Lagoon 27SW, also seen in Lagoon 27SE, was generally in excess of 1.7 m in thickness.

7.5.7 Similar to Lagoons 25 and 27SW, the coarse Glaciofluvial Deposits were not encountered in any of the boreholes drilled within Lagoon 27SE, although their presence cannot be ruled out given their discontinuous nature.

Solid Geology

7.5.8 Below the Tidal Flat Deposits the Mercia Mudstone Formation was encountered at depth of 10.9-12 m bGL. The top of the Mercia Mudstone was found to be at -6 to -5.14 m AOD, which remain consistent with the levels seen in Lagoons 12, 25 and 27SE. The Mercia Mudstone was typically described as very stiff reddish brown clay.

Geological Sequence Summary

7.5.9 The general geological sequence identified during the previous ground investigation is summarised in Table 19.

Table 19: Summary of Geological Sequence – Lagoon 27SE

Unit	Description	Thickness Range (m)	Basal depth (m AOD)
Made Ground	Slag slurry over discontinuous coarse slag layer	0.9 to 4.6	0.65 to 1.64
Superficial Deposits (Tidal Flat Deposits)	Silty Clay, organic in places with at least one main peat layer (see below)	6 to 10	-6 to -5.14
Superficial Deposits (Tidal Flat Deposits)	Peat layer	1 to >1.7	-0.74 to 0
Superficial Deposits (Glaciofluvial Deposits)	Sand and gravel	Absent	-
Mercia Mudstone	Very stiff becoming weak completely fractured mudstone	>7	< - 13

7.6 Geology – Lagoon 26

Made Ground

7.6.1 Lagoon 26 has no peripheral bund.

7.6.2 Whilst the ground level within the lagoon is similar to the ground level in the surrounding fields. Made Ground has been encountered to depths of 0.3 to 5.8 m bGL (1.18 to 4.7 m AOD). The Made Ground comprises predominantly slag gravel with variable mix of limestone, concrete, brick, lime and to lesser frequency metal and wood.

7.6.3 The variability in the thickness of Made Ground and its basal depth below ground level may indicate irregular settlement or placement of Made Ground materials across the lagoon area.

7.6.4 The limited data outside and to the south of Lagoon 26 (STPJ05, SHJ10, TP509 and BH525) has also identified similar Made Ground material to depth of 0.6 - 2.5 m (3.45 to 5.25 m AOD).

Superficial Deposits

7.6.5 Unconsolidated superficial deposits were encountered beneath the Made Ground in all locations. These comprised Tidal Flat Deposits consisting of generally firm bluish grey clays becoming soft or very soft with depth.

7.6.6 A thin and discontinuous peat band was encountered at typically 5.6 to 7.7 m bGL (-0.5 to -1.75 m AOD) with a thickness of less than 1 m.

7.6.7 Coarse Glaciofluvial Deposits were encountered in one borehole (SBHJ08A) at 10.4 m bGL (-4.5 m AOD) with a thickness of 0.4 m. All other deep boreholes proved the Tidal Flat Deposits overlie the Mercia Mudstone bedrock directly, confirming the discontinuous presence of the Glaciofluvial Deposits.

7.6.8 Borehole BH525 encountered stiff dark reddish brown slightly gravelly clay, identified in the borehole log sheet as River Terrace Deposit. However, this is considered to likely represent the upper formation of the Mercia Mudstone.

Solid Geology

7.6.9 Below the Tidal Flat Deposits and, where present, Glaciofluvial Deposits the Mercia Mudstone formation was encountered at depth of 9.3 - 11.1 m bGL. The top of the Mercia Mudstone was found to be at -4.9 to -3.9 m AOD, which remains consistent with the levels seen in all other lagoons, albeit marginally shallower. The Mercia Mudstone was typically described as very stiff reddish brown clay becoming weak mudstone.

Geological Sequence Summary

7.6.10 The general geological sequence identified during the previous ground investigation is summarised in Table 20.

Table 20: Summary of Geological Sequence – Lagoon 26

Unit	Description	Thickness Range (m)	Basal depth (m AOD)
Made Ground	Coarse slag with mix of limestone, concrete and bricks	0.3 to 5.8	1.18 to 4.7
Superficial Deposits (Tidal Flat Deposits)	Silty clay, organic in places with a discontinuous peat layer (see below)	5.3 to 9	-3.9 to -4.9
Superficial Deposits (Tidal Flat Deposits)	Peat layer (discontinuous)	0.5 to 1.0	-2.15 to -0.6
Superficial Deposits (Glaciofluvial Deposits)	Sand and gravel (discontinuous)	0.4	-4.91
Mercia Mudstone (Mudstone)	Very stiff becoming weak completely fractured mudstone	>9	< -16.7

7.7 Visual and Olfactory Evidence of Contamination

7.7.1 A summary of visual and olfactory evidence of potential contamination encountered during the previous ground investigations is summarised in Table 21.

Table 21: Visual and Olfactory Evidence of Contamination Summary

Site Area	Location ID	Depth (m bGL)	Strata	Evidence of Potential Contamination
Lagoon 12	All locations	All	Made Ground - Slag slurry and coarse slag	Slag and clinker reported.
	LGBH1	GL-8.5	Made Ground (coarse slag)	Slag containing concrete and clinker.
	LGBH2	GL-7.9	Made Ground (concrete gravel)	Concrete and slag.

Site Area	Location ID	Depth (m bGL)	Strata	Evidence of Potential Contamination
	SBHJ08	GL-2.2	Made Ground (coarse slag)	Slag containing ash.
	SWSJ09A	GL-2.6	Made Ground	Containing gravel of brick.
	SWSJ12	4.35-4.55	Made Ground (base of slag slurry within coarse slag layer)	Possible contamination (no further details given in the log).
	BH513	GL-9.3	Made Ground (coarse slag)	Slag containing brick. Malodorous (no further details given in the log).
	BH514	3.5-4.0	Made Ground (coarse slag)	Iron nodules.
		6.7	Made Ground (coarse slag)	Metal.
	BH515	GL-4.0	Made Ground (coarse slag)	Slag containing brick and fibrous organic material.
	BH516	GL-3.5	Made Ground (coarse slag)	Slag containing tarmacadam and brick.
	TP506	2.2-3.6	Made Ground (coarse slag)	Slag containing ash, brick, wood, plastic and steel.
Lagoon 25	Many locations		Made Ground	Slag and clinker reported (gravel & boulders).
	LGBH4	GL-11.2	Made Ground (coarse slag)	Slag containing ash and clinker.
	LGBH9	1.6-2.7	Made Ground (coarse slag)	Slag containing ash and clinker.
	SBHJ05	GL-6.0	Made Ground	Ash and clinker.
	SWSJ18	1-3.45	Made Ground (coarse slag)	Slag containing brick.

Site Area	Location ID	Depth (m bGL)	Strata	Evidence of Potential Contamination
Lagoon 27SW	All locations	All	Made Ground	Slag and clinker reported (gravel & boulders).
	LGBH10	GL-10.6	Made Ground (coarse slag)	Slag containing ash.
	SBHJ04	GL-6.0	Made Ground	Ash and clinker.
	BH520	4.9-7.0	Made Ground (coarse slag)	Slag containing fragments of metal.
Lagoon 27SE	All locations	All	Made Ground	Slag and clinker reported (gravel & boulders).
Lagoon 26	All locations	All	Made Ground	Slag reported (gravel & boulders).
	STPJ01	GL-3.0	Made Ground (coarse slag)	Slag containing brick, concrete, tarmac, wood and metal. Slight sulphur odour reported from 0.3 m.
	STPJ02	GL-0.3	Made Ground (coarse slag)	Slag containing brick and concrete.
		0.3-1.2	Made Ground (coarse slag)	Strong hydrocarbon odour at 0.3 m. Wooden sleepers reported from 0.5 to 1.2 m.
	STPJ03	GL-1.2	Made Ground (coarse slag)	Slag containing brick, concrete, wood and metal.
	STPJ04	GL-1.2	Made Ground (coarse slag)	Slag containing brick and concrete.
	STPJ05	GL-0.3	Made Ground (coarse slag)	Slag containing concrete and metal.
	STPJ06	GL-2.6	Made Ground (coarse slag)	Slag containing concrete, brick and metal.
	BH522	GL-2.3	Made Ground (coarse slag)	Slag containing rare fragments of steel.
	BH524	GL-4.0	Made Ground (coarse slag)	Slag containing concrete and brick.
	BH525	1.0-1.3	Made Ground (slag)	Clay containing gravel of brick and slag.
	BHM4CAN043	0 - 0.45 & 1.7 - 2.4	Made Ground (coarse slag)	Slag containing concrete, brick and lime.

7.7.2 Slag, ash and clinker are observed within the majority of the sampling locations across the Site. Fragments of brick, concrete, tarmacadam and metal are commonly observed within the coarse slag matrix.

7.7.3 Evidence of hydrocarbon contamination was identified during previous ground investigations, described as a strong hydrocarbon odour within STPJ02 (Lagoon 26).

7.7.4 BH513 (within Lagoon 12) was described as malodorous from ground level to 9.3 m bGL.

7.7.5 'Possible contamination' is recorded within the Made Ground at SWSJ12 (Lagoon 12), however no further information is available.

7.7.6 PID readings provided in Table 9 recorded VOC levels to a maximum of 35.5 ppm at SWSJ38 (Lagoon 27SE). This is indicated to be associated with frequent organic material.

7.8 Gas Monitoring

7.8.1 The ground gas monitoring datasets collected during each of the four monitoring rounds of the 2015 investigation (Geotechnical Engineering, 2015) and the three rounds of the 2016 Additional Ground Investigation are summarised on the field data sheets provided in Appendix 2. The maximum gas concentrations (minimum for oxygen) are presented in Table 22.

Table 22: Summary of Ground Gas Monitoring

Site Area	Location ID	Flow (l/hr)	VOCs (ppm)	CH4 (%/vol)	Peak LEL (%)	CO2 (%/vol)	O2 (%/vol)	CO (ppm)	H2S (ppm)
		Max.	Max.	Max.	Max.	Max.	Min.	Max.	Max.
Lagoon 12	BH515 (shallow) within coarse slag	0	5.2	3.9	90	0.1	0	935 (935)	200 (200)
	BHM4CAN040	0.4		18.6	> 100%	5.3	11.8	1	0
Lagoon 25	BH519 (shallow) within peat	0.4	2.1	8.6	>100 %	0	0.6	248 (193)	0
	BHM4CANA012	See Table 23 below							
	BHM4CAN041	See Table 23 below							
Lagoon 27SE	BH521 (shallow) within peat	0.4	1.6	5	94	0.3	19.3	2	0
Lagoon 26	BH525 (shallow) within Made Ground	1.2	1.2	9.9	>100 %	0	0	4 (3)	0
	BHM4CAN043 (Shallow)	0.4		0.3	0	0.1	19.7	4	0
	BHM4CAN043 (Deep)	4.4		4.4	0	0.1	18.1	2	0

7.8.2 BHM4CANA012 and BHM4CAN041 within Lagoon 25 encountered significantly elevated levels of hydrogen sulphide and carbon monoxide during the 2016 Additional Ground Investigation. Due to the concentrations of gases encountered, a separate monitoring regime was formulated and the readings encountered are discussed below.

7.8.3 Drilling at location BHM4CANA012 commenced on 21st January 2016. At a depth of approximately 8 m, at the interface between the lagoon sludge and underlying stabilised slag deposit, gas emissions were detected and monitoring was undertaken. This indicated elevated concentrations of both hydrogen sulphide and carbon monoxide and drilling was suspended. A suitably robust monitoring regime was formulated which involved the monitoring of ambient air concentrations within the vicinity of both BHM4CANA012 and BHM4CAN041 to confirm safe conditions were present prior to surveying directly from the gas valves. Monitoring was undertaken primarily to establish if drilling works across the lagoons could continue.

7.8.4 Due to the potential acute human health impacts associated with elevated levels of hydrogen sulphide and carbon monoxide, monitoring from the borehole headworks was not undertaken if significantly elevated levels of these gases were observed during the ambient air monitoring, in this instance the reading obtained during the ambient air monitoring is displayed.

7.8.5 Results from this subsequent monitoring are summarised in Table 23.

Table 23: Summary of Subsequent Ground Gas Monitoring

Location ID	Date	CO (ppm)	H2S (ppm)
		Max.	Max.
BHM4CANA012	20/01/2016	50**	50**
	21/01/2016	1500*	1500*
	28/01/2016		During safety inspection gas was identified within exclusion zone away from headworks
	03/02/2016	100**	500**
	04/02/2016	100**	1500*
	12/02/2016	During safety inspection gas was identified within exclusion zone away from headworks	During safety inspection gas was identified within exclusion zone away from headworks
	17/02/2016	50**	1500*
	04/03/2016	10***	400**
	18/03/2016	300**	0
	27/05/2016	219**	286**
	31/05/2016	19***	No H2S identified before monitoring was aborted due to high CO concentrations
BHM4CAN041	21/01/2016	No CO identified before monitoring was aborted due to high H2S concentrations	1500**
	28/01/2016	No CO identified before monitoring was aborted due to high H2S concentrations	During safety inspection gas was identified within exclusion zone away from headworks
	03/02/2016	300**	350**
	04/02/2016	0	0
	12/02/2016	During safety inspection	During safety inspection gas

Location ID	Date	CO (ppm)	H2S (ppm)
		Max.	Max.
		gas was identified within exclusion zone away from headworks	was identified within exclusion zone away from headworks
	17/02/2016	0	0
	04/03/2016	0	0
	18/03/2016	0	0
	27/05/2016	140***	During safety inspection gas was identified within exclusion zone away from headworks
	31/05/2016	300***	No H2S identified before monitoring was aborted due to high CO concentrations
	03/06/2016	150***	No H2S identified before monitoring was aborted due to high CO concentrations
BH512 (shallow install)	03/06/2016	0	0
BH512 (deep install)	03/06/2016	0	0
BH515 (shallow install)	03/06/2016	1500*	No H2S identified before monitoring was aborted due to high CO concentrations
BH515 (deep install)	03/06/2016	1500*	No H2S identified before monitoring was aborted due to high CO concentrations
SWSJ21	03/06/2016	1500* (inside headworks tap presumed closed)	No H2S identified before monitoring was aborted due to high CO concentrations
SWSJ34	03/06/2016	1500*	During safety inspection gas was identified away from the headworks H2S 10ppm

* denotes the maximum level the gas box used can read.

** denotes monitoring terminated early due to elevated gas concentrations

*** denotes monitoring terminated early due to elevated concentrations identified within surrounding ambient air.

7.8.6 During the subsequent gas monitoring, elevated concentrations of carbon monoxide and hydrogen sulphide were identified, both within the ambient air surrounding boreholes and when monitoring from standpipes directly.

7.8.7 Due to the identification of hydrogen sulphide and carbon monoxide within the ambient air surrounding BHM4CANA012 and BHM4CAN041, additional boreholes BH512, BH515 (Geotechnical Engineering, 2015), SWSJ21 and SWSJ34 (Norwest Holst Soil Engineering, 2008) were monitored within the last round of monitoring to identify if similar conditions were also present at these locations.

7.8.8 With the exception of BH512, levels of hydrogen sulphide and or carbon monoxide were identified surrounding these historical boreholes.

7.9 Groundwater Monitoring

Groundwater Encountered During Investigation

7.9.1 Groundwater strikes were encountered during the drilling of boreholes and excavation of trial pits across the Site, as detailed on the geological logs provided in Appendices 1a, 1b, 1c, 1d and 1e. These are summarised in Table 24.

Table 24: Summary of Groundwater Level Data During Investigation

Site Area	Location	Strike Depth m bGL (m AOD)	Geological Formation	Level after 20 minutes depth m bGL (m AOD)	Remarks
Lagoon 12	LGBH2	7.5 (3.31)	Made Ground (coarse slag - bund)	7.5 (3.31)	Water ingress sealed at 8.0 m bGL into the Tidal Flat Deposits
	LGBH3	none reported	-	-	Water recorded at 6.9 m bGL (3.63 m AOD) within the Made Ground (coarse slag – bund) at the beginning of the shift.
	BH14b	9.51 (2.9)	Interface between Made Ground (coarse slag - bund) and Tidal Flat Deposits	No data	——
	SBHJ04	None reported	-	-	Water reported to be at 11 m bGL (0.24 m AOD) at start of shift when borehole taken down to 16 m bGL (-4.76 m AOD) on top of the Fluvio Glacial Deposits. Water reported to be at 1.85 m bGL (9.39 m AOD) when borehole taken down to 18.5 m bGL (-7.26 m AOD) into Mercia Mudstone
	BH513	8.2 (3.0)	Made Ground (coarse slag - bund)	4.5 (6.7)	Fast
		17.5 (-6.3)	Tidal Flat Deposits / Mercia Mudstone	7.7 (3.5)	Subartesian pressure
	BH516	6.7 (0.5)	Tidal Flat Deposit	5.1 (2.1)	———

Site Area	Location	Strike Depth m bGL (m AOD)	Geological Formation	Level after 20 minutes depth m bGL (m AOD)	Remarks
	BHM4CAN 040	7.8 (4,23)	Made Ground / Tidal Flat Deposits		Rapid ingress
Lagoon 25	LGBH4	9.3 (2.88)	Made Ground (coarse slag - bund)	9.1 (3.08)	Water ingress sealed at 11.4 m bGL into the Tidal Flat Deposits
	LGBH7	None reported	-	-	Water reported to be at 9.8 m bGL (2.85 m AOD) when borehole taken down to 12.2 m bGL (0.45 m AOD) within the Made Ground (coarse slag bund).
	SBHJ05	14.8 (-1.56)	Tidal Flat Deposits	Not recorded	——
	SWSJ21	4 (8.97)	Made Ground (slurry slag)	4 (8.97)	Seepage
		6 (6.97)	Made Ground (slurry slag)	6 (6.97)	Seepage
	SWSJ22A	Surface water recorded on logs			
	SWSJ22B	1 (10.99)	Made Ground (slurry slag)	1 (10.99)	Seepage
	SWSJ23	1.5 (10.79)	Made Ground (slurry slag)	1.5 (10.79)	Seepage
	BH24	2.58 (2.8)	Tidal Flat Deposit	Not recorded	——
	BHM4CAN 041	7.4	Made Ground	7.1	
	BHM4CAN A011	7.6 (3.86)	Made Ground	6.8 (4.66)	
		13.2 (-1.74)	Tidal Flat Deposits	12.7 (-1.24)	
Lagoon 27SW	LGBH10	7.5 (4.74)	Made Ground (coarse slag - bund)	7.4 (4.75)	——
	BH17	1.5 (3.81)	Tidal Flat Deposits	Not recorded	——
	SWSJ31	2.3 (8.04)	Made Ground (slurry slag)	Not recorded	Seepage
	SWSJ32	2.3 (7.97)	Made Ground (slurry slag)	Not recorded	Seepage
	SWSJ33	2.0 (7.17)	Made Ground (slurry slag)	Not recorded	Seepage
	SBHJ07	None reported	-	-	Water reported to be at 2.6 m bGL (3.19 m AOD) when borehole taken down to 3 m bGL (3.19 m AOD) within the Made

Site Area	Location	Strike Depth m bGL (m AOD)	Geological Formation	Level after 20 minutes depth m bGL (m AOD)	Remarks
					Ground.
Lagoon 27SE	SWSJ36	2.3 (3.04)	Tidal Flat Deposits	2.3 (3.04)	Seepage
	SWSJ37	3.5 (2.75)	Tidal Flat Deposits	3.5 (2.75)	Seepage
	LGBH12	0.8 (4.3)	Made Ground	0.5 (4.6)	Medium inflow
	TP4	1.4	Made Ground	Not recorded	Visible oil layer
	BH18	2.9	Made Ground	Not recorded	____
		3.0	Made Ground	Not recorded	____
	BH521	6.5 (-0.5)	Tidal Flat Deposits	5.9 (0.1)	——
Lagoon 26	BH20	2.3	Tidal Flat Deposits	Not recorded	____
		2.8	Tidal Flat Deposits	Not recorded	____
	TP1	1.64	Made Ground	Not recorded	Free product visible on groundwater
	TP2	2.0	Made Ground	Not recorded	Rapid ingress. Slight sheen on groundwater.
	TP3	1.1	Made Ground	Not recorded	Rapid ingress.
	SBHJ08A CP	1.3 (4.59)	Made Ground	1.2 (4.69)	Seepage
	SBHJ10 CP	2.5 (3.55)	Tidal Flat Deposits	1.0 (5.5)	Slow
	STPJ01	1.0 (4.95)	Made Ground	Not recorded	Fast on one face.
	STPJ02	0.5 (4.87)	Made Ground	Not recorded	Fast on one face.
	STPJ03	0.5 (5.07)	Made Ground	Not recorded	Fast on one face.
	STPJ03	0.5 (4.93)	Made Ground	Not recorded	Fast on all faces.
	STPJ05	2.6 (3.25)	Tidal Flat Deposits	Not recorded	Seepage on one face.
	STPJ06	0.5 (5.21)	Made Ground	Not recorded	Fast on all faces.
	BH523	1 (5.15)	Made Ground	1 (5.15)	Seepage
		10.5 (-4.35)	Mercia Mudstone Group	9.6 (-3.45)	Medium flow
	BH524	10.5 (-4.8)	Mercia Mudstone Group	10.35 (-4.65)	——
	BH525	1.5 (4.45)	Made Ground	1.3 (4.65)	Medium flow
	BHM4CAN 043	1.4 (5.58)	Made Ground	Not recorded	
	TP509	Seepages observed between 1.2 m bGL (Made Ground) and 4.5 m bGL (Tidal Flat Deposits)			

7.9.2 Groundwater was not recorded in any other boreholes and trial pits.

Groundwater Level During Monitoring Rounds

7.9.3 The entire groundwater level data set gathered on site is provided in Appendix 2 and summarised in Table 25.

Table 25: Summary of Groundwater Level Data During Monitoring

Site Area	Location	Installation	Depth of response zone (m bGL) and Geological Formation	No. Measurements	Min. Depth m bGL (m AOD)	Max. Depth m bGL (m AOD)	Comments
Lagoon 12	LGBH2	50 mm	0.9-9 m (Made Ground CS / Tidal Flat Deposits)	5	7.46 (3.35)	7.52 (3.29)	-
	LGBH3	50 mm	0.9-9 m (Made Ground CS / Tidal Flat Deposits)	5	7.2 (3.33)	7.32 (3.21)	-
	SBHJ04	50 mm	12.1-13.1 m (Tidal Flat Deposits)	6	6.61 (4.63)	6.8 (4.44)	-
	BH515 (shallow)	35 mm	0.85-5.2 m (Made Ground)	4	Dry		-
	BH515 (deep)	50 mm	9.8-13.0 m (Tidal Flat Deposits)	4	6.22 (4.43)	7.83 (2.82)	-
	LGBH1 and SWSJ13	No data					-
	BHM4CAN040	50 mm	1 - 8 (Made Ground SS)	3	6.61	6.68	-
Lagoon 25	LGBH4	50 mm	1-11 m (Made Ground CS)	5	8.87 (3.31)	9.0 (3.18)	-
	SBHJ05	50 mm	9.5-11.5 m (Made Ground CS)	6	8.91 (4.33)	9.16 (4.08)	-
	SWSJ21	50 mm	4-6 (Made Ground SS)	6	3.87 (9.1)	6.5 (6.47)	-
	SWSJ23	50 mm	5.8-7.8 m (Made Ground SS)	6	5.92 (6.37)	7.58 (4.71)	-
	BH519 (shallow)	35 mm	0.85-4.2 (Made Ground / Tidal Flat Deposits)	4	0.74 (5.11)	2.65 (3.2)	-
	BH519 (deep)	50 mm	6.8-11.2 (Tidal Flat Deposits)	4	1.37 (4.48)	3.5 (2.35)	-
Lagoon 27SW	SWSJ34	50 mm	3-6 (Made Ground SS)	6	Dry	2.36 (8.16)	Dry recorded once. Second shallowest is 3.33 m bGL (7.19 m AOD)

Site Area	Location	Installation	Depth of response zone (m bGL) and Geological Formation	No. Measurements	Min. Depth m bGL (m AOD)	Max. Depth m bGL (m AOD)	Comments
	LGBH9	50 mm	1.5-7 m (Made Ground / Tidal Flat Deposits)	5	1.05 (3.91)	1.56 (3.4)	-
	LGBH10	50 mm	11-15 m (Tidal Flat Deposits)	5	8.15 (4.09)	8.7 (3.54)	-
	SBHJ06 CP	50 mm	3.1-4.1 (Tidal Flat Deposits)	6	1.35 (4.83)1.20 (4.98)	1.59 (4.59)1.33 (4.85)	-
	SBHJ07 CP	50 mm	8.4-10.4 (Tidal Flat Deposits / Mercia Mudstone Group)	6	1.35 (4.44)	1.59 (4.2)	-
Lagoon 27SE	SWSJ37	50 mm	4.1-6.45 (Tidal Flat Deposits)	6	0.46 (5.79)	0.67 (5.58)	-
	BH521 (shallow)	35 mm	4.3-6.2 (Tidal Flat Deposits)	4	0.85 (5.15)	2.66 (3.34)	-
	BH521 (deep)	50 mm	8.8-11.2 (Tidal Flat Deposits / Mercia Mudstone Group)	4	1.99 (4.01)	3.57 (2.43)	-
Lagoon 26	SBHJ09 CP	50 mm	1.0-2.2 (Made Ground)	6	0.65 (5.11)	0.9 (4.86)	-
	BH525 (shallow)	35 mm	0.5-2.8 (Made Ground / Tidal Flat Deposits)	4	Dry	1.66 (4.29)	Dry recorded once. Second shallowest is 1.32 m bGL (4.63)
	BH525 (deep)	50 mm	9.8-11.8 (Glaciofluvial Deposits)	4	1.8 (4.15)	3.26 (2.69)	-
	SBHJ10 CP	50 mm	9.0-10.0 (Tidal Flat Deposits)	6	2.0 (4.05)	2.3 (4.2)	-
	SBHJ08A CP	50 mm	6.4-7.4 (Tidal Flat Deposits)	6	2.31 (3.58)	3.59 (2.3)	-
	BHM4CAN043	50	1 - 6 (Made Ground)	3	1.92	2.05	-
		35	8.7 - 11.7 (Tidal Flat Deposits / Mercia Mudstone)	3	1.93	2.12	-

Groundwater Summary – Lagoon 12

7.9.4 The main groundwater body is within the granular Glaciofluvial Deposits (where present) and the Mercia Mudstone which is confined by the overlying Tidal Flat Deposits. This demonstrates that the Tidal Flat Deposits to represent an aquitard to vertical groundwater flow based upon groundwater level observations during drilling. Hydrostatic pressures within the confined aquifer have been noted elsewhere with standing water levels in the Mercia Mudstone 13 to 15 m higher than the level of the groundwater strike. However, very limited information exists on the groundwater level in the Mercia Mudstone at the Site.

7.9.5 Discontinuous perched groundwater is seen within the upper formation of the Tidal Flat Deposits. This "groundwater" is regarded as "pore water" given the low permeability soil and little flow is likely. Data from borehole SBJ04 indicates the presence of subartesian pressures within this body with resting levels rising to within the Made Ground (about 4.5 m AOD).

7.9.6 Perched water bodies which are considered over the underlying cohesive soils of the Tidal Flat Deposits were identified by the intrusive works within the base of the peripheral bund (coarse slag Made Ground). The monitoring data indicates the lower 0.5 m of the Made Ground to be saturated (about 3.3 m AOD). Little variability in the recorded monitoring rounds is noted.

7.9.7 The extent of perched water bodies within the Made Ground is anticipated to be strongly influenced by rainfall events and water levels within the reen and ditch system.

7.9.8 No groundwater levels are available from within the slurry waste, though BHM4CAN040 was dry on all three monitoring occasions in 2016.

Groundwater Summary – Lagoon 25

7.9.9 The main groundwater body within the Mercia Mudstone was not encountered in any of the three boreholes that penetrated the aquifer (SBHJ05, BH518, BH519 and BHM4CANA011). However no monitoring wells have been installed and therefore standing levels cannot be confirmed.

7.9.10 Discontinuous perched groundwater is seen within the upper formation of the Tidal Flat Deposits. This "groundwater" is regarded as "pore water" given the low permeability soil and a little flow is likely. When encountered, little or no rise in the levels after 20 minutes is noted, indicating low recharge. The water strikes ranged between -2.5 to 2.8 m AOD. The standing levels of the perched groundwater are not known given the absence of monitoring wells targeting the Tidal Flat Deposits.

7.9.11 Water bodies were identified by the intrusive works within the base of the peripheral bund (coarse slag). It is likely that this water body is perched over the underlying cohesive soils of the Tidal Flat Deposits. The monitoring data indicates the lower 2.5 m of the coarse slag to be saturated (between 3.18 and 4.33 m AOD). Little variability in the recorded levels during monitoring rounds was noted.

7.9.12 The resting groundwater level within the bund is similar to the perched water level seen outside the lagoon within the Made Ground indicating perched water being present generally within the Made Ground.

7.9.13 Higher elevations are typical of the monitoring points within the slurry waste with levels ranging from 4.71 to 9.1 m AOD. The minimum and maximum levels for the same monitoring location within the slurry are also noted to be wide (up to 2.63 m) indicating a possible increased sensitivity to rainfall events.

7.9.14 The extent of perched water bodies within the Made Ground is anticipated to be strongly influenced by rainfall events and water levels within the reen and ditch system.

Groundwater Summary – Lagoon 27SW

7.9.15 The main groundwater body within the Mercia Mudstone was not encountered in any of the three boreholes that penetrated within the formation (SBHJ06, SBHJ07 and BH520). However, no monitoring wells have been installed within the aquifer and therefore standing levels cannot be confirmed.

7.9.16 Whilst no strikes were recorded associated with the perched groundwater of the Tidal Flat Deposits standing water levels between 3.54 to 4.83 m AOD (i.e. near the original ground level) were noted between monitoring.

7.9.17 Water bodies were identified by the intrusive works within the top 2 - 2.5 m of the lagoon waste at an elevation of 7.17 to 8.16 m AOD. The variability in the data set for the same monitoring points indicates a possible increased sensitivity to rainfall events.

7.9.18 The resting groundwater level within the bund is similar to the perched groundwater level associated with the Tidal Flat Deposits indicating a possible hydraulic continuity. However, the Tidal Flat Deposits water is considered to be “pore water” given the low permeability and flow.

Groundwater Summary – Lagoon 27SE

7.9.19 The main groundwater within the Mercia Mudstone was encountered in borehole BH521 with a resting water level range of 1.99 to 3.57 m bGL (2.43 - 4.01 m AOD), which confirms it is confined by the overlying Tidal Flat Deposits.

7.9.20 Monitoring installations within the Tidal Flat Deposits identified a resting water level range between 0.46 and 2.66 m bGL. The strikes in this formation ranged between 2.3 to 6.5 m bGL with little rise after 20 minutes.

7.9.21 Perched water was also recorded within the Made Ground from strikes during trial pitting at depths of 0.8 to 3.0 m bGL.

7.9.22 The resting groundwater level within the Mercia Mudstone, the Tidal Flat Deposits and the Made Ground are reported to be similar.

Groundwater Summary – Lagoon 26

7.9.23 Groundwater within the Mercia Mudstone was encountered in borehole BH525 with a resting level ranging from 1.8 to 3.26 m bGL (2.69 - 4.15 m AOD), which confirms it is confined by the overlying Tidal Flat Deposits. The strikes were recorded to have little rise after 20 minutes indicating a low flow.

7.9.24 Perched “pore” water within the Tidal Flat Deposits was recorded to range from 2.0 to 3.26 m bGL The strikes in this formation ranged between 2.3 and 6.5 m bGL with little rise after 20 minutes.

7.9.25 Perched water within the Made Ground was also recorded at typically 0.5 to 2.05 m bGL.

8 Contamination Assessment

8.1 Introduction

8.1.1 The following sections provide details of the assessment of land contamination at the Site.

8.1.2 The outline Conceptual Site Model (CSM) presented within the 2014 PSSR has been reviewed and updated based on data from the Supplementary Ground Investigation (Geotechnical Engineering, 2015) and the 2016 Additional Ground Investigation. The main alterations to the 2014 PSSR model are summarised as the below.

- Revision of the Site geological ground model.
- New contamination sources identified (perched water body within the Made Ground).
- Additional gas pollutant (hydrogen sulphide, carbon monoxide, methane and/or carbon dioxide) considered from sources in Made Ground and natural soils (including peat).
- The use of band drains to accelerate settlement of the soft Tidal Flat Deposits is not required beneath the lagoons.
- Update of the source/pathway/receptor linkages taking account of the above and more detailed assessments.

8.2 Preliminary Risk Assessments

Potential Sources

8.2.1 A number of potential contaminant sources have been identified at the site.

- The Made Ground was identified in the 2014 PSSR as a potential source of contamination (lagoon waste). This is confirmed by the new data. The slag deposits within the lagoons were encountered 2 to 4 m below surrounding level.
- Made Ground is also found to extend beyond the lagoon footprints.
- The perched water body within the Made Ground is considered to represent a potential contaminant source rather than a receptor.
- The Made Ground and organic soils within the Tidal Flat Deposits may represent potential source of ground gas. The extent of the latter may increase during consolidation associated with the surcharge loading of the embankment.
- Hydrogen sulphide (H2S) and carbon monoxide were identified at significant levels within boreholes advanced in lagoon 25, considered to originate from the lagoons slurry slag infill materials.

8.2.2 In addition to the above sources, the quality of surface waters, perched groundwater and the deeper aquifer within the Glaciofluvial Deposits and Mercia Mudstone bodies may influence or impact the quality of the others (for instance the groundwater within the Glaciofluvial Deposits and Mercia Mudstone is saline whilst

the surface water is not). Surface water and deeper aquifer are therefore regarded as a source of possible contaminants as well as receptors.

8.2.3 To the north of the Site lies Llanwern Steelworks and its main operational activity also includes other waste deposits in lagoons. This is considered to be up-gradient to the Site from a groundwater flow (Appendix 16.2 of the March 2016 ES). The steelworks represent a possible off site contamination source.

8.2.4 To the east of the Site (east of Lagoon 26) is the Green Moor Landfill. The land contamination associated with this site has been considered with the CL-27 report (Annex D of Appendix 11.1 of the March 2016 ES). The landfill is reported to have received industrial waste and liquid sludge between 1981 and 1984 although evidence suggests the areas that may have received waste are very discrete in relation to the permit boundary. Previous ground investigation identified no evidence of waste deposition although slag material has been used to construct the various network of access roads. The Green Moor Landfill may be considered a possible off site contamination source in the shared boundary with Lagoon 26 although groundwater would likely be to the south rather than towards the site.

Potential Receptors

8.2.5 A number of relevant receptors during the construction and the operational stages of the Scheme have been considered:

Construction

- Construction workers during site development works;
- General public/workers adjacent to construction works;
- Main groundwater aquifer within the Glaciofluvial Deposits and/or Mercia Mudstone; and
- Nearby surface waters including the reens and existing surface water ditches bordering the surrounding fields including the Gwent Levels SSSI.

Operational

- General public end users;
- Maintenance workers;
- General public/workers, outside permanent land take;
- Groundwater aquifer within the Glaciofluvial Deposits (where present) and/or Mercia Mudstone; and
- Nearby surface waters including the reens and existing surface water ditches bordering the surrounding fields including the Gwent Levels SSSI.

Potential Pathways

8.2.6 Relevant pathways during the construction and the operational stages of the Scheme have been considered.

- Dermal contact, ingestion and inhalation of potentially contaminated soils, dust and waters by construction workers during construction and maintenance workers during operation.

- Dermal contact, ingestion, inhalation of potentially contaminated dusts, soils and waters by general public end users and adjacent general public/workers.
- Contaminated surface water run-off into surface waters including reens.
- Downward vertical migration of contaminated leachate and/or perched water within the Made Ground into the main groundwater bodies.
- Upward vertical migration of groundwater within the Glaciofluvial Deposits and/or Mercia Mudstone aquifer recharging perched waters due to band drain installations.
- Downward vertical migration of contaminated leachate and/or perched water within the Made Ground into the main groundwater bodies and subsequent lateral migration to surface waters.
- Vertical or lateral migration of ground gas associated with Made Ground and natural soils including peat causing an explosion during construction.
- Creation of potential new pathways for shallow contamination to migrate along band drains and foundations from the Made Ground, through the Tidal Flat Deposits and into Glaciofluvial Deposits and/or Mercia Mudstone
- Possibility of upward migration of ground gases along band drains and accumulation of ground gases in confined spaces.
- Explosive detonation of buried unexploded ordnance during excavation and band drain installation.

8.3 Risk Evaluation

8.3.1 Relevant source-pathway-receptor linkages were considered in the 2014 PSSR using the historical data available up to 2008. With review of the new data described herein, the following risk evaluation has been reconsidered.

- Proposed hardstanding (carriageway) is to be constructed at the Site which is to cover most of the motorway corridor reducing pathways to motorway users.
- Tidal Flat Deposits are classified as non-productive and overly an underlying secondary Aquifer associated with the mudstone.
- The low permeability Tidal Flat Deposits (of over 10m thickness) separates the Made Ground and Aquifer. Main groundwater body identified of being confined by the Tidal Flat Deposits.
- Perched groundwater within the Tidal Flat Deposits is not considered a water resource receptor due to its anticipated low vertical hydraulic continuity with the aquifer beneath.
- Lagoon wastes to be excavated and treated primarily using cement stabilisation to enable materials to be geotechnically and environmentally suitable for reuse as a construction material (general fill) during construction of the Scheme.
- Proposed hardstanding (carriageway) and use of low permeability cement stabilised lagoon waste is likely to limit infiltration and also severely inhibit or break ingestion, dermal contact and inhalation pathways.
- Contaminants from the soil matrix of the Made Ground may leach and subsequently migrate into shallow water.

- Motorway users will be within open environment with no proposed structures or other confined spaces.

8.3.2 Consideration has been given to the lagoon materials and the need for/suitability of the material for cement stabilisation and subsequent reuse within the Scheme as a construction material. The following comments are made.

- The material is likely to require treatment to enable it to be reused as part of the permanent works.
- Cement stabilisation would improve both the physical and chemical properties of the sludge material sufficiently to enable it to be used for the future works.
- The stabilised material is unlikely to have a significant effect on the global chemical composition of the surrounding surface water.

8.4 Human Health Risk Assessment

8.4.1 The rationale and approach for the human health (Tier 2) screening assessment is detailed in the Land Contamination Assessment Report (Appendix 11.1 of the March 2016 ES). Soil chemical analysis results and the findings of the generic tier 2 human health risk assessment are presented in Appendix 3. All exceedances of the relevant generic risk assessment criteria are summarised in Table 26 to Table 35. For the purposes of this report Made Ground and natural ground have been considered separately in each lagoon area.

8.4.2 Each of the four lagoons has been considered individually in order to identify any variability within the contamination fingerprint. Analytical data from samples for the material within the lagoons as well as from samples taken outside the lagoons has been considered.

Lagoon 12

Table 26: Summary of Human Health Soil Screening Exceedances - Lagoon 12 (Made Ground)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Chromium	mg/kg	60 - 1400	33	34 (34)	LGBH01 (x2), LGBH02, LGBH03, SWSJ09A (x2), SWSJ10 (x2), SWSJ11 (x2), SWSJ12 (x2), SWSJ13 (x2), SWSJ14 (x2), SWSJ15 (x2) SWSJ16 (x2), SWSJ17a (x2), BH514A (x5), BH515 (x2). BH516, TP506

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
					(x3), BHM4CAN040
Lead	mg/kg	20 - 3200	1,300	21 (34)	SWSJ09A (x2), SWSJ10 (x2), SWSJ11 (x2), SWSJ12 (x2), SWSJ13 (x2), SWSJ14 (x2), SWSJ16 (x2), SWSJ17a (x2), BH514A (x3), BH515, BHM4CAN040
pH	pH units	7.2 - 12.8	6-9	24 (34)	LGBH01 (x2), LGBH02, LGBH03, SWSJ10 (x2), SWSJ11 (x2), SWSJ12, SWSJ13, SWSJ14, SWSJ15 (x2), SWSJ16, SWSJ17a, BH514A (x2), BH515 (x2). BH516, TP506 (x3), BHM4CAN040
PAH (benzo(b)fluoranthene)	mg/kg	0.03-14	13	1 (32)	SWSJ14
PAH (dibenzo(ah)anthracene)	mg/kg	<0.2-7	1.1	1 (32)	SWSJ14

Table 27: Summary of Human Health Soil Screening Exceedances - Lagoon 12 (Natural Ground)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Chromium	mg/kg	35 - 130	33	6 (6)	LGBH01, LGBH02 (x2), LGBH03, SBHJ04 (x2)
pH	pH units	8.08 - 12.5	6-9	4 (6)	LGBH01, LGBH02 (x2), LGBH03

8.4.3 Elevated alkaline soil conditions have been identified over nearly three quarters of the samples within the Made Ground (both slurry and coarse slag) but also in the Tidal Flat Deposits.

8.4.4 Elevated concentrations of lead are also identified as being widespread in the Made Ground slurry and coarse slag (21 no. exceedances from the 34 no. total Made Ground samples).

8.4.5 Although exceedances of chromium are identified throughout the Made Ground, the criterion relates to the toxic hexavalent form of chromium. The majority of the results are considered to be above normal background data range (<95 mg/kg) and therefore may be considered to represent a contaminant of concern. A maximum concentration is recorded at 1,400 mg/kg. Chromium speciation has been undertaken within Lagoon 12 on one sample of Made Ground from the 2016 investigation. This confirms that the elevated chromium is not hexavalent and instead relates to a less toxic form. Additional chromium speciation analysis has been undertaken on samples from Lagoons 25 and 26 (see relevant section below) and this also confirms the elevated chromium is not hexavalent and instead relates to a lesser toxic form of these samples. The highest speciation test relates to slurry slag (Made Ground) in SWSJ18 (Lagoon 25) with a total chromium concentration of 960 mg/kg and an associated chromium hexavalent of 1.9 mg/kg. The latter is well below the screening criteria of 33 mg/kg. It is therefore considered that the chromium in Made Ground represents a low risk to human health.

8.4.6 A single sample (SWSJ14) was found to have two PAH compounds (benzo(b)fluoranthene and dibenzo(ah)anthracene) marginally in exceedance to the criteria. Overall PAH is considered to pose a low risk to human health and the two slightly elevated concentrations are not considered to require specific remediation.

8.4.7 No other exceedances of the screening criteria have been identified and no asbestos fibres were detected out of the 26 Made Ground and 2 Tidal Flat Deposits samples tested.

8.4.8 The total number of samples collected from Made Ground in Lagoon 12 was 34. Of these the majority (61 %) target soils within the top 1 m and only one sample has targeted soil below 5 m. Considering the overall Made Ground thickness of 7.2-9.3 m in Lagoon 12 further sampling of deep materials is recommended. It is possible some stratification of the slurry and slag is present which may have higher or lower levels of contaminants due to historical processes and alterations to the steel production processes. No obvious trend with depth from contaminants has been identified in the current data set.

Lagoon 25

Table 28: Summary of Human Health Soil Screening Exceedances - Lagoon 25 (Made Ground)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Chromium	mg/kg	42 - 1660	33	39 (39)	LGBH04 (x3), LGBH05 (x3), LGBH07 (x2), LGBH09, SWSJ18 (x2), SWSJ19 (x2), SWSJ20 (x2), SWSJ21 (x2), SWSJ22b (x2), SWSJ23 (x2), SWSJ24a (x2), SWSJ26 (x2), SWSJ27 (x2), SWSJ28 (x2), SWSJ29 (x2), SWSJ30, WS501 (x3), BH518, BH519, BHM4CAN041 (x2)
Lead	mg/kg	15 - 2700	1,300	12 (39)	SWSJ19, SWSJ20, SWSJ21, SWSJ23 (x2), SWSJ24a, SWSJ26, SWSJ27 (x2), SWSJ30, WS501, BHM4CAN041
pH	pH units	7.7 - 13	6-9	36 (38)	LGBH04 (x3), LGBH05 (x3), LGBH07 (x2), SWSJ18 (x2), SWSJ19 (x2), SWSJ20 (x2), SWSJ21 (x2), SWSJ22b (x2), SWSJ23 (x2), SWSJ24a (x2), SWSJ26 (x2), SWSJ27 (x2), SWSJ28 (x2), SWSJ29 (x2), WS501 (x3), BH519, BHM4CAN041 (x2)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Dibenzo[a]anthracene	mg/kg	<0.08 - 5	1.1	1 (32)	SWSJ28

Table 29: Summary of Human Health Soil Screening Exceedances - Lagoon 25 (Natural Ground)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Chromium	mg/kg	11 - 460	33	7 (12)	LGBH04, LGBH05, LGBH09, SBHJ05, WS501, BH518, BH519
Lead	mg/kg	3.3 - 1700	1,300	1 (12)	WS501
pH	pH units	7.6 - 12.1	6-9	6 (12)	LGBH04, LGBH05 (x2), LGBH09, , WS501, BH519

8.4.9 The human health risk assessment of the samples analysed from the lagoon sludge and coarse slag material and underlying Tidal Flat Deposits within Lagoon 25 have identified the below.

- Alkaline soil conditions have been identified within Made Ground coarse slag and sludge and the underlying natural strata.
- Elevated concentration of lead above the screening criteria was noted to be widespread in the sludge and coarse slag.
- Chromium is generally above the normal background data range (<95 mg/kg) with maximum concentrations of 1660 mg/kg in the Made Ground and of up to 460 mg/kg within the natural strata. However, chromium speciation undertaken in the samples from the 2016 investigation has indicated the chromium is not in its hexavalent form and is present in its less toxic form, for this reason it is considered to represent a low risk to human health.
- A single sample (SWSJ28) was found to have one PAH compound (dibenzo(ah)anthracene) marginally in exceedance of the screening criteria. Overall PAH is not considered to pose a significant risk to human health and the single elevated PAH concentration is not considered to require specific remedial action.

8.4.10 No other exceedances of the applied assessment criteria have been identified and no asbestos fibres were detected out of the 28 Made Ground and 4 Tidal Flat Deposits samples tested.

8.4.11 It is of note that although there is no screening value for iron it is present at high concentrations within the Made Ground (max. 400,000 mg/kg).

8.4.12 The elevated lead concentration on the sample of natural soil that was noted to be above the screening criteria may actually be from made ground as it is unclear on the borehole log (WS501) what material the sample has been collected from.

Lagoon 27SW

Table 30: Summary of Human Health Soil Screening Exceedances - Lagoon 27SW (Made Ground)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Chromium	mg/kg	52 - 1500	33	18 (18)	LGBH10 (x2), SBHJ06CP, SBHJ07CP (x2), SWSJ31 (x2), SWSJ32 (x2), SWSJ33 (x2), SWSJ34 (x2), BH520 (x5)
pH	pH units	8.73 - 12.9	6-9	17 (18)	LGBH10 (x2), SBHJ06CP, SBHJ07CP, SWSJ31 (x2), SWSJ32 (x2), SWSJ33 (x2), SWSJ34 (x2), BH520 (x5)
PCBs (Aro)	mg/kg	<0.035 - 1.2	0.24	1 (11)	SBHJ07CP

Table 31: Summary of Human Health Soil Screening Exceedances - Lagoon 27 SW (Natural Ground)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Chromium	mg/kg	17 - 90	33	2 (3)	LGBH10, SBHJ06CP
pH	pH units	8.8 - 10.6	6-9	1 (3)	LGHBH10

8.4.13 As per Lagoons 12 and 25, alkaline soil conditions have been identified within Made Ground and the underlying natural strata.

8.4.14 Chromium in made ground is identified above the normal background data range (<95 mg/kg) with a maximum concentration of 1500 mg/kg. However, it is considered that chromium represents a low risk to human health for the same reason as that given in the assessment of Lagoon 12.

8.4.15 A single sample (SBHJ07CP) was found to have PCBs marginally in exceedance to the criteria. This may represent discrete raised contamination that may require improved delineation and sampling. However the tests conducted were for aroclors and therefore will not necessarily comprise entirely of dioxin-like PCBs. The screening criterion is for dioxins, furans and dioxin-like PCBs and therefore the assessment may be considered conservative.

8.4.16 No other exceedances of the screening criteria have been identified and no asbestos fibres were detected out of the 14 Made Ground and 1 Tidal Flat Deposits samples tested.

Lagoon 27SE

Table 32: Summary of Human Health Soil Screening Exceedances - Lagoon 27SE (Made Ground)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Arsenic	mg/kg	<3 - 280	170	1 (8)	BH521
Chromium	mg/kg	28 - 3300	33	7 (8)	SWSJ37 (x2), SWSJ35A, SWSJ38, BH521 (x2), TP508
pH	pH units	8 - 12.2	6-9	4 (8)	SWSJ35A, BH521 (x2), TP508

Table 33: Summary of Human Health Soil Screening Exceedances - Lagoon 27SE (Natural Ground)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Chromium	mg/kg	8.9 - 47	33	2 (5)	SWSJ36, SWSJ35A

8.4.17 As per Lagoon 12 and 25, alkaline soil conditions have been identified within Made Ground and the underlying natural strata.

8.4.18 Chromium in Made Ground is identified above the normal background data range (<95 mg/kg) with a maximum concentration of 3,300 mg/kg (the highest of the entire data set for the Scheme). However, it is considered that chromium represents a low risk to human health for the same reason as that given in the assessment of Lagoon 12.

8.4.19 An elevated arsenic concentration is identified within the Made Ground at one exploratory hole location (BH521 at 1 to 1.5 m depth).

8.4.20 No other exceedances of the screening criteria have been identified and no asbestos fibres were detected out of the 7 Made Ground and 4 Tidal Flat Deposits samples tested.

Lagoon 26

Table 34: Summary of Human Health Soil Screening Exceedances - Lagoon 26 (Made Ground)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Arsenic	mg/kg	<3 - 420	170	2 (27)	BH522 (x2)
Chromium	mg/kg	48 - 2500	33	27 (27)	SBHJ08ACP (x2), STPJ02 (x2), STPJ06 (x2), STPJ04, STPJ01 (x2), SBHJ09CP, STPJ03, BH522 (x2), BH523 (x4), BH524 (x4), SBHJ10CP, STPJ05, BH525, TP509 (x2), BHM4CAN043
Nickel	mg/kg	<0.9 - 3400	980	2 (27)	BH522 (x2)
pH	pH units	7.95 - 12.84	6-9	23 (27)	SBHJ08ACP (x2), STPJ06 (x2), STPJ04, STPJ01 (x2), SBHJ09CP, STPJ03, BH522 (x2), BH523 (x4), BH524 (x4), SBHJ10CP, STPJ05, BH525, BHM4CAN043
VOC (carbon disulphide)	µg/kg	<7 - 35	11	1 (18)	STPJ02

Table 35: Summary of Human Health Soil Screening Exceedances - Lagoon 26 (Natural Ground)

Determinant	Units	Range	Screening Criteria	No. samples exceeding Screening Criteria (Total number of results)	Location of exceedances
Chromium	mg/kg	40 -110	33	5 (5)	STPJ04, STPJ03, STPJ05, SBHJ09CP, SBHJ10CP

8.4.21 As per the other lagoons, alkaline soil conditions have been identified within Made Ground.

8.4.22 Chromium in Made Ground and natural ground has been identified above the normal background data range (<95 mg/kg) with a maximum concentration of 2,500 mg/kg. However, it is considered that chromium represents a low risk to human health for the same reasons given in the assessment for Lagoon 12 and the confirmation from speciation undertaken on one sample of Made Ground from the 2016 investigation.

8.4.23 Elevated arsenic and nickel concentrations in Made Ground at one exploratory hole location (BH522 1.5 - 1.7 m and 2 - 2.2 m depth) were above the screening criteria. A single elevated VOC compound (STPJ02 0.3 m depth) was identified within Lagoon 26 in Made Ground. A TPH concentration of 2,300 mg/kg was also reported for this sample. It is noted that a strong hydrocarbon odour was identified at 0.3 m and frequent wooden sleepers were noted at between 0.5-1.2 m bGL however it is considered unlikely that this will require remediation.

8.4.24 No other exceedances of the applied assessment criteria have been identified and no asbestos fibres were detected out of the 23 Made Ground and 5 Tidal Flat Deposits samples tested.

8.5 Controlled Waters Screening Assessment

8.5.1 The rationale and approach for the controlled waters (Tier 1) screening assessment is detailed in the Land Contamination Assessment Report (Appendix 11.1 of the March 2016 ES) and the groundwater chemical results are presented in Appendix 4. All exceedances to the relevant generic criteria are summarised in Tables 36 to 42 for leachate, groundwater and surface water respectively.

8.5.2 Where an Environmental Quality Standard (EQS) is dependent on water hardness (i.e. some heavy metals), the hardness of the surface water receptor would normally be used. The Baseline Water Environment Report (Appendix 16.2 of the March 2016 ES) indicates surface water to be generally moderately hard with hardness in a range of 100 to 150 mg/l as calcium carbonate. Therefore EQSs within this water hardness range have been used for screening purposes.

Soil Leachate Results

Lagoon 12

8.5.3 Fifteen Made Ground samples and one natural soil sample from Lagoon 12 were subjected to leaching analysis. The majority of the soil leachate results were all below the applied screening criteria, with the exception of the contaminants in Table 36.

Table 36: Controlled waters screening exceedances – Lagoon 12 soil leachate

Determinant	Units	Range	EQS	DWS	No. exceeded EQS Screening Criteria (Total number of results)	Location (formation)	No. exceeded DWS Screening Criteria (Total number of results)	Location (formation)
Cadmium	µg/l	<0.08 - 0.2	0.15	5	1 (16)	BH514a (Made Ground)	0 (16)	-
Chromium	µg/l	<1 - 170	-	50	-	-	3 (16)	SWSJ10, SWSJ12 (x2) (All Made Ground)
Copper	µg/l	<1 - 22	10	2,000	1 (16)	SWSJ12 (Made Ground)	0 (16)	-
Lead	µg/l	<1 - 14	1.2	10	3 (16)	SWSJ12, BHM4CAN040 (Made Ground), SBHJ04 (TFD)	1 (16)	SWSJ12 (Made Ground)
pH	pH units	8.6 - 12	6-9	6.5-10	4 (5)	LGBH03, BH515, TP506, BHM4CAN040 (All Made Ground)	4 (5)	LGBH03, BH515, TP506, BHM4CAN040 (All Made Ground)
Anthracene	µg/l	<0.1 - 3.17	0.1	-	1 (4)	BHM4CAN040 (Made Ground)	-	-
Benzo(b)fluoranthene	µg/l	<0.1 - 0.0573	0.017	0.1	1 (4)	BHM4CAN040 (Made Ground)	0 (4)	-
Fluoranthene	µg/l	<0.1 - 11.4	0.0063	-	1 (4)	BHM4CAN040 (Made Ground)	0 (4)	-

8.5.4 It is considered that the elevated concentrations of chromium are not considered to be representative of a major contaminant source as there are no potable water abstractions at or near the Site and the aquifer is saline. There is no EQS criterion for this contaminant.

8.5.5 Copper, lead, cadmium and pH exceed the EQS criteria and may pose a risk of nearby surface waters (Bowleaze and Parish Reens, Monks Ditch and other unnamed ditches). These contaminants are not considered to represent widespread contaminants of concern as only one or two samples of the fifteen tested had been identified with exceedances.

8.5.6 A limited number of PAH compounds were identified above their EQS in BHM4CAN040. These contaminants are not considered to be a contaminant of concern due to the marginal and limited nature of the exceedances (one out of four Made Ground samples tested).

8.5.7 Certain laboratory detection levels in samples used in previous ground investigations for cadmium, mercury, cyanide and some PAHs are higher than the screening criteria. This is also the case for the analytical data collected from the other lagoons (discussed below).

Lagoon 25

8.5.8 Seventeen Made Ground samples and four natural soil samples from Lagoon 25 were subjected to leaching analysis. The majority of the soil leachate results were all below the applied screening criteria, with the exception of the contaminants in Table 37.

Table 37: Controlled waters screening exceedances – Lagoon 25 soil leachate

Determinant	Units	Range	EQS	DWS	No. exceeded EQS Screening Criteria (Total number of results)	Location (formation)	No. exceeded DWS Screening Criteria (Total number of results)	Location (formation)
Arsenic	µg/l	<1 - 11	50	10	0 (21)	-	1 (21)	BH519 (TFD)
Chromium	µg/l	<1 - 170	-	50	-	-	2 (21)	SWSJ24a, SWSJ28 (All Made Ground)
Copper	µg/l	<1 - 30	10	2,000	3 (21)	SWSJ18, SWSJ23, SWSJ24a (All Made Ground)	0 (21)	-

Determinant	Units	Range	EQS	DWS	No. exceeded EQS Screening Criteria (Total number of results)	Location (formation)	No. exceeded DWS Screening Criteria (Total number of results)	Location (formation)
Nickel	µg/l	<1 - 26	4	20	10 (21)	LGBH04, LGBH05, SWSJ19, SWSJ20, SWJ21, SWSJ22b, SWSJ23, SWSJ27, SWSJ30 (All Made Ground), SBHJ005 (TFD)	1 (21)	SWSJ27 (Made Ground)
Lead	µg/l	<1 - 600	1.2	10	11 (21)	LGBH04, SWSJ18, SWSJ19, SWSJ20, SWJ21, SWSJ22b, SWSJ23, SWSJ24a, SWSJ26, SWSJ27, SWSJ30, WS501 (All Made Ground)	8 (21)	WSJ18, SWSJ19, SWSJ20, SWJ21, SWSJ22b, SWSJ23, SWSJ26, SWSJ27 (All Made Ground)
Selenium	µg/l	<1 - 18	-	10	-	-	2 (21)	SWSJ27, SWSJ30 (All Made Ground)
Zinc	µg/l	<0.001 - 491	75	-	2 (21)	BHM4CAN041 (MG x2)	-	-
pH	pH units	9 - 12.3	6-9	6.5-10	7 (8)	LGBH04 (MG), LGBH05(MG), WS501 (1 x MG, 1 x TFD), BH519 (Peat), BHM4CAN041 (MG x2)	5 (8)	LGBH04, LGBH05, WS501, BHM4CAN041 (MG x2)
Ammoniacal Nitrogen as N	mg/l	0.8 - 1.2	0.6	-	2 (2)	LGBH04, LGBH05	-	-
Phenols	mg/l	<0.03 - 0.01	0.0077	-	1 (4)	BHM4CAN041 (MG x2)	-	-
Anthracene	µg/l	<0.1 - 0.244	0.1	-	1 (6)	BHM4CAN041 (MG)	-	-

Determinant	Units	Range	EQS	DWS	No. exceeded EQS Screening Criteria (Total number of results)	Location (formation)	No. exceeded DWS Screening Criteria (Total number of results)	Location (formation)
Fluoranthene	µg/l	<0.1 -1.9	0.0063	-	2 (6)	BHM4CAN041 (MG x2)	-	-

8.5.9 It is considered that the elevated concentrations of chromium, arsenic and selenium are not considered to be representative of a major contaminant source as there are no potable water abstractions at or near the Site and the aquifer in the Mercia Mudstone is saline. Furthermore only one or two of the nineteen samples tested had elevated leachate concentrations above the DWS criteria indicating a relatively limited contaminant source.

8.5.10 Copper, lead, nickel, zinc, ammoniacal nitrogen and pH exceeded the EQS criteria and may pose a risk to nearby surface waters (Bowleaze and Parish Reens, Monks Ditch and other unnamed ditches). Nickel, lead and ammoniacal nitrogen are considered to represent widespread contaminants of concern for Lagoon 25 as the majority of the samples have been identified with exceedances for these contaminants.

Lagoon 27SW

8.5.11 Seven Made Ground soil samples from Lagoon 27SW were subjected to leaching analysis. The majority of the soil leachate results were below the screening criteria, with the exception of the contaminants listed in Table 38.

Table 38: Controlled Waters Screening Exceedances – Lagoon 27SW soil leachate

Determinant	Units	Range	EQS	DWS	No. exceeded EQS Screening Criteria (Total number of results)	Location (Formation)	No. exceeded DWS Screening Criteria (Total number of results)	Location (Formation)
Copper	µg/l	3 - 39	10	2,000	2 (7)	SBHJ07CP, SWSJ32	0 (7)	-
Nickel	µg/l	1.3 - 11	4	20	5 (7)	SBHJ06CP, SBHJ07CP, SWSJ31, SWSJ32, SWSJ34	0 (7)	-

Determinant	Units	Range	EQS	DWS	No. exceeded EQS Screening Criteria (Total number of results)	Location (Formation)	No. exceeded DWS Screening Criteria (Total number of results)	Location (Formation)
Lead	µg/l	<1 - 54	1.2	10	4 (7)	LGBH10, SWSJ31, SWSJ32, SWSJ34	1 (7)	SWSJ31
pH	pH units	11.6 - 12.7	6-9	6.5-10	3 (3)	LGBH10, SBHJ06CP, BH520	3 (3)	LGBH10, SBHJ06CP, BH520
Ammoniacal Nitrogen as N	mg/l	0.8 - 200	0.6	-	2 (2)	LGBH10, SBHJ06CP	-	-

8.5.12 The leachate of the soils for Lagoon 27SW is similar to those identified for Lagoon 25, in particular the predominance of leachable nickel, lead, pH and ammoniacal nitrogen which may pose a risk to surface waters.

Lagoon 27SE

8.5.13 Five Made Ground and two natural soil samples from Lagoon 27SE were subjected to leaching analysis. The majority of the soil leachate results were all below the screening criteria, with the exception of the contaminants listed in Table 39.

Table 39: Controlled waters screening exceedances – Lagoon 27SE Soil Leachate

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location (Formation)	No. Exceeded DWS Screening Criteria (Total Number of results)	Location (Formation)
Nickel	µg/l	<1 - 6	4	20	1 (7)	LGBH12 (Made Ground)	0 (7)	-
Lead	µg/l	<1 - 26	1.2	10	3 (7)	SWSJ35a, SWSJ38 (Made Ground), SWSJ36	2 (7)	SWSJ35a (Made Ground), SWSJ36 (TFD)

Antimony	µg/l	<5 - 14	-	5	0 (4)	-	1 (4)	SWSJ36 (TFD)
pH	pH units	11.6 - 12	6-9	6.5-10	2 (2)	TP508, LGBH12 (Made Ground)	2 (2)	TP508, LGBH12 (Made Ground)

8.5.14 As per Lagoons 25 and 27SW, leachable lead and pH is predominant within Lagoon 27SE and similarly may pose a risk to surface waters. The leachability of nickel is however more localised and copper is not noted to be as leachable as in other lagoons.

8.5.15 Ammoniacal nitrogen analysis has not been included within the analytical suite available for Lagoon 27SE. The single elevated concentration of antimony is not considered to represent a major contaminant source as there are no nearby water abstractions.

Lagoon 26

8.5.16 Twelve Made Ground soil samples from Lagoon 26 were subjected to leaching analysis. The majority of the soil leachate results were all below the screening criteria, with the exception of the contaminants listed in Table 40.

Table 40: Controlled Waters Screening Exceedances – Lagoon 26 Soil Leachate

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location (Formation)	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location (Formation)
Cadmium	µg/l	<0.08 - 0.24	0.15	5	1 (12)	BH524	0 (12)	-
Copper	µg/l	1.36 - 89	10	2000	4 (12)	STPJ03, STPJ04, STPJ05, STPJ06	0 (12)	-
Nickel	µg/l	<1 - 16	4	20	7 (12)	SBHJ09CP, STPJ03, STPJ04, STPJ05, STPJ06, SBHJ08ACP, BHM4CAN043	0 (12)	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location (Formation)	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location (Formation)
Lead	µg/l	<1 - 14	1.2	10	8 (12)	SBHJ09CP, SBHJ10CP, STPJ01, STPJ05, STPJ06, SBHJ08ACP, BH524, BHM4CAN043	2 (12)	SBHJ09CP, STPJ06
pH	pH units	11 - 12.4	6-9	6.5-10	3 (3)	BH523, BH524, BHM4CAN043	3 (3)	BH523, BH524, BHM4CAN043
Benzo(a)pyrene	µg/l	<0.1 - 0.0115	0.00017	0.01	1 (3)	BHM4CAN043	1 (3)	BHM4CAN043
Benzo(ghi)perylene	µg/l	<0.1 - 0.0167	0.0082	0.1	1 (3)	BHM4CAN043	0 (3)	-
Fluoranthene	µg/l	<0.1 - 0.0317	0.0063	-	1 (3)	BHM4CAN043	-	-

8.5.17 The leachate fingerprint of the soils for Lagoon 26 is similar to those identified for Lagoons 25, 27SW and 27SE, and similarly leachable nickel, lead and pH may pose a risk to surface waters.

8.5.18 Ammoniacal nitrogen analysis has not been included within the analytical suite available for Lagoon 26.

Groundwater Results

8.5.19 The groundwater results assessment includes a number of monitoring rounds of groundwater monitoring results from boreholes drilled in 2002, 2008, 2015 and 2016. The groundwater samples were predominantly taken from the perched water within the Made Ground or Tidal Flat Deposits at the Site with only two sample locations (BHSBHJ07 in Lagoon 25 and BH525 in Lagoon 26) used for sampling the aquifer of the Mercia Mudstone. The deep well within BHM4CAN043 was installed across the Tidal Flat Deposits and the Mercia Mudstone, it is therefore unclear whether the waters sampled from this location relate to perched water within the Tidal Flat Deposits or the groundwater aquifer within the Mercia Mudstone.

8.5.20 The summary of the exceedances of the screening criteria is presented in Table 41.

Table 41: Groundwater Screening Exceedances - All Lagoons

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location of Exceedances EQS	No. exceeded DWS Screening Criteria (Total number of results)	Location of Exceedances DWS
Perched Water: Made Ground								
Boron	µg/l	86-1,200	2,000	1,000	0 (6)	-	1 (6)	BH519
Copper	µg/l	1 - 62	10	2,000	13 (47)	LGBH02 (x2), LGBH03 (x3), LGBH04 (x2), SWSJ23, BH519, BH525, BHM4CAN043 (x3)	0 (47)	-
Iron	µg/l	<10 - 6200	1,000	200	1 (3)	LGBH11	4 (38)	SWSJ34, LGBH11, LGBH12 (x2)
Lead	µg/l	<0.5 - 1500	1.2	10	21 (47)	LGBH02 (x4), LGBH03 (x2), LGBH04 (x3), LGBH07, SBHJ05, SWSJ21 (x2), SWSJ23, SBHJ09, SWSJ34 (x2), LGBH12, BHM4CAN043 (x3)	9 (47)	LGBH02 (x3), LGBH04, SWSJ21 (x2), SWSJ23, SWSJ34 (x2)
Manganese	µg/l	<1 - 2100	30	50	8 (31)	LGBH09 (x4), LGBH11 (x2), LGBH12 (x2)	8 (31)	LGBH09 (x4), LGBH11 (x2), LGBH12 (x2)

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location of Exceedances EQS	No. exceeded DWS Screening Criteria (Total number of results)	Location of Exceedances DWS
Nickel	µg/l	1.9 - 36	4	20	35 (47)	LGBH02 (x4), LGBH03 (x4), LGBH04 (x4), LGBH05 (x2), LGBH07, SBHJ05 (x2), SWSJ21 (x2), SWSJ23, BH519, LGBH09 (x3), SWSJ34 (x2), LGBH11, SBHJ09 (x2), BH525, SBHJ09, LGBH12 (x2), BHM4CAN043 (x3)	1 (47)	SWSJ21
Selenium	µg/l	<1 - 19	-	10	-	-	4 (47)	LGBH02, BH519, LGBH09, BH525
Cadmium	µg/l	<0.1 - 480	0.15	5	10 (41)	LGBH04, SBHJ05, SWSJ21 (x2), SWSJ23, SWSJ34 (x2), LGBH11 SBHJ09, LGBH12	5 (41)	LGBH04, SWSJ21, SWSJ23, SWSJ34 (x2)
Zinc	µg/l	3 - 82000	75	-	19 (47)	LGBH02, LGBH03 (x2), LGBH04 (x2), SBHJ05 (x2), SWSJ21 (x2), SWSJ23, LGBH09, SWSJ34 (x2), LGBH11 (x2), SBHJ09 (x2),	-	-
BOD	mg/l	<1 - 220	5	-	16 (21)	LGBH02, LGBH04 (x2), SBHJ05 (x2), SWSJ21, SWSJ23, LGBH09, SWSJ34 (x2), LGBH11 (x2), SBHJ09 (x2), LGBH12 (x2)	-	-
Sodium	mg/l	11 - 2000	-	200	-	-	5 (32)	LGBH09 (x4), SWSJ34, LGBH12

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location of Exceedances EQS	No. exceeded DWS Screening Criteria (Total number of results)	Location of Exceedances DWS
Sulphate (soluble)	mg/l	<3 - 302	400	250	0 (34)	-	1 (38)	LGBH03
Chloride	mg/l	3 - 1500	250	250	8 (41)	LGBH05, BH519 (x3), LGBH09 (x4)	8 (41)	LGBH05, BH519 (x3), LGBH09 (x4)
Ammoniacal Nitrogen	mg/l	0.7 - 15.1	0.6	-	47 (47)	LGBH02 (x4), LGBH03 (x4), LGBH04 (x4), LGBH05 (x3), LGBH07, SBHJ05 (x2), SWSJ21 (x2), SWSJ23, BH519 (x3), LGBH09 (x6), SWSJ34 (x2), LGBH11 (x4), SBHJ09 (x2), BH525 (x3), LGBH12 (x4), BHM4CAN043 (x3)	-	-
Total Ammonium	mg/l	1.8 - 7.5	-	0.5	-	-	4 (4)	SBHJ05, SWSJ23, SWSJ34, SBHJ09
pH	pH units	7.1 - 12.74	6-9	6.5-10	30 (47)	LGBH02 (x4), LGBH03 (x4), LGBH04 (x4), LGBH05 (x3), LGBH07, SBHJ05 (x2), SWSJ21 (x2), SWSJ23, SWSJ34 (x2), LGBH11, SBHJ09 (x2), BH525 , BHM4CAN043 (x3)	28 (47)	LGBH02 (x4), LGBH03 (x4), LGBH04 (x4), LGBH05 (x2), LGBH07, SBHJ05 (x2), SWSJ21 (x2), SWSJ23, SWSJ34 (x2), LGBH11, SBHJ09 (x2), BH525, BHM4CAN043 (x3)
Toluene	µg/l	<1 - 104	50	-	1 (47)	LGBH11	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location of Exceedances EQS	No. exceeded DWS Screening Criteria (Total number of results)	Location of Exceedances DWS
Phenol	mg/l	<0.001 - 0.3	0.0077[1]	-	11 (42)	LGBH04 (x2), SBHJ05 (x2), SWSJ21, SWSJ23, BH519 (x3), BH525 (x2)	-	-
Benzo(a)pyrene	µg/l	<0.002 - 0.098	0.00017	0.01	3 (39)	BHM4CAN043 (x3)	3 (39)	BHM4CAN043 (x3)
Benzo(b)fluoranthene	µg/l	<0.046 - 0.175	0.017	0.1	2 (39)	BHM4CAN043 (x2)	1 (39)	BHM4CAN043 (x1)
Fluoranthene	µg/l	<0.002 - 2	0.0063	-	7 (36)	LGBH04, SBHJ05, LGBH11 (x2), BHM4CAN043 (x3)	-	-
Napthalene	µg/l	<0.002 - 7	2	-	2 (36)	LGBH04 (x2)	-	-
Bis(2-ethylhexyl)phthalate	µg/l	<0.5 - 4	1.3	-	3 (26)	LGBH04, LGBH11 (x2)	-	-
1,2,3-Trichlorobenzene	µg/l	<1 - 21701	0.4	-	1 (32)	LGBH11	-	-
Perched Water: Tidal Flat Deposits								
Arsenic	µg/l	1 - 38	50	10	0 (30)	-	15 (30)	SBHJ04, BH515, BH519 (x3), LGBH10 (x2), BH521 (x2), SBHJ10 (x2), BHM4CAN043 (x2)

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location of Exceedances EQS	No. exceeded DWS Screening Criteria (Total number of results)	Location of Exceedances DWS
Boron	µg/l	290 - 1600	2,000	1,000	0 (11)	-	3 (11)	BH521 (x2), BH515
Chromium	µg/l	1 - 87	-	50	-	-	3 (27)	BH519 (x2), BH521
Copper	µg/l	<1 - 110	10	2,000	5 (27)	BH519 (x2), BH521 (x3),	0 (27)	-
Iron	µg/l	<10 - 5800	1,000	200	6 (16)	SBHJ04 (x2), LGBH10 (x2), SWSJ37, SBHJ10	8 (16)	SBHJ04 (x2), LGBH10 (x2), SBHJ06, SWSJ37 (x2), SBHJ10
Lead	µg/l	<0.4 - 5.2	1.2	10	3 (24)	SBHJ04, SBHJ06, SBHJ08A	0 (24)	-
Mercury	µg/l	<0.5-	0.07	1	1 (5)	BH525	0 (5)	-
Manganese	µg/l	2 - 2300	30	50	10 (12)	SBHJ04 (x2), LGBH10 (x2), SBHJ06 (x2), SWSJ37 (x2), LGBH10 (x2)	10 (12)	SBHJ04 (x2), LGBH10 (x2), SBHJ06 (x2), SWSJ37 (x2), LGBH10 (x2)
Nickel	µg/l	2.6 - 25	4	20	24 (30)	LGBH01(x2), SBHJ04, BH515 (x2), BH519 (x3), LGBH10 (x3), SBHJ06 (x2), SWSJ37, BH521 (x3), SBHJ08a (x2), SBHJ10 (x2), BHM4CAN043 (x3)	0 (30)	
Selenium	µg/l	<1 - 75	-	10	-	-	17 (30)	LGBH01, SBHJ04 (x2), BH519 (x3), LGBH10, SBHJ06 (x2), BH521 (x3), SBHJ10 (x2), BH515 (x2), BHM4CAN043

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location of Exceedances EQS	No. exceeded DWS Screening Criteria (Total number of results)	Location of Exceedances DWS
Cadmium	µg/l	<0.1 - 23	0.15	5	5 (11)	SBHJ04, LGBH10, SBHJ06 (x2), SBHJ10	1 (11)	SBHJ04
Zinc	µg/l	5 - 8100	75	-	11 (27)	SBHJ04 (x2), LGBH10 (x2), SBHJ06 (x2), SWSJ37 (x2), SBHJ08a (x2), SBHJ10	-	-
BOD	mg/l	<1 - 73	5	-	7 (12)	SBHJ04 (x2), LGBH10 (x2), SWSJ37, SBHJ08a, SBHJ10	-	-
Sodium	mg/l	48 - 4600	-	200	-	-	10 (12)	SBHJ04 (x2), LGBH10 (x2), SBHJ06 (x2), SWSJ37 (x2), SBHJ10 (x2)
Sulphate (soluble)	mg/l	<3 - 1160	400	250	4 (16)	LGBH01 (x2), SBHJ10 (x2)	4 (16)	LGBH01 (x2), SBHJ10 (x2)
Chloride	mg/l	38 - 4300	250	250	21 (24)	SBHJ04 (x2), BH515 (x2), BH519 (x3), LGBH10 (x2), SBHJ06 (x2), SWSJ37 (x2), BH521 (x3), SBHJ10 (x2), BHM4CAN043 (x3)	21 (24)	SBHJ04 (x2), BH515 (x2), BH519 (x3), LGBH10 (x2), SBHJ06 (x2), SWSJ37 (x2), BH521 (x3), SBHJ10 (x2), BHM4CAN043 (x3)
Ammoniacal Nitrogen	mg/l	2.4 - 36	0.6	-	28 (28)	LGBH01(x2), SBHJ04 (x2), BH515 (x2), BH519 (x3), LGBH10 (x4), SBHJ06 (x2), SWSJ37 (x2), BH521 (x4), SBHJ08a (x2), SBHJ10 (x2), BHM4CAN043 (x3)	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location of Exceedances EQS	No. exceeded DWS Screening Criteria (Total number of results)	Location of Exceedances DWS
Total Ammonium	mg/l	39	-	0.5	-	-	1 (1)	SBHJ04
pH	pH units	7.3 - 13	6-9	6.5-10	8 (30)	LGBH01(x2), BH519, LGBH10, BH521, SBHJ08a (x2), BHM4CAN043	6 (30)	LGBH01(x2), LGBH10, SBHJ08a (x2), BHM4CAN043
Phenol	mg/l	<0.001 - 0.089	0.0077[1]	-	6 (22)	BH515, BH519 (x2), BH521 (x3)	-	-
Benzo(a)pyrene	µg/l	0.0372 - 0.183	0.00017	0.01	3 (3)	BHM4CAN043 (x3)	3 (3)	BHM4CAN043 (x3)
Benzo(b)fluoranthene	µg/l	0.085 - 0.324	0.0017	0.1	3 (3)	BHM4CAN043 (x3)	2 (3)	BHM4CAN043 (x2)
Fluoranthene	µg/l	0.0632 - 0.298	0.0063	-	3 (3)	BHM4CAN043 (x3)	-	-
Indeno(1,2,3-cd)pyrene	µg/l	0.0228 - 0.193	-	0.1	-	-	2 (3)	BHM4CAN043 (x2)
Bis(2-ethylhexyl)phthalate	µg/l	<0.5 – 24.5	1.3	-	4 (19)	SWSJ37, BHM4CAN043 (x3)	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location of Exceedances EQS	No. exceeded DWS Screening Criteria (Total number of results)	Location of Exceedances DWS
Aquifer: Mercia Mudstone								
Arsenic	µg/l	7 - 18	50	10	0 (2)	-	1 (2)	SBHJ07
Copper	µg/l	2.3 - 110	10	2,000	3 (5)	BH525 (x3)	0 (5)	-
Iron	µg/l	570 - 840	1,000	200	0 (2)	-	2 (2)	SBHJ07 (x2)
Lead	µg/l	<0.5 - 8.2	1.2	10	1 (5)	SBHJ07	0 (5)	-
Manganese	µg/l	630 - 2100	30	50	2 (2)	SBHJ07(x2)	2 (2)	SBHJ07(x2)
Nickel	µg/l	4 – 6.1	4	20	3 (5)	SBHJ07, BH525 (x2)	0 (5)	-
Cadmium	µg/l	<0.4 - 18	0.15	5	1 (2)	SBHJ07	1 (2)	SBHJ07
Zinc	µg/l	58 - 6500	75	-	1 (2)	SBHJ07	-	-
BOD	mg/l	8 - 30	5	-	2 (2)	SBHJ07 (x2)	-	-
Sodium	mg/l	900 - 1400	-	200	-	-	2 (2)	SBHJ07(x2)
Selenium	µg/	7.3-75	-	10	-	-	3 (5)	SBHJ07, BH525 (x2)
Chloride	mg/l	540 - 3200	250	250	5 (5)	SBHJ07(x2), BH525 (x3)	5 (5)	SBHJ07(x2), BH525 (x3)
Ammoniacal Nitrogen	mg/l	9.3 - 25	0.6	-	5 (5)	SBHJ07(x2), BH525 (x2)	-	-

Determinant	Units	Range	EQS	DWS	No. Exceeded EQS Screening Criteria (Total Number of Results)	Location of Exceedances EQS	No. exceeded DWS Screening Criteria (Total number of results)	Location of Exceedances DWS
Total Ammonium	mg/l	12	-	0.5	-	-	1 (1)	SBHJ07

Note: [1] based on phenol criteria

8.5.21 Certain laboratory detection levels for mercury, lead, some PAHs, VOCs and SVOCs are higher than applied screening criteria within the data set.

8.5.22 The main contaminants of concern in perched water in Made Ground which consistently exceed EQS were nickel, ammoniacal nitrogen and pH. Other frequent EQS exceedances of zinc, lead, BOD and to a lesser extent copper, cadmium, iron, manganese and chloride are identified. The elevated copper, lead, nickel, pH and ammoniacal nitrogen indicate potential leaching of contaminants in coarse slag and sludges has occurred given similar concentrations were noted in the soil leaching test results.

8.5.23 Elevated chloride concentrations indicate the perched water is saline (brackish) and has similar concentrations to the perched water in the Tidal Flat Deposits. Exceedances of DWS were also noted for boron, iron, lead, nickel, manganese, cadmium, selenium, sodium, sulphate, pH and total ammonium although it is noted that there are no potable surface or groundwater abstractions in the area.

8.5.24 Certain PAH compounds (benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene and naphthalene) and VOCs (bis(2-ethylhexyl)phthalate and 1,2,3-Trichlorobenzene) were found within Lagoon 25 (LGBH04), Lagoon 26 (BHM4CAN043) and outside of Lagoon 25 (SBHJ05) and Lagoon 27 (LGBH11).

8.5.25 Total phenols were found to be present in a third of the samples analysed. Total phenol concentrations have been compared against the EQS for phenol and this is considered a conservative approach. This same screening approach has also been adopted when considered groundwater quality of the Tidal Flat Deposits and Mercia Mudstone discussed below.

8.5.26 Similar to the perched water within the Made Ground widespread EQS exceedances of nickel, pH and ammoniacal nitrogen were observed in the perched water of the Tidal Flat Deposits, chloride and manganese are also persistent within the perched groundwater. EQS exceedances of iron, BOD, phenols and to lesser extent cadmium, lead, mercury and sulphate are also identified. An exceedance of bis(2-ethylhexyl)phthalate was identified within the perched groundwater at SWSJ37 in Lagoon 27SE. The elevated chloride concentrations indicate saline conditions within the perched groundwater of the Tidal Flat Deposits. Within the perched groundwater of the Tidal Flat Deposits arsenic, selenium, sodium, chloride, total ammonium and to lesser degree boron, chromium, iron and manganese were identified as exceeding DWS criteria.

8.5.27 Similar contaminants of concern were identified within BHM4CAN043 screened mainly within the Tidal Flat Deposits and keyed into the Mercia Mudstone. Additionally certain PAH compounds were identified within this borehole similar to those identified within the perched water in the Made Ground at this location.

8.5.28 Similar to the perched water within the Made Ground and perched waters within the Tidal Flat Deposits, the main contaminants of concern within the Mercia Mudstone aquifer with widespread EQS exceedances are nickel and ammoniacal nitrogen. Chloride, lead, cadmium, copper, manganese and BOD are also persistent within the groundwater with concentrations often similar to the Made Ground perched water and water in the Tidal Flat Deposits. An exceedance of cadmium and zinc was identified within the groundwater at SBHJ07 on the second round of monitoring. The elevated chloride concentrations indicate saline conditions (brackish) within the groundwater. Only two boreholes (BH525 and

SBHJ07) with monitoring wells installed in the Mercia Mudstone aquifer were sampled and thus it is not clear whether the results from these two wells are representative of conditions beneath the Site. Within the aquifer, arsenic, selenium, manganese, iron, sodium, chloride, total ammonium and to lesser degree boron, chromium, cadmium were identified exceeding DWS criteria.

8.5.29 From the 47 water samples from the Made Ground, 16 gave TPH concentrations above the laboratory limit of detection ranging from 0.16 to 30,500 µg/l (maximum at LGBH11 during round 1 in 2002). In the water samples collected from Tidal Flat Deposits and Mercia Mudstone, ten TPH results were found to be above laboratory limit of detection (out of 36 samples). TPH concentrations ranged from 0.92 to 1,000 µg/l (maximum at SBHJ08A during round 1 in 2008).

8.5.30 The elevated concentrations of copper, lead, manganese, cadmium, zinc and ammoniacal nitrogen are very similar in the water samples from the Tidal Flat Deposits and the Mercia Mudstone aquifer. However, although the perched water in the Made Ground has similar concentrations of copper, manganese and ammoniacal nitrogen to the perched water in the Tidal Flat Deposits and the groundwater in the Mercia Mudstone, concentrations of pH, lead, nickel and cadmium were notably higher in the Made Ground samples. Furthermore pH, lead, nickel and cadmium are noted to be leachable from lagoon sludge and coarse slag. Discrete PAHs and phenols were also noted to be leachable from lagoon sludge and coarse slag. Elevated organic contaminants have been identified in the perched water of the Made Ground including PAHs, phenols and total TPH whereas organic contamination levels were generally noticeably lower or absent in the Tidal Flat Deposits. Low level PAHs were however identified within BHM4CAN043 both within the Made Ground and Tidal Flat Deposits. It is considered that the groundwater in the Mercia Mudstone does not appear to have been contaminated and the low permeability Tidal Flat Deposits are acting as an aquitard, protecting the lower aquifer. However, there is only limited sample data available for the aquifer and further sampling is recommended.

Surface Water

8.5.31 Twenty Seven surface water samples were taken and analysed from the reens surrounding the Site including analysis of water quality of a drainage ditch (the “dirty ditch”) within the Site boundary (SW505). A summary of the exceedances identified by the screening assessment are shown in Table 42. The results for all the sample locations are also presented in the Baseline Water Environment Report (Appendix 16.2 of the March 2016 ES).

Table 42: Surface Water Screening Exceedances

Parameter	Unit	No. Analyses	No. Analyses above LOD	Minimum concentration	Maximum Concentration	Location & Round of Maximum Concentration	EQS	No. Analyses Exceeding EQS	DWS	No. Analyses Exceeding DWS	CCW Trigger Level	No. Analyses Exceeding CCW Trigger Level
Copper	µg/l	127	15	<0.85	11	E3 / R13	10	1	2000	0	-	-
Lead	µg/l	18	3	<0.02	9	E3 / R13	1.2	1	10	0	250	0
Nickel	µg/l	18	9	<1	10	2 / MDSWS	4	3	20	0	100	0
Cadmium	µg/l	23	4	<0.08	2.9	2 / SW506	0.15	2	5	0	5	0
Cadmium (total)	µg/l	4	1	<0.5	0.5	E1 / R13	0.15	1	5	0	5	0
BOD	mg/l	6	3	1	7	E3 / R13	5	1	-	-	18	-
Dissolved Oxygen	%	4	4	10	63.2	E2 / R13	60	1	-	-	-	-
Nitrate as NO3	mg/l	6	2	0.368	9.73	Q1 / 15.3	-	-	50	0	1	3
Nitrogen as TON	mg/l	6	2	< 0.3	2.21	Q1 / 15.3	-	-	50	0	2	2
Phosphate	mg/l	4	3	0.3	1.3	E2 / R13	-	-	-	-	1	1
pH	pH Units	25	25	7.2	12	SW505	6-9	3	6.5-10	3	6.8-8.5	8

8.5.32 Water quality within Monks Ditch is generally good with a single exceedance above the EQS for cadmium. There are also single EQS exceedances for nitrate (NO3) and total oxidised nitrogen (TON) and three EQS exceedances for pH. All the surface water data for Monks Ditch has been collected in 2015.

8.5.33 Surface water monitoring location R13 on Bowleaze Reen has recorded poor water quality, with exceedances recorded for copper, lead and nickel above their respective EQS. However, these were all recorded during 3rd round (June 2008). This monitoring round also recorded elevated concentrations of long chain TPH, however during other monitoring rounds TPH has been recorded below the LOD. It is considered the elevated copper, lead, nickel and TPH results during this round is anomalous but further monitoring should be undertaken to verify the baseline conditions.

8.5.34 Monitoring locations SW505 and SW506 are situated on drainage ditches within the Site boundary ("dirty ditch" and "clean ditch" respectively). The pH for all monitoring rounds at SW505 and SW506 exceeds the EQS and also the CCW trigger level (notably SW505 recording pH 12 on all three monitoring occasions).

8.5.35 Based upon the surface water monitoring results it is clear that the water quality of the surface waters (Bowleaze Reen, Monks Ditch and Monkscroft Reen) are of far higher quality than that of the perched water of the Made Ground (lagoons) and Tidal Flat Deposits as well as the aquifer of the Mercia Mudstone. It is therefore arguable that the existing containment measures of the lagoons are functioning well.

8.6 Ground Gas Risk Assessment

8.6.1 The ground gas data available relate to: boreholes BH515 and BHM4CAN040 from Lagoon 12 with response zone within the Made Ground, BH519, BHM4CANA012 and BHM4CAN041 from lagoon 25 with response zones within the Made Ground and the transition zone between the Made Ground and the Tidal Flat Deposits (BH519), BH521 from Lagoon 27SE with response zone within the peat of the Tidal Flat Deposits and BH525 and BHM4CAN043 within Lagoon 26 with response zones within the Made Ground (BH525 and BHM4CAN043 Shallow) and the Tidal Flat Deposits (BHM4CAN043 Deep). Based on the monitoring undertaken the below observations have been made.

Lagoon 12

- Gas flow was generally recorded as absent, with the exceptions of a peak of 0.4 l/hr for Rounds 2 and 3 in BHM4CAN040.
- A single monitoring round for BH515 (undertaken on 7th May 2015) was undertaken during low barometric pressure (less than 1000 mb), with the lowest conditions being 997 mb. This monitoring data obtained were thus undertaken during conditions more likely to result in ground gas emission.
- BH515 was additionally monitored on 3rd June 2016 where carbon monoxide was detected above the limit of detection of the gas box (1500 ppm). Previous maximum within this borehole for carbon monoxide was 935 ppm during Round 1 in 2015. Carbon monoxide was recorded at low concentrations within BHM4CAN040 (max 1 ppm).

- Methane was detected within both boreholes generally above the screening criteria of 1% (maximum concentration 18.6 % in monitoring round one BHM4CAN040).
- Carbon dioxide is generally identified as absent or at low concentrations within BH515. However it was identified at or above the screening level of 5% during all three rounds within BHM4CAN040 (max 5.3% in Round two).
- Traces of VOCs of up to 5.2 ppm have been recorded in BH515.
- Hydrogen sulphide was absent within BHM4CAN040 during all three monitoring rounds. In BH515 hydrogen sulphide was recorded during all monitoring rounds with a maximum of 200 ppm recorded during monitoring round one.
- Oxygen was recorded as absent or at low concentrations within both boreholes (max 14.2 % in BHM4CAN040 round 3).

Lagoon 25

- During drilling of BHM4CANA012 and BHM4CAN041 levels of hydrogen sulphide and carbon monoxide were detected above the equipment level of detection (1500 ppm). Section 7.8 discusses these boreholes in more detail. As such the following observations are informed by BH519 installed within peat only.
- One monitoring round (undertaken on 7th May 2015) was undertaken during low barometric pressure (less than 1000 mb), with the lowest conditions being 996 mb. The monitoring data obtained in this round of monitoring were thus undertaken during conditions more likely to result in ground gas emission.
- Gas flow was generally recorded as absent or negative, with the exceptions of a peak of 0.4 l/hr during the third monitoring round.
- Methane was recorded above the screening level of 1% during all monitoring rounds (maximum concentration of 8.6%).
- Traces of VOCs of up to 2.0 ppm have been recorded.
- Carbon monoxide was recorded in three of the four monitoring rounds with below 1ppm recorded during the first round, between 2 and 248ppm recorded during the second round and between 0 and 58ppm during the third round. This is consistently above the screening criteria of 30 ppm.
- Carbon dioxide and hydrogen sulphide were recorded as absent during all monitoring rounds.
- Oxygen was generally recorded at low levels with concentrations of between 0.6 and 13.4 %.

Lagoon 26

- A single monitoring round (undertaken on 7th May 2015) was undertaken during low barometric pressure (less than 1000 mb), with the lowest conditions being 995 mb. The monitoring data obtained within this round of monitoring were thus undertaken during conditions more likely to result in ground gas emission.

- Gas flow was generally recorded as low with a peak of 4.4 l/hr within the deep well (TFD / MM) at BHM4CAN043 during round two.
- Methane was typically recorded above the screening criteria of 1 % (maximum concentration of 9.9% in monitoring round two at BH525).
- Carbon dioxide is generally recorded absent in all boreholes with the exception of a maximum concentration of 0.1 % in monitoring round one and two in BHM4CAN043 (shallow and deep). This is significantly below the screening criteria of 5 %.
- Traces of VOCs of up to 1.2 ppm have been recorded.
- Hydrogen sulphide was recorded as absent with the exception of a concentration of 1 ppm in BHM4CAN043 shallow (Made Ground) during monitoring round three.
- Carbon monoxide has been identified in all boreholes at concentrations between 0 and 4 ppm. These concentrations are below screening criteria of 30 ppm.
- Oxygen was identified at ambient concentrations within BHM4CAN043 and depleted levels within BH525 at absent to 15%.

Lagoon 27SE

- A single monitoring round (undertaken on 7th May 2015) was undertaken during low barometric pressure (less than 1000 mb), with the lowest conditions being 997 mb. The monitoring data obtained in this round of monitoring were thus undertaken during conditions more likely to result in ground gas emission.
- Gas flow was generally recorded as absent or negative, with the exception of a peak of 0.1 l/hr during the third monitoring round in BH521 (Made Ground).
- Methane has been recorded generally with concentrations above the screening criteria of 1 % (maximum concentration of 3.9% in monitoring round three in BH521).
- Carbon dioxide is generally recorded absent in all boreholes with the exception of a maximum concentration of 0.3 % in monitoring round three in BH521. This is significantly below the screening criteria of 5 %.
- Traces of VOCs of up to 1.6 ppm have been recorded.
- Hydrogen sulphide was recorded to be at zero throughout the monitoring in BH521.
- Carbon monoxide was identified at concentrations of up to 2 ppm in BH521. These concentrations are well below screening criteria of 30 ppm.
- Oxygen was recorded to be at ambient concentrations in BH521 of between 19 and 20.9 %.

8.6.2 All available gas monitoring data is presented in Appendix 2.

8.6.3 The available data identify overall moderate methane concentrations are present in soils and raised carbon monoxide and hydrogen sulphide is also present. Ambient or depleted oxygen conditions exist within the Made Ground and peat.

8.6.4 A gas risk assessment on the natural soils of the Tidal Flat Deposits has been undertaken and is set out within the Land Contamination Assessment Report (Appendix 11.1 of the March 2016 ES).

8.6.5 Further gas monitoring is recommended to verify conditions prior to construction and fully determine risks during construction and operation of the Scheme particularly to establish the localised occurrences in Lagoons 25 and 12 of the elevated hydrogen sulphide and carbon monoxide. Robust control measures will be needed during construction in to prevent risks to construction workers from hydrogen sulphide and carbon monoxide.

8.7 Summary

8.7.1 Made Ground and natural soils have been shown to have elevated chromium concentrations. However assessment and analysis indicates these are not of the more toxic hexavalent form of chromium thus are considered to be at tolerable levels to human health.

8.7.2 The Made Ground and to a lesser extent, shallow natural soils have been identified to be alkaline.

8.7.3 The lagoon material (both coarse slag and slurry sludge) is generally identified to have high levels of lead in Lagoon 12 and to lesser degree in Lagoon 25 which may pose a risk to human health. Discrete areas of elevated nickel, arsenic and PAH have also been recorded in some of the lagoons although these are not considered to represent such a widespread degree of contamination compared to lead.

8.7.4 Leachable metals (nickel, lead and to lesser extent copper) together with ammoniacal nitrogen and pH in sludge and slag have been identified to be widespread in most lagoons. This may pose a risk to the nearby surface waters. Chromium, arsenic, selenium and antimony present sporadic exceedances to DWS within the lagoons but these are not considered to be representative of risk as there are no potable water abstractions at or near the Site and the aquifer is also saline. Leaching tests undertaken in Lagoon 12 have identified considerably lower inorganic concentrations in comparison to other lagoons. Discrete concentrations of PAHs and phenols were also noted to be leachable from the lagoon sludge and coarse slag.

8.7.5 The lagoon slurry (sludge) and coarse slag have leachable inorganic and pH contaminants and perched waters within the lagoons and within Made Ground (coarse slag) have been noted to have similarly elevated levels of metals (particularly lead, nickel and cadmium) and pH. Elevated organic contaminants including TPH, PAHs and phenols were also identified in perched water in Made Ground and PAHs within the perched water of the Tidal Flat Deposits. Elevated copper, lead, manganese, cadmium, zinc and ammoniacal nitrogen were in perched water in the Tidal Flat Deposits and the Mercia Mudstone were noted to be similar. However the concentrations of pH, lead, nickel and cadmium and other organic contaminants were noted to be much higher in perched water in the Made Ground including lagoons. Thus, it is considered that the Tidal Flat Deposits are acting as a relatively effective aquitard severely limiting contaminants in the lagoons to mitigate the Mercia Mudstone aquifer.

8.7.6 The surface water monitoring results indicate that the surface waters adjacent to the lagoons are generally at good quality. Contaminant levels recorded in perched waters of the Made Ground were not identified in surface waters to the north and south of the Site. Based on the information available, it is considered that the current lagoon containment systems seem to be functioning adequately and are protecting the surface waters.

8.7.7 Overall, the quality status of the perched groundwater and aquifer is consistent to the one seen within the area of Newport associated with historical industrial land use.

8.7.8 Elevated methane levels and depleted oxygen levels with low gas flows have been identified. The results indicated that limited ground gas is being generated in Made Ground and natural soils. Significantly elevated carbon monoxide and hydrogen sulphide concentrations have been identified within the lagoon slag materials of Lagoon 12 and 25.

9 Refined Conceptual Site Model

9.1.1 The incorporation of data from the 2015 Supplementary Ground Investigation and the 2016 Additional Ground Investigation has enabled the original CSM presented in the 2014 PSSR to be updated. The assessment is based on the proposed Scheme during construction and operational phases.

9.1.2 A CSM representing general ground conditions, overall Scheme layout and relevant source/pathway/receptors (each of which having a specific alpha-numerical symbol attached) are presented in Figure 2 and is described in Table 43.

9.1.3 The CSM assumes that the construction of the motorway will include the excavation of lagoon wastes and reconstruction of the lagoon bunds to the north of the motorway. Surplus materials not used to reinstate the lagoons will be reused elsewhere on the Scheme provided they meet suitability for reuse criteria. Lagoon sludge materials will be treated and reused as 'general fill' within the core of the motorway embankment provided the treated material satisfies suitable for reuse criteria. Coarse slag will be excavated from beneath the water table and clean material placed in its place.

Table 43: Conceptual Site Model

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
On site Elevated metals and pH originating from Made Ground including lagoon waste and perched water and ground gas.	**Construction Stage**					
	Construction workers (B)	Direct dermal (1)	Likely	Moderate	Moderate	Construction workers could be exposed to Made Ground materials during construction works. However exposure duration will be short term only. Prior to construction, a specific risk assessment will be required in line with CDM and other health and safety legislation. This will enable safe methods of work and appropriate levels of PPE to be put in place. As such all risks will be duly considered and suitably mitigated to protect construction workers. The contamination status is not foreseen to represent abnormal constraints to construction workers health and safety over and above those typical of a brownfield site. A construction mat will be placed over the length and width of the proposed embankment to enable band drain installation as well as general construction. This will break dermal, ingestion and inhalation pathways once placed. Ground gas data from the Made Ground is characterised by moderately elevated methane and
		Ingestion (3)	Likely	Moderate	Moderate	
		Inhalation of soil dust (2)	Likely	Moderate	Moderate	

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
		Inhalation of soil gas or vapours (2)	Likely	High	High	depleted oxygen with localised abnormal carbon monoxide and hydrogen sulphide concentrations encountered within Lagoon12 and Lagoon 25. Any surcharge of superficial soils during construction may temporarily increase gas flux. Construction to be largely within open space. Any earthworks within confined space would require specific risk assessment, control measures and appropriate PPE. A gas risk assessment and robust control measures will be required during construction to protect construction workers.
	General public / site neighbours during construction works (C)	Dermal contact with dust (1)	Low likelihood	Low	Very low	During construction there is the possibility of inhalation/ ingestion of soil dust albeit a short term exposure only. The adaption of conventional construction safety methodologies typical for a brownfield site would be required to mitigate these risks to the general public. Dust suppression measures are recommended during construction works. Limited off site receptors within 50 m to main route alignment. Potential contamination sources extend well beyond land take. Ground gas data from the Made Ground is
		Ingestion of dust (3)	Unlikely	Low	Very low	
		Inhalation of soil dust (2)	Low likelihood	Low	Very low	

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
		Inhalation of soil gas or vapours (2)	Low likelihood	High	Moderate	characterised by moderate methane and depleted oxygen with localized abnormal carbon monoxide and hydrogen sulphide concentrations. A gas risk assessment and robust control measures will be required during construction.
	Surface water including reens of the Gwent Levels SSSI (C)	Saturated flow within perched water and groundwaters (4)	Likely	High	High	Perched water in the Made Ground is likely to have low flow and may be absent seasonally. Leachable organics identified within the soils. Surface waters at the boundary of the Site are generally of good quality. Perched (shallow) groundwater is currently intercepted by the lagoon containment systems ('dirty' and 'clean' ditches). The quality of perched water in the Made Ground and lagoons was shown to have been impacted by contamination and therefore the quality of surface water is likely to deteriorate if new pathways are created during construction. A water management system, temporary drainage and a surface water protection plan will be required during construction to protect surface waters being contaminated by leachate generated from lagoon sludge and coarse slag as well as perched waters within Made Ground and the lagoons.
		Contaminated surface water run-off (5)	Likely	High	High	Leachable metals identified within the lagoon waste. Surface water run-off from the construction area may deteriorate the quality of surface water and thus the construction process will need to adopt surface water control and management.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
	Groundwater - aquifer (Da)	Vertical migration (4)	Unlikely	Moderate	Low	Moderate leaching potential identified from lagoon waste. Perched groundwater quality within the Made Ground and Tidal Flat Deposits shown to have elevated concentrations of metals, inorganic and organic contaminants. Thick mantle of predominantly soft low permeability Tidal Flat Deposits overlying aquifer reducing risk of downward migration. Increased vertical pathways between possible contaminant and receptor with construction of band drains. Aquifer identified to be saline and have elevated concentrations of metals and inorganics and is not considered to represent a key receptor especially as it is not used for potable water supply. Hydrostatic pressures shown to be below or at base of the Made Ground. Possible increase in risk of Made Ground to become saturated.
Groundwater – Aquifer from the Glaciofluvial Deposits and/or Mercia Mudstone identified as saline and has elevated levels of metals and inorganics	Surface water (land drainage)	Band drains installation	Unlikely	High	Moderate to low	Water quality within reens identified as good with no obvious impact from existing contamination sources. Perched water of TFD and aquifer quality shown to be saline and has elevated metal, inorganic and organic contaminants. Controls and a foundation risk assessment are required to mitigate these risks. Band drains are not to be installed beneath the full extent of the lagoons reducing this risk.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
Ground gas from TFD including Peat	Construction workers (B)	Inhalation of soil gas / explosion (2)	Low likelihood	High	Moderate	Ground gas regime in natural strata characterised by moderate methane, depleted oxygen levels and low flow, likely associated with peat. Peat overlain by low permeability cohesive soils. Flux likely to increase during any surcharge loading. New pathways could be created with band drains. Construction to be largely within open space. Any earthworks within confined space and during band drain installation would require specific risk assessment, control measures and PPE.
	Off site users during construction works (C)	Inhalation of soil gas / explosion (2)	Unlikely	High	Moderate to low	Ground gas regime in natural strata characterised by moderate methane, depleted oxygen levels and low flow, likely associated with peat. Peat overlain by low permeability cohesive soils. Flux likely to increase during any surcharge loading. New pathways could be created with band drains. Nearest receptors over 50 m south and limited potential for lateral gas migration given the presence of low permeability.
<u>On site</u> Elevated metals and pH originating from Made Ground including lagoon waste and perched	**Operational**					
	Maintenance workers (B)	Direct dermal (1)	Unlikely	Low	Very low	Made Ground to be encapsulated by the embankment and landscaping and therefore the exposure to contamination will be effectively mitigated. Existing contamination levels are not foreseen to represent
		Ingestion (3)	Unlikely	Unlikely	Very low	

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
water and ground gas.		Inhalation of soil dust (2)	Unlikely	Low	Very low	abnormal constraints to maintenance workers health and safety over and above those typical of a brownfield site. Surcharge of superficial soils completed and gas flux likely to have stabilised. Maintenance works would be largely within open space. Any works within confined space would require specific risk assessment, control measures and PPE to meet legislative requirements.
		Inhalation of soil gas or vapours (2)	Unlikely	Low	Very low	
	Future Motorway users (A) and other off site users (C)	Dermal contact with soil dust (1)	Unlikely	Low	Very low	Exposure duration will be short term only for motorway users which are to be elevated above ground level. The human health screening criteria is considered conservative when considering exposure and pathway mechanisms to future site users. Made Ground to be encapsulated by the embankment and landscaping and therefore the exposure to contamination will be effectively mitigated. Limited potential for lateral gas migration given the presence of low permeability Tidal Flat Deposits to shallow depth and thus no viable off site receptors.
		Ingestion of soil dust (3)	Unlikely	Low	Very low	
		Inhalation of soil dust (2)	Unlikely	Low	Very low	
		Inhalation of soil gas or vapours (2)	Unlikely	Low	Very low	

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
	Groundwater - Aquifer (Da)	Leaching/migration (4)	Unlikely	Moderate	Low	Moderate leaching potential identified from lagoon waste materials. Lagoon wastes to be treated which will reduce mobilisation of contaminants. Majority of Made Ground to be encapsulated by the embankment, further reducing rainfall infiltration potential for mobilisation of contaminants contained within these materials. Aquifer identified to be saline and have elevated concentrations of metals and inorganics and is not considered to represent a key receptor especially as it is not used for potable water supply.
	Surface water including reens of the Gwent Levels SSSI (C)	Saturated flow within perched groundwater (4)	Unlikely	Moderate	Low	Perched water within the TFD and lagoon waste contains elevated metal, inorganic and organic contaminant concentrations and lagoon waste has leachable contaminants. Lagoon wastes to be treated which will reduce mobilisation of most contaminants. Lagoon wastes to be removed from beneath perched water level in TFD. Clean and dirty ditch to be reinstated north of motorway to prevent contaminants entering surface waters as per existing arrangements.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
Groundwater – Aquifer from the Glaciofluvial Deposits and/or Mercia Mudstone identified as saline and has elevated metals and inorganics	Surface water (land drainage)	Band drains	Unlikely	High	Moderate to low	Water quality within reens identified as good with no obvious impact from existing contamination sources. Perched groundwater and aquifer quality shown to be saline and has elevated metal, inorganic and organic contaminants.
Ground Gas from Made Ground / Peat	Maintenance Workers (B)	Inhalation of soil gas / explosion (2)	Unlikely	High	Moderate to low	Although elevated methane concentrations are known within the natural soils of the Tidal Flat Deposits, the low permeability soils will result in limited gas generation post construction. Risk to maintenance workers is low but entry into any confined spaces will need to adhere to health and safety legislation requirements. Pathways along band drains could still allow localised gas migration.
	Motorway users (A)	Inhalation of soil gas / explosion (2)	Unlikely	High	Moderate to low	Ground gas data from the peat horizons within the superficial deposits identify concentrations of methane. Limited potential for lateral gas migration given the presence of low permeability Tidal Flat Deposits to shallow depth. Motorway to be built on raised embankment providing a further barrier to migration of gases.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
	Off site users (C)	Inhalation of soil gas / explosion (2)	Unlikely	High	Moderate to low	Ground gas regime in natural strata characterised by moderate methane, depleted oxygen levels and low flow, likely associated with peat.Peat overlain by low permeability cohesive soils. Nearest receptors some 50 m south and limited potential for lateral gas migration given the presence of low permeability Tidal Flat Deposits viable pathways not considered realistic.

10 Conclusions and Recommendations

10.1 Conclusions

10.1.1 Ground investigations have been undertaken at the Site to assess risks from land contamination associated with the construction and operation of the Scheme including risks to human health and controlled waters.

10.1.2 Widespread contamination within lagoon wastes associated with the Site's historical use has been identified. The risk assessment has identified that some residual risks to human health and controlled waters exist and control measures are required to facilitate the construction and ongoing operation of the Scheme.

10.1.3 The laboratory testing results from ground investigations confirmed the onsite observations and field testing, and showed that the lagoon wastes including sludge and coarse slag encountered within the Site contain widespread alkaline conditions with elevated lead concentrations and discrete arsenic, nickel, VOCs and PCB concentrations (albeit a very conservative screening assessment is used for PCBs) which are likely to pose a moderate risk to human health during construction and a low risk during the operational phases.

10.1.4 Given the leachability of some contaminants, lagoon waste materials are unlikely to be suitable for reuse without some soil treatment which satisfies suitably for reuse criteria and implementation of a remediation strategy including adoption of a Material Management Plan. The coarse slag and other contaminated waste materials beneath the perched water table will require removal. However this material may be suitable for reuse on the Scheme subject to compliance with suitability for reuse criteria. Clean material won on site or imported to site will be placed where material is removed.

10.1.5 During the construction phase, specific mitigation measures will be required to prevent inhalation pathways of dust to off site and workforce receptors, although such measures would be no more than typically expected on a construction site.

10.1.6 Contaminated perched groundwaters especially within slag and sludge wastes will require suitable water management strategy and surface and groundwater protection plans will also be required to prevent potential impact to surface waters from contaminant run-offs during construction.

10.1.7 During the operational phase, the embankment will cover part of the Site which will significantly limit the infiltration of rainwater through the soils and potentially leaching any soil contaminants into the groundwater. However, perched water within the Made Ground could remain beneath the embankment and this will require mitigation to prevent future risks to surface waters.

10.1.8 Surface waters at the boundary of the Site are generally of good quality with limited evidence of contamination.

10.1.9 The use of band drains could create new pathways which may lead to impacted perched water within the Tidal Flat Deposits and within the Made Ground to enter the currently confined aquifer within the Glaciofluvial Deposits and the Mercia Mudstone. However band drains will not be used beneath the full extent of the lagoons and band drains will not be installed through contaminated material, which considerably reduces this risk.

10.1.10 The deep aquifer is identified to be have elevated metals and inorganic contaminants which may reduce surface water quality if the band drains pathway allows direct or indirect linkage during construction. Further consideration and a foundation (piling) risk assessment will be undertaken to mitigate the potential impact of the band drains to allow specific mitigation measures to be implemented. However as stated above band drains will not be used beneath the full extent of the lagoons and band drains will not be installed through contaminated material, which considerably reduces this risk.

10.1.11 Post construction, the embankment itself and topsoil and subsoil used for landscaping along the motorway corridor will break potential human health pathways to end-users and maintenance workers. However, topsoil materials placed at the surface will need to be checked for contamination.

10.1.12 Elevated levels of ground gas associated with the peat within the Tidal Flat Deposits and the Made Ground associated with the slurry and coarse slag materials are above screening criteria in some monitoring wells. Particularly elevated levels of carbon monoxide and hydrogen sulphide were identified within Lagoon 12 and Lagoon 25. Robust gas protection and control measures will be required during construction to protect workers (as well as off site users). Risks to human health and structures from ground gas during the operational phase are considered low.

10.1.13 An unexploded buried ordnance mitigation strategy will be required.

10.2 Recommendations

10.2.1 The ground investigation data have indicated that potential contamination is present that could cause an unacceptable risk to the identified receptors. This will require appropriate remedial mitigation measures to be implemented. These measures would be identified within a remediation strategy for the Scheme. The remediation strategy is anticipated to include but is not limited to the following.

- A separate management strategy for treatment of the lagoon sludge (silts) and slag to demonstrate that where required they can be fully recovered and incorporated into the permenant works.
- A programme for ground gas monitoring is undertaken to enable gas risks to be appropriately managed during and post construction.
- Design details of the reinstated lagoons to facilitate variations of environmental permits and partial surrender of land within the permanent highway and land to the south.
- Risk assessment of band drains and associated construction works creating pathways enabling contaminants migration, with due consideration of relevant EA guidance (EA, 2001 and EA, 2002).
- Dealing with unexpected contamination.
- Verification sampling strategy to confirm suitability for soils for retention / reuse.
- Control measures to prevent risks to construction workers and the general public during construction.
- Verification of imported topsoils for suitability of use.

10.2.2 The remediation strategy will include a remediation options appraisal, remediation implementation plan and remediation verification plan. The remediation strategy should be supplemented with a Scheme wide Material Management Plan prepared in accordance with CL:AIRE Code of Practice (CL:AIRE, 2011). The remediation strategy should be agreed with NRW prior to implementation.

11 References

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12 Glossary

BF	Blast Furnace
BGS	British Geological Survey
BOD	Biochemical Oxygen Demand
BOS	Basic Oxygen Slag
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CAT	Cable Avoidance Tool
CDM	Construction Design Management
CH_4	Methane
CLEA	Contaminated Land Exposure Assessment
CO_2	Carbon Dioxide
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CSM	Conceptual Site Model
DMRB	Design Manual for Roads and Bridges
DO	Dissolved Oxygen
DQRA	Detailed Quantitative Risk Assessment
DWS	Drinking Water Standard
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESG	Environmental Scientifics Group
EQS	Environmental Quality Standard
FTIR	Fourier Transform Infrared (spectroscopy)
GAC	Generic Assessment Criteria
GDR	Geotechnical Design Report
GIR	Ground Investigation Report
GRO	Gasoline Range Organics
LEL	Lower Explosive Limit
LOD	Limit of Detection
mAOD	Metres Above Ordnance Datum

mb	Millibars
mbGL	Metres below Ground Level
MTBE	Methyl Tert-butyl Ether
NRW	Natural Resources Wales
ORP	Oxidation Reduction Potential
O_2	Oxygen
OS	Ordnance Survey
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCSM	Preliminary Conceptual Site Model
PID	Photo Ionisation Detector
PPE	Personnel Protection Equipment
SGVs	Soil Guideline Values
SSAC	Site Specific Assessment Criteria
SSSI	Site of Special Scientific Interest
SVOCs	Semi-Volatile Organic Compounds
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbon
TPH CWG	Total Petroleum Hydrocarbon Criteria Working Group
UKAS	United Kingdom Accreditation Service
VOCs	Volatile Organic Compounds
WFD	Water Framework Directive
UXO	Unexploded Ordnance Survey

Figures

BHM4CAN038a
BH515
BH13
OCBH1
TPM4CAN018
BHM4CAN037
WSM4CAN023
BH15
LGBH01
BH14b
BH14a
TP506
BH514
BH514A
BHM4CAN040
TPM4CAN017
CL-26
LGBH06
BH512
SWSJ09A
SWSJ09
LGBH02
Lagoon 12
Monks Ditch
Backwall Reen
SWSJ10
SWSJ17A
SWSJ17
BH513
SBHJ03
SBHJ03 CP
SWSJ13
SWSJ15
SWSJ11
LGBH04
TPM4CANA006
SWSJ14
SWSJ16
Lagoon 25
SWSJ12
SBHJ04
SWSJ19
BHM4CANA012
LGBH03
BH516
SW505
SBHJ05
SWSJ18
WS501
DPWS501
SWSJ20
LGBH05
BH518
14800.000
14900.000
15000.000
15100.000
15200.000
15300.000
15400.000
Middle Reen
Chapel Reen
CL-24
CL-25

Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Proposed Water Treatment Area (WTA)
- Potential Area of Land Contamination based on 2014 PSSR
- Other Potential Area of Land Contamination
- Metal Recovery Area

Investigation Locations

2015-2016 (RPS)
- Borehole
- Window Sample
- Trial Pit

2015 (Geotechnical Engineering)
- Borehole
- Dynamic Probe (Proposed Borehole)
- Trial Pit
- Surface Water Monitoring Location

2007 (Norwest Holst)
- Borehole
- Window Sample

2006 (Enviros)
- Borehole

2002 (Exploration Associates)
- Borehole
- Monitoring Well Installation

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Appendix R11.1 Annex D CL-26

Site Plan for CL-26 (Lagoon 12)

Figure: 1a	Revision: 1
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked: FB

Scale: A3 @ 1:2,000
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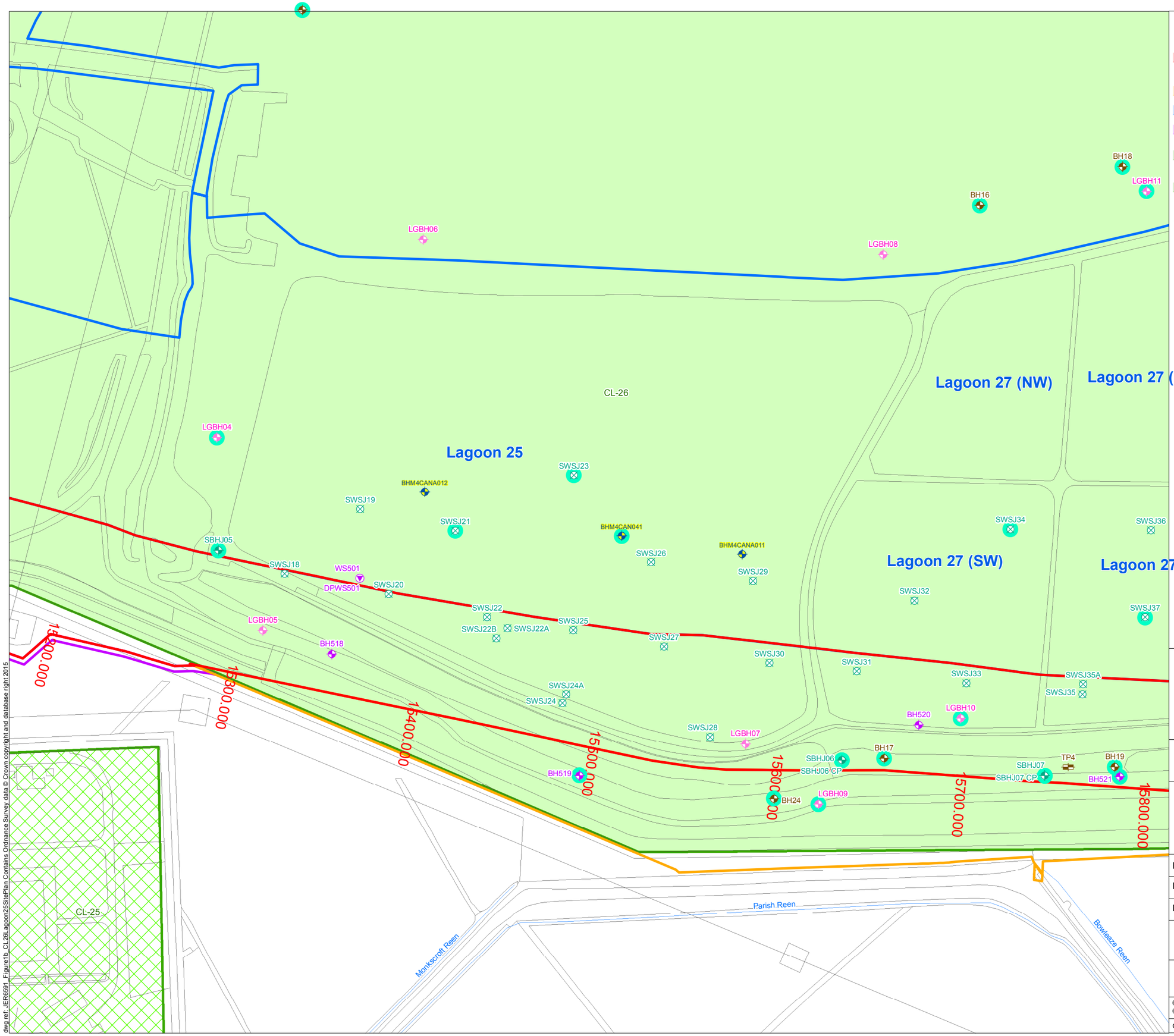

Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Potential Area of Land Contamination based on 2014 PSSR
- Other Potential Area of Land Contamination

Investigation Locations

2015-2016 (RPS)
- Borehole

2015 (Geotechnical Engineering)
- Borehole
- Dynamic Probe (Proposed Borehole)

2007 (Norwest Holst)
- Borehole
- Window Sample

2006 (Enviros)
- Borehole
- Trial Pit

2002 (Exploration Associates)
- Borehole
- Monitoring Well Installation

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Appendix R11.1 Annex D CL-26

Site Plan for CL-26 (Lagoon 25)

Figure: 1b	Revision: 1
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Lagoon 27 (NE)

Lagoon 27 (SE)

Lagoon 26

CL-26

BH18
LGBH11
BH20
TP2
BH23
TP3
SWSJ36
STPJ04
SWSJ37
STPJ02
SWSJ38
SWSJ35A
SWSJ35
SBHJ08
SBHJ08A CP
SBHJ08A
STPJ01
BH522
STPJ03
BHM4CAN043
SBHJ09
BH523
SBHJ09 CP
TP1
BH21
STPJ06
BH524
STPJ05
SBHJ10
SBHJ10 CP
TP509
BH525
TP4
BH19
BH521
SBHJ07
TP508
LGBH12
SW506
15800.000
15900.000
16000.000
16100.000
16200.000
16300.000
Bowleaze Reen
Parish Reen

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Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Potential Area of Land Contamination based on 2014 PSSR
- Other Potential Area of Land Contamination

Investigation Locations

2015-2016 (RPS)
- Borehole

2015 (Geotechnical Engineering)
- Borehole
- Dynamic Probe (Proposed Borehole)
- Trial Pit
- Surface Water Monitoring Location

2007 (Norwest Holst)
- Borehole
- Trial Pit
- Window Sample

2006 (Enviros)
- Borehole
- Trial Pit

2002 (Exploration Associates)
- Borehole
- Monitoring Well Installation

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Appendix R11.1 Annex D CL-26

Site Plan for CL-26 (Lagoon 26)

Figure: 1c	Revision: 1
Date: September 2016	Status: At Issue
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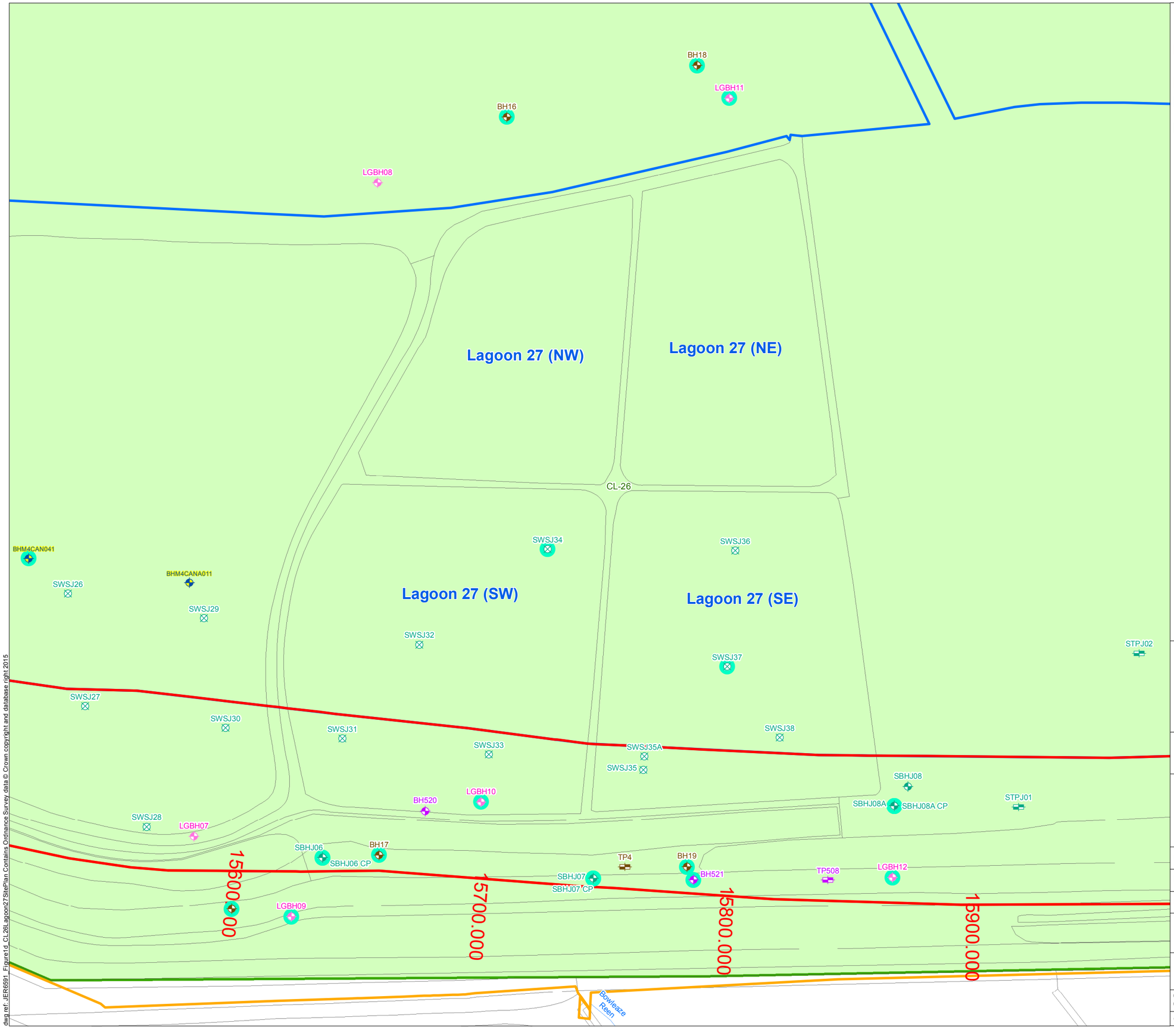

Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Potential Area of Land Contamination based on 2014 PSSR

Investigation Locations

2015-2016 (RPS)
- Borehole

2015 (Geotechnical Engineering)
- Borehole
- Trial Pit

2007 (Norwest Holst)
- Borehole
- Trial Pit
- Window Sample

2006 (Enviros)
- Borehole
- Trial Pit

2002 (Exploration Associates)
- Borehole
- Monitoring Well Installation

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Appendix R11.1 Annex D CL-26

Site Plan for CL-26 (Lagoon 27)

Figure: 1d	Revision: 1
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Scale: A3 @ 1:1,500
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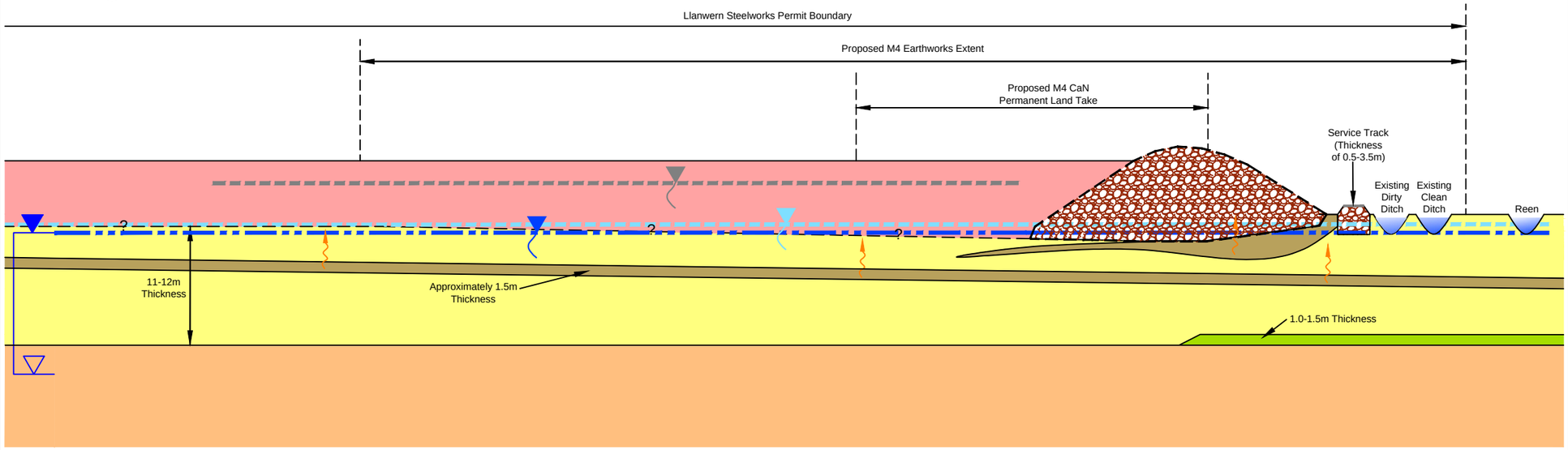
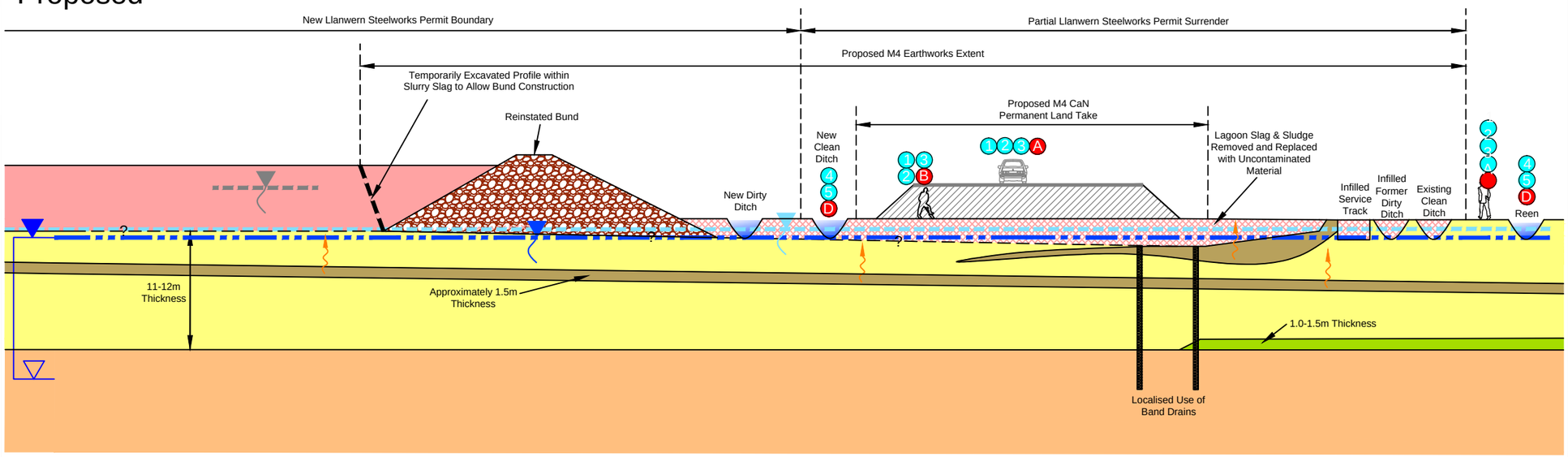
CL- 26 Llanwern Steelworks

Existing



Proposed



Ground conditions based on available information

Legend

- Made Ground (Slurry Slag) - MG
- Coarse Slag (Peripheral Bund)
- Uncontaminated Clean Infill Material
- Tidal Flat Deposits - TFD
- Peat
- Glaciofluvial Deposits - GFD
- Mercia Mudstone (Proven) - MM
- Proposed Motorway (Cement Stabilised Lagoon Slurry)
- Proposed Band Drain
- No Information Available
- Perched Water (MG)
- Perched Groundwater (TFD)
- Groundwater (GFD and MM)
- Water Strike
- Rest Water Level
- Gas Migration Pathway

Potential Receptors

- A Humans On-Site (M4 User)
- B Humans On-Site (Construction/Maintenance)
- C Humans Off-Site (Site Neighbours)
- GW Groundwater (Aquifer)
- GP Groundwater (Perched)
- D Surface Water

Potential Pathways

- 1 Dermal Contact
- 2 Inhalation
- 3 Ingestion
- 4 Leaching / Migration
- 5 Surface Run Off

Potential Sources of Contamination

Possible contamination present on site associated with :

On-Site

- Contamination present on site associated with the slag material located in the lagoons
- Cyanide is recorded in a mobile state

Off-Site

- Main Llanwern Steelworks

NOTE
Drawing refined from PSSR Drawing Reference M4-OA-17-00DR-Z-XX-0145 (April 2014)

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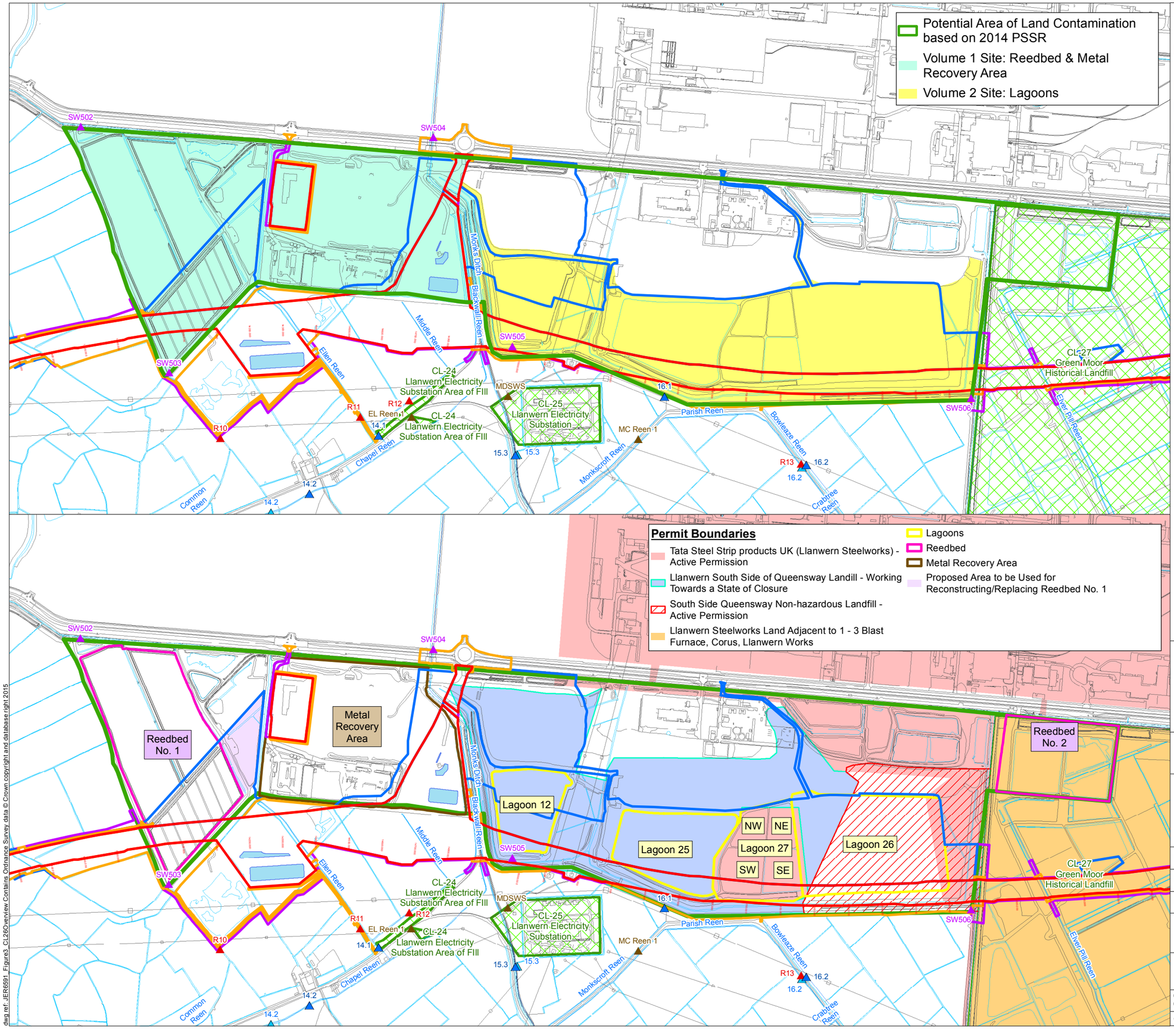
Appendix R11.1 Annex D CL-26

Conceptual Site Model for CL-26 (Lagoons)

Figure: 2	Revision: 1
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked: FB

Not to Scale

dwg ref: JER6591_Figure2_CL26LagoonsConceptualSiteModel



Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Proposed Water Treatment Area (WTA)
- Potential Area of Land Contamination based on 2014 PSSR
- Other Potential Area of Land Contamination

Surface Water Monitoring Locations

- 2015 (RPS) - Q2
- 2015 (RPS) - Q1
- 2015 (Geotechnical Engineering)
- 2008-2009 (Titan Surveys)
- 2006 (Enviros)

Llywodraeth Cymru
Welsh Government

Appendix R11.1 Annex D CL-26

Overview Site Plan for CL-26 with Permit Boundaries

Figure: 3	Revision: -
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked: FB

Scale: A3 @ 1:10,859
0 180 360m

N

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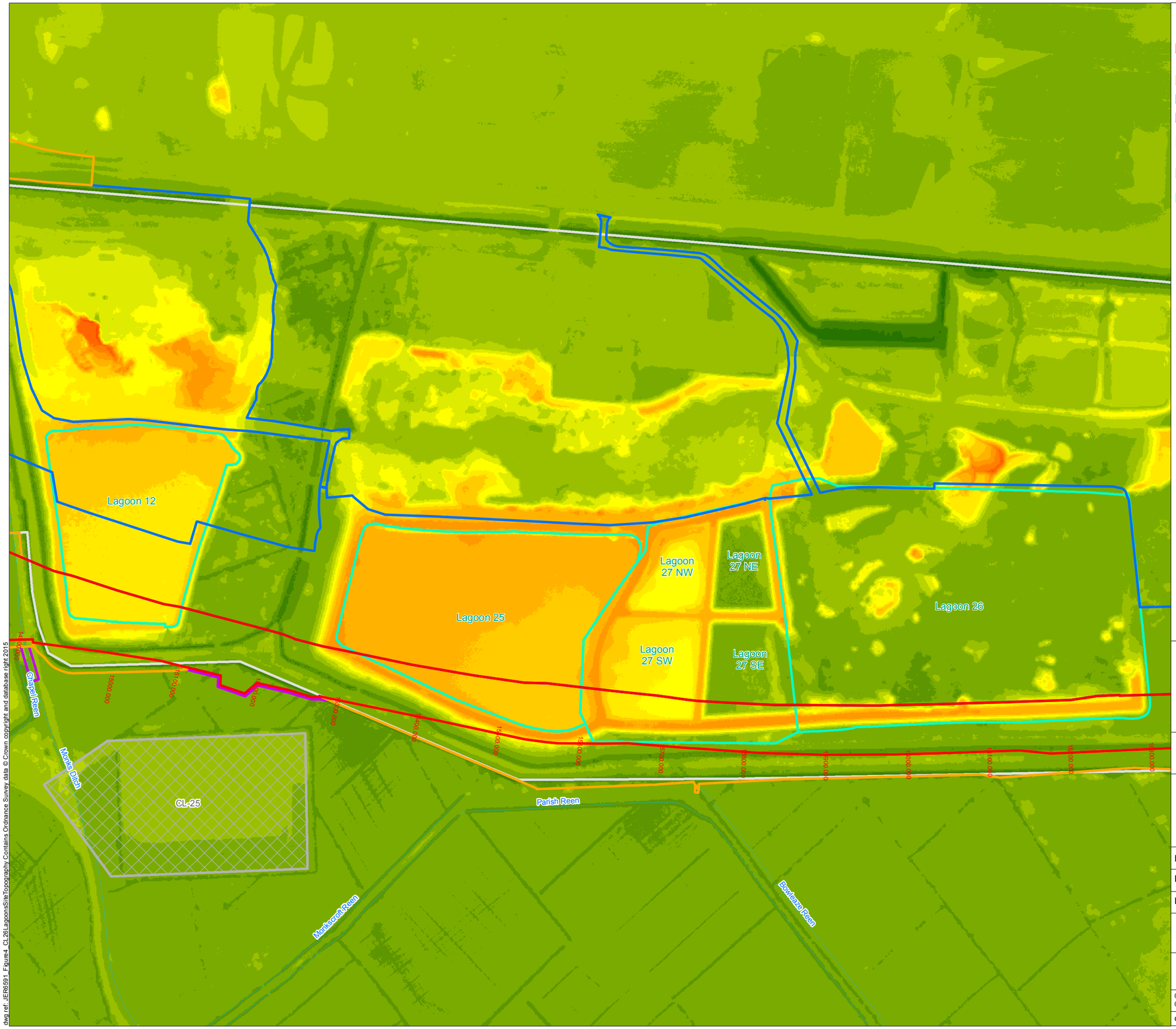
dwg ref: JER6591_Figure3_CL26Overview

dwg ref: JER6591_Figure3_CL26Overview Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

- Permanent Highway Land within Fenceline (including Water Treatment Areas)
- Other Permanent Land Take
- Temporary Construction Land
- Easement Only
- Potential Area of Land Contamination based on 2014 PSSR
- Other Potential Area of Land Contamination
- Lagoon

LiDAR Digital Terrain Model

- 1 -< 2 mAOD
- 2 -< 3 mAOD
- 3 -< 4 mAOD
- 4 -< 5 mAOD
- 5 -< 6 mAOD
- 6 -< 7 mAOD
- 7 -< 8 mAOD
- 8 -< 9 mAOD
- 9 -< 10 mAOD
- 10 -< 11 mAOD
- 11 -< 12 mAOD
- 12 -< 13 mAOD
- 13 -< 14 mAOD
- 14 -< 15 mAOD
- 15 -< 16 mAOD
- 16 -< 17 mAOD
- 17 -< 18 mAOD

Llywodraeth Cymru
Welsh Government

Appendix R11.1 Annex D CL-26

Site Topography for CL-26 (Lagoons)

Figure: 4	Revision: -
Date: September 2016	Status: At Issue
Drawn: RJJ	Checked: FB

Scale: A3 @ 1:4,500
0 112.5 225 m

N

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dwg ref: JER6591_Figure4_CL26LagoonsSiteTopography

dwg ref: JER6591_Figure4_CL26LagoonsSiteTopography Contains Ordnance Survey data © Crown copyright and database right 2015

Appendices

A1 Appendix 1a

Exploratory Records (Lagoon 12)

Borehole Log

Exploration Associates

Drilled by	NF	Equipment and Methods	Ground Level + 11.80 m OD
Logged by	LM	Inspection Pit from 0.00m to 1.20m. Cable Percussion 150 mm diameter from 1.20m to 10.50m.	National Grid Coordinates E 337005.30 N 185966.22
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
			05/02/2002 0.00	dry
1.00	ES1			
			05/02/2002 5.00	dry
			06/02/2002 5.00	dry
7.50	ES2			
9.50	ES3			

Strata

Description	Depth,Level (Thickness)
MADE GROUND: Brown and grey clayey sandy GRAVEL. Gravel is angular and subangular fine to coarse of slag, concrete and clinker.	(8.50)
Firm grey mottled orange brown and dark brown CLAY.	8.50 +3.30 (2.00)

Legend: c, b, a, b

Groundwater
Not encountered during drilling.

Remarks
Chiselling : 1.70m to 2.20m 90minutes, 2.90m to 3.50m 120minutes, 4.40m to 5.00m 90minutes, 5.00m to 5.70m 120minutes, 6.60m to 7.30m 120minutes, 8.00m to 8.50m 150minutes
Hole backfill : 0.00m to 0.30m Concrete (c), 0.30m to 1.00m Bentonite (b), 1.00m to 7.50m Arisings (a), 7.50m to 8.50m Bentonite (b). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 8.50m to 10.50m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
LGBH1
Sheet 1 of 2

03/05/2002 11:10:19 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	NF	Equipment and Methods	Ground Level + 11.80 m OD
Logged by	LM	See sheet 1	National Grid Coordinates E 337005.30 N 185966.22
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
10.50		kRH	06/02/2002 10.50	dry

Strata

Description	Depth,Level (Thickness)	Legend
As sheet 1	(2.00pen)	
EXPLORATORY HOLE ENDS AT 10.50 m.	10.50 +1.30	

Groundwater

Remarks

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project: ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.: 152002
Carried out for: Corus plc

Borehole: LGBH1
Sheet 2 of 2

03/05/2002 11:10:22 ESGLog v2.10

Borehole Log

Exploration Associates

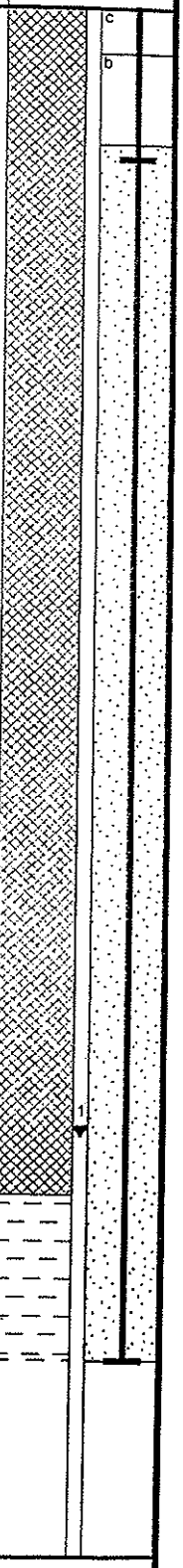
Drilled by	GW	Equipment and Methods	Ground Level + 10.81 m OD
Logged by	LM	Inspection Pit from 0.00m to 0.50m. Cable Percussion 150 mm diameter from 0.50m to 9.00m.	National Grid Coordinates E 336915.38 N 185866.11
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
0.50	ES1		05/02/2002	
			05/02/2002	dry
			6.00	
			06/02/2002	dry
			6.00	
8.10	ES2		06/02/2002	
			0.00	
9.00	ES3			

Strata

Description	Depth,Level (Thickness)	Legend
MADE GROUND: Grey brown sandy GRAVEL. Gravel is angular to subrounded fine to coarse of concrete. Driller reports slag.	(7.90)	
Soft to firm grey mottled brown slightly sandy CLAY.	7.90 +2.91 (1.10pen)	
EXPLORATORY HOLE ENDS AT 9.00 m.	9.00 +1.81	



Groundwater

No.	Struck	Behaviour
1	7.50m	Rising to 7.50m after 20 mins. Sealed 8.00. Slow inflow

Remarks

Chiselling : 0.50m to 6.00m 240minutes, 6.00m to 7.90m 360minutes
Hole backfill : 0.00m to 0.30m Concrete (c), 0.30m to 0.90m Bentonite (b). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 0.90m to 9.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
LGBH2
Sheet 1 of 1

03/05/2002 11:10:58 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	GW	Equipment and Methods	Ground Level + 10.53 m OD
Logged by	DE	Cable Percussion 150 mm diameter from 0.00m to 9.00m.	National Grid E 336994.50
Checked by			Coordinates N 185716.52

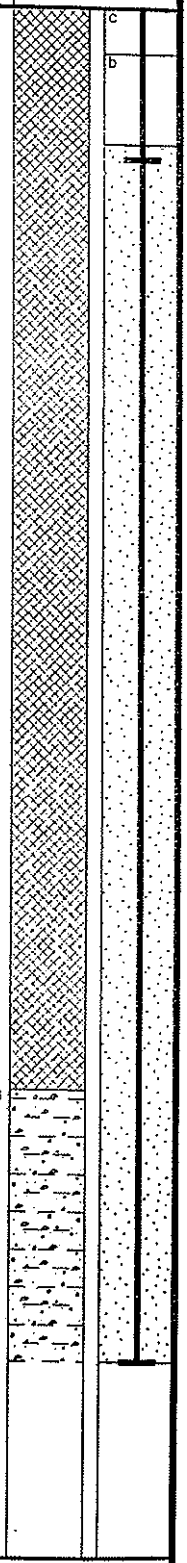
Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
			31/01/2002	
0.50	ES1			
			01/02/2002	
			3.00	dry
			04/02/2002	
			3.00	dry
			04/02/2002	
			7.00	dry
			05/02/2002	
			7.00	6.90
8.00	ES2			
			05/02/2002	
9.00		kRH		

Strata

Description	Depth,Level (Thickness)
MADE GROUND: Dark grey SAND AND GRAVEL. Gravel is subangular to rounded fine to coarse of slag.	(7.20)
	7.20 +3.33
Soft green grey mottled orange brown slightly gravelly CLAY. Gravel is angular fine to coarse of limestone.	(1.80pen)
EXPLORATORY HOLE ENDS AT 9.00 m.	9.00 +1.53

Legend



Groundwater

Remarks

Chiselling : 0.70m to 3.00m 150minutes, 3.00m to 7.00m 270minutes, 7.00m to 7.70m 90minutes
Hole backfill : 0.00m to 0.30m Concrete (c), 0.30m to 0.90m Bentonite (b). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 0.90m to 9.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
LGBH3
Sheet 1 of 1

03/05/2002 11:11:05 ESGLog v2.10

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ04
Header

Contract No.	F15056	Method	Cable Percussion & Rotary	Coordinates	337045.30 E
Project	New M4 - Second Preliminary Ground Investigation				185715.92 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	11.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	18/12/2007
Consultant	Ove Arup & Partners Ltd	Core barrel		Date Completed	09/01/2008
		Core bit	8 Inch Hammer		

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
18/12/2007	1730	7.70	7.70	DRY	End of Shift
08/01/2008	0730	7.70	7.70	DRY	Start of Shift
08/01/2008	1730	16.00	16.00	DRY	End of Shift
09/01/2008	0730	16.00	16.00	11.00	Start of Shift
09/01/2008	1730	18.50	18.20	1.85	End of Hole

CABLE PERCUSSION DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling Hours	Remarks
7.20	7.80	1.50	Chisseling
16.40	17.40	2.50	Slow Progress
18.20	18.50	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	7.70	200	7.70
150	18.50	150	18.20

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

ROTARY DRILLING DETAILS

From depth	To depth	Flush type	Flush return	Core diameter
0.00	7.70	Air	Good	0*

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm	Casing	Water Depth
8.50	S	N=13 (2,3,3,4,3,3)	8.00	DRY
10.50	S	N=19 (2,3,4,5,5,5)	9.70	DRY
12.50	S	N=22 (3,4,5,7,5,5)	12.00	DRY
14.50	S	N=8 (1,1,2,2,2,2)	14.00	DRY
16.50	C	N=39 (5,9,9,11,10,9)	10.00	12.00
18.00	S	50/210mm (7,14,16,16,18)	17.50	14.00
18.50	S	50/20mm (25,50)	18.20	10.00

* Seating blows only.

GENERAL NOTES

1. Rotary Openhole cemetrix drilling from GL to 7.70m.
2. Insitu permeability testing carried out from 17.40m to 18.50m.
3. Cable Percussive boring from 7.20m to 18.50m.
4. 50mm Standpipe installed slotted from 12.10m to 13.10m.
5. 0.00* indicates openhole drilling.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, hard strata time in hours

Form	ARIAL COMBINED HEADER
Version	3.04
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ04
Sheet 1 of 2

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337045.30 E
Project	New M4 - Second Preliminary Ground Investigation				185715.92 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	11.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	18/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel		Date Completed	09/01/2008
		Core Bit	8 Inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring		Blow Count TCR	SCR	RQD	SPT type, N & depth		Install-ation
MADE GROUND: Steel clinker. (Driller's description)											
MADE GROUND: Stiff clay. (Driller's description)		7.00	4.24								
MADE GROUND: Clinker fill. (Driller's description)		7.20	4.04								
Firm grey silty CLAY. (Driller's description) (Estuarine Alluvium)		7.80	3.44								
		8.00	3.24	ES1	8.00		(10)				
				D2	8.00						
				U3	8.00-8.45						
Firm high strength thinly laminated grey silty CLAY with occasional organic fragments. (Estuarine Alluvium)				D4	8.50				S13		
				D5	8.50				8.50	8.95	
---from 8.50m to 10.50m becomes soft to firm				ES6	9.00						
				D7	9.50						

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
Version	3.10
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ04
Sheet 2 of 2

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337045.30 E
Project	New M4 - Second Preliminary Ground Investigation				185715.92 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	11.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	18/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel		Date Completed	09/01/2008
		Core Bit	8 Inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring		Blow Count TCR / SCR / RQD	SPT type, N & depth	Install-ation
Firm black pseudofibrous PEAT. (Peat)		10.00	1.24	ES8 U9	10.00 10.00-10.45	(14)		
Firm high strength thinly laminated grey silty CLAY with occasional organic fragments. (Estuarine Alluvium)		10.50	0.74	D10 D11	10.50 10.50		S19 10.50 10.95	
				ES12	11.00			
---from 11.50m becomes speckled brown				D13	11.50			
Firm black pseudofibrous PEAT. (Peat)		11.80	-0.57	ES14 U15	12.00 12.00-12.45	(16)		
				D16 D17	12.50 12.50		S22 12.50 12.95	
Firm grey silty CLAY with occasional coarse gravel sized pockets of brown pseudofibrous peat. (Estuarine Alluvium)		13.00	-1.77	ES18	13.00			
				D19	13.50			
				U20 D21 D22	14.50 14.50 14.50	(5)	S8 14.50 14.95	
				D23	15.50			
Grey clayey slightly sandy subangular to rounded GRAVEL of quartz, mudstone, siltstone and sandstonewith medium cobble content. Sand is coarse. Cobbles are subrounded of sandstone and siltstone. (Fluvial Alluvium) from 16.22m slightly gravelly, gravel is subangular to subrounded fine to medium of mudstone, siltstone and sandstone.		16.00	-4.77	U24	16.00-16.45	(17)		
				D25	16.50		C39 16.50 16.95	
				B26	17.00			
Firm to stiff reddish brown mottled greenish grey slightly gravelly CLAY. Gravel is angular fine to medium (Weathered Mudstone). (Mercia Mudstone Group)		17.40	-6.17	D27 U28	17.50 17.50-17.95	(120)		
---from 18.00m very stiff				D29 D30	18.00 18.00		S50/210mm 18.00 18.36	
---at 18.50m recovered as angular fine to coarse gravel sized fragments		18.50	-7.27	D31 D32	18.50 18.50		S50/20mm 18.50 18.55	
Borehole complete at 18.50 m.								

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
Version	3.10
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Header

Contract No.	F15056	Method	Cable Percussion & Rotary	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core barrel	Cemetrix	Date Completed	13/01/2008
		Core bit	8 inch Hammer		

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
17/12/2007	1730	10.30	10.30	DRY	End of Shift
11/01/2008	0730	10.30	10.40	DRY	Start of Shift
11/01/2008	1730	10.70	10.70	DRY	End of Shift
12/01/2008	0730	10.70	10.70	DRY	Start of Shift
12/01/2008	1730	14.50	14.50	DRY	End of Shift
13/01/2008	0730	14.50	14.50	DRY	Start of Shift
13/01/2008	1730	20.50	19.50	DRY	End of Hole

CABLE PERCUSSION DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling Hours	Remarks
10.20	10.70	6.00	Chiselling
10.70	11.50	5.00	Chiselling
20.20	20.50	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	10.30	200	10.30
150	20.50	150	19.50

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
13/01/2008		14.80	14.80	NR	Seepage	14.80	NS

ROTARY DRILLING DETAILS

From depth	To depth	Flush type	Flush return	Core diameter
0.00	10.30	Air	Good	0*

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm	Casing	Water Depth
12.00	S	N=20 (3,4,4,5,5,6)	11.50	DRY
14.00	S	N=25 (4,5,5,6,7,7)	13.50	DRY
16.00	S	N=2 (1,1,0,1,0,1)	15.50	15.80
18.00	S	N=2 (1,0,1,0,1,0)	17.50	17.80
19.50	S	50/200mm (9,13,14,16,20)	19.00	DRY
20.50	S	50/20mm (25,50)	19.50	DRY

* Seating blows only.

GENERAL NOTES

1. Rotary Openhole cemetrix drilling from GL to 10.30m.
2. Cable Percussive boring from 10.20m to 20.50m.
3. 50mm standpipe installed, slotted from 9.50m to 11.50m.
4. 0.00* indicates openhole drilling.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, hard strata time in hours

Form	ARIAL COMBINED HEADER
Version	3.04
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Sheet 1 of 3

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel	Cemetrix	Date Completed	13/01/2008
		Core Bit	8 inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring	Blow Count TCR	SCR	RQD	SPT type, N & depth	Install-ation
MADE GROUND: Ash and steel clinker. (Driller's description)									
		6.00	7.24						
MADE GROUND: Clay and gravel. (Driller's description)									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
Version	3.10
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Sheet 2 of 3

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel	Cemetrix	Date Completed	13/01/2008
		Core Bit	8 inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring		Blow Count TCR / SCR / RQD	SPT type, N & depth	Install-ation
MADE GROUND: Clay and gravel. (Driller's description)		10.20	3.04					
MADE GROUND: Very compact slag fill with large fragments. (Driller's description)				ES1	11.30			
Brownish grey silty CLAY. (Estuarine Alluvium)		11.50	1.74	ES1 D2 U3	11.50 11.50 11.50-11.95	(21)		
---from 12.00m firm to stiff				D4 D5	12.00 12.00		S20 12.00 12.45	
				ES6 B7	12.50 12.50			
				D8	13.00			
Firm brown fibrous PEAT. (Peat)		13.50	-0.26	ES9 U10	13.50 13.50-13.95	(32)		
				D11 D12	14.00 14.00		S25 14.00 14.45	
				D13 ES14	14.50 14.50			
Grey slightly silty sandy CLAY with very closely spaced fine to coarse gravel sized pockets of pseudofibrous locally amorphous peat. Sand is fine. (Estuarine Alluvium)		14.80	-1.56					
				D15 ES16 U17	15.50 15.50 15.50	(6)		
				D18 D19	16.00 16.00		S2 16.00 16.45	
				ES20	16.50			
				D21 B22	17.00 17.00-17.50			
Grey slightly sandy SILT. Sand is fine to medium		17.50	-4.26	U23	17.50	(5)		
				D24 D25	18.00 18.00		S2 18.00 18.53	
Stiff reddish brown mottled grey slightly gravelly clay. Gravel is angular fine to coarse (Weathered Mudstone). (Mercia Mudstone Group)		18.90	-5.66	D26 U27	19.00 19.00	(110)		
---from 19.50m very stiff				D28 D29	19.50 19.50		S50/200mm 19.50 19.85	

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
Version	3.10
Revised	17/12/2007

NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Sheet 3 of 3

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel	Cemetrix	Date Completed	13/01/2008
		Core Bit	8 inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring		Blow Count TCR	SCR	RQD	SPT type, N & depth	Install-ation
Stiff reddish brown mottled grey slightly gravelly clay. Gravel is angular fine to coarse (Weathered Mudstone). (Mercia Mudstone Group)				D30	20.00					
		20.50	-7.26	D31	20.50				S50/20mm 20.50 20.55	
Borehole complete at 20.50 m.										

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ08A CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	337834.72 E
Project	New M4 - Second Preliminary Ground Investigation				185599.42 N
		Drilling Rig	Dando	Ground Level	5.89m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	20/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	08/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
20/12/2007	1730	6.00	5.70	1.70	End of Shift
07/01/2008	0730	6.00	5.70	1.40	Start of Shift
07/01/2008	1730	10.50	9.20	2.50	End of Shift
08/01/2008	0730	10.50	9.20	1.30	Start of Shift
08/01/2008	1730	13.40	11.50	6.50	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
0.70	0.80	0.50	Chiselling
1.30	2.20	2.50	Chiselling
3.70	3.90	0.50	Chiselling
13.00	13.40	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	13.70	200	11.50

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
20/12/2007		1.30	1.20	20	Seepage	1.20	NR

GENERAL NOTES

1. Cable Percussive boring from GL to 13.70m.
2. Insitu permeability testing carried out from 6.40m to 7.50m.
3. 50mm standpipe installed, slotted from 6.40m to 7.40m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.00	S	50/75mm (15,10,50)	1.00	DRY
2.20	S	50/85mm (7,15,34,16)	2.20	1.50
3.00	S	51/225mm (5,10,12,13,26)	2.80	1.30
4.00	S	N=43 (4,6,8,9,13,13)	3.90	1.30
5.50	S	N=15 (2,3,3,4,4,4)	5.70	1.70
7.50	S	N=12 (2,2,3,3,3,3)	6.40	1.70
9.00	S	N=12 (2,3,2,3,3,4)	8.50	2.60
11.50	S	50/190mm (10,12,16,21,13)	10.70	2.20
12.70	S	50/210mm (8,13,15,18,17)	11.50	4.90
13.40	S	50/150mm (9,15,21,29)	11.50	6.50

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ08A CP
Sheet 1 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	337834.72 E
Project	New M4 - Second Preliminary Ground Investigation				185599.42 N
		Drilling Rig	Dando	Ground Level	5.89m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	20/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	08/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Black very sandy gravel. Sand is fine to coarse. Gravel sized fragments are angular to subangular fine to coarse of slag.				ES1	0.30				
				B2	0.50				
				ES3	1.00	S50/75mm	S	1.00	
				D4	1.00 - 1.20			1.17	
				ES5	2.00				
				D6	2.20 - 2.40	S50/85mm	S	2.20	
								2.44	
				B7	2.50 - 3.00				
---from 2.50m Sandy with high cobble content. Cobble sized fragments are subangular of slag.				D8	3.00 - 3.30	S51/225mm	S	3.00	
				ES9	3.00			3.38	
				D11	4.00 - 4.45	S43	S	4.00	
				ES10	4.10			4.45	
		4.60	1.29						
Stiff grey CLAY. (Estuarine Alluvium)				D12	4.80				
---from 4.80m to 5.20m slightly gravelly. Gravel is angular fine of mudstone				U14	5.00 - 5.45	(14)			
				ES13	5.10				
				D15	5.50	S15	S	5.50	
				D16	5.50 - 5.95			5.95	
		6.40	-0.51						
Firm black psuedofibrous PEAT. (Peat)				D17	6.50				
				U18	7.00 - 7.45	(24)			
		7.20	-1.31	D19	7.00				
Firm medium strength grey silty CLAY with occasional coarse gravel sized pockets of brown fibrous peat. (Estuarine Alluvium)				D20	7.50 - 7.95	S12	S	7.50	
---from 7.50m become soft with occasional coarse gravel sized pockets of black amorphous peat								7.95	
				D21	8.50				
				U22	9.00 - 9.45	S12 (16)	S	9.00	
								9.45	
				D23	9.50				
				D24	9.50 - 9.95				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ08A CP
Sheet 2 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	337834.72 E
Project	New M4 - Second Preliminary Ground Investigation				185599.42 N
		Drilling Rig	Dando	Ground Level	5.89m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	20/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	08/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
Firm medium strength grey silty CLAY with occasional coarse gravel sized pockets of brown fibrous peat. (Estuarine Alluvium)									
		10.40	-4.51	D25	10.50				
Grey slightly sandy clayey subrounded to rounded medium to coarse GRAVEL of mudstone and siltstone. (Fluvial Alluvium)		10.80	-4.91						
				D26	10.90				
				U27	11.00 - 11.45	(100)			
Very stiff grey slightly gravelly CLAY. Gravel is angular fine of mudstone (Weathered Mudstone). (Mercia Mudstone Group)				D28	11.50	50/190mm	S	11.50	
---from 10.90m to 11.50m with occasional rootlets				D29	11.50 - 11.90			11.84	
---from 11.50m becomes reddish brown locally mottled greenish grey									
				D30	12.50				
				D31	12.70 - 13.10	50/210mm	S	12.70	
								13.06	
				D32	13.40 - 13.70	50/150mm	S	13.40	
								13.70	
		13.70	-7.81						
Cable Percussion boring complete at 13.70 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ08 CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	337840.41 E
Project	New M4 - Second Preliminary Ground Investigation				185607.35 N
		Drilling Rig	Dando	Ground Level	6.38m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	18/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	19/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
18/12/2007	1730	0.60	0.50	DRY	End of Shift
19/01/2008	0730	0.60	0.50	DRY	Start of Shift
19/01/2008	1730	1.10	1.10	DRY	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
0.50	0.60	0.50	Chiselling
0.60	1.10	6.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	1.10	200	1.10

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Cable Percussive boring terminated at 1.10m.
2. Borehole grouted upon completion.
3. Refer to SBHJ08A for Redrill

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
		* Seating blows only.		

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ08 CP
Sheet 1 of 1

Contract No.	F15056	Method	Cable Percussion	Coordinates	337840.41 E
Project	New M4 - Second Preliminary Ground Investigation				185607.35 N
		Drilling Rig	Dando	Ground Level	6.38m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	18/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	19/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Slag, stone. (Driller's description)				ES1	0.30			
		0.50	5.88	B2	0.50 - 1.00			
MADE GROUND: Black slightly sandy gravel. Sand sized fragments are fine to coarse. Gravel sized fragments are angular to subangular fine to coarse of slag.				ES3	1.00			
		1.10	5.28					
Cable Percussion boring complete at 1.10 m.								

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ09 CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	338052.21 E
Project	New M4 - Second Preliminary Ground Investigation				185604.66 N
		Drilling Rig	Dando	Ground Level	5.76m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	18/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
13/12/2007	1730	1.00	1.00	0.40	End of Shift
14/12/2007	0730	1.00	1.00	0.40	Start of Shift
14/12/2007	1730	3.50	2.50	2.20	End of Shift
17/12/2007	0730	3.50	2.50	1.30	Start of Shift
17/12/2007	1730	11.50	11.00	10.80	End of Shift
18/12/2007	0730	11.50	11.00	0.70	Start of Shift
18/12/2007	1730	13.20	11.00	6.80	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
1.00	2.20	4.00	Chiselling
12.40	12.80	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	13.20	200	11.00

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Cable Percussive boring complete at 13.20m.
2.50mm standpipe installed, slotted from 1.00m to 2.20m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.00	S	51/150mm (5,7,11,40)	1.00	0.50
2.00	S	50/75mm (12,50)	1.90	0.70
3.00	S	N=22 (2,4,5,5,6,6)	2.50	2.20
5.00	S	N=10 (1,2,2,2,3,3)	4.10	1.50
7.00	S	N=14 (1,2,3,3,4,4)	6.20	2.60
9.00	S	N=7 (1,2,1,2,2,2)	7.70	6.10
10.50	S	N=53 (6,8,10,14,14,15)	9.80	8.50
12.20	S	50/230mm (7,9,11,14,18,7)	11.00	2.10
12.80	S	50/225mm (9,10,11,16,23)	11.00	6.80

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ09 CP
Sheet 1 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	338052.21 E
Project	New M4 - Second Preliminary Ground Investigation				185604.66 N
		Drilling Rig	Dando	Ground Level	5.76m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	18/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Grey coarse sand sized fragments and angular to subangular fine to coarse gravel sized fragments of ash, limestone and slag. with low cobble content, cobble sized fragments are subangular of slag.				ES1	0.30				
				B2	0.50 - 1.00				
				ES3	1.00	S51/150mm	S	1.00	
				D4	1.00 - 1.30			1.30	
				ES5	2.00	S50/75mm	S	2.00	
				D6	2.00 - 2.10			2.23	
		2.20	3.56	D7	2.30				
Firm grey mottled orangish brown CLAY with rare rootlets. (Estuarine Alluvium) ---at 2.30m slightly gravelly. Gravel is angular fine of mudstone				U8	2.50 - 2.95	(24)			
				D9	3.00	S22	S	3.00	
				ES10	3.00			3.45	
				D11	3.00 - 3.45				
		4.00	1.76	ES12	4.00				
Soft to firm indistinctly laminated grey silty CLAY with extremely closely to very closely fine to medium gravel sized pockets of brown amorphous peat. Organic odour. (Estuarine Alluvium)				D13	4.00				
				U14	4.50 - 4.95	(12)			
---from 5.00m becomes firm with partings of silt and fine sand. Occasional medium gravel sized pockets of black clay				D15	5.00	S10	S	5.00	
				ES16	5.00			5.45	
				D17	5.00 - 5.45				
				D18	6.00				
				U19	6.50 - 6.95	(20)			
		6.80	-1.04						
Firm thinly laminated medium strength grey silty CLAY with laminations of extremely closely spaced black amorphous peat. (Estuarine Alluvium with bands of peat)				D20	7.00	S14	S	7.00	
				D21	7.00 - 7.45			7.45	
				D22	8.00	(12)			
				U23	8.00 - 8.95				
		8.90	-3.14						
Soft to firm grey silty CLAY with thin laminations of black fibrous peat. (Estuarine Alluvium)				D24	9.00	S7	S	9.00	
				D25	9.00 - 9.45			9.45	
		9.80	-4.04						
				D26	9.90				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ09 CP
Sheet 2 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	338052.21 E
Project	New M4 - Second Preliminary Ground Investigation				185604.66 N
		Drilling Rig	Dando	Ground Level	5.76m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	18/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
Very stiff reddish brown locally mottled greenish grey slightly gravelly CLAY. Gravel is angular fine to medium (Weathered Mudstone). (Mercia Mudstone Group)				U27	10.00 - 10.45	(93)			
				D28	10.50	S53	S	10.50	
				D29	10.50 - 10.95			10.95	
				D30	11.50				
				D31	12.00 - 12.40				
						S50/230mm	S	12.20	
								12.58	
				D32	12.80 - 13.20	S50/225mm	S	12.80	
								13.18	
		13.20	-7.44						
Cable Percussion boring complete at 13.20 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ10 CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	338240.80 E
Project	New M4 - Second Preliminary Ground Investigation				185578.80 N
		Drilling Rig	Dando	Ground Level	6.05m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	09/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	11/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
09/01/2008	1730	6.00	4.80	2.70	End of Shift
10/01/2008	0730	6.00	4.80	1.70	Start of Shift
10/01/2008	1730	11.50	10.50	11.30	End of Shift
11/01/2008	0730	11.50	10.50	7.30	Start of Shift
11/01/2008	1730	13.00	10.50	9.20	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
12.30	12.70	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	1.50	200	1.50
150	13.00	150	10.50

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
09/01/2008		2.50	1.00	20	Slow	2.50	NR

GENERAL NOTES

1.Cable Percussive boring from GL to 13.00m.
2.Insitu permeability testing carried out from 10.50 to 11.50m.
3.50mm standpipe installed, slotted from 9.00m to 10.00m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.50	S	N=15 (2,3,3,4,4,4)	1.00	DRY
3.50	S	N=6 (1,1,2,1,1,2)	2.80	1.50
5.50	S	N=2 (1,0,0,1,0,1)	4.80	2.70
7.50	S	N=5 (1,0,1,1,1,2)	6.80	2.00
9.50	S	N=9 (1,1,2,2,2,3)	8.80	4.80
11.00	S	50/225mm (5,12,15,15,17,3)	10.50	8.90
12.00	S	50/160mm (8,11,19,29,2)	10.50	8.10
12.70	S	50/160mm (7,16,18,23,9)	10.50	9.20

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ10 CP
Sheet 1 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	338240.80 E
Project	New M4 - Second Preliminary Ground Investigation				185578.80 N
		Drilling Rig	Dando	Ground Level	6.05m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	09/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	11/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Dark brown silty very sandy angular to subangular fine to coarse Gravel sized fragments of sandstone and slag.				ES1	0.30				
				B2	0.50 - 0.80				
		0.80	5.25						
Firm to stiff grey silty CLAY with occasional rootlets (Mild organic odour). (Estuarine Alluvium)				ES3	1.00				
				U4	1.00 - 1.45				
		1.50	4.55	D5	1.50	S15	S	1.50	1.95
Firm orangish brown mottled grey CLAY. (Estuarine Alluvium)				D6	1.50 - 1.95				
				ES7	2.00				
		2.50	3.55	D8	2.50				
Soft very low strength grey silty CLAY. (Estuarine Alluvium) ---from 2.50m to 3.50m become slightly gravelly. Gravel is angular fine to medium of mudstone				ES9	3.00				
				U10	3.00 - 3.45				
				D11	3.50	S6	S	3.50	3.95
				D12	3.50 - 3.95				
				ES13	4.00				
		4.50	1.55	D14	4.50				
Very soft grey silty CLAY with rare rootlets. (Estuarine Alluvium)				ES15	5.00				
				U16	5.00 - 5.45				
				D17	5.50	S2	S	5.50	6.03
				D18	5.50 - 5.95				
				B19	6.30 - 6.80				
				U20	7.00 - 7.45				
				D21	7.50	S5	S	7.50	8.03
				D22	7.50 - 7.95				
		7.70	-1.65						
Very soft dark grey clayey PEAT. (Peat)									
		8.20	-2.15						
Very soft grey silty CLAY with occasional coarse gravel sized pockets of fine sand. (Estuarine Alluvium)				D23	8.50				
				U24	9.00 - 9.45				
---from 9.50m becomes slightly sandy gravelly. Gravel is angular to subangular fine to medium of sandstone				D25	9.50	S9	S	9.50	9.95
				D26	9.50 - 9.95				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	3.09
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ10 CP
Sheet 2 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	338240.80 E
Project	New M4 - Second Preliminary Ground Investigation				185578.80 N
		Drilling Rig	Dando	Ground Level	6.05m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	09/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	11/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth	Install-ation
Remaining Detail : 9.40m - 9.40m : and mudstone		10.00	-3.95					
stiff to very stiff reddish brown mottled greenish grey slightly gravelly CLAY. Gravel is angular fine to medium of mudstone (Weathered Mudstone). (Mercia Mudstone Group)				D27	10.20			
				U28	10.50 - 10.95			
---from 11.00m very stiff				D29	11.00	50/225mm	S 11.00	
				D30	11.00 - 11.45		11.38	
				D31	12.00 - 12.30	50/160mm	S 12.00	
							12.31	
Very weak reddish brown mottled greenish grey MUDSTONE. Recovered as angular fine to coarse gravel sized fragments. (Mercia Mudstone Group)		12.50	-6.45	D32	12.50			
---from 12.50m recovered as angular fine to coarse gravel sized fragments				D33	12.70 - 13.00	50/160mm	S 12.70	
		13.00	-6.95				13.01	
Cable Percussion boring complete at 13.00 m.								

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	3.09
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ09
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336926.52 E
Project	New M4 - Second Preliminary Ground Investigation				185860.56 N
		Sampling Rig	Hydraulic Hammer	Ground Level	11.02m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	12/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	12/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Black and brown slightly sandy clayey silt.				L1	0.00 - 0.80	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 100% Blows: 1	
				ES2 L3	1.00 1.00 - 1.80	From: 1.00 To: 2.00 Diameter: 90mm Recovery : 100% Blows: 4	
				ES4 L5	2.00 2.00 - 2.40	From: 2.00 To: 2.60 Diameter: 80mm Recovery : 100% Blows: 7	
MADE GROUND: Gravel sized fragments of clinker. (Driller's description)		2.60	8.42				
Sampling complete at 2.61 m.		2.61	8.41				

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 2.61m.
2. Window Sampling terminated at 2.61m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

Form	ARIAL WINDOW LOG
Version	3.07
Revised	13/02/2008

Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ09A
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336929.51 E
Project	New M4 - Second Preliminary Ground Investigation				185861.77 N
		Sampling Rig	Hydraulic Hammer	Ground Level	10.95m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	13/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Black clayey slightly sandy slightly gravelly silt. Gravel sized fragments are angular fine to coarse of brick and sandstone. ---from 0.00m to 0.80m with occasional rootlets				L1	0.00 - 0.80	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 100% Blows: 2	
				ES2 L3	1.00 1.00 - 1.70	From: 1.00 To: 2.00 Diameter: 80mm Recovery : 100% Blows: 3	
---from 2.30m to 2.34m thin bed thinly laminated silt				ES4 L5	2.00 2.00 - 2.60	From: 2.00 To: 3.00 Diameter: 70mm Recovery : 100% Blows: 3	
MADE GROUND: Black slightly sandy silt. (Driller's description)		2.60	8.35				
				ES6 ES7	3.00 3.00 - 3.70	From: 3.00 To: 3.65 Diameter: 60mm Recovery : 100% Blows: 8	
MADE GROUND: Clinker. (Driller's description)		3.65	7.30			From: 3.65 To: 3.70 Diameter: 50mm Recovery : 100% Blows: 10	
Sampling complete at 3.70 m.		3.70	7.25				

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 3.70m.
2. Window Sampling terminated at 3.70m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ10
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336947.85 E
Project	New M4 - Second Preliminary Ground Investigation				185810.03 N
		Sampling Rig	Hydraulic Hammer	Ground Level	10.53m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	18/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	18/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type	and depth	Progress	Install-ation
MADE GROUND: Black clayey slightly sandy silt with occasional rootlets.		0.20	10.33	L1	0.00 - 1.00	From: 0.00 To: 1.00 Diameter: 80mm Recovery : 90% Blows: 1	
MADE GROUND: Black slightly clayey sandy slightly gravelly silt. Gravel sized fragments are subangular fine to medium of slag.				ES2 L3	1.00 1.00 - 1.80	From: 1.00 To: 2.00 Diameter: 70mm Recovery : 100% Blows: 1	
				ES4 L5	2.00 2.00 - 2.75	From: 2.00 To: 2.75 Diameter: 60mm Recovery : 100% Blows: 7	
				ES6 L7	3.00 3.00 - 3.60	From: 2.75 To: 3.75 Diameter: 50mm Recovery : 100% Blows: 8	
---from 3.50m to 3.60m 1 No thin bed slightly gravelly clayey sand. Sand is fine to coarse. Gravel sized fragments are subangular fine to medium of slag				ES8 L9	4.00 4.00 - 4.30	From: 3.75 To: 4.50 Diameter: 50mm Recovery : 100% Blows: 12	
		4.30	6.23				
MADE GROUND: Clinker. (Driller's description)		4.50	6.03	ES10	4.50		
Sampling complete at 4.50 m.							

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 4.50m.
2. Window Sampling terminated at 4.50m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ11
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336953.56 E
Project	New M4 - Second Preliminary Ground Investigation				185759.27 N
		Sampling Rig	Hydraulic Hammer	Ground Level	10.28m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	18/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	18/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Black slightly clayey slightly sandy slightly gravelly silt. Gravel sized fragments are subangular fine to medium of slag ---from GL to 0.15m with occasional rootlets				L1	0.00 - 0.80	From: 0.00 To: 1.00 Diameter: 80mm Recovery : 100% Blows: 1	
				ES2 L3	1.00 1.00 - 1.70	From: 1.00 To: 2.00 Diameter: 70mm Recovery : 100% Blows: 2	
				ES4 L5	2.00 2.00 - 2.70	From: 2.00 To: 3.00 Diameter: 60mm Recovery : 100% Blows: 3	
MADE GROUND: Dark brown slightly sandy clayey silt.		2.70	7.58				
				ES6	3.00	From: 3.00 To: 3.20 Diameter: 50mm Recovery : 100% Blows: 12	
MADE GROUND: Clinker. (Driller's description)		3.10	7.18				
Sampling complete at 3.20 m.		3.20	7.08	ES7	3.20		

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 3.20m.
2. Window Sampling terminated at 3.20m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ12
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336946.18 E
Project	New M4 - Second Preliminary Ground Investigation				185723.14 N
		Sampling Rig	Hydraulic Hammer	Ground Level	10.59m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	13/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Black slightly sandy clayey silt (fragmented) with occasional rootlets.				L1	0.00 - 0.80	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 80% Blows: 1	
MADE GROUND: Slightly sandy clayey silt.		0.45	10.14				
				ES2 L3	1.00 1.00 - 1.70	From: 1.00 To: 2.00 Diameter: 80mm Recovery : 100% Blows: 6	
				ES4 L5	2.00 2.00 - 2.20	From: 2.00 To: 2.60 Diameter: 70mm Recovery : 100% Blows: 10	
						From: 2.60 To: 4.00 Diameter: 50mm Recovery : 100% Blows: 7	
				ES6 L7	3.00 3.00 - 4.00		
				ES8 L9 ES10	4.00 4.00 - 4.20 4.20 - 4.55	From: 4.00 To: 4.45 Diameter: 70mm Recovery : 100% Blows: 12	
MADE GROUND: Gravels (possible contamination). (Driller's description)		4.35	6.24			From: 4.45 To: 4.55 Diameter: 50mm Recovery : 100% Blows: 12	
Sampling complete at 4.55 m.		4.55	6.04				

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 4.55m.
2. Window Sampling terminated at 4.55m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ13
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336991.86 E
Project	New M4 - Second Preliminary Ground Investigation				185779.46 N
		Sampling Rig	Hydraulic Hammer	Ground Level	11.01m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	14/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	14/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt. ---from 0.00m to 0.30m dark brown				L1	0.00 - 0.80	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 95% Blows: 1	
---from 0.60m to 0.65m speckled white and with frequent rootlets				ES2 L3	1.00 1.00 - 1.80	From: 1.00 To: 2.00 Diameter: 80mm Recovery : 100% Blows: 2	
				ES4 ES5	2.00 2.00 - 2.50	From: 2.00 To: 2.50 Diameter: 70mm Recovery : 100% Blows: 10	
MADE GROUND: Clinker. (Driller's description)		2.50	8.51			From: 2.50 To: 2.55 Diameter: 50mm Recovery : 100% Blows: 10	
Sampling complete at 2.55 m.		2.55	8.46				

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 2.55m.
2. Window Sampling terminated at 2.55m due to refusal.
3. 50mm standpipe installed, slotted from 0.50m to 2.50m.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

Form	ARIAL WINDOW LOG
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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ14
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	336992.97 E
Project	New M4 - Second Preliminary Ground Investigation				185736.12 N
		Sampling Rig	Hydraulic Hammer	Ground Level	10.14m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	14/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	14/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type	and depth	Progress	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt.				L1	0.00 - 0.60	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 80% Blows: 1	
				ES2	1.00	From: 1.00 To: 2.00	
				L3	1.00 - 1.75	Diameter: 80mm Recovery : 100% Blows: 2	
				ES4	2.00	From: 2.00 To: 3.00	
				L5	2.00 - 2.70	Diameter: 70mm Recovery : 100% Blows: 6	
---from 2.17m to 2.18m brown		2.30	7.84				
MADE GROUND: Black slightly gravelly slightly sandy clayey silt. Sand is fine to coarse. Gravel sized fragments are subangular to subrounded fine to coarse of sandstone and slag.				ES6	3.00	From: 3.00 To: 3.30 Diameter: 60mm Recovery : 100% Blows: 10	
MADE GROUND: Clinker. (Driller's description)		3.20	6.94				
		3.30	6.84	ES7	3.30	From: 3.30 To: 3.35 Diameter: 50mm Blows: 10	
Sampling complete at 3.30 m.							

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 3.30m.
2. Window Sampling terminated at 3.30m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ15
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337045.13 E
Project	New M4 - Second Preliminary Ground Investigation				185772.46 N
		Sampling Rig	Hydraulic Hammer	Ground Level	10.09m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	17/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt.				L1	0.00 - 0.80	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 90% Blows: 1	
				ES2 L3	1.00 1.00 - 1.60	From: 1.00 To: 2.00 Diameter: 60mm Recovery : 100% Blows: 1	
---from 1.90m to 2.00m sandy				ES4 L5	2.00 2.00 - 2.60	From: 2.00 To: 3.00 Diameter: 60mm Recovery : 100% Blows: 3	
MADE GROUND: Clinker. (Driller's description)		3.00	7.09	ES6	3.00	From: 3.00 To: 3.10 Diameter: 60mm Recovery : 100% Blows: 10	
Sampling complete at 3.10 m.		3.10	6.99	ES7	3.10		

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 3.10m.
2. Window Sampling terminated at 3.50m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ16
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337058.17 E
Project	New M4 - Second Preliminary Ground Investigation				185735.97 N
		Sampling Rig	Hydraulic Hammer	Ground Level	10.20m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	17/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt. ---from GL to 0.15m with occasional rootlets				L1	0.00 - 0.80	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 100% Blows: 1	
				ES2 L3	1.00 1.00 - 1.80	From: 1.00 To: 2.00 Diameter: 90mm Recovery : 100% Blows: 2	
---from 1.45m to 1.80m indistinctly laminated				ES4	2.00	From: 2.00 To: 2.30 Diameter: 80mm Recovery : 100% Blows: 8	
MADE GROUND: Clinker. (Driller's description)		2.30	7.90	ES5	2.30	From: 2.30 To: 2.40 Diameter: 50mm Recovery : 100% Blows: 12	
Sampling complete at 2.40 m.		2.40	7.80				

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 2.40m.
2. Window Sampling terminated at 2.40m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ17A
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337082.25 E
Project	New M4 - Second Preliminary Ground Investigation				185807.28 N
		Sampling Rig	Hydraulic Hammer	Ground Level	10.74m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	17/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt. ---from GL to 0.20m occasional rootlets upto 8mm diameter				L1	0.00 - 0.80	From: 0.00 To: 1.00 Diameter: 80mm Recovery : 90% Blows: 6	
				ES2	1.00	From: 1.00 To: 1.50 Diameter: 60mm Recovery : 100% Blows: 4	
Sampling complete at 1.50 m.		1.50	9.24	ES3	1.50		

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 1.50m.
2. Window Sampling terminated at 1.50m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

Form	ARIAL WINDOW LOG
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Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ17
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337088.49 E
Project	New M4 - Second Preliminary Ground Investigation				185805.72 N
		Sampling Rig	Terrier	Ground Level	11.33m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	17/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth	Progress	Install-ation
MADE GROUND: Clinker. (Driller's description)		0.05	11.28		From: 0.00 To: 0.05 Diameter: 90mm Recovery : 0% Blows: 10	
Sampling complete at 0.05 m.						

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling terminated at 0.05m due to refusal.
2. Window Sampling relocated 5.00m inter lagoon, refer to SWSJ17A.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

Form	ARIAL WINDOW LOG
Version	3.07
Revised	13/02/2008

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ21
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337387.85 E
Project	New M4 - Second Preliminary Ground Investigation				185703.94 N
		Drilling Rig	Terrier	Ground Level	12.97m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	16/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
16/12/2007		6.00	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
16/12/2007	1350	4.00	4.00	20	Seepage	NR	NR
16/12/2007	1450	6.00	6.00	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 6.00m.
2.Window Sampling complete at 6.00m.
3.50mm standpipe installed, slotted from 4.00m to 6.00m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
Version	3.03
Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ21
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337387.85 E
Project	New M4 - Second Preliminary Ground Investigation				185703.94 N
		Drilling Rig	Terrier	Ground Level	12.97m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	16/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt with occasional rootlets.				L1 0.00 - 0.80			
---from 0.25m becomes sandy		0.40	12.57				
---from 0.35m becomes very sandy		0.45	12.52				
MADE GROUND: Slightly gravelly sandy silt. Gravel sized fragments are subangular fine to medium of sandstone.				ES2 1.00 L3 1.00 - 1.80			
MADE GROUND: Black slightly clayey silt.				ES4 2.00 L5 2.00 - 2.80			
				ES6 3.00 L7 3.00 - 3.80			
				ES8 4.00			
				L9 5.00 - 6.00			
		6.00	6.97				
Sampling complete at 6.00 m.							

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ23
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337452.87 E
Project	New M4 - Second Preliminary Ground Investigation				185734.27 N
		Drilling Rig	Terrier	Ground Level	12.29m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	13/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	13/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
13/01/2008		8.35	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
13/01/2008		1.50	1.50	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 8.35m.
2.Window Sampling complete a 8.35m.
3.50mm standpipe installed, slotted from 5.80m to 7.80m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=0 (1,0,0,0,0,0)
3.00	S	N=0 (1,0,0,0,0,0)
4.00	S	N=0 (0,0,0,0,0,0)
5.00	S	N=0 (1,0,0,0,0,0)
6.00	S	N=0 (0,0,0,0,0,0)
7.00	S	N=0 (0,0,0,0,0,0)
7.90	S	72/225mm (18,24,28,27,17)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
Version	3.03
Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ23
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337452.87 E
Project	New M4 - Second Preliminary Ground Investigation				185734.27 N
		Drilling Rig	Terrier	Ground Level	12.29m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	13/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	13/01/2008

Description of Strata	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth
MADE GROUND: Black slightly clayey slightly sandy silt.			L1 0.00 - 0.80		
			ES2 1.00 D3 1.00 - 1.45 L4 1.00 - 1.80	S0	S 1.00 1.60
			ES5 2.00 D6 2.00 - 2.45 L7 2.00 - 2.80	S0	S 2.00 2.53
			ES8 3.00 D9 3.00 - 3.45	S0	S 3.00 3.53
			D10 4.00 - 4.50	S0	S 4.00 4.60
			D11 5.00 - 5.45	S0	S 5.00 5.53
MADE GROUND: Black slightly clayey slightly sandy silt.	6.00	6.29	D12 6.00 - 6.45 L13 6.00 - 6.80	S0	S 6.00 6.60
			ES14 7.00 D15 7.00 - 7.45 L16 7.00 - 7.80	S0	S 7.00 7.60
MADE GROUND: Clinker. (Driller's description)	7.80	4.49	ES17 7.90 D18 7.90 - 8.35	S72/225mm	S 7.90 8.28
Sampling complete at 8.35 m.	8.35	3.94			

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ34
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337692.22 E
Project	New M4 - Second Preliminary Ground Investigation				185704.76 N
		Drilling Rig	Terrier	Ground Level	10.52m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	17/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
16/01/2008	1730	2.00	0.00	NR	End of Shift
17/01/2008	0730	2.00	0.00	NR	Start of Shift
17/01/2008	1730	6.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.
3.50mm standpipe installed, slotted from 6.00m to 3.00m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=1 (0,0,0,1,0,0)
3.00	S	N=0 (0,0,0,0,0,0)
4.00	S	N=2 (1,0,1,0,0,1)
5.00	S	N=1 (1,0,0,1,0,0)
6.00	S	N=2 (1,0,1,0,1,0)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
Version	3.03
Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ34
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337692.22 E
Project	New M4 - Second Preliminary Ground Investigation				185704.76 N
		Drilling Rig	Terrier	Ground Level	10.52m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	17/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt.				L1 0.00 - 0.80			
				ES2 1.00 D3 1.00 - 1.45 L4 1.00 - 1.80	S0	S 1.00 1.60	
---from 2.00m sandy				ES5 2.00 D6 2.00 - 2.45 L7 2.00 - 2.80	S1	S 2.00 2.60	
MADE GROUND: Brown slightly sandy clayey silt.		3.00	7.52	ES8 3.00 D9 3.00 - 3.45 L10 3.00 - 3.80	S0	S 3.00 3.60	
				ES11 4.00 D12 4.00 - 4.45 L13 4.00 - 4.80	S2	S 4.00 4.53	
				ES14 5.00 D15 5.00 - 5.45 L16 5.00 - 5.80	S1	S 5.00 5.53	
				ES17 6.00 D18 6.00 - 6.45	S2	S 6.00 6.53	
Sampling complete at 6.45 m.		6.45	4.07				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ37
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337766.04 E
Project	New M4 - Second Preliminary Ground Investigation				185656.53 N
		Drilling Rig	Terrier	Ground Level	6.25m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	22/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	22/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
22/01/2008		6.45	2.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
100	2.00	100	2.00

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
22/01/2008		3.50	3.50	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.
3.50mm standpipe installed, slotted from 4.10m to 5.60m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=7 (1,2,2,2,1,2)
2.00	S	N=5 (1,1,1,2,1,1)
3.00	S	N=8 (2,2,2,2,2,2)
4.00	S	N=2 (1,0,1,0,1,0)
5.00	S	N=1 (0,0,0,0,0,1)
6.00	S	N=1 (1,0,0,0,1,0)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
Version	3.03
Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ37
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337766.04 E
Project	New M4 - Second Preliminary Ground Investigation				185656.53 N
		Drilling Rig	Terrier	Ground Level	6.25m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	22/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	22/01/2008

Description of Strata	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly sandy clayey silt.			ES1 0.30			
			ES2 1.00 D3 1.00 - 1.45 L4 1.00 - 1.80	S7	S 1.00 1.45	
Firm grey mottled orangish brown CLAY with occasional rootlets. (Estuarine Alluvium) ---from 1.65m becomes firm to stiff ---from 1.77m to 1.80m 1 No very thin bed of spongy brown pseudofibrous peat	1.20	5.05				
			ES5 2.00 D6 2.00 - 2.45 L7 2.00 - 2.80	S5	S 2.00 2.45	
Soft to firm grey CLAY. (Estuarine Alluvium)	2.20	4.05				
			ES8 3.00 D9 3.00 - 3.45 L10 3.00 - 3.80	S8	S 3.00 3.45	
			ES11 4.00 D12 4.00 - 4.45	S2	S 4.00 4.53	
Stiff and firm brown slightly sandy CLAY with much organic material. Estuarine Alluvium	4.35	1.90				
			ES13 5.00 D14 5.00 - 5.45 L15 5.00 - 5.80	S1	S 5.00 5.60	
Spongy black pseudofiberous PEAT. (Peat)	5.00	1.25				
			ES16 6.00 D17 6.00 - 6.45	S1	S 6.00 6.53	
Sampling complete at 6.45 m.	6.00	0.25				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

Geotechnical Engineering Limited

BOREHOLE LOG

BH513

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 4

Start Date 9 February 2015 — Easting 336926.7 — Scale 1 : 50

End Date 18 February 2015 — Northing 185781.1 — Ground level 11.20mOD — Depth 29.50 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
09/02/15 0800hrs	1B	0.00 - 0.50						Dark grey slightly silty sandy angular to subrounded fine to coarse sandstone and slag GRAVEL with a low cobble content. Cobbles are slag rarely brick. Malodourous. (MG)			
	2D*	0.00 - 0.50		Vo 0.2							
	3B	0.50 - 1.20									
	4D*	0.50 - 1.20		Vo 0.2							
		1.20 - 1.65	1.20	C 11							
	5B	1.20 - 1.65						1.20 - 2.10m: Medium dense.			
		1.65 - 2.10	1.50	C 23							
	6B	1.65 - 2.10		Vo 0.1							
		2.10 - 2.55	2.00	C 37					2.10	9.10	
	7B	2.10 - 2.55		Vo 0.2				Dense dark brown and dark grey silty sandy (ashy) angular to subrounded fine to coarse slag and sandstone GRAVEL. Malodourous. Driller notes slag cobbles throughout. (MG)			
		2.55 - 3.00	2.50	C 38							
09/02/15 1700hrs Dry	8B	2.55 - 3.00									
	9D*	2.55 - 3.00		Vo 0.0							
		3.00 - 3.45	3.00	C 50							
10/02/15 0800hrs Dry	10B	3.00 - 3.50									
	11D*	3.00 - 3.50		Vo 0.1							
		3.50 - 3.95	3.50	C 27							
10/02/15 1700hrs Dry	12B	3.50 - 4.00						3.50 - 4.50m: Medium dense.			
	13D*	3.50 - 4.00		Vo 0.0							
		4.00 - 4.45	4.00	C 25							
12/02/15 0800hrs Dry	14B	4.00 - 4.50									
	15D*	4.00 - 4.50		Vo 0.0							
		4.50 - 4.95	4.50	C 37							
	16B	4.50 - 5.00									
	17D*	4.50 - 5.00		Vo 0.1							
		5.00 - 5.45	5.00	C*52							
	18B	5.00 - 6.00						5.00m: Slag cobble.			
	19D*	5.00 - 6.00		Vo 0.0							
		6.00 - 6.45	6.00	C 34							
12/02/15 1700hrs Dry	20B	6.00 - 7.50									
	21D*	6.00 - 7.50		Vo 0.0							
13/02/15 0800hrs Dry											
		7.50 - 7.95	7.50	C 39							
	22B	7.50 - 9.00						7.50 - 9.50m: Low angular sandstone cobble content.			
	23D*	7.50 - 9.00		Vo 0.2							
								Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.20m. Cable percussion (200mm) 1.20-9.00m and (150mm) 9.00-19.20m. Waterflush rotary core drilled (116mm) 19.20-29.50m.

CASING: 200mm diam to 9.00m and 150mm diam to 19.00m.

BACKFILL: On completion, hole backfilled (on 19/02/2015) with bentonite pellets 29.50-0.60m and gravel 0.60-0.00m.

REMARKS: Bentonite seal for aquifer protection installed during drilling 7.50-9.00m, prior to reduction in casing diameter. Permeability test undertaken 13.00-13.50m.

CPT at 19.20m undertaken 17/02/2015 prior to rotary follow-on coring.

MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m) casing (m) rose to (m) time to rise (min) remarks

AGS

CONTRACT	CHECKED
30238	**EC**

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BOREHOLE LOG

BH513

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 4

Start Date 9 February 2015 — Easting 336926.7 — Scale 1 : 50

End Date 18 February 2015 — Northing 185781.1 — Ground level 11.20mOD — Depth 29.50 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	24B	9.00 - 9.45 9.00 - 9.50	9.00	C 21							
	25D*	9.00 - 9.50		Vo 0.0					9.30	1.90	
	26B 27D*	9.50 - 11.00 9.50 - 11.00						Soft dark grey mottled dark brown slightly sandy silty CLAY with frequent wood fragments (up to 3mm) and rootlets (up to 1mm). (TFD)			
	29D 28B 30D*	11.00 - 11.45 11.00 - 12.50 11.00 - 12.50	11.00	S 11 Vo 0.3					11.00	0.20	
13/02/15 1700hrs 8.00m								Firm dark brown PEAT with thin lenses and pockets (up to 10mm) of very soft grey clay. (PEAT)	12.50	-1.30	
16/02/15 0800hrs 9.20m	31UT 33B 32D	12.50 - 12.95 12.50 - 13.50 12.90 - 13.10	12.50					Very soft becoming firm with depth grey and bluish grey slightly sandy silty CLAY with frequent pockets (up to 50mm) of black organic material and decomposed roots (up to 2mm). (TFDP)			
	34B 35D	13.50 - 15.00 13.50 - 13.95	13.50	S 10				13.50 - 13.95m: Tending to dark grey very silty fine and medium sand.			
	36UT 37B 38D 39B	15.00 - 15.45 15.00 - 15.50 15.50 - 15.95 15.50 - 16.00	15.00 15.50	 S 8							
	40UT 41B	16.00 - 16.40 16.00 - 16.60	16.00								
	42D 43D 44B	16.40 - 16.60 16.60 - 17.05 16.60 - 18.10	16.50	S 35				16.40 - 16.60m: Slightly gravelly. Gravel is subangular and subrounded fine to coarse sandstone. Rare shell fragments (up to 50mm). Recovered as soft brown and dark grey slightly sandy slightly gravelly CLAY with rare rootlets (up to 2mm). Gravel is subangular and subrounded fine to coarse mudstone and sandstone. (TFD)	16.60	-5.40	
								Continued Next Page	{18.00}		

water strike (m)	casing (m)	rose to (m)	time to rise (m)	remarks
8.20	8.20	4.50	20	Fast
17.50	16.50	7.70	20	

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BOREHOLE LOG

BH513

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 4

Start Date 9 February 2015 — Easting 336926.7 — Scale 1 : 50

End Date 18 February 2015 — Northing 185781.1 — Ground level 11.20mOD — Depth 29.50 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
16/02/15 1700hrs 8.10m 17/02/15 0800hrs 8.10m 17/02/15 1000hrs 8.00m	45D 46B	18.10 - 18.55 18.10 - 19.00	18.00	S*54				Very stiff reddish brown and bluish grey slightly sandy slightly gravelly silty CLAY. Gravel is subangular fine to coarse mudstone lithorelicts. (MMG)	18.10	-6.90	
	48D	19.00 - 19.20				NI			19.00	-7.80	
		19.20 - 19.37	19.00	C*156				Extremely weak and very weak thinly laminated to thinly bedded reddish brown MUDSTONE. Fractures are subhorizontal to 10° and subvertical extremely closely and very closely spaced planar smooth. (MMG) (Grade II)			
18/02/15 1040hrs 16.30m	47C	19.20 - 20.50			100 10 0			19.20 - 19.30m: Light greenish grey.			
	49C	20.50 - 22.00	19.00		100 0 0			21.50 - 21.60m: 80° fracture planar smooth.			
	50C	22.00 - 23.50	19.00		100 0 0			22.00 - 22.60m: Intersecting subvertical fractures, surfaces stained dark grey.			
						NA		Stiff fissured reddish brown gravelly CLAY. Gravel is angular and subangular fine and medium lithorelicts of very stiff clay to extremely weak mudstone. Localised relict fissures are randomly orientated extremely closely spaced. (MMG) (Grade III)	22.60	-11.40	
	51C	23.50 - 25.00	19.00		100 5 0	NI			23.50	-12.30	
						NA		Extremely weak thinly laminated to thinly bedded reddish brown MUDSTONE. Fractures are subhorizontal to 10° and subvertical extremely closely and very closely spaced planar smooth. (MMG) (Grade II)	23.80	-12.60	
						NI NI 80		Stiff fissured reddish brown gravelly CLAY. Gravel is angular and subangular fine and medium lithorelicts of very stiff clay to extremely weak mudstone. Localised relict fissures are randomly orientated extremely closely spaced. (MMG) (Grade III)	24.50	-13.30	
	52C	25.00 - 26.50	19.00		100 0 0	NA		Extremely weak and very weak thinly laminated to thinly bedded reddish brown MUDSTONE. Fractures are subhorizontal to 10° and subvertical extremely closely and very closely spaced planar smooth. (MMG) (Grade II)	25.30	-14.10	
								Stiff fissured reddish brown gravelly CLAY. Gravel is angular and subangular fine and medium lithorelicts of very stiff clay to extremely weak mudstone. Localised relict fissures are randomly orientated extremely closely spaced. (MMG) (Grade III)			
	53C	26.50 - 28.00	19.00		100 0 0			25.80 - 25.90m: Light greenish grey.			
								27.50 - 28.20m: Tending to extremely weak mudstone.			
								Continued Next Page	{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

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BOREHOLE LOG

BH513

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 4 of 4

Start Date 9 February 2015 — Easting 336926.7 — Scale 1 : 50

End Date 18 February 2015 — Northing 185781.1 — Ground level 11.20mOD — Depth 29.50 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	54C	28.00 - 29.50	19.00		100 0 0						
18/02/15 1730hrs 2.70m									29.50	-18.30	
19/02/15 0845hrs 4.40m								Borehole completed at 29.50m.			
									{38.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

AGS

CONTRACT **30238**

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BOREHOLE LOG

BH514

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 1

Start Date 10 February 2015 — Easting 336928.2 — Scale 1 : 50

End Date 12 February 2015 — Northing 185960.8 — Ground level 12.00mOD — Depth 6.85 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
10/02/15 1500hrs	1B	0.20	0.50					Dense to very dense black slightly silty sandy angular to subrounded fine to coarse slag GRAVEL. (MG)			
	2D*	0.20	0.50		Vo 0						
	3B	0.50	1.00								
10/02/15 1700hrs Dry	4D*	0.50	1.00		Vo 0						
		1.00	1.45	1.00	C 34						
11/02/15 0800hrs Dry	5B	1.00	1.50								
	6D*	1.00	1.50		Vo 0						
		1.50	1.51	1.50	C**						
	7B	1.50	2.00								
	8D*	1.50	2.00		Vo 0.3						
		2.00	2.45		C 52						
	9B	2.50	3.00								
	10D*	2.50	3.00		Vo 0.2						
		3.00	3.00	3.00	C**						
	11B	3.50	4.00								
	12D*	3.50	4.00		Vo 0.1			3.50 - 4.00m: Rare rounded fine and medium gravel sized iron nodules.			
		4.00	4.00	3.00	C**						
	13B	4.50	5.20								
	14D*	4.50	5.20					4.50 - 5.20m: Cobble sized pockets of soft greenish grey locally brownish grey clay.			
		5.20	5.43	5.20	C*100						
	15D*	5.50	6.00		Vo 0.1						
11/02/15 1700hrs Dry	16B	6.00	6.30								
12/02/15 0800hrs Dry											
		6.70	6.70	6.70	C**			6.70m: Driller notes metal.	6.85	5.15	
12/02/15 1200hrs Dry		6.85	6.85	6.85	C**			Borehole completed at 6.85m.	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig.

METHOD: Hand dug inspection pit 0.00-1.00m. Cable percussion (200mm) 1.00-6.85m.

CASING: 200mm diam to 6.85m.

BACKFILL: On completion, hole backfilled with bentonite pellets.

REMARKS: Hole advanced by chiselling 1.50-2.00m (1hr), 3.00-4.50m (2.5hr), 5.60-6.85m (3.5hr). Hole terminated at 6.85m due to encountering metallic obstruction.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered.

AGS

CONTRACT	CHECKED
30238	EC

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BOREHOLE LOG

BH514A

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 1

Start Date 4 March 2015 — Easting 336934.3 — Scale 1 : 50

End Date 6 March 2015 — Northing 185953.7 — Ground level 11.90mOD — Depth 7.50 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
04/03/15 1500hrs	1D*	0.00 - 0.50		Vo 0.9			Soft to very soft black to dark brown (ashy) gravelly sandy clayey SILT with rare roots (up to 3mm diam). Gravel is subangular fine to coarse slag and mudstone. (MG)			
	2B	0.30 - 0.60								
	4D*	0.50 - 1.00		Vo 0.0						
	3B	0.60 - 1.00								
		1.00 - 1.45	1.00	C 1						
	5B	1.00 - 1.50								
	6D*	1.00 - 1.50		Vo 0.0						
		1.50 - 1.95	1.40	C 1						
04/03/15 1700hrs Dry	7B	1.50 - 2.00								
		2.00 - 2.45	2.00	C 12				2.00	9.90	
05/03/15 0800hrs Dry	8B	2.00 - 2.50					Firm black to dark brown gravelly sandy clayey SILT. Gravel is subangular fine to coarse slag and mudstone. (MG)			
	9D*	2.00 - 2.50		Vo 0.5						
		2.50 - 2.95	2.50	C 13						
	10B	2.50 - 3.00								
	11D*	2.50 - 2.70		Vo 0.7						
		3.00 - 3.45	3.00	C 28						
	12B	3.00 - 3.50					3.00 - 3.40m: Stiff.			
	13D*	3.00 - 3.20		Vo 0.3						
		3.50 - 3.80	3.50	C*106				3.40	8.50	
	14D*	3.50 - 3.70		Vo 0.3			Very dense dark brown sandy subangular fine to coarse slag GRAVEL with high subangular slag cobble content. (MG)			
		4.00 - 4.45	4.00	C 8						
	15B	4.00 - 4.50					4.00 - 4.45m: Loose (?).			
	16D*	4.00 - 4.20		Vo 0.0						
		4.50 - 4.80	4.50	C*106						
	17B	4.50 - 4.80								
	18D*	4.50 - 4.70		Vo 0.0						
		5.00 - 5.45	5.00	C 64						
05/03/15 1700hrs Dry	19D*	5.00 - 5.20		Vo 0.0						
06/05/15 0800hrs Dry		5.50	5.50							
	20B	6.00 - 7.50						6.00	5.90	
	21D*	6.00 - 6.50					Very dense dark brownish grey silty sandy subangular fine to coarse slag GRAVEL. (MG)			
		6.50 - 6.56	6.50	C*246						
06/05/15 1700hrs Dry	22D*	7.00 - 7.50								
		7.50 - 7.70	7.00	C*313				7.50	4.40	
	23D*	7.50					Borehole completed at 7.50m.			
								{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig.

METHOD: Hand dug inspection pit 0.00-1.00m. Cable percussion (200mm) 1.00-5.50m and (150mm) 5.50-7.50m.

CASING: 200mm diam to 5.50m and 150mm diam to 7.00m.

BACKFILL: On completion, hole backfilled with bentonite pellets.

REMARKS: Hole advanced by chiselling 3.60-6.00m (6.5hr) and 6.00-7.50m (8.5hr). Water added to assist boring 6.00-7.50m. Hole terminated at 7.50m due to encountering obstruction.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m) casing (m) rose to (m) time to rise (min) remarks

Groundwater not encountered.

AGS

CONTRACT	CHECKED
30238	EC

Geotechnical Engineering Limited

BOREHOLE LOG

BH515

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 5 February 2015 — Easting 336901.7 — Scale 1 : 50

End Date 9 February 2015 — Northing 186086.3 — Ground level 10.65mOD — Depth 21.70 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
05/02/15 0800hrs	1B	0.00 - 0.50						Black slightly sandy subangular to subrounded fine to coarse slag and red brick GRAVEL with low slag cobble content. (MG)			
	2D*	0.20 - 0.30		Vo 0.5							
	3B	0.50 - 1.00									
	4D*	0.50 - 0.60		Vo 3.7							
05/02/15 1600hrs Dry	5D	1.00 - 1.45	Nil	S 4							
	6B	1.00 - 1.50							1.00	9.65	
06/02/15 0800hrs Dry	7D*	1.00 - 1.10		Vo 0.8				Very loose to loose black sandy to very sandy very clayey GRAVEL with a medium brick cobble content. Frequent fragments of fibrous organic material. (MG)			
	8D	1.50 - 1.95	1.50	S 4				1.50m: Tending to very clayey very gravelly sand.			
	9B	1.50 - 2.00									
	10D*	1.50 - 1.60		Vo 1.9							
	11D	2.00 - 2.45	2.00	S 4							
	12B	2.00 - 2.50									
	13D	2.50 - 2.95	2.50	S 10							
	14B	2.50 - 3.00									
	15D*	2.50 - 2.60									
	16D	3.00 - 3.45	3.00	S 8							
	17B	3.00 - 3.50									
	18D*	3.00 - 3.10									
	19D	3.50 - 3.95	3.50	S 8							
	20B	3.50 - 4.00									
	21D	4.00 - 4.45	4.00	S 12					4.00	6.65	
	22B	4.00 - 4.50						Firm black and reddish brown slightly gravelly CLAY. Gravel is subangular fine and medium mudstone. (MG)			
	23D*	4.00 - 4.10									
	24D	4.50 - 4.95	4.50	S 8							
	25B	4.50 - 5.00									
	26D*	4.50 - 5.00									
	27D	5.00 - 5.45	5.00	S 6					5.00	5.65	
	28B	5.00 - 5.50						Soft dark grey and light brown slightly sandy CLAY. (MG)			
	29B	5.50 - 6.00									
		6.00 - 6.00	6.00	C**					6.00	4.65	
	30B	6.00 - 6.50						Driller notes slag boulders recovered as: Dark brown and black sandy very angular to subangular fine to coarse slag GRAVEL. (MG)			
	31D*	5.50 - 6.10									
	32B	6.00 - 6.10									
	33D*	6.50 - 7.00									
06/02/15 1600hrs Dry		6.50 - 7.00									
		7.00 - 7.00	6.00	C**							
09/02/15 0800hrs Dry	34B	7.00 - 7.50									
	35B	7.50 - 8.00							7.60	3.05	
		7.60 - 8.00						Firm dark and light brown slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium sandstone.			
								Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.00m. Cable percussion (200mm) 1.00-9.00m and (150mm) 9.00-16.50m. Waterflush rotary coring (116mm) 16.50-21.70m. CASING: 200mm to 8.00m and 150mm diam to 16.15m.

BACKFILL: On completion, borehole backfilled with bentonite 21.70-13.20m. A slotted standpipe (50mm) was installed to 13.00m, granular response zone 13.20-9.80m, bentonite seal 9.80-5.20m. A second standpipe (35mm) was installed to 5.00m, granular response zone 5.20-0.85m, bentonite seal 0.85-0.25m, concrete and stopcock cover 0.25-0.00m. REMARKS: Hole advanced by chiselling 6.00-7.00m (2hr), and 15.50-16.50m (2hr). Downhole magnetometry for UXO risk mitigation undertaken 0.00-6.00m. No anomalies encountered. Bentonite seal for aquifer protection installed during drilling 7.00-9.00m, prior to reduction in casing diameter. Permeability test undertaken at 11.00-12.00m. MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered.

AGS

CONTRACT	CHECKED
30238	EC

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BOREHOLE LOG

BH515

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 5 February 2015 — Easting 336901.7 — Scale 1 : 50

End Date 9 February 2015 — Northing 186086.3 — Ground level 10.65mOD — Depth 21.70 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	36UT	8.00 - 8.45						(TFD)			
	37B	8.00 - 8.50									
									9.00	1.65	
	38B	9.00 - 9.50						Spongy black and brown clayey fibrous PEAT. (PEAT)			
	39D	9.50 - 9.95	9.50	S 34							
	40B	10.00 - 10.50									
									11.00	-0.35	
	41D	10.90 - 11.00									
	42D	11.00 - 11.45	11.00	S 11				Soft dark grey sandy locally very sandy clayey SILT. (TFD)			
09/02/15 1600hrs 10.80m	43B	11.50 - 12.00									
10/02/15 0810hrs 6.75m											
	44D	12.50 - 12.95	12.50	S 2							
	45B	13.50 - 14.00									
	46UT	14.00 - 14.45	14.00								
	47B	15.00 - 15.50									
									15.50	-4.85	
	48D	15.50 - 15.95	15.50	S 38				Stiff fissured reddish brown slightly sandy slightly gravelly CLAY. Gravel is subrounded fine and medium lithorelicts of very stiff clay and extremely weak mudstone. Fissures are subhorizontal extremely closely spaced. (MMG) (Grade III/IVa)			
	49B	15.50 - 16.00									
	50D	16.00 - 16.09	16.00	S**							
10/02/15 1335hrs 6.75m	51B	16.00 - 16.50									
		16.50 - 16.61	16.15	C*250	100						
11/02/15 0955hrs 11.23m	52C	16.50 - 17.20									
	53C	17.20 - 18.70			99						
								17.30m: Single greenish grey reduction spot (30mm).	17.40	-6.75	
								Very stiff reddish brown very gravelly CLAY. Gravel is angular and subangular fine to coarse lithorelicts of very stiff clay and extremely weak mudstone. (MMG) (Grade III)			
								Continued Next Page	{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered.

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BOREHOLE LOG

BH515

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 5 February 2015 — Easting 336901.7 — Scale 1 : 50

End Date 9 February 2015 — Northing 186086.3 — Ground level 10.65mOD — Depth 21.70 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
									17.80 - 17.90m: Mottled greenish grey.	18.30	-7.65	
							NA		Stiff reddish brown slightly sandy slightly gravelly CLAY. Gravel is angular and subangular fine and medium lithorelicts of very stiff clay and extremely weak mudstone. (MMG) (Grade III/IVa)			
	54C	18.70	20.20			95				19.40	-8.75	
									Very stiff fissured reddish brown very gravelly CLAY. Gravel is angular and subangular medium and coarse lithorelicts of very stiff clay and extremely weak mudstone. Fissure are subhorizontal and vertical very closely spaced with bluish grey locally greenish grey staining. (MMG) (Grade III)			
	55C	20.20	21.70			96 20 20				21.00	-10.35	
							300		Weak thinly laminated reddish brown MUDSTONE. (MMG) (Grade I)	21.30	-10.65	
11/02/15 1245hrs 2.55m							NA		Stiff reddish brown slightly sandy slightly gravelly CLAY. Gravel is subangular and subrounded fine and medium lithorelicts of very stiff clay and extremely weak mudstone. (MMG) (Grade IVa)	21.70	-11.05	
									Borehole completed at 21.70m.	{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered.

AGS

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BOREHOLE LOG

BH516

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 5 February 2015 — Easting 337039.7 — Scale 1 : 50

End Date 10 February 2015 — Northing 185703.6 — Ground level 7.20mOD — Depth 25.30 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
04/02/15 0800hrs	1B	0.00	0.50						Black mottled dark grey sandy subangular fine to coarse tarmacadam, limestone and brick GRAVEL. (MG)			
	2D*	0.00	0.50		Vo 2.0							
	3B	0.50	1.20									
	4D*	0.50	1.20		Vo 0.6							
04/02/15 1700hrs Dry		1.20	1.20	1.20	C**							
	5B	1.20	1.50						1.20 - 1.50m: Driller notes slag boulders.			
		1.50	1.60	1.50	C*714							
05/02/15 0800hrs Dry	6B	1.65	2.05		Vo 1.3					1.65	5.55	
	7D*	1.70	2.30		Vo 1.4				Dense black mottled dark grey sandy subangular fine to coarse tarmacadam, limestone and brick GRAVEL with low subrounded limestone cobble content. (MG)			
		2.05	2.50	2.50	C 42							
	8B	2.05	2.50									
	9D*	2.30	2.80		Vo 0.7							
		2.50	2.95	2.50	C 44							
	10B	2.50	3.00									
	11D*	2.80	3.00		Vo 1.7							
	12D	3.00	3.45	3.00	S 9							
	13B	3.00	3.50									
	14D*	3.00	3.50		Vo 1.4					3.50	3.70	
	15UT	3.50	3.95	3.50					Firm dark grey mottled black slightly gravelly organic silty CLAY. Gravel is subangular fine and medium limestone. (TFD)			
	16B	3.50	4.10							4.00	3.20	
	17D	4.10	4.55	4.10	S 4				Firm dark grey mottled light brown and black organic silty CLAY with rare subangular fine and medium limestone gravel and rare plant fragments (up to 2mm). (TFDP)			
	18B	4.10	4.60									
	19UT	4.60	5.05	4.60								
	20B	4.60	5.20									
	21D	5.00	5.20							5.00	2.20	
	22B	5.00	5.20						Soft becoming firm light grey mottled light brown and black organic silty CLAY. (TFDP)			
	23D	5.20	5.65	5.20	S 6							
	24B	5.20	6.70									
05/02/15 1700hrs Dry												
06/02/15 0800hrs Dry	25UT	6.70	7.15	6.70								
	27B	6.70	7.30									
	26D	7.10	7.30									
	28D	7.30	7.75	7.30	S 4					7.30	-0.10	
	29B	7.30	8.80						Spongy dark brown fibrous PEAT. (PEAT)			
									Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.20m. Cable percussion (200mm) 1.20-3.00m and (150mm) 3.00-14.80m. Waterflush rotary core drilled (116mm) 14.80-25.30m.

CASING: 200mm diam to 3.00m and 150mm diam to 14.70m.

BACKFILL: On completion, hole backfilled with bentonite pellets 25.30-0.40m, gravel 0.40-0.10m, and topsoil 0.10-0.00m. REMARKS: Hole advanced by chiselling 1.20-1.30m (1hr), 1.30-1.50m (1hr), 1.50m: no penetration (2hr), 1.70-2.00m (1hr), 2.00-2.50m (1.5hr), 13.60-13.80m (1hr) and 14.40-14.70m (1hr). Water added to assist boring 1.20-1.50m. Downhole magnetometry for UXO risk mitigation undertaken 0.00-1.20m. No anomalies encountered. Bentonite seal for aquifer protection installed during drilling 3.00-2.00m, prior to reduction in casing diameter. Permeability test undertaken at 9.00m- 9.50m. MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
6.70	6.70	5.10	20	

AGS

CONTRACT	CHECKED
30238	EC

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BOREHOLE LOG

BH516

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 5 February 2015 — Easting 337039.7 — Scale 1 : 50

End Date 10 February 2015 — Northing 185703.6 — Ground level 7.20mOD — Depth 25.30 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
										8.80	-1.60	
	30UT	8.80	9.20	8.80					Very soft dark grey mottled dark brown and black silty CLAY with frequent plant and peat fragments (up to 5mm). (TFDP)			
	31B	9.20	10.30									
	32D	9.20	9.40									
	33D	10.30	10.75	10.30	S 4							
	34B	10.30	11.80									
	35UT	11.80	12.25	11.80								
		12.20	12.65	12.20	C 26					12.20	-5.00	
	36B	12.20	13.10						Stiff dark grey gravelly organic silty CLAY. Gravel is subangular fine and medium limestone. (TFD)			
	37D	13.10	13.48	13.10	S*67					13.10	-5.90	
	38B	13.10	13.60						Very stiff reddish brown mottled dark grey gravelly silty CLAY. Gravel is subangular fine and medium lithorelicts of extremely weak mudstone. (MMG) (Grade IVa)			
06/02/15 1600hrs Dry												
		13.60	13.99	13.10	C*64							
09/02/15 0830hrs 4.30m	39B	13.60	14.10									
		14.10	14.41	13.10	C*96							
	40B	14.10	14.70									
09/02/15 1700hrs 4.30m										14.50	-7.30	
	41X	14.50	14.80				NI		Very stiff reddish brown locally mottled greenish grey gravelly CLAY locally tending to extremely weak mudstone with rare greenish grey reduction spots (up to 10mm). Gravel is subangular fine to coarse lithorelicts of very stiff clay and extremely weak mudstone. Fissures are subhorizontal to 20° and subvertical very closely spaced planar rough locally stained dark grey. (MMG) (Grade III)			
		14.70	14.85	13.10	C*200							
10/02/15 0835hrs 4.58m	42C	14.80	16.30			100						
	43C	16.30	17.80			100			16.30 - 16.60m: Recovered as angular fine to coarse mudstone gravel. 17.10 - 17.30m: Recovered as angular fine to coarse mudstone gravel.			
	44C	17.80	19.30			100						
									Continued Next Page	{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

AGS

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BOREHOLE LOG

BH516

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 5 February 2015 — Easting 337039.7 — Scale 1 : 50

End Date 10 February 2015 — Northing 185703.6 — Ground level 7.20mOD — Depth 25.30 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
									17.70 - 17.85m: Recovered as angular fine to coarse mudstone gravel.			
	45C	19.30	20.80			100			19.30 - 19.60m: Recovered as angular fine to coarse mudstone gravel.			
	46C	20.80	22.30			100			20.80 - 22.30m: Rare greenish grey reduction spots (up to 20mm). 21.20 - 21.40m: Mottled greenish grey and reddish brown.			
	47C	22.30	23.80			100			22.30 - 23.50m: Recovered as angular fine to coarse mudstone gravel.			
	48C	23.80	25.30			100			23.70 - 23.85m: Recovered as angular fine to coarse mudstone gravel. 23.80 - 25.30m: Tending to extremely weak and weak mudstone. 24.05 - 24.20m: Recovered as angular fine to coarse mudstone gravel.			
10/02/15 1445hrs 3.78m										25.30	-18.10	
									Borehole completed at 25.30m.	{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

AGS

CONTRACT 30238

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Geotechnical Engineering Ltd, Tel. 01452 527743 30238 YODA.GPJ TRIALJH.GPJ GEOTECH.GLB 16/07/2015 16:02:12 RM EC

Geotechnical Engineering Limited

TRIAL PIT LOG

TP506

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 2

Start Date 10 February 2015 — Easting 336917.8 — Scale 1 : 25

End Date 10 February 2015 — Northing 185958.8 — Ground level 11.85mOD — Depth 4.10 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
				Black sandy angular and subangular fine and medium slag GRAVEL with frequent roots (up to 3mm diam.). (MG)	0.25	11.60	
	1D*		0.50	Dark grey sandy angular and subangular fine to coarse slag GRAVEL with low angular and subangular slag cobble content. (MG)			
	2B	Vo 1.3 H 37	1.00				
	3D*		1.00				
	4D*		1.50				
	5B	Vo 3.8 H 76	2.00				
	6D*		2.00		2.20	9.65	
	7D*		2.50	Dark greyish brown sandy angular and subangular fine to coarse ash, brick, wood, plastic and slag GRAVEL with rare cobbles of brick and slag and rare cobble sized fragments of sheet steel. (MG)			
	8B	Vo 9.1 H 24	3.00				
	9D*		3.00				
	10D*		3.50		3.60	8.25	
	11B	H 20	4.00	Dark reddish brown sandy angular and subangular fine and medium brick and slag GRAVEL. (MG)			

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater not encountered.
Trial pit sides remained stable and vertical.
Trial pit dimensions 0.75x3.00x4.10m.
On completion, the trial pit was backfilled with materials arising.
Trial pit terminated at 4.10m due to the strength of the ground.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

AGS

CONTRACT	CHECKED
30238	EC

Geotechnical Engineering Ltd, Tel. 01452 527743 30238 YODA.GPJ TRIALJH.GPJ GEOTECH.GLB 16/07/2015 15:53:24 RDL SF/EC

ROTARY CORE BOREHOLE LOG

Borehole No. **BHM4CAN040**

Sheet 1 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 10/12/2015 - 11/12/2015	Final Depth:
Project No:	JFR8703	Easting:	336932	Drilling Method: Pipe Diameter: 50mm	16.00m
Location:	Newport	Northing:	185944	Comacchio MC 305 — Casing Diameter (mm): 150; Casing Depth (m): 9.00	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	11.57	Logged By: ERH	1:50

Core Depth (m)	Depth (mbGL)	Thickness (m)	Level (mAOD)	Stratum Description
0.00 – 1.50	0.00	(2.00)	11.57	Very soft black slightly sandy CLAY of slag. (MADE GROUND)
				Firm to soft reddish black CLAY bands of slag from 0.4-0.9m depth.
				Firm reddish black CLAY bands of slag from 1.6-1.75m depth.
1.50 – 3.00	2.00	(0.20)	9.57	Firm black CLAY of slag with black fine to coarse, angular gravels. (MADE GROUND)
	2.20	(0.20)	9.37	Soft black slightly sandy CLAY of slag with frequent white sand pockets. (MADE GROUND)
	2.40	(0.80)	9.17	Firm black CLAY of slag with rare black fine to coarse angular gravels of slag present in bands. (MADE GROUND)
3.00 – 4.50	3.20	(0.50)	8.37	Firm reddish black CLAY with angular gravel of slag. (MADE GROUND)
	3.70		7.87	Soft black CLAY. (MADE GROUND)
4.50 – 6.00		(2.00)		*Becoming increasingly stiff after 5m depth.*
	5.70		5.87	Black clayey slightly sandy angular GRAVEL of slag. (MADE GROUND)
6.00 – 7.50		(2.10)		*Too hard for window sampler below 5.7m.*
	7.80		3.77	No recovery, driller notes soft fine gravelly clay. Geology inferred. (MADE GROUND)
7.50 – 9.00		(1.20)		
	9.00		2.57	Soft light grey slightly sandy CLAY with occasional inclusions of black organic matter. (TIDAL FLAT DEPOSITS)
9.00 – 10.50		(1.90)		
				Continued on next sheet

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Window sampled by rotary core rig 1.2 - 16.0m. Borehole terminated upon proving natural ground.
BACKFILL: On completion hole backfilled with bentonite 16.0 - 8.0m and 1.0 - 0.3m, gravel 8.0 - 1.0m and concrete 0.3 - 0.0m. One standpipe (50mm) was installed with slotted section between 1.0 - 8.0m.
REMARKS: Groundwater encountered between 7-8m with rapid ingress. Installed with raised cover.

Groundwater			Drilling Progress	
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Depth	Remarks
7.80			0.00 5.20 5.20 16.00	

AGS

ROTARY CORE BOREHOLE LOG

Borehole No. **BHM4CAN040**

Sheet 2 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 10/12/2015 - 11/12/2015		Final Depth:
Project No:	JFR8703	Easting:	336932	Drilling Method:	Pipe Diameter: 50mm	16.00m
Location:	Newport	Northing:	185944	Comacchio MC 305	Casing Diameter (mm) 150 / Casing Depth (m) 9.00	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	11.57	Logged By: ERH		1:50

Well	Water Strike(s)	Core Depth (m)	TCR	SCR	RQD	Fractures	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
		10.50 – 11.00					10.90	(0.10)	0.67		Stiff brown pseudo-fibrous PEAT. (PEAT)	11
		11.00 – 11.40					11.00	(0.40)	0.57		Soft light grey silty CLAY with frequent black organic inclusions. (TIDAL FLAT DEPOSITS)	
		11.40 – 11.50					11.40	(0.10)	0.17		Spongey black amorphous PEAT. (PEAT)	
		11.50 – 12.00					11.50		0.07		Spongey brown pseudo-fibrous PEAT. (PEAT)	12
		12.00 – 13.50					12.80	(1.30)	-1.23		Soft light grey slightly sandy CLAY. (TIDAL FLAT DEPOSITS)	13
		13.50 – 15.00						(3.20)				14
		15.00 – 16.00										15
											End of Borehole at 16.000m	16
												17
												18
												19
												20
			TCR	SCR	RQD	Fractures						

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Window sampled by rotary core rig 1.2 - 16.0m. Borehole terminated upon proving natural ground.
BACKFILL: On completion hole backfilled with bentonite 16.0 - 8.0m and 1.0 - 0.3m, gravel 8.0 - 1.0m and concrete 0.3 - 0.0m. One standpipe (50mm) was installed with slotted section between 1.0 - 8.0m.
REMARKS: Groundwater encountered between 7-8m with rapid ingress. Installed with raised cover.

Groundwater			Drilling Progress	
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Depth	Remarks
7.80			0.00 5.20 5.20 16.00	

AGS

SUPPLEMENTARY HOLE INFORMATION

BHM4CAN040

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
10/12/2015 07:30:00	0.00	0.00	
10/12/2015 18:00:00	5.20	3.80	
11/12/2015 07:30:00	5.20	3.80	
11/12/2015 18:00:00	16.00	9.00	

Sample Information

Type/Ref	Depth (m)	Date
ES	0.50	
ES	3.00	10-12-2015
B	4.20	
ES	9.00	

Standard Penetration Tests

Depth (m)	Type	Reported Result

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)
04/05/2016 14:20:00	1	6.61
26/05/2016 11:00:00	2	6.65
03/06/2016 14:20:00	3	6.68

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

DRAFT

A2 Appendix 1b

Exploratory Records (Lagoon 25)

Borehole Log

Exploration Associates

Drilled by	IH	Equipment and Methods	Ground Level + 12.18 m OD
Logged by	JL	Cable Percussion 150 mm diameter from 0.00m to 12.50m.	National Grid Coordinates E 337265.23 N 185731.72
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
			25/01/2002	
1.30	ES1			
5.00	ES2		25/01/2002 5.50	dry
			28/01/2002 5.50	dry
8.70	ES3			

Strata

Description	Depth,Level (Thickness)	Legend
MADE GROUND : Dark grey slightly clayey SAND AND GRAVEL. Gravel is angular to subrounded fine to coarse of ash and clinker. Driller reports slag.	(5.00)	c, b
	5.00 +7.18	
MADE GROUND: Dark grey slightly clayey SAND AND GRAVEL. Gravel is angular to subrounded fine to coarse of ash and clinker. Driller reports slag.	(6.20)	

Groundwater

No.	Struck	Behaviour
1	9.30m	Rising to 9.10m after 20 mins. Sealed 11.40.

Remarks

Chiselling : 3.80m to 4.10m 30minutes, 6.10m to 6.40m 30minutes, 7.30m to 7.50m 45minutes, 8.00m to 9.30m 90minutes, 9.30m to 10.40m 120minutes
Hole backfill : 0.00m to 0.30m Concrete (c), 0.30m to 1.00m Bentonite (b), 11.00m to 12.50m Arisings (a). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 1.00m to 11.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole **LGBH4**
Sheet 1 of 2

03/05/2002 11:11:12 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	IH	Equipment and Methods	Ground Level + 12.18 m OD
Logged by	JL	See sheet 1	National Grid E 337265.23
Checked by			Coordinates N 185731.72

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
11.00		kRH		
11.50	ES4		28/01/2002 11.50	dry

Strata

Description	Depth,Level (Thickness)	Legend
As sheet 1	(6.20)	
Firm to stiff light grey mottled orange brown slightly sandy CLAY with occasional rootlets. Driller reports clay and peat.	11.20 +0.98 (1.30pen)	a
EXPLORATORY HOLE ENDS AT 12.50 m.	12.50 -0.32	

Groundwater
No. Struck Behaviour

Remarks

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
LGBH4
Sheet 2 of 2

03/05/2002 11:11:16 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	DO	Equipment and Methods	Ground Level + 4.60 m OD
Logged by	LM	Cable Percussion 150 mm diameter from 0.00m to 7.00m.	National Grid Coordinates E 337283.62 N 185650.46
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
0.50	ES1		24/01/2002	
1.50	ES2			
1.60	ES3		24/01/2002	dry
			25/01/2002	dry
3.10	ES5			
6.00	ES6			
7.00	ES7	kRH	25/01/2002	dry
7.00				

Strata

Description	Depth,Level (Thickness)
MADE GROUND: Dark brown and grey brown slightly gravelly to gravelly fine to coarse SAND. Driller reports slag.	(1.50)
MADE GROUND: Soft pale grey CLAY. Driller reports slag.	1.50 +3.10 (0.50)
Soft grey silt with slag (DRILLERS DESCRIPTION).	2.00 +2.60 (0.50)
Firm pale grey CLAY.	2.50 +2.10 (0.60)
PEAT (DRILLERS DESCRIPTION).	3.10 +1.50 (2.90)
Soft pale grey CLAY.	6.00 -1.40 (1.00pen)
EXPLORATORY HOLE ENDS AT 7.00 m.	7.00 -2.40

Legend: c, b

Groundwater
Not encountered during drilling.

Remarks
Chiselling : 0.70m to 1.00m 75minutes
Hole backfill : 0.00m to 0.30m Concrete (c), 0.30m to 1.80m Bentonite (b). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 1.80m to 7.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole LGBH5
Sheet 1 of 1

03/05/2002 11:11:22 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by:	GR	Equipment and Methods	Ground Level + 12.65 m OD
Logged by	JN	Cable Percussion 150 mm diameter from 1.20m to 12.20m.	National Grid Coordinates E 337548.31 N 185583.01
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
1.00	ES1		30/01/2002	
			30/01/2002 5.00	dry
			31/01/2002 5.00	
			31/01/2002 0.00	
			04/02/2002	

Strata

Description	Depth,Level (Thickness)
MADE GROUND: Grey brown very sandy GRAVEL. Gravel is angular and subangular fine and medium of slag.	(5.00)
	5.00 +7.65
Fused steelworks slag (DRILLERS DESCRIPTION).	(1.80)
	6.80 +5.85
MADE GROUND: Grey slightly sandy GRAVEL. Gravel is angular fine and medium of shale. Driller reports slag.	(5.40)

Legend: c, b

Groundwater

Remarks

Chiselling : 1.80m to 2.80m 120minutes, 3.40m to 3.60m 30minutes, 4.00m to 4.30m 45minutes, 4.80m to 5.00m 30minutes, 5.90m to 6.10m 30minutes, 6.80m to 9.00m 360minutes, 9.00m to 10.70m 240minutes
Hole backfill : 0.00m to 0.50m Concrete (c), 0.50m to 1.00m Bentonite (b). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 1.00m to 12.20m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole **LGBH7**
Sheet 1 of 2

03/05/2002 11:11:32 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by GR Logged by JN Checked by	Equipment and Methods See sheet 1	Ground Level National Grid Coordinates

Samples and Tests

Strata

Depth	Type & No.	Records	Date / Casing	Time / Water	Description	Depth,Level (Thickness)	Legend
			04/02/2002				
			05/02/2002				
			10.70	9.80	As sheet 1	(5.40pen)	
12.00	ES2		05/02/2002				
					EXPLORATORY HOLE ENDS AT 12.20 m.	12.20	

Groundwater

Remarks
Chiselling : 10.70m to 12.20m 240minutes

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no. 152002
Carried out for Corus plc

Borehole
LGBH7
Sheet 2 of 2

19/04/2002 15:15:28 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	IH	Equipment and Methods	Ground Level + 4.96 m OD
Logged by	LM	Cable Percussion 150 mm diameter from 0.00m to 7.00m.	National Grid E 337621.91
Checked by			Coordinates N 185568.04

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
			25/01/2002	
1.90	ES1			
5.00	ES2			
			25/01/2002	dry
6.80	ES3			

Strata

Description	Depth,Level (Thickness)
Slag (DRILLERS DESCRIPTION).	(0.80)
Grey clayey SILT with slag (DRILLERS DESCRIPTION).	0.80 +4.16 (0.80)
MADE GROUND : Soft dark brown grey sandy gravelly CLAY. Gravel is subangular and subrounded fine and medium of ash and clinker. Driller reports some peat.	1.60 +3.36 (1.10)
PEAT (DRILLERS DESCRIPTION).	2.70 +2.26 (0.70)
Green grey silty CLAY (DRILLERS DESCRIPTION).	3.40 +1.56 (1.50)
Soft grey CLAY and black spongy pseudofibrous PEAT.	4.90 +0.06 (1.20)
Soft grey CLAY.	6.10 -1.14 (0.90pen)
EXPLORATORY HOLE ENDS AT 7.00 m.	7.00 -2.04

Legend: b

Groundwater
Not encountered during drilling.

Remarks
Chiselling : 0.40m to 0.60m 30minutes
Hole backfill : 0.00m to 1.50m Bentonite (b). Surface protection : <none>
Standpipe installed, 50mm diameter, response zone from 1.50m to 7.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
LGBH9
Sheet 1 of 1

03/05/2002 11:11:45 ESGLog v2.10

BOREHOLE No: BH 24

Client : Corus Ltd. **Contractor :** Apex Drilling Ltd. **Hole Coordinates :** E337962.515 N185757.140

Project : SSQ Landfill Llanwern **Hole Depth (m) :** **Logged By :** AWJ

Location : See site plan **Steel Collar Level :** **Date :** 06.10.05 **Sheet No :** 1 of 2

Depth (m)	Elevation	Geotechnical Description (BS5930:1999)	Strata Type	Well Details	Water Level Below Ground	Samples: Sample Type	Samples: From	Samples: To	Remarks
0	5.38	Ground Surface							
	5.08	**Made Ground** Dense to very dense dark grey silty sandy fine to coarse angular gravel with occasional cobble and rare boulder, comprising of slag							
	4.78	**Estuarine Alluvium** Firm grey CLAY							
1		**Peat** Soft dark brown fibrous woody PEAT							
	2.98	**Estuarine Alluvium** Firm becoming soft grey CLAY			2.58m				
3									
4									
5	0.18	**Triassic Bedrock** Moderately strong grey MUDSTONE/ Stiff Clay							
6									
8									
9									
10									

Drilled By : GJ

Rig Type : Gryphon

Hole Diameter (mm) : 110

Casing Depth (m) : 10.00

Bit Type :

Log Template File : GEOROTARY

Notes

1

2

3

4

5

BOREHOLE No: BH 24

Client : Corus Ltd. | **Contractor :** Apex Drilling Ltd. | **Hole Coordinates :** E337962.515 N185757.140

Project : SSQ Landfill Llanwern | **Hole Depth (m) :** | **Logged By :** AWJ

Location : See site plan | **Steel Collar Level :** | **Date :** 06.10.05 | **Sheet No :** 2 of 2

Depth (m)	Elevation	Geotechnical Description (BS5930:1999)	Strata Type	Well Details	Water Level Below Ground	Samples: Sample Type	Samples: From	Samples: To	Remarks
11	-5.62	**Triassic Bedrock** Strong dark reddish brown MARL with many fine to coarse sub-rounded gravels - Conglomerate							
13	-8.32	**Triassic Bedrock** Moderately strong reddish brown MARL							
14									
15	-9.62								
16									
17									
18									
19									
20									

Drilled By : GJ

Rig Type : Gryphon

Hole Diameter (mm) : 110

Casing Depth (m) : 10.00

Bit Type :

Log Template File : GEOROTARY

Notes

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4

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Header

Contract No.	F15056	Method	Cable Percussion & Rotary	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core barrel	Cemetrix	Date Completed	13/01/2008
		Core bit	8 inch Hammer		

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
17/12/2007	1730	10.30	10.30	DRY	End of Shift
11/01/2008	0730	10.30	10.40	DRY	Start of Shift
11/01/2008	1730	10.70	10.70	DRY	End of Shift
12/01/2008	0730	10.70	10.70	DRY	Start of Shift
12/01/2008	1730	14.50	14.50	DRY	End of Shift
13/01/2008	0730	14.50	14.50	DRY	Start of Shift
13/01/2008	1730	20.50	19.50	DRY	End of Hole

CABLE PERCUSSION DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling Hours	Remarks
10.20	10.70	6.00	Chiselling
10.70	11.50	5.00	Chiselling
20.20	20.50	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	10.30	200	10.30
150	20.50	150	19.50

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
13/01/2008		14.80	14.80	NR	Seepage	14.80	NS

ROTARY DRILLING DETAILS

From depth	To depth	Flush type	Flush return	Core diameter
0.00	10.30	Air	Good	0*

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm	Casing	Water Depth
12.00	S	N=20 (3,4,4,5,5,6)	11.50	DRY
14.00	S	N=25 (4,5,5,6,7,7)	13.50	DRY
16.00	S	N=2 (1,1,0,1,0,1)	15.50	15.80
18.00	S	N=2 (1,0,1,0,1,0)	17.50	17.80
19.50	S	50/200mm (9,13,14,16,20)	19.00	DRY
20.50	S	50/20mm (25,50)	19.50	DRY

* Seating blows only.

GENERAL NOTES

1. Rotary Openhole cemetrix drilling from GL to 10.30m.
2. Cable Percussive boring from 10.20m to 20.50m.
3. 50mm standpipe installed, slotted from 9.50m to 11.50m.
4. 0.00* indicates openhole drilling.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, hard strata time in hours

Form	ARIAL COMBINED HEADER
Version	3.04
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Sheet 1 of 3

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel	Cemetrix	Date Completed	13/01/2008
		Core Bit	8 inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring	Blow Count TCR	SCR	RQD	SPT type, N & depth	Install-ation
MADE GROUND: Ash and steel clinker. (Driller's description)									
		6.00	7.24						
MADE GROUND: Clay and gravel. (Driller's description)									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
Version	3.10
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Sheet 2 of 3

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel	Cemetrix	Date Completed	13/01/2008
		Core Bit	8 inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring		Blow Count TCR / SCR / RQD	SPT type, N & depth	Install-ation
MADE GROUND: Clay and gravel. (Driller's description)		10.20	3.04					
MADE GROUND: Very compact slag fill with large fragments. (Driller's description)				ES1	11.30			
Brownish grey silty CLAY. (Estuarine Alluvium)		11.50	1.74	ES1 D2 U3	11.50 11.50 11.50-11.95	(21)		
---from 12.00m firm to stiff				D4 D5	12.00 12.00		S20 12.00 12.45	
				ES6 B7	12.50 12.50			
				D8	13.00			
Firm brown fibrous PEAT. (Peat)		13.50	-0.26	ES9 U10	13.50 13.50-13.95	(32)		
				D11 D12	14.00 14.00		S25 14.00 14.45	
				D13 ES14	14.50 14.50			
Grey slightly silty sandy CLAY with very closely spaced fine to coarse gravel sized pockets of pseudofibrous locally amorphous peat. Sand is fine. (Estuarine Alluvium)		14.80	-1.56					
				D15 ES16 U17	15.50 15.50 15.50	(6)		
				D18 D19	16.00 16.00		S2 16.00 16.45	
				ES20	16.50			
				D21 B22	17.00 17.00-17.50			
Grey slightly sandy SILT. Sand is fine to medium		17.50	-4.26	U23	17.50	(5)		
				D24 D25	18.00 18.00		S2 18.00 18.53	
Stiff reddish brown mottled grey slightly gravelly clay. Gravel is angular fine to coarse (Weathered Mudstone). (Mercia Mudstone Group)		18.90	-5.66	D26 U27	19.00 19.00	(110)		
---from 19.50m very stiff				D28 D29	19.50 19.50		S50/200mm 19.50 19.85	

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
Version	3.10
Revised	17/12/2007

NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Sheet 3 of 3

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel	Cemetrix	Date Completed	13/01/2008
		Core Bit	8 inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring		Blow Count TCR	SCR	RQD	SPT type, N & depth	Install-ation
Stiff reddish brown mottled grey slightly gravelly clay. Gravel is angular fine to coarse (Weathered Mudstone). (Mercia Mudstone Group)				D30	20.00					
		20.50	-7.26	D31	20.50				S50/20mm 20.50 20.55	
Borehole complete at 20.50 m.										

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
Version	3.10
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ20
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337351.15 E
Project	New M4 - Second Preliminary Ground Investigation				185669.24 N
		Sampling Rig	Hydraulic Hammer	Ground Level	12.21m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	18/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	18/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt. ---from 0.30m to 0.50m sandy				L1	0.00 - 0.80	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 100% Blows: 1	
				ES2 L3	1.00 1.00 - 1.80	From: 1.00 To: 2.00 Diameter: 80mm Recovery : 90% Blows: 1	
				ES4 L5	2.00 2.00 - 2.60	From: 2.00 To: 3.00 Diameter: 70mm Recovery : 80% Blows: 1	
				ES6 L7	3.00 3.00 - 3.60	From: 3.00 To: 4.00 Diameter: 70mm Recovery : 80% Blows: 1	
				ES8 L9	4.00 4.00 - 4.50	From: 4.00 To: 5.00 Diameter: 50mm Recovery : 90% Blows: 2	
				ES10 L11	5.00 5.00 - 5.50	From: 5.00 To: 6.00 Diameter: 50mm Recovery : 100% Blows: 2	
Sampling complete at 6.00 m.		6.00	6.21	ES12	6.00		

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 6.00m.
2. Window Sampling complete at 6.00m.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

Form	ARIAL WINDOW LOG
Version	3.07
Revised	13/02/2008

Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ25
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337452.48 E
Project	New M4 - Second Preliminary Ground Investigation				185649.26 N
		Sampling Rig	Hydraulic Hammer	Ground Level	11.77m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	19/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	19/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth	Progress	Install-ation
MADE GROUND: Clinker. (Driller's description)					From: 0.00 To: 0.50 Diameter: 80mm Recovery : 100% Blows: 12	
		0.50	11.27			
Sampling complete at 0.50 m.						

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 0.50m.
2. Window Sampling terminated at 0.50m due to refusal.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

Form	ARIAL WINDOW LOG
Version	3.07
Revised	13/02/2008

Norwest Holst Soil Engineering Ltd.

WINDOW SAMPLING LOG

Hole ID.
SWSJ27
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337502.30 E
Project	New M4 - Second Preliminary Ground Investigation				185640.30 N
		Sampling Rig	Hydraulic Hammer	Ground Level	11.30m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	19/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	19/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sample type and depth		Progress	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt.				L1	0.00 - 0.80	From: 0.00 To: 1.00 Diameter: 90mm Recovery : 100% Blows: 1	
---from 0.23m to 0.26m 1 No thin bed of black clayey silty fine sand				ES2 L3	1.00 1.00 - 1.70	From: 1.00 To: 2.00 Diameter: 80mm Recovery : 90% Blows: 1	
				ES4 L5	2.00 2.00 - 2.70	From: 2.00 To: 3.00 Diameter: 70mm Recovery : 80% Blows: 2	
				ES6 L7	3.00 3.00 - 3.70	From: 3.00 To: 4.00 Diameter: 60mm Recovery : 100% Blows: 4	
				ES8 L9	4.00 4.00 - 4.60	From: 4.00 To: 5.00 Diameter: 50mm Recovery : 100% Blows: 3	
				ES10 L11	5.00 5.00 - 5.50	From: 5.00 To: 6.00 Diameter: 50mm Recovery : 90% Blows: 3	
Sampling complete at 6.00 m.		6.00	5.30	ES12	6.00		

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 6.00m.
2. Window Sampling complete at 6.00m.

NOTES: All depths in metres, all diameters in millimetres, Water strike rise time in minutes. See legend sheet for key to symbols.

Form	ARIAL WINDOW LOG
Version	3.07
Revised	13/02/2008

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ18
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337294.09 E
Project	New M4 - Second Preliminary Ground Investigation				185680.26 N
		Drilling Rig	Terrier	Ground Level	12.83m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	16/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
16/12/2007		3.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Window Sampling from GL to 3.45m.
2. Window Sampling terminated at 3.45m due to continuous collapse.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=21 (2,4,4,5,6,6)
2.00	S	N=24 (2,3,6,6,6,6)
3.00	S	N=26 (5,6,6,7,6,7)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
Version	3.03
Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ18
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337294.09 E
Project	New M4 - Second Preliminary Ground Investigation				185680.26 N
		Drilling Rig	Terrier	Ground Level	12.83m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	16/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Indistinctly laminated black slightly sandy clayey silt with rare rootlets.				L1	0.00 - 0.80				
MADE GROUND: Dark brown fine to coarse sand and angular to subangular gravel sized fragments of sandstone, slag and brick.		1.00	11.83	ES2 D3 L4	1.00 1.00 - 1.45 1.00 - 1.80	S21	S	1.00 1.45	
				ES5 D6 L7	2.00 2.00 - 2.45 2.00 - 2.80	S24	S	2.00 2.45	
				ES8 D9	3.00 3.00 - 3.45	S26	S	3.00 3.45	
Sampling complete at 3.45 m.		3.45	9.38						

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ19
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337335.58 E
Project	New M4 - Second Preliminary Ground Investigation				185715.90 N
		Drilling Rig	Terrier	Ground Level	12.31m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	16/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
16/12/2007		6.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=0 (0,0,0,0,0,0)
3.00	S	N=0 (0,0,0,0,0,0)
4.00	S	N=0 (0,0,0,0,0,0)
5.00	S	N=0 (0,0,0,0,0,0)
6.00	S	N=0 (1,0,0,0,0,0)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
Version	3.03
Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ19
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337335.58 E
Project	New M4 - Second Preliminary Ground Investigation				185715.90 N
		Drilling Rig	Terrier	Ground Level	12.31m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	16/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Black clayey silt with frequent rootlets.		0.10	12.21	L1	0.00 - 0.80				
MADE GROUND: Black clayey slightly sandy silt. Sand is fine. ---from 0.75m to 0.80m sand is fine to medium				ES2 D3 L4	1.00 1.00 - 1.45 1.00 - 1.80	S0	S	1.00 1.60	
				ES5 D6 L7	2.00 2.00 - 2.45 2.00 - 3.00	S0	S	2.00 2.60	
				ES8 D9	3.00 3.00 - 3.45	S0	S	3.00 3.60	
						S0	S	4.00 4.60	
				L10	5.00 - 6.00	S0	S	5.00 5.60	
				ES11 D12	6.00 6.00 - 6.45	S0	S	6.00 6.53	
Sampling complete at 6.45 m.		6.45	5.86						

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
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Revised	04/04/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ21
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337387.85 E
Project	New M4 - Second Preliminary Ground Investigation				185703.94 N
		Drilling Rig	Terrier	Ground Level	12.97m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	16/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
16/12/2007		6.00	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
16/12/2007	1350	4.00	4.00	20	Seepage	NR	NR
16/12/2007	1450	6.00	6.00	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 6.00m.
2.Window Sampling complete at 6.00m.
3.50mm standpipe installed, slotted from 4.00m to 6.00m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ21
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337387.85 E
Project	New M4 - Second Preliminary Ground Investigation				185703.94 N
		Drilling Rig	Terrier	Ground Level	12.97m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	16/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt with occasional rootlets.				L1 0.00 - 0.80			
---from 0.25m becomes sandy		0.40	12.57				
---from 0.35m becomes very sandy		0.45	12.52				
MADE GROUND: Slightly gravelly sandy silt. Gravel sized fragments are subangular fine to medium of sandstone.				ES2 1.00 L3 1.00 - 1.80			
MADE GROUND: Black slightly clayey silt.				ES4 2.00 L5 2.00 - 2.80			
				ES6 3.00 L7 3.00 - 3.80			
				ES8 4.00			
				L9 5.00 - 6.00			
		6.00	6.97				
Sampling complete at 6.00 m.							

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
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Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ22
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337405.22 E
Project	New M4 - Second Preliminary Ground Investigation				185656.40 N
		Drilling Rig	Terrier	Ground Level	11.99m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	11/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	11/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
11/01/2008		1.00	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
11/01/2008		1.00	1.00	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 1.00m.
2.Window Sampling terminated at 1.00m due to collapse.
3.Refer to SWSJ22A for reattempt.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ22
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337405.22 E
Project	New M4 - Second Preliminary Ground Investigation				185656.40 N
		Drilling Rig	Terrier	Ground Level	11.99m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	11/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	11/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly clayey sandy silt.				L1	0.00 - 0.80			
Sampling complete at 1.00 m.		1.00	10.99	ES2	1.00			

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
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Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ22A
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337416.40 E
Project	New M4 - Second Preliminary Ground Investigation				185650.28 N
		Drilling Rig	Terrier	Ground Level	11.94m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	11/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	12/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
11/01/2008	0730	1.00	0.00	NR	End of Shift
12/01/2008		5.00	0.00	NR	End of Hole
12/01/2008		1.00	0.00	NR	Start of Shift

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
11/01/2008		0.00	0.00	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 5.00m.
2.Window Sampling terminated at 5.00m due to surface water.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=0 (0,0,0,0,0,0)
3.00	S	N=0 (0,0,0,0,0,0)
4.00	S	N=0 (0,0,0,0,0,0)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
Version	3.03
Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ22A
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337416.40 E
Project	New M4 - Second Preliminary Ground Investigation				185650.28 N
		Drilling Rig	Terrier	Ground Level	11.94m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	11/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	12/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt.				L1 0.00 - 0.80			
				ES2 1.00 D3 1.00 - 1.45 L4 1.00 - 1.80	S0	S 1.00 1.60	
				ES5 2.00 D6 2.00 - 2.45	S0	S 2.00 2.60	
				D7 3.00 - 3.45	S0	S 3.00 3.60	
				D8 4.00 - 4.45	S0	S 4.00 4.60	
		5.00	6.94				
Sampling complete at 5.00 m.							

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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Version	3.04
Revised	04/04/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ22B
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337410.30 E
Project	New M4 - Second Preliminary Ground Investigation				185644.94 N
		Drilling Rig	Terrier	Ground Level	11.99m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	12/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	12/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
12/01/2008		4.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
12/01/2008		1.00	1.00	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 4.45m.
2.Window Sampling terminated at 4.45m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=0 (0,0,0,0,0,0)
3.00	S	N=0 (0,0,0,0,0,0)
4.00	S	N=0 (0,0,0,0,0,0)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ22B
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337410.30 E
Project	New M4 - Second Preliminary Ground Investigation				185644.94 N
		Drilling Rig	Terrier	Ground Level	11.99m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	12/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	12/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt.				L1	0.00 - 0.80				
				ES2	1.00	S0	S	1.00 1.60	
				D3	1.00 - 1.45				
				L4	1.00 - 1.80				
				ES5	2.00	S0	S	2.00 2.60	
				D6	2.00 - 2.45				
				ES7	3.00	S0	S	3.00 3.60	
				D8	3.00 - 3.45				
				D9	4.00 - 4.45	S0	S	4.00 4.60	
		4.45	7.54						
Sampling complete at 4.45 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ23
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337452.87 E
Project	New M4 - Second Preliminary Ground Investigation				185734.27 N
		Drilling Rig	Terrier	Ground Level	12.29m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	13/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	13/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
13/01/2008		8.35	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
13/01/2008		1.50	1.50	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 8.35m.
2.Window Sampling complete a 8.35m.
3.50mm standpipe installed, slotted from 5.80m to 7.80m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=0 (1,0,0,0,0,0)
3.00	S	N=0 (1,0,0,0,0,0)
4.00	S	N=0 (0,0,0,0,0,0)
5.00	S	N=0 (1,0,0,0,0,0)
6.00	S	N=0 (0,0,0,0,0,0)
7.00	S	N=0 (0,0,0,0,0,0)
7.90	S	72/225mm (18,24,28,27,17)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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SWSJ23
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Contract No.	F15056	Method	Window Sampling	Coordinates	337452.87 E
Project	New M4 - Second Preliminary Ground Investigation				185734.27 N
		Drilling Rig	Terrier	Ground Level	12.29m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	13/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	13/01/2008

Description of Strata	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth
MADE GROUND: Black slightly clayey slightly sandy silt.			L1 0.00 - 0.80		
			ES2 1.00 D3 1.00 - 1.45 L4 1.00 - 1.80	S0	S 1.00 1.60
			ES5 2.00 D6 2.00 - 2.45 L7 2.00 - 2.80	S0	S 2.00 2.53
			ES8 3.00 D9 3.00 - 3.45	S0	S 3.00 3.53
			D10 4.00 - 4.50	S0	S 4.00 4.60
			D11 5.00 - 5.45	S0	S 5.00 5.53
MADE GROUND: Black slightly clayey slightly sandy silt.	6.00	6.29	D12 6.00 - 6.45 L13 6.00 - 6.80	S0	S 6.00 6.60
			ES14 7.00 D15 7.00 - 7.45 L16 7.00 - 7.80	S0	S 7.00 7.60
MADE GROUND: Clinker. (Driller's description)	7.80	4.49	ES17 7.90 D18 7.90 - 8.35	S72/225mm	S 7.90 8.28
Sampling complete at 8.35 m.	8.35	3.94			

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ24
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337446.60 E
Project	New M4 - Second Preliminary Ground Investigation				185609.38 N
		Drilling Rig	Terrier	Ground Level	12.17m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	12/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	12/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
12/01/2008		2.00	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 2.00m.
2.Window Sampling terminated at 2.00m due to collapse.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=46 (1,3,4,12,17,13)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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Hole ID.
SWSJ24
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337446.60 E
Project	New M4 - Second Preliminary Ground Investigation				185609.38 N
		Drilling Rig	Terrier	Ground Level	12.17m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	12/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	12/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Dark grey medium to coarse sand and angular to subangular fine to medium gravel of slag.		0.20	11.97	L1	0.00 - 0.80				
MADE GROUND: Black slightly sandy clayey silt. ---from 0.57m to 0.62m black clayey sand ---from 0.62m to 0.68m Brown				ES2 D3 L4	1.00 1.00 - 1.45 1.00 - 1.80	S46	S	1.00 1.45	
Sampling complete at 2.00 m.		2.00	10.17	ES5	2.00				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ24A
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337448.56 E
Project	New M4 - Second Preliminary Ground Investigation				185614.04 N
		Drilling Rig	Terrier	Ground Level	12.01m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	12/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	12/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
12/01/2008		5.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 5.45m.
2.Window Sampling terminated at 5.45m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=0 (0,0,0,0,0,0)
3.00	S	N=9 (2,3,2,2,3,2)
4.00	S	N=13 (2,2,3,3,3,4)
5.00	S	N=29 (1,2,5,7,8,9)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID. **SWSJ24A** **Sheet 1 of 1**

Contract No.	F15056	Method	Window Sampling	Coordinates	337448.56 E
Project	New M4 - Second Preliminary Ground Investigation				185614.04 N
		Drilling Rig	Terrier	Ground Level	12.01m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	12/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	12/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Black slightly sandy silt.				L1	0.00 - 0.80				
---from 0.57m to 0.62m brown									
---from 1.00m with occasional coarse sand sized pockets of black clayey silty fine sand				ES2 D3 L4	1.00 1.00 - 1.45 1.00 - 1.80	S0	S	1.00 1.60	
				ES5 D6	2.00 2.00 - 2.45	S0	S	2.00 2.60	
				D7 L8	3.00 - 3.45 3.00 - 3.70	S9	S	3.00 3.45	
		3.25	8.76						
MADE GROUND: Fine to coarse gravel sized fragments of clinker.		3.40	8.61						
MADE GROUND: Black slightly sandy clayey silt.		3.80	8.21						
MADE GROUND: Black slightly sandy slightly gravelly clayey silt. Gravel sized fragments are subangular fine to medium of sandstone and clinker.				ES9 D10	4.00 4.00 - 4.45	S13	S	4.00 4.45	
				ES11 D12	5.00 5.00 - 5.45	S29	S	5.00 5.45	
		5.45	6.56						
Sampling complete at 5.45 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ26
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337495.14 E
Project	New M4 - Second Preliminary Ground Investigation				185686.59 N
		Drilling Rig	Terrier	Ground Level	11.60m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	15/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	15/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
15/12/2007		4.60	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 4.60m.
2.Window Sampling terminated at 4.60m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=0 (0,0,0,0,0,0)
3.00	S	N=0 (0,0,0,0,0,0)
4.00	S	N=0 (0,1,0,0,0,0)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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Hole ID.
SWSJ26
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337495.14 E
Project	New M4 - Second Preliminary Ground Investigation				185686.59 N
		Drilling Rig	Terrier	Ground Level	11.60m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	15/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	15/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black clayey slightly sandy silt.				L1 0.00 - 0.80			
---from 0.60m to 0.65m speckled white				ES2 1.00 D3 1.00 - 1.45 L4 1.00 - 1.80	S0	S 1.00 1.60	
				ES5 2.00 D6 2.00 - 2.45 L7 2.00 - 3.00	S0	S 2.00 2.60	
				ES8 3.00 D9 3.00 - 3.45 L10 3.00 - 3.80	S0	S 3.00 3.60	
				ES11 4.00 D12 4.00 - 4.45 L13 4.00 - 4.60	S0	S 4.00 4.53	
Sampling complete at 4.60 m.		4.60	7.00				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ28
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337527.55 E
Project	New M4 - Second Preliminary Ground Investigation				185590.83 N
		Drilling Rig	Terrier	Ground Level	11.59m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	13/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	13/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
13/01/2008		3.75	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 3.75m.
2.Window Sampling terminated at 3.75m due to refusal.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=0 (0,0,0,0,0,0)
3.00	S	N=34 (2,4,5,6,8,15)
3.50	S	49/100mm - Abandoned

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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Hole ID.
SWSJ28
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Contract No.	F15056	Method	Window Sampling	Coordinates	337527.55 E
Project	New M4 - Second Preliminary Ground Investigation				185590.83 N
		Drilling Rig	Terrier	Ground Level	11.59m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	13/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	13/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Dark brown slightly clayey slightly sandy silt.				L1	0.00 - 0.80				
---from 0.60m to 0.70m brown				ES2	1.00	S0	S	1.00 1.60	
				D3	1.00 - 1.45				
---from 1.20m to 1.23m 1 No very thin bed of black silty clayey fine sand				L4	1.00 - 1.80				
				ES5	2.00	S0	S	2.00 2.60	
				D6	2.00 - 2.45				
				L7	2.00 - 2.80				
MADE GROUND: Subangular fine to coarse gravel sized fragments of clinker.		3.00	8.59	ES8	3.00	S34	S	3.00 3.45	
				D9	3.00 - 3.45				
				ES10	3.50	S49/150mm - Abandoned	S	3.50 3.75	
				D11	3.50 - 3.75				
Sampling complete at 3.75 m.		3.75	7.84						

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ29
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337551.09 E
Project	New M4 - Second Preliminary Ground Investigation				185676.38 N
		Drilling Rig	Terrier	Ground Level	11.63m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	15/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	15/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
15/12/2007		6.00	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 6.00m.
2.Window Sampling complete at 6.00m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres,
water strike rise time in minutes, chiselling time in hours.

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Hole ID.
SWSJ29
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Contract No.	F15056	Method	Window Sampling	Coordinates	337551.09 E
Project	New M4 - Second Preliminary Ground Investigation				185676.38 N
		Drilling Rig	Terrier	Ground Level	11.63m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	15/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	15/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly sandy slightly gravelly silt. Gravel sized fragments are angular to subangular fine to coarse of slag.		0.30	11.33	L1	0.00 - 0.80			
MADE GROUND: Black slightly clayey slightly sandy silt.				ES2 L3	1.00 1.00 - 1.80			
				ES4 L5	2.00 2.00 - 2.80			
				ES6 L7	3.00 3.00 - 3.80			
				ES8 L9	4.00 4.00 - 4.80			
				ES10 L11	5.00 5.00 - 5.60			
Sampling complete at 6.00 m.		6.00	5.63	ES12	6.00			

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ30
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337559.99 E
Project	New M4 - Second Preliminary Ground Investigation				185631.41 N
		Drilling Rig	Terrier	Ground Level	11.54m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	15/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	15/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
15/12/2007		6.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=1 (1,0,0,0,1,0)
2.00	S	N=0 (1,0,0,0,0,0)
3.00	S	N=0 (1,0,0,0,0,0)
4.00	S	N=1 (1,0,0,0,1,0)
5.00	S	N=1 (1,0,0,0,1,0)
6.00	S	N=1 (1,0,0,0,1,0)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ30
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Contract No.	F15056	Method	Window Sampling	Coordinates	337559.99 E
Project	New M4 - Second Preliminary Ground Investigation				185631.41 N
		Drilling Rig	Terrier	Ground Level	11.54m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	15/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	15/12/2007

Description of Strata	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth
MADE GROUND: Black slightly gravelly clayey silt. Gravel sized fragments are angular fine to coarse of slag.			L1 0.00 - 0.80		
			ES2 1.00 D3 1.00 - 1.45 L4 1.00 - 1.80	S1	S 1.00 1.53
MADE GROUND: Dark brown slightly sandy clayey silt.	1.55	9.99			
			ES5 2.00 D6 2.00 - 2.45 L7 2.00 - 2.80	S0	S 2.00 2.53
			ES8 3.00 D9 3.00 - 3.45 L10 3.00 - 3.60	S0	S 3.00 3.53
			ES11 4.00 D12 4.00 - 4.45 L13 4.00 - 4.60	S1	S 4.00 4.53
			ES14 5.00 D15 5.00 - 5.45 L16 5.00 - 5.60	S1	S 5.00 5.53
			ES17 6.00 D18 6.00 - 6.45	S1	S 6.00 6.53
Sampling complete at 6.45 m.	6.45	5.09			

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

Geotechnical Engineering Limited

BOREHOLE LOG

BH518

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 27 February 2015 — Easting 337320.0 — Scale 1 : 50

End Date 5 March 2015 — Northing 185636.3 — Ground level 5.50mOD — Depth 18.50 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
27/02/15 0800hrs	1B	0.20 - 0.50						Soft dark greenish grey slightly gravelly CLAY. Gravel is subangular fine to medium slag. (MG)			
	2D*	0.20 - 0.50		Vo 0.0							
	3B	0.50 - 1.00									
	4D*	0.50 - 0.70		Vo 0.0							
	5D	1.00 - 1.45	1.00	S 6							
	6B	1.00 - 1.50							1.00	4.50	
	7D*	1.00 - 1.20		Vo 0.0				Soft dark greenish grey CLAY. (TFD)			
	8UT	1.50 - 1.95	1.50								
	9D	2.00 - 2.45	2.00	S 6							
	10B	2.00 - 2.50									
	11D*	2.00 - 2.20		Vo 0.0							
27/02/15 1700hrs Nil	12UT	2.50 - 2.95	2.00					2.50m: Tending to firm.			
	13D	2.95 - 3.05									
02/03/15 0800hrs Nil	14D	3.00 - 3.45	3.00	S 8							
	15B	3.00 - 3.50									
	16D*	3.00 - 3.50		Vo 0.1							
	17UT	3.50 - 3.95	3.50								
	18D	3.95 - 4.05							3.85	1.65	
	19D	4.00 - 4.45	4.00	S 7				Soft black fibrous PEAT. (PEAT)			
	20B	4.00 - 4.50									
	21D*	4.00 - 4.50		Vo 0.9							
	22UT	4.50 - 4.95	4.50								
	23D	4.95 - 5.05									
	24D	5.00 - 5.45	5.00	S 5							
	25B	5.00 - 5.50									
	26D*	5.00 - 5.50		Vo 0.0							
	27B	5.50 - 6.00									
	28UT	6.50 - 6.95	6.50					6.50 - 6.95m: Slightly sandy silty clay.			
	29D	6.95 - 7.05									
	30B	7.00 - 7.50									
	31B	7.50 - 8.00							7.50	-2.00	
	32D	8.00 - 8.45	8.00	S 1				Very soft dark greenish grey and black peaty CLAY. (TFDP)			
								Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.00m. Cable percussion (200mm) 1.00-2.00m and (150mm) 2.00-12.40m. Waterflush rotary core drilled (116mm) 12.40-18.50m.

CASING: 200mm diam to 2.00m and 150mm diam to 12.40m.

BACKFILL: On completion, hole backfilled with bentonite pellets18.50-0.80m and gravel 0.80-0.00m.

REMARKS: Downhole magnetometry for UXO risk mitigation undertaken 0.00-11.00m. No anomalies encountered.

Bentonite seal for aquifer protection installed during drilling 2.00m, prior to reduction in casing diameter.

Permeability test undertaken at 7.50m- 8.50m.

MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered.

AGS

CONTRACT	CHECKED
30238	EC

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BOREHOLE LOG

BH518

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 27 February 2015 — Easting 337320.0 — Scale 1 : 50

End Date 5 March 2015 — Northing 185636.3 — Ground level 5.50mOD — Depth 18.50 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	33B	8.00 - 8.50									
	34B	8.50 - 9.00						8.50 - 10.50m: Slightly sandy silty clay.			
	35UT	9.50 - 9.95	9.50								
	36B	10.00 - 10.50									
	37B	10.50 - 11.00							10.50	-5.00	
	38D	11.00 - 11.45	11.00	S 40				Stiff fissured reddish brown slightly gravelly CLAY. Gravel is subangular fine to coarse extremely weak mudstone lithorelicts. Fissures are subhorizontal and subvertical extremely closely spaced. (MMG) (Grade III)			
	39B	11.50 - 12.50									
02/03/15 1700hrs 3.95m	40D	12.50 - 12.73	12.30	S*100							
05/03/15 1010hrs 3.31m	41C	12.50 - 14.00			100 0 0	NA		12.70 - 12.80m: Light greenish grey.			
						NI		Extremely weak very thinly bedded reddish brown MUDSTONE. Fractures are subhorizontal to 20° and subvertical extremely closely spaced planar smooth. (MMG) (Grade II)	13.50	-8.00	
	42C	14.00 - 15.50	12.30		100 0 0						
	43C	15.50 - 17.00	12.30		100 0 0			16.70 - 16.80m: Light greenish grey.			
	44C	17.00 - 18.50	12.30		100 0 0						
						NA		Stiff fissured reddish brown slightly gravelly CLAY. Gravel is subangular fine to coarse extremely weak mudstone lithorelicts. Fissures subhorizontal and subvertical	17.40	-11.90	
								Continued Next Page	{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered.

AGS

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BOREHOLE LOG

BH518

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 27 February 2015 — Easting 337320.0 — Scale 1 : 50

End Date 5 March 2015 — Northing 185636.3 — Ground level 5.50mOD — Depth 18.50 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
05/03/15 1530hrs 2.23m									extremely closely spaced. (MMG) (Grade III)	18.50	-13.00	
									Borehole completed at 18.50m.	{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered.

AGS

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BOREHOLE LOG

BH519

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 17 February 2015 — Easting 337455.8 — Scale 1 : 50

End Date 20 February 2015 — Northing 185569.8 — Ground level 5.85mOD — Depth 18.80 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
17/02/15 1500hrs	1B	0.20 - 0.50						Dark brown and black slightly sandy angular and subangular fine to coarse slag GRAVEL. (MG)			
	2D*	0.20 - 0.50									
17/02/15 1700hrs Dry	3B	0.50 - 0.80									
	4D*	0.50 - 0.80									
	5D	0.90 - 1.00							0.90	4.95	
18/02/15 0800hrs Dry	6UT	1.00 - 1.45	1.00					Very soft grey slightly sandy silty CLAY. (TFD)	1.00	4.85	
								Black locally grey slightly clayey fibrous PEAT. Organic odour. (PEAT)			
	7D	1.45 - 1.55									
	8B	1.55 - 2.00									
	9D*	1.50 - 2.00									
	10D	2.00 - 2.45	2.00	S 4							
	11B	2.50 - 3.00						2.50 - 3.00m: Amorphous peat.			
	12D*	2.50 - 3.00									
	13D	3.00 - 3.45	3.00	S 6							
	14B	3.50 - 4.00									
	15D*	3.50 - 4.00									
	16D	4.00 - 4.45	4.00	S 4							
	17B	4.50 - 5.00									
	18D	5.00 - 5.45	5.00	S 4					5.15	0.70	
	19B	5.00 - 5.50						Very soft dark grey mottled light grey silty CLAY. (TFD)			
	20D*	5.00 - 5.50									
	21B	5.50 - 6.00									
	UT	6.00 - 6.45	6.00								
	22B	6.50 - 7.00						6.50m: Tending to very silty fine sand.			
	24D	7.00 - 7.45	7.00	S 2							
	23B	7.00 - 7.50									
	25B	7.50 - 8.00									
									8.00	-2.15	
								Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.00m. Cable percussion (150mm) 1.00-13.00m. Dynamic sampled (113mm) 13.00-13.50m. Waterflush rotary core drilled (116mm) 13.50-18.80m. CASING: 200mm diam to 1.00m and 150mm diam to 12.40m.

BACKFILL: On completion, borehole backfilled with bentonite 18.80-11.20m. A slotted standpipe (50mm) with geo-sock was installed to 11.00m, granular response zone 11.20-6.80m, bentonite seal 6.80-4.20m. A second slotted standpipe (35mm) with geo-sock was installed to 4.00m, granular response zone 4.20-0.85m, bentonite seal 0.85-0.25m, concrete and stopcock cover 0.25-0.00m.

REMARKS: Hole advanced by chiselling 12.00-12.90m (1hr), 12.90-13.00m (1hr). Downhole magnetometry for UXO risk mitigation undertaken 0.00-11.00m. No anomalies encountered. Bentonite seal for aquifer protection installed during drilling 1.00m, prior to reduction in casing diameter. MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered prior to use of water flush.

AGS

CONTRACT	CHECKED
30238	EC

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BOREHOLE LOG

BH519

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 17 February 2015 — Easting 337455.8 — Scale 1 : 50

End Date 20 February 2015 — Northing 185569.8 — Ground level 5.85mOD — Depth 18.80 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	26D 27B	8.00 - 8.45 8.00 - 8.50	8.00	S 1				Very loose grey silty fine SAND with rare fragments (up to 2mm) of black organic material. (TFD)			
									8.50	-2.65	
18/02/15 1700hrs 5.80m	28B	8.50 - 9.00						Very soft grey silty CLAY with frequent pockets (up to 30mm) of dark brown peat and rare fragments (up to 10mm) of black organic material. Organic odour. (TFDP)			
19/02/15 0815hrs 3.10m											
	29D 30B	9.50 - 9.95 9.50 - 10.00	9.50	S 4							
									10.00	-4.15	
	31B	10.00 - 10.50						Grey locally mottled red slightly sandy SILT with frequent pockets (up to 80mm) of spongy dark brown pseudofibrous peat and frequent fragments (up to 30mm) of black organic material. Rare subrounded coarse gravel of grey sandstone. Organic odour. (TFDP) 10.50 - 11.00m: Sandy very silty angular and subangular fine to coarse slag (?) gravel. 11.00 - 12.00m: Locally mottled red.			
	32B	10.50 - 11.00									
	33D 34B	11.00 - 11.45 11.00 - 11.50	11.00	S 52							
									12.00	-6.15	
								Very stiff reddish brown silty CLAY. (MMG)			
19/02/15 1200hrs 7.35m	35D	12.50 - 12.95	12.40	S 50							
									13.00	-7.15	
19/02/15 1435hrs 2.70m	36X	13.00 - 13.50	12.40			NA		Very stiff fissured dark reddish brown locally mottled grey gravelly CLAY locally tending to extremely weak highly fractured mudstone with rare light greenish grey reduction spots (up to 30mm). Gravel is angular and subangular fine to coarse lithorelicts of extremely weak mudstone. Fissures are subhorizontal to 20° and subvertical extremely closely spaced. (MMG) (Grade III)			
	37C	13.50 - 14.50	12.40		98						
	38C	14.50 - 16.00	12.40		96 6 0						
						90 NA		14.80 - 14.90m: Very weak reddish brown mottled grey mudstone.	15.10	-9.25	
						NI		Extremely weak and very weak highly fractured reddish brown MUDSTONE with frequent grey and greenish grey reduction spots (up to 20mm). Fractures are subhorizontal to 20° and subvertical extremely closely and very closely spaced planar smooth and rough frequently infilled (up to 5mm) with reddish brown clay. (MMG) (Grade II) 15.80 - 16.00m: Frequent pockets (up to 20mm) of light greenish grey clay. 16.50 - 16.60m: Very weak reddish brown calcareous mudstone. 17.20 - 18.25m: Locally disintegrated to claybound angular fine to coarse gravel sized mudstone lithorelicts.			
	39C	16.00 - 17.50	12.40		98 0 0						
19/02/15 1650hrs 2.20m											
20/02/15 0910hrs 2.67m	40C	17.50 - 18.80	12.40		100 5 0	70					
								Continued Next Page	{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered prior to use of water flush.

AGS

CONTRACT 30238

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BOREHOLE LOG

BH519

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 17 February 2015 — Easting 337455.8 — Scale 1 : 50

End Date 20 February 2015 — Northing 185569.8 — Ground level 5.85mOD — Depth 18.80 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
							NI			18.25	-12.40	
20/02/15 1220hrs 2.48m							NA		Very stiff fissured reddish brown gravelly CLAY with frequent light greenish grey reduction spots (up to 20mm). Gravel is subangular fine and medium lithorelicts of very stiff clay and extremely weak mudstone. Fissures are subhorizontal to 20° and subvertical extremely closely spaced. (MMG) (Grade III) 18.70 - 18.80m: Very weak highly fractured reddish brown mottled grey mudstone.	18.80	-12.95	
									Borehole completed at 18.80m.	{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered prior to use of water flush.

AGS

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Geotechnical Engineering Limited

BOREHOLE LOG

WS501

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 2

Start Date 26 February 2015 — Easting 337335.5 — Scale 1 : 50

End Date 26 February 2015 — Northing 185678.0 — Ground level 12.15mOD — Depth 9.00 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
26/02/15 1400hrs	X	0.00 - 1.00	Nil				Grass over very soft black sandy clayey SILT. (MG)	0.20	11.95	
	1D*	0.00 - 0.20		Vo 0.0			Very soft black clayey SILT. (MG)			
	2D*	0.60 - 0.80		Vo 0.0						
	X	1.00 - 2.00	1.00							
	3D*	1.20 - 1.40		Vo 0.0						
	4D*	1.80 - 2.00								
	X	2.00 - 3.00	2.00							
	5D*	2.40 - 2.60								
	X	3.00 - 4.00	3.00							
	6D*	3.00 - 3.20								
	7D*	3.50 - 3.70								
	X	4.00 - 5.00	4.00							
	8D*	4.00 - 4.20								
	9D*	4.50 - 4.70								
	X	5.00 - 6.00	5.00							
	10D*	5.00 - 5.20								
	11D*	5.50 - 5.70								
	X	6.00 - 7.00	6.00							
	12D*	6.00 - 6.20								
	13D*	6.50 - 6.70						7.00	5.15	
	X	7.00 - 8.00	7.00				Soft black slightly sandy slightly gravelly clayey SILT. Gravel is subangular fine to coarse slag. (MG)			
	14D*	7.00 - 7.20								
	15D*	7.50 - 7.70								
							Continued Next Page	{8.00}		

EQUIPMENT: Geotechnical Terrier 2000 rig.

METHOD: Dynamic sampled (98mm) 0.00-8.00m and (84mm) 8.00-9.00m. Samples not retained.

CASING: 113mm diam to 7.00m.

BACKFILL: On completion, hole backfilled with materials arising.

REMARKS: Downhole magnetometry for UXO risk mitigation undertaken 0.00-1.20m. No anomalies encountered.

DPSH(B) test carried out adjacent to borehole in general accordance with BS EN ISO 22476-2:2005 + A1:2011, sacrificial cone used, reported as DPWS501.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered.

AGS

CONTRACT	CHECKED
30238	EC

Geotechnical Engineering Limited

BOREHOLE LOG

WS501

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 2

Start Date 26 February 2015 — Easting 337335.5 — Scale 1 : 50

End Date 26 February 2015 — Northing 185678.0 — Ground level 12.15mOD — Depth 9.00 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range		instru -ment	description	depth (m)	reduced level (m)	legend
	X	8.00	9.00	7.00								
	16D*	8.00	8.20									
26/02/15 1700hrs Dry	17D*	8.70	8.90						Firm brown mottled bluish grey silty CLAY. (TFD)	8.70	3.45	
										9.00	3.15	
									Borehole completed at 9.00m.			
										{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered.

AGS

CONTRACT 30238

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BOREHOLE LOG

Borehole No. **BHM4CAN041**

Sheet 1 of 1

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 13/01/2016 - 18/01/2016		Final Depth:
Project No:	JFR8703	Easting:	337479	Drilling Method:	Pipe Diameter: 50mm	9.00m
Location:	Newport	Northing:	185701	Dando 2000	Casing Diameter (mm) 200 / Casing Depth (m) 9.00	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	11.69	Logged By: EJH		1:50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00	(1.00)	11.69		Soft black slightly coarse sandy SILT of slag. (MADE GROUND)	
		1.00 1.00 1.00	B ES SPT(C)	0 (1 for 450mm/0 for 0mm)	1.00	(1.00)	10.69		Soft black SILT of slag with occasional angular medium gravel of slag. (MADE GROUND)	1
		2.00 2.00	ES SPT(C)	0 (1 for 450mm/0 for 0mm)	2.00		9.69		Very soft black clayey SILT of slag. (MADE GROUND)	2
		3.00 3.00	ES SPT(C)	1 (1 for 225mm/1 for 225mm)		(3.00)				3
		4.00 4.00	ES SPT(C)	N=1 (1,0/1,,,)						4
		5.00 5.00 - 6.00	SPT(C) ES	2 (1 for 225mm/2 for 225mm)	5.00		6.69		Soft black clayey SILT of slag with rare fine to medium angular gravel of slag and clinker. (MADE GROUND)	5
		6.00	SPT(C)	N=2 (1 for 0mm/1,0,0,1)		(2.30)				6
	▼	7.00	SPT(C)	N=13 (1,0/1,0,1,11)						7
	▽	7.40	ES		7.30	(1.20)	4.39		Recovered as medium dense black angular to subangular coarse GRAVEL of slag with occasional cobbles of slag. (MADE GROUND)	8
					8.50	(0.50)	3.19		Soft to firm silty CLAY with occasional inclusions of brownish black pseudofibrous peat. (TIDAL FLAT DEPOSITS)	9
									End of Borehole at 9.00m	10

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 9.00m. Borehole terminated at 9m due to tool becoming stuck in casing, hard ground conditions and hazardous gas concentrations.
BACKFILL: On completion hole backfilled with bentonite 9 - 8.1m and 0.9 - 0.2m, gravel 8.1 - 0.9m and concrete 0.2 - 0.0m. One standpipe (50mm) was installed with slotted section between 1.0 - 8.0m.
REMARKS: Downhole magnetometry for UXO risk mitigation undertaken 1.2 - 9.0m. No anomalies encountered. Installed with raised cover. High levels of carbon monoxide and hydrogen sulphide recorded during installation of standpipe (18/1/16) and borehole left to vent until completion of installation (26/5/16). Position not accessible at time of survey due to hazardous gas levels. Co-ordinates are approximate.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
7.40	7.30	7.10	08:00 07:00	7.30 7.80	7.80 8.50

AGS

BOREHOLE LOG

Borehole No. **BHM4CANA011**

Sheet 1 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 07/01/2016 - 12/01/2016	Final Depth:
Project No:	JFR8703	Easting:	337545	Drilling Method:	18.95m
Location:	Newport	Northing:	185691	Dando 2000	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	11.46	Logged By: EJH	1:50

Casing Diameter (mm)	Casing Depth (m)
150	18.00
200	8.80

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00	(0.10)	11.46		Fine silty SAND of ash with some vegetation.	
					0.10		11.36		(MADE GROUND)	
		0.50	B			(0.90)			Loose black silty very gravelly fine SAND of ash. (MADE GROUND)	
		1.00	ES		1.00		10.46		Very loose black clayey fine SAND of slag. (MADE GROUND)	1
		1.00	SPT(C)	0 (1 for 450mm/0 for 0mm)						
		1.50	B			(1.00)				
		2.00	ES		2.00		9.46		Very loose black clayey gravelly fine SAND of slag. Gravel is coarse of slag. (MADE GROUND)	2
		2.00	SPT(C)	0 (1 for 450mm/0 for 0mm)		(1.00)				
		3.00	ES		3.00		8.46		Very loose black clayey fine SAND of slag. (MADE GROUND)	3
		3.00	SPT(C)	0 (1 for 450mm/0 for 0mm)		(1.00)				
		4.00	ES		4.00		7.46		Very loose silty gravelly fine to medium SAND of slag. Gravel is angular fine to medium of slag. (MADE GROUND)	4
		4.00	SPT(C)	1 (1 for 375mm/1 for 75mm)						
		5.00	ES							5
		5.00	SPT(C)	1 (1 for 225mm/1 for 225mm)		(3.00)				
		6.00	ES							6
		6.00	SPT(C)	2 (1 for 225mm/2 for 225mm)						
		7.00	ES		7.00		4.46		Greyish white medium to coarse GRAVEL of slag. (MADE GROUND)	7
		7.00	SPT(C)	1 (1 for 225mm/1 for 225mm)		(1.20)			*from 7.3m brownish yellow*	
									From 7.6m greyish yellow	
									From 7.8m greyish black	
		8.00	SPT(C)	50 (25 for 55mm/50 for 70mm)						8
		8.40	ES		8.20	(0.60)	3.26		Firm grey laminated yellowish brown slightly gravelly CLAY with rare shell fragments. Gravel is medium to coarse of slag. (MADE GROUND)	
		8.90	D		8.80		2.66		Firm grey CLAY with with rare fibrous peat inclusions and rootlets.	9
		9.00	SPT(S)	N=7 (1,1/1,2,2,2)					(TIDAL FLAT DEPOSITS)	
		9.10	ES						*From 8.8-9.1m slightly gravelly*	
		9.50 - 9.95	UT			(2.30)				
		10.00	SPT(S)	N=12 (1,1/2,3,3,4)					Continued on next sheet	10

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 18.95m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 18.95 - 0.2m and concrete 0.2 - 0.0m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (9.0 - 7.0m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 1.2 - 16.5m. No anomalies encountered.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
7.60	7.50	6.80	01:00	7.50	7.80
13.20	13.00	12.70	03:00	7.80	8.40

AGS

BOREHOLE LOG

Borehole No. **BHM4CANA011**

Sheet 2 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 07/01/2016 - 12/01/2016		Final Depth:
Project No:	JFR8703	Easting:	337545	Drilling Method:		18.95m
Location:	Newport	Northing:	185691	Dando 2000	Casing Diameter (mm) / Casing Depth (m): 150 / 18.00; 200 / 8.80	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	11.46	Logged By: EJH		1:50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
		10.50	B							
		11.00 11.10	SPT(S) ES	N=4 (1,1/1,1,1,1)	11.10		0.36		Firm pseudofibrous PEAT with a strong organic odour and rootlets. (TIDAL FLAT DEPOSITS)	11
		11.50	B							
		12.00	SPT(S)	N=6 (1,1/1,2,1,2)		(2.00)				12
	▼									
	▽	13.00 13.10	SPT(S) ES	N=10 (1,2/2,2,3,3)	13.10		-1.64		Stiff grey CLAY with frequent fibrous peat inclusions. (TIDAL FLAT DEPOSITS)	13
		13.50 - 14.50	P						*From 13.5m with rare fibrous peat inclusions*	14
		14.50	SPT(S)	N=9 (1,1/2,2,2,3)		(3.40)				15
		15.50	SPT(S)	N=11 (1,2/2,3,3,3)						
		16.00	D							16
		16.50 16.50	B SPT(C)	N=25 (3,5/5,6,7,7)	16.50	(0.40)	-5.04		Stiff grey laminated red slightly gravelly CLAY. (Weathering Grade IVa) (WEATHERED MERCIA MUDSTONE)	
		17.00	B		16.90		-5.44		Reddish brown extremely weak mudstone. (Weathering Grade III). (WEATHERED MERCIA MUDSTONE)	17
		17.50 17.50	ES SPT(C)	N=40 (6,8/9,9,11,11)		(2.05)				18
		18.50	SPT(C)	N=42 (6,9/9,10,11,12)						
									End of Borehole at 18.95m	19
										20

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 18.95m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 18.95 - 0.2m and concrete 0.2 - 0.0m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (9.0 - 7.0m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 1.2 - 16.5m. No anomalies encountered.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
7.60 13.20	7.50 13.00	6.80 12.70	01:00 03:00	7.50 7.80	7.80 8.40

AGS

BOREHOLE LOG

Borehole No. **BHM4CANA012**

Sheet 1 of 1

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 21/01/2016 - 26/05/2016		Final Depth:
Project No:	JFR8703	Easting:	337371	Drilling Method:	Pipe Diameter: 50mm	7.50m
Location:	Newport	Northing:	185725	Dando 2000	Casing Diameter (mm) 200 / Casing Depth (m) 8.00	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	12.15	Logged By: EJH		1:50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00		12.15		Very soft black fine SILT of slag. (MADE GROUND)	
		1.00	SPT(C)	N=1 (1,/,1,,)						
		1.50	D							
		3.00	SPT(C)	N=0 (1,/,,,)						
						(7.50)				
		5.75	SPT(C)	N=2 (1,/,1,,1)						
									End of Borehole at 7.50m	

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 7.50m. Borehole terminated due to hazardous gas levels.
BACKFILL: On completion hole backfilled with bentonite 1.0 - 0.3m, gravel 7.5 - 1.0m and concrete 0.2 - 0.0m. One standpipe (50mm) was installed with slotted section between 7.5 - 1.0m.
REMARKS: Downhole magnetometry for UXO risk mitigation undertaken 1.2 - 7.5m. No anomalies encountered. High levels of hydrogen sulphide and carbon monoxide within borehole at approximately 7.3m within slag. Borehole left to vent for significantly long period of time (21/1/16 - 26/5/16). Borehole terminated and installed with raised cover (26/5/16). Position not accessible at time of survey due to hazardous gas levels; co-ordinates are approximate.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)

SUPPLEMENTARY HOLE INFORMATION

BHM4CAN041

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
13/01/2016 07:30:00	0.00	0.00	
13/01/2016 18:00:00	7.30	7.30	
14/01/2016 07:30:00	7.30	7.30	
14/01/2016 18:00:00	7.80	7.80	
15/01/2016 07:30:00	7.80	7.80	
15/01/2016 18:00:00	9.00	9.00	

Sample Information

Type/Ref	Depth (m)	Date
ES	1.00	
B	1.00	
ES	2.00	
ES	3.00	
ES	4.00	
ES	5.00 - 6.00	13-01-2016
ES	7.40	14-01-2016

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.00	C	0 (1 for 450mm/0 for 0mm)
2.00	C	0 (1 for 450mm/0 for 0mm)
3.00	C	1 (1 for 225mm/1 for 225mm)
4.00	C	N=1 (1,0/1,,,)
5.00	C	2 (1 for 225mm/2 for 225mm)
6.00	C	N=2 (1 for 0mm/1,0,0,1)
7.00	C	N=13 (1,0/1,0,1,11)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

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SUPPLEMENTARY HOLE INFORMATION

BHM4CANA011

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
07/01/2016 07:30:00	0.00	0.00	
07/01/2016 18:00:00	7.80	7.00	6.8
08/01/2016 07:30:00	7.20	7.00	
08/01/2016 18:00:00	13.50	13.00	
12/01/2016 07:30:00	13.50	13.00	
12/01/2016 18:00:00	18.95	18.50	

Sample Information

Type/Ref	Depth (m)	Date
B	0.50	
ES	1.00	
B	1.50	
ES	2.00	
ES	3.00	
ES	4.00	
ES	5.00	
ES	6.00	
ES	7.00	
ES	8.40	
D	8.90	
ES	9.10	
UT	9.50 - 9.95	
B	10.50	
ES	11.10	
B	11.50	
ES	13.10	
P	13.50 - 14.50	
D	16.00	
B	16.50	
B	17.00	
ES	17.50	

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.00	C	0 (1 for 450mm/0 for 0mm)
2.00	C	0 (1 for 450mm/0 for 0mm)
3.00	C	0 (1 for 450mm/0 for 0mm)
4.00	C	1 (1 for 375mm/1 for 75mm)
5.00	C	1 (1 for 225mm/1 for 225mm)
6.00	C	2 (1 for 225mm/2 for 225mm)
7.00	C	1 (1 for 225mm/1 for 225mm)
8.00	C	50 (25 for 55mm/50 for 70mm)
9.00	S	N=7 (1,1/1,2,2,2)
10.00	S	N=12 (1,1/2,3,3,4)
11.00	S	N=4 (1,1/1,1,1,1)
12.00	S	N=6 (1,1/1,2,1,2)
13.00	S	N=10 (1,2/2,2,3,3)
14.50	S	N=9 (1,1/2,2,2,3)
15.50	S	N=11 (1,2/2,3,3,3)
16.50	C	N=25 (3,5/5,6,7,7)
17.50	C	N=40 (6,8/9,9,11,11)
18.50	C	N=42 (6,9/9,10,11,12)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

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SUPPLEMENTARY HOLE INFORMATION

BHM4CANA012

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
21/01/2016 07:30:00	0.00	0.00	
21/01/2016 18:00:00	7.50	7.00	

Sample Information

Type/Ref	Depth (m)	Date
D	1.50	

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.00	C	N=1 (1,/,1,,)
3.00	C	N=0 (1,/,,,)
5.75	C	N=2 (1,/,1,,1)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

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A3 Appendix 1c

Exploratory Records (Lagoon 27SW)

Borehole Log

Exploration Associates

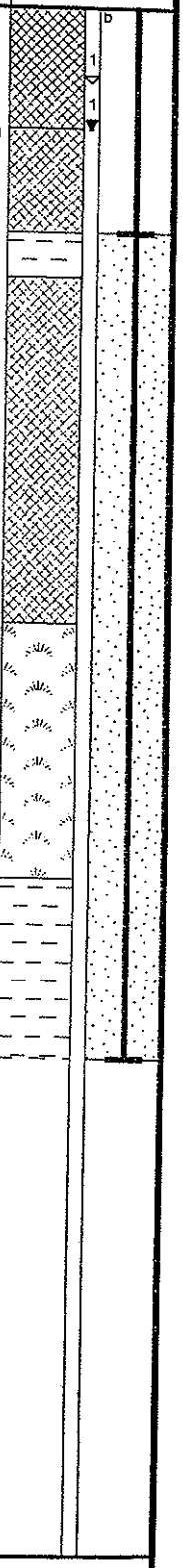
Drilled by	IH	Equipment and Methods	Ground Level + 5.10 m OD
Logged by	CW	Cable Percussion 150 mm diameter from 0.00m to 7.00m.	National Grid Coordinates E 337828.21 N 185570.66
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
0.90	ES1		24/01/2002	
2.00	ES2			
4.50	ES3			
6.80	ES4	kRH	24/01/2002	
7.00				

Strata

Description	Depth,Level (Thickness)	Legend
Slag (DRILLERS DESCRIPTION).	(0.80)	
MADE GROUND: Dark brown slightly sandy slightly gravelly CLAY. Gravel is angular and subangular fine and medium of slag.	0.80 +4.30 (0.70)	
Grey brown silty CLAY with gravels and peat (DRILLERS DESCRIPTION).	1.50 +3.60 (0.30)	
MADE GROUND: Dark brown sandy slightly gravelly CLAY. Gravel is subangular fine and medium of slag and clinker.	1.80 +3.30 (2.30)	
Dark brown spongy fibrous PEAT with occasional soft dark grey SILT pockets.	4.10 +1.00 (1.70)	
Soft grey CLAY.	5.80 -0.70 (1.20pen)	
EXPLORATORY HOLE ENDS AT 7.00 m.	7.00 -1.90	



Groundwater

No.	Struck	Behaviour
1	0.80m	Rising to 0.50m after 20 mins. Sealed 2.60. Medium inflow

Remarks

Chiselling : 0.40m to 0.70m 90minutes
Hole backfill : 0.00m to 1.50m Bentonite (b). Surface protection : <none>
Standpipe installed, 50mm diameter, response zone from 1.50m to 7.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
LGBH12
Sheet 1 of 1

03/05/2002 11:10:50 ESCLog V2.10

BOREHOLE No: BH 20

Client : Corus Ltd. **Contractor :** Apex Drilling Ltd. **Hole Coordinates :** E338232.128 N185934.655

Project : Queensway Landfill **Logged By :** AWJ **Ground Level :** 4.826m AOD

Location : See site plan **Date :** 27-29.09.05 **Hole Depth :** 11.3m **Sheet No :** 1 of 2

Depth (m)	Elevation	Geotechnical Description	Strata Symbol	Well Details (Shallow)	Well Details (Deep)	Samples: Sample Type	Samples: From	Samples: To	Samples: U100 Blows	SPT: 75 mm	SPT: 150 mm	SPT: 225 mm	SPT: 300 mm	SPT: 375 mm	SPT: 450 mm	SPT: N-Value / Rec %
0	4.83	Ground Surface														
		Made Ground Dense dark grey and grey silty sandy fine to coarse angular gravel with many cobbles and occasional boulders, comprising of slag														
	4.13	**Estuarine Alluvium** Firm becoming soft greyish brown becoming grey CLAY														
1																
3																
4																
5																
6	-1.17	**Peat** Firm dark brown fibrous woody PEAT														
	-2.17	**Estuarine Alluvium** Soft grey CLAY with some fine to coarse sub-rounded gravel														
8																
9	-4.67															
10																

Rig Type : Dando 150

Drilled By : MM

Hole Diameter (mm) : 200 / 150

Casing Depth (m) : 200mm - 7m, 150mm-10.50m

Log Template File : GEOSA

Chiselling :

Remarks

1 Hole excavated by backhoe to base of upper clayand re-drilled through

2 Casing reduced to 150mm at 7m with bentonite seal

3 installed within 200mm casing.

4

5

BOREHOLE No: BH 20

Client : Corus Ltd. **Contractor :** Apex Drilling Ltd. **Hole Coordinates :** E338232.128 N185934.655

Project : Queensway Landfill **Logged By :** AWJ **Ground Level :** 4.826m AOD

Location : See site plan **Date :** 27-29.09.05 **Hole Depth :** 11.3m **Sheet No :** 2 of 2

Depth (m)	Elevation	Geotechnical Description	Strata Symbol	Well Details (Shallow)	Well Details (Deep)	Samples				Standard Penetration Tests						
						Sample Type	From	To	U100 Blows	75 mm	150 mm	225 mm	300 mm	375 mm	450 mm	N-Value / Rec %
11	-6.47	**Triassic Bedrock** Firm reddish brown CLAY with much fine to medium angular gravel, comprising of mudstone lithorelicts														
13																
14																
15																
16																
18																
19																
20																

Rig Type : Dando 150

Drilled By : MM

Hole Diameter (mm) : 200 / 150

Casing Depth (m) : 200mm - 7m, 150mm-10.50m

Log Template File : GEOSA

Chiselling :

Remarks

1 Hole excavated by backhoe to base of upper clayand re-drilled through

2 Casing reduced to 150mm at 7m with bentonite seal

3 installed within 200mm casing.

4

5

BOREHOLE No: BH 21

Client : Corus Ltd. **Contractor :** Apex Drilling Ltd. **Hole Coordinates :** E337304.006 N185989.232

Project : Queensway Landfill **Logged By :** AWJ **Ground Level :** 5.255m AOD

Location : See site plan **Date :** 29-30.09.05 **Hole Depth :** 9.5m **Sheet No :** 1 of 1

Depth (m)	Elevation	Geotechnical Description	Strata Symbol	Well Details (Shallow)	Well Details (Deep)	Samples: Sample Type	Samples: From	Samples: To	Samples: U100 Blows	SPT: 75 mm	SPT: 150 mm	SPT: 225 mm	SPT: 300 mm	SPT: 375 mm	SPT: 450 mm	SPT: N-Value / Rec %
0	5.25	Ground Surface														
		Estuarine Alluvium Firm becoming soft greyish brown becoming grey CLAY														
1																
3																
4																
5																
6																
	-1.75	**Peat** Firm dark brown fibrous woody PEAT														
8	-2.75	**Estuarine Alluvium** Soft grey CLAY with some fine to coarse sub-rounded gravel														
9	-3.75															
	-4.25	**Triassic Bedrock** Firm reddish brown CLAY with much fine to medium angular gravel, comprising of mudstone lithorelicts														
10																

Rig Type : Dando 150

Drilled By : MM

Hole Diameter (mm) : 200 / 150

Casing Depth (m) : 7m and 9.5m - 200/150mm

Log Template File : GEOSA

Chiselling : None

Remarks

1 Hole excavated by backhoe to base of upper clayand re-drilled through

2 Casing reduced to 150mm at 7m with bentonite seal

3 installed within 200mm casing.

4

5

BOREHOLE No: BH 23

Client : Corus Ltd. **Contractor :** Apex Drilling Ltd. **Hole Coordinates :** E337962.515 N185757.140

Project : SSQ Landfill Llanwern **Hole Depth (m) :** **Logged By :** AWJ

Location : See site plan **Steel Collar Level :** **Date :** 06.10.05 **Sheet No :** 1 of 2

Depth (m)	Elevation	Geotechnical Description (BS5930:1999)	Strata Type	Well Details	Water Level Below Ground	Samples: Sample Type	Samples: From	Samples: To	Remarks
0	6.23	Ground Surface							
0 – 4.13		**Made Ground** Dense to very dense dark grey silty sandy fine to coarse angular gravel with occasional cobble and rare boulder, comprising of slag							
4.13 – 0.23		**Estuarine Alluvium** Firm grey CLAY			3.23				
0.23 – -0.87		**Peat** Soft dark brown fibrous woody PEAT							
-0.87 – 10		**Estuarine Alluvium** Firm becoming soft grey CLAY							

Drilled By : GJ

Rig Type : Gryphon

Hole Diameter (mm) : 110

Casing Depth (m) : 10.00

Bit Type :

Log Template File : GEOROTARY

Notes

1

2

3

4

5

BOREHOLE No: BH 23

Client : Corus Ltd.	**Contractor :** Apex Drilling Ltd.	**Hole Coordinates :** E337962.515 N185757.140
Project : SSQ Landfill Llanwern	**Hole Depth (m) :**	**Logged By :** AWJ
Location : See site plan	**Steel Collar Level :**	**Date :** 06.10.05 **Sheet No :** 2 of 2

Depth (m)	Elevation	Geotechnical Description (BS5930:1999)	Strata Type	Well Details	Water Level Below Ground	Samples: Sample Type	Samples: From	Samples: To	Remarks
11	-4.97	**Triassic Bedrock** Weak reddish brown MARL							
13									
14									
15									
16	-9.77								
18									
19									
20									

Drilled By : GJ

Rig Type : Gryphon

Hole Diameter (mm) : 110

Casing Depth (m) : 10.00

Bit Type :

Log Template File : GEOROTARY

Notes

1

2

3

4

5

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ06 CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	337599.88 E
Project	New M4 - Second Preliminary Ground Investigation				185578.07 N
		Drilling Rig	Dando	Ground Level	6.18m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	15/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	17/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
15/01/2008	1730	4.50	3.50	DRY	End of Shift
16/01/2008	0730	4.50	3.50	4.30	Start of Shift
16/01/2008	1730	12.50	12.00	7.20	End of Shift
17/01/2008	0730	12.50	12.00	3.20	Start of Shift
17/01/2008	1730	14.90	13.00	7.60	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
14.30	14.60	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	1.50	200	1.50
150	14.90	150	13.00

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Falling head test conducted from 4.00m to 5.00m.
2. Cable Percussive boring from GL to 14.90m.
3. 50mm standpipe installed, slotted from 3.10m to 4.10m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.50	S	N=8 (1,1,2,2,2,2)	1.70	DRY
2.70	S	N=7 (1,1,2,2,1,2)	2.00	DRY
4.00	S	N=9 (1,2,2,2,2,3)	3.30	DRY
6.00	S	N=6 (1,2,1,2,1,2)	5.30	1.80
8.00	S	N=6 (1,1,1,1,2,2)	7.30	4.80
10.00	S	N=8 (1,1,2,2,2,2)	9.20	6.20
12.00	S	N=21 (2,3,4,5,6,6)	11.40	7.60
13.10	S	50/150mm (9,12,19,27,4)	12.50	3.50
14.00	S	50/155mm (5,11,12,24,14)	13.00	4.70
14.60	S	50/155mm (10,14,19,26,5)	13.00	7.60

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ06 CP
Sheet 1 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	337599.88 E
Project	New M4 - Second Preliminary Ground Investigation				185578.07 N
		Drilling Rig	Dando	Ground Level	6.18m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	15/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	17/01/2008

Description of Strata	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Slag and stone. (Driller's description)			ES1 0.30			
	0.60	5.58				
Stiff orangish brown grey mottled slightly sandy slightly gravelly CLAY with occasional rootlets. Sand is fine. Gravel is angular fine of mudstone (Estuarine Alluvium)			D2 0.70 ES3 1.00 U4 1.00 - 1.45			
	1.50	4.68	D5 1.50 D6 1.50 - 1.95	S8	S 1.50	1.95
Soft dark grey CLAY. (Estuarine Alluvium)						
	2.00	4.18	ES7 2.00 D8 2.10 U9 2.20 - 2.65	(10)		
Plastic dark brown amorphous PEAT. (Peat)	2.46	3.72				
Firm greenish grey silty CLAY with occasional organic fragments. (Organic odour) (Estuarine Alluvium)			D10 2.70 D11 2.70 - 3.15 ES12 3.00	S7	S 2.70	3.15
	3.30	2.88	D13 3.40 U14 3.50 - 3.95	(9)		
Plastic dark brown amorphous PEAT. (Peat)	3.70	2.48				
Soft to firm greenish grey silty CLAY with closely spaced medium to coarse gravel sized pockets of light brown fibrous peat (Organic odour). (Estuarine Alluvium)			D15 4.00 ES16 4.00 D17 4.00 - 4.45 B18 4.50 - 5.00 ES19 5.00	S9	S 4.00	4.45
	5.30	0.88	D20 5.40 U21 5.50 - 5.95	(10)		
Plastic brown pseudofibrous PEAT. (Peat)						
---from 6.00m becomes spongy	6.10	0.08	D22 6.00 D23 6.00 - 6.45	S6	S 6.00	6.45
Very soft grey silty CLAY. (Estuarine Alluvium)			D24 7.00 U25 7.50 - 7.95	(9)		
---from 8.00m to 8.50m with occasional fine to medium gravel sized shell fragments			D26 8.00 D27 8.00 - 8.45 B28 8.50 - 9.00 U29 9.50 - 9.95	S6	S 8.00	8.45

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ06 CP
Sheet 2 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	337599.88 E
Project	New M4 - Second Preliminary Ground Investigation				185578.07 N
		Drilling Rig	Dando	Ground Level	6.18m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	15/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	17/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
Very soft grey silty CLAY. (Estuarine Alluvium) ---from 10.00m becomes slightly sandy. Sand is fine				D30 10.00 D31 10.00 - 10.45		S8	S	10.00 10.45	
		11.00	-4.82	D32 11.00					
Very soft to soft grey silty CLAY with closely spaced coarse gravel sized pockets of black pseudofibrous peat. (Estuarine Alluvium)				U33 11.50 - 11.95		(70)			
		11.95	-5.77	B34 12.00 D35 12.00 - 12.45		S21	S	12.00 12.45	
Soft brownish grey slightly sandy CLAY with occasional angular cobbles of sandstone. Sand is fine to medium. (Estuarine Alluvium)									
		12.50	-6.32	U36 12.70 - 13.05					
Very stiff reddish brown locally mottled greenish grey sandy slightly gravelly CLAY. Gravel is angular fine to medium (Weathered Mudstone). (Mercia Mudstone Group)				D37 13.10 D38 13.10 - 13.55		S50/150mm	S	13.10 13.40	
				D39 13.80					
				D40 14.00 - 14.30		S50/155mm	S	14.00 14.31	
				D41 14.60 - 14.90		S50/155mm	S	14.60 14.91	
		14.90	-8.72						
Cable Percussion boring complete at 14.90 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ08A CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	337834.72 E
Project	New M4 - Second Preliminary Ground Investigation				185599.42 N
		Drilling Rig	Dando	Ground Level	5.89m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	20/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	08/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
20/12/2007	1730	6.00	5.70	1.70	End of Shift
07/01/2008	0730	6.00	5.70	1.40	Start of Shift
07/01/2008	1730	10.50	9.20	2.50	End of Shift
08/01/2008	0730	10.50	9.20	1.30	Start of Shift
08/01/2008	1730	13.40	11.50	6.50	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
0.70	0.80	0.50	Chiselling
1.30	2.20	2.50	Chiselling
3.70	3.90	0.50	Chiselling
13.00	13.40	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	13.70	200	11.50

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
20/12/2007		1.30	1.20	20	Seepage	1.20	NR

GENERAL NOTES

1. Cable Percussive boring from GL to 13.70m.
2. Insitu permeability testing carried out from 6.40m to 7.50m.
3. 50mm standpipe installed, slotted from 6.40m to 7.40m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.00	S	50/75mm (15,10,50)	1.00	DRY
2.20	S	50/85mm (7,15,34,16)	2.20	1.50
3.00	S	51/225mm (5,10,12,13,26)	2.80	1.30
4.00	S	N=43 (4,6,8,9,13,13)	3.90	1.30
5.50	S	N=15 (2,3,3,4,4,4)	5.70	1.70
7.50	S	N=12 (2,2,3,3,3,3)	6.40	1.70
9.00	S	N=12 (2,3,2,3,3,4)	8.50	2.60
11.50	S	50/190mm (10,12,16,21,13)	10.70	2.20
12.70	S	50/210mm (8,13,15,18,17)	11.50	4.90
13.40	S	50/150mm (9,15,21,29)	11.50	6.50

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ08A CP
Sheet 1 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	337834.72 E
Project	New M4 - Second Preliminary Ground Investigation				185599.42 N
		Drilling Rig	Dando	Ground Level	5.89m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	20/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	08/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Black very sandy gravel. Sand is fine to coarse. Gravel sized fragments are angular to subangular fine to coarse of slag.				ES1	0.30				
				B2	0.50				
				ES3	1.00	S50/75mm	S	1.00	
				D4	1.00 - 1.20			1.17	
				ES5	2.00				
				D6	2.20 - 2.40	S50/85mm	S	2.20	
								2.44	
				B7	2.50 - 3.00				
---from 2.50m Sandy with high cobble content. Cobble sized fragments are subangular of slag.				D8	3.00 - 3.30	S51/225mm	S	3.00	
				ES9	3.00			3.38	
				D11	4.00 - 4.45	S43	S	4.00	
				ES10	4.10			4.45	
		4.60	1.29						
Stiff grey CLAY. (Estuarine Alluvium)				D12	4.80				
---from 4.80m to 5.20m slightly gravelly. Gravel is angular fine of mudstone				U14	5.00 - 5.45	(14)			
				ES13	5.10				
				D15	5.50	S15	S	5.50	
				D16	5.50 - 5.95			5.95	
		6.40	-0.51						
Firm black psuedofibrous PEAT. (Peat)				D17	6.50				
				U18	7.00 - 7.45	(24)			
		7.20	-1.31	D19	7.00				
Firm medium strength grey silty CLAY with occasional coarse gravel sized pockets of brown fibrous peat. (Estuarine Alluvium)				D20	7.50 - 7.95	S12	S	7.50	
---from 7.50m become soft with occasional coarse gravel sized pockets of black amorphous peat								7.95	
				D21	8.50				
				U22	9.00 - 9.45	S12 (16)	S	9.00	
								9.45	
				D23	9.50				
				D24	9.50 - 9.95				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ08A CP
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Contract No.	F15056	Method	Cable Percussion	Coordinates	337834.72 E
Project	New M4 - Second Preliminary Ground Investigation				185599.42 N
		Drilling Rig	Dando	Ground Level	5.89m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	20/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	08/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
Firm medium strength grey silty CLAY with occasional coarse gravel sized pockets of brown fibrous peat. (Estuarine Alluvium)									
		10.40	-4.51	D25	10.50				
Grey slightly sandy clayey subrounded to rounded medium to coarse GRAVEL of mudstone and siltstone. (Fluvial Alluvium)		10.80	-4.91						
				D26	10.90				
				U27	11.00 - 11.45	(100)			
Very stiff grey slightly gravelly CLAY. Gravel is angular fine of mudstone (Weathered Mudstone). (Mercia Mudstone Group)				D28	11.50	50/190mm	S	11.50	
---from 10.90m to 11.50m with occasional rootlets				D29	11.50 - 11.90			11.84	
---from 11.50m becomes reddish brown locally mottled greenish grey									
				D30	12.50				
				D31	12.70 - 13.10	50/210mm	S	12.70	
								13.06	
				D32	13.40 - 13.70	50/150mm	S	13.40	
								13.70	
		13.70	-7.81						
Cable Percussion boring complete at 13.70 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ09 CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	338052.21 E
Project	New M4 - Second Preliminary Ground Investigation				185604.66 N
		Drilling Rig	Dando	Ground Level	5.76m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	18/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
13/12/2007	1730	1.00	1.00	0.40	End of Shift
14/12/2007	0730	1.00	1.00	0.40	Start of Shift
14/12/2007	1730	3.50	2.50	2.20	End of Shift
17/12/2007	0730	3.50	2.50	1.30	Start of Shift
17/12/2007	1730	11.50	11.00	10.80	End of Shift
18/12/2007	0730	11.50	11.00	0.70	Start of Shift
18/12/2007	1730	13.20	11.00	6.80	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
1.00	2.20	4.00	Chiselling
12.40	12.80	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	13.20	200	11.00

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Cable Percussive boring complete at 13.20m.
2.50mm standpipe installed, slotted from 1.00m to 2.20m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.00	S	51/150mm (5,7,11,40)	1.00	0.50
2.00	S	50/75mm (12,50)	1.90	0.70
3.00	S	N=22 (2,4,5,5,6,6)	2.50	2.20
5.00	S	N=10 (1,2,2,2,3,3)	4.10	1.50
7.00	S	N=14 (1,2,3,3,4,4)	6.20	2.60
9.00	S	N=7 (1,2,1,2,2,2)	7.70	6.10
10.50	S	N=53 (6,8,10,14,14,15)	9.80	8.50
12.20	S	50/230mm (7,9,11,14,18,7)	11.00	2.10
12.80	S	50/225mm (9,10,11,16,23)	11.00	6.80

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ09 CP
Sheet 1 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	338052.21 E
Project	New M4 - Second Preliminary Ground Investigation				185604.66 N
		Drilling Rig	Dando	Ground Level	5.76m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	18/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Grey coarse sand sized fragments and angular to subangular fine to coarse gravel sized fragments of ash, limestone and slag. with low cobble content, cobble sized fragments are subangular of slag.				ES1	0.30				
				B2	0.50 - 1.00				
				ES3	1.00	S51/150mm	S	1.00	
				D4	1.00 - 1.30			1.30	
				ES5	2.00	S50/75mm	S	2.00	
				D6	2.00 - 2.10			2.23	
		2.20	3.56	D7	2.30				
Firm grey mottled orangish brown CLAY with rare rootlets. (Estuarine Alluvium) ---at 2.30m slightly gravelly. Gravel is angular fine of mudstone				U8	2.50 - 2.95	(24)			
				D9	3.00	S22	S	3.00	
				ES10	3.00			3.45	
				D11	3.00 - 3.45				
		4.00	1.76	ES12	4.00				
Soft to firm indistinctly laminated grey silty CLAY with extremely closely to very closely fine to medium gravel sized pockets of brown amorphous peat. Organic odour. (Estuarine Alluvium)				D13	4.00				
				U14	4.50 - 4.95	(12)			
---from 5.00m becomes firm with partings of silt and fine sand. Occasional medium gravel sized pockets of black clay				D15	5.00	S10	S	5.00	
				ES16	5.00			5.45	
				D17	5.00 - 5.45				
				D18	6.00				
				U19	6.50 - 6.95	(20)			
		6.80	-1.04						
Firm thinly laminated medium strength grey silty CLAY with laminations of extremely closely spaced black amorphous peat. (Estuarine Alluvium with bands of peat)				D20	7.00	S14	S	7.00	
				D21	7.00 - 7.45			7.45	
				D22	8.00	(12)			
				U23	8.00 - 8.95				
		8.90	-3.14						
Soft to firm grey silty CLAY with thin laminations of black fibrous peat. (Estuarine Alluvium)				D24	9.00	S7	S	9.00	
				D25	9.00 - 9.45			9.45	
		9.80	-4.04						
				D26	9.90				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ09 CP
Sheet 2 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	338052.21 E
Project	New M4 - Second Preliminary Ground Investigation				185604.66 N
		Drilling Rig	Dando	Ground Level	5.76m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	18/12/2007

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
Very stiff reddish brown locally mottled greenish grey slightly gravelly CLAY. Gravel is angular fine to medium (Weathered Mudstone). (Mercia Mudstone Group)				U27	10.00 - 10.45	(93)			
				D28	10.50	S53	S	10.50	
				D29	10.50 - 10.95			10.95	
				D30	11.50				
				D31	12.00 - 12.40				
						S50/230mm	S	12.20	
								12.58	
				D32	12.80 - 13.20	S50/225mm	S	12.80	
								13.18	
		13.20	-7.44						
Cable Percussion boring complete at 13.20 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ10 CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	338240.80 E
Project	New M4 - Second Preliminary Ground Investigation				185578.80 N
		Drilling Rig	Dando	Ground Level	6.05m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	09/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	11/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
09/01/2008	1730	6.00	4.80	2.70	End of Shift
10/01/2008	0730	6.00	4.80	1.70	Start of Shift
10/01/2008	1730	11.50	10.50	11.30	End of Shift
11/01/2008	0730	11.50	10.50	7.30	Start of Shift
11/01/2008	1730	13.00	10.50	9.20	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
12.30	12.70	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	1.50	200	1.50
150	13.00	150	10.50

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
09/01/2008		2.50	1.00	20	Slow	2.50	NR

GENERAL NOTES

1.Cable Percussive boring from GL to 13.00m.
2.Insitu permeability testing carried out from 10.50 to 11.50m.
3.50mm standpipe installed, slotted from 9.00m to 10.00m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.50	S	N=15 (2,3,3,4,4,4)	1.00	DRY
3.50	S	N=6 (1,1,2,1,1,2)	2.80	1.50
5.50	S	N=2 (1,0,0,1,0,1)	4.80	2.70
7.50	S	N=5 (1,0,1,1,1,2)	6.80	2.00
9.50	S	N=9 (1,1,2,2,2,3)	8.80	4.80
11.00	S	50/225mm (5,12,15,15,17,3)	10.50	8.90
12.00	S	50/160mm (8,11,19,29,2)	10.50	8.10
12.70	S	50/160mm (7,16,18,23,9)	10.50	9.20

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL CP HEADER
Version	3.05
Revised	17/12/2007

NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ10 CP
Sheet 1 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	338240.80 E
Project	New M4 - Second Preliminary Ground Investigation				185578.80 N
		Drilling Rig	Dando	Ground Level	6.05m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	09/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	11/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Dark brown silty very sandy angular to subangular fine to coarse Gravel sized fragments of sandstone and slag.				ES1	0.30				
				B2	0.50 - 0.80				
		0.80	5.25						
Firm to stiff grey silty CLAY with occasional rootlets (Mild organic odour). (Estuarine Alluvium)				ES3	1.00				
				U4	1.00 - 1.45				
		1.50	4.55	D5	1.50	S15	S	1.50	1.95
Firm orangish brown mottled grey CLAY. (Estuarine Alluvium)				D6	1.50 - 1.95				
				ES7	2.00				
		2.50	3.55	D8	2.50				
Soft very low strength grey silty CLAY. (Estuarine Alluvium) ---from 2.50m to 3.50m become slightly gravelly. Gravel is angular fine to medium of mudstone				ES9	3.00				
				U10	3.00 - 3.45				
				D11	3.50	S6	S	3.50	3.95
				D12	3.50 - 3.95				
				ES13	4.00				
		4.50	1.55	D14	4.50				
Very soft grey silty CLAY with rare rootlets. (Estuarine Alluvium)				ES15	5.00				
				U16	5.00 - 5.45				
				D17	5.50	S2	S	5.50	6.03
				D18	5.50 - 5.95				
				B19	6.30 - 6.80				
				U20	7.00 - 7.45				
				D21	7.50	S5	S	7.50	8.03
				D22	7.50 - 7.95				
		7.70	-1.65						
Very soft dark grey clayey PEAT. (Peat)									
		8.20	-2.15						
Very soft grey silty CLAY with occasional coarse gravel sized pockets of fine sand. (Estuarine Alluvium)				D23	8.50				
				U24	9.00 - 9.45				
---from 9.50m becomes slightly sandy gravelly. Gravel is angular to subangular fine to medium of sandstone				D25	9.50	S9	S	9.50	9.95
				D26	9.50 - 9.95				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	3.09
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ10 CP
Sheet 2 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	338240.80 E
Project	New M4 - Second Preliminary Ground Investigation				185578.80 N
		Drilling Rig	Dando	Ground Level	6.05m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	PW	Orientation	Vertical
		Logged by	DH	Date Started	09/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	11/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth	Install-ation
Remaining Detail : 9.40m - 9.40m : and mudstone		10.00	-3.95					
stiff to very stiff reddish brown mottled greenish grey slightly gravelly CLAY. Gravel is angular fine to medium of mudstone (Weathered Mudstone). (Mercia Mudstone Group)				D27	10.20			
				U28	10.50 - 10.95			
---from 11.00m very stiff				D29	11.00	50/225mm	S 11.00	
				D30	11.00 - 11.45		11.38	
				D31	12.00 - 12.30	50/160mm	S 12.00	
							12.31	
Very weak reddish brown mottled greenish grey MUDSTONE. Recovered as angular fine to coarse gravel sized fragments. (Mercia Mudstone Group)		12.50	-6.45	D32	12.50			
---from 12.50m recovered as angular fine to coarse gravel sized fragments				D33	12.70 - 13.00	50/160mm	S 12.70	
		13.00	-6.95				13.01	
Cable Percussion boring complete at 13.00 m.								

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	3.09
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

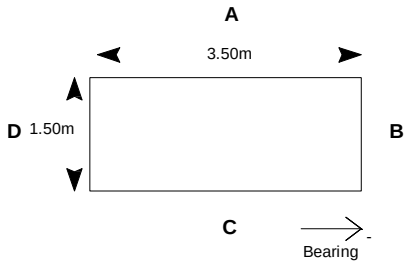
Hole ID.
STPJ01
Sheet 1 of 1

Contract No.	F15056	Method	Machine Excavated	Coordinates	337885.82 E
Project	New M4 - Second Preliminary Ground Investigation				185598.97 N
		Equipment	JCB 3CX	Ground Level	5.95m AOD
Client	Transport Wales, Welsh Assembly Government			Date Started	13/12/2007
		Logged by	JB	Date Completed	13/12/2007
Consultant	Ove Arup & Partners Ltd				

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		Remarks
MADE GROUND: Grey angular to subangular cobble and boulder sized fragments of slag, brick and concrete.		0.30	5.65	ES1	0.30	
MADE GROUND: Greyish brown sandy gravelly angular to subangular cobble sized fragments of slag, concrete, brick, tarmac, wood and metal. Gravel sized fragments are angular to subangular fine to coarse of slag, wood, metal, mudstone and sandstone. ---from 0.30m slight sulphur odour. ---from 0.50m low boulder content, boulder sized fragments are angular of slag ---at 1.10m yellowish grey on face A				D2 B3 W4 ES5 D6 ES7 B8	0.50 0.50 - 1.00 0.80 1.00 2.00 2.00 2.00 - 2.50	
Firm locally stiff grey mottled orangish brown slightly sandy CLAY. With frequent organic material. Estuarine Alluvium)		3.00	2.95	ES9 D10 B11	3.00 3.00 3.00 - 3.50	
Soft to firm grey slightly silty CLAY with occasional organic material. (Estuarine Alluvium)		3.80	2.15	ES12 D13 B14	4.00 4.00 4.00 - 4.50	
Trial pit complete at 4.50 m.		4.50	1.45			

Stability	Slight collapse from 1.00m on all faces
Shoring	None used
Groundwater	Water strike at 1.00m on face A - fast
Remarks	1.Trial pit complete at 4.50m

Sketch Plan of Trial Pit



NOTES: All depths in metres, all soil strengths in kPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic North

Form	ARIAL TP LOG
Version	3.06
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

HAND VANE AND HAND PENETROMETER TESTS

Hole ID.
STPJ01
Data Sheet

Contract No.	F15056	Method	Machine Excavated	Coordinates	337885.82E
Project	New M4 - Second Preliminary Ground Investigation				185598.97 N
		Equipment	JCB 3CX	Ground Level	5.95m AOD
Client	Transport Wales, Welsh Assembly Government			Orientation	Vertical
		Logged by	JB	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	13/12/2007

Hand Vane				Hand Penetrometer		
Depth	Test No	Peak	Remoulded	Depth	Test No	Result
3.00	01	90.0	30.0			
3.00	02	90.0	20.0			
3.00	03	60.0	20.0			
4.00	04	70.0	30.0			
4.00	05	50.0	20.0			
4.00	06	50.0	20.0			

NOTES: All depths in metres, all diameters in millimetres, test results in kPa.

Form	ARIAL HAND VANE/PEN
Version	3.03
Revised	18/01/2007

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID.
STPJ02
Sheet 1 of 1

Contract No.	F15056	Method	Machine Excavated	Coordinates	337935.30 E
Project	New M4 - Second Preliminary Ground Investigation				185662.19 N
		Equipment	JCB 3CX	Ground Level	5.37m AOD
Client	Transport Wales, Welsh Assembly Government			Date Started	13/12/2007
		Logged by	JB	Date Completed	13/12/2007
Consultant	Ove Arup & Partners Ltd				

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		Remarks
MADE GROUND: Grey slightly sandy ashy angular to subangular gravel sized fragnments of slag, concrete, brick, limestone and mudstone.		0.30	5.07	ES1	0.30	
MADE GROUND: Grey mottled brown locally red silty slightly sandy clay. ---at 0.30m strong hydrocarbon odour ---from 0.50m to 1.20m with frequent wooden sleepers and low boulder content, boulder sized fragments are subangular of slag		1.20	4.17	D2 B3 ES4 W5 D6	0.60 0.60 - 1.00 1.00 1.00 1.40	
Firm grey mottled orangish brown slightly sandy CLAY. With frequent organic material (Estuarine Alluvium) ---from 2.00m soft		2.80	2.57	ES7 B8	2.00 2.00 - 2.50	
Soft grey silty CLAY. (Estuarine Alluvium) ---from 4.00m occasional coarse gravel sized pockets of dark bown fibrous peat		4.50	0.87	ES9 D10 B11 ES12 D13	3.00 3.00 3.00 - 3.50 4.00 4.00	
Trial pit complete at 4.50 m.						

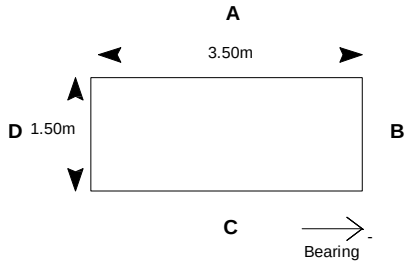
Stability: All faces stable

Shoring: None used

Groundwater: Water strike at 0.50m on face D - fast

Remarks: 1.Trial pit complete at 4.50m

Sketch Plan of Trial Pit



NOTES: All depths in metres, all soil strengths in kPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic North

Form	ARIAL TP LOG
Version	3.06
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

HAND VANE AND HAND PENETROMETER TESTS

Hole ID.
STPJ02
Data Sheet

Contract No.	F15056	Method	Machine Excavated	Coordinates	337935.30E
Project	New M4 - Second Preliminary Ground Investigation				185662.19 N
		Equipment	JCB 3CX	Ground Level	5.37m AOD
Client	Transport Wales, Welsh Assembly Government			Orientation	Vertical
		Logged by	JB	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	13/12/2007

Hand Vane				Hand Penetrometer		
Depth	Test No	Peak	Remoulded	Depth	Test No	Result
1.00	01	65.0	15.0			
1.00	02	60.0	20.0			
1.00	03	50.0	15.0			
2.00	04	45.0	15.0			
2.00	05	50.0	10.0			
2.00	06	50.0	20.0			
3.00	07	15.0	5.0			
3.00	08	20.0	10.0			
3.00	09	20.0	5.0			
4.00	10	15.0	5.0			
4.00	11	20.0	5.0			
4.00	12	20.0	5.0			

NOTES: All depths in metres, all diameters in millimetres, test results in kPa.

Form	ARIAL HAND VANE/PEN
Version	3.03
Revised	18/01/2007

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID.
STPJ03
Sheet 1 of 1

Contract No.	F15056	Method	Machine excavated	Coordinates	338042.86 E
Project	New M4 - Second Preliminary Ground Investigation				185622.56 N
		Equipment	JCB 3CX	Ground Level	5.57m AOD
Client	Transport Wales, Welsh Assembly Government			Date Started	13/12/2007
		Logged by	JB	Date Completed	13/12/2007
Consultant	Ove Arup & Partners Ltd				

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		Remarks
MADE GROUND: Greyish brown slightly sandy angular to subangular fine to coarse gravel sized fragments of limestone, slag, brick, concrete, wood and metal. With occasional coarse gravel sized pockets of greyish brown clay. ---from 0.30m with high cobble content, cobble sized fragments are subangular of slag				ES1 W2 D3 B4	0.40 0.50 0.60 0.60 - 1.00	
		1.20	4.37	ES5	1.20	
Firm locally stiff grey mottled orangish brown silty slightly sandy locally sandy CLAY. With frequent organic material. (Estuarine Alluvium) ---from 2.00m soft to firm				D6 ES7 D8 B9	1.40 2.00 2.00 2.00 - 2.50	
		2.80	2.77			
Soft locally firm grey silty CLAY with occasional organic material. (Estuarine Alluvium) ---from 0.30m with occasional lenses of grey coarse sand				ES10 D11 B12 ES13 D14	3.00 3.00 3.50 - 4.00 4.00 4.00	
		4.50	1.07			
Trial pit complete at 4.50 m.						

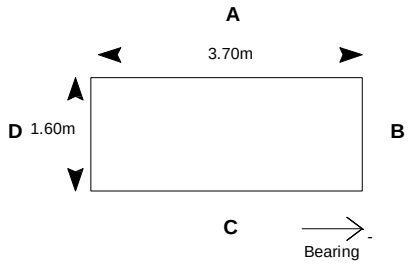
Stability: All faces stable

Shoring: None used

Groundwater: Water strike on all faces at 0.50m - fast

Remarks: 1.Trial pit complete at 4.50m

Sketch Plan of Trial Pit



NOTES: All depths in metres, all soil strengths in kPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic North

Form	ARIAL TP LOG
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Norwest Holst Soil Engineering Ltd.

HAND VANE AND HAND PENETROMETER TESTS

Hole ID.
STPJ03
Data Sheet

Contract No.	F15056	Method	Machine excavated	Coordinates	338042.86E
Project	New M4 - Second Preliminary Ground Investigation				185622.56 N
		Equipment	JCB 3CX	Ground Level	5.57m AOD
Client	Transport Wales, Welsh Assembly Government			Orientation	Vertical
		Logged by	JB	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	13/12/2007

Hand Vane				Hand Penetrometer		
Depth	Test No	Peak	Remoulded	Depth	Test No	Result
1.00	01	40.0	15.0			
1.00	02	40.0	20.0			
1.00	03	50.0	20.0			
2.00	04	30.0	10.0			
2.00	05	30.0	10.0			
2.00	06	40.0	15.0			
3.00	07	20.0	5.0			
3.00	08	20.0	5.0			
3.00	09	25.0	0.0			
4.00	10	20.0	5.0			
4.00	11	30.0	5.0			
4.00	12	25.0	5.0			

NOTES: All depths in metres, all diameters in millimetres, test results in kPa.

Form	ARIAL HAND VANE/PEN
Version	3.03
Revised	18/01/2007

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID.
STPJ04
Sheet 1 of 1

Contract No.	F15056	Method	Machine excavated	Coordinates	338151.61 E
Project	New M4 - Second Preliminary Ground Investigation				185699.26 N
		Equipment	JCB 3CX	Ground Level	5.43m AOD
Client	Transport Wales, Welsh Assembly Government			Date Started	13/12/2007
		Logged by	JB	Date Completed	13/12/2007
Consultant	Ove Arup & Partners Ltd				

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		Remarks
MADE GROUND: Greyish brown sandy angular to subangular coarse gravel sized fragments of limestone, slag, brick and concrete with high cobble content, cobble sized fragments are subangular of slag, concrete and brick.				ES1 W2 D3 B4 ES5	0.30 0.30 0.50 0.50 - 1.00 1.00	
Firm locally stiff grey mottled orangish brown slightly sandy CLAY. With abundant organic material. (Estuarine Alluvium) ---at 1.20m thin layer of plant matter ---from 1.50m occasional organic material		1.20	4.23	D6 ES7 B8	1.50 1.50 2.00 - 2.50	
Soft locally firm grey silty CLAY with occasional organic material. (Estuarine Alluvium) ---from 3.00m occasional lenses of coarse sand		2.40	3.03	ES9 D10 ES11 D12 B13 ES14	2.50 2.50 3.50 3.50 3.50 - 4.00 4.00	
Trial pit complete at 4.50 m.		4.50	0.93			

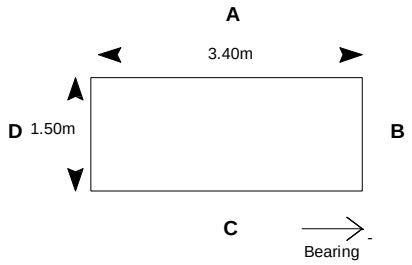
Stability: All faces stable

Shoring: None used

Groundwater: Water strike at 0.30m on all faces - fast

Remarks: 1.Trial pit complete at 4.50m

Sketch Plan of Trial Pit



NOTES: All depths in metres, all soil strengths in kPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic North

Form	ARIAL TP LOG
Version	3.06
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

HAND VANE AND HAND PENETROMETER TESTS

Hole ID.
STPJ04
Data Sheet

Contract No.	F15056	Method	Machine excavated	Coordinates	338151.61E
Project	New M4 - Second Preliminary Ground Investigation				185699.26 N
		Equipment	JCB 3CX	Ground Level	5.43m AOD
Client	Transport Wales, Welsh Assembly Government			Orientation	Vertical
		Logged by	JB	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	13/12/2007

Hand Vane				Hand Penetrometer		
Depth	Test No	Peak	Remoulded	Depth	Test No	Result
2.00	01	80.0	20.0			
2.00	02	75.0	20.0			
2.00	03	90.0	25.0			
3.00	04	25.0	5.0			
3.00	05	30.0	10.0			
3.00	06	35.0	10.0			
4.00	07	25.0	5.0			
4.00	08	30.0	5.0			
4.00	09	30.0	5.0			

NOTES: All depths in metres, all diameters in millimetres, test results in kPa.

Form	ARIAL HAND VANE/PEN
Version	3.03
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Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID.
STPJ05
Sheet 1 of 1

Contract No.	F15056	Method	Machine Excavated	Coordinates	338172.76 E
Project	New M4 - Second Preliminary Ground Investigation				185579.54 N
		Equipment	JCB 3CX	Ground Level	5.85m AOD
Client	Transport Wales, Welsh Assembly Government			Date Started	14/12/2007
		Logged by	JB	Date Completed	14/12/2007
Consultant	Ove Arup & Partners Ltd				

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		Remarks
MADE GROUND: Grey sandy angular to subangular gravel sized fragments of slag, limestone, metal and concrete with high cobble content, cobble sized fragments are angular of slag.		0.30	5.55	ES1	0.30	
MADE GROUND: Brownish grey mottled orangish brown slightly sandy clay with low cobble content and rootlets. Cobble sized fragments are angular of slag.		0.60	5.25	D2 B3	0.60 0.60 - 1.00	
Firm grey and orangish brown silty slightly sandy locally sandy CLAY with occasional organic matter. (Estuarine Alluvium)				ES4 D5 ES6 B7	1.00 2.00 2.00 2.50 - 3.00	
Soft to firm slightly silty grey CLAY with occasional organic matter. (Estuarine Alluvium) ---from 3.20m soft locally very soft silty		2.80	3.05	ES8 D9 ES10 D11 B12	3.00 3.00 4.00 4.00 4.00 - 4.50	
Trial pit complete at 4.50 m.		4.50	1.35			

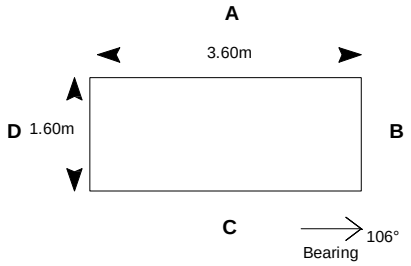
Stability: Collapse from 2.00m on face D

Shoring: None used

Groundwater: Water strike at 2.60m face A - seepage

Remarks: 1.Trial pit complete at 4.50m.

Sketch Plan of Trial Pit



NOTES: All depths in metres, all soil strengths in kPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic North

Form	ARIAL TP LOG
Version	3.06
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

HAND VANE AND HAND PENETROMETER TESTS

Hole ID.
STPJ05
Data Sheet

Contract No.	F15056	Method	Machine Excavated	Coordinates	338172.76E
Project	New M4 - Second Preliminary Ground Investigation				185579.54 N
		Equipment	JCB 3CX	Ground Level	5.85m AOD
Client	Transport Wales, Welsh Assembly Government			Orientation	Vertical
		Logged by	JB	Date Started	14/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	14/12/2007

Hand Vane				Hand Penetrometer		
Depth	Test No	Peak	Remoulded	Depth	Test No	Result
1.00	01	60.0	20.0			
1.00	02	50.0	15.0			
1.00	03	60.0	15.0			
2.00	04	40.0	15.0			
2.00	05	40.0	20.0			
2.00	06	45.0	15.0			
3.00	07	30.0	5.0			
3.00	08	25.0	5.0			
3.00	09	25.0	5.0			
4.00	10	30.0	10.0			
4.00	11	25.0	0.0			
4.00	12	30.0	5.0			

NOTES: All depths in metres, all diameters in millimetres, test results in kPa.

Form	ARIAL HAND VANE/PEN
Version	3.03
Revised	18/01/2007

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID.
STPJ06
Sheet 1 of 1

Contract No.	F15056	Method	Machine Excavated	Coordinates	338227.89 E
Project	New M4 - Second Preliminary Ground Investigation				185623.61 N
		Equipment	JCB 3CX	Ground Level	5.71m AOD
Client	Transport Wales, Welsh Assembly Government			Date Started	14/12/2007
		Logged by	JB	Date Completed	14/12/2007
Consultant	Ove Arup & Partners Ltd				

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		Remarks
MADE GROUND: Greyish brown sandy angular to subangular fine to coarse gravel sized fragments of slag, concrete, brick and metal. With high cobble content, cobble sized fragments are angular to subangular of slag and concrete.				ES1	0.30	
				D2	0.50	
				W3	0.50	
				B4	0.50 - 1.00	
				ES5	1.00	
				D6	1.50	
				ES7	2.00	
				B8	2.00 - 2.50	
Firm greenish grey mottled brown slightly sandy CLAY with occasional organic material. (Estuarine Alluvium)		2.60	3.11	D9	2.60	
				ES10	3.00	
				B11	3.50 - 4.00	
Soft grey silty CLAY with occasional organic material. (Estuarine Alluvium)		3.80	1.91	ES12	4.00	
				D13	4.00	
Trial pit complete at 4.50 m.		4.50	1.21			

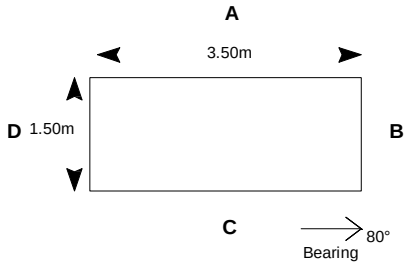
Stability: All faces stable

Shoring: None used

Groundwater: Water strike at 0.50m on all faces - fast

Remarks: 1.Trial pit complete at 4.50m.

Sketch Plan of Trial Pit



NOTES: All depths in metres, all soil strengths in kPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic North

Form	ARIAL TP LOG
Version	3.06
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

HAND VANE AND HAND PENETROMETER TESTS

Hole ID.
STPJ06
Data Sheet

Contract No.	F15056	Method	Machine Excavated	Coordinates	338227.89E
Project	New M4 - Second Preliminary Ground Investigation				185623.61 N
		Equipment	JCB 3CX	Ground Level	5.71m AOD
Client	Transport Wales, Welsh Assembly Government			Orientation	Vertical
		Logged by	JB	Date Started	14/12/2007
Consultant	Ove Arup & Partners Ltd			Date Completed	14/12/2007

Hand Vane				Hand Penetrometer		
Depth	Test No	Peak	Remoulded	Depth	Test No	Result
3.00	01	90.0	30.0			
3.00	02	70.0	20.0			
3.00	03	80.0	25.0			
4.00	04	30.0	10.0			
4.00	05	30.0	10.0			
4.00	06	30.0	10.0			

NOTES: All depths in metres, all diameters in millimetres, test results in kPa.

Form	ARIAL HAND VANE/PEN
Version	3.03
Revised	18/01/2007

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BOREHOLE LOG

BH522

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 2

Start Date 20 February 2015 — Easting 337987.9 — Scale 1 : 50

End Date 26 February 2015 — Northing 185605.2 — Ground level 5.30mOD — Depth 17.60 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
20/02/15 1500hrs									Dark grey and black subangular fine to coarse slag and limestone GRAVEL with a low subangular slag cobble content and rare fragments of steel. (MG)			
		0.50	0.95	Nil	C 29							
	1B	0.50	2.00						0.50 - 2.30m: Medium dense and dense.			
	2D*	0.50	0.70		Vo 0.2							
		1.00	1.45	1.00	C 24							
	3D*	1.00	1.20		Vo 0.2							
		1.50	1.95	1.50	C 33							
20/02/15 1700hrs 0.50m	4D*	1.50	1.70		Vo 0.2							
		2.00	2.45	2.00	C 26							
	5B	2.00	2.50									
23/02/15 0800hrs 0.50m	6D*	2.00	2.20		Vo 0.2				2.00 - 2.50m: Clayey.			
	7D	2.30								2.30	3.00	
									Very soft grey mottled orangish brown silty CLAY with frequent thin laminae of grey fine sand. (TFD)			
	8UT	2.50	2.95	2.40						2.70	2.60	
	10D*	2.50	2.70		Vo 0.2							
	9D	2.95	3.00						Very soft and soft grey silty CLAY with rare fragments (up to 10mm) of black organic material and rare rootlets (up to 50mm x 2mm diam). Organic odour. (TFD)			
	11D	3.00	3.45	3.00	S 8							
	12B	3.00	3.50									
	13D*	3.00	3.20		Vo 0.2							
	14UT	3.50	3.95	3.00								
	16D*	3.50	3.70		Vo 0.2							
	15D	3.95	4.00									
	16D	4.00	4.45	3.50	S 8							
	17B	4.00	4.50									
	18D*	4.00	4.20		Vo 0.2							
	19UT	4.50	4.95	4.00								
	21D*	4.50	4.70									
	20D	4.95	5.00									
	22D	5.00	5.45	4.90	S 6							
	23B	5.00	5.50									
	24D*	5.00	5.20		Vo 0.3							
										5.60	-0.30	
	25B	5.60	5.90									
	26D	5.70							Spongy black and dark brown fibrous PEAT with frequent plant fragments (up to 60mm). Organic odour. (PEAT)	5.90	-0.60	
	27D	6.00										
	28D*	6.00	6.20						Grey slightly sandy SILT with rare fragments (up to 5mm) of black organic material and rare shell fragments (up to 3mm). Slight organic odour. (TFD)			
	29UT	6.50	6.95	6.00								
	30D	6.95	7.00									
	31D*	7.00	7.20									
									7.30m: Driller notes silty sand.			
	32D	7.50										
	33D	8.20	8.60	8.00	S 4							
									Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-0.50m. Cable percussion (200mm) 0.50-3.00m and (150mm) 3.00-11.90m. Waterflush rotary core drilled (116mm) 11.90-17.60m.

CASING: 200mm diam to 2.50m and 150mm diam to 11.50m.

BACKFILL: On completion, hole backfilled with bentonite pellets 17.60-0.60m and gravel 0.60-0.00m.

REMARKS: Hole advanced by chiselling 0.50-2.30m (4hr) and 11.50-11.90m (1hr).

Downhole magnetometry for UXO risk mitigation undertaken 0.00-10.00m. No anomalies encountered.

Bentonite seal for aquifer protection installed during drilling 2.00-3.00m, prior to reduction in casing diameter. MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
0.20	Nil	0.20	20	Slow
5.90		5.50	20	Medium.

AGS

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BOREHOLE LOG

BH522

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 2

Start Date 20 February 2015 — Easting 337987.9 — Scale 1 : 50

End Date 26 February 2015 — Northing 185605.2 — Ground level 5.30mOD — Depth 17.60 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	34B	8.00 - 8.70						8.00 - 8.60m: Slightly gravelly. Gravel is subrounded fine to coarse sandstone.			
	35D*	8.00 - 8.20		Vo 0.0							
	36D	8.70						8.60 - 9.30m: With very thin beds and pockets of spongy dark brown fibrous peat.	9.30	-4.00	
	37D	9.40						Stiff fissured reddish brown slightly sandy slightly gravelly CLAY with rare light bluish grey reduction spots (up to 2mm). Gravel is angular fine and medium lithorelicts of very stiff clay. (MMG) (MMG)			
23/02/15 1700hrs Dry	38UT	9.50 - 9.80	9.00								
	39B	9.50 - 10.00									
	40D	10.00 - 10.45	10.00	S 48							
24/02/15 0800hrs 9.80m	41B	10.00 - 10.50									
	42B	11.00 - 11.50						Stiff reddish brown gravelly CLAY with rare low subangular mudstone cobble content. Gravel is subangular fine to coarse mudstone lithorelicts. (MMG) (MMG)	11.00	-5.70	
24/02/15 1200hrs 8.10m		11.50 - 11.70	10.00	C*278							
		11.90 - 12.01	10.00	C*417					11.90	-6.60	
26/02/15 1020hrs 5.28m	43C	11.90 - 13.10	11.50		100	NA		Stiff fissured reddish brown gravelly CLAY. Gravel is randomly orientated angular and subangular fine and medium lithorelicts of very stiff clay. (MMG) (Grade III)			
	44C	13.10 - 14.60	11.50		100			13.10 - 13.20m: Stiff greenish grey silty clay.			
								Stiff indistinctly fissured greenish grey silty CLAY. (MMG) (Grade IVb)	14.20	-8.90	
	45C	14.60 - 16.10	11.50		100 38 0			Stiff fissured reddish brown silty CLAY with rare subangular fine and medium gravel sized mudstone lithorelicts. (MMG) (Grade IVa)	14.70	-9.40	
						NI		Extremely weak and very weak thinly laminated to very thinly bedded reddish brown MUDSTONE. Fractures are subhorizontal and 20° extremely closely and very closely spaced planar rough with a clay veneer. (MMG) (Grade I/II)	15.10	-9.80	
						NA			15.90	-10.60	
	46C	16.10 - 17.60	11.50		100			Very stiff fissured reddish brown gravelly CLAY. Gravel is subangular fine to coarse lithorelicts of extremely weak mudstone. Fissures are subhorizontal extremely closely and very closely spaced planar smooth. (MMG) (Grade III)			
26/02/15 1305hrs 2.21m									17.60	-12.30	
								Borehole completed at 17.60m.	{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

AGS

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BOREHOLE LOG

BH523

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 2

Start Date 27 February 2015 — Easting 338059.0 — Scale 1 : 50

End Date 6 March 2015 — Northing 185604.9 — Ground level 6.15mOD — Depth 17.00 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
27/02/15 1100hrs		0.50	0.95	0.50	C 50				Dense and very dense dark greyish black subangular and subrounded fine to coarse slag GRAVEL with a high subangular slag cobble content. (MG)			
	1B	0.50	0.90									
	2D*	0.50	0.70		Vo 0.0							
		1.00	1.45	1.00	C 47							
	3B	1.00	1.40									
	4D*	1.00	1.20		Vo 0.0							
		1.50	1.95	1.50	C 35							
	5B	1.50	1.90									
	6D*	1.50	1.70		Vo 0.1							
		2.00	2.45	2.00	C 65							
	7B	2.00	2.40							2.00	4.15	
	8D*	2.00	2.20		Vo 0.0				Dense dark grey and black subangular and subrounded fine to coarse slag GRAVEL with low slag cobble content. (MG)			
		2.50	2.95	2.50	C 37							
	9B	2.50	2.90									
	10D*	2.50	2.70		Vo 0.0							
		3.00	3.45	3.00	C 33							
	12D*	3.00	3.20		Vo 0.0							
	11B	3.10	3.40							3.20	2.95	
									Soft brownish grey slightly sandy gravelly silty CLAY. Gravel is subangular fine to coarse slag. (MG)			
27/02/15 1700hrs NR	13D*	3.50	3.70		Vo 0.0					3.80	2.35	
	14D	4.00	4.45	4.00	S 15				Firm light grey slightly sandy slightly gravelly silty CLAY. Gravel is subangular and subrounded fine to coarse slag. (MG)			
03/03/15 0800hrs NR	15B	4.00	4.40									
	16D*	4.00	4.40							4.40	1.75	
	17UT	4.50	4.95	4.50					Firm brownish grey silty CLAY. (TFD)			
	20D*	4.50	4.70									
	18D	4.95	5.00									
	21D*	4.95	5.00									
	19D	5.00	5.45	5.00	S 10							
	22B	5.00	5.50									
	23D*	6.00	6.20									
	24UT	6.50	6.95	6.50								
										6.95	-0.80	
	25D	6.95	7.00						Firm black fibrous slightly clayey PEAT with frequent rootlets (up to 1mm diam). (PEAT)			
	26D*	7.00	7.20									
	27B	7.50	7.90									
										7.90	-1.75	
									Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-0.50m. Cable percussion (200mm) 0.50-4.00m and (150mm) 4.00-11.80m. Waterflush rotary core drilled (116mm) 11.80-17.00m.

CASING: 200mm diam to 4.00m, 150mm diam to 11.70m and 140mm diam to 11.70m.

BACKFILL: On completion, borehole backfilled with bentonite 17.00-0.00m.

REMARKS: Hole advanced by chiselling 0.60-0.90m (45mins) and 2.20-2.50m (1hr 15mins). Driller notes reduced flush returns 13.20-17.00 (40-55% returned). Downhole magnetometry for UXO risk mitigation undertaken 0.00-11.00m. No anomalies encountered. Bentonite seal for aquifer protection installed during drilling 3.00-4.00m, prior to reduction in casing diameter. MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
1.00	1.00	1.00	20	Seepage.

AGS

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BOREHOLE LOG

BH523

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 2

Start Date 27 February 2015 — Easting 338059.0 — Scale 1 : 50

End Date 6 March 2015 — Northing 185604.9 — Ground level 6.15mOD — Depth 17.00 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	28UT 30D* 29D 31B	8.00 - 8.45 8.00 - 8.20 8.45 - 8.50 8.50 - 9.00	8.00					Firm brownish grey mottled black silty CLAY with frequent lenses of black organic material. (TFD)			
	32D 33B	9.50 - 9.95 9.50 - 10.00	9.50	S 14					10.30	-4.15	
	34UT	10.50 - 10.95	10.50					Firm fissured reddish brown slightly sandy slightly gravelly CLAY. Gravel is subangular fine and medium lithorelicts of stiff clay and extremely weak mudstone. (MMG)			
	35D	10.95 - 11.00									
03/03/15 1700hrs NR	36B	11.30 - 11.70									
		11.80 - 12.25	11.70	C 68					11.80	-5.65	
05/03/15 1330hrs 1.10m	37C	11.80 - 13.20			100	NA		Very stiff fissured reddish brown sandy gravelly CLAY with subangular fine to coarse lithorelicts of extremely weak and weak mudstone. (MMG) (Grade III) 11.80 - 11.95m: Drilling disturbed. Sandstone cobble. Locally bluish grey. 11.85 - 11.95m: Bluish grey sandy clay. 12.25 - 12.60m: Bluish grey.			
	38C	13.20 - 14.70	11.70		100 0 0	NI NA		Highly fractured black and light brown SANDSTONE and MUDSTONE recovered non intact. (MMG)	13.20 13.40	-7.05 -7.25	
05/03/15 1600hrs 3.20m								Very stiff fissured reddish brown gravelly CLAY. Gravel is subangular and subrounded fine to coarse lithorelicts of extremely weak and very weak mudstone. Fractures are subhorizontal to 20° and subvertical very closely and closely spaced undulating rough with clay veneer. (MMG) (Grade III)			
06/03/15 1000hrs 4.10m	39C	14.70 - 16.20	14.70		100			15.45 - 16.05m: Mottled light bluish grey.			
	40C	16.20 - 17.00	14.70		100			Stiff fissured reddish brown slightly sandy gravelly CLAY. Gravel is subangular and subrounded fine and medium lithorelicts of very stiff clay and extremely weak mudstone. (MMG) (Grade III)	16.05	-9.90	
06/03/15 1330hrs 0.42m									17.00	-10.85	
								Borehole completed at 17.00m.	{18.00}		

water strike (m)	casing (m)	rose to (m)	time to rise (m)	remarks
10.50	10.50	9.60	20	Medium flow.

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BOREHOLE LOG

BH524

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 2

Start Date 23 February 2015 — Easting 338202.4 — Scale 1 : 50

End Date 25 February 2015 — Northing 185612.9 — Ground level 5.70mOD — Depth 17.00 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
23/02/15 1500hrs									Dense and very dense dark grey sandy subangular fine to coarse slag, concrete, brick and limestone GRAVEL. Driller notes slag cobbles and boulders. (MG)			
		0.50	0.90	0.50	C*61							
	1B	0.50	0.90									
24/02/15 0800hrs Dry	2D*	0.50	0.70		Vo 0.0							
		1.00	1.45	0.50	C 39							
	3B	1.00	1.40									
	4D*	1.00	1.20		Vo 0.0							
		1.50	1.95	1.00	C 33							
	5B	1.50	1.90									
	6D*	1.50	1.70		Vo 0.0							
		2.00	2.38	2.00	C*67							
	7B	2.00	2.40									
	8D*	2.00	2.20		Vo 0.0							
		2.50	2.95	2.50	C 40							
	9B	2.50	2.90									
	10D*	2.50	2.70		Vo 0.0							
		3.00	3.45	3.00	C 38							
	11B	3.00	3.40									
	12D*	3.00	3.20		Vo 0.0							
		3.50	3.95	3.50	C 27							
	13B	3.50	3.90									
	14D*	3.50	3.70		Vo 0.0				3.50m: Medium dense.			
	15D	4.00	4.45	4.00	S 13							
	16B	4.00	4.40							4.00	1.70	
	17D*	4.00	4.20		Vo 0.7				Soft dark grey silty CLAY with rare slag gravel. (MG)			
	20D*	4.50	4.70							4.50	1.20	
24/02/15 1700hrs Dry	18UT	4.50	4.95						Soft locally firm grey mottled light brown silty CLAY with rare fragments (up to 5mm) of black organic material. Slight organic odour. (TFD)			
	19D	4.95	5.00									
25/02/15 0800hrs Dry	21D	5.00	5.45	5.00	S 11							
	22B	5.00	5.50									
	23D*	5.00	5.10		Vo 0.0							
	24D*	5.60	5.70		Vo 0.0							
	26UT	6.50	6.95	6.50								
	25D*	6.50	6.60									
	27D	6.95	7.00							6.95	-1.25	
	28B	7.00	7.50						Soft grey and light greyish brown silty CLAY with very thin and thin beds of firm dark brown and black fibrous peat. Frequent rootlets and fragments (up to 60mm x 2mm diam) of plant material. Slight organic odour. (TFDP)			
	29D*	7.50	7.60		Vo 0.0							
									Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-0.50m. Cable percussion (200mm) 0.50-11.00m. Waterflush rotary core drilled (116mm) 11.00-17.00m.

CASING: 200mm diam to 11.00m.

BACKFILL: On completion, hole backfilled with bentonite pellets.

REMARKS: Hole advanced by chiselling 1.20-1.50m (1hr15mins), 2.30-2.50m (1hr15mins) and 2.80-3.00m (1hr).

Downhole magnetometry for UXO risk mitigation undertaken 0.00-11.00m. No anomalies encountered.

Bentonite seal for aquifer protection installed during drilling 3.50m, prior to reduction in casing diameter.

MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m) casing (m) rose to (m) time to rise (min) remarks

AGS

CONTRACT **30238**

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BOREHOLE LOG

BH524

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 2

Start Date 23 February 2015 — Easting 338202.4 — Scale 1 : 50

End Date 25 February 2015 — Northing 185612.9 — Ground level 5.70mOD — Depth 17.00 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	30UT	8.00 - 8.45	8.00								
	31D	8.45 - 8.50									
	32B	8.50 - 9.00									
	33D	9.50 - 9.95	9.50	S 27							
								Stiff dark reddish brown slightly gravelly CLAY. Gravel is angular and subangular fine and medium mudstone lithorelicts rarely subrounded and rounded fine to coarse sandstone. (MMG)	9.60	-3.90	
	34B	10.00 - 10.50									
									11.00	-5.30	
25/02/15 1700hrs 10.35m	35UT	11.00 - 11.45	11.00		89	NA		Stiff fissured reddish brown slightly gravelly CLAY. Gravel is subangular fine to coarse lithorelicts of very stiff clay to extremely weak mudstone. Localised relict fissures are randomly orientated extremely closely spaced. (MMG) (Grade III)			
	38C	11.00 - 12.50									
26/02/15 1230hrs 3.22m	36D	11.45 - 11.50									
	37D	11.50 - 11.88	11.00	S*68							
	39C	12.50 - 14.00	11.00		100						
								13.30 - 13.45m: Light greenish grey.			
						NI			13.60	-7.90	
	40C	14.00 - 15.50	11.00		100 34 0			Extremely weak highly fractured dark reddish brown MUDSTONE locally tending to claybound mudstone lithorelicts. Fractures are subhorizontal to 20° and 70° to subvertical extremely and very closely spaced planar and undulating smooth. (MMG) (Grade II/III)			
	41C	15.50 - 17.00	11.00		100 7 0			15.40 - 15.60m: Extremely weak light greenish grey siltstone.			
								16.20 - 16.65m: Very stiff light greenish grey slightly sandy silty clay with frequent fine and medium gravel sized siltstone lithorelicts.			
27/02/15 1530hrs 2.56m									17.00	-11.30	
								Borehole completed at 17.00m.			
									{18.00}		

water strike (m)	casing (m)	rose to (m)	time to rise (m)	remarks
10.50	10.50	10.35	20	

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CONTRACT **30238**

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BOREHOLE LOG

BH525

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 24 February 2015 — Easting 338301.6 — Scale 1 : 50

End Date 26 February 2015 — Northing 185578.3 — Ground level 5.95mOD — Depth 22.70 m

progress date/time water depth	sample no & type	depth (m) from	to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
24/02/15 0800hrs									Large slag BOULDERS (Driller's description). (MG)			
	1D	1.00	1.45	1.00	S 5							
	2B	1.00	1.50							1.00	4.95	
	3D*	1.00	1.20		Vo 0.2				Soft dark grey slightly gravelly silty CLAY. Gravel is angular and subangular fine to coarse brick, slag and limestone. (MG)	1.30	4.65	
	4D	1.50	1.95	1.50	S 8							
	5B	1.50	2.00									
	6D*	1.50	1.70		Vo 0.2				Stiff yellowish brown and grey slightly gravelly silty sandy CLAY. Gravel is angular and subangular fine to coarse slag and limestone. (MG)			
	7B	2.00	2.50									
	8D*	2.00	2.20		Vo 0.2							
		2.50			V 36					2.50	3.45	
24/02/15 1630hrs 1.50m	9UT	2.50	2.95	2.50					Very soft dark grey slightly sandy silty CLAY. (TFD) 2.54m: Low strength.			
	11D*	2.75	3.00		Vo 0.0							
25/02/15 0800hrs	10D	2.95	3.05									
	12D	3.00	3.45	3.00	S<1							
	13B	3.00	3.50									
	14D*	3.00	3.50		Vo 0.0							
	15B	3.50	4.00		Vo 0.0							
	16D*	3.50	4.00									
		3.95			V 36							
	17P	4.00	5.00	4.00		P/S			3.95m: Low strength.			
	18B	5.00	5.50									
		5.55			V 10							
	19P	5.50	6.50	5.50		P/S			5.55m: Extremely to very low strength.			
	20B	6.50	7.00									
		7.10			V 12							
	21P	7.00	7.60	7.00		P/S			7.10m: Very low strength.			
25/02/15 1700hrs NR										7.60	-1.65	
26/02/15 0800hrs									Very soft grey silty CLAY interbedded with firm dark brown fibrous PEAT. (PEAT)			
									Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig. METHOD: Cable percussion (200mm) 0.00-2.00m and (150mm) 2.00-12.20m. Waterflush rotary core drilled (116mm) 12.20-22.70m. CASING: 200mm diam to 2.00m, 150mm diam to 12.20m.

BACKFILL: On completion, borehole backfilled with bentonite pellets 22.70-11.80m. A slotted standpipe (50mm) with geo-sock was installed to 11.60m, granular response zone 11.80-9.80m and bentonite seal 9.80-2.80m. A second slotted standpipe (35mm) with geo-sock was installed to 2.60m, granular response zone 2.80-0.50m, bentonite seal 0.50-0.25m, concrete and stopcock cover 0.25-0.00m.

REMARKS: Hole advanced by chiselling 0.00-1.00m (1hr10mins) and 10.90-12.20m (2hr). Downhole magnetometry for UXO risk mitigation undertaken 0.00-11.00m. No anomalies encountered. Bentonite seal for aquifer protection installed during drilling 1.00-2.00m, prior to reduction in casing diameter. Permeability test undertaken at 7.00m- 8.00m.

MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
1.50	1.50	1.30	20	Medium flow.

AGS

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BOREHOLE LOG

BH525

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 24 February 2015 — Easting 338301.6 — Scale 1 : 50

End Date 26 February 2015 — Northing 185578.3 — Ground level 5.95mOD — Depth 22.70 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	22D	8.00 - 8.45	8.00	S 15							
	23B	8.50 - 9.00									
	24UT	9.50 - 9.95	9.50								
	25D	9.95 - 10.05							10.10	-4.15	
	26D	10.10 - 10.20						Stiff dark reddish brown slightly gravelly CLAY. Gravel is subangular and subrounded fine and medium sandstone and siltstone. (RTD)			
	27B	10.50 - 11.00									
	28D	11.00 - 11.45	11.00	S 39							
	29B	11.50 - 12.20									
26/02/15 1620hrs 5.90m	30D	12.20 - 12.43	12.10	S*113							
27/02/15 0915hrs 7.87m	31C	12.20 - 12.50			97	NA					
	32C	12.50 - 13.70	12.10		100			12.90 - 13.05m: Light greenish grey.			
	33C	13.70 - 15.20	12.10		100	NA		13.60 - 13.70m: Light greenish grey.	13.70	-7.75	
								Very stiff fissured dark reddish brown very gravelly CLAY. Gravel is subangular and subrounded fine and medium lithorelicts of extremely weak mudstone. Fissures are subhorizontal to 20° and subvertical extremely closely spaced. (MMG) (Grade III)	14.80	-8.85	
	34C	15.20 - 16.70	12.10		100 19 0	NI 40 80		Stiff fissured reddish brown gravelly CLAY. Gravel is angular and subangular fine and medium lithorelicts of extremely weak mudstone and very stiff clay. Fissures are subhorizontal to 20° very closely spaced planar smooth. (MMG) (Grade III) 15.55 - 15.70m: 70° to subvertical planar smooth.	15.60	-9.65	
								Weak thinly laminated reddish brown MUDSTONE with rare light greenish grey reduction spots (up to 20mm). Fractures are subhorizontal to 20° and subvertical very closely and closely spaced planar smooth. (MMG) (Grade I/II)			
	35C	16.70 - 18.20	12.10		93 5 0			15.60 - 16.20m: Light greenish grey. 15.70 - 15.80m: Tending to light greenish grey clay. 16.20 - 16.30m: Tending to reddish brown clay. 16.70 - 17.10m: Tending to light greenish grey clay. 17.30 - 17.40m: Tending to reddish brown clay. 17.50 - 17.60m: Tending to reddish brown clay. 17.60 - 18.20m: Subvertical fracture.			
								Continued Next Page	{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

AGS

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Geotechnical Engineering Limited

BOREHOLE LOG

BH525

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 24 February 2015 — Easting 338301.6 — Scale 1 : 50

End Date 26 February 2015 — Northing 185578.3 — Ground level 5.95mOD — Depth 22.70 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	36C	18.20 - 19.70	12.10		100 62 37						
						80 120 400			18.60	-12.65	
								Very weak and weak thinly laminated reddish brown MUDSTONE with rare light greenish grey reduction spots (up to 20mm). Fractures are subhorizontal to 20° and subvertical closely and medium spaced planar smooth. (MMG) (Grade I/II) 19.20 - 19.25m: 20° fracture with a veneer of reddish brown clay.			
	37C	19.70 - 21.20	12.10		100 100 61						
	38C	21.20 - 22.70	12.10		100 90 57			21.25 - 21.80m: 80° to vertical fracture undulating smooth. 22.00 - 22.40m: Tending to reddish brown clay. 22.40m: Calcite crystals (up to 20mm).			
27/02/15 1420hrs 2.60m									22.70	-16.75	
								Borehole completed at 22.70m.	{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

AGS

CONTRACT **30238**

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Geotechnical Engineering Limited

TRIAL PIT LOG

TP509

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 2

Start Date 11 February 2015 — Easting 338257.7 — Scale 1 : 25

End Date 11 February 2015 — Northing 185578.9 — Ground level 6.15mOD — Depth 4.50 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
				Dark greyish brown slightly clayey sandy angular and subangular fine to coarse slag GRAVEL. (MG)			
					0.20	5.95	
				Dark brown sandy angular and subangular fine to coarse slag GRAVEL. (MG)			
	1D*		0.50				
	2D*	Vo 0.2	0.60				
	3B		1.00				
	4D*	Vo 0.7	1.00	1.10 - 1.40m: Locally tending to soft dark bluish grey slightly sandy clay with rare medium gravel sized wood fragments.			
1.20m: Seepage	5B		1.10		1.40	4.75	
	6D*		1.10	Firm light grey mottled light orangish brown sandy CLAY. (TFD)			
		H37	1.30				
	7B	H 76	2.00				
	8D*	Vo 0.4	2.00				
	9D*		2.50				
					2.70	3.45	
				Soft locally very soft light bluish grey sandy CLAY with frequent organic fragments (up to 3mm). (TFD)			
	10B	H 23	3.00				
	11D*	Vo 0.1	3.00				

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater seepages noted between 1.20m and 4.50m.
Trial pit sides remained stable and vertical.
Trial pit dimensions 0.80x2.60x4.50m.
On completion, the trial pit was backfilled with materials arising.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

AGS

CONTRACT	CHECKED
30238	EC

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Geotechnical Engineering Limited

TRIAL PIT LOG

TP509

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 2

Start Date 11 February 2015 — Easting 338257.7 — Scale 1 : 25

End Date 11 February 2015 — Northing 185578.9 — Ground level 6.15mOD — Depth 4.50 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
	12B	H 20	4.00				
	13D*	Vo 0.2	4.00				
					4.50	1.65	
4.45m				Trial pit completed at 4.50m.			

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater seepages noted between 1.20m and 4.50m.
Trial pit sides remained stable and vertical.
Trial pit dimensions 0.80x2.60x4.50m.
On completion, the trial pit was backfilled with materials arising.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

AGS

CONTRACT	CHECKED
30238	EC

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BOREHOLE LOG

Borehole No. **BHM4CAN043**

Sheet 1 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 17/12/2016 - 21/12/2016	Final Depth:
Project No:	JFR8703	Easting:	338128	Drilling Method: Pipe Diameter: 35mm	11.80m
Location:	Newport	Northing:	185622	Dando 2000	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.98	Logged By: EJH	1:50

Casing Diameter (mm)	Casing Depth (m)
150	11.00
200	5.60

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					0.00	(0.45)	6.98		Greyish black coarse GRAVEL of slag with occasional fragments of brick & lime. (MADE GROUND)	
					0.45		6.52		Dense greyish black coarse sandy GRAVEL of slag with greyish blue cobbles (up to 8cm) of slag, and fine to medium gravel of lime. (MADE GROUND)	
		0.90	ES			(0.75)				
		1.00	B							1
	▼	1.20	SPT(C)	N=34 (5,7/8,8,9,9)	1.20		5.78		Dense coarse angular to subangular GRAVEL of slag with occasional lenses of lime. (MADE GROUND)	
		1.50	D			(0.50)				
					1.70		5.28		Very dense blackish grey fine gravel of SLAG with occasional lime and fragments of brick and concrete. (MADE GROUND)	
		2.00	SPT(C)	71 (25 for 105mm/71 for 225mm)		(0.70)				2
					2.40		4.58		Dense blackish grey coarse to medium, angular to subangular GRAVEL of slag with rare fragments of lime. (MADE GROUND)	
						(0.80)				
		3.00	ES							3
		3.00	SPT(C)	N=38 (5,4/7,11,11,9)	3.20		3.78		Medium dense to dense dark bluish grey coarse GRAVEL of slag. (MADE GROUND)	
		4.00	SPT(C)	N=16 (2,6/5,4,4,3)						4
						(2.60)				
		5.00	SPT(C)	N=33 (3,4/3,,15,15)						5
		5.80	D		5.80		1.18		Stiff grey CLAY with fibrous rootlets and frequent pockets of coarse sand. (TIDAL FLAT DEPOSITS)	
		6.00	ES							6
		6.00	SPT(S)	N=5 (2,1/1,2,1,1)						
		6.50	B			(1.90)				
		7.00	SPT(S)	2 (2 for 225mm/2 for 225mm)						7
					7.70		-0.72		Very soft grey silt CLAY with occasional rootlets. (TIDAL FLAT DEPOSITS)	
		8.00	SPT(S)	N=2 (1,1/1,0,1,0)					*Becoming soft below 8.2m.*	8
		8.50	B							
						(2.50)				
		9.00	SPT(S)	N=4 (1,1/1,1,1,1)						9
		10.00	SPT(S)	N=5 (1,1/1,1,1,2)					Continued on next sheet	10

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 11.80m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 8.0 - 6.1m and 0.9 - 0.2m, gravel 11.8 - 8.0m and 6.1 - 0.9m and concrete 0.2 - 0.0m. One standpipe (35mm) was installed with slotted section between 11.7 - 8.7m and a second standpipe (50mm) was installed with slotted section between 1.0 - 6.0m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (6.0 - 4.0m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 5.8 - 11.1m. No anomalies encountered.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
1.40			01:30	1.20	2.00
			01:30	2.00	2.30

AGS

BOREHOLE LOG

Borehole No. **BHM4CAN043**

Sheet 2 of 2

Project Name:	M4 CaN Additional GI	Co-ordinates:		Date(s): 17/12/2016 - 21/12/2016		Final Depth:
Project No:	JFR8703	Easting:	338128	Drilling Method:	Pipe Diameter: 35mm	11.80m
Location:	Newport	Northing:	185622	Dando 2000	Casing Diameter (mm) / Casing Depth (m): 150 / 11.00; 200 / 5.60	Scale:
Client:	Costain Vinci Joint Venture	Ground Level (mAOD):	6.98	Logged By: EJH		1:50

Well	Water Strike(s)	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (mbGL)	Thickness (m)	Level (mAOD)	Legend	Stratum Description	Scale
					10.20	(0.90)	-3.22		Soft grey gravelly silty CLAY with rare fibrous peat pockets. Gravel is fine, subangular to rounded of various lithologies. (TIDAL FLAT DEPOSITS)	
		10.50	D							
		11.00	B							11
		11.00	SPT(C)	N=13 (1,1/1,3,4,5)	11.10	(0.70)	-4.12		Firm reddish brown gravelly CLAY. Gravel is fine to medium, rounded to subangular. (Weathering Grade V) (MERCIA MUDSTONE)	
		11.50	B							
		11.50	ES							
		11.50	SPT(C)	50 (7,10/50 for 205mm)					End of Borehole at 11.80m	12
										13
										14
										15
										16
										17
										18
										19
										20

DRAFT

Remarks:
METHOD: Hand dug inspection pit 0.0 - 1.2m. Cable percussion 1.20m - 11.80m. Borehole terminated within bedrock upon SPT refusal.
BACKFILL: On completion hole backfilled with bentonite 8.0 - 6.1m and 0.9 - 0.2m, gravel 11.8 - 8.0m and 6.1 - 0.9m and concrete 0.2 - 0.0m. One standpipe (35mm) was installed with slotted section between 11.7 - 8.7m and a second standpipe (50mm) was installed with slotted section between 1.0 - 6.0m.
REMARKS: Bentonite seal for aquifer protection installed during drilling (6.0 - 4.0m) prior to reduction in casing diameter. Downhole magnetometry for UXO risk mitigation undertaken 5.8 - 11.1m. No anomalies encountered.

Groundwater			Chiselling		
Depth Strike (m)	Depth Casing (m)	Level After 20 Mins	Duration (hh:mm)	Top Depth (m)	Base Depth (m)
1.40			01:30 01:30	1.20 2.00	2.00 2.30

AGS

SUPPLEMENTARY HOLE INFORMATION

BHM4CAN043

Start & End of Shift Observations

Date & Time	Depth (m)	Casing (m)	Water (m)
17/12/2015 07:30:00	0.00	0.00	
17/12/2015 18:00:00	2.30	2.20	
18/12/2015 07:30:00	2.30	2.20	
18/12/2015 18:00:00	11.00	10.50	1.3
21/12/2015 07:30:00	11.00	10.50	1.9
21/12/2015 18:00:00	11.70	11.00	

Sample Information

Type/Ref	Depth (m)	Date
W1D		12-05-2016
W1S		12-05-2016
W3D		02-06-2016
W3S		02-06-2016
W2S		25-05-2016
W2D		25-05-2016
ES	0.90	
B	1.00	
D	1.50	
ES	3.00	18-12-2015
D	5.80	
ES	6.00	
B	6.50	
B	8.50	
D	10.50	
B	11.00	
B	11.50	
ES	11.50	

Standard Penetration Tests

Depth (m)	Type	Reported Result
1.20	C	N=34 (5,7/8,8,9,9)
2.00	C	71 (25 for 105mm/71 for 225mm)
3.00	C	N=38 (5,4/7,11,11,9)
4.00	C	N=16 (2,6/5,4,4,3)
5.00	C	N=33 (3,4/3,,15,15)
6.00	S	N=5 (2,1/1,2,1,1)
7.00	S	2 (2 for 225mm/2 for 225mm)
8.00	S	N=2 (1,1/1,0,1,0)
9.00	S	N=4 (1,1/1,1,1,1)
10.00	S	N=5 (1,1/1,1,1,2)
11.00	C	N=13 (1,1/1,3,4,5)
11.50	C	50 (7,10/50 for 205mm)

Groundwater Monitoring

Date & Time	Reference	Depth (mbGL)
12/05/2016 10:20:00	1D	1.92
12/05/2016 10:25:00	1S	1.93
25/05/2016 15:30:00	2D	1.96
25/05/2016 15:45:00	2S	1.99
02/06/2016 15:00:00	3S	2.12
02/06/2016 15:20:00	3D	2.05

In Situ Gas Monitoring

Depth (m)	Test No.	Result (ppm)

In Situ Vane Tests

Depth (m)	Test No.	Result (kPa)

Hand Penetrometer Testing

Depth (m)	Test No.	Result (kPa)

In Situ CBR Testing

Depth (m)	Test No.	CBR Value

Sample Types

ACM - Asbestos Containing Material
B - Bulk
C - Core (including Waxed)
CBR - CBR Mould
CPT - Cone Penetration Test
D - Disturbed
ES - Environmental Soil
EW - Environmental Water
L - Leachate
LB - Large Bulk
P - Piston
PID - Gas
R - Radiological
U - Undisturbed
UT - Undisturbed Thin Wall
W - Water
X - Explosives

DRAFT

A4 Appendix 1d

Exploratory Records (Lagoon 27SE)

Borehole Log

Exploration Associates

Drilled by	IH	Equipment and Methods	Ground Level + 5.10 m OD
Logged by	CW	Cable Percussion 150 mm diameter from 0.00m to 7.00m.	National Grid Coordinates E 337828.21 N 185570.66
Checked by			

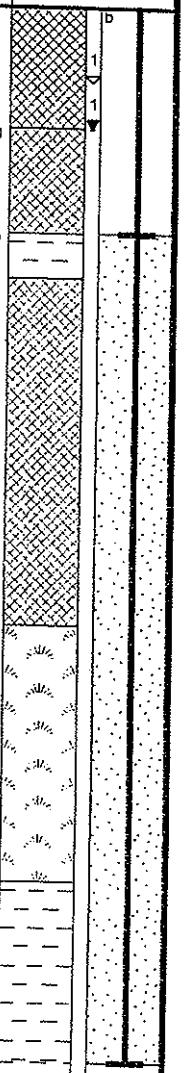
Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
			24/01/2002	
0.90	ES1			
2.00	ES2			
4.50	ES3			
6.80	ES4	kRH	24/01/2002	
7.00				

Strata

Description	Depth,Level (Thickness)
Slag (DRILLERS DESCRIPTION).	(0.80)
MADE GROUND: Dark brown slightly sandy slightly gravelly CLAY. Gravel is angular and subangular fine and medium of slag.	0.80 +4.30 (0.70)
Grey brown silty CLAY with gravels and peat (DRILLERS DESCRIPTION).	1.50 +3.60 (0.30)
MADE GROUND: Dark brown sandy slightly gravelly CLAY. Gravel is subangular fine and medium of slag and clinker.	1.80 +3.30 (2.30)
Dark brown spongy fibrous PEAT with occasional soft dark grey SILT pockets.	4.10 +1.00 (1.70)
Soft grey CLAY.	5.80 --0.70 (1.20pen)
EXPLORATORY HOLE ENDS AT 7.00 m.	7.00 --1.90

Legend



Groundwater

No.	Struck	Behaviour
1	0.80m	Rising to 0.50m after 20 mins. Sealed 2.60. Medium inflow

Remarks

Chiselling : 0.40m to 0.70m 90minutes
Hole backfill : 0.00m to 1.50m Bentonite (b). Surface protection : <none>
Standpipe installed, 50mm diameter, response zone from 1.50m to 7.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole **LGBH12**
Sheet 1 of 1

03/05/2002 11:10:50 ESGLog V2.10

BOREHOLE No: BH 18

Client : Corus Ltd. **Contractor :** Apex Drilling Ltd. **Hole Coordinates :** E337753.801 N185903.401

Project : Queensway Landfill **Logged By :** AWJ **Ground Level :** 6.659m AOD

Location : See site plan **Date :** 20-21.09.05 **Hole Depth :** 12.00m **Sheet No :** 1 of 2

Depth (m)	Elevation	Geotechnical Description	Strata Symbol	Well Details (Shallow)	Well Details (Deep)	Samples: Sample Type	Samples: From	Samples: To	Samples: U100 Blows	Standard Penetration Tests: 75 mm	150 mm	225 mm	300 mm	375 mm	450 mm	N-Value / Rec %
0	6.66	Ground Surface														
0 – 3		**Made Ground** Very dense dark grey and grey silty sandy fine to coarse angular gravel with many cobbles and occasional boulders, comprising of slag														
3	3.66															
3 – 6		**Estuarine Alluvium** Firm becoming soft grey CLAY with some small pockets of peat														
6	0.56															
6 – 8		**Peat** Firm dark brown fibrous woody PEAT														
8	-0.74															
8 – 10		**Estuarine Alluvium** Soft grey CLAY														

Rig Type : Dando 150

Drilled By : MM

Hole Diameter (mm) : 200 / 150

Casing Depth (m) : 4m and 12m 200/150mm

Log Template File : GEOSA

Chiselling :

Remarks

1 Hole excavated by backhoe to base of slag and re-drilled through

2 Casing reduced to 150mm at 3m with bentonite seal

3 installed within 200mm casing.

4

5

BOREHOLE No: BH 18

Client : Corus Ltd. | **Contractor :** Apex Drilling Ltd. | **Hole Coordinates :** E337753.801 N185903.401

Project : Queensway Landfill | **Logged By :** AWJ | **Ground Level :** 6.659m AOD

Location : See site plan | **Date :** 20-21.09.05 | **Hole Depth :** 12.00m | **Sheet No :** 2 of 2

Depth (m)	Elevation	Geotechnical Description	Strata Symbol	Well Details (Shallow)	Well Details (Deep)	Samples: Sample Type	Samples: From	Samples: To	Samples: U100 Blows	Standard Penetration Tests: 75 mm	150 mm	225 mm	300 mm	375 mm	450 mm	N-Value / Rec %
	-4.14															
11		**Estuarine Alluvium** Soft grey CLAY with some fine to coarse sub-rounded gravel														
	-5.14															
	-5.34	**Triassic Bedrock** Firm reddish brown CLAY with much fine to medium angular gravel, comprising of mudstone lithorelicts														
13																
14																
15																
16																
18																
19																
20																

Rig Type : Dando 150

Drilled By : MM

Hole Diameter (mm) : 200 / 150

Casing Depth (m) : 4m and 12m 200/150mm

Log Template File : GEOSA

Chiselling :

Remarks

1 Hole excavated by backhoe to base of slag and re-drilled through

2 Casing reduced to 150mm at 3m with bentonite seal

3 installed within 200mm casing.

4

5

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ35
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337731.68 E
Project	New M4 - Second Preliminary Ground Investigation				185614.13 N
		Drilling Rig	Terrier	Ground Level	5.78m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	21/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	21/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
21/01/2008		1.00	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 1.00m.
2.Window Sampling terminated at 1.00m due to refusal.
3.Refer to SWSJ35A.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
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Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ35
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337731.68 E
Project	New M4 - Second Preliminary Ground Investigation				185614.13 N
		Drilling Rig	Terrier	Ground Level	5.78m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	21/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	21/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt.				L1 0.00 - 1.00			
MADE GROUND: Brown coarse sand and angular fine to medium gravel of slag.		0.96 1.00	4.82 4.78				
Sampling complete at 1.00 m.							

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
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Revised	04/04/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ35A
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337732.02 E
Project	New M4 - Second Preliminary Ground Investigation				185619.65 N
		Drilling Rig	Terrier	Ground Level	5.72m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	21/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	21/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
21/01/2008		6.45	NR	0.00	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=5 (1,1,2,1,1,1)
2.00	S	N=3 (1,1,0,1,1,1)
3.00	S	N=2 (1,1,1,0,1,0)
4.00	S	N=4 (1,0,1,1,1,1)
5.00	S	N=2 (1,1,0,1,1,0)
6.00	S	N=2 (1,1,0,1,1,0)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
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Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID. **SWSJ35A** **Sheet 1 of 1**

Contract No.	F15056	Method	Window Sampling	Coordinates	337732.02 E
Project	New M4 - Second Preliminary Ground Investigation				185619.65 N
		Drilling Rig	Terrier	Ground Level	5.72m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	21/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	21/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Black slightly sandy clayey silt.				L1	0.00 - 0.80				
		0.60	5.12						
MADE GROUND: Black silty fine to coarse gravel sized fragments of clinker.				ES2	1.00	S5	S	1.00 1.45	
		1.10	4.62	D3	1.00 - 1.45				
Grey slightly sandy silty CLAY. (Estuarine Alluvium)				L4	1.00 - 1.80				
				ES5	2.00	S3	S	2.00 2.45	
				D6	2.00 - 2.45				
				ES7	3.00	S2	S	3.00 3.45	
				D8	3.00 - 3.45				
				L9	3.00 - 3.80				
				ES10	4.00	S4	S	4.00 4.53	
				D11	4.00 - 4.45				
				L12	4.00 - 4.70				
		4.45	1.27						
Dark brown pseudofibrous PEAT. (Peat)				ES13	5.00	S2	S	5.00 5.45	
				D14	5.00 - 5.45				
				L15	5.00 - 5.70				
		5.45	0.27						
Soft grey CLAY. (Estuarine Alluvium)									
		5.70	0.02						
Dark brown pseudofibrous PEAT. (Peat)				ES16	6.00	S2	S	6.00 6.45	
				D17	6.00 - 6.45				
		6.45	-0.73						
Sampling complete at 6.45 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ36
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337769.35 E
Project	New M4 - Second Preliminary Ground Investigation				185704.18 N
		Drilling Rig	Terrier	Ground Level	5.34m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	18/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	18/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
18/01/2008		6.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
18/01/2008		2.30	2.30	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=3 (1,1,1,1,0,1)
2.00	S	N=4 (1,0,1,1,1,1)
3.00	S	N=4 (1,1,1,1,1,1)
4.00	S	N=4 (1,1,1,1,1,1)
5.00	S	N=4 (1,1,1,1,1,1)
6.00	S	N=3 (1,1,1,1,0,1)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
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Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ36
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337769.35 E
Project	New M4 - Second Preliminary Ground Investigation				185704.18 N
		Drilling Rig	Terrier	Ground Level	5.34m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	18/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	18/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: black slightly sandy clayey silt.				L1	0.00 - 0.80				
		0.90	4.44						
Firm to stiff medium strength light grey mottled orangish brown silty slightly sandy CLAY with frequent fine to medium gravel sized pockets of brown clay. (Estuarine Alluvium)				ES2 D3 L4	1.00 1.00 - 1.45 1.00 - 1.80	S3	S	1.00 1.45	
				ES5 D6 L7	2.00 2.00 - 2.45 2.00 - 2.80	S4	S	2.00 2.53	
				ES8 D9 L10	3.00 3.00 - 3.45 3.00 - 3.80	S4	S	3.00 3.45	
		3.50	1.84						
Soft grey CLAY with rare fragments of organic material. (Estuarine Alluvium)				ES11 D12	4.00 4.00 - 4.45	S4	S	4.00 4.45	
				ES13 D14	5.00 5.00 - 5.45	S4	S	5.00 5.45	
				D15	6.00 - 6.45	S3	S	6.00 6.45	
		6.45	-1.11						
Sampling complete at 6.45 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
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Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ37
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337766.04 E
Project	New M4 - Second Preliminary Ground Investigation				185656.53 N
		Drilling Rig	Terrier	Ground Level	6.25m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	22/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	22/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
22/01/2008		6.45	2.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
100	2.00	100	2.00

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
22/01/2008		3.50	3.50	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.
3.50mm standpipe installed, slotted from 4.10m to 5.60m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=7 (1,2,2,2,1,2)
2.00	S	N=5 (1,1,1,2,1,1)
3.00	S	N=8 (2,2,2,2,2,2)
4.00	S	N=2 (1,0,1,0,1,0)
5.00	S	N=1 (0,0,0,0,0,1)
6.00	S	N=1 (1,0,0,0,1,0)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ37
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337766.04 E
Project	New M4 - Second Preliminary Ground Investigation				185656.53 N
		Drilling Rig	Terrier	Ground Level	6.25m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	22/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	22/01/2008

Description of Strata	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly sandy clayey silt.			ES1 0.30			
			ES2 1.00 D3 1.00 - 1.45 L4 1.00 - 1.80	S7	S 1.00 1.45	
Firm grey mottled orangish brown CLAY with occasional rootlets. (Estuarine Alluvium) ---from 1.65m becomes firm to stiff ---from 1.77m to 1.80m 1 No very thin bed of spongy brown pseudofibrous peat	1.20	5.05				
			ES5 2.00 D6 2.00 - 2.45 L7 2.00 - 2.80	S5	S 2.00 2.45	
Soft to firm grey CLAY. (Estuarine Alluvium)	2.20	4.05				
			ES8 3.00 D9 3.00 - 3.45 L10 3.00 - 3.80	S8	S 3.00 3.45	
			ES11 4.00 D12 4.00 - 4.45	S2	S 4.00 4.53	
Stiff and firm brown slightly sandy CLAY with much organic material. Estuarine Alluvium	4.35	1.90				
			ES13 5.00 D14 5.00 - 5.45 L15 5.00 - 5.80	S1	S 5.00 5.60	
Spongy black pseudofiberous PEAT. (Peat)	5.00	1.25				
			ES16 6.00 D17 6.00 - 6.45	S1	S 6.00 6.53	
Sampling complete at 6.45 m.	6.00	0.25				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
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Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ38
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337787.66 E
Project	New M4 - Second Preliminary Ground Investigation				185627.38 N
		Drilling Rig	Terrier	Ground Level	5.55m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	22/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	22/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
22/01/2008		6.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=4 (1,2,1,1,1,1)
2.00	S	N=1 (1,2,1,0,0,0)
3.00	S	N=5 (1,2,2,1,1,1)
4.00	S	N=4 (1,2,1,2,1,0)
5.00	S	N=6 (1,2,2,1,2,1)
6.00	S	N=5 (1,2,1,1,2,1)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
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Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ38
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337787.66 E
Project	New M4 - Second Preliminary Ground Investigation				185627.38 N
		Drilling Rig	Terrier	Ground Level	5.55m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	22/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	22/01/2008

Description of Strata	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly sandy clayey silt.			L2 0.00 - 0.80 ES1 0.30			
---from 0.50m with frequent fragments of organic material. Sand is medium			ES3 1.00 D4 1.00 - 1.45 L5 1.00 - 1.80	S4	S 1.00 1.45	
	1.50	4.05				
Stiff grey mottled orangish brown CLAY. (Estuarine Alluvium)						
---from 2.00m to 3.60m soft to firm			ES6 2.00 D7 2.00 - 2.45 L8 2.00 - 2.80	S1	S 2.00 2.45	
---from 2.50m firm			ES9 3.00 D10 3.00 - 3.45 L11 3.00 - 3.80	S5	S 3.00 3.45	
			ES12 4.00 D13 4.00 - 4.45 L14 4.00 - 4.80	S4	S 4.00 4.45	
	4.70	0.85				
Spongy black pseudofibrous PEAT. (Peat)			ES15 5.00 D16 5.00 - 5.45 L17 5.00 - 5.70	S6	S 5.00 5.45	
			ES18 6.00 D19 6.00 - 6.45	S5	S 6.00 6.45	
	6.45	-0.90				
Sampling complete at 6.45 m.						

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
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Revised	04/04/2005

Geotechnical Engineering Limited

BOREHOLE LOG

BH521

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 19 February 2015 — Easting 337752.2 — Scale 1 : 50

End Date 25 February 2015 — Northing 185569.1 — Ground level 6.00mOD — Depth 19.00 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
19/02/15 0800hrs	1D*	0.00 - 0.50		Vo 0.0				Greyish brown sandy angular and subangular fine to coarse slag GRAVEL. Driller notes slag boulders. (MG)			
	2B	0.20 - 0.30									
	3B	0.50 - 1.00									
	4D*	0.50 - 1.00		Vo 0.0							
	5D	1.00 - 1.45	1.00	S 26							
	6B	1.00 - 1.50							1.15	4.85	
	7D*	1.00 - 1.50		Vo 0.7				Very soft dark brownish grey peaty gravelly CLAY with frequent rootlets (up to 1mm diam) and fragments of plant material. Gravel is angular fine to coarse tarmacadam and slag. (MG)			
19/02/15 1700hrs Damp	8B	1.50 - 2.00									
	9D	2.00 - 2.45	2.00	S 5					2.00	4.00	
20/02/15 0800hrs Dry	10B	2.00 - 2.50						Very soft grey mottled black slightly gravelly silty CLAY. Gravel is angular medium and coarse sandstone and slag. (MG)			
	11D*	2.00 - 2.50		Vo 0.3							
	12B	2.50 - 3.00									
	13D*	2.50 - 3.00		Vo 0.2							
	14UT	3.00 - 3.45	3.00								
	16D	3.45 - 3.55		Vo 0.7					3.45	2.55	
	16D*	3.50 - 4.00						Very soft light bluish grey silty CLAY with rare rootlets (up to 2mm diam) and fragments of black organic material. Rare angular fine and medium sandstone gravel. Slight organic odour. (TFD)			
	15B	3.55 - 4.00		Vo 1.7							
	17D*	4.00 - 4.45	4.00	S 4							
	18D	4.00 - 4.50									
	19B	4.00 - 4.50		Vo 0.9					4.30	1.70	
	20D*	4.50 - 5.00						Spongy dark brown fibrous PEAT with frequent roots (up to 3mm diam). Organic odour. (PEAT) 4.50 - 5.00m: Tending to light brownish grey peaty silty clay.			
	21B	4.50 - 5.00									
	22D*	4.50 - 5.00		Vo 0.9							
	23UT	5.00 - 5.45	5.00								
	24D	5.45 - 5.50									
	25B	5.50 - 6.00									
	26D*	5.50 - 6.00		Vo 0.1							
	27D	6.00 - 6.10							6.00	0.00	
	28B	6.00 - 6.50						Very soft grey silty CLAY with rare fragments (up to 20mm) of wood and black organic material and rare thin laminae of grey clay. Organic odour. (TFD)			
	29D*	6.00 - 6.50		Vo 0.2							
	30D	6.50 - 6.95	6.50	S<1							
20/02/15 1300hrs 5.90m	31B	6.50 - 7.00									
23/02/15 0830hrs 5.90m	32B	7.00 - 7.50									
	33B	7.50 - 8.00									

Continued Next Page

{8.00}

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.00m. Cable percussion (200mm) 1.00-2.00m and 150mm 2.00-13.00m. Waterflush rotary core drilled (116mm) 13.00-19.00m. CASING: 200mm diam to 2.00m, 150mm diam to 12.95m.

BACKFILL: On completion, borehole backfilled with bentonite pellets 19.00-11.20m and gravel 11.20-11.00m. A slotted standpipe (50mm) with geo-sock was installed to 11.00m, granular response zone 11.20-8.80m and bentonite seal 8.80-6.20m. A second slotted standpipe (35mm) with geo-sock was installed to 6.00m, granular response zone 6.20-4.30m, bentonite seal 4.30-0.35m, gravel 0.35-0.25m, concrete and stopcock cover 0.25-0.00m.

REMARKS: Hole advanced by chiselling 12.00-13.00m (2hr). Downhole magnetometry for UXO risk mitigation undertaken 0.00-12.00m. No anomalies encountered. Bentonite seal for aquifer protection installed during drilling 2.00m, prior to reduction in casing diameter. Permeability test undertaken at 6.00-7.00m. MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
6.50	5.00	5.90	20	Groundwater not encountered prior to use of water flush.

AGS

CONTRACT	CHECKED
30238	EC

Geotechnical Engineering Ltd, Tel. 01452 527743 30238 YODA.GPJ TRIALJH.GPJ GEOTECH.GLB 16/07/2015 16:02:31 TP EC

Geotechnical Engineering Limited

BOREHOLE LOG

BH521

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 19 February 2015 — Easting 337752.2 — Scale 1 : 50

End Date 25 February 2015 — Northing 185569.1 — Ground level 6.00mOD — Depth 19.00 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
	34UT	8.00 - 8.45	8.00								
	35B	8.00 - 8.50									
	36B	8.50 - 9.00									
									9.50	-3.50	
	37D	9.50 - 9.95	9.50	S 10				Firm brownish yellow, light brown and dark grey slightly sandy slightly gravelly CLAY with low subangular sandstone cobble content. Gravel is subangular fine and medium sandstone and mudstone. (TFD)			
	38B	10.50 - 11.00									
									11.00	-5.00	
	39D	11.00 - 11.45	11.00	S 13				Firm becoming stiff with depth dark reddish brown slightly sandy slightly gravelly to gravelly CLAY. Gravel is angular and subangular fine and medium mudstone lithorelicts. (MMG)			
23/02/15 1700hrs 7.80m	40B	11.50 - 12.00									
	41D	12.00 - 12.23	12.00	S*100					12.00	-6.00	
24/02/15 0800hrs 7.80m	42B	12.00 - 12.50						Extremely weak reddish brown MUDSTONE with rare light greenish grey reduction spots (up to 10mm) recovered as slightly clayey sandy subangular fine to coarse gravel with a low cobble content. (MMG) (Grade II/III)			
24/02/15 1700hrs 8.00m	43D	12.50 - 12.61	12.50	S*214							
	44D	13.00 - 13.10	12.95	S*375					13.00	-7.00	
25/02/15 1005hrs 8.00m	45C	13.00 - 14.50			100 15 0	NA		Stiff fissured reddish brown mottled bluish grey gravelly CLAY. Gravel is subangular fine to coarse lithorelicts of very stiff clay to extremely weak mudstone. (MMG) (Grade III) 13.75 - 13.80m: Weak reddish brown thinly laminated mudstone. 14.00 - 14.10m: Weak reddish brown thinly laminated mudstone. 14.10 - 14.15m: 30mm band of light bluish grey silty clay.			
						NA			14.20	-8.20	
	46C	14.50 - 16.00	12.95		100			Stiff fissured reddish brown gravelly CLAY. Gravel is subangular fine to coarse lithorelicts of very stiff clay to extremely weak mudstone. (MMG) (Grade III) 14.25 - 14.40m: Stiff reddish brown mottled light bluish grey silty clay. 15.10 - 15.25m: Stiff light bluish grey silty clay. 15.70 - 16.00m: Tending to extremely weak thinly laminated reddish brown mudstone.			
	47C	16.00 - 17.50	12.95		100						
	48C	17.50 - 19.00	12.95		100						
								Continued Next Page	{18.00}		

water strike (m)	casing (m)	rose to (m)	time to rise (m)	remarks
				Groundwater not encountered prior to use of water flush.

AGS

CONTRACT 30238

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Geotechnical Engineering Limited

BOREHOLE LOG

BH521

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 19 February 2015 — Easting 337752.2 — Scale 1 : 50

End Date 25 February 2015 — Northing 185569.1 — Ground level 6.00mOD — Depth 19.00 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	I_f	instru -ment	description	depth (m)	reduced level (m)	legend
									18.35 - 18.40m: Thin horizontal lamination of gypsum.			
25/02/15 1320hrs 2.62m							NI		Extremely weak thinly laminated MUDSTONE. Fractures are subhorizontal to 20° very closely spaced planar rough with clay veneer. (MMG) (Grade II)	18.80	-12.80	
									Borehole completed at 19.00m.	19.00	-13.00	
										{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered prior to use of water flush.

AGS

CONTRACT 30238

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Geotechnical Engineering Limited

TRIAL PIT LOG

TP508

CLIENT	WELSH GOVERNMENT					Sheet	1 of 2
SITE	M4 CORRIDOR AROUND NEWPORT					Scale	1 : 25
Start Date	11 February 2015	Easting	337807.5				
End Date	11 February 2015	Northing	185569.0	Ground level	5.90mOD	Depth	4.30 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
				Dark brown sandy angular and subangular fine to coarse slag GRAVEL. (MADE GROUND) (MG)			
	1B		0.50				
	2D*	Vo 0.2	0.50				
				0.75 - 0.90m: Light yellowish brown slag.			
					0.90	5.00	
				Firm locally stiff dark bluish grey slightly sandy CLAY. (MADE GROUND) (MG)			
	3B	H 56	1.00				
	4D*	Vo 0.7	1.00				
					1.30	4.60	
				Firm locally stiff light grey mottled light orangish brown slightly sandy CLAY. (TFD)			
	5B	H 71	2.00				
	6D*	Vo 0.4	2.00				
					2.60	3.30	
				Soft locally very soft light bluish grey sandy CLAY with frequent organic fragments (up to 3mm diam.). (TFD)			
	D*	Vo 0.1	3.00				
	7B	H 25	3.00				
	8D*	Vo 0.2	3.00				

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater not encountered.
Trial pit sides remained stable and vertical.
Trial pit dimensions 0.80x2.50x4.30m.
On completion, the trial pit was backfilled with materials arising.
Trial pit terminated at 4.30m due to the strength of the ground.

Sketch of Foundation - Not to scale. All dimensions in metres.

CONTRACT	CHECKED
30238	EC

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

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Geotechnical Engineering Limited

TRIAL PIT LOG

TP508

CLIENT	WELSH GOVERNMENT					Sheet	2 of 2
SITE	M4 CORRIDOR AROUND NEWPORT					Scale	1 : 25
Start Date	11 February 2015	Easting	337807.5				
End Date	11 February 2015	Northing	185569.0	Ground level	5.90mOD	Depth	4.30 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
Dry	9B	H 33	4.00				
					4.30	1.60	
				Trial pit completed at 4.30m.			

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater not encountered.
Trial pit sides remained stable and vertical.
Trial pit dimensions 0.80x2.50x4.30m.
On completion, the trial pit was backfilled with materials arising.
Trial pit terminated at 4.30m due to the strength of the ground.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

AGS

CONTRACT	CHECKED
30238	EC

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A5 Appendix 1e

Exploratory Records (Lagoon 26)

Borehole Log

Exploration Associates

Drilled by	IH	Equipment and Methods	Ground Level + 4.96 m OD
Logged by	LM	Cable Percussion 150 mm diameter from 0.00m to 7.00m.	National Grid E 337621.91
Checked by			Coordinates N 185568.04

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
			25/01/2002	
1.90	ES1			
5.00	ES2			
			25/01/2002	dry
6.80	ES3			

Strata

Description	Depth,Level (Thickness)
Slag (DRILLERS DESCRIPTION).	(0.80)
Grey clayey SILT with slag (DRILLERS DESCRIPTION).	0.80 +4.16 (0.80)
MADE GROUND : Soft dark brown grey sandy gravelly CLAY. Gravel is subangular and subrounded fine and medium of ash and clinker. Driller reports some peat.	1.60 +3.36 (1.10)
PEAT (DRILLERS DESCRIPTION).	2.70 +2.26 (0.70)
Green grey silty CLAY (DRILLERS DESCRIPTION).	3.40 +1.56 (1.50)
Soft grey CLAY and black spongy pseudofibrous PEAT.	4.90 +0.06 (1.20)
Soft grey CLAY.	6.10 -1.14 (0.90pen)
EXPLORATORY HOLE ENDS AT 7.00 m.	7.00 -2.04

Legend: b

Groundwater
Not encountered during drilling.

Remarks
Chiselling : 0.40m to 0.60m 30minutes
Hole backfill : 0.00m to 1.50m Bentonite (b). Surface protection : <none>
Standpipe installed, 50mm diameter, response zone from 1.50m to 7.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
LGBH9
Sheet 1 of 1

03/05/2002 11:11:45 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	GR	Equipment and Methods	Ground Level + 12.24 m OD
Logged by	LM	Cable Percussion 150 mm diameter from 0.00m to 15.00m.	National Grid Coordinates E 337712.92 N 185594.87
Checked by			

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
1.00	ES1		25/01/2002	
			25/01/2002 3.50	dry
			28/01/2002 3.50	dry

Strata

Description	Depth,Level (Thickness)	Legend
MADE GROUND: Dark grey and brown sandy GRAVEL. Gravel is angular to subrounded fine to coarse of ash and slag.	(10.60)	c, b, g

Groundwater

No.	Struck	Behaviour
1	7.50m	Rising to 7.40m after 20 mins.

Remarks

Chiselling : 1.00m to 3.50m 315minules, 3.50m to 4.00m 60minutes, 4.20m to 4.60m 60minutes, 4.80m to 5.20m 60minutes, 6.00m to 6.50m 60minutes, 6.85m to 7.70m 30minutes
Hole backfill : 0.00m to 0.50m Concrete (c), 0.50m to 1.50m Bentonite (b), 1.50m to 10.00m Grout (g), 10.00m to 11.00m Bentonite (b). Surface protection : Stop Cock Cover
Standpipe installed, 50mm diameter, response zone from 11.00m to 15.00m.

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole **LGBH10**
Sheet 1 of 2

03/05/2002 11:10:27 ESGLog v2.10

Borehole Log

Exploration Associates

Drilled by	GR	Equipment and Methods	Ground Level + 12.24 m OD
Logged by	LM	See sheet 1	National Grid Coordinates E 337712.92 N 185594.87
Checked by			

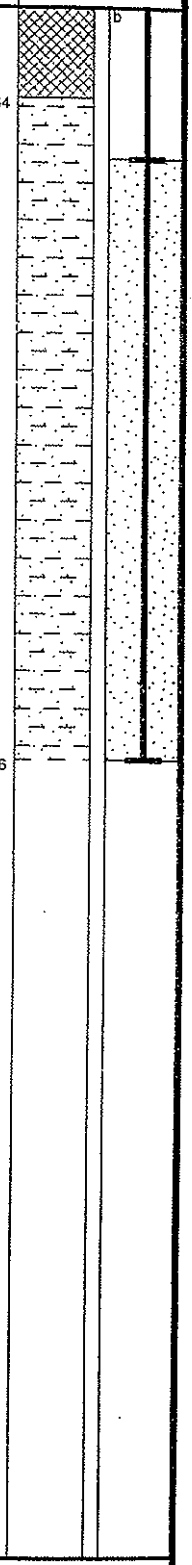
Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
10.00	ES2			
11.50	ES3			
			28/01/2002 13.50	
			30/01/2002 13.50	11.00
			30/01/2002	
15.00 15.00	ES4	kRH		

Strata

Description	Depth,Level (Thickness)
As sheet 1	(10.60)
	10.60 +1.64
Soft to firm light grey mottled brown slightly sandy CLAY with rare pockets of decaying plant matter.	(4.40pen)
EXPLORATORY HOLE ENDS AT 15.00 m.	15.00 -2.76

Legend



Groundwater
No. Struck Behaviour

Remarks

Notes : For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.
Scale 1 : 50

Project	ENVIRONMENTAL INVESTIGATION AT LLANWERN STEELWORKS
Project no.	152002
Carried out for	Corus plc

Borehole
LGBH10
Sheet 2 of 2

03/05/2002 11:10:31 ESGLog v2.10

BOREHOLE No: BH 17

Client : Corus Ltd. **Contractor :** Apex Drilling Ltd. **Hole Coordinates :** E337622.996 N185579.20

Project : SSQ Landfill Llanwern **Logged By :** AWJ **Ground Level :** 5.310m AOD

Location : See site plan **Date :** 03-04.10.05 **Hole Depth :** 11.50m **Sheet No :** 1 of 2

Depth (m)	Elevation	Geotechnical Description	Strata Symbol	Well Details (Shallow)	Well Details (Deep)	Samples: Sample Type	Samples: From	Samples: To	Samples: U100 Blows	Standard Penetration Tests: 75 mm	150 mm	225 mm	300 mm	375 mm	450 mm	N-Value / Rec %
0	0.00	Ground Surface														
	-0.50	**Made Ground** Dense dark grey and grey silty sandy fine to coarse angular gravel with many cobbles and occasional boulders, comprising of slag														
1		**Estuarine Alluvium** Firm becoming soft greyish brown becoming grey CLAY														
3																
	-3.90															
4		**Peat** Firm dark brown fibrous woody PEAT														
5																
6	-6.20															
		Estuarine Alluvium Soft grey CLAY with some fine to coarse sub-rounded gravel														
8																
9																
10																

Rig Type : Dando 150

Drilled By : MM

Hole Diameter (mm) : 200

Casing Depth (m) : 11.50m

Log Template File : GEOSA

Chiselling :

Remarks

1 Hole excavated by backhoe to base of upper clayand re-drilled through

2 Casing reduced to 150mm at 7m with bentonite seal

3 installed within 200mm casing.

4

5

BOREHOLE No: BH 17

Client : Corus Ltd. **Contractor :** Apex Drilling Ltd. **Hole Coordinates :** E337622.996 N185579.20

Project : SSQ Landfill Llanwern **Logged By :** AWJ **Ground Level :** 5.310m AOD

Location : See site plan **Date :** 03-04.10.05 **Hole Depth :** 11.50m **Sheet No :** 2 of 2

Depth (m)	Elevation	Geotechnical Description	Strata Symbol	Well Details (Shallow)	Well Details (Deep)	Samples: Sample Type	Samples: From	Samples: To	Samples: U100 Blows	Standard Penetration Tests: 75 mm	150 mm	225 mm	300 mm	375 mm	450 mm	N-Value / Rec %
11	-11.00															
	-11.50	**Triassic Bedrock** Firm reddish brown CLAY with much fine to medium angular gravel, comprising of mudstone lithorelicts														
13																
14																
15																
16																
18																
19																
20																

Rig Type : Dando 150

Drilled By : MM

Hole Diameter (mm) : 200

Casing Depth (m) : 11.50m

Log Template File : GEOSA

Chiselling :

Remarks

1 Hole excavated by backhoe to base of upper clayand re-drilled through

2 Casing reduced to 150mm at 7m with bentonite seal

3 installed within 200mm casing.

4

5

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Header

Contract No.	F15056	Method	Cable Percussion & Rotary	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core barrel	Cemetrix	Date Completed	13/01/2008
		Core bit	8 inch Hammer		

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
17/12/2007	1730	10.30	10.30	DRY	End of Shift
11/01/2008	0730	10.30	10.40	DRY	Start of Shift
11/01/2008	1730	10.70	10.70	DRY	End of Shift
12/01/2008	0730	10.70	10.70	DRY	Start of Shift
12/01/2008	1730	14.50	14.50	DRY	End of Shift
13/01/2008	0730	14.50	14.50	DRY	Start of Shift
13/01/2008	1730	20.50	19.50	DRY	End of Hole

CABLE PERCUSSION DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling Hours	Remarks
10.20	10.70	6.00	Chiselling
10.70	11.50	5.00	Chiselling
20.20	20.50	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	10.30	200	10.30
150	20.50	150	19.50

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
13/01/2008		14.80	14.80	NR	Seepage	14.80	NS

ROTARY DRILLING DETAILS

From depth	To depth	Flush type	Flush return	Core diameter
0.00	10.30	Air	Good	0*

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm	Casing	Water Depth
12.00	S	N=20 (3,4,4,5,5,6)	11.50	DRY
14.00	S	N=25 (4,5,5,6,7,7)	13.50	DRY
16.00	S	N=2 (1,1,0,1,0,1)	15.50	15.80
18.00	S	N=2 (1,0,1,0,1,0)	17.50	17.80
19.50	S	50/200mm (9,13,14,16,20)	19.00	DRY
20.50	S	50/20mm (25,50)	19.50	DRY

* Seating blows only.

GENERAL NOTES

1. Rotary Openhole cemetrix drilling from GL to 10.30m.
2. Cable Percussive boring from 10.20m to 20.50m.
3. 50mm standpipe installed, slotted from 9.50m to 11.50m.
4. 0.00* indicates openhole drilling.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, hard strata time in hours

Form	ARIAL COMBINED HEADER
Version	3.04
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Sheet 1 of 3

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel	Cemetrix	Date Completed	13/01/2008
		Core Bit	8 inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring	Blow Count TCR	SCR	RQD	SPT type, N & depth	Install-ation
MADE GROUND: Ash and steel clinker. (Driller's description)									
		6.00	7.24						
MADE GROUND: Clay and gravel. (Driller's description)									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
Version	3.10
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Sheet 2 of 3

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel	Cemetrix	Date Completed	13/01/2008
		Core Bit	8 inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring		Blow Count TCR / SCR / RQD	SPT type, N & depth	Install-ation
MADE GROUND: Clay and gravel. (Driller's description)		10.20	3.04					
MADE GROUND: Very compact slag fill with large fragments. (Driller's description)				ES1	11.30			
Brownish grey silty CLAY. (Estuarine Alluvium)		11.50	1.74	ES1 D2 U3	11.50 11.50 11.50-11.95	(21)		
---from 12.00m firm to stiff				D4 D5	12.00 12.00		S20 12.00 12.45	
				ES6 B7	12.50 12.50			
				D8	13.00			
Firm brown fibrous PEAT. (Peat)		13.50	-0.26	ES9 U10	13.50 13.50-13.95	(32)		
				D11 D12	14.00 14.00		S25 14.00 14.45	
				D13 ES14	14.50 14.50			
Grey slightly silty sandy CLAY with very closely spaced fine to coarse gravel sized pockets of pseudofibrous locally amorphous peat. Sand is fine. (Estuarine Alluvium)		14.80	-1.56					
				D15 ES16 U17	15.50 15.50 15.50	(6)		
				D18 D19	16.00 16.00		S2 16.00 16.45	
				ES20	16.50			
				D21 B22	17.00 17.00-17.50			
Grey slightly sandy SILT. Sand is fine to medium		17.50	-4.26	U23	17.50	(5)		
				D24 D25	18.00 18.00		S2 18.00 18.53	
Stiff reddish brown mottled grey slightly gravelly clay. Gravel is angular fine to coarse (Weathered Mudstone). (Mercia Mudstone Group)		18.90	-5.66	D26 U27	19.00 19.00	(110)		
---from 19.50m very stiff				D28 D29	19.50 19.50		S50/200mm 19.50 19.85	

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
Version	3.10
Revised	17/12/2007

NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE & ROTARY

Hole ID.
SBHJ05
Sheet 3 of 3

Contract No.	F15056	Method	Rotary & Cable Percussion	Coordinates	337257.91 E
Project	New M4 - Second Preliminary Ground Investigation				185693.20 N
		Drilling Rig	Dando Tractor/Dando	Ground Level	13.24m AOD
Client	Transport Wales, Welsh Assembly Government	Drillers	MM/PW	Orientation	Vertical
		Logged by	DH	Date Started	17/12/2007
Consultant	Ove Arup & Partners Ltd	Core Barrel	Cemetrix	Date Completed	13/01/2008
		Core Bit	8 inch Hammer		

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling & coring		Blow Count TCR	SCR	RQD	SPT type, N & depth	Install-ation
Stiff reddish brown mottled grey slightly gravelly clay. Gravel is angular fine to coarse (Weathered Mudstone). (Mercia Mudstone Group)				D30	20.00					
		20.50	-7.26	D31	20.50				S50/20mm 20.50 20.55	
Borehole complete at 20.50 m.										

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL COMBINED LOG
Version	3.10
Revised	17/12/2007

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ06 CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	337599.88 E
Project	New M4 - Second Preliminary Ground Investigation				185578.07 N
		Drilling Rig	Dando	Ground Level	6.18m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	15/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	17/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
15/01/2008	1730	4.50	3.50	DRY	End of Shift
16/01/2008	0730	4.50	3.50	4.30	Start of Shift
16/01/2008	1730	12.50	12.00	7.20	End of Shift
17/01/2008	0730	12.50	12.00	3.20	Start of Shift
17/01/2008	1730	14.90	13.00	7.60	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
14.30	14.60	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	1.50	200	1.50
150	14.90	150	13.00

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Falling head test conducted from 4.00m to 5.00m.
2. Cable Percussive boring from GL to 14.90m.
3. 50mm standpipe installed, slotted from 3.10m to 4.10m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.50	S	N=8 (1,1,2,2,2,2)	1.70	DRY
2.70	S	N=7 (1,1,2,2,1,2)	2.00	DRY
4.00	S	N=9 (1,2,2,2,2,3)	3.30	DRY
6.00	S	N=6 (1,2,1,2,1,2)	5.30	1.80
8.00	S	N=6 (1,1,1,1,2,2)	7.30	4.80
10.00	S	N=8 (1,1,2,2,2,2)	9.20	6.20
12.00	S	N=21 (2,3,4,5,6,6)	11.40	7.60
13.10	S	50/150mm (9,12,19,27,4)	12.50	3.50
14.00	S	50/155mm (5,11,12,24,14)	13.00	4.70
14.60	S	50/155mm (10,14,19,26,5)	13.00	7.60

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ06 CP
Sheet 1 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	337599.88 E
Project	New M4 - Second Preliminary Ground Investigation				185578.07 N
		Drilling Rig	Dando	Ground Level	6.18m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	15/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	17/01/2008

Description of Strata	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Slag and stone. (Driller's description)			ES1 0.30			
	0.60	5.58				
Stiff orangish brown grey mottled slightly sandy slightly gravelly CLAY with occasional rootlets. Sand is fine. Gravel is angular fine of mudstone (Estuarine Alluvium)			D2 0.70 ES3 1.00 U4 1.00 - 1.45			
	1.50	4.68	D5 1.50 D6 1.50 - 1.95	S8	S 1.50	1.95
Soft dark grey CLAY. (Estuarine Alluvium)						
	2.00	4.18	ES7 2.00 D8 2.10 U9 2.20 - 2.65	(10)		
Plastic dark brown amorphous PEAT. (Peat)	2.46	3.72				
Firm greenish grey silty CLAY with occasional organic fragments. (Organic odour) (Estuarine Alluvium)			D10 2.70 D11 2.70 - 3.15 ES12 3.00	S7	S 2.70	3.15
	3.30	2.88	D13 3.40 U14 3.50 - 3.95	(9)		
Plastic dark brown amorphous PEAT. (Peat)	3.70	2.48				
Soft to firm greenish grey silty CLAY with closely spaced medium to coarse gravel sized pockets of light brown fibrous peat (Organic odour). (Estuarine Alluvium)			D15 4.00 ES16 4.00 D17 4.00 - 4.45 B18 4.50 - 5.00 ES19 5.00	S9	S 4.00	4.45
	5.30	0.88	D20 5.40 U21 5.50 - 5.95	(10)		
Plastic brown pseudofibrous PEAT. (Peat)						
---from 6.00m becomes spongy	6.10	0.08	D22 6.00 D23 6.00 - 6.45	S6	S 6.00	6.45
Very soft grey silty CLAY. (Estuarine Alluvium)			D24 7.00 U25 7.50 - 7.95	(9)		
---from 8.00m to 8.50m with occasional fine to medium gravel sized shell fragments			D26 8.00 D27 8.00 - 8.45 B28 8.50 - 9.00 U29 9.50 - 9.95	S6	S 8.00	8.45

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ06 CP
Sheet 2 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	337599.88 E
Project	New M4 - Second Preliminary Ground Investigation				185578.07 N
		Drilling Rig	Dando	Ground Level	6.18m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	15/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	17/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
Very soft grey silty CLAY. (Estuarine Alluvium) ---from 10.00m becomes slightly sandy. Sand is fine				D30 10.00 D31 10.00 - 10.45		S8	S	10.00 10.45	
		11.00	-4.82	D32 11.00					
Very soft to soft grey silty CLAY with closely spaced coarse gravel sized pockets of black pseudofibrous peat. (Estuarine Alluvium)				U33 11.50 - 11.95		(70)			
		11.95	-5.77	B34 12.00 D35 12.00 - 12.45		S21	S	12.00 12.45	
Soft brownish grey slightly sandy CLAY with occasional angular cobbles of sandstone. Sand is fine to medium. (Estuarine Alluvium)									
		12.50	-6.32	U36 12.70 - 13.05					
Very stiff reddish brown locally mottled greenish grey sandy slightly gravelly CLAY. Gravel is angular fine to medium (Weathered Mudstone). (Mercia Mudstone Group)				D37 13.10 D38 13.10 - 13.55		S50/150mm	S	13.10 13.40	
				D39 13.80					
				D40 14.00 - 14.30		S50/155mm	S	14.00 14.31	
				D41 14.60 - 14.90		S50/155mm	S	14.60 14.91	
		14.90	-8.72						
Cable Percussion boring complete at 14.90 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ07 CP
Header

Contract No.	F15056	Method	Cable Percussion	Coordinates	337711.12 E
Project	New M4 - Second Preliminary Ground Investigation				185569.62 N
		Drilling Rig	Dando	Ground Level	5.79m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	12/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	14/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
12/01/2008	1730	3.00	2.80	DRY	End of Shift
13/01/2008	0730	3.00	2.80	2.60	Start of Shift
13/01/2008	1730	10.00	9.20	5.50	End of Shift
14/01/2008	0730	10.00	9.20	4.10	Start of Shift
14/01/2008	1730	13.00	11.50	9.30	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks
0.50	0.70	2.00	Chiselling
12.70	13.00	1.00	Chiselling

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	1.70	200	1.70
150	13.30	150	11.50

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Cable Percussive boring from GL to 13.00m.
2.50mm standpipe installed, slotted from 8.40m to 10.40m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth
1.00	S	N=13 (2,2,3,4,3,3)	1.00	0.80
2.00	S	N=7 (1,2,1,2,2,2)	1.90	DRY
4.00	S	N=9 (1,1,2,2,2,3)	3.30	3.30
6.00	S	N=4 (1,0,1,1,1,1)	5.40	4.10
8.00	S	N=3 (1,0,1,0,1,1)	7.30	5.00
10.00	S	N=7 (1,0,0,1,2,4)	9.30	4.20
11.20	S	N=46 (5,7,9,10,13,14)	11.50	6.10
12.30	S	50/235mm (7,11,12,16,18,4)	11.50	8.60
13.00	S	50/190mm (8,13,15,19,16)	11.50	9.30

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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NORWEST HOLST

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ07 CP
Sheet 1 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	337711.12 E
Project	New M4 - Second Preliminary Ground Investigation				185569.62 N
		Drilling Rig	Dando	Ground Level	5.79m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	12/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	14/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Slag, stone. (Driller's description)				ES1	0.30				
		0.50	5.29	B2	0.50 - 1.00				
MADE GROUND: Grey slightly gravelly clay. Gravel sized fragments are angular fine to coarse of slag and sandstone.				ES3	1.00	S13	S	1.00	
				D4	1.00 - 1.45			1.45	
				U5	1.50 - 1.95	(11)			
---from 2.00m with frequent coarse gravel sized pockets of brown pseudofibrous peat				D6	2.00	S7	S	2.00	
				ES7	2.00			2.45	
				D8	2.00 - 2.45				
				ES7	2.20				
				B9	2.50 - 3.00				
				ES10	3.00				
				U11	3.50 - 3.95	(11)			
		4.00	1.79	D12	4.00	S9	S	4.00	
Spongy brownish black pseudofibrous PEAT. (Peat)				ES13	4.00			4.45	
---from 4.20m becomes plastic				D14	4.00 - 4.45				
---from 4.20m to 4.45m with occasional coarse gravel sized pockets of grey silt									
---from 4.45m to 5.70m with occasional pockets of brown pseudofibrous peat				D15	5.00				
				ES16	5.00				
				U17	5.50 - 5.95	(10)			
		5.86	-0.07						
Very soft grey silty CLAY with occasional coarse gravel sized pockets of black pseudofibrous peat and occasional gravel sized organic fragments. (Estuarine Alluvium)				D18	6.00	S4	S	6.00	
				D19	6.00 - 6.45			6.53	
		7.00	-1.21	B20	7.00 - 7.50				
Extremely low strength grey slightly clayey slightly sandy SILT. (Estuarine Alluvium)				U21	7.50 - 7.95				
				D22	8.00	S3	S	8.00	
				D23	8.00 - 8.45			8.53	
---from 9.00m becomes slightly sandy. Sand is fine				D24	9.00				
				U25	9.50 - 9.95	(6)			

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
SBHJ07 CP
Sheet 2 of 2

Contract No.	F15056	Method	Cable Percussion	Coordinates	337711.12 E
Project	New M4 - Second Preliminary Ground Investigation				185569.62 N
		Drilling Rig	Dando	Ground Level	5.79m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	AL	Orientation	Vertical
		Logged by	DH	Date Started	12/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	14/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
Stiff reddish brown locally mottled greenish grey slightly gravelly clay. Gravel is angular to subangular fine to coarse mudstone (Weathered Mudstone). (Mercia Mudstone Group)		10.00	-4.21	D26	10.00	S7	S	10.00	
---from 10.00m to 11.20m firm				D27	10.00 - 10.45			10.53	
				D28	10.50				
				D30	11.20	S46	S	11.20	
				D31	11.20 - 11.45			11.65	
				D32	12.00				
---from 12.00m very stiff				D33	12.30 - 12.70	S50/235mm	S	12.30	
								12.69	
				D34	13.00 - 13.30	S50/190mm	S	13.00	
								13.34	
		13.30	-7.51						
Cable Percussion boring complete at 13.30 m.									

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of boring, progress and water strikes. See legend sheet for key to symbols.

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BOREHOLE LOG - ROTARY

Hole ID.
SBHJ07 RC
Header

Contract No.	F15056	Method	Rotary Openholing	Coordinates	337708.07 E
Project	New M4 - Second Preliminary Ground Investigation	Drilling Rig	Dando Tractor		185608.64 N
		Driller	ME	Ground Level	12.71m AOD
Client	Transport Wales, Welsh Assembly Government	Logged by	ME	Orientation	Vertical
		Core barrel	-	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd	Core bit	8 Inch Hammer	Date Completed	13/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
13/12/2007	1100	6.20	6.20	DRY	End of Hole

DRILLING DETAILS

From depth	To depth	Flush type	Flush return	Core diameter
0.00	6.20	Air	Good	0.00*

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	6.20	200	6.20

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Rotary Openhole cemetrix drilling from GL to 6.20m.
2. Borehole terminated at 6.20m due to obstruction.
3. Refer to SBHJ07A RC for redrill.
4. 0.00* indicates openhole drilling.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - ROTARY

Hole ID.
SBHJ07 RC
Sheet 1 of 1

Contract No.	F15056	Method	Rotary Openholing	Coordinates	337708.07 E
Project	New M4 - Second Preliminary Ground Investigation	Drilling Rig	Dando Tractor		185608.64 N
		Driller	ME	Ground Level	12.71m AOD
Client	Transport Wales, Welsh Assembly Government	Logged by	ME	Orientation	Vertical
		Core barrel	-	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd	Core bit	8 Inch Hammer	Date Completed	13/12/2007

Description of Strata	Legend	Drilled Length	Datum Level	Coring and Sampling	TCR	SCR	RQD		SPT N & depth	Install-ation
IRON/STEEL SLAG. (Driller's description)										
Rotary drilling complete at 6.20 m.		6.20	6.51							

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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BOREHOLE LOG - ROTARY

Hole ID.
SBHJ07A RC
Header

Contract No.	F15056	Method	Rotary Openholing	Coordinates	337707.69 E
Project	New M4 - Second Preliminary Ground Investigation	Drilling Rig	Dando Tractor		185607.02 N
		Driller	ME	Ground Level	12.73m AOD
Client	Transport Wales, Welsh Assembly Government	Logged by	ME	Orientation	Vertical
		Core barrel	-	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd	Core bit	8 Inch Hammer	Date Completed	13/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
13/12/2007	1430	6.20	6.20	DRY	End of Hole

DRILLING DETAILS

From depth	To depth	Flush type	Flush return	Core diameter
0.00	6.20	Air	Good	0.00*

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	6.20	200	6.20

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Rotary Openhole cemetrix drilling from GL to 6.20m.
2. Borehole terminated at 6.20m due to obstruction.
3. Refer to SBHJ07B RC for redrill.
4. 0.00* indicates openhole drilling.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes.

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BOREHOLE LOG - ROTARY

Hole ID.
SBHJ07A RC
Sheet 1 of 1

Contract No.	F15056	Method	Rotary Openholing	Coordinates	337707.69 E
Project	New M4 - Second Preliminary Ground Investigation	Drilling Rig	Dando Tractor		185607.02 N
		Driller	ME	Ground Level	12.73m AOD
Client	Transport Wales, Welsh Assembly Government	Logged by	ME	Orientation	Vertical
		Core barrel	-	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd	Core bit	8 Inch Hammer	Date Completed	13/12/2007

Description of Strata	Legend	Drilled Length	Datum Level	Coring and Sampling	TCR	SCR	RQD		SPT N & depth	Install-ation
IRON/STEEL and SLAG. (Driller's description)										
Rotary drilling complete at 6.20 m.		6.20	6.53							

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - ROTARY

Hole ID.
SBHJ07B RC
Header

Contract No.	F15056	Method	Rotary Openholing	Coordinates	337708.26 E
Project	New M4 - Second Preliminary Ground Investigation	Drilling Rig	Dando Tractor		185601.09 N
		Driller	ME	Ground Level	12.71m AOD
Client	Transport Wales, Welsh Assembly Government	Logged by	ME	Orientation	Vertical
		Core barrel	-	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd	Core bit	8 Inch Hammer	Date Completed	13/12/2007

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
13/12/2007	1730	6.20	6.20	DRY	End of Hole

DRILLING DETAILS

From depth	To depth	Flush type	Flush return	Core diameter
0.00	6.20	Air	Good	0.00*

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	6.20	200	6.20

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Rotary Openhole cemetrix drilling from GL to 6.20m.
2. Borehole terminated at 6.20m due to obstruction.
3. Borehole moved to east of bund, see SBHJ07 CP for details.
4. 0.00* indicates openhole drilling.

SPT DETAILS

Depth	Type	Incremental blow count/penetration	Casing	Water Depth

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes.

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BOREHOLE LOG - ROTARY

Hole ID.
SBHJ07B RC
Sheet 1 of 1

Contract No.	F15056	Method	Rotary Openholing	Coordinates	337708.26 E
Project	New M4 - Second Preliminary Ground Investigation	Drilling Rig	Dando Tractor		185601.09 N
		Driller	ME	Ground Level	12.71m AOD
Client	Transport Wales, Welsh Assembly Government	Logged by	ME	Orientation	Vertical
		Core barrel	-	Date Started	13/12/2007
Consultant	Ove Arup & Partners Ltd	Core bit	8 Inch Hammer	Date Completed	13/12/2007

Description of Strata	Legend	Drilled Length	Datum Level	Coring and Sampling	TCR	SCR	RQD		SPT N & depth	Install-ation
IRON/STEEL SLAG. (Driller's description)										
Rotary drilling complete at 6.20 m.		6.20	6.51							

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

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Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ31
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337607.95 E
Project	New M4 - Second Preliminary Ground Investigation				185627.00 N
		Drilling Rig	Terrier	Ground Level	10.34m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	14/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	14/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
14/01/2008		6.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
14/01/2008		2.30	2.30	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=0 (0,0,0,0,0,0)
3.00	S	N=0 (1,0,0,0,0,0)
4.00	S	N=0 (1,0,0,0,0,0)
5.00	S	N=8 (2,2,2,2,2,2)
6.00	S	N=6 (1,1,1,2,1,2)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

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Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ31
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337607.95 E
Project	New M4 - Second Preliminary Ground Investigation				185627.00 N
		Drilling Rig	Terrier	Ground Level	10.34m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	14/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	14/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly sandy clayey silt.				L1	0.00 - 0.80			
				ES2	1.00	S0	S 1.00 1.60	
				D3	1.00 - 1.45			
				L4	1.00 - 1.80			
				ES5	2.00	S0	S 2.00 2.60	
				D6	2.00 - 2.45			
				L7	2.00 - 2.80			
				ES8	3.00	S0	S 3.00 3.53	
				D9	3.00 - 3.45			
				L10	3.00 - 3.70			
				ES11	4.00	S0	S 4.00 4.53	
				D12	4.00 - 4.45			
				L13	4.00 - 4.70			
		4.90	5.44					
MADE GROUND: Grey slightly sandy clayey silt.				ES14	5.00	S8	S 5.00 5.45	
				D15	5.00 - 5.45			
				D16	6.00 - 6.45	S6	S 6.00 6.45	
		6.45	3.89					
Sampling complete at 6.45 m.								

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

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HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ32
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337639.54 E
Project	New M4 - Second Preliminary Ground Investigation				185665.63 N
		Drilling Rig	Terrier	Ground Level	10.27m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	15/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	15/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
15/01/2008		8.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
15/01/2008		2.30	2.30	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 8.45m.
2.Window Sampling complete at 8.45m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=0 (0,0,0,0,0,0)
3.00	S	N=0 (0,0,0,0,0,0)
4.00	S	N=0 (1,0,0,0,0,0)
5.00	S	N=0 (0,0,0,0,0,0)
6.00	S	N=0 (0,0,0,0,0,0)
7.00	S	N=5 (1,2,1,2,2,0)
8.00	S	N=6 (1,2,2,1,2,1)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
Version	3.03
Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ32
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337639.54 E
Project	New M4 - Second Preliminary Ground Investigation				185665.63 N
		Drilling Rig	Terrier	Ground Level	10.27m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	15/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	15/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling		SPT N & (U blows)	SPT type & depth		Install-ation
MADE GROUND: Black slightly clayey slightly sandy clayey silt.				L1	0.00 - 0.80				
				ES2	1.00	S0	S	1.00 1.60	
				D3	1.00 - 1.45				
				L4	1.00 - 1.80				
MADE GROUND: Brown slightly sandy clayey silt.		2.00	8.27	ES5	2.00	S0	S	2.00 2.60	
				D6	2.00 - 2.45				
				L7	2.00 - 2.80				
				ES8	3.00	S0	S	3.00 3.60	
				D9	3.00 - 3.45				
				L10	3.00 - 3.80				
				ES11	4.00	S0	S	4.00 4.53	
				D12	4.00 - 4.45				
				L13	4.00 - 4.80				
				ES14	5.00	S0	S	5.00 5.60	
				D15	5.00 - 5.45				
				ES16	6.00	S0	S	6.00 6.60	
				D17	6.00 - 6.45				
				L18	6.00 - 6.80				
				ES19	7.00	S5	S	7.00 7.45	
				D20	7.00 - 7.45				
				ES21	8.00	S6	S	8.00 8.45	
				D22	8.00 - 8.45				
Sampling complete at 8.45 m.		8.45	1.82						

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ33
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337668.11 E
Project	New M4 - Second Preliminary Ground Investigation				185620.46 N
		Drilling Rig	Terrier	Ground Level	9.17m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	16/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
16/01/2008		6.45	NR	0.00	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow
16/01/2008		2.00	2.00	20	Seepage	NR	NR

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=1 (0,0,0,0,0,1)
3.00	S	N=1 (0,0,1,0,0,0)
4.00	S	N=0 (0,0,0,0,0,0)
5.00	S	N=0 (0,0,0,0,0,0)
6.00	S	N=2 (0,0,0,0,1,1)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
Version	3.03
Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ33
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337668.11 E
Project	New M4 - Second Preliminary Ground Investigation				185620.46 N
		Drilling Rig	Terrier	Ground Level	9.17m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	16/01/2008

Description of Strata	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Dark grey silty very clayey fine sand.			L1 0.00 - 0.80			
---from 0.60m with very closely spaced coarse gravel sized pockets of plastic dark brown amorphous peat	0.80	8.37				
MADE GROUND: Black slightly clayey slightly sandy silt.			ES2 1.00 D3 1.00 - 1.45	S0	S 1.00 1.60	
			ES4 2.00 D5 2.00 - 2.45 L6 2.00 - 2.80	S1	S 2.00 2.60	
			ES7 3.00 D8 3.00 - 3.45 L9 3.00 - 3.70	S1	S 3.00 3.60	
			ES10 4.00 D11 4.00 - 4.45	S0	S 4.00 4.60	
			D12 5.00 - 5.45	S0	S 5.00 5.60	
			D13 6.00 - 6.45	S2	S 6.00 6.60	
Soft grey CLAY. (Estuarine Alluvium)	6.30	2.87				
Sampling complete at 6.45 m.	6.45	2.72				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ34
Header

Contract No.	F15056	Method	Window Sampling	Coordinates	337692.22 E
Project	New M4 - Second Preliminary Ground Investigation				185704.76 N
		Drilling Rig	Terrier	Ground Level	10.52m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	17/01/2008

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
16/01/2008	1730	2.00	0.00	NR	End of Shift
17/01/2008	0730	2.00	0.00	NR	Start of Shift
17/01/2008	1730	6.45	0.00	NR	End of Hole

BORING DETAILS

Hard Strata from depth	Hard Strata to depth	Chiselling hours	Remarks

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1.Window Sampling from GL to 6.45m.
2.Window Sampling complete at 6.45m.
3.50mm standpipe installed, slotted from 6.00m to 3.00m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.00	S	N=0 (0,0,0,0,0,0)
2.00	S	N=1 (0,0,0,1,0,0)
3.00	S	N=0 (0,0,0,0,0,0)
4.00	S	N=2 (1,0,1,0,0,1)
5.00	S	N=1 (1,0,0,1,0,0)
6.00	S	N=2 (1,0,1,0,1,0)

* Seating blows only.

NOTES: All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL HYDRAULIC HEADER
Version	3.03
Revised	19/01/2005

Norwest Holst Soil Engineering Ltd.

HYDRAULIC SAMPLING PROBE LOG

Hole ID.
SWSJ34
Sheet 1 of 1

Contract No.	F15056	Method	Window Sampling	Coordinates	337692.22 E
Project	New M4 - Second Preliminary Ground Investigation				185704.76 N
		Drilling Rig	Terrier	Ground Level	10.52m AOD
Client	Transport Wales, Welsh Assembly Government	Driller	RK	Orientation	Vertical
		Logged by	DH	Date Started	16/01/2008
Consultant	Ove Arup & Partners Ltd			Date Completed	17/01/2008

Description of Strata	Legend	Depth Below G.L.	Datum Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Black slightly clayey slightly sandy silt.				L1 0.00 - 0.80			
				ES2 1.00 D3 1.00 - 1.45 L4 1.00 - 1.80	S0	S 1.00 1.60	
---from 2.00m sandy				ES5 2.00 D6 2.00 - 2.45 L7 2.00 - 2.80	S1	S 2.00 2.60	
MADE GROUND: Brown slightly sandy clayey silt.		3.00	7.52	ES8 3.00 D9 3.00 - 3.45 L10 3.00 - 3.80	S0	S 3.00 3.60	
				ES11 4.00 D12 4.00 - 4.45 L13 4.00 - 4.80	S2	S 4.00 4.53	
				ES14 5.00 D15 5.00 - 5.45 L16 5.00 - 5.80	S1	S 5.00 5.53	
				ES17 6.00 D18 6.00 - 6.45	S2	S 6.00 6.53	
Sampling complete at 6.45 m.		6.45	4.07				

NOTES: All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL HYDRAULIC LOG
Version	3.04
Revised	04/04/2005

Geotechnical Engineering Limited

BOREHOLE LOG

BH520

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 1 of 3

Start Date 12 February 2015 — Easting 337642.0 — Scale 1 : 50

End Date 24 February 2015 — Northing 185597.3 — Ground level 12.85mOD — Depth 19.16 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
12/02/15 1500hrs	1B	0.20 - 0.50					Dense and very dense black and dark grey mottled green clayey sandy subangular fine to coarse slag and crystalline GRAVEL with low cobble content. (MG)			
	2B	0.50 - 1.00								
	3D*	0.50 - 0.60								
		1.00 - 1.00	1.00	C**						
	4B	1.00 - 1.50								
	5D*	1.00 - 1.10								
	6B	1.50 - 2.00								
12/02/15 1700hrs Dry	7D*	1.50 - 1.60								
		2.00 - 2.45	2.00	C 36						
13/02/15 0800hrs Dry	8B	2.00 - 2.50								
	9D*	2.00 - 2.10								
		2.50 - 2.95	2.50	C 39						
	10B	2.50 - 3.00								
	11D*	2.50 - 2.60								
							3.10 - 3.50m: Driller notes slag boulder.			
								3.50	9.35	
		3.50 - 3.95	3.50	C 39			Dense and very dense black sandy subangular fine to coarse slag and crystalline GRAVEL with low subangular slag cobble content. (MG)			
	12B	4.00 - 4.50								
		4.50 - 4.50	4.50	C**						
	13B	4.50 - 5.00								
		5.00 - 5.45	5.00	C 38			4.90m: Driller notes slag boulder. 4.90 - 7.00m: Driller notes fragments of metal.			
	14B	6.00 - 6.50								
		6.50 - 6.95	5.00	C 34						
13/02/15 1700hrs 4.75m	15B	6.50 - 7.00								
16/02/15 0830hrs 5.90m										
		7.50 - 7.95	7.50	C 32						
							Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig and Geotechnical Pioneer rig.

METHOD: Hand dug inspection pit 0.00-1.00m. Cable percussion (200mm) 1.00-12.20m. Dynamic sampled (113mm) 12.20-14.50m. Borehole advanced by reaming casing (140mm) 14.50-15.00m to recover vane. Dynamic sampled (113mm) 15.00-18.40m and (98mm) 18.40-18.90m.

CASING: 200mm diam to 11.00m.

BACKFILL: On completion, hole backfilled with bentonite pellets 19.16-0.50m, gravel 0.50-0.20m and arisings 0.20-0.00m.

REMARKS: Hole advanced by chiselling 1.00-1.30m (45mins), 3.10-3.50m (1hr), 4.50-4.90m (1hr), 7.00-7.50m (1hr), 8.50-9.00m (1hr) and 10.00-11.50m (2hr 45mins). Water added to assist boring 2.50-11.00m (23 litres used).

Vane test attempted at 14.80m. Rods parted, test aborted.

MMG = Mercia Mudstone Group. Weathering zone after Chandler RJ and Forster CIRIA C570; Engineering in Mercia Mudstone (2001).

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered prior to use of water flush.

AGS

CONTRACT	CHECKED
30238	EC

Geotechnical Engineering Limited

BOREHOLE LOG

BH520

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 2 of 3

Start Date 12 February 2015 — Easting 337642.0 — Scale 1 : 50

End Date 24 February 2015 — Northing 185597.3 — Ground level 12.85mOD — Depth 19.16 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
	16B	8.00 - 8.50								
		9.00 - 9.45	9.00	C 21			9.00m: Medium dense.			
	17B	10.00 - 10.50						10.00	2.85	
		10.50 - 10.54	10.50	C*375			Very dense black sandy subangular fine to coarse slag and crystalline GRAVEL with low subangular slag cobble content and frequent wood fragments (up to 5mm). (MG)			
16/02/15 1600hrs 10.60m	18B	10.50 - 11.00								
17/02/15 0830hrs 8.10m										
	19B	11.50 - 12.20	11.00					11.50	1.35	
17/02/15 1200hrs 8.10m							Firm dark grey slightly sandy slightly gravelly CLAY with frequent plant and wood fragments (up to 5mm). (MG)			
23/02/15 1050hrs 9.01m	20P	12.20 - 13.00	11.80		P/S			12.20	0.65	
	21X	12.20 - 13.50					Dark grey locally mottled black slightly sandy peaty CLAY with frequent plant fragments (up to 3mm). (TFDP)			
	22D*	12.30 - 12.40						12.85	0.00	
							Firm dark brown fibrous PEAT. (PEAT)			
	23P	13.50 - 14.00	13.00		P/S					
	24D	14.00 - 14.45	13.00	S 10						
23/02/15 1730hrs 8.84m	25X	14.00 - 14.50						14.30	-1.45	
24/02/15 0845hrs 8.64m	26D*	14.50 - 14.60					Firm dark grey mottled black organic clayey SILT. (TFD) 14.50 - 15.20m: No recovery.			
	27P	15.20 - 16.00	15.00		P/S					
	28X	15.20 - 16.60								
	29P	16.60 - 17.40	16.60		P/S		16.60 - 17.40m: Rare rootlets and shell fragments.			
	30D	17.40 - 17.85	16.60	S 19						
	31X	17.40 - 18.40					17.40 - 17.60m: Tending to mottled black and brown silty clay.	17.50	-4.65	
	32D*	17.40 - 17.50						17.85	-5.00	
							Continued Next Page	{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered prior to use of water flush.

AGS

CONTRACT 30238

CHECKED EC

Geotechnical Engineering Ltd, Tel. 01452 527743 30238 YODA.GPJ TRIALJH.GPJ GEOTECH.GLB 16/07/2015 16:02:26 RM EC

Geotechnical Engineering Limited

BOREHOLE LOG

BH520

CLIENT WELSH GOVERNMENT

SITE M4 CORRIDOR AROUND NEWPORT — Sheet 3 of 3

Start Date 12 February 2015 — Easting 337642.0 — Scale 1 : 50

End Date 24 February 2015 — Northing 185597.3 — Ground level 12.85mOD — Depth 19.16 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
								Stiff fissured reddish brown mottled dark grey silty CLAY. Fissures are randomly orientated closely spaced planar smooth. (MMG) (Grade IVb)			
	33X	18.40	18.90	16.60							
	34D*	18.40	18.50					Stiff fissured greenish grey gravelly silty CLAY. Gravel is subangular fine and medium lithorelicts of extremely weak siltstone. Fissures are randomly orientated closely spaced planar smooth. (MMG) (Grade III)	18.80	-5.95	
24/02/15 1420hrs 11.53m	35D	18.90	19.16	16.60	S*111				19.16	-6.31	
								Hard fissured reddish brown gravelly CLAY. Gravel is subangular fine and medium lithorelicts of extremely weak mudstone. Fissures are randomly orientated very closely spaced planar smooth. (MMG) (Grade III)			
								Borehole completed at 19.16m.			
									{28.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered prior to use of water flush.

AGS

CONTRACT 30238

CHECKED EC

Geotechnical Engineering Ltd, Tel. 01452 527743 30238 YODA.GPJ TRIALJH.GPJ GEOTECH.GLB 16/07/2015 16:02:27 RM EC

A6 Appendix 2

Gas and Groundwater Monitoring Results

M4CAN
Gas & Groundwater Monitoring
CL-26 Lagoon 12

Legend

DO	Dissolved Oxygen	ORP	Oxidation Reduction Potential	mAOD	meters Above Ordnance Datum
RWL	Resting Water Level	mbGL	meters below Ground Level		

Loc. Ref.	Install Ref. *1	Reading Ref. *2	Location Notes	Gas Monitoring																al Notes / Co
				Date	Time	Min	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak LEL	Flow Rate (l/hr)	Differential Pressure (pa)	Air Pressure (mb)	Air Temperature (°C)	
						Oxygen (O_2) %		Carbon Dioxide (CO_2) %		Carbon Monoxide (CO) ppm		Hydrogen Sulphide (H_2S) ppm		Methane (CH_4) %							
BHM4CAN040	1	1		04/05/16	02:15 PM	11.80	11.80	5.00	5.00	1.00	0.00	0.00	0.00	17.00	17.00	>>	0.00	-0.04	1024.00		
BHM4CAN040	1	2		26/05/16		11.90	11.90	5.30	5.30	0.00	0.00	0.00	0.00	18.60	18.60		0.40	0.12	1022.00		
BHM4CAN040	1	3		03/06/16		14.20	14.20	5.10	5.10	1.00	1.00	0.00	0.00	18.10	18.10		0.40	0.10			

Loc. Ref.	Install Ref. *1	Monitoring Round *2	Location Notes	Groundwater & Product Levels							Water Quality									Additional Notes / Comments
				Date	Time	Depth to Product (mbGL)	Groundwater Level (mbGL)	Depth to Base (mbGL)	Ground Level (mAOD)	RWL (mAOD)	Measurement Approach *3	Temperature (°C)	pH	Electrical Conductivity (µS/cm)	DO (%)	ORP (mV)	Stabilised Water Level (mbGL)	Time (min)	Logged Data Available (Y/N)	
BHM4CAN040	1	1		04/05/16	02:20 PM		6.61	6.84	11.57	4.96										Too little water to take sample.
BHM4CAN040	1	2		26/05/16	11:00 AM		6.65	6.95	11.57	4.92										Insufficient water to sample.
BHM4CAN040	1	3		03/06/16	02:20 PM		6.68	7.00	11.57	4.89										Insufficient water to take sample.

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		01

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		30/01/2008	09:50	2.45	25/02/2008	14:34	2.48	07/03/2008	14:25	2.60
SBHD03 CP	SPIE	10.00		30/01/2008	11:01	0.47	25/02/2008	14:52	0.43	07/03/2008	14:05	0.56
SBHD05 RC	SPIE	12.00		31/01/2008	09:00	1.02	25/02/2008	15:35	1.05	07/03/2008	13:50	1.77
SBHD06 RC	SP	15.00		30/01/2008	13:00	1.13	21/02/2008	10:30	1.39	07/03/2008	13:30	1.39
SBHD08 RC	SPIE	29.50		30/01/2008	13:50	1.20	25/02/2008	15:58	2.02	07/03/2008	13:35	1.40
SBHE02RD	SPIE	25.00		31/01/2008	09:25	2.18	25/02/2008	16:20	2.09	07/03/2008	13:10	2.48
SBHE04 RC	SPIE	17.20		31/01/2008	09:15	2.31	25/02/2008	16:11	2.51	07/03/2008	13:20	2.59
SBHF01 RC	SPIE	19.00		31/01/2008	09:40	5.69	25/02/2008	16:32	5.72	07/03/2008	12:50	5.43
SBHF02A CP	SPIE	17.00		01/02/2008	14:40	7.61	25/02/2008	17:13	7.57	07/03/2008	12:30	9.00
SBHF03 RC	SPIE	18.00		31/01/2008	10:35	6.97	26/02/2008	08:55	6.77	07/03/2008	12:15	7.22
SBHH01 RC	SPIE	25.00		31/01/2008	11:15	3.45	26/02/2008	09:39	3.42	07/03/2008	11:28	3.65
SBHH02 RC	SPIE	14.90		31/01/2008	11:10	3.42	26/02/2008	09:20	3.88	07/03/2008	11:35	3.64
SBHH05 RC	SPIE	21.50		31/01/2008	11:30	2.22	26/02/2008	10:01	2.13	07/03/2008	11:05	3.10
SBHH06 CP	SP	12.30		30/01/2008	15:30	3.75	21/02/2008	08:00	3.76	07/03/2008	11:10	3.87
SBHH07A RC	SPIE	24.85		30/01/2008	14:50	1.70	26/02/2008	10:40	1.34	07/03/2008	11:00	1.07
SBHJ01 CP	SP	7.50		01/02/2008	12:20	1.34	21/02/2008	11:45	5.98	06/03/2008	12:28	1.82
SBHJ03 CP	SP	5.20		01/02/2008	08:00	0.54	27/02/2008	16:15	0.70	07/03/2008	10:45	0.68
SBHJ04	SP	13.10		01/02/2008	11:55	6.61	22/02/2008	13::55	6.67	06/03/2008	11:46	6.75
SBHJ05	SP	11.50		01/02/2008	11:10	8.91	22/02/2008	09:00	9.07	06/03/2008	11:23	9.16
SBHJ06 CP	SP	4.10		01/02/2008	11:45	1.31	21/02/2008	15:30	1.32	06/03/2008	10:50	1.33
SBHJ07 CP	SP	10.40		01/02/2008	11:43	1.35	21/02/2008	14:40	1.40	06/03/2008	12:05	1.56
SBHJ08A CP	SP	7.40		01/02/2008	11:35	3.49	21/02/2008	13:05	2.31	06/03/2008	10:57	2.67
SBHJ09 CP	SP	2.20		01/02/2008	11:30	0.65	21/02/2008	12:25	0.85	06/03/2008	11:00	0.90
SBHJ10 CP	SP	10.00		01/02/2008	10:40	2.30	21/02/2008	13:45	2.24	06/03/2008	10:40	2.16
SBHK01 CP	SP	6.80		01/02/2008	10:55	0.70	25/02/2008	10:30	1.00	06/03/2008	14:24	1.06
SBHK02 CP	SP	11.20		01/02/2008	10:50	1.34	25/02/2008	11:20	1.33	06/03/2008	14:18	1.47
SBHK03 CP	SP	5.90		01/02/2008	10:45	0.87	25/02/2008	12:00	0.89	06/03/2008	14:15	1.00
SBHK04 CP	SP	12.20		01/02/2008	10:25	1.45	25/02/2008	12:30	1.60	06/03/2008	12:30	1.60
SBHL02 RC	SPIE	15.20		01/02/2008	10:35	2.27	25/02/2008	12:49	2.31	06/03/2008	14:00	2.42
SBHL03 RC	SPIE	15.00		31/01/2008	16:20	0.61	26/02/2008	11:15	0.51	07/03/2008	10:25	0.66
SBHM01 RC	SPIE	21.00		01/01/1900	08:20	-0.26	26/02/2008	11:30	-0.26	07/03/2008	10:17	0.05
SBHM02 RC	SPIE	20.00		01/02/2008	08:25	0.19	26/02/2008	11:41	0.49	07/03/2008	10:14	0.68
SBHN01A RC	SPIE	14.90		01/02/2008	15:20	8.49	27/02/2008	17:15	12.23	07/03/2008	14:45	13.18
SBHN02 RC	SPIE	20.40		31/01/2008	15:55	3.67	26/02/2008	11:57	4.19	07/03/2008	10:05	4.84
SBHN03 RC	SPIE	15.00		31/01/2008	15:45	1.07	26/02/2008	12:03	1.73	07/03/2008	09:55	2.34
SBHN04 RC	SPIE	10.00		31/01/2008	15:30	9.99	26/02/2008	14:42	DRY	07/03/2008	09:45	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
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Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		02

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		31/01/2008	14:50	DRY	26/02/2008	14:12	DRY	07/03/2008	09:35	DRY
SBHP02 RC	SPIE	9.80		31/01/2008	13:55	7.20	26/02/2008	13:59	8.09	07/03/2008	09:10	8.25
SBHP03 RC	SPIE	5.00		31/01/2008	13:40	4.09	26/02/2008	13:48	4.76	07/03/2008	09:05	4.78
SBHQ01 RC	SPIE	11.80		31/01/2008	14:20	5.76	26/02/2008	12:46	6.74	07/03/2008	09:30	7.20
SBHQ02 RC	SPIE	6.00		31/01/2008	14:15	4.98	26/02/2008	12:59	5.16	07/03/2008	09:25	5.98
SBHQ03 RC	SPIE	11.00		31/01/2008	13:20	6.04	26/02/2008	13:29	7.22	07/03/2008	08:38	7.59
SBHQ04 RC	SPIE	8.00		31/01/2008	13:05	4.35	26/02/2008	13:36	6.18	07/03/2008	08:55	6.94
SBHQ06 RC	SPIE	7.35		31/01/2008	13:00	3.89	26/02/2008	13:16	4.40	07/03/2008	08:25	4.63
SWSJ08	SP	3.30		01/02/2008	12:30	0.42	21/02/2008	11:45	0.37	06/03/2008	12:35	0.41
SWSJ13	SP	2.50		01/02/2008	12:00	DRY	22/02/2008	13:45	DRY	06/03/2008	11:50	DRY
SWSJ21	SP	6.00		01/02/2008	11:20	3.87	22/02/2008	09:30	5.72	06/03/2008	11:27	6.59
SWSJ23	SP	7.80		01/02/2008	11:22	5.92	22/02/2008	09:55	6.62	06/03/2008	11:30	6.97
SWSJ34	SP	6.00		01/02/2008	11:05	2.52	22/02/2008	10:55	3.33	06/03/2008	11:10	3.08
SWSJ37	SP	5.60		01/02/2008	11:25	0.46	22/02/2008	11:30	0.55	06/03/2008	11:15	0.61
LGBH02	SP	8.88					22/02/2008	14:35	7.50	06/03/2008	11:40	7.52
LGBH03	SP	8.90					22/02/2008	14:21	7.20	06/03/2008	11:44	7.28
LGBH04	SP	10.50					22/02/2008	10:30	8.87	06/03/2008	11:20	9.00
LGBH09	SP	7.00					22/02/2008	12:40	1.13	06/03/2008	10:48	1.56
LGBH10	SP	14.60					27/02/2008	14:30	8.15	06/03/2008	11:12	8.21
LGBH11	SP	11.20					27/02/2008	10:00	7.05	06/03/2008	11:03	7.07
LGBH12	SP	7.05					22/02/2008	13:10	1.40	06/03/2008	10:45	1.40
RBBH07	SP	6.25					27/02/2008	12.15	0.69	06/03/2008	12:20	0.71
RBBH09	SP	7.05					27/02/2008	13:40	1.25	06/03/2008	12:25	1.21
RBBH10	SP	6.85					27/02/2008	13:00	0.68	06/03/2008	12:30	0.82

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	30/01/08-07/03/08	Date:	16/04/2008	Date:	17/04/2008
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NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		03

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		20/03/2008	16:30	2.57	04/04/2008	08:00	2.59	18/04/2008	07:40	2.66
SBHD03 CP	SPIE	10.00		20/03/2008	16:45	0.58	04/04/2008	08:13	0.53	18/04/2008	08:00	0.60
SBHD05 RC	SPIE	12.00		20/03/2008	16:00	1.08	04/04/2008	09:15	1.22	18/04/2008	08:30	1.32
SBHD06 RC	SP	15.00		20/03/2008	17:55	1.20	04/04/2008	09:30	1.33	18/04/2008	08:40	1.44
SBHD08 RC	SPIE	29.50		19/03/2008	18:30	1.28	04/04/2008	10:00	1.39	18/04/2008	08:52	1.52
SBHE02RD	SPIE	25.00		20/03/2008	16:20	2.23	04/04/2008	08:50	2.46	18/04/2008	09:00	2.54
SBHE04 RC	SPIE	17.20		20/03/2008	15:45	2.20	04/04/2008	09:00	1.80	18/04/2008	08:15	1.80
SBHF01 RC	SPIE	19.00		20/03/2008	15:30	5.50	04/04/2008	08:40	5.55	18/04/2008	13:58	5.58
SBHF02A CP	SPIE	17.00		20/03/2008	15:10	5.60	04/04/2008	10:28	5.70	18/04/2008	13:45	5.77
SBHF03 RC	SPIE	18.00		20/03/2008	14:55	7.20	04/04/2008	10:36	7.38	18/04/2008	13:40	7.42
SBHH01 RC	SPIE	25.00		20/03/2008	14:25	3.60	04/04/2008	15:00	3.60	18/04/2008	13:10	3.62
SBHH02 RC	SPIE	14.90		20/03/2008	14:30	4.27	04/04/2008	15:05	3.64	18/04/2008	13:13	3.70
SBHH05 RC	SPIE	21.50		20/03/2008	17:30	2.17	04/04/2008	15:15	2.78	18/04/2008	11:34	2.90
SBHH06 CP	SP	12.30		17/03/2008	15:20	3.88	04/04/2008	15:20	3.89	17/04/2008	14:15	3.90
SBHH07A RC	SPIE	24.85		20/03/2008	13:55	1.33	04/04/2008	15:28	1.92	18/04/2008	11:43	0.88
SBHJ01 CP	SP	7.50		19/03/2008	14:15	1.81	03/04/2008	16:05	1.90	17/04/2008	12:40	1.80
SBHJ03 CP	SP	5.20		19/03/2008	16:40	0.78	03/04/2008	18:25	0.82	17/04/2008	15:55	0.80
SBHJ04	SP	13.10		17/03/2008	13:35	6.64	03/04/2008	18:10	6.74	17/04/2008	13:08	6.80
SBHJ05	SP	11.50		18/03/2008	13:50	9.02	03/04/2008	17:39	9.10	17/04/2008	13:31	9.11
SBHJ06 CP	SP	4.10		17/03/2008	12:55	1.29	03/04/2008	17:43	1.33	17/04/2008	15:05	1.20
SBHJ07 CP	SP	10.40		17/03/2008	10:25	1.59	03/04/2008	17:47	1.50	17/04/2008	13:58	1.47
SBHJ08A CP	SP	7.40		18/03/2008	10:00	2.50	03/04/2008	17:55	2.50	17/04/2008	15:33	2.50
SBHJ09 CP	SP	2.20		18/03/2008	10:25	0.69	03/04/2008	17:58	0.82	17/04/2008	15:22	0.90
SBHJ10 CP	SP	10.00		17/03/2008	09:15	2.10	03/04/2008	17:50	2.00	17/04/2008	13:55	2.00
SBHK01 CP	SP	6.80		19/03/2008	10:45	0.88	03/04/2008	16:40	1.00	17/04/2008	11:40	0.94
SBHK02 CP	SP	11.20		19/03/2008	11:15	1.46	03/04/2008	16:45	1.48	17/04/2008	11:43	1.46
SBHK03 CP	SP	5.90		19/03/2008	11:45	1.04	03/04/2008	16:48	1.07	17/04/2008	11::46	0.98
SBHK04 CP	SP	12.20		19/03/2008	12:15	1.64	03/04/2008	16:52	1.67	17/04/2008	12:05	1.60
SBHL02 RC	SPIE	15.20		19/03/2008	12:50	2.44	03/04/2008	17:00	2.45	17/04/2008	12:00	2.45
SBHL03 RC	SPIE	15.00		20/03/2008	13:25	0.76	08/04/2008	15:40	0.64	18/04/2008	09:50	0.62
SBHM01 RC	SPIE	21.00		20/03/2008	13:05	-0.21	08/04/2008	15:48	-0.45	18/04/2008	11:55	0.01
SBHM02 RC	SPIE	20.00		20/03/2008	13:10	0.61	08/04/2008	15:52	0.61	18/04/2008	11:50	0.61
SBHN01A RC	SPIE	14.90		20/03/2008	12:55	12.14	08/04/2008	16:05	12.58	18/04/2008	12:48	13.27
SBHN02 RC	SPIE	20.40		20/03/2008	12:45	4.26	08/04/2008	16:12	2.64	18/04/2008	12:45	4.85
SBHN03 RC	SPIE	15.00		20/03/2008	12:30	1.60	08/04/2008	16:17	2.07	18/04/2008	12:35	2.37
SBHN04 RC	SPIE	10.00		20/03/2008	12:10	DRY	08/04/2008	16:28	DRY	18/04/2008	10:55	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
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NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		04

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		20/03/2008	12:00	DRY	08/04/2008	16:40	DRY	18/04/2008	10:45	DRY
SBHP02 RC	SPIE	9.80		20/03/2008	11:45	5.59	08/04/2008	16:55	7.98	18/04/2008	10:30	8.20
SBHP03 RC	SPIE	5.00		20/03/2008	11:40	2.80	08/04/2008	16:50	DRY	18/04/2008	10:25	4.93
SBHQ01 RC	SPIE	11.80		20/03/2008	10:40	6.72	08/04/2008	17:13	7.24	18/04/2008	10:10	7.48
SBHQ02 RC	SPIE	6.00		20/03/2008	10:45	4.91	08/04/2008	17:10	DRY	18/04/2008	10:05	DRY
SBHQ03 RC	SPIE	11.00		20/03/2008	10:50	6.76	08/04/2008	17:05	7.69	18/04/2008	10:15	8.00
SBHQ04 RC	SPIE	8.00		20/03/2008	11:30	6.97	08/04/2008	17:02	DRY	18/04/2008	10:40	DRY
SBHQ06 RC	SPIE	7.35		20/03/2008	11:20	4.47	08/04/2008	17:20	6.63	18/04/2008	12:20	4.79
SWSJ08	SP	3.30		19/03/2008	15:10	0.44	03/04/2008	16:00	0.46	17/04/2008	12:35	0.42
SWSJ13	SP	2.50		17/03/2008	13:25	DRY	03/04/2008	18:12	DRY	17/04/2008	13:12	DRY
SWSJ21	SP	6.00		18/03/2008	14:30	4.42	03/04/2008	17:33	5.89	17/04/2008	13:32	6.50
SWSJ23	SP	7.80		18/03/2008	15:05	7.58	03/04/2008	17:35	7.20	17/04/2008	13:35	7.20
SWSJ34	SP	6.00		19/03/2008	08:55	2.36	03/04/2008	17:23	3.26	17/04/2008	13:46	DRY
SWSJ37	SP	5.60		18/03/2008	11:15	0.55	03/04/2008	17:25	0.67	17/04/2008	13:42	0.63
LGBH02	SP	8.88		17/03/2008	12:55	7.48	03/04/2008	18:05	7.46	17/04/2008	13:00	7.48
LGBH03	SP	8.90		17/03/2008	13:15	7.24	03/04/2008	18:08	7.32	17/04/2008	13:03	7.30
LGBH04	SP	10.50		18/03/2008	13:20	8.87	03/04/2008	17:40	8.90	17/04/2008	13:29	8.94
LGBH09	SP	7.00		17/03/2008	11:00	1.08	03/04/2008	17:45	1.15	17/04/2008	15:08	1.05
LGBH10	SP	14.60		18/03/2008	15:20	8.31	03/04/2008	17:27	8.20	17/04/2008	13:40	8.70
LGBH11	SP	11.20		18/03/2008	11:40	6.88	03/04/2008	17:18	7.00	17/04/2008	15:38	7.08
LGBH12	SP	7.05		17/03/2008	10:00	1.30	03/04/2008	17:49	1.47	17/04/2008	15:15	1.36
RBBH07	SP	6.25		19/03/2008	13:25	0.66	03/04/2008	15:50	0.68	17/04/2008	12:30	1.10
RBBH09	SP	7.05		19/03/2008	14:40	1.18	03/04/2008	16:07	1.21	17/04/2008	12:42	1.25
RBBH10	SP	6.85		19/03/2008	13:45	0.70	03/04/2008	16:03	0.75	17/04/2008	12:39	0.78

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	17/03/08-17/04/08	Date:	21/04/2008	Date:	21/04/2008
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NORWEST HOLST SOIL ENGINEERING

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH519	19/03/15 08:30:00	1037	-2								-0.4	5		14 litres purged, base depth 4.00m.
BH519	19/03/15 08:31:00										-0.4			
BH519	19/03/15 08:32:00										-0.4			
BH519	19/03/15 08:33:00										-0.4			
BH519	19/03/15 08:34:00										-0.4			
BH519	19/03/15 08:35:00			0.0	0.1	18.8	3.8	0	0	1.3				
BH519	19/03/15 08:36:00			0.0	0.6	18.6	41.9	0	0	0.7				
BH519	19/03/15 08:37:00			0.0	4.1	17.4	#	0	0	0.9				Upsurge at 3min 10sec. Unable to obtain further readings.
BH519	19/03/15 08:38:00													
BH519	19/03/15 08:39:00													
BH519	19/03/15 08:40:00													
BH519	19/03/15 08:41:00													
BH519	19/03/15 08:42:00													
BH519	19/03/15 08:43:00													
BH519	19/03/15 08:44:00												0.74	
BH519	26/03/15 09:00:00	1005	4								0.0	11		10 litres purged, base depth 4.00m.
BH519	26/03/15 09:01:00										0.0			
BH519	26/03/15 09:02:00										0.0			

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH519	26/03/15 09:03:00										0.0			
BH519	26/03/15 09:04:00										0.0			
BH519	26/03/15 09:05:00			0.0	3.0	17.7	50.0	0	1	1.7				
BH519	26/03/15 09:06:00			0.0	1.6	19.1	29.0	0	1	2.0				
BH519	26/03/15 09:07:00			0.0	1.2	19.6	21.0	0	1	2.1				
BH519	26/03/15 09:08:00			0.0	0.6	20.2	11.0	0	0	2.0				
BH519	26/03/15 09:09:00			0.0	0.5	20.4	8.0	0	0	2.1				
BH519	26/03/15 09:10:00			0.0	0.4	20.5	7.0	0	0	2.0				
BH519	26/03/15 09:11:00			0.0	0.3	20.5	6.0	0	0	1.7				
BH519	26/03/15 09:12:00			0.0	0.3	20.6	6.0	0	0	1.4				
BH519	26/03/15 09:13:00			0.0	0.3	20.6	5.0	0	0	1.4				
BH519	26/03/15 09:14:00			0.0	0.3	20.7	5.0	0	0	1.4			1.35	
BH519	02/04/15 08:30:00	1026	-1.01								0.0	7		12 litres purged, base depth 4.00m.
BH519	02/04/15 08:31:00										0.4			
BH519	02/04/15 08:32:00										0.4			
BH519	02/04/15 08:33:00										0.4			
BH519	02/04/15 08:34:00										0.4			
BH519	02/04/15 08:35:00			0.0	4.5	13.4	88.0	0	2	1.9				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH519	02/04/15 08:36:00			0.0	4.0	14.1	78.0	0	2	1.4				
BH519	02/04/15 08:37:00			0.0	4.5	10.1	98.0	0	12	0.9				
BH519	02/04/15 08:38:00			0.0	5.4	7.2	#	0	42	0.7				
BH519	02/04/15 08:39:00			0.0	5.7	5.3	#	0	182	0.6				
BH519	02/04/15 08:40:00			0.0	5.1	6.9	97.0	0	246	0.5				
BH519	02/04/15 08:41:00			0.0	4.1	9.8	77.0	0	248	0.4				
BH519	02/04/15 08:42:00			0.0	3.2	11.6	68.0	0	245	0.5				
BH519	02/04/15 08:43:00			0.0	3.1	12.1	56.0	0	229	0.7				
BH519	02/04/15 08:44:00			0.0	2.4	13.9	45.0	0	193	0.5			1.27	
BH519	07/05/15 12:12:00	996	0								0.0	17		
BH519	07/05/15 12:13:00										0.0			
BH519	07/05/15 12:14:00										0.0			
BH519	07/05/15 12:15:00										0.0			
BH519	07/05/15 12:16:00										0.0			
BH519	07/05/15 12:17:00			0.0	6.7	4.7	#	0	0	1.2				
BH519	07/05/15 12:18:00			0.0	7.7	2.3	#	0	0	1.1				
BH519	07/05/15 12:19:00			0.0	8.4	0.7	#	0	0	1.2				
BH519	07/05/15 12:20:00			0.0	8.6	0.6	#	0	10	1.4				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH519	07/05/15 12:21:00			0.0	8.4	1.3	#	0	34	1.4				
BH519	07/05/15 12:22:00			0.0	7.7	3.2	#	0	53	1.4				
BH519	07/05/15 12:23:00			0.0	6.4	6.8	#	0	58	1.5				
BH519	07/05/15 12:24:00			0.0	4.7	10.4	97.3	0	44	1.3				
BH519	07/05/15 12:25:00			0.0	3.5	12.9	74.3	0	35	1.3				
BH519	07/05/15 12:26:00			0.0	2.5	14.6	54.3	0	24	1.2				
BH519	07/05/15 12:27:00												2.65	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH519	19/03/15 08:44:00												1.37	57 litres purged, base depth 11.00m.
BH519	26/03/15 09:14:00												1.65	56 litres purged, base depth 11.00m.
BH519	02/04/15 08:44:00												1.82	55 litres purged, base depth 11.00m.
BH519	07/05/15 12:28:00												3.50	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Deep install.

CONTRACT **30238**

CHECKED **EC**

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		01

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		30/01/2008	09:50	2.45	25/02/2008	14:34	2.48	07/03/2008	14:25	2.60
SBHD03 CP	SPIE	10.00		30/01/2008	11:01	0.47	25/02/2008	14:52	0.43	07/03/2008	14:05	0.56
SBHD05 RC	SPIE	12.00		31/01/2008	09:00	1.02	25/02/2008	15:35	1.05	07/03/2008	13:50	1.77
SBHD06 RC	SP	15.00		30/01/2008	13:00	1.13	21/02/2008	10:30	1.39	07/03/2008	13:30	1.39
SBHD08 RC	SPIE	29.50		30/01/2008	13:50	1.20	25/02/2008	15:58	2.02	07/03/2008	13:35	1.40
SBHE02RD	SPIE	25.00		31/01/2008	09:25	2.18	25/02/2008	16:20	2.09	07/03/2008	13:10	2.48
SBHE04 RC	SPIE	17.20		31/01/2008	09:15	2.31	25/02/2008	16:11	2.51	07/03/2008	13:20	2.59
SBHF01 RC	SPIE	19.00		31/01/2008	09:40	5.69	25/02/2008	16:32	5.72	07/03/2008	12:50	5.43
SBHF02A CP	SPIE	17.00		01/02/2008	14:40	7.61	25/02/2008	17:13	7.57	07/03/2008	12:30	9.00
SBHF03 RC	SPIE	18.00		31/01/2008	10:35	6.97	26/02/2008	08:55	6.77	07/03/2008	12:15	7.22
SBHH01 RC	SPIE	25.00		31/01/2008	11:15	3.45	26/02/2008	09:39	3.42	07/03/2008	11:28	3.65
SBHH02 RC	SPIE	14.90		31/01/2008	11:10	3.42	26/02/2008	09:20	3.88	07/03/2008	11:35	3.64
SBHH05 RC	SPIE	21.50		31/01/2008	11:30	2.22	26/02/2008	10:01	2.13	07/03/2008	11:05	3.10
SBHH06 CP	SP	12.30		30/01/2008	15:30	3.75	21/02/2008	08:00	3.76	07/03/2008	11:10	3.87
SBHH07A RC	SPIE	24.85		30/01/2008	14:50	1.70	26/02/2008	10:40	1.34	07/03/2008	11:00	1.07
SBHJ01 CP	SP	7.50		01/02/2008	12:20	1.34	21/02/2008	11:45	5.98	06/03/2008	12:28	1.82
SBHJ03 CP	SP	5.20		01/02/2008	08:00	0.54	27/02/2008	16:15	0.70	07/03/2008	10:45	0.68
SBHJ04	SP	13.10		01/02/2008	11:55	6.61	22/02/2008	13::55	6.67	06/03/2008	11:46	6.75
SBHJ05	SP	11.50		01/02/2008	11:10	8.91	22/02/2008	09:00	9.07	06/03/2008	11:23	9.16
SBHJ06 CP	SP	4.10		01/02/2008	11:45	1.31	21/02/2008	15:30	1.32	06/03/2008	10:50	1.33
SBHJ07 CP	SP	10.40		01/02/2008	11:43	1.35	21/02/2008	14:40	1.40	06/03/2008	12:05	1.56
SBHJ08A CP	SP	7.40		01/02/2008	11:35	3.49	21/02/2008	13:05	2.31	06/03/2008	10:57	2.67
SBHJ09 CP	SP	2.20		01/02/2008	11:30	0.65	21/02/2008	12:25	0.85	06/03/2008	11:00	0.90
SBHJ10 CP	SP	10.00		01/02/2008	10:40	2.30	21/02/2008	13:45	2.24	06/03/2008	10:40	2.16
SBHK01 CP	SP	6.80		01/02/2008	10:55	0.70	25/02/2008	10:30	1.00	06/03/2008	14:24	1.06
SBHK02 CP	SP	11.20		01/02/2008	10:50	1.34	25/02/2008	11:20	1.33	06/03/2008	14:18	1.47
SBHK03 CP	SP	5.90		01/02/2008	10:45	0.87	25/02/2008	12:00	0.89	06/03/2008	14:15	1.00
SBHK04 CP	SP	12.20		01/02/2008	10:25	1.45	25/02/2008	12:30	1.60	06/03/2008	12:30	1.60
SBHL02 RC	SPIE	15.20		01/02/2008	10:35	2.27	25/02/2008	12:49	2.31	06/03/2008	14:00	2.42
SBHL03 RC	SPIE	15.00		31/01/2008	16:20	0.61	26/02/2008	11:15	0.51	07/03/2008	10:25	0.66
SBHM01 RC	SPIE	21.00		01/01/1900	08:20	-0.26	26/02/2008	11:30	-0.26	07/03/2008	10:17	0.05
SBHM02 RC	SPIE	20.00		01/02/2008	08:25	0.19	26/02/2008	11:41	0.49	07/03/2008	10:14	0.68
SBHN01A RC	SPIE	14.90		01/02/2008	15:20	8.49	27/02/2008	17:15	12.23	07/03/2008	14:45	13.18
SBHN02 RC	SPIE	20.40		31/01/2008	15:55	3.67	26/02/2008	11:57	4.19	07/03/2008	10:05	4.84
SBHN03 RC	SPIE	15.00		31/01/2008	15:45	1.07	26/02/2008	12:03	1.73	07/03/2008	09:55	2.34
SBHN04 RC	SPIE	10.00		31/01/2008	15:30	9.99	26/02/2008	14:42	DRY	07/03/2008	09:45	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	30/01/08-07/03/08	Date:	16/04/2008	Date:	17/04/2008
Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		02

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		31/01/2008	14:50	DRY	26/02/2008	14:12	DRY	07/03/2008	09:35	DRY
SBHP02 RC	SPIE	9.80		31/01/2008	13:55	7.20	26/02/2008	13:59	8.09	07/03/2008	09:10	8.25
SBHP03 RC	SPIE	5.00		31/01/2008	13:40	4.09	26/02/2008	13:48	4.76	07/03/2008	09:05	4.78
SBHQ01 RC	SPIE	11.80		31/01/2008	14:20	5.76	26/02/2008	12:46	6.74	07/03/2008	09:30	7.20
SBHQ02 RC	SPIE	6.00		31/01/2008	14:15	4.98	26/02/2008	12:59	5.16	07/03/2008	09:25	5.98
SBHQ03 RC	SPIE	11.00		31/01/2008	13:20	6.04	26/02/2008	13:29	7.22	07/03/2008	08:38	7.59
SBHQ04 RC	SPIE	8.00		31/01/2008	13:05	4.35	26/02/2008	13:36	6.18	07/03/2008	08:55	6.94
SBHQ06 RC	SPIE	7.35		31/01/2008	13:00	3.89	26/02/2008	13:16	4.40	07/03/2008	08:25	4.63
SWSJ08	SP	3.30		01/02/2008	12:30	0.42	21/02/2008	11:45	0.37	06/03/2008	12:35	0.41
SWSJ13	SP	2.50		01/02/2008	12:00	DRY	22/02/2008	13:45	DRY	06/03/2008	11:50	DRY
SWSJ21	SP	6.00		01/02/2008	11:20	3.87	22/02/2008	09:30	5.72	06/03/2008	11:27	6.59
SWSJ23	SP	7.80		01/02/2008	11:22	5.92	22/02/2008	09:55	6.62	06/03/2008	11:30	6.97
SWSJ34	SP	6.00		01/02/2008	11:05	2.52	22/02/2008	10:55	3.33	06/03/2008	11:10	3.08
SWSJ37	SP	5.60		01/02/2008	11:25	0.46	22/02/2008	11:30	0.55	06/03/2008	11:15	0.61
LGBH02	SP	8.88					22/02/2008	14:35	7.50	06/03/2008	11:40	7.52
LGBH03	SP	8.90					22/02/2008	14:21	7.20	06/03/2008	11:44	7.28
LGBH04	SP	10.50					22/02/2008	10:30	8.87	06/03/2008	11:20	9.00
LGBH09	SP	7.00					22/02/2008	12:40	1.13	06/03/2008	10:48	1.56
LGBH10	SP	14.60					27/02/2008	14:30	8.15	06/03/2008	11:12	8.21
LGBH11	SP	11.20					27/02/2008	10:00	7.05	06/03/2008	11:03	7.07
LGBH12	SP	7.05					22/02/2008	13:10	1.40	06/03/2008	10:45	1.40
RBBH07	SP	6.25					27/02/2008	12.15	0.69	06/03/2008	12:20	0.71
RBBH09	SP	7.05					27/02/2008	13:40	1.25	06/03/2008	12:25	1.21
RBBH10	SP	6.85					27/02/2008	13:00	0.68	06/03/2008	12:30	0.82

Recorded by: S Davis	Checked by: I Swain	Approved by: I Swain	NORWEST HOLST SOIL ENGINEERING
Date: 30/01/08-07/03/08	Date: 16/04/2008	Date: 17/04/2008	
Form No. SI GWR	Revision No. 2.03	Issue Date 07/01/2008	

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		03

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		20/03/2008	16:30	2.57	04/04/2008	08:00	2.59	18/04/2008	07:40	2.66
SBHD03 CP	SPIE	10.00		20/03/2008	16:45	0.58	04/04/2008	08:13	0.53	18/04/2008	08:00	0.60
SBHD05 RC	SPIE	12.00		20/03/2008	16:00	1.08	04/04/2008	09:15	1.22	18/04/2008	08:30	1.32
SBHD06 RC	SP	15.00		20/03/2008	17:55	1.20	04/04/2008	09:30	1.33	18/04/2008	08:40	1.44
SBHD08 RC	SPIE	29.50		19/03/2008	18:30	1.28	04/04/2008	10:00	1.39	18/04/2008	08:52	1.52
SBHE02RD	SPIE	25.00		20/03/2008	16:20	2.23	04/04/2008	08:50	2.46	18/04/2008	09:00	2.54
SBHE04 RC	SPIE	17.20		20/03/2008	15:45	2.20	04/04/2008	09:00	1.80	18/04/2008	08:15	1.80
SBHF01 RC	SPIE	19.00		20/03/2008	15:30	5.50	04/04/2008	08:40	5.55	18/04/2008	13:58	5.58
SBHF02A CP	SPIE	17.00		20/03/2008	15:10	5.60	04/04/2008	10:28	5.70	18/04/2008	13:45	5.77
SBHF03 RC	SPIE	18.00		20/03/2008	14:55	7.20	04/04/2008	10:36	7.38	18/04/2008	13:40	7.42
SBHH01 RC	SPIE	25.00		20/03/2008	14:25	3.60	04/04/2008	15:00	3.60	18/04/2008	13:10	3.62
SBHH02 RC	SPIE	14.90		20/03/2008	14:30	4.27	04/04/2008	15:05	3.64	18/04/2008	13:13	3.70
SBHH05 RC	SPIE	21.50		20/03/2008	17:30	2.17	04/04/2008	15:15	2.78	18/04/2008	11:34	2.90
SBHH06 CP	SP	12.30		17/03/2008	15:20	3.88	04/04/2008	15:20	3.89	17/04/2008	14:15	3.90
SBHH07A RC	SPIE	24.85		20/03/2008	13:55	1.33	04/04/2008	15:28	1.92	18/04/2008	11:43	0.88
SBHJ01 CP	SP	7.50		19/03/2008	14:15	1.81	03/04/2008	16:05	1.90	17/04/2008	12:40	1.80
SBHJ03 CP	SP	5.20		19/03/2008	16:40	0.78	03/04/2008	18:25	0.82	17/04/2008	15:55	0.80
SBHJ04	SP	13.10		17/03/2008	13:35	6.64	03/04/2008	18:10	6.74	17/04/2008	13:08	6.80
SBHJ05	SP	11.50		18/03/2008	13:50	9.02	03/04/2008	17:39	9.10	17/04/2008	13:31	9.11
SBHJ06 CP	SP	4.10		17/03/2008	12:55	1.29	03/04/2008	17:43	1.33	17/04/2008	15:05	1.20
SBHJ07 CP	SP	10.40		17/03/2008	10:25	1.59	03/04/2008	17:47	1.50	17/04/2008	13:58	1.47
SBHJ08A CP	SP	7.40		18/03/2008	10:00	2.50	03/04/2008	17:55	2.50	17/04/2008	15:33	2.50
SBHJ09 CP	SP	2.20		18/03/2008	10:25	0.69	03/04/2008	17:58	0.82	17/04/2008	15:22	0.90
SBHJ10 CP	SP	10.00		17/03/2008	09:15	2.10	03/04/2008	17:50	2.00	17/04/2008	13:55	2.00
SBHK01 CP	SP	6.80		19/03/2008	10:45	0.88	03/04/2008	16:40	1.00	17/04/2008	11:40	0.94
SBHK02 CP	SP	11.20		19/03/2008	11:15	1.46	03/04/2008	16:45	1.48	17/04/2008	11:43	1.46
SBHK03 CP	SP	5.90		19/03/2008	11:45	1.04	03/04/2008	16:48	1.07	17/04/2008	11::46	0.98
SBHK04 CP	SP	12.20		19/03/2008	12:15	1.64	03/04/2008	16:52	1.67	17/04/2008	12:05	1.60
SBHL02 RC	SPIE	15.20		19/03/2008	12:50	2.44	03/04/2008	17:00	2.45	17/04/2008	12:00	2.45
SBHL03 RC	SPIE	15.00		20/03/2008	13:25	0.76	08/04/2008	15:40	0.64	18/04/2008	09:50	0.62
SBHM01 RC	SPIE	21.00		20/03/2008	13:05	-0.21	08/04/2008	15:48	-0.45	18/04/2008	11:55	0.01
SBHM02 RC	SPIE	20.00		20/03/2008	13:10	0.61	08/04/2008	15:52	0.61	18/04/2008	11:50	0.61
SBHN01A RC	SPIE	14.90		20/03/2008	12:55	12.14	08/04/2008	16:05	12.58	18/04/2008	12:48	13.27
SBHN02 RC	SPIE	20.40		20/03/2008	12:45	4.26	08/04/2008	16:12	2.64	18/04/2008	12:45	4.85
SBHN03 RC	SPIE	15.00		20/03/2008	12:30	1.60	08/04/2008	16:17	2.07	18/04/2008	12:35	2.37
SBHN04 RC	SPIE	10.00		20/03/2008	12:10	DRY	08/04/2008	16:28	DRY	18/04/2008	10:55	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	17/03/08-17/04/08	Date:	21/04/2008	Date:	21/04/2008
Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		04

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		20/03/2008	12:00	DRY	08/04/2008	16:40	DRY	18/04/2008	10:45	DRY
SBHP02 RC	SPIE	9.80		20/03/2008	11:45	5.59	08/04/2008	16:55	7.98	18/04/2008	10:30	8.20
SBHP03 RC	SPIE	5.00		20/03/2008	11:40	2.80	08/04/2008	16:50	DRY	18/04/2008	10:25	4.93
SBHQ01 RC	SPIE	11.80		20/03/2008	10:40	6.72	08/04/2008	17:13	7.24	18/04/2008	10:10	7.48
SBHQ02 RC	SPIE	6.00		20/03/2008	10:45	4.91	08/04/2008	17:10	DRY	18/04/2008	10:05	DRY
SBHQ03 RC	SPIE	11.00		20/03/2008	10:50	6.76	08/04/2008	17:05	7.69	18/04/2008	10:15	8.00
SBHQ04 RC	SPIE	8.00		20/03/2008	11:30	6.97	08/04/2008	17:02	DRY	18/04/2008	10:40	DRY
SBHQ06 RC	SPIE	7.35		20/03/2008	11:20	4.47	08/04/2008	17:20	6.63	18/04/2008	12:20	4.79
SWSJ08	SP	3.30		19/03/2008	15:10	0.44	03/04/2008	16:00	0.46	17/04/2008	12:35	0.42
SWSJ13	SP	2.50		17/03/2008	13:25	DRY	03/04/2008	18:12	DRY	17/04/2008	13:12	DRY
SWSJ21	SP	6.00		18/03/2008	14:30	4.42	03/04/2008	17:33	5.89	17/04/2008	13:32	6.50
SWSJ23	SP	7.80		18/03/2008	15:05	7.58	03/04/2008	17:35	7.20	17/04/2008	13:35	7.20
SWSJ34	SP	6.00		19/03/2008	08:55	2.36	03/04/2008	17:23	3.26	17/04/2008	13:46	DRY
SWSJ37	SP	5.60		18/03/2008	11:15	0.55	03/04/2008	17:25	0.67	17/04/2008	13:42	0.63
LGBH02	SP	8.88		17/03/2008	12:55	7.48	03/04/2008	18:05	7.46	17/04/2008	13:00	7.48
LGBH03	SP	8.90		17/03/2008	13:15	7.24	03/04/2008	18:08	7.32	17/04/2008	13:03	7.30
LGBH04	SP	10.50		18/03/2008	13:20	8.87	03/04/2008	17:40	8.90	17/04/2008	13:29	8.94
LGBH09	SP	7.00		17/03/2008	11:00	1.08	03/04/2008	17:45	1.15	17/04/2008	15:08	1.05
LGBH10	SP	14.60		18/03/2008	15:20	8.31	03/04/2008	17:27	8.20	17/04/2008	13:40	8.70
LGBH11	SP	11.20		18/03/2008	11:40	6.88	03/04/2008	17:18	7.00	17/04/2008	15:38	7.08
LGBH12	SP	7.05		17/03/2008	10:00	1.30	03/04/2008	17:49	1.47	17/04/2008	15:15	1.36
RBBH07	SP	6.25		19/03/2008	13:25	0.66	03/04/2008	15:50	0.68	17/04/2008	12:30	1.10
RBBH09	SP	7.05		19/03/2008	14:40	1.18	03/04/2008	16:07	1.21	17/04/2008	12:42	1.25
RBBH10	SP	6.85		19/03/2008	13:45	0.70	03/04/2008	16:03	0.75	17/04/2008	12:39	0.78

Recorded by: S Davis	Checked by: I Swain	Approved by: I Swain
Date: 17/03/08-17/04/08	Date: 21/04/2008	Date: 21/04/2008
Form No. SI GWR	Revision No. 2.03	Issue Date 07/01/2008

NORWEST HOLST SOIL ENGINEERING

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH525	19/03/15 12:00:00	1037	2								0.4	9		5 litres purged, base depth 2.60m.
BH525	19/03/15 12:01:00										0.4			
BH525	19/03/15 12:02:00										0.0			
BH525	19/03/15 12:03:00										0.0			
BH525	19/03/15 12:04:00										0.0			
BH525	19/03/15 12:05:00			0.0	3.2	19.1	63.4	0	0	0.2				
BH525	19/03/15 12:06:00			0.0	2.4	19.2	55.7	0	0	0.0				
BH525	19/03/15 12:07:00			0.0	2.4	19.0	54.1	0	0	0.0				
BH525	19/03/15 12:08:00			0.0	2.2	18.9	51.3	0	0	0.0				
BH525	19/03/15 12:09:00			0.0	2.1	18.8	48.8	0	0	0.0				
BH525	19/03/15 12:10:00			0.0	2.0	18.7	46.1	0	0	0.0				
BH525	19/03/15 12:11:00			0.0	1.9	18.6	42.7	0	0	0.0				
BH525	19/03/15 12:12:00			0.0	1.6	18.4	37.0	0	0	0.0				
BH525	19/03/15 12:13:00			0.0	1.5	18.4	36.2	0	0	0.0				
BH525	19/03/15 12:14:00			0.0	1.5	18.2	33.6	0	0	0.0			1.32	
BH525	26/03/15 12:30:00	1008	-0.32								0.0	12		4 litres purged, base depth 2.60m.
BH525	26/03/15 12:31:00										0.0			
BH525	26/03/15 12:32:00										0.0			

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT **30238**

CHECKED **EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH525	26/03/15 12:33:00										0.0			
BH525	26/03/15 12:34:00										0.0			
BH525	26/03/15 12:35:00			0.0	9.9	15.0	#	0	2	0.0				
BH525	26/03/15 12:36:00			0.0	7.5	13.2	#	0	3	0.0				
BH525	26/03/15 12:37:00			0.0	5.8	11.7	#	0	3	0.0				
BH525	26/03/15 12:38:00			0.0	5.2	10.1	#	0	3	0.0				
BH525	26/03/15 12:39:00			0.0	5.0	9.1	99.0	0	3	0.0				
BH525	26/03/15 12:40:00			0.0	4.8	8.7	96.0	0	3	0.0				
BH525	26/03/15 12:41:00			0.0	4.7	8.5	93.0	0	4	0.0				
BH525	26/03/15 12:42:00			0.0	4.7	8.2	93.0	0	4	0.0				
BH525	26/03/15 12:43:00			0.0	4.6	8.0	92.0	0	4	0.0				
BH525	26/03/15 12:44:00			0.0	4.6	8.0	90.0	0	3	0.0			1.64	
BH525	02/04/15 12:00:00	1027	-0.92								0.0	9		4 litres purged, base depth 2.60m.
BH525	02/04/15 12:01:00										0.0			
BH525	02/04/15 12:02:00										0.0			
BH525	02/04/15 12:03:00										0.0			
BH525	02/04/15 12:04:00										0.0			
BH525	02/04/15 12:05:00			0.0	4.4	5.1	87.0	0	1	0.3				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH525	02/04/15 12:06:00			0.0	4.3	4.1	86.0	0	2	0.5				
BH525	02/04/15 12:07:00			0.0	4.3	3.6	84.0	0	1	0.2				
BH525	02/04/15 12:08:00			0.0	4.2	3.2	83.0	0	2	0.2				
BH525	02/04/15 12:09:00			0.0	4.1	3.2	81.0	0	2	0.0				
BH525	02/04/15 12:10:00			0.0	3.9	3.4	77.0	0	2	0.0				
BH525	02/04/15 12:11:00			0.0	3.8	3.8	74.0	0	2	0.0				
BH525	02/04/15 12:12:00			0.0	3.6	4.3	70.0	0	2	0.0				
BH525	02/04/15 12:13:00			0.0	3.4	4.9	67.0	0	2	0.0				
BH525	02/04/15 12:14:00			0.0	3.3	5.6	64.0	0	2	0.0			1.66	
BH525	07/05/15 14:39:00	995	1								0.4	17		
BH525	07/05/15 14:40:00										1.2			
BH525	07/05/15 14:41:00										0.0			
BH525	07/05/15 14:42:00										0.0			
BH525	07/05/15 14:43:00										0.0			
BH525	07/05/15 14:44:00			0.0	3.6	0.3	81.4	0	0	1.2				
BH525	07/05/15 14:45:00			0.0	3.7	0.1	85.2	0	0	1.2				
BH525	07/05/15 14:46:00			0.0	3.7	0.0	86.6	0	0	1.1				
BH525	07/05/15 14:47:00			0.0	3.7	0.3	83.8	0	0	1.1				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT **30238**

CHECKED **EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH525	07/05/15 14:48:00			0.0	3.6	0.7	82.1	0	0	1.1				
BH525	07/05/15 14:49:00			0.0	3.5	1.2	80.0	0	0	1.0				
BH525	07/05/15 14:50:00			0.0	3.3	2.2	75.9	0	0	1.0				
BH525	07/05/15 14:51:00			0.0	3.0	3.5	69.3	0	0	1.0				
BH525	07/05/15 14:52:00			0.0	2.7	4.7	62.7	0	0	1.0				
BH525	07/05/15 14:53:00			0.0	2.6	5.6	58.9	0	0	1.0				
BH525	07/05/15 14:54:00												Dry	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT **30238**

CHECKED **EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH525	19/03/15 12:14:00												1.80	58 litres purged, base depth 11.60m.
BH525	26/03/15 12:44:00												2.02	57 litres purged, base depth 11.60m.
BH525	02/04/15 12:14:00												1.80	58 litres purged, base depth 11.60m.
BH525	07/05/15 14:55:00												3.26	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Deep install.

CONTRACT **30238**

CHECKED **EC**

M4CAN
Gas & Groundwater Monitoring
CL-26 Lagoon 26

Legend

DO	Dissolved Oxygen	ORP	Oxidation Reduction Potential	mAOD	meters Above Ordnance Datum
RWL	Resting Water Level	mbGL	meters below Ground Level		

Loc. Ref.	Install Ref. *1	Reading Ref. *2	Location Notes	Gas Monitoring																	al Notes / C
				Date	Time	Min Oxygen (O_2) %	Steady Oxygen (O_2) %	Peak Carbon Dioxide (CO_2) %	Steady Carbon Dioxide (CO_2) %	Peak Carbon Monoxide (CO) ppm	Steady Carbon Monoxide (CO) ppm	Peak Hydrogen Sulphide (H_2S) ppm	Steady Hydrogen Sulphide (H_2S) ppm	Peak Methane (CH_4) %	Steady Methane (CH_4) %	Peak LEL	Flow Rate (l/hr)	Differential Pressure (pa)	Air Pressure (mb)	Air Temperature (°C)	
BHM4CAN043	1	1	Shallow	12/05/16		20.70	20.70	0.10	0.00	1.00	1.00	0.00	0.00	0.30	0.20		0.40	0.05	1014.00		
BHM4CAN043	2	1	Deep	12/05/16		20.80	20.80	0.10	0.10	0.00	0.00	0.00	0.00	0.40	0.40		0.50	0.02	1006.00		
BHM4CAN043	1	2	Shallow	25/05/16	03:30 PM	21.10	21.20	0.10	0.10	0.00	0.00	0.00	0.00	0.30	0.30	0.00	0.40	-0.12	1022.00		
BHM4CAN043	2	2	Deep	25/05/16	03:45 PM	21.00	21.10	0.10	0.10	0.00	0.00	0.00	0.00	0.40	0.30	0.00	4.40	-0.02	1028.00		
BHM4CAN043	1	3	Shallow	02/06/16		19.70	19.70	0.00	0.00	4.00	4.00	1.00	1.00	0.30	0.20	0.00	0.20	0.30			
BHM4CAN043	2	3	Deep	02/06/16		18.00	18.20	0.10	0.00	2.00	2.00	0.00	0.00	4.40	4.10		0.40				

Loc. Ref.	Install Ref. *1	Monitoring Round *2	Location Notes	Groundwater & Product Levels							Water Quality									Additional Notes / Comments
				Date	Time	Depth to Product (mbGL)	Groundwater Level (mbGL)	Depth to Base (mbGL)	Ground Level (mAOD)	RWL (mAOD)	Measurement Approach *3	Temperature (°C)	pH	Electrical Conductivity (µS/cm)	DO (%)	ORP (mV)	Stabilised Water Level (mbGL)	Time (min)	Logged Data Available (Y/N)	
BHM4CAN043	1	1	Shallow	12/05/16	10:20 AM		1.92	5.55	6.98	5.06	GS	14.53	13.0	8236	4	-75	1.94			Salinity 5.8 psu. Recovery rate good.
BHM4CAN043	2	1	Deep	12/05/16	10:25 AM		1.93	11.00	6.98	5.05	GS	14.36	12.4	3557	1	-81	8.60			Salinity 2.4 psu. Recovery rate dropped during purge. Waited for 30 mins only to recover 15L to 8.67m. Shallow and deep well connected? Draw down in deep well associated with shallow installation.
BHM4CAN043	1	2	Shallow	25/05/16	03:30 PM		1.96	5.53	6.98	5.02	GS	12.41	13.1	8782	9.40	-122.30	1.97			3 well volumes (21 l) taken prior to purging.
BHM4CAN043	2	2	Deep	25/05/16	03:45 PM		1.99	11.00	6.98	4.99	GS	12.58	12.8	5302	31.20	-49.70	8.81			3 well volumes (25.9 l) purged prior to sampling. Poor recovery rate.
BHM4CAN043	1	3	Shallow	02/06/16	03:20 PM		2.05	5.52	6.98	4.93	GS	13.13	12.9	9200	5.30	-153.70	2.02			3 well volumes (20.43 l) purged prior to sampling.
BHM4CAN043	2	3	Deep	02/06/16	03:00 PM		2.12	11.03	6.98	4.86	GS	14.90	12.7	5480	59.00	-95.40	11.03			3 well volimes (25.71 l) purged prior to sampling. Salinity 3.8 psu.

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		01

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		30/01/2008	09:50	2.45	25/02/2008	14:34	2.48	07/03/2008	14:25	2.60
SBHD03 CP	SPIE	10.00		30/01/2008	11:01	0.47	25/02/2008	14:52	0.43	07/03/2008	14:05	0.56
SBHD05 RC	SPIE	12.00		31/01/2008	09:00	1.02	25/02/2008	15:35	1.05	07/03/2008	13:50	1.77
SBHD06 RC	SP	15.00		30/01/2008	13:00	1.13	21/02/2008	10:30	1.39	07/03/2008	13:30	1.39
SBHD08 RC	SPIE	29.50		30/01/2008	13:50	1.20	25/02/2008	15:58	2.02	07/03/2008	13:35	1.40
SBHE02RD	SPIE	25.00		31/01/2008	09:25	2.18	25/02/2008	16:20	2.09	07/03/2008	13:10	2.48
SBHE04 RC	SPIE	17.20		31/01/2008	09:15	2.31	25/02/2008	16:11	2.51	07/03/2008	13:20	2.59
SBHF01 RC	SPIE	19.00		31/01/2008	09:40	5.69	25/02/2008	16:32	5.72	07/03/2008	12:50	5.43
SBHF02A CP	SPIE	17.00		01/02/2008	14:40	7.61	25/02/2008	17:13	7.57	07/03/2008	12:30	9.00
SBHF03 RC	SPIE	18.00		31/01/2008	10:35	6.97	26/02/2008	08:55	6.77	07/03/2008	12:15	7.22
SBHH01 RC	SPIE	25.00		31/01/2008	11:15	3.45	26/02/2008	09:39	3.42	07/03/2008	11:28	3.65
SBHH02 RC	SPIE	14.90		31/01/2008	11:10	3.42	26/02/2008	09:20	3.88	07/03/2008	11:35	3.64
SBHH05 RC	SPIE	21.50		31/01/2008	11:30	2.22	26/02/2008	10:01	2.13	07/03/2008	11:05	3.10
SBHH06 CP	SP	12.30		30/01/2008	15:30	3.75	21/02/2008	08:00	3.76	07/03/2008	11:10	3.87
SBHH07A RC	SPIE	24.85		30/01/2008	14:50	1.70	26/02/2008	10:40	1.34	07/03/2008	11:00	1.07
SBHJ01 CP	SP	7.50		01/02/2008	12:20	1.34	21/02/2008	11:45	5.98	06/03/2008	12:28	1.82
SBHJ03 CP	SP	5.20		01/02/2008	08:00	0.54	27/02/2008	16:15	0.70	07/03/2008	10:45	0.68
SBHJ04	SP	13.10		01/02/2008	11:55	6.61	22/02/2008	13::55	6.67	06/03/2008	11:46	6.75
SBHJ05	SP	11.50		01/02/2008	11:10	8.91	22/02/2008	09:00	9.07	06/03/2008	11:23	9.16
SBHJ06 CP	SP	4.10		01/02/2008	11:45	1.31	21/02/2008	15:30	1.32	06/03/2008	10:50	1.33
SBHJ07 CP	SP	10.40		01/02/2008	11:43	1.35	21/02/2008	14:40	1.40	06/03/2008	12:05	1.56
SBHJ08A CP	SP	7.40		01/02/2008	11:35	3.49	21/02/2008	13:05	2.31	06/03/2008	10:57	2.67
SBHJ09 CP	SP	2.20		01/02/2008	11:30	0.65	21/02/2008	12:25	0.85	06/03/2008	11:00	0.90
SBHJ10 CP	SP	10.00		01/02/2008	10:40	2.30	21/02/2008	13:45	2.24	06/03/2008	10:40	2.16
SBHK01 CP	SP	6.80		01/02/2008	10:55	0.70	25/02/2008	10:30	1.00	06/03/2008	14:24	1.06
SBHK02 CP	SP	11.20		01/02/2008	10:50	1.34	25/02/2008	11:20	1.33	06/03/2008	14:18	1.47
SBHK03 CP	SP	5.90		01/02/2008	10:45	0.87	25/02/2008	12:00	0.89	06/03/2008	14:15	1.00
SBHK04 CP	SP	12.20		01/02/2008	10:25	1.45	25/02/2008	12:30	1.60	06/03/2008	12:30	1.60
SBHL02 RC	SPIE	15.20		01/02/2008	10:35	2.27	25/02/2008	12:49	2.31	06/03/2008	14:00	2.42
SBHL03 RC	SPIE	15.00		31/01/2008	16:20	0.61	26/02/2008	11:15	0.51	07/03/2008	10:25	0.66
SBHM01 RC	SPIE	21.00		01/01/1900	08:20	-0.26	26/02/2008	11:30	-0.26	07/03/2008	10:17	0.05
SBHM02 RC	SPIE	20.00		01/02/2008	08:25	0.19	26/02/2008	11:41	0.49	07/03/2008	10:14	0.68
SBHN01A RC	SPIE	14.90		01/02/2008	15:20	8.49	27/02/2008	17:15	12.23	07/03/2008	14:45	13.18
SBHN02 RC	SPIE	20.40		31/01/2008	15:55	3.67	26/02/2008	11:57	4.19	07/03/2008	10:05	4.84
SBHN03 RC	SPIE	15.00		31/01/2008	15:45	1.07	26/02/2008	12:03	1.73	07/03/2008	09:55	2.34
SBHN04 RC	SPIE	10.00		31/01/2008	15:30	9.99	26/02/2008	14:42	DRY	07/03/2008	09:45	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	30/01/08-07/03/08	Date:	16/04/2008	Date:	17/04/2008
Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		02

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		31/01/2008	14:50	DRY	26/02/2008	14:12	DRY	07/03/2008	09:35	DRY
SBHP02 RC	SPIE	9.80		31/01/2008	13:55	7.20	26/02/2008	13:59	8.09	07/03/2008	09:10	8.25
SBHP03 RC	SPIE	5.00		31/01/2008	13:40	4.09	26/02/2008	13:48	4.76	07/03/2008	09:05	4.78
SBHQ01 RC	SPIE	11.80		31/01/2008	14:20	5.76	26/02/2008	12:46	6.74	07/03/2008	09:30	7.20
SBHQ02 RC	SPIE	6.00		31/01/2008	14:15	4.98	26/02/2008	12:59	5.16	07/03/2008	09:25	5.98
SBHQ03 RC	SPIE	11.00		31/01/2008	13:20	6.04	26/02/2008	13:29	7.22	07/03/2008	08:38	7.59
SBHQ04 RC	SPIE	8.00		31/01/2008	13:05	4.35	26/02/2008	13:36	6.18	07/03/2008	08:55	6.94
SBHQ06 RC	SPIE	7.35		31/01/2008	13:00	3.89	26/02/2008	13:16	4.40	07/03/2008	08:25	4.63
SWSJ08	SP	3.30		01/02/2008	12:30	0.42	21/02/2008	11:45	0.37	06/03/2008	12:35	0.41
SWSJ13	SP	2.50		01/02/2008	12:00	DRY	22/02/2008	13:45	DRY	06/03/2008	11:50	DRY
SWSJ21	SP	6.00		01/02/2008	11:20	3.87	22/02/2008	09:30	5.72	06/03/2008	11:27	6.59
SWSJ23	SP	7.80		01/02/2008	11:22	5.92	22/02/2008	09:55	6.62	06/03/2008	11:30	6.97
SWSJ34	SP	6.00		01/02/2008	11:05	2.52	22/02/2008	10:55	3.33	06/03/2008	11:10	3.08
SWSJ37	SP	5.60		01/02/2008	11:25	0.46	22/02/2008	11:30	0.55	06/03/2008	11:15	0.61
LGBH02	SP	8.88					22/02/2008	14:35	7.50	06/03/2008	11:40	7.52
LGBH03	SP	8.90					22/02/2008	14:21	7.20	06/03/2008	11:44	7.28
LGBH04	SP	10.50					22/02/2008	10:30	8.87	06/03/2008	11:20	9.00
LGBH09	SP	7.00					22/02/2008	12:40	1.13	06/03/2008	10:48	1.56
LGBH10	SP	14.60					27/02/2008	14:30	8.15	06/03/2008	11:12	8.21
LGBH11	SP	11.20					27/02/2008	10:00	7.05	06/03/2008	11:03	7.07
LGBH12	SP	7.05					22/02/2008	13:10	1.40	06/03/2008	10:45	1.40
RBBH07	SP	6.25					27/02/2008	12.15	0.69	06/03/2008	12:20	0.71
RBBH09	SP	7.05					27/02/2008	13:40	1.25	06/03/2008	12:25	1.21
RBBH10	SP	6.85					27/02/2008	13:00	0.68	06/03/2008	12:30	0.82

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
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Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		03

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		20/03/2008	16:30	2.57	04/04/2008	08:00	2.59	18/04/2008	07:40	2.66
SBHD03 CP	SPIE	10.00		20/03/2008	16:45	0.58	04/04/2008	08:13	0.53	18/04/2008	08:00	0.60
SBHD05 RC	SPIE	12.00		20/03/2008	16:00	1.08	04/04/2008	09:15	1.22	18/04/2008	08:30	1.32
SBHD06 RC	SP	15.00		20/03/2008	17:55	1.20	04/04/2008	09:30	1.33	18/04/2008	08:40	1.44
SBHD08 RC	SPIE	29.50		19/03/2008	18:30	1.28	04/04/2008	10:00	1.39	18/04/2008	08:52	1.52
SBHE02RD	SPIE	25.00		20/03/2008	16:20	2.23	04/04/2008	08:50	2.46	18/04/2008	09:00	2.54
SBHE04 RC	SPIE	17.20		20/03/2008	15:45	2.20	04/04/2008	09:00	1.80	18/04/2008	08:15	1.80
SBHF01 RC	SPIE	19.00		20/03/2008	15:30	5.50	04/04/2008	08:40	5.55	18/04/2008	13:58	5.58
SBHF02A CP	SPIE	17.00		20/03/2008	15:10	5.60	04/04/2008	10:28	5.70	18/04/2008	13:45	5.77
SBHF03 RC	SPIE	18.00		20/03/2008	14:55	7.20	04/04/2008	10:36	7.38	18/04/2008	13:40	7.42
SBHH01 RC	SPIE	25.00		20/03/2008	14:25	3.60	04/04/2008	15:00	3.60	18/04/2008	13:10	3.62
SBHH02 RC	SPIE	14.90		20/03/2008	14:30	4.27	04/04/2008	15:05	3.64	18/04/2008	13:13	3.70
SBHH05 RC	SPIE	21.50		20/03/2008	17:30	2.17	04/04/2008	15:15	2.78	18/04/2008	11:34	2.90
SBHH06 CP	SP	12.30		17/03/2008	15:20	3.88	04/04/2008	15:20	3.89	17/04/2008	14:15	3.90
SBHH07A RC	SPIE	24.85		20/03/2008	13:55	1.33	04/04/2008	15:28	1.92	18/04/2008	11:43	0.88
SBHJ01 CP	SP	7.50		19/03/2008	14:15	1.81	03/04/2008	16:05	1.90	17/04/2008	12:40	1.80
SBHJ03 CP	SP	5.20		19/03/2008	16:40	0.78	03/04/2008	18:25	0.82	17/04/2008	15:55	0.80
SBHJ04	SP	13.10		17/03/2008	13:35	6.64	03/04/2008	18:10	6.74	17/04/2008	13:08	6.80
SBHJ05	SP	11.50		18/03/2008	13:50	9.02	03/04/2008	17:39	9.10	17/04/2008	13:31	9.11
SBHJ06 CP	SP	4.10		17/03/2008	12:55	1.29	03/04/2008	17:43	1.33	17/04/2008	15:05	1.20
SBHJ07 CP	SP	10.40		17/03/2008	10:25	1.59	03/04/2008	17:47	1.50	17/04/2008	13:58	1.47
SBHJ08A CP	SP	7.40		18/03/2008	10:00	2.50	03/04/2008	17:55	2.50	17/04/2008	15:33	2.50
SBHJ09 CP	SP	2.20		18/03/2008	10:25	0.69	03/04/2008	17:58	0.82	17/04/2008	15:22	0.90
SBHJ10 CP	SP	10.00		17/03/2008	09:15	2.10	03/04/2008	17:50	2.00	17/04/2008	13:55	2.00
SBHK01 CP	SP	6.80		19/03/2008	10:45	0.88	03/04/2008	16:40	1.00	17/04/2008	11:40	0.94
SBHK02 CP	SP	11.20		19/03/2008	11:15	1.46	03/04/2008	16:45	1.48	17/04/2008	11:43	1.46
SBHK03 CP	SP	5.90		19/03/2008	11:45	1.04	03/04/2008	16:48	1.07	17/04/2008	11::46	0.98
SBHK04 CP	SP	12.20		19/03/2008	12:15	1.64	03/04/2008	16:52	1.67	17/04/2008	12:05	1.60
SBHL02 RC	SPIE	15.20		19/03/2008	12:50	2.44	03/04/2008	17:00	2.45	17/04/2008	12:00	2.45
SBHL03 RC	SPIE	15.00		20/03/2008	13:25	0.76	08/04/2008	15:40	0.64	18/04/2008	09:50	0.62
SBHM01 RC	SPIE	21.00		20/03/2008	13:05	-0.21	08/04/2008	15:48	-0.45	18/04/2008	11:55	0.01
SBHM02 RC	SPIE	20.00		20/03/2008	13:10	0.61	08/04/2008	15:52	0.61	18/04/2008	11:50	0.61
SBHN01A RC	SPIE	14.90		20/03/2008	12:55	12.14	08/04/2008	16:05	12.58	18/04/2008	12:48	13.27
SBHN02 RC	SPIE	20.40		20/03/2008	12:45	4.26	08/04/2008	16:12	2.64	18/04/2008	12:45	4.85
SBHN03 RC	SPIE	15.00		20/03/2008	12:30	1.60	08/04/2008	16:17	2.07	18/04/2008	12:35	2.37
SBHN04 RC	SPIE	10.00		20/03/2008	12:10	DRY	08/04/2008	16:28	DRY	18/04/2008	10:55	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	17/03/08-17/04/08	Date:	21/04/2008	Date:	21/04/2008
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NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		04

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		20/03/2008	12:00	DRY	08/04/2008	16:40	DRY	18/04/2008	10:45	DRY
SBHP02 RC	SPIE	9.80		20/03/2008	11:45	5.59	08/04/2008	16:55	7.98	18/04/2008	10:30	8.20
SBHP03 RC	SPIE	5.00		20/03/2008	11:40	2.80	08/04/2008	16:50	DRY	18/04/2008	10:25	4.93
SBHQ01 RC	SPIE	11.80		20/03/2008	10:40	6.72	08/04/2008	17:13	7.24	18/04/2008	10:10	7.48
SBHQ02 RC	SPIE	6.00		20/03/2008	10:45	4.91	08/04/2008	17:10	DRY	18/04/2008	10:05	DRY
SBHQ03 RC	SPIE	11.00		20/03/2008	10:50	6.76	08/04/2008	17:05	7.69	18/04/2008	10:15	8.00
SBHQ04 RC	SPIE	8.00		20/03/2008	11:30	6.97	08/04/2008	17:02	DRY	18/04/2008	10:40	DRY
SBHQ06 RC	SPIE	7.35		20/03/2008	11:20	4.47	08/04/2008	17:20	6.63	18/04/2008	12:20	4.79
SWSJ08	SP	3.30		19/03/2008	15:10	0.44	03/04/2008	16:00	0.46	17/04/2008	12:35	0.42
SWSJ13	SP	2.50		17/03/2008	13:25	DRY	03/04/2008	18:12	DRY	17/04/2008	13:12	DRY
SWSJ21	SP	6.00		18/03/2008	14:30	4.42	03/04/2008	17:33	5.89	17/04/2008	13:32	6.50
SWSJ23	SP	7.80		18/03/2008	15:05	7.58	03/04/2008	17:35	7.20	17/04/2008	13:35	7.20
SWSJ34	SP	6.00		19/03/2008	08:55	2.36	03/04/2008	17:23	3.26	17/04/2008	13:46	DRY
SWSJ37	SP	5.60		18/03/2008	11:15	0.55	03/04/2008	17:25	0.67	17/04/2008	13:42	0.63
LGBH02	SP	8.88		17/03/2008	12:55	7.48	03/04/2008	18:05	7.46	17/04/2008	13:00	7.48
LGBH03	SP	8.90		17/03/2008	13:15	7.24	03/04/2008	18:08	7.32	17/04/2008	13:03	7.30
LGBH04	SP	10.50		18/03/2008	13:20	8.87	03/04/2008	17:40	8.90	17/04/2008	13:29	8.94
LGBH09	SP	7.00		17/03/2008	11:00	1.08	03/04/2008	17:45	1.15	17/04/2008	15:08	1.05
LGBH10	SP	14.60		18/03/2008	15:20	8.31	03/04/2008	17:27	8.20	17/04/2008	13:40	8.70
LGBH11	SP	11.20		18/03/2008	11:40	6.88	03/04/2008	17:18	7.00	17/04/2008	15:38	7.08
LGBH12	SP	7.05		17/03/2008	10:00	1.30	03/04/2008	17:49	1.47	17/04/2008	15:15	1.36
RBBH07	SP	6.25		19/03/2008	13:25	0.66	03/04/2008	15:50	0.68	17/04/2008	12:30	1.10
RBBH09	SP	7.05		19/03/2008	14:40	1.18	03/04/2008	16:07	1.21	17/04/2008	12:42	1.25
RBBH10	SP	6.85		19/03/2008	13:45	0.70	03/04/2008	16:03	0.75	17/04/2008	12:39	0.78

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	17/03/08-17/04/08	Date:	21/04/2008	Date:	21/04/2008
Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH521	19/03/15 10:30:00	1038	1								0.4	6		23 litres purged, base depth 6.00m.
BH521	19/03/15 10:31:00										0.0			
BH521	19/03/15 10:32:00										0.0			
BH521	19/03/15 10:33:00										0.0			
BH521	19/03/15 10:34:00										0.0			
BH521	19/03/15 10:35:00			0.0	0.0	19.5	0.0	0	0	1.0				
BH521	19/03/15 10:36:00			0.0	0.0	19.6	0.0	0	0	0.8				
BH521	19/03/15 10:37:00			0.0	0.0	19.7	0.0	0	0	0.7				
BH521	19/03/15 10:38:00			0.0	0.0	19.7	0.0	0	0	0.6				
BH521	19/03/15 10:39:00			0.0	0.0	19.8	0.0	0	0	0.5				
BH521	19/03/15 10:40:00			0.0	0.0	19.8	0.0	0	0	0.4				
BH521	19/03/15 10:41:00			0.0	0.0	19.9	0.0	0	0	0.4				
BH521	19/03/15 10:42:00			0.0	0.0	19.9	0.0	0	0	0.3				
BH521	19/03/15 10:43:00			0.0	0.0	19.9	0.0	0	0	0.3				
BH521	19/03/15 10:44:00			0.0	0.0	19.9	0.0	0	0	0.3			0.85	
BH521	26/03/15 11:00:00	1007	0								0.0	11		17 litres purged, base depth 6.00m.
BH521	26/03/15 11:01:00										0.0			
BH521	26/03/15 11:02:00										0.0			

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT **30238**

CHECKED **EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH521	26/03/15 11:03:00										0.0			
BH521	26/03/15 11:04:00										0.0			
BH521	26/03/15 11:05:00			0.0	2.8	19.7	49.0	0	1	0.2				
BH521	26/03/15 11:06:00			0.0	1.4	20.2	27.0	0	0	0.5				
BH521	26/03/15 11:07:00			0.0	1.2	20.3	24.0	0	1	0.5				
BH521	26/03/15 11:08:00			0.0	1.1	20.4	21.0	0	0	0.6				
BH521	26/03/15 11:09:00			0.0	0.9	20.5	17.0	0	0	0.7				
BH521	26/03/15 11:10:00			0.0	0.8	20.5	15.0	0	0	0.7				
BH521	26/03/15 11:11:00			0.0	0.6	20.6	12.0	0	0	0.8				
BH521	26/03/15 11:12:00			0.0	0.6	20.6	10.0	0	0	0.9				
BH521	26/03/15 11:13:00			0.0	0.4	20.7	8.0	0	0	1.0				
BH521	26/03/15 11:14:00			0.0	0.4	20.7	6.0	0	0	1.1			1.26	
BH521	02/04/15 10:30:00	1027	-1.02								0.1	8		16 litres purged, base depth 6.00m.
BH521	02/04/15 10:31:00										0.0			
BH521	02/04/15 10:32:00										-0.3			
BH521	02/04/15 10:33:00										-0.5			
BH521	02/04/15 10:34:00										-1.2			
BH521	02/04/15 10:35:00			0.3	5.0	19.0	94.0	0	2	0.1				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT	CHECKED
30238	**EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH521	02/04/15 10:36:00			0.3	3.9	19.3	78.0	0	2	0.0				
BH521	02/04/15 10:37:00			0.3	3.5	19.6	66.0	0	2	0.0				
BH521	02/04/15 10:38:00			0.2	2.8	19.8	46.0	0	2	0.2				
BH521	02/04/15 10:39:00			0.1	1.8	20.2	33.0	0	1	0.5				
BH521	02/04/15 10:40:00			0.0	0.1	20.9	1.0	0	1	1.6				
BH521	02/04/15 10:41:00			0.0	0.1	20.9	1.0	0	1	1.5				
BH521	02/04/15 10:42:00			0.0	0.1	20.9	1.0	0	0	1.3				
BH521	02/04/15 10:43:00			0.0	0.1	20.9	1.0	0	0	1.2				
BH521	02/04/15 10:44:00			0.0	0.1	20.9	1.0	0	0	1.1			1.34	
BH521	07/05/15 13:44:00	997	0								0.0	17		
BH521	07/05/15 13:45:00										0.0			
BH521	07/05/15 13:46:00										0.0			
BH521	07/05/15 13:47:00										0.0			
BH521	07/05/15 13:48:00										0.0			
BH521	07/05/15 13:49:00			0.0	0.3	19.8	2.4	0	0	0.2				
BH521	07/05/15 13:50:00			0.0	0.0	20.1	0.0	0	0	0.0				
BH521	07/05/15 13:51:00			0.0	0.0	20.3	0.0	0	0	0.0				
BH521	07/05/15 13:52:00			0.0	0.0	20.3	0.0	0	0	0.0				

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT **30238**

CHECKED **EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH521	07/05/15 13:53:00			0.0	0.0	20.3	0.0	0	0	0.0				
BH521	07/05/15 13:54:00			0.0	0.0	20.3	0.0	0	0	0.0				
BH521	07/05/15 13:55:00			0.0	0.0	20.3	0.0	0	0	0.0				
BH521	07/05/15 13:56:00			0.0	0.0	20.3	0.0	0	0	0.0				
BH521	07/05/15 13:57:00			0.0	0.0	20.3	0.0	0	0	0.0				
BH521	07/05/15 13:58:00			0.0	0.0	20.3	0.0	0	0	0.0				
BH521	07/05/15 13:59:00												2.66	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Shallow install.

CONTRACT **30238**

CHECKED **EC**

Geotechnical Engineering Limited

GAS AND GROUNDWATER LEVELS

CLIENT: WELSH GOVERNMENT

SITE: M4 CORRIDOR AROUND NEWPORT

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H_2O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH521	19/03/15 10:44:00												2.93	36 litres purged, base depth 11.00m.
BH521	26/03/15 11:14:00												2.95	36 litres purged, base depth 11.00m.
BH521	02/04/15 10:44:00												1.99	42 litres purged, base depth 11.00m.
BH521	07/05/15 14:00:00												3.57	

remarks
# denotes result exceeding capacity of gas monitoring equipment
VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.
Deep install.

CONTRACT **30238**

CHECKED **EC**

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		01

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		30/01/2008	09:50	2.45	25/02/2008	14:34	2.48	07/03/2008	14:25	2.60
SBHD03 CP	SPIE	10.00		30/01/2008	11:01	0.47	25/02/2008	14:52	0.43	07/03/2008	14:05	0.56
SBHD05 RC	SPIE	12.00		31/01/2008	09:00	1.02	25/02/2008	15:35	1.05	07/03/2008	13:50	1.77
SBHD06 RC	SP	15.00		30/01/2008	13:00	1.13	21/02/2008	10:30	1.39	07/03/2008	13:30	1.39
SBHD08 RC	SPIE	29.50		30/01/2008	13:50	1.20	25/02/2008	15:58	2.02	07/03/2008	13:35	1.40
SBHE02RD	SPIE	25.00		31/01/2008	09:25	2.18	25/02/2008	16:20	2.09	07/03/2008	13:10	2.48
SBHE04 RC	SPIE	17.20		31/01/2008	09:15	2.31	25/02/2008	16:11	2.51	07/03/2008	13:20	2.59
SBHF01 RC	SPIE	19.00		31/01/2008	09:40	5.69	25/02/2008	16:32	5.72	07/03/2008	12:50	5.43
SBHF02A CP	SPIE	17.00		01/02/2008	14:40	7.61	25/02/2008	17:13	7.57	07/03/2008	12:30	9.00
SBHF03 RC	SPIE	18.00		31/01/2008	10:35	6.97	26/02/2008	08:55	6.77	07/03/2008	12:15	7.22
SBHH01 RC	SPIE	25.00		31/01/2008	11:15	3.45	26/02/2008	09:39	3.42	07/03/2008	11:28	3.65
SBHH02 RC	SPIE	14.90		31/01/2008	11:10	3.42	26/02/2008	09:20	3.88	07/03/2008	11:35	3.64
SBHH05 RC	SPIE	21.50		31/01/2008	11:30	2.22	26/02/2008	10:01	2.13	07/03/2008	11:05	3.10
SBHH06 CP	SP	12.30		30/01/2008	15:30	3.75	21/02/2008	08:00	3.76	07/03/2008	11:10	3.87
SBHH07A RC	SPIE	24.85		30/01/2008	14:50	1.70	26/02/2008	10:40	1.34	07/03/2008	11:00	1.07
SBHJ01 CP	SP	7.50		01/02/2008	12:20	1.34	21/02/2008	11:45	5.98	06/03/2008	12:28	1.82
SBHJ03 CP	SP	5.20		01/02/2008	08:00	0.54	27/02/2008	16:15	0.70	07/03/2008	10:45	0.68
SBHJ04	SP	13.10		01/02/2008	11:55	6.61	22/02/2008	13::55	6.67	06/03/2008	11:46	6.75
SBHJ05	SP	11.50		01/02/2008	11:10	8.91	22/02/2008	09:00	9.07	06/03/2008	11:23	9.16
SBHJ06 CP	SP	4.10		01/02/2008	11:45	1.31	21/02/2008	15:30	1.32	06/03/2008	10:50	1.33
SBHJ07 CP	SP	10.40		01/02/2008	11:43	1.35	21/02/2008	14:40	1.40	06/03/2008	12:05	1.56
SBHJ08A CP	SP	7.40		01/02/2008	11:35	3.49	21/02/2008	13:05	2.31	06/03/2008	10:57	2.67
SBHJ09 CP	SP	2.20		01/02/2008	11:30	0.65	21/02/2008	12:25	0.85	06/03/2008	11:00	0.90
SBHJ10 CP	SP	10.00		01/02/2008	10:40	2.30	21/02/2008	13:45	2.24	06/03/2008	10:40	2.16
SBHK01 CP	SP	6.80		01/02/2008	10:55	0.70	25/02/2008	10:30	1.00	06/03/2008	14:24	1.06
SBHK02 CP	SP	11.20		01/02/2008	10:50	1.34	25/02/2008	11:20	1.33	06/03/2008	14:18	1.47
SBHK03 CP	SP	5.90		01/02/2008	10:45	0.87	25/02/2008	12:00	0.89	06/03/2008	14:15	1.00
SBHK04 CP	SP	12.20		01/02/2008	10:25	1.45	25/02/2008	12:30	1.60	06/03/2008	12:30	1.60
SBHL02 RC	SPIE	15.20		01/02/2008	10:35	2.27	25/02/2008	12:49	2.31	06/03/2008	14:00	2.42
SBHL03 RC	SPIE	15.00		31/01/2008	16:20	0.61	26/02/2008	11:15	0.51	07/03/2008	10:25	0.66
SBHM01 RC	SPIE	21.00		01/01/1900	08:20	-0.26	26/02/2008	11:30	-0.26	07/03/2008	10:17	0.05
SBHM02 RC	SPIE	20.00		01/02/2008	08:25	0.19	26/02/2008	11:41	0.49	07/03/2008	10:14	0.68
SBHN01A RC	SPIE	14.90		01/02/2008	15:20	8.49	27/02/2008	17:15	12.23	07/03/2008	14:45	13.18
SBHN02 RC	SPIE	20.40		31/01/2008	15:55	3.67	26/02/2008	11:57	4.19	07/03/2008	10:05	4.84
SBHN03 RC	SPIE	15.00		31/01/2008	15:45	1.07	26/02/2008	12:03	1.73	07/03/2008	09:55	2.34
SBHN04 RC	SPIE	10.00		31/01/2008	15:30	9.99	26/02/2008	14:42	DRY	07/03/2008	09:45	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	30/01/08-07/03/08	Date:	16/04/2008	Date:	17/04/2008
Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		02

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS

Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		31/01/2008	14:50	DRY	26/02/2008	14:12	DRY	07/03/2008	09:35	DRY
SBHP02 RC	SPIE	9.80		31/01/2008	13:55	7.20	26/02/2008	13:59	8.09	07/03/2008	09:10	8.25
SBHP03 RC	SPIE	5.00		31/01/2008	13:40	4.09	26/02/2008	13:48	4.76	07/03/2008	09:05	4.78
SBHQ01 RC	SPIE	11.80		31/01/2008	14:20	5.76	26/02/2008	12:46	6.74	07/03/2008	09:30	7.20
SBHQ02 RC	SPIE	6.00		31/01/2008	14:15	4.98	26/02/2008	12:59	5.16	07/03/2008	09:25	5.98
SBHQ03 RC	SPIE	11.00		31/01/2008	13:20	6.04	26/02/2008	13:29	7.22	07/03/2008	08:38	7.59
SBHQ04 RC	SPIE	8.00		31/01/2008	13:05	4.35	26/02/2008	13:36	6.18	07/03/2008	08:55	6.94
SBHQ06 RC	SPIE	7.35		31/01/2008	13:00	3.89	26/02/2008	13:16	4.40	07/03/2008	08:25	4.63
SWSJ08	SP	3.30		01/02/2008	12:30	0.42	21/02/2008	11:45	0.37	06/03/2008	12:35	0.41
SWSJ13	SP	2.50		01/02/2008	12:00	DRY	22/02/2008	13:45	DRY	06/03/2008	11:50	DRY
SWSJ21	SP	6.00		01/02/2008	11:20	3.87	22/02/2008	09:30	5.72	06/03/2008	11:27	6.59
SWSJ23	SP	7.80		01/02/2008	11:22	5.92	22/02/2008	09:55	6.62	06/03/2008	11:30	6.97
SWSJ34	SP	6.00		01/02/2008	11:05	2.52	22/02/2008	10:55	3.33	06/03/2008	11:10	3.08
SWSJ37	SP	5.60		01/02/2008	11:25	0.46	22/02/2008	11:30	0.55	06/03/2008	11:15	0.61
LGBH02	SP	8.88					22/02/2008	14:35	7.50	06/03/2008	11:40	7.52
LGBH03	SP	8.90					22/02/2008	14:21	7.20	06/03/2008	11:44	7.28
LGBH04	SP	10.50					22/02/2008	10:30	8.87	06/03/2008	11:20	9.00
LGBH09	SP	7.00					22/02/2008	12:40	1.13	06/03/2008	10:48	1.56
LGBH10	SP	14.60					27/02/2008	14:30	8.15	06/03/2008	11:12	8.21
LGBH11	SP	11.20					27/02/2008	10:00	7.05	06/03/2008	11:03	7.07
LGBH12	SP	7.05					22/02/2008	13:10	1.40	06/03/2008	10:45	1.40
RBBH07	SP	6.25					27/02/2008	12.15	0.69	06/03/2008	12:20	0.71
RBBH09	SP	7.05					27/02/2008	13:40	1.25	06/03/2008	12:25	1.21
RBBH10	SP	6.85					27/02/2008	13:00	0.68	06/03/2008	12:30	0.82

Recorded by: S Davis	Checked by: I Swain	Approved by: I Swain	NORWEST HOLST SOIL ENGINEERING
Date: 30/01/08-07/03/08	Date: 16/04/2008	Date: 17/04/2008	
Form No. SI GWR	Revision No. 2.03	Issue Date 07/01/2008	

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		03

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		20/03/2008	16:30	2.57	04/04/2008	08:00	2.59	18/04/2008	07:40	2.66
SBHD03 CP	SPIE	10.00		20/03/2008	16:45	0.58	04/04/2008	08:13	0.53	18/04/2008	08:00	0.60
SBHD05 RC	SPIE	12.00		20/03/2008	16:00	1.08	04/04/2008	09:15	1.22	18/04/2008	08:30	1.32
SBHD06 RC	SP	15.00		20/03/2008	17:55	1.20	04/04/2008	09:30	1.33	18/04/2008	08:40	1.44
SBHD08 RC	SPIE	29.50		19/03/2008	18:30	1.28	04/04/2008	10:00	1.39	18/04/2008	08:52	1.52
SBHE02RD	SPIE	25.00		20/03/2008	16:20	2.23	04/04/2008	08:50	2.46	18/04/2008	09:00	2.54
SBHE04 RC	SPIE	17.20		20/03/2008	15:45	2.20	04/04/2008	09:00	1.80	18/04/2008	08:15	1.80
SBHF01 RC	SPIE	19.00		20/03/2008	15:30	5.50	04/04/2008	08:40	5.55	18/04/2008	13:58	5.58
SBHF02A CP	SPIE	17.00		20/03/2008	15:10	5.60	04/04/2008	10:28	5.70	18/04/2008	13:45	5.77
SBHF03 RC	SPIE	18.00		20/03/2008	14:55	7.20	04/04/2008	10:36	7.38	18/04/2008	13:40	7.42
SBHH01 RC	SPIE	25.00		20/03/2008	14:25	3.60	04/04/2008	15:00	3.60	18/04/2008	13:10	3.62
SBHH02 RC	SPIE	14.90		20/03/2008	14:30	4.27	04/04/2008	15:05	3.64	18/04/2008	13:13	3.70
SBHH05 RC	SPIE	21.50		20/03/2008	17:30	2.17	04/04/2008	15:15	2.78	18/04/2008	11:34	2.90
SBHH06 CP	SP	12.30		17/03/2008	15:20	3.88	04/04/2008	15:20	3.89	17/04/2008	14:15	3.90
SBHH07A RC	SPIE	24.85		20/03/2008	13:55	1.33	04/04/2008	15:28	1.92	18/04/2008	11:43	0.88
SBHJ01 CP	SP	7.50		19/03/2008	14:15	1.81	03/04/2008	16:05	1.90	17/04/2008	12:40	1.80
SBHJ03 CP	SP	5.20		19/03/2008	16:40	0.78	03/04/2008	18:25	0.82	17/04/2008	15:55	0.80
SBHJ04	SP	13.10		17/03/2008	13:35	6.64	03/04/2008	18:10	6.74	17/04/2008	13:08	6.80
SBHJ05	SP	11.50		18/03/2008	13:50	9.02	03/04/2008	17:39	9.10	17/04/2008	13:31	9.11
SBHJ06 CP	SP	4.10		17/03/2008	12:55	1.29	03/04/2008	17:43	1.33	17/04/2008	15:05	1.20
SBHJ07 CP	SP	10.40		17/03/2008	10:25	1.59	03/04/2008	17:47	1.50	17/04/2008	13:58	1.47
SBHJ08A CP	SP	7.40		18/03/2008	10:00	2.50	03/04/2008	17:55	2.50	17/04/2008	15:33	2.50
SBHJ09 CP	SP	2.20		18/03/2008	10:25	0.69	03/04/2008	17:58	0.82	17/04/2008	15:22	0.90
SBHJ10 CP	SP	10.00		17/03/2008	09:15	2.10	03/04/2008	17:50	2.00	17/04/2008	13:55	2.00
SBHK01 CP	SP	6.80		19/03/2008	10:45	0.88	03/04/2008	16:40	1.00	17/04/2008	11:40	0.94
SBHK02 CP	SP	11.20		19/03/2008	11:15	1.46	03/04/2008	16:45	1.48	17/04/2008	11:43	1.46
SBHK03 CP	SP	5.90		19/03/2008	11:45	1.04	03/04/2008	16:48	1.07	17/04/2008	11::46	0.98
SBHK04 CP	SP	12.20		19/03/2008	12:15	1.64	03/04/2008	16:52	1.67	17/04/2008	12:05	1.60
SBHL02 RC	SPIE	15.20		19/03/2008	12:50	2.44	03/04/2008	17:00	2.45	17/04/2008	12:00	2.45
SBHL03 RC	SPIE	15.00		20/03/2008	13:25	0.76	08/04/2008	15:40	0.64	18/04/2008	09:50	0.62
SBHM01 RC	SPIE	21.00		20/03/2008	13:05	-0.21	08/04/2008	15:48	-0.45	18/04/2008	11:55	0.01
SBHM02 RC	SPIE	20.00		20/03/2008	13:10	0.61	08/04/2008	15:52	0.61	18/04/2008	11:50	0.61
SBHN01A RC	SPIE	14.90		20/03/2008	12:55	12.14	08/04/2008	16:05	12.58	18/04/2008	12:48	13.27
SBHN02 RC	SPIE	20.40		20/03/2008	12:45	4.26	08/04/2008	16:12	2.64	18/04/2008	12:45	4.85
SBHN03 RC	SPIE	15.00		20/03/2008	12:30	1.60	08/04/2008	16:17	2.07	18/04/2008	12:35	2.37
SBHN04 RC	SPIE	10.00		20/03/2008	12:10	DRY	08/04/2008	16:28	DRY	18/04/2008	10:55	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
Date:	17/03/08-17/04/08	Date:	21/04/2008	Date:	21/04/2008
Form No.	SI GWR	Revision No.	2.03	Issue Date	07/01/2008

NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		04

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		20/03/2008	12:00	DRY	08/04/2008	16:40	DRY	18/04/2008	10:45	DRY
SBHP02 RC	SPIE	9.80		20/03/2008	11:45	5.59	08/04/2008	16:55	7.98	18/04/2008	10:30	8.20
SBHP03 RC	SPIE	5.00		20/03/2008	11:40	2.80	08/04/2008	16:50	DRY	18/04/2008	10:25	4.93
SBHQ01 RC	SPIE	11.80		20/03/2008	10:40	6.72	08/04/2008	17:13	7.24	18/04/2008	10:10	7.48
SBHQ02 RC	SPIE	6.00		20/03/2008	10:45	4.91	08/04/2008	17:10	DRY	18/04/2008	10:05	DRY
SBHQ03 RC	SPIE	11.00		20/03/2008	10:50	6.76	08/04/2008	17:05	7.69	18/04/2008	10:15	8.00
SBHQ04 RC	SPIE	8.00		20/03/2008	11:30	6.97	08/04/2008	17:02	DRY	18/04/2008	10:40	DRY
SBHQ06 RC	SPIE	7.35		20/03/2008	11:20	4.47	08/04/2008	17:20	6.63	18/04/2008	12:20	4.79
SWSJ08	SP	3.30		19/03/2008	15:10	0.44	03/04/2008	16:00	0.46	17/04/2008	12:35	0.42
SWSJ13	SP	2.50		17/03/2008	13:25	DRY	03/04/2008	18:12	DRY	17/04/2008	13:12	DRY
SWSJ21	SP	6.00		18/03/2008	14:30	4.42	03/04/2008	17:33	5.89	17/04/2008	13:32	6.50
SWSJ23	SP	7.80		18/03/2008	15:05	7.58	03/04/2008	17:35	7.20	17/04/2008	13:35	7.20
SWSJ34	SP	6.00		19/03/2008	08:55	2.36	03/04/2008	17:23	3.26	17/04/2008	13:46	DRY
SWSJ37	SP	5.60		18/03/2008	11:15	0.55	03/04/2008	17:25	0.67	17/04/2008	13:42	0.63
LGBH02	SP	8.88		17/03/2008	12:55	7.48	03/04/2008	18:05	7.46	17/04/2008	13:00	7.48
LGBH03	SP	8.90		17/03/2008	13:15	7.24	03/04/2008	18:08	7.32	17/04/2008	13:03	7.30
LGBH04	SP	10.50		18/03/2008	13:20	8.87	03/04/2008	17:40	8.90	17/04/2008	13:29	8.94
LGBH09	SP	7.00		17/03/2008	11:00	1.08	03/04/2008	17:45	1.15	17/04/2008	15:08	1.05
LGBH10	SP	14.60		18/03/2008	15:20	8.31	03/04/2008	17:27	8.20	17/04/2008	13:40	8.70
LGBH11	SP	11.20		18/03/2008	11:40	6.88	03/04/2008	17:18	7.00	17/04/2008	15:38	7.08
LGBH12	SP	7.05		17/03/2008	10:00	1.30	03/04/2008	17:49	1.47	17/04/2008	15:15	1.36
RBBH07	SP	6.25		19/03/2008	13:25	0.66	03/04/2008	15:50	0.68	17/04/2008	12:30	1.10
RBBH09	SP	7.05		19/03/2008	14:40	1.18	03/04/2008	16:07	1.21	17/04/2008	12:42	1.25
RBBH10	SP	6.85		19/03/2008	13:45	0.70	03/04/2008	16:03	0.75	17/04/2008	12:39	0.78

Recorded by: S Davis	Checked by: I Swain	Approved by: I Swain
Date: 17/03/08-17/04/08	Date: 21/04/2008	Date: 21/04/2008
Form No. SI GWR	Revision No. 2.03	Issue Date 07/01/2008

NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		01

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		30/01/2008	09:50	2.45	25/02/2008	14:34	2.48	07/03/2008	14:25	2.60
SBHD03 CP	SPIE	10.00		30/01/2008	11:01	0.47	25/02/2008	14:52	0.43	07/03/2008	14:05	0.56
SBHD05 RC	SPIE	12.00		31/01/2008	09:00	1.02	25/02/2008	15:35	1.05	07/03/2008	13:50	1.77
SBHD06 RC	SP	15.00		30/01/2008	13:00	1.13	21/02/2008	10:30	1.39	07/03/2008	13:30	1.39
SBHD08 RC	SPIE	29.50		30/01/2008	13:50	1.20	25/02/2008	15:58	2.02	07/03/2008	13:35	1.40
SBHE02RD	SPIE	25.00		31/01/2008	09:25	2.18	25/02/2008	16:20	2.09	07/03/2008	13:10	2.48
SBHE04 RC	SPIE	17.20		31/01/2008	09:15	2.31	25/02/2008	16:11	2.51	07/03/2008	13:20	2.59
SBHF01 RC	SPIE	19.00		31/01/2008	09:40	5.69	25/02/2008	16:32	5.72	07/03/2008	12:50	5.43
SBHF02A CP	SPIE	17.00		01/02/2008	14:40	7.61	25/02/2008	17:13	7.57	07/03/2008	12:30	9.00
SBHF03 RC	SPIE	18.00		31/01/2008	10:35	6.97	26/02/2008	08:55	6.77	07/03/2008	12:15	7.22
SBHH01 RC	SPIE	25.00		31/01/2008	11:15	3.45	26/02/2008	09:39	3.42	07/03/2008	11:28	3.65
SBHH02 RC	SPIE	14.90		31/01/2008	11:10	3.42	26/02/2008	09:20	3.88	07/03/2008	11:35	3.64
SBHH05 RC	SPIE	21.50		31/01/2008	11:30	2.22	26/02/2008	10:01	2.13	07/03/2008	11:05	3.10
SBHH06 CP	SP	12.30		30/01/2008	15:30	3.75	21/02/2008	08:00	3.76	07/03/2008	11:10	3.87
SBHH07A RC	SPIE	24.85		30/01/2008	14:50	1.70	26/02/2008	10:40	1.34	07/03/2008	11:00	1.07
SBHJ01 CP	SP	7.50		01/02/2008	12:20	1.34	21/02/2008	11:45	5.98	06/03/2008	12:28	1.82
SBHJ03 CP	SP	5.20		01/02/2008	08:00	0.54	27/02/2008	16:15	0.70	07/03/2008	10:45	0.68
SBHJ04	SP	13.10		01/02/2008	11:55	6.61	22/02/2008	13::55	6.67	06/03/2008	11:46	6.75
SBHJ05	SP	11.50		01/02/2008	11:10	8.91	22/02/2008	09:00	9.07	06/03/2008	11:23	9.16
SBHJ06 CP	SP	4.10		01/02/2008	11:45	1.31	21/02/2008	15:30	1.32	06/03/2008	10:50	1.33
SBHJ07 CP	SP	10.40		01/02/2008	11:43	1.35	21/02/2008	14:40	1.40	06/03/2008	12:05	1.56
SBHJ08A CP	SP	7.40		01/02/2008	11:35	3.49	21/02/2008	13:05	2.31	06/03/2008	10:57	2.67
SBHJ09 CP	SP	2.20		01/02/2008	11:30	0.65	21/02/2008	12:25	0.85	06/03/2008	11:00	0.90
SBHJ10 CP	SP	10.00		01/02/2008	10:40	2.30	21/02/2008	13:45	2.24	06/03/2008	10:40	2.16
SBHK01 CP	SP	6.80		01/02/2008	10:55	0.70	25/02/2008	10:30	1.00	06/03/2008	14:24	1.06
SBHK02 CP	SP	11.20		01/02/2008	10:50	1.34	25/02/2008	11:20	1.33	06/03/2008	14:18	1.47
SBHK03 CP	SP	5.90		01/02/2008	10:45	0.87	25/02/2008	12:00	0.89	06/03/2008	14:15	1.00
SBHK04 CP	SP	12.20		01/02/2008	10:25	1.45	25/02/2008	12:30	1.60	06/03/2008	12:30	1.60
SBHL02 RC	SPIE	15.20		01/02/2008	10:35	2.27	25/02/2008	12:49	2.31	06/03/2008	14:00	2.42
SBHL03 RC	SPIE	15.00		31/01/2008	16:20	0.61	26/02/2008	11:15	0.51	07/03/2008	10:25	0.66
SBHM01 RC	SPIE	21.00		01/01/1900	08:20	-0.26	26/02/2008	11:30	-0.26	07/03/2008	10:17	0.05
SBHM02 RC	SPIE	20.00		01/02/2008	08:25	0.19	26/02/2008	11:41	0.49	07/03/2008	10:14	0.68
SBHN01A RC	SPIE	14.90		01/02/2008	15:20	8.49	27/02/2008	17:15	12.23	07/03/2008	14:45	13.18
SBHN02 RC	SPIE	20.40		31/01/2008	15:55	3.67	26/02/2008	11:57	4.19	07/03/2008	10:05	4.84
SBHN03 RC	SPIE	15.00		31/01/2008	15:45	1.07	26/02/2008	12:03	1.73	07/03/2008	09:55	2.34
SBHN04 RC	SPIE	10.00		31/01/2008	15:30	9.99	26/02/2008	14:42	DRY	07/03/2008	09:45	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
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NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		02

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		31/01/2008	14:50	DRY	26/02/2008	14:12	DRY	07/03/2008	09:35	DRY
SBHP02 RC	SPIE	9.80		31/01/2008	13:55	7.20	26/02/2008	13:59	8.09	07/03/2008	09:10	8.25
SBHP03 RC	SPIE	5.00		31/01/2008	13:40	4.09	26/02/2008	13:48	4.76	07/03/2008	09:05	4.78
SBHQ01 RC	SPIE	11.80		31/01/2008	14:20	5.76	26/02/2008	12:46	6.74	07/03/2008	09:30	7.20
SBHQ02 RC	SPIE	6.00		31/01/2008	14:15	4.98	26/02/2008	12:59	5.16	07/03/2008	09:25	5.98
SBHQ03 RC	SPIE	11.00		31/01/2008	13:20	6.04	26/02/2008	13:29	7.22	07/03/2008	08:38	7.59
SBHQ04 RC	SPIE	8.00		31/01/2008	13:05	4.35	26/02/2008	13:36	6.18	07/03/2008	08:55	6.94
SBHQ06 RC	SPIE	7.35		31/01/2008	13:00	3.89	26/02/2008	13:16	4.40	07/03/2008	08:25	4.63
SWSJ08	SP	3.30		01/02/2008	12:30	0.42	21/02/2008	11:45	0.37	06/03/2008	12:35	0.41
SWSJ13	SP	2.50		01/02/2008	12:00	DRY	22/02/2008	13:45	DRY	06/03/2008	11:50	DRY
SWSJ21	SP	6.00		01/02/2008	11:20	3.87	22/02/2008	09:30	5.72	06/03/2008	11:27	6.59
SWSJ23	SP	7.80		01/02/2008	11:22	5.92	22/02/2008	09:55	6.62	06/03/2008	11:30	6.97
SWSJ34	SP	6.00		01/02/2008	11:05	2.52	22/02/2008	10:55	3.33	06/03/2008	11:10	3.08
SWSJ37	SP	5.60		01/02/2008	11:25	0.46	22/02/2008	11:30	0.55	06/03/2008	11:15	0.61
LGBH02	SP	8.88					22/02/2008	14:35	7.50	06/03/2008	11:40	7.52
LGBH03	SP	8.90					22/02/2008	14:21	7.20	06/03/2008	11:44	7.28
LGBH04	SP	10.50					22/02/2008	10:30	8.87	06/03/2008	11:20	9.00
LGBH09	SP	7.00					22/02/2008	12:40	1.13	06/03/2008	10:48	1.56
LGBH10	SP	14.60					27/02/2008	14:30	8.15	06/03/2008	11:12	8.21
LGBH11	SP	11.20					27/02/2008	10:00	7.05	06/03/2008	11:03	7.07
LGBH12	SP	7.05					22/02/2008	13:10	1.40	06/03/2008	10:45	1.40
RBBH07	SP	6.25					27/02/2008	12.15	0.69	06/03/2008	12:20	0.71
RBBH09	SP	7.05					27/02/2008	13:40	1.25	06/03/2008	12:25	1.21
RBBH10	SP	6.85					27/02/2008	13:00	0.68	06/03/2008	12:30	0.82

Recorded by: S Davis	Checked by: I Swain	Approved by: I Swain	NORWEST HOLST SOIL ENGINEERING
Date: 30/01/08-07/03/08	Date: 16/04/2008	Date: 17/04/2008	
Form No. SI GWR	Revision No. 2.03	Issue Date 07/01/2008	

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		03

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS SBHM01 RC installation extends 0.50m above ground level. - symbol indicates water level is above GL

All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHC01 RC	SPIE	8.05		20/03/2008	16:30	2.57	04/04/2008	08:00	2.59	18/04/2008	07:40	2.66
SBHD03 CP	SPIE	10.00		20/03/2008	16:45	0.58	04/04/2008	08:13	0.53	18/04/2008	08:00	0.60
SBHD05 RC	SPIE	12.00		20/03/2008	16:00	1.08	04/04/2008	09:15	1.22	18/04/2008	08:30	1.32
SBHD06 RC	SP	15.00		20/03/2008	17:55	1.20	04/04/2008	09:30	1.33	18/04/2008	08:40	1.44
SBHD08 RC	SPIE	29.50		19/03/2008	18:30	1.28	04/04/2008	10:00	1.39	18/04/2008	08:52	1.52
SBHE02RD	SPIE	25.00		20/03/2008	16:20	2.23	04/04/2008	08:50	2.46	18/04/2008	09:00	2.54
SBHE04 RC	SPIE	17.20		20/03/2008	15:45	2.20	04/04/2008	09:00	1.80	18/04/2008	08:15	1.80
SBHF01 RC	SPIE	19.00		20/03/2008	15:30	5.50	04/04/2008	08:40	5.55	18/04/2008	13:58	5.58
SBHF02A CP	SPIE	17.00		20/03/2008	15:10	5.60	04/04/2008	10:28	5.70	18/04/2008	13:45	5.77
SBHF03 RC	SPIE	18.00		20/03/2008	14:55	7.20	04/04/2008	10:36	7.38	18/04/2008	13:40	7.42
SBHH01 RC	SPIE	25.00		20/03/2008	14:25	3.60	04/04/2008	15:00	3.60	18/04/2008	13:10	3.62
SBHH02 RC	SPIE	14.90		20/03/2008	14:30	4.27	04/04/2008	15:05	3.64	18/04/2008	13:13	3.70
SBHH05 RC	SPIE	21.50		20/03/2008	17:30	2.17	04/04/2008	15:15	2.78	18/04/2008	11:34	2.90
SBHH06 CP	SP	12.30		17/03/2008	15:20	3.88	04/04/2008	15:20	3.89	17/04/2008	14:15	3.90
SBHH07A RC	SPIE	24.85		20/03/2008	13:55	1.33	04/04/2008	15:28	1.92	18/04/2008	11:43	0.88
SBHJ01 CP	SP	7.50		19/03/2008	14:15	1.81	03/04/2008	16:05	1.90	17/04/2008	12:40	1.80
SBHJ03 CP	SP	5.20		19/03/2008	16:40	0.78	03/04/2008	18:25	0.82	17/04/2008	15:55	0.80
SBHJ04	SP	13.10		17/03/2008	13:35	6.64	03/04/2008	18:10	6.74	17/04/2008	13:08	6.80
SBHJ05	SP	11.50		18/03/2008	13:50	9.02	03/04/2008	17:39	9.10	17/04/2008	13:31	9.11
SBHJ06 CP	SP	4.10		17/03/2008	12:55	1.29	03/04/2008	17:43	1.33	17/04/2008	15:05	1.20
SBHJ07 CP	SP	10.40		17/03/2008	10:25	1.59	03/04/2008	17:47	1.50	17/04/2008	13:58	1.47
SBHJ08A CP	SP	7.40		18/03/2008	10:00	2.50	03/04/2008	17:55	2.50	17/04/2008	15:33	2.50
SBHJ09 CP	SP	2.20		18/03/2008	10:25	0.69	03/04/2008	17:58	0.82	17/04/2008	15:22	0.90
SBHJ10 CP	SP	10.00		17/03/2008	09:15	2.10	03/04/2008	17:50	2.00	17/04/2008	13:55	2.00
SBHK01 CP	SP	6.80		19/03/2008	10:45	0.88	03/04/2008	16:40	1.00	17/04/2008	11:40	0.94
SBHK02 CP	SP	11.20		19/03/2008	11:15	1.46	03/04/2008	16:45	1.48	17/04/2008	11:43	1.46
SBHK03 CP	SP	5.90		19/03/2008	11:45	1.04	03/04/2008	16:48	1.07	17/04/2008	11::46	0.98
SBHK04 CP	SP	12.20		19/03/2008	12:15	1.64	03/04/2008	16:52	1.67	17/04/2008	12:05	1.60
SBHL02 RC	SPIE	15.20		19/03/2008	12:50	2.44	03/04/2008	17:00	2.45	17/04/2008	12:00	2.45
SBHL03 RC	SPIE	15.00		20/03/2008	13:25	0.76	08/04/2008	15:40	0.64	18/04/2008	09:50	0.62
SBHM01 RC	SPIE	21.00		20/03/2008	13:05	-0.21	08/04/2008	15:48	-0.45	18/04/2008	11:55	0.01
SBHM02 RC	SPIE	20.00		20/03/2008	13:10	0.61	08/04/2008	15:52	0.61	18/04/2008	11:50	0.61
SBHN01A RC	SPIE	14.90		20/03/2008	12:55	12.14	08/04/2008	16:05	12.58	18/04/2008	12:48	13.27
SBHN02 RC	SPIE	20.40		20/03/2008	12:45	4.26	08/04/2008	16:12	2.64	18/04/2008	12:45	4.85
SBHN03 RC	SPIE	15.00		20/03/2008	12:30	1.60	08/04/2008	16:17	2.07	18/04/2008	12:35	2.37
SBHN04 RC	SPIE	10.00		20/03/2008	12:10	DRY	08/04/2008	16:28	DRY	18/04/2008	10:55	DRY

Recorded by:	S Davis	Checked by:	I Swain	Approved by:	I Swain
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NORWEST HOLST SOIL ENGINEERING

Project Name	New M4 Preliminary Ground Investigation	**Groundwater Readings For Installations**	
Project No.	F15056		
Engineer	Ove Arup & Partners Ltd		Fig no.
Client	Transport Wales, Welsh Assembly Government		04

NOTES: SPIE=Piezometer, SP=Standpipe
For multiple installations, use different Installation IDs.
For piezometers installation depth = tip depth. For standpipes = base of pipe

COMMENTS
Unable to locate LGBH05 and RBBH08. LGBH06 was blocked
All groundwater levels are recorded from ground level

Exploratory Hole ID	Installation Details			Recorded Water Level								
	Type	Depth m	ID	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m	Date dd/mm/yyyy	Time hh:mm	Reading m
SBHP01 RC	SPIE	8.00		20/03/2008	12:00	DRY	08/04/2008	16:40	DRY	18/04/2008	10:45	DRY
SBHP02 RC	SPIE	9.80		20/03/2008	11:45	5.59	08/04/2008	16:55	7.98	18/04/2008	10:30	8.20
SBHP03 RC	SPIE	5.00		20/03/2008	11:40	2.80	08/04/2008	16:50	DRY	18/04/2008	10:25	4.93
SBHQ01 RC	SPIE	11.80		20/03/2008	10:40	6.72	08/04/2008	17:13	7.24	18/04/2008	10:10	7.48
SBHQ02 RC	SPIE	6.00		20/03/2008	10:45	4.91	08/04/2008	17:10	DRY	18/04/2008	10:05	DRY
SBHQ03 RC	SPIE	11.00		20/03/2008	10:50	6.76	08/04/2008	17:05	7.69	18/04/2008	10:15	8.00
SBHQ04 RC	SPIE	8.00		20/03/2008	11:30	6.97	08/04/2008	17:02	DRY	18/04/2008	10:40	DRY
SBHQ06 RC	SPIE	7.35		20/03/2008	11:20	4.47	08/04/2008	17:20	6.63	18/04/2008	12:20	4.79
SWSJ08	SP	3.30		19/03/2008	15:10	0.44	03/04/2008	16:00	0.46	17/04/2008	12:35	0.42
SWSJ13	SP	2.50		17/03/2008	13:25	DRY	03/04/2008	18:12	DRY	17/04/2008	13:12	DRY
SWSJ21	SP	6.00		18/03/2008	14:30	4.42	03/04/2008	17:33	5.89	17/04/2008	13:32	6.50
SWSJ23	SP	7.80		18/03/2008	15:05	7.58	03/04/2008	17:35	7.20	17/04/2008	13:35	7.20
SWSJ34	SP	6.00		19/03/2008	08:55	2.36	03/04/2008	17:23	3.26	17/04/2008	13:46	DRY
SWSJ37	SP	5.60		18/03/2008	11:15	0.55	03/04/2008	17:25	0.67	17/04/2008	13:42	0.63
LGBH02	SP	8.88		17/03/2008	12:55	7.48	03/04/2008	18:05	7.46	17/04/2008	13:00	7.48
LGBH03	SP	8.90		17/03/2008	13:15	7.24	03/04/2008	18:08	7.32	17/04/2008	13:03	7.30
LGBH04	SP	10.50		18/03/2008	13:20	8.87	03/04/2008	17:40	8.90	17/04/2008	13:29	8.94
LGBH09	SP	7.00		17/03/2008	11:00	1.08	03/04/2008	17:45	1.15	17/04/2008	15:08	1.05
LGBH10	SP	14.60		18/03/2008	15:20	8.31	03/04/2008	17:27	8.20	17/04/2008	13:40	8.70
LGBH11	SP	11.20		18/03/2008	11:40	6.88	03/04/2008	17:18	7.00	17/04/2008	15:38	7.08
LGBH12	SP	7.05		17/03/2008	10:00	1.30	03/04/2008	17:49	1.47	17/04/2008	15:15	1.36
RBBH07	SP	6.25		19/03/2008	13:25	0.66	03/04/2008	15:50	0.68	17/04/2008	12:30	1.10
RBBH09	SP	7.05		19/03/2008	14:40	1.18	03/04/2008	16:07	1.21	17/04/2008	12:42	1.25
RBBH10	SP	6.85		19/03/2008	13:45	0.70	03/04/2008	16:03	0.75	17/04/2008	12:39	0.78

Recorded by: S Davis	Checked by: I Swain	Approved by: I Swain	NORWEST HOLST SOIL ENGINEERING
Date: 17/03/08-17/04/08	Date: 21/04/2008	Date: 21/04/2008	
Form No. SI GWR	Revision No. 2.03	Issue Date 07/01/2008	

A7 Appendix 3

Soil Laboratory Data

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 12
21/06/2016

Screening Values and Assessment

	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Metals & Inorganics								
Antimony	mg/kg	20	20	54	2.5	SWSJ09A @ 1mbGL		
Arsenic	mg/kg	40	27	62	4	BH514A @ 2 - 2.5mbGL	170	0
Barium	mg/kg	20	20	370	44	SWSJ10 @ 4.5mbGL		
Boron Water Soluble	mg/kg	39	25	12	0.83	SWSJ11 @ 1mbGL		
Cadmium	mg/kg	40	31	48	0.14	SWSJ13 @ 2mbGL	190	0
Chromium	mg/kg	40	40	1400	35	BH514A @ 3.5 - 3.7mbGL	33	40
Chromium VI	mg/kg	1	0	None > LOD	None > LOD		33	0
Chromium III	mg/kg	1	1	159	159	BHM4CAN040 @ 3mbGL	8600	0
Copper	mg/kg	40	40	150	4	SWSJ13 @ 2mbGL	44000	0
Lead	mg/kg	40	40	3200	16	BH515 @ 2.5mbGL	1300	21
Mercury	mg/kg	40	12	1.3	0.22	BH514A @ 3.5 - 3.7mbGL	30	0
Molybdenum	mg/kg	20	11	9.2	0.7	SWSJ13 @ 1mbGL		
Nickel	mg/kg	40	39	120	4	BH515 @ 0.5mbGL	980	0
Selenium	mg/kg	40	14	3.79	0.21	LGBH002 @ 0.5mbGL	1800	0
Zinc	mg/kg	40	40	36000	21.3	SWSJ14 @ 1mbGL	170000	0
Beryllium	mg/kg	20	2	0.5	0.5	SWSJ10 @ 4mbGL	12	0
Iron	mg/kg	29	29	350000	545	SWSJ11 @ 1mbGL		
Vanadium	mg/kg	21	21	410	34	SWSJ12 @ 4.2mbGL	5000	0
Cyanide (total)	mg/kg	39	11	61	0.6	BH515 @ 2.5mbGL		
Cyanide (free)	mg/kg	14	1	4.1	4.1	BH515 @ 2.5mbGL		
Complex Cyanide	mg/kg	2	1	4	4	SWSJ17A @ 1mbGL		
Thiocyanate	mg/kg	10	7	2.4	0.6	LGBH002 @ 0.5mbGL		
Sulphate (soluble)	g/l	20	20	1.1	0.021	SWSJ09A @ 3mbGL		
Elemental/Free Sulphur	mg/kg	20	0	None > LOD	None > LOD			
Acid Soluble Sulphide	mg/kg	18	16	1100	94	SWSJ09A @ 3mbGL		
Ammoniacal Nitrogen as N	mg/kg	28	9	57	1.8	SBHJ04 @ 9mbGL		
Chloride	mg/kg	28	28	560	2	SWSJ10 @ 4.5mbGL		
Other								
Asbestos Presence Screen	None	28	0	None > LOD	None > LOD			
Loss on Ignition	%	11	10	39	0.4	SWSJ15 @ 2mbGL		
Total Organic Carbon	%	11	11	14	0.7	SWSJ12 @ 4.2mbGL		
Organic Matter	%	3	3	5.7	4.8	SWSJ15 @ 1mbGL		
pH Value	pH Units	40	40	12.8	7.2	LGBH001 @ 1mbGL	6-9	28
Material >2mm	%	3	1	9.4	9.4	SWSJ14 @ 2mbGL		
Organics								
BTEX								
GRO (C4-C12)	mg/kg	20	3	3.6	0.071	SWSJ16 @ 2.3mbGL		
GRO TOT (Moisture corrected)	mg/kg	1	1	0.41	0.41	BHM4CAN040 @ 3mbGL		
MTBE	mg/kg	21	0	None > LOD	None > LOD			
Benzene	mg/kg	23	2	0.156	0.071	BHM4CAN040 @ 3mbGL	27	0
Toluene	mg/kg	23	1	0.00996	0.00996	BHM4CAN040 @ 3mbGL	56000	0
Ethyl benzene	mg/kg	23	1	0.017	0.017	SWSJ16 @ 2.3mbGL	5700	0
m & p Xylene	mg/kg	23	1	0.1	0.1	SWSJ16 @ 2.3mbGL	5900	0
o Xylene	mg/kg	23	1	0.071	0.071	SWSJ16 @ 2.3mbGL	6600	0
Sum of Detected BTEX	mg/kg	1	1	0.166	0.166	BHM4CAN040 @ 3mbGL		
Sum of Detected Xylenes	mg/kg	1	0	None > LOD	None > LOD			
Phenols								
Phenol Index	mg/kg	0	0	None > LOD	None > LOD		440	0
Phenols Monohydric	mg/kg	1	0	None > LOD	None > LOD		440	0
Phenols (total)	mg/kg	37	1	0.0166	0.0166	BHM4CAN040 @ 3mbGL	440	0
Cresols	mg/kg	1	0	None > LOD	None > LOD			
Xylenols	mg/kg	1	0	None > LOD	None > LOD			
TPH								
TPH >C6-C8.	mg/kg	8	0	None > LOD	None > LOD		7800	0
TPH >C8-C10.	mg/kg	8	0	None > LOD	None > LOD		2000	0
TPH >C10-C12.	mg/kg	8	0	None > LOD	None > LOD		9200	0
TPH >C12-C16.	mg/kg	8	4	7.9	2.2	BH515 @ 0.5mbGL	10000	0
TPH >C16-C21.	mg/kg	8	5	31	6.2	TP506 @ 3 - 3.5mbGL	7600	0
TPH >C21-C35.	mg/kg	8	4	150	4.1	TP506 @ 3 - 3.5mbGL	7800	0
Aliphatics C5-C6	mg/kg	23	2	0.076	0.0282	SWSJ10 @ 4mbGL	3200	0
Aliphatics >C6-C8	mg/kg	23	2	0.0564	0.015	BHM4CAN040 @ 3mbGL	7800	0
Aliphatics >C8-C10	mg/kg	23	2	0.7	0.0398	SWSJ16 @ 2.3mbGL	2000	0
Aliphatics >C10-C12	mg/kg	23	2	0.68	0.0515	SWSJ16 @ 2.3mbGL	9700	0
Aliphatics >C12-C16	mg/kg	23	18	24	0.12	SWSJ09A @ 3mbGL	25000	0
Aliphatics >C16-C21	mg/kg	23	19	670	5.8	SWSJ09A @ 3mbGL	450000	0
Aliphatics >C21-C35	mg/kg	23	20	840	14	SWSJ09A @ 3mbGL	450000	0
Total Aliphatics C5-C35	mg/kg	20	19	1500	14	SWSJ09A @ 3mbGL	2000	0
Aliphatics >C35-44	mg/kg	3	1	7.53	7.53	BHM4CAN040 @ 3mbGL	450000	0
Total Aliphatics >C12-C44	mg/kg	1	1	182	182	BHM4CAN040 @ 3mbGL	25000	0
Aromatics C5-C7	mg/kg	3	1	0.156	0.156	BHM4CAN040 @ 3mbGL	26000	0
Aromatics C6-C7	mg/kg	20	1	0.071	0.071	SWSJ09A @ 3mbGL	7800	0
Aromatics >C7-C8	mg/kg	23	0	None > LOD	None > LOD		56000	0
Aromatics >EC8-EC10	mg/kg	23	2	1.2	0.0349	SWSJ16 @ 2.3mbGL	3500	0
Aromatics >EC10-EC12	mg/kg	23	2	1	0.0349	SWSJ16 @ 2.3mbGL	9200	0
Aromatics >EC12-EC16	mg/kg	23	15	9.9	0.98	SWSJ11 @ 1mbGL	10000	0
Aromatics >EC16-EC21	mg/kg	23	18	130	1.4	SWSJ09A @ 3mbGL	7600	0
Aromatics >EC21-EC35	mg/kg	23	21	400	5.7	SWSJ09A @ 3mbGL	7800	0
Total Aromatics C6-C35	mg/kg	20	19	540	5.7	SWSJ09A @ 3mbGL	3500	0
Aromatics >C35-44	mg/kg	3	1	9.04	9.04	BHM4CAN040 @ 3mbGL	7800	0
Aromatics >EC40-EC44	mg/kg	1	1	3.26	3.26	BHM4CAN040 @ 3mbGL	7800	0
Total Aromatics >EC12-EC44		1	1	247	247	BHM4CAN040 @ 3mbGL	7600	0
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	20	19	2100	24	SWSJ09A @ 3mbGL	2000	1
Total Aliphatics & Aromatics >C5-C44	mg/kg	1	1	429	429	BHM4CAN040 @ 3mbGL	2000	0
Total Aliphatic TPH	mg/kg	2	0	None > LOD	None > LOD		2000	0
Total Aromatic hydrocarbons	mg/kg	2	1	15	15	BH514A @ 2 - 2.5mbGL	3500	0
Total petroleum hydrocarbons	mg/kg	2	1	15	15	BH514A @ 2 - 2.5mbGL	2000	0
PAH								
Acenaphthene	mg/kg	34	18	5.2	0.016	LGBH001 @ 7.5mbGL	29000	0
Acenaphthylene	mg/kg	34	17	0.69	0.006	SWSJ09A @ 1mbGL	29000	0
Anthracene	mg/kg	34	24	3.4	0.014	SWSJ14 @ 2mbGL	150000	0
Benzo(a)anthracene	mg/kg	33	27	4.3	0.023	SWSJ09A @ 3mbGL	49	0
Benzo(a)pyrene	mg/kg	34	23	11	0.03	SWSJ14 @ 2mbGL	11	0
Benzo(b)fluoranthene	mg/kg	34	26	14	0.021	SWSJ14 @ 2mbGL	13	1

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 12
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Notes

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Chromium VI criteria used
Elemental Mercury criteria used
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Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Benzo(ghi)perylene	mg/kg	34	22	27	0.013	SWSJ14 @ 2mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	34	24	5	0.029	SWSJ14 @ 2mbGL	370	0
Chrysene	mg/kg	34	28	7.4	0.011	SWSJ09A @ 1mbGL	93	0
Dibenzo(ah)anthracene	mg/kg	34	19	7	0.013	SWSJ14 @ 2mbGL	1.1	1
Fluoranthene	mg/kg	34	29	9.4	0.026	SWSJ09A @ 3mbGL	6300	0
Fluorene	mg/kg	34	19	3.9	0.013	LGBH001 @ 7.5mbGL	20000	0
Indeno(123cd)pyrene	mg/kg	34	21	22	0.018	SWSJ14 @ 2mbGL	150	0
Naphthalene	mg/kg	34	20	4.8	0.035	SWSJ09A @ 1mbGL	190	0
Phenanthrene	mg/kg	34	28	14	0.027	SWSJ14 @ 2mbGL	6200	0
Pyrene	mg/kg	34	29	7.7	0.023	SWSJ09A @ 3mbGL	15000	0
PAH 16 Total	mg/kg	32	27	130	0.034	SWSJ14 @ 2mbGL		
PCBs								
PCBs (vs Aroclor 1254)	mg/kg	20	6	0.19	0.023	SWSJ16 @ 2.3mbGL	0.24	0
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
SVOCs								
Phenols								
2-Chlorophenol	mg/kg	20	0	None > LOD	None > LOD			
2-Methylphenol	mg/kg	20	0	None > LOD	None > LOD			
2-Nitrophenol	mg/kg	20	0	None > LOD	None > LOD			
2,4-Dichlorophenol	mg/kg	20	0	None > LOD	None > LOD			
2,4-Dimethylphenol	mg/kg	20	0	None > LOD	None > LOD			
2,4,5-Trichlorophenol	mg/kg	20	0	None > LOD	None > LOD			
2,4,6-Trichlorophenol	mg/kg	20	0	None > LOD	None > LOD			
4-Chloro-3-methylphenol	mg/kg	20	0	None > LOD	None > LOD			
4-Methylphenol	mg/kg	20	0	None > LOD	None > LOD			
4-Nitrophenol	mg/kg	20	0	None > LOD	None > LOD			
Pentachlorophenol	mg/kg	20	0	None > LOD	None > LOD			
Phenol	mg/kg	20	0	None > LOD	None > LOD		440	0
PAHs								
2-Chloronaphthalene	mg/kg	20	0	None > LOD	None > LOD			
2-Methylnaphthalene	mg/kg	20	1	0.23	0.23	SWSJ09A @ 3mbGL		
Acenaphthene	mg/kg	7	0	None > LOD	None > LOD		29000	0
Acenaphthylene	mg/kg	7	0	None > LOD	None > LOD		29000	0
Anthracene	mg/kg	7	2	0.56	0.38	SWSJ09A @ 3mbGL	150000	0
Benzo(a)anthracene	mg/kg	7	3	0.54	0.22	SWSJ09A @ 3mbGL	49	0
Benzo(a)pyrene	mg/kg	7	3	0.55	0.15	SWSJ14 @ 2mbGL	11	0
Benzo(b)fluoranthene	mg/kg	7	3	0.53	0.22	SWSJ14 @ 2mbGL	13	0
Benzo(ghi)perylene	mg/kg	7	1	1.2	1.2	SWSJ14 @ 2mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	7	3	0.39	0.19	SWSJ14 @ 2mbGL	370	0
Chrysene	mg/kg	7	3	0.97	0.31	SWSJ09A @ 3mbGL	93	0
Dibenzo(ah)anthracene	mg/kg	7	0	None > LOD	None > LOD		1.1	0
Fluoranthene	mg/kg	7	3	2	0.51	SWSJ09A @ 3mbGL	6300	0
Fluorene	mg/kg	7	1	0.28	0.28	SWSJ09A @ 3mbGL	20000	0
Indeno(123cd)pyrene	mg/kg	7	2	1.5	0.16	SWSJ14 @ 2mbGL	150	0
Naphthalene	mg/kg	7	3	0.65	0.23	SWSJ12 @ 2mbGL	190	0
Phenanthrene	mg/kg	7	6	2.1	0.2	SWSJ14 @ 2mbGL	6200	0
Pyrene	mg/kg	7	3	1.7	0.4	SWSJ09A @ 3mbGL	15000	0
Pthalates								
Bis(2-ethylhexyl) phthalate	mg/kg	20	11	0.58	0.14	SWSJ16 @ 2.3mbGL		
Butylbenzyl phthalate	mg/kg	20	0	None > LOD	None > LOD			
Di-n-butyl phthalate	mg/kg	20	0	None > LOD	None > LOD			
Di-n-Octyl phthalate	mg/kg	20	0	None > LOD	None > LOD			
Diethyl phthalate	mg/kg	20	0	None > LOD	None > LOD			
Dimethyl phthalate	mg/kg	20	0	None > LOD	None > LOD			
Other Semi-Volatiles								
1,2-Dichlorobenzene	mg/kg	20	0	None > LOD	None > LOD			
1,2,4-Trichlorobenzene	mg/kg	20	0	None > LOD	None > LOD		220	0
1,3-Dichlorobenzene	mg/kg	20	0	None > LOD	None > LOD			
1,4-Dichlorobenzene	mg/kg	20	0	None > LOD	None > LOD			
2-Nitroaniline	mg/kg	20	0	None > LOD	None > LOD			
2,4-Dinitrotoluene	mg/kg	20	0	None > LOD	None > LOD			
2,6-Dinitrotoluene	mg/kg	20	0	None > LOD	None > LOD			
3-Nitroaniline	mg/kg	20	0	None > LOD	None > LOD			
4-Bromophenylphenylether	mg/kg	20	0	None > LOD	None > LOD			
4-Chloroaniline	mg/kg	20	0	None > LOD	None > LOD			
4-Chlorophenylphenylether	mg/kg	20	0	None > LOD	None > LOD			
4-Nitroaniline	mg/kg	20	0	None > LOD	None > LOD			
Azobenzene	mg/kg	20	0	None > LOD	None > LOD			
Bis(2-chloroethoxy)methane	mg/kg	20	0	None > LOD	None > LOD			
Bis(2-chloroethyl)ether	mg/kg	20	0	None > LOD	None > LOD			
Carbazole	mg/kg	20	1	0.21	0.21	SWSJ09A @ 3mbGL		
Dibenzofuran	mg/kg	20	2	0.54	0.21	SWSJ14 @ 2mbGL		
Hexachlorobenzene	mg/kg	20	0	None > LOD	None > LOD		30	0
Hexachlorobutadiene	mg/kg	20	0	None > LOD	None > LOD		31	0
Hexachlorocyclopentadiene	mg/kg	20	0	None > LOD	None > LOD			
Hexachloroethane	mg/kg	20	0	None > LOD	None > LOD			
Isophorone	mg/kg	20	0	None > LOD	None > LOD			
N-nitrosodi-n-propylamine	mg/kg	20	0	None > LOD	None > LOD			
Nitrobenzene	mg/kg	20	0	None > LOD	None > LOD			
VOCs								
Methyl Tertiary Butyl Ether	ug/kg	19	0	None > LOD	None > LOD			
Benzene	ug/kg	21	1	23	23	SWSJ09A @ 3mbGL	27	0
Toluene	ug/kg	21	0	None > LOD	None > LOD		56000	0

M4CAN
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Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Ethylbenzene	ug/kg	21	1	5	5	SWSJ16 @ 2.3mbGL	5700	0
p/m-Xylene	ug/kg	21	1	37	37	SWSJ16 @ 2.3mbGL		
o-Xylene	ug/kg	21	1	44	44	SWSJ16 @ 2.3mbGL	6600	0
Naphthalene	ug/kg	19	0	None > LOD	None > LOD		190	0
Hexachlorobutadiene	ug/kg	19	0	None > LOD	None > LOD		31	0
1.2.4-Trichlorobenzene	ug/kg	19	0	None > LOD	None > LOD		220	0
1.2-Dichlorobenzene	ug/kg	19	0	None > LOD	None > LOD			
1.3-Dichlorobenzene	ug/kg	19	0	None > LOD	None > LOD			
1.4-Dichlorobenzene	ug/kg	19	0	None > LOD	None > LOD			
1.1.1.2-Tetrachloroethane	ug/kg	19	0	None > LOD	None > LOD			
1.1.1-Trichloroethane	ug/kg	19	0	None > LOD	None > LOD			
1.1.2.2-Tetrachloroethane	ug/kg	19	0	None > LOD	None > LOD			
1.1.2-Trichloroethane	ug/kg	19	0	None > LOD	None > LOD			
1.1-Dichloropropene	ug/kg	19	0	None > LOD	None > LOD			
1.1-Dichloroethane	ug/kg	19	0	None > LOD	None > LOD			
1.1-Dichloroethene	ug/kg	19	0	None > LOD	None > LOD			
1.2.3-Trichlorobenzene	ug/kg	19	0	None > LOD	None > LOD		102	0
1.2.3-Trichloropropane	ug/kg	19	0	None > LOD	None > LOD			
1.2.4-Trimethylbenzene	ug/kg	19	1	170	170	SWSJ16 @ 2.3mbGL		
1.2-Dibromo-3-chloropropane	ug/kg	19	0	None > LOD	None > LOD			
1.2-Dichloroethane	ug/kg	19	0	None > LOD	None > LOD			
cis-1-2-Dichloroethene	ug/kg	19	0	None > LOD	None > LOD			
1.2-Dibromoethane	ug/kg	19	0	None > LOD	None > LOD			
1.2-Dichloropropane	ug/kg	19	0	None > LOD	None > LOD			
1.3.5-Trimethylbenzene	ug/kg	19	1	73	73	SWSJ16 @ 2.3mbGL		
cis-1-3-Dichloropropene	ug/kg	19	0	None > LOD	None > LOD			
1.3-Dichloropropane	ug/kg	19	0	None > LOD	None > LOD			
2.2-Dichloropropane	ug/kg	19	0	None > LOD	None > LOD			
2-Chlorotoluene	ug/kg	19	0	None > LOD	None > LOD			
4-Chlorotoluene	ug/kg	19	0	None > LOD	None > LOD			
4-Isopropyltoluene	ug/kg	19	0	None > LOD	None > LOD			
Bromobenzene	ug/kg	19	0	None > LOD	None > LOD			
Bromochloromethane	ug/kg	19	0	None > LOD	None > LOD			
Bromoform	ug/kg	19	0	None > LOD	None > LOD			
Bromomethane	ug/kg	19	0	None > LOD	None > LOD			
Bromodichloromethane	ug/kg	19	0	None > LOD	None > LOD			
Chlorobenzene	ug/kg	19	0	None > LOD	None > LOD		56	0
Carbon Disulphide	ug/kg	19	0	None > LOD	None > LOD		11	0
Chloroethane	ug/kg	19	0	None > LOD	None > LOD			
Chloroform	ug/kg	19	0	None > LOD	None > LOD		99	0
Chloromethane	ug/kg	19	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	19	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	19	0	None > LOD	None > LOD			
Dibromomethane	ug/kg	19	0	None > LOD	None > LOD			
Dichlorodifluoromethane	ug/kg	19	0	None > LOD	None > LOD			
Dibromochloromethane	ug/kg	19	0	None > LOD	None > LOD			
Dichloromethane	ug/kg	19	0	None > LOD	None > LOD			
Isopropylbenzene	ug/kg	19	1	29	29	SWSJ16 @ 2.3mbGL		
n-Butylbenzene	ug/kg	19	0	None > LOD	None > LOD			
Propylbenzene	ug/kg	19	1	28	28	SWSJ16 @ 2.3mbGL		
sec-Butylbenzene	ug/kg	19	1	26	26	SWSJ16 @ 2.3mbGL		
Styrene	ug/kg	19	0	None > LOD	None > LOD			
trans-1-2-Dichloroethene	ug/kg	19	0	None > LOD	None > LOD			
trans-1-3-Dichloropropene	ug/kg	19	0	None > LOD	None > LOD			
Trichlorofluoromethane	ug/kg	19	0	None > LOD	None > LOD			
tert-Butylbenzene	ug/kg	19	1	88	88	SWSJ16 @ 2.3mbGL		
Tetrachloroethene	ug/kg	19	0	None > LOD	None > LOD		19	0
Trichloroethene	ug/kg	19	0	None > LOD	None > LOD		1.2	0
Vinyl Chloride	ug/kg	19	0	None > LOD	None > LOD		0.059	0

M4CAN
Soil Analysis Results & Screening Assessment
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Notes

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Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
Tidal Flat Deposits	TFD

Sample Reference	Units	LGBH001	LGBH001	LGBH002	LGBH003	SWSJ09A	SWSJ09A	SWSJ10	SWSJ10	SWSJ11	SWSJ11	SWSJ12	SWSJ12	SWSJ13	SWSJ13	SWSJ14	SWSJ14	SWSJ15	SWSJ15
Specimen Depth (m)		1	7.5	0.5	0.5	1	3	4	4.5	1	3	2	4.2	1	2	1	2	1	2
OD Level (m)						9.95	7.95	6.53	6.03	9.28	7.28	8.59	6.39	10.01	9.01	9.14	8.14	9.09	8.09
Sample Type						L	ES	ES	ES	ES	ES	L	ES	L	ES	L	L	L	L
Geology Code		MG-CS	MG-CS	MG-CS	MG-CS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG - CS	MG - GS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS
Cluster Code		2002	2002	2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI
Metals & Inorganics																			
Antimony	mg/kg					54	38	27	18	29	23	32	27	38	45	34	40	25	23
Arsenic	mg/kg	<3	<3	<3	<3	<3	23	5	30	11	4	<3	<3	10	20	9	21	15	27
Barium	mg/kg					310	180	170	370	150	170	110	92	150	110	170	91	200	140
Boron Water Soluble	mg/kg	<0.5	<0.5	4.3	<0.5	5.7	<3.5	8.9	4.2	12	<3.5	<3.5	4.8	5.8	<3.5	<3.5	<3.5	3.6	<3.5
Cadmium	mg/kg	<1	<1	<1	1	42	18	23	7.8	15	12	13	8	19	48	24	33	8.3	10
Chromium	mg/kg	474	316	60	339	140	110	100	92	140	120	120	230	170	140	120	140	160	170
Chromium VI	mg/kg																		
Chromium III	mg/kg																		
Copper	mg/kg	17	10	4	29	39	67	87	76	41	76	99	68	77	150	73	95	31	38
Lead	mg/kg	68	29	48	33	2900	2400	1900	1600	1400	2600	2200	1800	1800	3000	1900	2100	1200	660
Mercury	mg/kg	<0.5	<0.5	0.9	<0.5	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Molybdenum	mg/kg					5	3	<0.6	<0.6	<0.6	<0.6	5.5	5.7	9.2	9	5	8.1	<0.6	<0.6
Nickel	mg/kg	4	5	<2	18	11	13	25	37	28	35	45	31	47	45	35	45	37	48
Selenium	mg/kg	2.48	2.37	3.79	2.5	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Zinc	mg/kg	166	90	47	76	9900	13000	20000	4300	25000	6500	14000	7800	24000	30000	36000	33000	6100	7000
Beryllium	mg/kg					<0.4	<0.4	0.5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Iron	mg/kg	99000	87700	16600	186000	290000	280000	280000	250000	350000	320000	300000	200000	330000	300000	320000	290000	330000	300000
Vanadium	mg/kg					55	61	59	76	46	79	72	410	52	48	34	46	89	55
Cyanide (total)	mg/kg	<1	<1	<1	2	<1	<1	10	1	<1	12	<1	7	<1	<1	<1	<1	<1	<1
Cyanide (free)	mg/kg											<1							
Complex Cyanide	mg/kg											<1							
Thiocyanate	mg/kg	1.2	1.9	2.4	0.6							<1							
Sulphate (soluble)	g/l					0.22	1.1	0.2	0.18	0.89	0.24	0.29	0.074	0.066	0.13	0.024	0.17	0.054	0.15
Elemental/Free Sulphur	mg/kg					<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70
Acid Soluble Sulphide	mg/kg					<50	1100	160	140	400	180	170	220	200	<50	220	270	94	200
Ammoniacal Nitrogen as N	mg/kg	2	1.8	2.2	2.8	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
Chloride	mg/kg	155	286	362	69.8	8	420	40	560	32	8	26	14	6	6	2	4	44	26
Other																			
Asbestos Presence Screen	None					NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD
Loss on Ignition	%					3.6			0.9		<0.3	2.5	2.5		4.1	24			39
Total Organic Carbon	%					8.1			2.1		6.4	7.8	14		4.4	4.4			2.5
Organic Matter	%													4.8			5	5.7	
pH Value	pH Units	12.8	12.4	11.7	12.1	8.27	8.58	10.44	10.11	10.47	9.7	8.93	9.21	9.19	8.39	9.02	8.44	9.41	9.18
Material >2mm	%													<0.1			9.4	<0.1	
Organics																			
BTEX																			
GRO (C4-C12)	mg/kg					<0.01	0.071	0.091	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GRO TOT (Moisture corrected)	mg/kg																		
MTBE	mg/kg					<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
Benzene	mg/kg					<0.01	0.071	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	mg/kg					<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
Ethyl benzene	mg/kg					<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
m & p Xylene	mg/kg					<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
o Xylene	mg/kg					<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
Sum of Detected BTEX	mg/kg																		
Sum of Detected Xylenes	mg/kg																		
Phenols																			
Phenol Index	mg/kg																		
Phenols Monohydric	mg/kg																		
Phenols (total)	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Cresols	mg/kg																		
Xylenols	mg/kg																		
TPH																			
TPH >C6-C8.	mg/kg																		
TPH >C8-C10.	mg/kg																		
TPH >C10-C12.	mg/kg																		
TPH >C12-C16.	mg/kg																		
TPH >C16-C21.	mg/kg																		
TPH >C21-C35.	mg/kg																		
Aliphatics C5-C6	mg/kg					<0.01	<0.01	0.076	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C6-C8	mg/kg					<0.01	<0.01	0.015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

M4CAN
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CL-26 Lagoon 12
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Notes

NFD = No Fibres Detected
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Chromium VI criteria used
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Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	x

Geological Formation Legend

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
Tidal Flat Deposits	TFD

Sample Reference	Units	SWSJ16	SWSJ16	SWSJ17A	SWSJ17A	BH514A	BH514A	BH514A	BH514A	BH514A	BH516	BH515	BH515	TP506	TP506	TP506	LGBH001	LGBH002	LGBH002	LGBH003	SBHJ04	SBHJ04	BHM4CAN040
Specimen Depth (m)		2	2.3	1	1.5	0 - 0.5	1 - 1.5	2 - 2.5	3.5 - 3.7	4.5 - 4.7	0- 0.5	0.5	2.5	0.5 - 0.6	1.5 - 1.6	3 - 3.5	9.5	8.1	9	8	8	9	3
OD Level (m)		8.2	7.9	9.74	9.24	11.9	10.9	9.9	8.4	7.4	7.2	10.6	10.4	11.35	10.35	8.85					3.24	2.24	8.57
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					ES	ES	ES
Geology Code		MG -SS	MG - CS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	TFD	TFD	TFD	TFD	TFD	TFD	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002	2002	2002	2002	2007 GI	2007 GI	2016 GI
Metals & Inorganics																							
Antimony	mg/kg	36	23	26	28																2.6	2.5	
Arsenic	mg/kg	<3	<3	<3	<3	54	51	62	51	33	17	32	22	22	40	24	5	7	5	8	<3	<3	52.8
Barium	mg/kg	130	220	150	96																47	44	
Boron Water Soluble	mg/kg	<3.5	7	<3.5	<3.5	0.86	0.83	1	2.7	2.5	2.9	2.3	2.4	3.7	2.1	2.5	1	1	2	1.6	<3.5	4.8	
Cadmium	mg/kg	29	15	26	13	21	25	32	3.4	0.51	1.4	2	20	0.7	0.14	0.43	<1	<1	<1	<1	<0.3	<0.3	40.6
Chromium	mg/kg	130	330	130	180	210	190	170	1400	1300	670	880	170	610	1300	780	129	63	130	56	59	35	159
Chromium VI	mg/kg																						<0.3
Chromium III	mg/kg																						159
Copper	mg/kg	64	54	130	79	81	47	46	46	23	42	63	94	19	20	22	23	9	10	12	9	8	59.7
Lead	mg/kg	2100	1900	3100	1500	2100	2200	2700	430	20	250	270	3200	69	25	37	130	18	36	39	16	21	2710
Mercury	mg/kg	<0.6	<0.6	<0.6	<0.6	0.53	0.48	0.62	1.3	1.2	0.46	0.38	0.22	0.39	0.62	0.36	<0.5	<0.5	<0.5	<0.5	<0.6	<0.6	<0.14
Molybdenum	mg/kg	1	1.9	<0.6	0.7																<0.6	<0.6	
Nickel	mg/kg	16	16	29	31	69	50	49	44	41	34	120	50	24	25	24	25	20	31	26	20	25	51.2
Selenium	mg/kg	<3	<3	<3	<3	2.6	2.3	2.4	<0.2	0.21	0.43	<0.2	1.8	<0.2	<0.2	<0.2	1.14	0.9	1.1	0.96	<3	<3	<10
Zinc	mg/kg	32000	6300	19000	11000	1800	11000	10000	1400	100	520	1100	8000	360	130	95	269	62	56	63	84	100	21.3
Beryllium	mg/kg	<0.4	<0.4	<0.4	<0.4																<0.4	0.5	
Iron	mg/kg	300000	210000	300000	320000												65700	34800	41900	58600	31000	30000	545
Vanadium	mg/kg	55	290	67	60																65	46	65.6
Cyanide (total)	mg/kg	<1	10	4	<1	<0.5	<0.5	0.6	<0.5	<0.5	5.4	0.6	61	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	
Cyanide (free)	mg/kg			<1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.1	<0.5	<0.5	<0.5							<1
Complex Cyanide	mg/kg			4																			
Thiocyanate	mg/kg			<1													1.6	<0.5	0.7	0.6			
Sulphate (soluble)	g/l	0.24	0.23	0.2	0.021																0.034	0.12	
Elemental/Free Sulphur	mg/kg	<70	<70	<70	<70																<70	<70	
Acid Soluble Sulphide	mg/kg	230	200	340	710																		
Ammoniacal Nitrogen as N	mg/kg	<15	<15	<15	<15												9.2	7	8.2	7	<15	57	
Chloride	mg/kg	6	20	6	8												132	32.9	63.9	53.2	130	440	
Other																							
Asbestos Presence Screen	None	NFD	NFD	NFD	NFD	NAD	NAD	NAD				NAD	NAD	NAD	NAD	NAD					NFD	NFD	
Loss on Ignition	%		1.7	0.4																	2.2		
Total Organic Carbon	%		4.5	3.7																	0.7		
Organic Matter	%																						
pH Value	pH Units	8.39	9.41	9.68	8.85	7.2	8.6	8.4	11.9	12.3	12.3	12.1	11.1	12.7	12.7	12.7	12.5	11	11.8	10.8	8.08	8.36	9.78
Material >2mm	%																						
Organics																							
BTEX																							
GRO (C4-C12)	mg/kg	<0.01	3.6	<0.01	<0.01																<0.01	<0.01	
GRO TOT (Moisture corrected)	mg/kg																						0.41
MTBE	mg/kg	<0.01	<0.01	<0.01	<0.01																<0.01	<0.01	<0.005
Benzene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.001		<0.001													<0.01	<0.01	0.156
Toluene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.001		<0.001													<0.01	<0.01	0.00996
Ethyl benzene	mg/kg	<0.01	0.017	<0.01	<0.01	<0.001		<0.001													<0.01	<0.01	<0.003
m & p Xylene	mg/kg	<0.01	0.1	<0.01	<0.01	<0.001		<0.001													<0.01	<0.01	<0.006
o Xylene	mg/kg	<0.01	0.071	<0.01	<0.01	<0.001		<0.001													<0.01	<0.01	<0.003
Sum of Detected BTEX	mg/kg																						0.166
Sum of Detected Xylenes	mg/kg																						<0.009
Phenols																							
Phenol Index	mg/kg																						
Phenols Monohydric	mg/kg																						<0.16
Phenols (total)	mg/kg	<0.15	<0.15	<0.15	<0.15	<0.3	<0.3	<0.3				<0.3	<0.3	<0.3	<0.3	<0.3	<0.0005	<0.0005	<0.0005	<0.0005	<0.15	<0.15	0.0166
Cresols	mg/kg																						<0.01
Xylenols	mg/kg																						<0.015
TPH																							
TPH >C6-C8.	mg/kg						<1		<1	<1		<1	<1	<1	<1	<1							
TPH >C8-C10.	mg/kg						<1		<1	<1		<1	<1	<1	<1	<1							
TPH >C10-C12.	mg/kg						<1		<1	<1		<1	<1	<1	<1	<1							
TPH >C12-C16.	mg/kg						<1		<1	<1		7.9	<1	3.1	2.2	3.1							
TPH >C16-C21.	mg/kg						<1		<1	<1		12	6.2	10	7.4	31							
TPH >C21-C35.	mg/kg						<1		<1	<1		4.1	<1	44	40	150							
Aliphatics C5-C6	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.1		<0.1													<0.01	<0.01	0.0282
Aliphatics >C6-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.1		<0.1													<0.01	<0.01	0.0564

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Made Ground (coarse slag)	MG-CS
Tidal Flat Deposits	TFD

Sample Reference	Units	LGBH001	LGBH001	LGBH002	LGBH003	SWSJ09A	SWSJ09A	SWSJ10	SWSJ10	SWSJ11	SWSJ11	SWSJ12	SWSJ12	SWSJ13	SWSJ13	SWSJ14	SWSJ14	SWSJ15	SWSJ15
Specimen Depth (m)		1	7.5	0.5	0.5	1	3	4	4.5	1	3	2	4.2	1	2	1	2	1	2
OD Level (m)						9.95	7.95	6.53	6.03	9.28	7.28	8.59	6.39	10.01	9.01	9.14	8.14	9.09	8.09
Sample Type						L	ES	ES	ES	ES	ES	L	ES	L	ES	L	L	L	L
Geology Code		MG-CS	MG-CS	MG-CS	MG-CS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG - CS	MG - GS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS
Cluster Code		2002	2002	2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI
Aliphatics >C8-C10	mg/kg					<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
Aliphatics >C10-C12	mg/kg					<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
Aliphatics >C12-C16	mg/kg					4.1	24	9.6	4.2	7	6.3	2.9	1.9	8.3	1.8	5.1	3.7	2.2	1
Aliphatics >C16-C21	mg/kg					100	670	300	130	55	58	93	39	56	35	130	140	26	16
Aliphatics >C21-C35	mg/kg					250	840	270	110	120	62	200	35	160	170	150	120	72	39
Total Aliphatics C5-C35	mg/kg					360	1500	580	250	180	130	290	76	220	200	280	270	100	56
Aliphatics >C35-44	mg/kg																		
Total Aliphatics >C12-C44	mg/kg																		
Aromatics C5-C7	mg/kg																		
Aromatics C6-C7	mg/kg					<0.01	0.071	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >C7-C8	mg/kg					<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
Aromatics >EC8-EC10	mg/kg					<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
Aromatics >EC10-EC12	mg/kg					<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
Aromatics >EC12-EC16	mg/kg					2.3	5.3	8.3	7.1	9.9	2.6	2	0.98	1.9	3.9	3.6	1.7	6.6	<0.1
Aromatics >EC16-EC21	mg/kg					20	130	24	7	18	18	14	8.7	17	23	33	30	4.7	3.1
Aromatics >EC21-EC35	mg/kg					95	400	110	36	71	45	64	8.5	47	100	82	300	32	8.6
Total Aromatics C6-C35	mg/kg					120	540	140	50	98	65	80	18	66	130	120	330	43	12
Aromatics >C35-44	mg/kg																		
Aromatics >EC40-EC44	mg/kg																		
Total Aromatics >EC12-EC44																			
TPH (Aliphatics and Aromatics C5-C35)	mg/kg					480	2100	730	300	280	190	370	94	290	330	400	600	140	68
Total Aliphatics & Aromatics >C5-C44	mg/kg																		
Total Aliphatic TPH	mg/kg																		
Total Aromatic hydrocarbons	mg/kg																		
Total petroleum hydrocarbons	mg/kg																		
PAH																			
Acenaphthene	mg/kg		5.2		<0.2	0.22	0.25	0.05	0.025	0.037	0.076	0.044	0.086	0.091	0.09	0.063	0.12	<0.014	0.038
Acenaphthylene	mg/kg		<0.2		<0.2	0.69	0.086	0.013	0.006	0.008	0.006	0.062	0.016	0.017	0.033	0.021	0.16	0.006	<0.005
Anthracene	mg/kg		0.8		<0.2	2	1.6	0.28	0.047	0.2	0.092	0.18	0.11	0.33	0.59	0.38	3.4	0.091	0.13
Benzo(a)anthracene	mg/kg		3.1			3.7	4.3	0.91	0.5	0.77	0.094	1.1	0.21	0.75	0.63	0.81	3.7	0.39	0.19
Benzo(a)pyrene	mg/kg		3.1		0.7	1	1.8	0.32	0.1	0.2	<0.012	0.26	0.045	0.25	0.37	0.12	11	0.14	0.033
Benzo(b)fluoranthene	mg/kg		4.5		0.9	3.4	3.3	0.59	0.27	0.6	0.03	0.91	0.16	1.1	0.98	0.63	14	0.44	0.1
Benzo(ghi)perylene	mg/kg		1.8		0.6	0.15	1.5	0.3	0.083	0.21	<0.01	0.23	<0.01	0.3	0.72	0.032	27	0.14	0.041
Benzo(k)fluoranthene	mg/kg		2.2		0.7	1.7	1.2	0.5	0.15	0.23	0.029	0.42	0.056	0.28	0.3	0.2	5	0.18	0.058
Chrysene	mg/kg		3.9		0.8	7.4	5.4	1.4	0.74	1.1	0.3	1.7	0.78	1.7	1.1	1.8	7.1	0.54	0.34
Dibenzo(ah)anthracene	mg/kg		0.5		<0.2	0.057	0.51	0.11	0.028	0.087	<0.008	0.11	<0.008	0.065	0.24	0.013	7	0.058	0.018
Fluoranthene	mg/kg		5.4		0.9	5.4	9.4	2.6	1.3	2.2	1.4	2.8	0.98	1.8	1.5	2.1	8.5	0.49	0.51
Fluorene	mg/kg		3.9		<0.2	1.2	0.79	0.061	0.013	0.044	0.024	0.043	0.036	0.084	0.15	0.083	0.29	0.017	0.047
Indeno(123cd)pyrene	mg/kg		1.8		0.6	0.11	1	0.18	0.058	0.13	<0.011	0.18	<0.011	0.2	0.41	0.018	22	0.1	0.022
Naphthalene	mg/kg		0.9		<0.2	4.8	0.6	0.22	0.081	0.15	0.21	0.87	0.1	0.18	0.24	0.24	0.51	0.05	0.11
Phenanthrene	mg/kg		6.9		0.4	8.3	4	0.84	0.18	1.1	0.55	0.81	1.4	1.8	2.5	2.5	14	0.34	0.89
Pyrene	mg/kg		4.9		0.9	7.2	7.7	2.1	0.95	1.5	1.1	2.1	0.58	1.9	1	1.6	5.1	0.65	0.48
PAH 16 Total	mg/kg					47	43	10	4.6	8.6	3.9	12	4.6	11	11	11	130	3.6	3
PCBs																			
PCBs (vs Aroclor 1254)	mg/kg					<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	0.1	<0.02	<0.02	0.065	<0.1	<0.2	<0.02	<0.02
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg																		
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg																		
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg																		
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg																		
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg																		
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg																		
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg																		
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg																		
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg																		
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg																		
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg																		
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg																		
SVOCs																			
Phenols																			
2-Chlorophenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylphenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Nitrophenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 12
21/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	x

Geological Formation Legend

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
Tidal Flat Deposits	TFD

Sample Reference	Units	SWSJ16	SWSJ16	SWSJ17A	SWSJ17A	BH514A	BH514A	BH514A	BH514A	BH514A	BH516	BH515	BH515	TP506	TP506	TP506	LGBH001	LGBH002	LGBH002	LGBH003	SBHJ04	SBHJ04	BHM4CAN040
Specimen Depth (m)		2	2.3	1	1.5	0 - 0.5	1 - 1.5	2 - 2.5	3.5 - 3.7	4.5 - 4.7	0- 0.5	0.5	2.5	0.5 - 0.6	1.5 - 1.6	3 - 3.5	9.5	8.1	9	8	8	9	3
OD Level (m)		8.2	7.9	9.74	9.24	11.9	10.9	9.9	8.4	7.4	7.2	10.6	10.4	11.35	10.35	8.85					3.24	2.24	8.57
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					ES	ES	ES
Geology Code		MG -SS	MG - CS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	TFD	TFD	TFD	TFD	TFD	TFD	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002	2002	2002	2002	2007 GI	2007 GI	2016 GI
Aliphatics >C8-C10	mg/kg	<0.01	0.7	<0.01	<0.01	<0.1		<0.1													<0.01	<0.01	0.0398
Aliphatics >C10-C12	mg/kg	<0.01	0.68	<0.01	<0.01	<1		<1													<0.01	<0.01	0.0515
Aliphatics >C12-C16	mg/kg	0.12	0.15	<0.1	<0.1	<1		<1													0.55	<0.1	1.03
Aliphatics >C16-C21	mg/kg	35	60	11	<0.1	<1		<1													5.8	<0.1	65.1
Aliphatics >C21-C35	mg/kg	120	180	26	<0.1	<1		<1													270	14	108
Total Aliphatics C5-C35	mg/kg	150	240	37	<0.1																280	14	
Aliphatics >C35-44	mg/kg					<1		<1															7.53
Total Aliphatics >C12-C44	mg/kg																						182
Aromatics C5-C7	mg/kg					<0.1		<0.1															0.156
Aromatics C6-C7	mg/kg	<0.01	<0.01	<0.01	<0.01																<0.01	<0.01	
Aromatics >C7-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.1		<0.1													<0.01	<0.01	<0.01
Aromatics >EC8-EC10	mg/kg	<0.01	1.2	<0.01	<0.01	<0.1		<0.1													<0.01	<0.01	0.0349
Aromatics >EC10-EC12	mg/kg	<0.01	1	<0.01	<0.01	<1		<1													<0.01	<0.01	0.0349
Aromatics >EC12-EC16	mg/kg	1.1	<0.1	<0.1	<0.1	<1		<1													<0.1	<0.1	5.83
Aromatics >EC16-EC21	mg/kg	6.9	1.4	<0.1	<0.1	<1		6.3													<0.1	<0.1	101
Aromatics >EC21-EC35	mg/kg	51	11	7.7	<0.1	<1		8.9													5.7	9.7	131
Total Aromatics C6-C35	mg/kg	59	15	7.7	<0.1																5.7	9.7	
Aromatics >C35-44	mg/kg					<1		<1															9.04
Aromatics >EC40-EC44	mg/kg																						3.26
Total Aromatics >EC12-EC44																							247
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	210	250	45	<0.1																280	24	
Total Aliphatics & Aromatics >C5-C44	mg/kg																						429
Total Aliphatic TPH	mg/kg					<5		<5															
Total Aromatic hydrocarbons	mg/kg					<5		15															
Total petroleum hydrocarbons	mg/kg					<10		15															
PAH																							
Acenaphthene	mg/kg	0.016	0.023	<0.014	<0.014	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.33					<0.014	<0.014	0.265
Acenaphthylene	mg/kg	0.012	0.014	<0.005	<0.005	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.26	<0.1					<0.005	<0.005	0.0595
Anthracene	mg/kg	0.24	0.19	0.042	0.014	<0.1	0.49	0.4	<0.1	<0.1	<0.1	<0.1	0.8	<0.1	<0.1	0.59					<0.009	<0.009	1.64
Benzo(a)anthracene	mg/kg	0.52	0.87	0.26	0.097	<0.1	1.6	1.5	<0.1	<0.1	0.85	<0.1	<0.1	<0.1	0.4	1.8					0.028	0.023	2.06
Benzo(a)pyrene	mg/kg	0.42	0.24	0.037	0.03	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1	<0.1	0.55	2.3					<0.012	<0.012	0.754
Benzo(b)fluoranthene	mg/kg	0.66	0.82	0.18	0.081	<0.1	0.81	<0.1	<0.1	<0.1	1.9	<0.1	<0.1	<0.1	0.68	3.1					0.021	<0.016	1.99
Benzo(ghi)perylene	mg/kg	0.53	0.28	0.087	0.062	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.47	1.9					0.013	<0.01	0.521
Benzo(k)fluoranthene	mg/kg	0.48	0.42	0.11	0.043	<0.1	0.15	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	0.21	1					<0.025	<0.025	<0.014
Chrysene	mg/kg	0.97	1.4	0.5	0.17	<0.1	0.87	0.82	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	0.86	2.8					0.018	0.011	2.01
Dibenzo(ah)anthracene	mg/kg	0.1	0.14	0.018	0.015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.18					<0.008	<0.008	0.235
Fluoranthene	mg/kg	0.79	2.3	0.47	0.18	<0.1	0.94	0.74	<0.1	<0.1	2.7	<0.1	1.5	0.28	1	3.8					0.026	<0.025	4.7
Fluorene	mg/kg	0.044	0.035	<0.012	<0.012	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.18					<0.012	<0.012	1.43
Indeno(123cd)pyrene	mg/kg	0.26	0.19	0.045	0.025	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.48	1.5					<0.011	<0.011	0.303
Naphthalene	mg/kg	0.13	0.11	0.035	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.29					<0.01	<0.01	0.535
Phenanthrene	mg/kg	0.68	0.74	0.23	0.058	<0.1	1.8	1.7	<0.1	<0.1	1.3	<0.1	2.3	<0.1	0.74	3					0.027	<0.021	6.38
Pyrene	mg/kg	0.71	1.9	0.49	0.17	<0.1	1	0.78	<0.1	<0.1	2.6	<0.1	1.3	0.38	0.97	3.7					0.023	<0.022	4.01
PAH 16 Total	mg/kg	6.5	9.7	2.5	0.94	<2	7.7	5.9	<2	<2	12	<2	5.9	<2	6.6	27					0.16	0.034	26.9
PCBs																							
PCBs (vs Aroclor 1254)	mg/kg	0.023	0.19	0.035	<0.02																0.039	<0.035	
Pcb-105 2,3,3',4,4'-Pentachlorobiphenyl	mg/kg														<0.01								
Pcb-114 2,3,4,4',5-Pentachlorobiphenyl	mg/kg														<0.01								
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg														<0.01								
Pcb-123 2,3',4,4',5'-Pentachlorobiphenyl	mg/kg														<0.01								
Pcb-126 3,3',4,4',5-Pentachlorobiphenyl	mg/kg														<0.01								
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg														<0.01								
Pcb-157 2,3,3',4,4',5'-Hexachlorobiphenyl	mg/kg														<0.01								
Pcb-167 2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg														<0.01								
Pcb-169 3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg														<0.01								
Pcb-189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg														<0.01								
Pcb-77 3,3',4,4'-Tetrachlorobiphenyl	mg/kg														<0.01								
Pcb-81 3,4,4',5-Tetrachlorobiphenyl	mg/kg														<0.01								
SVOCs																							
Phenols																							
2-Chlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
2-Methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
2-Nitrophenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 12
21/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
Tidal Flat Deposits	TFD

Sample Reference	Units	LGBH001	LGBH001	LGBH002	LGBH003	SWSJ09A	SWSJ09A	SWSJ10	SWSJ10	SWSJ11	SWSJ11	SWSJ12	SWSJ12	SWSJ13	SWSJ13	SWSJ14	SWSJ14	SWSJ15	SWSJ15
Specimen Depth (m)		1	7.5	0.5	0.5	1	3	4	4.5	1	3	2	4.2	1	2	1	2	1	2
OD Level (m)						9.95	7.95	6.53	6.03	9.28	7.28	8.59	6.39	10.01	9.01	9.14	8.14	9.09	8.09
Sample Type						L	ES	ES	ES	ES	ES	L	ES	L	ES	L	L	L	L
Geology Code		MG-CS	MG-CS	MG-CS	MG-CS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG - CS	MG - GS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS
Cluster Code		2002	2002	2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI
2,4-Dichlorophenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dimethylphenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,5-Trichlorophenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,6-Trichlorophenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Chloro-3-methylphenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Methylphenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Nitrophenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pentachlorophenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenol	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAHs																			
2-Chloronaphthalene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	mg/kg					<0.1	0.23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg						<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Acenaphthylene	mg/kg						<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Anthracene	mg/kg						0.56					<0.1	<0.1	<0.1	<0.1	<0.1	0.38		
Benzo(a)anthracene	mg/kg						0.54					0.22	<0.1	<0.1	<0.1	<0.1	0.23		
Benzo(a)pyrene	mg/kg						0.23					0.15	<0.1	<0.1	<0.1	<0.1	0.55		
Benzo(b)fluoranthene	mg/kg						0.35					0.22	<0.1	<0.1	<0.1	<0.1	0.53		
Benzo(ghi)perylene	mg/kg						<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	1.2		
Benzo(k)fluoranthene	mg/kg						0.24					0.19	<0.1	<0.1	<0.1	<0.1	0.39		
Chrysene	mg/kg						0.97					0.31	<0.1	<0.1	<0.1	<0.1	0.38		
Dibenzo(ah)anthracene	mg/kg						<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Fluoranthene	mg/kg						2					0.51	<0.1	<0.1	<0.1	<0.1	0.73		
Fluorene	mg/kg						0.28					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Indeno(123cd)pyrene	mg/kg						<0.1					0.16	<0.1	<0.1	<0.1	<0.1	1.5		
Naphthalene	mg/kg						0.25					0.65	<0.1	<0.1	<0.1	<0.1	0.23		
Phenanthrene	mg/kg						1.4					0.27	<0.1	0.3	0.45	0.2	2.1		
Pyrene	mg/kg						1.7					0.4	<0.1	<0.1	<0.1	<0.1	0.46		
Pthalates																			
Bis(2-ethylhexyl) phthalate	mg/kg					0.2	0.28	0.5	<0.1	0.34	<0.1	<0.1	0.41	<0.1	0.32	<0.1	0.18	<0.1	<0.1
Butylbenzyl phthalate	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Di-n-butyl phthalate	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Di-n-Octyl phthalate	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Diethyl phthalate	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethyl phthalate	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Other Semi-Volatiles																			
1,2-Dichlorobenzene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,2,4-Trichlorobenzene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,3-Dichlorobenzene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,4-Dichlorobenzene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Nitroaniline	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dinitrotoluene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,6-Dinitrotoluene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
3-Nitroaniline	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Bromophenylphenylether	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Chloroaniline	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Chlorophenylphenylether	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Nitroaniline	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Azobenzene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethyl)ether	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carbazole	mg/kg					<0.1	0.21	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzofuran	mg/kg					<0.1	0.21	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.54	<0.1	<0.1
Hexachlorobenzene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobutadiene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorocyclopentadiene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachloroethane	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isophorone	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
N-nitrosodi-n-propylamine	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrobenzene	mg/kg					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VOCs																			
Methyl Tertiary Butyl Ether	ug/kg					<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11		<11	<11

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 12
21/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	x

Geological Formation Legend

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
Tidal Flat Deposits	TFD

Sample Reference	**Units**	**SWSJ16**	**SWSJ16**	**SWSJ17A**	**SWSJ17A**	**BH514A**	**BH514A**	**BH514A**	**BH514A**	**BH514A**	**BH516**	**BH515**	**BH515**	**TP506**	**TP506**	**TP506**	**LGBH001**	**LGBH002**	**LGBH002**	**LGBH003**	**SBHJ04**	**SBHJ04**	**BHM4CAN040**
Specimen Depth (m)		2	2.3	1	1.5	0 - 0.5	1 - 1.5	2 - 2.5	3.5 - 3.7	4.5 - 4.7	0- 0.5	0.5	2.5	0.5 - 0.6	1.5 - 1.6	3 - 3.5	9.5	8.1	9	8	8	9	3
OD Level (m)		8.2	7.9	9.74	9.24	11.9	10.9	9.9	8.4	7.4	7.2	10.6	10.4	11.35	10.35	8.85					3.24	2.24	8.57
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					ES	ES	ES
Geology Code		MG -SS	MG - CS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	TFD	TFD	TFD	TFD	TFD	TFD	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002	2002	2002	2002	2007 GI	2007 GI	2016 GI
2,4-Dichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
2,4-Dimethylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
2,4,5-Trichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
2,4,6-Trichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
4-Chloro-3-methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
4-Methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
4-Nitrophenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Pentachlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Phenol	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
PAHs																							
2-Chloronaphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
2-Methylnaphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Acenaphthene	mg/kg																						
Acenaphthylene	mg/kg																						
Anthracene	mg/kg																						
Benzo(a)anthracene	mg/kg																						
Benzo(a)pyrene	mg/kg																						
Benzo(b)fluoranthene	mg/kg																						
Benzo(ghi)perylene	mg/kg																						
Benzo(k)fluoranthene	mg/kg																						
Chrysene	mg/kg																						
Dibenzo(ah)anthracene	mg/kg																						
Fluoranthene	mg/kg																						
Fluorene	mg/kg																						
Indeno(123cd)pyrene	mg/kg																						
Naphthalene	mg/kg																						
Phenanthrene	mg/kg																						
Pyrene	mg/kg																						
Pthalates																							
Bis(2-ethylhexyl) phthalate	mg/kg	<0.1	0.58	0.35	0.25																0.14	<0.1	
Butylbenzyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Di-n-butyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Di-n-Octyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Diethyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Dimethyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Other Semi-Volatiles																							
1,2-Dichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
1,2,4-Trichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
1,3-Dichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
1,4-Dichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
2-Nitroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
2,4-Dinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
2,6-Dinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
3-Nitroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
4-Bromophenylphenylether	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
4-Chloroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
4-Chlorophenylphenylether	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
4-Nitroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Azobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Bis(2-chloroethoxy)methane	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Bis(2-chloroethyl)ether	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Carbazole	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Dibenzofuran	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Hexachlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Hexachlorobutadiene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Hexachlorocyclopentadiene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Hexachloroethane	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Isophorone	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
N-nitrosodi-n-propylamine	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
Nitrobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1																<0.1	<0.1	
VOCs																							
Methyl Tertiary Butyl Ether	ug/kg	<11	<11	<11	<11																<11	<11	

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 12
21/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
Tidal Flat Deposits	TFD

Sample Reference	Units	LGBH001	LGBH001	LGBH002	LGBH003	SWSJ09A	SWSJ09A	SWSJ10	SWSJ10	SWSJ11	SWSJ11	SWSJ12	SWSJ12	SWSJ13	SWSJ13	SWSJ14	SWSJ14	SWSJ15	SWSJ15
Specimen Depth (m)		1	7.5	0.5	0.5	1	3	4	4.5	1	3	2	4.2	1	2	1	2	1	2
OD Level (m)						9.95	7.95	6.53	6.03	9.28	7.28	8.59	6.39	10.01	9.01	9.14	8.14	9.09	8.09
Sample Type						L	ES	ES	ES	ES	ES	L	ES	L	ES	L	L	L	L
Geology Code		MG-CS	MG-CS	MG-CS	MG-CS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG - CS	MG - GS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS
Cluster Code		2002	2002	2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI
Benzene	ug/kg					<9	23	<9	<9	<9	<9	<9	<9	<9	<9	<9		<9	<9
Toluene	ug/kg					<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5
Ethylbenzene	ug/kg					<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4		<4	<4
p/m-Xylene	ug/kg					<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14		<14	<14
o-Xylene	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
Naphthalene	ug/kg					<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13		<13	<13
Hexachlorobutadiene	ug/kg					<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12		<12	<12
1.2.4-Trichlorobenzene	ug/kg					<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6		<6	<6
1.2-Dichlorobenzene	ug/kg					<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12		<12	<12
1.3-Dichlorobenzene	ug/kg					<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6		<6	<6
1.4-Dichlorobenzene	ug/kg					<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5
1.1.1.2-Tetrachloroethane	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
1.1.1-Trichloroethane	ug/kg					<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	<7
1.1.2.2-Tetrachloroethane	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
1.1.2-Trichloroethane	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
1.1-Dichloropropene	ug/kg					<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11		<11	<11
1.1-Dichloroethane	ug/kg					<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8		<8	<8
1.1-Dichloroethene	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
1.2.3-Trichlorobenzene	ug/kg					<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11		<11	<11
1.2.3-Trichloropropane	ug/kg					<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17		<17	<17
1.2.4-Trimethylbenzene	ug/kg					<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9		<9	<9
1.2-Dibromo-3-chloropropane	ug/kg					<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14		<14	<14
1.2-Dichloroethane	ug/kg					<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5
cis-1-2-Dichloroethene	ug/kg					<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5
1.2-Dibromoethane	ug/kg					<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12		<12	<12
1.2-Dichloropropane	ug/kg					<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12		<12	<12
1.3.5-Trimethylbenzene	ug/kg					<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8		<8	<8
cis-1-3-Dichloropropene	ug/kg					<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14		<14	<14
1.3-Dichloropropane	ug/kg					<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	<7
2.2-Dichloropropane	ug/kg					<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12		<12	<12
2-Chlorotoluene	ug/kg					<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9		<9	<9
4-Chlorotoluene	ug/kg					<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12		<12	<12
4-Isopropyltoluene	ug/kg					<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11		<11	<11
Bromobenzene	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
Bromochloromethane	ug/kg					<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14		<14	<14
Bromoform	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
Bromomethane	ug/kg					<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13		<13	<13
Bromodichloromethane	ug/kg					<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	<7
Chlorobenzene	ug/kg					<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5
Carbon Disulphide	ug/kg					<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	<7
Chloroethane	ug/kg					<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14		<14	<14
Chloroform	ug/kg					<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8		<8	<8
Chloromethane	ug/kg					<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	<7
Carbontetrachloride	ug/kg					<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14		<14	<14
Carbontetrachloride	ug/kg					<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14		<14	<14
Dibromomethane	ug/kg					<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9		<9	<9
Dichlorodifluoromethane	ug/kg					<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4		<4	<4
Dibromochloromethane	ug/kg					<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13		<13	<13
Dichloromethane	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
Isopropylbenzene	ug/kg					<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5
n-Butylbenzene	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
Propylbenzene	ug/kg					<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11		<11	<11
sec-Butylbenzene	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
Styrene	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10
trans-1-2-Dichloroethene	ug/kg					<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11		<11	<11
trans-1-3-Dichloropropene	ug/kg					<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14		<14	<14
Trichlorofluoromethane	ug/kg					<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6		<6	<6
tert-Butylbenzene	ug/kg					<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12		<12	<12
Tetrachloroethene	ug/kg					<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5
Trichloroethene	ug/kg					<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9		<9	<9
Vinyl Chloride	ug/kg					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 12
21/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	x

Geological Formation Legend

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
Tidal Flat Deposits	TFD

Sample Reference	Units	SWSJ16	SWSJ16	SWSJ17A	SWSJ17A	BH514A	BH514A	BH514A	BH514A	BH514A	BH516	BH515	BH515	TP506	TP506	TP506	LGBH001	LGBH002	LGBH002	LGBH003	SBHJ04	SBHJ04	BHM4CAN040
Specimen Depth (m)		2	2.3	1	1.5	0 - 0.5	1 - 1.5	2 - 2.5	3.5 - 3.7	4.5 - 4.7	0- 0.5	0.5	2.5	0.5 - 0.6	1.5 - 1.6	3 - 3.5	9.5	8.1	9	8	8	9	3
OD Level (m)		8.2	7.9	9.74	9.24	11.9	10.9	9.9	8.4	7.4	7.2	10.6	10.4	11.35	10.35	8.85					3.24	2.24	8.57
Sample Type		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					ES	ES	ES
Geology Code		MG -SS	MG - CS	MG -SS	MG -SS	MG -SS	MG -SS	MG -SS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	TFD	TFD	TFD	TFD	TFD	TFD	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002	2002	2002	2002	2007 GI	2007 GI	2016 GI
Benzene	ug/kg	<9	<9	<9	<9	<1		<1													<9	<9	
Toluene	ug/kg	<5	<5	<5	<5	<1		<1													<5	<5	
Ethylbenzene	ug/kg	<4	5	<4	<4	<1		<1													<4	<4	
p/m-Xylene	ug/kg	<14	37	<14	<14	<1		<1													<14	<14	
o-Xylene	ug/kg	<10	44	<10	<10	<1		<1													<10	<10	
Naphthalene	ug/kg	<13	<13	<13	<13																<13	<13	
Hexachlorobutadiene	ug/kg	<12	<12	<12	<12																<12	<12	
1.2.4-Trichlorobenzene	ug/kg	<6	<6	<6	<6																<6	<6	
1.2-Dichlorobenzene	ug/kg	<12	<12	<12	<12																<12	<12	
1.3-Dichlorobenzene	ug/kg	<6	<6	<6	<6																<6	<6	
1.4-Dichlorobenzene	ug/kg	<5	<5	<5	<5																<5	<5	
1.1.1.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10																<10	<10	
1.1.1-Trichloroethane	ug/kg	<7	<7	<7	<7																<7	<7	
1.1.2.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10																<10	<10	
1.1.2-Trichloroethane	ug/kg	<10	<10	<10	<10																<10	<10	
1.1-Dichloropropene	ug/kg	<11	<11	<11	<11																<11	<11	
1.1-Dichloroethane	ug/kg	<8	<8	<8	<8																<8	<8	
1.1-Dichloroethene	ug/kg	<10	<10	<10	<10																<10	<10	
1.2.3-Trichlorobenzene	ug/kg	<11	<11	<11	<11																<11	<11	
1.2.3-Trichloropropane	ug/kg	<17	<17	<17	<17																<17	<17	
1.2.4-Trimethylbenzene	ug/kg	<9	170	<9	<9																<9	<9	
1.2-Dibromo-3-chloropropane	ug/kg	<14	<14	<14	<14																<14	<14	
1.2-Dichloroethane	ug/kg	<5	<5	<5	<5																<5	<5	
cis-1-2-Dichloroethene	ug/kg	<5	<5	<5	<5																<5	<5	
1.2-Dibromoethane	ug/kg	<12	<12	<12	<12																<12	<12	
1.2-Dichloropropane	ug/kg	<12	<12	<12	<12																<12	<12	
1.3.5-Trimethylbenzene	ug/kg	<8	73	<8	<8																<8	<8	
cis-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14																<14	<14	
1.3-Dichloropropane	ug/kg	<7	<7	<7	<7																<7	<7	
2.2-Dichloropropane	ug/kg	<12	<12	<12	<12																<12	<12	
2-Chlorotoluene	ug/kg	<9	<9	<9	<9																<9	<9	
4-Chlorotoluene	ug/kg	<12	<12	<12	<12																<12	<12	
4-Isopropyltoluene	ug/kg	<11	<11	<11	<11																<11	<11	
Bromobenzene	ug/kg	<10	<10	<10	<10																<10	<10	
Bromochloromethane	ug/kg	<14	<14	<14	<14																<14	<14	
Bromoform	ug/kg	<10	<10	<10	<10																<10	<10	
Bromomethane	ug/kg	<13	<13	<13	<13																<13	<13	
Bromodichloromethane	ug/kg	<7	<7	<7	<7																<7	<7	
Chlorobenzene	ug/kg	<5	<5	<5	<5																<5	<5	
Carbon Disulphide	ug/kg	<7	<7	<7	<7																<7	<7	
Chloroethane	ug/kg	<14	<14	<14	<14																<14	<14	
Chloroform	ug/kg	<8	<8	<8	<8																<8	<8	
Chloromethane	ug/kg	<7	<7	<7	<7																<7	<7	
Carbontetrachloride	ug/kg	<14	<14	<14	<14																<14	<14	
Carbontetrachloride	ug/kg	<14	<14	<14	<14																<14	<14	
Dibromomethane	ug/kg	<9	<9	<9	<9																<9	<9	
Dichlorodifluoromethane	ug/kg	<4	<4	<4	<4																<4	<4	
Dibromochloromethane	ug/kg	<13	<13	<13	<13																<13	<13	
Dichloromethane	ug/kg	<10	<10	<10	<10																<10	<10	
Isopropylbenzene	ug/kg	<5	29	<5	<5																<5	<5	
n-Butylbenzene	ug/kg	<10	<10	<10	<10																<10	<10	
Propylbenzene	ug/kg	<11	28	<11	<11																<11	<11	
sec-Butylbenzene	ug/kg	<10	26	<10	<10																<10	<10	
Styrene	ug/kg	<10	<10	<10	<10																<10	<10	
trans-1-2-Dichloroethene	ug/kg	<11	<11	<11	<11																<11	<11	
trans-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14																<14	<14	
Trichlorofluoromethane	ug/kg	<6	<6	<6	<6																<6	<6	
tert-Butylbenzene	ug/kg	<12	88	<12	<12																<12	<12	
Tetrachloroethene	ug/kg	<5	<5	<5	<5																<5	<5	
Trichloroethene	ug/kg	<9	<9	<9	<9																<9	<9	
Vinyl Chloride	ug/kg	<10	<10	<10	<10																<10	<10	

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 25
21/06/2016

Screening Values and Assessment

	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Metals								
Antimony	mg/kg	24	23	41	6.9	SWSJ27 @ 3mbGL		
Arsenic	mg/kg	51	24	41	2.3	WS501 @ 8.7 - 8.9mbGL	170	0
Barium	mg/kg	25	25	230	31	SWSJ22B @ 1mbGL		
Boron Water Soluble	mg/kg	48	31	41	0.56	SBHJ05 @ 14.5mbGL		
Cadmium	mg/kg	51	30	38	0.14	SWSJ30 @ 3mbGL	190	0
Chromium	mg/kg	51	51	1660	11	LGBH004 @ 8.7mbGL	33	46
Chromium Hexavalent	mg/kg	4	1	1.9	1.9	SWSJ18 @ 2mbGL		
Copper	mg/kg	51	49	150	1.6	SWSJ30 @ 3mbGL	44000	0
Lead	mg/kg	51	51	2700	3.3	SWSJ30 @ 3mbGL	1300	13
Mercury	mg/kg	51	10	1	0.12	WS501 @ 4.5 - 4.7mbGL	30	0
Molybdenum	mg/kg	25	17	8.8	0.7	SWSJ23 @ 7mbGL		
Nickel	mg/kg	51	45	49	1.8	WS501 @ 8.7 - 8.9mbGL	980	0
Selenium	mg/kg	50	19	7.66	0.52	BHM4CAN041 @ 7.4mbGL	1800	0
Zinc	mg/kg	50	50	45000	29	SWSJ20 @ 6mbGL	170000	0
Beryllium	mg/kg	25	1	1	1	SBHJ05 @ 11.5mbGL	12	0
Iron	mg/kg	42	42	400000	5800	SWSJ22B @ 1mbGL		
Vanadium	mg/kg	26	26	710	6.7	SWSJ18 @ 2mbGL	5000	0
Non-Metal Inorganics								
Cyanide (total)	mg/kg	48	7	36	1	SWSJ24A @ 5mbGL		
Cyanide (free)	mg/kg	10	0	None > LOD	None > LOD			
Sulphate (soluble)	g/l	24	22	1.5	0.004	SWSJ28 @ 1mbGL		
Elemental/Free Sulphur	mg/kg	24	1	97	97	SWSJ19 @ 1mbGL		
Easily Liberated Sulphide	mg/kg	11	6	1100	42	SWSJ22B @ 1mbGL		
Acid Soluble Sulphide	mg/kg	13	12	3200	75	SWSJ27 @ 6mbGL		
Ammoniacal Nitrogen as N	mg/kg	40	17	84.5	0.8	LGBH005 @ 6mbGL		
Chloride	mg/kg	39	38	5090	14	LGBH005 @ 3.1mbGL		
Other								
Asbestos Presence Screen	None	32	0	None > LOD	None > LOD			
Loss on Ignition	%	14	11	91	1.7	SBHJ05 @ 14.5mbGL		
Total Organic Carbon	%	16	16	32	0.5	SBHJ05 @ 14.5mbGL		
Organic Matter	%	4	4	8.5	6.7	SWSJ22B @ 1mbGL		
pH Value	pH Units	50	50	13	7.6	LGBH005 @ 0.5mbGL	6-9	42
Material >2mm	%	4	0	None > LOD	None > LOD			
Calorific Value	MJ/kg	1	1	8.1	8.1	WS501 @ 0 - 0.2mbGL		
Organics								
PCBs (vs Aroclor 1254)	mg/kg	27	2	0.22	0.038	SWSJ24A @ 5mbGL	0.24	0
PCB 105	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 114	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 123	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 126	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 157	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 167	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 169	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 189	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 77	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 81	mg/kg	5	0	None > LOD	None > LOD		0.24	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg	5	0	None > LOD	None > LOD		0.24	0
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg	3	0	None > LOD	None > LOD		0.24	0
Phenols								
Phenols Monohydric	mg/kg	1	0	None > LOD	None > LOD		440	0
Phenols (total)	mg/kg	48	4	0.2	0.0007	SWSJ24A @ 4mbGL	440	0
Cresols	mg/kg	1	0	None > LOD	None > LOD			
Xylenols	mg/kg	1	0	None > LOD	None > LOD			
BTEX								
GRO (C4-C12)	mg/kg	24	7	0.64	0.016	SWSJ23 @ 7.9mbGL		
GRO TOT (Moisture Corrected)	mg/kg	2	2	0.595	0.0728	BHM4CAN041 @ 5 - 6mbGL		
MTBE	mg/kg	27	0	None > LOD	None > LOD			
Benzene	mg/kg	32	5	0.16	0.016	SWSJ23 @ 7.9mbGL	27	0
Toluene	mg/kg	31	4	0.053	0.00321	SWSJ23 @ 7.9mbGL	56000	0
Ethyl benzene	mg/kg	32	0	None > LOD	None > LOD		5700	0
m & p Xylene	mg/kg	32	1	0.053	0.053	SWSJ23 @ 7.9mbGL	5900	0
o Xylene	mg/kg	32	1	0.054	0.054	SWSJ23 @ 7.9mbGL	6600	0
Sum of Detected BTEX	mg/kg	2	0	None > LOD	None > LOD			
Sum of Detected Xylenes	mg/kg	2	0	None > LOD	None > LOD			
TPH								
Aliphatics C5-C6	mg/kg	32	4	0.044	0.0234	SWSJ20 @ 6mbGL	3200	0
Aliphatics >C6-C8	mg/kg	32	1	0.0501	0.0501	BHM4CAN041 @ 5 - 6mbGL	7800	0
Aliphatics >C8-C10	mg/kg	32	2	0.12	0.0301	SWSJ23 @ 7.9mbGL	2000	0
Aliphatics >C10-C12	mg/kg	32	3	0.282	0.012	BHM4CAN041 @ 5 - 6mbGL	9700	0
Aliphatics >C12-C16	mg/kg	32	21	22	0.25	SWSJ30 @ 3mbGL	25000	0
Aliphatics >C16-C21	mg/kg	32	24	110	1	SWSJ24A @ 5mbGL	450000	0
Aliphatics >C21-C35	mg/kg	32	25	240	1.3	SWSJ24A @ 5mbGL	450000	0
Total Aliphatics C5-C35	mg/kg	26	25	350	2.6	SWSJ24A @ 5mbGL	2000	0
Aliphatics >C35-C44	mg/kg	7	1	12	12	BHM4CAN041 @ 7.4mbGL	450000	0
Total Aliphatics >C12-C44	mg/kg	2	2	86.4	12.4	BHM4CAN041 @ 7.4mbGL	25000	0
Aromatics C5-C7	mg/kg	7	0	None > LOD	None > LOD		26000	0
Aromatics C6-C7	mg/kg	26	5	0.16	0.016	SWSJ23 @ 7.9mbGL	7800	0
Aromatics >C7-C8	mg/kg	32	3	0.053	0.016	SWSJ23 @ 7.9mbGL	56000	0
Aromatics >EC8-EC10	mg/kg	32	3	0.29	0.011	SWSJ23 @ 7.9mbGL	3500	0
Aromatics >EC10-EC12	mg/kg	32	4	0.189	0.011	BHM4CAN041 @ 5 - 6mbGL	9200	0
Aromatics >EC12-EC16	mg/kg	32	23	9.4	0.21	SWSJ19 @ 1mbGL	10000	0
Aromatics >EC16-EC21	mg/kg	32	25	63	0.48	SWSJ23 @ 7.9mbGL	7600	0
Aromatics >EC21-EC35	mg/kg	32	26	530	2	SBHJ05 @ 14.5mbGL	7800	0
Total Aromatics C6-C35	mg/kg	26	24	560	2	SBHJ05 @ 14.5mbGL	3500	0
Aromatics >C35-C44	mg/kg	6	1	7.1	7.1	BHM4CAN041 @ 7.4mbGL	7800	0
Aromatics >EC40-EC44	mg/kg	2	1	3.14	3.14	BHM4CAN041 @ 7.4mbGL	7800	0
Total Aromatics >EC12-EC44	mg/kg	2	2	51.4	16.1	BHM4CAN041 @ 7.4mbGL	7600	0
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	26	25	720	4.6	SBHJ05 @ 14.5mbGL	2000	0
Total Aliphatics & Aromatics >C5-C44	mg/kg	2	2	138	29.1	BHM4CAN041 @ 7.4mbGL	2000	0
Total Aliphatic	mg/kg	4	0	None > LOD	None > LOD			
Total Aromatics	mg/kg	4	0	None > LOD	None > LOD			
Total Petroleum Hydrocarbons	mg/kg	4	0	None > LOD	None > LOD		2000	0

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	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
PAH								
Acenaphthene	mg/kg	38	23	4.4	0.016	SWSJ28 @ 1mbGL	29000	0
Acenaphthylene	mg/kg	38	25	4.4	0.006	SWSJ28 @ 1mbGL	29000	0
Anthracene	mg/kg	38	28	3.8	0.017	SWSJ28 @ 1mbGL	150000	0
Benzo(a)anthracene	mg/kg	38	29	4.5	0.027	SWSJ28 @ 1mbGL	49	0
Benzo(a)pyrene	mg/kg	38	28	4.5	0.016	SWSJ28 @ 1mbGL	11	0
Benzo(b)fluoranthene	mg/kg	38	28	6	0.033	SWSJ28 @ 1mbGL	13	0
Benzo(ghi)perylene	mg/kg	38	25	5.3	0.014	SWSJ28 @ 1mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	38	24	4.5	0.039	SWSJ28 @ 1mbGL	370	0
Chrysene	mg/kg	38	30	5.1	0.02	SWSJ28 @ 1mbGL	93	0
Dibenzo(ah)anthracene	mg/kg	38	23	5	0.011	SWSJ28 @ 1mbGL	1.1	1
Fluoranthene	mg/kg	38	32	6.5	0.071	SWSJ23 @ 7.9mbGL	6300	0
Fluorene	mg/kg	38	25	4.5	0.02	SWSJ28 @ 1mbGL	20000	0
Indeno(123cd)pyrene	mg/kg	38	24	4.9	0.022	SWSJ28 @ 1mbGL	150	0
Naphthalene	mg/kg	38	28	4.3	0.033	SWSJ28 @ 1mbGL	190	0
Phenanthrene	mg/kg	38	31	5.2	0.043	SWSJ23 @ 7.9mbGL	6200	0
Pyrene	mg/kg	37	31	5.3	0.056	SWSJ28 @ 1mbGL	15000	0
PAH 16 Total	mg/kg	36	29	77	0.095	SWSJ28 @ 1mbGL		
SVOCs								
Phenols								
2-Chlorophenol	mg/kg	25	0	None > LOD	None > LOD			
2-Methylphenol	mg/kg	25	0	None > LOD	None > LOD			
2-Nitrophenol	mg/kg	25	0	None > LOD	None > LOD			
2,4-Dichlorophenol	mg/kg	25	0	None > LOD	None > LOD			
2,4-Dimethylphenol	mg/kg	25	0	None > LOD	None > LOD			
2,4,5-Trichlorophenol	mg/kg	25	0	None > LOD	None > LOD			
2,4,6-Trichlorophenol	mg/kg	25	0	None > LOD	None > LOD			
4-Chloro-3-methylphenol	mg/kg	25	0	None > LOD	None > LOD			
4-Methylphenol	mg/kg	25	0	None > LOD	None > LOD			
4-Nitrophenol	mg/kg	25	0	None > LOD	None > LOD			
Pentachlorophenol	mg/kg	25	0	None > LOD	None > LOD			
Phenol	mg/kg	25	0	None > LOD	None > LOD		440	0
PAHs								
2-Chloronaphthalene	mg/kg	25	0	None > LOD	None > LOD			
2-Methylnaphthalene	mg/kg	25	2	0.27	0.2	SWSJ30 @ 3mbGL		
Acenaphthene	mg/kg	10	0	None > LOD	None > LOD		29000	0
Acenaphthylene	mg/kg	10	0	None > LOD	None > LOD		29000	0
Anthracene	mg/kg	10	0	None > LOD	None > LOD		150000	0
Benzo(a)anthracene	mg/kg	10	1	0.4	0.4	LGBH005 @ 1.6mbGL	49	0
Benzo(a)pyrene	mg/kg	10	1	0.4	0.4	LGBH005 @ 1.6mbGL	11	0
Benzo(b)fluoranthene	mg/kg	10	1	0.3	0.3	LGBH005 @ 1.6mbGL	13	0
Benzo(ghi)perylene	mg/kg	10	1	0.3	0.3	LGBH005 @ 1.6mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	10	0	None > LOD	None > LOD		370	0
Chrysene	mg/kg	10	1	0.6	0.6	LGBH005 @ 1.6mbGL	93	0
Dibenzo(a,h)anthracene	mg/kg	10	0	None > LOD	None > LOD			
Fluoranthene	mg/kg	10	4	0.5	0.26	LGBH005 @ 1.6mbGL	6300	0
Fluorene	mg/kg	10	2	0.22	0.2	SWSJ30 @ 3mbGL	20000	0
Indeno(1,2,3-cd)pyrene	mg/kg	10	0	None > LOD	None > LOD			
Naphthalene	mg/kg	10	3	0.44	0.18	SWSJ30 @ 3mbGL	190	0
Phenanthrene	mg/kg	9	5	0.72	0.19	SWSJ29 @ 4mbGL	6200	0
Pyrene	mg/kg	9	3	0.8	0.25	LGBH005 @ 1.6mbGL	15000	0
Pthalates								
Bis(2-ethylhexyl) phthalate	mg/kg	25	9	5.4	0.13	SBHJ05 @ 14.5mbGL		
Butylbenzyl phthalate	mg/kg	25	0	None > LOD	None > LOD			
Di-n-butyl phthalate	mg/kg	25	0	None > LOD	None > LOD			
Di-n-Octyl phthalate	mg/kg	25	0	None > LOD	None > LOD			
Diethyl phthalate	mg/kg	25	0	None > LOD	None > LOD			
Dimethyl phthalate	mg/kg	25	0	None > LOD	None > LOD			
Other Semi-Volatiles								
1,2-Dichlorobenzene	mg/kg	25	0	None > LOD	None > LOD			
1,2,4-Trichlorobenzene	mg/kg	25	0	None > LOD	None > LOD		220	0
1,3-Dichlorobenzene	mg/kg	25	0	None > LOD	None > LOD			
1,4-Dichlorobenzene	mg/kg	25	0	None > LOD	None > LOD			
2-Nitroaniline	mg/kg	25	0	None > LOD	None > LOD			
2,4-Dinitrotoluene	mg/kg	25	0	None > LOD	None > LOD			
2,6-Dinitrotoluene	mg/kg	25	0	None > LOD	None > LOD			
3-Nitroaniline	mg/kg	25	0	None > LOD	None > LOD			
4-Bromophenylphenylether	mg/kg	25	0	None > LOD	None > LOD			
4-Chloroaniline	mg/kg	25	0	None > LOD	None > LOD			
4-Chlorophenylphenylether	mg/kg	25	0	None > LOD	None > LOD			
4-Nitroaniline	mg/kg	25	0	None > LOD	None > LOD			
Azobenzene	mg/kg	25	0	None > LOD	None > LOD			
Bis(2-chloroethoxy)methane	mg/kg	25	0	None > LOD	None > LOD			
Bis(2-chloroethyl)ether	mg/kg	25	0	None > LOD	None > LOD			
Carbazole	mg/kg	25	0	None > LOD	None > LOD			
Dibenzofuran	mg/kg	25	1	0.21	0.21	SWSJ30 @ 3mbGL		
Hexachlorobenzene	mg/kg	25	0	None > LOD	None > LOD		30	0
Hexachlorobutadiene	mg/kg	25	0	None > LOD	None > LOD		31	0
Hexachlorocyclopentadiene	mg/kg	25	0	None > LOD	None > LOD			
Hexachloroethane	mg/kg	25	0	None > LOD	None > LOD			
Isophorone	mg/kg	25	0	None > LOD	None > LOD			
N-nitrosodi-n-propylamine	mg/kg	25	0	None > LOD	None > LOD			
Nitrobenzene	mg/kg	25	0	None > LOD	None > LOD			
VOCs								
Methyl Tertiary Butyl Ether	ug/kg	25	0	None > LOD	None > LOD			
Benzene	ug/kg	25	2	16	16	SWSJ20 @ 6mbGL	27	0
Toluene	ug/kg	24	1	15	15	SWSJ20 @ 6mbGL	56000	0
Ethylbenzene	ug/kg	25	1	11	11	SWSJ23 @ 7.9mbGL	5700	0
p/m-Xylene	ug/kg	25	3	84	28	SWSJ23 @ 7.9mbGL		
o-Xylene	ug/kg	25	3	140	26	SWSJ23 @ 7.9mbGL	6600	0
Naphthalene	ug/kg	25	0	None > LOD	None > LOD		190	0
Hexachlorobutadiene	ug/kg	25	0	None > LOD	None > LOD		31	0
1.2.4-Trichlorobenzene	ug/kg	25	0	None > LOD	None > LOD		220	0

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Screening Values and Assessment

	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
1.2-Dichlorobenzene	ug/kg	25	0	None > LOD	None > LOD			
1.3-Dichlorobenzene	ug/kg	25	0	None > LOD	None > LOD			
1.4-Dichlorobenzene	ug/kg	25	0	None > LOD	None > LOD			
1.1.1.2-Tetrachloroethane	ug/kg	25	0	None > LOD	None > LOD			
1.1.1-Trichloroethane	ug/kg	25	0	None > LOD	None > LOD			
1.1.2.2-Tetrachloroethane	ug/kg	25	0	None > LOD	None > LOD			
1.1.2-Trichloroethane	ug/kg	25	0	None > LOD	None > LOD			
1.1-Dichloropropene	ug/kg	25	0	None > LOD	None > LOD			
1.1-Dichloroethane	ug/kg	25	0	None > LOD	None > LOD			
1.1-Dichloroethene	ug/kg	25	0	None > LOD	None > LOD			
1.2.3-Trichlorobenzene	ug/kg	25	0	None > LOD	None > LOD		102	0
1.2.3-Trichloropropane	ug/kg	25	0	None > LOD	None > LOD			
1.2.4-Trimethylbenzene	ug/kg	25	3	300	39	SWSJ23 @ 7.9mbGL		
1.2-Dibromo-3-chloropropane	ug/kg	25	0	None > LOD	None > LOD			
1.2-Dichloroethane	ug/kg	25	0	None > LOD	None > LOD			
cis-1-2-Dichloroethene	ug/kg	25	0	None > LOD	None > LOD			
1.2-Dibromoethane	ug/kg	25	0	None > LOD	None > LOD			
1.2-Dichloropropane	ug/kg	25	0	None > LOD	None > LOD			
1.3.5-Trimethylbenzene	ug/kg	25	2	150	60	SWSJ23 @ 7.9mbGL		
cis-1-3-Dichloropropene	ug/kg	25	0	None > LOD	None > LOD			
1.3-Dichloropropane	ug/kg	25	0	None > LOD	None > LOD			
2.2-Dichloropropane	ug/kg	25	0	None > LOD	None > LOD			
2-Chlorotoluene	ug/kg	25	0	None > LOD	None > LOD			
4-Chlorotoluene	ug/kg	25	0	None > LOD	None > LOD			
4-Isopropyltoluene	ug/kg	25	0	None > LOD	None > LOD			
Bromobenzene	ug/kg	25	0	None > LOD	None > LOD			
Bromochloromethane	ug/kg	25	0	None > LOD	None > LOD			
Bromoform	ug/kg	25	0	None > LOD	None > LOD			
Bromomethane	ug/kg	25	0	None > LOD	None > LOD			
Bromodichloromethane	ug/kg	25	0	None > LOD	None > LOD			
Chlorobenzene	ug/kg	25	0	None > LOD	None > LOD		56	0
Carbon Disulphide	ug/kg	25	0	None > LOD	None > LOD		11	0
Chloroethane	ug/kg	25	0	None > LOD	None > LOD			
Chloroform	ug/kg	25	0	None > LOD	None > LOD		99	0
Chloromethane	ug/kg	25	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	25	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	25	0	None > LOD	None > LOD			
Dibromomethane	ug/kg	25	0	None > LOD	None > LOD			
Dichlorodifluoromethane	ug/kg	25	0	None > LOD	None > LOD			
Dibromochloromethane	ug/kg	25	0	None > LOD	None > LOD			
Dichloromethane	ug/kg	25	0	None > LOD	None > LOD			
Isopropylbenzene	ug/kg	25	2	77	23	SWSJ23 @ 7.9mbGL		
n-Butylbenzene	ug/kg	25	0	None > LOD	None > LOD			
Propylbenzene	ug/kg	25	2	38	20	SWSJ23 @ 7.9mbGL		
sec-Butylbenzene	ug/kg	24	1	34	34	SWSJ23 @ 7.9mbGL		
Styrene	ug/kg	24	0	None > LOD	None > LOD			
trans-1-2-Dichloroethene	ug/kg	24	0	None > LOD	None > LOD			
trans-1-3-Dichloropropene	ug/kg	24	0	None > LOD	None > LOD			
Trichlorofluoromethane	ug/kg	24	0	None > LOD	None > LOD			
tert-Butylbenzene	ug/kg	24	3	140	21	SWSJ23 @ 7.9mbGL		
Tetrachloroethene	ug/kg	24	0	None > LOD	None > LOD		19	0
Trichloroethene	ug/kg	24	0	None > LOD	None > LOD		1.2	0
Vinyl Chloride	ug/kg	24	0	None > LOD	None > LOD		0.059	0

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Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Notes

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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

TFD	Tidal Flat Deposits
MG	Made Ground
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	LGBH004	LGBH004	LGBH004	LGBH005	LGBH005	LGBH005	LGBH007	LGBH007	LGBH009	SWSJ18	SWSJ18	SWSJ19	SWSJ19	SWSJ20	SWSJ20	SWSJ21	SWSJ21	SWSJ22B	SWSJ22B	SWSJ23	SWSJ23	SWSJ24A	SWSJ24A	SWSJ26	SWSJ26
Specimen Depth (m)		1.3	5	8.7	0.5	1.6	1.6	1	12	0.9	2	3	1	6	5	6	2	4	1	3	7	7.9	4	5	1	4
OD Level (m)											10.83	9.83	11.31	6.31	7.21	6.21	10.97	8.97	10.99	8.99	5.29	4.39	8.01	7.01	10.6	7.6
Sample Type											ES	ES	ES	D	ES	ES	ES	ES	D	ES	D	D	D	ES	ES	ES
Geology Code		MG-CS	MG-CS	MG-CS	MG-CS	MG-G	MG-G	MG-CS	MG-CS	MG-SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI
Metals																										
Antimony	mg/kg										34	20	23	34	29	24	30	35	22	30	34	27	31	26	24	32
Arsenic	mg/kg	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	14	22	27	28	<3	24	<3	<3
Barium	mg/kg										90	170	92	83	110	110	100	72	230	160	140	180	220	220	74	86
Boron Water Soluble	mg/kg	<0.5	<0.5	1.2	1.9	1.7	3.5	0.8	1.4		<3.5	<3.5	6.3	<3.5	<3.5	4.6	11	<3.5	3.9	<3.5	<3.5	4.3	8.5	5.8	4.4	<3.5
Cadmium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.3	1.1	19	17	25	17	7.2	13	14	16	9.3	20	7.5	20	16	30
Chromium	mg/kg	931	853	1660	850	410	438	1350	1290	663	960	550	82	90	120	87	80	110	160	120	130	120	620	170	99	80
Chromium Hexavalent	mg/kg										1.9															
Copper	mg/kg	15	23	20	17	8	12	32	26	11	<6	18	62	110	99	58	46	84	110	85	86	79	16	84	51	64
Lead	mg/kg	28	170	82	60	19	39	64	65	54	15	150	1400	1300	1700	1100	900	1400	950	1300	1600	2000	420	2100	920	1400
Mercury	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	0.7	0.9	<0.6	<0.6	<0.6	<0.6	<0.6
Molybdenum	mg/kg										0.8	<0.6	2.4	4.5	<0.6	<0.6	1.6	3.9	2.7	1.1	8.8	3.9	3.1	3.9	1.3	1.7
Nickel	mg/kg	6	11	3	8	14	18	12	8	7	<0.9	<0.9	46	31	15	<0.9	12	37	12	<0.9	4.2	12	<0.9	11	34	25
Selenium	mg/kg	2.27	2.44	1.83	1.13	0.98	1.07	1.1	1.05	1.53	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Zinc	mg/kg	99	653	366	63	70	66	41	33	45	46	870	18000	38000	12000	45000	23000	31000	11000	11000	13000	9200	3400	7700	23000	31000
Beryllium	mg/kg										<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Iron	mg/kg	170000	183000	179000	211000	66300	66000	192000	238000	137000	110000	94000	240000	320000	330000	320000	290000	340000	400000	310000	320000	280000	110000	260000	270000	300000
Vanadium	mg/kg										710	440	28	30	41	38	38	39	42	36	44	31	590	130	30	27
Non-Metal Inorganics																										
Cyanide (total)	mg/kg	4	3	<1	<1	1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	5	36	<1	<1
Cyanide (free)	mg/kg																									
Sulphate (soluble)	g/l										0.011	<0.003	0.19	0.17	0.11	0.13	0.34	0.2	0.28	0.15	0.2	0.15	0.004	0.23	0.5	0.55
Elemental/Free Sulphur	mg/kg										<70	<70	97	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70
Easily Liberated Sulphide	mg/kg																		1100	730	440	1100	<15	<15		
Acid Soluble Sulphide	mg/kg										75	110	1600	620	1800	<50	1400	1200							110	1500
Ammoniacal Nitrogen as N	mg/kg	1.3	1.3	1.6	0.8	2.9	4.8	1.1	1	4.1	<15	24	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
Chloride	mg/kg	68.1	63.1	49	26.8	233	219	57.1	47.6		14	20	460	370	190	240	270	590	170	660	280	390	34	150	540	720
Other																										
Asbestos Presence Screen	None										NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD
Loss on Ignition	%											1.7	4.3			8.3		12	4.8		<0.3	<0.3		3.8	5.9	
Total Organic Carbon	%											0.7	19			1.6		2.9	13		1.1	5.1		8.6	11	
Organic Matter	%																		8.5		7.3					
pH Value	pH Units	12.6	12.5	12.9	13	11.9	12.1	12.9	12.9		12.51	12.06	10.4	9.4	10.49	10.3	9.8	10.87	12.28	12	11.9	11.51	11.69	11.38	11.73	9.98
Material >2mm	%																		<0.1		<0.1					
Calorific Value	MJ/kg																									
Organics																										
PCBs (vs Aroclor 1254)	mg/kg										<0.02	0.038	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.035	<0.035	<0.035	<0.035	<0.035	0.22	<0.02	<0.02
PCB 105	mg/kg																									
PCB 114	mg/kg																									
PCB 123	mg/kg																									
PCB 126	mg/kg																									
PCB 157	mg/kg																									
PCB 167	mg/kg																									
PCB 169	mg/kg																									
PCB 189	mg/kg																									
PCB 77	mg/kg																									
PCB 81	mg/kg																									
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg																									
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg																									
Phenols																										
Phenols Monohydric	mg/kg																									
Phenols (total)	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	0.2	<0.15	<0.15	<0.15

M4CAN
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21/06/2016

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

TFD	Tidal Flat Deposits
MG	Made Ground
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	SWSJ27	SWSJ27	SWSJ28	SWSJ28	SWSJ29	SWSJ29	SWSJ30	WS501	WS501	WS501	BH518	BH519	LGBH004	LGBH005	LGBH005	LGBH005	LGBH005	LGBH009	SBHJ05	SBHJ05	WS501	BH518	BH519	BH519	BHM4CAN041	BHM4CAN041
Specimen Depth (m)		3	6	1	2	4	6	3	0 - 0.2	0.6 - 0.8	4.5 - 4.7	0.5 - 0.7	0.2 - 0.5	11.5	2.5	3.1	6	7	6.8	11.5	14.5	8.7 - 8.9	2 - 2.2	1.55 - 2	2.5 - 3	5 - 6	7.4
OD Level (m)		8.3	5.3	10.59	9.59	7.63	5.63	8.54	12.15	11.55	7.65	5	5.65							1.74	-1.26	3.45	3.5	4.3	3.35		
Sample Type		L	ES	ES	L	ES	ES	ES	ES	ES	ES	ES	ES							ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG	MG	MG	MG	MG	TFD	TFD	TFD (peat)	TFD	TFD	TFD	TFD	PEAT	TFD	TFD	PEAT	PEAT	MG	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002	2002	2002	2002	2002	2002	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2016 GI	2016 GI
Metals																											
Antimony	mg/kg	41	38	21	28	37	20													6.9	<1.5						
Arsenic	mg/kg	<3	<3	13	18	<3	<3	<3	22	20	29	13	35	7	4	3	11	12	8	14	<3	41	14	2.3	<1	26.1	5.07
Barium	mg/kg	66	79	160	140	110	110	100												120	31						
Boron Water Soluble	mg/kg	<3.5	<3.5	3.8	<3.5	<3.5	7.4	<3.5	<0.4	1.5	0.56	2.4	2.2	0.8	1.7	25	1.8	2	1.6	<3.5	41	4.8	3.1	4	17		
Cadmium	mg/kg	19	30	25	23	24	25	38	6.2	11	21	0.37	0.14	<1	<1	<1	<1	<1	<1	<0.3	<0.3	13	<0.1	<0.1	<0.1	25.1	2.41
Chromium	mg/kg	100	94	110	110	87	53	150	51	91	92	42	1400	60	300	25	31	32	41	68	11	460	34	230	15	131	789
Chromium Hexavalent	mg/kg												<0.5													<0.3	<0.3
Copper	mg/kg	98	90	47	79	63	46	150	11	47	78	24	22	8	10	5	14	16	15	6	<6	89	6.6	4.1	1.6	92.1	7.71
Lead	mg/kg	2200	2000	1100	1200	1300	690	2700	370	940	1500	18	18	22	36	16	19	36	29	9	8	1700	12	5.2	3.3	1530	115
Mercury	mg/kg	<0.6	<0.6	0.7	0.6	<0.6	<0.6	<0.6	0.21	0.33	1	0.12	0.19	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.6	<0.6	0.65	<0.1	<0.1	<0.1	<0.14	<0.14
Molybdenum	mg/kg	1.9	2.5	0.7	0.7	<0.6	<0.6	<0.6												<0.6	<0.6						
Nickel	mg/kg	23	36	7.9	<0.9	5.7	1.9	46	40	36	30	35	31	25	19	12	29	33	27	30	1.9	49	21	5.3	1.8	44.4	6.29
Selenium	mg/kg	<3	<3	<3	<3	<3	<3		<0.2	0.82	1.3	0.53	<0.2	<0.50	0.6	0.72	0.96	<0.50	0.72	<3	<3	<0.2	<0.2	0.52	0.57	<1	7.66
Zinc	mg/kg	39000	35000	7200	9800	25000	29000		1200	15000	26000	86	150	86	58	46	85	100	77	280	42	9300	58	29	29	28300	2310
Beryllium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4												1	<0.4						
Iron	mg/kg	320000	320000	260000	270000	310000	270000	330000						37300	59600	18400	29000	29800	25000	45000	5800					392000	159000
Vanadium	mg/kg	31	29	29	28	35	28													65	6.7					45.2	636
Non-Metal Inorganics																											
Cyanide (total)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	2	<1	<1	<1	<1	6.1	<0.5	<0.5	<0.5		
Cyanide (free)	mg/kg								<0.5	<0.5	<0.5	<0.5	<0.5									<0.5	<0.5	<0.5	<0.5		<1
Sulphate (soluble)	g/l	0.17	0.16	1.5	0.11	0.28	0.27													0.022	NDP						
Elemental/Free Sulphur	mg/kg	<70	<70	<70	<70	<70	<70													<70	<70						
Easily Liberated Sulphide	mg/kg			190	42		<15													<15	<15						
Acid Soluble Sulphide	mg/kg	1200	3200			440																					
Ammoniacal Nitrogen as N	mg/kg	<15	<15	<15	<15	<15	<15	<15						8.6	13.1	24.2	84.5	60.7	39.4	<15	62						
Chloride	mg/kg	280	390	22	74	560	810	400						77.2	344	5090	1390	1540	1260	56	NDP						
Other																											
Asbestos Presence Screen	None	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NAD	NAD	NAD	NAD	NAD							NFD	NFD		NAD	NAD			
Loss on Ignition	%		10		<0.3	4.1														3.2	91						
Total Organic Carbon	%		4		3.5	4.6			31											0.5	32	2.4					
Organic Matter	%	6.7		6.7																							
pH Value	pH Units	11.55	11.74	10.22	10.92	10.86	10.87	8.73	9.2	12.1	9.1	7.7	12.8	10	12.1	7.6	9.4	8.9	10.3	8.21	7.8	10.8	8.3	10	8.1	11.9	12
Material >2mm	%	<0.1		<0.1																							
Calorific Value	MJ/kg								8.1																		
Organics																											
PCBs (vs Aroclor 1254)	mg/kg	<0.02	<0.02	<0.035	<0.035	<0.02	<0.02	<0.02				<0.01	<0.01							<0.035	<0.035						
PCB 105	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
PCB 114	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
PCB 123	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
PCB 126	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
PCB 157	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
PCB 167	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
PCB 169	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
PCB 189	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
PCB 77	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
PCB 81	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg											<0.01	<0.01									<0.01	<0.01	<0.01			
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg																					<0.01	<0.01	<0.01			
Phenols																											
Phenols Monohydric	mg/kg																										<0.035
Phenols (total)	mg/kg	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.3	<0.3	<0.3	<0.3	<0.3	<0.0005	<0.0005	0.0007	0.0008	<0.0005	<0.0005	<0.15	<0.15	<0.3	<0.3	<0.3			0.0107

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Notes

NFD = No Fibres Detected
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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

TFD	Tidal Flat Deposits
MG	Made Ground
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	LGBH004	LGBH004	LGBH004	LGBH005	LGBH005	LGBH005	LGBH007	LGBH007	LGBH009	SWSJ18	SWSJ18	SWSJ19	SWSJ19	SWSJ20	SWSJ20	SWSJ21	SWSJ21	SWSJ22B	SWSJ22B	SWSJ23	SWSJ23	SWSJ24A	SWSJ24A	SWSJ26	SWSJ26
Specimen Depth (m)		1.3	5	8.7	0.5	1.6	1.6	1	12	0.9	2	3	1	6	5	6	2	4	1	3	7	7.9	4	5	1	4
OD Level (m)											10.83	9.83	11.31	6.31	7.21	6.21	10.97	8.97	10.99	8.99	5.29	4.39	8.01	7.01	10.6	7.6
Sample Type											ES	ES	ES	D	ES	ES	ES	ES	D	ES	D	D	D	ES	ES	ES
Geology Code		MG-CS	MG-CS	MG-CS	MG-CS	MG-G	MG-G	MG-CS	MG-CS	MG-SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI
Cresols	mg/kg																									
Xylenols	mg/kg																									
BTEX																										
GRO (C4-C12)	mg/kg										<0.01	<0.01	<0.01	0.025	0.065	0.12	<0.01	<0.01	<0.01	0.031	0.042	0.64	<0.01	<0.01	<0.01	<0.01
GRO TOT (Moisture Corrected)	mg/kg																									
MTBE	mg/kg										<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
Benzene	mg/kg										<0.01	<0.01	<0.01	<0.01	0.019	0.045	<0.01	<0.01	<0.01	0.031	<0.01	0.16	<0.01	<0.01	<0.01	<0.01
Toluene	mg/kg										<0.01	<0.01	<0.01	<0.01	0.016	0.032	<0.01	<0.01	<0.01	<0.01	<0.01	0.053	<0.01	<0.01	<0.01	<0.01
Ethyl benzene	mg/kg										<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
m & p Xylene	mg/kg										<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.053	<0.01	<0.01	<0.01	<0.01
o Xylene	mg/kg										<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.054	<0.01	<0.01	<0.01	<0.01
Sum of Detected BTEX	mg/kg																									
Sum of Detected Xylenes	mg/kg																									
TPH																										
Aliphatics C5-C6	mg/kg										<0.01	<0.01	<0.01	0.025	0.03	0.044	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C6-C8	mg/kg										<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
Aliphatics >C8-C10	mg/kg										<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.12	<0.01	<0.01	<0.01	<0.01
Aliphatics >C10-C12	mg/kg										<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C12-C16	mg/kg										<0.1	0.56	10	0.92	<0.1	0.33	4.1	1.2	6.9	8.4	4.3	3.2	1.6	0.33	1.6	<0.1
Aliphatics >C16-C21	mg/kg										<0.1	7.9	16	25	34	28	14	14	32	36	26	86	22	110	14	24
Aliphatics >C21-C35	mg/kg										19	89	35	32	21	48	30	15	83	65	35	140	71	240	43	44
Total Aliphatics C5-C35	mg/kg										19	97	61	58	56	76	48	31	120	110	65	230	95	350	59	68
Aliphatics >C35-C44	mg/kg																									
Total Aliphatics >C12-C44	mg/kg																									
Aromatics C5-C7	mg/kg																									
Aromatics C6-C7	mg/kg										<0.01	<0.01	<0.01	<0.01	0.019	0.045	<0.01	<0.01	<0.01	0.031	<0.01	0.16	<0.01	<0.01	<0.01	<0.01
Aromatics >C7-C8	mg/kg										<0.01	<0.01	<0.01	<0.01	0.016	0.032	<0.01	<0.01	<0.01	<0.01	<0.01	0.053	<0.01	<0.01	<0.01	<0.01
Aromatics >EC8-EC10	mg/kg										<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.011	0.29	<0.01	<0.01	<0.01	<0.01
Aromatics >EC10-EC12	mg/kg										<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.019	0.011	<0.01	<0.01	<0.01	<0.01
Aromatics >EC12-EC16	mg/kg										<0.1	<0.1	9.4	0.63	<0.1	0.21	3.9	1.4	4.5	3.2	0.94	3.1	0.47	2.7	2	1.1
Aromatics >EC16-EC21	mg/kg										<0.1	0.48	17	6.6	4	10	5.1	5.4	32	14	7.1	63	4	21	4.7	12
Aromatics >EC21-EC35	mg/kg										<0.1	8.3	29	32	10	67	3.4	14	64	19	30	180	19	84	5.4	32
Total Aromatics C6-C35	mg/kg										<0.1	8.8	55	39	14	78	12	20	100	36	38	250	24	110	12	45
Aromatics >C35-C44	mg/kg																									
Aromatics >EC40-EC44	mg/kg																									
Total Aromatics >EC12-EC44	mg/kg																									
TPH (Aliphatics and Aromatics C5-C35)	mg/kg										19	110	120	97	70	150	60	51	220	150	100	470	120	460	71	110
Total Aliphatics & Aromatics >C5-C44	mg/kg																									
Total Aliphatic	mg/kg																									
Total Aromatics	mg/kg																									
Total Petroleum Hydrocarbons	mg/kg																									
PAH																										
Acenaphthene	mg/kg	<0.2	<0.2								<0.014	<0.014	0.21	0.032	<0.014	0.026	0.19	0.058	0.15	0.1	<0.014	0.06	0.016	0.033	0.11	0.061
Acenaphthylene	mg/kg	<0.2	<0.2								0.01	0.013	0.036	0.016	<0.005	0.006	0.019	0.01	0.043	0.03	<0.005	0.035	0.007	0.014	0.026	0.012
Anthracene	mg/kg	<0.2	0.3								<0.009	0.017	0.52	0.37	0.11	0.23	0.12	0.13	0.65	0.3	0.073	1.1	0.1	0.25	0.27	0.25
Benzo(a)anthracene	mg/kg	0.2	1.5								0.054	0.11	0.054	0.72	0.89	1.6	<0.012	0.33	1.2	0.46	0.22	1.8	0.35	0.94	0.059	0.71
Benzo(a)pyrene	mg/kg	0.2	1.2								0.042	0.11	0.016	1.1	0.28	0.49	<0.012	0.1	0.24	0.13	0.16	0.55	0.084	0.18	0.02	0.16
Benzo(b)fluoranthene	mg/kg	0.3	1.9								0.047	0.2	0.033	1.8	0.67	1.1	<0.016	0.26	0.66	0.29	0.24	2.1	0.2	0.73	0.039	0.6
Benzo(ghi)perylene	mg/kg	<0.2	1								0.042	0.16	<0.01	2	0.27	0.4	<0.01	0.084	0.041	0.042	0.15	0.54	0.094	0.061	<0.01	0.19
Benzo(k)fluoranthene	mg/kg	<0.2	1.1								0.039	0.11	<0.025	0.62	0.32	0.44	<0.025	0.11	0.21	0.11	0.17	0.88	0.12	0.28	<0.025	0.15
Chrysene	mg/kg	0.4	1.9								0.05	0.18	0.16	1.1	0.92	1.4	0.02	0.53	1.7	0.68	0.42	3.3	0.61	1.5	0.19	1.1
Dibenzo(ah)anthracene	mg/kg	<0.2	0.2								0.011	0.038	<0.008	0.53	0.11	0.19	<0.008	0.031	0.023	0.024	0.037	0.27	0.034	0.03	<0.008	0.077

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MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Notes

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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	SWSJ27	SWSJ27	SWSJ28	SWSJ28	SWSJ29	SWSJ29	SWSJ30	WS501	WS501	WS501	BH518	BH519	LGBH004	LGBH005	LGBH005	LGBH005	LGBH005	LGBH009	SBHJ05	SBHJ05	WS501	BH518	BH519	BH519	BHM4CAN041	BHM4CAN041
Specimen Depth (m)		3	6	1	2	4	6	3	0 - 0.2	0.6 - 0.8	4.5 - 4.7	0.5 - 0.7	0.2 - 0.5	11.5	2.5	3.1	6	7	6.8	11.5	14.5	8.7 - 8.9	2 - 2.2	1.55 - 2	2.5 - 3	5 - 6	7.4
OD Level (m)		8.3	5.3	10.59	9.59	7.63	5.63	8.54	12.15	11.55	7.65	5	5.65							1.74	-1.26	3.45	3.5	4.3	3.35		
Sample Type		L	ES	ES	L	ES	ES	ES	ES	ES	ES	ES	ES							ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG	MG	MG	MG	MG	TFD	TFD	TFD (peat)	TFD	TFD	TFD	TFD	PEAT	TFD	TFD	PEAT	PEAT	MG	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002	2002	2002	2002	2002	2002	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2016 GI	2016 GI
Cresols	mg/kg																										<0.01
Xylenols	mg/kg																										<0.015
BTEX																											
GRO (C4-C12)	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	0.016													<0.01	<0.01						
GRO TOT (Moisture Corrected)	mg/kg																									0.595	0.0728
MTBE	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01												<0.01	<0.02					<0.005	<0.005
Benzene	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01	0.016	<0.01	<0.001	<0.001	<0.001									<0.01	<0.02	<0.001		<0.001		<0.01	<0.01
Toluene	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01		<0.001	<0.001	<0.001									<0.01	<0.02	<0.001		<0.001		<0.002	0.00321
Ethyl benzene	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001									<0.01	<0.02	<0.001		<0.001		<0.01	<0.01
m & p Xylene	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001									<0.01	<0.02	<0.001		<0.001		<0.006	<0.006
o Xylene	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001									<0.01	<0.02	<0.001		<0.001		<0.003	<0.003
Sum of Detected BTEX	mg/kg																									<0.024	<0.024
Sum of Detected Xylenes	mg/kg																									<0.009	<0.009
TPH																											
Aliphatics C5-C6	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1									<0.01	<0.01	<0.1		<0.1		0.0234	<0.01
Aliphatics >C6-C8	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1									<0.01	<0.02	<0.1		<0.1		0.0501	<0.01
Aliphatics >C8-C10	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001									<0.01	<0.02	<0.001		<0.1		0.0301	<0.01
Aliphatics >C10-C12	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001									<0.01	<0.02	<0.001		<1		0.282	0.0236
Aliphatics >C12-C16	mg/kg	7.3	<0.02	5.4	3.4	9.6	0.83	22	<0.001	<0.001	<0.001									0.25	<0.02	<0.001		<1		<0.1	1.12
Aliphatics >C16-C21	mg/kg	100	<0.02	17	41	40	54	47	<0.001	<0.001	<0.001									1	<0.02	<0.001		<1		6.11	16.6
Aliphatics >C21-C35	mg/kg	93	<0.02	66	55	67	76	84	<0.001	<0.001	<0.001									1.3	<0.02	<0.001		<1		6.29	56.7
Total Aliphatics C5-C35	mg/kg	200	150	88	99	120	130	150												2.6	160			<1			
Aliphatics >C35-C44	mg/kg								<1	<1	<1											<1		<0.1		<0.1	12
Total Aliphatics >C12-C44	mg/kg																									12.4	86.4
Aromatics C5-C7	mg/kg								<0.1	<0.1	<0.1											<0.1		<0.1		<0.01	<0.01
Aromatics C6-C7	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	0.016	<0.01												<0.01	<0.01			<0.1			
Aromatics >C7-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1									<0.01	<0.01	<0.1		<1		<0.01	<0.01
Aromatics >EC8-EC10	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1									<0.01	<0.01	<0.1		<1		0.02	<0.01
Aromatics >EC10-EC12	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1	<1	<1									<0.01	<0.01	<1		<1		0.189	0.0161
Aromatics >EC12-EC16	mg/kg	4.6	3.9	3.2	1.1	6.1	5.9	7.6	<1	<1	<1									<0.1	6.2	<1		<1		0.493	0.866
Aromatics >EC16-EC21	mg/kg	13	8.5	14	4.9	21	18	21	<1	<1	<1									<0.1	21	<1		<1		9.73	15
Aromatics >EC21-EC35	mg/kg	25	27	27	8.5	41	43	20	<1	<1	<1									2	530	<1		<5		5.88	28.5
Total Aromatics C6-C35	mg/kg	43	40	45	14	69	67	49												2	560			<5			
Aromatics >C35-C44	mg/kg								<1	<1	<1											<1				<0.1	7.1
Aromatics >EC40-EC44	mg/kg																									<0.1	3.14
Total Aromatics >EC12-EC44	mg/kg																									16.1	51.4
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	250	190	130	110	180	200	200												4.6	720			<10			
Total Aliphatics & Aromatics >C5-C44	mg/kg																									29.1	138
Total Aliphatic	mg/kg								<5	<5	<5											<5					
Total Aromatics	mg/kg								<5	<5	<5											<5					
Total Petroleum Hydrocarbons	mg/kg								<10	<10	<10											<10					
PAH																											
Acenaphthene	mg/kg	0.063	0.045	4.4	0.025	0.27	0.13	0.48	<0.1	0.3	<0.1	<0.1	<0.1							<0.014	<0.14	0.11	<0.1	<0.1	<0.1	0.157	0.0324
Acenaphthylene	mg/kg	0.024	0.019	4.4	0.011	0.018	0.011	0.015	<0.1	0.46	0.25	<0.1	<0.1							<0.005	<0.05	0.43	<0.1	<0.1	<0.1	0.0627	<0.012
Anthracene	mg/kg	0.4	0.28	3.8	0.16	0.41	0.47	0.35	<0.1	0.31	0.18	<0.1	<0.1							<0.009	<0.09	0.2	<0.1	<0.1	<0.1	1.02	0.172
Benzo(a)anthracene	mg/kg	0.87	0.85	4.5	0.29	0.72	1.4	0.61	<0.1	<0.1	0.53	<0.1	<0.1							0.027	<0.12	0.38	<0.1	<0.1	<0.1	1.81	0.36
Benzo(a)pyrene	mg/kg	0.27	0.23	4.5	0.049	0.38	0.76	0.11	<0.1	<0.1	0.17	<0.1	<0.1							<0.012	<0.12	0.3	<0.1	<0.1	<0.1	1.09	0.278
Benzo(b)fluoranthene	mg/kg	0.91	0.7	6	0.16	0.72	1.1	0.39	<0.1	<0.1	0.4	<0.1	<0.1							<0.016	<0.16	0.57	<0.1	<0.1	<0.1	1.52	0.39
Benzo(ghi)perylene	mg/kg	0.066	0.04	5.3	0.13	0.51	0.6	0.014	<0.1	<0.1	<0.1	<0.1	<0.1							0.027	<0.1	0.1	<0.1	<0.1	<0.1	0.659	0.205
Benzo(k)fluoranthene	mg/kg	0.29	0.3	4.5	0.082	0.26	1.1	0.13	<0.1	<0.1	<0.1	<0.1	<0.1							<0.025	<0.25	0.1	<0.1	<0.1	<0.1	0.781	0.2
Chrysene	mg/kg	1.5	1.6	5.1	0.46	0.98	2.5	0.87	<0.1	<0.1	0.96	<0.1	<0.1							<0.01	0.1	0.49	<0.1	<0.1	<0.1	2	0.399
Dibenzo(ah)anthracene	mg/kg	0.033	0.019	5	0.083	0.13	0.24	<0.008	<0.1	<0.1	<0.1	<0.1	<0.1							0.019	<0.08	<0.1	<0.1	<0.1	<0.1	0.247	0.604

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 25
21/06/2016

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

TFD	Tidal Flat Deposits
MG	Made Ground
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	LGBH004	LGBH004	LGBH004	LGBH005	LGBH005	LGBH005	LGBH007	LGBH007	LGBH009	SWSJ18	SWSJ18	SWSJ19	SWSJ19	SWSJ20	SWSJ20	SWSJ21	SWSJ21	SWSJ22B	SWSJ22B	SWSJ23	SWSJ23	SWSJ24A	SWSJ24A	SWSJ26	SWSJ26
Specimen Depth (m)		1.3	5	8.7	0.5	1.6	1.6	1	12	0.9	2	3	1	6	5	6	2	4	1	3	7	7.9	4	5	1	4
OD Level (m)											10.83	9.83	11.31	6.31	7.21	6.21	10.97	8.97	10.99	8.99	5.29	4.39	8.01	7.01	10.6	7.6
Sample Type											ES	ES	ES	D	ES	ES	ES	ES	D	ES	D	D	D	ES	ES	ES
Geology Code		MG-CS	MG-CS	MG-CS	MG-CS	MG-G	MG-G	MG-CS	MG-CS	MG-SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI
Fluoranthene	mg/kg	0.5	3.9								0.071	0.27	1.2	1.7	1.5	2.6	0.22	0.81	2.7	1	0.53	6.5	0.83	2.1	0.92	2.2
Fluorene	mg/kg	<0.2	<0.2								<0.012	<0.012	0.49	0.082	0.056	0.13	0.18	0.11	0.56	0.26	0.036	0.56	0.02	0.063	0.083	0.12
Indeno(123cd)pyrene	mg/kg	<0.2	1								0.03	0.11	<0.011	1.6	0.17	0.29	<0.011	0.058	0.033	0.027	0.093	0.41	0.059	0.039	<0.011	0.11
Naphthalene	mg/kg	<0.2	0.2								<0.01	0.033	0.57	0.13	0.073	0.1	0.7	0.12	0.6	0.62	0.034	0.27	0.14	0.23	0.49	0.24
Phenanthrene	mg/kg	0.4	2.7								0.043	0.16	3	1.7	0.58	1.4	0.74	0.7	3.5	1.6	0.33	5.2	0.53	1.2	1.6	1.6
Pyrene	mg/kg	0.5	2.9								0.056	0.2	1.5	1.3	1.3	2.1	0.23	0.73	2.1	1.1	0.48	4.3	0.72	1.9	0.93	1.7
PAH 16 Total	mg/kg										0.5	1.7	7.8	15	7.2	12	2.4	4.2	14	6.8	3	28	3.9	9.6	4.7	9.3
SVOCs																										
Phenols																										
2-Chlorophenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylphenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Nitrophenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dichlorophenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dimethylphenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,5-Trichlorophenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,6-Trichlorophenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Chloro-3-methylphenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Methylphenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Nitrophenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pentachlorophenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenol	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAHs																										
2-Chloronaphthalene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg					<0.2							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Acenaphthylene	mg/kg					<0.2							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Anthracene	mg/kg					<0.2							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Benzo(a)anthracene	mg/kg					0.4							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Benzo(a)pyrene	mg/kg					0.4							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Benzo(b)fluoranthene	mg/kg					0.3							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Benzo(ghi)perylene	mg/kg					0.3							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Benzo(k)fluoranthene	mg/kg					<0.2							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Chrysene	mg/kg					0.6							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg					<0.2							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Fluoranthene	mg/kg					0.5							<0.1	<0.1			<0.1	<0.1							<0.1	0.31
Fluorene	mg/kg					<0.2							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg					<0.2							<0.1	<0.1			<0.1	<0.1							<0.1	<0.1
Naphthalene	mg/kg					<0.2							<0.1	<0.1			0.18	<0.1							<0.1	<0.1
Phenanthrene	mg/kg					0.5							0.19	<0.1			<0.1	0.19							<0.1	0.39
Pyrene	mg/kg					0.8							<0.1	<0.1			<0.1	<0.1							<0.1	0.25
Pthalates																										
Bis(2-ethylhexyl) phthalate	mg/kg										<0.1	0.13	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21	0.58	<0.1	0.23	0.77	<0.1	<0.1
Butylbenzyl phthalate	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Di-n-butyl phthalate	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Di-n-Octyl phthalate	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Diethyl phthalate	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethyl phthalate	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Other Semi-Volatiles																										
1,2-Dichlorobenzene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,2,4-Trichlorobenzene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,3-Dichlorobenzene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,4-Dichlorobenzene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 25
21/06/2016

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

TFD	Tidal Flat Deposits
MG	Made Ground
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	SWSJ27	SWSJ27	SWSJ28	SWSJ28	SWSJ29	SWSJ29	SWSJ30	WS501	WS501	WS501	BH518	BH519	LGBH004	LGBH005	LGBH005	LGBH005	LGBH005	LGBH009	SBHJ05	SBHJ05	WS501	BH518	BH519	BH519	BHM4CAN041	BHM4CAN041
Specimen Depth (m)		3	6	1	2	4	6	3	0 - 0.2	0.6 - 0.8	4.5 - 4.7	0.5 - 0.7	0.2 - 0.5	11.5	2.5	3.1	6	7	6.8	11.5	14.5	8.7 - 8.9	2 - 2.2	1.55 - 2	2.5 - 3	5 - 6	7.4
OD Level (m)		8.3	5.3	10.59	9.59	7.63	5.63	8.54	12.15	11.55	7.65	5	5.65							1.74	-1.26	3.45	3.5	4.3	3.35		
Sample Type		L	ES	ES	L	ES	ES	ES	ES	ES	ES	ES	ES							ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG	MG	MG	MG	MG	TFD	TFD	TFD (peat)	TFD	TFD	TFD	TFD	PEAT	TFD	TFD	PEAT	PEAT	MG	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002	2002	2002	2002	2002	2002	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2016 GI	2016 GI
Fluoranthene	mg/kg	2.6	2.4	5.7	0.84	1.5	5.1	1.6	0.44	1.3	3.5	<0.1	<0.1							<0.025	<0.25	1.4	<0.1	<0.1	0.17	4.94	0.895
Fluorene	mg/kg	0.2	0.13	4.5	0.034	0.49	0.2	0.53	<0.1	0.31	<0.1	<0.1	<0.1							<0.012	<0.12	0.13	<0.1	<0.1	<0.1	0.524	0.0819
Indeno(123cd)pyrene	mg/kg	0.038	0.023	4.9	0.1	0.42	0.42	<0.011	<0.1	<0.1	<0.1	<0.1	<0.1							0.022	<0.11	0.13	<0.1	<0.1	<0.1	0.421	0.137
Naphthalene	mg/kg	0.33	0.33	4.3	0.29	0.92	0.45	1.5	<0.1	0.54	0.13	<0.1	<0.1							<0.01	<0.1	0.28	<0.1	<0.1	<0.1	0.691	0.0785
Phenanthrene	mg/kg	1.7	1.5	4.7	1.1	1.9	1.9	2.3	0.47	2	1.1	<0.1	<0.1							<0.021	<0.21	1.3	<0.1	<0.1	<0.1	3.55	0.666
Pyrene	mg/kg	2.3	2.1	5.3	0.76	1.5	3.8		0.32	1.3	3.2	<0.1	<0.1							<0.022	<0.22	1.3	<0.1	<0.1	0.29	3.88	0.699
PAH 16 Total	mg/kg	12	11	77	4.6	11	20	10	<2	6.5	10	<2	<2							0.095	<0.25	7.2	<2	<2	<2	23.4	4.66
SVOCs																											
Phenols																											
2-Chlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
2-Methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
2-Nitrophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
2,4-Dichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
2,4-Dimethylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
2,4,5-Trichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
2,4,6-Trichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
4-Chloro-3-methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
4-Methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
4-Nitrophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Pentachlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Phenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
PAHs																											
2-Chloronaphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
2-Methylnaphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.27												<0.1	<0.1						
Acenaphthene	mg/kg					<0.1		<0.1									<0.2										
Acenaphthylene	mg/kg					<0.1		<0.1									<0.2										
Anthracene	mg/kg					<0.1		<0.1									<0.2										
Benzo(a)anthracene	mg/kg					<0.1		<0.1									<0.2										
Benzo(a)pyrene	mg/kg					<0.1		<0.1									<0.2										
Benzo(b)fluoranthene	mg/kg					<0.1		<0.1									<0.2										
Benzo(ghi)perylene	mg/kg					<0.1		<0.1									<0.2										
Benzo(k)fluoranthene	mg/kg					<0.1		<0.1									<0.2										
Chrysene	mg/kg					<0.1		<0.1									<0.2										
Dibenzo(a,h)anthracene	mg/kg					<0.1		<0.1									<0.2										
Fluoranthene	mg/kg					0.26		0.29									<0.2										
Fluorene	mg/kg					0.2		0.22									<0.2										
Indeno(1,2,3-cd)pyrene	mg/kg					<0.1		<0.1									<0.2										
Naphthalene	mg/kg					0.37		0.44									<0.2										
Phenanthrene	mg/kg					0.72											<0.2										
Pyrene	mg/kg					0.27											<0.2										
Pthalates																											
Bis(2-ethylhexyl) phthalate	mg/kg	<0.1	<0.1	0.19	0.19	<0.1	<0.1	0.51												<0.1	5.4						
Butylbenzyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Di-n-butyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Di-n-Octyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Diethyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Dimethyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Other Semi-Volatiles																											
1,2-Dichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
1,2,4-Trichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
1,3-Dichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
1,4-Dichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						

M4CAN
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Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Notes

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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

TFD	Tidal Flat Deposits
MG	Made Ground
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	LGBH004	LGBH004	LGBH004	LGBH005	LGBH005	LGBH005	LGBH007	LGBH007	LGBH009	SWSJ18	SWSJ18	SWSJ19	SWSJ19	SWSJ20	SWSJ20	SWSJ21	SWSJ21	SWSJ22B	SWSJ22B	SWSJ23	SWSJ23	SWSJ24A	SWSJ24A	SWSJ26	SWSJ26
Specimen Depth (m)		1.3	5	8.7	0.5	1.6	1.6	1	12	0.9	2	3	1	6	5	6	2	4	1	3	7	7.9	4	5	1	4
OD Level (m)											10.83	9.83	11.31	6.31	7.21	6.21	10.97	8.97	10.99	8.99	5.29	4.39	8.01	7.01	10.6	7.6
Sample Type											ES	ES	ES	D	ES	ES	ES	ES	D	ES	D	D	D	ES	ES	ES
Geology Code		MG-CS	MG-CS	MG-CS	MG-CS	MG-G	MG-G	MG-CS	MG-CS	MG-SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI
2-Nitroaniline	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dinitrotoluene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,6-Dinitrotoluene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
3-Nitroaniline	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Bromophenylphenylether	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Chloroaniline	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Chlorophenylphenylether	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Nitroaniline	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Azobenzene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethyl)ether	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carbazole	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzofuran	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobenzene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobutadiene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorocyclopentadiene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachloroethane	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isophorone	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
N-nitrosodi-n-propylamine	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrobenzene	mg/kg										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VOCs																										
Methyl Tertiary Butyl Ether	ug/kg										<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11
Benzene	ug/kg										<9	<9	<9	<9	<9	16	<9	<9	<9	<9	<9	16	<9	<9	<9	<9
Toluene	ug/kg										<5	<5	<5	<5	<5	15	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	ug/kg										<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	11	<4	<4	<4	<4
p/m-Xylene	ug/kg										<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	84	<14	<14	<14	<14
o-Xylene	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	140	<10	<10	<10	<10
Naphthalene	ug/kg										<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13
Hexachlorobutadiene	ug/kg										<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12
1.2.4-Trichlorobenzene	ug/kg										<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
1.2-Dichlorobenzene	ug/kg										<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12
1.3-Dichlorobenzene	ug/kg										<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
1.4-Dichlorobenzene	ug/kg										<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1.1.1.2-Tetrachloroethane	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
1.1.1-Trichloroethane	ug/kg										<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
1.1.2.2-Tetrachloroethane	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
1.1.2-Trichloroethane	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
1.1-Dichloropropene	ug/kg										<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11
1.1-Dichloroethane	ug/kg										<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
1.1-Dichloroethene	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
1.2.3-Trichlorobenzene	ug/kg										<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11
1.2.3-Trichloropropane	ug/kg										<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17
1.2.4-Trimethylbenzene	ug/kg										<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	300	<9	<9	<9	<9
1.2-Dibromo-3-chloropropane	ug/kg										<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14
1.2-Dichloroethane	ug/kg										<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1-2-Dichloroethene	ug/kg										<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1.2-Dibromoethane	ug/kg										<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12
1.2-Dichloropropane	ug/kg										<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12
1.3.5-Trimethylbenzene	ug/kg										<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	150	<8	<8	<8	<8
cis-1-3-Dichloropropene	ug/kg										<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14
1.3-Dichloropropane	ug/kg										<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
2.2-Dichloropropane	ug/kg										<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 25
21/06/2016

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
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Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

TFD	Tidal Flat Deposits
MG	Made Ground
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	SWSJ27	SWSJ27	SWSJ28	SWSJ28	SWSJ29	SWSJ29	SWSJ30	WS501	WS501	WS501	BH518	BH519	LGBH004	LGBH005	LGBH005	LGBH005	LGBH005	LGBH009	SBHJ05	SBHJ05	WS501	BH518	BH519	BH519	BHM4CAN041	BHM4CAN041
Specimen Depth (m)		3	6	1	2	4	6	3	0 - 0.2	0.6 - 0.8	4.5 - 4.7	0.5 - 0.7	0.2 - 0.5	11.5	2.5	3.1	6	7	6.8	11.5	14.5	8.7 - 8.9	2 - 2.2	1.55 - 2	2.5 - 3	5 - 6	7.4
OD Level (m)		8.3	5.3	10.59	9.59	7.63	5.63	8.54	12.15	11.55	7.65	5	5.65							1.74	-1.26	3.45	3.5	4.3	3.35		
Sample Type		L	ES	ES	L	ES	ES	ES	ES	ES	ES	ES	ES							ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG	MG	MG	MG	MG	TFD	TFD	TFD (peat)	TFD	TFD	TFD	TFD	PEAT	TFD	TFD	PEAT	PEAT	MG	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002	2002	2002	2002	2002	2002	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2016 GI	2016 GI
2-Nitroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
2,4-Dinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
2,6-Dinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
3-Nitroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
4-Bromophenylphenylether	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
4-Chloroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
4-Chlorophenylphenylether	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
4-Nitroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Azobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Bis(2-chloroethoxy)methane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Bis(2-chloroethyl)ether	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Carbazole	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Dibenzofuran	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21												<0.1	<0.1						
Hexachlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Hexachlorobutadiene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Hexachlorocyclopentadiene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Hexachloroethane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Isophorone	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
N-nitrosodi-n-propylamine	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
Nitrobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												<0.1	<0.1						
VOCs																											
Methyl Tertiary Butyl Ether	ug/kg	<11	<11	<11	<11	<11	<11	<11												<11	<11						
Benzene	ug/kg	<9	<9	<9	<9	<9	<9	<9												<9	<9						
Toluene	ug/kg	<5	<5	<5	<5	<5	<5													<5	<5						
Ethylbenzene	ug/kg	<4	<4	<4	<4	<4	<4	<4												<4	<4						
p/m-Xylene	ug/kg	<14	28	<14	30	<14	<14	<14												<14	<14						
o-Xylene	ug/kg	<10	37	<10	26	<10	<10	<10												<10	<10						
Naphthalene	ug/kg	<13	<13	<13	<13	<13	<13	<13												<13	<13						
Hexachlorobutadiene	ug/kg	<12	<12	<12	<12	<12	<12	<12												<12	<12						
1.2.4-Trichlorobenzene	ug/kg	<6	<6	<6	<6	<6	<6	<6												<6	<6						
1.2-Dichlorobenzene	ug/kg	<12	<12	<12	<12	<12	<12	<12												<12	<12						
1.3-Dichlorobenzene	ug/kg	<6	<6	<6	<6	<6	<6	<6												<6	<6						
1.4-Dichlorobenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5												<5	<5						
1.1.1.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10												<10	<10						
1.1.1-Trichloroethane	ug/kg	<7	<7	<7	<7	<7	<7	<7												<7	<7						
1.1.2.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10												<10	<10						
1.1.2-Trichloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10												<10	<10						
1.1-Dichloropropene	ug/kg	<11	<11	<11	<11	<11	<11	<11												<11	<11						
1.1-Dichloroethane	ug/kg	<8	<8	<8	<8	<8	<8	<8												<8	<8						
1.1-Dichloroethene	ug/kg	<10	<10	<10	<10	<10	<10	<10												<10	<10						
1.2.3-Trichlorobenzene	ug/kg	<11	<11	<11	<11	<11	<11	<11												<11	<11						
1.2.3-Trichloropropane	ug/kg	<17	<17	<17	<17	<17	<17	<17												<17	<17						
1.2.4-Trimethylbenzene	ug/kg	<9	93	<9	39	<9	<9	<9												<9	<9						
1.2-Dibromo-3-chloropropane	ug/kg	<14	<14	<14	<14	<14	<14	<14												<14	<14						
1.2-Dichloroethane	ug/kg	<5	<5	<5	<5	<5	<5	<5												<5	<5						
cis-1-2-Dichloroethene	ug/kg	<5	<5	<5	<5	<5	<5	<5												<5	<5						
1.2-Dibromoethane	ug/kg	<12	<12	<12	<12	<12	<12	<12												<12	<12						
1.2-Dichloropropane	ug/kg	<12	<12	<12	<12	<12	<12	<12												<12	<12						
1.3.5-Trimethylbenzene	ug/kg	<8	60	<8	<8	<8	<8	<8												<8	<8						
cis-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14	<14	<14	<14												<14	<14						
1.3-Dichloropropane	ug/kg	<7	<7	<7	<7	<7	<7	<7												<7	<7						
2.2-Dichloropropane	ug/kg	<12	<12	<12	<12	<12	<12	<12												<12	<12						

M4CAN
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Screening Values and Assessment

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Notes

NFD = No Fibres Detected
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Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

TFD	Tidal Flat Deposits
MG	Made Ground
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	LGBH004	LGBH004	LGBH004	LGBH005	LGBH005	LGBH005	LGBH007	LGBH007	LGBH009	SWSJ18	SWSJ18	SWSJ19	SWSJ19	SWSJ20	SWSJ20	SWSJ21	SWSJ21	SWSJ22B	SWSJ22B	SWSJ23	SWSJ23	SWSJ24A	SWSJ24A	SWSJ26	SWSJ26
Specimen Depth (m)		1.3	5	8.7	0.5	1.6	1.6	1	12	0.9	2	3	1	6	5	6	2	4	1	3	7	7.9	4	5	1	4
OD Level (m)											10.83	9.83	11.31	6.31	7.21	6.21	10.97	8.97	10.99	8.99	5.29	4.39	8.01	7.01	10.6	7.6
Sample Type											ES	ES	ES	D	ES	ES	ES	ES	D	ES	D	D	D	ES	ES	ES
Geology Code		MG-CS	MG-CS	MG-CS	MG-CS	MG-G	MG-G	MG-CS	MG-CS	MG-SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS
Cluster Code		2002	2002	2002	2002	2002	2002	2002	2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI
2-Chlorotoluene	ug/kg										<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9
4-Chlorotoluene	ug/kg										<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12
4-Isopropyltoluene	ug/kg										<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11
Bromobenzene	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bromochloromethane	ug/kg										<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14
Bromoform	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bromomethane	ug/kg										<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13
Bromodichloromethane	ug/kg										<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
Chlorobenzene	ug/kg										<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Disulphide	ug/kg										<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
Chloroethane	ug/kg										<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14
Chloroform	ug/kg										<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
Chloromethane	ug/kg										<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
Carbontetrachloride	ug/kg										<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14
Carbontetrachloride	ug/kg										<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14
Dibromomethane	ug/kg										<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9
Dichlorodifluoromethane	ug/kg										<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Dibromochloromethane	ug/kg										<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13
Dichloromethane	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Isopropylbenzene	ug/kg										<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	77	<5	<5	<5	<5
n-Butylbenzene	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Propylbenzene	ug/kg										<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	38	<11	<11	<11	<11
sec-Butylbenzene	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	34	<10	<10	<10	<10
Styrene	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
trans-1-2-Dichloroethene	ug/kg										<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11
trans-1-3-Dichloropropene	ug/kg										<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14
Trichlorofluoromethane	ug/kg										<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
tert-Butylbenzene	ug/kg										<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	140	<12	<12	<12	<12
Tetrachloroethene	ug/kg										<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	ug/kg										<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9
Vinyl Chloride	ug/kg										<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

M4CAN
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Sample Reference	Units	SWSJ27	SWSJ27	SWSJ28	SWSJ28	SWSJ29	SWSJ29	SWSJ30	WS501	WS501	WS501	BH518	BH519	LGBH004	LGBH005	LGBH005	LGBH005	LGBH005	LGBH009	SBHJ05	SBHJ05	WS501	BH518	BH519	BH519	BHM4CAN041	BHM4CAN041
Specimen Depth (m)		3	6	1	2	4	6	3	0 - 0.2	0.6 - 0.8	4.5 - 4.7	0.5 - 0.7	0.2 - 0.5	11.5	2.5	3.1	6	7	6.8	11.5	14.5	8.7 - 8.9	2 - 2.2	1.55 - 2	2.5 - 3	5 - 6	7.4
OD Level (m)		8.3	5.3	10.59	9.59	7.63	5.63	8.54	12.15	11.55	7.65	5	5.65							1.74	-1.26	3.45	3.5	4.3	3.35		
Sample Type		L	ES	ES	L	ES	ES	ES	ES	ES	ES	ES	ES							ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG	MG	MG	MG	MG	TFD	TFD	TFD (peat)	TFD	TFD	TFD	TFD	PEAT	TFD	TFD	PEAT	PEAT	MG	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002	2002	2002	2002	2002	2002	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2016 GI	2016 GI
2-Chlorotoluene	ug/kg	<9	<9	<9	<9	<9	<9	<9												<9	<9						
4-Chlorotoluene	ug/kg	<12	<12	<12	<12	<12	<12	<12												<12	<12						
4-Isopropyltoluene	ug/kg	<11	<11	<11	<11	<11	<11	<11												<11	<11						
Bromobenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10												<10	<10						
Bromochloromethane	ug/kg	<14	<14	<14	<14	<14	<14	<14												<14	<14						
Bromoform	ug/kg	<10	<10	<10	<10	<10	<10	<10												<10	<10						
Bromomethane	ug/kg	<13	<13	<13	<13	<13	<13	<13												<13	<13						
Bromodichloromethane	ug/kg	<7	<7	<7	<7	<7	<7	<7												<7	<7						
Chlorobenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5												<5	<5						
Carbon Disulphide	ug/kg	<7	<7	<7	<7	<7	<7	<7												<7	<7						
Chloroethane	ug/kg	<14	<14	<14	<14	<14	<14	<14												<14	<14						
Chloroform	ug/kg	<8	<8	<8	<8	<8	<8	<8												<8	<8						
Chloromethane	ug/kg	<7	<7	<7	<7	<7	<7	<7												<7	<7						
Carbontetrachloride	ug/kg	<14	<14	<14	<14	<14	<14	<14												<14	<14						
Carbontetrachloride	ug/kg	<14	<14	<14	<14	<14	<14	<14												<14	<14						
Dibromomethane	ug/kg	<9	<9	<9	<9	<9	<9	<9												<9	<9						
Dichlorodifluoromethane	ug/kg	<4	<4	<4	<4	<4	<4	<4												<4	<4						
Dibromochloromethane	ug/kg	<13	<13	<13	<13	<13	<13	<13												<13	<13						
Dichloromethane	ug/kg	<10	<10	<10	<10	<10	<10	<10												<10	<10						
Isopropylbenzene	ug/kg	<5	23	<5	<5	<5	<5	<5												<5	<5						
n-Butylbenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10												<10	<10						
Propylbenzene	ug/kg	<11	20	<11	<11	<11	<11	<11												<11	<11						
sec-Butylbenzene	ug/kg	<10	<10	<10	<10	<10	<10													<10	<10						
Styrene	ug/kg	<10	<10	<10	<10	<10	<10													<10	<10						
trans-1-2-Dichloroethene	ug/kg	<11	<11	<11	<11	<11	<11													<11	<11						
trans-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14	<14	<14													<14	<14						
Trichlorofluoromethane	ug/kg	<6	<6	<6	<6	<6	<6													<6	<6						
tert-Butylbenzene	ug/kg	<12	50	<12	21	<12	<12													<12	<12						
Tetrachloroethene	ug/kg	<5	<5	<5	<5	<5	<5													<5	<5						
Trichloroethene	ug/kg	<9	<9	<9	<9	<9	<9													<9	<9						
Vinyl Chloride	ug/kg	<10	<10	<10	<10	<10	<10													<10	<10						

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 26
21/06/2016

Screening Values and Assessment

	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Metals								
Antimony	mg/kg	18	18	45	2.2	SBHJ08ACP @ 2mbGL		
Arsenic	mg/kg	32	16	420	5	BH522 @ 1.5 - 1.7mbGL	170	2
Barium	mg/kg	18	18	1100	21	STPJ02 @ 0.3mbGL		
Boron Water Soluble	mg/kg	31	20	8.6	0.9	STPJ01 @ 2mbGL		
Cadmium	mg/kg	32	15	1.54	0.11	BHM4CAN043 @ 3mbGL	190	0
Chromium	mg/kg	32	32	2500	40	BH522 @ 1.5 - 1.7mbGL	33	32
Chromium Hexavalent	mg/kg	1	0	None > LOD	None > LOD			
Copper	mg/kg	32	20	29	9	BH524 @ 0.5 - 0.7mbGL	44000	0
Lead	mg/kg	32	31	51	1.1	SBHJ08ACP @ 4.1mbGL	1300	0
Mercury	mg/kg	32	12	1.5	0.21	BH523 @ 0.5 - 0.7mbGL	30	0
Molybdenum	mg/kg	18	9	5.1	0.7	STPJ06 @ 0.3mbGL		
Nickel	mg/kg	32	25	3400	4.8	BH522 @ 1.5 - 1.7mbGL	980	2
Selenium	mg/kg	32	3	16.8	0.41	BHM4CAN043 @ 3mbGL	1800	0
Zinc	mg/kg	32	32	340	30	SBHJ09CP @ 5mbGL	170000	0
Beryllium	mg/kg	18	5	1.3	0.5	STPJ02 @ 0.3mbGL	12	0
Iron	mg/kg	18	18	130000	19000	STPJ06 @ 0.3mbGL		
Vanadium	mg/kg	19	19	782	41	BHM4CAN043 @ 3mbGL	5000	0
Hexavalent Chromium	mg/kg	1	0	None > LOD	None > LOD			
Non-Metal Inorganics								
Cyanide (total)	mg/kg	31	0	None > LOD	None > LOD			
Cyanide (free)	mg/kg	13	0	None > LOD	None > LOD			
Sulphate (soluble)	g/l	18	10	0.2	0.003	STPJ02 @ 0.3mbGL		
Elemental/Free Sulphur	mg/kg	18	2	730	79	STPJ02 @ 1mbGL		
Acid Soluble Sulphide	mg/kg	16	7	470	57	STPJ02 @ 0.3mbGL		
Ammoniacal Nitrogen as N	mg/kg	18	5	56	21	SBHJ09CP @ 5mbGL		
Chloride	mg/kg	18	18	400	6	SBHJ09CP @ 5mbGL		
Other								
Asbestos Presence Screen	None	28	0	None > LOD	None > LOD			
Loss on Ignition	%	10	10	5.3	1	STPJ02 @ 0.3mbGL		
Total Organic Carbon	%	18	15	7.6	0.27	BH524 @ 1.5 - 1.7mbGL		
Organic Matter	%	0	0	None > LOD	None > LOD			
pH Value	pH Units	32	32	12.84	7.78	STPJ06 @ 1mbGL	6-9	23
Calorific Value	MJ/kg	5	2	0.61	0.17	BH524 @ 3.5 - 3.7mbGL		
Organics								
Phenols (total)	mg/kg	24	1	0.2	0.2	SBHJ10CP @ 1mbGL	440	0
BTEX								
GRO (C4-C12)	mg/kg	18	0	None > LOD	None > LOD			
GRO TOT (Moisture Corrected)	mg/kg	1	0	None > LOD	None > LOD			
MTBE	mg/kg	19	0	None > LOD	None > LOD			
Benzene	mg/kg	27	0	None > LOD	None > LOD		27	0
Toluene	mg/kg	27	0	None > LOD	None > LOD		56000	0
Ethyl benzene	mg/kg	27	0	None > LOD	None > LOD		5700	0
m & p Xylene	mg/kg	27	0	None > LOD	None > LOD		5900	0
o Xylene	mg/kg	27	0	None > LOD	None > LOD		6600	0
Sum of Detected BTEX	mg/kg	1	0	None > LOD	None > LOD			
Sum of Detected Xylenes	mg/kg	1	0	None > LOD	None > LOD			
TPH								
TPH >C6-C8.	mg/kg	3	0	None > LOD	None > LOD		7800	0
TPH >C8-C10.	mg/kg	3	0	None > LOD	None > LOD		2000	0
TPH >C10-C12.	mg/kg	3	0	None > LOD	None > LOD		9200	0
TPH >C12-C16.	mg/kg	3	0	None > LOD	None > LOD		10000	0
TPH >C16-C21.	mg/kg	3	1	7.7	7.7	BH524 @ 0.5 - 0.7mbGL	7600	0
TPH >C21-C35.	mg/kg	3	2	37	13	BH524 @ 0.5 - 0.7mbGL	7800	0
Aliphatics C5-C6	mg/kg	27	0	None > LOD	None > LOD		3200	0
Aliphatics >C6-C8	mg/kg	27	0	None > LOD	None > LOD		7800	0
Aliphatics >C8-C10	mg/kg	27	0	None > LOD	None > LOD		2000	0
Aliphatics >C10-C12	mg/kg	27	0	None > LOD	None > LOD		9700	0
Aliphatics >C12-C16	mg/kg	27	12	190	0.12	STPJ02 @ 0.3mbGL	25000	0
Aliphatics >C16-C21	mg/kg	27	16	270	0.95	STPJ02 @ 0.3mbGL	450000	0
Aliphatics >C21-C35	mg/kg	27	19	810	1	STPJ02 @ 0.3mbGL	450000	0
Total Aliphatics C5-C35	mg/kg	18	18	1300	1.1	STPJ02 @ 0.3mbGL	2000	0
Aliphatics >C35-44	mg/kg	11	1	1.94	1.94	BHM4CAN043 @ 3mbGL	450000	0
Total Aliphatics >C12-C44	mg/kg	1	1	17.8	17.8	BHM4CAN043 @ 3mbGL	25000	0
Aromatics >C5-7	mg/kg	11	0	None > LOD	None > LOD		26000	0
Aromatics C6-C7	mg/kg	16	0	None > LOD	None > LOD		7800	0
Aromatics >C7-C8	mg/kg	27	0	None > LOD	None > LOD		56000	0
Aromatics >EC8-EC10	mg/kg	27	1	2.3	2.3	SBHJ10CP @ 0.3mbGL	3500	0
Aromatics >EC10-EC12	mg/kg	27	2	3.7	0.19	SBHJ10CP @ 0.3mbGL	9200	0
Aromatics >EC12-EC16	mg/kg	27	8	130	0.38	STPJ02 @ 0.3mbGL	10000	0
Aromatics >EC16-EC21	mg/kg	25	10	270	0.17	STPJ02 @ 0.3mbGL	7600	0
Aromatics >EC21-EC35	mg/kg	25	12	1100	0.49	STPJ02 @ 0.3mbGL	7800	0
Total Aromatics C6-C35	mg/kg	18	14	1500	3.2	STPJ02 @ 0.3mbGL	3500	0
Aromatics >C35-44	mg/kg	11	2	320	4.3	SBHJ10CP @ 1mbGL	7800	0
Aromatics >EC40-EC44	mg/kg	1	0	None > LOD	None > LOD		7800	0
Total Aromatics >EC12-EC44	mg/kg							
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	18	18	2800	4.9	STPJ02 @ 0.3mbGL	2000	1
Total Aliphatics & Aromatics >C5-C44	mg/kg	1	1	17.8	17.8	BHM4CAN043 @ 3mbGL	2000	0
Total Aliphatic TPH	mg/kg	8	0	None > LOD	None > LOD		2000	0
Total Aromatic hydrocarbons	mg/kg	8	0	None > LOD	None > LOD		3500	0
Total petroleum hydrocarbons	mg/kg	8	0	None > LOD	None > LOD		2000	0
PAH								
Acenaphthene	mg/kg	32	8	2.1	0.02	STPJ02 @ 0.3mbGL	29000	0
Acenaphthylene	mg/kg	32	10	0.026	0.007	STPJ06 @ 0.3mbGL	29000	0
Anthracene	mg/kg	32	12	0.83	0.009	STPJ02 @ 1mbGL	150000	0
Benzo(a)anthracene	mg/kg	32	18	1.9	0.02	SBHJ10CP @ 0.3mbGL	49	0
Benzo(a)pyrene	mg/kg	32	17	1.8	0.015	SBHJ10CP @ 0.3mbGL	11	0
Benzo(b)fluoranthene	mg/kg	32	17	1.9	0.0198	SBHJ10CP @ 0.3mbGL	13	0
Benzo(ghi)perylene	mg/kg	32	16	2	0.012	SBHJ10CP @ 0.3mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	32	13	1	0.028	SBHJ10CP @ 0.3mbGL	370	0
Chrysene	mg/kg	32	19	2.3	0.0128	SBHJ10CP @ 0.3mbGL	93	0
Dibenzo(ah)anthracene	mg/kg	32	12	0.55	0.012	SBHJ10CP @ 0.3mbGL	1.1	0
Fluoranthene	mg/kg	32	19	5.5	0.00016	STPJ02 @ 0.3mbGL	6300	0

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Notes

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Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Fluorene	mg/kg	32	8	1.7	0.013	STPJ02 @ 0.3mbGL	20000	0
Indeno(123cd)pyrene	mg/kg	32	14	1.2	0.012	SBHJ10CP @ 0.3mbGL	150	0
Naphthalene	mg/kg	32	17	0.21	0.011	STPJ03 @ 0.4mbGL	190	0
Phenanthrene	mg/kg	32	21	5.4	0.026	STPJ02 @ 0.3mbGL	6200	0
Pyrene	mg/kg	32	18	4	0.00015	STPJ02 @ 0.3mbGL	15000	0
PAH 16 Total	mg/kg	32	18	22	0.12	STPJ02 @ 0.3mbGL		
PCBs								
PCBs (vs Aroclor 1254)	mg/kg	18	1	0.021	0.021	STPJ01 @ 0.3mbGL	0.24	0
PCB 105	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 114	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 123	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 126	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 157	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 167	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 169	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 189	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 77	mg/kg	5	0	None > LOD	None > LOD		0.24	0
PCB 81	mg/kg	5	0	None > LOD	None > LOD		0.24	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg	5	0	None > LOD	None > LOD		0.24	0
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg	5	0	None > LOD	None > LOD		0.24	0
SVOCs								
Phenols								
2-Chlorophenol	mg/kg	18	0	None > LOD	None > LOD			
2-Methylphenol	mg/kg	18	0	None > LOD	None > LOD			
2-Nitrophenol	mg/kg	18	0	None > LOD	None > LOD			
2,4-Dichlorophenol	mg/kg	18	0	None > LOD	None > LOD			
2,4-Dimethylphenol	mg/kg	18	0	None > LOD	None > LOD			
2,4,5-Trichlorophenol	mg/kg	18	0	None > LOD	None > LOD			
2,4,6-Trichlorophenol	mg/kg	18	0	None > LOD	None > LOD			
4-Chloro-3-methylphenol	mg/kg	18	0	None > LOD	None > LOD			
4-Methylphenol	mg/kg	18	0	None > LOD	None > LOD			
4-Nitrophenol	mg/kg	18	0	None > LOD	None > LOD			
Pentachlorophenol	mg/kg	18	0	None > LOD	None > LOD			
Phenol	mg/kg	18	0	None > LOD	None > LOD		440	0
PAHs								
2-Chloronaphthalene	mg/kg	18	0	None > LOD	None > LOD			
2-Methylnaphthalene	mg/kg	18	0	None > LOD	None > LOD			
Acenaphthene	mg/kg	13	0	None > LOD	None > LOD		29000	0
Acenaphthylene	mg/kg	13	0	None > LOD	None > LOD		29000	0
Anthracene	mg/kg	13	0	None > LOD	None > LOD		150000	0
Benzo(a)anthracene	mg/kg	13	0	None > LOD	None > LOD		49	0
Benzo(a)pyrene	mg/kg	13	0	None > LOD	None > LOD		11	0
Benzo(b)fluoranthene	mg/kg	13	0	None > LOD	None > LOD		13	0
Benzo(ghi)perylene	mg/kg	13	0	None > LOD	None > LOD		1400	0
Benzo(k)fluoranthene	mg/kg	13	0	None > LOD	None > LOD		370	0
Chrysene	mg/kg	13	0	None > LOD	None > LOD		93	0
Dibenzo(a,h)anthracene	mg/kg	13	0	None > LOD	None > LOD			
Fluoranthene	mg/kg	13	1	2	2	STPJ02 @ 0.3mbGL	6300	0
Fluorene	mg/kg	13	0	None > LOD	None > LOD		20000	0
Indeno(1,2,3-cd)pyrene	mg/kg	13	0	None > LOD	None > LOD			
Naphthalene	mg/kg	13	0	None > LOD	None > LOD		190	0
Phenanthrene	mg/kg	13	1	1.4	1.4	STPJ02 @ 0.3mbGL	6200	0
Pyrene	mg/kg	13	2	2	0.12	STPJ02 @ 0.3mbGL	15000	0
Pthalates								
Bis(2-ethylhexyl) phthalate	mg/kg	18	5	1.5	0.14	SBHJ10CP @ 1mbGL		
Butylbenzyl phthalate	mg/kg	18	0	None > LOD	None > LOD			
Di-n-butyl phthalate	mg/kg	18	0	None > LOD	None > LOD			
Di-n-Octyl phthalate	mg/kg	18	0	None > LOD	None > LOD			
Diethyl phthalate	mg/kg	18	0	None > LOD	None > LOD			
Dimethyl phthalate	mg/kg	18	0	None > LOD	None > LOD			
Other Semi-Volatiles								
1,2-Dichlorobenzene	mg/kg	18	0	None > LOD	None > LOD			
1,2,4-Trichlorobenzene	mg/kg	18	0	None > LOD	None > LOD		220	0
1,3-Dichlorobenzene	mg/kg	18	0	None > LOD	None > LOD			
1,4-Dichlorobenzene	mg/kg	18	0	None > LOD	None > LOD			
2-Nitroaniline	mg/kg	18	0	None > LOD	None > LOD			
2,4-Dinitrotoluene	mg/kg	18	0	None > LOD	None > LOD			
2,6-Dinitrotoluene	mg/kg	18	0	None > LOD	None > LOD			
3-Nitroaniline	mg/kg	18	0	None > LOD	None > LOD			
4-Bromophenylphenylether	mg/kg	18	0	None > LOD	None > LOD			
4-Chloroaniline	mg/kg	18	0	None > LOD	None > LOD			
4-Chlorophenylphenylether	mg/kg	18	0	None > LOD	None > LOD			
4-Nitroaniline	mg/kg	18	0	None > LOD	None > LOD			
Azobenzene	mg/kg	18	0	None > LOD	None > LOD			
Bis(2-chloroethoxy)methane	mg/kg	18	0	None > LOD	None > LOD			
Bis(2-chloroethyl)ether	mg/kg	18	0	None > LOD	None > LOD			
Carbazole	mg/kg	18	0	None > LOD	None > LOD			
Dibenzofuran	mg/kg	18	0	None > LOD	None > LOD			
Hexachlorobenzene	mg/kg	18	0	None > LOD	None > LOD		30	0
Hexachlorobutadiene	mg/kg	18	0	None > LOD	None > LOD		31	0
Hexachlorocyclopentadiene	mg/kg	18	0	None > LOD	None > LOD			
Hexachloroethane	mg/kg	18	0	None > LOD	None > LOD			
Isophorone	mg/kg	18	0	None > LOD	None > LOD			
N-nitrosodi-n-propylamine	mg/kg	18	0	None > LOD	None > LOD			
Nitrobenzene	mg/kg	18	0	None > LOD	None > LOD			
VOCs								
Methyl Tertiary Butyl Ether	ug/kg	18	0	None > LOD	None > LOD			
Benzene	ug/kg	18	0	None > LOD	None > LOD		27	0
Toluene	ug/kg	18	0	None > LOD	None > LOD		56000	0
Ethylbenzene	ug/kg	18	0	None > LOD	None > LOD		5700	0
p/m-Xylene	ug/kg	18	0	None > LOD	None > LOD			
o-Xylene	ug/kg	18	1	68	68	STPJ02 @ 0.3mbGL	6600	0
Naphthalene	ug/kg	18	0	None > LOD	None > LOD		190	0
Hexachlorobutadiene	ug/kg	18	0	None > LOD	None > LOD		31	0

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	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion

Notes

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Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
1.2.4-Trichlorobenzene	ug/kg	18	0	None > LOD	None > LOD		220	0
1.2-Dichlorobenzene	ug/kg	18	0	None > LOD	None > LOD			
1.3-Dichlorobenzene	ug/kg	18	0	None > LOD	None > LOD			
1.4-Dichlorobenzene	ug/kg	18	0	None > LOD	None > LOD			
1.1.1.2-Tetrachloroethane	ug/kg	18	0	None > LOD	None > LOD			
1.1.1-Trichloroethane	ug/kg	18	0	None > LOD	None > LOD			
1.1.2.2-Tetrachloroethane	ug/kg	18	0	None > LOD	None > LOD			
1.1.2-Trichloroethane	ug/kg	18	0	None > LOD	None > LOD			
1.1-Dichloropropene	ug/kg	18	0	None > LOD	None > LOD			
1.1-Dichloroethane	ug/kg	18	0	None > LOD	None > LOD			
1.1-Dichloroethene	ug/kg	18	0	None > LOD	None > LOD			
1.2.3-Trichlorobenzene	ug/kg	18	0	None > LOD	None > LOD		102	0
1.2.3-Trichloropropane	ug/kg	18	0	None > LOD	None > LOD			
1.2.4-Trimethylbenzene	ug/kg	18	0	None > LOD	None > LOD			
1.2-Dibromo-3-chloropropane	ug/kg	18	0	None > LOD	None > LOD			
1.2-Dichloroethane	ug/kg	18	0	None > LOD	None > LOD			
cis-1-2-Dichloroethene	ug/kg	18	0	None > LOD	None > LOD			
1.2-Dibromoethane	ug/kg	18	0	None > LOD	None > LOD			
1.2-Dichloropropane	ug/kg	18	0	None > LOD	None > LOD			
1.3.5-Trimethylbenzene	ug/kg	18	0	None > LOD	None > LOD			
cis-1-3-Dichloropropene	ug/kg	18	0	None > LOD	None > LOD			
1.3-Dichloropropane	ug/kg	18	0	None > LOD	None > LOD			
2.2-Dichloropropane	ug/kg	18	0	None > LOD	None > LOD			
2-Chlorotoluene	ug/kg	18	0	None > LOD	None > LOD			
4-Chlorotoluene	ug/kg	18	0	None > LOD	None > LOD			
4-Isopropyltoluene	ug/kg	18	0	None > LOD	None > LOD			
Bromobenzene	ug/kg	18	0	None > LOD	None > LOD			
Bromochloromethane	ug/kg	18	0	None > LOD	None > LOD			
Bromoform	ug/kg	18	0	None > LOD	None > LOD			
Bromomethane	ug/kg	18	0	None > LOD	None > LOD			
Bromodichloromethane	ug/kg	18	0	None > LOD	None > LOD			
Chlorobenzene	ug/kg	18	0	None > LOD	None > LOD		56	0
Carbon Disulphide	ug/kg	18	1	35	35	STPJ02 @ 0.3mbGL	11	1
Chloroethane	ug/kg	18	0	None > LOD	None > LOD			
Chloroform	ug/kg	18	0	None > LOD	None > LOD		99	0
Chloromethane	ug/kg	18	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	18	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	18	0	None > LOD	None > LOD			
Dibromomethane	ug/kg	18	0	None > LOD	None > LOD			
Dichlorodifluoromethane	ug/kg	18	0	None > LOD	None > LOD			
Dibromochloromethane	ug/kg	18	0	None > LOD	None > LOD			
Dichloromethane	ug/kg	18	0	None > LOD	None > LOD			
Isopropylbenzene	ug/kg	18	0	None > LOD	None > LOD			
n-Butylbenzene	ug/kg	18	0	None > LOD	None > LOD			
Propylbenzene	ug/kg	18	0	None > LOD	None > LOD			
sec-Butylbenzene	ug/kg	18	0	None > LOD	None > LOD			
Styrene	ug/kg	18	0	None > LOD	None > LOD			
trans-1-2-Dichloroethene	ug/kg	18	0	None > LOD	None > LOD			
trans-1-3-Dichloropropene	ug/kg	18	0	None > LOD	None > LOD			
Trichlorofluoromethane	ug/kg	18	0	None > LOD	None > LOD			
tert-Butylbenzene	ug/kg	18	0	None > LOD	None > LOD			
Tetrachloroethene	ug/kg	18	0	None > LOD	None > LOD		19	0
Trichloroethene	ug/kg	18	0	None > LOD	None > LOD		1.2	0
Vinyl Chloride	ug/kg	18	0	None > LOD	None > LOD		0.059	0

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Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Tidal Flat Deposits	TFD
Mercia Mudstone Group	MMG
Made Ground	MG
Peat	PEAT

Notes

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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	SBHJ08ACP	SBHJ08ACP	STPJ02	STPJ06	STPJ04	STPJ01	SBHJ09CP	STPJ02	STPJ06	STPJ01	STPJ03	BH522	BH522	BH523	BH523	BH523
Specimen Depth (m)		2	4.1	0.3	0.3	1	2	1	1	1	0.3	0.4	1.5 - 1.7	2 - 2.2	0.5 - 0.7	1 - 1.2	2 - 2.2
OD Level (m)		3.89	1.79	5.07	5.41	4.43	3.95	4.76	4.37	4.71	5.65	5.17	3.8	3.3	5.65	5.15	4.15
Sample Type		ES	ES	ES	ES	ES	ES	ES	W	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI
Metals																	
Antimony	mg/kg	45	31	2.8	32	27	30	38	3.3	26	25	11					
Arsenic	mg/kg	<3	<3	<3	<3	<3	<3	<3	5	<3	<3	<3	420	380	43	35	39
Barium	mg/kg	21	210	1100	89	110	150	120	150	79	180	150					
Boron Water Soluble	mg/kg	<3.5	5.5	7.8	<3.5	<3.5	8.6	<3.5	4	5.5	4.6	<3.5	1.5	1.3	0.9	<0.4	4.8
Cadmium	mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.31	0.27	0.24	0.28	0.31
Chromium	mg/kg	760	530	66	670	430	630	790	48	500	700	280	2500	2100	2100	1400	1500
Chromium Hexavalent	mg/kg																
Copper	mg/kg	<6	<6	<6	9	<6	<6	<6	9	10	<6	9	26	19	14	20	22
Lead	mg/kg	22	51	2	24	14	29	20	28	46	25	44	7.5	4.1	1.1	6.2	9.1
Mercury	mg/kg	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	0.79	0.79	1.5	1.2	1.1
Molybdenum	mg/kg	<0.6	<0.6	0.7	5.1	1.1	4.8	4.1	<0.6	4.8	<0.6	1.2					
Nickel	mg/kg	<0.9	<0.9	<0.9	<0.9	<0.9	5.4	<0.9	37	4.8	<0.9	17	3400	3000	41	41	27
Selenium	mg/kg	<3	<3	<3	<3	<3	8	<3	<3	<3	<3	<3	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc	mg/kg	32	100	30	56	69	79	87	130	130	140	220	48	54	50	47	45
Beryllium	mg/kg	<0.4	0.8	1.3	<0.4	<0.4	<0.4	<0.4	1	<0.4	<0.4	<0.4					
Iron	mg/kg	120000	100000	19000	130000	110000	110000	120000	43000	120000	110000	64000					
Vanadium	mg/kg	420	350	57	530	340	410	410	57	430	430	160					
Hexavalent Chromium	mg/kg		<0.3														
Non-Metal Inorganics																	
Cyanide (total)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide (free)	mg/kg												<0.5	<0.5	<0.5	<0.5	<0.5
Sulphate (soluble)	g/l	0.006	0.003	0.2	<0.003	<0.003	<0.003	<0.003	0.16	<0.003	<0.003	0.054					
Elemental/Free Sulphur	mg/kg	<70	<70	<700	<70	<70	<70	<70	730	<70	<70	<70					
Acid Soluble Sulphide	mg/kg	66	63	470	<50	<50	57	110	<50	<50	<50	<50					
Ammoniacal Nitrogen as N	mg/kg	<15	<15	24	<15	21	<15	<15	27	<15	<15	<15					
Chloride	mg/kg	24	36	340	6	14	18	10	170	12	12	86					
Other																	
Asbestos Presence Screen	None	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NAD	NAD	NAD	NAD	NAD
Loss on Ignition	%		1.2	5.3		4	1.4	1.7		1.9		2					
Total Organic Carbon	%		2	3		0.3	<0.2	<0.2		0.3		1.8	0.36	<0.2	0.89		
Organic Matter	%																
pH Value	pH Units	12.5	12.52	8.17	12.82	10.19	12.53	12.63	7.95	12.84	12.39	10.69	12.7	12.7	12.2	12.4	12.5
Calorific Value	MJ/kg												<0.1		<0.1		
Organics																	
Phenols (total)	mg/kg	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15				<0.3	<0.3
BTEX																	
GRO (C4-C12)	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					
GRO TOT (Moisture Corrected)	mg/kg																
MTBE	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					
Benzene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Ethyl benzene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
m & p Xylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
o Xylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Sum of Detected BTEX	mg/kg																
Sum of Detected Xylenes	mg/kg																
TPH																	
TPH >C6-C8.	mg/kg																
TPH >C8-C10.	mg/kg																
TPH >C10-C12.	mg/kg																
TPH >C12-C16.	mg/kg																
TPH >C16-C21.	mg/kg																
TPH >C21-C35.	mg/kg																
Aliphatics C5-C6	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aliphatics >C6-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aliphatics >C8-C10	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aliphatics >C10-C12	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Aliphatics >C12-C16	mg/kg	0.53	12	190	<0.1	<0.1	0.12	<0.1	14	0.34	0.14	1.3	<0.001	<0.001	<0.001	<0.001	<0.001
Aliphatics >C16-C21	mg/kg	4.6	60	270	<0.1	1.6	2.3	0.95	29	6.5	1.7	2.8	<0.001	<0.001	<0.001	<0.001	<0.001
Aliphatics >C21-C35	mg/kg	41	460	810	14	23	55	17	47	62	52	12	<0.001	<0.001	<0.001	<0.001	<0.001
Total Aliphatics C5-C35	mg/kg	46	530	1300	14	25	57	18	91	69	54	16					
Aliphatics >C35-44	mg/kg												<0.001	<0.001	<0.001	<0.001	<0.001
Total Aliphatics >C12-C44	mg/kg																
Aromatics >C5-7	mg/kg												<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aromatics C6-C7	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					
Aromatics >C7-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aromatics >EC8-EC10	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aromatics >EC10-EC12	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Aromatics >EC12-EC16	mg/kg	0.86	4.9	130	<0.1	<0.1	<0.1	<0.1	11	<0.1	<0.1	0.65	<0.001	<0.001	<0.001	<0.001	<0.001
Aromatics >EC16-EC21	mg/kg	0.63	21	270	<0.1	0.17	<0.1	<0.1	24	0.39	<0.1	0.33	<0.001	<0.001	<0.001	<0.001	<0.001
Aromatics >EC21-EC35	mg/kg	8.4	170	1100	<0.1	5	<0.1	<0.1	88	3.1	<0.1	41	<0.001	<0.001	<0.001	<0.001	<0.001
Total Aromatics C6-C35	mg/kg	9.9	190	1500	<0.1	5.2	<0.1	<0.1	120	3.5	<0.1	42					
Aromatics >C35-44	mg/kg												<0.001	<0.001	<0.001	<0.001	<0.001
Aromatics >EC40-EC44	mg/kg																
Total Aromatics >EC12-EC44	mg/kg																
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	56	720	2800	14	30	57	18	210	73	54	59					
Total Aliphatics & Aromatics >C5-C44	mg/kg																
Total Aliphatic TPH	mg/kg												<0.005	<0.005	<0.005	<0.005	<0.005
Total Aromatic hydrocarbons	mg/kg												<0.005	<0.005	<0.005	<0.005	<0.005
Total petroleum hydrocarbons	mg/kg												<0.01	<0.01	<0.01	<0.01	<0.01
PAH																	
Acenaphthene	mg/kg	<0.014	0.041	2.1	<0.014	<0.014	<0.014	<0.014	0.23	<0.014	<0.014	0.037	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.007	0.013	<0.05	0.026	0.008	<0.005	0.01	<0.005	<0.005	0.018	0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.009	0.033	0.71	<0.009	0.012	0.02	<0.009	0.83	0.021	<0.009	0.013	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.025	0.12	0.62	0.053	0.083	0.07	0.063	0.11	0.09	0.071	0.25	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.015	0.078	0.29	0.033	0.085	0.044	0.13	0.034	0.059	0.059	0.39	<0.1	<0.1	<0.1	<0.1	<0.1

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 26
21/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Tidal Flat Deposits	TFD
Mercia Mudstone Group	MMG
Made Ground	MG
Peat	PEAT

Sample Reference	Units	BH523	BH524	BH524	BH524	BH524	SBHJ10CP	STPJ05	STPJ04	STPJ03	SBHJ09CP	STPJ05	SBHJ10CP	BH525	TP509	TP509	BHM4CAN043
Specimen Depth (m)		3 - 3.2	0.5 - 0.7	1.5 - 1.7	2.5 - 2.7	3.5 - 3.7	0.3	0.3	1.5	1.2	5	1	1	1	0.6	1.1	3
OD Level (m)		3.15	5.2	4.2	3.2	2.2	5.75	5.55	3.93	4.37	0.76	4.85	5.05				3.98
Sample Type		ES	ES	ES	ES	ES	ES	ES	D	ES	D	ES	U				ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	TFD	TFD	TFD	TFD	TFD	MG	MG	MG	MG
Cluster Code		2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2016 GI
Metals																	
Antimony	mg/kg						27	28	4.5	2.8	3.3	2.2	5.4				
Arsenic	mg/kg	13	33	22	22	14	<3	<3	<3	<3	24	<3	<3	30	15	16	8.74
Barium	mg/kg						140	83	52	64	28	33	77				
Boron Water Soluble	mg/kg	1.2	1.9	1.9	1.6	1.6	4.8	<3.5	<3.5	<3.5	3.5	<3.5	<3.5	3	1.4	3.2	
Cadmium	mg/kg	0.11	0.53	0.27	0.24	0.16	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	0.55	0.14	0.32	1.54
Chromium	mg/kg	430	1300	770	900	650	480	590	76	44	68	40	110	780	520	71	790
Chromium Hexavalent	mg/kg																<0.3
Copper	mg/kg	13	29	24	18	12	<6	<6	9	9	9	<6	<6	14	10	13	<14
Lead	mg/kg	10	17	17	15	12	12	25	24	25	28	14	20	33	18	50	<7
Mercury	mg/kg	0.41	0.29	0.26	0.25	0.21	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	0.82	0.21	<0.1	<1.4
Molybdenum	mg/kg						<0.6	0.8	<0.6	<0.6	0.7	<0.6	<0.6				
Nickel	mg/kg	32	34	42	34	27	39	4.8	32	34	39	25	23	49	130	39	10.5
Selenium	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<3	<3	<3	<3	<3	<3	<3	<0.2	<0.2	0.41	16.8
Zinc	mg/kg	73	130	140	150	99	84	260	120	130	340	97	100	230	120	130	41.1
Beryllium	mg/kg						<0.4	<0.4	0.5	1	<0.4	<0.4	<0.4				
Iron	mg/kg						89000	100000	45000	40000	32000	29000	39000				
Vanadium	mg/kg						280	370	71	51	55	41	91				782
Hexavalent Chromium	mg/kg																
Non-Metal Inorganics																	
Cyanide (total)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	
Cyanide (free)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5								<0.5	<0.5	<0.5	
Sulphate (soluble)	g/l						<0.003	<0.003	0.053	0.014	0.089	0.077	0.084				
Elemental/Free Sulphur	mg/kg						<70	<70	<70	<70	79	<70	<70				
Acid Soluble Sulphide	mg/kg							100	<50	<50	91	<50					
Ammoniacal Nitrogen as N	mg/kg						<15	<15	<15	<15	56	<15	32				
Chloride	mg/kg						8	12	68	52	400	40	16				
Other																	
Asbestos Presence Screen	None		NAD	NAD	NAD		NFD	NFD	NFD	NFD	NFD	NFD	NFD		NAD	NAD	
Loss on Ignition	%						1	2			3.6						
Total Organic Carbon	%			7.6	0.3	0.27	0.8	0.4	0.5		0.9	0.3					
Organic Matter	%																
pH Value	pH Units	12.2	12.5	12.2	12.6	12.7	12.03	12.65	8.37	7.78	8.39	8.44	8.75	11.7	8.5	8.4	11.7
Calorific Value	MJ/kg		<0.1	0.17		0.61											
Organics																	
Phenols (total)	mg/kg		<0.3		<0.3		<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	0.2		<0.3	<0.3	
BTEX																	
GRO (C4-C12)	mg/kg						<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
GRO TOT (Moisture Corrected)	mg/kg																<0.044
MTBE	mg/kg						<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.005
Benzene	mg/kg	<0.001		<0.001		<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Toluene	mg/kg	<0.001		<0.001		<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.002
Ethyl benzene	mg/kg	<0.001		<0.001		<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.003
m & p Xylene	mg/kg	<0.001		<0.001		<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.006
o Xylene	mg/kg	<0.001		<0.001		<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.003
Sum of Detected BTEX	mg/kg																<0.024
Sum of Detected Xylenes	mg/kg																<0.009
TPH																	
TPH >C6-C8.	mg/kg		<1		<1									<1			
TPH >C8-C10.	mg/kg		<1		<1									<1			
TPH >C10-C12.	mg/kg		<1		<1									<1			
TPH >C12-C16.	mg/kg		<1		<1									<1			
TPH >C16-C21.	mg/kg		7.7		<1									<1			
TPH >C21-C35.	mg/kg		37		<1									13			
Aliphatics C5-C6	mg/kg	<0.0001		<0.0001		<0.0001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Aliphatics >C6-C8	mg/kg	<0.0001		<0.0001		<0.0001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Aliphatics >C8-C10	mg/kg	<0.0001		<0.0001		<0.0001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Aliphatics >C10-C12	mg/kg	<0.001		<0.001		<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Aliphatics >C12-C16	mg/kg	<0.001		<0.001		<0.001	4.5	<0.1	<0.1	<0.1	0.63	1.3	2.8				<0.1
Aliphatics >C16-C21	mg/kg	<0.001		<0.001		<0.001	15	2.3	<0.1	<0.1	3.8	1.3	4.8				1.2
Aliphatics >C21-C35	mg/kg	<0.001		<0.001		<0.001	75	44	1.1	1.6	66	1	30				14.7
Total Aliphatics C5-C35	mg/kg						94	47	1.1	1.6	70	3.7	38				
Aliphatics >C35-44	mg/kg	<0.001		<0.001		<0.001	<0.01	<0.01									1.94
Total Aliphatics >C12-C44	mg/kg																17.8
Aromatics >C5-7	mg/kg	<0.0001		<0.0001		<0.0001	<0.01	<0.01									<0.01
Aromatics C6-C7	mg/kg						<0.01	<0.01	<0.01	<0.01	<0.01						
Aromatics >C7-C8	mg/kg	<0.0001		<0.0001		<0.0001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Aromatics >EC8-EC10	mg/kg	<0.0001		<0.0001		<0.0001	2.3	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Aromatics >EC10-EC12	mg/kg	<0.001		<0.001		<0.001	3.7	0.19	<0.01	<0.01	<0.01	<0.01	<0.01				<0.01
Aromatics >EC12-EC16	mg/kg	<0.001		<0.001		<0.001	28	5.5	<0.1	<0.1	0.38	<0.01	<0.01				<0.1
Aromatics >EC16-EC21	mg/kg	<0.001		<0.001		<0.001			<0.1	<0.1	0.81	0.63	4.8				<0.1
Aromatics >EC21-EC35	mg/kg	<0.001		<0.001		<0.001			3.8	8	21	0.49	15				<0.1
Total Aromatics C6-C35	mg/kg						34	5.7	3.8	8	22	3.2	300				
Aromatics >C35-44	mg/kg	<0.001		<0.001		<0.001						4.3	320				<0.1
Aromatics >EC40-EC44	mg/kg																<0.1
Total Aromatics >EC12-EC44	mg/kg																<0.1
TPH (Aliphatics and Aromatics C5-C35)	mg/kg						130	52	4.9	9.6	92	8	360				
Total Aliphatics & Aromatics >C5-C44	mg/kg																17.8
Total Aliphatic TPH	mg/kg	<0.005		<0.005		<0.005											
Total Aromatic hydrocarbons	mg/kg	<0.005		<0.005		<0.005											
Total petroleum hydrocarbons	mg/kg	<0.01		<0.01		<0.01											
PAH																	
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	0.097	0.02	<0.014	<0.014	0.029	0.042	<0.014	<0.1	<0.1	<0.1	<0.008
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.025	0.012	<0.005	<0.005	0.007	<0.005	0.007	<0.1	<0.1	<0.1	<0.012
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	0.25	0.043	<0.009	<0.009	0.035	0.009	0.015	<0.1	<0.1	<0.1	<0.016
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	1.9	0.23	0.02	0.14	0.17	0.037	0.071	<0.1	<0.1	<0.1	<0.014
Benzo(a)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	1.8	0.2	<0.012	0.25	0.16	0.021	0.13	<0.1	<0.1	<0.1	<0.015

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 26
21/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Tidal Flat Deposits	TFD
Mercia Mudstone Group	MMG
Made Ground	MG
Peat	PEAT

Sample Reference	Units	SBHJ08ACP	SBHJ08ACP	STPJ02	STPJ06	STPJ04	STPJ01	SBHJ09CP	STPJ02	STPJ06	STPJ01	STPJ03	BH522	BH522	BH523	BH523	BH523
Specimen Depth (m)		2	4.1	0.3	0.3	1	2	1	1	1	0.3	0.4	1.5 - 1.7	2 - 2.2	0.5 - 0.7	1 - 1.2	2 - 2.2
OD Level (m)		3.89	1.79	5.07	5.41	4.43	3.95	4.76	4.37	4.71	5.65	5.17	3.8	3.3	5.65	5.15	4.15
Sample Type		ES	ES	ES	ES	ES	ES	ES	W	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI
Benzo(b)fluoranthene	mg/kg	<0.016	0.18	0.32	0.072	0.13	0.059	0.14	0.062	0.11	0.11	0.47	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.016	0.084	<0.1	0.057	0.086	0.038	0.087	<0.01	0.062	0.075	0.26	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	<0.025	0.085	<0.25	0.042	0.066	0.028	0.072	<0.025	0.047	0.051	0.19	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.027	0.16	0.81	0.081	0.13	0.084	0.048	0.099	0.11	0.085	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	<0.008	0.023	<0.08	<0.008	0.026	0.012	0.021	<0.008	0.021	0.013	0.061	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.029	0.24	5.5	0.067	0.076	0.094	0.026	0.72	0.15	0.09	0.1	<0.1	<0.1	<0.1	0.00016	<0.1
Fluorene	mg/kg	<0.012	0.03	1.7	<0.012	<0.012	<0.012	<0.012	0.21	<0.012	<0.012	0.033	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	mg/kg	<0.011	0.054	<0.11	0.034	0.056	0.023	0.068	<0.011	0.045	0.041	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	mg/kg	0.012	0.045	<0.1	0.014	0.035	0.021	0.02	0.041	0.026	0.011	0.21	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.034	0.21	5.4	0.053	0.077	0.13	0.036	0.86	0.14	0.063	0.066	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.027	0.22	4	0.057	0.12	0.094	<0.022	0.47	0.13	0.083	0.086	<0.1	<0.1	<0.1	0.00015	<0.1
PAH 16 Total	mg/kg	0.19	1.6	22	0.59	0.98	0.72	0.72	3.7	1	0.77	2.6	<2	<2	<2	<2	<2
PCBs																	
PCBs (vs Aroclor 1254)	mg/kg	<0.02	<0.02	<0.4	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.021	<0.02					
PCB 105	mg/kg												<0.01	<0.01	<0.01	<0.01	
PCB 114	mg/kg												<0.01	<0.01	<0.01	<0.01	
PCB 123	mg/kg												<0.01	<0.01	<0.01	<0.01	
PCB 126	mg/kg												<0.01	<0.01	<0.01	<0.01	
PCB 157	mg/kg												<0.01	<0.01	<0.01	<0.01	
PCB 167	mg/kg												<0.01	<0.01	<0.01	<0.01	
PCB 169	mg/kg												<0.01	<0.01	<0.01	<0.01	
PCB 189	mg/kg												<0.01	<0.01	<0.01	<0.01	
PCB 77	mg/kg												<0.01	<0.01	<0.01	<0.01	
PCB 81	mg/kg												<0.01	<0.01	<0.01	<0.01	
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg												<0.01	<0.01	<0.01	<0.01	
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg												<0.01	<0.01	<0.01	<0.01	
SVOCs																	
Phenols																	
2-Chlorophenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2-Methylphenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2-Nitrophenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,4-Dichlorophenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,4-Dimethylphenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,4,5-Trichlorophenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,4,6-Trichlorophenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Chloro-3-methylphenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Methylphenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Nitrophenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Pentachlorophenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Phenol	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
PAHs																	
2-Chloronaphthalene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2-Methylnaphthalene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Acenaphthene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Acenaphthylene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Anthracene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Benzo(a)anthracene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Benzo(a)pyrene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Benzo(b)fluoranthene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Benzo(ghi)perylene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Benzo(k)fluoranthene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Chrysene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Dibenzo(a,h)anthracene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Fluoranthene	mg/kg			2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Fluorene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Indeno(1,2,3-cd)pyrene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Naphthalene	mg/kg			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Phenanthrene	mg/kg			1.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1					
Pyrene	mg/kg			2	<0.1	0.12	<0.1	<0.1	<0.1	<0.1		<0.1					
Pthalates																	
Bis(2-ethylhexyl) phthalate	mg/kg	0.14	<0.1	<1	<0.1	<0.1	<0.1	0.45	0.16	<0.1	<0.1	<0.1					
Butylbenzyl phthalate	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Di-n-butyl phthalate	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Di-n-Octyl phthalate	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Diethyl phthalate	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Dimethyl phthalate	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Other Semi-Volatiles																	
1,2-Dichlorobenzene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
1,2,4-Trichlorobenzene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
1,3-Dichlorobenzene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
1,4-Dichlorobenzene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2-Nitroaniline	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,4-Dinitrotoluene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,6-Dinitrotoluene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
3-Nitroaniline	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Bromophenylphenylether	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Chloroaniline	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Chlorophenylphenylether	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Nitroaniline	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Azobenzene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Bis(2-chloroethoxy)methane	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Bis(2-chloroethyl)ether	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Carbazole	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Dibenzofuran	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Hexachlorobenzene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Hexachlorobutadiene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Hexachlorocyclopentadiene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					

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Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Tidal Flat Deposits	TFD
Mercia Mudstone Group	MMG
Made Ground	MG
Peat	PEAT

Sample Reference	Units	BH523	BH524	BH524	BH524	BH524	SBHJ10CP	STPJ05	STPJ04	STPJ03	SBHJ09CP	STPJ05	SBHJ10CP	BH525	TP509	TP509	BHM4CAN043
Specimen Depth (m)		3 - 3.2	0.5 - 0.7	1.5 - 1.7	2.5 - 2.7	3.5 - 3.7	0.3	0.3	1.5	1.2	5	1	1	1	0.6	1.1	3
OD Level (m)		3.15	5.2	4.2	3.2	2.2	5.75	5.55	3.93	4.37	0.76	4.85	5.05				3.98
Sample Type		ES	ES	ES	ES	ES	ES	ES	D	ES	D	ES	U				ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	TFD	TFD	TFD	TFD	TFD	MG	MG	MG	MG
Cluster Code		2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2016 GI
Benzo(b)fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	1.9	0.32	<0.016	0.27	0.18	0.021	0.16	<0.1	<0.1	<0.1	0.0198
Benzo(ghi)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	2	0.14	0.012	0.16	0.13	0.014	0.21	<0.1	<0.1	<0.1	<0.024
Benzo(k)fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	1	0.13	<0.025	0.14	0.081	<0.025	0.1	<0.1	<0.1	<0.1	<0.014
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	2.3	0.25	0.017	0.1	0.17	0.028	0.055	<0.1	<0.1	<0.1	0.0128
Dibenzo(ah)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	0.55	0.044	<0.008	0.036	0.034	<0.008	0.096	<0.1	<0.1	<0.1	<0.023
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	1.8	0.35	<0.025	<0.025	0.36	0.052	0.082	<0.1	0.14	<0.1	0.0195
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.06	0.018	<0.012	0.013	0.035	0.052	<0.012	<0.1	<0.1	<0.1	<0.01
Indeno(123cd)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	1.2	0.1	<0.011	0.14	0.11	0.012	0.16	<0.1	<0.1	<0.1	<0.018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	0.056	0.045	0.086	0.033	0.051	0.039	<0.1	<0.1	<0.1	<0.009
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	1	0.18	0.026	0.027	0.22	0.11	0.067	0.19	0.13	<0.1	0.0304
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	3.1	0.3	<0.022	<0.022	0.28	0.042	0.069	0.32	<0.1	<0.1	0.0159
PAH 16 Total	mg/kg	<2	<2	<2	<2	<2	19	2.4	0.12	1.4	2	0.49	1.3	<2	<2	<2	<0.118
PCBs																	
PCBs (vs Aroclor 1254)	mg/kg						<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.035				
PCB 105	mg/kg				<0.01												
PCB 114	mg/kg				<0.01												
PCB 123	mg/kg				<0.01												
PCB 126	mg/kg				<0.01												
PCB 157	mg/kg				<0.01												
PCB 167	mg/kg				<0.01												
PCB 169	mg/kg				<0.01												
PCB 189	mg/kg				<0.01												
PCB 77	mg/kg				<0.01												
PCB 81	mg/kg				<0.01												
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg				<0.01												
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg				<0.01												
SVOCs																	
Phenols																	
2-Chlorophenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
2-Methylphenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
2-Nitrophenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
2,4-Dichlorophenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
2,4-Dimethylphenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
2,4,5-Trichlorophenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
2,4,6-Trichlorophenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
4-Chloro-3-methylphenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
4-Methylphenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
4-Nitrophenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Pentachlorophenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Phenol	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
PAHs																	
2-Chloronaphthalene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
2-Methylnaphthalene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Acenaphthene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Acenaphthylene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Anthracene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Benzo(a)anthracene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Benzo(a)pyrene	mg/kg							<0.1	**<0.1**	**<0.1**	**<0.1**	<0.1					
Benzo(b)fluoranthene	mg/kg							<0.1	**<0.1**	**<0.1**	**<0.1**	<0.1					
Benzo(ghi)perylene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Benzo(k)fluoranthene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Chrysene	mg/kg							<0.1	**<0.1**	**<0.1**	**<0.1**	<0.1					
Dibenzo(a,h)anthracene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Fluoranthene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Fluorene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Indeno(1,2,3-cd)pyrene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Naphthalene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Phenanthrene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Pyrene	mg/kg							<0.1	<0.1	<0.1	<0.1	<0.1					
Pthalates																	
Bis(2-ethylhexyl) phthalate	mg/kg						<0.5	<0.1	<0.1	<0.1	0.23	<0.1	1.5				
Butylbenzyl phthalate	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Di-n-butyl phthalate	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Di-n-Octyl phthalate	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Diethyl phthalate	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Dimethyl phthalate	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Other Semi-Volatiles																	
1,2-Dichlorobenzene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
1,2,4-Trichlorobenzene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
1,3-Dichlorobenzene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
1,4-Dichlorobenzene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
2-Nitroaniline	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
2,4-Dinitrotoluene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
2,6-Dinitrotoluene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
3-Nitroaniline	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
4-Bromophenylphenylether	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
4-Chloroaniline	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
4-Chlorophenylphenylether	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
4-Nitroaniline	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Azobenzene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Bis(2-chloroethoxy)methane	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Bis(2-chloroethyl)ether	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Carbazole	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Dibenzofuran	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Hexachlorobenzene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Hexachlorobutadiene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Hexachlorocyclopentadiene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 26
21/06/2016

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Tidal Flat Deposits	TFD
Mercia Mudstone Group	MMG
Made Ground	MG
Peat	PEAT

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference	Units	SBHJ08ACP	SBHJ08ACP	STPJ02	STPJ06	STPJ04	STPJ01	SBHJ09CP	STPJ02	STPJ06	STPJ01	STPJ03	BH522	BH522	BH523	BH523	BH523
Specimen Depth (m)		2	4.1	0.3	0.3	1	2	1	1	1	0.3	0.4	1.5 - 1.7	2 - 2.2	0.5 - 0.7	1 - 1.2	2 - 2.2
OD Level (m)		3.89	1.79	5.07	5.41	4.43	3.95	4.76	4.37	4.71	5.65	5.17	3.8	3.3	5.65	5.15	4.15
Sample Type		ES	ES	ES	ES	ES	ES	ES	W	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI
Hexachloroethane	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Isophorone	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
N-nitrosodi-n-propylamine	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Nitrobenzene	mg/kg	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
VOCs																	
Methyl Tertiary Butyl Ether	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11					
Benzene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9					
Toluene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
Ethylbenzene	ug/kg	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4					
p/m-Xylene	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14					
o-Xylene	ug/kg	<10	<10	68	<10	<10	<10	<10	<10	<10	<10	<10					
Naphthalene	ug/kg	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13					
Hexachlorobutadiene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12					
1.2.4-Trichlorobenzene	ug/kg	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6					
1.2-Dichlorobenzene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12					
1.3-Dichlorobenzene	ug/kg	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6					
1.4-Dichlorobenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
1.1.1.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					
1.1.1-Trichloroethane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7					
1.1.2.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					
1.1.2-Trichloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					
1.1-Dichloropropene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11					
1.1-Dichloroethane	ug/kg	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8					
1.1-Dichloroethene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					
1.2.3-Trichlorobenzene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11					
1.2.3-Trichloropropane	ug/kg	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17					
1.2.4-Trimethylbenzene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9					
1.2-Dibromo-3-chloropropane	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14					
1.2-Dichloroethane	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
cis-1-2-Dichloroethene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
1.2-Dibromoethane	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12					
1.2-Dichloropropane	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12					
1.3.5-Trimethylbenzene	ug/kg	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8					
cis-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14					
1.3-Dichloropropane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7					
2.2-Dichloropropane	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12					
2-Chlorotoluene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9					
4-Chlorotoluene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12					
4-Isopropyltoluene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11					
Bromobenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					
Bromochloromethane	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14					
Bromoform	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					
Bromomethane	ug/kg	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13					
Bromodichloromethane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7					
Chlorobenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
Carbon Disulphide	ug/kg	<7	<7	35	<7	<7	<7	<7	<7	<7	<7	<7					
Chloroethane	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14					
Chloroform	ug/kg	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8					
Chloromethane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7					
Carbontetrachloride	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14					
Carbontetrachloride	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14					
Dibromomethane	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9					
Dichlorodifluoromethane	ug/kg	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4					
Dibromochloromethane	ug/kg	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13					
Dichloromethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					
Isopropylbenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
n-Butylbenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					
Propylbenzene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11					
sec-Butylbenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					
Styrene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					
trans-1-2-Dichloroethene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11	<11					
trans-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14					
Trichlorofluoromethane	ug/kg	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6					
tert-Butylbenzene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12					
Tetrachloroethene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
Trichloroethene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9					
Vinyl Chloride	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 26
21/06/2016

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Geological Formation Legend

Tidal Flat Deposits	TFD
Mercia Mudstone Group	MMG
Made Ground	MG
Peat	PEAT

Sample Reference	Units	BH523	BH524	BH524	BH524	BH524	SBHJ10CP	STPJ05	STPJ04	STPJ03	SBHJ09CP	STPJ05	SBHJ10CP	BH525	TP509	TP509	BHM4CAN043
Specimen Depth (m)		3 - 3.2	0.5 - 0.7	1.5 - 1.7	2.5 - 2.7	3.5 - 3.7	0.3	0.3	1.5	1.2	5	1	1	1	0.6	1.1	3
OD Level (m)		3.15	5.2	4.2	3.2	2.2	5.75	5.55	3.93	4.37	0.76	4.85	5.05				3.98
Sample Type		ES	ES	ES	ES	ES	ES	ES	D	ES	D	ES	U				ES
Geology Code		MG	MG	MG	MG	MG	MG	MG	TFD	TFD	TFD	TFD	TFD	MG	MG	MG	MG
Cluster Code		2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2016 GI
Hexachloroethane	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Isophorone	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
N-nitrosodi-n-propylamine	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Nitrobenzene	mg/kg						<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
VOCs																	
Methyl Tertiary Butyl Ether	ug/kg						<11	<11	<11	<11	<11	<11	<11				
Benzene	ug/kg						<9	<9	<9	<9	<9	<9	<9				
Toluene	ug/kg						<5	<5	<5	<5	<5	<5	<5				
Ethylbenzene	ug/kg						<4	<4	<4	<4	<4	<4	<4				
p/m-Xylene	ug/kg						<14	<14	<14	<14	<14	<14	<14				
o-Xylene	ug/kg						<10	<10	<10	<10	<10	<10	<10				
Naphthalene	ug/kg						<13	<13	<13	<13	<13	<13	<13				
Hexachlorobutadiene	ug/kg						<12	<12	<12	<12	<12	<12	<12				
1.2.4-Trichlorobenzene	ug/kg						<6	<6	<6	<6	<6	<6	<6				
1.2-Dichlorobenzene	ug/kg						<12	<12	<12	<12	<12	<12	<12				
1.3-Dichlorobenzene	ug/kg						<6	<6	<6	<6	<6	<6	<6				
1.4-Dichlorobenzene	ug/kg						<5	<5	<5	<5	<5	<5	<5				
1.1.1.2-Tetrachloroethane	ug/kg						<10	<10	<10	<10	<10	<10	<10				
1.1.1-Trichloroethane	ug/kg						<7	<7	<7	<7	<7	<7	<7				
1.1.2.2-Tetrachloroethane	ug/kg						<10	<10	<10	<10	<10	<10	<10				
1.1.2-Trichloroethane	ug/kg						<10	<10	<10	<10	<10	<10	<10				
1.1-Dichloropropene	ug/kg						<11	<11	<11	<11	<11	<11	<11				
1.1-Dichloroethane	ug/kg						<8	<8	<8	<8	<8	<8	<8				
1.1-Dichloroethene	ug/kg						<10	<10	<10	<10	<10	<10	<10				
1.2.3-Trichlorobenzene	ug/kg						<11	<11	<11	<11	<11	<11	<11				
1.2.3-Trichloropropane	ug/kg						<17	<17	<17	<17	<17	<17	<17				
1.2.4-Trimethylbenzene	ug/kg						<9	<9	<9	<9	<9	<9	<9				
1.2-Dibromo-3-chloropropane	ug/kg						<14	<14	<14	<14	<14	<14	<14				
1.2-Dichloroethane	ug/kg						<5	<5	<5	<5	<5	<5	<5				
cis-1-2-Dichloroethene	ug/kg						<5	<5	<5	<5	<5	<5	<5				
1.2-Dibromoethane	ug/kg						<12	<12	<12	<12	<12	<12	<12				
1.2-Dichloropropane	ug/kg						<12	<12	<12	<12	<12	<12	<12				
1.3.5-Trimethylbenzene	ug/kg						<8	<8	<8	<8	<8	<8	<8				
cis-1-3-Dichloropropene	ug/kg						<14	<14	<14	<14	<14	<14	<14				
1.3-Dichloropropane	ug/kg						<7	<7	<7	<7	<7	<7	<7				
2.2-Dichloropropane	ug/kg						<12	<12	<12	<12	<12	<12	<12				
2-Chlorotoluene	ug/kg						<9	<9	<9	<9	<9	<9	<9				
4-Chlorotoluene	ug/kg						<12	<12	<12	<12	<12	<12	<12				
4-Isopropyltoluene	ug/kg						<11	<11	<11	<11	<11	<11	<11				
Bromobenzene	ug/kg						<10	<10	<10	<10	<10	<10	<10				
Bromochloromethane	ug/kg						<14	<14	<14	<14	<14	<14	<14				
Bromoform	ug/kg						<10	<10	<10	<10	<10	<10	<10				
Bromomethane	ug/kg						<13	<13	<13	<13	<13	<13	<13				
Bromodichloromethane	ug/kg						<7	<7	<7	<7	<7	<7	<7				
Chlorobenzene	ug/kg						<5	<5	<5	<5	<5	<5	<5				
Carbon Disulphide	ug/kg						<7	<7	<7	<7	<7	<7	<7				
Chloroethane	ug/kg						<14	<14	<14	<14	<14	<14	<14				
Chloroform	ug/kg						<8	<8	<8	<8	<8	<8	<8				
Chloromethane	ug/kg						<7	<7	<7	<7	<7	<7	<7				
Carbontetrachloride	ug/kg						<14	<14	<14	<14	<14	<14	<14				
Carbontetrachloride	ug/kg						<14	<14	<14	<14	<14	<14	<14				
Dibromomethane	ug/kg						<9	<9	<9	<9	<9	<9	<9				
Dichlorodifluoromethane	ug/kg						<4	<4	<4	<4	<4	<4	<4				
Dibromochloromethane	ug/kg						<13	<13	<13	<13	<13	<13	<13				
Dichloromethane	ug/kg						<10	<10	<10	<10	<10	<10	<10				
Isopropylbenzene	ug/kg						<5	<5	<5	<5	<5	<5	<5				
n-Butylbenzene	ug/kg						<10	<10	<10	<10	<10	<10	<10				
Propylbenzene	ug/kg						<11	<11	<11	<11	<11	<11	<11				
sec-Butylbenzene	ug/kg						<10	<10	<10	<10	<10	<10	<10				
Styrene	ug/kg						<10	<10	<10	<10	<10	<10	<10				
trans-1-2-Dichloroethene	ug/kg						<11	<11	<11	<11	<11	<11	<11				
trans-1-3-Dichloropropene	ug/kg						<14	<14	<14	<14	<14	<14	<14				
Trichlorofluoromethane	ug/kg						<6	<6	<6	<6	<6	<6	<6				
tert-Butylbenzene	ug/kg						<12	<12	<12	<12	<12	<12	<12				
Tetrachloroethene	ug/kg						<5	<5	<5	<5	<5	<5	<5				
Trichloroethene	ug/kg						**<9**	**<9**	**<9**	**<9**	**<9**	**<9**	**<9**				
Vinyl Chloride	ug/kg						**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**				

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Screening Values and Assessment

	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Sample Reference								
Specimen Depth (m)								
OD Level (m)								
Sample Type								
Geology Code								
Cluster Code								
Metals								
Antimony	mg/kg	8	6	30	3.3	SWSJ38 @ 0.3mbGL		
Arsenic	mg/kg	13	7	280	5	BH521 @ 1 - 1.5mbGL	170	1
Barium	mg/kg	8	8	170	29	SWSJ38 @ 0.3mbGL		
Boron Water Soluble	mg/kg	13	8	91	1.6	SWSJ36 @ 4mbGL		
Cadmium	mg/kg	13	9	26	0.14	SWSJ35A @ 1mbGL	190	0
Chromium	mg/kg	13	13	3300	8.9	BH521 @ 1 - 1.5mbGL	33	9
Copper	mg/kg	13	8	87	5.5	SWSJ37 @ 0.3mbGL	44000	0
Lead	mg/kg	13	13	890	5.5	SWSJ38 @ 0.3mbGL	1300	0
Mercury	mg/kg	13	4	0.92	0.16	BH521 @ 0 - 0.5mbGL	30	0
Molybdenum	mg/kg	8	4	1.7	0.7	SWSJ38 @ 0.3mbGL		
Nickel	mg/kg	13	13	93	6	BH521 @ 1 - 1.5mbGL	980	0
Selenium	mg/kg	13	0	None > LOD	None > LOD		1800	0
Zinc	mg/kg	13	13	48000	62	SWSJ37 @ 0.3mbGL	170000	0
Beryllium	mg/kg	8	2	1.4	1.2	SWSJ36 @ 1mbGL	12	0
Iron	mg/kg	8	8	380000	19000	SWSJ38 @ 0.3mbGL		
Vanadium	mg/kg	8	8	58	7.5	SWSJ36 @ 1mbGL	5000	0
Non-Metal Inorganics								
Cyanide (total)	mg/kg	13	0	None > LOD	None > LOD			
Sulphate (soluble)	g/l	8	7	0.36	0.012	SWSJ36 @ 4mbGL		
Elemental/Free Sulphur	mg/kg	8	1	240	240	SWSJ38 @ 5mbGL		
Easily Liberated Sulphide	mg/kg	8	4	280	64	SWSJ38 @ 0.3mbGL		
Acid Soluble Sulphide	mg/kg	0	0	None > LOD	None > LOD			
Ammoniacal Nitrogen as N	mg/kg	8	6	120	27	SWSJ38 @ 5mbGL		
Chloride	mg/kg	8	7	1500	20	SWSJ35A @ 1mbGL		
Other								
Asbestos Presence Screen	None	11	0	None > LOD	None > LOD			
Loss on Ignition	%	6	2	75	5.1	SWSJ36 @ 4mbGL		
Total Organic Carbon	%	8	8	42	0.4	SWSJ38 @ 5mbGL		
Organic Matter	%	2	2	16.9	2.7	SWSJ38 @ 5mbGL		
pH Value	pH Units	13	13	12.2	7.37	BH521 @ 0 - 0.5mbGL	6-9	4
Material >2mm	%	2	2	71.7	39.8	SWSJ35A @ 1mbGL		
Organics								
PCBs (vs Aroclor 1254)	mg/kg	8	0	None > LOD	None > LOD		0.24	0
Phenols (total)	mg/kg	10	0	None > LOD	None > LOD		440	0
BTEX								
GRO (C4-C12)	mg/kg	8	3	5	0.11	SWSJ38 @ 5mbGL		
MTBE	mg/kg	8	0	None > LOD	None > LOD			
Benzene	mg/kg	9	0	None > LOD	None > LOD		27	0
Toluene	mg/kg	9	0	None > LOD	None > LOD		56000	0
Ethyl benzene	mg/kg	9	0	None > LOD	None > LOD		5700	0
m & p Xylene	mg/kg	9	0	None > LOD	None > LOD		5900	0
o Xylene	mg/kg	9	1	0.27	0.27	SWSJ38 @ 5mbGL	6600	0
TPH								
Aliphatics C5-C6	mg/kg	9	1	0.24	0.24	SWSJ38 @ 0.3mbGL	3200	0
Aliphatics >C6-C8	mg/kg	9	0	None > LOD	None > LOD		7800	0
Aliphatics >C8-C10	mg/kg	9	2	0.97	0.038	SWSJ38 @ 5mbGL	2000	0
Aliphatics >C10-C12	mg/kg	9	1	0.91	0.91	SWSJ38 @ 5mbGL	9700	0
Aliphatics >C12-C16	mg/kg	9	1	39	39	SWSJ35A @ 1mbGL	25000	0
Aliphatics >C16-C21	mg/kg	9	2	49	12	SWSJ35A @ 1mbGL	450000	0
Aliphatics >C21-C35	mg/kg	9	4	430	9.6	SWSJ35A @ 1mbGL	450000	0
Total Aliphatics C5-C35	mg/kg	9	5	520	0.24	SWSJ35A @ 1mbGL	2000	0
Aromatics C6-C7	mg/kg	9	0	None > LOD	None > LOD		7800	0
Aromatics >C7-C8	mg/kg	9	0	None > LOD	None > LOD		56000	0
Aromatics >EC8-EC10	mg/kg	9	2	1.7	0.056	SWSJ38 @ 5mbGL	3500	0
Aromatics >EC10-EC12	mg/kg	9	2	1.4	0.012	SWSJ38 @ 5mbGL	9200	0
Aromatics >EC12-EC16	mg/kg	9	1	0.51	0.51	SWSJ35A @ 1mbGL	10000	0
Aromatics >EC16-EC21	mg/kg	9	2	0.82	0.72	SWSJ35A @ 1mbGL	7600	0
Aromatics >EC21-EC35	mg/kg	9	7	1000	11	SWSJ36 @ 4mbGL	7800	0
Total Aromatics C6-C35	mg/kg	9	7	1000	12	SWSJ36 @ 4mbGL	3500	0
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	9	8	1200	0.24	SWSJ36 @ 4mbGL	2000	0
PAH								
Acenaphthene	mg/kg	13	4	0.66	0.021	SWSJ38 @ 5mbGL	29000	0
Acenaphthylene	mg/kg	13	5	0.024	0.01	SWSJ38 @ 5mbGL	29000	0
Anthracene	mg/kg	13	5	0.066	0.013	SWSJ35A @ 1mbGL	150000	0
Benzo(a)anthracene	mg/kg	13	8	0.21	0.024	SWSJ35A @ 1mbGL	49	0
Benzo(a)pyrene	mg/kg	13	6	0.23	0.022	SWSJ35A @ 1mbGL	11	0
Benzo(b)fluoranthene	mg/kg	13	6	0.47	0.027	SWSJ35A @ 1mbGL	13	0
Benzo(ghi)perylene	mg/kg	13	4	0.17	0.02	SWSJ35A @ 1mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	13	3	0.14	0.035	SWSJ35A @ 1mbGL	370	0
Chrysene	mg/kg	13	8	0.31	0.013	SWSJ35A @ 1mbGL	93	0
Dibenzo(ah)anthracene	mg/kg	13	2	0.041	0.02	SWSJ35A @ 1mbGL	1.1	0
Fluoranthene	mg/kg	13	7	0.46	0.028	TP508 @ 0.5 - 0.6mbGL	6300	0
Fluorene	mg/kg	13	4	0.34	0.017	SWSJ38 @ 5mbGL	20000	0
Indeno(123cd)pyrene	mg/kg	13	4	0.18	0.017	SWSJ35A @ 1mbGL	150	0
Naphthalene	mg/kg	13	5	7	0.013	SWSJ38 @ 5mbGL	190	0
Phenanthrene	mg/kg	13	7	0.27	0.023	SWSJ38 @ 5mbGL	6200	0
Pyrene	mg/kg	13	8	0.64	0.023	TP508 @ 0.5 - 0.6mbGL	15000	0
PAH 16 Total	mg/kg	13	8	8.6	0.044	SWSJ38 @ 5mbGL		
SVOCs								
Phenols								
2-Chlorophenol	mg/kg	8	0	None > LOD	None > LOD			
2-Methylphenol	mg/kg	8	0	None > LOD	None > LOD			
2-Nitrophenol	mg/kg	8	0	None > LOD	None > LOD			
2,4-Dichlorophenol	mg/kg	8	0	None > LOD	None > LOD			

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	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
2,4-Dimethylphenol	mg/kg	8	0	None > LOD	None > LOD			
2,4,5-Trichlorophenol	mg/kg	8	0	None > LOD	None > LOD			
2,4,6-Trichlorophenol	mg/kg	8	0	None > LOD	None > LOD			
4-Chloro-3-methylphenol	mg/kg	8	0	None > LOD	None > LOD			
4-Methylphenol	mg/kg	8	0	None > LOD	None > LOD			
4-Nitrophenol	mg/kg	8	0	None > LOD	None > LOD			
Pentachlorophenol	mg/kg	8	0	None > LOD	None > LOD			
Phenol	mg/kg	8	0	None > LOD	None > LOD		440	0
PAHs								
2-Chloronaphthalene	mg/kg	8	0	None > LOD	None > LOD			
2-Methylnaphthalene	mg/kg	8	0	None > LOD	None > LOD			
Bis(2-ethylhexyl) phthalate	mg/kg	8	4	2.1	0.28	SWSJ38 @ 5mbGL		
Butylbenzyl phthalate	mg/kg	8	0	None > LOD	None > LOD			
Di-n-butyl phthalate	mg/kg	8	0	None > LOD	None > LOD			
Di-n-Octyl phthalate	mg/kg	8	0	None > LOD	None > LOD			
Diethyl phthalate	mg/kg	8	0	None > LOD	None > LOD			
Dimethyl phthalate	mg/kg	8	0	None > LOD	None > LOD			
Other Semi-Volatiles								
1,2-Dichlorobenzene	mg/kg	8	0	None > LOD	None > LOD			
1,2,4-Trichlorobenzene	mg/kg	8	0	None > LOD	None > LOD		220	0
1,3-Dichlorobenzene	mg/kg	8	0	None > LOD	None > LOD			
1,4-Dichlorobenzene	mg/kg	8	0	None > LOD	None > LOD			
2-Nitroaniline	mg/kg	8	0	None > LOD	None > LOD			
2,4-Dinitrotoluene	mg/kg	8	0	None > LOD	None > LOD			
2,6-Dinitrotoluene	mg/kg	8	0	None > LOD	None > LOD			
3-Nitroaniline	mg/kg	8	0	None > LOD	None > LOD			
4-Bromophenylphenylether	mg/kg	8	0	None > LOD	None > LOD			
4-Chloroaniline	mg/kg	8	0	None > LOD	None > LOD			
4-Chlorophenylphenylether	mg/kg	8	0	None > LOD	None > LOD			
4-Nitroaniline	mg/kg	8	0	None > LOD	None > LOD			
Azobenzene	mg/kg	8	0	None > LOD	None > LOD			
Bis(2-chloroethoxy)methane	mg/kg	8	0	None > LOD	None > LOD			
Bis(2-chloroethyl)ether	mg/kg	8	0	None > LOD	None > LOD			
Carbazole	mg/kg	8	0	None > LOD	None > LOD			
Dibenzofuran	mg/kg	8	0	None > LOD	None > LOD			
Hexachlorobenzene	mg/kg	8	0	None > LOD	None > LOD		30	0
Hexachlorobutadiene	mg/kg	8	0	None > LOD	None > LOD		31	0
Hexachlorocyclopentadiene	mg/kg	8	0	None > LOD	None > LOD			
Hexachloroethane	mg/kg	8	0	None > LOD	None > LOD			
Isophorone	mg/kg	8	0	None > LOD	None > LOD			
N-nitrosodi-n-propylamine	mg/kg	8	0	None > LOD	None > LOD			
Nitrobenzene	mg/kg	8	0	None > LOD	None > LOD			
VOCs								
Methyl Tertiary Butyl Ether	ug/kg	8	0	None > LOD	None > LOD			
Benzene	ug/kg	8	0	None > LOD	None > LOD		27000	0
Toluene	ug/kg	8	2	35	14	SWSJ38 @ 5mbGL	56000000	0
Ethylbenzene	ug/kg	8	2	120	7	SWSJ38 @ 5mbGL	5700000	0
p/m-Xylene	ug/kg	8	2	180	31	SWSJ38 @ 5mbGL		
o-Xylene	ug/kg	8	2	680	38	SWSJ38 @ 5mbGL	6600000	0
Naphthalene	ug/kg	8	0	None > LOD	None > LOD		190000	0
Hexachlorobutadiene	ug/kg	8	0	None > LOD	None > LOD		31000	0
1.2.4-Trichlorobenzene	ug/kg	8	0	None > LOD	None > LOD		220000	0
1.2-Dichlorobenzene	ug/kg	8	0	None > LOD	None > LOD			
1.3-Dichlorobenzene	ug/kg	8	0	None > LOD	None > LOD			
1.4-Dichlorobenzene	ug/kg	8	0	None > LOD	None > LOD			
1.1.1.2-Tetrachloroethane	ug/kg	8	0	None > LOD	None > LOD			
1.1.1-Trichloroethane	ug/kg	8	0	None > LOD	None > LOD			
1.1.2.2-Tetrachloroethane	ug/kg	8	0	None > LOD	None > LOD			
1.1.2-Trichloroethane	ug/kg	8	0	None > LOD	None > LOD			
1.1-Dichloropropene	ug/kg	8	0	None > LOD	None > LOD			
1.1-Dichloroethane	ug/kg	8	0	None > LOD	None > LOD			
1.1-Dichloroethene	ug/kg	8	0	None > LOD	None > LOD			
1.2.3-Trichlorobenzene	ug/kg	8	0	None > LOD	None > LOD		102000	0
1.2.3-Trichloropropane	ug/kg	8	0	None > LOD	None > LOD			
1.2.4-Trimethylbenzene	ug/kg	8	2	400	74	SWSJ38 @ 5mbGL		
1.2-Dibromo-3-chloropropane	ug/kg	8	0	None > LOD	None > LOD			
1.2-Dichloroethane	ug/kg	8	0	None > LOD	None > LOD			
cis-1-2-Dichloroethene	ug/kg	8	0	None > LOD	None > LOD			
1.2-Dibromoethane	ug/kg	8	0	None > LOD	None > LOD			
1.2-Dichloropropane	ug/kg	8	0	None > LOD	None > LOD			
1.3.5-Trimethylbenzene	ug/kg	8	2	640	33	SWSJ38 @ 5mbGL		
cis-1-3-Dichloropropene	ug/kg	8	0	None > LOD	None > LOD			
1.3-Dichloropropane	ug/kg	8	0	None > LOD	None > LOD			
2.2-Dichloropropane	ug/kg	8	0	None > LOD	None > LOD			
2-Chlorotoluene	ug/kg	8	0	None > LOD	None > LOD			
4-Chlorotoluene	ug/kg	8	0	None > LOD	None > LOD			
4-Isopropyltoluene	ug/kg	8	0	None > LOD	None > LOD			
Bromobenzene	ug/kg	8	0	None > LOD	None > LOD			
Bromochloromethane	ug/kg	8	0	None > LOD	None > LOD			
Bromoform	ug/kg	8	0	None > LOD	None > LOD			
Bromomethane	ug/kg	8	0	None > LOD	None > LOD			
Bromodichloromethane	ug/kg	8	0	None > LOD	None > LOD			
Chlorobenzene	ug/kg	8	0	None > LOD	None > LOD		56000	0
Carbon Disulphide	ug/kg	8	0	None > LOD	None > LOD		11000	0
Chloroethane	ug/kg	8	0	None > LOD	None > LOD			

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Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Chloroform	ug/kg	8	0	None > LOD	None > LOD		99000	0
Chloromethane	ug/kg	8	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	8	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	8	0	None > LOD	None > LOD			
Dibromomethane	ug/kg	8	0	None > LOD	None > LOD			
Dichlorodifluoromethane	ug/kg	8	0	None > LOD	None > LOD			
Dibromochloromethane	ug/kg	8	0	None > LOD	None > LOD			
Dichloromethane	ug/kg	8	0	None > LOD	None > LOD			
Isopropylbenzene	ug/kg	8	2	200	16	SWSJ38 @ 5mbGL		
n-Butylbenzene	ug/kg	8	0	None > LOD	None > LOD			
Propylbenzene	ug/kg	8	1	240	240	SWSJ38 @ 5mbGL		
sec-Butylbenzene	ug/kg	8	1	100	100	SWSJ38 @ 5mbGL		
Styrene	ug/kg	8	0	None > LOD	None > LOD			
trans-1-2-Dichloroethene	ug/kg	8	0	None > LOD	None > LOD			
trans-1-3-Dichloropropene	ug/kg	8	0	None > LOD	None > LOD			
Trichlorofluoromethane	ug/kg	8	0	None > LOD	None > LOD			
tert-Butylbenzene	ug/kg	8	2	500	28	SWSJ38 @ 5mbGL		
Tetrachloroethene	ug/kg	8	0	None > LOD	None > LOD		19000	0
Trichloroethene	ug/kg	8	0	None > LOD	None > LOD		1200	0
Vinyl Chloride	ug/kg	8	0	None > LOD	None > LOD		59	0

M4CAN
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Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

MG	Made Ground
PEAT	Peat
TFD	Tidal Flat Deposits

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Sample Reference	Units	SWSJ37	SWSJ35A	SWSJ38	SWSJ37	SWSJ38	SWSJ36	SWSJ36	SWSJ35A	BH521	BH521	TP508	TP508	TP508
Specimen Depth (m)		1	1	0.3	0.3	5	4	1	2	0 - 0.5	1 - 1.5	0.5 - 0.6	1 - 1.1	2 - 2.1
OD Level (m)		5.25	4.72	5.25	5.95	0.55	1.34	4.34	3.72	6	5	5.4	4.9	3.9
Sample Type		D	L	ES	ES	D	D	ES	D	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	PEAT	TFD	TFD	TFD	MG	MG	MG	MG	TFD
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI
Metals														
Antimony	mg/kg	15	25	30	29	<1.5	<1.5	3.3	3.4					
Arsenic	mg/kg	<3	<3	<3	<3	<3	<3	5	7	34	280	8.1	12	14
Barium	mg/kg	150	110	170	170	29	48	95	69					
Boron Water Soluble	mg/kg	<3.5	63	<3.5	<3.5	81	91	<3.5	<3.5	1.7	5.7	2.4	1.8	1.6
Cadmium	mg/kg	3.1	26	12	16	<0.3	<0.3	<0.3	0.3	0.23	0.25	<0.1	0.14	0.15
Chromium	mg/kg	100	110	170	150	8.9	13	47	47	940	3300	28	150	21
Copper	mg/kg	<6	<6	14	87	46	<6	<6	<6	5.5	19	5.8	18	39
Lead	mg/kg	410	390	890	740	19	17	43	31	5.5	8	22	61	170
Mercury	mg/kg	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	0.92	0.55	<0.1	0.16	0.39
Molybdenum	mg/kg	1.1	<0.6	1.7	1.7	<0.6	0.7	<0.6	<0.6					
Nickel	mg/kg	31	19	42	37	6	8.3	35	33	39	93	26	56	23
Selenium	mg/kg	<3	<3	<3	<3	<3	<3	<3	<3	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc	mg/kg	20000	23000	43000	48000	670	380	470	570	100	110	62	120	180
Beryllium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	1.4	1.2					
Iron	mg/kg	240000	300000	380000	320000	19000	22000	40000	44000					
Vanadium	mg/kg	41	26	37	37	7.5	17	58	58					
Non-Metal Inorganics														
Cyanide (total)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5
Sulphate (soluble)	g/l	0.047	0.048	0.06	0.012	NDP	0.36	0.078	0.016					
Elemental/Free Sulphur	mg/kg	<70	<70	<70	<70	240	<70	<70	<70					
Easily Liberated Sulphide	mg/kg	150	64	280	130	<15	<15	<15	<15					
Acid Soluble Sulphide	mg/kg													
Ammoniacal Nitrogen as N	mg/kg	39	<15	27	<15	120	88	31	29					
Chloride	mg/kg	38	1500	28	20	NDP	730	110	110					
Other														
Asbestos Presence Screen	None	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NAD		NAD	NAD	
Loss on Ignition	%		<0.3	<0.3	<0.3	<0.3	75	5.1						
Total Organic Carbon	%		0.4	0.7	0.5	42	34	1.8		0.47		0.74		
Organic Matter	%		2.7			16.9								
pH Value	pH Units	8.07	10.9	8.69	8.5	7.37	7.57	7.75	8.24	12.2	11.4	11.7	8	8.3
Material >2mm	%		71.7			39.8								
Organics														
PCBs (vs Aroclor 1254)	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035					
Phenols (total)	mg/kg	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15			<0.3	<0.3	
BTEX														
GRO (C4-C12)	mg/kg	0.11	<0.01	0.24	<0.01	5	<0.01	<0.01	<0.01					
MTBE	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01					
Benzene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.001				
Toluene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.001				
Ethyl benzene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.001				
m & p Xylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.001				
o Xylene	mg/kg	<0.01	<0.01	<0.01	<0.01	0.27	<0.01	<0.01	<0.01	<0.001				
TPH														
Aliphatics C5-C6	mg/kg	<0.01	<0.01	0.24	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1				
Aliphatics >C6-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1				
Aliphatics >C8-C10	mg/kg	0.038	<0.01	<0.01	<0.01	0.97	<0.01	<0.01	<0.01	<0.1				

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Geological Formation Legend

MG	Made Ground
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Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Sample Reference	Units	SWSJ37	SWSJ35A	SWSJ38	SWSJ37	SWSJ38	SWSJ36	SWSJ36	SWSJ35A	BH521	BH521	TP508	TP508	TP508
Specimen Depth (m)		1	1	0.3	0.3	5	4	1	2	0 - 0.5	1 - 1.5	0.5 - 0.6	1 - 1.1	2 - 2.1
OD Level (m)		5.25	4.72	5.25	5.95	0.55	1.34	4.34	3.72	6	5	5.4	4.9	3.9
Sample Type		D	L	ES	ES	D	D	ES	D	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	PEAT	TFD	TFD	TFD	MG	MG	MG	MG	TFD
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI
Aliphatics >C10-C12	mg/kg	<0.01	<0.01	<0.01	<0.01	0.91	<0.01	<0.01	<0.01	<1				
Aliphatics >C12-C16	mg/kg	<0.1	39	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1				
Aliphatics >C16-C21	mg/kg	<0.1	49	<0.1	<0.1	12	<0.1	<0.1	<0.1	<1				
Aliphatics >C21-C35	mg/kg	<0.1	430	<0.1	9.6	140	140	<0.1	<0.1	<1				
Total Aliphatics C5-C35	mg/kg	<0.1	520	0.24	9.6	160	140	<0.1	<0.1	<1				
Aromatics C6-C7	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1				
Aromatics >C7-C8	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1				
Aromatics >EC8-EC10	mg/kg	0.056	<0.01	<0.01	<0.01	1.7	<0.01	<0.01	<0.01	<0.1				
Aromatics >EC10-EC12	mg/kg	0.012	<0.01	<0.01	<0.01	1.4	<0.01	<0.01	<0.01	<1				
Aromatics >EC12-EC16	mg/kg	<0.1	0.51	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1				
Aromatics >EC16-EC21	mg/kg	<0.1	0.82	<0.1	0.72	<0.1	<0.1	<0.1	<0.1	<1				
Aromatics >EC21-EC35	mg/kg	26	66	<0.1	11	540	1000	22	24	<1				
Total Aromatics C6-C35	mg/kg	26	68	<0.1	12	540	1000	22	24	<1				
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	26	580	0.24	21	700	1200	22	24	<10				
PAH														
Acenaphthene	mg/kg	0.45	0.032	<0.014	<0.014	0.66	0.021	<0.014	<0.014	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.012	0.02	<0.005	0.01	0.024	0.018	<0.005	<0.005	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.033	0.066	<0.009	0.019	0.043	0.013	<0.009	<0.009	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.08	0.21	0.024	0.1	0.039	0.033	0.04	0.031	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.063	0.23	<0.012	0.099	0.024	0.022	0.022	<0.012	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	mg/kg	0.096	0.47	<0.016	0.14	0.027	0.028	0.031	<0.016	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.04	0.17	<0.01	0.086	<0.01	<0.01	0.02	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.035	0.14	<0.025	0.094	<0.025	<0.025	<0.025	<0.025	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.086	0.31	0.015	0.12	0.036	0.022	0.033	0.013	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	<0.008	0.041	<0.008	0.02	<0.008	<0.008	<0.008	<0.008	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.17	0.42	<0.025	0.15	0.084	0.028	0.045	<0.025	<0.1	<0.1	0.46	<0.1	<0.1
Fluorene	mg/kg	0.23	0.017	<0.012	<0.012	0.34	0.021	<0.012	<0.012	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	mg/kg	0.036	0.18	<0.011	0.063	<0.011	<0.011	0.017	<0.011	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	mg/kg	4.2	0.028	<0.01	<0.01	7	0.097	0.013	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.24	0.18	0.023	0.064	0.27	0.048	0.041	<0.021	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.13	0.37	0.028	0.16	0.063	0.023	0.039	<0.022	<0.1	<0.1	0.64	<0.1	<0.1
PAH 16 Total	mg/kg	5.9	2.9	0.09	1.1	8.6	0.37	0.3	0.044	<2	<2	<2	<2	<2
SVOCs														
Phenols														
2-Chlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2-Methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2-Nitrophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,4-Dichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,4-Dimethylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,4,5-Trichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,4,6-Trichlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Chloro-3-methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Methylphenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Nitrophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Pentachlorophenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Phenol	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
PAHs														
2-Chloronaphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					

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Specimen Depth (m)		1	1	0.3	0.3	5	4	1	2	0 - 0.5	1 - 1.5	0.5 - 0.6	1 - 1.1	2 - 2.1
OD Level (m)		5.25	4.72	5.25	5.95	0.55	1.34	4.34	3.72	6	5	5.4	4.9	3.9
Sample Type		D	L	ES	ES	D	D	ES	D	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	PEAT	TFD	TFD	TFD	MG	MG	MG	MG	TFD
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI
2-Methylnaphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Bis(2-ethylhexyl) phthalate	mg/kg	<0.1	<0.1	<0.1	0.28	2.1	0.47	<0.1	0.96					
Butylbenzyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Di-n-butyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Di-n-Octyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Diethyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Dimethyl phthalate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Other Semi-Volatiles														
1,2-Dichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
1,2,4-Trichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
1,3-Dichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
1,4-Dichlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2-Nitroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,4-Dinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
2,6-Dinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
3-Nitroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Bromophenylphenylether	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Chloroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Chlorophenylphenylether	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
4-Nitroaniline	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Azobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Bis(2-chloroethoxy)methane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Bis(2-chloroethyl)ether	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Carbazole	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Dibenzofuran	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Hexachlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Hexachlorobutadiene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Hexachlorocyclopentadiene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Hexachloroethane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Isophorone	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
N-nitrosodi-n-propylamine	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Nitrobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
VOCs														
Methyl Tertiary Butyl Ether	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11					
Benzene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9					
Toluene	ug/kg	<5	<5	14	<5	35	<5	<5	<5					
Ethylbenzene	ug/kg	7	<4	<4	<4	120	<4	<4	<4					
p/m-Xylene	ug/kg	31	<14	<14	<14	180	<14	<14	<14					
o-Xylene	ug/kg	38	<10	<10	<10	680	<10	<10	<10					
Naphthalene	ug/kg	<13	<13	<13	<13	<13	<13	<13	<13					
Hexachlorobutadiene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12					
1.2.4-Trichlorobenzene	ug/kg	<6	<6	<6	<6	<6	<6	<6	<6					
1.2-Dichlorobenzene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12					
1.3-Dichlorobenzene	ug/kg	<6	<6	<6	<6	<6	<6	<6	<6					
1.4-Dichlorobenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5					
1.1.1.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10					
1.1.1-Trichloroethane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7					
1.1.2.2-Tetrachloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10					

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 27SE
05/10/2015

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

MG	Made Ground
PEAT	Peat
TFD	Tidal Flat Deposits

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than screening criterion	X

Sample Reference	Units	SWSJ37	SWSJ35A	SWSJ38	SWSJ37	SWSJ38	SWSJ36	SWSJ36	SWSJ35A	BH521	BH521	TP508	TP508	TP508
Specimen Depth (m)		1	1	0.3	0.3	5	4	1	2	0 - 0.5	1 - 1.5	0.5 - 0.6	1 - 1.1	2 - 2.1
OD Level (m)		5.25	4.72	5.25	5.95	0.55	1.34	4.34	3.72	6	5	5.4	4.9	3.9
Sample Type		D	L	ES	ES	D	D	ES	D	ES	ES	ES	ES	ES
Geology Code		MG	MG	MG	MG	PEAT	TFD	TFD	TFD	MG	MG	MG	MG	TFD
Cluster Code		2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI
1.1.2-Trichloroethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10					
1.1-Dichloropropene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11					
1.1-Dichloroethane	ug/kg	<8	<8	<8	<8	<8	<8	<8	<8					
1.1-Dichloroethene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10					
1.2.3-Trichlorobenzene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11					
1.2.3-Trichloropropane	ug/kg	<17	<17	<17	<17	<17	<17	<17	<17					
1.2.4-Trimethylbenzene	ug/kg	74	<9	<9	<9	400	<9	<9	<9					
1.2-Dibromo-3-chloropropane	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14					
1.2-Dichloroethane	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5					
cis-1-2-Dichloroethene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5					
1.2-Dibromoethane	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12					
1.2-Dichloropropane	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12					
1.3.5-Trimethylbenzene	ug/kg	33	<8	<8	<8	640	<8	<8	<8					
cis-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14					
1.3-Dichloropropane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7					
2.2-Dichloropropane	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12					
2-Chlorotoluene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9					
4-Chlorotoluene	ug/kg	<12	<12	<12	<12	<12	<12	<12	<12					
4-Isopropyltoluene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11					
Bromobenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10					
Bromochloromethane	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14					
Bromoform	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10					
Bromomethane	ug/kg	<13	<13	<13	<13	<13	<13	<13	<13					
Bromodichloromethane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7					
Chlorobenzene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5					
Carbon Disulphide	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7					
Chloroethane	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14					
Chloroform	ug/kg	<8	<8	<8	<8	<8	<8	<8	<8					
Chloromethane	ug/kg	<7	<7	<7	<7	<7	<7	<7	<7					
Carbontetrachloride	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14					
Carbontetrachloride	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14					
Dibromomethane	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9					
Dichlorodifluoromethane	ug/kg	<4	<4	<4	<4	<4	<4	<4	<4					
Dibromochloromethane	ug/kg	<13	<13	<13	<13	<13	<13	<13	<13					
Dichloromethane	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10					
Isopropylbenzene	ug/kg	16	<5	<5	<5	200	<5	<5	<5					
n-Butylbenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10					
Propylbenzene	ug/kg	<11	<11	<11	<11	240	<11	<11	<11					
sec-Butylbenzene	ug/kg	<10	<10	<10	<10	100	<10	<10	<10					
Styrene	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10					
trans-1-2-Dichloroethene	ug/kg	<11	<11	<11	<11	<11	<11	<11	<11					
trans-1-3-Dichloropropene	ug/kg	<14	<14	<14	<14	<14	<14	<14	<14					
Trichlorofluoromethane	ug/kg	<6	<6	<6	<6	<6	<6	<6	<6					
tert-Butylbenzene	ug/kg	28	<12	<12	<12	500	<12	<12	<12					
Tetrachloroethene	ug/kg	<5	<5	<5	<5	<5	<5	<5	<5					
Trichloroethene	ug/kg	<9	<9	<9	<9	<9	<9	<9	<9					
Vinyl Chloride	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10					

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 27SW
05/10/2015

Screening Values and Assessment

	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Sample Reference								
Specimen Depth (m)								
OD Level (m)								
Sample Type								
Geology Code								
Cluster Code								
Metals								
Antimony	mg/kg	12	12	32	3	SWSJ33 @ 1mbGL		
Arsenic	mg/kg	21	14	35	4	BH520 @ 4.5mbGL	170	0
Barium	mg/kg	12	12	210	66	SWSJ32 @ 6mbGL		
Boron Water Soluble	mg/kg	21	15	6.7	1	SWSJ31 @ 5mbGL		
Cadmium	mg/kg	21	13	22	0.78	SWSJ33 @ 3mbGL	190	0
Chromium	mg/kg	21	21	1500	17	BH520 @ 10.5mbGL	33	20
Copper	mg/kg	21	19	72	2	SWSJ31 @ 2mbGL	44000	0
Lead	mg/kg	21	21	830	10	SWSJ33 @ 3mbGL	1300	0
Mercury	mg/kg	21	8	1	0.48	BH520 @ 4.5mbGL	30	0
Molybdenum	mg/kg	12	2	1.1	0.6	SWSJ34 @ 2mbGL		
Nickel	mg/kg	21	18	39	2.1	SWSJ33 @ 1mbGL	980	0
Selenium	mg/kg	16	3	1.91	0.66	LGBH010 @ 10mbGL	1800	0
Zinc	mg/kg	21	21	31000	45	SWSJ33 @ 1mbGL	170000	0
Beryllium	mg/kg	12	1	0.9	0.9	SWSJ32 @ 8mbGL	12	0
Iron	mg/kg	16	15	350000	20600	SWSJ33 @ 1mbGL		
Vanadium	mg/kg	12	12	400	25	SBHJ07CP @ 0.3mbGL	5000	0
Cyanide (total)	mg/kg	21	0	None > LOD	None > LOD			
Sulphate (soluble)	g/l	12	11	0.19	0.007	SWSJ34 @ 4mbGL		
Elemental/Free Sulphur	mg/kg	12	0	None > LOD	None > LOD			
Easily Liberated Sulphide	mg/kg	12	9	310	36	SBHJ07CP @ 0.3mbGL		
Ammoniacal Nitrogen as N	mg/kg	16	11	55	1.3	SWSJ32 @ 8mbGL		
Chloride	mg/kg	16	15	793	4	LGBH010 @ 15mbGL		
Other								
Asbestos Presence Screen	None	15	0	None > LOD	None > LOD			
Asbestos Identification	%	5	5	2.1	0	SBHJ07CP @ 2mbGL		
Loss on Ignition	%	8	5	4.4	0.3	SWSJ31 @ 5mbGL		
Total Organic Carbon	%	7	6	0.67	0.2	BH520 @ 0.5mbGL		
Organic Matter	%	2	2	6	4.6	SWSJ34 @ 2mbGL		
pH Value	pH Units	21	21	12.9	8.73	BH520 @ 2mbGL	6-9	18
Material >2mm	%	2	0	None > LOD	None > LOD			
Calorific Value	MJ/kg	3	0	None > LOD	None > LOD			
Organics								
PCBs (vs Aroclor 1254)	mg/kg	12	1	1.2	1.2	SBHJ07CP @ 0.3mbGL	0.24	1
PCB 105	mg/kg	1	0	None > LOD	None > LOD		0.24	0
PCB 114	mg/kg	1	0	None > LOD	None > LOD		0.24	0
PCB 123	mg/kg	1	0	None > LOD	None > LOD		0.24	0
PCB 126	mg/kg	1	0	None > LOD	None > LOD		0.24	0
PCB 157	mg/kg	1	0	None > LOD	None > LOD		0.24	0
PCB 167	mg/kg	1	0	None > LOD	None > LOD		0.24	0
PCB 169	mg/kg	1	0	None > LOD	None > LOD		0.24	0
PCB 189	mg/kg	1	0	None > LOD	None > LOD		0.24	0
PCB 77	mg/kg	1	0	None > LOD	None > LOD		0.24	0
PCB 81	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg	1	0	None > LOD	None > LOD		0.24	0
Phenols (total)	mg/kg	21	2	0.51	0.0005	SWSJ32 @ 8mbGL	440	0
BTEX								
GRO (C4-C12)	mg/kg	12	3	0.67	0.078	SWSJ32 @ 6mbGL		
MTBE	mg/kg	12	0	None > LOD	None > LOD			
Benzene	mg/kg	15	0	None > LOD	None > LOD		27	0
Toluene	mg/kg	15	0	None > LOD	None > LOD		56000	0
Ethyl benzene	mg/kg	15	0	None > LOD	None > LOD		5700	0
m & p Xylene	mg/kg	15	0	None > LOD	None > LOD		5900	0
o Xylene	mg/kg	15	0	None > LOD	None > LOD		6600	0
TPH								
Aliphatics C5-C6	mg/kg	15	2	0.078	0.056	SWSJ34 @ 4mbGL	3200	0
Aliphatics >C6-C8	mg/kg	15	1	0.046	0.046	SWSJ33 @ 3mbGL	7800	0
Aliphatics >C8-C10	mg/kg	15	1	0.19	0.19	SWSJ32 @ 6mbGL	2000	0
Aliphatics >C10-C12	mg/kg	15	1	0.081	0.081	SWSJ32 @ 6mbGL	9700	0
Aliphatics >C12-C16	mg/kg	15	9	42	0.38	BH520 @ 8mbGL	25000	0
Aliphatics >C16-C21	mg/kg	15	13	330	1.5	BH520 @ 8mbGL	450000	0
Aliphatics >C21-C35	mg/kg	15	13	1800	0.56	BH520 @ 8mbGL	450000	0
Total Aliphatics C5-C35	mg/kg	12	11	930	0.1	SWSJ31 @ 5mbGL	2000	0
Aliphatics >C35-C44	mg/kg	3	1	170	170	BH520 @ 8mbGL	450000	0
Aromatics C5-C7	mg/kg	3	0	None > LOD	None > LOD		26000	0
Aromatics C6-C7	mg/kg	12	0	None > LOD	None > LOD		7800	0
Aromatics >C7-C8	mg/kg	15	0	None > LOD	None > LOD		56000	0
Aromatics >EC8-EC10	mg/kg	15	1	0.28	0.28	SWSJ32 @ 6mbGL	3500	0
Aromatics >EC10-EC12	mg/kg	15	1	0.12	0.12	SWSJ32 @ 6mbGL	9200	0
Aromatics >EC12-EC16	mg/kg	15	5	17	0.42	BH520 @ 8mbGL	10000	0
Aromatics >EC16-EC21	mg/kg	15	10	32	0.17	BH520 @ 8mbGL	7600	0
Aromatics >EC21-EC35	mg/kg	15	12	110	3.4	SWSJ31 @ 5mbGL	7800	0
Total Aromatics C6-C35	mg/kg	12	9	140	3.4	SWSJ31 @ 5mbGL	3500	0
Aromatics >C35-C44	mg/kg	3	0	None > LOD	None > LOD		7800	0
TPH (Aliphatics and Aromatics C5-C35)	mg/kg	12	11	1100	0.1	SWSJ31 @ 5mbGL	2000	0
Total Aliphatic TPH	mg/kg	3	3	2300	15	BH520 @ 8mbGL	2000	1
Total Aromatic hydrocarbons	mg/kg	3	3	140	6.6	BH520 @ 8mbGL	3500	0
Total Petroleum Hydrocarbons	mg/kg	3	3	2400	21	BH520 @ 8mbGL	2000	1
PAH								
Acenaphthene	mg/kg	17	3	0.16	0.018	SBHJ06CP @ 1mbGL	29000	0
Acenaphthylene	mg/kg	17	7	0.054	0.006	SBHJ06CP @ 1mbGL	29000	0
Anthracene	mg/kg	17	7	0.12	0.01	SBHJ06CP @ 1mbGL	150000	0
Benzo(a)anthracene	mg/kg	17	12	0.31	0.015	SWSJ31 @ 5mbGL	49	0

M4CAN
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CL-26 Lagoon 27SW
05/10/2015

Screening Values and Assessment

	Exceeds S4ULs criteria
X	Laboratory detection level higher than screening criterion

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
Benzo(a)pyrene	mg/kg	17	7	0.25	0.03	SBHJ06CP @ 1mbGL	11	0
Benzo(b)fluoranthene	mg/kg	17	9	0.3	0.016	SBHJ06CP @ 1mbGL	13	0
Benzo(ghi)perylene	mg/kg	17	10	0.23	0.014	SBHJ06CP @ 1mbGL	1400	0
Benzo(k)fluoranthene	mg/kg	17	7	0.12	0.03	SWSJ31 @ 5mbGL	370	0
Chrysene	mg/kg	17	11	0.35	0.012	SWSJ31 @ 5mbGL	93	0
Dibenzo(ah)anthracene	mg/kg	17	6	0.035	0.009	SWSJ31 @ 5mbGL	1.1	0
Fluoranthene	mg/kg	17	14	0.61	0.025	BH520 @ 10.5mbGL	6300	0
Fluorene	mg/kg	17	5	0.14	0.023	SBHJ06CP @ 1mbGL	20000	0
Indeno(123cd)pyrene	mg/kg	17	7	0.21	0.025	SBHJ06CP @ 1mbGL	150	0
Naphthalene	mg/kg	17	8	0.12	0.012	SBHJ06CP @ 0.3mbGL	190	0
Phenanthrene	mg/kg	17	11	0.58	0.027	SBHJ06CP @ 1mbGL	6200	0
Pyrene	mg/kg	17	14	0.66	0.031	SWSJ31 @ 5mbGL	15000	0
PAH 16 Total	mg/kg	17	11	3.8	0.16	SBHJ06CP @ 1mbGL		
SVOCs								
Phenols								
2-Chlorophenol	mg/kg	12	0	None > LOD	None > LOD			
2-Methylphenol	mg/kg	12	0	None > LOD	None > LOD			
2-Nitrophenol	mg/kg	12	0	None > LOD	None > LOD			
2,4-Dichlorophenol	mg/kg	12	0	None > LOD	None > LOD			
2,4-Dimethylphenol	mg/kg	12	0	None > LOD	None > LOD			
2,4,5-Trichlorophenol	mg/kg	12	0	None > LOD	None > LOD			
2,4,6-Trichlorophenol	mg/kg	12	0	None > LOD	None > LOD			
4-Chloro-3-methylphenol	mg/kg	12	0	None > LOD	None > LOD			
4-Methylphenol	mg/kg	12	0	None > LOD	None > LOD			
4-Nitrophenol	mg/kg	12	0	None > LOD	None > LOD			
Pentachlorophenol	mg/kg	12	0	None > LOD	None > LOD			
Phenol	mg/kg	12	0	None > LOD	None > LOD		440	0
PAHs								
2-Chloronaphthalene	mg/kg	10	0	None > LOD	None > LOD			
2-Methylnaphthalene	mg/kg	10	0	None > LOD	None > LOD			
Bis(2-ethylhexyl) phthalate	mg/kg	10	5	2.2	0.27	SWSJ32 @ 8mbGL		
Butylbenzyl phthalate	mg/kg	10	0	None > LOD	None > LOD			
Di-n-butyl phthalate	mg/kg	10	0	None > LOD	None > LOD			
Di-n-Octyl phthalate	mg/kg	10	0	None > LOD	None > LOD			
Diethyl phthalate	mg/kg	10	0	None > LOD	None > LOD			
Dimethyl phthalate	mg/kg	10	0	None > LOD	None > LOD			
Other Semi-Volatiles								
1,2-Dichlorobenzene	mg/kg	10	0	None > LOD	None > LOD			
1,2,4-Trichlorobenzene	mg/kg	10	0	None > LOD	None > LOD		220	0
1,3-Dichlorobenzene	mg/kg	10	0	None > LOD	None > LOD			
1,4-Dichlorobenzene	mg/kg	10	0	None > LOD	None > LOD			
2-Nitroaniline	mg/kg	10	0	None > LOD	None > LOD			
2,4-Dinitrotoluene	mg/kg	10	0	None > LOD	None > LOD			
2,6-Dinitrotoluene	mg/kg	10	0	None > LOD	None > LOD			
3-Nitroaniline	mg/kg	10	0	None > LOD	None > LOD			
4-Bromophenylphenylether	mg/kg	10	0	None > LOD	None > LOD			
4-Chloroaniline	mg/kg	10	0	None > LOD	None > LOD			
4-Chlorophenylphenylether	mg/kg	10	0	None > LOD	None > LOD			
4-Nitroaniline	mg/kg	10	0	None > LOD	None > LOD			
Azobenzene	mg/kg	10	0	None > LOD	None > LOD			
Bis(2-chloroethoxy)methane	mg/kg	10	0	None > LOD	None > LOD			
Bis(2-chloroethyl)ether	mg/kg	10	0	None > LOD	None > LOD			
Carbazole	mg/kg	10	0	None > LOD	None > LOD			
Dibenzofuran	mg/kg	10	0	None > LOD	None > LOD			
Hexachlorobenzene	mg/kg	10	0	None > LOD	None > LOD		30	0
Hexachlorobutadiene	mg/kg	10	0	None > LOD	None > LOD		31	0
Hexachlorocyclopentadiene	mg/kg	10	0	None > LOD	None > LOD			
Hexachloroethane	mg/kg	10	0	None > LOD	None > LOD			
Isophorone	mg/kg	10	0	None > LOD	None > LOD			
N-nitrosodi-n-propylamine	mg/kg	10	0	None > LOD	None > LOD			
Nitrobenzene	mg/kg	10	0	None > LOD	None > LOD			
VOCs								
Methyl Tertiary Butyl Ether	ug/kg	10	0	None > LOD	None > LOD			
Benzene	ug/kg	10	0	None > LOD	None > LOD		27000	0
Toluene	ug/kg	10	0	None > LOD	None > LOD		56000000	0
Ethylbenzene	ug/kg	10	0	None > LOD	None > LOD		5700000	0
p/m-Xylene	ug/kg	10	1	26	26	SWSJ32 @ 8mbGL		
o-Xylene	ug/kg	10	2	20	18	SWSJ32 @ 8mbGL	6600000	0
Naphthalene	ug/kg	10	0	None > LOD	None > LOD		190000	0
Hexachlorobutadiene	ug/kg	10	0	None > LOD	None > LOD		31000	0
1.2.4-Trichlorobenzene	ug/kg	10	0	None > LOD	None > LOD		220000	0
1.2-Dichlorobenzene	ug/kg	10	0	None > LOD	None > LOD			
1.3-Dichlorobenzene	ug/kg	10	0	None > LOD	None > LOD			
1.4-Dichlorobenzene	ug/kg	10	0	None > LOD	None > LOD			
1.1.1.2-Tetrachloroethane	ug/kg	10	0	None > LOD	None > LOD			
1.1.1-Trichloroethane	ug/kg	10	0	None > LOD	None > LOD			
1.1.2.2-Tetrachloroethane	ug/kg	10	0	None > LOD	None > LOD			
1.1.2-Trichloroethane	ug/kg	10	0	None > LOD	None > LOD			
1.1-Dichloropropene	ug/kg	10	0	None > LOD	None > LOD			
1.1-Dichloroethane	ug/kg	10	0	None > LOD	None > LOD			
1.1-Dichloroethene	ug/kg	10	0	None > LOD	None > LOD			
1.2.3-Trichlorobenzene	ug/kg	10	0	None > LOD	None > LOD		102000	0
1.2.3-Trichloropropane	ug/kg	10	0	None > LOD	None > LOD			
1.2.4-Trimethylbenzene	ug/kg	10	2	52	41	SWSJ32 @ 6mbGL		
1.2-Dibromo-3-chloropropane	ug/kg	10	0	None > LOD	None > LOD			

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Screening Values and Assessment

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Notes

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Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	Selected S4ULs Criteria	No. Data Exceeding S4ULs Criteria
1.2-Dichloroethane	ug/kg	10	0	None > LOD	None > LOD			
cis-1-2-Dichloroethene	ug/kg	10	0	None > LOD	None > LOD			
1.2-Dibromoethane	ug/kg	10	0	None > LOD	None > LOD			
1.2-Dichloropropane	ug/kg	10	0	None > LOD	None > LOD			
1.3.5-Trimethylbenzene	ug/kg	10	2	23	21	SWSJ32 @ 6mbGL		
cis-1-3-Dichloropropene	ug/kg	10	0	None > LOD	None > LOD			
1.3-Dichloropropane	ug/kg	10	0	None > LOD	None > LOD			
2.2-Dichloropropane	ug/kg	10	0	None > LOD	None > LOD			
2-Chlorotoluene	ug/kg	10	0	None > LOD	None > LOD			
4-Chlorotoluene	ug/kg	10	0	None > LOD	None > LOD			
4-Isopropyltoluene	ug/kg	10	0	None > LOD	None > LOD			
Bromobenzene	ug/kg	10	0	None > LOD	None > LOD			
Bromochloromethane	ug/kg	10	0	None > LOD	None > LOD			
Bromoform	ug/kg	10	0	None > LOD	None > LOD			
Bromomethane	ug/kg	10	0	None > LOD	None > LOD			
Bromodichloromethane	ug/kg	10	0	None > LOD	None > LOD			
Chlorobenzene	ug/kg	10	0	None > LOD	None > LOD		56000	0
Carbon Disulphide	ug/kg	10	0	None > LOD	None > LOD		11000	0
Chloroethane	ug/kg	10	0	None > LOD	None > LOD			
Chloroform	ug/kg	10	0	None > LOD	None > LOD		99000	0
Chloromethane	ug/kg	10	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	10	0	None > LOD	None > LOD			
Carbontetrachloride	ug/kg	10	0	None > LOD	None > LOD			
Dibromomethane	ug/kg	10	0	None > LOD	None > LOD			
Dichlorodifluoromethane	ug/kg	10	0	None > LOD	None > LOD			
Dibromochloromethane	ug/kg	10	0	None > LOD	None > LOD			
Dichloromethane	ug/kg	10	0	None > LOD	None > LOD			
Isopropylbenzene	ug/kg	10	2	11	9	SWSJ32 @ 6mbGL		
n-Butylbenzene	ug/kg	10	0	None > LOD	None > LOD			
Propylbenzene	ug/kg	10	0	None > LOD	None > LOD			
sec-Butylbenzene	ug/kg	10	0	None > LOD	None > LOD			
Styrene	ug/kg	10	0	None > LOD	None > LOD			
trans-1-2-Dichloroethene	ug/kg	10	0	None > LOD	None > LOD			
trans-1-3-Dichloropropene	ug/kg	10	0	None > LOD	None > LOD			
Trichlorofluoromethane	ug/kg	10	0	None > LOD	None > LOD			
tert-Butylbenzene	ug/kg	10	2	23	20	SWSJ32 @ 6mbGL		
Tetrachloroethene	ug/kg	10	0	None > LOD	None > LOD		19000	0
Trichloroethene	ug/kg	10	0	None > LOD	None > LOD		1200	0
Vinyl Chloride	ug/kg	10	0	None > LOD	None > LOD		59	0

M4CAN
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Geological Formation Legend

TFD	Tidal Flat Deposits
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	LGBH010	LGBH010	SBHJ06CP	SBHJ07CP	SBHJ07CP	SWSJ31	SWSJ31	SWSJ32	SWSJ32	SWSJ33	SWSJ33	SWSJ34	SWSJ34	BH520	BH520	BH520	BH520	BH520	LGBH010	LGBH010	SBHJ06CP
Specimen Depth (m)		1	10	0.3	0.3	2	2	5	6	8	1	3	2	4	0.5	2	4.5	8	10.5	11.5	15	1
OD Level (m)				5.88	5.49	3.79	8.34	5.34	4.27	2.27	8.17	6.17	8.52	6.52	12.35	10.85	8.35	4.85	2.35			5.18
Sample Type				ES	ES	D	ES	D	ES	ES	D	L	L	L	ES	ES	ES	ES	ES			ES
Geology Code		MG - CS	MG - CS	MG - G	MG - G	MG - G	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	TFD	TFD	TFD
Cluster Code		2002 GI	2002 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002 GI	2002 GI	2007 GI
Metals																						
Antimony	mg/kg			23	26	3	29	25	23	7.7	32	30	26	30								5.2
Arsenic	mg/kg	<3	<3	<3	<3	4	9	8	9	15	<3	<3	8	13	26	28	35	22	24	6	5	<3
Barium	mg/kg			130	140	66	150	150	210	89	130	120	140	140								100
Boron Water Soluble	mg/kg	3	1.7	<3.5	<3.5	<3.5	4	6.7	4.5	5.6	<3.5	6.3	<3.5	6.5	2.8	3	2.4	3.6	3.1	1.9	1	<3.5
Cadmium	mg/kg	<1	<1	<0.3	<0.3	<0.3	21	8.8	11	1.6	17	22	6	14	3.3	0.78	7.5	0.81	1.2	<1	<1	<0.3
Chromium	mg/kg	541	1230	550	660	76	150	120	180	52	150	160	150	160	830	930	660	980	1500	60	17	90
Copper	mg/kg	2	6	<6	<6	8	72	31	66	13	41	59	54	71	20	15	25	27	32	11	8	23
Lead	mg/kg	20	14	36	38	19	690	270	350	60	560	830	580	710	42	27	30	52	78	33	10	110
Mercury	mg/kg	<0.5	<0.5	<0.6	<0.6	<0.6	<0.6	<0.6	0.7	<0.6	<0.6	<0.6	0.7	0.6	0.51	0.48	1	0.6	0.59	<0.5	<0.5	<0.6
Molybdenum	mg/kg			<0.6	<0.6	<0.6	<0.6	0.6	<0.6	<0.6	<0.6	<0.6	1.1	<0.6								<0.6
Nickel	mg/kg	5	<2	<0.9	<0.9	27	19	2.1	8.5	25	39	26	18	16	35	36	35	28	35	25	16	16
Selenium	mg/kg	1.63	1.91	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3						0.66	<0.50	<3
Zinc	mg/kg	61	45	65	95	99	10000	11000	10000	2500	31000	30000	11000	10000	99	110	120	800	1700	92	47	370
Beryllium	mg/kg			<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.9	<0.4	<0.4	<0.4	<0.4								<0.4
Iron	mg/kg	202000	216000	110000	110000	37000	300000	300000	<4	85000	350000	320000	320000	300000						34900	20600	37000
Vanadium	mg/kg			360	400	70	29	32	43	44	35	45	26	25								71
Cyanide (total)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1
Sulphate (soluble)	g/l			<0.003	0.007	0.031	0.084	0.016	0.022	0.13	0.008	0.17	0.096	0.19								0.068
Elemental/Free Sulphur	mg/kg			<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70								<70
Easily Liberated Sulphide	mg/kg			<15	310	<15	73	180	120	160	270	200	36	50								<15
Ammoniacal Nitrogen as N	mg/kg	1.3	1.3	<15	21	23	<15	34	33	55	<15	24	52	<15						15.3	26.4	<15
Chloride	mg/kg	31.3	32	4	14	80	130	88	78	280	18	NDP	390	380						239	793	650
Other																						
Asbestos Presence Screen	None			NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NFD	NAD		NAD		NAD			NFD
Asbestos Identification	%				1.1	2.1									0		0		0			
Loss on Ignition	%			1.4	0.3	1.8		4.4	<0.3		<0.3			<0.3								2.5
Total Organic Carbon	%			0.2				0.5	0.6		<0.2			0.2	0.67							0.6
Organic Matter	%								4.6				6									
pH Value	pH Units	12.7	12.8	12.05	11.67	8.73	11.65	12.41	12.46	12.42	10.18	11.87	10.31	10.41	12.8	12.9	12.9	12.7	12.7	10.6	8.8	8.83
Material >2mm	%								<0.1				<0.1									
Calorific Value	MJ/kg														<0.1		<0.1		<0.1			
Organics																						
PCBs (vs Aroclor 1254)	mg/kg			<0.035	1.2	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035								<0.035
PCB 105	mg/kg																		<0.01			
PCB 114	mg/kg																		<0.01			
PCB 123	mg/kg																		<0.01			
PCB 126	mg/kg																		<0.01			
PCB 157	mg/kg																		<0.01			
PCB 167	mg/kg																		<0.01			
PCB 169	mg/kg																		<0.01			
PCB 189	mg/kg																		<0.01			
PCB 77	mg/kg																		<0.01			
PCB 81	mg/kg																		<0.01			
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	mg/kg																		<0.01			
Pcb-156 2,3,3,4,4,5 - Hexachlorobiphenyl	mg/kg																		<0.01			
Phenols (total)	mg/kg	<0.0005	<0.0005	<0.15	<0.15	<0.15	<1.5	<1.5	<1.5	0.51	<1.5	<1.5	<1.5	<1.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.0005	0.0005	<0.15
BTEX																						

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Notes

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Screening criterion for lead is C4SL in the absence of a S4UL

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MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	LGBH010	LGBH010	SBHJ06CP	SBHJ07CP	SBHJ07CP	SWSJ31	SWSJ31	SWSJ32	SWSJ32	SWSJ33	SWSJ33	SWSJ34	SWSJ34	BH520	BH520	BH520	BH520	BH520	LGBH010	LGBH010	SBHJ06CP
Specimen Depth (m)		1	10	0.3	0.3	2	2	5	6	8	1	3	2	4	0.5	2	4.5	8	10.5	11.5	15	1
OD Level (m)				5.88	5.49	3.79	8.34	5.34	4.27	2.27	8.17	6.17	8.52	6.52	12.35	10.85	8.35	4.85	2.35			5.18
Sample Type				ES	ES	D	ES	D	ES	ES	D	L	L	L	ES	ES	ES	ES	ES			ES
Geology Code		MG - CS	MG - CS	MG - G	MG - G	MG - G	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	TFD	TFD	TFD
Cluster Code		2002 GI	2002 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002 GI	2002 GI	2007 GI
GRO (C4-C12)	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	0.67	<0.01	<0.01	0.1	<0.01	0.078								<0.01
MTBE	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01								<0.01
Benzene	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001		<0.001				<0.01
Toluene	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001		<0.001				<0.01
Ethyl benzene	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001		<0.001				<0.01
m & p Xylene	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001		<0.001				<0.01
o Xylene	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001		<0.001				<0.01
TPH																						
Aliphatics C5-C6	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.056	<0.01	0.078	<0.1	<0.1		<0.1				<0.01
Aliphatics >C6-C8	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.046	<0.01	<0.01	<0.1	<0.1		<0.1				<0.01
Aliphatics >C8-C10	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	0.19	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1		<0.1				<0.01
Aliphatics >C10-C12	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	0.081	<0.01	<0.01	<0.01	<0.01	<0.01	<1	<1		<1				<0.01
Aliphatics >C12-C16	mg/kg			0.83	<0.1	<0.1	0.57	10	6.5	4	<0.1	<0.1	1.5	0.43	<1	<1		42				0.38
Aliphatics >C16-C21	mg/kg			1.7	12	20	2.6	190	110	63	<0.1	<0.1	25	9	1.5	1.5		330				1.7
Aliphatics >C21-C35	mg/kg			1.6	120	150	0.56	720	410	320	<0.1	<0.1	85	26	16	13		1800				37
Total Aliphatics C5-C35	mg/kg			4.2	130	170	3.7	930	520	390	<0.1	0.1	110	35								39
Aliphatics >C35-C44	mg/kg														<1	<1		170				
Aromatics C5-C7	mg/kg														<0.1	<0.1		<0.1				
Aromatics C6-C7	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01								<0.01
Aromatics >C7-C8	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1		<0.1				<0.01
Aromatics >EC8-EC10	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	0.28	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1		<0.1				<0.01
Aromatics >EC10-EC12	mg/kg			<0.01	<0.01	<0.01	<0.01	<0.01	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<1	<1		<1				<0.01
Aromatics >EC12-EC16	mg/kg			<0.1	<0.1	<0.1	<0.1	2.8	1.1	<0.1	<0.1	<0.1	0.42	<0.1	<1	<1		17				1
Aromatics >EC16-EC21	mg/kg			<0.1	0.17	<0.1	<0.1	21	7.9	1.7	<0.1	<0.1	5.1	0.88	1.2	1.2		32				0.96
Aromatics >EC21-EC35	mg/kg			3.4	47	40	<0.1	110	56	66	<0.1	<0.1	47	4.6	5.6	5.5		92				9.7
Total Aromatics C6-C35	mg/kg			3.4	47	40	<0.1	140	66	68	<0.1	<0.1	53	5.5								12
Aromatics >C35-C44	mg/kg														<1	<1		<1				
TPH (Aliphatics and Aromatics C5-C35)	mg/kg			7.5	180	210	3.7	1100	590	460	<0.1	0.1	160	41								51
Total Aliphatic TPH	mg/kg														17	15		2300				
Total Aromatic hydrocarbons	mg/kg														6.8	6.6		140				
Total Petroleum Hydrocarbons	mg/kg														24	21		2400				
PAH																						
Acenaphthene	mg/kg			0.043	<0.014	<0.014	<0.014	0.018	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.1	<0.1	<0.1	<0.1	<0.014			0.16
Acenaphthylene	mg/kg			0.006	0.012	0.007	<0.005	0.023	0.011	0.007	<0.005	<0.005	<0.005	<0.005	<0.1	<0.1	<0.1	<0.1	<0.005			0.054
Anthracene	mg/kg			0.019	0.028	<0.009	<0.009	0.056	0.04	0.02	0.01	<0.009	<0.009	<0.009	<0.1	<0.1	<0.1	<0.1	<0.009			0.12
Benzo(a)anthracene	mg/kg			0.052	0.13	0.023	0.036	0.31	0.088	0.077	0.045	0.023	0.025	0.015	<0.1	<0.1	<0.1	<0.1	<0.1			0.24
Benzo(a)pyrene	mg/kg			0.063	0.11	<0.012	<0.012	0.13	0.04	0.03	0.04	<0.012	<0.012	<0.012	<0.1	<0.1	<0.1	<0.1	<0.013			0.25
Benzo(b)fluoranthene	mg/kg			0.083	0.14	<0.016	0.024	0.19	0.098	0.095	0.052	<0.016	0.016	<0.016	<0.1	<0.1	<0.1	<0.1	<0.1			0.3
Benzo(ghi)perylene	mg/kg			0.098	0.098	<0.01	0.015	0.096	0.045	0.038	0.043	0.018	0.014	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1			0.23
Benzo(k)fluoranthene	mg/kg			0.03	0.081	<0.025	<0.025	0.12	0.056	0.044	0.03	<0.025	<0.025	<0.025	<0.1	<0.1	<0.1	<0.1	<0.026			0.12
Chrysene	mg/kg			0.056	0.12	0.026	0.021	0.35	0.2	0.11	0.041	0.012	0.034	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1			0.28
Dibenzo(ah)anthracene	mg/kg			0.009	0.014	<0.008	<0.008	0.035	0.014	0.013	<0.008	<0.008	<0.008	<0.008	<0.1	<0.1	<0.1	<0.1	<0.009			0.033
Fluoranthene	mg/kg			0.076	0.19	0.053	0.047	0.59	0.42	0.2	0.058	0.026	0.025	<0.025	0.15	0.17	<0.1	<0.1	0.61			0.49
Fluorene	mg/kg			0.031	<0.012	<0.012	<0.012	0.027	0.028	0.023	<0.012	<0.012	<0.012	<0.012	<0.1	<0.1	<0.1	<0.1	<0.012			0.14
Indeno(123cd)pyrene	mg/kg			0.051	0.075	<0.011	<0.011	0.058	0.028	0.025	0.036	<0.011	<0.011	<0.011	<0.1	<0.1	<0.1	<0.1	<0.011			0.21
Naphthalene	mg/kg			0.12	0.057	0.012	<0.01	0.017	0.029	0.032	<0.01	0.027	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1			0.085
Phenanthrene	mg/kg			0.096	0.12	0.031	0.033	0.21	0.24	0.1	0.041	0.027	0.041	<0.021	<0.1	<0.1	<0.1	<0.1	<0.1			0.58
Pyrene	mg/kg			0.072	0.16	0.042	0.05	0.66	0.37	0.22	0.061	0.031	0.032	<0.022	0.21	0.19	<0.1	<0.1	0.5			0.49
PAH 16 Total	mg/kg			0.9	1.3	0.19	0.23	2.9	1.7	1	0.46	0.16	0.19	<0.025	<2	<2	<2	<2	<2			3.8

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Geological Formation Legend

TFD	Tidal Flat Deposits
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	LGBH010	LGBH010	SBHJ06CP	SBHJ07CP	SBHJ07CP	SWSJ31	SWSJ31	SWSJ32	SWSJ32	SWSJ33	SWSJ33	SWSJ34	SWSJ34	BH520	BH520	BH520	BH520	BH520	LGBH010	LGBH010	SBHJ06CP
Specimen Depth (m)		1	10	0.3	0.3	2	2	5	6	8	1	3	2	4	0.5	2	4.5	8	10.5	11.5	15	1
OD Level (m)				5.88	5.49	3.79	8.34	5.34	4.27	2.27	8.17	6.17	8.52	6.52	12.35	10.85	8.35	4.85	2.35			5.18
Sample Type				ES	ES	D	ES	D	ES	ES	D	L	L	L	ES	ES	ES	ES	ES			ES
Geology Code		MG - CS	MG - CS	MG - G	MG - G	MG - G	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	TFD	TFD	TFD
Cluster Code		2002 GI	2002 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002 GI	2002 GI	2007 GI
SVOCs																						
Phenols																						
2-Chlorophenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
2-Methylphenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
2-Nitrophenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
2,4-Dichlorophenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
2,4-Dimethylphenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
2,4,5-Trichlorophenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
2,4,6-Trichlorophenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
4-Chloro-3-methylphenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
4-Methylphenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
4-Nitrophenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Pentachlorophenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Phenol	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
PAHs																						
2-Chloronaphthalene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
2-Methylnaphthalene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Bis(2-ethylhexyl) phthalate	mg/kg			<0.1			0.27	0.58	0.39	2.2	<0.1	<0.1	<0.1	<0.1								0.64
Butylbenzyl phthalate	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Di-n-butyl phthalate	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Di-n-Octyl phthalate	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Diethyl phthalate	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Dimethyl phthalate	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Other Semi-Volatiles																						
1,2-Dichlorobenzene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
1,2,4-Trichlorobenzene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
1,3-Dichlorobenzene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
1,4-Dichlorobenzene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
2-Nitroaniline	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
2,4-Dinitrotoluene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
2,6-Dinitrotoluene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
3-Nitroaniline	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
4-Bromophenylphenylether	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
4-Chloroaniline	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
4-Chlorophenylphenylether	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
4-Nitroaniline	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Azobenzene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Bis(2-chloroethoxy)methane	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Bis(2-chloroethyl)ether	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Carbazole	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Dibenzofuran	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Hexachlorobenzene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Hexachlorobutadiene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Hexachlorocyclopentadiene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Hexachloroethane	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Isophorone	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
N-nitrosodi-n-propylamine	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
Nitrobenzene	mg/kg			<0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1
VOCs																						

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 27SW
05/10/2015

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than	X

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

TFD	Tidal Flat Deposits
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	LGBH010	LGBH010	SBHJ06CP	SBHJ07CP	SBHJ07CP	SWSJ31	SWSJ31	SWSJ32	SWSJ32	SWSJ33	SWSJ33	SWSJ34	SWSJ34	BH520	BH520	BH520	BH520	BH520	LGBH010	LGBH010	SBHJ06CP
Specimen Depth (m)		1	10	0.3	0.3	2	2	5	6	8	1	3	2	4	0.5	2	4.5	8	10.5	11.5	15	1
OD Level (m)				5.88	5.49	3.79	8.34	5.34	4.27	2.27	8.17	6.17	8.52	6.52	12.35	10.85	8.35	4.85	2.35			5.18
Sample Type				ES	ES	D	ES	D	ES	ES	D	L	L	L	ES	ES	ES	ES	ES			ES
Geology Code		MG - CS	MG - CS	MG - G	MG - G	MG - G	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	TFD	TFD	TFD
Cluster Code		2002 GI	2002 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002 GI	2002 GI	2007 GI
Methyl Tertiary Butyl Ether	ug/kg			<11			<11	<11	<11	<11	<11	<11	<11	<11								<11
Benzene	ug/kg			<9			<9	<9	<9	<9	<9	<9	<9	<9								<9
Toluene	ug/kg			<5			<5	<5	<5	<5	<5	<5	<5	<5								<5
Ethylbenzene	ug/kg			<4			<4	<4	<4	<4	<4	<4	<4	<4								<4
p/m-Xylene	ug/kg			<14			<14	<14	<14	26	<14	<14	<14	<14								<14
o-Xylene	ug/kg			<10			<10	<10	18	20	<10	<10	<10	<10								<10
Naphthalene	ug/kg			<13			<13	<13	<13	<13	<13	<13	<13	<13								<13
Hexachlorobutadiene	ug/kg			<12			<12	<12	<12	<12	<12	<12	<12	<12								<12
1.2.4-Trichlorobenzene	ug/kg			<6			<6	<6	<6	<6	<6	<6	<6	<6								<6
1.2-Dichlorobenzene	ug/kg			<12			<12	<12	<12	<12	<12	<12	<12	<12								<12
1.3-Dichlorobenzene	ug/kg			<6			<6	<6	<6	<6	<6	<6	<6	<6								<6
1.4-Dichlorobenzene	ug/kg			<5			<5	<5	<5	<5	<5	<5	<5	<5								<5
1.1.1.2-Tetrachloroethane	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10
1.1.1-Trichloroethane	ug/kg			<7			<7	<7	<7	<7	<7	<7	<7	<7								<7
1.1.2.2-Tetrachloroethane	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10
1.1.2-Trichloroethane	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10
1.1-Dichloropropene	ug/kg			<11			<11	<11	<11	<11	<11	<11	<11	<11								<11
1.1-Dichloroethane	ug/kg			<8			<8	<8	<8	<8	<8	<8	<8	<8								<8
1.1-Dichloroethene	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10
1.2.3-Trichlorobenzene	ug/kg			<11			<11	<11	<11	<11	<11	<11	<11	<11								<11
1.2.3-Trichloropropane	ug/kg			<17			<17	<17	<17	<17	<17	<17	<17	<17								<17
1.2.4-Trimethylbenzene	ug/kg			<9			<9	<9	52	41	<9	<9	<9	<9								<9
1.2-Dibromo-3-chloropropane	ug/kg			<14			<14	<14	<14	<14	<14	<14	<14	<14								<14
1.2-Dichloroethane	ug/kg			<5			<5	<5	<5	<5	<5	<5	<5	<5								<5
cis-1-2-Dichloroethene	ug/kg			<5			<5	<5	<5	<5	<5	<5	<5	<5								<5
1.2-Dibromoethane	ug/kg			<12			<12	<12	<12	<12	<12	<12	<12	<12								<12
1.2-Dichloropropane	ug/kg			<12			<12	<12	<12	<12	<12	<12	<12	<12								<12
1.3.5-Trimethylbenzene	ug/kg			<8			<8	<8	23	21	<8	<8	<8	<8								<8
cis-1-3-Dichloropropene	ug/kg			<14			<14	<14	<14	<14	<14	<14	<14	<14								<14
1.3-Dichloropropane	ug/kg			<7			<7	<7	<7	<7	<7	<7	<7	<7								<7
2.2-Dichloropropane	ug/kg			<12			<12	<12	<12	<12	<12	<12	<12	<12								<12
2-Chlorotoluene	ug/kg			<9			<9	<9	<9	<9	<9	<9	<9	<9								<9
4-Chlorotoluene	ug/kg			<12			<12	<12	<12	<12	<12	<12	<12	<12								<12
4-Isopropyltoluene	ug/kg			<11			<11	<11	<11	<11	<11	<11	<11	<11								<11
Bromobenzene	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10
Bromochloromethane	ug/kg			<14			<14	<14	<14	<14	<14	<14	<14	<14								<14
Bromoform	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10
Bromomethane	ug/kg			<13			<13	<13	<13	<13	<13	<13	<13	<13								<13
Bromodichloromethane	ug/kg			<7			<7	<7	<7	<7	<7	<7	<7	<7								<7
Chlorobenzene	ug/kg			<5			<5	<5	<5	<5	<5	<5	<5	<5								<5
Carbon Disulphide	ug/kg			<7			<7	<7	<7	<7	<7	<7	<7	<7								<7
Chloroethane	ug/kg			<14			<14	<14	<14	<14	<14	<14	<14	<14								<14
Chloroform	ug/kg			<8			<8	<8	<8	<8	<8	<8	<8	<8								<8
Chloromethane	ug/kg			<7			<7	<7	<7	<7	<7	<7	<7	<7								<7
Carbontetrachloride	ug/kg			<14			<14	<14	<14	<14	<14	<14	<14	<14								<14
Carbontetrachloride	ug/kg			<14			<14	<14	<14	<14	<14	<14	<14	<14								<14
Dibromomethane	ug/kg			<9			<9	<9	<9	<9	<9	<9	<9	<9								<9
Dichlorodifluoromethane	ug/kg			<4			<4	<4	<4	<4	<4	<4	<4	<4								<4
Dibromochloromethane	ug/kg			<13			<13	<13	<13	<13	<13	<13	<13	<13								<13

M4CAN
Soil Analysis Results & Screening Assessment
CL-26 Lagoon 27SW
05/10/2015

Screening Values and Assessment

Exceeds S4ULs criteria	
Laboratory detection level higher than	X

Notes

NFD = No Fibres Detected
NAD = No Asbestos Detected
Chromium VI criteria used
Elemental Mercury criteria used
Screening criterion for lead is C4SL in the absence of a S4UL

Geological Formation Legend

TFD	Tidal Flat Deposits
MG-SS	Made Ground (slurry slag)
MG-CS	Made Ground (coarse slag)
MG-G	Made Ground (general)

Sample Reference	Units	LGBH010	LGBH010	SBHJ06CP	SBHJ07CP	SBHJ07CP	SWSJ31	SWSJ31	SWSJ32	SWSJ32	SWSJ33	SWSJ33	SWSJ34	SWSJ34	BH520	BH520	BH520	BH520	BH520	LGBH010	LGBH010	SBHJ06CP
Specimen Depth (m)		1	10	0.3	0.3	2	2	5	6	8	1	3	2	4	0.5	2	4.5	8	10.5	11.5	15	1
OD Level (m)				5.88	5.49	3.79	8.34	5.34	4.27	2.27	8.17	6.17	8.52	6.52	12.35	10.85	8.35	4.85	2.35			5.18
Sample Type				ES	ES	D	ES	D	ES	ES	D	L	L	L	ES	ES	ES	ES	ES			ES
Geology Code		MG - CS	MG - CS	MG - G	MG - G	MG - G	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - CS	MG - CS	MG - CS	MG - CS	MG - CS	TFD	TFD	TFD
Cluster Code		2002 GI	2002 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2015 GI	2002 GI	2002 GI	2007 GI
Dichloromethane	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10
Isopropylbenzene	ug/kg			<5			<5	<5	11	9	<5	<5	<5	<5								<5
n-Butylbenzene	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10
Propylbenzene	ug/kg			<11			<11	<11	<11	<11	<11	<11	<11	<11								<11
sec-Butylbenzene	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10
Styrene	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10
trans-1-2-Dichloroethene	ug/kg			<11			<11	<11	<11	<11	<11	<11	<11	<11								<11
trans-1-3-Dichloropropene	ug/kg			<14			<14	<14	<14	<14	<14	<14	<14	<14								<14
Trichlorofluoromethane	ug/kg			<6			<6	<6	<6	<6	<6	<6	<6	<6								<6
tert-Butylbenzene	ug/kg			<12			<12	<12	23	20	<12	<12	<12	<12								<12
Tetrachloroethene	ug/kg			<5			<5	<5	<5	<5	<5	<5	<5	<5								<5
Trichloroethene	ug/kg			<9			<9	<9	<9	<9	<9	<9	<9	<9								<9
Vinyl Chloride	ug/kg			<10			<10	<10	<10	<10	<10	<10	<10	<10								<10

A8 Appendix 4

Groundwater Laboratory Data

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 All Lagoons
08/07/2015

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference / Round / Sampled Date / Depth / Response Zone (RZ) Details / Installation Details / Location	Units	Screening Criteria EQS	Screening Criteria DWS	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Installation Details of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
Metals										
Arsenic Dissolved	ug/l	50	10	82	80	38	0.242	BH519 @ 7.97	0	16
Beryllium Dissolved	ug/l			35	0	None > LOD	None > LOD			
Boron	ug/l	2000	1000	20	20	1600	86	BH521 @ 5.13	0	5
Cadmium Dissolved	ug/l	0.15	5	26	2	0.146	0.094	BHM4CAN043 @ 2.12	0	0
Calcium Dissolved	ug/l			46	46	800000	70.8	SBHJ09 @ 2.2		
Chromium Dissolved	ug/l		50	82	65	130	0.307	BH525 @ 3.47		5
Copper Dissolved	ug/l	10	2000	82	67	110	1	BH525 @ 3.92	21	0
Iron Dissolved	ug/l	1000	200	56	36	6200	10	LGBH011 @	7	14
Lead Dissolved	ug/l	1.2	10	76	39	1500	0.22	SWSJ21 @ 6	25	9
Mercury Dissolved	ug/l	0.07	1	20	1	0.56	0.56	BH525 @ 1.98	1	0
Magnesium Dissolved	ug/l			46	24	270000	99	SBHJ04 @ 13.1		
Manganese Dissolved	ug/l	30	50	45	40	2300	1	SBHJ04 @ 6.67	20	20
Nickel Dissolved	ug/l	4	20	82	82	36	1.9	SWSJ21 @ 5.72	62	2
Selenium Dissolved	ug/l		10	82	77	75	1	BH525 @ 3.47		24
Vanadium Dissolved	ug/l			41	30	158	0.28	BHM4CAN043 @ 1.99		
Zinc Dissolved	ug/l	75		26	24	14	1.34	BH515 @ 8.4	0	
Cadmium Total	ug/l	0.15	5	56	16	480	0.5	SWSJ21 @ 5.72	16	7
Zinc Total	ug/l	75		56	56	82000	3	SWSJ34 @	31	
Mercury Total	ug/l	0.07	1	56	13	0.07	0.01	SBHJ10 @ 10	0	0
Non-Metal Inorganics										
Hardness Total	mg/l			35	35	2100	99	SBHJ09 @ 2.2		
Total Alkalinity as CaCO3	mg/l			70	70	20000	93	SWSJ34 @		
BOD	mg/l	5		35	30	220	1	LGBH04 @	24	
COD	mg/l			35	35	7400	38	SBHJ10 @ 10		
Potassium Dissolved	mg/l			46	46	580	12	SWSJ34 @		
Sodium Dissolved	mg/l		200	46	46	4600	11	SBHJ10 @ 2.24		18
Nitrate as NO3	mg/l		50	52	9	1.6	0.324	LGBH04 @		0
Nitrite as NO2	mg/l		0.5	6	2	0.099	0.074	BHM4CAN043 @ 1.99		0
Sulphate (soluble)	mg/l	400	250	56	52	1160	1.55	LGBH01 @	4	5
Chloride	mg/l	250	250	70	70	4300	3	SBHJ10 @ 10	34	34
Sulphide	mg/l			43	1	1.3	1.3	LGBH011 @		
Phosphate	mg/l			21	13	3.6	0.1	LGBH011 @		
Fluoride	mg/l	5000	1500	11	11	3.5	0.2	LGBH09 @	0	0
Ammoniacal Nitrogen as N	mg/l	0.6		80	80	36	0.7	SBHJ10 @ 10	80	
unionised ammonia	mg/l			33	33	6.153	0.017	SBHJ05 @ 11.5		
Total Ammonium as NH4	mg/l		0.5	6	6	39	1.8	SBHJ04 @ 6.67		6
Hexavalent Chromium	mg/l		50	2	0	None > LOD	None > LOD			0
Phenols Monohydric	mg/l			55	22	0.28	0.01	SBHJ08A @ 7.4		
Thiocyanate	mg/l			1	0	None > LOD	None > LOD			
Total Cyanide	mg/l	0.001	0.05	75	0	None > LOD	None > LOD		0	0
Free Cyanide	mg/l			22	0	None > LOD	None > LOD			
Free Cyanide Low	mg/l			0	0	None > LOD	None > LOD			
Complex Cyanide	mg/l			2	0	None > LOD	None > LOD			
Complex Cyanide Low	mg/l			0	0	None > LOD	None > LOD			
Carbon Dioxide Dissolved	ug/l			6	2	74	59	SBHJ04 @ 6.67		
Conductivity @ 20 deg.C	mS/cm			6	6	7.4	3.25	BHM4CAN043 @ 1.96		0
pH Value	pH units	6-9	6.5-10	82	82	13	7.1	LGBH01 @	0	0
Organics										
GRO (C4-C12)	ug/l			41	1	14	14	LGBH04 @		
GRO Surrogate % recovery**	%			6	6	97	74	BHM4CAN043 @ 2.12		0
MTBE	ug/l			50	0	None > LOD	None > LOD			
Benzene	ug/l	10	1	62	0	None > LOD	None > LOD		0	0
Toluene	ug/l	50		83	4	104	7	LGBH011 @	1	
Ethyl benzene	ug/l	20		62	0	None > LOD	None > LOD		0	
m & p Xylene	ug/l	30		62	0	None > LOD	None > LOD		0	
o Xylene	ug/l	30		62	0	None > LOD	None > LOD		0	
Aliphatics C5-C6	ug/l			61	0	None > LOD	None > LOD			
Aliphatics >C6-C8	ug/l			61	1	14	14	LGBH04 @		
Aliphatics >C8-C10	ug/l			61	0	None > LOD	None > LOD			
Aliphatics >C10-C12	ug/l			61	1	11	11	BHM4CAN043 @ 2.05		
Aliphatics >C12-C16 Aqueous	ug/l			61	4	280	10	LGBH011 @		
Aliphatics >C16-C21 Aqueous	ug/l			61	10	3000	0.5	LGBH011 @		
Aliphatics >C21-C35 Aqueous	ug/l			61	17	17000	39	LGBH011 @		
Total Aliphatics C5-C35 Aqueous	ug/l			41	15	20000	14	LGBH011 @		
Aliphatics >C35-44	ug/l			20	3	37	16	BH519 @ 3.49		
Aromatics C5-C7	ug/l			26	0	None > LOD	None > LOD			
Aromatics C6-C7	ug/l			35	0	None > LOD	None > LOD			
Aromatics >C7-C8	ug/l			61	0	None > LOD	None > LOD			
Aromatics >EC8-EC10	ug/l			61	0	None > LOD	None > LOD			
Aromatics >EC10-EC12	ug/l			61	0	None > LOD	None > LOD			
Aromatics >EC12-EC16 Aqueous	ug/l			61	4	92	55	LGBH011 @		
Aromatics >EC16-EC21 Aqueous	ug/l			61	6	840	0.5	LGBH011 @		
Aromatics >EC21-EC35 Aqueous	ug/l			61	10	5600	17	LGBH011 @		
Total Aromatics C6-C35 Aqueous	ug/l			41	7	6500	17	LGBH011 @		
Aromatics >C35-44	ug/l			20	3	14	9.8	BH519 @ 3.49		
TPH GC (C10-C37)	ug/l			10	7	30500	160	LGBH011 @		
TPH (Aliphatics and Aromatics C5-C35)	ug/l			41	16	27000	14	LGBH011 @		
Total Aliphatic	ug/l			20	3	460	170	BH519 @ 3.49		
Total Aromatic	ug/l			20	3	99	70	BH519 @ 3.49		
Total Petroleum Hydrocarbons	ug/l			20	3	560	240	BH519 @ 3.49		
PAHs										
Acenaphthene	ug/l			6	5	0.655	0.0175	BHM4CAN043 @ 1.96		0
Acenaphthylene	ug/l			6	3	0.0404	0.0258	BHM4CAN043 @ 1.96		0
Anthracene	ug/l			6	4	0.0932	0.0374	BHM4CAN043 @ 1.96		0
Benzo(a)anthracene	ug/l			6	6	0.232	0.0174	BHM4CAN043 @ 1.99		
Benzo(a)pyrene	ug/l	0.00017	0.01	6	6	0.183	0.0197	BHM4CAN043 @ 2.12	6	6
Benzo(b)fluoranthene	ug/l	0.017	0.1	6	5	0.324	0.085	BHM4CAN043 @ 1.99	5	3
Benzo(ghi)perylene	ug/l			6	5	0.184	0.0342	BHM4CAN043 @ 1.99		0
Benzo(k)fluoranthene	ug/l			6	3	0.108	0.0294	BHM4CAN043 @ 2.12		0
Chrysene	ug/l			6	6	0.154	0.0399	BHM4CAN043 @ 1.99		

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Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference / Round / Sampled Date / Depth / Response Zone (RZ) Details / Installation Details / Location	Units	Screening Criteria EQS	Screening Criteria DWS	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Installation Details of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
Dibenzo(a,h)anthracene	ug/l			6	2	0.0467	0.0183	BHM4CAN043 @ 2.12		
Fluoranthene	ug/l	0.0063		6	6	0.513	0.0632	BHM4CAN043 @ 1.96	6	
Fluorene	ug/l			6	6	0.182	0.0224	BHM4CAN043 @ 1.96		0
Indeno(1,2,3-cd)pyrene	ug/l		0.1	6	5	0.193	0.0228	BHM4CAN043 @ 1.99		2
Naphthalene	ug/l	2		6	4	1.1	0.113	BHM4CAN043 @ 1.96	0	
Pyrene	ug/l			6	6	0.356	0.05	BHM4CAN043 @ 1.96		
Phenanthrene	ug/l			6	6	1.99	0.128	BHM4CAN043 @ 1.96		0
PAH, Total Detected USEPA 16	ug/l			6	6	5.61	0.547	BHM4CAN043 @ 1.96		0
SVOC by GCMS										
Phenols										
2-Chlorophenol	ug/l	50		48	0	None > LOD	None > LOD		0	
2-Methylphenol	ug/l	100		48	6	9	1	SWSJ23 @ 6.62	0	
2-Nitrophenol	ug/l			48	0	None > LOD	None > LOD			
2,4-Dichlorophenol	ug/l	20		48	0	None > LOD	None > LOD		0	
2,4-Dimethylphenol	ug/l			48	6	7	2	SWSJ23 @ 6.62		
2,4,5-Trichlorophenol	ug/l			48	0	None > LOD	None > LOD			
2,4,6-Trichlorophenol	ug/l			48	0	None > LOD	None > LOD			
4-Chloro-3-methylphenol	ug/l	40		48	0	None > LOD	None > LOD		0	
4-Methylphenol	ug/l	100		48	11	18	2	SWSJ23 @ 6.62	0	
4-Nitrophenol	ug/l			48	0	None > LOD	None > LOD			
Pentachlorophenol	ug/l	0.4		48	0	None > LOD	None > LOD		0	
Phenol	ug/l	7.7		48	16	89	2	SBHJ08A @ 7.4	9	
Phenols	mg/l	0.0077		20	11	0.3	0.03	BH519 @ 3.52	11	
Phenols Monohydric	mg/l	0.0077		20	10	0.4	0.02	SWSJ34 @	10	0
PAHs										
2-Chloronaphthalene	ug/l			46	0	None > LOD	None > LOD			
2-Methylnaphthalene	ug/l			46	3	3	2	LGBH03 @		
Acenaphthene	ug/l			66	2	2	2	LGBH04 @		
Acenaphthylene	ug/l			66	0	None > LOD	None > LOD			
Anthracene	ug/l	0.1		66	0	None > LOD	None > LOD		0	
Benzo(a)anthracene	ug/l			66	0	None > LOD	None > LOD			
Benzo(a)pyrene	ug/l	0.00017	0.01	66	0	None > LOD	None > LOD		0	0
Benzo(b)fluoranthene	ug/l	0.017	0.1	66	0	None > LOD	None > LOD		0	0
Benzo(k)fluoranthene	ug/l	0.017	0.1	66	0	None > LOD	None > LOD		0	0
Benzo(ghi)perylene	ug/l	0.0082	0.1	66	0	None > LOD	None > LOD		0	0
Indeno(1,2,3-cd)pyrene	ug/l		0.1	66	0	None > LOD	None > LOD			0
Chrysene	ug/l			66	0	None > LOD	None > LOD			
Dibenzo(a,h)anthracene	ug/l			66	0	None > LOD	None > LOD			
Fluoranthene	ug/l	0.0063		66	4	2	0.029	LGBH04 @	4	
Fluorene	ug/l			66	2	1	1	LGBH04 @		
Naphthalene	ug/l	2		66	4	6	2	LGBH04 @	2	
Phenanthrene	ug/l			66	7	5	0.029	LGBH04 @		
Pyrene	ug/l			66	5	1	0.024	LGBH04 @		
Total PAHs (USEPA 16)	ug/l			28	1	0.342	0.342	LGBH011 @		
Phthalates										
Bis(2-ethylhexyl) phthalate	ug/l	1.3		48	7	24.5	3	BHM4CAN043 @ 1.99	7	
Butylbenzyl phthalate	ug/l	20		48	0	None > LOD	None > LOD		0	
Di-n-butyl phthalate	ug/l	8		48	0	None > LOD	None > LOD		0	
Di-n-Octyl phthalate	ug/l	20		48	0	None > LOD	None > LOD		0	
Diethyl phthalate	ug/l	200		48	5	2	1	LGBH010 @	0	
Dimethyl phthalate	ug/l	800		48	0	None > LOD	None > LOD		0	
Other Semi-Volatiles										
1,2-Dichlorobenzene	ug/l	20		39	0	None > LOD	None > LOD		0	
1,2,4-Trichlorobenzene	ug/l	0.4		39	0	None > LOD	None > LOD		0	
1,3-Dichlorobenzene	ug/l	20		48	0	None > LOD	None > LOD		0	
1,4-Dichlorobenzene	ug/l	20		39	0	None > LOD	None > LOD		0	
2-Nitroaniline	ug/l			48	0	None > LOD	None > LOD			
2,4-Dinitrotoluene	ug/l			48	0	None > LOD	None > LOD			
2,6-Dinitrotoluene	ug/l			48	0	None > LOD	None > LOD			
3-Nitroaniline	ug/l			48	0	None > LOD	None > LOD			
4-Bromophenylphenylether	ug/l			48	0	None > LOD	None > LOD			
4-Chloroaniline	ug/l			48	0	None > LOD	None > LOD			
4-Chlorophenylphenylether	ug/l			48	0	None > LOD	None > LOD			
4-Nitroaniline	ug/l			48	0	None > LOD	None > LOD			
Azobenzene	ug/l			48	0	None > LOD	None > LOD			
Bis(2-chloroethoxy)methane	ug/l			48	0	None > LOD	None > LOD			
Bis(2-chloroethyl)ether	ug/l			48	0	None > LOD	None > LOD			
Bis(2-chloroisopropyl)ether	ug/l			9	0	None > LOD	None > LOD			
Carbazole	ug/l			48	3	2	1	LGBH04 @		
Dibenzofuran	ug/l			48	1	1	1	LGBH04 @		
Hexachlorobenzene	ug/l	0.05		48	0	None > LOD	None > LOD		0	
Hexachlorobutadiene	ug/l	0.6		39	0	None > LOD	None > LOD		0	
Hexachlorocyclopentadiene	ug/l			48	0	None > LOD	None > LOD			
Hexachloroethane	ug/l			48	0	None > LOD	None > LOD			
Isophorone	ug/l			48	0	None > LOD	None > LOD			
n-nitrosodimethylamine	ug/l			9	0	None > LOD	None > LOD			
N-nitrosodi-n-propylamine	ug/l			48	0	None > LOD	None > LOD			
Nitrobenzene	ug/l			48	0	None > LOD	None > LOD			
VOCs										
Dichlorodifluoromethane	ug/l			56	0	None > LOD	None > LOD			
Chloromethane	ug/l			56	0	None > LOD	None > LOD			
Vinyl Chloride	ug/l	0	0.5	47	0	None > LOD	None > LOD		0	0
Bromomethane	ug/l			56	0	None > LOD	None > LOD			
Chloroethane	ug/l			56	0	None > LOD	None > LOD			
Trichlorofluoromethane	ug/l			56	0	None > LOD	None > LOD			
trans-1-2-Dichloroethene	ug/l			56	0	None > LOD	None > LOD			
Dichloromethane	ug/l	20		40	0	None > LOD	None > LOD		0	
Carbon Disulphide	ug/l			40	2	1.64	1.33	BHM4CAN043 @ 1.93		
1.1-Dichloroethene	ug/l			56	0	None > LOD	None > LOD			
1.1-Dichloroethane	ug/l			56	0	None > LOD	None > LOD			
Methyl Tertiary Butyl Ether	ug/l			49	0	None > LOD	None > LOD			

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Screening Values & Assessment

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	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference / Round / Sampled Date / Depth / Response Zone (RZ) Details / Installation Details / Location	Units	Screening Criteria EQS	Screening Criteria DWS	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Installation Details of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
cis-1-2-Dichloroethene	ug/l			56	0	None > LOD	None > LOD			
Bromochloromethane	ug/l		100	56	0	None > LOD	None > LOD			0
Chloroform	ug/l	2.5	100	56	0	None > LOD	None > LOD		0	0
2.2-Dichloropropane	ug/l			47	0	None > LOD	None > LOD			
1.2-Dichloroethane	ug/l	10	3	56	0	None > LOD	None > LOD		0	0
1.2-Dichloroethene				6	0	None > LOD	None > LOD			0
1.1.1-Trichloroethane	ug/l	100		56	0	None > LOD	None > LOD		0	
1.1-Dichloropropene	ug/l			56	0	None > LOD	None > LOD			
Benzene	ug/l	10	1	60	1	1	1	SWSJ23 @ 6.62	0	0
Carbontetrachloride	ug/l	12	3	47	0	None > LOD	None > LOD		0	0
Dibromomethane	ug/l			56	0	None > LOD	None > LOD			
1.2-Dichloropropane	ug/l			56	0	None > LOD	None > LOD			
Bromodichloromethane	ug/l			56	0	None > LOD	None > LOD			
Trichloroethene	ug/l	10	10	56	1	3	3	LGBH010 @	0	0
cis-1-3-Dichloropropene	ug/l			56	0	None > LOD	None > LOD			
trans-1-3-Dichloropropene	ug/l			56	0	None > LOD	None > LOD			
1.1.2-Trichloroethane	ug/l	400		56	0	None > LOD	None > LOD		0	
Toluene	ug/l	50		60	15	7	1	SBHJ04 @ 6.67	0	
Toluene-d8**	%			6	6	103	97.6	BHM4CAN043 @ 1.96		0
1.3-Dichloropropane	ug/l			56	1	2	2	LGBH010 @		
Dibromochloromethane	ug/l		100	56	0	None > LOD	None > LOD			0
Dibromofluoromethane**	%			6	6	104	0.44	BHM4CAN043 @ 1.93		0
1.2-Dibromoethane	ug/l			56	1	1	1	LGBH010 @		
Tetrachloroethene	ug/l	10	10	56	0	None > LOD	None > LOD		0	0
1.1.1.2-Tetrachloroethane	ug/l			56	0	None > LOD	None > LOD			
Chlorobenzene	ug/l			56	0	None > LOD	None > LOD			
Ethylbenzene	ug/l	20		60	0	None > LOD	None > LOD		0	
p/m-Xylene	ug/l	30		60	2	4	2	SWSJ23 @ 6.62	0	
Bromoform	ug/l			47	0	None > LOD	None > LOD			
Styrene	ug/l	50		56	0	None > LOD	None > LOD		0	
1.1.2.2-Tetrachloroethane	ug/l			47	0	None > LOD	None > LOD			
o-Xylene	ug/l	30		60	1	4	4	SWSJ23 @ 6.62	0	
1.2.3-Trichloropropane	ug/l			56	1	3	3	LGBH010 @		
Isopropylbenzene	ug/l			56	1	3	3	SWSJ23 @ 6.62		
Bromobenzene	ug/l			56	0	None > LOD	None > LOD			
2-Chlorotoluene	ug/l			56	0	None > LOD	None > LOD			
Propylbenzene	ug/l			56	1	3	3	SWSJ23 @ 6.62		
4-Chlorotoluene	ug/l			56	0	None > LOD	None > LOD			
4-Bromofluorobenzene**	%			6	6	101	93.7	BHM4CAN043 @ 1.92		0
1.2.4-Trimethylbenzene	ug/l			56	4	631	3	LGBH011 @		
4-Isopropyltoluene	ug/l			56	0	None > LOD	None > LOD			
1.3.5-Trimethylbenzene	ug/l			56	1	6	6	SWSJ23 @ 6.62		
1.2-Dichlorobenzene	ug/l	20		56	0	None > LOD	None > LOD		0	
1.4-Dichlorobenzene	ug/l	20		56	0	None > LOD	None > LOD		0	
sec-Butylbenzene	ug/l			56	0	None > LOD	None > LOD			
tert-Butylbenzene	ug/l			56	1	6	6	SWSJ23 @ 6.62		
1.3-Dichlorobenzene	ug/l	20		56	0	None > LOD	None > LOD		0	
n-Butylbenzene	ug/l			56	0	None > LOD	None > LOD			
1.2-Dibromo-3-chloropropane	ug/l			56	0	None > LOD	None > LOD			
1.2.4-Trichlorobenzene	ug/l	0.4		56	0	None > LOD	None > LOD		0	
Naphthalene	ug/l	2		56	1	7	7	LGBH04 @	1	
1.2.3-Trichlorobenzene	ug/l	0.4		56	1	21701	21701	LGBH011 @	1	
Hexachlorobutadiene	ug/l	0.6		56	0	None > LOD	None > LOD		0	
Chloroethene	ug/l			15	0	None > LOD	None > LOD			
Tribromomethane	ug/l		100	9	0	None > LOD	None > LOD			0
PCBs										
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0	6	0	None > LOD	None > LOD		0	0
PCB congener 105	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 114	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 118	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 123	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 126	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 156	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 157	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 167	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 169	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 189	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 77	ug/l			4	0	None > LOD	None > LOD			0
PCB congener 81	ug/l			4	0	None > LOD	None > LOD			0

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH02	LGBH02	LGBH02	LGBH02	LGBH03	LGBH03	LGBH03	LGBH03	LGBH01	LGBH01	SBHJ04	SBHJ04	BH515	BH515	BH515	LGBH04	LGBH04	LGBH04
Round				Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 3	Round 1	Round 2	Round 1
Sampled Date				12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	06/03/2015	13/03/2015	18/03/2015	12/03/2002	12/03/2002	22/02/2008
Depth														6.67	13.10	10.62	10.64	8.40			
Response Zone (RZ) Details		**EQS**	**DWS**	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	TFD	TFD	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	MG-CS	MG-CS	MG-CS
Installation Details				1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	8.5 - 10.5	8.5 - 10.5	12.1 - 13.1	12.1 - 13.1	9.8 - 13.2	9.8 - 13.2	9.8 - 13.2	1 - 11	1 - 11	1 - 11
Location				**Lagoon 12**															**Lagoon 25**		
Metals																					
Arsenic Dissolved	ug/l	50	10	3	3	<1	1	2	3	2	2	6	10	9	20	11		10	2	2	3
Beryllium Dissolved	ug/l					<1	<1			<1	<1			<1	<1						<1
Boron	ug/l	2000	1000													960		1500			
Cadmium Dissolved	ug/l	0.15	5													<0.08		<0.08			
Calcium Dissolved	ug/l			496	514	510000	410000	480	522	480000	380000			110000	150000				612	578	660000
Chromium Dissolved	ug/l		50	1	<1	<1	3	5	8	14	9	2	<1	2	18	21		35	<1	<1	2
Copper Dissolved	ug/l	10	2000	3	6	62	29	17	13	20	6	2	<1	5.3	<1.6	6.4		8.4	12	9	14
Iron Dissolved	ug/l	1000	200	<10	<10	<50	57	<10	<10	190	130	50	<10	1200	3500				<10	<10	140
Lead Dissolved	ug/l	1.2	10	5	38	82	39	5	1	3.1	0.7	<1	<1	1.3	<0.5	<1		<1	34	9	1.4
Mercury Dissolved	ug/l	0.07	1													<0.5		<0.5			
Magnesium Dissolved	ug/l			<30	<30	<40	<40	<30	<30	200	<40			190000	270000				<30	<30	<40
Manganese Dissolved	ug/l	30	50	5	6	1	<1	<2	2	16	4			2300	1800				<2	4	8
Nickel Dissolved	ug/l	4	20	5	7	5.1	6.6	5	8	5.6	8.6	14	25	3.6	5.9	5.9		9.7	12	8	11
Selenium Dissolved	ug/l		10	11	7	3	4	5	6	3	5	17	10	22	33	12		16	5	9	5
Vanadium Dissolved	ug/l					<1	<1			13	5			3	5						1
Zinc Dissolved	ug/l	75														6.5		14			
Cadmium Total	ug/l	0.15	5	<0.1	<0.1	<0.4	<0.4	<0.1	<0.1	<0.4	<0.4	<0.1	<0.1	<0.4	23				<0.1	<0.1	21
Zinc Total	ug/l	75		4	11	75	170	8	3	86	110	16	15	240	8100				71	31	680
Mercury Total	ug/l	0.07	1	<0.1	<0.1	0.04	0.05	<0.1	<0.1	<0.01	<0.01	<0.1	<0.1	<0.01	<0.01				<0.1	<0.1	0.03
Non-Metal Inorganics																					
Hardness Total	mg/l					1200	910			1200	790			1200	1300						1100
Total Alkalinity as CaCO3	mg/l			1270	1320	700	880	1160	1200	750	750			1700	6900	1900		1400	1730	1670	1800
BOD	mg/l	5				<1	7			1	3			7	41						220
COD	mg/l					180	91			38	43			1000	2900						300
Potassium Dissolved	mg/l			137	161	110	99	65.6	54.9	38	42			78	80				134	124	200
Sodium Dissolved	mg/l		200	40.7	44.2	30	32	19.9	23.1	11	22			2900	2700				61.9	54.5	110
Nitrate as NO3	mg/l		50	1.1	1.1	<1.5	<1.5	1	0.8	<0.6	<0.3			<0.3	<0.3				0.6	<0.5	<0.3
Nitrite as NO2	mg/l		0.5																		
Sulphate (soluble)	mg/l	400	250	227	235	230	190	148	302	100	89	1160	901	89	59				201	30	8
Chloride	mg/l	250	250	13	9	36	29	12	3	32	30			3200	3400	450		510	70	42	110
Sulphide	mg/l					<0.5	<0.5	<0.2	<0.2	<0.5	<0.5			<0.5	<0.5				<0.2		<0.5
Phosphate	mg/l			<0.1	0.1			0.1	<0.1			<0.01	0.2						0.1	<0.1	
Fluoride	mg/l	5000	1500	1.2	2.9			2.2	2.2										1.2	2.8	
Ammoniacal Nitrogen as N	mg/l	0.6		3.6	4.8	2.8	1.9	1.6	1	2.4	2.2	4.2	9.8	31	35	12		14	9.9	9.3	5.4
unionised ammonia	mg/l					2.791	1.896			2.39	2.195			0.306	0.37						
Total Ammonium as NH4	mg/l		0.5											39							
Hexavalent Chromium	mg/l		50								<0.03										
Phenols Monohydric	mg/l			<0.05	<0.05	0.02	0.02	<0.05	<0.05	<0.01	0.01	0.06	0.16	<0.01	<0.01				0.06	0.06	<0.01
Thiocyanate	mg/l																				
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05
Free Cyanide	mg/l															<0.05		<0.05			
Free Cyanide Low	mg/l																				

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH04	LGBH05	LGBH05	LGBH05	LGBH07	SBHJ05	SBHJ05	SWSJ21	SWSJ21	SWSJ23	BH519	BH519	BH519	BH519	BH519	BH519	LGBH09	LGBH09
Round				Round 2	Round 1	Round 2	Round 3	Round 1	Round 1	Round 2	Round 1	Round 2	Round 1	1		2		3		Round 1	Round 2
Sampled Date				18/03/2008	27/02/2002	27/02/2002	27/02/2002	27/02/2002	22/02/2008	18/03/2008	27/02/2008	18/03/2008		19/03/2015		26/03/2015		01/04/2015		27/02/2002	27/02/2002
Depth									9.07	11.5	5.72	6	6.62	3.49	8.67	3.52	7.97	3.71	7.03		
Response Zone (RZ) Details		EQS	DWS	MG-CS	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS	MG-CS	MG-CS	MG-SS	MG-SS	MG-SS	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG/TFD	MG/TFD
Installation Details				1 - 11	2 - 7	2 - 7	2 - 7	1 - 12.2	9.5 - 11.5	9.5 - 11.5	4 - 6	4 - 6	5.8 - 7.8	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	1.5 - 7	1.5 - 7
Location																					
Metals																					
Arsenic Dissolved	ug/l	50	10	4	<1	3	1	2	5	4	4	5	3	5.8	23	6.3	38	4.5	38	5	5
Beryllium Dissolved	ug/l			<1					<1	<1	<1	<1	<1								
Boron	ug/l	2000	1000											300	320	1200	1000	690	570		
Cadmium Dissolved	ug/l	0.15	5											<0.08	<0.08	<0.08	<0.08	<0.08	<0.08		
Calcium Dissolved	ug/l			600000	268		266	609	38000	66000	360000	690000	470000							70.8	84.6
Chromium Dissolved	ug/l		50	2	13	1	11	<1	<1	2	1	2	<1	29	68	35	87	13	25	2	<1
Copper Dissolved	ug/l	10	2000	9.3	6	2	9	4	3.1	6	<1.6	4.1	23	36	74	8.1	25	2.8	9.1	1	1
Iron Dissolved	ug/l	1000	200	110	30	<10	<10	<10	83	<50	140	66	<50							<10	<10
Lead Dissolved	ug/l	1.2	10	1.2	<1	<1	<1	2	1.8	0.8	180	1500	1000	<1	<1	<1	<1	<1	<1	<1	<1
Mercury Dissolved	ug/l	0.07	1											<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Magnesium Dissolved	ug/l			99	<30		<30	<30	790	<40	<40	<40	<40							36300	47800
Manganese Dissolved	ug/l	30	50	4			3	<2	9	1	3	2	4							164	216
Nickel Dissolved	ug/l	4	20	15	12	6	4	8	9.5	8.1	36	10	9.7	3.4	7.1	4.6	7.3	2.8	11	5	14
Selenium Dissolved	ug/l		10	7	2	1	3	5	6	6	4	3	4	9.8	27	19	62	3.6	12	3	3
Vanadium Dissolved	ug/l			<1					110	64	<1	<1	<1								
Zinc Dissolved	ug/l	75												2.3	3.5	4.4	3.8	4.6	5.2		
Cadmium Total	ug/l	0.15	5	<0.4	<0.1	<0.1	<0.1	<0.1	0.5	<0.4	480	0.5	10							<0.1	<0.1
Zinc Total	ug/l	75		120	4	12	10	10	190	130	1100	3200	12000							22	18
Mercury Total	ug/l	0.07	1	0.03	<0.1	<0.1	<0.1	<0.1	0.01	0.02	<0.01	<0.01	NDP							<0.1	<0.1
Non-Metal Inorganics																					
Hardness Total	mg/l			1600					99	160	770	1800	1200								
Total Alkalinity as CaCO3	mg/l			1600	675		683	1790	280	360	8700	1600	1700	730	1700	960	2400	1400	3000	438	539
BOD	mg/l	5		52					47	18	41	<1	10								
COD	mg/l			340					1300	400	780	2000	530								
Potassium Dissolved	mg/l			190	12		14.4	156	140	170	140	150	320							15.8	20.6
Sodium Dissolved	mg/l		200	80	19.3		31.6	66.5	120	120	62	59	170							228	274
Nitrate as NO3	mg/l		50	1.6	<0.5		<0.5	0.9	<0.3	<0.3	<0.3	<0.3	<0.3							<0.5	<0.5
Nitrite as NO2	mg/l		0.5																		
Sulphate (soluble)	mg/l	400	250	7	80.9	65.8	79.1	19.4	48	38	11	9	17							11.4	9.73
Chloride	mg/l	250	250	110	668		32	75	140	100	84	110	160	320	1100	360	1500	440	1400	282	363
Sulphide	mg/l			<0.5			<0.2		<0.5	<0.5	<0.5	<0.5	<0.5							<0.2	<0.2
Phosphate	mg/l				<0.1	0.1	0.2	0.1												0.2	0.1
Fluoride	mg/l	5000	1500		2		0.2	1.4												3.5	2
Ammoniacal Nitrogen as N	mg/l	0.6		4.7	1.3	9.3	3.8	8.3	5.8	6.2	0.7	2.1	3.4	6.7	10	7.8	15	8.6	15	5	6
unionised ammonia	mg/l			4.693					5.728	6.153	0.699	2.097									
Total Ammonium as NH4	mg/l		0.5						7.5				3.1								
Hexavalent Chromium	mg/l		50																		
Phenols Monohydric	mg/l			0.08	<0.05	<0.05	<0.05	0.06	0.1	0.13	0.05	0.06	0.14							<0.05	<0.05
Thiocyanate	mg/l																				
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Free Cyanide	mg/l													<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Free Cyanide Low	mg/l																				

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH09	LGBH09	LGBH09	SWSJ34	SWSJ34	LGBH010	LGBH010	LGBH010	LGBH010	SBHJ06	SBHJ06	SBHJ07	SBHJ07	SWSJ37	SWSJ37	LGBH012	LGBH012	LGBH012
Round				Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1
Sampled Date				27/02/2002	22/02/2008	17/03/2008	27/02/2008	19/03/2008	27/02/2002	07/03/2002	27/02/2008	18/03/2008	21/02/2008	17/03/2008	22/02/2008	17/03/2008	22/02/2008	19/03/2008	27/02/2002	27/02/2002	22/02/2008
Depth													1.32	4.1	1.4	10.4	0.55	5.6			
Response Zone (RZ) Details		**EQS**	**DWS**	MG/TFD	MG/TFD	MG/TFD	MG-CS	MG-CS	TFD	TFD	TFD	TFD	TFD(Peat)	TFD(Peat)	TFD/MM	TFD/MM	TFD	TFD	MG/TFD	MG/TFD	MG/TFD
Installation Details				1.5 - 7	1.5 - 7	1.5 - 7	3 - 6	3 - 6	11 - 15	11 - 15	11 - 15	11 - 15	3.1 - 4.1	3.1 - 4.1	8.4 - 10.4	8.4 - 10.4	4.1 - 5.6	4.1 - 5.6	1.5 - 7	1.5 - 7	1.5 - 7
Location				**Lagoon 27 SW**																	
Metals																					
Arsenic Dissolved	ug/l	50	10	4	5	8	8	6.2	6	1	12	22	7	5	7	18	3	3.7	7	3	1
Beryllium Dissolved	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1	<1	<1	<1			<1
Boron	ug/l	2000	1000																		
Cadmium Dissolved	ug/l	0.15	5																		
Calcium Dissolved	ug/l				160000	130000	290000	270000			160000	140000	220000	210000	190000	120000	180000	110000			90000
Chromium Dissolved	ug/l		50	2	1	13	2	<1	2	<1	10	4	13	12	<1	26	<1	15	4	<1	<1
Copper Dissolved	ug/l	10	2000	2	1.9	<1.6	<1.6	7.2	2	2	<1.6	<1.6	2.2	<1.6	2.3	2.5	<1.6	4.2	2	8	1.7
Iron Dissolved	ug/l	1000	200	<10	150	88	210	<50	10	<10	5800	3100	240	170	840	570	1800	430	10	250	250
Lead Dissolved	ug/l	1.2	10	<1	<0.5	<0.5	71	53	1	<1	<0.5	<0.5	2.8	<0.5	8.2	<0.5	1.1	<0.4	<1	<1	1.4
Mercury Dissolved	ug/l	0.07	1																		
Magnesium Dissolved	ug/l				190000	130000	<40	<40			170000	170000	200000	180000	130000	160000	150000	150000			68000
Manganese Dissolved	ug/l	30	50		1600	1200	2	6			1300	1100	2100	1900	2100	630	2100	850			1600
Nickel Dissolved	ug/l	4	20	4	3.3	4.1	8.1	4.9	6	6	4.7	3.7	7.7	5.5	4	5.5	3.6	6.9	5	6	1.9
Selenium Dissolved	ug/l		10	4	9	11	1	<1	5	6	7	11	19	12	8	9	8	9	3	1	<1
Vanadium Dissolved	ug/l				<1	2	<1	1			10	8	<1	4	4	10	1	7			2
Zinc Dissolved	ug/l	75																			
Cadmium Total	ug/l	0.15	5	<0.1	<0.4	<0.4	12	45	<0.1	<0.1	0.7	<0.4	3	2.3	<0.4	18	<0.4	<0.4	<0.1	<0.1	<0.4
Zinc Total	ug/l	75		15	100	62	1300	82000	31	5	960	130	320	230	58	6500	170	1600	6	12	76
Mercury Total	ug/l	0.07	1	<0.1	<0.01	<0.01	<0.01	0.05	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.1	<0.1	<0.01
Non-Metal Inorganics																					
Hardness Total	mg/l				1300	710	680	570			1100	1100	1300	1100	890	810	1100	850			510
Total Alkalinity as CaCO3	mg/l				1600	1100	20000	1600			1300	1600	1500	1400	1200	810	1200	1500			670
BOD	mg/l	5			6	4	>33	15			18	16	5	<1	8	30	73	2			7
COD	mg/l				210	91	150	280			340	540	290	1200	140	3200	2900	530			130
Potassium Dissolved	mg/l				60	38	580	340			48	56	39	53	33	63	47	38			23
Sodium Dissolved	mg/l		200		2000	680	380	200			790	1100	1300	1200	900	1400	900	980			230
Nitrate as NO3	mg/l		50		<0.3	<0.3	<0.3	<0.3			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			<0.3
Nitrite as NO2	mg/l		0.5																		
Sulphate (soluble)	mg/l	400	250	11.4	<3	<3	8	8	1.55	148	<3	29	16	7	170	110	26	<3	60.6	10.7	14
Chloride	mg/l	250	250		1500	760	90	45			850	910	1500	1700	540	1300	750	950			140
Sulphide	mg/l				<0.5	<0.5	<0.5	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5
Phosphate	mg/l			<0.1					2	<0.1									0.1	0.2	
Fluoride	mg/l	5000	1500																		
Ammoniacal Nitrogen as N	mg/l	0.6		1.4	13	6.1	1.2	1.2	18.9	9.7	15	17	9.8	9.4	9.3	16	32	18	3.6	4.7	4.1
unionised ammonia	mg/l				0.062	0.171	1.199	1.198			0.213	0.265	0.072	0.122	0.101	0.298	0.13	1.599			0.039
Total Ammonium as NH4	mg/l		0.5				1.8								12						
Hexavalent Chromium	mg/l		50											<0.03							
Phenols Monohydric	mg/l			<0.05	<0.01	<0.01	0.04	<0.01	<0.05	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.05	<0.05	<0.01
Thiocyanate	mg/l																				
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05
Free Cyanide	mg/l																				
Free Cyanide Low	mg/l																				

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**LGBH012**	**BH521**	**BH521**	**BH521**	**BH521**	**BH521**	**BH521**	**LGBH011**	**LGBH011**	**LGBH011**	**LGBH011**	**LGBH011**	**SBHJ08A**	**SBHJ08A**	**SBHJ09**	**SBHJ09**	**SBHJ10**	**SBHJ10**
Round				Round 2	1		2		3		Round 1	Round 2	Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2
Sampled Date				17/03/2008	19/03/2015		26/03/2015		01/04/2015		11/03/2002	11/03/2002	11/03/2002	27/02/2008	18/03/2008	22/02/2008	18/03/2008	21/02/2008	18/03/2008	22/02/2008	17/03/2008
Depth					05/01/1900	08/01/1900	05/01/1900	08/01/1900	05/01/1900	07/01/1900						2.31	7.4	0.85	2.2	2.24	10
Response Zone (RZ) Details		**EQS**	**DWS**	MG/TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	TFD(Peat)	TFD(Peat)	MG	MG	TFD	TFD
Installation Details				1.5 - 7	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	6.4 - 7.4	6.4 - 7.4	1 - 2.2	1 - 2.2	9 - 10	9 - 10
Location				**Lagoon 27 SE**							**Lagoon 27NE**										
Metals																					
Arsenic Dissolved	ug/l	50	10	5	9.4	10	13	9.5	10	14	3	10		6	9	2	6	2	1	12	21
Beryllium Dissolved	ug/l			<1										<1	<1	<1	<1	<1	<1	<1	<1
Boron	ug/l	2000	1000		500	390	1600	1400	930	550											
Cadmium Dissolved	ug/l	0.15	5		<0.08	<0.08	<0.08	<0.08	0.094	<0.08											
Calcium Dissolved	ug/l			94000										110000	74000	610000	430000	750000	800000	120000	140000
Chromium Dissolved	ug/l		50	7	29	39	39	52	25	21	1	2		4	2	<1	1	2	2	<1	12
Copper Dissolved	ug/l	10	2000	<1.6	26	26	6.9	12	2.7	8.5	<1	1		<1.6	6.3	4.2	5.8	10	4.5	<1.6	<1.6
Iron Dissolved	ug/l	1000	200	86							30	170		6200	120	<50	<50	150	77	150	5300
Lead Dissolved	ug/l	1.2	10	<0.5							<1	1		<0.5	1	5.2	0.7	1.2	1.5	0.8	<0.5
Mercury Dissolved	ug/l	0.07	1																		
Magnesium Dissolved	ug/l			69000										39000	19000	<40	<40	100	<40	170000	200000
Manganese Dissolved	ug/l	30	50	1600										2100	770	2	2	3	<1	360	520
Nickel Dissolved	ug/l	4	20	2.6	2.9	5.8	3.7	13	3.8	10	14	4		2.6	4	9.9	12	19	11	7.3	6.9
Selenium Dissolved	ug/l		10	5	9.6	14	18	27	2.9	6.7	8	3		3	6	<1	2	3	<1	24	31
Vanadium Dissolved	ug/l			5										3	2	4	8	3	2	3	<1
Zinc Dissolved	ug/l	75			2.3	3.3	2.9	3.8	3.5	12											
Cadmium Total	ug/l	0.15	5	0.7							<0.1	<0.1		1.1	<0.4	<0.4	<0.4	1.3	<0.4	<0.4	3.8
Zinc Total	ug/l	75		150							4	16		760	140	130	160	490	250	67	8000
Mercury Total	ug/l	0.07	1	0.03							<0.1	<0.1		<0.01	<0.01	0.02	0.02	0.03	<0.01	<0.01	0.07
Non-Metal Inorganics																					
Hardness Total	mg/l			520										410	260	1600	1100	1900	2100	1000	1100
Total Alkalinity as CaCO3	mg/l			780			950	1300	1400	2700				590	240	1600	950	1800	2000	1200	4400
BOD	mg/l	5		6										28	25	<1	55	8	9	5	33
COD	mg/l			150										760	580	100	2600	300	310	3500	7400
Potassium Dissolved	mg/l			19										66	100	21	23	23	26	69	68
Sodium Dissolved	mg/l		200	200										200	100	48	72	42	22	4600	3500
Nitrate as NO3	mg/l		50	<0.3										0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Nitrite as NO2	mg/l		0.5																		
Sulphate (soluble)	mg/l	400	250	11							241	13		210	240	6	19	13	17	500	550
Chloride	mg/l	250	250	130			290	500	190	670				150	62	38	60	30	20	3700	4300
Sulphide	mg/l			<0.5							1.3	<0.2		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phosphate	mg/l										<0.1	3.6									
Fluoride	mg/l	5000	1500																		
Ammoniacal Nitrogen as N	mg/l	0.6		4.3			7.2	7.8	6.7	14	6.9	15.1		6	4.9	4	5.6	1.5	1.6	2.4	36
unionised ammonia	mg/l			0.06										0.055	0.128	3.996	5.587	1.498	1.598	0.017	0.719
Total Ammonium as NH4	mg/l		0.5															1.9			
Hexavalent Chromium	mg/l		50																		
Phenols Monohydric	mg/l			<0.01							0.08	<0.05		<0.01	0.01	0.06	0.28	0.02	0.02	<0.01	<0.01
Thiocyanate	mg/l																<0.05				
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Free Cyanide	mg/l				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05						<0.01	<0.05				
Free Cyanide Low	mg/l																				

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		BH525	BH525	BH525	BH525	BH525	BH525	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043
Round				1		2		3		1		2		3	
Sampled Date				19/03/2015		26/03/2015		01/04/2015		12/05/2016		25/05/2016		02/06/2016	
Depth				2.55	3.92	2.49	3.47	1.98	2.28	1.93	1.92	1.99	1.96	2.12	2.05
Response Zone (RZ) Details				MG	TFD / GFD	MG	TFD / GFD	TFD / GFD	MG	TFD / MM	MG	TFD / MM	MG	TFD / MM	MG
Installation Details				0.5 - 2.8	9.8 - 11.8	0.5 - 2.8	9.8 - 11.8	9.8 - 11.8	0.5 - 2.8	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6
Location				Lagoon 26											
Metals															
Arsenic Dissolved	ug/l	50	10	3.6	25	7.6	21	10	8.4	19.8	1.24	23.1	0.541	2.7	0.242
Beryllium Dissolved	ug/l														
Boron	ug/l	2000	1000	86	290	540	1100	440	250						
Cadmium Dissolved	ug/l	0.15	5	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.1	<0.1	<0.1	<0.1	0.146	<0.1
Calcium Dissolved	ug/l														
Chromium Dissolved	ug/l		50	16	100	15	130	32	19	14.4	0.419	1.93	0.345	0.701	0.307
Copper Dissolved	ug/l	10	2000	31	110	4.8	25	11	5.4	<0.85	40.7	6.22	20.3	4.31	13.8
Iron Dissolved	ug/l	1000	200												
Lead Dissolved	ug/l	1.2	10	<1	<1	<1	<1	<1	<1	1.04	1.29	0.804	3.47	0.22	3.23
Mercury Dissolved	ug/l	0.07	1	<1	<1	<1	<1	0.56	<1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Magnesium Dissolved	ug/l														
Manganese Dissolved	ug/l	30	50												
Nickel Dissolved	ug/l	4	20	2.7	3.6	4.6	6.1	5.7	3.7	7.91	18	5.25	8.53	4.74	12.9
Selenium Dissolved	ug/l		10	6.4	38	15	75	20	7.3	13.3	1.16	7.69	1	6.11	<0.39
Vanadium Dissolved	ug/l									9.78	0.787	158	0.28	5.31	<0.24
Zinc Dissolved	ug/l	75		2.9	6	<1	4.9	5.6	3.9	2.39	4.88	1.34	1.75	<0.41	2.95
Cadmium Total	ug/l	0.15	5												
Zinc Total	ug/l	75													
Mercury Total	ug/l	0.07	1												
Non-Metal Inorganics															
Hardness Total	mg/l														
Total Alkalinity as CaCO3	mg/l			110	750	230	990	1300	93	2300	5200	3000	2880	973	2560
BOD	mg/l	5													
COD	mg/l														
Potassium Dissolved	mg/l														
Sodium Dissolved	mg/l		200												
Nitrate as NO3	mg/l		50							<0.3	<0.3	<0.3	<0.3	0.324	<0.3
Nitrite as NO2	mg/l		0.5							<0.05	0.074	0.099	<0.05	<0.05	<0.05
Sulphate (soluble)	mg/l	400	250												
Chloride	mg/l	250	250	200	2200	240	3000	3200	200	1730	18.5	760	14.9	602	15.5
Sulphide	mg/l														
Phosphate	mg/l														
Fluoride	mg/l	5000	1500												
Ammoniacal Nitrogen as N	mg/l	0.6		1.3	17	2.2	23	25	1.4	24.1	1.75	10.1	1.54	6	1.51
unionised ammonia	mg/l														
Total Ammonium as NH4	mg/l		0.5												
Hexavalent Chromium	mg/l		50												
Phenols Monohydric	mg/l														
Thiocyanate	mg/l														
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05						
Free Cyanide	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05						
Free Cyanide Low	mg/l														

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**LGBH02**	**LGBH02**	**LGBH02**	**LGBH02**	**LGBH03**	**LGBH03**	**LGBH03**	**LGBH03**	**LGBH01**	**LGBH01**	**SBHJ04**	**SBHJ04**	**BH515**	**BH515**	**BH515**	**LGBH04**	**LGBH04**	**LGBH04**
Round				Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 3	Round 1	Round 2	Round 1
Sampled Date				12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	06/03/2015	13/03/2015	18/03/2015	12/03/2002	12/03/2002	22/02/2008
Depth														6.67	13.10	10.62	10.64	8.40			
Response Zone (RZ) Details		**EQS**	**DWS**	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	TFD	TFD	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	MG-CS	MG-CS	MG-CS
Installation Details				1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	8.5 - 10.5	8.5 - 10.5	12.1 - 13.1	12.1 - 13.1	9.8 - 13.2	9.8 - 13.2	9.8 - 13.2	1 - 11	1 - 11	1 - 11
Location				**Lagoon 12**															**Lagoon 25**		
Complex Cyanide	mg/l																				
Complex Cyanide Low	mg/l																				
Carbon Dioxide Dissolved	ug/l													74							
Conductivity @ 20 deg.C	mS/cm																				
pH Value	pH units	6-9	6.5-10	12.5	12.6	12.21	12.45	12.6	12.3	12.09	12.4	13	12.8	7.73	7.76	7.4		8	12.7	12.4	12.74
Organics																					
GRO (C4-C12)	ug/l					<10	<10			<10	<10			<10	<10						<10
GRO Surrogate % recovery**	%																				
MTBE	ug/l					<10	<10			<10	<10			<10	<10		<1				<10
Benzene	ug/l	10	1			**<10**	**<10**			**<10**	**<10**			**<10**	**<10**	**<1**	**<1**	**<1**			**<10**
Toluene	ug/l	50		<5	<5	<10	<10	<5	<5	<10	<10	<5	7	<10	<10	<1	<1	<1	<5	<5	<10
Ethyl benzene	ug/l	20				<10	<10			<10	<10			<10	<10	<1	<1	<1			<10
m & p Xylene	ug/l	30				<10	<10			<10	<10			<10	<10	<1	<1	<1			<10
o Xylene	ug/l	30				<10	<10			<10	<10			<10	<10	<1	<1	<1			<10
Aliphatics C5-C6	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			<10
Aliphatics >C6-C8	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			<10
Aliphatics >C8-C10	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			<10
Aliphatics >C10-C12	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			<10
Aliphatics >C12-C16 Aqueous	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			<10
Aliphatics >C16-C21 Aqueous	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			24
Aliphatics >C21-C35 Aqueous	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			170
Total Aliphatics C5-C35 Aqueous	ug/l					<10	<10			<10	<10			<10	<10						190
Aliphatics >C35-44	ug/l															<0.1		<0.1			
Aromatics C5-C7	ug/l															<0.1		<0.1			
Aromatics C6-C7	ug/l					<10	<10			<10	<10			<10	<10						<10
Aromatics >C7-C8	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			<10
Aromatics >EC8-EC10	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			<10
Aromatics >EC10-EC12	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			<10
Aromatics >EC12-EC16 Aqueous	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			75
Aromatics >EC16-EC21 Aqueous	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			170
Aromatics >EC21-EC35 Aqueous	ug/l					<10	<10			<10	<10			<10	<10	<0.1		<0.1			1700
Total Aromatics C6-C35 Aqueous	ug/l					<10	<10			<10	<10			<10	<10						1900
Aromatics >C35-44	ug/l															<0.1		<0.1			
TPH GC (C10-C37)	ug/l				160			380					920						480		
TPH (Aliphatics and Aromatics C5-C35)	ug/l					<10	<10			<10	<10			<10	<10						2100
Total Aliphatic	ug/l															<5		<5			
Total Aromatic	ug/l															<5		<5			
Total Petroleum Hydrocarbons	ug/l															<10		<10			
PAHs																					
Acenaphthene	ug/l																				
Acenaphthylene	ug/l																				
Anthracene	ug/l																				
Benzo(a)anthracene	ug/l																				

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH04	LGBH05	LGBH05	LGBH05	LGBH07	SBHJ05	SBHJ05	SWSJ21	SWSJ21	SWSJ23	BH519	BH519	BH519	BH519	BH519	BH519	LGBH09	LGBH09
Round		EQS	DWS	Round 2	Round 1	Round 2	Round 3	Round 1	Round 1	Round 2	Round 1	Round 2	Round 1	1		2		3		Round 1	Round 2
Sampled Date				18/03/2008	27/02/2002	27/02/2002	27/02/2002	27/02/2002	22/02/2008	18/03/2008	27/02/2008	18/03/2008		19/03/2015		26/03/2015		01/04/2015		27/02/2002	27/02/2002
Depth									9.07	11.5	5.72	6	6.62	3.49	8.67	3.52	7.97	3.71	7.03		
Response Zone (RZ) Details				MG-CS	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS	MG-CS	MG-CS	MG-SS	MG-SS	MG-SS	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG/TFD	MG/TFD
Installation Details				1 - 11	2 - 7	2 - 7	2 - 7	1 - 12.2	9.5 - 11.5	9.5 - 11.5	4 - 6	4 - 6	5.8 - 7.8	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	1.5 - 7	1.5 - 7
Location																					
Complex Cyanide	mg/l																				
Complex Cyanide Low	mg/l																				
Carbon Dioxide Dissolved	ug/l								<1				<1								
Conductivity @ 20 deg.C	mS/cm																				
pH Value	pH units	6-9	6.5-10	12.57	11.8	9.2	12.3	12.7	11.63	11.85	12.44	12.62	12.65	7.9	7.6	7.5	7.4	8.8	9.2	7.8	8.2
Organics																					
GRO (C4-C12)	ug/l			14					<10	<10	<10	<10	<10								
GRO Surrogate % recovery**	%																				
MTBE	ug/l			<10					<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1		
Benzene	ug/l	10	1	<10					<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1		
Toluene	ug/l	50		<10	<5	<5	<5	<5	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<5	<5
Ethyl benzene	ug/l	20		<10					<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1		
m & p Xylene	ug/l	30		<10					<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1		
o Xylene	ug/l	30		<10					<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1		
Aliphatics C5-C6	ug/l			<10					<10	<10	<10	<10	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Aliphatics >C6-C8	ug/l			14					<10	<10	<10	<10	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Aliphatics >C8-C10	ug/l			<10					<10	<10	<10	<10	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Aliphatics >C10-C12	ug/l			<10					<10	<10	<10	<10	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Aliphatics >C12-C16 Aqueous	ug/l			<10					<10	<10	42	<10	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Aliphatics >C16-C21 Aqueous	ug/l			<10					<10	<10	1300	<10	<10	6.4	0.5	<0.1	<0.1	<0.1	<0.1		
Aliphatics >C21-C35 Aqueous	ug/l			<10					<10	<10	940	<10	<10	420	220	<0.1	<0.1	<0.1	<0.1		
Total Aliphatics C5-C35 Aqueous	ug/l			14					<10	<10	2300	<10	<10								
Aliphatics >C35-44	ug/l													37	18	<0.1	<0.1	<0.1	<0.1		
Aromatics C5-C7	ug/l													<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Aromatics C6-C7	ug/l			<10					<10	<10	<10	<10	<10								
Aromatics >C7-C8	ug/l			<10					<10	<10	<10	<10	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Aromatics >EC8-EC10	ug/l			<10					<10	<10	<10	<10	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Aromatics >EC10-EC12	ug/l			<10					<10	<10	<10	<10	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Aromatics >EC12-EC16 Aqueous	ug/l			<10					<10	<10	55	<10	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Aromatics >EC16-EC21 Aqueous	ug/l			<10					<10	<10	300	<10	<10	5.7	0.5	<0.1	<0.1	<0.1	<0.1		
Aromatics >EC21-EC35 Aqueous	ug/l			<10					<10	<10	720	<10	<10	79	74	<0.1	<0.1	<0.1	<0.1		
Total Aromatics C6-C35 Aqueous	ug/l			<10					<10	<10	1100	<10	<10								
Aromatics >C35-44	ug/l													14	11	<0.1	<0.1	<0.1	<0.1		
TPH GC (C10-C37)	ug/l							430													<10
TPH (Aliphatics and Aromatics C5-C35)	ug/l			14					<10	<10	3300	<10	<10								
Total Aliphatic	ug/l													460	240	<5	<5	<5	<5		
Total Aromatic	ug/l													99	86	<5	<5	<5	<5		
Total Petroleum Hydrocarbons	ug/l													560	320	<10	<10	<10	<10		
PAHs																					
Acenaphthene	ug/l																				
Acenaphthylene	ug/l																				
Anthracene	ug/l																				
Benzo(a)anthracene	ug/l																				

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH09	LGBH09	LGBH09	SWSJ34	SWSJ34	LGBH010	LGBH010	LGBH010	LGBH010	SBHJ06	SBHJ06	SBHJ07	SBHJ07	SWSJ37	SWSJ37	LGBH012	LGBH012	LGBH012
Round				Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1
Sampled Date				27/02/2002	22/02/2008	17/03/2008	27/02/2008	19/03/2008	27/02/2002	07/03/2002	27/02/2008	18/03/2008	21/02/2008	17/03/2008	22/02/2008	17/03/2008	22/02/2008	19/03/2008	27/02/2002	27/02/2002	22/02/2008
Depth													1.32	4.1	1.4	10.4	0.55	5.6			
Response Zone (RZ) Details		EQS	DWS	MG/TFD	MG/TFD	MG/TFD	MG-CS	MG-CS	TFD	TFD	TFD	TFD	TFD(Peat)	TFD(Peat)	TFD/MM	TFD/MM	TFD	TFD	MG/TFD	MG/TFD	MG/TFD
Installation Details				1.5 - 7	1.5 - 7	1.5 - 7	3 - 6	3 - 6	11 - 15	11 - 15	11 - 15	11 - 15	3.1 - 4.1	3.1 - 4.1	8.4 - 10.4	8.4 - 10.4	4.1 - 5.6	4.1 - 5.6	1.5 - 7	1.5 - 7	1.5 - 7
Location				Lagoon 27 SW																	
Complex Cyanide	mg/l																				
Complex Cyanide Low	mg/l																				
Carbon Dioxide Dissolved	ug/l						<1								59						
Conductivity @ 20 deg.C	mS/cm																				
pH Value	pH units	6-9	6.5-10	7.5	7.41	8.19	12.74	12.61	7.3	12.2	7.89	7.93	7.6	7.85	7.77	8.01	7.34	8.72	7.9	7.5	7.71
Organics																					
GRO (C4-C12)	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
GRO Surrogate % recovery**	%																				
MTBE	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Benzene	ug/l	10	1		<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Toluene	ug/l	50		<5	<10	<10	<10	<10	<5	15	<10	<10	<10	<10	<10	<10	<10	<10	<5	<5	<10
Ethyl benzene	ug/l	20			<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
m & p Xylene	ug/l	30			<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
o Xylene	ug/l	30			<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aliphatics C5-C6	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aliphatics >C6-C8	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aliphatics >C8-C10	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aliphatics >C10-C12	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aliphatics >C12-C16 Aqueous	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aliphatics >C16-C21 Aqueous	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aliphatics >C21-C35 Aqueous	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	56	<10	<10	<10			<10
Total Aliphatics C5-C35 Aqueous	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	56	<10	<10	<10			<10
Aliphatics >C35-44	ug/l																				
Aromatics C5-C7	ug/l																				
Aromatics C6-C7	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aromatics >C7-C8	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aromatics >EC8-EC10	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aromatics >EC10-EC12	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aromatics >EC12-EC16 Aqueous	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aromatics >EC16-EC21 Aqueous	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aromatics >EC21-EC35 Aqueous	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Total Aromatics C6-C35 Aqueous	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	<10	<10	<10	<10			<10
Aromatics >C35-44	ug/l																				
TPH GC (C10-C37)	ug/l								<10											<10	
TPH (Aliphatics and Aromatics C5-C35)	ug/l				<10	<10	<10	<10			<10	<10	<10	<10	56	<10	<10	<10			<10
Total Aliphatic	ug/l																				
Total Aromatic	ug/l																				
Total Petroleum Hydrocarbons	ug/l																				
PAHs																					
Acenaphthene	ug/l																				
Acenaphthylene	ug/l																				
Anthracene	ug/l																				
Benzo(a)anthracene	ug/l																				

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**LGBH012**	**BH521**	**BH521**	**BH521**	**BH521**	**BH521**	**BH521**	**LGBH011**	**LGBH011**	**LGBH011**	**LGBH011**	**LGBH011**	**SBHJ08A**	**SBHJ08A**	**SBHJ09**	**SBHJ09**	**SBHJ10**	**SBHJ10**
Round				Round 2	1		2		3		Round 1	Round 2	Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2
Sampled Date				17/03/2008	19/03/2015		26/03/2015		01/04/2015		11/03/2002	11/03/2002	11/03/2002	27/02/2008	18/03/2008	22/02/2008	18/03/2008	21/02/2008	18/03/2008	22/02/2008	17/03/2008
Depth					05/01/1900	08/01/1900	05/01/1900	08/01/1900	05/01/1900	07/01/1900						2.31	7.4	0.85	2.2	2.24	10
Response Zone (RZ) Details				MG/TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	TFD(Peat)	TFD(Peat)	MG	MG	TFD	TFD
Installation Details				1.5 - 7	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	6.4 - 7.4	6.4 - 7.4	1 - 2.2	1 - 2.2	9 - 10	9 - 10
Location		**EQS**	**DWS**	**Lagoon 27 SE**							**Lagoon 27NE**										
Complex Cyanide	mg/l															<0.01	<0.05				
Complex Cyanide Low	mg/l																				
Carbon Dioxide Dissolved	ug/l																	<1			
Conductivity @ 20 deg.C	mS/cm																				
pH Value	pH units	6-9	6.5-10	7.88	8.2	7.7	8.2	7.6	9	9.1	11.8	7.1		7.7	8.16	12.72	12.35	12.71	12.7	7.59	8.04
Organics																					
GRO (C4-C12)	ug/l			<10										<10	<10	<10	<10	<10	<10	<10	<10
GRO Surrogate % recovery**	%																				
MTBE	ug/l			<10					<1	<1				<10	<10	<10	<10	<10	<10	<10	<10
Benzene	ug/l	10	1	<10	<1	<1	<1	<1	<1	<1				<10	<10	<10	<10	<10	<10	<10	<10
Toluene	ug/l	50		<10	<1	<1	<1	<1	<1	<1	104	35		<10	<10	<10	<10	<10	<10	<10	<10
Ethyl benzene	ug/l	20		<10	<1	<1	<1	<1	<1	<1				<10	<10	<10	<10	<10	<10	<10	<10
m & p Xylene	ug/l	30		<10	<1	<1	<1	<1	<1	<1				<10	<10	<10	<10	<10	<10	<10	<10
o Xylene	ug/l	30		<10	<1	<1	<1	<1	<1	<1				<10	<10	<10	<10	<10	<10	<10	<10
Aliphatics C5-C6	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<10	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<10	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C8-C10	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<10	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C10-C12	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<10	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C12-C16 Aqueous	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				280	130	<10	<10	<10	<10	<10	<10
Aliphatics >C16-C21 Aqueous	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				3000	1700	54	<10	<10	<10	<10	<10
Aliphatics >C21-C35 Aqueous	ug/l			<10	<0.1	150	<0.1	<0.1	<0.1	<0.1				17000	9400	820	690	39	<10	150	<10
Total Aliphatics C5-C35 Aqueous	ug/l			<10										20000	11000	870	690	39	<10	150	<10
Aliphatics >C35-44	ug/l				<0.1	16	<0.1	<0.1	<0.1	<0.1											
Aromatics C5-C7	ug/l				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1											
Aromatics C6-C7	ug/l			<10										<10	<10	<10	<10	<10	<10	<10	<10
Aromatics >C7-C8	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<10	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<10	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC10-EC12	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				<10	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC12-EC16 Aqueous	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				92	59	<10	<10	<10	<10	<10	<10
Aromatics >EC16-EC21 Aqueous	ug/l			<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				840	420	<10	<10	<10	<10	<10	<10
Aromatics >EC21-EC35 Aqueous	ug/l			<10	<0.1	60	<0.1	<0.1	<0.1	<0.1				5600	2700	150	<10	<10	<10	<10	<10
Total Aromatics C6-C35 Aqueous	ug/l			<10										6500	3200	150	<10	<10	<10	<10	<10
Aromatics >C35-44	ug/l				<0.1	9.8	<0.1	<0.1	<0.1	<0.1											
TPH GC (C10-C37)	ug/l										30500	11000									
TPH (Aliphatics and Aromatics C5-C35)	ug/l			<10										27000	14000	1000	690	39	<10	150	<10
Total Aliphatic	ug/l				<5	170	<5	<5	<5	<5											
Total Aromatic	ug/l				<5	70	<5	<5	<5	<5											
Total Petroleum Hydrocarbons	ug/l				<10	240	<10	<10	<10	<10											
PAHs																					
Acenaphthene	ug/l																				
Acenaphthylene	ug/l																				
Anthracene	ug/l																				
Benzo(a)anthracene	ug/l																				

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**BH525**	**BH525**	**BH525**	**BH525**	**BH525**	**BH525**	**BHM4CAN043**	**BHM4CAN043**	**BHM4CAN043**	**BHM4CAN043**	**BHM4CAN043**	**BHM4CAN043**
Round				1		2		3		1		2		3	
Sampled Date				19/03/2015		26/03/2015		01/04/2015		12/05/2016		25/05/2016		02/06/2016	
Depth				2.55	3.92	2.49	3.47	1.98	2.28	1.93	1.92	1.99	1.96	2.12	2.05
Response Zone (RZ) Details		**EQS**	**DWS**	MG	TFD / GFD	MG	TFD / GFD	TFD / GFD	MG	TFD / MM	MG	TFD / MM	MG	TFD / MM	MG
Installation Details				0.5 - 2.8	9.8 - 11.8	0.5 - 2.8	9.8 - 11.8	9.8 - 11.8	0.5 - 2.8	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6
Location				**Lagoon 26**											
Complex Cyanide	mg/l														
Complex Cyanide Low	mg/l														
Carbon Dioxide Dissolved	ug/l														
Conductivity @ 20 deg.C	mS/cm									4.83	6.64	3.25	7.4	3.78	6.87
pH Value	pH units	6-9	6.5-10	8.6	7.7	9.3	7.7	8.6	8.8	8.38	12.8	8.94	12.8	11.9	12.6
Organics															
GRO (C4-C12)	ug/l									<50	<50	<50	<50	<50	<50
GRO Surrogate % recovery**	%									85	83	89	74	97	93
MTBE	ug/l									<3	<3	<3	<3	<3	<3
Benzene	ug/l	10	1	<1	<1	<1	<1	<1	<1	<7	<7	<7	<7	<7	<7
Toluene	ug/l	50		<1	<1	<1	<1	<1	<1	<4	<4	<4	<4	<4	<4
Ethyl benzene	ug/l	20		<1	<1	<1	<1	<1	<1	<5	<5	<5	<5	<5	<5
m & p Xylene	ug/l	30		<1	<1	<1	<1	<1	<1	<8	<8	<8	<8	<8	<8
o Xylene	ug/l	30		<1	<1	<1	<1	<1	<1	<3	<3	<3	<3	<3	<3
Aliphatics C5-C6	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10
Aliphatics >C8-C10	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10
Aliphatics >C10-C12	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	11
Aliphatics >C12-C16 Aqueous	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	10	<10	<10	<10
Aliphatics >C16-C21 Aqueous	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	22	<10	51	<10	25	<10
Aliphatics >C21-C35 Aqueous	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	51	50	171	48	68	<10
Total Aliphatics C5-C35 Aqueous	ug/l									73	50	232	48	93	<10
Aliphatics >C35-44	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
Aromatics C5-C7	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10
Aromatics C6-C7	ug/l														
Aromatics >C7-C8	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10
Aromatics >EC10-EC12	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10
Aromatics >EC12-EC16 Aqueous	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10
Aromatics >EC16-EC21 Aqueous	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	<10	<10	<10	<10
Aromatics >EC21-EC35 Aqueous	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<10	17	<10	29	<10
Total Aromatics C6-C35 Aqueous	ug/l									<10	<10	17	<10	29	<10
Aromatics >C35-44	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
TPH GC (C10-C37)	ug/l														
TPH (Aliphatics and Aromatics C5-C35)	ug/l									73	64	251	49	135	38
Total Aliphatic	ug/l			<5	<5	<5	<5	<5	<5						
Total Aromatic	ug/l			<5	<5	<5	<5	<5	<5						
Total Petroleum Hydrocarbons	ug/l			<10	<10	<10	<10	<10	<10						
PAHs															
Acenaphthene	ug/l									0.0175	0.367	<0.075	0.655	0.0479	0.548
Acenaphthylene	ug/l									<0.011	0.0258	<0.055	0.0404	<0.011	0.0381
Anthracene	ug/l									<0.015	0.0597	<0.075	0.0932	0.0374	0.0705
Benzo(a)anthracene	ug/l									0.0174	0.0406	0.232	0.105	0.0889	0.0459

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**LGBH02**	**LGBH02**	**LGBH02**	**LGBH02**	**LGBH03**	**LGBH03**	**LGBH03**	**LGBH03**	**LGBH01**	**LGBH01**	**SBHJ04**	**SBHJ04**	**BH515**	**BH515**	**BH515**	**LGBH04**	**LGBH04**	**LGBH04**
Round				Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 3	Round 1	Round 2	Round 1
Sampled Date				12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	06/03/2015	13/03/2015	18/03/2015	12/03/2002	12/03/2002	22/02/2008
Depth														6.67	13.10	10.62	10.64	8.40			
Response Zone (RZ) Details		**EQS**	**DWS**	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	TFD	TFD	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	MG-CS	MG-CS	MG-CS
Installation Details				1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	8.5 - 10.5	8.5 - 10.5	12.1 - 13.1	12.1 - 13.1	9.8 - 13.2	9.8 - 13.2	9.8 - 13.2	1 - 11	1 - 11	1 - 11
Location				**Lagoon 12**															**Lagoon 25**		
Benzo(a)pyrene	ug/l	0.00017	0.01																		
Benzo(b)fluoranthene	ug/l	0.017	0.1																		
Benzo(ghi)perylene	ug/l																				
Benzo(k)fluoranthene	ug/l																				
Chrysene	ug/l																				
Dibenzo(a,h)anthracene	ug/l																				
Fluoranthene	ug/l	0.0063																			
Fluorene	ug/l																				
Indeno(1,2,3-cd)pyrene	ug/l		0.1																		
Naphthalene	ug/l	2																			
Pyrene	ug/l																				
Phenanthrene	ug/l																				
PAH, Total Detected USEPA 16	ug/l																				
SVOC by GCMS																					
Phenols																					
2-Chlorophenol	ug/l	50				<1	<1			<1	<1			<1	NDP		<0.5				<1
2-Methylphenol	ug/l	100				<1	<1			<1	<1			<1	NDP		<0.5				1
2-Nitrophenol	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
2,4-Dichlorophenol	ug/l	20				<1	<1			<1	<1			<1	NDP		<0.5				<1
2,4-Dimethylphenol	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				3
2,4,5-Trichlorophenol	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
2,4,6-Trichlorophenol	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
4-Chloro-3-methylphenol	ug/l	40				<1	<1			<1	<1			<1	NDP		<0.5				<1
4-Methylphenol	ug/l	100				<1	<1			<1	<1			<1	NDP		<0.5				7
4-Nitrophenol	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
Pentachlorophenol	ug/l	0.4				**<1**	**<1**			**<1**	**<1**			**<1**	NDP		<0.5				**<1**
Phenol	ug/l	7.7				7	5			<1	2			<1	NDP		<0.5				40
Phenols	mg/l	0.0077														0.04		<0.03			
Phenols Monohydric	mg/l	0.0077												**<0.01**	**<0.01**						
PAHs																					
2-Chloronaphthalene	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
2-Methylnaphthalene	ug/l					<1	<1			<1	3			<1	NDP		<0.5				2
Acenaphthene	ug/l			<0.002		<1	<1	<0.002		<1	<1	<0.002		<1	NDP	<0.1	<0.5	<0.1	<0.002		2
Acenaphthylene	ug/l			<0.002		<1	<1	<0.002		<1	<1	<0.002		<1	NDP	<0.1	<0.5	<0.1	<0.002		<1
Anthracene	ug/l	0.1		<0.002		**<1**	**<1**	<0.002		**<1**	**<1**	<0.002		**<1**	NDP	<0.1	<0.5	<0.1	<0.002		**<1**
Benzo(a)anthracene	ug/l			<0.002		<1	<1	<0.002		<1	<1	<0.002		<1	NDP	<0.1	<0.5	<0.1	<0.002		<1
Benzo(a)pyrene	ug/l	0.00017	0.01	<0.002		**<1**	**<1**	<0.002		**<1**	**<1**	<0.002		**<1**	NDP	<0.1	<0.5	<0.1	<0.002		**<1**
Benzo(b)fluoranthene	ug/l	0.017	0.1	**<0.002**		**<1**	**<1**	**<0.002**		**<1**	**<1**	**<0.002**		**<1**	NDP	<0.1	<0.5	<0.1	**<0.002**		**<1**
Benzo(k)fluoranthene	ug/l	0.017	0.1	**<0.002**		**<1**	**<1**	**<0.002**		**<1**	**<1**	**<0.002**		**<1**	NDP	<0.1	<0.5	<0.1	**<0.002**		**<1**
Benzo(ghi)perylene	ug/l	0.0082	0.1	**<0.002**		**<1**	**<1**	**<0.002**		**<1**	**<1**	**<0.002**		**<1**	NDP	<0.1	<0.5	<0.1	**<0.002**		**<1**
Indeno(1,2,3-cd)pyrene	ug/l		0.1	<0.002		**<1**	**<1**	<0.002		**<1**	**<1**	<0.002		**<1**	NDP	<0.1	<0.5	<0.1	<0.002		**<1**
Chrysene	ug/l			<0.002		<1	<1	<0.002		<1	<1	<0.002		<1	NDP	<0.1	<0.5	<0.1	<0.002		<1
Dibenzo(a,h)anthracene	ug/l			<0.002		<1	<1	<0.002		<1	<1	<0.002		<1	NDP	<0.1	<0.5	<0.1	<0.002		<1

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH04	LGBH05	LGBH05	LGBH05	LGBH07	SBHJ05	SBHJ05	SWSJ21	SWSJ21	SWSJ23	BH519	BH519	BH519	BH519	BH519	BH519	LGBH09	LGBH09
Round				Round 2	Round 1	Round 2	Round 3	Round 1	Round 1	Round 2	Round 1	Round 2	Round 1	1		2		3		Round 1	Round 2
Sampled Date				18/03/2008	27/02/2002	27/02/2002	27/02/2002	27/02/2002	22/02/2008	18/03/2008	27/02/2008	18/03/2008		19/03/2015		26/03/2015		01/04/2015		27/02/2002	27/02/2002
Depth									9.07	11.5	5.72	6	6.62	3.49	8.67	3.52	7.97	3.71	7.03		
Response Zone (RZ) Details				MG-CS	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS	MG-CS	MG-CS	MG-SS	MG-SS	MG-SS	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG/TFD	MG/TFD
Installation Details				1 - 11	2 - 7	2 - 7	2 - 7	1 - 12.2	9.5 - 11.5	9.5 - 11.5	4 - 6	4 - 6	5.8 - 7.8	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	1.5 - 7	1.5 - 7
Location																					
Benzo(a)pyrene	ug/l	0.00017	0.01																		
Benzo(b)fluoranthene	ug/l	0.017	0.1																		
Benzo(ghi)perylene	ug/l																				
Benzo(k)fluoranthene	ug/l																				
Chrysene	ug/l																				
Dibenzo(a,h)anthracene	ug/l																				
Fluoranthene	ug/l	0.0063																			
Fluorene	ug/l																				
Indeno(1,2,3-cd)pyrene	ug/l		0.1																		
Naphthalene	ug/l	2																			
Pyrene	ug/l																				
Phenanthrene	ug/l																				
PAH, Total Detected USEPA 16	ug/l																				
SVOC by GCMS																					
Phenols																					
2-Chlorophenol	ug/l	50		<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
2-Methylphenol	ug/l	100		1					<1	1		3	9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
2-Nitrophenol	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
2,4-Dichlorophenol	ug/l	20		<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
2,4-Dimethylphenol	ug/l			3					3	3		2	7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
2,4,5-Trichlorophenol	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
2,4,6-Trichlorophenol	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
4-Chloro-3-methylphenol	ug/l	40		<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
4-Methylphenol	ug/l	100		5					4	4		7	18	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
4-Nitrophenol	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Pentachlorophenol	ug/l	0.4		<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Phenol	ug/l	7.7		26					23	20		8	18	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Phenols	mg/l	0.0077												0.09	0.03	0.3	0.05	0.23	<0.03		
Phenols Monohydric	mg/l	0.0077							0.1	0.13	0.05	0.06	0.14								
PAHs																					
2-Chloronaphthalene	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
2-Methylnaphthalene	ug/l			2					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Acenaphthene	ug/l			2				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Acenaphthylene	ug/l			<1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Anthracene	ug/l	0.1		<1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Benzo(a)anthracene	ug/l			<1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Benzo(a)pyrene	ug/l	0.00017	0.01	<1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Benzo(b)fluoranthene	ug/l	0.017	0.1	<1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Benzo(k)fluoranthene	ug/l	0.017	0.1	<1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Benzo(ghi)perylene	ug/l	0.0082	0.1	<1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Indeno(1,2,3-cd)pyrene	ug/l		0.1	<1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Chrysene	ug/l			<1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Dibenzo(a,h)anthracene	ug/l			<1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**LGBH09**	**LGBH09**	**LGBH09**	**SWSJ34**	**SWSJ34**	**LGBH010**	**LGBH010**	**LGBH010**	**LGBH010**	**SBHJ06**	**SBHJ06**	**SBHJ07**	**SBHJ07**	**SWSJ37**	**SWSJ37**	**LGBH012**	**LGBH012**	**LGBH012**
Round				Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1
Sampled Date				27/02/2002	22/02/2008	17/03/2008	27/02/2008	19/03/2008	27/02/2002	07/03/2002	27/02/2008	18/03/2008	21/02/2008	17/03/2008	22/02/2008	17/03/2008	22/02/2008	19/03/2008	27/02/2002	27/02/2002	22/02/2008
Depth													1.32	4.1	1.4	10.4	0.55	5.6			
Response Zone (RZ) Details		**EQS**	**DWS**	MG/TFD	MG/TFD	MG/TFD	MG-CS	MG-CS	TFD	TFD	TFD	TFD	TFD(Peat)	TFD(Peat)	TFD/MM	TFD/MM	TFD	TFD	MG/TFD	MG/TFD	MG/TFD
Installation Details				1.5 - 7	1.5 - 7	1.5 - 7	3 - 6	3 - 6	11 - 15	11 - 15	11 - 15	11 - 15	3.1 - 4.1	3.1 - 4.1	8.4 - 10.4	8.4 - 10.4	4.1 - 5.6	4.1 - 5.6	1.5 - 7	1.5 - 7	1.5 - 7
Location				**Lagoon 27 SW**																	
Benzo(a)pyrene	ug/l	0.00017	0.01																		
Benzo(b)fluoranthene	ug/l	0.017	0.1																		
Benzo(ghi)perylene	ug/l																				
Benzo(k)fluoranthene	ug/l																				
Chrysene	ug/l																				
Dibenzo(a,h)anthracene	ug/l																				
Fluoranthene	ug/l	0.0063																			
Fluorene	ug/l																				
Indeno(1,2,3-cd)pyrene	ug/l		0.1																		
Naphthalene	ug/l	2																			
Pyrene	ug/l																				
Phenanthrene	ug/l																				
PAH, Total Detected USEPA 16	ug/l																				
SVOC by GCMS																					
Phenols																					
2-Chlorophenol	ug/l	50			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
2-Methylphenol	ug/l	100			<1	<1	2	<1			<1	<1	<1	<1	<1		<1	<1			<1
2-Nitrophenol	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
2,4-Dichlorophenol	ug/l	20			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
2,4-Dimethylphenol	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
2,4,5-Trichlorophenol	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
2,4,6-Trichlorophenol	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
4-Chloro-3-methylphenol	ug/l	40			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
4-Methylphenol	ug/l	100			<1	<1	3	2			<1	<1	<1	<1	<1		<1	<1			<1
4-Nitrophenol	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Pentachlorophenol	ug/l	0.4			**<1**	**<1**	**<1**	**<1**			**<1**	**<1**	**<1**	**<1**	**<1**		**<1**	**<1**			**<1**
Phenol	ug/l	7.7			<1	<1	7	6			<1	<1	<1	<1	<1		<1	<1			<1
Phenols	mg/l	0.0077																			
Phenols Monohydric	mg/l	0.0077					0.4	<0.01					**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**				
PAHs																					
2-Chloronaphthalene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
2-Methylnaphthalene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Acenaphthene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1	<0.002		<1
Acenaphthylene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1	<0.002		<1
Anthracene	ug/l	0.1			**<1**	**<1**	**<1**	**<1**			**<1**	**<1**	**<1**	**<1**	**<1**		**<1**	**<1**	<0.002		**<1**
Benzo(a)anthracene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1	<0.002		<1
Benzo(a)pyrene	ug/l	0.00017	0.01		**<1**	**<1**	**<1**	**<1**			**<1**	**<1**	**<1**	**<1**	**<1**		**<1**	**<1**	<0.002		**<1**
Benzo(b)fluoranthene	ug/l	0.017	0.1		**<1**	**<1**	**<1**	**<1**			**<1**	**<1**	**<1**	**<1**	**<1**		**<1**	**<1**	**<0.002**		**<1**
Benzo(k)fluoranthene	ug/l	0.017	0.1		**<1**	**<1**	**<1**	**<1**			**<1**	**<1**	**<1**	**<1**	**<1**		**<1**	**<1**	**<0.002**		**<1**
Benzo(ghi)perylene	ug/l	0.0082	0.1		**<1**	**<1**	**<1**	**<1**			**<1**	**<1**	**<1**	**<1**	**<1**		**<1**	**<1**	**<0.002**		**<1**
Indeno(1,2,3-cd)pyrene	ug/l		0.1		**<1**	**<1**	**<1**	**<1**			**<1**	**<1**	**<1**	**<1**	**<1**		**<1**	**<1**	<0.002		**<1**
Chrysene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1	<0.002		<1
Dibenzo(a,h)anthracene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1	<0.002		<1

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 All Lagoons
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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**LGBH012**	**BH521**	**BH521**	**BH521**	**BH521**	**BH521**	**BH521**	**LGBH011**	**LGBH011**	**LGBH011**	**LGBH011**	**LGBH011**	**SBHJ08A**	**SBHJ08A**	**SBHJ09**	**SBHJ09**	**SBHJ10**	**SBHJ10**
Round				Round 2	1		2		3		Round 1	Round 2	Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2
Sampled Date				17/03/2008	19/03/2015		26/03/2015		01/04/2015		11/03/2002	11/03/2002	11/03/2002	27/02/2008	18/03/2008	22/02/2008	18/03/2008	21/02/2008	18/03/2008	22/02/2008	17/03/2008
Depth					05/01/1900	08/01/1900	05/01/1900	08/01/1900	05/01/1900	07/01/1900						2.31	7.4	0.85	2.2	2.24	10
Response Zone (RZ) Details		**EQS**	**DWS**	MG/TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	TFD(Peat)	TFD(Peat)	MG	MG	TFD	TFD
Installation Details				1.5 - 7	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	6.4 - 7.4	6.4 - 7.4	1 - 2.2	1 - 2.2	9 - 10	9 - 10
Location				**Lagoon 27 SE**							**Lagoon 27NE**										
Benzo(a)pyrene	ug/l	0.00017	0.01																		
Benzo(b)fluoranthene	ug/l	0.017	0.1																		
Benzo(ghi)perylene	ug/l																				
Benzo(k)fluoranthene	ug/l																				
Chrysene	ug/l																				
Dibenzo(a,h)anthracene	ug/l																				
Fluoranthene	ug/l	0.0063																			
Fluorene	ug/l																				
Indeno(1,2,3-cd)pyrene	ug/l		0.1																		
Naphthalene	ug/l	2																			
Pyrene	ug/l																				
Phenanthrene	ug/l																				
PAH, Total Detected USEPA 16	ug/l																				
SVOC by GCMS																					
Phenols																					
2-Chlorophenol	ug/l	50		<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
2-Methylphenol	ug/l	100		<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
2-Nitrophenol	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
2,4-Dichlorophenol	ug/l	20		<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
2,4-Dimethylphenol	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
2,4,5-Trichlorophenol	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
2,4,6-Trichlorophenol	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
4-Chloro-3-methylphenol	ug/l	40		<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
4-Methylphenol	ug/l	100		<1					<0.5	<0.5				<1	<1	4	11	<1	2	<1	NDP
4-Nitrophenol	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Pentachlorophenol	ug/l	0.4		<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Phenol	ug/l	7.7		<1					<0.5	<0.5				<1	<1	25	89	<1	8	<1	NDP
Phenols	mg/l	0.0077			0.03	<0.03	0.05	0.04	<0.03	<0.03											
Phenols Monohydric	mg/l	0.0077														0.06	0.28	0.02	0.02	<0.01	<0.01
PAHs																					
2-Chloronaphthalene	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
2-Methylnaphthalene	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Acenaphthene	ug/l			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Acenaphthylene	ug/l			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Anthracene	ug/l	0.1		<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Benzo(a)anthracene	ug/l			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Benzo(a)pyrene	ug/l	0.00017	0.01	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Benzo(b)fluoranthene	ug/l	0.017	0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Benzo(k)fluoranthene	ug/l	0.017	0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Benzo(ghi)perylene	ug/l	0.0082	0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Indeno(1,2,3-cd)pyrene	ug/l		0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Chrysene	ug/l			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Dibenzo(a,h)anthracene	ug/l			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP

M4CAN
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CL-26 All Lagoons
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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		BH525	BH525	BH525	BH525	BH525	BH525	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043
Round				1		2		3		1		2		3	
Sampled Date				19/03/2015		26/03/2015		01/04/2015		12/05/2016		25/05/2016		02/06/2016	
Depth				2.55	3.92	2.49	3.47	1.98	2.28	1.93	1.92	1.99	1.96	2.12	2.05
Response Zone (RZ) Details				MG	TFD / GFD	MG	TFD / GFD	TFD / GFD	MG	TFD / MM	MG	TFD / MM	MG	TFD / MM	MG
Installation Details				0.5 - 2.8	9.8 - 11.8	0.5 - 2.8	9.8 - 11.8	9.8 - 11.8	0.5 - 2.8	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6
Location		EQS	DWS	Lagoon 26											
Benzo(a)pyrene	ug/l	0.00017	0.01							0.0372	0.0521	0.165	0.098	0.183	0.0197
Benzo(b)fluoranthene	ug/l	0.017	0.1							0.085	0.0878	0.324	0.175	0.297	<0.046
Benzo(ghi)perylene	ug/l									0.0342	0.0382	0.184	0.0657	0.16	<0.032
Benzo(k)fluoranthene	ug/l									0.0294	<0.054	<0.135	0.0442	0.108	<0.054
Chrysene	ug/l									0.0399	0.0551	0.154	0.0963	0.0956	0.0421
Dibenzo(a,h)anthracene	ug/l									<0.016	<0.032	<0.08	0.0183	0.0467	<0.032
Fluoranthene	ug/l	0.0063								0.0632	0.25	0.298	0.513	0.22	0.315
Fluorene	ug/l									0.0224	0.115	0.107	0.182	0.0686	0.162
Indeno(1,2,3-cd)pyrene	ug/l		0.1							0.0228	0.0357	0.193	0.0677	0.145	<0.028
Naphthalene	ug/l	2								<0.1	0.911	<0.5	1.1	0.113	0.997
Pyrene	ug/l									0.05	0.188	0.266	0.356	0.195	0.204
Phenanthrene	ug/l									0.128	0.979	0.693	1.99	0.385	1.49
PAH, Total Detected USEPA 16	ug/l									0.547	3.24	3.22	5.61	2.19	4.01
SVOC by GCMS															
Phenols															
2-Chlorophenol	ug/l	50								<4	<4	<2	<1	<8	<1
2-Methylphenol	ug/l	100								<4	<4	<2	<1	<8	<1
2-Nitrophenol	ug/l									<4	<4	<2	<1	<8	<1
2,4-Dichlorophenol	ug/l	20								<4	<4	<2	<1	<8	<1
2,4-Dimethylphenol	ug/l									<4	<4	<2	<1	<8	<1
2,4,5-Trichlorophenol	ug/l									<4	<4	<2	<1	<8	<1
2,4,6-Trichlorophenol	ug/l									<4	<4	<2	<1	<8	<1
4-Chloro-3-methylphenol	ug/l	40								<4	<4	<2	<1	<8	<1
4-Methylphenol	ug/l	100								<4	<4	<2	<1	<8	<1
4-Nitrophenol	ug/l									<4	<4	<2	<1	<8	<1
Pentachlorophenol	ug/l	0.4								<4	<4	<2	<1	<8	<1
Phenol	ug/l	7.7								<4	<4	<2	7.16	<9	6.47
Phenols	mg/l	0.0077		<0.03	<0.03	0.08	<0.03	<0.03	0.05						
Phenols Monohydric	mg/l	0.0077													
PAHs															
2-Chloronaphthalene	ug/l									<4	<4	<2	<1		
2-Methylnaphthalene	ug/l									<4	<4	<2	<1		
Acenaphthene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Acenaphthylene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Anthracene	ug/l	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Benzo(a)anthracene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Benzo(a)pyrene	ug/l	0.00017	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Benzo(b)fluoranthene	ug/l	0.017	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Benzo(k)fluoranthene	ug/l	0.017	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Benzo(ghi)perylene	ug/l	0.0082	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Indeno(1,2,3-cd)pyrene	ug/l		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Chrysene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Dibenzo(a,h)anthracene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		

M4CAN
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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH02	LGBH02	LGBH02	LGBH02	LGBH03	LGBH03	LGBH03	LGBH03	LGBH01	LGBH01	SBHJ04	SBHJ04	BH515	BH515	BH515	LGBH04	LGBH04	LGBH04
Round				Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 3	Round 1	Round 2	Round 1
Sampled Date				12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	06/03/2015	13/03/2015	18/03/2015	12/03/2002	12/03/2002	22/02/2008
Depth														6.67	13.10	10.62	10.64	8.40			
Response Zone (RZ) Details		EQS	DWS	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	TFD	TFD	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	MG-CS	MG-CS	MG-CS
Installation Details				1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	8.5 - 10.5	8.5 - 10.5	12.1 - 13.1	12.1 - 13.1	9.8 - 13.2	9.8 - 13.2	9.8 - 13.2	1 - 11	1 - 11	1 - 11
Location				Lagoon 12															Lagoon 25		
Fluoranthene	ug/l	0.0063		<0.002		<1	<1	<0.002		<1	<1	<0.002		<1	NDP	<0.1	<0.5	<0.1	<0.002		<1
Fluorene	ug/l			<0.002		<1	<1	<0.002		<1	<1	<0.002		<1	NDP	<0.1	<0.5	<0.1	<0.002		1
Naphthalene	ug/l	2		<0.002		<1	<1	<0.002		<1	2	<0.002		<1	NDP	<0.1	<0.5	<0.1	<0.002		5
Phenanthrene	ug/l			<0.002		<1	<1	<0.002		<1	<1	<0.002		<1	NDP	<0.1	<0.5	<0.1	<0.002		3
Pyrene	ug/l			<0.002		<1	<1	<0.002		<1	<1	<0.002		<1	NDP	<0.1	<0.5	<0.1	<0.002		<1
Total PAHs (USEPA 16)	ug/l			<0.032				<0.032				<0.032				<2		<2	<0.032		
Phthalates																					
Bis(2-ethylhexyl) phthalate	ug/l	1.3				<2	<2			<2	<2			<2	NDP		<0.5				4
Butylbenzyl phthalate	ug/l	20				<1	<1			<1	<1			<1	NDP		<0.5				<1
Di-n-butyl phthalate	ug/l	8				<1	<1			<1	<1			<1	NDP		<0.5				<1
Di-n-Octyl phthalate	ug/l	20				<5	<5			<5	<5			<5	NDP		<0.5				<5
Diethyl phthalate	ug/l	200				<1	<1			<1	<1			<1	NDP		<0.5				<1
Dimethyl phthalate	ug/l	800				<1	<1			<1	<1			<1	NDP		<0.5				<1
Other Semi-Volatiles																					
1,2-Dichlorobenzene	ug/l	20				<1	<1			<1	<1			<1	NDP						<1
1,2,4-Trichlorobenzene	ug/l	0.4				<1	<1			<1	<1			<1	NDP						<1
1,3-Dichlorobenzene	ug/l	20				<1	<1			<1	<1			<1	NDP		<0.5				<1
1,4-Dichlorobenzene	ug/l	20				<1	<1			<1	<1			<1	NDP						<1
2-Nitroaniline	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
2,4-Dinitrotoluene	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
2,6-Dinitrotoluene	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
3-Nitroaniline	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
4-Bromophenylphenylether	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
4-Chloroaniline	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
4-Chlorophenylphenylether	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
4-Nitroaniline	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
Azobenzene	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
Bis(2-chloroethoxy)methane	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
Bis(2-chloroethyl)ether	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
Bis(2-chloroisopropyl)ether	ug/l																<0.5				
Carbazole	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				1
Dibenzofuran	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
Hexachlorobenzene	ug/l	0.05				<1	<1			<1	<1			<1	NDP		<0.5				<1
Hexachlorobutadiene	ug/l	0.6				<1	<1			<1	<1			<1	NDP						<1
Hexachlorocyclopentadiene	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
Hexachloroethane	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
Isophorone	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
n-nitrosodimethylamine	ug/l																<0.5				
N-nitrosodi-n-propylamine	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
Nitrobenzene	ug/l					<1	<1			<1	<1			<1	NDP		<0.5				<1
VOCs																					
Dichlorodifluoromethane	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
Chloromethane	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 All Lagoons
08/07/2015

Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH04	LGBH05	LGBH05	LGBH05	LGBH07	SBHJ05	SBHJ05	SWSJ21	SWSJ21	SWSJ23	BH519	BH519	BH519	BH519	BH519	BH519	LGBH09	LGBH09
Round				Round 2	Round 1	Round 2	Round 3	Round 1	Round 1	Round 2	Round 1	Round 2	Round 1	1		2		3		Round 1	Round 2
Sampled Date				18/03/2008	27/02/2002	27/02/2002	27/02/2002	27/02/2002	22/02/2008	18/03/2008	27/02/2008	18/03/2008		19/03/2015		26/03/2015		01/04/2015		27/02/2002	27/02/2002
Depth									9.07	11.5	5.72	6	6.62	3.49	8.67	3.52	7.97	3.71	7.03		
Response Zone (RZ) Details		EQS	DWS	MG-CS	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS	MG-CS	MG-CS	MG-SS	MG-SS	MG-SS	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG/TFD	MG/TFD
Installation Details				1 - 11	2 - 7	2 - 7	2 - 7	1 - 12.2	9.5 - 11.5	9.5 - 11.5	4 - 6	4 - 6	5.8 - 7.8	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	1.5 - 7	1.5 - 7
Location																					
Fluoranthene	ug/l	0.0063		2				<0.002	<1	2		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Fluorene	ug/l			1				<0.002	<1	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Naphthalene	ug/l	2		6				<0.002	2	<1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Phenanthrene	ug/l			5				<0.002	1	2		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Pyrene	ug/l			1				<0.002	<1	1		<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.002	
Total PAHs (USEPA 16)	ug/l							<0.032						<2	<2	<2	<2	<2	<2	<0.032	
Phthalates																					
Bis(2-ethylhexyl) phthalate	ug/l	1.3		<2					<2	<2		<2	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Butylbenzyl phthalate	ug/l	20		<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Di-n-butyl phthalate	ug/l	8		<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Di-n-Octyl phthalate	ug/l	20		<5					<5	<5		<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Diethyl phthalate	ug/l	200		1					1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Dimethyl phthalate	ug/l	800		<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Other Semi-Volatiles																					
1,2-Dichlorobenzene	ug/l	20		<1					<1	<1		<1	<1								
1,2,4-Trichlorobenzene	ug/l	0.4		<1					<1	<1		<1	<1								
1,3-Dichlorobenzene	ug/l	20		<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
1,4-Dichlorobenzene	ug/l	20		<1					<1	<1		<1	<1								
2-Nitroaniline	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
2,4-Dinitrotoluene	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
2,6-Dinitrotoluene	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
3-Nitroaniline	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
4-Bromophenylphenylether	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
4-Chloroaniline	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
4-Chlorophenylphenylether	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
4-Nitroaniline	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Azobenzene	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Bis(2-chloroethoxy)methane	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Bis(2-chloroethyl)ether	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Bis(2-chloroisopropyl)ether	ug/l													<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Carbazole	ug/l			2					<1	1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Dibenzofuran	ug/l			1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Hexachlorobenzene	ug/l	0.05		<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Hexachlorobutadiene	ug/l	0.6		<1					<1	<1		<1	<1								
Hexachlorocyclopentadiene	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Hexachloroethane	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Isophorone	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
n-nitrosodimethylamine	ug/l													<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
N-nitrosodi-n-propylamine	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Nitrobenzene	ug/l			<1					<1	<1		<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
VOCs																					
Dichlorodifluoromethane	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Chloromethane	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH09	LGBH09	LGBH09	SWSJ34	SWSJ34	LGBH010	LGBH010	LGBH010	LGBH010	SBHJ06	SBHJ06	SBHJ07	SBHJ07	SWSJ37	SWSJ37	LGBH012	LGBH012	LGBH012
Round				Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1
Sampled Date				27/02/2002	22/02/2008	17/03/2008	27/02/2008	19/03/2008	27/02/2002	07/03/2002	27/02/2008	18/03/2008	21/02/2008	17/03/2008	22/02/2008	17/03/2008	22/02/2008	19/03/2008	27/02/2002	27/02/2002	22/02/2008
Depth													1.32	4.1	1.4	10.4	0.55	5.6			
Response Zone (RZ) Details		**EQS**	**DWS**	MG/TFD	MG/TFD	MG/TFD	MG-CS	MG-CS	TFD	TFD	TFD	TFD	TFD(Peat)	TFD(Peat)	TFD/MM	TFD/MM	TFD	TFD	MG/TFD	MG/TFD	MG/TFD
Installation Details				1.5 - 7	1.5 - 7	1.5 - 7	3 - 6	3 - 6	11 - 15	11 - 15	11 - 15	11 - 15	3.1 - 4.1	3.1 - 4.1	8.4 - 10.4	8.4 - 10.4	4.1 - 5.6	4.1 - 5.6	1.5 - 7	1.5 - 7	1.5 - 7
Location				**Lagoon 27 SW**																	
Fluoranthene	ug/l	0.0063			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1	<0.002		<1
Fluorene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1	<0.002		<1
Naphthalene	ug/l	2			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1	<0.002		<1
Phenanthrene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1	<0.002		<1
Pyrene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1	<0.002		<1
Total PAHs (USEPA 16)	ug/l																		<0.032		
Phthalates																					
Bis(2-ethylhexyl) phthalate	ug/l	1.3			<2	<2	<2	<2			<2	<2	<2	<2	<2		<2	4			<2
Butylbenzyl phthalate	ug/l	20			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Di-n-butyl phthalate	ug/l	8			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Di-n-Octyl phthalate	ug/l	20			<5	<5	<5	<5			<5	<5	<5	<5	<5		<5	<5			<5
Diethyl phthalate	ug/l	200			<1	<1	<1	<1			<1	2	<1	<1	<1		<1	<1			<1
Dimethyl phthalate	ug/l	800			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Other Semi-Volatiles																					
1,2-Dichlorobenzene	ug/l	20			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
1,2,4-Trichlorobenzene	ug/l	0.4			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
1,3-Dichlorobenzene	ug/l	20			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
1,4-Dichlorobenzene	ug/l	20			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
2-Nitroaniline	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
2,4-Dinitrotoluene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
2,6-Dinitrotoluene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
3-Nitroaniline	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
4-Bromophenylphenylether	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
4-Chloroaniline	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
4-Chlorophenylphenylether	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
4-Nitroaniline	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Azobenzene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Bis(2-chloroethoxy)methane	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Bis(2-chloroethyl)ether	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Bis(2-chloroisopropyl)ether	ug/l																				
Carbazole	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Dibenzofuran	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Hexachlorobenzene	ug/l	0.05			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Hexachlorobutadiene	ug/l	0.6			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Hexachlorocyclopentadiene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Hexachloroethane	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Isophorone	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
n-nitrosodimethylamine	ug/l																				
N-nitrosodi-n-propylamine	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Nitrobenzene	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
VOCs																					
Dichlorodifluoromethane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Chloromethane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH012	BH521	BH521	BH521	BH521	BH521	BH521	LGBH011	LGBH011	LGBH011	LGBH011	LGBH011	SBHJ08A	SBHJ08A	SBHJ09	SBHJ09	SBHJ10	SBHJ10
Round				Round 2	1		2		3		Round 1	Round 2	Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2
Sampled Date				17/03/2008	19/03/2015		26/03/2015		01/04/2015		11/03/2002	11/03/2002	11/03/2002	27/02/2008	18/03/2008	22/02/2008	18/03/2008	21/02/2008	18/03/2008	22/02/2008	17/03/2008
Depth					05/01/1900	08/01/1900	05/01/1900	08/01/1900	05/01/1900	07/01/1900						2.31	7.4	0.85	2.2	2.24	10
Response Zone (RZ) Details		**EQS**	**DWS**	MG/TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	TFD(Peat)	TFD(Peat)	MG	MG	TFD	TFD
Installation Details				1.5 - 7	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	6.4 - 7.4	6.4 - 7.4	1 - 2.2	1 - 2.2	9 - 10	9 - 10
Location				**Lagoon 27 SE**							**Lagoon 27NE**										
Fluoranthene	ug/l	0.0063		<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.029			2	<1	<1	<2	<1	<1	<1	NDP
Fluorene	ug/l			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Naphthalene	ug/l	2		<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020			<1	<1	<1	<2	<1	<1	<1	NDP
Phenanthrene	ug/l			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.029			3	<1	<1	<2	<1	<1	<1	NDP
Pyrene	ug/l			<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.024			1	1	<1	<2	<1	<1	<1	NDP
Total PAHs (USEPA 16)	ug/l				<2	<2	<2	<2	<2	<2	0.342										
Phthalates																					
Bis(2-ethylhexyl) phthalate	ug/l	1.3		<2					<0.5	<0.5				3	3	<2	<4	<2	<2	<2	NDP
Butylbenzyl phthalate	ug/l	20		<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Di-n-butyl phthalate	ug/l	8		<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Di-n-Octyl phthalate	ug/l	20		<5					<0.5	<0.5				<5	<5	<5	<10	<5	<5	<5	NDP
Diethyl phthalate	ug/l	200		<1					<0.5	<0.5				<1	2	<1	<2	<1	1	<1	NDP
Dimethyl phthalate	ug/l	800		<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Other Semi-Volatiles																					
1,2-Dichlorobenzene	ug/l	20		<1										<1	<1	<1	<2	<1	<1	<1	NDP
1,2,4-Trichlorobenzene	ug/l	0.4		<1										<1	<1	<1	<2	<1	<1	<1	NDP
1,3-Dichlorobenzene	ug/l	20		<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
1,4-Dichlorobenzene	ug/l	20		<1										<1	<1	<1	<2	<1	<1	<1	NDP
2-Nitroaniline	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
2,4-Dinitrotoluene	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
2,6-Dinitrotoluene	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
3-Nitroaniline	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
4-Bromophenylphenylether	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
4-Chloroaniline	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
4-Chlorophenylphenylether	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
4-Nitroaniline	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Azobenzene	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Bis(2-chloroethoxy)methane	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Bis(2-chloroethyl)ether	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Bis(2-chloroisopropyl)ether	ug/l								<0.5	<0.5											
Carbazole	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Dibenzofuran	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Hexachlorobenzene	ug/l	0.05		<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Hexachlorobutadiene	ug/l	0.6		<1										<1	<1	<1	<2	<1	<1	<1	NDP
Hexachlorocyclopentadiene	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Hexachloroethane	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Isophorone	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
n-nitrosodimethylamine	ug/l								<0.5	<0.5											
N-nitrosodi-n-propylamine	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
Nitrobenzene	ug/l			<1					<0.5	<0.5				<1	<1	<1	<2	<1	<1	<1	NDP
VOCs																					
Dichlorodifluoromethane	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 All Lagoons
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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**BH525**	**BH525**	**BH525**	**BH525**	**BH525**	**BH525**	**BHM4CAN043**	**BHM4CAN043**	**BHM4CAN043**	**BHM4CAN043**	**BHM4CAN043**	**BHM4CAN043**
Round				1		2		3		1		2		3	
Sampled Date				19/03/2015		26/03/2015		01/04/2015		12/05/2016		25/05/2016		02/06/2016	
Depth				2.55	3.92	2.49	3.47	1.98	2.28	1.93	1.92	1.99	1.96	2.12	2.05
Response Zone (RZ) Details				MG	TFD / GFD	MG	TFD / GFD	TFD / GFD	MG	TFD / MM	MG	TFD / MM	MG	TFD / MM	MG
Installation Details				0.5 - 2.8	9.8 - 11.8	0.5 - 2.8	9.8 - 11.8	9.8 - 11.8	0.5 - 2.8	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6
Location				**Lagoon 26**											
Fluoranthene	ug/l	0.0063		**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	<4	<4	<2	<1		
Fluorene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Naphthalene	ug/l	2		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Phenanthrene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	1.22		
Pyrene	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<4	<2	<1		
Total PAHs (USEPA 16)	ug/l			<2	<2	<2	<2	<2	<2						
Phthalates															
Bis(2-ethylhexyl) phthalate	ug/l	1.3								14.2	<8	24.5	<2	16.7	<2
Butylbenzyl phthalate	ug/l	20								<4	<4	<2	<1	<8	<1
Di-n-butyl phthalate	ug/l	8								<4	<4	<2	<1	<8	<1
Di-n-Octyl phthalate	ug/l	20								<4	<4	<2	<1	<8	<1
Diethyl phthalate	ug/l	200								<4	<4	<2	<1	<8	<1
Dimethyl phthalate	ug/l	800								<4	<4	<2	<1	<8	<1
Other Semi-Volatiles															
1,2-Dichlorobenzene	ug/l	20								<4	<4	<2	<1	<8	<1
1,2,4-Trichlorobenzene	ug/l	0.4								<4	<4	<2	<1	<8	<1
1,3-Dichlorobenzene	ug/l	20								<4	<4	<2	<1	<8	<1
1,4-Dichlorobenzene	ug/l	20								<4	<4	<2	<1	<8	<1
2-Nitroaniline	ug/l									<4	<4	<2	<1	<8	<1
2,4-Dinitrotoluene	ug/l									<4	<4	<2	<1	<8	<1
2,6-Dinitrotoluene	ug/l									<4	<4	<2	<1	<8	<1
3-Nitroaniline	ug/l									<4	<4	<2	<1	<8	<1
4-Bromophenylphenylether	ug/l									<4	<4	<2	<1	<8	<1
4-Chloroaniline	ug/l									<4	<4	<2	<1	<8	<1
4-Chlorophenylphenylether	ug/l									<4	<4	<2	<1	<8	<1
4-Nitroaniline	ug/l									<4	<4	<2	<1	<8	<1
Azobenzene	ug/l									<4	<4	<2	<1	<8	<1
Bis(2-chloroethoxy)methane	ug/l									<4	<4	<2	<1	<8	<1
Bis(2-chloroethyl)ether	ug/l									<4	<4	<2	<1	<8	<1
Bis(2-chloroisopropyl)ether	ug/l														
Carbazole	ug/l									<4	<4	<2	<1	<8	<1
Dibenzofuran	ug/l									<4	<4	<2	<1	<8	<1
Hexachlorobenzene	ug/l	0.05								<4	<4	<2	<1	<8	<1
Hexachlorobutadiene	ug/l	0.6								<4	<4	<2	<1	<8	<1
Hexachlorocyclopentadiene	ug/l									<4	<4	<2	<1	<8	<1
Hexachloroethane	ug/l									<4	<4	<2	<1	<8	<1
Isophorone	ug/l									<4	<4	<2	<1	<8	<1
n-nitrosodimethylamine	ug/l														
N-nitrosodi-n-propylamine	ug/l									<4	<4	<2	<1	<8	<1
Nitrobenzene	ug/l									<4	<4	<2	<1	<8	<1
VOCs															
Dichlorodifluoromethane	ug/l									<1	<1	<1	<1	<1	<1
Chloromethane	ug/l									<1	<1	<1	<1	<1	<1

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Groundwater Analysis Results & Screening Assessment
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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH02	LGBH02	LGBH02	LGBH02	LGBH03	LGBH03	LGBH03	LGBH03	LGBH01	LGBH01	SBHJ04	SBHJ04	BH515	BH515	BH515	LGBH04	LGBH04	LGBH04
Round				Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 3	Round 1	Round 2	Round 1
Sampled Date				12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	06/03/2015	13/03/2015	18/03/2015	12/03/2002	12/03/2002	22/02/2008
Depth														6.67	13.10	10.62	10.64	8.40			
Response Zone (RZ) Details		EQS	DWS	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	TFD	TFD	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	MG-CS	MG-CS	MG-CS
Installation Details				1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	8.5 - 10.5	8.5 - 10.5	12.1 - 13.1	12.1 - 13.1	9.8 - 13.2	9.8 - 13.2	9.8 - 13.2	1 - 11	1 - 11	1 - 11
Location				Lagoon 12															Lagoon 25		
Vinyl Chloride	ug/l	0	0.5			<1	<1			<1	<1		<1	<1	<1				<1		<1
Bromomethane	ug/l					<1	<1			<1	<1		<1	<1	<1		<5		<1		<1
Chloroethane	ug/l					<1	<1			<1	<1		<1	<1	<1		<2		<1		<1
Trichlorofluoromethane	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
trans-1-2-Dichloroethene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
Dichloromethane	ug/l	20				<1	<1			<1	<1			<1	<1						<1
Carbon Disulphide	ug/l					<1	<1			<1	<1			<1	<1						<1
1.1-Dichloroethene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
1.1-Dichloroethane	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
Methyl Tertiary Butyl Ether	ug/l					<1	<1			<1	<1			<1	<1		<1				<1
cis-1-2-Dichloroethene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
Bromochloromethane	ug/l		100			<1	<1			<1	<1		<1	<1	<1		<5		<1		<1
Chloroform	ug/l	2.5	100			<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
2.2-Dichloropropane	ug/l					<1	<1			<1	<1		<1	<1	<1				<1		<1
1.2-Dichloroethane	ug/l	10	3			<1	<1			<1	<1		<1	<1	<1		<2		<1		<1
1.2-Dichloroethene																					
1.1.1-Trichloroethane	ug/l	100				<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
1.1-Dichloropropene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
Benzene	ug/l	10	1			<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
Carbontetrachloride	ug/l	12	3			<1	<1			<1	<1		<1	<1	<1				<1		<1
Dibromomethane	ug/l					<1	<1			<1	<1		<1	<1	<1		<10		<1		<1
1.2-Dichloropropane	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
Bromodichloromethane	ug/l					<1	<1			<1	<1		<1	<1	<1		<5		<1		<1
Trichloroethene	ug/l	10	10			<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
cis-1-3-Dichloropropene	ug/l					<1	<1			<1	<1		<1	<1	<1		<10		<1		<1
trans-1-3-Dichloropropene	ug/l					<1	<1			<1	<1		<1	<1	<1		<10		<1		<1
1.1.2-Trichloroethane	ug/l	400				<1	<1			<1	<1		<1	<1	<1		<10		<1		<1
Toluene	ug/l	50				<1	<1			<1	<1		<1	7	5		<1		<1		<1
Toluene-d8**	%																				
1.3-Dichloropropane	ug/l					<1	<1			<1	<1		<1	<1	<1		<2		<1		<1
Dibromochloromethane	ug/l		100			<1	<1			<1	<1		<1	<1	<1		<10		<1		<1
Dibromofluoromethane**	%																				
1.2-Dibromoethane	ug/l					<1	<1			<1	<1		<1	<1	<1		<5		<1		<1
Tetrachloroethene	ug/l	10	10			<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
1.1.1.2-Tetrachloroethane	ug/l					<1	<1			<1	<1		<1	<1	<1		<2		<1		<1
Chlorobenzene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
Ethylbenzene	ug/l	20				<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
p/m-Xylene	ug/l	30				<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
Bromoform	ug/l					<1	<1			<1	<1		<1	<1	<1				<1		<1
Styrene	ug/l	50				<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
1.1.2.2-Tetrachloroethane	ug/l					<1	<1			<1	<1		<1	<1	<1				<1		<1
o-Xylene	ug/l	30				<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
1.2.3-Trichloropropane	ug/l					<1	<1			<1	<1		<1	<1	<1		<50		<1		<1
Isopropylbenzene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1

M4CAN
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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH04	LGBH05	LGBH05	LGBH05	LGBH07	SBHJ05	SBHJ05	SWSJ21	SWSJ21	SWSJ23	BH519	BH519	BH519	BH519	BH519	BH519	LGBH09	LGBH09
Round				Round 2	Round 1	Round 2	Round 3	Round 1	Round 1	Round 2	Round 1	Round 2	Round 1	1		2		3		Round 1	Round 2
Sampled Date				18/03/2008	27/02/2002	27/02/2002	27/02/2002	27/02/2002	22/02/2008	18/03/2008	27/02/2008	18/03/2008		19/03/2015		26/03/2015		01/04/2015		27/02/2002	27/02/2002
Depth									9.07	11.5	5.72	6	6.62	3.49	8.67	3.52	7.97	3.71	7.03		
Response Zone (RZ) Details		EQS	DWS	MG-CS	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS	MG-CS	MG-CS	MG-SS	MG-SS	MG-SS	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG/TFD	MG/TFD
Installation Details				1 - 11	2 - 7	2 - 7	2 - 7	1 - 12.2	9.5 - 11.5	9.5 - 11.5	4 - 6	4 - 6	5.8 - 7.8	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	1.5 - 7	1.5 - 7
Location																					
Vinyl Chloride	ug/l	0	0.5	<1				<1	<1	<1	<1	<1	<1								
Bromomethane	ug/l			<1				<1	<1	<1	<1	<1	<1	<5	<5	<5	<5	<5	<5		
Chloroethane	ug/l			<1				<1	<1	<1	<1	<1	<1	<2	<2	<2	<2	<2	<2		
Trichlorofluoromethane	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
trans-1-2-Dichloroethene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Dichloromethane	ug/l	20		<1					<1	<1	<1	<1	<1								
Carbon Disulphide	ug/l			<1					<1	<1	<1	<1	<1								
1.1-Dichloroethene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
1.1-Dichloroethane	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Methyl Tertiary Butyl Ether	ug/l			<1					<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
cis-1-2-Dichloroethene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Bromochloromethane	ug/l		100	<1				<1	<1	<1	<1	<1	<1	<5	<5	<5	<5	<5	<5		
Chloroform	ug/l	2.5	100	<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
2.2-Dichloropropane	ug/l			<1				<1	<1	<1	<1	<1	<1								
1.2-Dichloroethane	ug/l	10	3	<1				<1	<1	<1	<1	<1	<1	<2	<2	<2	<2	<2	<2		
1.2-Dichloroethene																					
1.1.1-Trichloroethane	ug/l	100		<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
1.1-Dichloropropene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Benzene	ug/l	10	1	<1				<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1		
Carbontetrachloride	ug/l	12	3	<1				<1	<1	<1	<1	<1	<1								
Dibromomethane	ug/l			<1				<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10		
1.2-Dichloropropane	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Bromodichloromethane	ug/l			<1				<1	<1	<1	<1	<1	<1	<5	<5	<5	<5	<5	<5		
Trichloroethene	ug/l	10	10	<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
cis-1-3-Dichloropropene	ug/l			<1				<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10		
trans-1-3-Dichloropropene	ug/l			<1				<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10		
1.1.2-Trichloroethane	ug/l	400		<1				<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10		
Toluene	ug/l	50		2				<1	<1	2	<1	1	2	<1	<1	<1	<1	<1	<1		
Toluene-d8**	%																				
1.3-Dichloropropane	ug/l			<1				<1	<1	<1	<1	<1	<1	<2	<2	<2	<2	<2	<2		
Dibromochloromethane	ug/l		100	<1				<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10		
Dibromofluoromethane**	%																				
1.2-Dibromoethane	ug/l			<1				<1	<1	<1	<1	<1	<1	<5	<5	<5	<5	<5	<5		
Tetrachloroethene	ug/l	10	10	<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
1.1.1.2-Tetrachloroethane	ug/l			<1				<1	<1	<1	<1	<1	<1	<2	<2	<2	<2	<2	<2		
Chlorobenzene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Ethylbenzene	ug/l	20		<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
p/m-Xylene	ug/l	30		2				<1	<1	<1	<1	<1	4	<1	<1	<1	<1	<1	<1		
Bromoform	ug/l			<1				<1	<1	<1	<1	<1	<1								
Styrene	ug/l	50		<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
1.1.2.2-Tetrachloroethane	ug/l			<1				<1	<1	<1	<1	<1	<1								
o-Xylene	ug/l	30		<1				<1	<1	<1	<1	<1	4	<1	<1	<1	<1	<1	<1		
1.2.3-Trichloropropane	ug/l			<1				<1	<1	<1	<1	<1	<1	<50	<50	<50	<50	<50	<50		
Isopropylbenzene	ug/l			<1				<1	<1	<1	<1	<1	3	<1	<1	<1	<1	<1	<1		

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 All Lagoons
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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH09	LGBH09	LGBH09	SWSJ34	SWSJ34	LGBH010	LGBH010	LGBH010	LGBH010	SBHJ06	SBHJ06	SBHJ07	SBHJ07	SWSJ37	SWSJ37	LGBH012	LGBH012	LGBH012
Round				Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1
Sampled Date				27/02/2002	22/02/2008	17/03/2008	27/02/2008	19/03/2008	27/02/2002	07/03/2002	27/02/2008	18/03/2008	21/02/2008	17/03/2008	22/02/2008	17/03/2008	22/02/2008	19/03/2008	27/02/2002	27/02/2002	22/02/2008
Depth													1.32	4.1	1.4	10.4	0.55	5.6			
Response Zone (RZ) Details		EQS	DWS	MG/TFD	MG/TFD	MG/TFD	MG-CS	MG-CS	TFD	TFD	TFD	TFD	TFD(Peat)	TFD(Peat)	TFD/MM	TFD/MM	TFD	TFD	MG/TFD	MG/TFD	MG/TFD
Installation Details				1.5 - 7	1.5 - 7	1.5 - 7	3 - 6	3 - 6	11 - 15	11 - 15	11 - 15	11 - 15	3.1 - 4.1	3.1 - 4.1	8.4 - 10.4	8.4 - 10.4	4.1 - 5.6	4.1 - 5.6	1.5 - 7	1.5 - 7	1.5 - 7
Location				Lagoon 27 SW																	
Vinyl Chloride	ug/l	0	0.5		<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Bromomethane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Chloroethane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Trichlorofluoromethane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
trans-1-2-Dichloroethene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Dichloromethane	ug/l	20			<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
Carbon Disulphide	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
1.1-Dichloroethene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.1-Dichloroethane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Methyl Tertiary Butyl Ether	ug/l				<1	<1	<1	<1			<1	<1	<1	<1	<1		<1	<1			<1
cis-1-2-Dichloroethene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Bromochloromethane	ug/l		100		<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Chloroform	ug/l	2.5	100		<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
2.2-Dichloropropane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.2-Dichloroethane	ug/l	10	3		<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.2-Dichloroethene																					
1.1.1-Trichloroethane	ug/l	100			<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.1-Dichloropropene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Benzene	ug/l	10	1		<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Carbontetrachloride	ug/l	12	3		<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Dibromomethane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.2-Dichloropropane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Bromodichloromethane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Trichloroethene	ug/l	10	10		<1	<1	<1	<1	3		<1	<1	<1	<1	<1		<1	<1	<1		<1
cis-1-3-Dichloropropene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
trans-1-3-Dichloropropene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.1.2-Trichloroethane	ug/l	400			<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Toluene	ug/l	50			<1	<1	2	5	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Toluene-d8**	%																				
1.3-Dichloropropane	ug/l				<1	<1	<1	<1	2		<1	<1	<1	<1	<1		<1	<1	<1		<1
Dibromochloromethane	ug/l		100		<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Dibromofluoromethane**	%																				
1.2-Dibromoethane	ug/l				<1	<1	<1	<1	1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Tetrachloroethene	ug/l	10	10		<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.1.1.2-Tetrachloroethane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Chlorobenzene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Ethylbenzene	ug/l	20			<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
p/m-Xylene	ug/l	30			<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Bromoform	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Styrene	ug/l	50			<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.1.2.2-Tetrachloroethane	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
o-Xylene	ug/l	30			<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.2.3-Trichloropropane	ug/l				<1	<1	<1	<1	3		<1	<1	<1	<1	<1		<1	<1	<1		<1
Isopropylbenzene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 All Lagoons
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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**LGBH012**	**BH521**	**BH521**	**BH521**	**BH521**	**BH521**	**BH521**	**LGBH011**	**LGBH011**	**LGBH011**	**LGBH011**	**LGBH011**	**SBHJ08A**	**SBHJ08A**	**SBHJ09**	**SBHJ09**	**SBHJ10**	**SBHJ10**
Round				Round 2	1		2		3		Round 1	Round 2	Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2
Sampled Date				17/03/2008	19/03/2015		26/03/2015		01/04/2015		11/03/2002	11/03/2002	11/03/2002	27/02/2008	18/03/2008	22/02/2008	18/03/2008	21/02/2008	18/03/2008	22/02/2008	17/03/2008
Depth					05/01/1900	08/01/1900	05/01/1900	08/01/1900	05/01/1900	07/01/1900						2.31	7.4	0.85	2.2	2.24	10
Response Zone (RZ) Details		**EQS**	**DWS**	MG/TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	TFD(Peat)	TFD(Peat)	MG	MG	TFD	TFD
Installation Details				1.5 - 7	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	6.4 - 7.4	6.4 - 7.4	1 - 2.2	1 - 2.2	9 - 10	9 - 10
Location				**Lagoon 27 SE**							**Lagoon 27NE**										
Vinyl Chloride	ug/l	0	0.5	<1							<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/l			<1					<5	<5	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l			<1					<2	<2	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
trans-1-2-Dichloroethene	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	ug/l	20		<1										<1	<1	<1	<1	<1	<1	<1	<1
Carbon Disulphide	ug/l			<1										<1	<1	<1	<1	<1	<1	<1	<1
1.1-Dichloroethene	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
1.1-Dichloroethane	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Methyl Tertiary Butyl Ether	ug/l			<1					<1	<1				<1	<1	<1	<1	<1	<1	<1	<1
cis-1-2-Dichloroethene	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/l		100	<1					<5	<5	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	2.5	100	<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
2.2-Dichloropropane	ug/l			<1							<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
1.2-Dichloroethane	ug/l	10	3	<1					<2	<2	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
1.2-Dichloroethene																					
1.1.1-Trichloroethane	ug/l	100		<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
1.1-Dichloropropene	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	ug/l	10	1	<1	<1	<1	<1	<1	<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Carbontetrachloride	ug/l	12	3	<1							<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	ug/l			<1					<10	<10	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
1.2-Dichloropropane	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l			<1					<5	<5	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	10	10	<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
cis-1-3-Dichloropropene	ug/l			<1					<10	<10	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
trans-1-3-Dichloropropene	ug/l			<1					<10	<10	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
1.1.2-Trichloroethane	ug/l	400		<1					<10	<10	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	50		<1	<1	<1	<1	<1	<1	<1	<1		<500	<1	<1	<1	3	<1	<1	6	6
Toluene-d8**	%																				
1.3-Dichloropropane	ug/l			<1					<2	<2	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	ug/l		100	<1					<10	<10	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Dibromofluoromethane**	%																				
1.2-Dibromoethane	ug/l			<1					<5	<5	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/l	10	10	<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
1.1.1.2-Tetrachloroethane	ug/l			<1					<2	<2	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	20		<1	<1	<1	<1	<1	<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
p/m-Xylene	ug/l	30		<1	<1	<1	<1	<1	<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	ug/l			<1							<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/l	50		<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
1.1.2.2-Tetrachloroethane	ug/l			<1							<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
o-Xylene	ug/l	30		<1	<1	<1	<1	<1	<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
1.2.3-Trichloropropane	ug/l			<1					<50	<50	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/l			<1					<1	<1	<1		<500	<1	<1	<1	<1	<1	<1	<1	<1

M4CAN
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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		BH525	BH525	BH525	BH525	BH525	BH525	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043
Round				1		2		3		1		2		3	
Sampled Date				19/03/2015		26/03/2015		01/04/2015		12/05/2016		25/05/2016		02/06/2016	
Depth				2.55	3.92	2.49	3.47	1.98	2.28	1.93	1.92	1.99	1.96	2.12	2.05
Response Zone (RZ) Details				MG	TFD / GFD	MG	TFD / GFD	TFD / GFD	MG	TFD / MM	MG	TFD / MM	MG	TFD / MM	MG
Installation Details				0.5 - 2.8	9.8 - 11.8	0.5 - 2.8	9.8 - 11.8	9.8 - 11.8	0.5 - 2.8	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6
Location		EQS	DWS	Lagoon 26											
Vinyl Chloride	ug/l	0	0.5							<1	<1	<1	<1	<1	<1
Bromomethane	ug/l									<1	<1	<1	<1	<1	<1
Chloroethane	ug/l									<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/l									<1	<1	<1	<1	<1	<1
trans-1-2-Dichloroethene	ug/l									<1	<1	<1	<1	<1	<1
Dichloromethane	ug/l	20								<1	<1	<1	<1	<1	<1
Carbon Disulphide	ug/l									1.64	<1	1.33	<1	<1	<1
1.1-Dichloroethene	ug/l									<1	<1	<1	<1	<1	<1
1.1-Dichloroethane	ug/l									<1	<1	<1	<1	<1	<1
Methyl Tertiary Butyl Ether	ug/l									<1	<1	<1	<1	<1	<1
cis-1-2-Dichloroethene	ug/l									<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/l		100							<1	<1	<1	<1	<1	<1
Chloroform	ug/l	2.5	100							<1	<1	<1	<1	<1	<1
2.2-Dichloropropane	ug/l									<1	<1	<1	<1	<1	<1
1.2-Dichloroethane	ug/l	10	3							<1	<1	<1	<1	<1	<1
1.2-Dichloroethene										<1	<1	<1	<1	<1	<1
1.1.1-Trichloroethane	ug/l	100								<1	<1	<1	<1	<1	<1
1.1-Dichloropropene	ug/l									<1	<1	<1	<1	<1	<1
Benzene	ug/l	10	1							<1	<1	<1	<1	<1	<1
Carbontetrachloride	ug/l	12	3							<1	<1	<1	<1	<1	<1
Dibromomethane	ug/l									<1	<1	<1	<1	<1	<1
1.2-Dichloropropane	ug/l									<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l									<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	10	10							<1	<1	<1	<1	<1	<1
cis-1-3-Dichloropropene	ug/l									<1	<1	<1	<1	<1	<1
trans-1-3-Dichloropropene	ug/l									<1	<1	<1	<1	<1	<1
1.1.2-Trichloroethane	ug/l	400								<1	<1	<1	<1	<1	<1
Toluene	ug/l	50								2.99	1.22	2.32	<1	2.72	<1
Toluene-d8**	%									102	97.6	102	103	99	99.4
1.3-Dichloropropane	ug/l									<1	<1	<1	<1	<1	<1
Dibromochloromethane	ug/l		100							<1	<1	<1	<1	<1	<1
Dibromofluoromethane**	%									104	0.44	69.5	0.46	0.51	0.44
1.2-Dibromoethane	ug/l									<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/l	10	10							<1	<1	<1	<1	<1	<1
1.1.1.2-Tetrachloroethane	ug/l									<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/l									<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	20								<1	<1	<1	<1	<1	<1
p/m-Xylene	ug/l	30								<1	<1	<1	<1	<1	<1
Bromoform	ug/l									<1	<1	<1	<1	<1	<1
Styrene	ug/l	50								<1	<1	<1	<1	<1	<1
1.1.2.2-Tetrachloroethane	ug/l									<1	<1	<1	<1	<1	<1
o-Xylene	ug/l	30								<1	<1	<1	<1	<1	<1
1.2.3-Trichloropropane	ug/l									<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/l									<1	<1	<1	<1	<1	<1

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CL-26 All Lagoons
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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH02	LGBH02	LGBH02	LGBH02	LGBH03	LGBH03	LGBH03	LGBH03	LGBH01	LGBH01	SBHJ04	SBHJ04	BH515	BH515	BH515	LGBH04	LGBH04	LGBH04
Round				Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 3	Round 1	Round 2	Round 1
Sampled Date				12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	12/03/2002	12/03/2002	22/02/2008	17/03/2008	06/03/2015	13/03/2015	18/03/2015	12/03/2002	12/03/2002	22/02/2008
Depth														6.67	13.10	10.62	10.64	8.40			
Response Zone (RZ) Details		EQS	DWS	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	MG-CS/TDF	TFD	TFD	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	TFD (Peat)	MG-CS	MG-CS	MG-CS
Installation Details				1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	1 - 9	8.5 - 10.5	8.5 - 10.5	12.1 - 13.1	12.1 - 13.1	9.8 - 13.2	9.8 - 13.2	9.8 - 13.2	1 - 11	1 - 11	1 - 11
Location				Lagoon 12															Lagoon 25		
Bromobenzene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
2-Chlorotoluene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
Propylbenzene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
4-Chlorotoluene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
4-Bromofluorobenzene**	%																				
1.2.4-Trimethylbenzene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
4-Isopropyltoluene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
1.3.5-Trimethylbenzene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
1.2-Dichlorobenzene	ug/l	20				<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
1.4-Dichlorobenzene	ug/l	20				<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
sec-Butylbenzene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
tert-Butylbenzene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
1.3-Dichlorobenzene	ug/l	20				<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
n-Butylbenzene	ug/l					<1	<1			<1	<1		<1	<1	<1		<1		<1		<1
1.2-Dibromo-3-chloropropane	ug/l					<1	<1			<1	<1		<5	<1	<1		<50		<5		<1
1.2.4-Trichlorobenzene	ug/l	0.4				<1	<1			<1	<1		<5	<1	<1		<1		<5		<1
Naphthalene	ug/l	2				<1	<1			<1	<1		<5	<1	<1		<0.1		<5		<1
1.2.3-Trichlorobenzene	ug/l	0.4				<1	<1			<1	<1		<5	<1	<1		<2		<5		<1
Hexachlorobutadiene	ug/l	0.6				<1	<1			<1	<1		<5	<1	<1		<1		<5		<1
Chloroethene	ug/l																<1				
Tribromomethane	ug/l		100														<1				
PCBs																					
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0														<0.01	<0.01			
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0														<0.01	<0.01			
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0														<0.01	<0.01			
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0														<0.01	<0.01			
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0														<0.01	<0.01			
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0														<0.01	<0.01			
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0														<0.01	<0.01			
PCB congener 105	ug/l																				
PCB congener 114	ug/l																				
PCB congener 118	ug/l																				
PCB congener 123	ug/l																				
PCB congener 126	ug/l																				
PCB congener 156	ug/l																				
PCB congener 157	ug/l																				
PCB congener 167	ug/l																				
PCB congener 169	ug/l																				
PCB congener 189	ug/l																				
PCB congener 77	ug/l																				
PCB congener 81	ug/l																				

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**LGBH04**	**LGBH05**	**LGBH05**	**LGBH05**	**LGBH07**	**SBHJ05**	**SBHJ05**	**SWSJ21**	**SWSJ21**	**SWSJ23**	**BH519**	**BH519**	**BH519**	**BH519**	**BH519**	**BH519**	**LGBH09**	**LGBH09**
Round				Round 2	Round 1	Round 2	Round 3	Round 1	Round 1	Round 2	Round 1	Round 2	Round 1	1		2		3		Round 1	Round 2
Sampled Date				18/03/2008	27/02/2002	27/02/2002	27/02/2002	27/02/2002	22/02/2008	18/03/2008	27/02/2008	18/03/2008		19/03/2015		26/03/2015		01/04/2015		27/02/2002	27/02/2002
Depth									9.07	11.5	5.72	6	6.62	3.49	8.67	3.52	7.97	3.71	7.03		
Response Zone (RZ) Details		**EQS**	**DWS**	MG-CS	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS	MG-CS	MG-CS	MG-CS	MG-SS	MG-SS	MG-SS	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG-CS/TFD	TFD	MG/TFD	MG/TFD
Installation Details				1 - 11	2 - 7	2 - 7	2 - 7	1 - 12.2	9.5 - 11.5	9.5 - 11.5	4 - 6	4 - 6	5.8 - 7.8	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	0.85 - 4.2	6.8 - 11.2	1.5 - 7	1.5 - 7
Location																					
Bromobenzene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
2-Chlorotoluene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Propylbenzene	ug/l			<1				<1	<1	<1	<1	<1	3	<1	<1	<1	<1	<1	<1		
4-Chlorotoluene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
4-Bromofluorobenzene**	%																				
1.2.4-Trimethylbenzene	ug/l			<1				<1	<1	<1	<1	<1	11	<1	<1	<1	<1	<1	<1		
4-Isopropyltoluene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
1.3.5-Trimethylbenzene	ug/l			<1				<1	<1	<1	<1	<1	6	<1	<1	<1	<1	<1	<1		
1.2-Dichlorobenzene	ug/l	20		<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
1.4-Dichlorobenzene	ug/l	20		<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
sec-Butylbenzene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
tert-Butylbenzene	ug/l			<1				<1	<1	<1	<1	<1	6	<1	<1	<1	<1	<1	<1		
1.3-Dichlorobenzene	ug/l	20		<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
n-Butylbenzene	ug/l			<1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
1.2-Dibromo-3-chloropropane	ug/l			<1				<5	<1	<1	<1	<1	<1	<50	<50	<50	<50	<50	<50		
1.2.4-Trichlorobenzene	ug/l	0.4		<1				<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Naphthalene	ug/l	2		7				<5	<1	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
1.2.3-Trichlorobenzene	ug/l	0.4		<1				<5	<1	<1	<1	<1	<1	<2	<2	<2	<2	<2	<2		
Hexachlorobutadiene	ug/l	0.6		<1				<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Chloroethene	ug/l													<1	<1	<1	<1	<1	<1		
Tribromomethane	ug/l		100											<1	<1	<1	<1	<1	<1		
PCBs																					
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0											<0.01	<0.01	<0.01	<0.01				
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0											<0.01	<0.01	<0.01	<0.01				
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0											<0.01	<0.01	<0.01	<0.01				
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0											<0.01	<0.01	<0.01	<0.01				
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0											<0.01	<0.01	<0.01	<0.01				
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0											<0.01	<0.01	<0.01	<0.01				
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0											<0.01	<0.01	<0.01	<0.01				
PCB congener 105	ug/l																				
PCB congener 114	ug/l																				
PCB congener 118	ug/l																				
PCB congener 123	ug/l																				
PCB congener 126	ug/l																				
PCB congener 156	ug/l																				
PCB congener 157	ug/l																				
PCB congener 167	ug/l																				
PCB congener 169	ug/l																				
PCB congener 189	ug/l																				
PCB congener 77	ug/l																				
PCB congener 81	ug/l																				

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Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**LGBH09**	**LGBH09**	**LGBH09**	**SWSJ34**	**SWSJ34**	**LGBH010**	**LGBH010**	**LGBH010**	**LGBH010**	**SBHJ06**	**SBHJ06**	**SBHJ07**	**SBHJ07**	**SWSJ37**	**SWSJ37**	**LGBH012**	**LGBH012**	**LGBH012**
Round				Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1
Sampled Date				27/02/2002	22/02/2008	17/03/2008	27/02/2008	19/03/2008	27/02/2002	07/03/2002	27/02/2008	18/03/2008	21/02/2008	17/03/2008	22/02/2008	17/03/2008	22/02/2008	19/03/2008	27/02/2002	27/02/2002	22/02/2008
Depth													1.32	4.1	1.4	10.4	0.55	5.6			
Response Zone (RZ) Details				MG/TFD	MG/TFD	MG/TFD	MG-CS	MG-CS	TFD	TFD	TFD	TFD	TFD(Peat)	TFD(Peat)	TFD/MM	TFD/MM	TFD	TFD	MG/TFD	MG/TFD	MG/TFD
Installation Details				1.5 - 7	1.5 - 7	1.5 - 7	3 - 6	3 - 6	11 - 15	11 - 15	11 - 15	11 - 15	3.1 - 4.1	3.1 - 4.1	8.4 - 10.4	8.4 - 10.4	4.1 - 5.6	4.1 - 5.6	1.5 - 7	1.5 - 7	1.5 - 7
Location				**Lagoon 27 SW**																	
Bromobenzene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
2-Chlorotoluene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
Propylbenzene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
4-Chlorotoluene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
4-Bromofluorobenzene**	%																				
1.2.4-Trimethylbenzene	ug/l				<1	<1	3	<1	<1		<1	<1	<1	<1	<1		13	<1	<1		<1
4-Isopropyltoluene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.3.5-Trimethylbenzene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.2-Dichlorobenzene	ug/l	20			<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.4-Dichlorobenzene	ug/l	20			<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
sec-Butylbenzene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
tert-Butylbenzene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.3-Dichlorobenzene	ug/l	20			<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
n-Butylbenzene	ug/l				<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1	<1	<1		<1
1.2-Dibromo-3-chloropropane	ug/l				<1	<1	<1	<1	<5		<1	<1	<1	<1	<1		<1	<1	<5		<1
1.2.4-Trichlorobenzene	ug/l	0.4			<1	<1	<1	<1	<5		<1	<1	<1	<1	<1		<1	<1	<5		<1
Naphthalene	ug/l	2			<1	<1	<1	<1	<5		<1	<1	<1	<1	<1		<1	<1	<5		<1
1.2.3-Trichlorobenzene	ug/l	0.4			<1	<1	<1	<1	<5		<1	<1	<1	<1	<1		<1	<1	<5		<1
Hexachlorobutadiene	ug/l	0.6			<1	<1	<1	<1	<5		<1	<1	<1	<1	<1		<1	<1	<5		<1
Chloroethene	ug/l																				
Tribromomethane	ug/l		100																		
PCBs																					
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0																		
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0																		
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0																		
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0																		
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0																		
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0																		
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0																		
PCB congener 105	ug/l																				
PCB congener 114	ug/l																				
PCB congener 118	ug/l																				
PCB congener 123	ug/l																				
PCB congener 126	ug/l																				
PCB congener 156	ug/l																				
PCB congener 157	ug/l																				
PCB congener 167	ug/l																				
PCB congener 169	ug/l																				
PCB congener 189	ug/l																				
PCB congener 77	ug/l																				
PCB congener 81	ug/l																				

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 All Lagoons
08/07/2015

Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	**Units**	**Screening Criteria**		**LGBH012**	**BH521**	**BH521**	**BH521**	**BH521**	**BH521**	**BH521**	**LGBH011**	**LGBH011**	**LGBH011**	**LGBH011**	**LGBH011**	**SBHJ08A**	**SBHJ08A**	**SBHJ09**	**SBHJ09**	**SBHJ10**	**SBHJ10**
Round				Round 2	1		2		3		Round 1	Round 2	Round 3	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2
Sampled Date				17/03/2008	19/03/2015		26/03/2015		01/04/2015		11/03/2002	11/03/2002	11/03/2002	27/02/2008	18/03/2008	22/02/2008	18/03/2008	21/02/2008	18/03/2008	22/02/2008	17/03/2008
Depth					05/01/1900	08/01/1900	05/01/1900	08/01/1900	05/01/1900	07/01/1900						2.31	7.4	0.85	2.2	2.24	10
Response Zone (RZ) Details				MG/TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	TFD(Peat)	TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	MG-CS/TFD	TFD(Peat)	TFD(Peat)	MG	MG	TFD	TFD
Installation Details				1.5 - 7	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	4.3 - 6.2	8.8 -11.2	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	7.8 - 12.4	6.4 - 7.4	6.4 - 7.4	1 - 2.2	1 - 2.2	9 - 10	9 - 10
Location				**Lagoon 27 SE**							**Lagoon 27NE**										
Bromobenzene	ug/l			<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/l			<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
Propylbenzene	ug/l			<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
4-Chlorotoluene	ug/l			<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
4-Bromofluorobenzene**	%																				
1.2.4-Trimethylbenzene	ug/l			<1					<1	<1	<1		631	<1	<1	<1	<1	<1	<1	<1	<1
4-Isopropyltoluene	ug/l			<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
1.3.5-Trimethylbenzene	ug/l			<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
1.2-Dichlorobenzene	ug/l	20		<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
1.4-Dichlorobenzene	ug/l	20		<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/l			<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/l			<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
1.3-Dichlorobenzene	ug/l	20		<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/l			<1					<1	<1	<1		**<500**	<1	<1	<1	<1	<1	<1	<1	<1
1.2-Dibromo-3-chloropropane	ug/l			<1					<50	<50	<5		**<2500**	<1	<1	<1	<1	<1	<1	<1	<1
1.2.4-Trichlorobenzene	ug/l	0.4		**<1**					**<1**	**<1**	**<5**		**<2500**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**
Naphthalene	ug/l	2		<1					<0.1	<0.1	**<5**		**<2500**	<1	<1	<1	<1	<1	<1	<1	<1
1.2.3-Trichlorobenzene	ug/l	0.4		**<1**					**<2**	**<2**	**<5**		21701	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**
Hexachlorobutadiene	ug/l	0.6		**<1**					**<1**	**<1**	**<5**		**<2500**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**
Chloroethene	ug/l								<1	<1											
Tribromomethane	ug/l		100						<1	<1											
PCBs																					
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0																		
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0																		
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0																		
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0																		
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0																		
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0																		
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0																		
PCB congener 105	ug/l																				
PCB congener 114	ug/l																				
PCB congener 118	ug/l																				
PCB congener 123	ug/l																				
PCB congener 126	ug/l																				
PCB congener 156	ug/l																				
PCB congener 157	ug/l																				
PCB congener 167	ug/l																				
PCB congener 169	ug/l																				
PCB congener 189	ug/l																				
PCB congener 77	ug/l																				
PCB congener 81	ug/l																				

M4CAN
Groundwater Analysis Results & Screening Assessment
CL-26 All Lagoons
08/07/2015

Geological Formation Legends

Made Ground (slurry slag)	MG-SS
Made Ground (coarse slag)	MG-CS
General Made Ground	MG-G
Tidal Flat Deposits	TDF
Mercia Mudstone	MM

Screening Values & Assessment

Environmental Quality Standards	EQS
Drinking Water Standard	DWS
Exceeds EQS	
Exceeds DWS	X
Laboratory detection level higher than screening criterion	X

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		BH525	BH525	BH525	BH525	BH525	BH525	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043	BHM4CAN043
Round				1		2		3		1		2		3	
Sampled Date				19/03/2015		26/03/2015		01/04/2015		12/05/2016		25/05/2016		02/06/2016	
Depth				2.55	3.92	2.49	3.47	1.98	2.28	1.93	1.92	1.99	1.96	2.12	2.05
Response Zone (RZ) Details				MG	TFD / GFD	MG	TFD / GFD	TFD / GFD	MG	TFD / MM	MG	TFD / MM	MG	TFD / MM	MG
Installation Details				0.5 - 2.8	9.8 - 11.8	0.5 - 2.8	9.8 - 11.8	9.8 - 11.8	0.5 - 2.8	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6	11.7 - 8.7	1 - 6
Location				Lagoon 26											
Bromobenzene	ug/l									<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/l									<1	<1	<1	<1	<1	<1
Propylbenzene	ug/l									<1	<1	<1	<1	<1	<1
4-Chlorotoluene	ug/l									<1	<1	<1	<1	<1	<1
4-Bromofluorobenzene**	%									93.7	101	99.9	101	98.8	99
1.2.4-Trimethylbenzene	ug/l									<1	<1	<1	<1	<1	<1
4-Isopropyltoluene	ug/l									<1	<1	<1	<1	<1	<1
1.3.5-Trimethylbenzene	ug/l									<1	<1	<1	<1	<1	<1
1.2-Dichlorobenzene	ug/l	20								<1	<1	<1	<1	<1	<1
1.4-Dichlorobenzene	ug/l	20								<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/l									<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/l									<1	<1	<1	<1	<1	<1
1.3-Dichlorobenzene	ug/l	20								<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/l									<1	<1	<1	<1	<1	<1
1.2-Dibromo-3-chloropropane	ug/l									<1	<1	<1	<1	<1	<1
1.2.4-Trichlorobenzene	ug/l	0.4								<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	2								<1	<1	<1	<1	<1	<1
1.2.3-Trichlorobenzene	ug/l	0.4								<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/l	0.6								<1	<1	<1	<1	<1	<1
Chloroethene	ug/l									<1	<1	<1	<1	<1	<1
Tribromomethane	ug/l		100												
PCBs															
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0												
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0												
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0												
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0												
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0												
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0												
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0												
PCB congener 105	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 114	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 118	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 123	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 126	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 156	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 157	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 167	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 169	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 189	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 77	ug/l									<0.015	<0.015	<0.015	<0.015		
PCB congener 81	ug/l									<0.015	<0.015	<0.015	<0.015		

A9 Appendix 5

Surface Water Laboratory Data

ANCAN
Surface Water Sample Analysis & Screening Assessment
CL3B - Lagoons
15/07/2015

Screening Values and Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standards
100	Exceeds EQS
<50	Laboratory
BOL/ITA	Exceeds CCW

Notes
EQS calcium carbonate 100-150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
NDP - No determination possible

Monitoring Round / Location		Screening Criteria			E1 / R13	E2 / R13	E3 / R13	E4 / R13	1 / SW504	2 / SW504	3 / SW504	1 / SW505	2 / SW505	3 / SW505	1 / SW506	2 / SW506	3 / SW506	Q1 / 15.3	Q1 / 16.2	1 / MCBeach1	2 / MCBeach1	3 / MCBeach1	4 / MCBeach1	1 / MD06W	2 / MD06W	3 / MD06W	4 / MD06W	1 / MD09W5	2 / MD09W5	3 / MD09W5	4 / MD09W5
Date Sampled	Units	EQS	DWS	CCW	07/12/2007	17/03/2008	24/06/2008	24/09/2008	01/04/2015	01/04/2015	22/04/2015	01/04/2015	01/04/2015	22/04/2015	01/04/2015	01/04/2015	22/04/2015	01/04/2015	01/04/2015	01/04/2015	01/04/2015	30/09/2004	06/05/2008	30/04/2008	30/04/2008	30/04/2008	06/05/2008	30/04/2008	30/04/2008	30/04/2008	06/05/2008
Metals & Non-Metal Inorganics																															
Hardness Total	mg/l				241	205	266	221																185		205		201	198		
Total Alkalinity	mg/l																							144		155		151	116		
Bicarbonate Alkalinity as CaCO3	mg/l																							149	143			151	116		
Arsenic Dissolved	ug/l	50	10						1.8	<1	<1	1.6	2	1.1	1.5	4.6	1.5	1.17	1.55	<1	2	<1	2	<50	<50	<50	<50	<5	<5	<5	<5
Boron Dissolved	ug/l	3500	1000						970	990	24	150	220	45	710	920	130	49.8	36.3	80	80	<50	70	<50	<50	<50	<50	<50	<50	<50	<50
Calcium Dissolved	ug/l			300000	60	83	3.9	60																49.8	39.3						
Iron Dissolved	ug/l																							1500	1200			1400	1100		
Cadmium Dissolved	ug/l																							2200	2200			2	2		
Cadmium Dissolved	ug/l	0.15	5	5					0.76	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.8	0.097	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	20.1	<0.1	20.1	<0.1	20.1	<0.1	20.1	<0.1
Chromium Dissolved	ug/l			50					18	<1	<1	15	10	<1	9.3	6.2	<1	1.41	1.29	2	<1	2	13	<1	<1	<1	12	<1	<1	<1	11
Copper Dissolved	ug/l	10	2000		<0.85	5	11	<0.85	1.4	<0.85	<0.85	1.5	2.8	1.1	1.4	1.6	1.6	1.75	<0.85	<1	<1	<1	<1	2	3	<1	2	<1	2	<1	2
Lead Dissolved	ug/l	1.2	10	250	<0.02	<0.02	9	<0.02										0.081	0.045	<1	<1	<1	<1	<1	<2	<1	<1	6	<1	<1	6	<1
Magnesium Dissolved	ug/l				12	16	1.5	14																15.1	15.1						
Nickel Dissolved	ug/l	4	20	100	<1	<1	5	<1										1.17	1.06	5	1	1	<1	8	<1	<1	<1	10	<1	<1	<1	10
Selenium Dissolved	ug/l		10						<1	<1	<1	2	2.5	2.5	<1	4.9	1.6	0.329	0.491	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc Dissolved	ug/l	75		1000																3	13	21	<2	8	10	7	<2	10	7	8	<2
Manganese Dissolved	ug/l	30	50																	4	110	144	19	9	144	2	10	8	144	2	10
Iron Dissolved	ug/l	1000	200																	<10	<10	<10	<10	930	<10	<10	<10	50	930	<10	<10	50
Mercury Dissolved	ug/l	0.07	1																	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum Dissolved	ug/l																							<1	<1						
Sulphate Total	mg/l	0.15	5	5	0.5	<0.5	<0.5	<0.5																							
Zinc Total	ug/l	75		1000	20	24	27	23																							
COD	mg/l																							<5	<5			<5	<5		
BOD	mg/l	5		18	1	<1	7	2										<1	<1					4.5	<2.0			1	<2.0		
TOC	mg/l																							3.6	3.3			3.8	4.2		
Nitrate as N	mg/l		50	1	<0.1	0.5	<0.3	<0.3												<0.3	<0.3	129	<0.3	4.4	3.3	4.1	4.3			2.4	2.8
Nitrate as NO3	mg/l		50	1	*1.9*	*2.35*	<0.3	<0.3										*0.72*	0.368												
Nitrite as N	mg/l		0.5727785513	1	<0.1	<0.1	<0.1	<0.1																							
Nitrite as NO2	mg/l		0.5	1														<0.05	<0.05												
Nitrogen, Total Oxidised as N	mg/l		50	2	<0.3	0.5	<0.3	<0.3										*2.21*	<0.3												
Phosphate, Ortho as P	mg/l			1	*1.3*	*1.3*	0.3	0.3										1.17	1.06	5	1	1	<1	8	<1	<1	<1	10	<1	<1	<1	10
Phosphorus (wet chem)	ug/l	120																0.329	0.491	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sulphate (soluble)	mg/l	400	250	300														21.3	16.4												
Sulphate as SO4	mg/l	400	250	300	8	<5	8	36												31.7	11.8	11.9	30.7	15	16.4	27.6	28.8	29.2	16	27.1	30
Sulphide-Extractable Material	mg/l																			<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloride	mg/l	250	250	300	21	18	31	19										24.6	24.9	47	52	29	55	19	26	21	23			21	21
Fluoride	mg/l																			4.4	1.8			2	1.8						
Sulphide	mg/l																							<5	<5						
Ammoniacal Nitrogen as N	mg/l	0.6		1	0.09	0.11	0.04	0.1	0.078	0.13	0.06	0.44	0.49	0.56	0.044	0.044	0.075	0.227	<0.2	0.14	0.16	0.16	0.11	0.2	<0.1	<0.1	0.1	<0.1	0.2	0.1	0.1
Cyanide Free	mg/l								<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cyanide Total	mg/l																			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Thiocyanate as SCN	mg/l																			<0.1	5.1	<0.1	7.2	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.2	0.1
Dissolved Oxygen	mg/l				6.47	7.33	0.91	5.76										14	12.6													
Dissolved Oxygen (Saturation)	%	60			57.2	63.2	10	53																							
pH Value	pH units	6.9	6.5-10	6.8-8.5	7.7	7.7	7.3	7.3	*8.0*	*8.6*	8.2	7.7	7.7	7.7	*8.7*	*8.9*	*8.6*	7.7	7.2	7.5	7.5	7.9	7.9	8	7.6	8	7.7	7.8	7.6	8.1
Conductivity	us/cm																	649	502	498	682	499	439	487	479	442	396	483	481		
Organics																															
C>5-C7-C12	ug/l																							<50	<50						
BTEX	ug/l								<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3					<3	<3						
Benzene	ug/l	10	1						<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7					<7	<7						
Toluene	ug/l	50							<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4					<4	<4						
Ethyl benzene	ug/l	20							<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					<5	<5						
m & p Xylene	ug/l	30							<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8					<8	<8						
o Xylene	ug/l	30							<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3					<3	<3						
TPH																															
Aliphatics C5-C6	ug/l								<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C6-C8	ug/l								<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C8-C10	ug/l								<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C10-C12	ug/l								<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C12-C16 Aqueous	ug/l								<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C16-C21 Aqueous	ug/l								<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Aliphatics >C21-C35 Aqueous	ug/l								<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10												
Total Aliphatics C12-C35 Aqueous	ug/l																							<10	<10						
Total Aliphatic TPH	ug/l								0	0	0	0	0	0	0	0	0														
TPH >C6-C8	ug/l				<40	<40	<40	<40																							
TPH >C8-C10	ug/l				<40	<40	<40	<40																							
TPH >C10-C16	ug/l				<80	<80	<80	<80																							
TPH >C16-C24	ug/l				<80	<80	78	<80																							
TPH >C24-C40	ug/l				<200	<200	197	<200																							
TPH >C6-C40	ug/l				<200	<200	275	<200																							
Total petroleum hydrocarbons	ug/l								<30	<10	<10	<10	<10	<10	<10	<10	<10							<100	<100			140			
Phenols																															
2-Chlorophenol	ug/l	50							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
2 - Methyl-4,6-Dinitrophenol	ug/l								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
2-Methylphenol	ug/l	100							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
2-Nitrophenol	ug/l								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
4,6-Dichlorophenol	ug/l	20							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
4,6-Dinethylphenol	ug/l								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
2,4,5-Trichlorophenol	ug/l								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
2,4,6-Trichlorophenol	ug/l								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
4-Chloro-3-methylphenol	ug/l	40							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
4-Methylphenol	ug/l	100							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
Pentachlorophenol	ug/l	0.4							<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
Phenols	ug/l	7.7							<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03														
Phenol-Index	mg/l	0.0077							*<0.03*	*<0.03*	<0.03	*<0.03*	*<0.03*	<0.03	*<0.03*	*<0.03*	<0.03														
PAHs																															
2-Chloronaphthalene	ug/l								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
2-Methylnaphthalene	ug/l								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5														
Acenaphthene	ug/l								<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015					<2	<2			<2	<2		
Acenaphthylene	ug/l								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<2	<2			<2	<2		
Anthracene	ug/l	0.1							<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015					<2	<2			<2	<2		
Benzo(a)anthracene	ug/l								<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.1	<0.1					<2	<2			<2	<2		
Benzo(a)pyrene	ug/l	0.00017	0.01						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<2	<2			<2	<2		
Benzo(b)fluoranthene	ug/l	0.017	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.033	<0.033					<2	<2			<2	<2		
Benzo(b)fluoranthene	ug/l	0.017	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.027	<0.027					<2	<2			<2	<2		
Benzo(g,h,i)perylene	ug/l	0.0082	0.1						<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016					<2	<2			<2	<2		
Indeno(1,2,3-cd)pyrene	ug/l		0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.014	<0.014					<2	<2			<2	<2		
Chrysene	ug/l								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.016	<0.016					<2	<2			<2	<2		
Dibenz(a,h)anthracene	ug/l								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.016	<0.016					<2	<2			<2	<2		
Fluoranthene	ug/l	0.0063							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.017	<0.017					<2	<2			<2	<2		
Fluorene	ug/l								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.014	<0.014					<2	<2			<2	<2		
Naphthalene	ug/l	2							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<2	<2			<2	<2		
Phenanthrene	ug/l								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.022	<0.022					<2	<2			<2	<2		
Pyrene	ug/l								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.015	<0.015					<2	<2			<2	<2		
Total PAHs (USEPA 16)	ug/l																	<0.344	<0.344					<32	<32			<32	<32		
VOCs																															
1,1,1,2-Tetrachloroethane	ug/l								<2	<2	<2	<2	<2	<2	<2	<2	<2														
1,1,1-Trichloroethane	ug/l	100							<1	<1	<1	<1	<1	<1	<1	<1	<1														
1,1,2-Trichloroethane	ug/l	400							<10	<10	<10	<10	<10	<10	<10	<10	<10														
1,1-Dichloroethane	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
1,1-Dichloroethene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
1,2,3-Trichlorobenzene	ug/l	0.4							<2	<2	<2	<2	<2	<2	<2	<2	<2														
1,2,3-Trichloropropane	ug/l								<50	<50	<50	<50	<50	<50	<50	<50	<50														
1,2,4-Trichlorobenzene	ug/l	0.4							<1	<1	<1	<1	<1	<1	<1	<1	<1														
1,2,4-Trimethylbenzene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
1,2-Dibromo-3-Chloropropane	ug/l								<50	<50	<50	<50	<50	<50	<50	<50	<50														
1,2-Dibromoethane	ug/l								<5	<5	<5	<5	<5	<5	<5	<5	<5														
1,2-Dichlorobenzene	ug/l	20							<1	<1	<1	<1	<1	<1	<1	<1	<1														
1,2-Dichloroethane	ug/l	10	3						<2	<2	<2	<2	<2	<2	<2	<2	<2														
1,2-Dichloropropane	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
1,3,5-Trimethylbenzene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
1,3-Dichloropropane	ug/l								<2	<2	<2	<2	<2	<2	<2	<2	<2														
1,4-Dichlorobenzene	ug/l	20							<0.18	<0.15	<0.18	<0.17	<0.18	<0.18	<0.18	<0.18	<0.18	<0.23	<0.23												
2-Chlorotoluene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
4-Chlorotoluene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
Benzene	ug/l	10	1						<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7												
Bromobenzene	ug/l								<5	<5	<5	<5	<5	<5	<5	<5	<5														
Bromochloromethane	ug/l			100					<5	<5	<5	<5	<5	<5	<5	<5	<5														
Bromodichloromethane	ug/l								<5	<5	<5	<5	<5	<5	<5	<5	<5														
Bromoform	ug/l								<5	<5	<5	<5	<5	<5	<5	<5	<5														
Chloroethane	ug/l								<2	<2	<2	<2	<2	<2	<2	<2	<2														
Chloroform	ug/l	2.5		100					<1	<1	<1	<1	<1	<1	<1	<1	<1														
Chloromethane	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
cis-1,2-Dichloroethene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
cis-1,3-Dichloropropene	ug/l								<10	<10	<10	<10	<10	<10	<10	<10	<10														
Dibromochloromethane	ug/l			100					<10	<10	<10	<10	<10	<10	<10	<10	<10														
Dibromomethane	ug/l								<10	<10	<10	<10	<10	<10	<10	<10	<10														
Dichlorodifluoromethane	ug/l								6	10	11	12	13	14	15	16	17														
Dichlorobenzene	ug/l	20							<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5												
Hexachlorobutadiene (HCBD)	ug/l	0.6							<1	<1	<1	<1	<1	<1	<1	<1	<1														
Isopropylbenzene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
m,p Xylenes	ug/l	30							<8	<8	<8	<8	<8	<8	<8	<8	<8														
Methyl tert-butyl ether (MTBE)	ug/l								<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3												
n-Butylbenzene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
n-propylbenzene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
O-Xylene	ug/l	30							<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3												
sec-Butylbenzene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
Styrene	ug/l	50							<1	<1	<1	<1	<1	<1	<1	<1	<1														
Tert-Butylbenzene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
Tetrachloroethene	ug/l	10	10						<1	<1	<1	<1	<1	<1	<1	<1	<1														
Tetrachloromethane (Carbon Tetra Chloride)	ug/l	12	3						<1	<1	<1	<1	<1	<1	<1	<1	<1														
Toluene	ug/l	50							<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4												
trans-1,2-Dichloroethene	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
trans-1,3-Dichloropropene	ug/l								<10	<10	<10	<10	<10	<10	<10	<10	<10														
Tribromomethane	ug/l			100					<1	<1	<1	<1	<1	<1	<1	<1	<1														
Trichloroethene	ug/l	10	10						<1	<1	<1	<1	<1	<1	<1	<1	<1														
Trichlorofluoromethane	ug/l								<1	<1	<1	<1	<1	<1	<1	<1	<1														
Phthalates																															
Bis(2-ethylhexyl) phthalate	ug/l	1.3							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
Butylbenzyl phthalate	ug/l	20							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
Di-n-butyl phthalate	ug/l	8							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
Di-n-Octyl phthalate	ug/l	20							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
Diethyl phthalate	ug/l	200							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
Dimethyl phthalate	ug/l	400							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
Other Semi-Volatiles																															
1,2-Dichlorobenzene	ug/l	20							<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1												
1,2,4-Trichlorobenzene	ug/l	0.4							<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1												
1,3-Dichlorobenzene	ug/l	20							<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1												
1,4-Dichlorobenzene	ug/l	20							<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1												
2-Nitroaniline	ug/l								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5												
2,4-Dinitrotoluene	ug/l				

A10 Appendix 6

Soil Leachate Laboratory Data

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 12
21/06/2016

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria	
Specimen Depth (m)			
OD Level (m)			
Sample Type			
Geology Code			
Cluster Code		EQS	DWS
2:1 Results			
Arsenic Dissolved	ug/l	50	10
Boron Dissolved	ug/l	2000	1000
Barium Dissolved	ug/l		
Beryllium Dissolved	ug/l		
Cadmium Dissolved	ug/l	0.15	5
Chromium Dissolved	ug/l		50
Chromium VI Dissolved	ug/l	3.4	
Chromium III Dissolved	ug/l	4.7	
Copper Dissolved	ug/l	10	2000
Iron Dissolved	ug/l	1000	200
Molybdenum Dissolved	ug/l		
Nickel Dissolved	ug/l	4	20
Lead Dissolved	ug/l	1.2	10
Antimony Dissolved	ug/l		5
Selenium Dissolved	ug/l		10
Vanadium Dissolved	ug/l		
Zinc Dissolved	ug/l	75	
Iron as Fe Dissolved	ug/l	1000	200
Mercury as Hg Dissolved	ug/l	0.07	1
Total Sulphur as SO4 Dissolved	mg/l		
Chloride as Cl	mg/l	250	250
pH units	mg/l	6-9	6.5-10
phosphate as P	mg/l		
Thiocyanate as SCN	mg/l		
Conductivity uS/um @ 25C	mg/l		
Ammoniacal Nitrogen as N	mg/l	0.6	
Total Cyanide	mg/l	0.001	0.05
Cyanide Free	mg/l		
Organics			
Phenols			
Phenols	mg/l	0.0077	
Phenols monohydric	mg/l		
Cresols	mg/l		
Xylenols	mg/l		
BTEX			
GRO >C5-C12	ug/l		
Benzene	ug/l	10	1
Toluene	ug/l	50	
Ethylbenzene	ug/l	20	
m,p xylenes	ug/l	30	
O-Xylene	ug/l	30	
MTBE	ug/l		
Sum of detected BTEX	ug/l		
Sum of detected Xylenes	ug/l		
TPH			
Aliphatics >C5-C6	ug/l		
Aliphatics >C6-C8	ug/l		
Aliphatics >C8-C10	ug/l		
Aliphatics >C10-C12	ug/l		
Aliphatics >C12-C16	ug/l		
Aliphatics >C16-C21	ug/l		
Aliphatics >C21-C35	ug/l		
Aliphatics >C35-44	ug/l		
Aromatics >C5-C7	ug/l		
Aromatics >C7-C8	ug/l		
Aromatics >C8-C10	ug/l		
Aromatics >C10-C12	ug/l		
Aromatics >C12-C16	ug/l		
Aromatics >C16-C21	ug/l		
Aromatics >C21-C35	ug/l		
Aromatics >C35-44	ug/l		
Total Aliphatic TPH	ug/l		
Total Aromatic TPH	ug/l		
Total petroleum hydrocarbons	ug/l		
PAH			
Acenaphthene	ug/l		
Acenaphthylene	ug/l		
Anthracene	ug/l	0.1	
Benzo(a)anthracene	ug/l		
Benzo(a)pyrene	ug/l	0.00017	0.01
Benzo(b)fluoranthene	ug/l	0.017	0.1
Benzo(ghi)perylene	ug/l	0.0082	0.1
Benzo(k)fluoranthene	ug/l	0.017	0.1
Chrysene	ug/l		
Dibenzo(ah)anthracene	ug/l		
Fluoranthene	ug/l	0.0063	
Fluorene	ug/l		
Indeno(123cd)pyrene	ug/l	N/A	0.1
Naphthalene	ug/l	2	
Phenanthrene	ug/l		
Pyrene	ug/l		
PAH 16 Total	ug/l		
PCBs			
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
16	6	6	1	SWSJ10 @ 4.5mbGL	0	0
14	11	430	50	SWSJ09A @ 1mbGL	0	0
14	11	46	7	SWSJ14 @ 1mbGL		
14	0	None > LOD	None > LOD			
16	1	0.2	0.2	BH514A @ 2 - 2.5mbGL	1	0
16	11	170	1.5	SWSJ12 @ 4mbGL		3
1	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD		0	
16	9	22	1	SWSJ12 @ 4mbGL	1	0
12	3	71	6	SWSJ10 @ 4.5mbGL	0	0
14	11	64	10	SWSJ13 @ 2mbGL		
16	3	4	2	SWSJ12 @ 4mbGL	0	0
16	3	14	3.75	SWSJ12 @ 4mbGL	3	1
14	0	None > LOD	None > LOD			0
16	11	5	1	SWSJ11 @ 3mbGL		0
15	5	16	2	SWSJ12 @ 4mbGL		
16	7	50	10	SWSJ09A @ 1mbGL	0	
1	0	None > LOD	None > LOD		0	0
5	0	None > LOD	None > LOD		0	0
1	1	36	36	LGBH003 @ 0.5mbGL		
1	0	None > LOD	None > LOD		0	0
5	5	12	8.6	BH515 @ 0.5mbGL	4	4
1	1	0.2	0.2	LGBH003 @ 0.5mbGL		
1	0	None > LOD	None > LOD			
1	1	606	606	LGBH003 @ 0.5mbGL		
1	1	0.1	0.1	LGBH003 @ 0.5mbGL	0	
15	0	None > LOD	None > LOD		0	0
4	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
4	0	None > LOD	None > LOD		0	0
4	0	None > LOD	None > LOD		0	
4	0	None > LOD	None > LOD		0	
4	0	None > LOD	None > LOD		0	
4	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
4	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD			
4	1	20	20	BHM4CAN040 @ 3mbGL		
4	2	105	31	BHM4CAN040 @ 3mbGL		
4	2	35	27	BH514A @ 2 - 2.5mbGL		
3	0	None > LOD	None > LOD			
4	0	None > LOD	None > LOD			
4	2	152	76	BHM4CAN040 @ 3mbGL		
4	2	153	76	BHM4CAN040 @ 3mbGL		
4	1	1.02	1.02	BHM4CAN040 @ 3mbGL		
4	1	0.0265	0.0265	BHM4CAN040 @ 3mbGL		
4	1	3.17	3.17	BHM4CAN040 @ 3mbGL	1	
4	1	0.308	0.308	BHM4CAN040 @ 3mbGL		
4	0	None > LOD	None > LOD		0	0
4	1	0.0573	0.0573	BHM4CAN040 @ 3mbGL	1	0
4	0	None > LOD	None > LOD		0	0
4	0	None > LOD	None > LOD		0	0
4	1	0.212	0.212	BHM4CAN040 @ 3mbGL		
4	0	None > LOD	None > LOD			
4	1	11.4	11.4	BHM4CAN040 @ 3mbGL	1	
4	1	3.6	3.6	BHM4CAN040 @ 3mbGL		
4	0	None > LOD	None > LOD		0	0
4	0	None > LOD	None > LOD		0	
4	1	26.5	26.5	BHM4CAN040 @ 3mbGL		
4	1	5.74	5.74	BHM4CAN040 @ 3mbGL		
4	1	52.1	52.1	BHM4CAN040 @ 3mbGL		
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 12
21/06/2016

Notes
EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Geological Formation Legend

MG - CS	Made Ground (coarse slag)
MG - SS	Made Ground (slurry slag)
TFD	Tidal Flat Deposit

Sample Reference	Units	Screening Criteria		LGBH003	SWSJ09A	SWSJ10	SWSJ11	SWSJ12	SWSJ12	SWSJ13	SWSJ14	SWSJ15	SWSJ16	SWSJ17A	BH514A	BH515	TP506	SBHJ04	BHM4CAN040
Specimen Depth (m)				0.5	1	4.5	3	2	4	2	1	2	2.3	1	2 - 2.5	0.5	1.5 - 1.6	8	3
OD Level (m)					9.95	6.03	7.28	8.59	6.59	9.01	9.14	8.09	7.9	9.74	9.9	10.6	10.35	3.24	8.57
Sample Type					L	ES	ES	ES	L	ES	ES	ES	ES	ES	ES	ES	ES	D	ES
Geology Code		**EQS**	**DWS**	MG - CS	MG - SS	MG - CS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - CS	MG - SS	MG - CS	MG - CS	MG - CS	TFD	MG - SS
Cluster Code				2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2007 GI	2016 GI
2:1 Results																			
Arsenic Dissolved	ug/l	50	10	<1	<1	6	<1	<1	<1	<1	2	<1	<1	1	<1	<1	1.5	4	2.85
Boron Dissolved	ug/l	2000	1000	<50	430	370	170	70	250	50	100	130	100	270		<20	<20	320	
Barium Dissolved	ug/l				31	44	11	20	17	14	46	7	41	17				17	
Beryllium Dissolved	ug/l				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1				<1	
Cadmium Dissolved	ug/l	0.15	5	<0.1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.2	<0.08	<0.08	<0.4	<0.1
Chromium Dissolved	ug/l		50	11	<1	100	19	55	170	28	<1	13	6	43	1.5	<1	<1	2	<0.22
Chromium VI Dissolved	ug/l	3.4																	<30
Chromium III Dissolved	ug/l	4.7																	<30
Copper Dissolved	ug/l	10	2000	1	<1	3	<1	3	22	<1	<1	<1	10	5	<1	4.2	2.1	<1	1.2
Iron Dissolved	ug/l	1000	200		<5	71	<5	<5	<5	<5	<5	46	<5	<5				6	<19
Molybdenum Dissolved	ug/l				10	17	33	32	58	64	17	29	25	58				26	
Nickel Dissolved	ug/l	4	20	<1	<1	<1	<1	<1	4	<1	<1	<1	<1	<1	<1	<1	<1	2	2.82
Lead Dissolved	ug/l	1.2	10	<1	<1	<1	<1	<1	14	<1	<1	<1	<1	<1	<1	<1	<1	7	3.75
Antimony Dissolved	ug/l		5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5				<5	
Selenium Dissolved	ug/l		10	1	<1	4	5	<1	<1	3	4	3	<1	3	2.4	2.5	2.9	3	<0.39
Vanadium Dissolved	ug/l				<1	2	<1	<1	16	<1	<1	<1	5	5				3	<0.24
Zinc Dissolved	ug/l	75		14	50	10	10	<3	<3	<3	<3	10	<3	<3	28	<1	<1	<3	16.7
Iron as Fe Dissolved	ug/l	1000	200	<10															
Mercury as Hg Dissolved	ug/l	0.07	1	<0.1											<0.5	<0.5	<0.5		<0.01
Total Sulphur as SO4 Dissolved	mg/l			36															
Chloride as CI	mg/l	250	250	<2															
pH units	mg/l	6-9	6.5-10	11.6											8.6	12	12		11.5
phosphate as P	mg/l			0.2															
Thiocyanate as SCN	mg/l			<0.1															
Conductivity uS/um @ 25C	mg/l			606															
Ammoniacal Nitrogen as N	mg/l	0.6		0.1															
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Cyanide Free	mg/l														<0.05	<0.05	<0.05		<0.05
Organics																			
Phenols																			
Phenols	mg/l	0.0077													<0.03	<0.03	<0.03		<0.002
Phenols monohydric	mg/l																		<0.016
Cresols	mg/l																		<0.006
Xylenols	mg/l																		<0.008
BTEX																			
GRO >C5-C12	ug/l																		<50
Benzene	ug/l	10	1												<1	<1	<1		<7
Toluene	ug/l	50													<1	<1	<1		<4
Ethylbenzene	ug/l	20													<1	<1	<1		<5
m,p xylenes	ug/l	30													<1	<1	<1		<8
O-Xylene	ug/l	30													<1	<1	<1		<3
MTBE	ug/l																		<3
Sum of detected BTEX	ug/l																		<28
Sum of detected Xylenes	ug/l																		<11
TPH																			
Aliphatics >C5-C6	ug/l														<0.1	<0.1	<0.1		<10
Aliphatics >C6-C8	ug/l														<0.1	<0.1	<0.1		<10
Aliphatics >C8-C10	ug/l														<0.1	<0.1	<0.1		<10
Aliphatics >C10-C12	ug/l														<0.1	<0.1	<0.1		<10

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 12
21/06/2016

Notes
EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Geological Formation Legend

MG - CS	Made Ground (coarse slag)
MG - SS	Made Ground (slurry slag)
TFD	Tidal Flat Deposit

Sample Reference	Units	Screening Criteria		LGBH003	SWSJ09A	SWSJ10	SWSJ11	SWSJ12	SWSJ12	SWSJ13	SWSJ14	SWSJ15	SWSJ16	SWSJ17A	BH514A	BH515	TP506	SBHJ04	BHM4CAN040
Specimen Depth (m)		EQS	DWS	0.5	1	4.5	3	2	4	2	1	2	2.3	1	2 - 2.5	0.5	1.5 - 1.6	8	3
OD Level (m)					9.95	6.03	7.28	8.59	6.59	9.01	9.14	8.09	7.9	9.74	9.9	10.6	10.35	3.24	8.57
Sample Type					L	ES	ES	ES	L	ES	ES	ES	ES	ES	ES	ES	ES	D	ES
Geology Code				MG - CS	MG - SS	MG - CS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - CS	MG - SS	MG - CS	MG - CS	MG - CS	TFD	MG - SS
Cluster Code				2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2007 GI	2016 GI
Aliphatics >C12-C16	ug/l														<0.1	<0.1	<0.1		<10
Aliphatics >C16-C21	ug/l														<0.1	<0.1	<0.1		<10
Aliphatics >C21-C35	ug/l														<0.1	<0.1	<0.1		<10
Aliphatics >C35-44	ug/l														<0.1	<0.1	<0.1		
Aromatics >C5-C7	ug/l														<0.1	<0.1	<0.1		<10
Aromatics >C7-C8	ug/l														<0.1	<0.1	<0.1		<10
Aromatics >C8-C10	ug/l														<0.1	<0.1	<0.1		<10
Aromatics >C10-C12	ug/l														<0.1	<0.1	<0.1		<10
Aromatics >C12-C16	ug/l														<0.1	<0.1	<0.1		20
Aromatics >C16-C21	ug/l														31	<0.1	<0.1		105
Aromatics >C21-C35	ug/l														35	<0.1	<0.1		27
Aromatics >C35-44	ug/l														<0.1	<0.1	<0.1		
Total Aliphatic TPH	ug/l														<5	<5	<5		<10
Total Aromatic TPH	ug/l														76	<5	<5		152
Total petroleum hydrocarbons	ug/l														76	<10	<10		153
PAH																			
Acenaphthene	ug/l														<0.1	<0.1	<0.1		1.02
Acenaphthylene	ug/l														<0.1	<0.1	<0.1		0.0265
Anthracene	ug/l	0.1													<0.1	<0.1	<0.1		3.17
Benzo(a)anthracene	ug/l														<0.1	<0.1	<0.1		0.308
Benzo(a)pyrene	ug/l	0.00017	0.01												<0.1	<0.1	<0.1		<0.018
Benzo(b)fluoranthene	ug/l	0.017	0.1												<0.1	<0.1	<0.1		0.0573
Benzo(ghi)perylene	ug/l	0.0082	0.1												<0.1	<0.1	<0.1		<0.032
Benzo(k)fluoranthene	ug/l	0.017	0.1												<0.1	<0.1	<0.1		<0.054
Chrysene	ug/l														<0.1	<0.1	<0.1		0.212
Dibenzo(ah)anthracene	ug/l														<0.1	<0.1	<0.1		<0.032
Fluoranthene	ug/l	0.0063													<0.1	<0.1	<0.1		11.4
Fluorene	ug/l														<0.1	<0.1	<0.1		3.6
Indeno(123cd)pyrene	ug/l	N/A	0.1												<0.1	<0.1	<0.1		<0.028
Naphthalene	ug/l	2													<0.1	<0.1	<0.1		<0.2
Phenanthrene	ug/l														<0.1	<0.1	<0.1		26.5
Pyrene	ug/l														<0.1	<0.1	<0.1		5.74
PAH 16 Total	ug/l														<2	<2	<2		52.1
PCBs																			
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0														<0.01		
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0														<0.01		
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0														<0.01		
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0														<0.01		
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0														<0.01		
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0														<0.01		
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0														<0.01		

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 25
21/06/2016

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
2:1 Results								
Arsenic Dissolved	ug/l	21	17	11	0.923	BH519 @ 1.55 - 2mbGL	0	1
Boron Dissolved	ug/l	19	15	560	40	SWSJ30 @ 6mbGL	0	0
Barium Dissolved	ug/l	19	13	1300	7	SWSJ18 @ 3mbGL		
Beryllium Dissolved	ug/l	19	0	None > LOD	None > LOD			
Cadmium Dissolved	ug/l	21	0	None > LOD	None > LOD		0	0
Chromium Dissolved	ug/l	21	7	64	1.2	SWSJ28 @ 2mbGL		2
Chromium Trivalent	ug/l	2	0	None > LOD	None > LOD			0
Chromium Hexavalent	ug/l	2	0	None > LOD	None > LOD			0
Copper Dissolved	ug/l	21	13	30	2.4	SWSJ18 @ 3mbGL	3	0
Iron Dissolved	ug/l	17	5	85	10	SWSJ24A @ 5mbGL	0	0
Molybdenum Dissolved	ug/l	19	12	160	2	SWSJ23 @ 7.9mbGL		
Nickel Dissolved	ug/l	21	18	26	1.65	SWSJ27 @ 6mbGL	10	1
Lead Dissolved	ug/l	21	13	600	0.257	SWSJ19 @ 1mbGL	11	8
Antimony Dissolved	ug/l	19	0	None > LOD	None > LOD			0
Selenium Dissolved	ug/l	21	18	18	0.63	SWSJ27 @ 6mbGL		2
Vanadium Dissolved	ug/l	21	1	2.79	2.79	BHM4CAN041 @ 7.4mbGL		
Mercury as Hg Dissolved	ug/l	8	0	None > LOD	None > LOD		0	0
Chloride as Cl	mg/l	2	1	4	4	LGBH005 @ 1.6mbGL	0	0
pH	mg/l	8	8	12.3	9	LGBH004 @ 1.3mbGL	7	5
Conductivity uS/cm @25C	mg/l	2	2	2330	730	LGBH004 @ 1.3mbGL		
Zinc Dissolved	mg/l	21	15	491	0.0019	BHM4CAN041 @ 5 - 6mbGL	2	
Total Sulphur as SO4 Dissolved	mg/l	2	2	154	55.4	LGBH004 @ 1.3mbGL		
Phosphate as P	mg/l	2	2	0.2	0.1	LGBH004 @ 1.3mbGL		
Thiocyanate as SCN	mg/l	2	2	0.2	0.1	LGBH005 @ 1.6mbGL		
Ammoniacal Nitrogen as N	mg/l	2	2	1.2	0.8	LGBH004 @ 1.3mbGL	2	
Total Cyanide	mg/l	19	0	None > LOD	None > LOD		0	0
Cyanide Free	mg/l	6	0	None > LOD	None > LOD			
Organics								
Phenols								
Phenols	mg/l	4	1	0.01	0.01	BHM4CAN041 @ 7.4mbGL	1	
Cresols	mg/l	1	0	None > LOD	None > LOD			0
Phenols total detected monohydric	mg/l	1	0	None > LOD	None > LOD			0
Xylenols	mg/l	1	0	None > LOD	None > LOD			0
BTEX								
GRO >C5-C12	ug/l	2	0	None > LOD	None > LOD			0
Benzene	ug/l	6	0	None > LOD	None > LOD		0	0
Toluene	ug/l	6	0	None > LOD	None > LOD		0	
Ethylbenzene	ug/l	6	0	None > LOD	None > LOD		0	
m,p xylenes	ug/l	6	0	None > LOD	None > LOD		0	
O-Xylene	ug/l	6	0	None > LOD	None > LOD		0	
Methyl tertiary butyl ether (MTBE)	ug/l	2	0	None > LOD	None > LOD			0
Sum of detected BTEX	ug/l	2	0	None > LOD	None > LOD			0
Sum of detected Xylenes	ug/l	2	0	None > LOD	None > LOD			0
TPH								
Aliphatics >C5-C6	ug/l	6	0	None > LOD	None > LOD			
Aliphatics >C6-C8	ug/l	6	0	None > LOD	None > LOD			
Aliphatics >C8-C10	ug/l	6	0	None > LOD	None > LOD			
Aliphatics >C10-C12	ug/l	6	0	None > LOD	None > LOD			
Aliphatics >C12-C16	ug/l	6	0	None > LOD	None > LOD			
Aliphatics >C16-C21	ug/l	6	0	None > LOD	None > LOD			
Aliphatics >C21-C35	ug/l	6	0	None > LOD	None > LOD			
Aliphatics >C35-44	ug/l	4	0	None > LOD	None > LOD			
Aromatics >C5-C7	ug/l	6	0	None > LOD	None > LOD			
Aromatics >C7-C8	ug/l	6	0	None > LOD	None > LOD			
Aromatics >C8-C10	ug/l	6	0	None > LOD	None > LOD			
Aromatics >C10-C12	ug/l	6	0	None > LOD	None > LOD			
Aromatics >C12-C16	ug/l	6	1	22	22	BHM4CAN041 @ 5 - 6mbGL		
Aromatics >C16-C21	ug/l	6	1	36	36	BHM4CAN041 @ 5 - 6mbGL		
Aromatics >C21-C35	ug/l	6	1	11	11	BHM4CAN041 @ 5 - 6mbGL		
Aromatics >C35-44	ug/l	3	0	None > LOD	None > LOD			
Total Aliphatic TPH	ug/l	6	0	None > LOD	None > LOD			
Total Aromatic TPH	ug/l	6	1	69	69	BHM4CAN041 @ 5 - 6mbGL		
Total petroleum hydrocarbons	ug/l	6	1	69	69	BHM4CAN041 @ 5 - 6mbGL		
PAH								
Acenaphthene	ug/l	6	2	0.422	0.307	BHM4CAN041 @ 5 - 6mbGL		
Acenaphthylene	ug/l	6	2	0.0285	0.0193	BHM4CAN041 @ 5 - 6mbGL		
Anthracene	ug/l	6	2	0.244	0.067	BHM4CAN041 @ 5 - 6mbGL	1	
Benz(a)anthracene	ug/l	6	1	0.0443	0.0443	BHM4CAN041 @ 5 - 6mbGL		
Benzo(a)pyrene	ug/l	6	0	None > LOD	None > LOD		0	0
Benzo(b)fluoranthene	ug/l	6	0	None > LOD	None > LOD		0	0
Benzo(ghi)perylene	ug/l	6	0	None > LOD	None > LOD		0	0
Benzo(k)fluoranthene	ug/l	6	0	None > LOD	None > LOD		0	0
Chrysene	ug/l	6	1	0.0451	0.0451	BHM4CAN041 @ 5 - 6mbGL		
Dibenzo(ah)anthracene	ug/l	6	0	None > LOD	None > LOD			
Fluoranthene	ug/l	6	2	1.9	0.322	BHM4CAN041 @ 5 - 6mbGL	2	
Fluorene	ug/l	6	2	0.404	0.163	BHM4CAN041 @ 5 - 6mbGL		
Indeno(123cd)pyrene	ug/l	6	0	None > LOD	None > LOD		0	0
Naphthalene	ug/l	6	2	0.337	0.102	BHM4CAN041 @ 7.4mbGL	0	
Phenanthrene	ug/l	6	2	2.72	0.862	BHM4CAN041 @ 5 - 6mbGL		
Pyrene	ug/l	6	2	1.22	0.21	BHM4CAN041 @ 5 - 6mbGL		
PAH 16 Total	ug/l	6	2	7.14	2.29	BHM4CAN041 @ 5 - 6mbGL		

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 25
21/06/2016

Geological Formation Legend

MG - G	Made Ground (General)
MG - SS	Made Ground (slurry slag)
MG - CS	Made Ground (coarse slag)
MG	Made Ground
TFD	Tidal Flat Deposit
PEAT	Peat

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH004	LGBH005	SWSJ18	SWSJ19	SWSJ20	SWSJ21	SWSJ22B	SWSJ23	SWSJ24A	SWSJ26	SWSJ27	SWSJ28	SWSJ29	SWSJ30	SBHJ05	WS501	WS501	BH518	BH519	BHM4CAN041	BHM4CAN041
Specimen Depth (m)				1.3	1.6	3	1	6	4	1	7.9	5	1	6	2	4	6	11.5	0.6 - 0.8	8.7 - 8.9	2 - 2.2	1.55 - 2	5 - 6	7.4
OD Level (m)						9.83	11.31	6.21	8.97	10.99	4.39	7.01	10.6	5.3	9.59	7.63	5.54	1.74	11.55	3.45	3.5	4.3		
Sample Type						ES	ES	ES	ES	ES	ES	ES	L	ES	D	ES	D	U	ES	ES	ES	ES	ES	ES
Geology Code				MG-CS	MG-G / MG-CS	MG-G / MG-CS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	TFD	MG	TFD	TFD	PEAT	MG - SS	MG
Cluster Code				2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2016 GI	2016 GI
2:1 Results																								
Arsenic Dissolved	ug/l	50	10	<1	3	<1	8	6	4	<1	3	6	2	7	4	5	6	<1	1.5	8.3	1	11	1.11	0.923
Boron Dissolved	ug/l	2000	1000	<50	<50	40	<10	250	90	50	300	400	<10	290	200	460	560	150	400	100	65	440		
Barium Dissolved	ug/l					1300	1100	190	190	330	200	83	190	120	7	17	11	10						
Beryllium Dissolved	ug/l					<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1						
Cadmium Dissolved	ug/l	0.15	5	<0.1	<0.1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.08	<0.08	<0.08	<0.08	<0.1	<0.1
Chromium Dissolved	ug/l		50	8	3	33	<1	<1	<1	<1	<1	62	<1	<1	64	<1	<1	5	<1	<1	<1	1.2	<0.22	<0.22
Chromium Trivalent	ug/l																						<30	<30
Chromium Hexavalent	ug/l																						<30	<30
Copper Dissolved	ug/l	10	2000	10	7	30	<1	<1	4	6	12	29	9	<1	8	4	3	10	<1	2.4	<1	<1	<0.85	<0.85
Iron Dissolved	ug/l	1000	200	10	<10	<5	20	<5	<5	<5	20	85	<5	<5	<5	<5	<5	35					<19	<19
Molybdenum Dissolved	ug/l					2	14	140	78	12	160	2	2	92	7	42	65	<1						
Nickel Dissolved	ug/l	4	20	6	11	3	5	17	10	5	20	4	3	26	<1	3	7	5	2.4	2.3	<1	<1	1.65	2.94
Lead Dissolved	ug/l	1.2	10	2	<1	48	600	480	100	16	13	8	110	32	<1	<1	<1	<1	8	<1	<1	<1	0.257	0.335
Antimony Dissolved	ug/l		5			<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5						
Selenium Dissolved	ug/l		10	2	<1	<1	7	5	6	<1	8	8	3	18	5	7	11	5	1.1	2.9	1.5	5	0.893	0.63
Vanadium Dissolved	ug/l					<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					<0.24	2.79
Mercury as Hg Dissolved	ug/l	0.07	1	<0.1	<0.1														<0.5	<0.5	<0.5	<0.5	<0.01	<0.01
Chloride as Cl	mg/l	250	250	<2	4																			
pH	mg/l	6-9	6.5-10	12.3	11.6														12	9.4	9	9.5	12.2	12.1
Conductivity uS/cm @25C	mg/l			2330	730																			
Zinc Dissolved	mg/l	75		0.025	0.017	0.017	0.82	0.65	0.56	0.33	0.017	0.032	0.47	0.53	<0.003	<0.003	<0.003	<0.003	0.34	0.0019	<0.001	<0.001	491	77.4
Total Sulphur as SO4 Dissolved	mg/l			154	55.4																			
Phosphate as P	mg/l			0.2	0.1																			
Thiocyanate as SCN	mg/l			0.1	0.2																			
Ammoniacal Nitrogen as N	mg/l	0.6		1.2	0.8																			
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Cyanide Free	mg/l																		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Organics																								
Phenols																								
Phenols	mg/l	0.0077																	<0.03	<0.03	<0.03			0.01
Cresols	mg/l																							<0.006
Phenols total detected monohydric	mg/l																							<0.016
Xylenols	mg/l																							<0.008
BTEX																								
GRO >C5-C12	ug/l																						<50	<50
Benzene	ug/l	10	1																<1	<1	<1	<1	<7	<7
Toluene	ug/l	50																	<1	<1	<1	<1	<4	<4
Ethylbenzene	ug/l	20																	<1	<1	<1	<1	<5	<5
m,p xylenes	ug/l	30																	<1	<1	<1	<1	<8	<8
O-Xylene	ug/l	30																	<1	<1	<1	<1	<3	<3
Methyl tertiary butyl ether (MTBE)	ug/l																						<3	<3
Sum of detected BTEX	ug/l																						<11	<11
Sum of detected Xylenes	ug/l																						<11	<11
TPH																								
Aliphatics >C5-C6	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aliphatics >C6-C8	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aliphatics >C8-C10	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aliphatics >C10-C12	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aliphatics >C12-C16	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aliphatics >C16-C21	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aliphatics >C21-C35	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aliphatics >C35-44	ug/l																		<0.1	<0.1	<0.1	<0.1		
Aromatics >C5-C7	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aromatics >C7-C8	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aromatics >C8-C10	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aromatics >C10-C12	ug/l																		<0.1	<0.1	<0.1	<0.1	<10	<10
Aromatics >C12-C16	ug/l																		<0.1	<0.1	<0.1	<0.1	22	<10
Aromatics >C16-C21	ug/l																		<0.1	<0.1	<0.1	<0.1	36	<10
Aromatics >C21-C35	ug/l																		<0.1	<0.1	<0.1	<0.1	11	<10

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 25
21/06/2016

Geological Formation Legend

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MG - CS	Made Ground (coarse slag)
MG	Made Ground
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PEAT	Peat

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: Cr, Cu, Pb, Ni & Zn

Sample Reference	Units	Screening Criteria		LGBH004	LGBH005	SWSJ18	SWSJ19	SWSJ20	SWSJ21	SWSJ22B	SWSJ23	SWSJ24A	SWSJ26	SWSJ27	SWSJ28	SWSJ29	SWSJ30	SBHJ05	WS501	WS501	BH518	BH519	BHM4CAN041	BHM4CAN041
Specimen Depth (m)				1.3	1.6	3	1	6	4	1	7.9	5	1	6	2	4	6	11.5	0.6 - 0.8	8.7 - 8.9	2 - 2.2	1.55 - 2	5 - 6	7.4
OD Level (m)						9.83	11.31	6.21	8.97	10.99	4.39	7.01	10.6	5.3	9.59	7.63	5.54	1.74	11.55	3.45	3.5	4.3		
Sample Type						ES	ES	ES	ES	ES	ES	ES	L	ES	D	ES	D	U	ES	ES	ES	ES	ES	ES
Geology Code		EQS	DWS	MG-CS	MG-G / MG-CS	MG-G / MG-CS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	MG - SS	TFD	MG	TFD	TFD	PEAT	MG - SS	MG
Cluster Code				2002	2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2015 GI	2015 GI	2016 GI	2016 GI
Aromatics >C35-44	ug/l																		<0.1	<0.1	<0.1			
Total Aliphatic TPH	ug/l																		<5	<5	<5	<5	<10	<10
Total Aromatic TPH	ug/l																		<5	<5	<5	<5	69	<10
Total petroleum hydrocarbons	ug/l																		<10	<10	<10	<10	69	<10
PAH																								
Acenaphthene	ug/l																		<0.1	<0.1	<0.1	<0.1	0.422	0.307
Acenaphthylene	ug/l																		<0.1	<0.1	<0.1	<0.1	0.0285	0.0193
Anthracene	ug/l	0.1																	<0.1	<0.1	<0.1	<0.1	0.244	0.067
Benz(a)anthracene	ug/l																		<0.1	<0.1	<0.1	<0.1	0.0443	<0.017
Benzo(a)pyrene	ug/l	0.00017	0.01																<0.1	<0.1	<0.1	<0.1	<0.009	<0.009
Benzo(b)fluoranthene	ug/l	0.017	0.1																<0.1	<0.1	<0.1	<0.1	<0.023	<0.023
Benzo(ghi)perylene	ug/l	0.0082	0.1																<0.1	<0.1	<0.1	<0.1	<0.016	<0.016
Benzo(k)fluoranthene	ug/l	0.017	0.1																<0.1	<0.1	<0.1	<0.1	<0.027	<0.027
Chrysene	ug/l																		<0.1	<0.1	<0.1	<0.1	0.0451	<0.013
Dibenzo(ah)anthracene	ug/l																		<0.1	<0.1	<0.1	<0.1	<0.016	<0.016
Fluoranthene	ug/l	0.0063																	<0.1	<0.1	<0.1	<0.1	1.9	0.322
Fluorene	ug/l																		<0.1	<0.1	<0.1	<0.1	0.404	0.163
Indeno(123cd)pyrene	ug/l	N/A	0.1																<0.1	<0.1	<0.1	<0.1	<0.014	<0.014
Naphthalene	ug/l	2																	<0.1	<0.1	<0.1	<0.1	0.102	0.337
Phenanthrene	ug/l																		<0.1	<0.1	<0.1	<0.1	2.72	0.862
Pyrene	ug/l																		<0.1	<0.1	<0.1	<0.1	1.22	0.21
PAH 16 Total	ug/l																		<2	<2	<2	<2	7.14	2.29

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 26
21/06/2016

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria	
Specimen Depth (m)		EQS	DWS
OD Level (m)			
Sample Type			
Geology Code			
Cluster Code			
2:1 Results			
Arsenic Dissolved	ug/l	50	10
Boron Dissolved	ug/l	2000	1000
Barium Dissolved	ug/l		
Beryllium Dissolved	ug/l		
Cadmium Dissolved	ug/l	0.15	5
Chromium Dissolved	ug/l		50
Chromium Trivalent	ug/l		
Chromium Hexavalent	ug/l		
Copper Dissolved	ug/l	10	2000
Iron Dissolved	ug/l	1000	200
Molybdenum Dissolved	ug/l		
Mercury as Hg Dissolved	ug/l	0.07	1
Nickel Dissolved	ug/l	4	20
Lead Dissolved	ug/l	1.2	10
Antimony Dissolved	ug/l		5
Selenium Dissolved	ug/l		10
Vanadium Dissolved	ug/l		
Conductivity uS/m @ 25C	mg/l		
pH units	pH units	6-9	6.5-10
Chloride as Cl	mg/l	250	250
Thiocyanate as SCN	mg/l		
Phosphate as P	mg/l		
Total Sulphur as SO4 Dissolved	mg/l		
Zinc Dissolved	mg/l	75	
Total Cyanide	mg/l	0.001	0.05
Cyanide Free	mg/l		
Organics			
Phenols			
Phenols	mg/l	0.0077	
BTEX			
GRO >C5-C12	ug/l		
Benzene	ug/l	10	1
Toluene	ug/l	50	
Ethylbenzene	ug/l	20	
m,p xylenes	ug/l	30	
O-Xylene	ug/l	30	
Methyl tertiary butyl ether (MTBE)	ug/l		
Sum of detected BTEX	ug/l		
Sum of detected Xylenes	ug/l		
TPH			
Aliphatics >C5-C6	ug/l		
Aliphatics >C6-C8	ug/l		
Aliphatics >C8-C10	ug/l		
Aliphatics >C10-C12	ug/l		
Aliphatics >C12-C16	ug/l		
Aliphatics >C16-C21	ug/l		
Aliphatics >C21-C35	ug/l		
Aliphatics >C35-44	ug/l		
Aromatics >C5-C7	ug/l		
Aromatics >C7-C8	ug/l		
Aromatics >C8-C10	ug/l		
Aromatics >C10-C12	ug/l		
Aromatics >C12-C16	ug/l		
Aromatics >C16-C21	ug/l		
Aromatics >C21-C35	ug/l		
Aromatics >C35-44	ug/l		
Total Aliphatic TPH	ug/l		
Total Aromatic TPH	ug/l		
Total petroleum hydrocarbons	ug/l		
PAH			
Acenaphthene	ug/l		
Acenaphthylene	ug/l		
Anthracene	ug/l	0.1	
Benzo(a)anthracene	ug/l		
Benzo(a)pyrene	ug/l	0.00017	0.01
Benzo(b)fluoranthene	ug/l	0.017	0.1
Benzo(ghi)perylene	ug/l	0.0082	0.1
Benzo(k)fluoranthene	ug/l	0.017	0.1
Chrysene	ug/l		
Dibenzo(ah)anthracene	ug/l		
Fluoranthene	ug/l	0.0063	
Fluorene	ug/l		
Indeno(123cd)pyrene	ug/l	N/A	0.1
Naphthalene	ug/l	2	
Phenanthrene	ug/l		
Pyrene	ug/l		
PAH 16 Total	ug/l		
PCBs			
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
12	3	10	0.269	STPJ02 @ 0.3mbGL	0	0
11	3	240	35	STPJ02 @ 0.3mbGL	0	0
11	9	1100	12	SBHJ09CP @ 1mbGL		
11	0	None > LOD	None > LOD			
12	1	0.24	0.24	BH524 @ 2.5 - 2.7mbGL	1	0
12	8	49	0.827	STPJ05 @ 0.3mbGL		0
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
12	12	89	1.36	STPJ04 @ 1mbGL	4	0
10	5	100	6	STPJ01 @ 2mbGL	0	0
11	6	29	1	STPJ02 @ 0.3mbGL		
3	0	None > LOD	None > LOD		0	0
12	11	16	1.4	STPJ04 @ 1mbGL	7	0
12	8	14	1.3	SBHJ09CP @ 1mbGL	8	2
11	0	None > LOD	None > LOD			0
12	3	9	2.1	STPJ02 @ 0.3mbGL		0
12	5	46	0.352	STPJ02 @ 0.3mbGL		
0	0	None > LOD	None > LOD			
3	3	12.4	11	BHM4CAN043 @ 3mbGL	3	3
0	0	None > LOD	None > LOD		0	0
0	0	None > LOD	None > LOD			
0	0	None > LOD	None > LOD			
0	0	None > LOD	None > LOD			
12	3	8.13	0.0023	BHM4CAN043 @ 3mbGL	0	
11	0	None > LOD	None > LOD		0	0
2	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD		0	0
3	0	None > LOD	None > LOD		0	
3	0	None > LOD	None > LOD		0	
3	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
1	0	None > LOD	None > LOD			0
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
2	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD		0	
3	1	0.0115	0.0115	BHM4CAN043 @ 3mbGL	1	1
3	0	None > LOD	None > LOD		0	0
3	1	0.0167	0.0167	BHM4CAN043 @ 3mbGL	1	0
3	0	None > LOD	None > LOD		0	0
3	1	0.0134	0.0134	BHM4CAN043 @ 3mbGL		
3	0	None > LOD	None > LOD			
3	1	0.0317	0.0317	BHM4CAN043 @ 3mbGL	1	
3	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD		0	0
3	0	None > LOD	None > LOD		0	
3	1	0.117	0.117	BHM4CAN043 @ 3mbGL		
3	1	0.0237	0.0237	BHM4CAN043 @ 3mbGL		
3	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	0

M4CAN
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CL-26 - Leachate - Lagoon 26
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Screening Values & Assessment

EQS	Environmental Quality Standards
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	Exceeds EQS
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Geological Formation Legend

MG - G	Made Ground (General)
MG-CS	Made Ground (coarse slag)

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria		SBHJ09CP	SBHJ10CP	STPJ01	STPJ02	STPJ03	STPJ04	STPJ05	STPJ06	SBHJ08ACP	BH523	BH524	BHM4CAN043
Specimen Depth (m)		EQS	DWS	1	0.3	2	0.3	0.4	1	0.3	1	4.1	1 - 1.2	2.5 - 2.7	3
OD Level (m)				4.76	5.75	3.95	5.07	5.17	4.43	5.55	4.71	1.79	5.15	3.2	3.98
Sample Type				D	ES	B	ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code				MG-G	MG	MG-G	MG-G	MG-G	MG-G	MG-G	MG-G	MG-CS	MG-G / MG-CS	MG-G / MG-CS	MG-CS
Cluster Code				2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2016 GI
2:1 Results															
Arsenic Dissolved	ug/l	50	10	<1	<1	<1	10	<1	8	<1	<1	<1	<1	<1	0.269
Boron Dissolved	ug/l	2000	1000	<10	40	<10	240	<10	<10	<10	<10	<10	<20	35	
Barium Dissolved	ug/l			1100	600	860	91	960	12	700	570	950			
Beryllium Dissolved	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1			
Cadmium Dissolved	ug/l	0.15	5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.08	0.24	<0.1
Chromium Dissolved	ug/l		50	<1	5	4	<1	3	5	49	2	<1	<1	9.8	0.827
Chromium Trivalent	ug/l														<30
Chromium Hexavalent	ug/l														<30
Copper Dissolved	ug/l	10	2000	4	3	10	2	37	89	11	21	5	7.2	9.4	1.36
Iron Dissolved	ug/l	1000	200	<5	6	100	17	9	<5	<5	96	<5			<19
Molybdenum Dissolved	ug/l			1	<1	2	29	3	8	<1	2	<1			
Mercury as Hg Dissolved	ug/l	0.07	1										<0.5	<0.5	<0.01
Nickel Dissolved	ug/l	4	20	9	4	4	<1	7	16	10	7	10	2.2	1.4	4.58
Lead Dissolved	ug/l	1.2	10	14	2	8	<1	<1	<1	7	12	5	<1	1.3	3.51
Antimony Dissolved	ug/l		5	<5	<5	<5	<5	<5	<5	<5	<5	<5			
Selenium Dissolved	ug/l		10	<1	<1	<1	9	<1	9	<1	<1	<1	<1	2.1	<0.39
Vanadium Dissolved	ug/l			2	<1	<1	46	5	13	<1	<1	<1			0.352
Conductivity uS/m @ 25C	mg/l														
pH units	pH units	6-9	6.5-10										12	11	12.4
Chloride as Cl	mg/l	250	250												
Thiocyanate as SCN	mg/l														
Phosphate as P	mg/l														
Total Sulphur as SO4 Dissolved	mg/l														
Zinc Dissolved	mg/l	75		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0037	0.0023	8.13
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Cyanide Free	mg/l												<0.05	<0.05	
Organics															
Phenols															
Phenols	mg/l	0.0077											<0.03	<0.03	
BTEX															
GRO >C5-C12	ug/l														<50
Benzene	ug/l	10	1										<1	<1	<7
Toluene	ug/l	50											<1	<1	<4
Ethylbenzene	ug/l	20											<1	<1	<5
m,p xylenes	ug/l	30											<1	<1	<8
O-Xylene	ug/l	30											<1	<1	<3
Methyl tertiary butyl ether (MTBE)	ug/l														<3
Sum of detected BTEX	ug/l														<28
Sum of detected Xylenes	ug/l														<11
TPH															
Aliphatics >C5-C6	ug/l												<0.1	<0.1	<10
Aliphatics >C6-C8	ug/l												<0.1	<0.1	<10
Aliphatics >C8-C10	ug/l												<0.1	<0.1	<10

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 26
21/06/2016

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Geological Formation Legend

MG - G	Made Ground (General)
MG-CS	Made Ground (coarse slag)

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria		SBHJ09CP	SBHJ10CP	STPJ01	STPJ02	STPJ03	STPJ04	STPJ05	STPJ06	SBHJ08ACP	BH523	BH524	BHM4CAN043
Specimen Depth (m)		EQS	DWS	1	0.3	2	0.3	0.4	1	0.3	1	4.1	1 - 1.2	2.5 - 2.7	3
OD Level (m)				4.76	5.75	3.95	5.07	5.17	4.43	5.55	4.71	1.79	5.15	3.2	3.98
Sample Type				D	ES	B	ES	ES	ES	ES	ES	ES	ES	ES	ES
Geology Code				MG-G	MG	MG-G	MG-G	MG-G	MG-G	MG-G	MG-G	MG-CS	MG-G / MG-CS	MG-G / MG-CS	MG-CS
Cluster Code				2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI	2015 GI	2016 GI
Aliphatics >C10-C12	ug/l												<0.1	<0.1	<10
Aliphatics >C12-C16	ug/l												<0.1	<0.1	<10
Aliphatics >C16-C21	ug/l												<0.1	<0.1	<10
Aliphatics >C21-C35	ug/l												<0.1	<0.1	<10
Aliphatics >C35-44	ug/l												<0.1	<0.1	
Aromatics >C5-C7	ug/l												<0.1	<0.1	<10
Aromatics >C7-C8	ug/l												<0.1	<0.1	<10
Aromatics >C8-C10	ug/l												<0.1	<0.1	<10
Aromatics >C10-C12	ug/l												<0.1	<0.1	<10
Aromatics >C12-C16	ug/l												<0.1	<0.1	<10
Aromatics >C16-C21	ug/l												<0.1	<0.1	<10
Aromatics >C21-C35	ug/l												<0.1	<0.1	<10
Aromatics >C35-44	ug/l												<0.1	<0.1	
Total Aliphatic TPH	ug/l												<5	<5	<10
Total Aromatic TPH	ug/l												<5	<5	<10
Total petroleum hydrocarbons	ug/l												<10	<10	<10
PAH															
Acenaphthene	ug/l												<0.1	<0.1	<0.015
Acenaphthylene	ug/l												<0.1	<0.1	<0.011
Anthracene	ug/l	0.1											<0.1	<0.1	<0.015
Benzo(a)anthracene	ug/l												<0.1	<0.1	<0.017
Benzo(a)pyrene	ug/l	0.00017	0.01										<0.1	<0.1	0.0115
Benzo(b)fluoranthene	ug/l	0.017	0.1										<0.1	<0.1	<0.023
Benzo(ghi)perylene	ug/l	0.0082	0.1										<0.1	<0.1	0.0167
Benzo(k)fluoranthene	ug/l	0.017	0.1										<0.1	<0.1	<0.027
Chrysene	ug/l												<0.1	<0.1	0.0134
Dibenzo(ah)anthracene	ug/l												<0.1	<0.1	<0.016
Fluoranthene	ug/l	0.0063											<0.1	<0.1	0.0317
Fluorene	ug/l												<0.1	<0.1	<0.014
Indeno(123cd)pyrene	ug/l	N/A	0.1										<0.1	<0.1	<0.014
Naphthalene	ug/l	2											<0.1	<0.1	<0.1
Phenanthrene	ug/l												<0.1	<0.1	0.117
Pyrene	ug/l												<0.1	<0.1	0.0237
PAH 16 Total	ug/l												<2	<2	<0.344
PCBs															
Pcb-101 2,2',4,5,5' - Pentachlorobiphenyl	ug/l	0	0										<0.01		
Pcb-118 2,3',4,4',5 - Pentachlorobiphenyl	ug/l	0	0										<0.01		
Pcb-138 2,2',3,4,4',5' - Hexachlorobiphenyl	ug/l	0	0										<0.01		
Pcb-153 2,2',4,4',5,5' - Hexachlorobiphenyl	ug/l	0	0										<0.01		
Pcb-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	ug/l	0	0										<0.01		
Pcb-28 2,4,4' - Trichlororbiphenyl	ug/l	0	0										<0.01		
Pcb-52 2,2',5,5' - Tetrachlorobiphenyl	ug/l	0	0										<0.01		

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 27SE
30/06/2015

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference / Specimen Depth (m) / OD Level (m) / Sample Type / Geology Code / Cluster Code	Units	Screening Criteria EQS	Screening Criteria DWS	No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
2:1 Results										
Arsenic Dissolved	ug/l	50	10	7	2	3	1	SWSJ36 @ 1mbGL	0	0
Boron Dissolved	ug/l	2000	1000	7	4	350	50	SWSJ35A @ 1mbGL	0	0
Barium Dissolved	ug/l			5	4	32	2	SWSJ36 @ 1mbGL		
Beryllium Dissolved	ug/l			5	0	None > LOD	None > LOD			
Cadmium Dissolved	ug/l	0.15	5	7	0	None > LOD	None > LOD		0	0
Chromium Dissolved	ug/l		50	7	2	30	6.8	SWSJ35A @ 1mbGL		0
Copper Dissolved	ug/l	10	2000	7	4	8	5	TP508 @ 0.5 - 0.6mbGL	0	0
Iron Dissolved	ug/l	1000	200	6	1	58	58	SWSJ36 @ 1mbGL	0	0
Mercury Dissolved	ug/l	0.07	1						0	0
Molybdenum Dissolved	ug/l			5	3	17	2	SWSJ38 @ 0.3mbGL		
Nickel Dissolved	ug/l	4	20	7	2	6	2	SWSJ36 @ 1mbGL	1	0
Lead Dissolved	ug/l	1.2	10	7	3	26	4	SWSJ36 @ 1mbGL	3	2
Antimony Dissolved	ug/l		5	5	2	14	2	SWSJ36 @ 1mbGL		1
Selenium Dissolved	ug/l		10	7	4	3	2	SWSJ36 @ 1mbGL		0
Vanadium Dissolved	ug/l			5	0	None > LOD	None > LOD			
Zinc Dissolved	ug/l	75		7	4	38	0.016	SWSJ37 @ 0.3mbGL	0	
Total Cyanide	mg/l	0.001	0.05	7	0	None > LOD	None > LOD		0	0
Cyanide Free	mg/l			1	0	None > LOD	None > LOD			
pH units	pH units	6-9	6.5-10	3	2	12	11.6	TP508 @ 0.5 - 0.6mbGL	2	2
Phenols										
Phenol	ug/l	7.7		1	0	None > LOD	None > LOD		0	
BTEX										
Benzene	ug/l	10	1	1	0	None > LOD	None > LOD		0	0
Toluene	ug/l	50		1	0	None > LOD	None > LOD		0	
Ethylbenzene	ug/l	20		1	0	None > LOD	None > LOD		0	
m,p xylenes	ug/l	30		1	0	None > LOD	None > LOD		0	
O-Xylene	ug/l	30		1	0	None > LOD	None > LOD		0	
PAH										
Acenaphthene	ug/l			1	0	None > LOD	None > LOD			
Acenaphthylene	ug/l			1	0	None > LOD	None > LOD			
Anthracene	ug/l	0.1		1	0	None > LOD	None > LOD		0	
Benz(a)anthracene	ug/l			1	0	None > LOD	None > LOD			
Benzo(a)pyrene	ug/l	0.00017	0.01	1	0	None > LOD	None > LOD		0	0
Benzo(b)fluoranthene	ug/l	0.017	0.1	1	0	None > LOD	None > LOD		0	0
Benzo(ghi)perylene	ug/l	0.0082	0.1	1	0	None > LOD	None > LOD		0	0
Benzo(k)fluoranthene	ug/l	0.017	0.1	1	0	None > LOD	None > LOD		0	0
Chrysene	ug/l			1	0	None > LOD	None > LOD			
Dibenzo(ah)anthracene	ug/l			1	0	None > LOD	None > LOD			
Fluoranthene	ug/l	0.0063		1	0	None > LOD	None > LOD		0	
Fluorene	ug/l			1	0	None > LOD	None > LOD			
Indeno(123cd)pyrene	ug/l	N/A	0.1	1	0	None > LOD	None > LOD		0	0
Naphthalene	ug/l	2		1	0	None > LOD	None > LOD		0	
Phenanthrene	ug/l			1	0	None > LOD	None > LOD			
Pyrene	ug/l			1	0	None > LOD	None > LOD			
PAH 16 Total	ug/l			1	0	None > LOD	None > LOD			

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 27SE
30/06/2015

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Geological Formation Legend

Made Ground	MG
Made Ground (slurry slag)	MG-SS
Tidal Flat Deposit	TFD
Peat	PEAT

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc
I.S : Insufficent sample

Sample Reference	Units	Screening Criteria		SWSJ35A	SWSJ37	SWSJ38	TP508	SWSJ36	LGBH012	LGBH012
Specimen Depth (m)				1	0.3	0.3	0.5 - 0.6	1	0.9	4.5
OD Level (m)				4.72	5.95	5.25	5.4	4.34		
Sample Type				ES	ES	ES	ES	L		
Geology Code		EQS	DWS	MG-SS	MG-SS	MG-SS	MG-CS	TFD	MG	PEAT
Cluster Code				2007 GI	2007 GI	2007 GI	2015 GI	2007 GI	2002	2002
2:1 Results										
Arsenic Dissolved	ug/l	50	10	1	<1	<1	<1	3	<50	I.S
Boron Dissolved	ug/l	2000	1000	350	100	80	<20	50	<5	I.S
Barium Dissolved	ug/l			2	3	2		32		
Beryllium Dissolved	ug/l			<1	<1	<1		<1		
Cadmium Dissolved	ug/l	0.15	5	**<0.4**	**<0.5**	**<0.4**	<0.08	**<0.4**	<0.1	I.S
Chromium Dissolved	ug/l		50	30	<1	<1	6.8	<1	<1	I.S
Copper Dissolved	ug/l	10	2000	5	<1.6	<1	5.2	5	8	I.S
Iron Dissolved	ug/l	1000	200	<5	<50	<5		58	<1	I.S
Mercury Dissolved	ug/l	0.07	1				**<0.5**		**<0.1**	I.S
Molybdenum Dissolved	ug/l			<1	4	17		2		
Nickel Dissolved	ug/l	4	20	<1	<1.5	<1	<1	2	6	I.S
Lead Dissolved	ug/l	1.2	10	25	<0.5	4	<1	26	<1	I.S
Antimony Dissolved	ug/l		5	<5	2	<5		14		
Selenium Dissolved	ug/l		10	2	2	<1	<1	3	2	I.S
Vanadium Dissolved	ug/l			<1	<1	<1		<1		
Zinc Dissolved	ug/l	75		22	38	<3	3.3	<3	0.016	I.S
Total Cyanide	mg/l	0.001	0.05	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	I.S
Cyanide Free	mg/l						<0.05			
pH units	pH units	6-9	6.5-10				12		11.6	I.S
Phenols										
Phenol	ug/l	7.7					**<0.5**			
BTEX										
Benzene	ug/l	10	1				<1			
Toluene	ug/l	50					<1			
Ethylbenzene	ug/l	20					<1			
m,p xylenes	ug/l	30					<1			
O-Xylene	ug/l	30					<1			
PAH										
Acenaphthene	ug/l						<0.1			
Acenaphthylene	ug/l						<0.1			
Anthracene	ug/l	0.1					<0.1			
Benz(a)anthracene	ug/l						<0.1			
Benzo(a)pyrene	ug/l	0.00017	0.01				**<0.1**			
Benzo(b)fluoranthene	ug/l	0.017	0.1				**<0.1**			
Benzo(ghi)perylene	ug/l	0.0082	0.1				**<0.1**			
Benzo(k)fluoranthene	ug/l	0.017	0.1				**<0.1**			
Chrysene	ug/l						<0.1			
Dibenzo(ah)anthracene	ug/l						<0.1			
Fluoranthene	ug/l	0.0063					<0.1			
Fluorene	ug/l						<0.1			
Indeno(123cd)pyrene	ug/l	N/A	0.1				**<0.1**			
Naphthalene	ug/l	2					<0.1			
Phenanthrene	ug/l						<0.1			
Pyrene	ug/l						<0.1			
PAH 16 Total	ug/l						<2			

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 27SW
30/06/2015

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria	
Specimen Depth (m)			
OD Level (m)			
Sample Type			
Geology Code			
Cluster Code		EQS	DWS
2:1 Results			
Arsenic Dissolved	ug/l	50	10
Ammoniacal Nitrogen as N	ug/l	0.6	
Boron Dissolved	ug/l	2000	1000
Barium Dissolved	ug/l		
Beryllium Dissolved	ug/l		
Cadmium Dissolved	ug/l	0.15	5
Chromium Dissolved	ug/l		50
Copper Dissolved	ug/l	10	2000
Iron Dissolved	ug/l	1000	200
Molybdenum Dissolved	ug/l		
Mercury as Hg Dissolved	ug/l	0.07	1
Nickel Dissolved	ug/l	4	20
Lead Dissolved	ug/l	1.2	10
Antimony Dissolved	ug/l		5
Selenium Dissolved	ug/l		10
Vanadium Dissolved	ug/l		
Conductivity uS/m @ 25C	mg/l		
pH units	pH units	6-9	6.5-10
Chloride as Cl	mg/l	250	250
Thiocyanate as SCN	mg/l		
Phosphate as P	mg/l		
Total Sulphur as SO4 Dissolved	mg/l		
Zinc Dissolved	mg/l	75	
Total Cyanide	mg/l	0.001	0.05
Cyanide Free	mg/l		
Phenols			
Phenols	mg/l	0.0077	
BTEX			
Benzene	ug/l	10	1
Toluene	ug/l	50	
Ethylbenzene	ug/l	20	
m,p xylenes	ug/l	30	
O-Xylene	ug/l	30	
TPH			
Aliphatics >C5-C6	ug/l		
Aliphatics >C6-C8	ug/l		
Aliphatics >C8-C10	ug/l		
Aliphatics >C10-C12	ug/l		
Aliphatics >C12-C16	ug/l		
Aliphatics >C16-C21	ug/l		
Aliphatics >C21-C35	ug/l		
Aliphatics >C35-44	ug/l		
Aromatics >C5-C7	ug/l		
Aromatics >C7-C8	ug/l		
Aromatics >C8-C10	ug/l		
Aromatics >C10-C12	ug/l		
Aromatics >C12-C16	ug/l		
Aromatics >C16-C21	ug/l		
Aromatics >C21-C35	ug/l		
Aromatics >C35-44	ug/l		
Total Aliphatic TPH	ug/l		
Total Aromatic TPH	ug/l		
Total petroleum hydrocarbons	ug/l		
PAH			
Acenaphthene	ug/l		
Acenaphthylene	ug/l		
Anthracene	ug/l	0.1	
Benz(a)anthracene	ug/l		
Benzo(a)pyrene	ug/l	0.00017	0.01
Benzo(b)fluoranthene	ug/l	0.017	0.1
Benzo(ghi)perylene	ug/l	0.0082	0.1
Benzo(k)fluoranthene	ug/l	0.017	0.1
Chrysene	ug/l		
Dibenzo(ah)anthracene	ug/l		
Fluoranthene	ug/l	0.0063	
Fluorene	ug/l		
Indeno(123cd)pyrene	ug/l	N/A	0.1
Naphthalene	ug/l	2	
Phenanthrene	ug/l		
Pyrene	ug/l		
PAH 16 Total	ug/l		

No. Analyses	No. Analyses Above LOD	Maximum	Minimum	Location & Depth of Maximum Concentration	No. Data Exceeding EQS	No. Data Exceeding DWS
7	4	6	1.6	SWSJ31 @ 5mbGL	0	0
2	2	200	0.8	LGBH010 @ 1mbGL	2	
7	4	960	80	SWSJ31 @ 5mbGL	0	0
7	4	4000	68	SWSJ32 @ 6mbGL		
7	0	None > LOD	None > LOD			
7	1	0.082	0.082	BH520 @ 4.5 - 5mbGL	0	0
7	4	6.4	3	BH520 @ 4.5 - 5mbGL		0
7	7	39	3	SBHJ07 CP @ 0.3mbGL	2	0
6	3	36	9	SWSJ32 @ 6mbGL	0	0
7	0	None > LOD	None > LOD			
3	0	None > LOD	None > LOD		0	0
7	7	11	1.3	SBHJ06 CP @ 0.3mbGL	5	0
7	4	54	3	SWSJ31 @ 5mbGL	4	1
7	0	None > LOD	None > LOD			0
7	3	2.2	2	BH520 @ 4.5 - 5mbGL		0
7	1	27	27	SBHJ07 CP @ 0.3mbGL		
2	2	5250	730	LGBH010 @ 1mbGL		
3	3	12.7	11.6	LGBH010 @ 1mbGL	3	3
2	1	4	4	SBHJ06 CP @ 0.3mbGL	0	0
2	1	0.2	0.2	SBHJ06 CP @ 0.3mbGL		
2	2	0.1	0.1	LGBH010 @ 1mbGL		
2	2	299	55.4	LGBH010 @ 1mbGL		
7	6	1.4	0.0041	SWSJ32 @ 6mbGL	0	
7	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD		0	0
1	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD		0	
1	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD			
1	0	None > LOD	None > LOD

M4CAN
Leachate Samples Analysis & Screening Assessment
CL-26 - Leachate - Lagoon 27SW
30/06/2015

Screening Values & Assessment

EQS	Environmental Quality Standards
DWS	Drinking Water Standard
	Exceeds EQS
X	Exceeds DWS
X	Laboratory detection level higher than screening criterion

Geological Formation Legend

Made Ground (General)	MG - G
Made Ground (slurry slag)	MG - SS
Made Ground (coarse slag)	MG - CS

Notes

EQS calcium carbonate 100 - 150mg/l for heavy metals: chromium, copper, lead, nickel and zinc

Sample Reference	Units	Screening Criteria		LGBH010	SBHJ06 CP	SBHJ07 CP	SWSJ31	SWSJ32	SWSJ34	BH520
Specimen Depth (m)				1	0.3	0.3	5	6	4	4.5 - 5
OD Level (m)					5.88	5.49	5.34	4.27	6.52	8.35
Sample Type					ES	ES	D	ES	L	ES
Geology Code		EQS	DWS	MG - CS	MG - G	MG - G	MG - SS	MG - SS	MG - SS	MG - SS
Cluster Code				2002	2007 GI	2007 GI	2007 GI	2007 GI	2007 GI	2015 GI
2:1 Results										
Arsenic Dissolved	ug/l	50	10	<1	3	<1	6	<1	2	1.6
Ammoniacal Nitrogen as N	ug/l	0.6		200	0.8					
Boron Dissolved	ug/l	2000	1000	<5	<50	80	960	650	720	<20
Barium Dissolved	ug/l					68	260	4000	150	
Beryllium Dissolved	ug/l					<1	<1	<1	<1	
Cadmium Dissolved	ug/l	0.15	5	<0.1	<0.1	<0.4	<0.4	<0.4	<0.4	0.082
Chromium Dissolved	ug/l		50	3	3	3	<1	<1	<1	6.4
Copper Dissolved	ug/l	10	2000	4	7	39	7	39	8	3
Iron Dissolved	ug/l	1000	200	<1	<10	<5	20	36	9	
Molybdenum Dissolved	ug/l					<1	<1	<1	<1	
Mercury as Hg Dissolved	ug/l	0.07	1	<0.1	<0.1					<0.5
Nickel Dissolved	ug/l	4	20	4	11	6	5	10	5	1.3
Lead Dissolved	ug/l	1.2	10	8	<1	<1	54	3	3	<1
Antimony Dissolved	ug/l		5			<5	<5	<5	<5	
Selenium Dissolved	ug/l		10	2	<1	2	<1	<1	<1	2.2
Vanadium Dissolved	ug/l					27	<1	<1	<1	
Conductivity uS/m @ 25C	mg/l			5250	730					
pH units	pH units	6-9	6.5-10	12.7	11.6					12
Chloride as CI	mg/l	250	250	<2	4					
Thiocyanate as SCN	mg/l			<0.01	0.2					
Phosphate as P	mg/l			0.1	0.1					
Total Sulphur as SO4 Dissolved	mg/l			299	55.4					
Zinc Dissolved	mg/l	75		0.024	0.017	<0.003	0.55	1.4	0.18	0.0041
Total Cyanide	mg/l	0.001	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cyanide Free	mg/l									<0.05
Phenols										
Phenols	mg/l	0.0077								<0.03
BTEX										
Benzene	ug/l	10	1							<1
Toluene	ug/l	50								<1
Ethylbenzene	ug/l	20								<1
m,p xylenes	ug/l	30								<1
O-Xylene	ug/l	30								<1
TPH										
Aliphatics >C5-C6	ug/l									<0.1
Aliphatics >C6-C8	ug/l									<0.1
Aliphatics >C8-C10	ug/l									<0.1
Aliphatics >C10-C12	ug/l									<0.1
Aliphatics >C12-C16	ug/l									<0.1
Aliphatics >C16-C21	ug/l									<0.1
Aliphatics >C21-C35	ug/l									<0.1
Aliphatics >C35-44	ug/l									<0.1
Aromatics >C5-C7	ug/l									<0.1
Aromatics >C7-C8	ug/l									<0.1
Aromatics >C8-C10	ug/l									<0.1
Aromatics >C10-C12	ug/l									<0.1
Aromatics >C12-C16	ug/l									<0.1
Aromatics >C16-C21	ug/l									<0.1
Aromatics >C21-C35	ug/l									<0.1
Aromatics >C35-44	ug/l									<0.1
Total Aliphatic TPH	ug/l									<5
Total Aromatic TPH	ug/l									<5
Total petroleum hydrocarbons	ug/l									<10
PAH										
Acenaphthene	ug/l									<0.1
Acenaphthylene	ug/l									<0.1
Anthracene	ug/l	0.1								<0.1
Benz(a)anthracene	ug/l									<0.1
Benzo(a)pyrene	ug/l	0.00017	0.01							<0.1
Benzo(b)fluoranthene	ug/l	0.017	0.1							<0.1
Benzo(ghi)perylene	ug/l	0.0082	0.1							<0.1
Benzo(k)fluoranthene	ug/l	0.017	0.1							<0.1
Chrysene	ug/l									<0.1
Dibenzo(ah)anthracene	ug/l									<0.1
Fluoranthene	ug/l	0.0063								<0.1
Fluorene	ug/l									<0.1
Indeno(123cd)pyrene	ug/l	N/A	0.1							<0.1
Naphthalene	ug/l	2								<0.1
Phenanthrene	ug/l									<0.1
Pyrene	ug/l									<0.1
PAH 16 Total	ug/l									<2

A11 Appendix 7

Relevant Extract from Additional Environmental Data

Plate 01: Extract of 1969 Aerial Photograph.

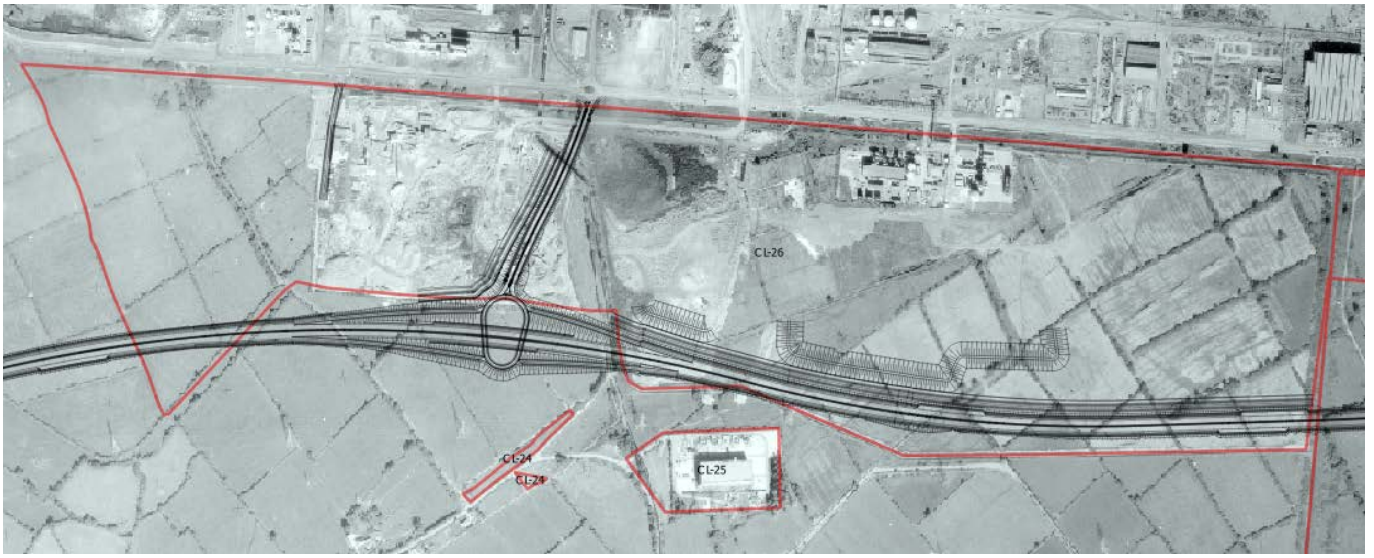

Plate 02: Extract of 1979 Aerial Photograph.

Client:	Welsh Government
Project:	M4CaN
Job Ref:	JER6591 Checked By: Date: Oct 2015

Plate 03: Extract of 1991 Aerial Photograph.

Plate 04: Extract of 2006 Aerial Photograph.

Client:	Welsh Government
Project:	M4CaN
Job Ref:	JER6591 Checked By: Date: Oct 2015

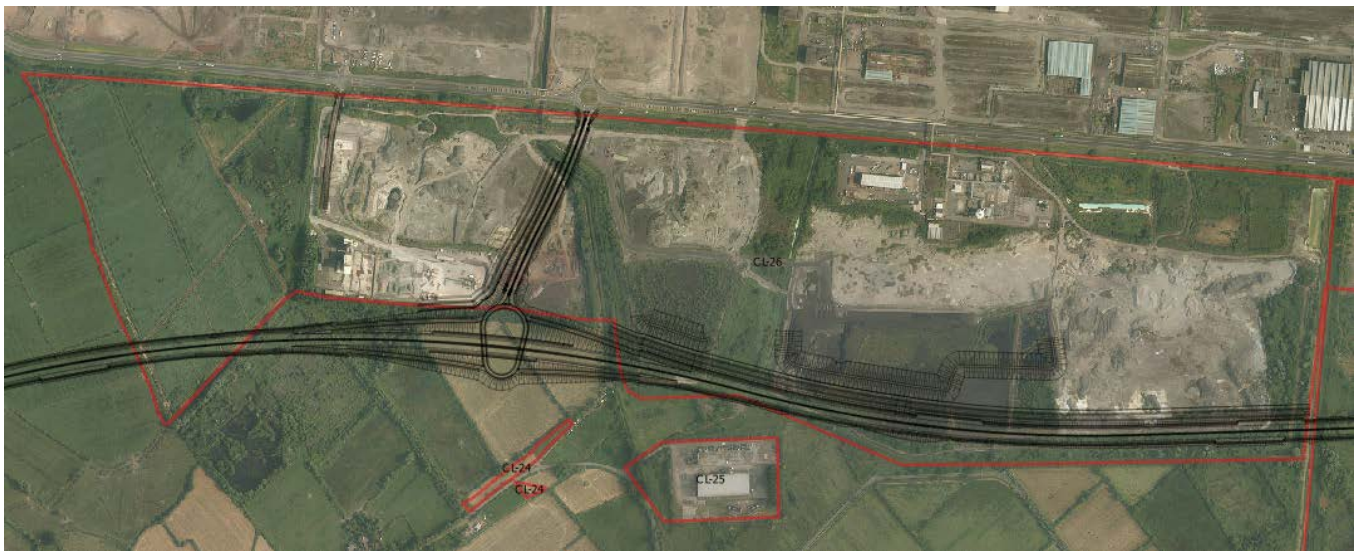

Plate 05: Extract of 2013/14 Aerial Photograph.

Client:	Welsh Government
Project:	M4CaN
Job Ref:	JER6591 Checked By: Date: Oct 2015

A12 Appendix 8

Site Walkover Photographs

Plate 01: CL26 – Lagoon 12, 29th June 2015

Plate 02: CL26 – Lagoon 25, 29th June 2015

Client:	Welsh Government				
Project:	M4CaN				
Job Ref:	JER6591	Checked By:		Date:	July 2016

Plate 03: CL26 – Lagoon 25, 29th June 2015.

Plate 04: CL26 – Lagoon 27, 29th June 2016.

Client:	Welsh Government				
Project:	M4CaN				
Job Ref:	JER6591	Checked By:		Date:	July 2016

Plate 05: CL26 – Lagoon 26, 29th June 2015.

Plate 06: CL26 – Lagoon 27 NE, 29th June 2015

Plate 07: CL26 – Lagoon 25 southwest corner. 29th June 2015.

Plate 08: CL26 – Looking northeast towards Lagoon 25. 11th April 2016.

Plate 09: CL26 – Lagoon 25 southwest corner, 11th April 2016.

Plate 10: CL26 – Lagoon 27, 11th April 2016.

Client:	Welsh Government				
Project:	M4CaN				
Job Ref:	JER6591	Checked By:		Date:	July 2016

Plate 11: CL26 – Lagoon 26, 11th April 2016

Plate 12: CL26 - Lagoon 26, 11th April 2016

Plate 13: CL26 – Lagoon 27 NE, 11th April 2016.

Plate 14: CL26 – Lagoon 27 NW, 11th April 2016.

Plate 15: CL26 – Lagoon 27 NW, 11th April 2016.

Plate 16: CL26 – Outside bund of Lagoon 27 to the south, 11th April 2016

Plate 17: CL26 – Eastern edge of Lagoon 26. 11th April 2016

Plate 18: CL26 – Lagoon 26 eastern edge. 11th April 2016.