

Appendix O

Environmental Assessment Report (2010)



Invista Textiles (UK) Ltd
Wilton
Redcar
TS10 4XY

Environmental Assessment Report
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Wilton
Redcar

February 2010

960100203

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Report Details

Client	Invista Textiles (UK) Ltd
Address	Invista Textiles (UK) Ltd Wilton Redcar TS10 4XY
Report Title	Environmental Assessment Report
Report Number	960100203
Report Date	February 2010

Quality Assurance

Issue Number /Status	Date	Prepared By	Technical Review	Authorised by
02 Report re-issue				
		██████████ Consultant	██████████ Principal	██████████ Director
01 Draft for comment				
		██████████ Consultant	██████████ Principal	██████████ Director

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Executive Summary

ARCADIS was commissioned by Invista Textiles (UK) Ltd to undertake two phases of work at the facility located in Wilton, Redcar, TS6 8JJ (the site) to aid with the IPPC licence surrender. The first phase of work included groundwater well development and groundwater sampling as part of the environmental permit surrender Site Condition Report. The second phase of work included additional groundwater monitoring and limited intrusive investigation.

Phase 1

The objectives of the work were to provide an assessment of the environmental condition of the site and to detail any variations from the initial baseline survey in line with the Environmental Permit conditions. The scope of works included a site reconnaissance, rehabilitation of existing monitoring wells, sampling and analysis; and reporting.

The first stage in compiling the surrender Site Condition Report was the re-sampling and analysis of the existing site groundwater monitoring wells, tested as part of the IPPC permit submissions in 2002. The aim of this phase of work was to sample and analyse groundwater samples from as many of the original boreholes sampled as part of the permit application. A number of these boreholes could not be located or were found to be damaged.

Groundwater samples were collected using a low-flow sampling technique, where possible, and sent to an accredited laboratory for the following analysis: Volatile Organic Compounds (VOC) inc Tentatively Identified Compounds (TIC), Semi-Volatile Organic Compounds (SVOC) inc TIC, Total Petroleum Hydrocarbons (TPH), Metals, Ammonia, Acids, Methanol, PCBs, Cyclohexane and TOC. QA/QC samples were also submitted for analysis for the same suite of determinands.

The most notable variations between the baseline survey undertaken in 2002 and the monitoring round undertaken in July 2009 were found in groundwater sampled from boreholes BH1101, 1104 and 304. Elevated concentrations of acids detected in BH1101; a concentration of 595 µg/l was recorded in the baseline survey (described as C6-9 acid) and 101,920 µg/l recorded in the 2009 survey (described as Carboxylic Acid Group and Dicarboxylic acid (ranging from Propanoic Acid to Heptanoic Acid also Decanedioic acid and Octanedioic acid)). It should be noted that these acids were recorded as tentatively identified compounds on both occasions and as such are indicative only.

Some variations of TPH DRO and TPH GRO were also recorded; however, these are thought to be a result of differing sampling techniques, with the TPH – DRO consistently lower in 2009. The low-flow monitoring technique, utilised in 2009, is considered to provide the most representative sample of groundwater quality.

The metals analysis recorded generally consistent results, except for boron, which recorded an increase from 590 µg/l to 15,000 µg/l in groundwater sampled from BH1104. Boron is a naturally occurring element and is commonly present in groundwater. The concentration increase observed in monitoring well BH1104 may be due natural variations and is not thought to be of concern.

Ammonia analysis also recorded an increase in BH304 between 2002 and 2009.

The TOC concentration in BH304 has recorded an increase from 10,000 µg/l to 580,000 µg/l over the life of the permit and slight increases in the total VOC and SVOC concentrations were observed at this location.

The analysis of the samples collected from the LDPs (WALE and Dump Tank) did not identify any elevated concentrations of target compounds.

After the first phase of monitoring it was found that the results were generally consistent between the baseline (2002) and closure monitoring programme (July 2009), except for boreholes BH304 and BH1101, where the analysis suggested some impacts of SVOC compounds, ammonium and possibly an unquantified source of TOC over the lifetime of the permit.

Phase 2

The second phase of works included additional groundwater monitoring and a limited intrusive investigation which was undertaken to collect additional data from the area around the three boreholes identified in phase one as having increased levels of contamination.

The objectives of the additional work were to confirm the groundwater quality in the selected monitoring wells (BH304, BH1101 and BH1104); to delineate the extent of the impacts near to those wells. The scope of works comprised the re-sampling of four existing boreholes, BH304, BH1101, BH501 (between BH1101 and the potential source) and BH1104; the drilling of 10 new boreholes to delineate the impacts around the existing boreholes; and the sampling of the newly installed wells on two occasions.

Based on the elevated Contaminants of Concern (CoC) identified in phase one and discussions with Invista, the soil and groundwater samples were submitted for analysis for some or all of the following, ammonium, Total Organic Carbon (TOC), Total Petroleum Hydrocarbons (TPH), Volatile Organic Compounds (VOC), Semi-Volatile Organic Compounds (SVOC), metals, pH, boron and borate.

A total of 10 boreholes were drilled at the site between 2nd and 3rd November 2009. Boreholes were drilled to depths of between 2.5 metres (m) and 6m below ground level (bgl). Four boreholes were drilled around BH304, three boreholes were drilled around BH1101 and three boreholes were drilled around BH1104.

The geology encountered generally comprised Made Ground comprising of reinforced concrete encountered to depths of between 0.2m and 0.3m bgl. The concrete was underlain in places by a grey-brown clayey slightly sandy coarse gravel. A firm to stiff red brown clay was encountered in all of the boreholes. All the boreholes were terminated in this clay deposit at depths of between 2.4m bgl and 6m bgl.

BH1101 Area

The re-sampling of BH1101 recorded elevated concentrations of acids in the TIC, with concentrations rising from 595µg/l in the 2002 baseline survey to 101,920µg/l in the September 2009 monitoring and 487,753µg/l in the November 2009 monitoring. Elevated concentrations of comparable acids were also detected in soil samples taken from BH1101-1 and in groundwater sampled from BH1101-1, BH1101-2, and BH1101-3.

The re-sampling of BH1101 also recorded elevated Gasoline Range Organics, however, although above the 2002 baseline survey the concentrations had reduced since the July 2009 monitoring from 931µg/l to 190µg/l. Elevated TPH was also recorded in soil sampled from BH1101-1 (350mg/kg) and in groundwater (3,600µg/l).

BH501, located between the potential source and BH1101, recorded no SVOC TIC or TPH concentrations above the MDL.

Based on the findings of the additional environmental assessment it is evident that the soil and groundwater have been impacted with acids. Given the location in the Acid Plant area it is likely that these impacts are associated with site activities. The lack of impact in BH501 indicates the source is not to the north east of BH1101.

BH304 Area

The re-sampling of BH304 recorded elevated concentrations of VOC and SVOC above the 2002 baseline survey, although slightly lower than those recorded in September 2009. A number of VOC and SVOC TIC were recorded with VOC TIC being recorded for the first time.

Ammonium concentrations which recorded a significant increase in BH304 between 2002 and 2009 also record a continued increasing trend with concentrations rising from 260,000µg/l in September 2009 to 390,000µg/l in November 2009.

None of the delineation boreholes showed elevated concentrations of the COC.

Based on the findings of the additional environmental assessment it is evident that the groundwater impacts in BH304 of VOC, SVOC and ammonium are still elevated above the 2002 baseline survey. The delineation boreholes show none of the COC above the MRL as such BH304 represents a isolated hotspot.

BH1104 Area

The re-sampling of BH1104 recorded elevated boron concentrations above the 2002 baseline survey (590µg/l), although it has reduced from 15,000µg/l in September 2009 to 1,100µg/l in November 2009. Comparable concentrations were also recorded in the three delineation boreholes.

Borate levels, not previously analysed, were recorded at 9,000µg/l in BH1104 and between 1,000µg/l and 1,300µg/l in BH1104-1, BH1104-2 and BH1104-3.

The boron levels are generally elevated above those recorded across the site in the September 2009 monitoring, although lower than the high recorded in September 2009. It is not clear whether this represents natural levels in this area or whether this is from a site derived source.

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List of abbreviations that may be used in this report

ARCADIS	ARCADIS (UK) Ltd
bgl	below ground level
CAT	Cable Avoidance Tool
CoC	Contaminants of Concern
DNAPL	Dense Non-Aqueous Phase Liquid
GPR	Ground Penetrating Radar
IPPC	Integrated Pollution Prevention and Control
LDPs	Leak Detection Point
LNAPL	Light Non-Aqueous Phase Liquid
m	Metres
mm	Millimetre
mbgl	metres below ground level
MTBE	Methyl Tertiary Butyl Ether
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Poly Chlorinated Biphenyls
SCR	Site Condition Report
SVOCs	Semi-Volatile Organic Compounds
TICs	Tentatively Identified Compounds
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
VOCs	Volatile Organic Compounds

List of Abbreviations that may be used in this report

ARCADIS	Arcadis Geraghty & Miller International Ltd
bgl	Below ground level
CAT	Cable Avoidance Tool
CoC	Contaminant of Concern
HDPE	High Density Polyethylene
IPPC	Integrated Pollution Prevention and Control
PID	Photo Ionisation Detector
PPC	Pollution Prevention and Control
SCR	Site Condition Report
SVOC	Semi Volatile Organic Compounds
TIC	Tentatively Identified Compounds
TPH	Total Petroleum Hydrocarbons
VOC	Volatile Organic Compounds

1 INTRODUCTION

ARCADIS was commissioned by Invista Textiles (UK) Ltd to undertake two phases of work at their facility located in Wilton, Redcar, TS6 8JJ (the site). The works were undertaken to provide information for the environmental permit surrender site condition report.

The first phase of work undertaken was groundwater well development and groundwater sampling as detailed in the ARCADIS proposal, *Proposal For Groundwater Monitoring Services – Invista Textiles (UK) Ltd, Wilton, referenced 55800.00.01, and dated 15 June 2009.*

The second phase of work included additional groundwater monitoring and limited intrusive investigation to delineate the identified impacts around a number of boreholes of concern at the site. The works undertaken are as detailed in the ARCADIS proposal, *Proposal Additional Environmental Works associated with the Environmental Permit Surrender – Invista Textiles (UK) Ltd, Wilton, referenced 55991.00.01, and dated 8th October 2009.*

A site location plan is presented as Figure 1.

1.1 Background

The site is in the process of closure, and as part of this there is a requirement to surrender the Environmental Permit (PPC Permit), in line with the Site Closure Plan for the facility.

As part of the closure strategy, a surrender Site Condition Report (SCR) is required. This report describes the condition of the land and groundwater at the point at which the Environmental Permit is surrendered. The Environment Agency require that this report must provide the evidence necessary to demonstrate that the site does not pose a pollution risk and is in a satisfactory state.

The SCR must contain statements that summarise the information that has been recorded during the life of the permit, and the evidence must demonstrate that:

- Measures to protect land and groundwater quality have been effective;
- Any pollution incidents that may have affected the land have been investigated and remediated;
- Soil, gas or water quality have been monitored, and that any deterioration in quality has been investigated and remediated; and
- Pollution risks caused by decommissioning have been managed and remedied.

The first step in compiling the SCR is the re-sampling and analysis of the site groundwater monitoring wells tested as part of the IPPC permit submissions in 2002.

1.2 Objectives

The objectives of the two phases of work were to:

- Provide an assessment of the environmental condition of the site;
- Detail any variations from the initial baseline survey in line with the Environmental Permit conditions;
- To delineate the extent of any identified impacts near to selected monitoring wells; and
- Prepare a report to support Invista in surrendering the site's Environmental Permit.

1.3 Scope of Works

1.3.1 Phase 1

As part of the environmental permit surrender Invista undertook to collect and analyse groundwater samples from all of the available boreholes which were originally sampled as part of the PPC permit application in 2002.

Prior to undertaking the groundwater sampling, a site reconnaissance visit was undertaken. The objective of the task was to undertake a detailed site inspection with the aim of locating and inspecting all available and existing groundwater monitoring wells. Leak detection monitoring wells located around the WALE and dump tanks were inspected for their suitability for sampling.

Monitoring wells were located and inspected for integrity and suitability for the proposed groundwater monitoring. The monitoring wells were then purged and rehabilitated prior to sampling to ensure that groundwater samples would be representative of the water bearing strata beneath the site. Groundwater samples were submitted for the analysis of a range of contaminants of concern (CoC) in line with the analysis undertaken for the PPC permit application.

Water samples were also collected from leak detection points (LDPs) DUMP 5, WALE 1 and WALE 6 and submitted for a reduced range of analysis.

1.3.2 Phase 2

Additional Groundwater Sampling and Analysis

Based on the findings of the first phase of works and discussions with Invista, four of the monitoring wells were identified as having elevated Chemicals of Concern (CoC). As such groundwater samples were collected and subsequently submitted for laboratory analysis for a selected number of analytes. The wells identified to be re-sampled were BH304, BH501, BH1101 and BH1104.

Characterisation of Ground Conditions Near to Impacted Monitoring Wells

Limited intrusive investigation was undertaken around those monitoring wells where elevated COC in groundwater were recorded. The drilling works were undertaken to further characterise the extent of the impacts. Based on discussions with Invista the intrusive works comprised the drilling of three boreholes in the vicinity of BH1101 and four boreholes in the vicinity of BH304.

In addition to the above ARCADIS recommended that the elevated boron concentration, identified in groundwater sampled from monitoring well BH1104, be investigated further. Boron is a naturally occurring element and in some cases elevated concentrations can be attributed to natural sources. However, it is understood that the site has handled boronated compounds. An additional three monitoring wells were installed in the vicinity of BH1104.

Soil and groundwater samples collected for Laboratory analysis. Monitoring wells were installed in all of the boreholes drilled in order to facilitate subsequent groundwater sampling.

1.4 Study Limitations

This section should be read before reliance is placed on any of the information, opinions, advice, recommendations or conclusions contained in this report.

1. This report has been prepared by ARCADIS, with all reasonable skill, care and diligence within the terms of the contract, resources and manpower agreed with Invista Textiles (UK) Ltd (the 'Client'). ARCADIS does not accept responsibility for any matters outside the agreed scope.

2. This report has been prepared for the sole benefit of the Client.
3. Unless stated otherwise, no consultations external to Invista Textiles (UK) Ltd have been carried out. ARCADIS are unable to give categorical assurance that the findings of this work will be accepted by regulatory bodies prior to consultation with these bodies.
4. All work carried out in preparing this report has used, and is based on, ARCADIS' professional knowledge and understanding of current relevant legislation. Changes in legislation or regulatory guidance may cause the opinion or advice contained in this report to become inappropriate or incorrect. Following delivery of the report ARCADIS have no obligation to advise the Client or any other party of such changes or their repercussions.
5. This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report.
6. Whilst this report and the opinions made are accurate to the best of ARCADIS' belief, ARCADIS cannot guarantee the accuracy or completeness of any information provided by third parties.
7. This report has been prepared based on the information reasonably available during the project programme.
8. This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.
9. The content of this report represents the professional opinion of experienced environmental consultants. ARCADIS does not provide specialist legal or other professional advice. The advice of other professionals may be required.
10. Where intrusive investigation techniques have been employed they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature of sampling, no investigation technique is capable of identifying all conditions present in all areas. In some cases the investigation is further limited by site operations, underground obstructions and above ground structures. Unless otherwise stated, areas beyond the boundary of the site have not been investigated.
11. If below ground intrusive investigations have been conducted as part of the scope, service tracing for safe location of exploratory holes has been carried out. The location of underground services shown on any drawing in this report has been determined by visual observations and electromagnetic techniques. No guarantee can be given that all services have been identified. Additional services, structures or other below ground obstructions, not indicated on the drawing, may be present on site.
12. Unless otherwise stated the report provides no comment on the nature of building materials, operational integrity of the facility or on any regulatory compliance issues.

1.5 Reliability of Information

ARCADIS warrants that the services performed were conducted in a competent and professional manner in accordance with sound consulting practices and procedures, and based on the project brief defined in consultation with Invista Textiles (UK) Ltd.

During preliminary discussions with Invista Textiles (UK) Ltd, prior to undertaking this environmental review, it was agreed that ARCADIS should not contact any persons outside the Invista Textiles (UK) Ltd organisation and hence opinions stated here relating to legislative drivers are based on ARCADIS' experience and professional judgement. This report is based on currently available data, if further information is forthcoming, it may be necessary to update this report.

2 METHODOLOGY

2.1 Phase 1

2.1.1 Site Reconnaissance

The site reconnaissance was undertaken between the 14th and 17th July 2009. Monitoring wells were located, inspected and checked for integrity for groundwater monitoring sampling. Each location was:

- Located using a variety of techniques, including metal detector, and positioned using a portable hand held GPS device;
- Photographed;
- Assessed for the condition of the well head;
- Recorded for well construction details (diameter, method of construction);
- Measured for water level and bottom of borehole;
- Recorded for presence and thickness of any Light Non-Aqueous Phase Liquid (LNAPL) or Dense Non-Aqueous Phase Liquid (DNAPL); and
- Logged with a summary of any rehabilitation actions required (e.g. new well covers / well-head maintenance).

A summary of well construction, installation and location is provided in Table 1.

2.1.2 Well Development

Each well was purged using a combination of techniques, including dedicated Waterra tubing to clean and rehabilitate the wells such that they would provide representative groundwater samples. Where possible approximately five wetted volumes of water were purged from the wells, however this was not possible at all locations due to the low permeability of the geology beneath the site. In these cases, the wells were purged dry three times.

Table 1 contains details of the quantities of water purged from the monitoring wells.

2.1.3 Reinstatement Works

During the site reconnaissance a number of wells and well covers were noted to be in a state of disrepair and required to be reinstated. Eight existing well covers were broken out by hand and reinstated with new covers; seven flush to the ground and one top hat cover.

2.1.4 Groundwater Sampling

Following well development, groundwater samples were collected using a low-flow technique. The use of low-flow techniques typically results in the collection of a water sample without entrained particulate material or surface sheen that may lead to an overestimation in dissolved contaminant concentrations. Low flow sampling also enabled the collection of hydrogeochemical data (pH, Redox, dissolved oxygen, conductivity and temperature) at the well head.

Samples were collected using dedicated tubing attached to a peristaltic pump and passed through the flow cell equipped with a YSI 556 multi-parameter hydrochemical probe. During low flow sampling groundwater is abstracted at a low rate (typically < 0.5 litres/min) until the hydrogeochemical parameters have stabilised within 10% of the previous reading.

Where the recharge of the well was too poor to enable sampling using low-flow techniques a grab sample was collected from the well using the peristaltic pump.

2.1.5 Leak Detection Points

Hydrochemical data was collected from three of the Leak Detection Points (LDPs) around the WALE and dump tanks using a YSI 556 multi-parameter probe. Water was also sampled from the LDPs using a peristaltic pump.

2.1.6 Laboratory Analysis

Groundwater samples were tested for the following suites:

- Volatile Organic Compounds including tentatively identified compounds (VOC including TICs);
- Semi-volatile Organic Compounds including tentatively identified compounds (SVOC including TICs);
- Total Petroleum Hydrocarbons by the total petroleum hydrocarbon criteria working group (TPHCWG) methodology;
- Metals (arsenic, water soluble boron, cadmium, chromium, copper, mercury, nickel, lead, selenium, vanadium, zinc);
- Ammonium as NH_4 ;
- Acids (pH and acids identified in the VOC and SVOC TICs);
- Methanol;
- Poly Chlorinated Biphenyls (PCBs);
- Cyclohexane Extract; and
- Total Organic Carbon (TOC).

A schedule of the groundwater laboratory analysis is presented in Table 2.

Samples collected from LDPs were submitted for the following analysis:

- VOC including TICs;
- SVOC including TICs;
- TPHCWG;
- Metals (arsenic, water soluble boron, cadmium, chromium, copper, mercury, nickel, lead, selenium, vanadium, zinc);
- Alcohols and acetates;
- Cyclohexane extract;
- Ammonium as NH_4 ; and,
- TOC.

2.2 Phase 2

2.2.1 Additional Groundwater Sampling and Analysis

The groundwater sampling was carried out in the first and third week in November 2009. The site layout and monitoring well locations are presented on Figure 2. The existing wells identified to be re-sampled were monitoring wells BH304, BH1101, BH1104 and BH501. The table below details the rationale for the proposed sampling:

Monitoring Well	Justification for Re-sampling
BH304	Total Organic Carbon (TOC), Semi-Volatile Organic Compounds (SVOC) and ammonium concentrations noted to be elevated relative to baseline survey.
BH1101	SVOC Tentatively Identified Compounds (TICs), Total Petroleum Hydrocarbons (TPH) and ammonium concentrations noted to be elevated relative to baseline survey.
BH501	Monitoring well located between potential source area and BH1101.
BH1104	Boron concentration noted to be elevated relative to baseline survey.

Groundwater samples were intended to be collected using low-flow techniques as in phase 1. However, due to the nature of the ground conditions and the very low recharge of groundwater it was not possible to take true low flow samples from the wells other than BH1101 and BH501.

2.2.2 Characterisation of Ground Conditions Near to Impacted Monitoring Wells

The intrusive site investigation was carried out on 2nd and 3rd November 2009. The intrusive works comprised the drilling of three boreholes in the vicinity of BH1101 and four boreholes in the vicinity of BH304. Three boreholes were also drilled around BH1104 to further investigate elevated boron concentrations identified in groundwater sampled from the monitoring well in July 2009. The site layout and existing monitoring well locations are presented on Figure 2. Figures 3, 4 and 5 show the locations of the new wells.

The first stage of the intrusive investigation included underground utility clearance at each borehole location. The borehole clearance survey utilised both electromagnetic (CAT and generator) and ground penetrating radar (GPR) techniques.

Intrusive drilling works were undertaken using ARCADIS' in-house drilling capabilities, utilising our tracked Geoprobe 6610 drilling rig. A total of ten boreholes were drilled at the site and advanced to facilitate soil sampling to a maximum depth of six metres (m) below ground level (bgl). Borehole positioning was agreed with the site. Monitoring wells were installed in all ten boreholes with installation design based on the ground conditions and previously installed monitoring wells, constructed from 50mm diameter threaded HDPE well screen and blank casing. Construction details are presented on the borehole logs in Appendix A.

Soil samples were collected at approximate 0.5m intervals, placed into polythene bags and sealed to enclose as much air as possible around the soil sample. The soil sample was gently broken up and left for approximately fifteen minutes. Following this, the polythene bag was pierced and the MiniRAE 2000 PID fitted with a 10.6eV UV lamp and was inserted to test for ionisable volatile contaminants. Field headspace screening of soil samples was conducted to enable selection of samples for independent laboratory analysis. These screening methods allow for identification of 'down hole' trends in contaminant distribution. PID readings are presented on the borehole logs in Appendix A.

All soil samples recovered were logged in accordance with BS 5930:1999 to provide information on the sequence of strata observed at each position. Soil samples were selected for laboratory analysis from the boreholes based on PID headspace reading, visible or olfactory evidence of impact and/or representative of different lithologies or depths.

2.2.3 Laboratory Analysis

Based on the elevated CoC identified in the previous monitoring and discussions with Invista, the soil and groundwater samples were submitted for the following analysis:

Borehole	NH4 – N	TOC	TPH	VOC	SVOC	Metals	pH	Boron /Borate
BH304	✓	✓	✓	✓	✓	-	-	-
BH501	✓	✓	✓	-	✓	-	-	-
BH1101	✓	✓	✓	-	✓	-	-	-
BH1104	-	-	-	-	-	✓	✓	✓

- Not tested

All samples were forwarded to Alcontrol Laboratories with the exception of Boron which was analysed by Jones Environmental Laboratories. A schedule of the laboratory analysis is presented in Table 3.

2.3 Collection, Preservation and Transport of Samples

All samples from both phases of work were decanted into dedicated laboratory supplied containers. Glass bottles and vials were used for samples to be analysed for organic species and plastic bottles were used for samples to be analysed for inorganic species. Containers for volatile analysis were filled so that no air space remained in the container prior to sealing.

All samples were stored in dedicated cool boxes, at a target temperature of 4°C. All samples and analytical requests were recorded on the laboratory chain of custody form, prior to dispatching for analysis, on the day of sampling, where possible.

2.4 Quality Assurance and Quality Control

All samples were submitted to ALcontrol Laboratories a certified United Kingdom Accreditation Services (UKAS) accredited laboratory. All samples were sent with a full chain of custody identifying ARCADIS as the client, the ARCADIS project reference, the consultant/project manager, the nature of the sample and the parameters to be tested. Where possible samples were analysed using the EA Monitoring Certification Scheme (MCerts) accredited methodologies.

3 RESULTS – PHASE 1

3.1 Introduction

The results of the monitoring visit and water analysis undertaken in July 2009 are presented within this section. Field data collected during the groundwater monitoring visit is presented in Table 4 and laboratory analysis results are presented in Tables 5 to 9

3.2 Groundwater

3.2.1 Hydrogeological Results

Groundwater was encountered at depths of between 0.15m bgl (BH1106) and 2.78m bgl (BH1103) during the groundwater monitoring visit. Given the nature of the geology beneath the site, the slow rates of groundwater recharge observed, the variability noted in the measured depths to groundwater, and the relatively flat topography, it is considered that groundwater is likely to exist in localised perched bodies rather than in one laterally continuous body beneath the site.

3.2.2 Hydrogeochemical Parameters

The hydrogeochemical parameters were monitored during low flow sampling at the well head and are presented in Table 4 and are summarised below:

Temperature

Groundwater temperature was measured in the range of 14.54°C (BH501) to 17.9°C (BH606).

Conductivity

Groundwater conductivity was measured in the range of 251 mS (BH606) to 1,342 mS (BH112), however the majority of the results were less than 1,000 mS.

pH

All of the field pH values were recorded in the range of between 6.58 (BH401) and 8.35 (BH105).

Oxidation/Reduction Potential (ORP)

ORP readings ranged between -114.6 mV (BH105) and 133.7 mV (BH605). The ORP results record a good correlation with the dissolved oxygen results (see below) and indicate that the groundwater conditions are generally aerobic beneath the site.

Dissolved Oxygen

The dissolved oxygen concentrations were generally recorded between 3% (BH105) and 71.4% (BH504).

Appearance

Most samples were clear and colourless with the exception of BH304 (suspended black sediment), BH401 (suspended sediment) and BH1102 (orangey brown and cloudy). None of the samples were noted to have odours which may be associated with potential groundwater impacts.

3.2.3 Laboratory Analysis

As part of this task, a total of 20 of the original 24 boreholes sampled during the PPC permit application (Reference BM 2063) were sampled. The following PPC permit boreholes were sampled: BH105, BH112, BH201, BH202, BH203, BH204, BH304, BH401, BH404, BH405, BH501, BH504, BH601B, BH605, BH606 and BH1101, BH1102, BH1103, BH1104 and BH1107.

The results of the analysis of these samples is summarised below:

Volatile Organic Compounds (including Tentatively Identified Compounds)

VOC were identified at concentrations greater than laboratory method detection limits (MDL) in groundwater sampled from monitoring wells BH105 and BH304. The highest recorded concentration was 53 µg/l naphthalene in the field duplicate sampled from BH304.

VOC TIC were not recorded in any of the samples analysed.

Semi Volatile Organic Compounds (including Tentatively Identified Compounds)

SVOC were identified in groundwater sampled from monitoring well BH304 and comprised phenolic and polycyclic aromatic hydrocarbons (PAH) compounds with the highest measured concentration being 140 µg/l 2,4-dimethylphenol.

SVOC TIC were identified in groundwater sampled from BH605 (16 µg/l unknown – 60% match ethyl isothiocyanate) and BH1101 (101,920 µg/l – carboxylic acid group). The unknown compound detected in BH605 is at a low concentration and could not be identified.

Total Petroleum Hydrocarbons

Sixteen groundwater samples were submitted for TPHCWG analysis. Petroleum hydrocarbons were identified in five of the samples with TPH concentrations between 55 µg/l (BH1102) and 1,000 µg/l (BH304).

Metals

Groundwater samples were collected from twenty locations. Measured metal concentrations are broadly inline with those expected for groundwater. Of note, elevated boron concentrations of 1,400 µg/l, 1,700 µg/l and 15,000 µg/l were recorded in the samples collected from monitoring wells BH201, BH1103 and BH1104.

Ammonium

Twenty samples were submitted for ammonium analysis and ammonium was identified in fifteen samples; concentrations were generally in the range of 500 µg/l to 5,000 µg/l, however a concentration of 260,000 µg/l was recorded in groundwater sampled from BH1101.

Total Organic Carbon (TOC)

All samples were submitted for TOC analysis and TOC was identified in twenty samples. Measured TOC concentrations were generally in the range 3,000 µg/l to 8,000 µg/l, however high concentrations of 5,900,000 µg/l and 580,000 µg/l were measured in groundwater sampled from monitoring wells BH1101 and BH304 respectively.

Alcohols and Acetates

Samples from fourteen monitoring wells were submitted for alcohols and acetates analysis. No alcohol or acetate species were identified at concentrations >MDL in any of the samples tested.

Poly Chlorinated Biphenyls

PCBs were not identified in any of the eighteen groundwater samples tested.

3.3 Leak Detection Points

Three samples were collected from Leak Detection Points, referred to as WALE 1, WALE 6 and DUMP 5. No detections of VOCs and TICs, SVOCs and TICs, or TPH were recorded in the LDP sampling above the relevant method detection limits.

Metal concentrations were within the ranges observed for groundwater.

3.4 Quality Assurance / Quality Check

Two blind field duplicates were collected BH105 and BH304 and one blank were also submitted to the laboratory as part of the QA/QC control to provide an indication of the reproducibility of the field sampling and laboratory analytical methods. Comparison of the field duplicate results shows a

good level of agreement between the duplicate samples across all of the analytical suites indicating a good degree of reproducibility in the results between the samples. One laboratory prepared travel blank was also submitted for analysis and no CoC were identified with the exception of low concentrations of chloroform and bromodichloromethane in the VOC suite.

4 RESULTS – PHASE 2

This section presents the results of the intrusive investigation, and the groundwater sampling conducted in November 2009. Borehole locations are presented on Figures 2 to 5.

4.1 Intrusive Investigation

A total of 10 boreholes were drilled at the site between 2nd and 3rd November 2009. Boreholes were drilled to depths of between 2.5m and 6m bgl. Four boreholes were drilled around BH304, three boreholes were drilled around BH1101 and three boreholes were drilled around BH1104. Detailed borehole logs are presented in Appendix A and the ground conditions are summarised below.

4.1.1 Ground Conditions

BH304 Area

Made Ground

Reinforced concrete was encountered in three of the four boreholes to depths of between 0.2m (BH304-1) and 0.3m bgl (BH304-2 / 4).

Topsoil was encountered to a depth of 0.3m bgl in BH304-3.

Gravels

The made ground was underlain by a grey-brown clayey slightly sandy coarse gravel 0.2m thick in BH304-3. No gravel was encountered in any of the other boreholes.

Clay

A firm to stiff red brown clay was encountered in all of the boreholes at depths of between 0.2m bgl (BH304-1), and 0.5m bgl (BH304-3). All the boreholes were terminated in this clay deposit at depths of between 2.4m bgl (BH304-4) and 6m bgl (BH304-1).

BH1101 Area

Made Ground

Reinforced concrete was encountered in all of the boreholes proven to 0.3m bgl.

Brown and black stained slightly sandy, clayey fine to medium gravel was encountered in BH1101-1 and BH1101-2 proven to depths of 0.5m bgl and 0.8m bgl respectively.

Clay

A firm to stiff red brown clay was encountered in all of the boreholes at depths of between 0.3m bgl (BH1101-3), and 0.8m bgl (BH1101-2). All the boreholes were terminated in this clay deposit at depths of 5m bgl.

BH1104 Area

Made Ground

Reinforced concrete was encountered in two of the three boreholes at a depth of 0.3m bgl (BH1104-1 / 2). Bituminous macadam was encountered in BH1104-3 to a depth of 0.2m bgl.

Light brown with occasional black staining, slightly clayey, slightly sandy gravel was encountered in BH1104-1 and BH1104-3 to depths of 1.7m bgl and 0.7m bgl respectively.

Clay

A firm to stiff red brown clay was encountered in all of the boreholes at depths of between 0.3m bgl (BH1104-2), and 1.3m bgl (BH1104-1). All the boreholes were terminated in this clay deposit at depths of 6m bgl.

4.1.2 Groundwater Occurrence

A groundwater strike was recorded in BH1101-1 at 0.5m bgl. All other boreholes remained dry throughout drilling.

Groundwater was encountered in all boreholes during subsequent monitoring, however, due to the perched nature of the groundwater no flow direction could be inferred. Table 10 details the groundwater monitoring data.

- BH304 Area – Groundwater encountered between 0.322m and 3.103m bgl.
- BH1101 Area – Groundwater encountered between 0.405m and 2.775m bgl.
- BH1104 Area – Groundwater encountered between 0.512m and 4.338m bgl.

4.1.3 Field Readings

Field samples were screened using a PID. Readings were generally below 5ppm with the exception of those recorded for BH1101-1, BH1101-4, and BH304-3 which are displayed in the table below.

PID Readings		
Borehole	Depth m bgl	PID Reading ppm
BH1101-1	0.4 – 0.5	9
	1.4 – 1.6	1
	2.0 – 2.2	2
	3.2 – 3.4	4
	3.7 – 3.8	5
	4.1 – 4.2	1
	4.5 – 4.6	2
BH1101-4	1.2 – 1.3	11
	2.5 – 2.7	1
	3.0 – 3.1	0
	3.9 – 4.0	0
	5.0 – 5.1	0
	5.5 – 5.6	0
BH304-3	0.2 – 0.5	21
	0.9 – 1.1	1
	1.3 – 1.4	1
	2.0 – 2.2	1
	2.5 – 2.6	1
	3.0 – 3.1	0

A full dataset of PID readings are presented on the borehole logs in Appendix A.

4.2 Laboratory Analysis – Soil

Two soil samples, one shallow and one deep, from each of the newly drilled boreholes were submitted for laboratory analysis. The results of the analysis of the samples are presented in tables

12 to 16 and are summarised below. The summary is split into the three areas investigated, namely BH304, BH1101, BH1104.

4.2.1 BH304 Area

VOC were identified at concentrations above laboratory method detection limits (MDL) in soil samples BH304-3 (0.2-0.5m) and BH304-4 (0.3-0.5m). The highest recorded concentration was 0.095mg/kg of m/p-xylene in the sample from BH304-3 (0.2-0.5m).

A number of VOC TIC were recorded in BH304-3 (0.2-0.5m), namely, methyl-cyclohexane (0.117 mg/kg), ethyl-cyclohexane (0.065 mg/kg), ethyl-methyl-benzene isomer (0.059mg/kg) and an unknown compound at 0.055 mg/kg.

No SVOC and SVOC TIC were detected in any of the soil samples.

Total petroleum hydrocarbons were identified in all eight of the soil samples submitted with the highest TPH concentration recorded in 304-4 (0.3-0.5m) at 250mg/kg. Gasoline Range Organics were detected in two of the eight samples at 0.28mg/kg in BH304-2 (0.3-0.6m) and 0.1mg/kg in BH304-1 (0.2-0.5m).

All eight samples submitted for TOC analysis recorded concentrations greater than method detection limits with concentrations ranging from 0.6% to 1.1%.

Ammonia was detected in two of the eight samples submitted for analysis; BH304-1 (0.2-0.3m) at 52mg/kg and in BH304-3 (2.2-2.4m) at 52mg/kg.

4.2.2 BH1101 Area

VOC were identified at concentrations above laboratory MDL in soil samples BH1101-1 (0.4-0.5m) and BH1101-1 (1.2-1.5m). The highest recorded concentration was 0.4mg/kg of 1,3,5-trimethylbenzene in the sample from BH1101-1 (0.4-0.5m).

VOC TIC were encountered in BH1101, namely C6-9 aliphatic hydrocarbons (5.4mg/kg) and C9-10 aromatic hydrocarbons (6.8mg/kg).

SVOC were identified in soil samples from boreholes BH1101-1 (0.4-0.5m), BH1101-1 (1.2-1.5m) and BH1101-2 (0.3-0.8m) and comprised phthalates, phenolic and polycyclic aromatic hydrocarbons (PAH) compounds with the highest measured concentration being 3.4 mg/kg 4-nitrophenol.

SVOC TIC were identified in soil samples from BH1101-1 (0.4-0.5m), BH1101-1 (1.2-1.5m), and BH1101-2 (0.3-0.8m) and comprised hexanoic acid (23.841mg/kg), 2-methyl-hexanoic acid (3.469mg/kg), , 4-oxo-pentanoic acid (2.857mg/kg), ethyl ester pentanoic acid (2.765mg/kg), ethyl ester 4-methyl-pentanoic acid (11.988mg/kg) and pentanedioic acid (21.215mg/kg).

Total petroleum hydrocarbons were identified in all samples with highest TPH concentrations recorded in BH1101-1 (0.4-0.5m) at 350mg/kg and the highest GRO concentration also in BH1101-1 (0.4-0.5m) at 9.6mg/kg.

Six samples were submitted for ammonium analysis which was identified in two samples; BH1101-1 (0.4-0.5m) at 47mg/kg and in BH1101-1 (1.2-1.5m) at 49mg/kg.

Of the six samples submitted for TOC analysis all samples measured TOC concentrations above MDL, concentration ranged from 0.8% to 1.7%.

4.2.3 BH1104 Area

Soils samples in the boreholes drilled around monitoring well BH1104 were submitted for laboratory analysis for a suite of metal compounds, boron, borate and pH testing.

Six soil samples were collected and submitted for analysis. Metal compounds of note were barium (ranging from 140mg/kg to 270mg/kg), chromium (29mg/kg to 160mg/kg) nickel (32mg/kg to 290mg/kg), Vanadium (27mg/kg to 76mg/kg) and Zinc (6.7mg/kg to 86mg/kg).

Borate was identified in all samples ranging from 16mg/kg in BH1104-2 (1.3-1.5m) to 6mg/kg in BH1104-3 (0.3-0.7m). Boron was identified in one monitoring well, BH1104-3 (0.3-0.7m), at 12mg/kg.

pH values ranged from 7.95 in sample BH1104-2 (0.3-0.6m) to 8.88 in BH1104-3 (0.3-0.7m).

4.3 Laboratory Analysis – Groundwater

As part of this task, a total of four of the original 24 boreholes sampled during the PPC permit application (Reference BM 2063) were re-sampled; BH304, BH501, BH1101 and BH1104. In addition new boreholes were drilled around the existing boreholes and were subsequently monitored where there was sufficient water.

Given the reported nature of the geology beneath the site, the slow rates of groundwater recharge observed, the variability noted in the measured depths to groundwater, and the relatively flat topography, it is considered that groundwater is likely to exist in localised perched bodies rather than in one laterally continuous body beneath the site.

The results of the analysis of the samples are presented in tables 17 to 22 and are summarised below.

4.3.1 BH304 Area

4th November 2009

VOC were identified at concentrations above laboratory method detection limits (MDL) in groundwater sampled from monitoring wells BH304 and BH304-2. The highest recorded concentration was 39µg/l naphthalene in BH304.

VOC TIC were identified in groundwater sampled from BH304; Tetrahydro-Naphthlene Isomer (52 µg/l), Cyclopentylcyclopentene Isomer (48µg/l), Limonene (28µg/l), Cyclopentylcyclopentene Isomer (20µg/l), Ethenyl-ethyl-Benzene Isomer (20µg/l), and an unknown compound (28 µg/l).

SVOC were identified in groundwater sampled from monitoring well BH304 with the highest recorded compound 4-Methylphenol at 250µg/l. No SVOC were identified above MDL in samples from the other boreholes.

SVOC TIC were identified in BH304 and comprised Methyl Hexanoic Acid (20µg/l), Cyclopentylcyclopentene isomer (12µg/l), Dimethylstyrene Isomer (45µg/l), Phenylacetic acid (50µg/l), Caprolactam Isomer (160µg/l), Oxindole (32µg/l) and Phenazine (430µg/l). Caffeine was identified in BH304-2 at 33µg/l.

Petroleum hydrocarbons were identified in BH304 with a concentration of 1,100µg/l. No petroleum hydrocarbons were identified above MDL in samples from the other boreholes.

Ammonium (as NH₄) was identified in monitoring well BH304 at 390,000µg/l. No ammonium was identified above MDL in samples from the other boreholes.

TOC analysis identified concentrations greater than MDL in all samples. Measured TOC concentrations were 160,000µg/l (BH304), 10,000µg/l (BH304-4 and 6,000µg/l (BH304-2).

18th November 2009

No VOC, VOC TIC, SVOC and SVOC TIC were identified above MDL in samples from any of the boreholes.

No petroleum hydrocarbons were identified above MDL in samples from any of the boreholes.

No ammonium was identified above MDL in samples from any of the boreholes.

TOC analysis identified concentrations greater than MDL in all samples. Measured TOC concentrations were 10,000µg/l (BH304-1), 4,000µg/l (BH304-2), 8,000µg/l (BH304-3) and 6,000µg/l (BH304-4).

4.3.2 BH1101 Area

4th November 2009

No SVOC were recorded above the laboratory MDL.

A number of SVOC TIC were recorded comprising alkyl acids including pentanoic, hexanoic and octanoic acids with the highest concentration identified as Methyl pentanoic acid Isomer (287,150 µg/l) in BH1101. A range of unknown compounds were also identified ranging from 14µg/l to 451,841µg/l.

Petroleum hydrocarbons were identified in BH1101 (190µg/l) and BH1101-1 (1,700).

Ammonium concentrations ranged from 300µg/l (BH1101-3) to 13,000µg/l (BH1101-1).

Five samples were submitted for TOC analysis which was identified in all samples. Measured TOC concentrations ranged from 8,000µg/l (BH1101-3) to 3,000,000µg/l (BH1101).

18th November 2009

A single SVOC was recorded above the laboratory MDL, 4-methylphenol (27µg/l) in BH1101-1.

A number of SVOC TIC were recorded comprising unknown organic acids (263,147µg/l) in BH1101-1.

Petroleum hydrocarbons were identified in BH1101-1 (1,800).

Ammonium concentrations ranged from 200µg/l (BH1101-2/3) to 9,100µg/l (BH1101-1).

Three samples were submitted for TOC analysis which was identified in all samples. Measured TOC concentrations ranged from 10,000µg/l (BH1101-2) to 480,000µg/l (BH1101-1).

4.3.3 BH1104 Area

4th November 2009

Boron was identified in all samples, concentrations were recorded at 1,100µg/l (BH1104), 1,200µg/l (BH1104-1), 1,500µg/l (BH1104-2) and 1,800µg/l (BH1104-3).

Borate was identified in all samples; concentrations were recorded at 9,000µg/l (BH1104), 1,000µg/l (BH1104-2), 1,100µg/l (BH1104-1) and 1,400µg/l (BH1104-3).

The pH of the groundwater in the monitoring wells around BH1104 ranged from 8.28 (BH1104-1) to 8.43 (BH1104-3).

18th November 2009

Boron was identified in all samples, concentrations were recorded at 1,100µg/l (BH1104-1), 1,000µg/l (BH1104-2) and 1,500µg/l (BH1104-3).

Borate was identified in all samples; concentrations were recorded at 1,000µg/l (BH1104-2), 1,000µg/l (BH1104-1) and 1,300µg/l (BH1104-3).

The pH of the groundwater in the monitoring wells around BH1104 ranged from 8.34 (BH1104-1) to 8.51 (BH1104-3).

4.4 QA / QC

As part of the monitoring works a blind duplicate sample was submitted to the laboratory. The laboratory results are presented in Table 23 and summarised below:

Analyte	BH1101	BH1101-A
Aliphatics C5-C6	43	36
Aliphatics >C6-C8	530	470
Aliphatics >C8-C10	290	240
Aliphatics >C10-C12	180	170
Aromatics >EC8-EC10	440	360
Aromatics >EC10-EC12	270	250
Aromatics >EC12-EC16	16	34
Total Ammonium as NH4	9,100	9,200
Total Organic Carbon	480,000	430,000
4-Methylphenol	27	52
Naphthalene	<MDL	18

The comparison between the duplicate samples is good.

5 PHASE 1 COMPARISON - BASELINE AND CLOSURE DATA

A comparison between groundwater data collected, as part of the baseline, in October 2002 and the data collected as part of the closure, during July 2009 monitoring visit is presented below.

Data of the 2002 monitoring is presented as Appendix B.

5.1.1 Volatile Organic Compounds

The following table provides a summary of total VOCs measured above the MDL:

Total Volatile Organic Compounds (µg/l)		
Borehole	Baseline (2002)	Closure (2009)
BH1105	14	nt
BH1109	11	nt
BH304	7	56
BH405	2	-
BHWW	1	nt
BH105	nt	2

nt not tested
- Below MDL

The following VOC TIC were identified during the baseline survey, of note no concentration data was provided.

VOC TIC	
Baseline (2002)	Borehole
Cyclohexanone	BH1102, BH1104, BH1105, BH1106, BH1107, BH1108, BH1109, BH201, BH202, BH203, BH204, BH207, BH504, BH601, BH605
Cyclohexane	BH105, BH112, BH113, BH201, BH404, BH405, BHWW, BH501
Cyclohexanol	BH606

5.1.2 Semi-Volatile Organic Compounds

The following table provides a summary of total VOC measured above MDL:

Total Semi-Volatile Organic Compounds (µg/l)		
Borehole	Baseline (2002)	Closure (2009)
BH304	-	311

- Below MDL

The following table provides a summary of SVOC TIC identified in 2002 and 2009:

Borehole	TIC (Concentration µg/l)	
	Baseline (2002)	Closure (2009)
BH304	Unresolved complex matter including some terpene (940)	-
BH1101	C6-9 Acids (595)	Carboxylic Acid Group and Dicarboxylic acid (ranging from Propanoic Acid to Heptanoic Acid also Decanedioic acid and Octanedioic acid) (101,920)
BH405	C9-22 hydrocarbons: 20% aromatic (205)	
BH605	-	Unknown (60% match Ethyl isothiocyanate) (16)
BH1109	molecular sulphur (29)	-
	unknown compound (8)	-
BH401	molecular sulphur (6)	-
BH204	unknown compound (2)	-

5.1.3 Total Petroleum Hydrocarbons

The following table provides a comparison of petroleum hydrocarbons, where measured above MDL, in groundwater samples collected in 2002 and 2009:

Total Petroleum Hydrocarbons (µg/l)				
Borehole	Gasoline Range Organics		Diesel Range Organics (C12 – C35)	
	Baseline (2002) *	Closure (2009) **	Baseline (2002)	Closure (2009) ***
BH304	770	370	2,026	643
BH1105	292	nt	568	nt
BH401	-	-	292	490
BH1101	-	931	10,016	-
BH1102	-	55	-	-
BH1103	-	-	1,151	-

* Sum C4 – C13

** Sum C5 – C12

*** Sum C12 – C35

- Below MDL

5.1.4 Metals

A summary of the maximum metal concentrations values identified during the 2002 and 2009 assessment is presented in the following table.

Compound	Baseline (2002)	Closure (2009)
	Max (µg/l)	Max (µg/l)
Arsenic	12	7.5
Boron	1,010	15,000
Cadmium	-	2.7
Chromium	19	36
Copper	16	22
Lead	-	18
Mercury	-	-
Nickel	19	38
Selenium	-	12
Zinc	80	160

- Below MDL

5.1.5 Ammonium

A summary of the ammonium concentrations measured in groundwater samples collected the 2002 and 2009 assessment are presented in the following table:

Borehole	Ammonium as NH ₄ -N (µg/l)	
	Baseline (2002)	Closure (2009)
BH1101	1,000	4,000
BH1106	300	1,100
BH112	3,500	300
BH202	-	400
BH203	800	400
BH204	300	800
BH304	1,200	260,000
BH401	11,700	6,900
BH405	900	1,600
BH501	-	800
BH504	-	300

- Below MDL
nt not tested

5.1.6 Methanol

Eight samples were submitted in 2002 for methanol analysis and methanol was not identified in any of the samples. ARCADIS submitted five samples from the available locations for the alcohols analysis and methyl alcohol (methanol) was not identified in any of the samples.

5.1.7 Polychlorinated biphenyls (PCBs)

PCBs were tested for in nine samples in 2002 and eight in 2009. No PCBs were identified at concentrations above the MDL in any of the samples tested during the 2002 and 2009 assessments.

5.1.8 Cyclohexane

Cyclohexane was detected as a VOC TIC in groundwater samples collected from monitoring wells BH105, BH112, BH113 BH404 and BH405 during the baseline survey undertaken in 2002

ARCADIS submitted 20 samples for cyclohexane analysis which identified elevated concentrations above MDL across the site, and in particular in BH404 3,000µg/l.

5.1.9 Total Organic Carbon (TOC)

TOC was not tested for in 2002 in the groundwater samples. The site has however, undertaken six-monthly sampling and analysis since June 1997. The analysis broadly indicates that there are levels of TOC greater than MDL across the site, in particular in BH304.

ARCADIS submitted 25 samples for TOC analysis which identified TOC above MDL across the site, and in particular in BH304 with a measured concentration of 580,000µg/l.

5.1.10 Summary

In general, where repeat samples and analysis have been possible, similar results have been recorded between the 2002 baseline assessment and the 2009 closure monitoring. The only notable exceptions are:

Analysis	Borehole	Baseline – 2002 (µg/l)	Closure – 2009 (µg/l)
VOC	Non noted		
VOC TIC	Site wide	Not quantified	-
SVOC	BH304	-	311
SVOC TIC	BH1101	595 (C6-C9 Acids)	101,920 (Carboxylic Acid Group and Dicarboxylic acid)
TPH – GRO	BH1101	-	931
TPH – DRO	BH304	2,026	643
	BH1101	10,016	-
	BH1103	1,151	-
Metals	Boron - Max Values	1,010	15,000
Ammonium as NH ₄	BH1101	1,000	4,000
	BH1106	300	1,100
	BH112	3,500	300
	BH304	1,200	260,00
	BH401	11,700	6,900
TOC	BH105	25,000*	4,000
	BH304	10,000*	580,000
	BH605	70,000*	3,000

- Below MDL

nt not tested

* December 2002 data used for comparison

The results to note from the above table are:

Borehole	Analysis	Trend
BH1011	SVOC TIC	Increased
	TPH – GRO	Increased
	TPH – DRO	Decreased
	Ammonia	Increased
BH304	SVOC	Increased
	TPH-DRO	Decreased
	Ammonia	Increased
	TOC	Increased

6 PHASE 2 COMPARISON – BASELINE, CLOSURE AND ADDITIONAL INVESTIGATION DATA

6.1 Groundwater Results

A comparison between groundwater data collected in July 2009 and the two monitoring visits in November 2009 is presented below. The baseline data from 2002 has been included for reference.

6.1.1 BH304 Area

Volatile Organic Compounds

The following table provides a summary comparison of analytes measured:

Total Volatile Organic Compounds (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH304	7	56	47	nt
BH304-1			Dry	<MDL
BH304-2			1	<MDL
BH304-3			Dry	<MDL
BH304-4			<MDL	<MDL

The VOC concentrations recorded in BH304 are still recorded in excess of the 2002 baseline. Only one VOC (toluene) was recorded at low levels (1µg/l) in the delineation borehole BH304-2.

Total Volatile Organic Compounds TICS (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH304	-	-	Limonene (28), Cyclopentylcyclopentene Isomer (48) and (20), Ethenyl-ethyl-Benzene Isomer (20), Unknown (20), Tetrahydro-Naphthlene Isomer (52)	nt
BH304-1			Dry	<MDL
BH304-2			<MDL	<MDL
BH304-3			Dry	<MDL
BH304-4			<MDL	<MDL

nt not tested

A number of VOC TIC were identified in BH304 in the first of the November 2009 monitoring. None of the delineation boreholes recorded any TIC.

Semi-Volatile Organic Compounds

The following table provides a summary comparison of analytes measured:

Total Semi-Volatile Organic Compounds (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH304	<MDL	311	244	nt
BH304-1			Dry	<MDL
BH304-2			<MDL	<MDL
BH304-3			Dry	<MDL
BH304-4			<MDL	<MDL

nt not tested

The SVOC concentrations recorded in BH304 are still recorded in excess of the 2002 baseline. None of the delineation boreholes recorded any VOC in excess of the MDL.

Total Semi-Volatile Organic Compounds TICS (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH304	Unresolved complex matter including some terpene (940)	<MDL	Methyl Hexanoic Acid (20) Cyclopentylcyclopentene isomer (12), Dimethylstyrene Isomer (45), Phenylacetic acid (50) Caprolactam Isomer (160) Oxindole (32), Phenazine (430), Nine unknown compounds (584)	nt
BH304-1			Dry	<MDL
BH304-2			Caffeine (33)	<MDL
BH304-3			Dry	<MDL
BH304-4			<MDL	<MDL

A number of SVOC TIC were identified in BH304 in the first of the November 2009 monitoring. The TIC recorded are different from those recorded in the baseline. Only one TIC, caffeine at 33µg/l, was recorded in any of the delineation boreholes (BH304-2).

Total Petroleum Hydrocarbons

The following table provides a summary comparison of analytes measured:

Total Petroleum Hydrocarbons - GRO (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH304	770*	370**	470**	nt
BH304-1			Dry	<MDL
BH304-2			<MDL	<MDL
BH304-3			Dry	<MDL
BH304-4			<MDL	<MDL

Total Petroleum Hydrocarbons - DRO (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH304	2,026	643***	1,100**	nt
BH304-1			Dry	<MDL
BH304-2			<MDL	<MDL
BH304-3			Dry	<MDL
BH304-4			<MDL	<MDL

- Below MDL, nt not tested, * Sum C4 – C13, ** Sum C5 – C12, *** Sum C12 – C35

Total Petroleum Hydrocarbons (GRO and DRO) are recorded in borehole BH304, although below the 2002 baseline. None of the delineation boreholes recorded TPH concentrations in excess of the MDL.

Ammonium

Ammonium as NH ₄ -N (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH304	1,200	260,000	390,000	nt
BH304-1			Dry	<MDL
BH304-2			<MDL	<MDL
BH304-3			Dry	<MDL
BH304-4			<MDL	<MDL

- Below MDL, nt not tested

Ammonium concentrations are recorded above the 2002 baseline in BH304. None of the delineation boreholes recorded ammonium in excess of the MDL

Total Organic Carbon

Total Organic Carbon (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH304	nt	580,000	160,000	nt
BH304-1			Dry	<MDL
BH304-2			6,000	4,000
BH304-3			Dry	8,000
BH304-4			10,000	6,000

- Below MDL, nt not tested

6.1.2 BH1101 Area

Semi-Volatile Organic Compounds

The following table provides a summary comparison of analytes measured:

Total Semi-Volatile Organic Compounds (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH1101	<MDL	<MDL	<MDL	nt
BH1101-1			<MDL	27
BH1101-2			<MDL	-
BH1101-3			<MDL	-
BH501	<MDL	<MDL	<MDL	nt

The SVOC 4-methylphenol was recorded in the delineation borehole BH1101-1 at 27 µg/l. None of the other boreholes recorded any SVOC above the MDL.

Total Semi-Volatile Organic Compounds TICS (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH1101	C6-9 Acids (595)	Carboxylic Acid Group and Dicarboxylic acid (ranging from Propanoic Acid to Heptanoic Acid also Decanedioic acid and Octanedioic acid) (101,920)	Pentanoic Acid (21,424), Methyl pentanoic acid Isomer (287,150), Hexanoic Acid (14,454), Methyl Hexanoic acid Isomer (155,640), Heptanoic Acid (3,494), Ethyl Hexanoic acid Isomer (485), Cyclohexanecarboxylic Acid (2,841), Methyl Hexanoic acid Isomer (478), Octanoic Acid (1,787)	Nt
BH1101-1			Unknown Organic Acids (451,841)	Unknown Organic Acids (263,147), Unknown compounds, total (11,849)
BH1101-2			Four unknown organic acids (413), Trimethyl Hexanoic Acid (15)	<MDL
BH1101-3			Four unknown organic acids (144)	<MDL
BH501	<MDL	<MDL	<MDL	Nt

- Below MDL, nt not tested

A number of SVOC TIC were identified in BH1101 in the first of the November 2009 monitoring rounds, the closure monitoring and the 2002 baseline monitoring. The number of compounds identified and concentrations have increased during each monitoring. Similar TICs have been recorded in the three delineation boreholes (BH1101-1, 2 & 3) in at least one of the two November monitoring events.

Total Petroleum Hydrocarbons

The following table provides a summary comparison of analytes measured:

Total Petroleum Hydrocarbons - GRO (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH1101	<MDL	931	190	nt
BH1101-1			1,600	1,800
BH1101-2			nt	<MDL
BH1101-3			nt	<MDL
BH501	<MDL	<MDL	<MDL	nt

Total Petroleum Hydrocarbons - DRO (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH1101	10,016	<MDL	190	nt
BH1101-1			1,700	1,800
BH1101-2			<MDL	<MDL
BH1101-3			<MDL	<MDL
BH501	<MDL	<MDL	<MDL	nt

- Below MDL, nt not tested, * Sum C4 – C13, ** Sum C5 – C12, *** Sum C12 – C35

Total Petroleum Hydrocarbons (GRO) are recorded in borehole BH1101 above the 2002 baseline. Elevated concentrations of GRO and DRO were also recorded in the delineation borehole BH1101-1.

Ammonium

Ammonium as NH ₄ -N (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH1101	1,000	4,000	500	nt
BH1101-1			13,000	9,100
BH1101-2			600	200
BH1101-3			300	200
BH501	<MDL	800	400	<MDL

- Below MDL, nt not tested

Ammonium concentrations have been recorded in BH1101 and all the delineation boreholes. The highest concentrations have been recorded in BH1101-1.

Total Organic Carbon

Total Organic Carbon (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH1101	nt	5,900,000	3,000,000	nt
BH1101-1			560,000	480,000
BH1101-2			11,000	10,000
BH1101-3			8,000	10,000
BH501	nt	8,000	6,000	nt

- Below MDL, nt not tested

6.1.3 BH1104 Area

The following table provides a summary comparison of analytes measured:

Boron (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH1104	590	15,000	1,100	nt
BH1104-1			1,200	1,100
BH1104-2			1,500	1,000
BH1104-3			1,800	1,500

Borate (µg/l)				
Borehole	Baseline (2002)	Closure (2009)	First Monitoring (Nov 2009)	Second Monitoring (Nov 2009)
BH1104	nt	nt	9,000	nt
BH1104-1			1,100	1,000
BH1104-2			1,000	1,000
BH1104-3			1,400	1,300

Boron is recorded at concentrations above the 2002 baseline in BH1104, although the concentrations have reduced since the closure monitoring. Comparable concentrations are recorded in the delineation boreholes. The highest concentrations are recorded in BH1104-3.

Borate is recorded at elevated concentrations in BH1104 and all the delineation boreholes. The highest concentrations are recorded in BH1104.

7 CONCLUSIONS

7.1 Phase 1

The baseline survey undertaken in 2002 provided a summary of the groundwater quality beneath the site at the start of the PPC permit. The assessment undertaken by ARCADIS in July 2009 provided an indication of the groundwater quality, and identified impacts to groundwater that were likely to be associated with historical activities at the site. Monitoring undertaken by Invista, over the life of the permit, has recorded fluctuations in concentrations of chemicals of concern over time.

In general, both the 2002 baseline, and the phase 1 closure monitoring recorded low to moderate levels of contamination associated with the industrial activities at the site. The majority of samples collected in 2009 were of similar magnitude to the 2002 monitoring, except BH1101 in the Acids area and BH304 in the old drum storage area. In both sampling events BH304 has recorded levels of VOC, SVOC, TPH and TOC greater than laboratory MDL. BH1101 has recorded levels of SVOC and TPH above MDL in both sampling events.

The most notable variations between the two rounds of monitoring were the elevated concentrations of acids detected in BH1101 in the baseline survey at 595µg/l and identified as C6-9 Acid and in 2009 described as Carboxylic Acid Group and Dicarboxylic acid (ranging from Propanoic Acid to Heptanoic Acid also Decanedioic acid and Octanedioic acid) at 101,920µg/l. It should be noted that these acids were recorded as tentatively identified compounds on both occasions and as such are indicative only.

Some variations of TPH DRO and TPH GRO were also recorded, however, these are thought to be a result of differing sampling techniques, with the TPH – DRO consistently lower in 2009. The low-flow monitoring technique, utilised in 2009, is considered to provide the most representative sample of groundwater quality.

The metals analysis recorded generally consistent results, except for boron, which recorded an increase from 590 µg/l to 15,000 µg/l in groundwater sampled from BH1104. Boron is a naturally occurring element and is commonly present in groundwater and the concentration increase observed in monitoring well BH1104 may be due natural variations and is not thought to be of concern.

Ammonium analysis also recorded significant increase in BH304 between 2002 and 2009.

The TOC concentration in BH304 has increased from 10,000 µg/l to 580,000 µg/l between 2002 and 2009 and slight increases in the total VOC and SVOC concentrations were observed at this location; the variation between the VOC and SVOC results and the TOC results may indicate unidentified / unquantified impacts, which may need further consideration.

The analysis of the samples collected from the LDPs (WALE and Dump Tank) did not identify any elevated concentrations of target compounds.

In summary, the results are generally consistent between the baseline (2002) and closure monitoring programme (2009), except for boreholes BH304 and BH1101, where the analysis suggests some impacts of SVOC compounds, ammonium and possibly an unquantified source of TOC have occurred.

7.2 Phase 2

The additional environmental assessment was undertaken to collect additional data from the area around three boreholes, namely BH304, BH1101 and BH1104, based on the findings of the phase 1 monitoring undertaken by ARCADIS in September 2009. The boreholes recorded CoC above the concentrations recorded in the IPPC baseline survey undertaken in 2002.

The works comprised the re-sampling of four existing boreholes, BH304, BH1101, BH501 and BH1104; the drilling of 10 new boreholes to delineate the impacts around the existing boreholes; and the sampling of the newly installed wells on two occasions.

BH1101 Area

The re-sampling of BH1101 recorded elevated concentrations of acids in the SVOC TIC, with concentrations rising from 595µg/l in the 2002 baseline survey to 101,920µg/l in the September 2009 monitoring and 487,753µg/l in the November 2009 monitoring. Elevated concentrations of comparable acids were also detected in soil samples taken from BH1101-1 and in groundwater sampled from BH1101-1, BH1101-2, and BH1101-3.

The re-sampling of BH1101 also recorded elevated Gasoline Range Organics, however, although above the 2002 baseline survey the concentrations had reduced since the September 2009 monitoring from 931µg/l to 190µg/l. Elevated TPH was also recorded in soil sampled from BH1101-1 (350mg/kg) and in groundwater (3,600µg/l).

BH501, located between the potential source and BH1101, recorded no SVOC TIC or TPH concentrations above the MDL.

Based on the findings of the additional environmental assessment it is evident that the soil and groundwater in this area have been locally impacted with acids, although it should be noted that these were only tentatively identified. Given the location in the Acid Plant area it is likely that these impacts are associated with historical site activities. The lack of impact in BH501 indicates the source is not to the north east of BH1101 and is likely to be a localised hot spot of contamination. Also given the geology at the site and the likelihood of localised perched water bodies the source area is potentially constrained to a small area.

BH304 Area

The re-sampling of BH304 recorded elevated concentrations of VOC and SVOC above the 2002 baseline survey, although slightly lower than those recorded in September 2009. A number of VOC and SVOC TIC were recorded with VOC TIC being recorded for the first time.

Ammonium concentrations which recorded a significant increase in BH304 between 2002 and 2009 also record a continued increasing trend with concentrations rising from 260,000µg/l in September 2009 to 390,000µg/l in November 2009.

None of the delineation boreholes showed elevated concentrations of the COC.

Based on the findings of the additional environmental assessment it is evident that the groundwater impacts in BH304 of VOC, SVOC and ammonium are still elevated above the 2002 baseline survey. The delineation boreholes show none of the COC above the MRL as such BH304 represents an isolated hotspot.

BH1104 Area

The re-sampling of BH1104 recorded elevated boron concentrations above the 2002 baseline survey (590µg/l), although it has reduced from 15,000µg/l in September 2009 to 1,100µg/l in November 2009. Comparable concentrations were also recorded in the three delineation boreholes.

Borate levels, not previously analysed, were recorded at 9,000µg/l in BH1104 and between 1,000µg/l and 1,300µg/l in BH1104-1, BH1104-2 and BH1104-3.

The boron levels are generally elevated above those recorded across the site in the September 2009 monitoring, although lower than the high recorded in September 2009. It is not clear whether this represents natural levels in this area or whether this is from a site derived source.

TABLES

Table 1 - Borehole Inspection Log and Purge Volume Details

	Borehole	Location	Well Construction	Installation Date	Easting	Northing	PPC	INVISTA sampled	Comment	Purged Water (litres)			
										15/07/2009	16/07/2009	17/07/2009	Total
Boreholes Found	105	Boundary - east of CT No 3	75mm	1993	456525	520616	Yes	Yes	Rusty top hat	30	-	-	30
	112	Boundary - north of corner of Road N15	75mm	1993	456288	521212	Yes	Yes	Rusty blue top hat	20 - dry	18	-	28
	201	KA Plant - north of Tanks 321/2/3	50mm	1993	456208	520953	Yes	Yes	Rusty blue top hat	-	-	-	-
	202	KA Plant - north of Effluent Tank	50mm	1993	456172	521060	Yes	Yes	Rusty blue top hat	-	-	35	35
	203	KA Plant - south of CT Tank 331	50mm	1993	456113	520989	Yes	Yes	Rusty blue top hat	-	-	20	20
	204	KA Plant - west of Tank 326	50mm	1993	456140	520921	Yes	Yes	Rusty blue top hat	-	-	16	16
	304	HMD Plant - west of storage bund	75mm	1993	456422	520714	Yes	Yes	Manhole cover. Water at ground level.	12 - dry	4 - dry	-	16
	401	Acids 2 Plant - Road N36	75mm	1993	456621	520815	Yes	Yes	Manhole cover, required reinstatement	14 - dry	18 - dry	-	32
	404	Acids 2 Plant - near neutralisation plant	75mm	1993	456660	520886	Yes	Yes	Rusty top hat	22 - dry	3 - dry	18	43
	405	Acids 2 Plant - north of re-crystallisation area	75mm	1993	456575	520792	Yes	Yes	Rusty blue top hat	35	-	-	35
	501	Acids 1 Plant - west by Road N43	75mm	1993	456516	521103	No	Yes	Rusty yellow top hat. Roots & soil collected in base of well	18 - dry	15 - dry	35	68
	504	Acids 1 Plant - south-east	75mm	1993	456326	521129	Yes	Yes	Rusty top hat	16 - dry	8 - dry	18 - dry	42
	601b	Inters 1 - west of No 1 CT	75mm	1993	456254	520985	Yes	Yes	Rusty blue top hat	10 - dry	12 - dry	-	22
	605	Inters 1 - south of HMD tank farm	75mm	1993	456244	521061	Yes	Yes	Rusty blue top hat	15 - dry	20 - dry	-	35
	606	Inters 1 - north of HMD tank farm	75mm	1993	456472	521181	Yes	Yes	Flush to ground	35 - dry	20	-	55
	1101	Inters 1 - west of Acids 1 Plant	50mm	2003	456462	521012	Yes	No	Flush to ground - cover rusted and screws damaged	7 - dry	2 - dry	2 - dry	11
	1102	Nylon Main Offices - Road N2	50mm	2003	456543	521035	Yes	No	Flush to ground	10 - dry	8 - dry	12 - dry	30
	1103	Thermex heaters - Road N2	50mm	2003	456325	520743	Yes	No	Flush to ground	5 - dry	2 - dry	1 - dry	8
	1104	HMD Plant - east of ABP catalyst plant	50mm	2003	456508	520777	Yes	No	Flush to ground, cover rusted shut	9 - dry	3 - dry	15 - dry	27
	1106	HMD Plant - north of ammonia storage	75mm	2003	456525	520616	Yes	No	Flush to ground	10 - dry	10 - dry	-	20
Boreholes not found	104	Boundary - south-west corner	unknown	1993	na	na	No	No	Not found				
	109	Not shown on plan	unknown	1993	na	na	No	No	Not found				
	113	Boundary - north of N9	unknown	1993	na	na	No		Not found				
	207	KA Plant - on site of CDC sump	unknown	1993	na	na	Yes	To 17/12/2002	Lost due to construction				
	402	Acids 2 Plant - south of reactor compound	unknown	1993	na	na	No	To 10/06/98	Lost due to construction				
	702	Polymer plant - north	unknown	1993	na	na	No	To 10/01/01	Lost due to construction				
	1105	No.2 HMD Crude	50mm	2003	na	na	Yes		Full of bentonite				
	1107	Acids - crude building	unknown	2003	na	na	Yes	No	Lost due to construction				
	1108	Near WALE	unknown	2003	na	na	Yes	No	Not found				
Boreholes drilled but no installation	101	Boundary - north of CH Tank 331	unknown	1993	na	na	No						
	103	Boundary - near Kettle Beck	unknown	1993	na	na	No						
	106	Boundary - east of WALE tank	unknown	1993	na	na	No						
	107	Boundary - corner of Roads N3 and N42	unknown	1993	na	na	No						
	110	Boundary - north of Nitric 3 Plant	unknown	1993	na	na	No						
	111	Boundary - north of nitric adsorption	unknown	1993	na	na	No						
	301	HMD Plant - south of ABP catalyst plant	unknown	1993	na	na	No						
	302	HMD Plant - south of office building	unknown	1993	na	na	No						
	303	HMD Plant - west of office building	unknown	1993	na	na	No						
	305	HMD Plant - corner of Roads N30 and N38	unknown	1993	na	na	No						
	503	Acids 1 Plant - east	unknown	1993	na	na	No						
	602	Inters 1 - west of No 1 CT	unknown	1993	na	na	No						
	603	Not shown on plan	unknown	1993	na	na	No						
	604	Not shown on plan	unknown	1993	na	na	No						
	701	Polymer plant - south	unknown	1993	na	na	No						
	703	Polymer plant - experimental building	unknown	1993	na	na	No						

Table 2 - Phase 1 Laboratory Testing Schedule

Borehole	VOCs inc TICs	SVOC inc TICs	TPH	Metals	Ammonium	Methanol	PCBs	Cyclohexane	Alcohol & Acetate	TOC	pH
105	✓	✓		✓	✓			✓		✓	
112	✓	✓		✓	✓			✓		✓	
201	✓	✓	✓	✓	✓			✓	✓	✓	
202	✓	✓	✓	✓	✓			✓	✓	✓	
203	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
204	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
304	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
401	✓	✓	✓	✓	✓		✓	✓		✓	
404	✓	✓		✓	✓		✓	✓		✓	
405	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
501	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
504	✓	✓	✓	✓	✓		✓	✓	✓	✓	
601b	✓	✓		✓	✓		✓	✓		✓	
605	✓	✓		✓	✓		✓	✓		✓	
606	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
1101	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1102	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1103	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1104	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1106	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

QA/QC Samples

Duplicate 1 (BH105)	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Duplicate 2 (BH304)	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Field Blank	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓

Leak Detection Points

WALE 1	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
WALE 2	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
DUMP5	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓

Notes

VOC	Volatile organic compounds
SVOC	Semi-volatile organic compounds
TICs	Tentatively identified compounds
Metals	As, B, Cd, Cr, Cu, Pb, Ni, Se, Zn and Hg.
PCBs	Poly chlorinated biphenyls
TOC	Total organic carbon

Table 3 - Phase 2 Laboratory Testing Schedule

Borehole ID		NH4-N	TOC	TPH	VOC	SVOC	Metals	pH	Boron/Borate
BH304 Area	304	✓	✓	✓	✓	✓	*	*	*
	304-1	✓	✓	✓	✓	✓	*	*	*
	304-2	✓	✓	✓	✓	✓	*	*	*
	304-3	✓	✓	✓	✓	✓	*	*	*
	304-4	✓	✓	✓	✓	✓	*	*	*
BH1101 Area	501	✓	✓	✓	*	✓	*	*	*
	1101	✓	✓	✓	*	✓	*	*	*
	1101-1	✓	✓	✓	*	✓	*	*	*
	1101-2	✓	✓	✓	*	✓	*	*	*
	1101-3	✓	✓	✓	*	✓	*	*	*
BH1104 Area	1104	*	*	*	*	*	✓	✓	✓
	1104-1	*	*	*	*	*	✓	✓	✓
	1104-2	*	*	*	*	*	✓	✓	✓
	1104-3	*	*	*	*	*	✓	✓	✓

Notes:
* = Not Tested

Table 4 - Field Data

Borehole ID	Water Level (mbgl)	Base of Well (mbgl)	Measuring Point	Temperature (°C)	Conductivity (mS)	Salinity	Dissolved Oxygen (%)	pH	pH Lab	Redox (mV)	Comment
Groundwater Monitoring Wells											
105	0.72	2.63	well pipe	14.64	361	0.22	3	8.35	nt	-114.60	Clear and colourless
112	1.42	3.79	casing	14.78	1342	0.85	3.6	7.09	nt	-24.10	Clear and colourless
201	1.32	3.50	well pipe	15.89	494	0.29	18.2	6.93	nt	26.60	Clear and colourless
202	1.08	3.64	casing	15.46	509	0.3	44	7.19	nt	12.40	Clear and colourless
203	0.68	3.61	casing	15.82	297	0.17	76.1	7.85	nt	-8.50	Clear and colourless
204	0.52	3.56	casing	15.25	368	0.21	23.8	7.43	nt	-44.80	Clear and colourless
304	2.18	3.19	casing	-	-	-	-	-	nt	-	GRAB SAMPLE. Colourless, some suspended black sediment
401	0.53	3.11	well pipe	16.33	1148	0.69	6.4	6.58	6.62	-80.1	Colourless, some suspended sediment, oily sheen on surface
404	0.73	2.59	well pipe	16.9	520	0.3	66.6	7.93	nt	33.8	Clear and colourless
405	0.76	3.73	casing	14.74	594	0.36	3.3	6.96	nt	15.5	Clear and colourless
501	1.62	3.99	casing	14.54	717	0.44	11.6	7.16	nt	135	Clear and colourless
504	0.72	2.61	casing	16.87	381	0.22	71.4	7.8	nt	132.4	Clear and colourless
601b	1.65	3.42	casing	16.44	932	0.56	15	7.15	nt	-30.7	Clear and colourless
605	1.29	3.49	casing	15.82	1118	0.68	19	6.98	nt	133.7	Clear and colourless
606	0.51	3.74	well pipe	17.9	251	0.14	3.9	7.39	nt	-36.9	Clear and colourless
1101	1.14	4.82	well pipe	-	-	-	-	-	6.69	-	Clear and colourless
1102	0.48	4.90	well pipe	15.26	841	0.51	19.9	7.36	7.61	17.7	GRAB SAMPLE. Light orangey brown, cloudy
1103	2.78	4.90	well pipe	-	-	-	-	-	7.22	-	GRAB SAMPLE. Clear and colourless
1104	0.91	4.91	well pipe	-	-	-	-	-	7.52	-	GRAB SAMPLE. Clear and colourless
1106	0.15	4.90	well pipe	-	-	-	-	-	7.37	-	GRAB SAMPLE. Clear and colourless
Leak Detection Points											
WALE 1	ground level	-	well pipe	17.73	539	0.31	61.1	7.72	8.05	35.2	Clear and colourless
WALE 6	ground level	-	well pipe	18.99	535	0.29	63.7	7.84	8.09	5.8	Clear and colourless
DUMP 5	ground level	-	well pipe	16.66	869	0.52	73.7	7.86	8.24	20.5	Clear and colourless

Notes

- no data collected

Table 5 - Volatile Organic Compounds in Groundwater and LDPs (µg/l)

Analytes	MDL	GROUNDWATER										
		BH105	BH105 Duplicate	BH112	BH401	BH404	BH601B	BH605	BH1101	BH1102	BH1103	BH1106
		29/07/2009	29/07/2009	28/07/2009	29/07/2009	29/07/2009	28/07/2009	28/07/2009	28/07/2009	29/07/2009	28/07/2009	29/07/2009
Dichlorodifluoromethane	<1	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	<1	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	<1	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	<2	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	<2	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	<2	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	<2	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	<3	-	-	-	-	-	-	-	-	-	-	-
Carbon Disulphide	<2	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	<1	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	<1	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	<2	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	<2	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	<2	-	-	-	-	-	-	-	-	-	-	-
Chloroform	<2	-	2	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	<1	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	<4	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	<1	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	<1	-	-	-	-	-	-	-	-	-	-	-
Benzene	<1	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	<1	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	<3	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	<3	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	<1	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	<2	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	<2	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	<3	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	<2	-	-	-	-	-	-	-	-	-	-	-
Toluene	<1	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	<2	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	<2	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane	<2	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	<2	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	<1	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	<4	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	<2	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	<2	-	-	-	-	-	-	-	-	-	-	-
Bromoform	<3	-	-	-	-	-	-	-	-	-	-	-
Styrene	<1	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	<5	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	<1	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	<9	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	<2	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	<1	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	<2	-	-	-	-	-	-	-	-	-	-	-
Propylbenzene	<3	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	<2	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	<1	-	-	-	-	-	-	-	-	-	-	-
4-Isopropyltoluene	<3	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	<1	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	<3	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	<1	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	<2	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	<2	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	<2	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	<10	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	<2	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	<4	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	<3	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	<3	-	-	-	-	-	-	-	-	-	-	-
TIC's	<10	-	-	-	-	-	-	-	-	-	-	-

Table 5 - Volatile Organic Compounds in Groundwater and LDPs (µg/l)

Analytes	MDL	GROUNDWATER												LEAK DETECTION POINTS		
		BH201	BH202	BH203	BH204	BH304	BH304 Duplicate	BH405	BH501	BH504	BH606	BH1104	BHFB1	DUMP 5	WALE 1	WALE 6
		30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	31/07/2009	31/07/2009	30/07/2009	31/07/2009	31/07/2009	29/07/2009	29/07/2009	29/07/2009
Dichlorodifluoromethane	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1-2-Dichloroethene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Disulphide	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1-2-Dichloroethene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	<2	-	-	-	-	-	-	-	-	-	-	-	38	-	-	-
2,2-Dichloropropane	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	<4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	<1	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-
Carbontetrachloride	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	<1	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-
Trichloroethene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1-3-Dichloropropene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1-3-Dichloropropene	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	<1	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	<4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	<9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Propylbenzene	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	<1	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-
4-Isopropyltoluene	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	<1	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	<4	-	-	-	-	49	53	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIC's	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 6 - Semi Volatile Organic Compounds in Groundwater and LDPs (µg/l)

Analytes	MDL	GROUNDWATER								
		BH105	BH105 Duplicate	BH112	BH401	BH404	BH601B	BH605	BH1101	BH1102
		29/07/2009	29/07/2009	28/07/2009	29/07/2009	29/07/2009	28/07/2009	28/07/2009	28/07/2009	29/07/2009
Phenols										
2-Chlorophenol	<1	-	-	-	-	-	-	-	-	-
2-Methylphenol	<1	-	-	-	-	-	-	-	-	-
2-Nitrophenol	<1	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	<1	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	<1	-	-	-	-	-	-	-	-	-
2,4,5-Trichlorophenol	<1	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	<1	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	<1	-	-	-	-	-	-	-	-	-
4-Methylphenol	<1	-	-	-	-	-	-	-	-	-
4-Nitrophenol	<1	-	-	-	-	-	-	-	-	-
Pentachlorophenol	<1	-	-	-	-	-	-	-	-	-
Phenol	<1	-	-	-	-	-	-	-	-	-
PAHs										
2-Chloronaphthalene	<1	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	<1	-	-	-	-	-	-	-	-	-
Acenaphthene	<1	-	-	-	-	-	-	-	-	-
Acenaphthylene	<1	-	-	-	-	-	-	-	-	-
Anthracene	<1	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	<1	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	<1	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	<1	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene	<1	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	<1	-	-	-	-	-	-	-	-	-
Chrysene	<1	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)anthracene	<1	-	-	-	-	-	-	-	-	-
Fluoranthene	<1	-	-	-	-	-	-	-	-	-
Fluorene	<1	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	<1	-	-	-	-	-	-	-	-	-
Naphthalene	<1	-	-	-	-	-	-	-	-	-
Phenanthrene	<1	-	-	-	-	-	-	-	-	-
Pyrene	<1	-	-	-	-	-	-	-	-	-
Phthalates										
Bis(2-ethylhexyl) phthalate	<2	-	-	-	-	-	-	-	-	-
Butylbenzyl phthalate	<1	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	<1	-	-	-	-	-	-	-	-	-
Di-n-Octyl phthalate	<5	-	-	-	-	-	-	-	-	-
Diethyl phthalate	<1	-	-	-	-	-	-	-	-	-
Dimethyl phthalate	<1	-	-	-	-	-	-	-	-	-
Other Semi-volatiles										
1,2-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	<1	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-
2-Nitroaniline	<1	-	-	-	-	-	-	-	-	-
2,4-Dinitrotoluene	<1	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	<1	-	-	-	-	-	-	-	-	-
3-Nitroaniline	<1	-	-	-	-	-	-	-	-	-
4-Bromophenylphenylether	<1	-	-	-	-	-	-	-	-	-
4-Chloroaniline	<1	-	-	-	-	-	-	-	-	-
4-Chlorophenylphenylether	<1	-	-	-	-	-	-	-	-	-
4-Nitroaniline	<1	-	-	-	-	-	-	-	-	-
Azobenzene	<1	-	-	-	-	-	-	-	-	-
Bis(2-chloroethoxy)methane	<1	-	-	-	-	-	-	-	-	-
Bis(2-chloroethyl)ether	<1	-	-	-	-	-	-	-	-	-
Carbazole	<1	-	-	-	-	-	-	-	-	-
Dibenzofuran	<1	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	<1	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	<1	-	-	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	<1	-	-	-	-	-	-	-	-	-
Hexachloroethane	<1	-	-	-	-	-	-	-	-	-
Isophorone	<1	-	-	-	-	-	-	-	-	-
N-nitrosodi-n-propylamine	<1	-	-	-	-	-	-	-	-	-
Nitrobenzene	<1	-	-	-	-	-	-	-	-	-
TIC's		<10	-	-	-	-	-	-	-	-
Unknown(60% match Ethyl isothiocyanate)	-	-	-	-	-	-	-	16	101,920	-
								16	-	-
Carboxylic Acid Group and Dicarboxylic acid (ranging from Propanoic Acid to Heptanoic Acid also Decanedioic acid and Octanedioic acid)	-	-	-	-	-	-	-	-	101,920	-

Table 6 - Semi Volatile Organic Compounds in Groundwater and LDPs (µg/l)

		GROUNDWATER														LEAK DETECTION POINTS		
Analytes	MDL	BH1103	BH1106	BH201	BH202	BH203	BH204	BH304	BH304 Duplicate	BH405	BH501	BH504	BH606	BH1104	BHFB1	DUMP 5	WALE 1	WALE 6
		28/07/2009	29/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	31/07/2009	31/07/2009	31/07/2009	30/07/2009	31/07/2009	31/07/2009	29/07/2009	29/07/2009
Phenols																		
2-Chlorophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	<1	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-
2-Nitrophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	<1	-	-	-	-	-	-	140	130	-	-	-	-	-	-	-	-	-
2,4,5-Trichlorophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol	<1	-	-	-	-	-	-	82	76	-	-	-	-	-	-	-	-	-
4-Nitrophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	<1	-	-	-	-	-	-	18	12	-	-	-	-	-	-	-	-	-
PAHs																		
2-Chloronaphthalene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	<1	-	-	-	-	-	-	27	20	-	-	-	-	-	-	-	-	-
Acenaphthene	<1	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-
Acenaphthylene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)anthracene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	<1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	<1	-	-	-	-	-	-	42	36	-	-	-	-	-	-	-	-	-
Phenanthrene	<1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Pyrene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phthalates																		
Bis(2-ethylhexyl) phthalate	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Butylbenzyl phthalate	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-Octyl phthalate	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dimethyl phthalate	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Semi-volatiles																		
1,2-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitroaniline	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrotoluene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Nitroaniline	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromophenylphenylether	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloroaniline	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorophenylphenylether	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitroaniline	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Azobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethoxy)methane	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethyl)ether	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbazole	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Isophorone	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-nitrosodi-n-propylamine	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIC's		<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unknown(60% match Ethyl isothiocyanate)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carboxylic Acid Group and Dicarboxylic acid (ranging from Propanoic Acid to Heptanoic Acid also Decanedioic acid andOctanedioic acid)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 7 - Total Petroleum Hydrocarbons including BTEX and MTBE (µg/l) in Groundwater and LDPs

Analytes	MDL	GROUNDWATER										GROUNDWATER							LEAK DETECTION POINTS		
		BH401	BH1101	BH1102	BH1103	BH1106	BH201	BH202	BH203	BH204	BH304	BH304 Duplicate	BH405	BH501	BH504	BH606	BH1104	BHFB1	DUMP 5	WALE 1	WALE 6
		29/07/2009	29/07/2009	29/07/2009	28/07/2009	29/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	31/07/2009	31/07/2009	30/07/2009	31/07/2009	31/07/2009	29/07/2009	29/07/2009	29/07/2009
Aliphatics C5-C6	<10	-	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics >C6-C8	<10	-	260	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics >C8-C10	<10	-	140	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics >C10-C12	<10	-	91	12	-	-	-	-	-	-	150	120	-	-	-	-	-	-	-	-	-
Aliphatics >C12-C16 Aqueous	<10	-	-	-	-	-	-	-	-	-	22	-	-	-	-	-	-	-	-	-	-
Aliphatics >C16-C21 Aqueous	<10	-	-	-	-	-	-	-	-	-	110	-	-	-	-	-	-	-	-	-	-
Aliphatics >C21-C35 Aqueous	<10	490	-	-	-	-	-	-	-	-	57	-	-	-	-	-	-	-	-	-	-
Total Aliphatics C5-C35 Aqueous	<10	490	570	22	-	-	-	-	-	-	330	120	-	-	-	-	-	-	-	-	-
Aromatics C6-C7	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics >C7-C8	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics >EC8-EC10	<10	-	210	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics >EC10-EC12	<10	-	140	17	-	-	-	-	-	-	220	180	-	-	-	-	-	-	-	-	-
Aromatics >EC12-EC16 Aqueous	<10	-	-	-	-	-	-	-	-	-	230	150	-	-	-	-	-	-	-	-	-
Aromatics >EC16-EC21 Aqueous	<10	-	-	-	-	-	-	-	-	-	180	64	-	-	-	-	-	-	-	-	-
Aromatics >EC21-EC35 Aqueous	<10	-	-	-	-	-	-	-	-	-	44	23	-	-	-	-	-	-	-	-	-
Total Aromatics C5-C35 Aqueous	<10	-	340	33	-	-	-	-	-	-	670	420	-	-	-	-	-	-	-	-	-
TPH (Aliphatics and Aromatics C5-C35) Aqueous	<10	490	920	55	-	-	-	-	-	-	1000	550	-	-	-	-	-	-	-	-	-
GRO (C4-C12)	<10	-	920	55	-	-	-	-	-	-	360	310	-	-	-	-	-	-	-	-	-
MTBE	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyl benzene	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
m & p Xylene	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o Xylene	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table 8 - Metals, Inorganic Compounds, TOC and Cyclohexane in Groundwater and LDPs (µg/l)

Analytes	MDL	GROUNDWATER												
		BH105	BH105 Duplicate	BH112	BH401	BH404	BH601B	BH605	BH1101	BH1102	BH1103	BH1106	BH1104	BHFB1
		29/07/2009	29/07/2009	28/07/2009	29/07/2009	29/07/2009	28/07/2009	28/07/2009	28/07/2009	29/07/2009	28/07/2009	29/07/2009	31/07/2009	31/07/2009
Arsenic Dissolved (ICP-MS)	<0.75	1.5	1.5	0.88	nt	2.3	nt	1.1	5.1	1.6	7.5	1.3	4.5	-
Boron Dissolved (ICP-MS)	<20	24	-	280	nt	110	nt	250	980	240	1,700	330	15,000	110
Cadmium Dissolved (ICP-MS)	<0.22	-	-	-	nt	-	nt	-	-	-	0.27	-	2.7	-
Chromium Dissolved (ICP-MS)	<1	4	4	7	nt	9	nt	9	36	6	11	7	5	-
Copper Dissolved (ICP-MS)	<1.6	9.4	8.8	9.3	nt	22	nt	8.3	11	7.7	12	9.2	-	-
Lead Dissolved (ICP-MS)	<0.4	3.9	3.0	3.2	nt	2.9	nt	3.5	3.1	3.8	4.8	3.1	18	-
Nickel Dissolved (ICP-MS)	<1.5	4.1	1.8	5.4	nt	2.4	nt	5.0	42	-	22	12	-	5.3
Selenium Dissolved (ICP-MS)	<1	2	3	3	nt	2	nt	1	6	2	12	3	7	-
Zinc Dissolved (ICP-MS)	<5	23	11	15	nt	12	nt	18	27	40	160	16	-	-
Mercury Dissolved (CVAF)	<0.01	-	-	-	nt	-	nt	-	-	-	-	-	-	-
Ammonia as NH3	<200	-	-	300	6500	-	-	-	3800	-	-	1000	200	300
Ammonium as NH4	<300	-	-	300	6,900	-	-	-	4,000	-	-	1,100	-	300
Total Organic Carbon	<3000	4,000	3,000	6,000	6,000	3,000	4,000	3,000	5,900,000	NDP	7,000	7,000	5,000	-
Cyclohexane Extract	<1000	-	-	-	NDP	3,000	NDP	NDP	NDP	NDP	NDP	NDP	-	-
pH Value	<1.00	nt	nt	nt	nt	nt	nt	nt	6.69	7.61	7.22	7.37	7.52	6.74

Analytes	MDL	GROUNDWATER									LEAK DETECTION POINTS			
		BH201	BH202	BH203	BH204	BH304	BH304 Duplicate	BH405	BH501	BH504	BH606	DUMP 5	WALE 1	WALE 6
		30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	31/07/2009	31/07/2009	30/07/2009	29/07/2009	29/07/2009	29/07/2009
Arsenic Dissolved (ICP-MS)	<0.75	-	-	-	-	14	9.8	-	-	6.4	-	2.4	-	-
Boron Dissolved (ICP-MS)	<20	1,400	-	92	-	330	350	-	630	240	-	520	58	62
Cadmium Dissolved (ICP-MS)	<0.22	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Dissolved (ICP-MS)	<1	3	-	-	-	24	25	-	4	14	-	7	4	5
Copper Dissolved (ICP-MS)	<1.6	-	-	-	-	-	-	-	-	-	-	8.3	8.3	9.1
Lead Dissolved (ICP-MS)	<0.4	-	-	-	-	-	-	-	-	-	-	2.9	3.0	3.1
Nickel Dissolved (ICP-MS)	<1.5	2.5	-	6.0	-	35	38	-	4.1	6.7	-	2.8	3.2	2.0
Selenium Dissolved (ICP-MS)	<1	-	-	-	-	-	-	-	-	1	-	4	1	1
Zinc Dissolved (ICP-MS)	<5	-	-	-	-	-	-	-	-	12	-	16	17	13
Mercury Dissolved (CVAF)	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia as NH3	<200	300	400	400	800	250,000	250,000	1500	800	300	400	-	-	-
Ammonium as NH4	<300	300	400	400	800	260,000	270,000	1,600	800	300	400	-	-	-
Total Organic Carbon	<3000	4,000	-	-	3,000	580,000	540,000	8,000	8,000	3,000	-	6,000	7,000	6,000
Cyclohexane Extract	<1000	-	-	-	-	1,000	1,000	1,000	-	-	-	NDP	NDP	NDP
pH Value	<1.00	-	-	-	-	-	-	-	-	-	-	8.24	8.05	8.09

Table 9 - Alcohols, Acetates and Total Polychlorinated Biphenyls in Groundwater and LDPs (µg/l)

		GROUNDWATER																			LEAK DETECTION POINTS			
Analytes	MDL	BH401	BH404	BH601B	BH605	BH1101	BH1102	BH1103	BH1106	BH201	BH202	BH203	BH204	BH304	BH304 Duplicate	BH405	BH501	BH504	BH606	BH1104	BHFB1	DUMP 5	WALE 1	WALE 6
		29/07/2009	29/07/2009	28/07/2009	28/07/2009	28/07/2009	29/07/2009	29/07/2009	29/07/2009	29/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	30/07/2009	31/07/2009	31/07/2009	30/07/2009	31/07/2009	31/07/2009	29/07/2009	29/07/2009
Methyl Alcohol	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyl Alcohol	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
i-Propyl Alcohol	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Propyl Alcohol	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Butyl Alcohol	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Pentyl Alcohol	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Hexyl Alcohol	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Heptyl Alcohol	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Acetate	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyl Acetate	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
i-Propyl Acetate	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Propyl Acetate	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Butyl Acetate	<100	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PCBs	<1	-	-	-	-	-	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 10 - Groundwater Monitoring Data

	Borehole ID	Measuring Point (mASD)	First Monitoring				First Monitoring			
			Water Level (mbgl)	Water Level (mASD)	Base of Well (mbgl)	Comment	Water Level (mbgl)	Water Level (mASD)	Base of Well (mbgl)	Comment
BH304 Area	BH304	100.00	2.565	97.44	3.14	Grab sample, grey cloudy.	2.285	97.72	3.19	Black sediment and cloudy
	BH304-1	99.99	3.014	96.97	3.22	Insufficient water to sample.	2.679	97.31	3.23	Clear
	BH304-2	100.10	3.188	96.91	3.632	Low flow grab sample. Clear & colourless, purged dry after approx 1.5lts	3.103	96.99	3.64	Low flow grab sample. Clear
	BH304-3	100.06	2.842	97.22	2.426	Insufficient water to sample.	2.269	97.79	2.87	Low flow grab sample. Clear
	BH304-4	100.08	1.735	98.35	2.863	Low flow grab sample. Clear & colourless, purged dry after approx 1.5lts	0.322	99.76	2.428	Low flow grab sample. Cloudy
BH1101 Area	BH1101	100.00	1.701	98.30	4.865	Low flow grab sample. Colourless, slightly cloudy.	1.264	98.74	4.75	Low flow grab sample. Slightly cloudy
	BH1101-1	100.05	0.431	99.62	4.035	Purged 80 litres. Brown & Cloudy.	0.405	99.64	4.674	Clear
	BH1101-2	99.95	2.015	97.93	4.645	Low flow grab sample, drawdown >10% after 1 min. Clear & colourless.	0.795	99.15	4.875	Low flow grab sample. Clear
	BH1101-3	99.95	3.432	96.52	4.75	Low flow grab sample, drawdown >10% after 1 min. Brown & cloudy.	2.775	97.18	4.859	Low flow grab sample. Slightly cloudy
	BH501	100.24	1.626	98.62	3.96	Low flow sample	1.274	98.97	3.98	Low flow sample. Clear
BH1104 Area	BH1104	100.00	0.668	99.33	4.94		0.512	99.49	4.93	
	BH1104-1	99.82	5.886	93.93	6.035	Low flow grab sample, drawdown >10% after 1 min. Clear & colourless.	1.303	98.52	5.954	
	BH1104-2	99.78	5.695	94.08	5.835	Low flow grab sample, drawdown >10% after 1 min. Clear & colourless.	2.742	97.03	5.825	
	BH1104-3	99.76	6.058	93.70	6.110	Low flow grab sample. Clear & colourless, purged dry after approx 1.5lts	4.338	95.42	6.11	

Notes

* could not get dip meter down well pipe

- no data collected

ASD above site datum

Table 11 - Soil Data Volatile Organic Compounds (mg/kg)

Analytes	MDL	BH304 Area								BH1101 Area					
		BH304-1	BH304-1	BH304-2	BH304-2	BH304-3	BH304-3	BH304-4	BH304-4	BH1101-1	BH1101-1	BH1101-2	BH1101-2	BH1101-3	BH1101-3
		0.20-0.50	2.10-2.40	0.30-0.60	1.40-1.80	0.20-0.50	2.20-2.40	0.30-0.50	1.80-2.10	0.40-0.50	1.20-1.50	0.30-0.80	2.20-2.30	0.40-0.50	1.20-1.40
Dichlorodifluoromethane	<0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	<0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	<0.013	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	<0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	<0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	<0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Disulphide	<0.007	-	-	-	-	-	-	0.009	-	0.034	0.011	-	-	-	-
1,1-Dichloroethene	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	<0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	<0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	<0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	<0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	<0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	<0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	<0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	<0.009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	<0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	<0.009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	<0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	<0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	<0.009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	<0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	<0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	<0.005	-	-	-	-	0.021	-	-	-	0.012	-	-	-	-	-
1,3-Dichloropropane	<0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	<0.013	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane	<0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	<0.004	-	-	-	-	0.051	-	-	-	0.033	-	-	-	-	-
p/m-Xylene	<0.014	-	-	-	-	0.095	-	-	-	0.088	-	-	-	-	-
Bromoform	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	<0.01	-	-	-	-	0.05	-	-	-	0.06	-	-	-	-	-
1,2,3-Trichloropropane	<0.017	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	<0.005	-	-	-	-	0.025	-	-	-	0.036	-	-	-	-	-
Bromobenzene	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	<0.009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Propylbenzene	<0.011	-	-	-	-	0.03	-	-	-	0.13	-	-	-	-	-
4-Chlorotoluene	<0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	<0.009	-	-	-	-	0.05	-	-	-	1.1	-	-	-	-	-
4-Isopropyltoluene	<0.011	-	-	-	-	-	-	-	-	0.025	-	-	-	-	-
1,3,5-Trimethylbenzene	<0.008	-	-	-	-	0.021	-	-	-	0.4	-	-	-	-	-
1,2-Dichlorobenzene	<0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	<0.01	-	-	-	-	0.01	-	-	-	0.04	-	-	-	-	-
tert-Butylbenzene	<0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	<0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	<0.01	-	-	-	-	0.03	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	<0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	<0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	<0.013	-	-	-	-	0.075	-	-	-	0.13	-	-	-	-	-
1,2,3-Trichlorobenzene	<0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	<0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 12 - Soil Data
Volatile Organic Compounds Tentatively Identified Compounds (mg/kg)

	Borehole ID	Depth	Analytes	Retention Times (min)	Concentration
BH1101 Area	1101-1	1.20-1.50	-		-
	1101-1	0.4-0.5	C6-9 Aliphatic Hydrocarbons		5.393
			C9-10 Aromatic Hydrocarbons		6.768
	BH1101-2	0.3-0.8	-		-
	BH1101-2	2.2-2.3	-		-
	BH1101-3	0.4-0.5	-		-
	BH1101-3	1.2-1.4	-		-
BH304 Area	BH304-1	0.2-0.5	-		-
	BH304-1	2.1-2.4	-		-
	BH304-2	0.3-0.6	-		-
	BH304-2	1.4-1.8	-		-
	BH304-3	0.2-0.5	Unknown		0.055
			methyl-Cyclohexane		0.117
			ethyl-Cyclohexane		0.065
			ethyl-methyl-Benzene Isomer		0.059
	BH304-3	2.2-2.4	-		-
	BH304-4	0.3-0.5	-		-
	BH304-4	1.8-2.1	-		-

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

Table 13 - Soil Data Semi-Volatile Organic Compounds (mg/kg)

Analytes	MDL	BH304 Area								BH1101 Area					
		BH304-1	BH304-1	BH304-2	BH304-2	BH304-3	BH304-3	BH304-4	BH304-4	BH1101-1	BH1101-1	BH1101-2	BH1101-2	BH1101-3	BH1101-3
		0.20-0.50	2.10-2.40	0.30-0.60	1.40-1.80	0.20-0.50	2.20-2.40	0.30-0.50	1.80-2.10	0.40-0.50	1.20-1.50	0.30-0.80	2.20-2.30	0.40-0.50	1.20-1.40
Phenols															
2-Chlorophenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-Trichlorophenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	<0.1	-	-	-	-	-	-	-	-	3.4	-	-	-	-	-
Pentachlorophenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAHs															
2-Chloronaphthalene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	<0.1	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-
Acenaphthene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	<0.1	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-
Benzo(a)pyrene	<0.1	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-
Benzo(b)fluoranthene	<0.1	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-
Benzo(ghi)perylene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	<0.1	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-
Chrysene	<0.1	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-
Dibenzo(a,h)anthracene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	<0.1	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-
Phenanthrene	<0.1	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-
Pyrene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phthalates															
Bis(2-ethylhexyl) phthalate	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Butylbenzyl phthalate	<0.1	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-
Di-n-butyl phthalate	<0.1	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-
Di-n-Octyl phthalate	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dimethyl phthalate	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Semi-volatiles															
1,2-Dichlorobenzene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitroaniline	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrotoluene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Nitroaniline	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromophenylphenylether	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloroaniline	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorophenylphenylether	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitroaniline	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Azobenzene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethoxy)methane	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethyl)ether	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbazole	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Isophorone	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-nitrosodi-n-propylamine	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

Table 14 - Soil Data Semi-Volatile Organic Compounds Tentatively Identified Compounds (mg/kg)

Borehole ID	Depth	Analytes	Retention Times (min)	Concentration
BH1101 Area	1101-1	1.20-1.50	Hexanoic acid	23.841
			Pentanoic acid, 2-methyl	11.111
			Hexanoic acid, 2-methyl	3.469
			Pentanoic acid, 4-oxo	2.857
			Pentanoic acid, ethyl ester	2.765
			unknown	18.416
			unknown	5.366
			unknown	13.069
			unknown	6.365
			Pentanedioic acid	21.251
			unknown	4.509
	1101-1	0.4-0.5	Pentanoic acid, 4-methyl-, methyl ester	11.988
			unknown	9.276
			unknown	19.784
			unknown	41.077
			unknown	27.176
			unknown	11.437
			unknown	15.174
			unknown	9.039
			unknown	8.004
			unknown	9.440
			unknown	16.881
	BH1101-2	0.3-0.8	unknown	1.124
	BH1101-2	2.2-2.3	-	-
	BH1101-3	0.4-0.5	-	-
	BH1101-3	1.2-1.4	-	-
BH304 Area	BH304-1	0.2-0.5	-	-
	BH304-1	2.1-2.4	-	-
	BH304-2	0.3-0.6	-	-
	BH304-2	1.4-1.8	-	-
	BH304-3	0.2-0.5	-	-
	BH304-3	2.2-2.4	-	-
	BH304-4	0.3-0.5	-	-
	BH304-4	1.8-2.1	-	-

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

Table 15 - Soil Data
TPH including BTEX MTBE (mg/kg)

Analytes	MDL	BH304 Area								BH1101 Area					
		BH304-1	BH304-1	BH304-2	BH304-2	BH304-3	BH304-3	BH304-4	BH304-4	BH1101-1	BH1101-1	BH1101-2	BH1101-2	BH1101-3	BH1101-3
		0.20-0.50	2.10-2.40	0.30-0.60	1.40-1.80	0.20-0.50	2.20-2.40	0.30-0.50	1.80-2.10	0.40-0.50	1.20-1.50	0.30-0.80	2.20-2.30	0.40-0.50	1.20-1.40
Aliphatics C5-C6	<0.01	-	-	-	-	-	-	-	-	0.68	0.16	0.04	-	-	-
Aliphatics >C6-C8	<0.01	-	-	0.05	-	-	-	-	-	1.7	0.14	0.16	-	-	-
Aliphatics >C8-C10	<0.01	0.03	-	0.05	-	-	-	-	-	1.9	0.1	0.09	-	-	-
Aliphatics >C10-C12	<0.01	0.01	-	0.04	-	-	-	-	-	0.95	0.07	0.06	-	-	-
Aliphatics >C12-C16	<0.01	29	7.8	5.8	2.8	7.5	7	30	-	27	3.1	24	8.8	3.6	5.8
Aliphatics >C16-C21	<0.01	42	5	3	2.3	7	5.1	50	1.7	46	2.9	19	3.6	7.5	5.1
Aliphatics >C21-C35	<0.01	56	-	-	1.7	7.2	3.7	85	0.7	110	2.6	28	2.3	17	5.8
Total Aliphatics C5-C35	<0.01	130	13	8.9	6.8	22	16	160	2.4	190	9	71	15	28	17
Aromatics C6-C7	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics >C7-C8	<0.01	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-
Aromatics >EC8-EC10	<0.01	0.04	-	0.07	-	-	-	-	-	2.9	0.14	0.13	-	-	-
Aromatics >EC10-EC12	<0.1	0.02	-	0.06	-	-	-	-	-	1.4	0.1	0.08	-	-	-
Aromatics >EC12-EC16	<0.1	8.2	3.7	3.4	0.4	3.8	3.8	8.3	-	8.9	-	7.6	1.5	1.1	-
Aromatics >EC16-EC21	<0.1	13	2.5	2.7	0.8	4	3.8	17	0.7	58	-	6.4	-	0.8	-
Aromatics >EC21-EC35	<0.1	34	-	-	-	-	12	60	0.8	93	3.5	5.7	-	8.5	-
Total Aromatics C6-C35	<0.01	56	6.2	6.2	1.2	7.8	20	85	1.5	160	3.7	20	1.5	10	-
TPH (Aliphatics and Aromatics C5-C35)	<0.01	180	19	15	8.1	30	36	250	3.9	350	13	91	16	38	17
GRO (C4-C12)	<0.01	0.1	-	0.28	-	-	-	-	-	9.6	0.71	0.56	-	-	-
MTBE	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	<0.1	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-
Toluene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyl benzene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
m & p Xylene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o Xylene	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

Table 16 - Soil Data
Metals and Inorganic Compounds (mg/kg)

Analytes	MDL	BH1104 Area						BH304 Area								BH1101 Area					
		BH1104-1 1.20-1.30	BH1104-1 2.50-2.70	BH1104-2 0.30-0.60	BH1104-2 1.30-1.50	BH1104-3 0.30-0.70	BH1104-3 1.60-1.80	BH304-1 0.20-0.50	BH304-1 2.10-2.40	BH304-2 0.30-0.60	BH304-2 1.40-1.80	BH304-3 0.20-0.50	BH304-3 2.20-2.40	BH304-4 0.30-0.50	BH304-4 1.80-2.10	BH1101-1 0.40-0.50	BH1101-1 1.20-1.50	BH1101-2 0.30-0.80	BH1101-2 2.20-2.30	BH1101-3 0.40-0.50	BH1101-3 1.20-1.40
Borate	<1	2	2	5	1	6	2	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Boron Water Soluble	<3.5	-	-	-	-	12	-	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Arsenic	<3.0	6	-	33	-	-	-	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Barium	<6.0	270	140	210	160	320	140	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Beryllium	<0.4	-	-	0.7	-	7.8	0.5	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Cadmium	<0.2	-	-	0.3	-	-	-	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Chromium	<4.5	33	29	43	29	160	31	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Copper	<6	20	17	13	15	-	18	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Lead	<2	13	15	19	13	-	15	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Mercury	<0.4	-	-	-	-	-	-	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Nickel	<0.9	42	34	47	32	290	40	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Selenium	<3	6	-	-	-	-	-	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Vanadium	<1.5	34	29	58	29	76	27	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Zinc	<2.5	55	86	68	57	6.7	68	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
Total Organic Carbon	<0.2	nt	nt	nt	nt	nt	nt	0.7	0.7	0.6	0.6	0.7	1.0	1.1	1.1	0.8	1.7	0.8	1.4	1.7	1.0
Ammoniacal Nitrogen as N	<15	nt	nt	nt	nt	nt	nt	52	-	-	-	31	-	-	-	47	49	-	-	-	-
pH Value	<1.00	8.04	8.31	7.95	8.12	8.88	8.27	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

Table 17 - Groundwater Monitoring Data Volatile Organic Compound (µg/l)

Analytes	MDL	BH304 Area							
		BH304		BH304-1	BH304-2		BH304-3	BH304-4	
		03/11/09	18/11/09	18/11/09	09/11/09	18/11/09	18/11/09	09/11/09	18/11/09
Dichlorodifluoromethane	<1	-	-	-	-	-	-	-	-
Chloromethane	<1	-	-	-	-	-	-	-	-
Vinyl Chloride	<1	-	-	-	-	-	-	-	-
Bromomethane	<2	-	-	-	-	-	-	-	-
Chloroethane	<2	-	-	-	-	-	-	-	-
Trichlorofluoromethane	<2	-	-	-	-	-	-	-	-
trans-1-2-Dichloroethene	<2	-	-	-	-	-	-	-	-
Dichloromethane	<3	-	-	-	-	-	-	-	-
Carbon Disulphide	<2	-	-	-	-	-	-	-	-
1,1-Dichloroethene	<1	-	-	-	-	-	-	-	-
1,1-Dichloroethane	<1	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	<2	-	-	-	-	-	-	-	-
cis-1-2-Dichloroethene	<2	-	-	-	-	-	-	-	-
Bromochloromethane	<2	-	-	-	-	-	-	-	-
Chloroform	<2	-	-	-	-	-	-	-	-
2,2-Dichloropropane	<1	-	-	-	-	-	-	-	-
1,2-Dichloroethane	<4	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	<1	-	-	-	-	-	-	-	-
1,1-Dichloropropene	<1	-	-	-	-	-	-	-	-
Benzene	<1	2	-	-	-	-	-	-	-
Carbontetrachloride	<1	-	-	-	-	-	-	-	-
Dibromomethane	<3	-	-	-	-	-	-	-	-
1,2-Dichloropropane	<3	-	-	-	-	-	-	-	-
Bromodichloromethane	<1	-	-	-	-	-	-	-	-
Trichloroethene	<2	-	-	-	-	-	-	-	-
cis-1-3-Dichloropropene	<2	-	-	-	-	-	-	-	-
trans-1-3-Dichloropropene	<3	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	<2	-	-	-	-	-	-	-	-
Toluene	<1	2	-	-	1	-	-	-	-
1,3-Dichloropropane	<2	-	-	-	-	-	-	-	-
Dibromochloromethane	<2	-	-	-	-	-	-	-	-
1,2-Dibromoethane	<2	-	-	-	-	-	-	-	-
Tetrachloroethene	<2	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	<1	-	-	-	-	-	-	-	-
Chlorobenzene	<4	-	-	-	-	-	-	-	-
Ethylbenzene	<2	-	-	-	-	-	-	-	-
p/m-Xylene	<2	-	-	-	-	-	-	-	-
Bromoform	<3	-	-	-	-	-	-	-	-
Styrene	<1	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	<5	-	-	-	-	-	-	-	-
o-Xylene	<1	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	<9	-	-	-	-	-	-	-	-
Isopropylbenzene	<2	-	-	-	-	-	-	-	-
Bromobenzene	<1	-	-	-	-	-	-	-	-
2-Chlorotoluene	<2	-	-	-	-	-	-	-	-
Propylbenzene	<3	-	-	-	-	-	-	-	-
4-Chlorotoluene	<2	2	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	<1	-	-	-	-	-	-	-	-
4-Isopropyltoluene	<3	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	<1	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	<3	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	<1	-	-	-	-	-	-	-	-
sec-Butylbenzene	<1	-	-	-	-	-	-	-	-
tert-Butylbenzene	<2	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	<2	-	-	-	-	-	-	-	-
n-Butylbenzene	<2	2	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	<10	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	<2	-	-	-	-	-	-	-	-
Naphthalene	<4	39	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	<3	-	-	-	-	-	-	-	-
Hexachlorobutadiene	<3	-	-	-	-	-	-	-	-

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

Table 18 - Groundwater Monitoring Data Volatile Organic Compound Tentitively Identified Compounds (µg/l)

Borehole ID		Analytes	Retention Times (min)	Concentration	
				03/11/09	18/11/09
BH304 Area	BH304	Limonene		28	nt
		Cyclopentylcyclopentene Isomer		48	
		Cyclopentylcyclopentene Isomer		20	
		ethenyl-ethyl-Benzene Isomer		20	
		Unknown		28	
		Tetrahydro-Naphthlene Isomer		52	
	BH304-1	-		ns	-
	BH304-2	-		-	-
	BH304-3	-		ns	-
	BH304-4	-		-	-

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

Table 19 - Groundwater Monitoring Data Semi-Volatile Organic Compound (µg/l)

Analytes	MDL	BH304 Area								BH1101 Area							
		BH304	BH304-1	BH304-2		BH304-3	BH304-4			BH1101	BH1101-1		BH1101-2		BH1101-3		BH501
		03/11/09	18/11/09	09/11/09	18/11/09	18/11/09	09/11/09	18/11/09	04/11/09	04/11/09	18/11/09	09/11/09	18/11/09	09/11/09	18/11/09	04/11/09	
Phenols																	
2-Chlorophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	<1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	<1	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-Trichlorophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol	<1	120	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	<1	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAHs																	
2-Chloronaphthalene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	<1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)anthracene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	<1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	<1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phthalates																	
Bis(2-ethylhexyl) phthalate	<21	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Butylbenzyl phthalate	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	<1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-Octyl phthalate	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dimethyl phthalate	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Semi-volatiles																	
1,2-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitroaniline	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrotoluene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Nitroaniline	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromophenylphenylether	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloroaniline	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorophenylphenylether	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitroaniline	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Azobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethoxy)methane	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethyl)ether	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbazole	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Isophorone	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-nitrosodi-n-propylamine	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

Table 20 - Groundwater Monitoring Data Semi-Volatile Organic Compound Tentitively Identified Compounds (µg/l)

Borehole ID	Analytes	Retention Times (min)	Concentration µg/l	
			03/11/09	18/11/09
BH304 Area	BH304	Methyl Hexanoic Acid	20	nt
		Unknown	11	
		Cyclopentylcyclopentene isomer	12	
		Dimethylstyrene Isomer	45	
		Phenylacetic acid	50	
		Caprolactam Isomer	160	
		Unknown	30	
		Unknown	40	
		Unknown	15	
		Oxindole	32	
		Unknown	88	
		Phenazine	430	
		Unknown	125	
		Unknown	80	
		Unknown	140	
		Unknown	55	
	BH304-1	-	ns	-
	BH304-2	Caffeine	33	-
	BH304-3	-	ns	-
	BH304-4	-	-	-
BH1101 Area	BH1101	Pentanoic Acid	21,424	nt
		Methyl pentanoic acid Isomer	287,150	
		Hexanoic Acid	14,454	
		Methyl Hexanoic acid Isomer	155,640	
		Heptanoic Acid	3,494	
		Ethyl Hexanoic acid Isomer	485	
		Cyclohexanecarboxylic Acid	2,841	
		Methyl Hexanoic acid Isomer	478	
		Octanoic Acid	1,787	
	BH1101-1	Unknown Organic Acids	4.7-6.2	263,147
		Unknown	6.292	2,527
		Unknown	6.317	1,785
		Unknown	6.369	978
		Unknown	6.397	834
		Unknown	6.647	836
		Unknown	6.707	1,335
		Unknown	6.811	1,050
		Unknown	6.831	1,382
		Unknown	6.959	1,122
	BH1101-2	Unknown Organic Acid	140	-
		Unknown Organic Acid	45	
		Unknown Organic Acid	80	
		Unknown Organic Acid	148	
		Trimethyl Hexanoic Acid	15	
	BH1101-3	Unknown Organic Acid	40	-
		Unknown Organic Acid	14	
		Unknown Organic Acid	38	
		Unknown Organic Acid	52	
	BH501	-	-	nt

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

Table 21 - Groundwater Monitoring Data Total Petroleum including BTEX MTBE (µg/l)

Analytes	MDL	BH304 Area								BH1101 Area							
		BH304 18/11/09	304-1 18/11/09	BH304-2 09/11/09 18/11/09		BH304-3 18/11/09		BH304-4 09/11/09 18/11/09		BH1101 04/11/09	BH1101-1 04/11/09 18/11/09		BH1101-2 09/11/09 18/11/09		BH1101-3 09/11/09 18/11/09		BH501 04/11/09
Aliphatics C5-C6	<10	-	-	-	-	-	-	-	-	48	70	43	-	-	-	-	-
Aliphatics >C6-C8	<10	-	-	-	-	-	-	-	-	64	450	530	-	-	-	-	-
Aliphatics >C8-C10	<10	28	-	-	-	-	-	-	-	18	270	290	-	-	-	-	-
Aliphatics >C10-C12	<10	160	-	-	-	-	-	-	-	12	150	180	-	-	-	-	-
Aliphatics >C12-C16	<10	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics >C16-C21	<10	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics >C21-C35	<10	130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Aliphatics C5-C35	<10	510	-	-	-	-	-	-	-	140	940	1,000	-	-	-	-	-
Aromatics C6-C7	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics >C7-C8	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics >EC8-EC10	<10	43	-	-	-	-	-	-	-	26	410	440	-	-	-	-	-
Aromatics >EC10-EC12	<10	240	-	-	-	-	-	-	-	18	230	270	-	-	-	-	-
Aromatics >EC12-EC16	<10	130	-	-	-	-	-	-	-	-	82	16	-	-	-	-	-
Aromatics >EC16-EC21	<10	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics >EC21-EC35	<10	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Aromatics C6-C35	<10	610	-	-	-	-	-	-	-	44	720	730	-	-	-	-	-
TPH (Aliphatics and Aromatics C5-C35)	<10	1100	-	-	-	-	-	-	-	190	1,700	1,800	-	-	-	-	-
GRO (C4-C12)	<10	470	-	-	-	-	-	-	-	190	1,600	1,800	-	-	-	-	-
MTBE	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyl benzene	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
m & p Xylene	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o Xylene	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

Table 22-Groundwater Monitoring Data Metals and Inorganics (µg/l)

Analytes		MDL		BH1104 Area								BH304 Area								BH1101 Area											
				BH1104		BH1104-1		BH1104-2		BH1104-3		BH304		BH304-1		BH304-2		BH304-3		BH304-4		BH1101		BH1101-1		BH1101-2		BH1101-3		BH501	
				09/11/09	04/11/09	18/11/09	09/11/09	18/11/09	09/11/09	18/11/09	03/11/08	18/11/09	09/11/09	18/11/09	18/11/09	09/11/09	18/11/09	04/11/09	04/11/09	18/11/09	09/11/09	18/11/09	09/11/09	18/11/09	04/11/09	04/11/09	18/11/09	09/11/09	18/11/09	04/11/09	
Borate	<1000µg/l	9,000	1,100	1,000	1,000	1,000	1,400	1,300	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Arsenic Dissolved (ICP-MS)	<0.75	1.4	3.7	1	1.2	1.5	1.9	1.1	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Barium Dissolved (ICP-MS)	<1	4.1	57	41	25	20	26	16	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Beryllium Dissolved (ICP-MS)	<1	-	-	-	-	-	-	-	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Boron Dissolved (ICP-MS)	<20	1,100	1,200	1,100	1,500	1,000	1,800	1,500	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Cadmium Dissolved (ICP-MS)	<0.22	-	-	-	0.3	0.4	0.62	-	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Chromium Dissolved (ICP-MS)	<1	2	7	2	8	10	11	5	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Copper Dissolved (ICP-MS)	<1.6	7.2	19	7.2	15	13	8.8	6.5	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Lead Dissolved (ICP-MS)	<0.4	0.8	4.7	0.8	8	9.9	11	6.1	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Nickel Dissolved (ICP-MS)	<1.5	4.5	12	4.5	18	13	14	9.3	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Selenium Dissolved (ICP-MS)	<1	2	3	2	4	6	8	7	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Vanadium Dissolved (ICP-MS)	<1	2	2	2	2	3	5	3	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Zinc Dissolved (ICP-MS)	<5	7	10	7	20	41	22	10	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Mercury Dissolved (CVAF)	<0.01	nt	-	-	-	-	-	-	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
Total Ammonium as NH4	<200	nt	nt	nt	nt	nt	nt	nt	390,000	-	-	-	-	-	-	-	-	500	13,000	9,100	600	200	300	200	400	3,000,000	560,000	480,000	11,000		
Total Organic Carbon	<3000	nt	nt	nt	nt	nt	nt	nt	160,000	10,000	6,000	4,000	8,000	10,000	6,000	6,000	6,000	3,000,000	560,000	480,000	11,000	10,000	8,000	15,000	6,000	3,000,000	560,000	480,000	11,000		
pH Value	<1.00	8.34	8.28	8.34	8.41	8.46	8.43	8.51	nt	nt	nt	nt	nt	nt	nt	nt	nt	7.49	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		

Notes:
NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

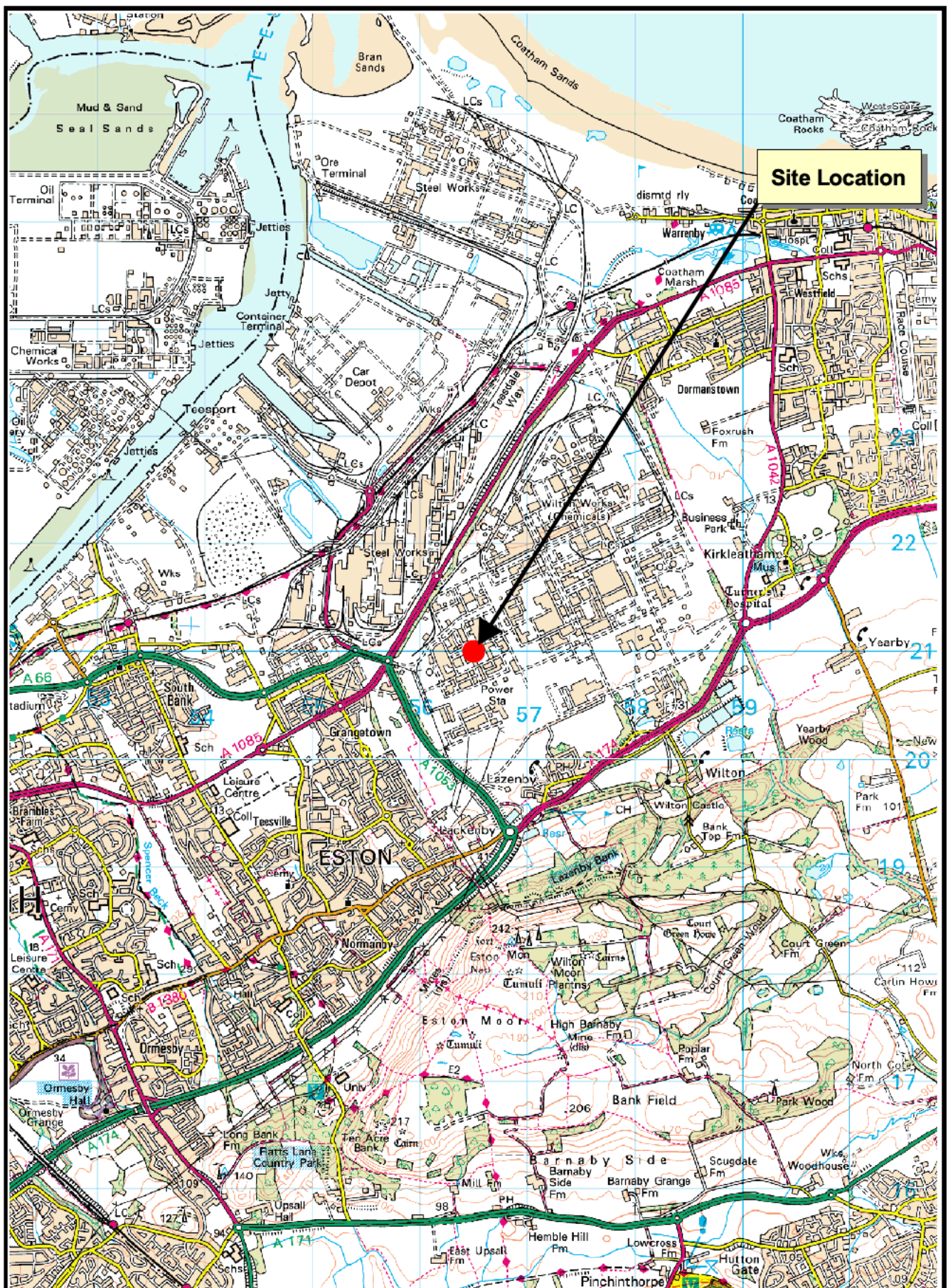
Table 23 - Groundwater Monitoring QA/QC (µg/l)

Analytes	MDL	BH1101	BH1101-A
		18/11/09	18/11/09
Aliphatics C5-C6	<10	43	36
Aliphatics >C6-C8	<10	530	470
Aliphatics >C8-C10	<10	290	240
Aliphatics >C10-C12	<10	180	170
Aliphatics >C12-C16	<10	-	-
Aliphatics >C16-C21	<10	-	-
Aliphatics >C21-C35	<10	-	-
Total Aliphatics C5-C35	<10	1,000	910
Aromatics C6-C7	<10	-	-
Aromatics >C7-C8	<10	-	-
Aromatics >EC8-EC10	<10	440	360
Aromatics >EC10-EC12	<10	270	250
Aromatics >EC12-EC16	<10	16	34
Aromatics >EC16-EC21	<10	-	-
Aromatics >EC21-EC35	<10	-	-
Total Aromatics C6-C35	<10	730	640
TPH (Aliphatics and Aromatics C5-C35)	<10	1,800	1,600
GRO (C4-C12)	<10	1,800	1,500
MTBE	<10	-	-
Benzene	<10	-	-
Toluene	<10	-	-
Ethyl benzene	<10	-	-
m & p Xylene	<10	-	-
o Xylene	<10	-	-
Total Ammonium as NH4	<200	9,100	9,200
Total Organic Carbon	<3000	480,000	430,000
Phenols			
2-Chlorophenol	<1	-	-
2-Methylphenol	<1	-	-
2-Nitrophenol	<1	-	-
2,4-Dichlorophenol	<1	-	-
2,4-Dimethylphenol	<1	-	-
2,4,5-Trichlorophenol	<1	-	-
2,4,6-Trichlorophenol	<1	-	-
4-Chloro-3-methylphenol	<1	-	-
4-Methylphenol	<1	27	52
4-Nitrophenol	<1	-	-
Pentachlorophenol	<1	-	-
Phenol	<1	-	-
PAHs			
2-Chloronaphthalene	<1	-	-
2-Methylnaphthalene	<1	-	-
Acenaphthene	<1	-	-
Acenaphthylene	<1	-	-
Anthracene	<1	-	-
Benzo(a)anthracene	<1	-	-
Benzo(a)pyrene	<1	-	-
Benzo(b)fluoranthene	<1	-	-
Benzo(ghi)perylene	<1	-	-
Benzo(k)fluoranthene	<1	-	-
Chrysene	<1	-	-
Dibenzo(a,h)anthracene	<1	-	-
Fluoranthene	<1	-	-
Fluorene	<1	-	-
Indeno(1,2,3-cd)pyrene	<1	-	-
Naphthalene	<1	-	18
Phenanthrene	<1	-	-
Pyrene	<1	-	-
Phthalates			
Bis(2-ethylhexyl) phthalate	<21	-	-
Butylbenzyl phthalate	<1	-	-
Di-n-butyl phthalate	<1	-	-
Di-n-Octyl phthalate	<5	-	-
Diethyl phthalate	<1	-	-
Dimethyl phthalate	<1	-	-
Other Semi-volatiles			
1,2-Dichlorobenzene	<1	-	-
1,2,4-Trichlorobenzene	<1	-	-
1,3-Dichlorobenzene	<1	-	-
1,4-Dichlorobenzene	<1	-	-
2-Nitroaniline	<1	-	-
2,4-Dinitrotoluene	<1	-	-
2,6-Dinitrotoluene	<1	-	-
3-Nitroaniline	<1	-	-
4-Bromophenylphenylether	<1	-	-
4-Chloroaniline	<1	-	-
4-Chlorophenylphenylether	<1	-	-
4-Nitroaniline	<1	-	-
Azobenzene	<1	-	-
Bis(2-chloroethoxy)methane	<1	-	-
Bis(2-chloroethyl)ether	<1	-	-
Carbazole	<1	-	-
Dibenzofuran	<1	-	-
Hexachlorobenzene	<1	-	-
Hexachlorobutadiene	<1	-	-
Hexachlorocyclopentadiene	<1	-	-
Hexachloroethane	<1	-	-
Isophorone	<1	-	-
N-nitrosodi-n-propylamine	<1	-	-
Nitrobenzene	<1	-	-

Notes:

NDP = No detection possible, nt = Not tested, MDL = Method detection limit, - = below MDL

FIGURES



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Legend :

- Site Location

Client : Invista

Project : 96010.00

Site : Invista Wilton

Date : 14/09/09

Scale : 1:50,000

Drawn By : ASZ

DRG No : 960100004.apr / SLP

Figure 1 :

Site Location Plan

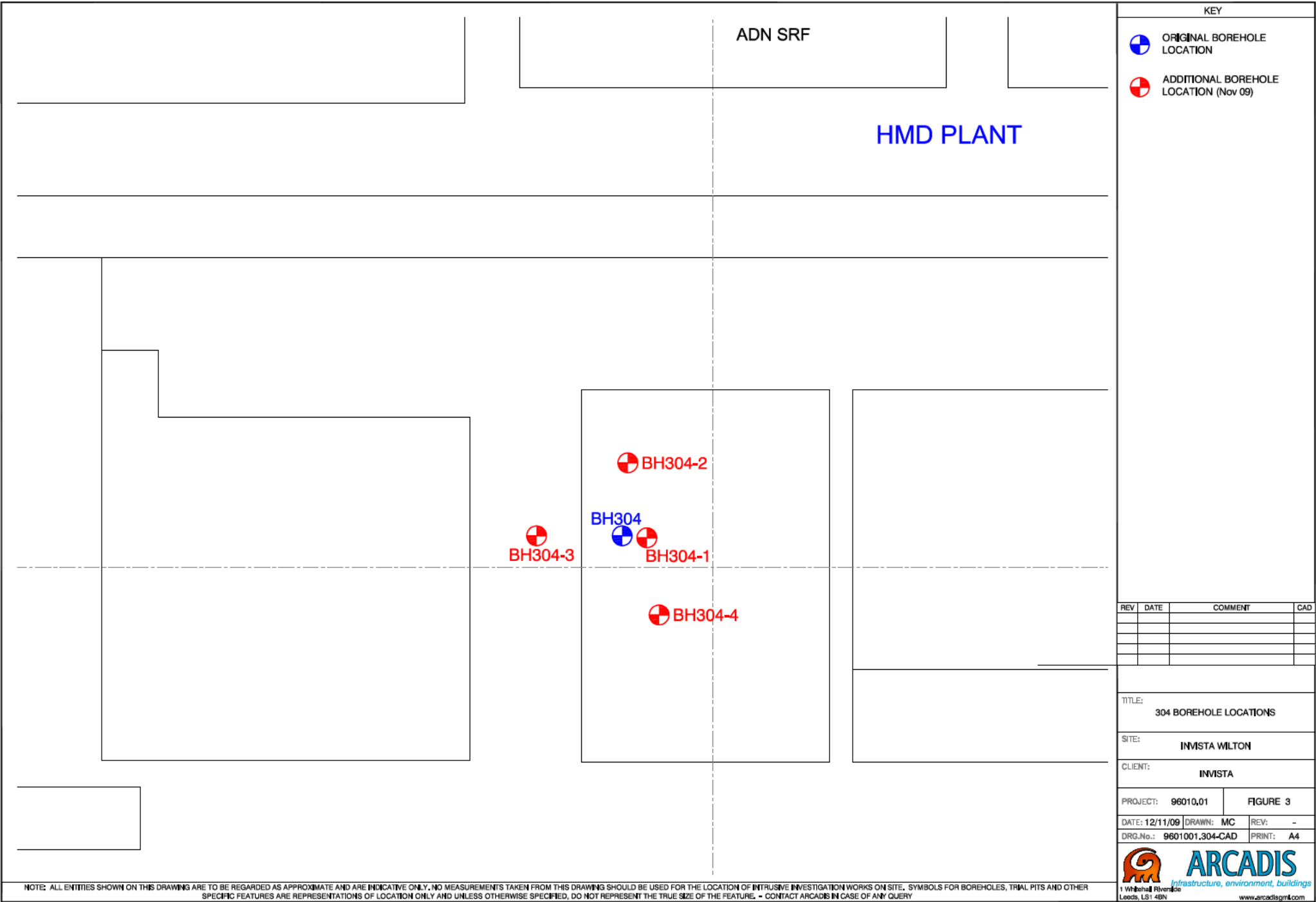


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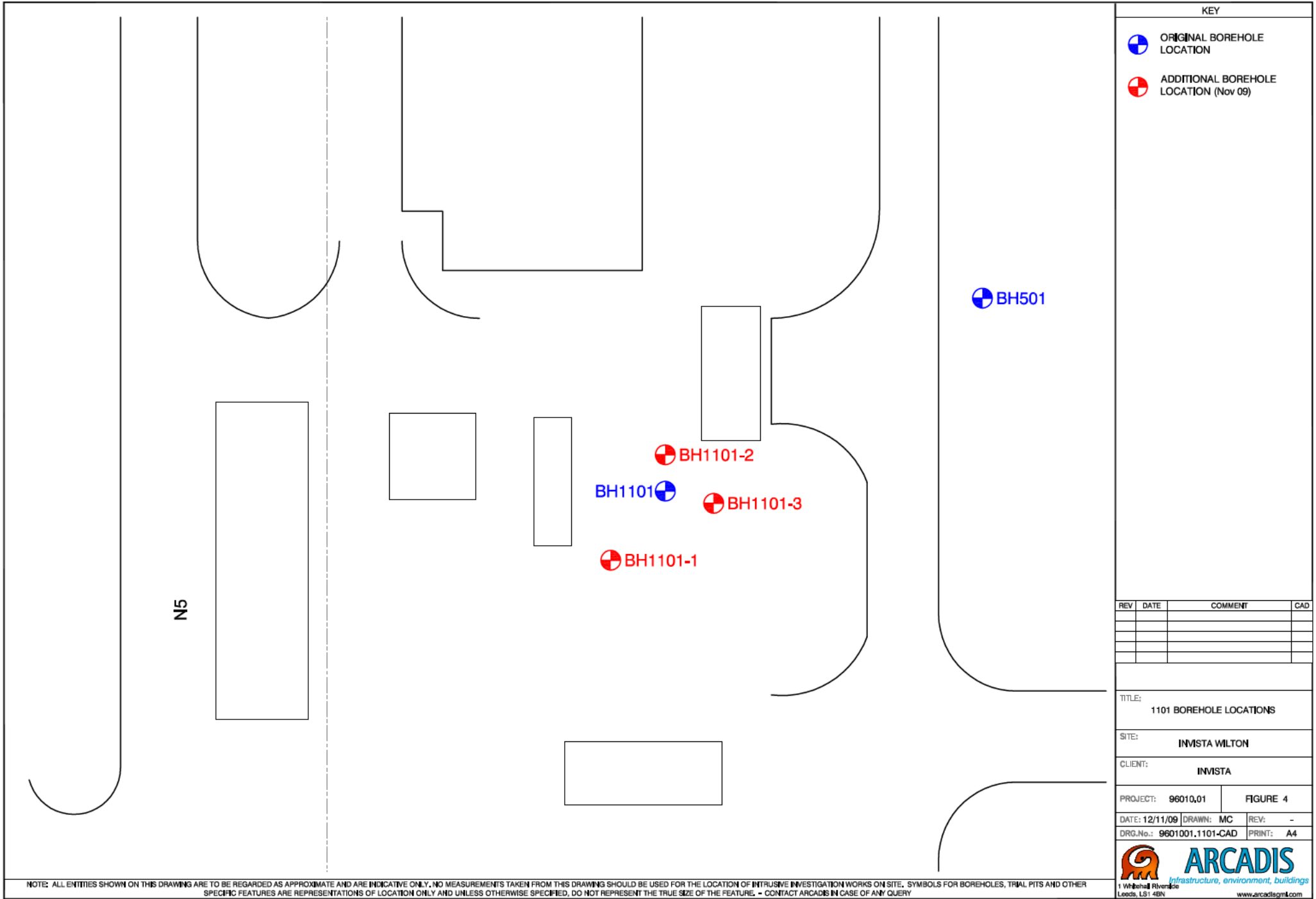
Infrastructure, environment, buildings

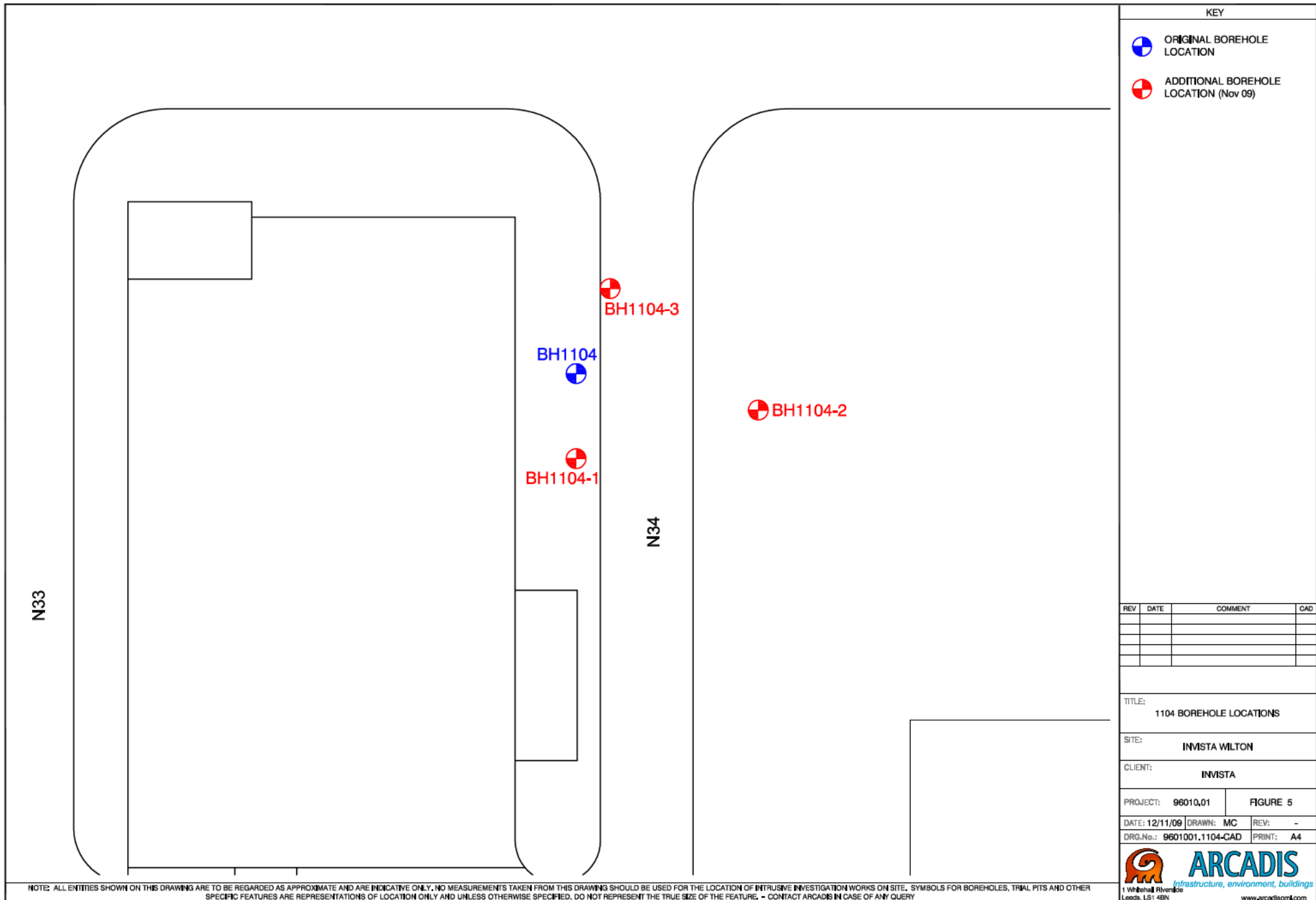
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NOTE: ALL ENTITIES SHOWN ON THIS DRAWING ARE TO BE REGARDED AS APPROXIMATE AND ARE INDICATIVE ONLY. NO MEASUREMENTS TAKEN FROM THIS DRAWING SHOULD BE USED FOR THE LOCATION OF INTRUSIVE INVESTIGATION WORKS ON SITE. SYMBOLS FOR BOREHOLES, TRIAL PITS AND OTHER SPECIFIC FEATURES ARE REPRESENTATIONS OF LOCATION ONLY AND UNLESS OTHERWISE SPECIFIED, DO NOT REPRESENT THE TRUE SIZE OF THE FEATURE. - CONTACT ARCADIS IN CASE OF ANY QUERY





APPENDICES

Site: Invista Wilton	Location: Wilton Site, Redcar	Ground Level (mASD):	Hole Diameter (mm): 50	Scale 1:40
Client: Invista		Easting: Northing:	Well Diameter (mm): 50 Well Type: SPIE	Logged by: 
Project: 96010.01	Date: 03/11/2009	Method: Geoprobe- Percussive		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m)	Level (mASD)	Sample Type	Sample Depth (m)	PID (ppm)	Vane/PPT (kPa)	SPT N Value	Well Details	Water Level
Re-enforced Concrete (MADE GROUND)										
Brown and Black stained, slightly sandy, clayey, fine to medium, angular to sub-angular GRAVEL. (MADE GROUND)		0.30		D	0.40-0.50	9				
		0.50								
No recovery, Liner blocked by coarse gravel.										
(Poor Recovery 30%) Brown red, very clayey SAND.		1.20								1
(Poor Recovery 30%) Soft, red brown, slightly sandy CLAY		1.40		D	1.40-1.60	1				
				D	2.00-2.20	2				2
(Poor Recovery 40%) Soft, red brown, sandy CLAY.		2.40								
(Poor Recovery 40%) Firm, red brown, gravelly CLAY. Gravel is fine to medium, angular to sub-rounded red and yellow sandstone gravels.		2.80								
				D	3.20-3.40	4				3
				D	3.70-3.80	5				
				D	4.10-4.20	1				4
				D	4.50-4.60	2				
End of Borehole at 5.00 m		5.00								5
										6
										7

Key:

- D Disturbed Sample
- B Bulk Sample
- U Undisturbed Sample
- J Jar Sample
- ▽ Water Strike
- ▼ Standing Water Level

Remarks: Groundwater encountered in well

Site: Invista Wilton	Location: Wilton Site, Redcar	Ground Level (mASD):	Hole Diameter (mm): 50	Scale 1:40
Client: Invista		Easting: Northing:	Well Diameter (mm): 50 Well Type: SPIE	
Project: 96010.01	Date: 03/11/2009	Method: Geoprobe- Percussive		Checked by: 

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m)	Level (mASD)	Sample Type	Sample Depth (m)	PID (ppm)	Vane/PPT (kPa)	SPT N Value	Well Details	Water Level
Re-enforced Concrete (MADE GROUND)										
Brown and Black stained, sandy, clayey, fine to medium, angular to sub-rounded GRAVEL. (MADE GROUND)		0.30		D	0.30-0.80	2				1
Firm, grey brown, slightly gravelly CLAY. Gravels are fine to medium, sub-angular to sub-rounded red and yellow sandstone gravels.		0.80		D	1.30-1.40	0				2
				D	2.20-2.30	0				3
			D	2.80-2.90	0				4	
			D	3.30-3.40	0					
Firm, red brown, slightly gravelly CLAY. Gravels are fine to medium, sub-angular to sub-rounded red and yellow sandstone gravels.		3.00		D	3.80-3.90	0				5
			D	4.50-4.60	0					
End of Borehole at 5.00 m		5.00								6
										7

Key:

- D Disturbed Sample
- B Bulk Sample
- U Undisturbed Sample
- J Jar Sample
- ▽ Water Strike
- ▼ Standing Water Level

Remarks: No Groundwater Encountered

[illegible]

Remarks:	No Groundwater Encountered
----------	----------------------------

Site: Invista Wilton	Location: Wilton Site, Redcar	Ground Level (mASD):	Hole Diameter (mm): 50	Scale 1:40
Client: Invista		Easting: Northing:	Well Diameter (mm): 50 Well Type: SPIE	
Project: 96010.01	Date: 03/11/2009	Method: Geoprobe- Percussive		Checked by: 

STRATA RECORD

IN SITU TESTS / SAMPLES

Sheet 1 of 1

Description	Legend	Depth (m)	Level (mASD)	Sample Type	Sample Depth (m)	PID (ppm)	Vane/PPT (kPa)	SPT N Value	Well Details	Water Level
Re-enforced Concrete (MADE GROUND)		0.30								
No Recovery. Liner blocked by coarse gravel.		1.20		D	1.20-1.30	11				1
Firm, red brown, with grey mottling, gravelly CLAY. Gravel is fine to medium, angular to sub-rounded red, brown and yellow sandstone gravels.		2.40		D	2.50-2.70	1				2
Firm, red brown, gravelly CLAY. Gravel is fine to medium, angular to sub-rounded red, brown and yellow sandstone gravels with occasional grey coarse, rounded, shaley mudstone gravels.		2.40		D	3.00-3.10	0				3
				D	3.90-4.00	0				4
				D	4.40-4.50	0				
				D	5.00-5.10	0				5
				D	5.50-5.60	0				
End of Borehole at 6.00 m		6.00								6
										7

Key:

- D Disturbed Sample
- B Bulk Sample
- U Undisturbed Sample
- J Jar Sample
- ▽ Water Strike
- ▼ Standing Water Level

Remarks: No Groundwater Encountered

Site: Invista Wilton	Location: Wilton Site, Redcar	Ground Level (mASD):	Hole Diameter (mm): 50	Scale 1:40
Client: Invista		Easting: Northing:	Well Diameter (mm): 50 Well Type: SPIE	
Project: 96010.01	Date: 03/11/2009	Method: Geoprobe- Percussive		Checked by: 

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m)	Level (mASD)	Sample Type	Sample Depth (m)	PID (ppm)	Vane/PPT (kPa)	SPT N Value	Well Details	Water Level
Re-enforced Concrete (MADE GROUND)		0.30		D	0.30-0.60	2				
(Poor recovery 50%) Soft brown, very sandy CLAY.										
Firm, red brown, slightly gravelly CLAY. Gravel is fine to medium, angular to rounded red and yellow sandstone gravels.		1.30		D	1.30-1.50	0				
				D	2.00-2.10	0				
				D	2.60-2.70	0				
				D	3.10-3.20	0				
				D	3.80-3.90	0				
				D	4.50-4.60	0				
				D	5.10-5.20	0				
				D	5.80-5.90	0				
End of Borehole at 6.00 m		6.00								

Key:

- D Disturbed Sample
- B Bulk Sample
- U Undisturbed Sample
- J Jar Sample
- ▽ Water Strike
- ▼ Standing Water Level

Remarks: No Groundwater Encountered

Site: Invista Wilton	Location: Wilton Site, Redcar	Ground Level (mASD):	Hole Diameter (mm): 50	Scale 1:40
Client: Invista		Easting: Northing:	Well Diameter (mm): 50 Well Type: SPIE	Logged by: 
Project: 96010.01	Date: 03/11/2009	Method: Geoprobe- Percussive		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m)	Level (mASD)	Sample Type	Sample Depth (m)	PID (ppm)	Vane/PPT (kPa)	SPT N Value	Well Details	Water Level
Bituminous surface (MADE GROUND)		0.20								
Road Fill. Angular coarse GRAVEL (MADE GROUND)		0.30		D	0.30-0.50	0				
Light brown, slightly clayey, slightly sandy GRAVEL (MADE GROUND)		0.50		D	0.50-0.60	0				
Black stained, slightly clayey, slightly sandy GRAVEL (MADE GROUND)		0.70		D	0.60-0.70	0				
Firm, dark red brown, gravelly CLAY. Gravel is fine to medium, angular to rounded red and yellow sandstone gravels.		1.20		D	1.00-1.10	0				1
Poor recovery 1.2m to 2.4m (40%). Firm red brown, with grey mottling, gravelly CLAY. Gravels are fine to medium, angular to sub-rounded red and yellow sandstone gravels with occasional grey coarse, rounded, shaley mudstone gravels. Below 2.5m occasional c				D	1.60-1.70	0				2
				D	2.10-2.20	0				3
				D	2.60-2.70	0				4
				D	3.30-3.40	0				5
				D	3.80-3.90	0				6
				D	4.40-4.50	0				7
				D	5.00-5.10	0				
				D	5.50-5.60	0				
End of Borehole at 6.00 m		6.00								

Key:

- D Disturbed Sample
- B Bulk Sample
- U Undisturbed Sample
- J Jar Sample
- ▽ Water Strike
- ▼ Standing Water Level

Remarks: No Groundwater Encountered

Site: Invista Wilton	Location: Wilton Site, Redcar	Ground Level (mASD):	Hole Diameter (mm): 50	Scale 1:40
Client: Invista		Easting: Northing:	Well Diameter (mm): 50 Well Type: SPIE	Logged by: 
Project: 96010.01	Date: 02/11/2009	Method: Geoprobe- Percussive		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m)	Level (mASD)	Sample Type	Sample Depth (m)	PID (ppm)	Vane/PPT (kPa)	SPT N Value	Well Details	Water Level
Re-enforced Concrete (MADE GROUND)										
Soft, brown grey, sandy, gravelly CLAY. Gravel is angular to rounded, fine to medium, red and yellow sandstone and grey coarse, rounded, shaley mudstone gravels		0.20		D	0.20-0.50	2				
Soft to firm, red brown with occasional grey mottling, slightly sandy CLAY.		0.70		D	1.00-1.10	0				1
				D	1.60-1.70	0				
				D	2.00-2.20	1				2
Soft to firm, grey and red brown, slightly gravelly CLAY. Gravel is fine to medium, angular to rounded red and yellow sandstone gravels.		2.10								
Firm, red brown, slightly gravelly CLAY. Gravels are fine to medium, sub-angular to rounded red and yellow sandstone gravels with grey coarse, rounded, shaley mudstone gravels.		2.60		D	2.80-3.00	0				3
				D	3.30-3.50	0				
Red brown, slightly clayey, gravelly SAND. Gravel is fine to coarse, angular to sub-rounded red and yellow sandstone gravels.		3.80 3.90		D	3.90-4.00	0				4
Firm, red brown, slightly gravelly CLAY. Gravels are fine to medium, sub-angular to rounded red and yellow sandstone gravels with grey coarse, rounded, shaley mudstone gravels.				D	4.50-4.60	0				5
				D	5.10-5.20	0				6
End of Borehole at 6.00 m		6.00								7

Key:

- D Disturbed Sample
- B Bulk Sample
- U Undisturbed Sample
- J Jar Sample
- ▽ Water Strike
- ▼ Standing Water Level

Remarks: No Groundwater Encountered

Site: Invista Wilton	Location: Wilton Site, Redcar	Ground Level (mASD):	Hole Diameter (mm): 50	Scale 1:40
Client: Invista		Easting: Northing:	Well Diameter (mm): 50 Well Type: SPIE	Logged by: 
Project: 96010.01	Date: 02/11/2009	Method: Geoprobe- Percussive		Checked by:

STRATA RECORD

IN SITU TESTS / SAMPLES

Sheet 1 of 1

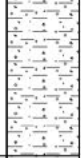
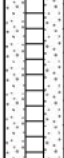
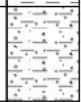
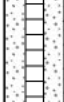
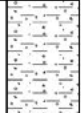
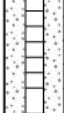
Description	Legend	Depth (m)	Level (mASD)	Sample Type	Sample Depth (m)	PID (ppm)	Vane/PPT (kPa)	SPT N Value	Well Details	Water Level
Re-enforced Concrete (MADE GROUND)		0.30		D	0.30-0.60	1				
Poor recovery (50%) Stiff, brown with grey mottling, slightly gravelly CLAY. Gravel is fine, angular to rounded red and yellow sandstone gravels.				D	0.90-1.20	1				1
				D	1.60-1.80	1				
				D	2.10-2.30	1				2
				D	2.80-2.90	1				3
Stiff, red brown, slightly gravelly CLAY. Gravel is red, brown and yellow, sub-angular to rounded, fine to medium sandstone gravels.		2.40		D	2.80-2.90	1				
Stiff, red brown, slightly gravelly CLAY. Gravel is brown sub-angular to rounded, fine to medium sandstone gravels.		3.20		D	3.30-3.40	1				
End of Borehole at 3.60 m		3.60								
										4
										5
										6
										7

Key:

- D Disturbed Sample
- B Bulk Sample
- U Undisturbed Sample
- J Jar Sample
- ▽ Water Strike
- ▼ Standing Water Level

Remarks: No Groundwater Encountered

Site: Invista Wilton	Location: Wilton Site, Redcar	Ground Level (mASD):	Hole Diameter (mm): 50	Scale 1:40
Client: Invista		Easting: Northing:	Well Diameter (mm): 50 Well Type: SPIE	Logged by: 
Project: 96010.01	Date: 02/11/2009	Method: Geoprobe- Percussive		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m)	Level (mASD)	Sample Type	Sample Depth (m)	PID (ppm)	Vane/PPT (kPa)	SPT N Value	Well Details	Water Level
TOPSOIL mixed with medium, angular, limestone gravels.		0.30		D	0.20-0.50	21				
Grey brown, clayey, slightly sandy, angular, coarse GRAVEL.		0.50								
Firm to stiff, red brown and grey slightly gravelly CLAY. Gravel is fine, angular to rounded, red, orange, yellow and black/brown sandstone gravels.		1.50		D	0.90-1.10	1				1
Firm, red with grey mottling, CLAY.		1.90		D	1.30-1.40	1				
Firm, red brown, slightly gravelly CLAY. Gravel is fine to medium, angular to rounded sandstone gravels.		2.40		D	2.00-2.20	1				2
Firm, red brown, gravelly CLAY. Gravel is fine to medium, angular to rounded sandstone gravels.		3.60		D	2.50-2.60	1				
				D	3.00-3.10	0				3
End of Borehole at 3.60 m										4
										5
										6
										7

Key:

- D Disturbed Sample
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Remarks: No Groundwater Encountered

[illegible]

Remarks: No Groundwater Encountered