

**Remediation Infrastructure Installation Phase II
(Main Production Building) and Baseline Monitoring Report
Grange Road
Cwmbran
Gwent
NP44 3XU
South Wales**

**October 2012
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Meritor Heavy Vehicle Braking Systems (UK) Limited

Grange Road
Cwmbran
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NP44 3XU
South Wales

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List of Abbreviations that may be used in this report

ARCADIS	ARCADIS (UK) Limited
BTEX	Benzene, toluene, ethylbenzene, xylenes
BS	British Standard
CAT	Cable Avoidance Tool
CDM	Construction, Design and Management
<i>cis</i> -1,2-DCE	<i>cis</i> -1,2-dichloroethene
CLR	Contaminated Land Report
CO	Carbon monoxide
CoC	Contaminants of Concern
CVOC	Chlorinated Volatile Organic Compounds
DEFRA	Department for Environment and Rural Affairs
DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DQRA	Detailed Quantitative Risk Assessment
EA	Environment Agency
ERD	Enhanced Reductive Dechlorination
EP	Environmental Permit
ESA	Environmental Site Assessment
GC-MS	Gas Chromatograph – Mass Spectrometry
GC-FID	Gas Chromatograph – Flame Ionisation Detector
GPR	Ground Penetrating Radar
GPS	Global Positioning System
HDPE	High Density Polyethylene
ISO	International Standards Organisation
LGA	Landfill gas Analyser
LNAPL	Light Non-Aqueous Phase Liquid
mbgl	Metres below ground level
MCertS	Monitoring Certification Scheme
Meritor	Meritor Heavy Vehicle Braking Systems UK Limited
MTBE	Methyl <i>tertiary</i> -butyl ether
NDIR	Non dispersive infrared sensor
NAPL	Non-Aqueous Phase Liquid
ORP	Oxidation Reduction Potential
PCE	Tetrachloroethene
PID	Photo Ionisation Detector
QA/QC	Quality Assurance / Quality Control
ROA	Remediation Options Appraisal
SSAC	Site Specific Assessment Criteria
SVE	Soil Vapour Extraction

TCBC	Torfaen County Borough Council
TCE	Trichloroethene
TFP	Total Fluids Pumping
TIC	Tentatively Identified Compounds
TOC	Total Organic Carbon
TPHCWG	Total Petroleum Hydrocarbons Criteria Working Group
<i>trans</i> -1,2-DCE	<i>trans</i> -1,2-dichloroethene
UKAS	United Kingdom Accreditation Service
uPVC	Unplasticized polyvinylchloride
VOCs	Volatile Organic Compounds

1 INTRODUCTION

In March 2012, ARCADIS (UK) Limited (ARCADIS) was commissioned by Meritor Heavy Vehicle Braking Systems (UK) Limited (Meritor) to undertake the installation of remediation infrastructure within the main production building at the facility located on Grange Road, Cwmbran, Gwent NP44 3XU, South Wales (the Site). Following the installation of remediation infrastructure, ARCADIS was commissioned to undertake baseline groundwater and soil gas monitoring visits, the results of which are presented in this report.

The work was conducted in accordance with the scope of work detailed in ARCADIS' proposal reference P/80570/01/01_02 dated April 2012. The work was also conducted with reference to the Global Master Services Agreement (2008) between ARCADIS and Meritor, Inc.

The work represents part of the enabling works to allow implementation of subsequent remediation strategies at the Site. The remediation works will be performed in accordance with UK and Welsh legislation and regulatory guidance for the assessment of land contamination, an overview of which is presented in Appendix A.

1.1 Objectives

The objective of this report is to provide Meritor with 'as built' data relating to the remediation infrastructure installed in the southern area of the main production area and southern yard area of Zone 3 of the Site, and document baseline ground gas and groundwater conditions prior to the operation of the proposed remediation systems.

1.2 Background

1.2.1 Planning Conditions

The remediation infrastructure installation works have been conducted in support of planned redevelopment of the Site, as evidenced by a joint planning application (reference Application Number 11/P/00101), submitted to Torfaen County Borough Council (TCBC) on 28 February 2011, by Meritor and Morrisons Supermarkets Plc. For the purposes of the planning application and based on future proposed end-uses, the full land parcel can be divided into three areas as defined below:

- **Zone 1** – Former employee car park to the north of the main production plant, divested by Meritor in April 2012 and currently under redevelopment as a new supermarket, associated petrol filling station and two smaller retail units (as well as a pedestrian bridge from the Site into Cwmbran town centre).
- **Zone 2** – Central portion of the Meritor Site including the Heavy Goods Vehicle (HGV) entrance, loading bay and the northern third of the existing production building to be redeveloped as commercial offices with a hotel (and associated bar/ restaurant) and car parking areas.
- **Zone 3** – The remainder of the Meritor production building (south of building column row M) and the car park to be retained as a heavy vehicle braking systems production building with associated employee and visitor car parking areas; an engineering centre; and Meritor's offices.

The general Site location and the physiogeographic features of the surrounding area are presented on Figure 1 at a map scale of 1:50,000. The current Site layout featuring the location of the pilot trial area in Zone 3 is presented on Figure 2, and the future redevelopment zones are presented on Figure 3.

1.2.2 Regulatory Liaison

In early 2012, ARCADIS submitted a number of documents to TCBC, on behalf of Meritor, including a Ground Gas Strategy report and Remediation Implementation Plans (RIPs) and Remediation Verification Plans (RVPs) for the recovery of Light Non-Aqueous Phase Liquid (LNAPL) from the sub-surface of the southern area of the Site and for the remediation of Chlorinated Volatile Organic Compounds (CVOC) in groundwater (see Section 2 of this report). ARCADIS on behalf of Meritor, submitted the information presented in these reports to assist in the discharge of environmental pre-commencement Planning Conditions 4, 18, 26 and 59 associated with the divestment and redevelopment of Zone 1 and refurbishment of Zone 3. Regulatory approval of the documents and discharge of the associated Planning Conditions 4, 18, 26 and 59 was achieved in April 2012.

The scope of work summarised in the Section below was developed during the preparation of the RIPs and the Ground Gas Strategy documents and in discussion with the Regulators, TCBC and the Welsh Environment Agency (EA), with regard to the discharge of the environmental Planning Conditions during early 2012.

1.3 Scope of Work

The scope of work was outlined in a proposal by ARCADIS to Meritor (reference P/80570/01/01_01, April 2012) and is summarised below:

- *Health and Safety*: Preparation of task-specific method statements and risk assessments, utility tracing and positive identification of utilities in work area and preparation of a Health and Safety Plan to manage ARCADIS' responsibilities as a contractor under the *Construction (Design and Management) Regulations 2007*.
- *Installation of Soil Vapour Extraction (SVE) Well Network*: Drilling of an additional fifteen boreholes on-site, with borehole logging, collection of soil samples for field screening using a Photoionisation Detector (PID), and installation of permanent SVE wells.
- *Installation of Enhanced Reductive Dechlorination (ERD) Injection and Monitoring Well Network*: Drilling of an additional 25 boreholes on-site within the production building, with borehole logging, field screening using a PID, and installation of permanent double installation injection wells at 3-6 metres below ground level (mbgl) and 8-11 mbgl, and four monitoring wells at depths of 3-6 mbgl, 8-13 mbgl, and 15-20 mbgl.
- *Installation of Light Non-Aqueous Phase Liquid (LNAPL) Extraction Well Network*: Drilling of 11 boreholes on Site within the production building, borehole logging, collection of soil samples for field screening using a PID and installation of permanent extraction wells.
- *Installation of sub-surface ducting and inspection chambers*:
 - Installation of LNAPL Recovery System Sub-Surface Infrastructure: Installation of sub-surface ducting within shallow trenches to connect the newly installed internal LNAPL recovery well network and installation of an inspection chamber above each internal LNAPL recovery well;
 - Installation of SVE System Sub-Surface Infrastructure: Installation of sub-surface ducting within shallow trenches to connect the SVE well network, and installation of an inspection chamber above each well; and
 - Installation of ERD System Sub-Surface Infrastructure: Installation of sub-surface ducting within shallow trenches to connect the injection well network and installation of an inspection chamber above each well.

In addition, the scope of works included the following tasks:

- *Zone 1 Monitoring Well Decommissioning:* Following the divestment of Zone 1, decommissioning of existing on-Site monitoring well network to remove the potential for the monitoring wells to act as preferential pathways for transport of surface contaminants, which may arise through future site-use, into the underlying aquifers;
- *Decommissioning and Replacement of Selected Wells in the Main Production Building:* Decommissioning of monitoring wells installed during previous phases of work which will be located directly underneath new machinery following refurbishment of the production building, and replacement of decommissioned wells;
- *Installation of Passive Ground Gas Vent Wells in South Car Park:* Drilling of up to 15 passive ground gas vent wells in the newly constructed south car park to a maximum depth of 2.5 mbgl;
- *Regulatory Liaison:* To address the remediation licensing (including the requirement for an Environmental Permit); and modification of the trade effluent discharge consent (if required); and
- *Reporting:* Reporting of the above works.

The installation of sub-surface infrastructure and additional tasks were carried out concurrently.

The scope of work has been developed in accordance with the Environment Agency (EA) and Department for Environment Food and Rural Affairs (DEFRA) document '*Model Procedures for the Management of Land Contamination*' Contaminated Land Report (CLR) 11, dated 2004 and the Welsh Local Government Association, Welsh Assembly Government and EA document *Land Contamination: A Guide for Developers*, dated 2006.

In addition, the works documented in this report relate to the implementation of remediation at the Meritor facility, in accordance with the plans resulting from discussions held with the Regulators, with regard to the discharge of the pre-commencement Planning Conditions.

1.4 Reliability of Information/ Limitations

This report is only valid when read in its entirety. Any information or advice included in this report should not be relied on unless considered in the context of the whole report. Reference should be made to the notes on study limitations at the end of this report.

A copy of ARCADIS' study limitations are presented in Section 9.

1.5 User Reliance

There are neither third party rights nor benefits conferred under this report. Use of this report is strictly limited to Meritor and Meritor, Inc and its direct and indirect subsidiaries, which are the sole parties to whom ARCADIS intends to confer any rights. Any reliance on the contents of this report by any other party is the sole responsibility of that party.

2 PREVIOUS WORKS

In December 2009, ARCADIS was commissioned to undertake an updated Phase I Environmental Site Assessment (ESA) of the Site and to develop a scope of works for a subsequent Phase II ESA. The environmental works to date conducted by Meritor are detailed in the following reports:

- *Phase I Environmental Site Assessment*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, ARCADIS report reference 909361804_03, January 2010.
- *Phase II Environmental Site Assessment Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran. ARCADIS report ref: 909361904_02, February 2010.
- *Phase IIB Environmental Site Assessment Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran. ARCADIS report reference 909362203_02, May 2010.
- *Detailed Quantitative Risk Assessment (DQRA)*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, ARCADIS report reference 909362002_01, May 2010.
- *Remediation Options Appraisal (ROA) Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, ARCADIS report reference 909362302_01, August 2010.
- *Revised Detailed Quantitative Risk Assessment Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, ARCADIS report reference 909362802_01, January 2011.
- *Remediation Method Statement*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, ARCADIS report reference 909362819_03, January 2011.
- *Supplementary Environmental Site Investigation Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran. ARCADIS report reference 909362509_01, April 2011.
- *Remediation Pilot Testing (Oil Recovery) Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran 909362711_01, June 2011.
- *Updated Detailed Quantitative Risk Assessment*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran 909363202_02, April 2012.
- *Baseline Site-Wide Groundwater Monitoring Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran 909362902_02, September 2011.
- *Location of Historic Abstraction Well Letter Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, ARCADIS report reference 909363603_01, January 2012.
- *Quarterly Groundwater Monitoring – November 2011 Update Letter Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, ARCADIS report reference 909363603_01, January 2012.
- *Interim Enhanced Reductive Dechlorination Pilot Trial Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, 909363415_01, January 2012.
- *Remediation Implementation Plan – Chlorinated Volatile Organic Compound Groundwater Remediation*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, 909363805_04, January 2012.

- *Ground Gas Strategy Report, Zone 2 and Zone 3*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, 909364202_04, January 2012.
- *Remediation Verification Plan for Chlorinated Volatile Organic Compounds Groundwater Remediation*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, 909363806_04, January 2012.
- *Remediation Verification Plan (LNAPL Recovery)*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, 909364003_04, January 2012.
- *Remediation Implementation Plan (LNAPL Recovery)*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, 909363022_06, February 2012.
- *Remediation Method Statement*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, ARCADIS report reference 909362819_03, January 2011.
- *Quarterly Groundwater Monitoring – February 2012 Update Letter Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, ARCADIS report reference 909363707_01, March 2012.
- *Remediation of Chlorinated Volatile Organic Compounds (CVOCs) – Raglan Mudstone Formation Aquifer Letter Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, 909363825_02, April 2012
- *Remediation Infrastructure Installation Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, 909363909_01, March 2012.
- *Enhanced Reductive Dechlorination Pilot Trial Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, 909363429_02, June 2012.
- *Annual Groundwater Monitoring Report*, Meritor Heavy Vehicle Braking Systems (UK) Limited, Cwmbran, 909363716_01, October 2012

The general Site location and the physiogeographic features of the surrounding area are presented on Figure 1 at a map scale of 1:50,000. The current Site layout is presented on Figure 2, the proposed redevelopment areas are presented on Figure 3.

This report follows on from and should be read in conjunction with the previous reports detailed above.

3 ZONE 1 MONITORING WELL DECOMMISSIONING

Decommissioning of five monitoring wells (BH126, BH127, BH128, and BH201S&D) located in Zone 1, to the north of the Meritor facility, was carried out in April 2012 prior to the divestment of the land later that month. The locations of the Zone 1 monitoring wells are presented on Figure 4.

Zone 1 has now been divested by Meritor and is currently undergoing redevelopment as a supermarket with associated petrol filling station, and two smaller retail units.

3.1 Rationale

The existing on-Site monitoring well network had potential for the monitoring wells to act as preferential pathways for transport of surface contaminants during and following the redevelopment works into the underlying aquifers.

3.2 Methodology

Prior to decommissioning the monitoring wells, the wells were inspected for the presence of groundwater and LNAPL. No LNAPL or Dense Non-Aqueous Phase Liquid (DNAPL) was encountered within the well network in Zone 1.

The monitoring wells were subsequently decommissioned in general accordance with the EA guidance Decommissioning Redundant Boreholes and Wells. The works comprised:

- Removal of the headworks at each location;
- Backfilling of the borehole via the introduction of a concrete/ bentonite grout from the base of the borehole to ground level; and,
- Sealing of the borehole for the last meter with a concrete 'plug' brought up to flush with ground level.

Photographic records of the monitoring well decommissioning are presented in Appendix B.

3.2.1 Waste

Waste arisings were collected and transported off-Site for appropriate disposal, in accordance with the Environmental Permitting and Waste Management Duty of Care Regulations.

4 PREPARATORY WORKS

The Site works were completed between the 22nd March 2012 and 17th August 2012. Prior to undertaking the installation of the remediation wells and sub-surface trenching, preparatory works were undertaken at the Site, as detailed below.

4.1 Health and Safety

ARCADIS' works formed part of a larger notifiable project on going on Site to which the *Construction, Design, and Management (CDM) 2007 Regulations* applied.

ARCADIS prepared task-specific method statements and risk assessments and a Health and Safety Plan to manage ARCADIS' responsibilities as a contractor under the *Construction (Design and Management) Regulations 2007*.

A project specific health and safety induction for the works was prepared, and was delivered to ARCADIS sub-contractors prior to the commencement of site works.

4.2 Preparation of Work Area

The proposed internal remediation installation area covered a large proportion of the production building. To enable concurrent refurbishment works to be carried out, ARCADIS occupied a limited section of the work area at any given time.

During the installation of remediation infrastructure at the Site, work area sections were secured with fencing to prevent unauthorised access from non-ARCADIS personnel. Heras fencing was maintained around the active work area throughout the works, with the area handed back to the site following completion of each section.

Short duration work areas for the additional works were set up using high visibility barriers.

4.2.1 Utility Tracing

Main Production Building

Earlier environmental works within the production building at the Site and discussions with the Site-staff indicated that there were a number of underground structures (drainage systems, etc) present in the area of the internal installation of remediation infrastructure.

A utility trace was undertaken prior to the intrusive works commencing. The utility tracing comprised the following components:

- Inspection of utility company plans and utility information obtained during previous phases of works at the Site;
- Inspection of Sub-Surface Chambers and Ducts;
- Ground Penetrating Radar (GPR) Survey; and,
- Active Electronic Detection Method Survey (power cable detection).

Where utilities or services were identified in proximity to the proposed remediation infrastructure, the location of the infrastructure was moved if possible to a cleared location.

No electric cables or gas pipes (above ground) were identified near the proposed remediation installation area within the sub-surface in the production building, as such vacuum excavation was not required during the internal infrastructure installation works. When it was not possible to relocate the remediation infrastructure where shallow drainage channels intersected the route of remediation trenches, precautions such as the use of a lookout during concrete

breaking and trench excavation were used to progress the trench without causing damage to the site drainage.

New South Car Park

Following the construction of the south car park, comprising the installation of a new surface water drainage network and electric feeds, a utility trace was undertaken prior to the intrusive works for the installation of the passive ground gas vent wells commencing. The utility tracing comprised the following components:

- Inspection of utility company plans and utility information obtained during previous phases of works at the Site;
- Inspection of Sub-Surface Chambers and Ducts;
- GPR Survey; and,
- Active Electronic Detection Method Survey (power cable detection).

The positioning of the ground gas vents was constrained by the presence of drainage channels and the layout of the car parking bays.

4.2.2 Overhead Obstructions

The presence of overhead structures within the production building, including steel beams, sprinkler system pipework, and the overhead medium pressure gas main, was taken into consideration when selecting groundwork and drilling plant, and when positioning locations for drilling.

4.2.3 Provision of Welfare

A welfare area for ARCADIS personnel was initially provided in the southern area of the main production area by the Site at the commencement of the works, comprising welfare and rest area facilities for use throughout the works. Use of the wider site's welfare facilities was also provided to ARCADIS.

In June 2012, ARCADIS were required to hand back the welfare area so it could undergo redevelopment. ARCADIS mobilised a welfare cabin to site to provide facilities close to the work area during the remainder of the installation works.

4.2.4 Concrete Coring

Internal drilling locations and locations in the new south car park were surfaced with concrete or bituminous hardstanding. Prior to the start of the intrusive works, concrete coring equipment was used to bore holes through the hardstanding at the Site, to allow more rapid progression of the drilling works.

5 SOIL VAPOUR EXTRACTION WELL INSTALLATION

The intrusive work for the installation of the internal network of wells was undertaken between 25th April 2012 and 28th June 2012. Photographic plates taken during the works are presented in Appendix B.

5.1 Rationale

In accordance with the design presented in the *RIP – CVOC Groundwater Remediation* (ARCADIS reference 909363805_04 dated January 2012) referenced previously in this report, ARCADIS installed infrastructure to facilitate SVE in the southern portion of the main production building of the Site to allow extraction of soil vapours and ground gases that may be associated with the measureable concentrations of Volatile Organic Compounds (VOCs), including trichloroethene (TCE) and its associated breakdown products, in the soil and groundwater underlying the Site.

5.2 Methodology

5.2.1 Borehole Drilling

A total of fifteen SVE boreholes were progressed in the southern portion of the main production building of the Site to a maximum depth of 2.4 mbgl using an ARCADIS-owned tracked Geoprobe® 6610 drilling rig employing direct push/ drive-in sampling techniques.

The borehole locations are presented on Figure 5. The borehole logs are included in Appendix C.

5.2.2 Installation of SVE Wells

Permanent extraction wells were installed in the boreholes to allow for subsequent vapour extraction. The wells were constructed from 50 mm-diameter threaded well screen and blank casing. The construction details are presented on the borehole logs in Appendix C.

Washed filter glass was used to fill the annulus between the extraction well casing and the borehole wall. The filter glass extended approximately 0.2 m above the uppermost screen slot. Cement-bentonite granules were placed above the filter glass. A well cap and flush mounted security casing were temporarily installed flush with the ground surface prior to the remediation trenching and installation of an inspection chamber around each SVE well.

5.2.3 Soil Screening

Ground conditions were logged, with a particular emphasis on physical evidence of impact, such as soil staining and the presence of separate phase liquids. The depths of groundwater strikes were also noted.

Soil samples were collected at approximately 0.5 m intervals and placed into polythene bags. The polythene bag was 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 a MiniRAE 2000 PID fitted with a 10.6eV UV lamp was inserted to test for ionisable volatile contaminants. This provides a qualitative method, which results in a representation of the presence of volatile compounds in the soil. The numerical output cannot be directly compared to the measured soil concentrations of Contaminants of Concern (CoC). The PID readings are presented on the borehole logs in Appendix C.

Limited soil sampling was undertaken during this phase of works to enable the collection of soil quality data to enhance the understanding of the environmental condition of the Site and to collect data from previously inaccessible areas of the main production building. One soil sample was submitted for analysis from an SVE borehole. Laboratory results for the soil samples analysed are presented in Tables 1 and 2.

5.2.4 Soil Sampling

One soil sample from the unsaturated alluvium was collected and submitted for laboratory analysis.

Sample Collection

Soil samples were placed into appropriate glass jars, glass *vials* and plastic tubs, supplied by the laboratory, using dedicated disposable and/or previously decontaminated reusable sampling tools (shovels, trowels) and dedicated disposable nitrile gloves.

Sample Preservation

Samples were stored in dedicated sample boxes with cooling aids to reduce microbial degradation. Containers for analyses of volatile organic compounds were filled so that minimal air space remained prior to sealing the container. No additional preservation was required for the analyses scheduled.

Sample Transport

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.

5.3 Analytical Strategy

The parameters for analysis were selected based on the findings of the previous phases of investigation and DQRA to provide additional soil quality data for the Site. Details of the environmental analysis conducted on soil samples obtained from beneath the Site are detailed below:

- Total Petroleum Hydrocarbons Criteria Working Group (TPHCWG) *via* Gas Chromatography – Flame Ionisation Detector (GC-FID);
- VOCs *via* Gas Chromatography – Mass Spectroscopy (GC-MS); and
- pH *via* meter.

5.3.1 Quality Assurance/ Quality Control

The samples were submitted to Jones Environmental Laboratory of Deeside, an ARCADIS approved supplier and a certified United Kingdom Accreditation Service (UKAS) & Monitoring Certification Scheme (MCertS) accredited laboratory, for selected chemical analysis. The samples were submitted with a chain of custody identifying ARCADIS as the client, the ARCADIS project reference, the Consultant/ Project Manager, the nature of the sample (*i.e.* soil) and the parameters to be tested.

The QA/ QC at the laboratory was carried out as part of their standard procedures certified as part of their International Organization for Standardization (ISO) 17025 and MCertS accreditation for methodologies, where applicable. ARCADIS' QA/ QC was conducted in line with in-house procedures, as part of our ISO 9001 and ISO 14001 accreditation.

5.4 Surveying

In July 2012, the locations of the newly installed SVE wells were recorded using Global Positioning System (GPS) technology. The co-ordinates obtained have been used to provide

an accurate Site layout plan, including the location of the SVE wells and ground elevations relative to Ordnance Datum.

5.5 Waste

The soil arisings were collected during the SVE well installation in an appropriate container (plastic membrane lined skip) and disposed of in accordance with current Environmental Permitting and Waste Management Duty-of-Care Regulations.

6 ENHANCED REDUCTIVE DECHLORINATION WELL INSTALLATION

The injection and monitoring well installation works were undertaken between 27th March 2012 and 11th May 2012. Photographic plates taken during the works are presented in Appendix B.

6.1 Rationale

In accordance with the design presented in the *RIP – CVOC Groundwater Remediation* (ARCADIS reference 909363805_04 dated January 2012) referenced previously in this report, ARCADIS identified ERD at the Site as a suitable remediation technology to reduce identified TCE and daughter product impacts to groundwater quality. A network of injection wells to deliver carbohydrate reagent solution to the sub-surface is needed to implement this technology.

6.2 Methodology

6.2.1 Borehole Drilling

A total of 25 boreholes were progressed to a maximum depth of 11 mbgl to allow injection well installation, and a total of four boreholes were progressed to a maximum depth of 20 mbgl to allow the installation of response monitoring wells using a Rota-Sonic drilling rig, provided and operated by Boart Longyear and ARCADIS approved sub-contractor, in the southern portion of the production building of the Site.

The borehole locations are presented on Figure 6. The borehole logs are included in Appendix E.

6.2.2 Installation of Injection Wells

The injection boreholes were installed with double installation injection wells as follows:

- A shallow injection well to allow delivery of carbohydrate solution to the Alluvium, screened from 3 m to 6 mbgl; and
- A medium injection well to allow delivery of carbohydrate solution to the upper section of the Raglan Mudstone Formation, screened from 8 m to 11 mbgl.

The injection wells were constructed from 50 mm diameter High Density Polyethylene (HDPE) threaded well screen with 1mm-2mm slots and blank casing, with female British Standard (BS) thread pipe at the top of the well to enable connection to the carbohydrate solution delivery pipework.

Washed filter gravel was used to fill the annulus between the injection well casing and the borehole wall. The filter gravel extended approximately 0.2 m above the uppermost screen slot of each of the three installations. Bentonite overlain by a cement and bentonite mix was placed above each installation filter pack to create a suitable seal between installations to prevent the upward migration of carbohydrate solution during injections.

The construction details are presented on the borehole logs in Appendix E.

6.2.3 Installation of Monitoring Wells

Monitoring boreholes were installed with triple installation monitoring wells as follows:

- A shallow monitoring well targeting the Alluvium, screened from 3 m to 6 mbgl;

- A medium monitoring well targeting to the upper section of the Raglan Mudstone Formation, screened from 8 m to 13 mbgl; and
- A deep monitoring well targeting the deeper sections of the Raglan Mudstone Formation, screened from 15 m to 20 mbgl.

The monitoring wells were constructed from 50 mm diameter HDPE threaded well screen with 1mm-2mm slots and blank casing.

Washed filter gravel was used to fill the annulus between the extraction well casing and the borehole wall. The filter gravel extended approximately 0.2 m above the uppermost screen slot. Bentonite granules were placed above the filter gravel.

The construction details are presented on the borehole logs in Appendix E.

6.2.4 Soil Screening

Ground conditions were logged, with a particular emphasis on physical evidence of impact, such as soil staining and the presence of separate phase liquids. The depths of groundwater strikes were also noted.

Soil samples were collected at approximate 0.5 m intervals for PID screening as described in section 5.2.3. The PID readings are presented on the borehole logs in Appendix E.

6.2.5 Soil Sampling

Limited soil sampling was undertaken during this phase of works to enable the collection of soil quality data to enhance the understanding of the environmental condition of the Site and to collect data from previously inaccessible areas of the main production building. A total of seven soil samples from the Alluvium and eight samples from the Raglan Mudstone Formation were collected and submitted for laboratory analysis following the methodology described in Section 5.2.4.

Laboratory results for the soil samples analysed are presented in Tables 1 and 2.

6.3 Surveying

In July 2012, following the installation of the injection and response monitoring wells, the location of the newly installed inspection chambers, monitoring and injection wells, and predominant Site features were recorded using GPS technology. The co-ordinates obtained have been used to provide an accurate Site layout plan, including the location of the injection and response wells and ground elevations relative to Ordnance Datum.

6.4 Waste

The soil arisings were collected during the injection and monitoring well installation in an appropriate container (plastic membrane lined skip) and disposed of in accordance with current Environmental Permitting and Waste Management Duty-of-Care Regulations.

7 LIGHT NON-AQUEOUS PHASE LIQUID EXTRACTION WELL INSTALLATION

The injection and monitoring well installation works were undertaken between 28th March 2012 and 24th April 2012. Photographic plates taken during the works are presented in Appendix B.

7.1 Rationale

During previous phases of environmental work, a notable presence of LNAPL (free-phase oil) was identified in the sub-surface in the southern section of the production building. The rationale for the installation of the extraction wells was to install a series of wider diameter wells to enable the recovery of LNAPL from the sub-surface and enable LNAPL containment on the Site in accordance with the design presented in the *RIP – LNAPL Recovery* (ARCADIS reference 909363022_06 dated February 2012) referenced previously in this report.

7.2 Methodology

7.2.1 Borehole Drilling

A total of 11 extraction wells were progressed to a maximum depth of 8 mbgl using a Rota-Sonic drilling rig in the southern portion of the production building of the Site.

The borehole locations are presented on Figure 7. The borehole logs are included in Appendix F.

7.2.2 Installation of Extraction Wells

The extraction boreholes were installed with single installation extraction wells screened from 1 or 2 mbgl, dependent on the thickness of made ground, to 8 mbgl.

The extraction wells were constructed from 125 mm diameter unplasticized polyvinyl chloride (uPVC) threaded well screen with 1mm-2mm slots and blank casing.

Washed filter gravel was used to fill the annulus between the injection well casing and the borehole wall. The filter sand extended approximately 0.2 m above the uppermost screen slot of each of the installations. Bentonite was placed above each installation filter pack.

The construction details are presented on the borehole logs in Appendix F.

7.2.3 Soil Screening

Ground conditions were logged, with a particular emphasis on physical evidence of impact, such as soil staining and the presence of separate phase liquids. The depths of groundwater strikes were also noted.

Soil samples were collected at approximate 0.5 m intervals for PID screening as described in section 5.2.3. The PID readings are presented on the borehole logs in Appendix F.

7.2.4 Soil Sampling

Limited soil sampling was undertaken during this phase of works to enable the collection of soil quality data to enhance the understanding of the environmental condition of the Site and to collect data from previously inaccessible areas of the main production building. One soil sample from the unsaturated Alluvium was collected and submitted for laboratory analysis following the methodology described in Section 5.2.4.

Laboratory results for the soil samples analysed are presented in Tables 1 and 2.

7.3 Surveying

In July 2012, following the installation of the extraction wells, the location of the newly installed inspection chambers, extraction wells, and predominant Site features were recorded using GPS technology. The co-ordinates obtained have been used to provide an accurate Site layout plan, including the location of the injection and response wells and ground elevations relative to Ordnance Datum.

7.4 Waste

The soil arisings were collected during the extraction well installation in an appropriate container (plastic membrane lined skip) and disposed of in accordance with current Environmental Permitting and Waste Management Duty-of-Care Regulations.

8 FIELD INVESTIGATION FINDINGS – SOIL QUALITY

A total of 15 SVE boreholes, 25 ERD injection boreholes, four ERD monitoring wells, and 11 LNAPL extraction boreholes were drilled in the southern portion of the main production. The borehole logs are presented in Appendices C, E, and F. Figures showing the well locations are presented on Figure 5 to Figure 7.

8.1 Ground Conditions

Hardstanding & Made Ground

Concrete was encountered in all borehole locations across the production building in thicknesses ranging from 0.15 m (SVE3001 and IW4015) to 1.0 m (EX6009). Underlying the concrete, Made Ground was encountered in all locations, with the exception of SVE3009, to a maximum depth of 2.34 mbgl in EX6007.

The Made Ground comprised predominantly gravelly clay, with gravels comprised of fragments of concrete, hardcore, red brick, and mixed lithologies.

Natural Ground

The Made Ground was underlain by sandy gravelly clay, clayey or sandy occasionally cobbly gravel, and clayey gravelly cobbles, proven to a maximum depth of 6.9 mbgl (IW4002, IW4005, and EX6001) considered typical of alluvial deposits. The Alluvium was underlain by a red mottled grey mudstone, proven to a maximum depth of 20 mbgl. The mudstone is considered representative of the Raglan Mudstone Formation.

The ground conditions encountered during this phase of work are generally consistent with the findings of previous phases of environmental works undertaken at the Site by ARCADIS. A detailed description of the ground conditions encountered beneath the Site is included on the borehole logs, which are presented in Appendices C, E, and F.

8.2 Groundwater Occurrence

In the extraction, injection, and monitoring wells, groundwater strikes were typically noted between 3.0 m and 4.0 mbgl, however a strike at 2.0 mbgl was observed in EX6001, and a strike at 4.7 mbgl was noted in IW4008.

In the SVE wells, possible groundwater strikes were noted during the drilling of boreholes SVE3011 and SVE3012 at depths of 2.3 mbgl and 2.2 mbgl, respectively.

8.3 Field Screening and Visual and Olfactory Observations – SVE Wells

Field screening was carried out using a MiniRAE Lite PID fitted with a 10.6eV UV lamp. *The* results are detailed on the borehole logs presented in Appendices C to E. A maximum PID reading of 137.2 ppmV was recorded on the soil sample from borehole SVE3007 at a depth of 1.8 m – 1.9 mbgl.

Hydrocarbon-type odours were noted associated with several of the samples from the south-east corner of the main production building (SVE3002 and SVE 3003) and the soil samples from the wells along the northern most line of SVE wells (SVE3011, SVE3013 and SVE3014). In addition, separate phase LNAPL was identified on the soil sample from SVE well SVE3003 at a depth of 1.0 m to 1.9 mbgl.

8.4 Field Screening and Visual and Olfactory Observations – Injection and Monitoring Wells

A maximum PID reading of 3,689 ppmV was recorded on the soil sample from borehole IW4004 at a depth of 2.9 m to 3.0 mbgl. In addition, PID reading of greater than the instrument detection limit of 5,000 ppmV was recorded on the soil sample from borehole IW4024 at a depth of 7.7 m to 7.8 mbgl.

Separate phase LNAPL was identified on the soil sample from monitoring well RSW7002 at a depth of 3.5 m to 5.0 mbgl.

8.5 Field Screening and Visual and Olfactory Observations – LNAPL Extraction Wells

A maximum PID reading of 307 ppmV was recorded on the soil sample from borehole EX6001 at a depth of 4.2 m to 4.4 mbgl.

Solvent and hydrocarbon-type odours were noted associated with the soil samples from each of the LNAPL extraction wells at depths ranging from 1.0 mbgl to 6.3 mbgl.

8.6 Laboratory Analysis Results

Soil sampling was carried out during the works to provide additional data in previously inaccessible areas of the Site. The laboratory results are presented in Tables 1 and 2.

9 PASSIVE GROUND GAS VENT WELL INSTALLATION

The passive ground gas vent wells were progressed on 17th April 2012 to a target depth of 2.4 mbgl using a percussive and lost point methodology. A total of seven locations were advanced within the newly constructed south car park, and three locations were progressed in the south-east corner of Zone 3.

The location of the passive ground gas vents is presented on Figure 8.

9.1 Rationale

The implementation of the proposed ERD remediation strategy is designed to increase the rate of natural degradation of solvents below the Site. The by-products of the degradation include generation of methane and hydrogen sulphide into solution. Although the volumes of gas produced are anticipated to be low, as a precautionary control measure the infrastructure to allow, passive gas venting was proposed to be installed in addition to the SVE system within the main production building and the southern boundary SVE remediation in the south car park, to provide additional mitigation against the potential build-up of gases in the sub-surface. Reference should be made to Appendix B of the *RIP – CVOC Groundwater Remediation* (ARCADIS reference 909363805_04 dated January 2012) referenced previously in this report.

9.2 Methodology

9.2.1 Borehole Drilling

Concrete coring equipment was used to bore holes through the bituminous hardstanding in the new car park and the existing underlying concrete slab to allow more rapid movement of the drilling rigs between borehole locations.

An ARCADIS-owned Geoprobe® rig was subsequently used to advance ten boreholes across the southern car park and adjoining areas, to facilitate the installation of passive ground gas vents. The boreholes were advanced to a maximum depth of 2.4 mbgl using a percussive and lost point methodology, which does not allow the recovery of soil samples.

9.2.2 Well Installation

The boreholes were each installed with a well screened from 0.5 mbgl to 2.4 mbgl, and constructed from 50mm diameter HDPE threaded well screen with 1-2mm slots and blank casing.

Washed filter glass was used to fill the annulus between the injection well casing and the borehole wall. The filter gravel extended approximately 0.2 m above the uppermost screen slot of the installations. A cement-bentonite mix was placed above the installation filter pack. A well cap and flush mounted security casing were installed flush with the surface.

9.2.3 Above-Ground Vent Installation

The below-ground infrastructure for the passive vents has been installed, *i.e.* monitoring wells installed to a shallow depth (2.4 mbgl). However, the vents themselves have not yet been installed.

The passive ground gas vents are considered to be an additional control measure should sub-surface gas levels increase considerably during the operation of the ERD remediation system. The above ground components of the vents will be installed if monitoring of the sub-surface gas emission rates indicates there is a requirement for passive venting.

At that stage, further assessment of the risk from vapour released to atmosphere will be undertaken.

10 DECOMMISSIONING AND REPLACEMENT OF SELECTED WELLS

The development of the new south car park, and the internal refurbishment of the production building have to date resulted in the loss of one groundwater and one soil gas monitoring well, through destruction or being inaccessible due to new layouts.

10.1 Monitoring Well BH111

Monitoring well BH111 was located within the footprint of the new car park, and was destroyed during earth works, associated with the south car park construction.

10.1.1 Borehole Drilling

ARCADIS undertook the replacement of BH111, named RBH111, concurrently to the installation of the below ground passive ground gas vent infrastructure prior to the opening of the car park for use by site employees, to minimise disruption to site activities and reduce the number of mobilisations to site. Utility clearance and coring activities are described in Sections 9.2.1 and 9.2.2. The replacement location was located as close as practicable to the original location.

An ARCADIS-owned Geoprobe® rig was used to advance the borehole in the southern car park. The borehole was advanced to a depth of 5.0 mbgl using a percussive and lost point methodology, which does not allow the recovery of soil samples.

The location of RBH111 is presented on Figure 8.

10.1.2 Monitoring Well Installation

The borehole was installed with a groundwater monitoring well screened from 1 mbgl to 5 mbgl and constructed from 50mm diameter HDPE threaded well screen with 1-2mm slots and blank casing.

Washed filter glass was used to fill the annulus between the injection well casing and the borehole wall. The filter gravel extended approximately 0.2 m above the uppermost screen slot of the installation. Bentonite was placed above the installation filter pack. A well cap and flush mounted security casing were installed flush with the surface.

10.2 Soil Gas Monitoring Point SG05

Near source soil gas point SG05 is located in the south west of the main production building. In the new factory layout, this area will be used for one of two Claas Assembly lines, with a machine placed over SG05, preventing access to it for monitoring purposes. Soil gas monitoring point SG05 forms part of the monitoring well set regularly monitored as part of the soil gas monitoring regime agreed with the regulators (ARCADIS report 909364202_04, April 2012).

10.2.1 Decommissioning

Soil gas point SG05 was decommissioned on 24th May 2012 by an ARCADIS engineer. The monitoring well was decommissioned in general accordance with the EA guidance Decommissioning Redundant Boreholes and Wells. The works comprised:

- Removal of the headworks;
- Backfilling of the borehole *via* the introduction of a concrete/ bentonite grout from the base of the borehole to ground level; and,

- Sealing of the borehole for the last meter with a concrete 'plug' brought up to flush with ground level.

10.2.2 Borehole Drilling

ARCADIS undertook the replacement of SG05, named RSG05, concurrently to the installation of remaining SVE wells within the production building. Utility clearance and coring activities are described in Sections 5.2.1 and 5.2.4. The replacement location was located as close as practicable to the original location, within the constraints associated with the proposed machine layout.

An ARCADIS-owned Geoprobe® rig was used to advance the borehole in the southern car park. The borehole was advanced on 28th June 2012 to a depth of 2.4 mbgl using a percussive and lost point methodology, which does not allow the recovery of soil samples.

10.2.3 Soil Gas Point Installation

A 0.3 m screened stainless steel soil gas point was installed at the base of the location, and sealed with cement-bentonite slurry to prevent ingress of atmospheric gasses during sampling. The soil gas sampling point was connected to the surface using HDPE tubing and installed beneath a flush fitting well cover.

10.3 Monitoring Well BH302

Monitoring well BH302 is located in the south west of the main production building. In the new factory layout, this area will be used for one of two Claas Assembly lines, with a machine placed over BH302, preventing access to it for future monitoring purposes.

Monitoring well BH302 was progressed in March 2010 to a depth of 33 mbgl and installed with dual installation groundwater monitoring wells. Due to the depth and the drilling technique required (Rota-sonic), replacement of the well would have been costly.

As an alternative, it was proposed to relocate the well head to a location that will be accessible following the installation of the new production machines. During the excavation of the Claas line area by Meritor's appointed subcontractor prior to the installation of foundations for the machine bay, an ARCADIS engineer attended Site on 24th May 2012 to relocate the well head.

The original well cover had already been broken out during the excavation works, and was removed. The well pipes were then trimmed down to allow flexible hose to be lowered into each of the monitoring wells with a 90 degree angle tube connector fitted to the top of each well pipe. The flexible hoses were then each run to the new well head location along the excavation base at approximately 0.2 mbgl, through a length of HDPE pipe to prevent damage to the flexible hoses once the excavation was reinstated. A length of HDPE tubing was run through the flexible hose and into each of the wells below the groundwater resting level, to allow the collection of groundwater samples from the wells via the newly installed well head. Photographs of the works are presented in Appendix B.

Although it will no longer be possible to gauge the wells in BH302 to determine resting groundwater level, it is considered that there are sufficient other wells in the south west of the production building screening both the Alluvium and the Raglan Mudstone Formation to provide data on groundwater resting levels and flow direction in this part of the site.

11 DUCTING, PIPEWORK AND INSPECTION CHAMBER INSTALLATION

Groundworks to facilitate the installation of remediation systems in the production building were undertaken between 27th March 2012 and 17th August 2012. Photographic plates taken during the works are presented in Appendix B. The works comprised of:

- Installation of inspection chambers around the ERD, SVE and LNAPL extraction (Total Fluid Pumping [TFP]) wells;
- Installation of trenches containing pipework and ducting to facilitate connection of above ground remediation plant to the ERD, SVE and TFP wells; and,
- SVE System Infrastructure Requirements

Installation of the sub-surface ducting, pipework and inspection chambers was undertaken between 27th March 2012 and 17th August 2012.

During the trenching works, there were limited deviations from the planned routes between boreholes. A number of redundant utilities were uncovered during the works that were not possible to be identified during the utility trace undertaken prior to the start of the works. The utilities comprised predominantly drainage channels, and occasional redundant cables. Whenever a utility was uncovered, work was stopped, a cable avoidance tool (CAT) was used to check the area, and the Site contact was informed and asked to confirm the utility was not live. Work resumed following confirmation that the utility was not live.

11.1 SVE Wells

11.1.1 Inspection Chamber Installation

Number of Newly Installed SVE Wells: 15 (as detailed in Section 5)

The layout of the SVE remediation system infrastructure in the production building area is presented on Figure 9 and comprises 15 SVE wells located within the three northernmost remediation lines within the production building. The SVE wells are located within inspection chambers, the specification of which are presented below:

Inspection Chambers

Minimum Depth:	750 mm
Minimum Length:	650 mm
Minimum Width:	650 mm
Inspection Cover:	Composite Flush to Proposed Floor Level
Inspection Cover Rating:	FibreLite Orange Traffic Rated (up to 25 tonnes)

11.1.2 Remediation System Ducting & Pipework

Inspection chambers were connected by shallow trenches in which 110 mm diameter fusion welded sub-surface remediation pipework was installed from the SVE well heads to the proposed SVE remediation system container. In addition, between two and six flexible ducts with draw cords were installed in the trenches connecting the chambers as a contingency for additional functionality.

An above-ground remediation container will be used to house the equipment for the SVE remediation system to enable easy access for maintenance of the system. The SVE remediation system will connect to the SVE wells *via* the sub-surface pipework installed in shallow utility trenches; each remediation well will be accessed *via* its inspection chamber. By linking the remediation wells and remediation system container (once built and mobilised to the Site) *via* the network of underground pipes and ducts, the Site should be able to operate normally during the remediation period.

11.2 LNAPL Extraction (TFP) System

Installation of the sub-surface pipework, ducting and inspection chambers was undertaken between 26th March and 17th August 2012.

11.2.1 Inspection Chamber Installation

Inspection chambers were installed over the newly installed extraction wells within the production building (EX6001 – EX6011).

In addition to the internal works, a chamber over an external extraction well (EX21) which could not be installed during the external remediation infrastructure installation phase of works due to restricted access was installed between 8th and 10th August 2012.

The layout of the TFP system is presented on Figure 10. The specification for the remediation infrastructure installed is summarised below:

Extraction Wells

Number of Newly Installed Extraction Wells: 11 (See Section 7)

The layout of the TFP remediation system infrastructure in the production building area is presented on Figure 10. The extraction wells are located within inspection chambers, the specification of which is presented below:

Inspection Chambers

Minimum Depth:	650 mm
Minimum Length:	650 mm
Minimum Width:	450 mm
Inspection Cover:	Composite Flush to Proposed Floor Level
Inspection Cover Rating:	FibreLite Orange Traffic Rated (up to 25 tonnes)

11.2.2 Remediation System Ducting & Pipework

Inspection chambers were connected by shallow trenches to enable the installation of remediation pipework from the extraction well heads to the proposed TFP remediation system container.

The extraction wells (EX6001 – EX6011) are connected by 150 mm diameter sub-surface rigid fusion welded pipework where required, and a 32 mm rigid fusion welded airline pipe, installed in shallow trenches. In addition, between two and six flexible ducts with draw cords were installed in the trenches connecting the chambers to allow additional future connectivity.

The layout of the TFP remediation system infrastructure in the production building, which links to the TFP infrastructure in the south yard, is presented on Figure 10.

The internal TFP well network is linked to the external TFP well network *via* underground pipework running from the southern remediation line through the eastern building wall, and will be linked into above ground TFP pipework running along the eastern site boundary.

An above-ground remediation container located in the south yard will be used to house the equipment for the TFP remediation system to enable easy access for maintenance of the system

11.3 ERD System

Installation of the sub-surface ducting and inspection chambers was undertaken between 26th March 2012 and 17th August 2012.

11.3.1 Inspection Chamber Installation

Inspection chambers were installed over the newly installed ERD injection wells within the production building (IW4001 – IW4025). Inspection chambers were not installed over the newly installed monitoring wells (RSW7001 – RSW7004), the flush traffic rated steel well covers installed during the drilling works will remain present.

The layout of the ERD system is presented on Figure 11. The specification for the remediation infrastructure installed is summarised below.

Injection and Monitoring Wells

Number of Newly Installed Injection Wells:	25 (See Section 6)
Number of Newly Installed Monitoring Wells:	4 (See Section 6)

The layout of the ERD remediation system infrastructure in the production building is presented on Figure 11 and comprises a series of 25 injection wells across the production building. The injection wells are located within inspection chambers, the specification of which is presented below:

Inspection Chambers	
Minimum Depth:	750 mm
Minimum Length:	600 mm
Minimum Width:	450 mm
Inspection Cover:	Composite Flush to Proposed Floor Level
Inspection Cover Rating:	FibreLite Orange Traffic Rated (up to 25 tonnes)

A schematic of a typical inspection chamber is presented on Figure 13.

11.3.2 Remediation System Ducting & Pipework

Inspection chambers over the injection wells were connected by shallow trenches to enable the installation of remediation pipework from the injection well heads to the proposed ERD remediation system container (carbohydrate solution injection unit).

The ERD injection wells (IW4001 – IW4025) are connected by 150 mm diameter rigid fusion welded sub-surface pipes where required, installed in shallow trenches. In addition, between two and six flexible ducts with draw cords were installed in the trenches connecting the chambers to provide routes for electrical control ability and future flexibility.

The layout of the ERD remediation system infrastructure in the production building is presented on Figure 11.

An above-ground remediation container located under the canopy over East Road will be used to house the carbohydrate solution injection unit at the Site. The carbohydrate solution injection unit will be connected to the injection wells *via* the sub-surface pipes and ducting installed in shallow utility trenches; each remediation well will be accessed *via* its inspection chamber. By linking the injection wells and the carbohydrate solution injection unit (once built and mobilised to the Site) *via* the network of underground pipes and ducts, the Site will be able to operate normally during the remediation period.

11.4 Fusion Welding

Electrofusion is a method of joining High Density Poly Ethylene (HDPE) pipes using fittings with integral heating elements. Sockets are used to join mains and service pipes and saddle fittings are used to connect services to mains. The pipe to be joined is prepared by removing the outer surface layer to a depth of around 0.2 mm, then pipe and fitting are clamped together to prevent movement. A voltage is applied across the fitting terminals via a control box. An electric current is passed through the wire which heats the wire and melts the

polymer, fusing the fitting to the pipe. After welding, the joint is allowed to cool before removing the restraining clamps.

The HDPE pipework infrastructure at Cwmbran was built using the "Fusamatic" brand of electrofusion fittings from Fusion Provida, along with the Fusamatic QBOX, which enables viewing and analysis of joint data / integrity on completion. This is made possible by the following several features on the fittings:

Fusamatic Pin: this provides a totally automatic method for ensuring the correct welding parameters are used. Within each Fusamatic pin is a resistor. When the QBOX is connected to the fitting, the Fusamatic pin enables it to automatically identify the correct fusion time required to make the joint. The QBOX identifies if the joint integrity has been compromised due to insufficient heat of current provided during the welding process.

The fusion welds undertaken during the installation of the internal remediation infrastructure were indicated to be successful.

Indicators: The pressure created by the expanding molten plastic in the jointing area inside the fitting during the electrofusion process will force out the indicator lugs. This is a visible sign that the necessary jointing pressure has been achieved. The ducts and pipework at Cwmbran were all visually inspected following install. In addition, the majority of couplers on the HDPE pipework were installed within the inspection chambers, rather than in the trench. The connection joints were made inside the inspection chambers on the car park. Inside the factory, there were number of joins made just outside of the chambers to enable orientation of inspection chambers with the factory walls. The combined approach of Electrofusion welding and minimisation of joints outside inspection chambers was used to maximise the pipework security against integrity breach.

11.5 Waste

During the course of the trenching works, broken out concrete was stored externally in the south yard. Soil arising were stored internally, and samples were collected and sent for laboratory analysis for waste classification purposes. Results indicated the material excavated from the site was non-hazardous. The concrete and soils were removed separately by ARCADIS' appointed subcontractor under duty of care documentation.

General waste generated throughout the works was collected in appropriate containers (plastic membrane lined skips), and removed from site by an appointed ARCADIS subcontractor under duty of care documentation.

During the excavation of the section between SVE3010 and EX6010, visually impacted material was uncovered. The material was segregated internally within the building, and a sample collected for laboratory analysis. The analysis results indicated the soil was classified as non-hazardous, and as such were removed with other soil arisings.

11.6 Surveying

In July 2012, following the installation of the majority of the remediation infrastructure, the location of the newly installed remediation trenching, inspection chambers and predominant Site features were recorded using GPS technology.

The co-ordinates obtained have been used to provide an accurate Site layout plan, including the location of the inspection chambers and ground elevations relative to Ordnance Datum.

11.7 Reinstatement

11.7.1 Backfilling

Ducts and pipes were bedded in pipe bedding gravel. Marking tape was laid over the gravel to warn of the presence of buried utilities should future excavations be undertaken in the vicinity of the remediation infrastructure. The trenches were subsequently filled with MoT Type 1 gravel compacted in 100 mm layers to max of 200 mm depth. A 300 mu damp proof membrane was then laid over the MoT Type I.

11.7.2 Concreting

The existing concrete on each side of the trench was doweled using 400mm bars of 16 mm diameter at a depth of 0.1 mbgl, and inserted 200mm into surrounding concrete at 1 m spacing, staggered on either side. Double A393 reinforcing mesh was then placed on 50 mm spacers/seats, with a second layer placed on top of the dowel bars.

Ready mix concrete RC35 was then poured, poked, and hand trowel finished. The fresh concrete was covered in visqueen, and left to cure for seven days. Expansion joints were retrospectively cut at a spacing of approximately 6.5 m.

12 FIELD INVESTIGATION BASELINE GROUNDWATER MONITORING

A groundwater monitoring visit was completed between 28th August 2012 and 11th September 2012. The Site layout and monitoring well locations are presented on Figure 12.

12.1 Rationale

In accordance with the design presented in the *RIP – CVOC Groundwater Remediation* (ARCADIS reference 909363805_04 dated January 2012) and *RIP – LNAPL Recovery* (ARCADIS reference 909363022_06 dated February 2012) referenced previously in this report, a baseline groundwater monitoring visit was undertaken to establish groundwater conditions across the Site, including at the location of selected newly installed remediation wells prior to commissioning the proposed TFP and ERD remediation works.

12.2 Methodology

Groundwater monitoring involved the inspection of 83 selected monitoring wells on Site for the presence of groundwater and NAPL, if present, using an oil-water interface probe. The monitoring event also involved the collection of groundwater samples from 51 selected wells via low-flow technique.

Low-flow sampling is a specific water delivery technique that is designed to produce a sample that most closely resembles the water quality in the aquifer adjacent to the screened zone of a well by reducing sample turbidity, which in turn reduces the variability in the sampling results. During low-flow sampling, purge water is passed through a flow cell and water quality parameters are measured using a multi-parameter meter. Dissolved Oxygen (DO), Oxidation-Reduction Potential (ORP), electrical conductivity and pH are measured at regular intervals until the DO and ORP readings stabilise to within 10% of the previous reading, or three saturated well volumes of groundwater has been removed from the well. A sample of the groundwater was subsequently collected.

12.3 Collection, Preservation and Transport of Samples

Collection

Groundwater samples were placed into appropriate glass bottles and glass vials supplied by the laboratory. Glass bottles and vials were used for the transport of groundwater samples to the laboratory for analyses of volatile and semi-volatile contaminants.

Preservation

Samples were stored in dedicated sample boxes with cooling aids to reduce microbial degradation and the containers for volatile analysis were filled so that minimal headspace remained prior to sealing the container.

This, in combination with a low storage temperature, reduced the potential for volatile loss. No additional sample preservation was required for the scheduled analysis.

Transport

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.

12.4 Analytical Strategy

Groundwater samples were submitted for analysis for CoC based on the CoC identified during previous phases of works, including the DQRA:

- TPHCWG via GC-FID methods if no LNAPL was present in the monitoring well; and,

- VOCs *via* GC-MS methods.

Groundwater samples from monitoring wells in which LNAPL was identified were not scheduled for TPH analysis but were scheduled for the remainder of the analytical suite.

In addition, selected groundwater samples were submitted for analysis of the following parameters, which will be used to monitor the performance of the remediation during the operation of the remediation systems:

- pH *via* meter;
- Total Organic Carbon (TOC) *via* Non-Dispersive Infrared (NDIR);
- Dissolved Organic Carbon (DOC) *via* NDIR;
- Methane, ethene, and ethane *via* GC-FID;
- Carbon dioxide *via* GC-FID;
- Nitrate *via* photometric analysis; and
- Sulphate *via* photometric analysis.

12.4.1 Quality Assurance/Quality Control

The samples were submitted to Jones Environmental Laboratory of Deeside, an ARCADIS approved supplier and a certified UKAS & MCertS accredited laboratory, for selected chemical analysis. The samples were submitted with a chain of custody identifying ARCADIS as the client, the ARCADIS project reference, the Consultant/ Project Manager, the nature of the sample (*i.e.* water) and the parameters to be tested.

The QA/ QC at the laboratory was carried out as part of their standard procedures certified as part of their ISO 17025 accreditation for methodologies, where applicable. ARCADIS' QA/ QC was conducted in line with in-house procedures, as part of our ISO 9001 and ISO 14001 accreditation. ARCADIS' Laboratory Data Quality Assurance and Quality Control Policy is presented in Appendix D.

13 FIELD INVESTIGATION BASELINE GROUND GAS MONITORING

A baseline bulk ground gas monitoring visit was completed between 23rd and 31st May 2012. A baseline near source soil gas sampling visit was carried out between the 22nd and 25th May 2012. The Site layout and monitoring well locations are presented on Figure 15 and Figure 16.

13.1 Rationale

As agreed with the Regulators in April 2012 and outlined in the Ground Gas Strategy (ARCADIS reference 909364002_04 dated January 2012) referenced previously in this report an additional near-source soil gas sampling and a baseline bulk ground gas monitoring visit was undertaken to establish ground gas conditions across the Site, prior to proposed remediation works.

13.2 Methodology

13.2.1 Bulk Ground Gas Monitoring

Gas monitoring was undertaken using a GA2000 infra red portable landfill gas analyser (LGA). The analyser is used to detect for a range of gases including carbon monoxide, carbon dioxide, methane, hydrogen sulphide and oxygen. Monitoring is carried out using tubing attached to the gas valve on the well. The valve is opened and the gas flow is measured. Following the measurement of gas flow, the instrument actively draws gases out of the well using an internal pump and measurement of ground gases is undertaken. Measurements are stopped when the gas readings have equalised.

The monitoring comprised the following tasks in chronological order:

- Measurement of relative pressure difference;
- Measurement of flow rate (peak and steady);
- Measurement of concentrations of methane, carbon dioxide, and hydrogen sulphide gases using infra-red gas analyser;
- Measurement of depth to LNAPL and groundwater; and,
- Screening using a MiniRAE 2000 PID.

In addition to the above, the measurement records also included:

- Date and time for each borehole standpipe measurement;
- Person carrying out the work, equipment used (*i.e.* gas analyser model and serial number);
- Weather conditions at the time of visit;
- Presence of waterlogged or frozen ground;
- Atmospheric pressure details for the day preceding monitoring; and,
- Comments on faults/ condition of boreholes (*i.e.* valve left open, bung/valve head missing, standpipe blocked *etc.*).

13.2.2 Soil Gas Sampling

The basic monitoring procedure involved the following tasks which were carried out in this order:

- Measurement using a PID at the selected near-source soil gas monitoring points SG01 – SG09.
- Using the LGA, the soil gas monitoring points (SG01 – SG09) were evaluated to ensure that there was no significant atmospheric air entrainment through a surface leak. No

- ambient air entrainment would be expected to occur during the soil gas monitoring.
- The soil gas samples were collected using evacuated Bottle Vac stainless steel vacuum canisters *via* a dedicated sampling train connected to the near source soil gas point.

13.3 Collection, Preservation and Transport of Samples

Collection

Near source soil gas samples were collected using dedicated evacuated Silo-Can type canisters supplied by the laboratory.

Preservation

Samples were stored in dedicated sample boxes. No additional preservation was required for the analyses scheduled.

Transport

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.

13.4 Analytical Strategy

Near source gas samples were submitted for the following analyses:

- Aliphatic Hydrocarbons C₅-C₁₂ *via* GC-MS - Tentatively Identified Compounds (TIC) methods;
- Aromatic Hydrocarbons C₅-C₁₆ *via* GC-MS - TIC methods;
- Benzene, toluene, ethylbenzene, and xylene (BTEX) compounds *via* GC-MS methods;
- Methyl *tertiary*-butyl ether (MTBE) *via* GC-MS methods;
- VOCs *via* GC-MS; and,
- Naphthalene *via* GC-FID – TIC methods.

13.4.1 Quality Assurance/Quality Control

The samples were submitted to Jones Environmental Laboratory of Deeside, an ARCADIS approved supplier and a certified UKAS and MCertS accredited laboratory, for selected chemical analysis. The samples were submitted with a chain of custody identifying ARCADIS as the client, the ARCADIS project reference, the Consultant/ Project Manager, the nature of the sample (*i.e.* soil gas) and the parameters to be tested.

The QA/ QC at the laboratory was carried out as part of their standard procedures certified as part of their ISO 17025 accreditation for methodologies, where applicable. ARCADIS' QA/ QC was conducted in line with in-house procedures, as part of our ISO 9001 and ISO 14001 accreditation. ARCADIS' Laboratory Data Quality Assurance and Quality Control Policy is presented in Appendix D.

14 FIELD INVESTIGATION FINDINGS – GROUNDWATER QUALITY

14.1 Groundwater

14.1.1 Groundwater Occurrence

Groundwater resting levels recorded during the August 2012 baseline monitoring visit are presented in Table 3.

During the August 2012 baseline groundwater monitoring visit, resting groundwater levels were measured in selected monitoring wells screened within the Alluvium at depths ranging from 0.70 m to 4.51 mbgl in monitoring wells BHOS409A and EX6005, respectively. It should be noted that 2,025 mm of LNAPL was present in EX6005, which has notably depressed the resting water level.

Resting groundwater levels measured within selected monitoring wells screened in the underlying Raglan Mudstone Formation ranged from depths of 2.14 m to 6.72 mbgl in monitoring wells BHOS306S and RSW7003D, respectively. It should be noted that 3,935 mm of LNAPL was present in RSW7003D, which has notably depressed the resting water level.

14.1.2 Groundwater Flow Direction

Groundwater elevation data has been used in combination with topographic data to infer the relative rest level of groundwater across the Site. This information has been used to determine a groundwater flow direction in the Alluvium and underlying Raglan Mudstone Formation beneath the Site to the south, south-east. Groundwater flow direction has previously been inferred to the south-east in both the Alluvium and Ragland Mudstone Formation.

Groundwater elevations from the August 2012 monitoring visit are presented on Figure 17A-C.

14.1.3 Hydrogeochemical Parameters

The stabilised hydrogeochemical parameters for the monitoring wells where groundwater samples were collected during the August 2012 baseline visit are presented in Table 4 and Table 5.

14.2 LNAPL

During the August 2012 baseline site visit, LNAPL was encountered in 40 of the 83 monitoring wells inspected across Zone 3, with the maximum LNAPL thickness recorded in monitoring well RSW7003D at 3,935 mm.

Of note, the presence of LNAPL in RSW7003D, screened in the Raglan Mudstone Formation from 15 to 20 mbgl is unexpected. A baildown test, where LNAPL is removed from a well and its recharge over time is measured, may help further evaluate this occurrence.

14.3 Laboratory Analysis Results

The results of the laboratory analysis of the groundwater samples for CoC obtained during the monitoring visit compared to the Site-Specific Assessment Criteria (SSAC) protective of human health and water resources are presented in Tables 6 to 15.

14.3.1 Quality Assurance and Quality Control

The QA/ QC data shows that the sampling methodology, together with the laboratory analysis, are providing reproducible results.

Duplicate samples were collected from monitoring wells BH114A and BH919 screening the alluvium and BH205AD and RSW7002D screening the Raglan Mudstone Formation and submitted blind as DUPA, DUPC, DUPE and DUPF to the laboratory for analysis. The original sample analytical results compared to the duplicate sample analytical results, for monitoring wells BH114A, BH919, BH205AD and RSW7002D, suggests that the data is in the bounds anticipated for natural variation in environmental media.

14.3.2 ERD Baseline Performance Parameters

The results of the laboratory analysis of the groundwater samples for ERD baseline performance parameters are presented in Table 16 to Table 18.

15 FIELD INVESTIGATION FINDINGS – GROUND GAS QUALITY

The objective of the ground gas monitoring is to investigate and monitor Zones 2 and 3 for the presence of gases being generated at the Site.

15.1 Bulk Ground Gas Results

The baseline ground gas monitoring visit was completed between 23rd and 31st May 2012 during a period of relatively high atmospheric pressure (ranging from 1011 millibar (mb) to 1021 mb). Measurements undertaken on 23rd May 2012 were carried out during a period of increasing atmospheric pressure, and measurements carried out between 29th and 31st May 2012 were undertaken during a period of relatively stable pressure. Ground gas monitoring results are presented in Table 19, and atmospheric pressure data over the course of the monitoring period is presented on Figure 18.

15.1.1 Methane and Carbon Dioxide

Peak methane and carbon dioxide concentrations in excess of 0.1 %v/v and 5 %v/v respectively are presented below.

Bulk Ground Gas Monitoring ID	Location	Methane Concentration (%v/v)	Carbon dioxide Concentration (%v/v)
BH103	East Road	36.6	5.3
BH107	East Road	5.1	0.8
BH118	South-east corner	7.8	1.9
BH122	Production building	<0.1	7.5
BH132	ERD pilot trial area	54.0	23.9
BH406	South site boundary	13.0	1.1
BH913	Production building	2.1	5.3

Methane and carbon dioxide concentrations in BH103, BH118, and BH406 may be attributed to the presence of LNAPL in the wells, recorded at thicknesses of 1,010 mm, 610 mm, and 505 mm, respectively, during the bulk ground gas monitoring. The methane and carbon dioxide concentrations could be as a result of interference with the LGA resulting in erroneously high readings or as a result of the LNAPL acting as an electron donor inducing the biological transformation of chlorinated compounds. Further assessment will be undertaken during future rounds of bulk ground gas monitoring.

It is considered likely that the elevated measurements from BH132 may be due to its proximity to the ERD pilot trial area, as supported by the low oxygen measurement and elevated carbon dioxide measurement.

The slightly elevated measurements obtained from monitoring wells BH107 and BH913 may be due to the presence of made ground, present at thicknesses of 0.7 m and 0.5 m, respectively, and Alluvium, present to depths of 4.7 mbgl in borehole BH107 and 3.6 mbgl in BH913. No visual or olfactory evidence of contamination was observed during the progression of the wells in 2010.

According to the borehole logs recorded during the progression of BH122, an odour was noted between 2.1 m and 3.5 mbgl, and a PID reading of 33.2 ppmV was recorded from a sample collected from 4.0 m – 4.4 mbgl. During the baseline groundwater monitoring visit 8 mm of LNAPL was measured resting on the groundwater in monitoring well BH122.

15.1.2 Hydrogen Sulphide

Hydrogen sulphide was detected above the instrument detection limit of <1 ppm at only one location, monitoring well BH132, where H₂S was recorded at 28 ppm. It is considered that this is due to the proximity of BH132 to the ERD pilot trial area, as hydrogen sulphide can be generated by the reductive dechlorination process.

15.1.3 Carbon Monoxide

Carbon monoxide (CO) was measured in concentrations exceeding the upper instrument calibration limit of 500 ppm in monitoring wells BH103 and BH132. Other concentrations recorded above the instrument detection limit are presented below:

Bulk Ground Gas Monitoring ID	Location	Carbon Monoxide (ppm)
BH120	Zone 2	48
BH121	Zone 2	94
BH406	South site boundary	3
BH913	Production building	4
BH921	Production building	3

Of note, the carbon monoxide measurement on the LGA gas analyser used for the measurement is known to be sensitive to hydrogen sulphide. The presence of hydrogen sulphide will cause the CO reading to be too high. For future monitoring events, an external hydrogen sulphide filter will be used to obtain the CO measurement.

15.1.4 Flow Measurements

Flow measurements were recorded ranging from -1.1 l/hr in BH202S to 0.1 l/hr in BH122, BH406, BH913, and BH921. In approximately half the wells gauged, flow was recorded below the instrument detection limit.

Bulk ground gas flow rates, where recorded, have been low and are not considered significant. In addition the low flow rates suggest that there is not currently significant gas generation beneath the Site.

15.2 Near Source Soil Gas Baseline Results

The laboratory results from the soil gas sampling are presented in Tables 20 and 21.

Detections above laboratory method detection limit comprised predominantly chlorinated solvent compounds (tetrachloroethene [PCE], TCE, *cis*-1,2-dichloroethene [*cis*-1,2-DCE], vinyl chloride and chloroform), benzene, toluene, ethylbenzene and xylenes (BTEX compounds), aliphatic and aromatic TPH compounds and trimethylbenzene isomers.

15.2.1 Quality Assurance and Quality Control

The QA/ QC data shows that the sampling methodology, together with the laboratory analysis, are providing reproducible results.

A duplicate sample was collected from well SG05 and submitted blind as SGA to the laboratory for analysis. The original sample analytical results compared to the duplicate sample analytical results, for well SG05, suggests that the data is in the bounds anticipated for natural variation in environmental media.

16 RISK ASSESSMENT

16.1 Derivation of Soil and Groundwater Site Specific Assessment Criteria

The soil and groundwater SSAC were derived in the ARCADIS Updated DQRA (909363202_02, April 2012).

16.2 Comparison of Soil Data with SSAC

Measured concentrations of CoC in soil measured during the progression of the remediation boreholes have been compared to SSAC protective of human health and water resources derived in the updated Quantitative Risk Assessment (ARCADIS ref. 909363202, June 2011) in Tables 1 and 2.

16.2.1 Human Health

TPH

None of the measured concentrations of TPH compounds in the soil samples analysed exceeded the SSAC derived for the protection of human health receptors (commercial Site workers).

VOCs

Measured concentrations of vinyl chloride, *cis*-1,2-DCE, TCE and PCE exceeded the SSAC derived to be protective of human health receptors in a number of locations across the Site in samples collected from the Alluvium.

Measured concentrations of *cis*-1,2-DCE, TCE, and PCE were detected above the SSAC in a number of samples collected from the Raglan Mudstone Formation.

16.2.2 Water Resources

TPH

One detection of xylenes was found to marginally exceed the SSAC protective of water resources in a sample collected from the Alluvium as summarised in the table below:

Compound	Water Resources SSAC Petroleum Source Area 9R (mg/kg)	Soil Sample Location	Measured Concentration Exceeding SSAC (mg/kg)
Total Xylenes	181	RSW7002, 3.3 mbgl	188

VOCs

Measured concentrations of *cis*-1,2-DCE, TCE, and PCE exceeded the SSAC protective of water resources in samples collected across the Site from the Alluvium and the Raglan Mudstone Formation.

In addition, the measured concentrations of vinyl chloride and *trans*-1,2-dichloroethene (*trans*-1,2-DCE) in one soil sample, exceeded the SSAC in a sample collected from the Alluvium (RSW7002 3.3, mbgl).

16.3 Comparison of Groundwater Data with SSAC

16.3.1 Human Health

TPH

None of the measured concentrations of TPH compounds in the groundwater samples analysed exceeded the SSAC derived for the protection of human health receptors (commercial Site workers).

VOCs

Measured concentrations of vinyl chloride, *cis*-1,2-DCE, and TCE exceeded the SSAC protective of human health receptors in a number of locations across the site in samples collected from the Alluvium. The measured concentrations of vinyl chloride in a one groundwater sample (BH204AD) from the Raglan Mudstone Formation exceeded the SSAC protective of human health receptors.

16.3.2 Water Resources

TPH

None of the measured concentrations of TPH compounds in the groundwater samples analysed exceeded the SSAC derived for the protection of water resource receptors.

VOCs

Measured concentrations of vinyl chloride, *cis*-1,2-DCE, TCE, and PCE exceeded the SSAC protective of water resources in samples collected across the Site from the Alluvium and the Raglan Mudstone Formation.

In addition, the measured concentrations of *trans*-1,2-DCE in two groundwater samples from the Alluvium, exceeded the SSAC, from monitoring wells BH204AS and BH922.

16.4 Discussion

The results obtained from laboratory analysis of soil sample samples collected during the installation of the remediation well network has provided additional information on soil quality in areas of the production building that were previously inaccessible. A number of concentrations of chlorinated VOCs in these locations were measured at concentrations exceeding the SSAC protective of human health and water resource receptors indicate a potentially unacceptable level of risk to these receptors. The additional soil sample locations are within the area of remediation activities that are currently being implemented.

17 CONCLUSIONS AND RECOMMENDATIONS

A network of remediation infrastructure, comprising pipework, ducting, inspection chambers, and ERD injection, ERD monitoring, LNAPL extraction and SVE wells, has been installed in the southern portion of the main production building on-Site in accordance with the RIPs produced by ARCADIS (Report references 909363022_06 dated February 2012 and 909363805_04 dated January 2012).

In addition a number of additional tasks were completed, including:

- Decommissioning of the Zone 1 Monitoring Well Network;
- Decommissioning and Replacement of Selected Monitoring Wells;
- Baseline Groundwater Monitoring; and,
- Baseline Bulk Ground Gas and Additional Near-Source Soil Gas Monitoring undertaken in accordance with the Ground Gas Strategy (ARCADIS reference 909364002_04 dated January 2010).

An application has been made to the EA to obtain an Environmental Permit (EP) for the operation of remediation systems at the Site as described in the RIPs for LNAPL recovery and the remediation of chlorinated VOC (CVOC) in groundwater. Following the approval of the EP, the remediation systems should be commissioned. The subsequent operation, monitoring and maintenance should be undertaken in accordance with the RIPs referenced above and the Ground Gas Strategy document, referenced earlier in this report.

18 STUDY LIMITATIONS

IMPORTANT. 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 (UK) Limited (ARCADIS), with all reasonable skill, care and diligence within the terms of the Appointment and with the resources and manpower agreed with Meritor (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 unless agreed otherwise in writing.
3. Unless stated otherwise, no consultations with authorities or funders or other interested third parties have been carried out. ARCADIS are unable to give categorical assurance that the findings will be accepted by these third parties as such bodies may have unpublished, more stringent objectives. Further work may be required by these parties.
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. In giving opinions and advice, pending changes in legislation, of which ARCADIS is aware, have been considered. 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 correct 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. All information relevant to the scope may not have been received.
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 changes in the condition of the site since the time of the investigation.
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.
13. Unless otherwise stated, samples from the site (soil, groundwater, building fabric or other samples) have NOT been analysed or assed for waste classification purposes.

TABLES

Table 1
Comparison of TPH Concentrations in Soil (mg/kg) to SSAC and pH Values

Borehole Location	Human Health SSAC (mg/kg) Protective of Commercial Workers	Water Resources SSAC Petroleum Source Area 8R (mg/kg)	Water Resources SSAC Petroleum Source Area 9R (mg/kg)	Alluvium							Raglan Mudstone Formation								Laboratory Method Detection Limit
				EX6008	RSW7002	IW4003	IW4010	IW4012	IW4016	SVE3010	RSW7001	RSW7002	IW4003	IW4012	IW4017	IW4020	IW4022	IW4024	
				2.10	3.30	3.00	2.4 - 2.5	2.5 - 3.0	2.5 - 2.9	1.50	6.20	7.00	9.00	7.0 -7.5	9.20	6.00	8.0 - 8.5	7.8	
Depth (mbgl)				9R	9R	9R	9R	9R	9R	N/A	9R	9R	9R	9R	9R	8R	N/A	N/A	
Source Area																			
TOTAL PETROLEUM HYDROCARBONS	Aliphatics																		
	>C ₅ -C ₆ Aliphatics	*	*	1,044	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
	>C ₆ -C ₈ Aliphatics	*	*	3,554	-	2.3	0.1	-	0.9	-	-	-	-	-	-	-	-	-	0.1
	>C ₈ -C ₁₀ Aliphatics	1,418	*	*	-	0.6	2.8	-	0.1	0.3	-	-	-	-	-	-	-	-	0.1
	>C ₁₀ -C ₁₂ Aliphatics	6,373	*	*	-	8	88.8	-	-	-	-	-	-	-	-	-	-	-	0.1
	>C ₁₂ -C ₁₆ Aliphatics	25,141	*	*	-	300	607	15	140	48	15	-	-	-	-	-	-	-	1
	>C ₁₆ -C ₂₁ Aliphatics	*	*	*	-	3,795	2,744	594	914	735	105	-	54	-	-	-	-	-	1
	>C ₂₁ -C ₃₅ Aliphatics	*	*	*	-	4,295	5,707	406	1,126	620	223	-	44	-	-	-	-	-	1
	Aromatics																		
	>EC ₅ -EC ₇ Aromatics	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
	>EC ₇ -EC ₈ Aromatics	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
	>EC ₈ -EC ₁₀ Aromatics	10,007	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
	>EC ₁₀ -EC ₁₂ Aromatics	19,225	43,805	3,268	-	2.4	16.8	-	-	-	-	-	-	-	-	-	-	-	0.1
	>EC ₁₂ -EC ₁₆ Aromatics	16,150	24,234,694	4,339	-	-	269.4	11.4	57.5	12.3	1.4	-	-	-	-	-	-	-	0.5
	>EC ₁₆ -EC ₂₁ Aromatics	16,150	*	*	-	2,403	1,680	566	436	380	28	-	33	-	-	-	-	-	1
	>EC ₂₁ -EC ₃₅ Aromatics	*	*	*	-	2,840	3,450	323	628	482	79	-	59	-	-	-	-	-	1
	PRO	**	**	**	-	11	92	-	0.1	1.2	-	-	-	-	-	-	-	-	Sum of C ₄ -C ₁₂
	EPH	**	**	**	-	8,390	9,058	1,015	2,180	1,403	343	-	98	-	-	-	-	-	Sum of C ₁₂ -C ₃₅
	TPH	**	**	**	-	13,646	14,566	1,915	3,302	2,278	451	-	190	-	-	-	-	-	Sum of C ₄ -C ₃₅
	MTBE	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002
	Benzene	32	*	25.9	-	18	27	-	-	-	-	-	-	-	-	-	-	-	0.003
	Toluene	59,357	*	*	6	33	19	-	-	-	-	-	5	-	-	-	-	-	0.003
	Ethylbenzene	17,085	*	*	-	80	167	-	-	-	-	-	17	-	-	-	-	-	0.003
	Xylenes	7,065	*	181	-	188	117	-	-	-	-	-	21	-	-	-	-	-	
pH				7.57	7.78	6.51	6.51	7.27	6.90	7.80	8.04	8.30	8.96	9.10	8.90	8.50	8.94	7.86	

Notes

SSAC	Site-Specific Assessment Criteria (Assumes Commercial Worker Playing Rugby at Off Site Playing FieldsFields - Meritor Reduced Footprint)
mbgl	Metres below ground level
Zone 3	South area of the Site as presented on Figure 3
Source 8R	As detailed in ARCADIS' Detailed Quantitative Risk Assessment (DQRA) - Contaminant Distribution Source 8R
Source 9R	As detailed in ARCADIS' DQRA - Contaminant Distribution Source 9R
1.23	Value exceeds the SSAC derived to be protective of human health and water resource receptors
1.23	Value exceeds the SSAC derived to be protective of water resource receptors
*	No SSAC derived
**	No SSAC derived due to multiple components
-	Less than laboratory detection limit
PRO	Petrol Range Organics (C ₄ -C ₁₂) plus MTBE
EPH	Extractable Petroleum Hydrocarbons (C ₁₂ -C ₃₅)
TPH	Total Petroleum Hydrocarbons (C ₄ -C ₃₅)
MTBE	Methyl tertiary-butyl ether
Italics	Target exceeds theoretical soil saturation limit. Concentrations above the soil saturation limit may indicate the presence of separate phase in soil, but does not necessarily present a significant risk

Table 2
Comparison of VOC Concentrations in Soil (mg/kg) to SSAC

				Alluvium							Raglan Mudstone Formation								Laboratory Method Detection Limit (µg/kg)		
Borehole Location	Human Health SSAC (mg/kg) Protective of Commercial Workers	Water Resources SSAC Non-Petroleum Source Area 4R (mg/kg)	Water Resources SSAC Non-Petroleum Source Area 3R (mg/kg)	EX6008	RSW7002	IW4003	IW4010	IW4012	IW4016	SVE3010	RSW7001	RSW7002	IW4003	IW4012	IW4017	IW4020	IW4022	IW4024			
Depth (mbgl)				2.10	3.30	3.00	2.4 - 2.5	2.5 - 3.0	2.5 - 2.9	1.50	6.20	7.00	9.00	7.0 - 7.5	9.20	6.00	8.0 - 8.5	7.8			
Source Area				N/A	4R	4R	N/A	N/A	4R	N/A	4R	4R	4R	N/A	4R	3R	N/A	N/A			
VOLATILE ORGANIC COMPOUNDS	Dichlorodifluoromethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2		
	Methyl Tertiary Butyl Ether	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2		
	Chloromethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	Vinyl Chloride	0.0824	0.0628	*	6	29	-	-	-	-	-	-	-	-	-	-	-	-	<2		
	Bromomethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1		
	Chloroethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2		
	Trichlorofluoromethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2		
	1,1-Dichloroethene	25.3	1,252,066	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<6		
	Dichloromethane	*	*	*	-	-	-	27	-	17	16	-	-	-	9	-	-	-	<7		
	trans-1-2-dichloroethene	230	3.17	*	-	106	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	1,1-Dichloroethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	cis-1-2-dichloroethene	13.8	2.97	1.30	40	6,551	33	-	29	221	-	-	507	17	8	-	-	40	<3		
	2,2-Dichloropropane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4		
	Bromochloromethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	Chloroform	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	1,1,1-Trichloroethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	1,1-Dichloropropene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	Carbon tetrachloride	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4		
	1,2-Dichloroethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4		
	Benzene	32	*	*	-	18	27	-	-	-	-	-	-	-	-	-	-	-	<3		
	Trichloroethene	13.8	4.57	1.87	-	15,774	68	208	125	512	85	-	5,222	27	9	45	7	4	31,110	<3	
	1,2-Dichloropropane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<6		
	Dibromomethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	Bromodichloromethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	68	<3		
	cis-1-3-Dichloropropene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4		
	Toluene	59,357	*	*	6	33	19	-	-	-	-	-	5	-	-	-	-	-	<3		
	trans-1-3-Dichloropropene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	1,1,2-Trichloroethane	2.8	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	Tetrachloroethene	182	21.5	13.8	-	356	14	298	13	283	79	-	303	75	-	114	-	12	<3		
	1,3-Dichloropropane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	Dibromochloromethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	1,2-Dibromoethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	Chlorobenzene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	1,1,1,2-Tetrachloroethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	Ethylbenzene	17,085	*	*	-	80	167	-	-	-	-	-	17	-	-	-	-	-	<3		
	p/m-Xylene	*	*	*	-	124	80	-	-	-	-	-	15	-	-	-	-	-	<6		
	o-Xylene	7,065	*	*	-	64	37	-	-	-	-	-	6	-	-	-	-	-	<3		
	Styrene		*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	Bromoform	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3		
	Isopropylbenzene	*	*	*	-	-	33	-	-	-	-	-	-	-	-	-	-	-	<3		
1,1,2,2-Tetrachloroethane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3			
Bromobenzene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2			
1,2,3-Trichloropropane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4			
Propylbenzene	*	*	*	-	-	57	-	-	-	-	-	-	-	-	-	-	-	<4			
2-Chlorotoluene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3			
1,3,5-Trimethylbenzene	*	*	*	-	64	94	-	-	-	-	-	8	-	-	-	-	-	<3			
4-Chlorotoluene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<3			
tert-Butylbenzene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<5			
1,2,4-Trimethylbenzene	*	*	*	-	157	157	-	-	-	-	-	17	-	-	-	-	-	<6			
sec-Butylbenzene	*	*	*	-	-	151	-	-	-	-	-	-	-	-	-	-	-	<4			
4-Isopropyltoluene	*	*	*	-	47	79	-	-	-	-	-	-	-	-	-	-	-	<4			
1,3-Dichlorobenzene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4			
1,4-Dichlorobenzene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4			
n-Butylbenzene	*	*	*	-	-	338	-	-	-	-	-	-	-	-	-	-	-	<4			
1,2-Dichlorobenzene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4			
1,2-Dibromo-3-chloropropane	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4			
1,2,4-Trichlorobenzene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<7			
Hexachlorobutadiene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4			
Naphthalene	1,895	*	*	-	212	103	-	-	-	-	-	-	-	-	-	-	-	<27			
1,2,3-Trichlorobenzene	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<7			
Total VOCs				**	**	**	52	23,615	1,457	533	167	1,033	180	-	6,100	119	17	168	7	4	31,230

Notes

SSAC	Site-Specific Assessment Criteria (Assumes Commercial Worker Playing Rugby at Off Site Playing FieldsFields - Meritor Reduced Footprint)
mbgl	Metres below ground level
Zone 3	South area of the Site as presented on Figure 3
Source 3R	As detailed in ARCADIS' Detailed Quantitative Risk Assessment (DQRA) - Contaminant Distribution Source 3R
Source 4R	As detailed in ARCADIS' DQRA - Contaminant Distribution Source 4R
1.23	Value exceeds the SSAC derived to be protective of human health and water resource receptors
1.23	Value exceeds the SSAC derived to be protective of human health receptors
1.23	Value exceeds the SSAC derived to be protective of water resource receptors
*	No SSAC derived
**	No SSAC derived due to multiple components
-	Less than laboratory detection limit
Italics	Target exceeds theoretical soil saturation limit. Concentrations above the soil saturation limit may indicate the presence of separate phase in soil, but does not necessarily present a significant risk

Table 3
Ground Elevations - Baseline Groundwater Monitoring

Monitoring Well	Monitoring Well Elevation (mAOD)	Depth to LNAPL (mbgl)	Depth to Groundwater (mbgl)	LNAPL Thickness (mm)	Elevation of Groundwater (mAOD)	Corrected Elevation of Groundwater for Presence of LNAPL* (mAOD)
Alluvium						
BH107	54.34	-	2.47	-	51.87	-
BH108	54.48	2.53	2.86	330	51.62	51.93
BH114A	53.52	-	1.83	-	51.69	-
BH115	54.58	-	2.35	-	52.23	-
BH122	54.56	2.56	2.57	8	51.99	51.99
BH204AS	53.49	3.52	4.18	660	49.31	49.92
BH205AS	53.52	-	3.02	-	50.51	-
BH400	53.29	UTL				
BH402	53.34	1.46	1.57	115	51.77	51.88
BH909	54.61	-	2.18	-	52.44	-
BH912	54.56	2.34	2.86	516	51.71	52.18
BH919	54.59	2.34	2.36	25	52.23	52.25
BH922	54.57	-	2.62	-	51.94	-
BH923	53.42	-	1.18	-	52.24	-
BH925	54.59	-	1.83	-	52.76	-
BH926	54.57	-	1.86	-	52.71	-
BH928	54.61	-	1.79	-	52.82	-
EX03	53.33	Not measured				
EX04	53.49	UTL				
EX06	53.39	2.67	2.84	163	50.56	50.71
EX07	53.39	2.17	3.55	1,380	49.84	51.12
EX08	53.40	2.08	2.93	853	50.47	51.26
EX09	53.52	2.23	2.71	480	50.81	51.26
EX10	53.59	-	2.38	-	51.21	-
EX11	53.37	-	1.70	-	51.67	-
EX12	53.34	-	1.55	-	51.79	-
EX13	53.36	1.44	1.46	25	51.90	51.92
EX14	53.38	1.37	1.44	70	51.94	52.01
EX15	53.36	1.33	3.40	2,070	49.96	51.89
EX16	53.37	1.45	2.45	1,000	50.92	51.85
EX17	53.47	1.87	2.54	666	50.93	51.55
EX18	53.61	1.82	2.42	600	51.19	51.75
EX19	53.73	1.94	2.90	965	50.83	51.73
EX20	53.98	1.98	3.05	1,070	50.93	51.93
EX21	54.25	2.41	2.99	580	51.26	51.80
EX22	53.35	-	1.61	-	51.75	-
EX23	53.51	1.94	3.10	1,160	50.41	51.49
EX6001	54.57	2.63	3.02	390	51.55	51.91
EX6002	54.57	2.59	3.21	620	51.36	51.93
EX6003	54.57	2.64	2.90	260	51.67	51.92
EX6004	54.58	2.55	4.45	1,900	50.13	51.90
EX6005	54.59	2.49	4.51	2,025	50.08	51.97
EX6006	54.57	2.52	4.17	1,650	50.40	51.94
EX6007	54.53	2.61	4.01	1,400	50.53	51.83
EX6008	54.54	2.63	3.53	905	51.01	51.85
EX6009	54.57	2.55	2.97	420	51.60	51.99
EX6010	54.58	2.63	3.05	420	51.53	51.92
EX6011	54.57	2.68	3.30	620	51.27	
RSW7001S	54.60	-	2.64	-	51.96	-
RSW7002S	54.57	2.52	4.23	1,715	50.34	51.93
RSW7003S	54.52	2.64	2.79	153	51.73	51.87
RSW7004S	54.54	2.59	4.035	1,445	50.50	51.85
RSW2006S	53.48	-	4.13	-	49.35	-
RSW2007S	53.50	1.97	2.88	915	50.62	51.47
RSW2008S	53.52	-	2.34	-	51.18	-
RSW2009S	53.49	2.26	2.55	290	50.94	51.21
RSW2010S	53.51	-	2.52	-	50.99	-
RSW2011S	53.33	-	2.79	-	50.54	-
BHOS409A	52.36	-	0.70	-	51.66	-
BHOS410	51.82	-	1.31	-	50.51	-
BHOS412	50.70	-	1.16	-	49.54	-
BHOS414	51.18	-	1.89	-	49.29	-

Notes

mAOD Metres Above Ordnance Datum
mbgl Metres Below Ground Level
LNAPL Light Non-Aqueous Phase Liquid
DRY No water present in monitoring well
- No LNAPL encountered
UTL Unable to locate or access

Where LNAPL was encountered, groundwater elevation corrected for depression effect using Hughes, J.R., Sullivan, C.R. and Zinner, R.E., 1988. "Two techniques for determining the true hydrocarbon thickness in an unconfined aquifer".

*

Table 3
Ground Elevations - Baseline Groundwater Monitoring

Monitoring Well	Monitoring Well Elevation (mAOD)	Depth to LNAPL (mbgl)	Depth to Groundwater (mbgl)	LNAPL Thickness (mm)	Elevation of Groundwater (mAOD)	Corrected Elevation of Groundwater for Presence of LNAPL* (mAOD)
Raglan Mudstone Formation						
BH204AD	53.49	-	3.80	-	49.69	-
BH205AD	53.52	-	3.03	-	50.49	-
BH301S	54.60	-	2.57	-	52.04	-
BH301D	54.60	-	2.73	-	51.87	-
BH303S	54.08	-	2.77	-	51.31	-
BH303D	54.08	-	4.28	-	49.80	-
BH304S	53.43	-	2.92	-	50.51	-
BH304D	53.43	-	3.44	-	49.99	-
Raglan Mudstone Formation						
EX01	53.63	-	5.84	-	47.79	-
EX02	53.38	2.73	2.99	260	50.39	50.63
EX05	53.30	2.66	2.82	160	50.48	50.63
RSW7001D	54.60	-	2.99	-	51.61	-
RSW7002D	54.57	2.75	3.71	960	50.86	51.75
RSW7003D	54.52	2.78	6.72	3,935	47.80	51.46
RSW7004D	54.54	-	3.46	-	51.08	-
RSW2006D	53.48	-	2.59	-	50.89	-
RSW2007D	53.50	-	3.65	-	49.85	-
RSW2008D	53.52	-	4.00	-	49.52	-
RSW2009D	53.49	-	3.80	-	49.70	-
RSW2010D	53.51	-	3.22	-	50.29	-
RSW2011D	53.33	-	3.76	-	49.58	-
RSW2012D	53.38	3.59	3.86	273	49.52	49.77
BHOS306S	51.60	-	2.14	-	49.46	-
BHOS306D	51.60	-	2.79	-	48.81	-
BHOS307	50.73	-	2.69	-	48.04	-

Notes

mAOD Metres Above Ordnance Datum
mbgl Metres Below Ground Level
LNAPL Light Non-Aqueous Phase Liquid
DRY No water present in monitoring well
- No LNAPL encountered
UTL Unable to locate or access

Where LNAPL was encountered, groundwater elevation corrected for depression effect using Hughes, J.R., Sullivan, C.R. and Zinner, R.E., 1988. "Two techniques for determining the true hydrocarbon thickness in an unconfined aquifer".

*

Table 4
Stabilised Hydrogeochemical Parameters – Zone 3

Monitoring Well	Alluvium														
	BH107	BH108	BH114A	BH115	BH122	BH204AS	BH400	BH402	BH909	BH912	BH919	BH922	BH923	BH925	BH926
Electrical Conductivity (µS/cm)	348	-	325	222	-	-	Well assumed destroyed during car park development	-	380	-	-	826	361	-	-
Dissolved Oxygen (mg/l)	0.51	-	1.41	1.84	-	-		-	0.48	-	-	0.96	1.62	-	-
pH pH units	6.62	-	9.95	7.47	-	-		-	6.89	-	-	6.30	7.70	-	-
Oxidation-Reduction Potential (mV)	24.0	-	100.9	59.7	-	-		-	-74.0	-	-	65.4	115.5	-	-

Monitoring Well	Alluvium										
	BH928	RSW7001S	RSW7002S	RSW7003S	RSW7004S	RSW2006S	RSW2007S	RSW2008S	RSW2009S	RSW2010S	RSW2011S
Electrical Conductivity (µS/cm)	-	724	No parameters collected - LNAPL present	No parameters collected - LNAPL present	No parameters collected - grab sample	412	No parameters collected - LNAPL present	270	No parameters collected - grab sample	428	535
Dissolved Oxygen (mg/l)	-	0.23				0.48		0.90		0.45	1.56
pH pH units	-	7.59				6.79		6.43		7.25	7.26
Oxidation-Reduction Potential (mV)	-	-117.3				-116.1		-29.0		-99.5	19.9

Monitoring Well	Raglan Mudstone Formation														
	BH204AD	BH205AD	BH301S	BH301D	BH303S	BH303D	BH304S	EX02	EX05	RSW7001D	RSW7002D	RSW7003D	RSW7004D	RSW2006D	RSW2007D
Electrical Conductivity (µS/cm)	649	336	682	468	318	369	347	-	-	334	No parameters collected - LNAPL present	No parameters collected - LNAPL present	301	465	221
Dissolved Oxygen (mg/l)	1.30	0.35	0.62	0.53	0.52	0.51	0.41	-	-	0.28			0.79	0.71	0.48
pH pH units	6.91	7.15	6.62	6.65	6.86	7.32	7.16	-	-	8.98			7.78	7.05	7.14
Oxidation-Reduction Potential (mV)	87.2	18.0	-96.2	-105.1	-40.2	-101.7	-12.7	-	-	-167.4			-112.1	-80.9	-70.0

Monitoring Well	Raglan Mudstone Formation			
	RSW2008D	RSW2009D	RSW2010D	RSW2011D
Electrical Conductivity (µS/cm)	211	589	434	209
Dissolved Oxygen (mg/l)	0.53	0.75	0.51	0.43
pH pH units	7.14	7.28	7.44	7.24
Oxidation-Reduction Potential (mV)	127.0	6.4	-26.9	34.9

Notes

- S Shallower screened well installed in dual installation location
 - No hydrogeochemical data collected due to either presence of LNAPL in well or malfunction with multiprobe

Table 5
Stabilised Hydrogeochemical Parameters – Off-Site

Monitoring Well	Alluvium				Raglan Mudstone Formation
	BHOS409A	BHOS410	BHOS412	BHOS414	BHOS307
Electrical Conductivity (μS/cm)	162	224	82	253	213
Dissolved Oxygen (mg/l)	0.37	1.95	0.43	0.77	0.41
pH pH units	6.07	6.80	5.72	6.85	7.42
Oxidation-Reduction Potential (mV)	27.7	8.8	84.3	69.9	-47.9

Notes

S Shallower screened well installed in dual installation location
D Deeper screened well installed in dual installation location

Table 6
Total Petroleum Hydrocarbons in Groundwater (µg/l) – Zone 3

	Monitoring Well	SSAC	SSAC			Laboratory Method Detection Limit	Alluvium												
		Human Health	Water Resources Source Area 8R	Water Resources Source Area 9R	Water Resources Source Area 10		BH107	BH108	BH114A	BH114A Duplicate	BH115	BH204AS	BH909	BH912	BH922	BH923	BH925	BH926	BH928
	Source Area							N/A	9R	N/A	N/A	N/A	10	N/A	8R	9R	N/A	N/A	N/A
TOTAL PETROLEUM HYDROCARBONS	Aliphatics																		
	>C ₅ -C ₆	*	*	7,400	4,120	5	-	NA	-	-	-	NA	-	-	-	-	-	-	-
	>C ₆ -C ₈	*	*	7,190	7,170	5	-	NA	-	-	-	NA	-	-	-	-	-	-	-
	>C ₈ -C ₁₀	ND	*	*	*	5	-	NA	-	-	-	NA	-	-	-	-	-	-	-
	>C ₁₀ -C ₁₂	ND	*	*	*	5	-	NA	-	-	-	NA	-	-	-	-	-	-	-
	>C ₁₂ -C ₁₆	ND	*	*	*	10	-	NA	-	-	-	NA	-	90	-	-	50	2,280	-
	>C ₁₆ -C ₂₁	*	*	*	*	10	-	NA	-	-	-	NA	-	1,480	-	-	660	17,960	-
	>C ₂₁ -C ₃₅	*	*	*	*	10	-	NA	-	-	-	NA	-	2,000	-	-	940	25,530	-
	Aromatics																		
	>C ₆ -C ₇	*	*	*	*	5	-	NA	-	-	-	NA	-	-	-	-	-	-	-
	>C ₇ -C ₈	*	*	*	*	5	-	NA	-	-	-	NA	-	-	-	-	-	-	-
	>C ₈ -C ₁₀	*	*	*	*	5	-	NA	-	-	-	NA	-	-	-	-	-	-	-
	>C ₁₀ -C ₁₂	ND	*	*	*	5	-	NA	-	-	-	NA	-	-	-	-	-	42	-
	>C ₁₂ -C ₁₆	ND	2,857,000	100,000	25,100	10	-	NA	-	-	-	NA	-	200	-	-	70	1,400	-
	>C ₁₆ -C ₂₁	*	*	*	*	10	-	NA	-	-	-	NA	-	970	-	-	780	12,840	-
	>C ₂₁ -C ₃₅	*	*	*	*	10	-	NA	-	-	-	NA	-	820	-	-	1,510	20,160	-
	PRO	**	**	**	**	Sum C ₄ -C ₁₂	-	NA	-	-	-	NA	-	-	-	-	-	-	-
	EPH	**	**	**	**	Sum C ₁₂ -C ₃₅	-	NA	-	-	-	NA	-	5,560	-	-	4,010	80,170	-
	TPH	**	**	**	**	Sum C ₄ -C ₃₅	-	NA	-	-	-	NA	-	5,560	-	-	4,010	80,212	-
	MTBE	*	*	*	*	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzene	190,000	*	1,670	909	1	-	-	-	-	-	2	-	-	1	-	-	-	-
	Toluene	ND	*	*	*	2	-	-	-	-	-	4	-	-	5	-	-	-	-
	Ethylbenzene	ND	*	*	*	2	-	-	-	-	-	4	-	-	-	-	-	-	-
	<i>p/m</i> -Xylene	ND	*	4.19	2,430	2	-	-	-	-	-	4	-	-	-	-	-	-	-
	<i>o</i> -Xylene		*	4.19	2,430	3	-	-	-	-	-	3	-	-	-	-	-	3	-

Notes

SSAC	Assessment
Zone 3	South area of the Site as presented on Figure 3
Source 8R	As detailed in ARCADIS' Detailed Quantitative Risk Assessment (DQRA) - Contaminant Distribution Source 8R
Source 9R	As detailed in ARCADIS' DQRA - Contaminant Distribution Source 9R
Source 10	As detailed in ARCADIS' DQRA - Contaminant Distribution Source 10
1.23	Value exceeds the SSAC derived to be protective of human health and water resource receptors
1.23	Value exceeds the SSAC derived to be protective of water resource receptors
*	No SSAC derived
**	No SSAC derived due to multiple components
-	Less than laboratory detection limit
PRO	Petrol Range Organics (C ₄ -C ₁₂) plus MTBE
EPH	Extractable Petroleum Hydrocarbons (C ₁₂ -C ₃₅)

Table 6
Total Petroleum Hydrocarbons in Groundwater (µg/l) – Zone 3

Monitoring Well	SSAC	SSAC			Laboratory Method Detection Limit	Raglan Mudstone Formation							
	Human Health	Water Resources Source Area 8R	Water Resources Source Area 9R	Water Resources Source Area 10		BH204AD	BH205AD	BH205AD Duplicate	BH301S	BH301D	BH303S	BH303D	BH304D
		10	N/A	N/A		N/A	N/A	N/A	N/A	N/A	9R	9R	10
TOTAL PETROLEUM HYDROCARBONS	Aliphatics												
	>C ₅ -C ₆	*	*	7,400	4,120	5	-	-	-	-	-	-	-
	>C ₆ -C ₈	*	*	7,190	7,170	5	-	-	-	-	-	-	-
	>C ₈ -C ₁₀	ND	*	*	*	5	-	-	-	-	-	-	-
	>C ₁₀ -C ₁₂	ND	*	*	*	5	-	-	-	-	-	-	-
	>C ₁₂ -C ₁₆	ND	*	*	*	10	-	-	-	-	-	-	-
	>C ₁₆ -C ₂₁	*	*	*	*	10	-	-	-	-	-	-	-
	>C ₂₁ -C ₃₅	*	*	*	*	10	-	-	-	-	-	-	-
	Aromatics												
	>C ₆ -C ₇	*	*	*	*	5	-	-	-	-	-	-	-
	>C ₇ -C ₈	*	*	*	*	5	-	-	-	-	-	-	-
	>C ₈ -C ₁₀	*	*	*	*	5	-	-	-	-	-	-	-
	>C ₁₀ -C ₁₂	ND	*	*	*	5	-	-	-	-	-	-	-
	>C ₁₂ -C ₁₆	ND	2,857,000	100,000	25,100	10	-	-	-	-	-	-	-
	>C ₁₆ -C ₂₁	*	*	*	*	10	-	-	-	-	-	-	-
	>C ₂₁ -C ₃₅	*	*	*	*	10	-	-	-	-	-	-	-
	PRO	**	**	**	**	Sum C ₄ -C ₁₂	-	-	-	-	-	-	-
	EPH	**	**	**	**	Sum C ₁₂ -C ₃₅	-	-	-	-	-	-	-
	TPH	**	**	**	**	Sum C ₄ -C ₃₅	-	-	-	-	-	-	-
	MTBE	*	*	*	*	1	-	-	-	-	-	-	-
	Benzene	190,000	*	1,670	909	1	-	-	-	-	-	-	-
	Toluene	ND	*	*	*	2	-	-	-	-	-	-	-
	Ethylbenzene	ND	*	*	*	2	-	-	-	-	-	-	-
	p/m-Xylene	ND	*	4.19	2,430	2	-	-	-	-	-	-	-
	o-Xylene					3	-	-	-	-	-	-	-

Notes

SSAC	Assessment
Zone 3	South area of the Site as presented on Figure 3
Source 8R	As detailed in ARCADIS' Detailed Quantitative Risk Assessment (DQRA) - Contaminant
Source 9R	As detailed in ARCADIS' DQRA - Contaminant Distribution Source 9R
Source 10	As detailed in ARCADIS' DQRA - Contaminant Distribution Source 10
1.23	Value exceeds the SSAC derived to be protective of human health and water resource
1.23	Value exceeds the SSAC derived to be protective of water resource receptors
*	No SSAC derived
**	No SSAC derived due to multiple components
-	Less than laboratory detection limit
PRO	Petrol Range Organics (C ₄ -C ₁₂) plus MTBE
EPH	Extractable Petroleum Hydrocarbons (C ₁₂ -C ₃₅)

Table 7
Total Petroleum Hydrocarbons in Groundwater (µg/l) – Off-Site

Monitoring Well	SSAC	Laboratory Method Detection Limit	August 2012 Alluvium			August 2012 Raglan Mudstone Formation
	Human Health		BHOS409A	BHOS412	BHOS414	BHOS307
TOTAL PETROLEUM HYDROCARBONS	Aliphatics					
	>C ₅ -C ₆	*	5	-	-	-
	>C ₆ -C ₈	*	5	-	-	-
	>C ₈ -C ₁₀	ND	5	-	-	-
	>C ₁₀ -C ₁₂	ND	5	-	-	-
	>C ₁₂ -C ₁₆	ND	10	-	-	-
	>C ₁₆ -C ₂₁	*	10	-	-	-
	>C ₂₁ -C ₃₅	*	10	-	-	-
	Aromatics					
	>C ₆ -C ₇	*	5	-	-	-
	>C ₇ -C ₈	*	5	-	-	-
	>C ₈ -C ₁₀	*	5	-	-	-
	>C ₁₀ -C ₁₂	ND	5	-	-	-
	>C ₁₂ -C ₁₆	ND	10	-	-	-
	>C ₁₆ -C ₂₁	*	10	-	-	-
	>C ₂₁ -C ₃₅	*	10	-	-	-
	PRO	**	Sum C ₄ -C ₁₂	-	-	-
	EPH	**	Sum C ₁₂ -C ₃₅	-	-	-
	TPH	**	Sum C ₄ -C ₃₅	-	-	-
	MTBE	*	1	-	-	-
	Benzene	ND	1	-	-	-
	Toluene	ND	2	-	-	-
	Ethylbenzene	ND	2	-	-	-
	<i>p/m</i> -Xylene	ND	2	-	-	-
	<i>o</i> -Xylene		3	-	-	-

Notes

SSAC	Site-Specific Assessment Criteria
S	Shallower screened well installed in dual installation location
D	Deeper screened well installed in dual installation location
ND	Results of risk assessment demonstrate contaminant does not present significant level of risk <i>via</i> this pathway
105	Measured concentration exceeds the SSAC derived to be protective of human health
*	No SSAC derived
**	No SSAC derived due to multiple components
PRO	Petrol Range Organics (C ₄ -C ₁₂) plus MTBE
EPH	Extractable Petroleum Hydrocarbons (C ₁₂ -C ₃₅)
TPH	Total Petroleum Hydrocarbons (C ₄ -C ₃₅)
MTBE	Methyl <i>Tertiary</i> -Butyl Ether
-	Less than laboratory method detection limit

Table 8
Baseline Groundwater VOC Concentrations (µg/l) in Zone 3 Alluvium Wells

Sample Identity	Human Health SSAC	Laboratory Method Detection Limit	Alluvium					
			BH107	BH108	BH114A	BH114A Duplicate	BH115	BH122
Dichlorodifluoromethane	*	2	-	-	-	-	-	-
Methyl Tertiary Butyl Ether #	*	1	-	-	-	-	-	-
Chloromethane #	*	3	-	-	-	-	-	-
Vinyl Chloride	3,000	2	33	7	-	-	-	791
Bromomethane	*	1	-	-	-	-	-	-
Chloroethane #	*	3	-	-	-	-	-	-
Trichlorofluoromethane #	*	3	-	-	-	-	-	-
1,1-Dichloroethene #	60,000	3	19	-	-	-	-	10
Dichloromethane #	*	3	-	-	-	-	-	-
trans-1-2-Dichloroethene #	1,400,000	3	24	-	-	-	-	15
1,1-Dichloroethane #	ND	3	-	-	-	-	-	-
cis- DCE	150,000	3	1,000	50	-	-	5	-
2,2-Dichloropropane	*	1	-	-	-	-	-	-
Bromochloromethane #	*	2	-	-	-	-	-	-
Chloroform #	*	2	-	-	-	-	16	-
1,1,1-Trichloroethane #	ND	2	-	-	-	-	-	-
1,1-Dichloropropene #	*	3	-	-	-	-	-	-
Carbon tetrachloride #	*	2	-	-	-	-	-	-
1,2-Dichloroethane #	*	2	-	-	-	-	-	-
Benzene #	190,000	1	-	-	-	-	-	-
TCE	100,000	3	3,000	-	-	-	5	-
1,2-Dichloropropane #	*	2	-	-	-	-	-	-
Dibromomethane #	*	3	-	-	-	-	-	-
Bromodichloromethane #	*	2	-	-	-	-	-	-
cis-1-3-Dichloropropene	*	2	-	-	-	-	-	-
Toluene #	ND	2	-	-	-	-	-	-
trans-1-3-Dichloropropene	*	2	-	-	-	-	-	-
1,1,2-Trichloroethane #	15,000	2	-	-	-	-	-	-
PCE	ND	3	-	-	-	-	-	92
1,3-Dichloropropane #	*	2	-	-	-	-	-	-
Dibromochloromethane #	*	2	-	-	-	-	-	-
1,2-Dibromoethane #	*	2	-	-	-	-	-	-
Chlorobenzene #	*	2	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane #	*	2	-	-	-	-	-	-
Ethylbenzene #	ND	2	-	-	-	-	-	-
p/m-Xylene #	ND	3	-	-	-	-	-	-
o-Xylene #	*	2	-	-	-	-	-	-
Styrene #	*	2	-	-	-	-	-	-
Bromoform #	*	2	-	-	-	-	-	-
Isopropylbenzene #	*	3	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	*	4	-	-	-	-	-	-
Bromobenzene #	*	2	-	-	-	-	-	-
1,2,3-Trichloropropane #	*	3	-	-	-	-	-	-
Propylbenzene #	*	3	-	-	-	-	-	-
2-Chlorotoluene #	*	3	-	-	-	-	-	-
1,3,5-Trimethylbenzene #	*	3	-	-	-	-	-	-
4-Chlorotoluene #	*	3	-	-	-	-	-	-
tert-Butylbenzene #	*	3	-	-	-	-	-	-
1,2,4-Trimethylbenzene #	*	3	-	-	-	-	-	-
sec-Butylbenzene #	*	3	-	-	-	-	-	-
4-Isopropyltoluene #	*	3	-	-	-	-	-	-
1,3-Dichlorobenzene #	*	3	-	-	-	-	-	-
1,4-Dichlorobenzene #	*	3	-	-	-	-	-	-
n-Butylbenzene #	*	3	-	-	-	-	-	-
1,2-Dichlorobenzene #	*	3	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	*	2	-	-	-	-	-	-
1,2,4-Trichlorobenzene	*	3	-	-	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-	-	-
Naphthalene	ND	2	-	-	-	-	-	-
1,2,3-Trichlorobenzene	*	3	-	-	-	-	-	-
Total VOCs		**	4,076	57	0	0	26	908

Notes:

- Below MDL
MDL Method detection limit
cis- DCE cis-1,2-dichloroethene
TCE Trichloroethene
PCE Tetrachloroethene

Table 8
Baseline Groundwater VOC Concentrations (µg/l) in Zone 3 Alluvium Wells

Sample Identity	Human Health SSAC	Laboratory Method Detection Limit	Alluvium					
			BH204AS	BH402	BH909	BH912	BH919	BH919 Duplicate
Dichlorodifluoromethane	*	2	-	-	-	-	-	-
Methyl Tertiary Butyl Ether #	*	1	-	-	-	-	-	-
Chloromethane #	*	3	-	-	-	-	-	-
Vinyl Chloride	3,000	2	20,000	-	146	1,000	172	206
Bromomethane	*	1	-	-	-	-	-	-
Chloroethane #	*	3	-	-	-	-	-	-
Trichlorofluoromethane #	*	3	-	-	-	-	-	-
1,1-Dichloroethene #	60,000	3	68	12	-	27	7	8
Dichloromethane #	*	3	-	-	-	-	-	-
trans-1-2-Dichloroethene #	1,400,000	3	138	98	-	19	35	39
1,1-Dichloroethane #	ND	3	24	-	-	-	-	-
cis-DCE	150,000	3	71,000	3,000	235	3,000	-	-
2,2-Dichloropropane	*	1	-	-	-	-	-	-
Bromochloromethane #	*	2	-	-	-	-	-	-
Chloroform #	*	2	-	-	-	-	-	-
1,1,1-Trichloroethane #	ND	2	-	-	-	-	-	-
1,1-Dichloropropene #	*	3	-	-	-	-	-	-
Carbon tetrachloride #	*	2	-	-	-	-	-	-
1,2-Dichloroethane #	*	2	-	-	-	-	-	-
Benzene #	190,000	1	2	-	-	-	-	-
TCE	100,000	3	509	149	4	-	-	-
1,2-Dichloropropane #	*	2	-	-	-	-	-	-
Dibromomethane #	*	3	-	-	-	-	-	-
Bromodichloromethane #	*	2	-	-	-	-	-	-
cis-1-3-Dichloropropene	*	2	-	-	-	-	-	-
Toluene #	ND	2	4	-	-	-	-	-
trans-1-3-Dichloropropene	*	2	-	-	-	-	-	-
1,1,2-Trichloroethane #	15,000	2	-	-	-	-	-	-
PCE	ND	3	10	356	-	-	6	6
1,3-Dichloropropane #	*	2	-	-	-	-	-	-
Dibromochloromethane #	*	2	-	-	-	-	-	-
1,2-Dibromoethane #	*	2	-	-	-	-	-	-
Chlorobenzene #	*	2	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane #	*	2	-	-	-	-	-	-
Ethylbenzene #	ND	2	4	-	-	-	-	-
p/m-Xylene #	ND	3	4	-	-	-	-	-
o-Xylene #	*	2	3	-	-	-	3	4
Styrene #	*	2	-	-	-	-	-	-
Bromoform #	*	2	-	-	-	-	-	-
Isopropylbenzene #	*	3	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	*	4	-	-	-	-	-	-
Bromobenzene #	*	2	-	-	-	-	-	-
1,2,3-Trichloropropane #	*	3	-	-	-	-	-	-
Propylbenzene #	*	3	-	-	-	-	-	-
2-Chlorotoluene #	*	3	-	-	-	-	-	-
1,3,5-Trimethylbenzene #	*	3	-	-	-	-	-	-
4-Chlorotoluene #	*	3	-	-	-	-	-	-
tert-Butylbenzene #	*	3	-	-	-	-	-	-
1,2,4-Trimethylbenzene #	*	3	-	-	-	-	-	-
sec-Butylbenzene #	*	3	-	-	-	-	-	-
4-Isopropyltoluene #	*	3	-	-	-	-	-	-
1,3-Dichlorobenzene #	*	3	-	-	-	-	-	-
1,4-Dichlorobenzene #	*	3	-	-	-	-	-	-
n-Butylbenzene #	*	3	-	-	-	-	-	-
1,2-Dichlorobenzene #	*	3	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	*	2	-	-	-	-	-	-
1,2,4-Trichlorobenzene	*	3	-	-	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-	-	-
Naphthalene	ND	2	-	-	-	-	-	-
1,2,3-Trichlorobenzene	*	3	-	-	-	-	-	-
Total VOCs		**	91,766	3,615	385	4,046	223	263

Notes:

- Below MDL
MDL Method detection limit
cis-DCE cis-1,2-dichloroethene
TCE Trichloroethene
PCE Tetrachloroethene

Table 8
Baseline Groundwater VOC Concentrations (µg/l) in Zone 3 Alluvium Wells

Sample Identity	Human Health SSAC	Laboratory Method Detection Limit	Alluvium					
			BH922	BH923	BH925	BH926	BH928	RSW7001S
Dichlorodifluoromethane	*	2	-	-	-	-	-	-
Methyl Tertiary Butyl Ether #	*	1	-	-	-	-	-	-
Chloromethane #	*	3	-	-	-	-	-	-
Vinyl Chloride	3,000	2	741	-	51	18	3	<1,000
Bromomethane	*	1	-	-	-	-	-	-
Chloroethane #	*	3	-	-	-	-	-	-
Trichlorofluoromethane #	*	3	-	-	-	-	-	-
1,1-Dichloroethene #	60,000	3	187	-	13	3	-	20
Dichloromethane #	*	3	-	-	-	-	-	-
trans-1-2-Dichloroethene #	1,400,000	3	491	-	36	3	-	28
1,1-Dichloroethane #	ND	3	13	-	-	-	-	-
cis-DCE	150,000	3	153,000	5	7,000	486	20	7,000
2,2-Dichloropropane	*	1	-	-	-	-	-	-
Bromochloromethane #	*	2	-	-	-	-	-	-
Chloroform #	*	2	-	-	7	-	-	-
1,1,1-Trichloroethane #	ND	2	-	-	-	-	-	-
1,1-Dichloropropene #	*	3	-	-	-	-	-	-
Carbon tetrachloride #	*	2	-	-	-	-	-	-
1,2-Dichloroethane #	*	2	-	-	-	-	-	-
Benzene #	190,000	1	1	-	-	-	-	-
TCE	100,000	3	735,000	-	4,000	1,000	5	102
1,2-Dichloropropane #	*	2	-	-	-	-	-	-
Dibromomethane #	*	3	-	-	-	-	-	-
Bromodichloromethane #	*	2	-	-	-	-	-	-
cis-1-3-Dichloropropene	*	2	-	-	-	-	-	-
Toluene #	ND	2	5	-	-	-	-	-
trans-1-3-Dichloropropene	*	2	-	-	-	-	-	-
1,1,2-Trichloroethane #	15,000	2	20	-	-	-	-	-
PCE	ND	3	17	-	7	-	11	-
1,3-Dichloropropane #	*	2	-	-	-	-	-	-
Dibromochloromethane #	*	2	-	-	-	-	-	-
1,2-Dibromoethane #	*	2	-	-	-	-	-	-
Chlorobenzene #	*	2	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane #	*	2	-	-	-	-	-	-
Ethylbenzene #	ND	2	-	-	-	-	-	-
p/m-Xylene #	ND	3	-	-	-	-	-	-
o-Xylene #	*	2	-	-	-	3	-	-
Styrene #	*	2	-	-	-	-	-	-
Bromoform #	*	2	-	-	-	-	-	-
Isopropylbenzene #	*	3	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	*	4	-	-	-	-	-	-
Bromobenzene #	*	2	-	-	-	-	-	-
1,2,3-Trichloropropane #	*	3	-	-	-	-	-	-
Propylbenzene #	*	3	-	-	-	-	-	-
2-Chlorotoluene #	*	3	-	-	-	-	-	-
1,3,5-Trimethylbenzene #	*	3	-	-	-	-	-	-
4-Chlorotoluene #	*	3	-	-	-	-	-	-
tert-Butylbenzene #	*	3	-	-	-	-	-	-
1,2,4-Trimethylbenzene #	*	3	-	-	-	-	-	-
sec-Butylbenzene #	*	3	-	-	-	-	-	-
4-Isopropyltoluene #	*	3	-	-	-	-	-	-
1,3-Dichlorobenzene #	*	3	-	-	-	-	-	-
1,4-Dichlorobenzene #	*	3	-	-	-	-	-	-
n-Butylbenzene #	*	3	-	-	-	-	-	-
1,2-Dichlorobenzene #	*	3	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	*	2	-	-	-	-	-	-
1,2,4-Trichlorobenzene	*	3	-	-	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-	-	-
Naphthalene	ND	2	-	-	-	-	-	-
1,2,3-Trichlorobenzene	*	3	-	-	-	-	-	-
Total VOCs		**	889,475	5	11,114	1,513	39	7,150

Notes:

- Below MDL
MDL Method detection limit
cis-DCE cis-1,2-dichloroethene
TCE Trichloroethene
PCE Tetrachloroethene

Table 8
Baseline Groundwater VOC Concentrations (µg/l) in Zone 3 Alluvium Wells

Sample Identity	Human Health SSAC	Laboratory Method Detection Limit	Alluvium					
			RSW7002S	RSW7003S	RSW7004S	RSW2006S	RSW2007S	RSW2008S
Dichlorodifluoromethane	*	2	-	-	-	-	-	-
Methyl Tertiary Butyl Ether #	*	1	-	-	-	-	-	-
Chloromethane #	*	3	-	-	-	-	-	-
Vinyl Chloride	3,000	2	278	91	523	83	120	12
Bromomethane	*	1	-	-	-	-	-	-
Chloroethane #	*	3	-	-	-	-	-	-
Trichlorofluoromethane #	*	3	-	-	-	-	-	-
1,1-Dichloroethene #	60,000	3	14	-	4	-	-	-
Dichloromethane #	*	3	-	-	-	-	-	-
trans-1-2-Dichloroethene #	1,400,000	3	18	-	-	7	-	4
1,1-Dichloroethane #	ND	3	-	-	-	-	-	-
cis-DCE	150,000	3	2,000	33	834	6,000	197	143
2,2-Dichloropropane	*	1	-	-	-	-	-	-
Bromochloromethane #	*	2	-	-	-	-	-	-
Chloroform #	*	2	-	-	-	-	-	-
1,1,1-Trichloroethane #	ND	2	-	-	-	-	-	-
1,1-Dichloropropene #	*	3	-	-	-	-	-	-
Carbon tetrachloride #	*	2	-	-	-	-	-	-
1,2-Dichloroethane #	*	2	-	-	-	-	-	-
Benzene #	190,000	1	-	-	-	-	-	-
TCE	100,000	3	<1,000	50	11	56	-	57
1,2-Dichloropropane #	*	2	-	-	-	-	-	-
Dibromomethane #	*	3	-	-	-	-	-	-
Bromodichloromethane #	*	2	-	-	-	-	-	-
cis-1-3-Dichloropropene	*	2	-	-	-	-	-	-
Toluene #	ND	2	-	-	-	-	-	-
trans-1-3-Dichloropropene	*	2	-	-	-	-	-	-
1,1,2-Trichloroethane #	15,000	2	-	-	-	-	-	-
PCE	ND	3	46	-	-	-	-	3
1,3-Dichloropropane #	*	2	-	-	-	-	-	-
Dibromochloromethane #	*	2	-	-	-	-	-	-
1,2-Dibromoethane #	*	2	-	-	-	-	-	-
Chlorobenzene #	*	2	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane #	*	2	-	-	-	-	-	-
Ethylbenzene #	ND	2	-	-	-	-	-	-
p/m-Xylene #	ND	3	-	-	-	-	-	-
o-Xylene #	*	2	-	-	-	-	-	-
Styrene #	*	2	-	-	-	-	-	-
Bromoform #	*	2	-	-	-	-	-	-
Isopropylbenzene #	*	3	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	*	4	-	-	-	-	-	-
Bromobenzene #	*	2	-	-	-	-	-	-
1,2,3-Trichloropropane #	*	3	-	-	-	-	-	-
Propylbenzene #	*	3	-	-	-	-	-	-
2-Chlorotoluene #	*	3	-	-	-	-	-	-
1,3,5-Trimethylbenzene #	*	3	-	-	-	-	-	-
4-Chlorotoluene #	*	3	-	-	-	-	-	-
tert-Butylbenzene #	*	3	-	-	-	-	-	-
1,2,4-Trimethylbenzene #	*	3	-	-	-	-	-	-
sec-Butylbenzene #	*	3	-	-	-	-	-	-
4-Isopropyltoluene #	*	3	-	-	-	-	-	-
1,3-Dichlorobenzene #	*	3	-	-	-	-	-	-
1,4-Dichlorobenzene #	*	3	-	-	-	-	-	-
n-Butylbenzene #	*	3	-	-	-	-	-	-
1,2-Dichlorobenzene #	*	3	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	*	2	-	-	-	-	-	-
1,2,4-Trichlorobenzene	*	3	-	-	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-	-	-
Naphthalene	ND	2	-	-	-	-	-	-
1,2,3-Trichlorobenzene	*	3	-	-	-	-	-	-
Total VOCs		**	2,356	174	1,372	6,146	317	219

Notes:

- Below MDL
MDL Method detection limit
cis-DCE cis-1,2-dichloroethene
TCE Trichloroethene
PCE Tetrachloroethene

Table 8
Baseline Groundwater VOC Concentrations (µg/l) in Zone 3 Alluvium Wells

Sample Identity	Human Health SSAC	Laboratory Method Detection Limit	Alluvium			
			RSW2009S	RSW2010S	RSW2011S	RSW2012S
Dichlorodifluoromethane	*	2	-	-	-	-
Methyl Tertiary Butyl Ether #	*	1	-	-	-	-
Chloromethane #	*	3	-	-	-	-
Vinyl Chloride	3,000	2	430	80	3	5,000
Bromomethane	*	1	-	-	-	-
Chloroethane #	*	3	-	-	-	-
Trichlorofluoromethane #	*	3	-	-	-	-
1,1-Dichloroethene #	60,000	3	-	-	-	28
Dichloromethane #	*	3	-	-	-	-
trans-1-2-Dichloroethene #	1,400,000	3	-	-	4	48
1,1-Dichloroethane #	ND	3	6	-	-	4
cis- DCE	150,000	3	409	179	1438	31,000
2,2-Dichloropropane	*	1	-	-	-	-
Bromochloromethane #	*	2	-	-	-	-
Chloroform #	*	2	-	-	-	2
1,1,1-Trichloroethane #	ND	2	-	-	-	-
1,1-Dichloropropene #	*	3	-	-	-	-
Carbon tetrachloride #	*	2	-	-	-	-
1,2-Dichloroethane #	*	2	-	-	-	-
Benzene #	190,000	1	-	-	-	-
TCE	100,000	3	4	18	770	25,000
1,2-Dichloropropane #	*	2	-	-	-	-
Dibromomethane #	*	3	-	-	-	-
Bromodichloromethane #	*	2	-	-	-	-
cis-1-3-Dichloropropene	*	2	-	-	-	-
Toluene #	ND	2	-	-	-	-
trans-1-3-Dichloropropene	*	2	-	-	-	-
1,1,2-Trichloroethane #	15,000	2	-	-	-	-
PCE	ND	3	-	-	21	5
1,3-Dichloropropane #	*	2	-	-	-	-
Dibromochloromethane #	*	2	-	-	-	-
1,2-Dibromoethane #	*	2	-	-	-	-
Chlorobenzene #	*	2	-	-	-	-
1,1,1,2-Tetrachloroethane #	*	2	-	-	-	-
Ethylbenzene #	ND	2	-	-	-	-
p/m-Xylene #	ND	3	-	-	-	-
o-Xylene #	ND	2	-	-	-	-
Styrene #	*	2	-	-	-	-
Bromoform #	*	2	-	-	-	-
Isopropylbenzene #	*	3	-	-	-	-
1,1,2,2-Tetrachloroethane	*	4	-	-	-	-
Bromobenzene #	*	2	-	-	-	-
1,2,3-Trichloropropane #	*	3	-	-	-	-
Propylbenzene #	*	3	-	-	-	-
2-Chlorotoluene #	*	3	-	-	-	-
1,3,5-Trimethylbenzene #	*	3	-	-	-	-
4-Chlorotoluene #	*	3	-	-	-	-
tert-Butylbenzene #	*	3	-	-	-	-
1,2,4-Trimethylbenzene #	*	3	-	-	-	-
sec-Butylbenzene #	*	3	-	-	-	-
4-Isopropyltoluene #	*	3	-	-	-	-
1,3-Dichlorobenzene #	*	3	-	-	-	-
1,4-Dichlorobenzene #	*	3	-	-	-	-
n-Butylbenzene #	*	3	-	-	-	-
1,2-Dichlorobenzene #	*	3	-	-	-	-
1,2-Dibromo-3-chloropropane	*	2	-	-	-	-
1,2,4-Trichlorobenzene	*	3	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-
Naphthalene	ND	2	-	-	-	-
1,2,3-Trichlorobenzene	*	3	-	-	-	-
Total VOCs		**	849	277	2,236	61,087

Notes:

- Below MDL
MDL Method detection limit
cis- DCE cis-1,2-dichloroethene
TCE Trichloroethene
PCE Tetrachloroethene

Table 9
Baseline Groundwater VOC Concentrations (µg/l) in Zone 3 Raglan Mudstone Formation Wells

Sample Identity	Human Health SSAC	Laboratory Method Detection Limit	Alluvium	Alluvium			
			BH204AD	BH205AD	BH205AD Duplicate	BH301S	BH301D
Dichlorodifluoromethane	*	2	-	-	-	-	-
Methyl Tertiary Butyl Ether [#]	*	1	-	-	-	-	-
Chloromethane [#]	*	3	-	-	-	-	-
Vinyl Chloride	3,000	2	10,000	5	4	141	55
Bromomethane	*	1	-	-	-	-	-
Chloroethane [#]	*	3	-	-	-	-	-
Trichlorofluoromethane [#]	*	3	-	-	-	-	-
1,1-Dichloroethene [#]	60,000	3	52	6	6	-	-
Dichloromethane [#]	*	3	-	-	-	-	-
trans-1-2-Dichloroethene [#]	1,400,000	3	55	5	5	-	-
1,1-Dichloroethane [#]	ND	3	16	-	-	-	-
cis-DCE	150,000	3	48,000	2,286	2,356	172	943
2,2-Dichloropropane	*	1	-	-	-	-	-
Bromochloromethane [#]	*	2	-	-	-	-	-
Chloroform [#]	*	2	-	-	-	-	-
1,1,1-Trichloroethane [#]	ND	2	12	-	-	-	-
1,1-Dichloropropene [#]	*	3	-	-	-	-	-
Carbon tetrachloride [#]	*	2	-	-	-	-	-
1,2-Dichloroethane [#]	*	2	-	-	-	-	-
Benzene [#]	190,000	1	-	-	-	-	-
TCE	100,000	3	7,000	195	149	-	-
1,2-Dichloropropane [#]	*	2	-	-	-	-	-
Dibromomethane [#]	*	3	-	-	-	-	-
Bromodichloromethane [#]	*	2	-	-	-	-	-
cis-1-3-Dichloropropene	*	2	-	-	-	-	-
Toluene [#]	ND	2	-	-	-	-	-
trans-1-3-Dichloropropene	*	2	-	-	-	-	-
1,1,2-Trichloroethane [#]	*	2	-	-	-	-	-
PCE	15,000	3	26	93	78	-	-
1,3-Dichloropropane [#]	*	2	-	-	-	-	-
Dibromochloromethane [#]	*	2	-	-	-	-	-
1,2-Dibromoethane [#]	*	2	-	-	-	-	-
Chlorobenzene [#]	*	2	-	-	-	-	-
1,1,1,2-Tetrachloroethane [#]	*	2	-	-	-	-	-
Ethylbenzene [#]	ND	2	-	-	-	-	-
p/m-Xylene [#]	ND	3	-	-	-	-	-
o-Xylene [#]		2	-	-	-	-	-
Styrene [#]	*	2	-	-	-	-	-
Bromoform [#]	*	2	-	-	-	-	-
Isopropylbenzene [#]	*	3	-	-	-	-	-
1,1,2,2-Tetrachloroethane	*	4	-	-	-	-	-
Bromobenzene [#]	*	2	-	-	-	-	-
1,2,3-Trichloropropane [#]	*	3	-	-	-	-	-
Propylbenzene [#]	*	3	-	-	-	-	-
2-Chlorotoluene [#]	*	3	-	-	-	-	-
1,3,5-Trimethylbenzene [#]	*	3	-	-	-	-	-
4-Chlorotoluene [#]	*	3	-	-	-	-	-
tert-Butylbenzene [#]	*	3	-	-	-	-	-
1,2,4-Trimethylbenzene [#]	*	3	-	-	-	-	-
sec-Butylbenzene [#]	*	3	-	-	-	-	-
4-Isopropyltoluene [#]	*	3	-	-	-	-	-
1,3-Dichlorobenzene [#]	*	3	-	-	-	-	-
1,4-Dichlorobenzene [#]	*	3	-	-	-	-	-
n-Butylbenzene [#]	*	3	-	-	-	-	-
1,2-Dichlorobenzene [#]	*	3	-	-	-	-	-
1,2-Dibromo-3-chloropropane	*	2	-	-	-	-	-
1,2,4-Trichlorobenzene	*	3	-	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-	-
Naphthalene	ND	2	-	-	-	-	-
1,2,3-Trichlorobenzene	*	3	-	-	-	-	-
Total VOCs		**	65,161	2,590	2,598	313	998

Notes:

-
mbgl
MDL
cis-DCE
TCE
PCE

Below MDL
Metres below ground level
Method detection limit
cis-1,2-dichloroethene
Trichloroethene
Tetrachloroethene

Table 9
Baseline Groundwater VOC Concentrations (µg/l) in Zone 3 Raglan Mudstone Formation Wells

Sample Identity	Human Health SSAC	Laboratory Method Detection Limit	Alluvium					
			BH303S	BH303D	BH304D	RSW7001D	RSW7002D	RSW7002D Duplicate
Dichlorodifluoromethane	*	2	-	-	-	-	-	-
Methyl Tertiary Butyl Ether #	*	1	-	-	-	-	-	-
Chloromethane #	*	3	-	-	-	-	-	-
Vinyl Chloride	3,000	2	225	49	484	798	480	481
Bromomethane	*	1	-	-	-	-	-	-
Chloroethane #	*	3	-	-	-	-	-	-
Trichlorofluoromethane #	*	3	-	-	-	-	-	-
1,1-Dichloroethene #	60,000	3	7	-	18	21	14	13
Dichloromethane #	*	3	-	-	-	-	-	-
trans-1-2-Dichloroethene #	1,400,000	3	-	-	35	38	22	21
1,1-Dichloroethane #	ND	3	-	-	-	-	-	-
cis-DCE	150,000	3	971	47	12,550	<1,000	3,000	<1,000
2,2-Dichloropropane	*	1	-	-	-	-	-	-
Bromochloromethane #	*	2	-	-	-	-	-	-
Chloroform #	*	2	-	-	-	-	-	-
1,1,1-Trichloroethane #	ND	2	-	-	-	-	-	-
1,1-Dichloropropene #	*	3	-	-	-	-	-	-
Carbon tetrachloride #	*	2	-	-	-	-	-	-
1,2-Dichloroethane #	*	2	-	-	-	-	-	-
Benzene #	190,000	1	-	-	-	-	-	-
TCE	100,000	3	-	-	9,075	79	-	-
1,2-Dichloropropane #	*	2	-	-	-	-	-	-
Dibromomethane #	*	3	-	-	-	-	-	-
Bromodichloromethane #	*	2	-	-	-	-	-	-
cis-1-3-Dichloropropene	*	2	-	-	-	-	-	-
Toluene #	ND	2	-	-	-	-	-	-
trans-1-3-Dichloropropene	*	2	-	-	-	-	-	-
1,1,2-Trichloroethane #	*	2	-	-	20	-	-	-
PCE	15,000	3	-	-	1,488	-	-	-
1,3-Dichloropropane #	*	2	-	-	-	-	-	-
Dibromochloromethane #	*	2	-	-	-	-	-	-
1,2-Dibromoethane #	*	2	-	-	-	-	-	-
Chlorobenzene #	*	2	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane #	*	2	-	-	-	-	-	-
Ethylbenzene #	ND	2	-	-	-	-	-	-
p/m-Xylene #	ND	3	-	-	-	-	-	-
o-Xylene #	*	2	-	-	-	-	-	-
Styrene #	*	2	-	-	-	-	-	-
Bromoform #	*	2	-	-	-	-	-	-
Isopropylbenzene #	*	3	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	*	4	-	-	-	-	-	-
Bromobenzene #	*	2	-	-	-	-	-	-
1,2,3-Trichloropropane #	*	3	-	-	-	-	-	-
Propylbenzene #	*	3	-	-	-	-	-	-
2-Chlorotoluene #	*	3	-	-	-	-	-	-
1,3,5-Trimethylbenzene #	*	3	-	-	-	-	-	-
4-Chlorotoluene #	*	3	-	-	-	-	-	-
tert-Butylbenzene #	*	3	-	-	-	-	-	-
1,2,4-Trimethylbenzene #	*	3	-	-	-	-	-	-
sec-Butylbenzene #	*	3	-	-	-	-	-	-
4-Isopropyltoluene #	*	3	-	-	-	-	-	-
1,3-Dichlorobenzene #	*	3	-	-	-	-	-	-
1,4-Dichlorobenzene #	*	3	-	-	-	-	-	-
n-Butylbenzene #	*	3	-	-	-	-	-	-
1,2-Dichlorobenzene #	*	3	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	*	2	-	-	-	-	-	-
1,2,4-Trichlorobenzene	*	3	-	-	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-	-	-
Naphthalene	ND	2	-	-	-	-	-	-
1,2,3-Trichlorobenzene	*	3	-	-	-	-	-	-
Total VOCs		**	1,203	96	23,670	936	3,516	515

Notes:

- Below MDL
mbgl Metres below grc
MDL Method detector
cis-DCE cis-1,2-dichloroe
TCE Trichloroethene
PCE Tetrachloroether

Table 9
Baseline Groundwater VOC Concentrations (µg/l) in Zone 3 Raglan Mudstone Formation Wells

Sample Identity	Human Health SSAC	Laboratory Method Detection Limit	Alluvium					
			RSW7003D	RSW7004D	RSW2006D	RSW2007D	RSW2008D	RSW2009D
Dichlorodifluoromethane	*	2	-	-	-	-	-	-
Methyl Tertiary Butyl Ether [#]	*	1	-	-	-	-	-	-
Chloromethane [#]	*	3	-	-	-	-	-	-
Vinyl Chloride	3,000	2	92	782	161	416	226	1,000
Bromomethane	*	1	-	-	-	-	-	-
Chloroethane [#]	*	3	-	11	-	-	-	-
Trichlorofluoromethane [#]	*	3	-	-	-	-	-	-
1,1-Dichloroethene [#]	60,000	3	-	10	5	13	11	28
Dichloromethane [#]	*	3	-	-	-	-	-	-
trans-1-2-Dichloroethene [#]	1,400,000	3	-	10	8	16	11	31
1,1-Dichloroethane [#]	ND	3	-	5	-	-	-	4
cis-DCE	150,000	3	30	17,000	6,000	6,000	4,000	17,000
2,2-Dichloropropane	*	1	-	-	-	-	-	-
Bromochloromethane [#]	*	2	-	-	-	-	-	-
Chloroform [#]	*	2	-	-	-	-	-	-
1,1,1-Trichloroethane [#]	ND	2	-	-	-	-	-	-
1,1-Dichloropropene [#]	*	3	-	-	-	-	-	-
Carbon tetrachloride [#]	*	2	-	-	-	-	-	-
1,2-Dichloroethane [#]	*	2	-	-	-	-	-	-
Benzene [#]	190,000	1	-	-	-	-	-	-
TCE	100,000	3	20	390	7,000	17,000	9,000	33,000
1,2-Dichloropropane [#]	*	2	-	-	-	-	-	-
Dibromomethane [#]	*	3	-	-	-	-	-	-
Bromodichloromethane [#]	*	2	-	-	-	-	-	-
cis-1-3-Dichloropropene	*	2	-	-	-	-	-	-
Toluene [#]	ND	2	-	-	-	-	-	-
trans-1-3-Dichloropropene	*	2	-	-	-	-	-	-
1,1,2-Trichloroethane [#]	*	2	-	-	-	-	-	-
PCE	15,000	3	-	-	446	1,803	280	931
1,3-Dichloropropane [#]	*	2	-	-	-	-	-	-
Dibromochloromethane [#]	*	2	-	-	-	-	-	-
1,2-Dibromoethane [#]	*	2	-	-	-	-	-	-
Chlorobenzene [#]	*	2	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane [#]	*	2	-	-	-	-	-	-
Ethylbenzene [#]	ND	2	-	-	-	-	-	-
p/m-Xylene [#]	ND	3	-	-	-	-	-	-
o-Xylene [#]	*	2	-	-	-	6	-	7
Styrene [#]	*	2	-	-	-	-	-	-
Bromoform [#]	*	2	-	-	-	-	-	-
Isopropylbenzene [#]	*	3	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	*	4	-	-	-	-	-	-
Bromobenzene [#]	*	2	-	-	-	-	-	-
1,2,3-Trichloropropane [#]	*	3	-	-	-	-	-	-
Propylbenzene [#]	*	3	-	-	-	-	-	-
2-Chlorotoluene [#]	*	3	-	-	-	-	-	-
1,3,5-Trimethylbenzene [#]	*	3	-	-	-	-	-	-
4-Chlorotoluene [#]	*	3	-	-	-	-	-	-
tert-Butylbenzene [#]	*	3	-	-	-	-	-	-
1,2,4-Trimethylbenzene [#]	*	3	-	-	-	-	-	-
sec-Butylbenzene [#]	*	3	-	-	-	-	-	-
4-Isopropyltoluene [#]	*	3	-	-	-	-	-	-
1,3-Dichlorobenzene [#]	*	3	-	-	-	-	-	-
1,4-Dichlorobenzene [#]	*	3	-	-	-	-	-	-
n-Butylbenzene [#]	*	3	-	-	-	-	-	-
1,2-Dichlorobenzene [#]	*	3	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	*	2	-	-	-	-	-	-
1,2,4-Trichlorobenzene	*	3	-	-	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-	-	-
Naphthalene	ND	2	-	-	-	-	-	-
1,2,3-Trichlorobenzene	*	3	-	-	-	-	-	-
Total VOCs		**	142	18,208	13,620	25,254	13,528	52,001

Notes:

- Below MDL
mbgl Metres below grc
MDL Method detector
cis-DCE cis-1,2-dichloroe
TCE Trichloroethene
PCE Tetrachloroether

Table 9
Baseline Groundwater VOC Concentrations (µg/l) in Zone 3 Raglan Mudstone Formation Wells

Sample Identity	Human Health SSAC	Laboratory Method Detection Limit	Alluvium		
			RSW2010D	RSW2011D	RSW2012D
Dichlorodifluoromethane	*	2	-	-	-
Methyl Tertiary Butyl Ether #	*	1	-	-	-
Chloromethane #	*	3	-	-	-
Vinyl Chloride	3,000	2	256	1,213	915
Bromomethane	*	1	-	-	-
Chloroethane #	*	3	-	-	3
Trichlorofluoromethane #	*	3	-	-	-
1,1-Dichloroethene #	60,000	3	11	29	26
Dichloromethane #	*	3	-	-	-
trans-1-2-Dichloroethene #	1,400,000	3	10	48	25
1,1-Dichloroethane #	ND	3	-	-	-
cis- DCE	150,000	3	17,000	18,478	16,000
2,2-Dichloropropane	*	1	-	-	-
Bromochloromethane #	*	2	-	-	-
Chloroform #	*	2	-	-	14
1,1,1-Trichloroethane #	ND	2	-	4	-
1,1-Dichloropropene #	*	3	-	-	-
Carbon tetrachloride #	*	2	-	-	-
1,2-Dichloroethane #	*	2	-	-	-
Benzene #	190,000	1	-	-	-
TCE	100,000	3	34,000	13,704	15,000
1,2-Dichloropropane #	*	2	-	-	-
Dibromomethane #	*	3	-	-	-
Bromodichloromethane #	*	2	-	-	-
cis-1-3-Dichloropropene	*	2	-	-	-
Toluene #	ND	2	-	-	-
trans-1-3-Dichloropropene	*	2	-	-	-
1,1,2-Trichloroethane #	*	2	-	17	9
PCE	15,000	3	3,636	831	-
1,3-Dichloropropane #	*	2	-	-	-
Dibromochloromethane #	*	2	-	-	-
1,2-Dibromoethane #	*	2	-	-	-
Chlorobenzene #	*	2	-	-	-
1,1,1,2-Tetrachloroethane #	*	2	-	-	-
Ethylbenzene #	ND	2	-	-	-
p/m-Xylene #	ND	3	-	-	-
o-Xylene #	ND	2	-	5	-
Styrene #	*	2	-	-	-
Bromoform #	*	2	-	-	-
Isopropylbenzene #	*	3	-	-	-
1,1,2,2-Tetrachloroethane	*	4	-	-	-
Bromobenzene #	*	2	-	-	-
1,2,3-Trichloropropane #	*	3	-	-	-
Propylbenzene #	*	3	-	-	-
2-Chlorotoluene #	*	3	-	-	-
1,3,5-Trimethylbenzene #	*	3	-	-	-
4-Chlorotoluene #	*	3	-	-	-
tert-Butylbenzene #	*	3	-	-	-
1,2,4-Trimethylbenzene #	*	3	-	-	-
sec-Butylbenzene #	*	3	-	-	-
4-Isopropyltoluene #	*	3	-	-	-
1,3-Dichlorobenzene #	*	3	-	-	-
1,4-Dichlorobenzene #	*	3	-	-	-
n-Butylbenzene #	*	3	-	-	-
1,2-Dichlorobenzene #	*	3	-	-	-
1,2-Dibromo-3-chloropropane	*	2	-	-	-
1,2,4-Trichlorobenzene	*	3	-	-	-
Hexachlorobutadiene	*	3	-	-	-
Naphthalene	ND	2	-	-	-
1,2,3-Trichlorobenzene	*	3	-	-	-
Total VOCs		**	54,913	34,329	31,992

Notes:

-
mbgl
MDL
cis-DCE
TCE
PCE

Below MDL
Metres below grc
Method detector
cis-1,2-dichloroe
Trichloroethene
Tetrachloroether

Table 10
Comparison of VOC Concentrations in Groundwater (µg/l) to Water Resources SSAC – Source Area 3R

Monitoring Well	SSAC	Laboratory Method Detection Limit	Alluvium			Raglan Mudstone Formation	
	Water Resources		BH912	BH925	BH926	BH301S	BH301D
Dichlorodifluoromethane	*	2	-	-	-	-	-
MTBE	*	1	-	-	-	-	-
Chloromethane	*	3	-	-	-	-	-
Vinyl chloride	2.15	2	1,000	51	18	141	55
Bromomethane	*	1	-	-	-	-	-
Chloroethane	*	3	-	-	-	-	-
Trichlorofluoromethane	*	3	-	-	-	-	-
1,1-dichloroethene	*	3	27	13	3	-	-
Dichloromethane	*	3	-	-	-	-	-
trans-1-2-dichloroethene	108	3	19	36	3	-	-
1,1-dichloroethane	*	3	-	-	-	-	-
cis-1,2-dichloroethene	108	3	3,000	7,000	486	172	943
2,2-dichloropropane	*	1	-	-	-	-	-
Bromochloromethane	*	2	-	-	-	-	-
Chloroform	*	2	-	7	-	-	-
1,1,1-trichloroethane	*	2	-	-	-	-	-
1,1-dichloropropene	*	3	-	-	-	-	-
Carbon tetrachloride	*	2	-	-	-	-	-
1,2-dichloroethane	*	2	-	-	-	-	-
Benzene	*	1	-	-	-	-	-
Trichloroethene	50.8	3	-	4,000	1,000	-	-
1,2-dichloropropane	*	2	-	-	-	-	-
Dibromomethane	*	3	-	-	-	-	-
Bromodichloromethane	*	2	-	-	-	-	-
cis-1,3-dichloropropene	*	2	-	-	-	-	-
Toluene	*	2	-	-	-	-	-
trans-1,3-dichloropropene	*	2	-	-	-	-	-
1,1,2-Trichloroethane	*	2	-	-	-	-	-
Tetrachloroethene	478	3	-	7	-	-	-
1,3-dichloropropane	*	2	-	-	-	-	-
Dibromochloromethane	*	2	-	-	-	-	-
1,2-dibromoethane	*	2	-	-	-	-	-
Chlorobenzene	*	2	-	-	-	-	-
1,1,1,2-tetrachloroethane	*	2	-	-	-	-	-
Ethylbenzene	*	2	-	-	-	-	-
p/m-Xylene	*	3	-	-	-	-	-
o-Xylene	*	2	-	-	3	-	-
Styrene	*	2	-	-	-	-	-
Bromoform	*	2	-	-	-	-	-
Isopropylbenzene	*	3	-	-	-	-	-
1,1,2,2-tetrachloroethane	*	4	-	-	-	-	-
Bromobenzene	*	2	-	-	-	-	-
1,2,3-trichloropropane	*	3	-	-	-	-	-
Propylbenzene	*	3	-	-	-	-	-
2-chlorotoluene	*	3	-	-	-	-	-
1,3,5-trimethylbenzene	*	3	-	-	-	-	-
4-chlorotoluene	*	3	-	-	-	-	-
tert-butylbenzene	*	3	-	-	-	-	-
1,2,4-trimethylbenzene	*	3	-	-	-	-	-
sec-butylbenzene	*	3	-	-	-	-	-
4-isopropyltoluene	*	3	-	-	-	-	-
1,3-dichlorobenzene	*	3	-	-	-	-	-
1,4-dichlorobenzene	*	3	-	-	-	-	-
n-butylbenzene	*	3	-	-	-	-	-
1,2-dichlorobenzene	*	3	-	-	-	-	-
1,2-dibromo-3-chloropropane	*	2	-	-	-	-	-
1,2,4-trichlorobenzene	*	3	-	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-	-
Naphthalene	*	2	-	-	-	-	-
1,2,3-trichlorobenzene	*	3	-	-	-	-	-
Total VOCs	**		4,046	11,114	1,513	313	998

Notes

SSAC	Site-Specific Assessment Criteria
S	Shallower screened well installed in dual installation location
D	Deeper screened well installed in dual installation location
NR	Results of risk assessment demonstrate contaminant does not present significant level of risk via this pathway
105	Measured concentration exceeds the SSAC derived to be protective of water resources
*	No SSAC derived
**	No SSAC derived due to multiple components
MTBE	Methyl Tertiary-Butyl Ether
-	Less than laboratory method detection limit

Table 11
Comparison of VOC Concentrations in Groundwater (µg/l) to Water Resources SSAC – Source Area 4R

Monitoring Well	SSAC	Laboratory Method Detection Limit	Alluvium							Raglan Mudstone Formation	
	Water Resources		BH122	BH402	BH919	BH922	BH923	RSW7001S	RSW7002S	RSW7001D	RSW7002D
Dichlorodifluoromethane	*	2	-	-	-	-	-	-	-	-	-
MTBE	*	1	-	-	-	-	-	-	-	-	-
Chloromethane	*	3	-	-	-	-	-	-	-	-	-
Vinyl chloride	3.17	2	791	-	172	741	-	-	278	798	480
Bromomethane	*	1	-	-	-	-	-	-	-	-	-
Chloroethane	*	3	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	*	3	-	-	-	-	-	-	-	-	-
1,1-dichloroethene	17,748,000	3	10	12	7	187	-	20	14	21	14
Dichloromethane	*	3	-	-	-	-	-	-	-	-	-
trans -1,2-dichloroethene	158	3	15	98	35	491	-	28	18	38	22
1,1-dichloroethane	3,010	3	-	-	-	13	-	-	-	-	-
cis -1,2-dichloroethene	159	3	-	3,000	-	153,000	5	7,000	2,000	-	3,000
2,2-dichloropropane	*	1	-	-	-	-	-	-	-	-	-
Bromochloromethane	*	2	-	-	-	-	-	-	-	-	-
Chloroform	*	2	-	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	19,500	2	-	-	-	-	-	-	-	-	-
1,1-dichloropropene	*	3	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	*	2	-	-	-	-	-	-	-	-	-
1,2-dichloroethane	*	2	-	-	-	-	-	-	-	-	-
Benzene	*	1	-	-	-	1	-	-	-	-	-
Trichloroethene	65	3	-	149	-	735,000	-	102	-	79	-
1,2-dichloropropane	*	2	-	-	-	-	-	-	-	-	-
Dibromomethane	*	3	-	-	-	-	-	-	-	-	-
Bromodichloromethane	*	2	-	-	-	-	-	-	-	-	-
cis -1,3-dichloropropene	*	2	-	-	-	-	-	-	-	-	-
Toluene	*	2	-	-	-	5	-	-	-	-	-
trans -1,3-dichloropropene	*	2	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	406	2	-	-	-	20	-	-	-	-	-
Tetrachloroethene	407	3	92	356	6	17	-	-	46	-	-
1,3-dichloropropane	*	2	-	-	-	-	-	-	-	-	-
Dibromochloromethane	*	2	-	-	-	-	-	-	-	-	-
1,2-dibromoethane	*	2	-	-	-	-	-	-	-	-	-
Chlorobenzene	*	2	-	-	-	-	-	-	-	-	-
1,1,1,2-tetrachloroethane	*	2	-	-	-	-	-	-	-	-	-
Ethylbenzene	*	2	-	-	-	-	-	-	-	-	-
p/m-Xylene	*	3	-	-	-	-	-	-	-	-	-
o-Xylene	*	2	-	-	3	-	-	-	-	-	-
Styrene	*	2	-	-	-	-	-	-	-	-	-
Bromoform	*	2	-	-	-	-	-	-	-	-	-
Isopropylbenzene	*	3	-	-	-	-	-	-	-	-	-
1,1,1,2-tetrachloroethane	*	4	-	-	-	-	-	-	-	-	-
Bromobenzene	*	2	-	-	-	-	-	-	-	-	-
1,2,3-trichloropropane	*	3	-	-	-	-	-	-	-	-	-
Propylbenzene	*	3	-	-	-	-	-	-	-	-	-
2-chlorotoluene	*	3	-	-	-	-	-	-	-	-	-
1,3,5-trimethylbenzene	*	3	-	-	-	-	-	-	-	-	-
4-chlorotoluene	*	3	-	-	-	-	-	-	-	-	-
tert-butylbenzene	*	3	-	-	-	-	-	-	-	-	-
1,2,4-trimethylbenzene	*	3	-	-	-	-	-	-	-	-	-
sec-butylbenzene	*	3	-	-	-	-	-	-	-	-	-
4-isopropyltoluene	*	3	-	-	-	-	-	-	-	-	-
1,3-dichlorobenzene	*	3	-	-	-	-	-	-	-	-	-
1,4-dichlorobenzene	*	3	-	-	-	-	-	-	-	-	-
n-butylbenzene	*	3	-	-	-	-	-	-	-	-	-
1,2-dichlorobenzene	*	3	-	-	-	-	-	-	-	-	-
1,2-dibromo-3-chloropropane	*	2	-	-	-	-	-	-	-	-	-
1,2,4-trichlorobenzene	*	3	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-	-	-	-	-	-
Naphthalene	*	2	-	-	-	-	-	-	-	-	-
1,2,3-trichlorobenzene	*	3	-	-	-	-	-	-	-	-	-
Total VOCs	**		908	3,615	223	889,475	5	7,150	2,356	936	3,516

Notes

SSAC	Site-Specific Assessment Criteria
S	Shallower screened well installed in dual installation location
D	Deeper screened well installed in dual installation location
NR	Results of risk assessment demonstrate contaminant does not present significant level of risk via this pathway
105	Measured concentration exceeds the SSAC derived to be protective of water resources
*	No SSAC derived
**	No SSAC derived due to multiple components
MTBE	Methyl Tertiary-Butyl Ether
-	Less than laboratory method detection limit

Table 12
Comparison of VOC Concentrations in Groundwater (µg/l) to Water Resources SSAC – Source Area 5R

Monitoring Well	SSAC	Laboratory Method Detection Limit	Alluvium	Raglan Mudstone Formation	
	Water Resources		BH107	BH303S	BH303D
Dichlorodifluoromethane	*	2	-	-	-
MTBE	*	1	-	-	-
Chloromethane	*	3	-	-	-
Vinyl chloride	1.52	2	33	225	49
Bromomethane	*	1	-	-	-
Chloroethane	*	3	-	-	-
Trichlorofluoromethane	*	3	-	-	-
1,1-dichloroethene	1,765,000	3	19	7	-
Dichloromethane	*	3	-	-	-
<i>trans</i> -1,2-dichloroethene	76.1	3	24	-	-
1,1-dichloroethane	*	3	-	-	-
<i>cis</i> -1,2-dichloroethene	76	3	1,000	971	47
2,2-dichloropropane	*	1	-	-	-
Bromochloromethane	*	2	-	-	-
Chloroform	*	2	-	-	-
1,1,1-trichloroethane	*	2	-	-	-
1,1-dichloropropene	*	3	-	-	-
Carbon tetrachloride	*	2	-	-	-
1,2-dichloroethane	*	2	-	-	-
Benzene	*	1	-	-	-
Trichloroethene	26.6	3	3,000	-	-
1,2-dichloropropane	*	2	-	-	-
Dibromomethane	*	3	-	-	-
Bromodichloromethane	*	2	-	-	-
<i>cis</i> -1,3-dichloropropene	*	2	-	-	-
Toluene	*	2	-	-	-
<i>trans</i> -1,3-dichloropropene	*	2	-	-	-
1,1,2-Trichloroethane	*	2	-	-	-
Tetrachloroethene	*	3	-	-	-
1,3-dichloropropane	*	2	-	-	-
Dibromochloromethane	*	2	-	-	-
1,2-dibromoethane	*	2	-	-	-
Chlorobenzene	*	2	-	-	-
1,1,1,2-tetrachloroethane	*	2	-	-	-
Ethylbenzene	*	2	-	-	-
<i>p/m</i> -Xylene	*	3	-	-	-
<i>o</i> -Xylene	*	2	-	-	-
Styrene	*	2	-	-	-
Bromoform	*	2	-	-	-
Isopropylbenzene	*	3	-	-	-
1,1,1,2,2-tetrachloroethane	*	4	-	-	-
Bromobenzene	*	2	-	-	-
1,2,3-trichloropropane	*	3	-	-	-
Propylbenzene	*	3	-	-	-
2-chlorotoluene	*	3	-	-	-
1,3,5-trimethylbenzene	*	3	-	-	-
4-chlorotoluene	*	3	-	-	-
tert-butylbenzene	*	3	-	-	-
1,2,4-trimethylbenzene	*	3	-	-	-
sec-butylbenzene	*	3	-	-	-
4-isopropyltoluene	*	3	-	-	-
1,3-dichlorobenzene	*	3	-	-	-
1,4-dichlorobenzene	*	3	-	-	-
n-butylbenzene	*	3	-	-	-
1,2-dichlorobenzene	*	3	-	-	-
1,2-dibromo-3-chloropropane	*	2	-	-	-
1,2,4-trichlorobenzene	*	3	-	-	-
Hexachlorobutadiene	*	3	-	-	-
Naphthalene	*	2	-	-	-
1,2,3-trichlorobenzene	*	3	-	-	-
Total VOCs	**		4,076	1,203	96

Notes

SSAC	Site-Specific Assessment Criteria
S	Shallower screened well installed in dual installation location
D	Deeper screened well installed in dual installation location
NR	Results of risk assessment demonstrate contaminant does not present significant level of risk via this pathway
105	Measured concentration exceeds the SSAC derived to be protective of water resources
*	No SSAC derived
**	No SSAC derived due to multiple components
MTBE	Methyl <i>Tertiary</i> -Butyl Ether
-	Less than laboratory method detection limit

Table 13
Comparison of VOC Concentrations in Groundwater (µg/l) to Water Resources SSAC – Source Area 6R

Monitoring Well	SSAC	Laboratory Method Detection Limit	Raglan Mudstone Formation
	Water Resources		BH205AD
Dichlorodifluoromethane	*	2	-
MTBE	*	1	-
Chloromethane	*	3	-
Vinyl chloride	*	2	5
Bromomethane	*	1	-
Chloroethane	*	3	-
Trichlorofluoromethane	*	3	-
1,1-dichloroethene	*	3	6
Dichloromethane	*	3	-
<i>trans</i> -1-2-dichloroethene	*	3	5
1,1-dichloroethane	*	3	-
<i>cis</i> -1,2-dichloroethene	285	3	2,286
2,2-dichloropropane	*	1	-
Bromochloromethane	*	2	-
Chloroform	*	2	-
1,1,1-trichloroethane	*	2	-
1,1-dichloropropene	*	3	-
Carbon tetrachloride	*	2	-
1,2-dichloroethane	*	2	-
Benzene	*	1	-
Trichloroethene	94.7	3	195
1,2-dichloropropane	*	2	-
Dibromomethane	*	3	-
Bromodichloromethane	*	2	-
<i>cis</i> -1,3-dichloropropene	*	2	-
Toluene	*	2	-
<i>trans</i> -1,3-dichloropropene	*	2	-
1,1,2-Trichloroethane	*	2	-
Tetrachloroethene	325	3	93
1,3-dichloropropane	*	2	-
Dibromochloromethane	*	2	-
1,2-dibromoethane	*	2	-
Chlorobenzene	*	2	-
1,1,1,2-tetrachloroethane	*	2	-
Ethylbenzene	*	2	-
<i>p/m</i> -Xylene	*	3	-
<i>o</i> -Xylene	*	2	-
Styrene	*	2	-
Bromoform	*	2	-
Isopropylbenzene	*	3	-
1,1,2,2-tetrachloroethane	*	4	-
Bromobenzene	*	2	-
1,2,3-trichloropropane	*	3	-
Propylbenzene	*	3	-
2-chlorotoluene	*	3	-
1,3,5-trimethylbenzene	*	3	-
4-chlorotoluene	*	3	-
tert-butylbenzene	*	3	-
1,2,4-trimethylbenzene	*	3	-
sec-butylbenzene	*	3	-
4-isopropyltoluene	*	3	-
1,3-dichlorobenzene	*	3	-
1,4-dichlorobenzene	*	3	-
n-butylbenzene	*	3	-
1,2-dichlorobenzene	*	3	-
1,2-dibromo-3-chloropropane	*	2	-
1,2,4-trichlorobenzene	*	3	-
Hexachlorobutadiene	*	3	-
Naphthalene	*	2	-
1,2,3-trichlorobenzene	*	3	-
Total VOCs	**		2,590

Notes

SSAC	Site-Specific Assessment Criteria
S	Shallower screened well installed in dual installation location
D	Deeper screened well installed in dual installation location
NR	Results of risk assessment demonstrate contaminant does not present significant level of risk <i>via</i> this pathway
105	Measured concentration exceeds the SSAC derived to be protective of water resources
*	No SSAC derived
**	No SSAC derived due to multiple components
MTBE	Methyl <i>Tertiary</i> -Butyl Ether
-	Less than laboratory method detection limit

Table 14
Comparison of VOC Concentrations in Groundwater (µg/l) to Water Resources SSAC – Source Area 7R

Monitoring Well	SSAC	Laboratory Method Detection Limit	Alluvium				Raglan Mudstone Formation		Raglan Mudstone Formation		
	Water Resources		BH204AS	RSW2009S	RSW2011S	RSW2012S	BH204AD	BH304D	RSW2009D	RSW2011D	RSW2012D
Dichlorodifluoromethane	*	2	-	-	-	-	-	-	-	-	-
MTBE	*	1	-	-	-	-	-	-	-	-	-
Chloromethane	*	3	-	-	-	-	-	-	-	-	-
Vinyl chloride	1.17	2	20,000	430	3	5,000	10,000	484	1,000	1,213	915
Bromomethane	*	1	-	-	-	-	-	-	-	-	-
Chloroethane	*	3	-	-	-	-	-	-	-	-	3
Trichlorofluoromethane	*	3	-	-	-	-	-	-	-	-	-
1,1-dichloroethene	6,790	3	68	-	-	28	52	18	28	29	26
Dichloromethane	*	3	-	-	-	-	-	-	-	-	-
trans-1-2-dichloroethene	58.6	3	138	-	4	48	55	35	31	48	25
1,1-dichloroethane	59	3	24	6	-	4	16	-	4	-	-
cis-1,2-dichloroethene	58.8	3	71,000	409	1,438	31,000	48,000	12,550	17,000	18,478	16,000
2,2-dichloropropane	*	1	-	-	-	-	-	-	-	-	-
Bromochloromethane	*	2	-	-	-	-	-	-	-	-	-
Chloroform	*	2	-	-	-	2	-	-	-	-	14
1,1,1-trichloroethane	606	2	-	-	-	-	12	-	-	4	-
1,1-dichloropropene	*	3	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	*	2	-	-	-	-	-	-	-	-	-
1,2-dichloroethane	*	2	-	-	-	-	-	-	-	-	-
Benzene	*	1	2	-	-	-	-	-	-	-	-
Trichloroethene	15.7	3	509	4	770	25,000	7,000	9,075	33,000	13,704	15,000
1,2-dichloropropane	*	2	-	-	-	-	-	-	-	-	-
Dibromomethane	*	3	-	-	-	-	-	-	-	-	-
Bromodichloromethane	*	2	-	-	-	-	-	-	-	-	-
cis-1,3-dichloropropene	*	2	-	-	-	-	-	-	-	-	-
Toluene	*	2	4	-	-	-	-	-	-	-	-
trans-1,3-dichloropropene	*	2	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	58.9	2	-	-	-	-	-	20	-	17	9
Tetrachloroethene	35	3	10	-	21	5	26	1,488	931	831	-
1,3-dichloropropane	*	2	-	-	-	-	-	-	-	-	-
Dibromochloromethane	*	2	-	-	-	-	-	-	-	-	-
1,2-dibromoethane	*	2	-	-	-	-	-	-	-	-	-
Chlorobenzene	*	2	-	-	-	-	-	-	-	-	-
1,1,1,2-tetrachloroethane	*	2	-	-	-	-	-	-	-	-	-
Ethylbenzene	*	2	4	-	-	-	-	-	-	-	-
p/m-Xylene	*	3	4	-	-	-	-	-	-	-	-
o-Xylene	*	2	3	-	-	-	-	-	7	5	-
Styrene	*	2	-	-	-	-	-	-	-	-	-
Bromoform	*	2	-	-	-	-	-	-	-	-	-
Isopropylbenzene	*	3	-	-	-	-	-	-	-	-	-
1,1,2,2-tetrachloroethane	*	4	-	-	-	-	-	-	-	-	-
Bromobenzene	*	2	-	-	-	-	-	-	-	-	-
1,2,3-trichloropropane	*	3	-	-	-	-	-	-	-	-	-
Propylbenzene	*	3	-	-	-	-	-	-	-	-	-
2-chlorotoluene	*	3	-	-	-	-	-	-	-	-	-
1,3,5-trimethylbenzene	*	3	-	-	-	-	-	-	-	-	-
4-chlorotoluene	*	3	-	-	-	-	-	-	-	-	-
tert-butylbenzene	*	3	-	-	-	-	-	-	-	-	-
1,2,4-trimethylbenzene	*	3	-	-	-	-	-	-	-	-	-
sec-butylbenzene	*	3	-	-	-	-	-	-	-	-	-
4-isopropyltoluene	*	3	-	-	-	-	-	-	-	-	-
1,3-dichlorobenzene	*	3	-	-	-	-	-	-	-	-	-
1,4-dichlorobenzene	*	3	-	-	-	-	-	-	-	-	-
n-butylbenzene	*	3	-	-	-	-	-	-	-	-	-
1,2-dichlorobenzene	*	3	-	-	-	-	-	-	-	-	-
1,2-dibromo-3-chloropropane	*	2	-	-	-	-	-	-	-	-	-
1,2,4-trichlorobenzene	*	3	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	*	3	-	-	-	-	-	-	-	-	-
Naphthalene	*	2	-	-	-	-	-	-	-	-	-
1,2,3-trichlorobenzene	*	3	-	-	-	-	-	-	-	-	-
Total VOCs	**		91,766	849	2,236	61,087	65,161	23,670	52,001	34,329	31,992

Notes

SSAC	Site-Specific Assessment Criteria
S	Shallower screened well installed in dual installation location
D	Deeper screened well installed in dual installation location
NR	Results of risk assessment demonstrate contaminant does not present significant level of risk via this pathway
105	Measured concentration exceeds the SSAC derived to be protective of water resources
*	No SSAC derived
**	No SSAC derived due to multiple components
MTBE	Methyl Tertiary-Butyl Ether
-	Less than laboratory method detection limit

Table 15
Groundwater VOC Concentrations (µg/l) Compared to SSAC - Off Site

Sample Identity	Human Health SSAC	SSAC	Laboratory Method Detection Limit	Alluvium				Raglan Mudstone Formation
		Water Resources		BHOS409A	BHOS410	BHOS412	BHOS414	BHOS307
Dichlorodifluoromethane	*	*	2	-	-	-	-	-
Methyl Tertiary Butyl Ether [#]	*	*	1	-	-	-	-	-
Chloromethane [#]	*	*	3	-	-	-	-	-
Vinyl Chloride	15,000	1.17	2	-	-	-	-	-
Bromomethane	*	*	1	-	-	-	-	-
Chloroethane [#]	*	*	3	-	-	-	-	-
Trichlorofluoromethane [#]	*	*	3	-	-	-	-	-
1,1-Dichloroethene [#]	2,400,000	6,790	3	-	-	-	-	-
Dichloromethane [#]	*	*	3	-	-	-	-	-
trans-1-2-Dichloroethene [#]	3,400,000	58.6	3	-	-	-	-	-
1,1-Dichloroethane [#]	*	59	3	-	-	-	-	-
cis- DCE	470,000	58.8	3	4	-	-	789	-
2,2-Dichloropropane	*	*	1	-	-	-	-	-
Bromochloromethane [#]	*	*	2	-	-	-	-	-
Chloroform [#]	*	*	2	-	-	-	-	-
1,1,1-Trichloroethane [#]	*	606	2	-	-	-	-	-
1,1-Dichloropropene [#]	*	*	3	-	-	-	-	-
Carbon tetrachloride [#]	*	*	2	-	-	-	-	-
1,2-Dichloroethane [#]	*	*	2	-	-	-	-	-
Benzene [#]	430,000	*	1	-	-	-	-	-
TCE	410,000	15.7	3	4	-	-	174	-
1,2-Dichloropropane [#]	*	*	2	-	-	-	-	-
Dibromomethane [#]	*	*	3	-	-	-	-	-
Bromodichloromethane [#]	*	*	2	-	-	-	-	-
cis-1-3-Dichloropropene	*	*	2	-	-	-	-	-
Toluene [#]	ND	*	2	-	-	-	-	-
trans-1-3-Dichloropropene	*	*	2	-	-	-	-	-
1,1,2-Trichloroethane [#]	30,000	58.9	2	-	-	-	-	-
PCE	ND	35	3	-	-	-	-	-
1,3-Dichloropropane [#]	*	*	2	-	-	-	-	-
Dibromochloromethane [#]	*	*	2	-	-	-	-	-
1,2-Dibromoethane [#]	*	*	2	-	-	-	-	-
Chlorobenzene [#]	*	*	2	-	-	-	-	-
1,1,1,2-Tetrachloroethane [#]	*	*	2	-	-	-	-	-
Ethylbenzene [#]	ND	*	2	-	-	-	-	-
p/m-Xylene [#]	ND	*	3	-	-	-	-	-
o-Xylene [#]	*	*	2	-	-	-	-	-
Styrene [#]	*	*	2	-	-	-	-	-
Bromoform [#]	*	*	2	-	-	-	-	-
Isopropylbenzene [#]	*	*	3	-	-	-	-	-
1,1,2,2-Tetrachloroethane	*	*	4	-	-	-	-	-
Bromobenzene [#]	*	*	2	-	-	-	-	-
1,2,3-Trichloropropane [#]	*	*	3	-	-	-	-	-
Propylbenzene [#]	*	*	3	-	-	-	-	-
2-Chlorotoluene [#]	*	*	3	-	-	-	-	-
1,3,5-Trimethylbenzene [#]	*	*	3	-	-	-	-	-
4-Chlorotoluene [#]	*	*	3	-	-	-	-	-
tert-Butylbenzene [#]	*	*	3	-	-	-	-	-
1,2,4-Trimethylbenzene [#]	*	*	3	-	-	-	-	-
sec-Butylbenzene [#]	*	*	3	-	-	-	-	-
4-Isopropyltoluene [#]	*	*	3	-	-	-	-	-
1,3-Dichlorobenzene [#]	*	*	3	-	-	-	-	-
1,4-Dichlorobenzene [#]	*	*	3	-	-	-	-	-
n-Butylbenzene [#]	*	*	3	-	-	-	-	-
1,2-Dichlorobenzene [#]	*	*	3	-	-	-	-	-
1,2-Dibromo-3-chloropropane	*	*	2	-	-	-	-	-
1,2,4-Trichlorobenzene	*	*	3	-	-	-	-	-
Hexachlorobutadiene	*	*	3	-	-	-	-	-
Naphthalene	ND	*	2	-	-	-	-	-
1,2,3-Trichlorobenzene	*	*	3	-	-	-	-	-
Total VOCs	**	**		8	-	-	963	-

Notes:

SSAC	Site-Specific Assessment Criteria
S	Shallower screened well installed in dual installation location
D	Deeper screened well installed in dual installation location
NR	Results of risk assessment demonstrate contaminant does not present significant level of risk via this pathway
105	Measured concentration exceeds the SSAC derived to be protective of water resources
*	No SSAC derived
**	No SSAC derived due to multiple components
MTBE	Methyl Tertiary-Butyl Ether
-	Less than laboratory method detection limit

Table 16
Baseline Geochemical Parameters - Zone 3 Alluvium Wells

Sample Identity	MDL	BH107	BH108	BH114A	BH115	BH122	BH204AS	BH402	BH909	BH912	BH919	BH922	BH923	BH925
Dissolved Methane	1 µg/l	35	5,430	-	-	1,096	16,164	1,346	1,248	1,667	286	218	-	666
Dissolved Ethene	1 µg/l	-	-	-	-	246	3,983	53	44	789	27	67	-	<1
Dissolved Ethane	1 µg/l	-	2,612	-	-	66	1,145	-	15	288	-	32	-	<1
Dissolved Carbon Dioxide	1 µg/l	53,442	62,550	2,154	21,788	147,007	166,052	83,418	102,895	125,632	178,667	217,029	21,893	143,964
pH	0.01 pH Units	8.44	8.21	8.21	8.24	8.52	8.26	8.38	8.54	8.47	8.45	8.23	7.68	8.43
Sulphate	0.05 mg/l	38.58	0.76	78.52	21.1	31.58	6.78	9.57	34.97	9.55	34.71	71.54	91.21	35.88
Nitrate	0.2 mg/l	0.7	-	11.8	3.3	-	-	-	0.4	0.5	-	29	30.5	2
TOC	2 mg/l	-	na	-	-	-	4	13	3	13	-	na	na	-

Sample Identity	MDL	BH926	BH928	RSW7001S	RSW7002S	RSW7003S	RSW7004S	RSW2006S	RSW2007S	RSW2008S	RSW2009S	RSW2010S	RSW2011S	RSW2012S
Dissolved Methane	1 µg/l	16	5	5,752	2,991	17,112	9,852	276	21,823	1,159	13,827	2,562	5	10,851
Dissolved Ethene	1 µg/l	<1	<1	2,841	278	352	644	13	111	-	679	13	-	NM
Dissolved Ethane	1 µg/l	<1	<1	756	424	1,914	2,112	21	315	32	458	142	-	NM
Dissolved Carbon Dioxide	1 µg/l	88,734	86,992	226,472	136,204	157,840	121,188	88,811	69,270	466,243	53,400	96,661	48,944	97,697
pH	0.01 pH Units	8.54	8.42	8.58	8.6	8.54	8.62	6.89	8.62	8.25	8.46	7.61	8.35	8.39
Sulphate	0.05 mg/l	28.12	40.09	7.47	27.17	2.31	0.71	64.38	19.27	265.35	19.96	91.62	116.6	12.34
Nitrate	0.2 mg/l	0.7	8.2	-	-	-	-	-	-	-	-	-	1.3	-
TOC	2 mg/l	-	-	6	-	5	-	13	5	7	-	24	6	14

Notes:

- Below MDL
mbgl Metres below ground level
MDL Method detection limit
DOC Dissolved Organic Carbon
TOC Total Organic Carbon

Table 17
Baseline Geochemical Parameters - Zone 3 Raglan Mudstone Formation wells

Sample Identity	MDL	BH204AD	BH205AD	BH301S	BH301D	BH303S	BH303D	BH304D	RSW7001D	RSW7002D	RSW7003D	RSW7004D	RSW2006D
Dissolved Methane	1 µg/l	18,367	492	20,110	27,563	2,719	1,636	979	366	3,575	17,446	4,952	132
Dissolved Ethene	1 µg/l	2,984	-	698	511	22	145	51	38	432	406	48	13
Dissolved Ethane	1 µg/l	1,298	230	27	43	1,240	818	63	75	483	2,120	2,270	23
Dissolved Carbon Dioxide	1 µg/l	97,106	57,184	286,763	237,989	71,418	38,659	83,170	11,250	120,264	84,774	40,251	73,191
pH	0.01 pH Units	8.36	8.12	8.33	8.36	8.58	8.5	7.88	8.01	8.62	8.55	8.36	7.38
Sulphate	0.05 mg/l	11.19	25.01	5.14	1.93	1.92	6.9	29.81	13.2	24.82	4.07	8.04	48.7
Nitrate	0.2 mg/l	-	-	0.4	0.4	-	-	4.4	-	-	-	-	3.2
TOC	2 mg/l	-	-	-	-	3	2	-	13	-	5	-	13

Sample Identity	MDL	RSW2007D	RSW2008D	RSW2009D	RSW2010D	RSW2011D	RSW2012D
Dissolved Methane	1 µg/l	7,658	1,310	10,716	1,550	6,586	4,875
Dissolved Ethene	1 µg/l	204	26	536	18	216	NM
Dissolved Ethane	1 µg/l	1,157	358	1,241	311	848	NM
Dissolved Carbon Dioxide	1 µg/l	46,004	80,076	47,681	40,805	59,447	46,147
pH	0.01 pH Units	8.28	8.16	8.17	7.87	8.14	8.21
Sulphate	0.05 mg/l	15.16	39.02	17.13	24.12	22.93	24.98
Nitrate	0.2 mg/l	0.4	12	-	2.1	-	0.2
TOC	2 mg/l	3	-	16	7	3	5

Notes:

- Below MDL
mbgl Metres below ground level
MDL Method detection limit
DOC Dissolved Organic Carbon

Table 18
Baseline Geochemical Parameters - Off Site Wells

Sample Identity	MDL	Alluvium				Raglan Mudstone Formation
		BHOS409A	BHOS410	BHOS412	BHOS414	BHOS307
Dissolved Methane	1 µg/l	25	-	9	5	-
Dissolved Ethene	1 µg/l	NM	-	-	-	-
Dissolved Ethane	1 µg/l	NM	-	-	-	-
Dissolved Carbon Dioxide	1 µg/l	117,011	126,924	95,532	77,769	19,995
pH	0.01 pH Units	8.33	7.24	7.01	8.29	8.36
Sulphate	0.05 mg/l	21.14	18.01	15.45	16.49	11.14
Nitrate	0.2 mg/l	10.9	0.8	-	1.6	-
TOC	2 mg/l	4	4	4	3	-

Notes:

- Below MDL
mbgl Metres below ground level
MDL Method detection limit
DOC Dissolved Organic Carbon
TOC Total Organic Carbon

Table 19
Baseline Bulk Ground Gas Monitoring Results

Monitoring Point	Date	Groundwater Elevation (m bgl)	LNAPL Thickness (mm)	Atmos. Pressure (mb)	Methane		Carbon-Dioxide		Oxygen		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Flow Rate (l/hr)
					Peak (%v/v)	Steady (%v/v)	Peak (%v/v)	Steady (%v/v)	Minimum (%v/v)	Steady (%v/v)			
BH103	29/05/2012	3.31	1101	1013	36.6	28.1	5.3	5.3	0.5	0.5	6.0	> DL	<0.1
BH104	23/05/2012	1.07	-	1021	0.1	<0.1	0.3	<0.1	18.2	20.4	<1	1.0	<0.1
BH106	31/05/2012	2.05	-	1012	<0.1	<0.1	0.9	0.9	19.8	19.8	<1	2	<0.1
BH107	29/05/2012	2.44	-	1013	5.1	<0.1	0.8	0.7	16.2	19.5	<1	> DL	<0.1
BH115	23/05/2012	2.25	-	1018	<0.1	<0.1	0.1	0.1	19.9	19.9	<1	<1	0.1
BH118	29/05/2012	3.18	610	1012	7.8	4.3	1.9	1.1	5.1	10.0	<1	<1	-0.1
BH120	29/05/2012	1.48	-	1013	<0.1	<0.1	0.9	0.9	20.0	20.1	<1	48	<0.1
BH121	29/05/2012	2.03	-	1013	<0.1	<0.1	0.2	0.2	20.3	20.4	<1	94	<0.1
BH122	23/05/2012	2.26	-	1018	<0.1	<0.1	7.5	3.5	10.8	16.3	<1	<1	0.1
BH129	23/05/2012	1.71	-	1021	<0.1	<0.1	0.2	0.2	18.3	18.3	<1	<1	-0.1
BH132	29/05/2012	2.03	-	1013	54.0	53.1	23.9	23.7	0.0	0.0	28.0	> DL	-0.1
BH202S	29/05/2012	0.85	-	1013	<0.1	<0.1	0.2	0.2	20.2	20.2	<1	<1	-1.1
BH203S	23/05/2012	1.66	-	1021	<0.1	<0.1	0.1	<0.1	20.2	20.3	<1	<1	<0.1
BH205AS	23/05/2012	3.02	660	1013	<0.1	<0.1	0.2	0.2	20.2	20.2	<1	<1	-1.1
BH401	23/05/2012	1.72	-	1021	<0.1	<0.1	0.5	0.3	19.6	19.8	<1	<1	<0.1
BH406	23/05/2012	2.80	505	1021	13.0	6.2	1.1	0.6	4.9	12.6	<1	4	0.1
BH913	23/05/2012	2.81	-	1020	2.1	<0.1	5.3	5.3	13.1	13.1	<1	3	0.1
BH918	29/05/2012	2.32	-	1011	<0.1	<0.1	3.2	2.5	14.6	15.9	<1	<1	<0.1
BH921	23/05/2012	2.84	-	1018	0.1	0.1	3.0	0.5	17.2	19.2	<1	3	0.1
BH924	23/05/2012	UTA	-	1012	0.1	<0.1	1.6	<0.1	16.2	20.4	<1	<1	<0.1
BH927	29/05/2012	1.86	-	1012	<0.1	<0.1	0.2	0.2	20.2	20.2	<1	<1	<0.1

Notes

mb millibars
 %v/v percentage volume to volume
 ppmV parts per million by Volume
 l/hr litres per hour
 > DL Above instrument detection limit
 UTA Unable to access well for gauging
 - No LNAPL encountered in the well

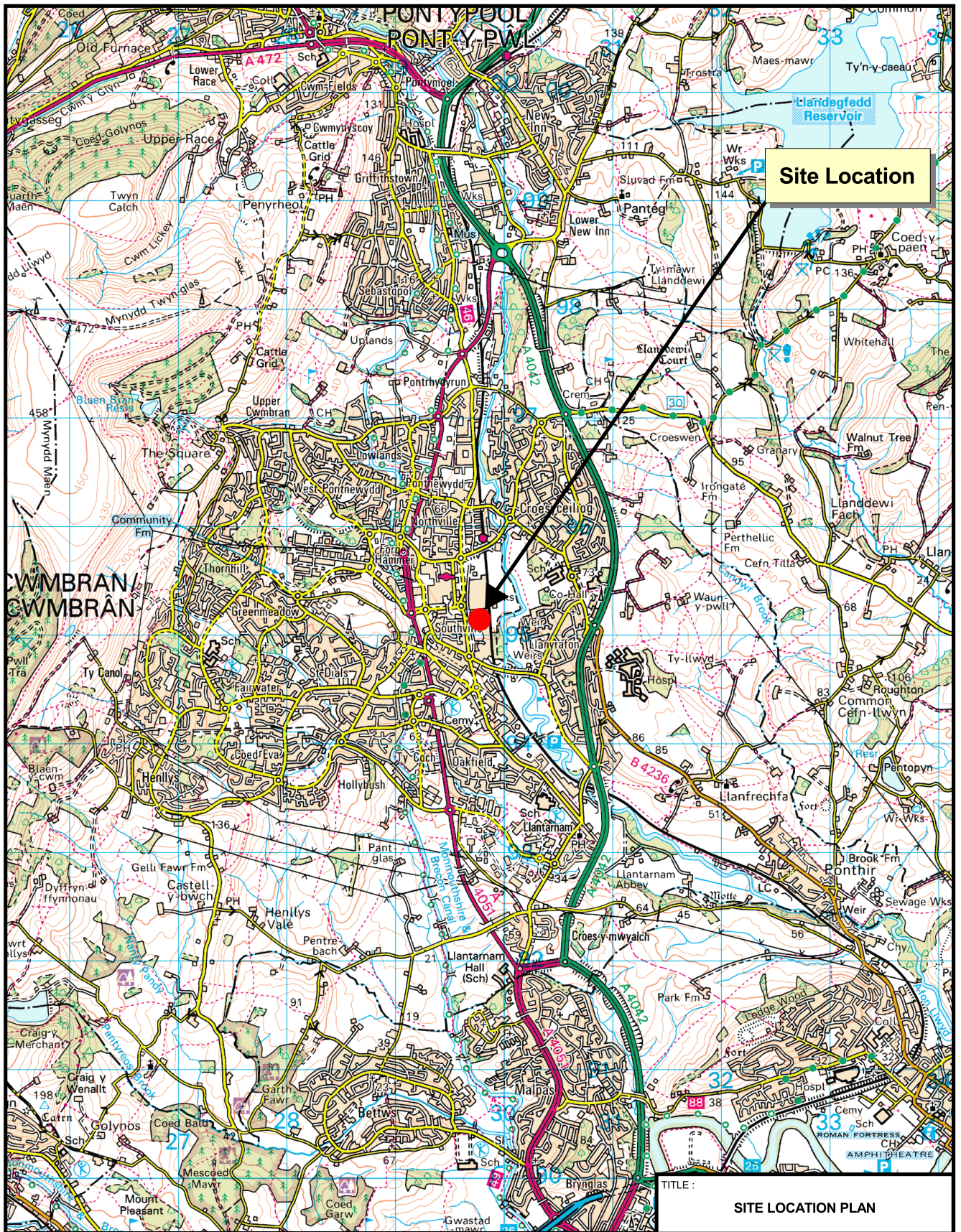
Table 20
Measured Concentrations of CoC in Soil Gas (µg/m³)
- Area A

Location	Laboratory Method Detection Limit	Area A					
		SG1		SG2		SG3	
Sample Date		Apr-10	May-12	Apr-10	May-12	Apr-10	May-12
Chlorodifluoromethane (HCFC-22)	7	-	-	-	-	-	-
Dichlorodifluoromethane (F-12)	12.4	-	-	-	-	-	-
Chloromethane	3.1	-	-	-	-	-	-
1,2-Dichlorotetrafluoroethane (F-114)	10.5	-	-	-	-	-	-
Vinyl Chloride	3.8	14,102	-	3,972,356	2,765	1301.1	-
Isobutene	3.4	-	-	-	-	-	-
1,3-Butadiene	3.3	-	-	-	-	-	-
Bromomethane	5.8	-	-	-	-	-	-
Chloroethane	4	-	-	-	-	-	-
Ethanol	4.7	-	-	-	-	-	-
Acetonitrile	2.5	-	-	-	-	-	-
Acrolein	5.7	-	-	-	-	-	-
Acetone + Propanal	14	-	-	-	-	-	-
Trichlorofluoromethane (F-11)	8.4	-	-	-	-	-	-
2-Propanol	15	-	-	-	-	-	-
Pentane	4.4	-	-	-	-	-	-
Isoprene	6	-	-	-	-	-	-
Methyl Iodide	8.7	-	-	-	-	-	-
1,1-Dichloroethene	5.9	646.3	-	9924.6	-	83.3	-
Methylene Chloride	35	160	-	125	-	-	-
Trichlorotrifluoroethane	11.5	-	-	-	-	-	-
Carbon Disulfide	4.7	-	-	-	-	-	-
1-Propanol	3.7	-	-	-	-	-	-
Methylacrolein	4.3	-	-	-	-	-	-
1,1-Dichloroethane	6.1	1659.6	-	983.6	-	109.3	-
Cyclopentane	4.3	-	-	-	-	-	-
Methyl Vinyl Ketone	4.6	-	-	-	-	-	-
Methyl tertiary butyl ether	5.4	-	-	-	-	-	-
Vinyl Acetate	5.3	-	-	-	-	-	-
Butanal	6	-	-	-	-	-	-
2-Butanone (MEK)	6	-	-	-	-	-	12
cis-1,2-Dichloroethene	4	178,763	91	2,783,776	6,895	41,316	155
Hexane	5.3	63.4	-	-	-	155.1	-
Chloroform	7.3	19.5	-	117.2	-	-	-
1,2-Dichloroethane	6.1	-	-	44.5	-	-	-
1,1,1-Trichloroethane	8.2	660.3	-	611.1	-	98.2	-
1-Butanol	9	-	-	-	-	-	-
Benzene	4.8	-	30	99	-	38.3	-
Carbon Tetrachloride	9.4	-	-	-	-	-	-
Cyclohexane	7	114	-	-	-	-	-
2-Pentanone	5.3	-	-	-	-	-	-
Pentanal	5.3	-	-	-	-	-	-
3-Pentanone	5.3	-	-	-	-	-	-
1,2-Dichloropropane	6.9	-	-	-	-	-	-
Bromodichloromethane	10.1	-	-	-	-	-	-
1,4-Dioxane	7	-	-	-	-	-	-
Trichloroethene	8.1	1,076,693	720.1	8,966,272	8,574	440,155	482.1
cis-1,3-Dichloropropene	6.8	-	-	-	-	-	-
4-Methyl-2-pentanone	6.1	-	-	-	-	-	-
trans-1,3-Dichloropropene	6.8	-	-	-	-	-	-
1,1,2-Trichloroethane	8.2	-	-	-	-	-	-
Toluene	5.7	52.8	113	648.1	-	60.3	38.8
3-Hexanone	6.1	-	-	-	-	-	-
2-Hexanone	6.1	-	-	-	-	-	-
Hexanal	6.1	-	-	-	-	-	-
1,2-Dibromoethane	11.5	-	-	-	-	-	-
Tetrachloroethene	10.2	474.8	-	9082.4	213.7	413.8	-
Chlorobenzene	6.9	-	-	78.3	-	-	-
Ethylbenzene	6.5	34.7	38.2	108.5	-	21.7	-
m&p - Xylenes	6.5	26.1	187.1	125.9	-	30.4	-
o-Xylene	6.5	8.7	44.3	39.1	-	13	-
Bromoform	15.5	-	-	-	-	-	-
Styrene	6.4	-	-	17	-	-	-
1,1,2,2-Tetrachloroethane	10.3	-	-	-	-	-	-
1,3,5-Trimethylbenzene	7.4	-	29.5	-	-	-	-
1,2,4-Trimethylbenzene	7.4	-	75.7	-	-	-	-
1,3-Dichlorobenzene	9	-	-	-	-	-	-
Benzyl Chloride	7.8	-	-	-	-	-	-
1,4-Dichlorobenzene	9	-	-	-	-	-	-
1,2,3-Trimethylbenzene	7.4	-	34.9	-	-	-	-
1,2-Dichlorobenzene	9	-	-	-	-	-	-
1,2,4-Trichlorobenzene	11.1	-	-	-	-	-	-
Naphthalene	7.9	*	-	*	-	*	-
Aliphatic >C4-C6	33	*	76	*	6526	*	149
Aliphatic >C6-C8	41	*	556	*	14588	*	368
Aliphatic >C8-C10	53	*	-	*	165	*	-
Aliphatic >C10-C12	65	*	-	*	-	*	-
Aromatic >EC8-EC10	49	*	304	*	-	*	-
Aromatic >EC10-EC12	53	*	149	*	-	*	-



Table 21
Measured Concentrations of Soil Gas
(µg/m³) - Areas B and C

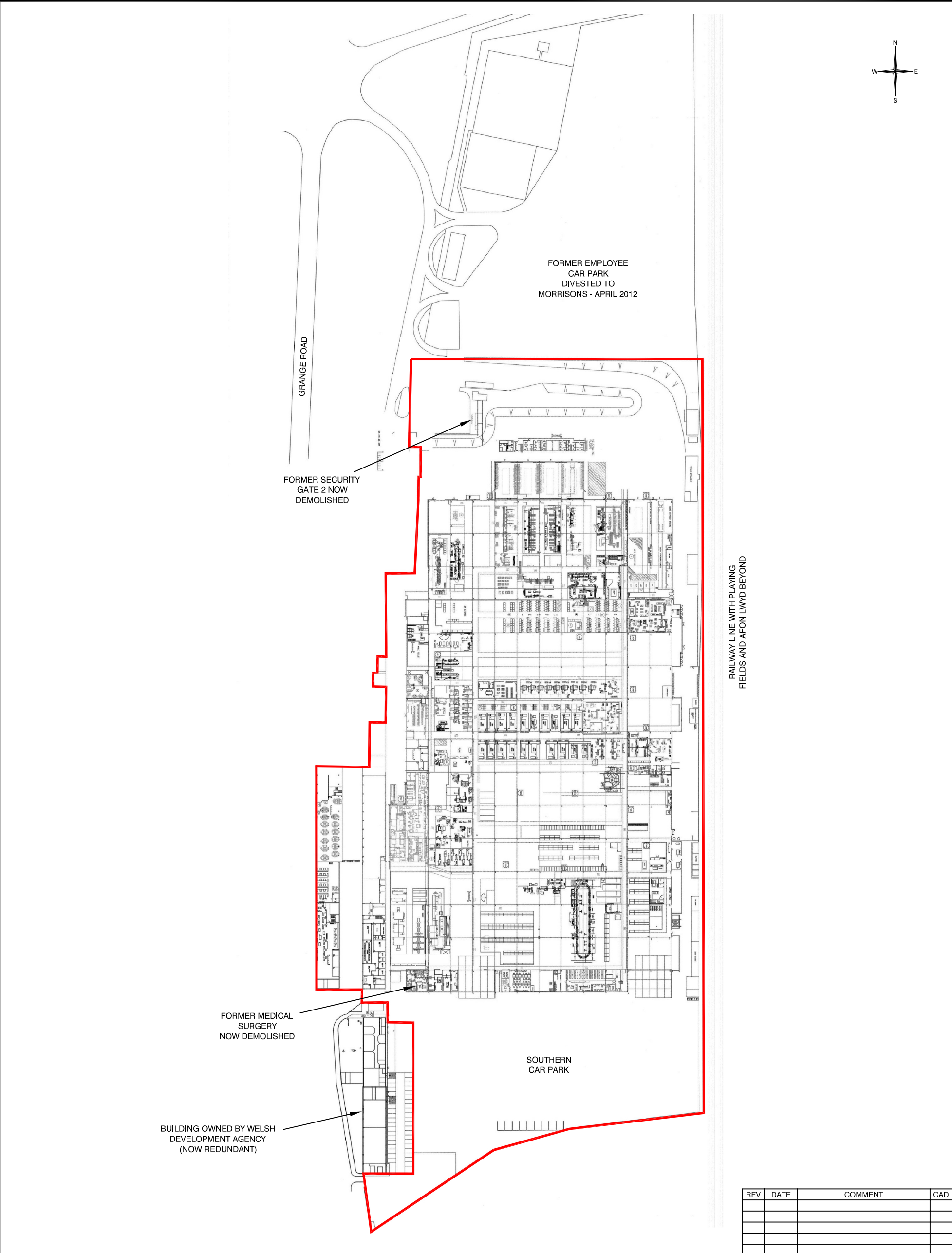
Location	Area B												Area C				Laboratory Method Detection Limit
	SG4			SG5				SG6		SG7			SG8			SG9	
Sample Date	Apr-10	Sep-10	May-12	Apr-10	Sep-10	May-12	May-12 Duplicate	Apr-10	May-12	Apr-10	Sep-10	May-12	Apr-10	Sep-10	May-12	Apr-10	
Chlorodifluoromethane (HCFC-22)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Dichlorodifluoromethane (F-12)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.4
Chloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.1
1,2-Dichlorotetrafluoroethane (F-114)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.5
Vinyl Chloride	1,389,808	862,320	3,417	913,520	95,420	121.9	138	376,333	324.6	9,623.9	565.7	39.4	3,417.6	-	473.9	2,029.6	3.8
Isobutene	-	4274.1	-	-	-	-	-	-	-	-	255	-	-	-	-	-	3.4
1,3-Butadiene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.3
Bromomethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.8
Chloroethane	-	-	-	-	-	-	-	-	-	-	242.5	-	-	-	-	-	4
Ethanol	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7
Acetonitrile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5
Acrolein	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7
Acetone + Propanal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
Trichlorofluoromethane (F-11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.4
2-Propanol	-	-	-	-	-	-	-	-	-	-	-	-	-	-	76	-	15
Pentane	1,838.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.4
Isoprene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Methyl Iodide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.7
1,1-Dichloroethene	77,954	49,987.5	-	48,905.4	8,821.9	-	-	1,149.9	-	-	-	-	959.6	-	-	828.7	5.9
Methylene Chloride	882	-	-	-	-	-	-	104	-	-	-	-	83	-	-	-	35
Trichlorotrifluoroethane	4,138.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.5
Carbon Disulfide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7
1-Propanol	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.7
Methylacrolein	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.3
1,1-Dichloroethane	-	2,521.7	-	-	-	-	-	161.9	-	56.7	47.4	-	56.7	-	-	101.2	6.1
Cyclopentane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.3
Methyl Vinyl Ketone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.6
Methyl tertiary butyl ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.4
Vinyl Acetate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3
Butanal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
2-Butanone (MEK)	-	-	-	-	-	62	47	-	74	-	-	50	-	-	41	-	6
cis-1,2-Dichloroethene	8,978,169	3,032,033	103,446	4,813,110	248,958	4,381	3,826	33,823	5,297	206	448	2,581.0	182,189.0	119,226.0	10,308	612,341.0	4
Hexane	-	-	-	-	-	-	-	95.2	-	77.5	-	-	-	-	-	-	5.3
Chloroform	-	3,314.5	-	-	-	-	-	-	-	-	-	-	1,865.2	1,874.0	-	2,670.9	7.3
1,2-Dichloroethane	-	-	-	-	-	-	-	-	-	20.2	94.7	-	-	-	-	-	6.1
1,1,1-Trichloroethane	11,813.6	5,998.5	-	31,855.9	-	-	-	-	-	-	-	-	502	-	-	403.8	8.2
1-Butanol	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Benzene	418.5	-	-	338.6	-	8.6	-	73.5	-	35.1	-	15.3	70.3	-	-	95.8	4.8
Carbon Tetrachloride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.4
Cyclohexane	-	-	-	-	-	-	-	34	-	21	-	10	-	-	38	-	7
2-Pentanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3
Pentanal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3
3-Pentanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3
1,2-Dichloropropane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.9
Bromodichloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.1
1,4-Dioxane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Trichloroethene	32,766,799.2	17,385,537.9	613,885	16,910,799.4	1,910,096	22,378	20,525	1037.2	1351	408.4	748.6	625.5	4,117,532	3,967,962	735.2	7,590,475.6	8.1
cis-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.8
4-Methyl-2-pentanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.1
trans-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.8
1,1,2-Trichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2
Toluene	3,526.8	1,468.8	-	1,631.5	-	133.8	391	75.4	-	180.9	104.7	40.3	86.7	-	-	98	5.7
3-Hexanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.1
2-Hexanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.1
Hexanal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.1
1,2-Dibromoethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.5
Tetrachloroethene	16,123.1	29,611.8	-	21,074.7	3215.1	24.4	22	-	17	54.3	108.5	-	16,170.6	11641	-	8,628.0	10.2
Chlorobenzene	267	-	-	-	-	-	-	-	-	18.4	69.1	-	27.6	-	-	78.3	6.9
Ethylbenzene	130.3	-	-	82.5	-	17.8	12	-	9.6	17.4	13.9	23.9	30.4	-	-	26.1	6.5
m&p - Xylenes	247.5	-	-	78.2	-	64.3	43	-	33.9	56.4	59.1	122.9	26.1	-	-	26.1	6.5
o-Xylene	121.6	-	-	39.1	-	35.2	-	-	16.9	21.7	25.2	25.2	-	-	-	21.7	6.5
Bromoform	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.5
Styrene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.4
1,1,2,2-Tetrachloroethane	-	-	-	-	-	-	112	-	-	-	-	-	-	-	-	-	10.3
1,3,5-Trimethylbenzene	-	-	-	-	-	284.1	38	-	56	-	-	70.8	14.7	-	-	-	7.4
1,2,4-Trimethylbenzene	172	-	-	49.2	-	1,050.9	375	-	198.6	29.5	-	232	19.7	-	-	-	7.4
1,3-Dichlorobenzene	-	-	-	18	-	-	1,281	-	-	-	-	-	30.1	-	-	-	9
Benzyl Chloride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8
1,4-Dichlorobenzene	-	-	-	18	-	-	-	-	-	-	-	-	24	-	-	-	9
1,2,3-Trimethylbenzene	-	-	-	14.7	-	340.2	371	-	78.2	-	-	88	-	-	-	-	7.4
1,2-Dichlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	18	-	-	-	9
1,2,4-Trichlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	14.8	-	-	-	11.1
Naphthalene	*	*	-	*	*	-	-	*	*	*	*	-	*	*	-	*	7.9
Aliphatic >C4-C6	*	*	90,859	*	*	106	-	*	5,257.0	*	*	2,263.0	*	*	9,127.0	*	33
Aliphatic >C6-C8	*	*	467,189	*	*	18,294.0	23,541	*	1027	*	*	487	*	*	613	*	41
Aliphatic >C8-C10	*	*	-	*	*	2,993.0	17,971	*	-	*	*	-	*	*	-	*	53
Aliphatic >C10-C12	*	*	-	*	*	-	7,839	*	-	*	*	-	*	*	-	*	65
Aromatic >EC8-EC10	*	*	-	*	*	133	108	*	69	*	*	196	*	*	-	*	49
Aromatic >EC10-EC12	*	*	-	*	*	7,002.0	3,280	*	356	*	*	436	*	*	-	*	53

FIGURES




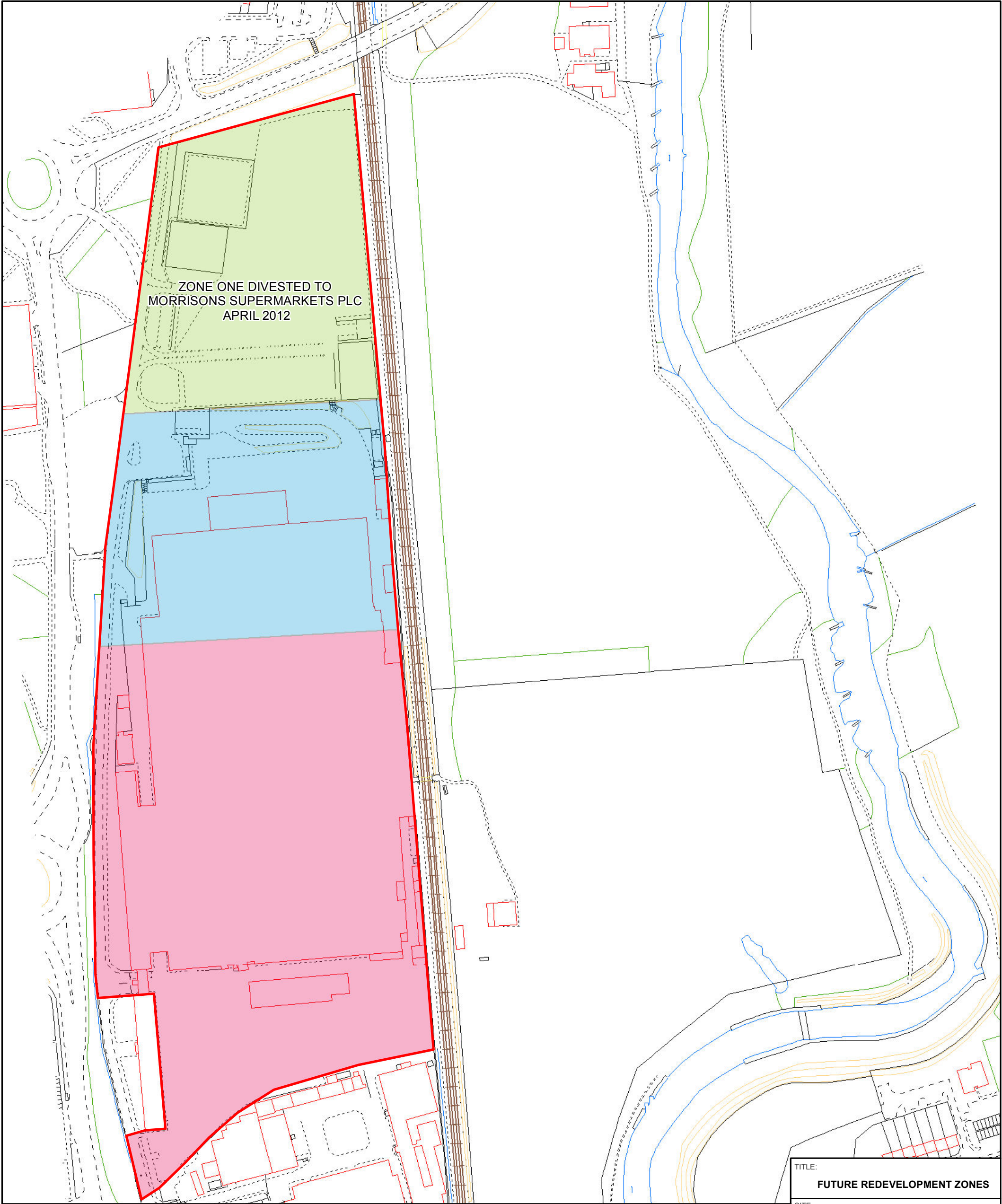
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LEGEND	NOTES	TITLE : SITE LOCATION PLAN	
 SITE LOCATION		SITE : CWMBRAN	
		CLIENT : MERITOR HVBS (UK) LIMITED	
		PROJECT : 90936.41	FIGURE 1
		DATE : 09/05/12	DRAWN BY : AP
		DRG No : 909364112.apr / SLP	
		SCALE : 1 : 50,000	PRINT : A4
			







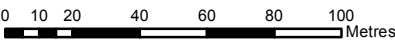
REV	DATE	COMMENT	CAD


DISCLAIMER	NOTES	KEY	TITLE: SITE LAYOUT PLAN		SITE: CWMBRAN	
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 UK IN CASE OF ANY QUERY	NOT TO SCALE INTERIOR OF PRODUCTION BUILDING HAS BEEN ALTERED	<div></div> SITE BOUNDARY	PROJECT: 90936.41		CLIENT: MERITOR HVBS (UK) LTD	
			DATE: 23/01/13	PRINT: A3		
			DRAWN BY: BNB	REV: -		
			DRG.No.: 909364137-CAD		FIGURE 2	

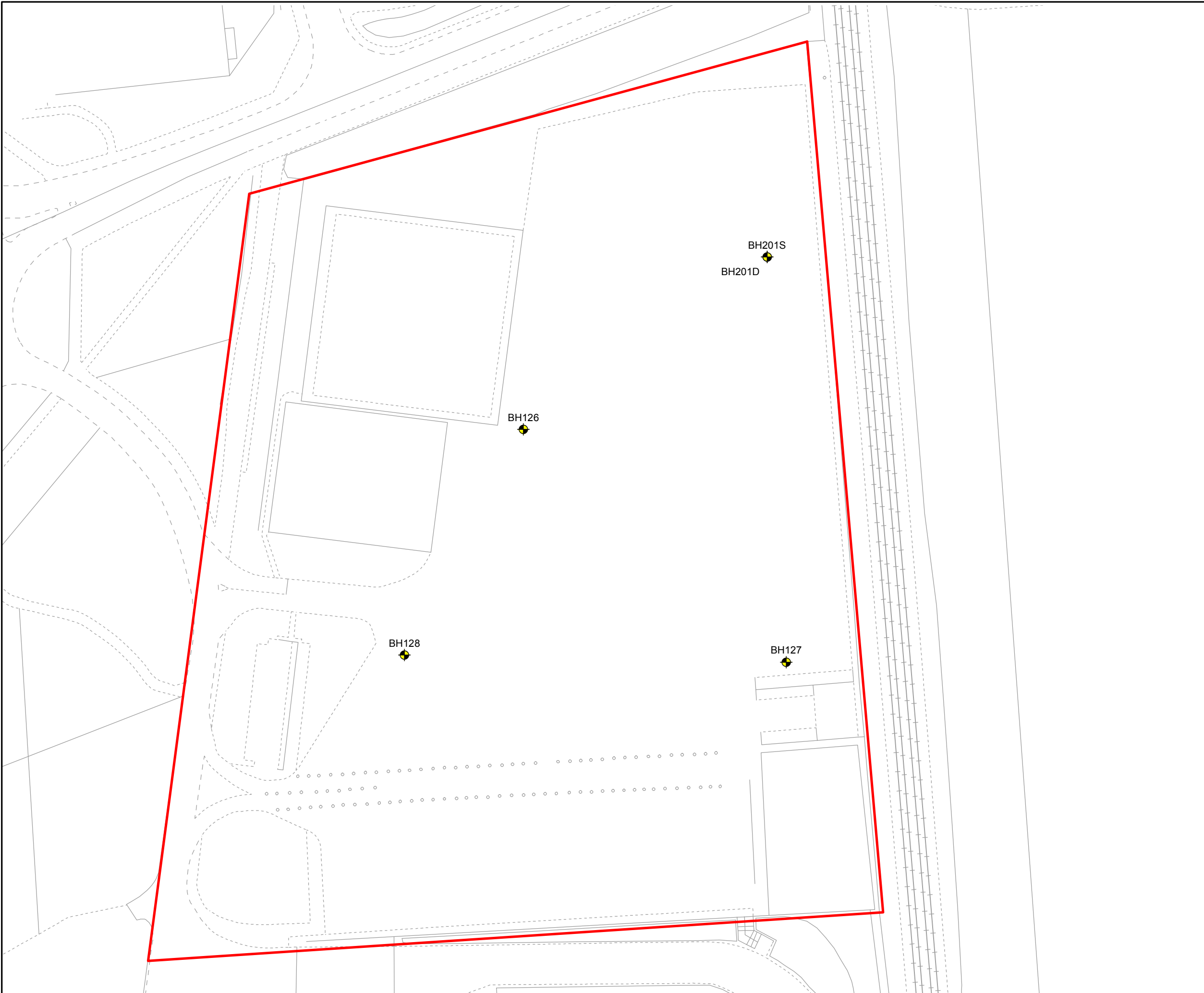


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LEGEND	
	SITE BOUNDARY
	ZONE 1: REDEVELOPMENT FOR SUPERMARKET AND PETROL FILLING STATION - ON-GOING
	ZONE 2: REDEVELOPMENT FOR MIXED COMMERCIAL END-USE
	ZONE 3: REFURBISHMENT OF MERITOR FACILITY (REDUCED FOOTPRINT)


NOTES	
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.	
	

TITLE: FUTURE REDEVELOPMENT ZONES	
SITE : CWMBRAN	
CLIENT : MERITOR HVBS (UK) LIMITED	
PROJECT : 90936.41	FIGURE 3
DATE : 18/10/12	DRAWN BY : RJM
DRG No. : 909364128 GIS	
SCALE : 1 : 2,250	PRINT : A3
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LEGEND

 MONITORING WELL LOCATION PHASE II ESA

 APPROXIMATE ZONE 1 BOUNDARY

NOTES

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.

MONITORING WELLS DECOMMISSIONED IN APRIL 2012

S = SHALLOW INSTALLATION
D = DEEP INSTALLATION

03612182430Metres

N

TITLE: FORMER ZONE ONE MONITORING WELL NETWORK LAYOUT PLAN (NOW DECOMMISSIONED)

SITE : CWMBRAN

CLIENT : MERITOR HVBS (UK) LIMITED

PROJECT : 90936.41

FIGURE 4


DATE : 18/10/12

DRAWN BY : AP

DRG No. : 909364138 GIS

SCALE : 1 : 800

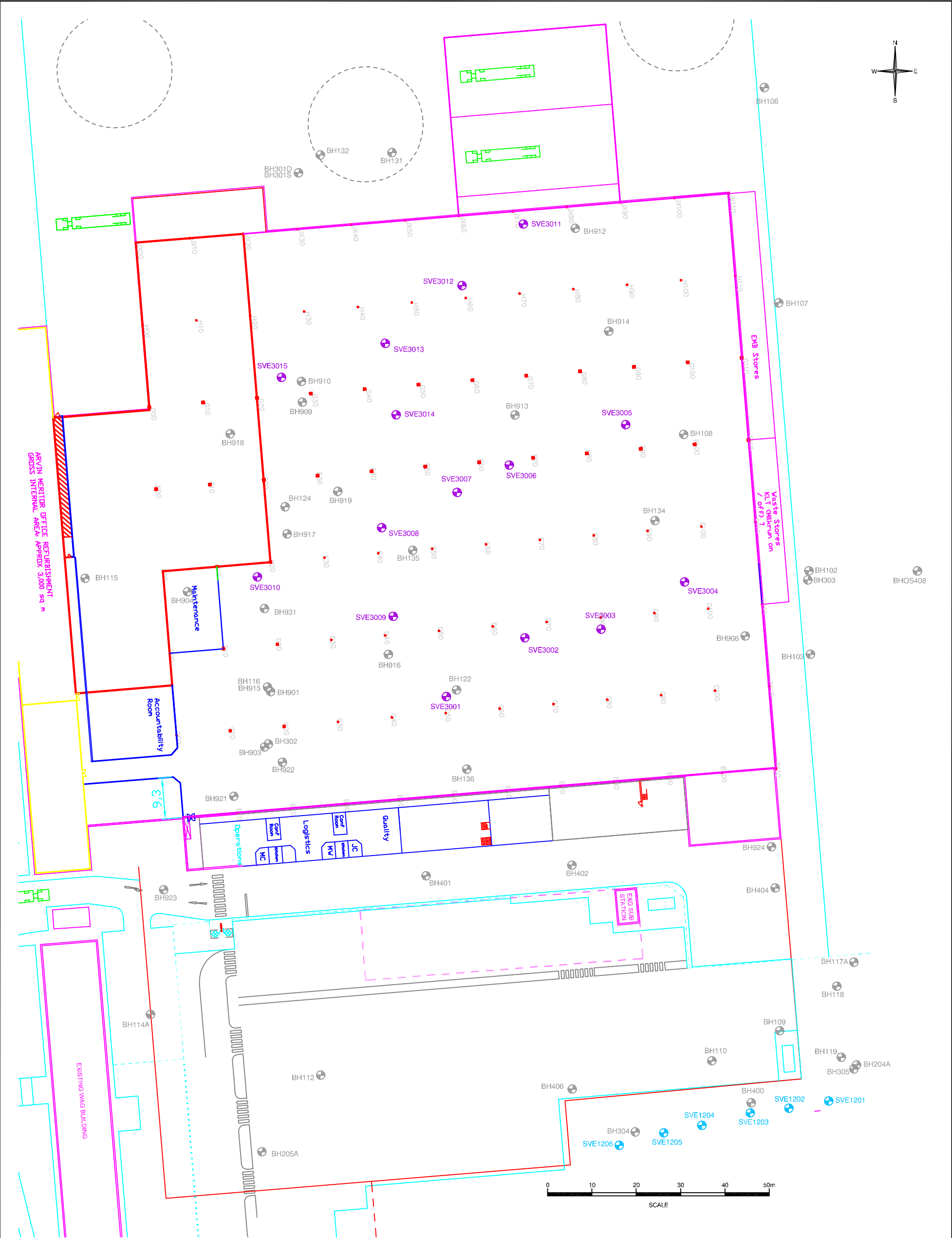
PRINT : A3


**ARCADIS**

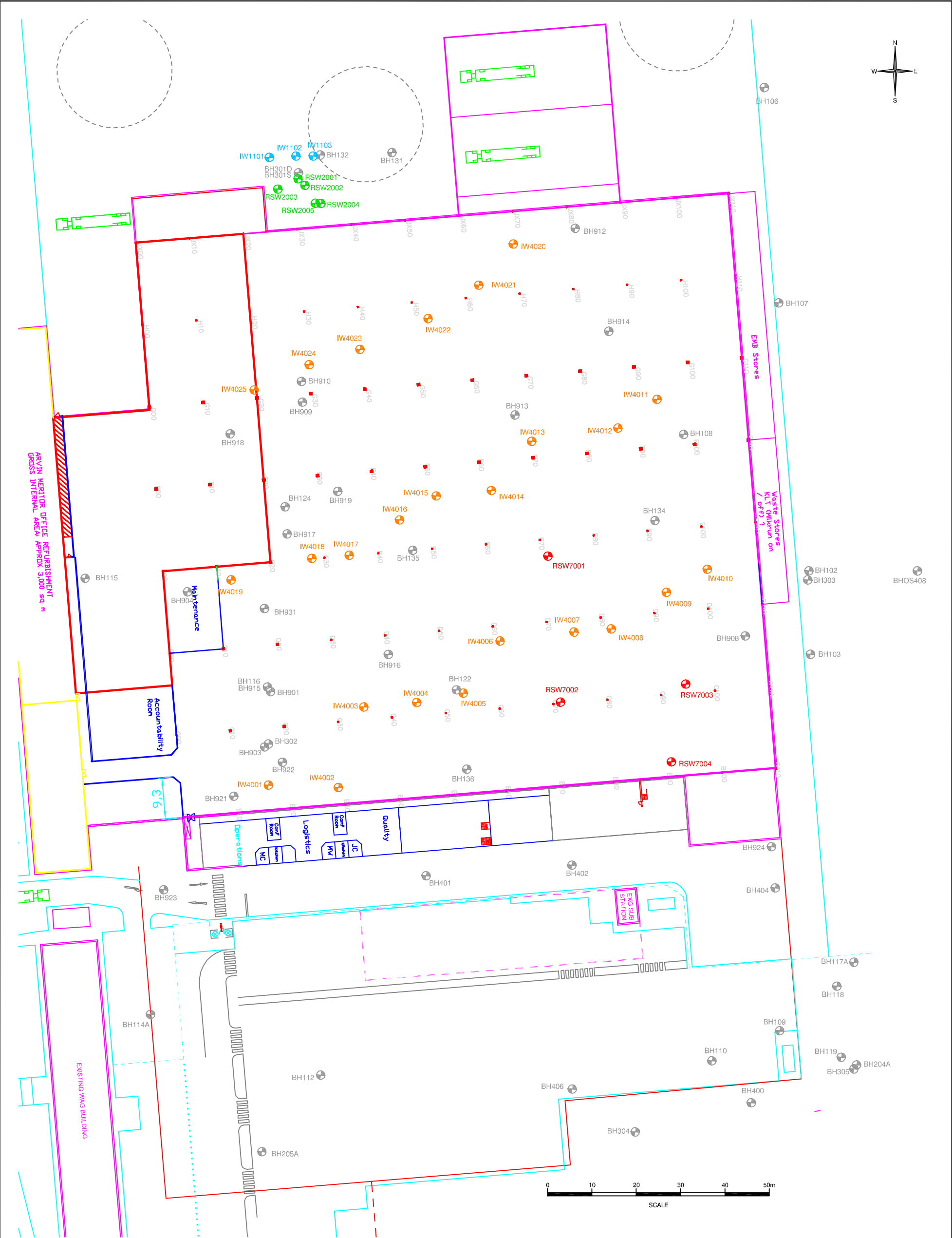
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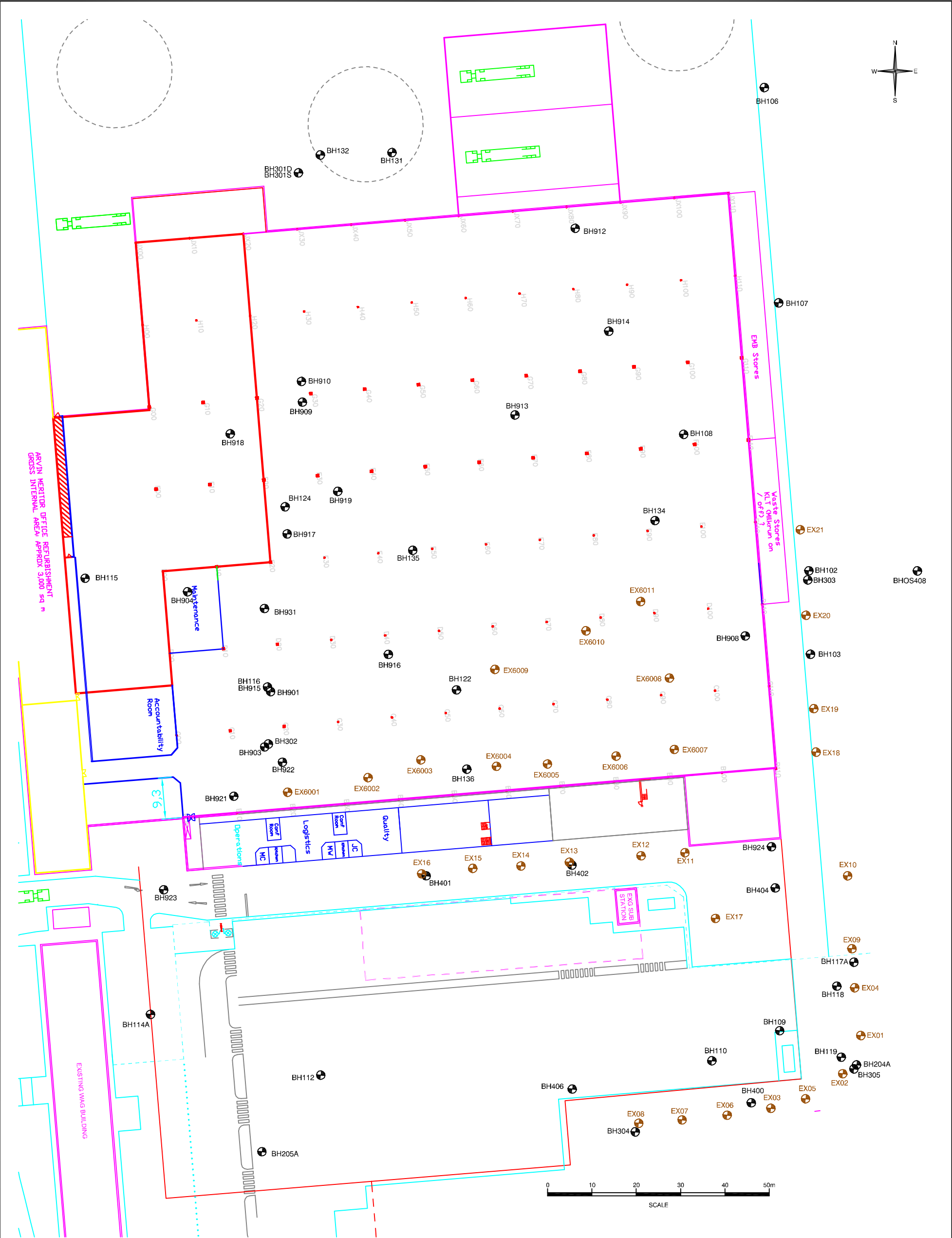
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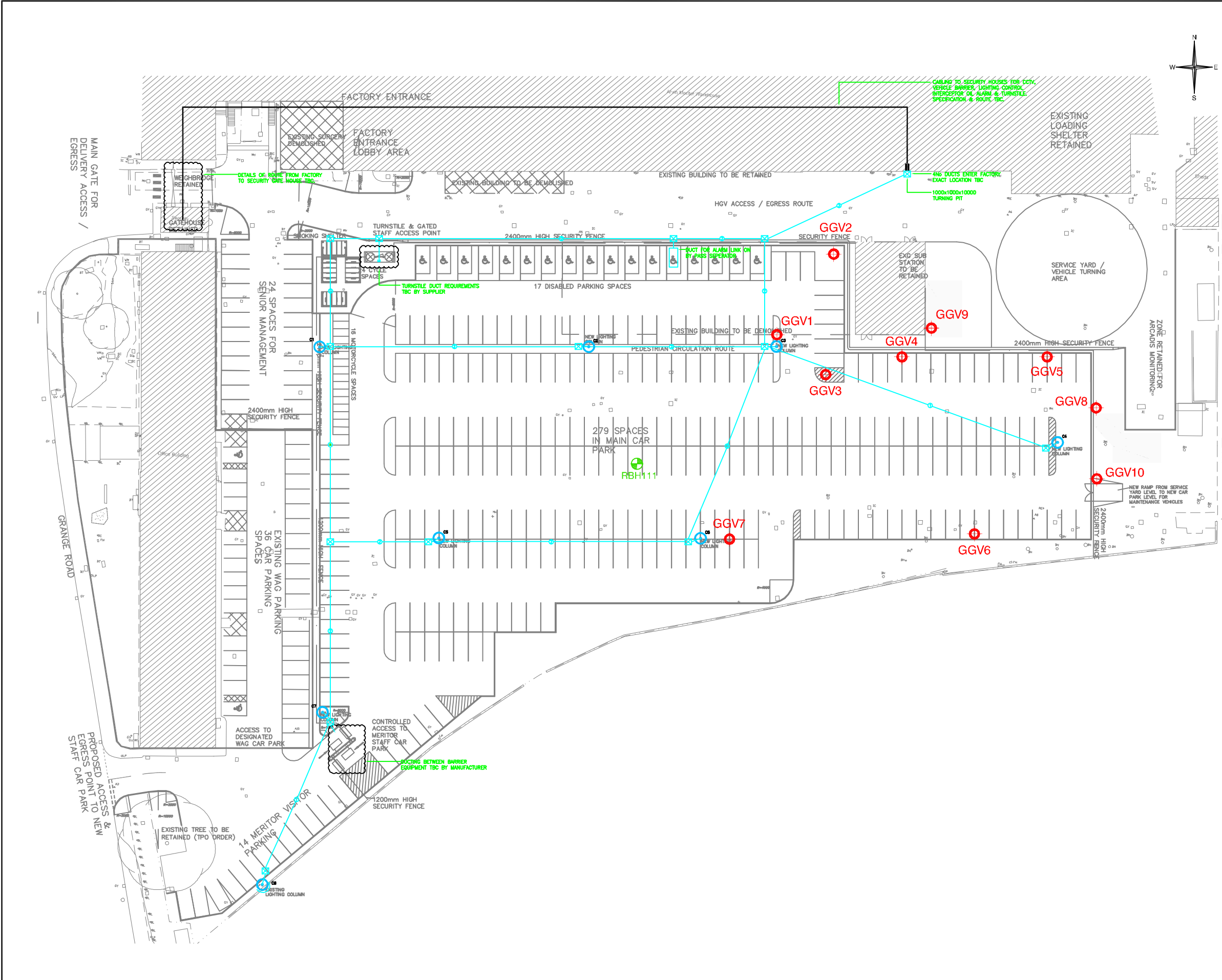
DISCLAIMER		NOTES		KEY		TITLE:		SITE:			
<p>NOTE: ALL ENTITIES SHOWN ON THIS DRAWING ARE TO BE REGARDED AS APPROXIMATE AND ARE INDICATIVE ONLY. NO MEASUREMENTS TAKEN FROM THIS DRAWING SHOULD BE USED FOR THE LOCATION OF INTRUSIVE INVESTIGATION WORKS ON SITE. SYMBOLS FOR BOREHOLES, TRIAL PITS AND OTHER SPECIFIC FEATURES ARE REPRESENTATIONS OF LOCATION ONLY AND UNLESS OTHERWISE SPECIFIED, DO NOT REPRESENT THE TRUE SIZE OF THE FEATURE. - CONTACT ARCADIS UK IN CASE OF ANY QUERY</p>		SVE = SOIL VAPOUR EXTRACTION		<div><div>⦿</div> EXISTING GROUNDWATER MONITORING WELL</div> <div><div>⦿</div> SVE EXTRACTION WELL</div> <div><div>⦿</div> EXISTING SVE EXTRACTION WELL</div>		SVE WELL LOCATION PLAN		CWMBRAN			
						PROJECT: 90936.41		CLIENT: MERITOR HVBS (UK) LIMITED		FIGURE 5	
						DATE: 04/10/12		PRINT: A3		<div><div></div><div>ARCADIS</div><div>Infrastructure · Water · Environment · Buildings</div><div>Tel +44 (0) 1638 674767</div><div>www.arcadis-uk.com</div></div>	
						DRAWN BY: AP		REV: -			
						DRG.No.: 909364139-CAD					



DISCLAIMER		NOTES		KEY		TITLE:		SITE:	
<p>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</p> <p>SPECIFIC FEATURES ARE REPRESENTATIONS OF LOCATION ONLY AND UNLESS OTHERWISE SPECIFIED, DO NOT REPRESENT THE TRUE SIZE OF THE FEATURE. - CONTACT ARCADIS UK IN CASE OF ANY QUERY</p>		ERD = ENHANCED REDUCTIVE DECHLORINATION		<ul style="list-style-type: none">● EXISTING GROUNDWATER MONITORING WELL● NEWLY INSTALLED DUAL INSTALLATION ERD INJECTION WELL● NEWLY INSTALLED TRIPLE INSTALLATION ERD RESPONSE MONITORING WELL● EXISTING ERD PILOT TRIAL WELL DUAL INSTALLATION● EXISTING ERD RESPONSE WELL		ERD WELL LOCATION PLAN		CWMBRAN	
						PROJECT: 90936.41		CLIENT: MERITOR HVBS (UK) LIMITED	
						DATE: 04/10/12	PRINT: A3	 Infrastructure · Water · Environment · Buildings Tel +44 (0) 1638 674767 www.arcadis-uk.com	
						DRAWN BY: AP	REV: -		
						DRG.No.: 909364140-CAD		FIGURE 6	



DISCLAIMER	NOTES	KEY	TITLE: LNAPL RECOVERY WELL LOCATION PLAN		SITE: CWMBRAN	
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 UK IN CASE OF ANY QUERY	LNAPL = LIGHT NON-AQUEOUS PHASE LIQUID	<div> GROUNDWATER MONITORING WELL</div> <div> LNAPL EXTRACTION WELL</div>	PROJECT: 90936.41		CLIENT: MERITOR HVBS (UK) LIMITED	FIGURE 7
			DATE: 04/10/12		PRINT: A3	
			DRAWN BY: AP		REV: -	
			DRG.No.: 909364141-CAD			
					<div> ARCADIS</div> <div>Infrastructure · Water · Environment · Buildings</div> <div>Tel +44 (0) 1638 674767</div> <div>www.arcadis-uk.com</div>	



KEY	
	PASSIVE GROUND GAS VENT LOCATION
	REPLACEMENT BOREHOLE LOCATION (REPLACEMENT FOR WELL BH111)

NOTES

BASED ON DRAWING BY LX ENGINEERING
DRAWING No: 12-100061-BW1 P1
DATE: 12/01/2012

REV	DATE	COMMENT	CAD

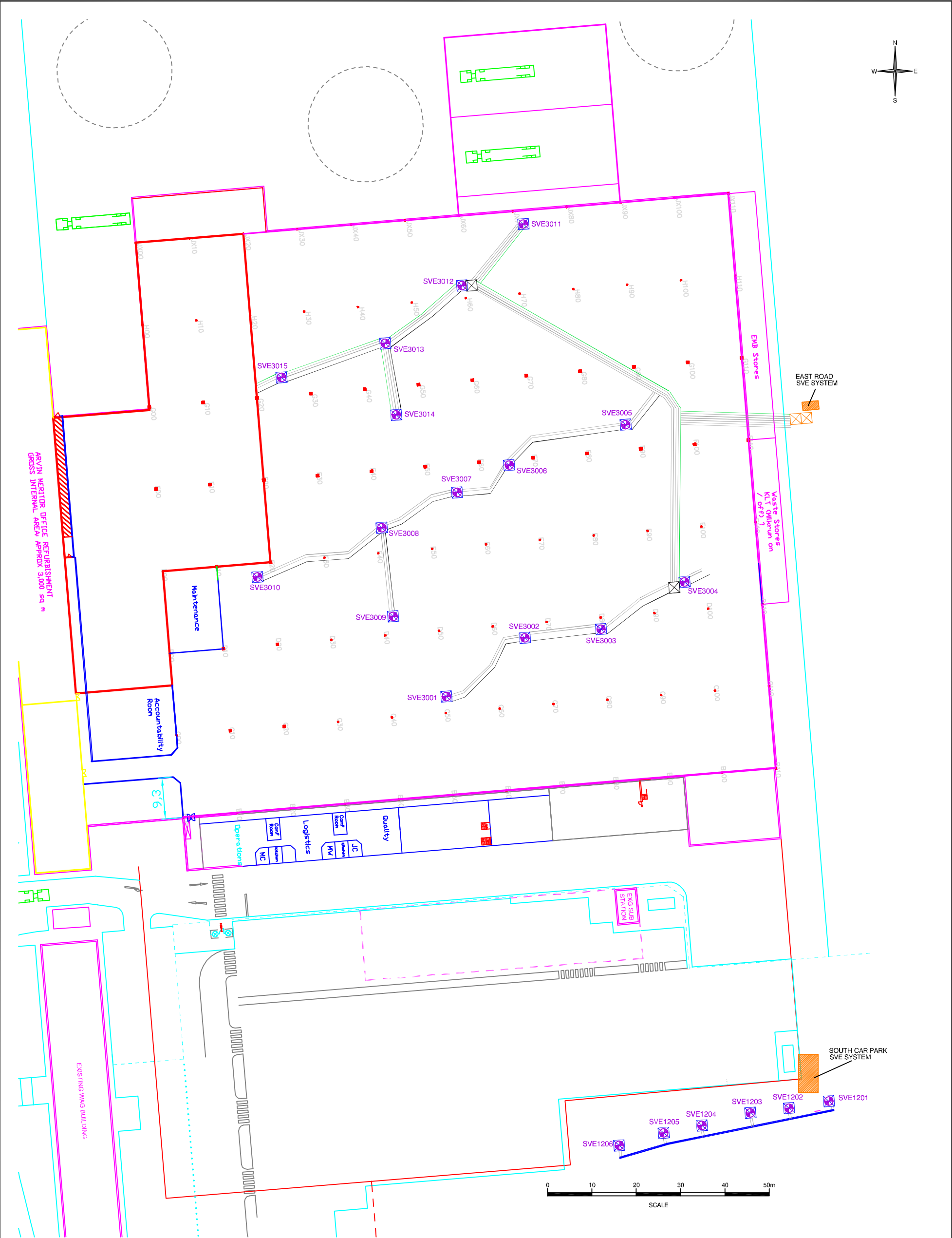
TITLE: PASSIVE GROUND GAS VENT WELL LOCATION PLAN	
SITE: CWMBRAN	
CLIENT: MERITOR HVBS (UK) LIMITED	
PROJECT: 90936.41	FIGURE 8
DATE: 13/07/12	DRAWN: BNB
DRG.No.: 909364122-CAD	PRINT: A3



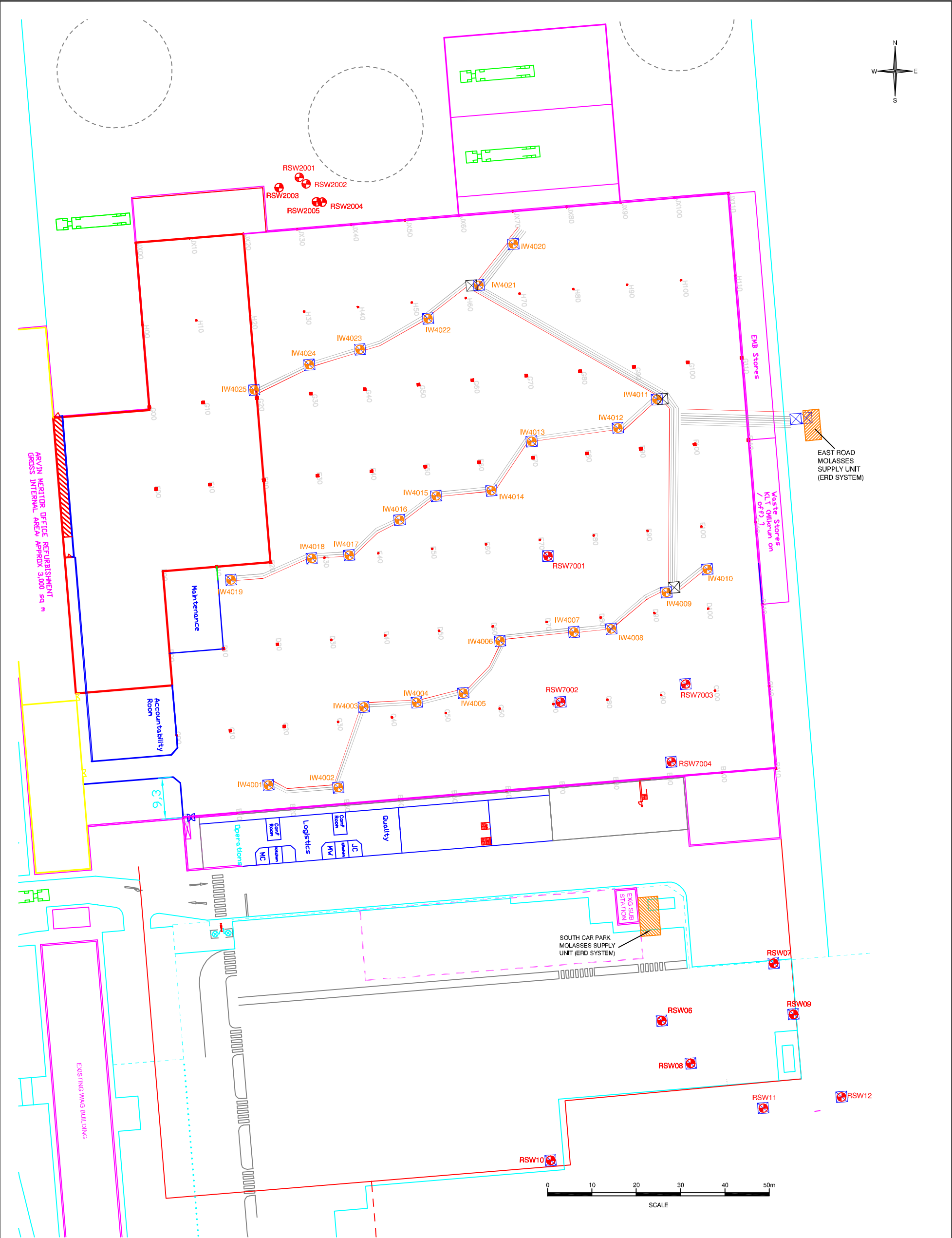
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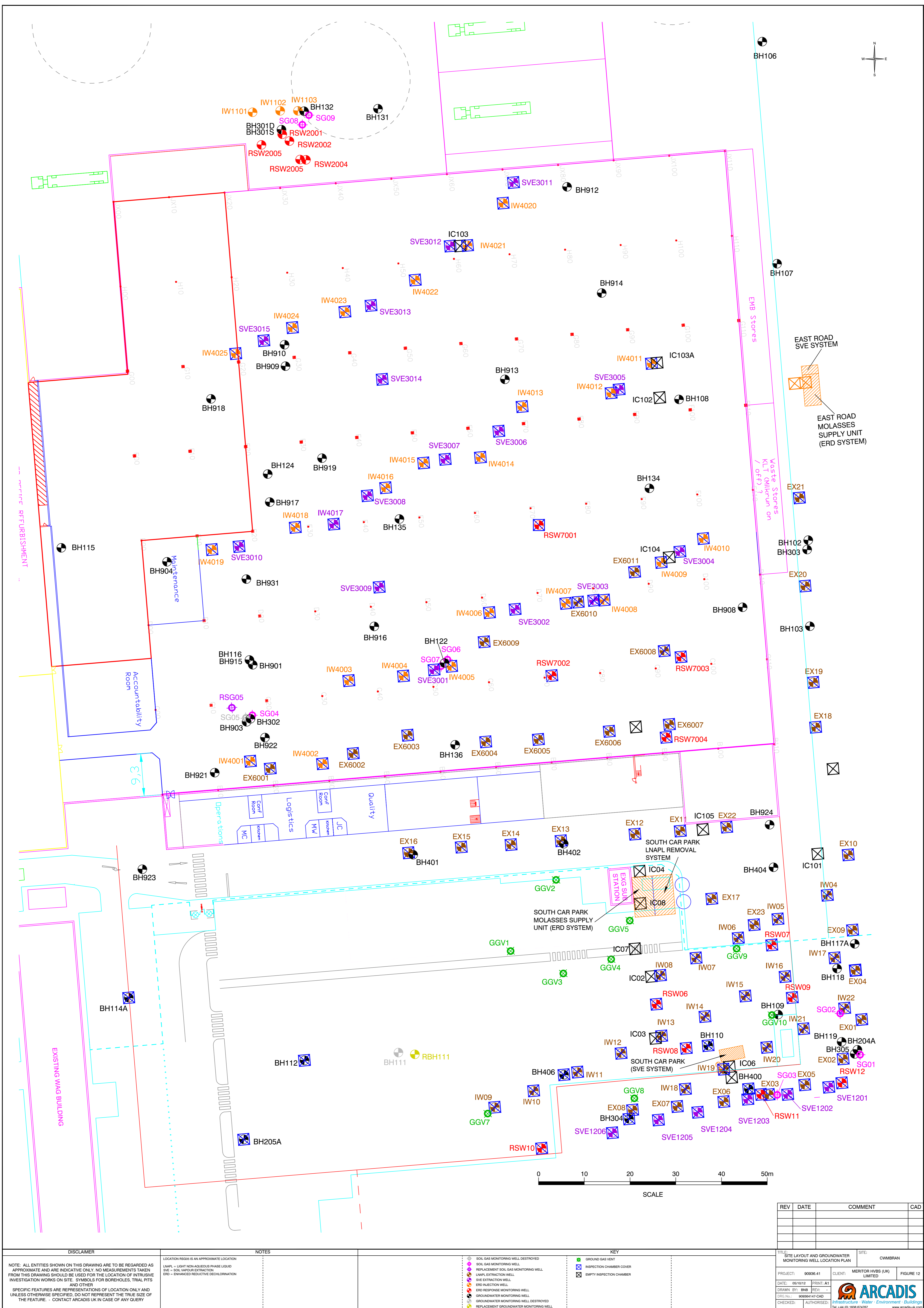
NOTE: ALL ENTITIES SHOWN ON THIS DRAWING ARE TO BE REGARDED AS APPROXIMATE AND ARE INDICATIVE ONLY. NO MEASUREMENTS TAKEN FROM THIS DRAWING SHOULD BE USED FOR THE LOCATION OF INTRUSIVE INVESTIGATION WORKS ON SITE. SYMBOLS FOR BOREHOLES, TRIAL PITS AND OTHER SPECIFIC FEATURES ARE REPRESENTATIONS OF LOCATION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



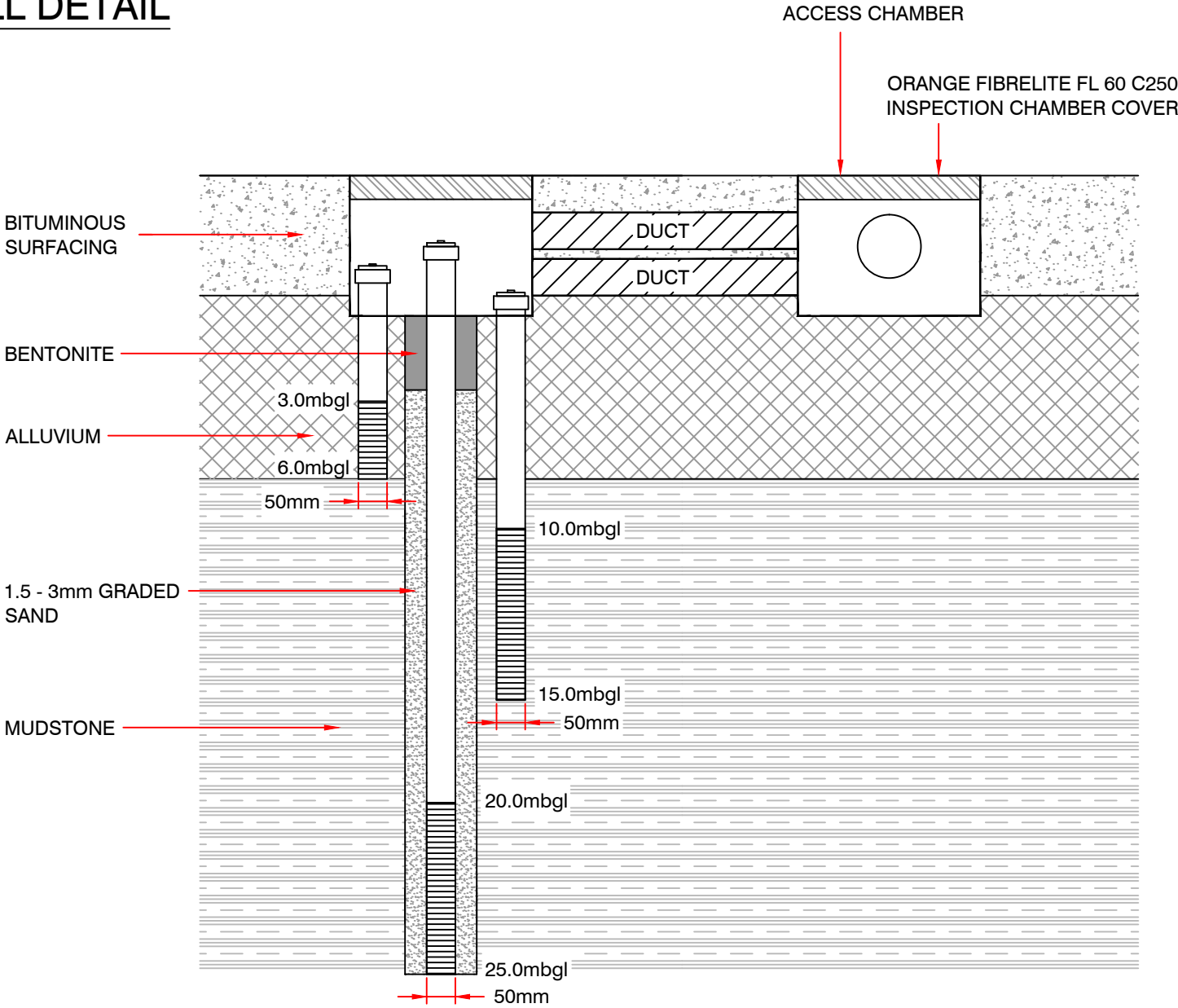
DISCLAIMER	NOTES	KEY	TITLE: SVE INTERNAL REMEDIATION SYSTEM LAYOUT		SITE: CWMBRAN		
<p>NOTE: ALL ENTITIES SHOWN ON THIS DRAWING ARE TO BE REGARDED AS APPROXIMATE AND ARE INDICATIVE ONLY. NO MEASUREMENTS TAKEN FROM THIS DRAWING SHOULD BE USED FOR THE LOCATION OF INTRUSIVE INVESTIGATION WORKS ON SITE. 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 UK IN CASE OF ANY QUERY</p>	SVE = SOIL VAPOUR EXTRACTION	<div><div><div><div><div></div></div><div>SVE EXTRACTION WELL</div></div><div><div><div></div></div><div>INSPECTION CHAMBER COVER</div></div><div><div><div></div></div><div>CONNECTING CHAMBER NO WELL BENEATH</div></div><div><div><div></div></div><div>ABOVE GROUND PIPEWORK</div></div><div><div><div></div></div><div>BELOW GROUND PIPEWORK:</div></div><div><div><div></div></div><div>110mm HDPE DUET</div></div><div><div><div></div></div><div>110mm SVE</div></div><div><div><div></div></div><div>150mm HDPE SVE</div></div></div></div>	PROJECT: 90936.41		CLIENT: MERITOR HVBS (UK) LIMITED	FIGURE 9	
			DATE: 04/10/12		PRINT: A3		<div><div><div><div></div></div><div>ARCADIS</div><div>Infrastructure · Water · Environment · Buildings</div><div>Tel +44 (0) 1638 674767</div><div>www.arcadis-uk.com</div></div></div>
			DRAWN BY: AP		REV: -		
			DRG.No.: 909364142-CAD				



DISCLAIMER		NOTES		KEY		TITLE:		SITE:			
<p>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 UK IN CASE OF ANY QUERY</p>		ERD = ENHANCED REDUCTIVE DECHLORINATION		ERD INJECTION WELL		ERD INTERNAL REMEDIATION SYSTEM		CWMBRAN			
				ERD RESPONSE MONITORING WELL		PROJECT: 90936.41		CLIENT: MERITOR HVBS (UK) LIMITED		FIGURE 11	
				INSPECTION CHAMBER COVER							
				CONNECTING CHAMBER NO WELL BENEATH		DATE: 04/10/12		PRINT: A3			
						BELOW GROUND PIPEWORK		DRAWN BY: AP		REV: -	
				ABOVE GROUND PIPEWORK		DRG.No.: 909364144-CAD		 <i>Infrastructure · Water · Environment · Buildings</i> Tel +44 (0) 1638 674767 www.arcadis-uk.com			
				110mm HDPE DUET							
				50mm HDPE MOLASSES INJECTION							
				110mm HDPE MOLASSES INJECTION							



INJECTION WELL DETAIL



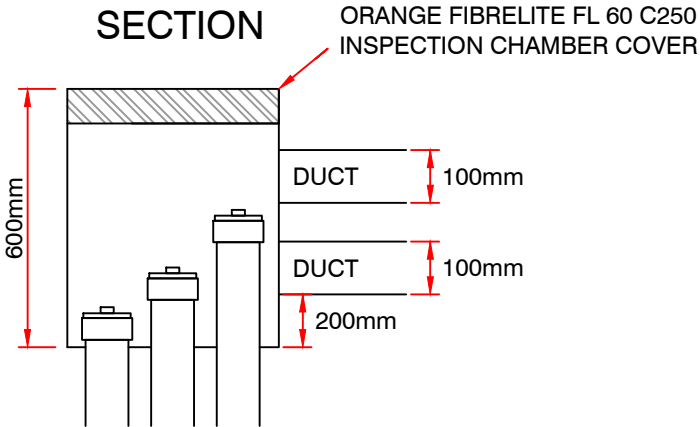
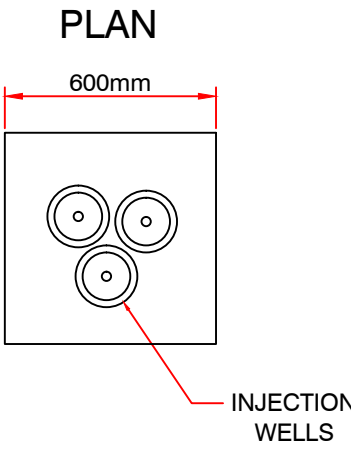
KEY

NOTES

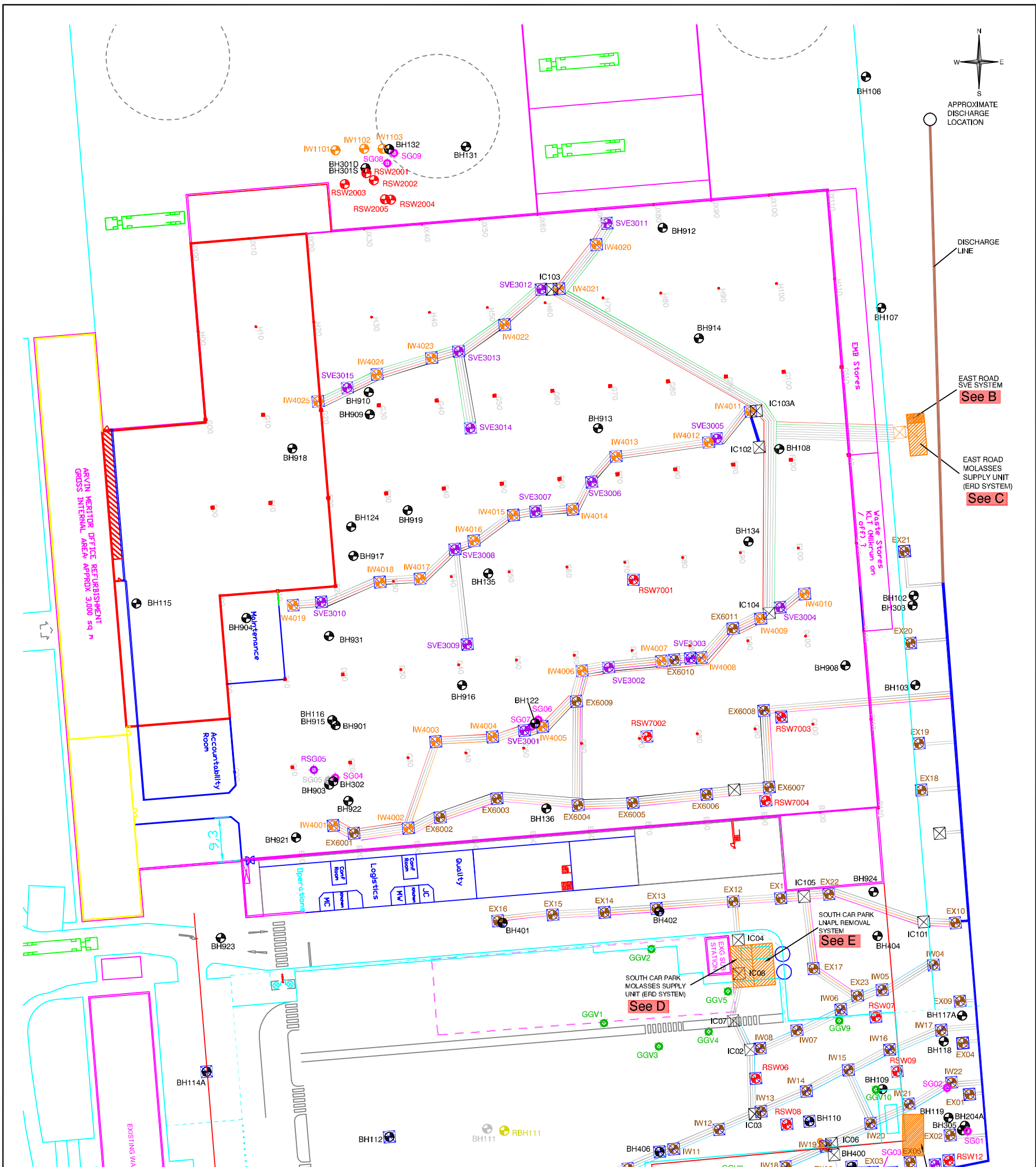
NOT TO SCALE - SCHEMATIC ONLY

REV	DATE	COMMENT	CAD

INSPECTION CHAMBER



TITLE: INSPECTION CHAMBER AND INJECTION WELL DESIGN			
SITE: CWMBRAN			
CLIENT: MERITOR HVBS (UK) LTD			
PROJECT: 90936.41		FIGURE 13	
DATE: 22/10/12	DRAWN: BNB	REV: -	
DRG.No.: 909364158-CAD	PRINT: A3		



A: South Yard SVE System	Electricity	3 phase 420v 12kW 32A cable, 18.4 amp max current. 4 wire + earth
	Water	None
B: East Road SVE System	Electricity	3 phase 420v 12kW 32A cable, 18.4 amp max current. 4 wire + earth
	Water	None
C: East Road Molasses System	Electricity	3 phase 420v 12kW 40A cable, 18.4 amp max current. 4 wire + earth
	Water	Minimum 3/4inch mains water supply
D: South Yard Molasses	Electricity	3 phase 420v 12kW 40A cable, 18.4 amp max current. 4 wire + earth
	Water	Minimum 3/4inch mains water supply
E: South Yard TFP (LNAPL Removal)	Electricity	3 phase 420v 25kW 50A cable, 38.2 amp max current. 4 wire + earth
	Water	None

DISCLAIMER

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 UK IN CASE OF ANY QUERY

NOTES

LOCATION RSG05 IS AN APPROXIMATE LOCATION
LNAPL = LIGHT NON-AQUEOUS PHASE LIQUID
SVE = SOIL VAPOUR EXTRACTION
ERD = ENHANCED REDUCTIVE DECHLORINATION

KEY

SOIL GAS MONITORING WELL DESTROYED

SOIL GAS MONITORING WELL

REPLACEMENT SOIL GAS MONITORING WELL

LNAPL EXTRACTION WELL

SVE EXTRACTION WELL

ERD INJECTION WELL

ERD RESPONSE MONITORING WELL

GROUNDWATER MONITORING WELL

GROUNDWATER MONITORING WELL DESTROYED

REPLACEMENT GROUNDWATER MONITORING WELL

GROUND GAS VENT

INSPECTION CHAMBER COVER

CONNECTING CHAMBER NO WELL BENEATH

ABOVE GROUND PIPEWORK

BELOW GROUND PIPEWORK:

110mm HDPE DUET

32mm AIRLINE

110mm HDPE PUMP RETURN

50mm HDPE MOLASSES INJECTION

110mm SVE

110mm HDPE MOLASSES INJECTION

150mm HDPE SVE

TITLE: REMEDIATION SYSTEM LAYOUT AND UTILITY CONNECTION PLAN

SITE: CWMBRAN

PROJECT: 90936.41

CLIENT: MERITOR HVBS (UK) LIMITED

FIGURE 14

DATE: 16/10/12

PRINT: A3

DRAWN BY: AP

REV: -

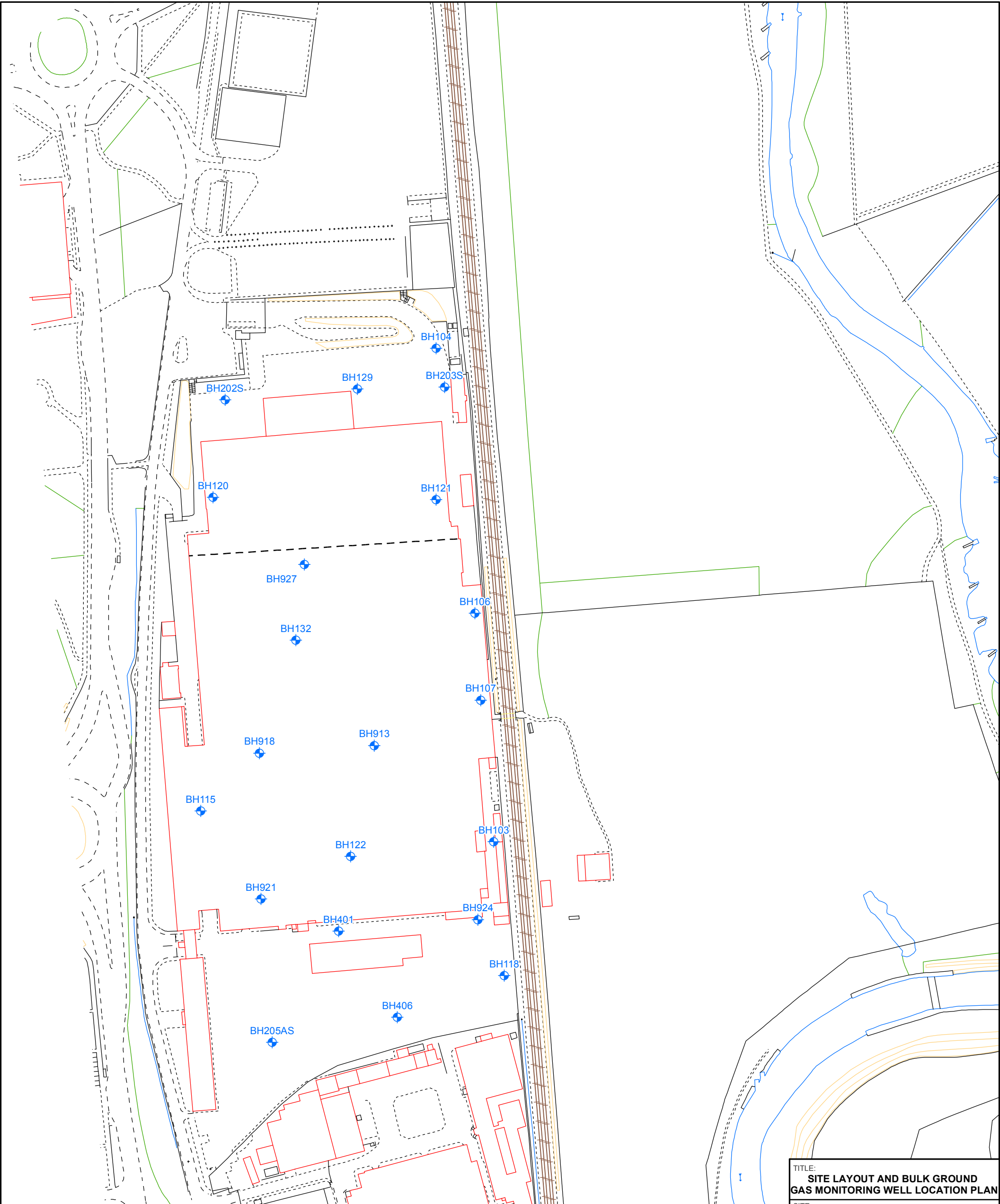
DRG.No.: 909364157-CAD

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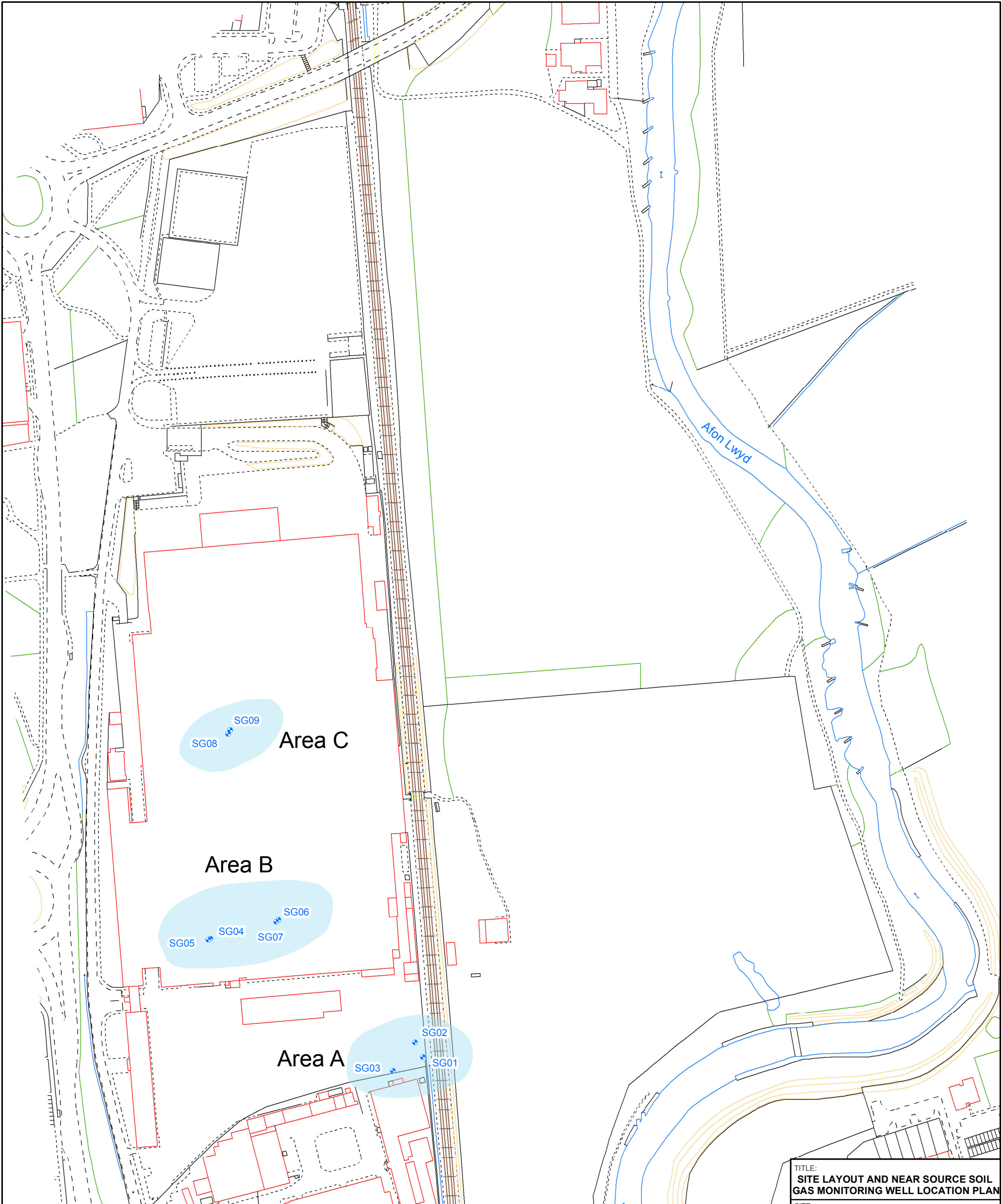
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LEGEND		NOTES		CLIENT : MERITOR HVBS (UK) LIMITED			
GROUND GAS MONITORING WELL LOCATION		SYMBOLS FOR BOREHOLES, TRIAL PITS AND OTHER SPECIFIC FEATURES ARE REPRESENTATIONS OF LOCATION ONLY AND UNLESS OTHERWISE SPECIFIED, DO NOT REPRESENT THE TRUE SIZE OF THE FEATURE.		PROJECT : 90936.41		FIGURE 15	
- - - ZONE 2 AND 3 BOUNDARY				DATE : 18/10/12		DRAWN BY : RJM	
				DRG No. : 909364145 GIS			
				SCALE : 1 : 2,000		PRINT : A3	
						<div> Infrastructure · Water · Environment · Buildings Tel +44 (0) 1638 674767 www.arcadis-uk.com</div>	
		<div><div>01020406080100</div><div>Metres</div></div>				<div><div>N</div><div></div></div>	

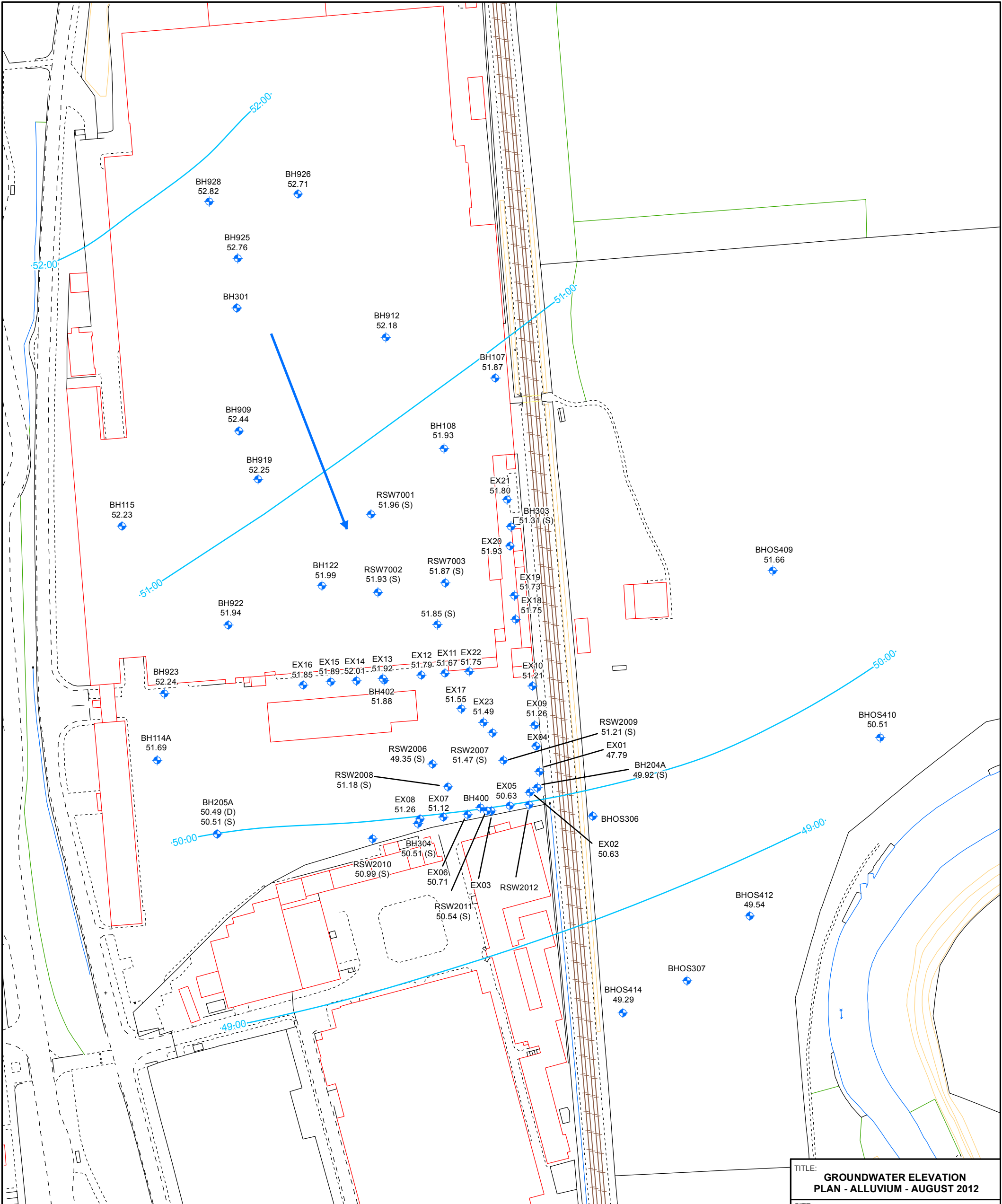


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LEGEND	
	NEAR SOURCE SOIL GAS SAMPLING LOCATION

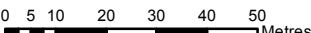
NOTES	
SYMBOLS FOR BOREHOLES, TRIAL PITS AND OTHER SPECIFIC FEATURES ARE REPRESENTATIONS OF LOCATION ONLY AND UNLESS OTHERWISE SPECIFIED, DO NOT REPRESENT THE TRUE SIZE OF THE FEATURE.	


TITLE: SITE LAYOUT AND NEAR SOURCE SOIL GAS MONITORING WELL LOCATION PLAN	
SITE : CWMBRAN	
CLIENT : MERITOR HVBS (UK) LIMITED	
PROJECT : 90936.41	FIGURE 16
DATE : 05/10/12	DRAWN BY : RJM
DRG No. : 909364204 GIS	
SCALE : 1 : 2,250	PRINT : A3
 ARCADIS Infrastructure · Water · Environment · Buildings Tel +44 (0) 1638 674767 www.arcadis-uk.com	

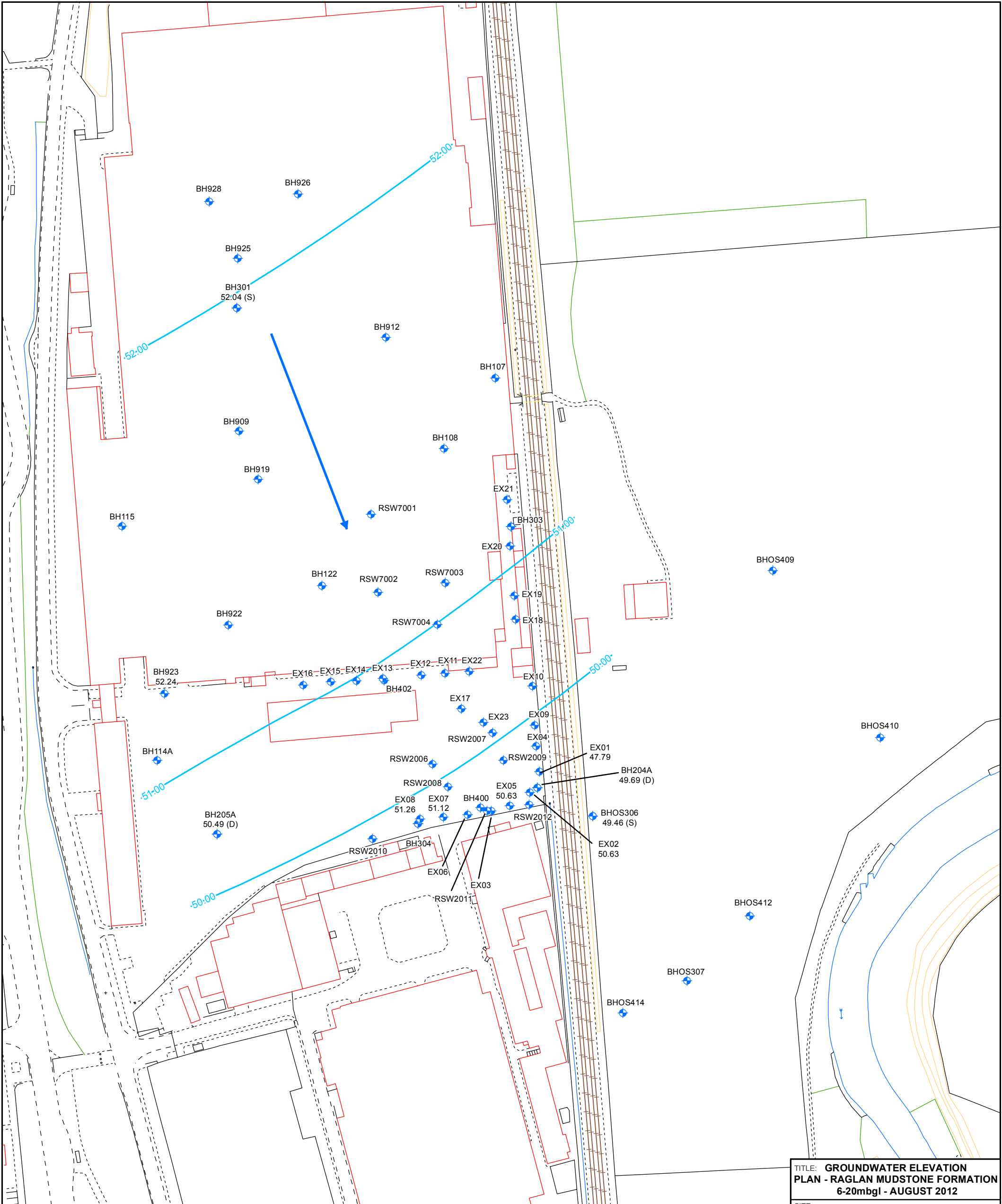


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LEGEND	
	MONITORING WELL LOCATION
	APPROXIMATE GROUNDWATER CONTOUR
50.00	MEASURED GROUNDWATER ELEVATION (m)
	INFERRED GROUNDWATER FLOW DIRECTION

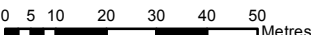
NOTES	
SYMBOLS FOR BOREHOLES, TRIAL PITS AND OTHER SPECIFIC FEATURES ARE REPRESENTATIONS OF LOCATION ONLY AND UNLESS OTHERWISE SPECIFIED, DO NOT REPRESENT THE TRUE SIZE OF THE FEATURE.	
	


TITLE: GROUNDWATER ELEVATION PLAN - ALLUVIUM - AUGUST 2012	
SITE : CWMBRAN	
CLIENT : MERITOR HVBS (UK) LIMITED	
PROJECT : 90936.41	FIGURE 17A
DATE : 18/10/12	DRAWN BY : RJM
DRG No. : 909364156 GIS	
SCALE : 1 : 1,500	PRINT : A3
 ARCADIS Infrastructure · Water · Environment · Buildings Tel +44 (0) 1638 674767 www.arcadis-uk.com	

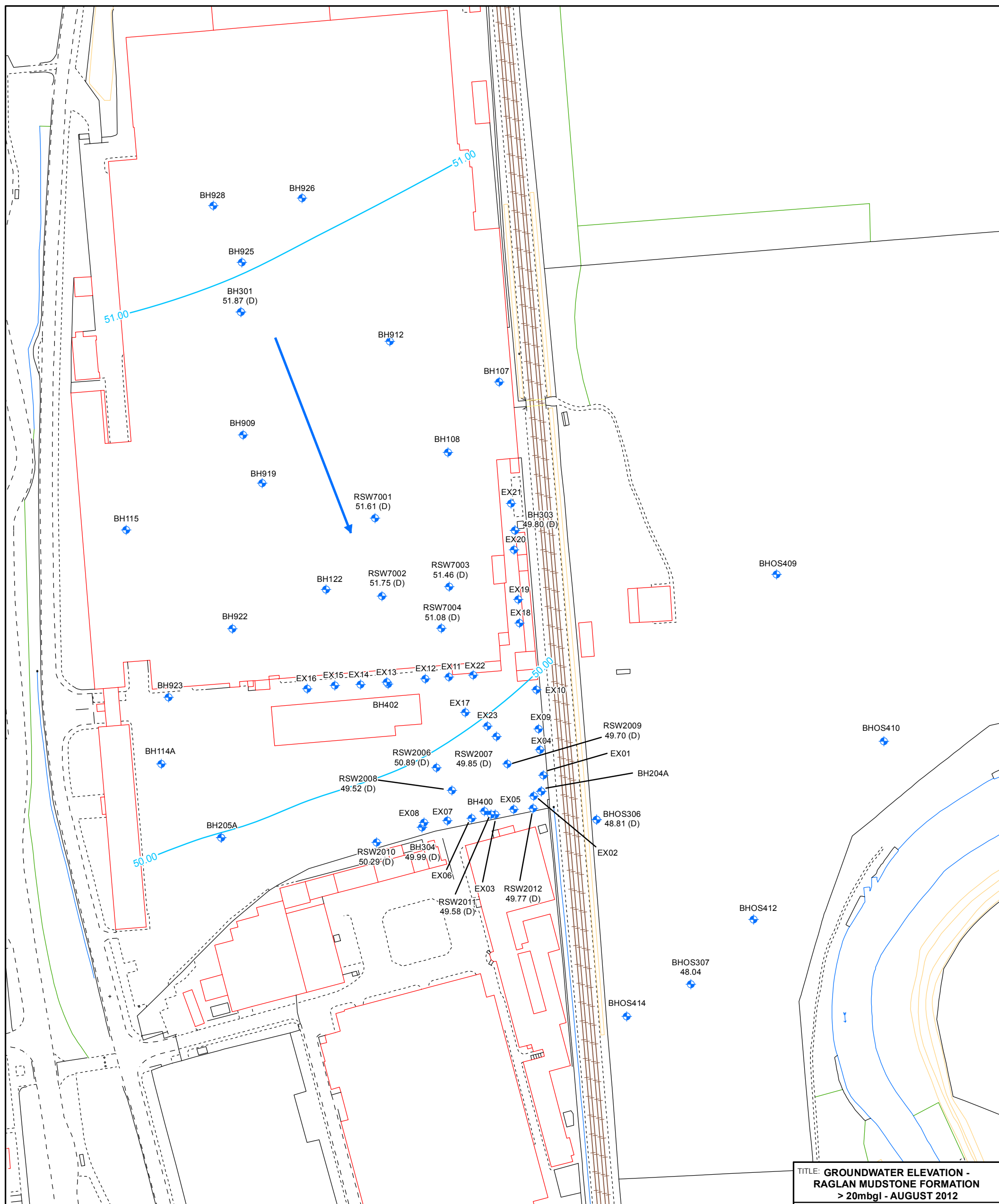


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LEGEND	
	MONITORING WELL LOCATION
	APPROXIMATE GROUNDWATER CONTOUR
50.00	MEASURED GROUNDWATER ELEVATION (m)
	INFERRED GROUNDWATER FLOW DIRECTION




NOTES	
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.	
	

TITLE: GROUNDWATER ELEVATION PLAN - RAGLAN MUDSTONE FORMATION 6-20mbgl - AUGUST 2012	
SITE : CWMBRAN	
CLIENT : MERITOR HVBS (UK) LIMITED	
PROJECT : 90936.41	FIGURE 17B
DATE : 18/10/12	DRAWN BY : RJM
DRG No. : 909364155 GIS	
SCALE : 1 : 1,500	PRINT : A3
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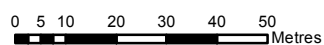
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LEGEND

-  MONITORING WELL LOCATION
 -  APPROXIMATE GROUNDWATER CONTOUR
 - 50.00** MEASURED GROUNDWATER ELEVATION (m)
 -  INFERRED GROUNDWATER FLOW DIRECTION

NOTES

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.



**TITLE: GROUNDWATER ELEVATION -
RAGLAN MUDSTONE FORMATION
> 20mbgl - AUGUST 2012**

SITE :

CWMBRAN

CLIENT :	
----------	--

MERITOR HVBS (UK) LIMITED

PROJECT : 90936.41

FIGURE 17C

DATE : 18/10/12

DRAWN BY: RJM

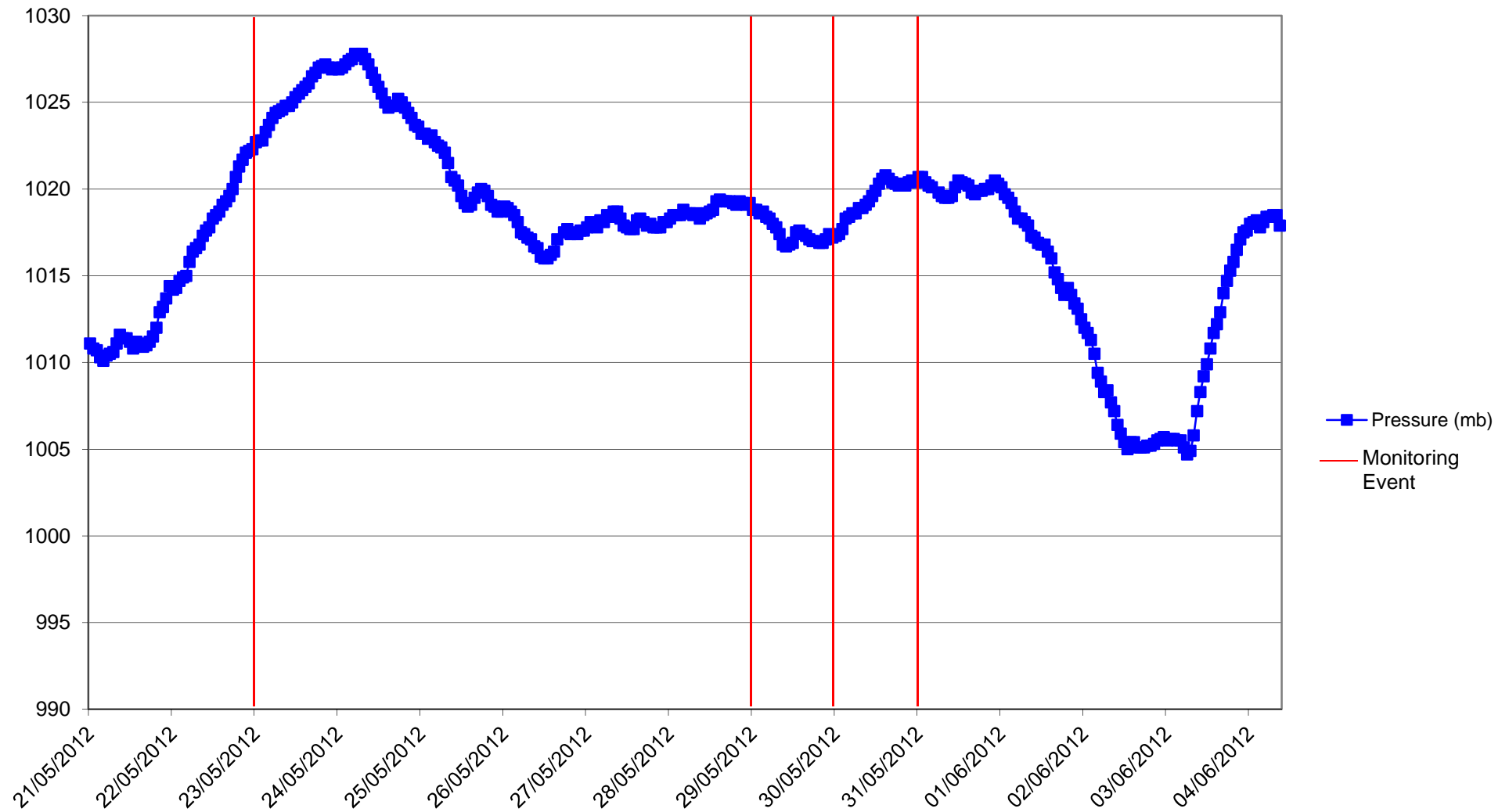
SCALE : 1 : 1,500

PRINT : **A3**



Figure 18
Atmospheric Pressure Data – Time Period 21st May to 4th June 2012

Remediation Infrastructure Installation Report –
Phase II (Internal)
Meritor HVBS (UK) Limited, Cwmbran
909364102/ October 2012



APPENDICES

Appendix A
Legislative Context and Regulatory Guidance

APPENDIX A Legislative Context and Regulatory Guidance

Land contamination is generally dealt with by the following types of regulation:

- Acts of Parliament to investigate and remedy harm caused by land contamination;
- Conditions placed upon Planning Permissions for the redevelopment of land; and,
- Acts of Parliament and Regulations for the control of waste.

In Wales land contamination is identified and dealt with through Acts / Regulations including:

- The Contaminated Land (Wales) Regulations (2006);
- Part 2A of the Environmental Protection Act (1990);
- The Environment Act 1995;
- The Town and Country Planning Act (1990);
- The Environmental Permitting (England and Wales) Regulations (2007);
- The Water Resources Act (1991);
- The Water Act (2003);
- The Environmental Damage (Prevention and Remediation) (Wales) Regulations (2009); and,
- The Groundwater (England and Wales) Regulations (2009).

Part 2A of the Environmental Protection Act 1990

Part 2A of the Environmental Protection Act 1990 (which was inserted by Section 57 of the Environment Act 1995) created a regime for the identification and remediation of contaminated land. Section 78A(2) of the Environmental Protection Act 1990 defines contaminated land for the purposes of Part 2A as:

'any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that;
(a) significant harm is being caused or there is a significant possibility of such harm being caused; or
*(b) pollution of controlled waters is being, or is likely to be caused.'*¹

Harm is defined under section 78A of the Environmental Protection Act as meaning 'harm to the health of living organisms or other interference with the ecological systems of which they form part and, in the case of man, includes harm to his property'. Types of harm are related to specific receptors in order to determine whether they can be regarded as "significant", as defined in Table A of Part 3 of the Welsh Assembly Government (2006)² statutory guidance.

Part 2A sets the definition of contaminated land within the context of the 'suitable for use' approach. The legal definition of contaminated land is also discussed within Statutory Guidance released by DEFRA (2008)³, although this is currently only applicable for England the paper was prepared in consultation with the other UK countries.

The 'suitable for use' approach underlies the assessment process, and is based on the principles of risk assessment, including the concept of the 'pollutant linkage'.

In the event that there are unacceptable levels of risk posed by a Site, a remediation notice can be served under the contaminated land regime introduced under Part 2A of the Environmental Protection Act 1990.

¹ Definition to be amended to "significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused" under the Water Act 2003

² Part 2A. Statutory Guidance on Contaminated Land. Welsh Assembly Government, December 2006

³ Guidance on the legal definition of contaminated land. DEFRA July 2008

Regulation of Development on Land Affected by Contamination

Management of risks from contamination in development of land is also regulated in Wales under the Town and Country Planning Act 1990. Land contamination is a material planning consideration within this planning regime. The Local Planning Authority may impose conditions on the development during planning that include preliminary risk assessment, Site investigation, risk assessment and remediation. The Environment Agency may use its role as a statutory consultee to provide the Local Planning Authority with advice.

Assessment of risk is again based on the pollutant linkage concept. The aim of risk management in the development should be to render the land suitable for the proposed use and, therefore, to prevent consideration of the Site under Part 2A.

The Welsh Assembly Government document Planning Policy Wales (March 2002) provides guidance on the relationship between development and the management of risks from land contamination caused by historical use. The Building Regulations 2000, made under the Building Act 1984, also require measures to be taken to protect new buildings and their occupants from the effects of contamination.

Voluntary Remediation Action

Voluntary remediation action on contamination resulting from historical activities can often anticipate future remediation requirements, such as through the Planning regime, and is encouraged, especially where the Site is not being assessed under Part 2A.

Environmental Damage

The Environmental Damage (Prevention and Remediation) Regulations 2009 came into force on 1st March 2009 to implement EC Directive 2004/35 on environmental liability with regard to the prevention and remedying of environmental damage.

These Regulations do not apply retrospectively; environmental damage that took place before the Regulations came into force (1st March 2009), or damage that takes place (or is likely to take place) after that date but is caused by an incident, event or emission that occurred before that date are exempt from the requirements of the Regulations.

The Regulation is concerned with preventing environmental damage. It requires that all operators of activities that cause an imminent threat of environmental damage to take all reasonably practical steps to prevent the damage. Where damage has already been caused, the operator must take all reasonably practical steps to prevent further damage from occurring.

Non-Statutory Regulatory Technical Guidance Documents

The UK non-statutory regulatory technical guidance on the assessment of land contamination, primarily released as part of the Contaminated Land Exposure Assessment (CLEA) methodology (DEFRA and EA) has recently been updated. New guidance has been released by the EA, for use in England and Wales. The following documents currently present guiding principles in investigating and assessing potentially contaminated land, which are generally adopted in considering Sites within any of the legal frameworks discussed above, or when considering voluntary remediation action:


- *Investigation of potentially contaminated Sites – Code of Practice* (British Standard 10175: 2001).
- *Contaminated Land Report CLR11 Model Procedures for the Management of Land Contamination*. (DEFRA and EA, 2004).
- *Human health toxicological assessment of contaminants in soil* Environment Agency Science Report SC050021/SR2 (EA, 2009)
- *Updated technical background to the CLEA model* Environment Agency Science Report

- SC050021/SR3 (EA, 2009)
- *Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values* Environment Agency Science Report SC050021/SR7 (EA, 2008)
 - *An ecological risk assessment framework for contaminants in soil.* Environment Agency Science Report SC070009/SR1 and related reports S2a-e
 - *Groundwater Protection: Policy and Practice*, Environment Agency GP3 Parts 1-4
 - *Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination* (EA of England and Wales, 2006) developed in consultation with the Scottish Environment Protection Agency (SEPA) and the Northern Ireland Heritage and Environment Service.
 - *Assessing risks posed by hazardous ground gases to buildings* Report C665 (CIRIA, 2007)
 - *BS 8485:2007 Code of practice for the characterization and remediation from ground gas in affected developments*(British Standards Institution, 2007)
 - *Risk Based Corrective Action (RBCA) Methodology* (ASTM designation E1739-95, E2081-00).
 - *DoE Industry Profiles*


Appendix B
Photographic Plates


CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 1	
DATE: April 2012	
DESCRIPTION: View of the work area within the southern end of the production building. The ARCADIS work area was enclosed using Heras fencing throughout the works to prevent unauthorised access by other site contractors.	


CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 2	
DATE: April 2012	
DESCRIPTION: Coring of the hardstanding in the new south car park prior to the progression of the passive ground gas vents. Coring was carried out using the same rig for the borehole locations in the production building.	

CLIENT: Meritor HVBS (UK) Ltd		
PROJECT NUMBER: 90936.41		
PLATE NUMBER: 3		
DATE: April 2012		
DESCRIPTION: Drilling of injection well IW4008 inside the production building. The Rota-Sonic drilling rig was positioned to avoid overhead structures and services, and the work area was enclosed using Heras fencing at all times.		


CLIENT: Meritor HVBS (UK) Ltd		
PROJECT NUMBER: 90936.41		
PLATE NUMBER: 4		
DATE: May 2012		
DESCRIPTION: Drilling of injection well IW4017. Drilling activities were segregated from other refurbishment and remediation works on going within the building as far as was practicable.		


CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 5	
DATE: April 2012	
DESCRIPTION: Following installation the injection wells, monitoring wells, and LNAPL recovery wells were developed using Waterra pipe and a foot valve to remove 10 times the wetted volume of the well.	


CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 6	
DATE: May 2012	
DESCRIPTION: The well head for BH302 was relocated to allow access to the well for sampling following the installation of the new Claas line. Low-flow tubing was installed through a relocated well cover and HDPE pipes to the monitoring wells.	


CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 7	
DATE: April 2012	
DESCRIPTION: Floor sawing along the marked up trench lines connecting EX6004 to EX6009.	

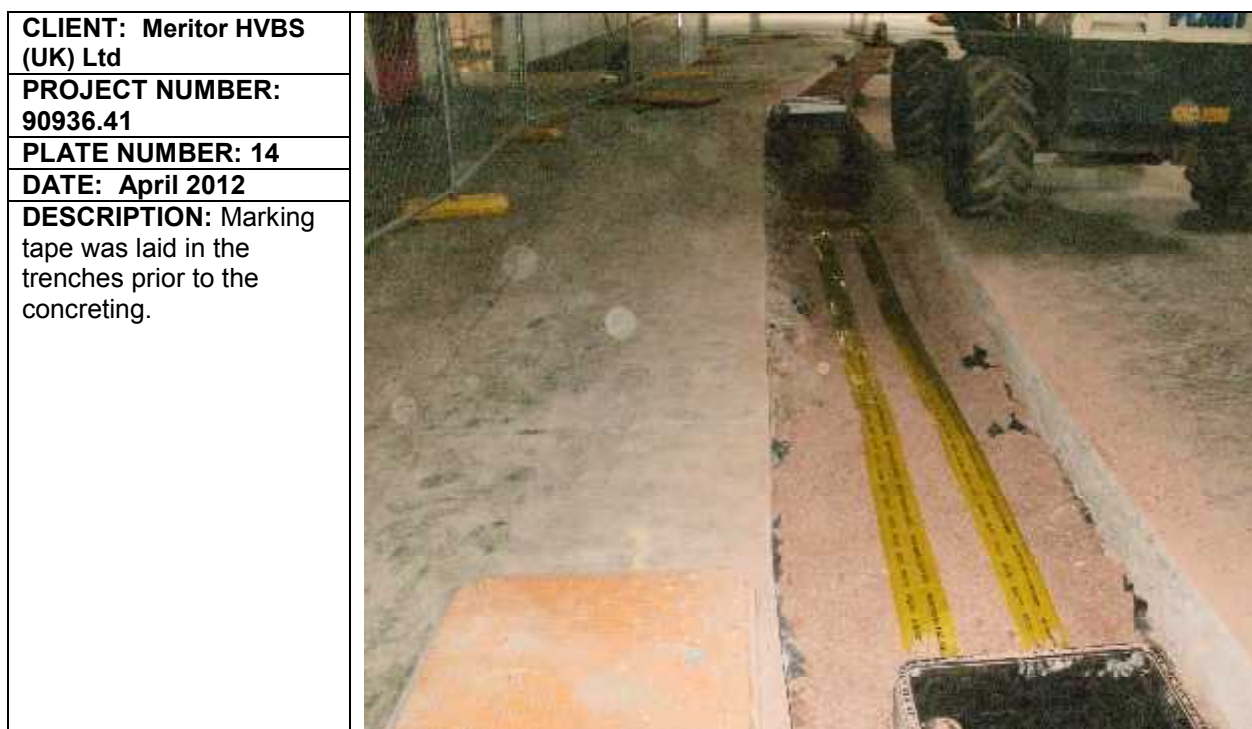
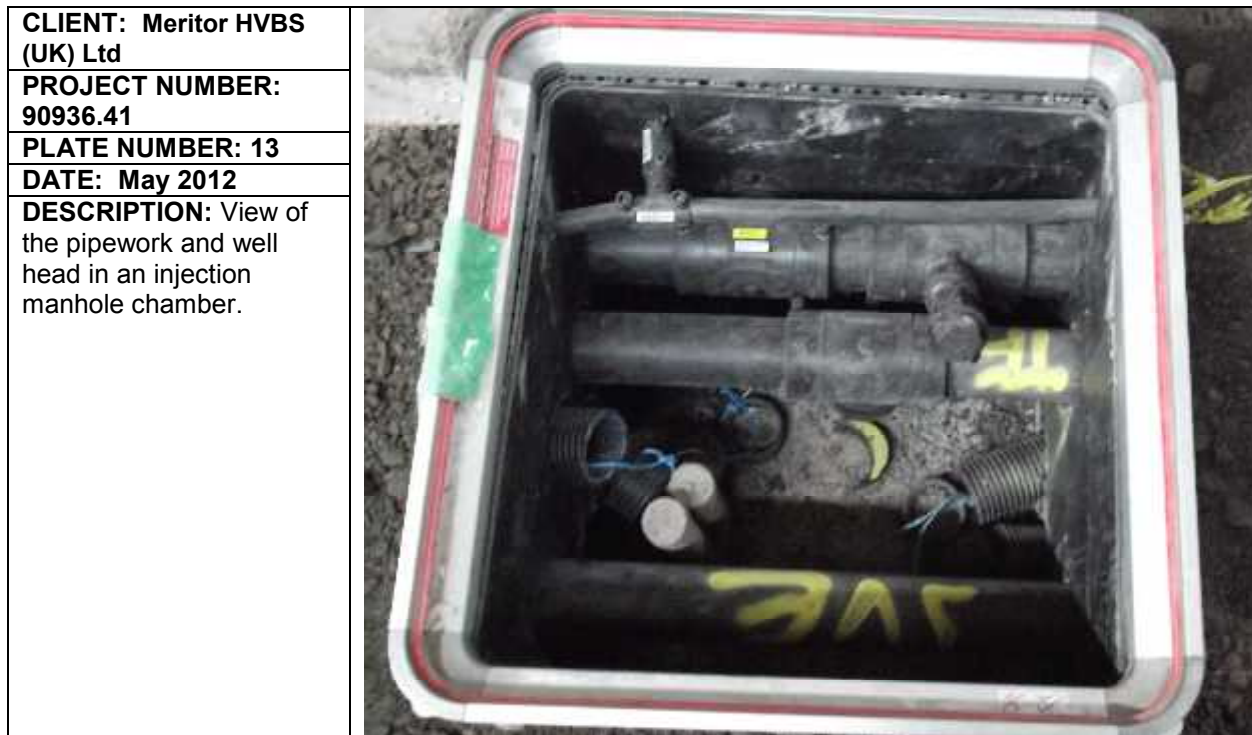
CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 8	
DATE: April 2012	
DESCRIPTION: Breaking out of the concrete along the trench lines. Debris netting was used over the Heras fencing to prevent flying debris from causing injury or damage.	


CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 9	
DATE: April 2012	
DESCRIPTION: Removal of broken out concrete and soils with a mechanical excavator between EX6004 and EX6009.	

CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 10	
DATE: April 2012	
DESCRIPTION: Material excavated around EX6008 prior to the installation of the manhole chamber around the well.	

CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 11	
DATE: May 2012	
DESCRIPTION: Example of a redundant drainage utility encountered during the excavation works.	


CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 12	
DATE: May 2012	
DESCRIPTION: View of the pipework and well head in an LNAPL extraction manhole chamber.	




CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 15	
DATE: April 2012	
DESCRIPTION: Concrete pouring in the southern remediation line.	


CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 16	
DATE: April 2012	
DESCRIPTION: Hand smoothed concrete finish across the remediation line.	

CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 17	
DATE: June 2012	
DESCRIPTION: Clean material for backfilling stored externally in the south yard.	

CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 18	
DATE: June 2012	
DESCRIPTION: Excavated material from the trenches was stored internally with the fenced off ARCADIS work area.	

CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 19	
DATE: June 2012	
DESCRIPTION: Excavated material was removed off site and appropriately disposed of on a needs basis.	


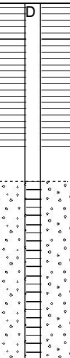







CLIENT: Meritor HVBS (UK) Ltd	
PROJECT NUMBER: 90936.41	
PLATE NUMBER: 20	
DATE: May 2012	
DESCRIPTION: Dedicated labelled skips were used in the ARCADIS working area for segregating and storing drilling arisings and general waste. The skips were lined with a plastic membrane to prevent releases, and covered to help prevent unauthorised use.	



CLIENT: Meritor HVBS (UK) Ltd		
PROJECT NUMBER: 90936.41		
PLATE NUMBER: 21		
DATE: May 2012		
DESCRIPTION: Soil gas sampling from SG05 using a vacuum canister.		

CLIENT: Meritor HVBS (UK) Ltd		
PROJECT NUMBER: 90936.41		
PLATE NUMBER: 22		
DATE: July 2012		
DESCRIPTION: Groundwater monitoring of EX10.		

Appendix C
SVE Well Borehole Logs


Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 50	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: E.Jarratt
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 26/04/2012	Method: Percussive		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: CONCRETE.		0.15								
No Recovery		0.35								
MADE GROUND: Black/brown slightly clayey slightly sandy GRAVEL. Gravel is subangular to subrounded, fine to coarse fragments of clinker and concrete.		0.55		PID	0.40-0.50	<1				
		0.65								
Brown clayey slightly silty GRAVEL. Gravel is angular to subangular fine to coarse fragments of sandstone.				PID	0.90-1.00	5.1				1
Soft grey becoming brown silty CLAY.				PID	1.30-1.40	2.4				
		1.80								
Soft to firm brown mottled grey silty slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse fragments of sandstone and mixed lithologies. Slightly wet at 1.9m-2.0m bgl.		2.00		PID	1.90-2.00	1.9				2
End of Borehole at 2.00 m										
										3
										4
										5
										6
										7

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample  Water Strike  Standing Water Level	Remarks:
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STRATA RECORD	IN SITU TESTS / SAMPLES	Sheet 1 of 1
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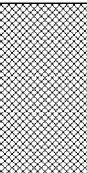
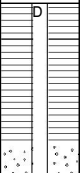
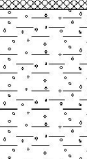
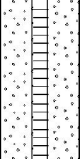


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<p>MADE GROUND: Soft black/grey/brown silty slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium fragments of concrete, sandstone, and mixed lithologies. Slight hydrocarbon odour noted.</p>		<p>0.60</p>									
			PID	1.10-1.20	5.1						

End of Borehole at 2.00 m

<p>Key:</p> <p>D Disturbed Sample PPT Pocket Penetrometer Test</p> <p>B Bulk Sample PID Photoionisation Detector</p> <p>U Undisturbed Sample SPT Standard Penetration Test</p> <p>J Jar Sample (Uncorrected)</p> <p>▽ Water Strike</p> <p>▼ Standing Water Level</p>	Remarks: Slightly hydrocarbon odour noted between 0.6m-1.0 mbgl.
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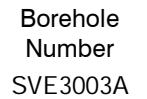
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 50	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: E.Jarratt
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 28/06/2012	Method: Percussive		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Manhole chamber.										
Soft brown silty slightly gravelly CLAY. Gravel is fine to medium subangular to subrounded fragments of mixed lithologies. LNAPL present on sample, hydrocarbon odour noted.		1.00		PID	1.10-1.30	14.9				1
Grey/brown slightly sandy fine to medium subangular to angular GRAVEL of sandstone and mixed lithologies.		1.90		PID	1.90-2.00	3				2
End of Borehole at 2.00 m		2.00								
										3
										4
										5
										6
										7

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: LNAPL present on sample, hydrocarbon odour noted 1.0-1.9 mbgl.



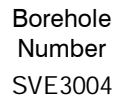
Scale
1:43

Logged by:
E.Jarratt

Checked by:

Sheet 1 of 1

Remarks: Refusal at 1.0m bgl. Black staining, hydrocarbon odour noted 0.95m-1.0 mbgl.



Scale 1:43
Logged by: C.Nielsen&E.Jarratt



Checked by:

Sheet 1 of 1


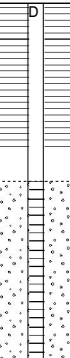



Remarks:



STRATA RECORD	IN SITU TESTS / SAMPLES	Sheet 1 of 1
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Project	Start Date	End Date	Project Manager	Status	Progress (%)	Budget (€)	Actual Cost (€)	Variance (€)	Comments
Project A	2023-01-01	2023-03-31	John Doe	Completed	100	100000	98000	2000	On schedule and under budget.
Project B	2023-04-01	2023-06-30	Jane Smith	In Progress	75	150000	145000	5000	Minor delays, but budget is on track.
Project C	2023-07-01	2023-09-30	Mike Johnson	On Hold	20	80000	80000	0	Project paused due to resource allocation.
Project D	2023-10-01	2023-12-31	Sarah Lee	Not Started	0	120000	0	120000	Project planning phase.







Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test J Jar Sample (Uncorrected)  Water Strike  Standing Water Level	Remarks:
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

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 50	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: C.Nielsen&E.Jarratt
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 26/04/2012	Method: Percussive		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: CONCRETE.											
No Recovery		0.25									
		0.40		PID	0.40-0.50	2.4					
MADE GROUND: Soft black/brown gravelly CLAY. Gravel is subangular fine to coarse fragments of red brick and bitumen.		0.60									
				PID	1.30-1.40	2.3				1	
Soft red mottled grey silty gravelly CLAY. Gravel is subangular to rounded fine to coarse fragments of mudstone and mixed lithologies.				PID	1.70-1.80	3.6					
End of Borehole at 2.00 m		2.00								2	
										3	
										4	
										5	
										6	
										7	

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample  Water Strike  Standing Water Level	Remarks:
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Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 50	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: C.Nielsen&E.Jarratt
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 26/04/2012	Method: Percussive		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: CONCRETE.		0.26								
No Recovery.		0.40		PID	0.40-0.50	2.7				
MADE GROUND: Soft brown gravelly CLAY. Gravel is subangular medium fragments of concrete.		0.60		PID	0.60-0.70	3.7				
MADE GROUND: Fine brown mottled yellow SAND.		0.70								
Soft red mottled grey silty CLAY.		1.20		PID	1.00-1.20	65.4				1
Soft red mottled grey CLAY with gravelly bands at 1.5-1.6m and 1.8-1.9m bgl.		1.50		PID	1.50-1.60	96.4				
		1.80		PID	1.80-1.90	137.2				
End of Borehole at 2.00 m		2.00								2
										3
										4
										5
										6
										7

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample  Water Strike  Standing Water Level	Remarks:
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2 Craven Court, Newmarket, Suffolk CB8 7FA
Tel: +44(0)1638 674767
Fax: +44(0)1638 668191
www.arcadis-uk.com

Borehole
Number
SVE3008

Site:
Cwmbran

Location:
Grange Road, Cwmbran, NP44
3XU

Ground Level (mAOD):

Hole Diameter (mm):	50
---------------------	----

Scale
1:43

Client:
Meritor HVBS (UK) Ltd

Easting:

Well Diameter (mm):	50
---------------------	----

Logged by:
E.Jarratt

Nothing:

Filter Material: Gravel

Project: 90936.41

Date: 28/06/2012

Method: Percussive



Checked by:

STRATA RECORD

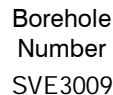
IN SITU TESTS / SAMPLES

Sheet 1 of 1

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Key:			
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B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test
J	Jar Sample		(Uncorrected)
	Water Strike		
	Standing Water Level		

Remarks:



Scale
1:43

Logged by:
Nielsen&E.Jarratt



C.Nielsen&E.Jarratt

Checked by:












Sheet 1 of 1

Remarks:

STRATA RECORD	IN SITU TESTS / SAMPLES	Sheet 1 of 1
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Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test J Jar Sample (Uncorrected)  Water Strike  Standing Water Level	Remarks: Black staining and hydrocarbon odour noted from 2.3 m-2.4m bgl.
--	--

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 50	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: C.Nielsen&E.Jarratt
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 25/04/2012	Method: Percussive		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: CONCRETE.		0.21		PID	0.30-0.40	8.9				
MADE GROUND: Brown mottled black/grey gravelly CLAY. Gravel is angular medium fragments of concrete.		0.66		PID	0.70-0.80	2.2				
Red/brown CLAY becoming gravelly with depth. Gravel is rounded medium fragments of sandstone.		1.20								1
Soft to firm brown mottled yellow slightly gravelly CLAY.		1.70		PID	1.50-1.60	1.9				
Brown mottled grey/yellow CLAY becoming gravelly between 2.1m-2.2m bgl.		2.20		PID	1.80-1.90	2.2				2
End of Borehole at 2.20 m										3
										4
										5
										6
										7


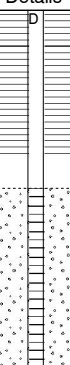





Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

Remarks: Hydrocarbon odour noted between 0.21m-1.2m bgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 50	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: C.Nielsen&E.Jarratt
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 26/04/2012	Method: Percussive		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 1				
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level				
MADE GROUND: CONCRETE.		0.23		PID	0.50-0.60	8.8								
No Recovery.														
MADE GROUND: Black/brown slightly sandy GRAVEL. Gravel is subangular to angular fine to medium fragments of concrete and bitumen.		0.50			PID	0.90-1.10					311			
		0.65												
Firm red/brown silty slightly gravelly CLAY. Gravel is subangular to subrounded fine fragments of mixed lithologies. Solvent odour noted.		1.20												
No Recovery.		1.60		PID	1.70-1.90	129								
Firm red/brown silty slightly gravelly CLAY. Gravel is subangular to subrounded fine fragments of mixed lithologies.		1.70												
		2.00												
Brown/grey slightly clayey sandy GRAVEL. Gravel is subrounded to angular, fine to coarse fragments of sandstone.														
End of Borehole at 2.00 m														

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: Solvent odour noted between 0.65m-1.2m bgl.

[illegible]

Remarks: Slightly wet from 1.8m-2.0m bgl.

Appendix D
ERD Well Borehole Logs

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: E.Jarratt
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 27/03/2012	Method: Rotary sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 2 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red mottled grey weathered MUDSTONE.		8.66								
Red/brown weathered MUDSTONE recovered as fine to medium gravel of mudstone fragments.		9.00		PID	8.80-8.90	146				9
Red mottled grey weathered MUDSTONE.				PID	9.20-9.40	9.4				
				PID	9.80-10.00	131				
Red/brown weathered MUDSTONE recovered as fine to coarse subangular gravel of mudstone fragments.		10.00		PID	10.10-10.20	40.2				10
Red mottled grey weathered MUDSTONE.		10.50								
				PID	10.80-10.90	1114				
End of Borehole at 11.00 m		11.00								11
										12
										13
										14
										15

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: Solvent odour noted at 0.5 -1.0 mbgl and slight solvent odour noted 3.2-4.0 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: C.Nielsen
Project: 90936.41	Date: 28/03/2012	Method: Rotary sonic		Checked by:

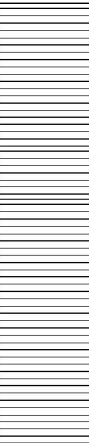
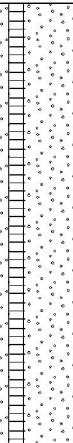
STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.30-0.50	22.4					
MADE GROUND: Brown gravelly SAND.			PID	0.80-1.00	56.4						
MADE GROUND: Light brown grey slightly cobbly SAND. Cobbles are medium subrounded fragments of sandstone with medium to coarse subangular to subrounded gravel sized fragments of concrete. Organic odour noted between 1.3-3.0 mbgl.		1.00	PID	1.20-1.40	51.4						
Soft red mottled brown CLAY.		1.73		PID	1.80-2.00	20.9				1	
Grey sandy CLAY.		2.00	PID	2.10-2.30	129				2		
Soft red mottled yellow to grey slightly gravelly CLAY. Gravel is medium subrounded fragments of mixed lithologies.		2.20	PID	2.60-2.70	70.5						
Soft red to brown sandy gravelly CLAY. Gravel is medium subrounded fragments of mixed lithologies. Organic odour noted.		2.80		PID	2.80-3.00	20.3					
Soft brown slightly sandy gravelly CLAY. Gravel is medium to coarse subangular fragments of mixed lithology.		3.00	PID	3.20-3.40	134					3	
Soft brown sandy gravelly CLAY. Sand is fine to medium. Gravel is medium to coarse subangular fragments of mixed lithologies.		3.60	PID	3.80-4.00	112					4	
				PID	4.00-5.00	37					
Brown slightly clayey slightly cobbly sandy fine to coarse subangular to subrounded mixed lithology GRAVEL. Cobbles are subrounded fragments of chert and mixed lithologies.		5.00		PID	5.40-5.60	81				5	
Brown slightly clayey slightly sandy fine to coarse subangular to subrounded mixed lithology GRAVEL. Organic odour noted.		6.00	PID	6.20-6.40	48.2					6	
Red to brown weathered MUDSTONE recovered as fine to medium subangular mudstone fragments.		6.90	PID	6.90-7.00	38.9					7	
Red mottled grey weathered MUDSTONE.		7.00		PID	7.30-7.50	42.4					
Red to brown weathered MUDSTONE recovered as fine to medium subangular mudstone fragments.		7.20	PID	7.50-7.60	30						
Red mottled grey weathered MUDSTONE.		7.80	PID	7.90-8.00	59.4						
				PID	8.20-8.40	10.6					
Continued next sheet											

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▽	Standing Water Level		


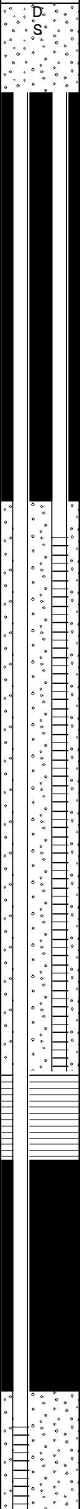










Remarks: Organic odour noted 1.0- 3.0 mbgl, 2.8-3.0 mbgl and 6.90 7.2 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: C.Nielsen
Project: 90936.41	Date: 28/03/2012	Method: Rotary sonic		Checked by:

STRATA RECORD				IN SITU TESTS / SAMPLES					Sheet 2 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red mottled grey weathered MUDSTONE.		9.30		PID	8.80-9.00	93.1				9
				PID	9.10-9.30	87.4				
Red to brown weathered MUDSTONE recovered as fine to medium subangular mudstone fragments.		PID		9.40-9.60	39.6	10				
Red mottled grey weathered MUDSTONE.		PID		9.80-10.00	109					
		PID		10.20-10.40	43.7	11				
		PID		10.80-11.00	79.4					
End of Borehole at 11.00 m				11.00						
									13	
									14	
									15	

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample ▽ Water Strike ▼ Standing Water Level	Remarks: Organic odour noted 1.0- 3.0 mbgl, 2.8-3.0 mbgl and 6.90 7.2 mbgl.
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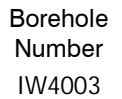
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: T. Costema
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 03/04/2012	Method: Rotary sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.17		PID	0.00-0.10	2.8					
MADE GROUND: Grey GRAVEL. Gravel is medium to coarse fragments of hardcore.		0.38 0.50		PID	0.40-0.50	5.3					
MADE GROUND: Soft to firm dark grey/brown/black gravelly CLAY. Gravel is angular to subrounded fine to medium fragments of hardcore.		0.66		PID	0.90-1.00	5.9				1	
MADE GROUND: Dark grey/brown/black clayey GRAVEL. Gravel is medium to coarse subrounded to subangular fragments of hardcore.		1.30		PID	1.40-1.50	6.1					
Soft to firm dark brown/grey slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded.				PID	1.90-2.00	7				2	
Soft to firm red/brown mottled grey silty CLAY with rare subangular coarse gravel sized fragments of mudstone.				PID	2.40-2.50	6.7					
Firm to stiff orange/red/brown mottled grey sandy CLAY with rare subangular coarse gravels sized fragments of mudstone.		2.37		PID	2.90-3.00	24.1					
Dark grey/brown slightly sandy clayey GRAVEL. Gravel is fine to coarse subangular to rounded. Rare rounded cobbles of sandstone.		3.00		PID	3.40-3.50	13.9				3	
Dark grey/brown sandy slightly cobbly GRAVEL. Gravel is fine to coarse subangular to rounded. Cobbles are coarse and rounded fragments of sandstone.		4.00		PID	3.90-4.00	46.1				4	
				PID	4.40-4.50	55.1					
				PID	4.90-5.00	61.4			5		
				PID	5.40-5.50	44.9					
				PID	5.90-6.00	24.6			6		
Stiff red/orange mottled grey gravelly CLAY. Gravel is fine to coarse subangular to subrounded fragments of mudstone.		6.10		PID	6.40-6.50	21.8					
Very weathered red mottled grey MUDSTONE. Band of moderate mudstone recovered as fine to medium angular to subrounded gravel between 7.6 and 7.7m bgl.		6.77		PID	6.90-7.00	17.2			7		
				PID	7.40-7.50	9.4					
				PID	7.90-8.00	7.2					
Continued next sheet				PID	8.40-8.50	17.3					

Key:






















D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▽	Standing Water Level		

Remarks:

[illegible]

Remarks:

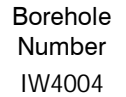
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: T. Costema
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 04/04/2012	Method: Rotary sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20									
MADE GROUND: Grey/brown GRAVEL. Gravel is medium to coarse fragments of hardcore.		0.30		PID	0.40-0.50	27.2					
MADE GROUND: Soft light grey mottled orange sandy CLAY.		0.50									
MADE GROUND: Soft dark grey mottled orange slightly sandy CLAY.		1.04		PID	0.90-1.00	5.8					
Soft light grey/brown slightly gravelly CLAY. Gravel is fine to medium subangular to subrounded.		1.19		PID	1.40-1.50	49.4				1	
Soft to firm brown/orange slightly silty CLAY with rare subangular to subrounded gravel fragments.		1.90		PID	1.90-2.00	52.5					
Firm to stiff brown/orange sandy cobbly CLAY. Cobbles are subrounded fragments of sandstone.		2.25		PID	2.40-2.50	47.4				2	
Firm to stiff light brown/yellow slightly silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to subangular.		2.40		PID	2.40-2.50	47.4					
Dark brown mottled orange very sandy GRAVEL. Gravel is fine to coarse subangular to rounded.		3.20		PID	2.90-3.00	3689				3	
Dark brown/grey sandy cobbly GRAVEL. Gravel is fine to coarse rounded to subangular. Cobbles are subrounded fragments of sandstone.				PID	3.40-3.50	1503					
				PID	3.90-4.00	648				4	
				PID	4.40-4.50	1360					
				PID	4.90-5.00	490				5	
				PID	5.40-5.50	245					
Dark brown/grey/orange sandy GRAVEL. Gravel is fine to medium subangular fragments of flint and mudstone.		5.70		PID	5.90-6.00	91.3				6	
Stiff red/brown mottled grey gravelly CLAY. Gravel is fine to medium subangular fragments of flint and mudstone.		6.00		PID	6.40-6.50	23.1					
Weathered red/brown mottled grey MUDSTONE.		6.80		PID	6.90-7.00	2.8				7	
				PID	7.40-7.50	8.8					
				PID	7.90-8.00	3.2					
Continued next sheet											

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▽	Standing Water Level		

Remarks:



Scale
1:43
Logged by:
T. Costema

Checked by:

Sheet 2 of 2

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: T. Costema
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 03/04/2012	Method: Rotary sonic		Checked by:

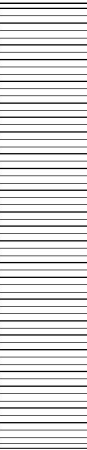
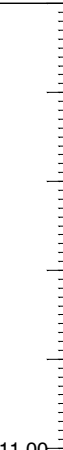
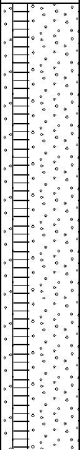
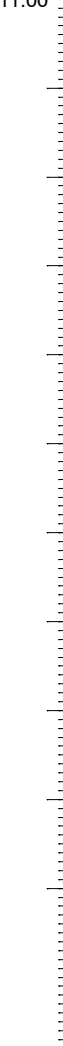
STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.		0.20		PID	0.00-0.10	3.4				
MADE GROUND: Light brown/grey sandy GRAVEL. Gravel is fine to coarse subangular to subrounded fragments of hardcore.		0.70		PID	0.40-0.50	3.6				
MADE GROUND: Dark brown/black very sandy GRAVEL. Gravel is fine to coarse.		1.00		PID	0.90-1.00	4.6				1
Soft to firm dark brown/grey sandy CLAY with occasional cobbles of brick.		1.45		PID	1.40-1.50	5.7				
Soft to firm dark orange/brown mottled grey slightly silty CLAY with occasional subangular to rounded gravel.		2.50		PID	1.90-2.00	5.9				2
		2.50		PID	2.40-2.50	6.7				
Soft to firm grey/brown mottled yellow sandy CLAY with occasional gravels. Gravel is fine to coarse subangular to rounded.		2.80		PID	2.90-3.00	7.2				
Grey/brown very sandy slightly clayey GRAVEL. Gravel is fine to coarse subangular to subrounded.		3.00		PID	3.40-3.50	9.2				3
Grey/brown very sandy GRAVEL. Gravel is coarse subangular to subrounded. Saturated sample.				PID	3.90-4.00	7.3				4
				PID	4.40-4.50	23.1				
				PID	4.90-5.00	33.2				5
				PID	5.40-5.50	20.4				
				PID	5.90-6.00	30.1				6
Firm to stiff red/brown gravelly CLAY. Gravel is fine to medium angular to subrounded fragments of mudstone.		6.20		PID	6.40-6.50	11.2				
Stiff to very stiff red/brown mottled grey slightly gravelly CLAY. Gravel is fine to medium angular to subrounded fragments of mudstone.		6.50		PID	6.90-7.00	9.1				7
Red/brown mottled grey weathered MUDSTONE.		6.90		PID	7.40-7.50	8.2				
				PID	7.90-8.00	7.3				
Continued next sheet				PID	8.40-8.50	8.2				



Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		







































Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T. Costema
Project: 90936.41	Date: 03/04/2012	Method: Rotary sonic		Checked by:

STRATA RECORD				IN SITU TESTS / SAMPLES					Sheet 2 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red/brown mottled grey weathered MUDSTONE.				PID	8.90-9.00	8.7				9
				PID	9.40-9.50	8.2				
				PID	9.90-10.00	6.9				10
				PID	10.40-10.50	10.8				
				PID	10.90-11.00	5.2				11
End of Borehole at 11.00 m		11.00								11
										12
										13
										14
										15

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample  Water Strike  Standing Water Level	Remarks:
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Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: T. Costema
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 04/04/2012	Method: Rotary sonic		Checked by:

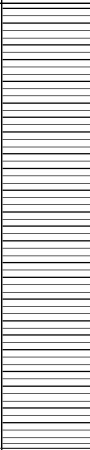

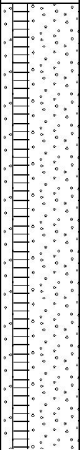

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.		0.20		PID	0.00-0.10	5.4				
MADE GROUND: Brown/grey slightly clayey GRAVEL. Gravel is fine to coarse subangular to subrounded fragments of hardcore.		0.40		PID	0.40-0.50	7.8				
MADE GROUND: Soft dark grey/brown sandy CLAY with occasional gravels. Gravel is medium subangular fragments of hardcore.		0.80		PID	0.90-1.00	12.1				1
Soft to firm orange/brown mottled grey slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded fragments of sandstone.				PID	1.40-1.50	9.7				
				PID	1.90-2.00	15.4				2
				PID	2.40-2.50	16.7				
Dark brown /orange/grey clayey GRAVEL. Gravel is medium subrounded fragments of sandstone.		2.60								
Dark brown/grey very sandy GRAVEL. Gravel is fine to coarse subrounded to subangular fragments of sandstone.		2.80		PID	2.90-3.00	8.4				
Dark brown/grey clayey GRAVEL with occasional cobbles. Cobbles are large and rounded fragments of sandstone. Gravel is fine to coarse subrounded fragments of sandstone. Saturated sample.		3.10		PID	3.40-3.50	7.8				
				PID	3.90-4.00	10.5				4
				PID	4.40-4.50	6.1				
				PID	4.90-5.00	9.1				5
Soft to firm dark brown/grey very sandy CLAY with frequent gravels. Gravels are fine to coarse subrounded to subangular fragments of sandstone.		5.10		PID	5.40-5.50	24.9				
Stiff red/brown mottled grey slightly sandy CLAY.		5.47		PID	5.90-6.00	11				6
Red brown mottled grey weathered MUDSTONE.		6.05		PID	6.40-6.50	13.3				
				PID	6.90-7.00	12.3				7
				PID	7.40-7.50	5.5				
				PID	7.90-8.00	4.7				
Continued next sheet				PID	8.40-8.50	9.2				



Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		






































Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T. Costema
Project: 90936.41	Date: 04/04/2012	Method: Rotary sonic		Checked by:

STRATA RECORD				IN SITU TESTS / SAMPLES					Sheet 2 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red brown mottled grey weathered MUDSTONE.				PID	8.90-9.00	4.1				9
				PID	9.40-9.50	6.4				
				PID	9.90-10.00	6.5				10
				PID	10.40-10.50	16.5				
				PID	10.90-11.00	7.4				11
End of Borehole at 11.00 m		11.00								11
										12
										13
										14
										15

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample  Water Strike  Standing Water Level	Remarks:
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Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: C.Nielsen
Project: 90936.41	Date: 12/04/2012	Method: Rotary sonic		Checked by:

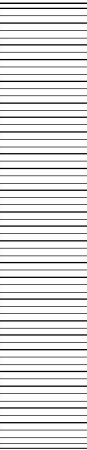

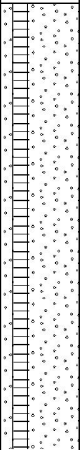

STRATA RECORD				IN SITU TESTS / SAMPLES					Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.				PID	0.20-0.40	3.6				
MADE GROUND: Black reworked sandy gravelly CLAY. Gravel is fine to medium angular to subangular fragments of concrete. Strong organic odour noted.		0.45		PID	0.40-0.60	6.1				
MADE GROUND: Soft brown CLAY with occasionally cobbles. Cobbles are subangular fragments of concrete. Strong organic odour noted.		0.60		PID	0.60-0.80	4.5				
MADE GROUND: Brown/red mottled black clayey gravelly SAND. Gravel is medium fragments of brick. Strong organic odour noted.		0.80		PID	0.80-1.00	10.1				
MADE GROUND: Soft brown CLAY. Some black staining visible. Organic odour noted.		1.00		PID	1.00-1.20	6.4				1
MADE GROUND: Soft brown CLAY. Some black staining visible. Organic odour noted.		1.20		PID	1.40-1.60	6.8				
Red mottled grey slightly sandy CLAY. Occasional cobble and gravels. Gravel is medium to coarse subangular to angular mixed lithologies. Organic odour noted.		1.80		PID	1.80-2.00	5				
Red mottled grey slightly sandy CLAY. Occasional cobble and gravels. Gravel is medium to coarse subangular to angular mixed lithologies. Organic odour noted.		2.00		PID	2.00-2.20	4.5				2
Brown sandy CLAY. Occasional gravel of medium to coarse subangular to angular mixed lithologies.		2.40		PID	2.40-2.60	7.4				
Brown sandy CLAY. Occasional gravel of medium to coarse subangular to angular mixed lithologies.		2.60		PID	2.60-2.80	2.9				
Brown sandy gravelly CLAY. Gravel is medium subangular to subrounded fragments of mixed lithologies. Organic odour noted.		3.00		PID	3.00-4.00	5.3				3
Red mottled grey sandy slightly gravelly CLAY. Gravel is medium rounded of mixed lithologies. Visible black staining and organic odour.		4.00		PID	4.00-5.00	7.9				4
Brown clayey gravelly SAND. Gravel is subangular to subrounded medium fragments of mixed lithologies. Pockets of yellow sand. Solvent odour.				PID	5.20-5.40	16				
Brown sandy gravelly CLAY. Gravel is fine to medium subrounded fragments of mixed lithologies. Poor recovery ~20% due to cobble at the end of the sample. Sample recovered wet.		5.50		PID	5.60-5.80	32.9				5
Red mottled grey weak weathered MUDSTONE.		6.00		PID	6.00-6.20	5.2				6
Red mottled grey weak weathered MUDSTONE. Recovered as gravel sized fragments of Mudstone. Sample between 6.0-6.2 mbgl recovered wet.				PID	6.80-7.00	4.5				
Red mottled grey weak weathered MUDSTONE.		7.00		PID	7.00-7.20	10.5				7
Red mottled grey weak weathered MUDSTONE.				PID	7.80-8.00	6.5				
Continued next sheet				PID	8.40-8.60	6.8				

Key:



D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▽	Standing Water Level		

Remarks: Organic odour noted between 0.45-1.8 mbgl and 2.0-2.6 mbgl. Solvent odour noted between 2.6-3.0 mbgl, and slight solvent odour noted between 4.0-5.0 mbgl. Visible black staining between 1.0-1.2 mbgl and 2.4-2.6 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: C.Nielsen
Project: 90936.41	Date: 12/04/2012	Method: Rotary sonic		Checked by:


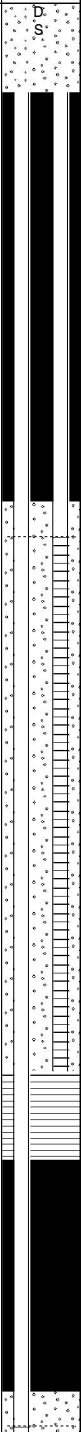






STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 2 of 2		
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
Red mottled grey weak weathered MUDSTONE.				PID	9.00-10.00	6.4				9	
				PID	10.00-11.00	9.1				10	
				PID	10.40-10.60	11.9					
End of Borehole at 11.00 m		11.00								11	
										12	
											13
											14
											15

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
	Water Strike		
	Standing Water Level		

Remarks: Organic odour noted between 0.45-1.8 mbgl and 2.0-2.6 mbgl. Solvent odour noted between 2.6-3.0 mbgl, and slight solvent odour noted between 4.0-5.0 mbgl. Visible black staining between 1.0-1.2 mbgl and 2.4-2.6 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 23/04/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2		
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level		
MADE GROUND: Concrete.		0.25		PID	0.25-0.35	2.4				1		
MADE GROUND: Grey GRAVEL. Gravel is fragments of concrete.		0.35										
MADE GROUND: Clayey sandy gravelly SILT. Gravels are fragments of brick, concrete, metal and wood.		0.90										
MADE GROUND: Concrete.		1.50										
Silty gravelly SAND. Sand is fine to coarse. Gravel is subrounded to subangular, medium to coarse with rare cobbles of mixed lithologies. Slight organic odour noted.		1.50		PID	1.50-1.70	8.2			2			
										PID	1.80-2.00	7
										PID	2.00-2.50	9
Silty gravelly SAND. Sand is coarse. Gravel is subrounded to subangular, medium to cobble sized fragments of mixed lithologies. Slight organic odour noted.		2.50		PID	2.50-3.00	9.1			3			
		3.00								PID	3.00-3.50	4.2
Very silty gravelly SAND. Sand is coarse. Gravel is subangular to subrounded fine to coarse fragments of mixed lithologies.		3.50		PID	3.50-4.00	3.9			4			
Dark brown silty sandy GRAVEL. Gravel is subrounded to subangular fine to cobble sized fragments of mixed lithologies.		3.90								PID	4.00-4.50	7.2
Dark brown gravelly SAND. Sand is medium to coarse. Gravel is subangular to subrounded fine to coarse fragments of mixed lithologies. Cobble at 4.1m-4.2m bgl.		4.30		PID	5.00-5.40	5.7			5			
Dark brown/black clayey sandy GRAVEL. Gravel is subangular to subrounded fine to coarse fragments of mixed lithologies with rare cobbles of mixed lithologies.		5.00								PID	5.40-6.00	<1
Brown gravelly SAND. Sand is medium to coarse. Gravel is subrounded to subangular fine to medium fragments of mixed lithologies.		5.40		PID	6.00-6.50	3.7			6			
Sandy GRAVEL. Sand is medium to coarse. Gravel is subrounded to subangular fine to coarse with cobble sized fragments of sandstone and mixed lithologies.		6.10								PID	6.50-7.00	10.4
Red/brown weathered MUDSTONE. Cobble of quartzite at 7.0m bgl.		7.00		PID	7.20-7.30	4.2			7			
Red/brown mottled green/grey weathered MUDSTONE.										PID	7.50-7.60	8.3
										PID	7.70-7.80	7.9
										PID	8.00-8.50	5.4
Continued next sheet												

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▽	Standing Water Level		

Remarks: Slight organic odour noted between 1.5m-2.0m bgl and between 2.5-3.0 mbgl.

Remarks: Slight organic odour noted between 1.5m-2.0m bgl and between 2.5-3.0 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 24/04/2012	Method: Rotary Sonic		Checked by:

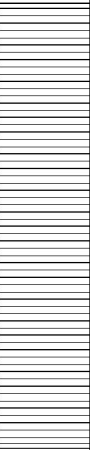




STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.20-0.50	2.4			D.S.		
MADE GROUND: Reworked mottled orange/grey clayey SILT with fragments of subangular medium to coarse coal and sandstone.		0.90		PID	0.90-1.00	2.9					
MADE GROUND: Soft light brown SILT with rootlets.		1.00		PID	1.00-1.30	4				1	
MADE GROUND: Red/brown/ grey gravelly clayey SILT. Gravel is subrounded to subangular medium to cobble sized fragments of mixed lithologies.		1.30		PID	1.40-2.00	2.6					
MADE GROUND: Black clayey GRAVEL. Gravel is fragments of slag and clinker.		1.40									
Soft dark brown SILT with rootlets.		2.00		PID	2.00-2.50	2.1				2	
Soft gravelly clayey SILT. Gravel is subangular to subrounded fragments of sandstone.		2.60		PID	2.60-3.00	1.7					
Soft very sandy gravelly SILT. Sand is medium. Gravel is subangular to subrounded fragments of sandstone and mudstone.				PID	3.00-3.50	3.6				3	
				PID	3.50-3.80	4.2					
Sandstone COBBLE.		3.90		PID	4.00-4.50	15.2				4	
Soft brown slightly sandy gravelly CLAY. Gravel is subrounded to subangular fine to coarse fragments of mixed lithologies.		4.00		PID	4.50-5.00	12					
				PID	5.00-5.50	12				5	
Red mottled grey/green very weathered MUDSTONE.		5.60		PID	5.60-6.00	9.9					
				PID	6.00-6.50	5.6				6	
Red/brown weathered MUDSTONE.		6.50		PID	6.50-7.00	5.4					
				PID	7.00-7.50	4.8				7	
				PID	7.50-8.00	4.8					
				PID	8.00-8.50	6.1					
Continued next sheet											



Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		















Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: S.Barton
Project: 90936.41	Date: 24/04/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD				IN SITU TESTS / SAMPLES					Sheet 2 of 2		
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
Red/brown weathered MUDSTONE.				PID	8.50-9.00	5.9					
				PID	9.00-9.50	4.3					9
				PID	9.50-10.00	4					10
End of Borehole at 11.00 m		11.00								11	
										12	
										13	
										14	
										15	

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample  Water Strike  Standing Water Level	Remarks:
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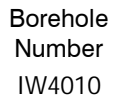
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 23/04/2012	Method: Rotary Sonic		Checked by:

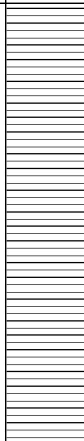

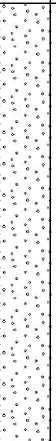
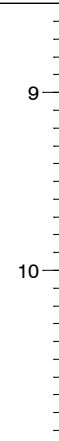

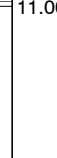
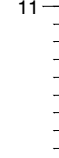

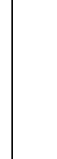
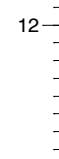

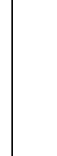
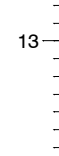

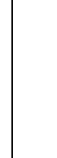
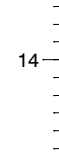

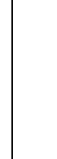
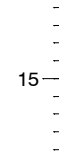

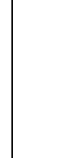
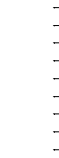

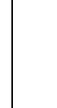

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.										
MADE GROUND: Firm silty brown CLAY. Black staining noted.		0.30 0.40		PID	0.30-0.40	2.1				
MADE GROUND: Soft brown silty CLAY. Black staining noted.				PID	0.50-1.00	2.7				
MADE GROUND: Soft black/grey clayey SILT with occasional subrounded to subangular fine to medium fragments of coal and mixed lithologies.		1.00		PID	1.00-1.20	3.8				1
				PID	1.20-1.50	4.7				
MADE GROUND: Red brick.		1.55 1.60		PID	1.60-2.00	3.6				
MADE GROUND: Soft brown silty CLAY with occasional subrounded gravels of mixed lithologies. Black staining noted.		1.70 2.00		PID	2.00-2.10	4.2				2
Soft black/dark brown SILT with rootlets.				PID	2.40-2.50	4.7				
Soft brown silty sandy gravelly CLAY. Gravel is subrounded to subangular fine to medium fragments of mixed lithologies.		2.70		PID	2.80-2.90	3.9				
Silty gravelly SAND. Gravel is subangular to subrounded medium to coarse fragments of mixed lithologies.		3.00		PID	3.00-3.50	5.1				3
Soft silty slightly sandy gravelly CLAY. Gravel is subrounded, medium to coarse fragments of mixed lithologies with rare cobble sized fragments of mixed lithologies.				PID	3.50-4.00	4.3				
Clayey gravelly SAND. Gravel is subrounded medium to coarse fragments of mixed lithologies and rare cobble sized fragments of mixed lithologies. Recovered as slurry.		4.00		PID	4.00-5.00	5.2				4
				PID	4.50-5.00	4.3				
Soft to firm brown silty gravelly CLAY. Gravel is subangular to subrounded medium to coarse fragments of mixed lithologies.		5.00		PID	5.00-5.50	10.8				5
Firm brown gravelly CLAY. Gravel is subangular fine to medium fragments of mixed lithologies.		5.50 5.60		PID	5.60-6.00	9.9				
Red/brown mottled grey/green weathered MUDSTONE.				PID	6.00-6.50	5.1				6
				PID	6.50-7.00	5.5				
				PID	7.00-7.50	4				7
				PID	7.50-8.00	6.2				
				PID	8.00-8.50	3.1				

Continued next sheet

Key:			
D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		




















Remarks: Black staining noted between 0.3m-1.0m bgl, and between 1.6-1.7 mbgl.



Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red/brown mottled grey/green weathered MUDSTONE.				PID	8.50-9.00	3.8				
				PID	9.00-9.50	6.2				
				PID	9.50-10.00	3.5				
				PID	10.00-10.50	4				
				PID	10.50-11.00	49				
End of Borehole at 11.00 m		11.00								
										
										
										
										
										
										
										

Remarks: Black staining noted between 0.3m-1.0m bgl, and between 1.6-1.7 mbgl.

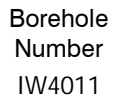
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 03/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.											
MADE GROUND: Black medium silty SAND with gravel sized fragments of brick and concrete.		0.30		PID	0.40-0.60	3.1					
MADE GROUND: Stiff brown mottled orange slightly sandy silty CLAY.		0.40		PID	0.60-1.00	1.7					
MADE GROUND: Soft brown to red mottled green silty gravelly CLAY. Gravel is medium to coarse subrounded fragments of mixed lithologies. Rare fragment of plastic sheet.		1.10		PID	1.00-1.50	2.9				1	
Soft brown to black organic slightly gravelly SILT. Gravel is medium subrounded fragments of mixed lithologies. Frequent rootlets and roots.				PID	1.50-2.00	3.6					
Soft light brown silty gravelly sandy CLAY. Gravel is medium to coarse subrounded to subangular fragments of mixed lithology. Frequent rootlets and roots.		2.00		PID	2.00-2.50	3.1				2	
Green to brown silty gravelly subrounded mixed lithology COBBLES. Gravel is medium subrounded to subangular fragments of mixed lithologies.		2.70		PID	2.70-3.00	4.7					
Soft brown slightly sandy gravelly CLAY. Gravel is medium to coarse subrounded to subangular fragments of mixed lithologies. Sand is medium to coarse.		3.00		PID	3.00-3.50	4.3				3	
Soft brown slightly sandy gravelly CLAY. Gravel is medium to coarse subrounded to subangular fragments of mixed lithologies. Sand is medium to coarse.		3.50		PID	3.50-4.00	4.6				▽	
Brown slightly sandy clayey medium subrounded cobbly mixed lithology GRAVEL.				PID	4.00-4.50	2.6				4	
				PID	4.50-5.00	2.7					
				PID	5.00-5.50	3.6				5	
Red/brown mottled green weathered MUDSTONE.		5.20		PID	5.50-6.00	3.3					
				PID	6.00-6.50	3				6	
				PID	6.50-7.00	5.3					
				PID	7.00-7.50	4				7	
				PID	7.50-8.00	4.5					
				PID	8.00-8.50	3.5					
Continued next sheet											

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		



Remarks:









Scale
1:43
Logged by:
S.Barton

Checked by:

Sheet 2 of 2

Key:				Remarks:
D	Disturbed Sample	PPT	Pocket Penetrometer Test	
B	Bulk Sample	PID	Photoionisation Detector	
U	Undisturbed Sample	SPT	Standard Penetration Test	
J	Jar Sample		(Uncorrected)	
	Water Strike			
	Standing Water Level			

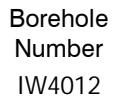
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 02/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.30		PID	0.30-0.50	2.7					
MADE GROUND: Soft brown mottled orange slightly gravelly clayey SILT. Gravel is medium subrounded fragments of mixed lithologies.				PID	0.50-1.00	3.2					
				PID	1.00-1.50	3.7					
Brown sandy silty cobbly fine to coarse subrounded to subangular mixed lithology GRAVEL. Cobbles are subrounded fragments of mixed lithology.		1.40		PID	1.50-2.00	4.1					
		PID		2.00-2.50	4.1						
		PID		2.70-3.00	4.6						
		PID		3.00-3.50	6.4						
		PID		3.50-4.00	2.8						
Slightly sandy gravelly CLAY. Gravel is fine to coarse subrounded to subangular fragments of mixed lithologies.		3.00		PID	4.00-4.50	5.3					
		PID		4.50-5.00	13.3						
		PID	5.00-5.50	12.7							
		PID	5.50-6.00	4.3							
		PID	6.00-6.50	5.4							
		PID	6.50-7.00	3.7							
Red/brown mottled green weathered MUDSTONE.		5.70	PID	7.00-7.50	6						
		PID	7.50-8.00	5.3							
		PID	8.00-8.50	3.9							
Continued next sheet											

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		



































Remarks:



Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
Red/brown mottled green weathered MUDSTONE.				PID	8.50-9.00	4				9	
				PID	9.00-9.50	<1					10
				PID	9.50-10.00	<1					
				PID	10.00-10.50	<1					
				PID	10.50-11.00	<1					
End of Borehole at 11.00 m		11.00						12			
										13	
											14
											15

Remarks:

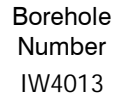
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 02/05/2012	Method: Rotary Sonic		Checked by:

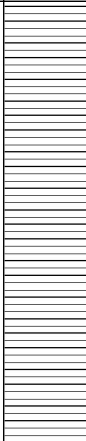





STRATA RECORD				IN SITU TESTS / SAMPLES					Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.		0.20		PID	0.25-0.50	3.3				
MADE GROUND: Gravel sized fragments of concrete.		0.25		PID	0.50-1.00	4				
MADE GROUND: Soft brown very silty CLAY.		0.40		PID	1.00-1.50	5.2				
MADE GROUND: Cobble sized fragments of concrete.		0.45		PID	1.50-2.00	7.9				
MADE GROUND: Soft brown red mottled green very silty CLAY.		1.00		PID	2.00-2.50	3.4				
MADE GROUND: Firm brown red mottled green very silty CLAY.				PID	2.70-3.00	15.7				
MADE GROUND: Soft red mottled green silty CLAY.		2.00		PID	3.00-3.50	8.2				
Brown clayey slightly sandy cobbly fine to coarse subrounded to subangular mixed lithology GRAVEL.		2.50		PID	3.50-4.00	5				
Soft red brown slightly sandy gravelly CLAY. Gravel is fine to coarse subrounded to subangular fragments of mixed lithologies.		3.00		PID	4.00-4.50	3.2				
				PID	4.50-5.00	4.4				
Clayey slightly sandy cobbly medium to coarse subrounded to subangular mixed lithology GRAVEL.		4.40		PID	5.00-5.50	3.5				
Soft red brown slightly sandy gravelly CLAY. Gravel is fine to coarse subrounded to subangular fragments of mixed lithologies.		4.80		PID	5.50-6.00	4.7				
Brown/red slightly sandy clayey fine to coarse subrounded to subangular mixed lithology GRAVEL.		5.40		PID	6.00-6.50	3.4				
Red/brown mottled green weathered MUDSTONE.				PID	6.50-7.00	3.3				
				PID	7.00-7.50	3.2				
				PID	7.50-8.00	3.8				
				PID	8.00-8.50	2.1				
Continued next sheet										

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		






























Remarks:



Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red/brown mottled green weathered MUDSTONE.				PID	8.50-9.00	2.3				
				PID	9.00-9.50	3.4				
				PID	9.50-10.00	5.2				
				PID	10.00-10.50	3.3				
				PID	10.50-11.00	3.2				
End of Borehole at 11.00 m		11.00								
										

Remarks:

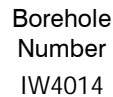
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 01/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.20-0.50	4.9					
MADE GROUND: Black to brown sandy SILT with gravel sized fragments of medium to coarse subangular concrete and metal reinforcing.				PID	0.50-1.00	6.1					
MADE GROUND: Soft red mottled green silty CLAY.		0.80									
MADE GROUND: Concrete.		0.90		PID	1.00-1.50	14.8				1	
MADE GROUND: Soft red mottled green silty CLAY.		1.00									
MADE GROUND: Stiff red mottled green silty CLAY with fragments of metal reinforcing.		1.10									
MADE GROUND: Stiff red mottled green silty CLAY with fragments of metal reinforcing.				PID	1.50-2.00	11.5					
MADE GROUND: Gravel sized fragments of concrete with fragments of metal reinforcing.		1.80									
MADE GROUND: Stiff mottled green silty CLAY with fragments of metal reinforcing.		2.00		PID	2.00-2.50	52.3				2	
MADE GROUND: Firm red mottled green to orange silty gravelly CLAY. Gravel is subangular sandstone fragments.		2.80		PID	2.70-3.00	72.4					
		2.90		PID	3.00-3.50	35.7				3	
Subrounded sandstone COBBLE.		3.00									
Brown gravelly sandy cobbly CLAY. Gravel is fine to coarse subangular to subrounded fragments of mixed lithologies. Cobble is subrounded fragment of sandstone.				PID	3.50-4.00	195					
					PID	4.00-4.50	73.5				4
				PID	4.50-5.00	96.1					
					PID	5.00-5.50	73				5
											
Red/brown weathered MUDSTONE.		5.50		PID	5.50-6.00	16.3					
Sandstone COBBLE.		6.00		PID	6.00-6.50	14.5				6	
Red mottled green weathered MUDSTONE.		6.20		PID	6.50-7.00	14.1					
					PID	7.00-7.50	7.1				7
				PID	7.50-8.00	6.6					
					PID	8.00-8.50	13.4				
Continued next sheet											

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:



Scale
1:43

Filter Material: Gravel

Checked by:

Sheet 2 of 2

Remarks:

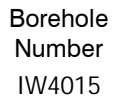
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 01/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.		0.15		PID	0.15-0.50	3				
MADE GROUND: Soft black to brown slightly silty CLAY with gravel sized fragments of concrete.		0.30		PID	0.50-1.00	3.2				
MADE GROUND: Fine to medium subangular to subrounded gravel sized fragments of concrete.		0.40								
MADE GROUND: Soft black to brown slightly silty CLAY with gravel sized fragments of concrete.		0.45								
MADE GROUND: Soft black to brown slightly silty CLAY with gravel sized fragments of concrete.		1.00		PID	1.00-1.50	4.5				1
MADE GROUND: Soft red to brown mottled green slightly silty gravelly CLAY. Gravel is fine to coarse subangular fragments of limestone. Rare fragment of metal reinforcing.		1.30		PID	1.50-2.00	66				
MADE GROUND: Soft red to brown mottled green very silty CLAY.				PID	2.00-2.50	24.7				2
MADE GROUND: Soft to firm red mottled brown to grey silty gravelly CLAY. Gravel is medium subrounded fragments of coal and mixed lithologies.				PID	2.70-3.00	85				
Silty clayey sandy cobbly subrounded to subangular mixed lithology GRAVEL.		2.85		PID	3.00-3.50	352.3				3
Soft brown very gravelly CLAY. Gravel is medium to coarse subrounded to subangular fragments of mixed lithologies.		3.00		PID	3.50-4.00	861.5				
Soft brown slightly sandy gravelly CLAY. Gravel is medium to coarse subrounded to subangular fragments of mixed lithologies.		4.00		PID	4.00-4.50	1860				4
				PID	4.50-5.00	98.3				
				PID	5.00-5.50	76.5				5
Red/brown mottled green weathered MUDSTONE.		5.40		PID	5.50-6.00	8.9				
				PID	6.00-6.50	13.5				6
Red to brown green coarse clayey gravelly SAND. Gravel is fine subangular fragments of sandstone.		6.20		PID	6.50-7.00	6.2				
Red mottled green weathered MUDSTONE.		6.40		PID	7.00-7.50	3.3				7
				PID	7.50-8.00	3.9				
				PID	8.00-8.50	3				
Continued next sheet										

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:







































































Scale
1:43
Logged by:
S.Barton

Checked by:

Sheet 2 of 2

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 50	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S. Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 30/04/2012	Method: Rotary Sonic		Checked by:

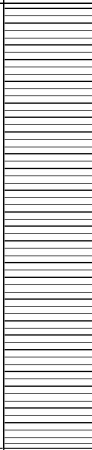
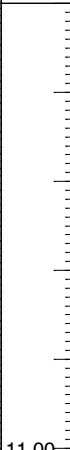
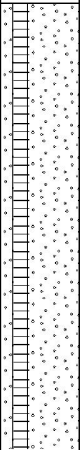




STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.		0.20		PID	0.20-0.50	5				
MADE GROUND: Soft brown silty slightly gravelly CLAY. Gravel is subrounded to subangular fine fragments of mixed lithologies. Black staining noted. Clay is possibly reworked.		0.50		PID	0.50-1.00	2.8				
MADE GROUND: Soft to firm red mottled green/grey very silty CLAY. Clay possibly reworked.				PID	1.00-1.50	43.9				1
										
Brown silty gravelly SAND. Sand is medium to coarse. Gravel is subrounded to subangular medium to coarse fragments of mixed lithologies.		1.90		PID	1.90-2.00	3.3				2
		2.00		PID	2.00-2.50	289				
Silty sandy cobbly GRAVEL. Cobbles are subrounded fragments of mixed lithologies. Gravel is mixed lithologies.				PID	2.50-2.90	29.8				
										
Clayey silty sandy GRAVEL with occasional cobbles. Gravel is subangular to subrounded of mixed lithologies.		3.00		PID	3.00-3.50	157.5				3
				PID	3.50-4.00	78.7				
				PID	4.00-4.50	362				4
				PID	4.50-5.00	701				
				PID	5.00-5.50	13.8				5
										
Red/brown weathered MUDSTONE.		5.20		PID	5.50-6.00	4.7				6
				PID	6.00-6.50	4.7				
				PID	6.50-7.00	4.6				
				PID	7.00-7.50	7.9				7
				PID	7.50-8.00	7.6				
				PID	8.00-8.50	6.9				
										
										
										
										
										
										
										
										
										
										
										
										
										
										
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Key:



D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: Black staining noted between 0.2-0.5 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 50	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: S. Barton
Project: 90936.41	Date: 30/04/2012	Method: Rotary Sonic		Checked by:



































STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 2 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red/brown weathered MUDSTONE.				PID	8.50-9.00	7				
				PID	9.00-9.50	4.3				
				PID	9.50-10.00	5.2				
				PID	10.00-10.50	5				
				PID	10.50-11.00	5.1				
End of Borehole at 11.00 m		11.00								
										

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
	Water Strike		
	Standing Water Level		

Remarks: Black staining noted between 0.2-0.5 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: S.Barton
Project: 90936.41	Date: 25/04/2012	Method: Rotary Sonic		Checked by:

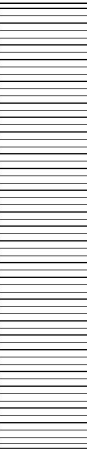
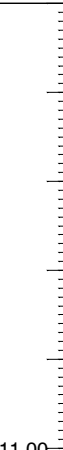
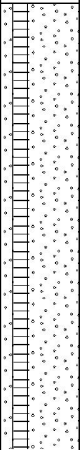
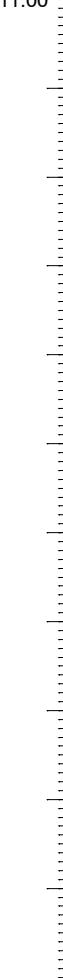
STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.		0.30		PID	0.35-0.50	52.2				
MADE GROUND: Gravel sized fragments of concrete, flint, and hardcore.		0.35		PID	0.50-1.00	58.2				
MADE GROUND: Firm red mottled brown very silty CLAY. Possibly reworked.		1.00		PID	1.00-1.50	82.1				1
Firm red mottled brown very silty gravelly CLAY. Gravel is subangular to subrounded fine to coarse fragments of mixed lithologies. Possibly reworked.				PID	1.50-2.00	131.5				
Red mottled brown/grey silty slightly gravelly CLAY. Gravel is subangular fine to medium fragments of mixed lithologies. Possibly reworked.		2.00		PID	2.00-2.50	112.8				2
Red/brown silty gravelly CLAY. Gravel is subangular to subrounded medium to coarse fragments of mixed lithologies with rare sandstone cobbles.		2.80		PID	2.50-3.00	78.8				
Clayey sandy GRAVEL. Gravel is subangular medium to cobble sized fragments of sandstone and mixed lithologies. Recovered as slurry.		3.20		PID	3.00-3.50	173.2				3
				PID	3.50-4.00	145.6				
				PID	4.00-4.50	14.1				4
				PID	4.50-5.00	65.2				
				PID	5.00-5.50	13.5				5
				PID	5.50-6.00	8.7				
Soft red slightly silty gravelly CLAY. Gravel is subangular to subrounded fine to coarse fragments of mixed lithologies.		6.00		PID	6.00-6.50	432.8				6
Red/brown mottled green weathered MUDSTONE.		6.10		PID	6.50-7.00	42.3				
				PID	7.00-7.50	348.8				7
				PID	7.50-8.00	61.1				
				PID	8.20-8.30	7.3				
Continued next sheet										



Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		



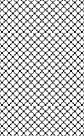


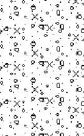
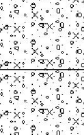
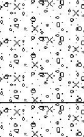
Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: S.Barton
Project: 90936.41	Date: 25/04/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 2 of 2		
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
Red/brown mottled green weathered MUDSTONE.				PID	8.90-9.00	18				9	
				PID	9.20-9.30	101.3					
				PID	9.80-9.90	16				10	
End of Borehole at 11.00 m		11.00								11	
										12	
											13
											14
											15

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample  Water Strike  Standing Water Level	Remarks:
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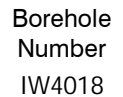
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 30/04/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.										
MADE GROUND: Soft red mottled green slightly gravelly silty CLAY. Gravel is medium to coarse subrounded fragments of sandstone.		0.30		PID	0.30-0.50	39.6				
				PID	0.50-1.00	38.1				
				PID	1.00-1.50	101.6				1
Firm brown sandy gravelly SILT. Gravel is fine to medium subangular to rounded fragments of coal, sandstone, and mudstone. Sand is fine to medium.		1.20								
				PID	1.50-2.00	121.5				
				PID	2.00-2.50	387.1				2
Slightly silty sandy cobbly fine to coarse subrounded mixed lithology GRAVEL.		2.70		PID	2.70-3.00	1826				
				PID	3.00-3.50	427.9				3
				PID	3.50-4.00	204.8				
Slightly silty sandy fine to coarse angular to rounded mixed lithology GRAVEL.		4.00		PID	4.00-4.50	170.9				4
				PID	4.50-5.00	40.7				
Silty sandy cobbly fine to coarse subrounded mixed lithology GRAVEL.		5.00		PID	5.00-5.50	11.3				5
				PID	5.50-5.75	7.6				
				PID	5.75-5.95	5.2				
Red/brown mottled green weathered MUDSTONE.				PID	6.00-6.50	8.9				6
				PID	6.50-7.00	4.9				
				PID	7.00-7.50	4.1				7
				PID	7.50-8.00	5.2				
				PID	8.00-8.50	3.8				
Continued next sheet										

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		



Remarks:



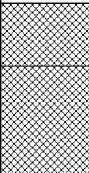
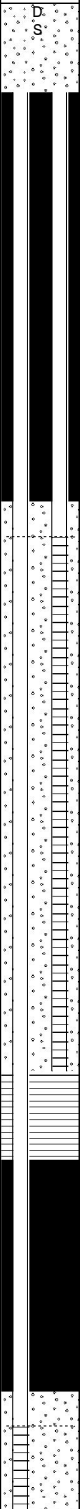
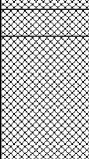

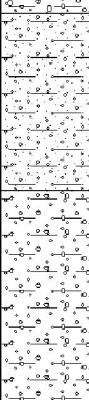
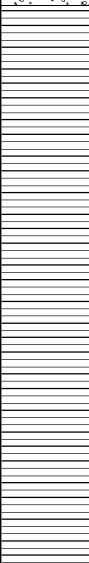
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Logged by:
S.Barton

Checked by:

Sheet 2 of 2

Key:				Remarks:
D	Disturbed Sample	PPT	Pocket Penetrometer Test	
B	Bulk Sample	PID	Photoionisation Detector	
U	Undisturbed Sample	SPT	Standard Penetration Test	
J	Jar Sample		(Uncorrected)	
	Water Strike			
	Standing Water Level			

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 14/05/2012	Method: Rotary Sonic		Checked by:

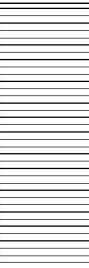

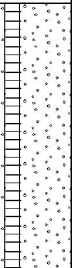
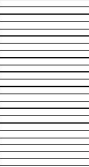


STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.											
MADE GROUND: Firm red mottled green very silty slightly gravelly CLAY. Gravel is subrounded fragments of sandstone.		0.35		PID	0.40-0.50	16.2					
				PID	0.80-0.90	16.6					
MADE GROUND: Concrete.		1.00								1	
MADE GROUND: Firm red mottled green very silty slightly gravelly CLAY. Gravel is subrounded fragments of sandstone.		1.15		PID	1.30-1.40	17.6					
											
				PID	1.60-1.70	16.9					
Brown/red clayey sandy cobbly GRAVEL. Gravel is subrounded fine to coarse fragments of sandstone.		1.85		PID	1.90-2.00	13.4			2		
		2.00		PID	2.00-2.50	17.6					
Brown very clayey slightly sandy gravelly COBBLES. Gravel is subangular to subrounded fragments of mixed lithologies. Cobbles are subangular to subrounded fragments of mixed lithologies.				PID	2.50-3.00	13.8					
											
				PID	3.00-4.00	31.9			3		
(Poor recovery ~10%). Brown slightly clayey slightly sandy GRAVEL. Gravel is subangular to subrounded fine to coarse fragments of mixed lithologies.		3.00									
				PID	4.00-4.50	10.9			4		
Brown sandy slightly clayey cobbly GRAVEL. Gravel is fine to coarse rounded to subangular fragments of mixed lithologies. Cobbles are subrounded fragments of mixed lithologies.		4.00		PID	4.50-5.00	9.4					
											
				PID	5.00-5.20	6.5			5		
				PID	5.70-6.00	7.2					
Red mottled grey/green very weathered MUDSTONE.		5.20		PID	6.00-6.50	7.3			6		
											
				PID	6.50-7.00	7.8					
				PID	7.00-7.50	6.1			7		
				PID	7.50-8.00	6.2					
				PID	8.00-8.50	7.6					
Continued next sheet											

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: S.Barton
Project: 90936.41	Date: 14/05/2012	Method: Rotary Sonic		Checked by:






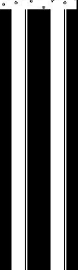

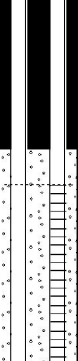
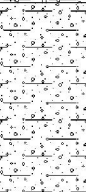
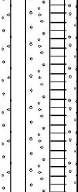
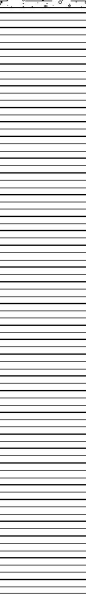


STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 2 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red mottled grey/green very weathered MUDSTONE.				PID	8.50-9.00	15.6				9
PID				9.00-9.50	47.8					
PID				9.50-10.00	182.8					
No recovery due to drilling technique, assumed as above.										10
End of Borehole at 11.00 m										11
										12
										13
										14
										15

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: T.Costema
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 10/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.20-0.30	18.5					
(Poor recovery ~60%). MADE GROUND: Very soft light grey/brown CLAY. Strong hydrocarbon odour noted.		0.57		PID	0.70-0.80	43.4					
(Poor recovery ~60%). Soft grey mottled orange/brown silty slightly gravelly CLAY. Gravel is subrounded to rounded fine to coarse fragments of mixed lithologies. Strong hydrocarbon odour noted from 1.1 to 2.0 mbgl.				PID	1.40-1.50	230.9				1	
				PID	1.90-2.00	129.8				2	
				PID	2.40-2.50	98.1					
Brown/grey clayey sandy slightly cobbly GRAVEL. Gravel is subrounded to subangular fine to coarse fragments of mixed lithologies. Cobbles are rounded to subrounded fragments of sandstone. Strong hydrocarbon odour noted.		2.00		PID	2.90-3.00	72.3				3	
				PID	3.40-3.50	31.1					
				PID	3.90-4.00	15.7					
(Poor recovery ~50%). Brown/red/grey clayey sandy GRAVEL. Gravel is rounded to subangular fine to coarse fragments of mixed lithologies. Cobbles are rounded to subrounded fragments of sandstone.		4.00		PID PID	4.00-4.50	28.5				4	
Red/brown mottled grey very weathered MUDSTONE.		5.10		PID	5.10	6.9				5	
				PID	5.60-5.70	11.3					
				PID	5.90-6.00	23.7					
				PID	6.60-6.70	10.6					
				PID	6.90-7.00	11.8					
				PID	7.40-7.50	8.7					
Continued next sheet				PID	8.40-8.50	9.1					

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: Strong hydrocarbon odour noted 0.2-0.57 mbgl and 1.1-4.0 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 10/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 2 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red/brown mottled grey very weathered MUDSTONE.				PID	8.90-9.00	9.2				9
				PID	9.40-9.50	5.9				
		10.00		PID	9.90-10.00	7.3				10
No recovery due to drilling technique, assumed as above.										
End of Borehole at 11.00 m		11.00								11
										12
										13
										14
										15

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: Strong hydrocarbon odour noted 0.2-0.57 mbgl and 1.1-4.0 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 09/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.20-0.30	3.2					
MADE GROUND: Dark brown/black sandy GRAVEL. Gravel is angular to subrounded fine to coarse fragments of hardcore.		0.46		PID	0.40-0.50	4.6					
MADE GROUND: Soft orange/brown mottled grey silty CLAY with rare rounded fragments of mixed lithologies.		1.03		PID	0.70-0.80	3.3					
MADE GROUND: Dark brown very sandy GRAVEL. Gravel is angular to subrounded fine to coarse fragments of hardcore.	1.13		PID	1.30-1.40	3.9						
Soft orange/brown mottled yellow/grey very silty CLAY with rare subangular to subrounded fine to coarse fragments of mixed lithologies.	2.00		PID	1.90-2.00	4.9						
(Poor recovery ~60%). Brown/grey very sandy GRAVEL. Gravel is subrounded to subangular fine to coarse fragments of mixed lithologies.	3.00		PID	2.70-2.80	5.6						
(Poor recovery ~60%). Brown/grey clayey sandy GRAVEL. Gravel is subangular to subrounded fine to coarse mixed lithologies.	4.00		PID	3.40-3.50	26.7						
Soft brown/grey sandy gravelly slightly cobbly CLAY.	5.00		PID	4.70-4.80	20.5						
Red/brown mottled grey very weathered MUDSTONE.			PID	5.00-5.10	8.5						
			PID	5.50-5.60	7.1						
			PID	5.90-6.00	5.3						
			PID	6.40-6.50	5.7						
			PID	6.90-7.00	6						
			PID	7.40-7.50	3.9						
			PID	7.90-8.00	8.2						
Continued next sheet			PID	8.40-8.50	8.9						

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		







Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 09/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD				IN SITU TESTS / SAMPLES					Sheet 2 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red/brown mottled grey very weathered MUDSTONE.				PID	8.90-9.00	10.4				9
				PID	9.40-9.50	7.8				
		10.00		PID	9.90-10.00	9.6				10
No recovery due to drilling technique, assumed as above.										
		11.00								11
End of Borehole at 11.00 m										
										12
										13
										14
										15

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample ▽ Water Strike ▼ Standing Water Level	Remarks:
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Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: S.Barton
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 03/05/2012	Method: Rotary Sonic		Checked by:

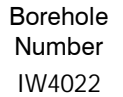
STRATA RECORD				IN SITU TESTS / SAMPLES						Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.20-0.50	1.3					
MADE GROUND: Black medium to coarse silty SAND.		0.30		PID	0.50-1.00	3.2					
MADE GROUND: Firm red mottled green very silty gravelly CLAY. Gravel is fine to medium subrounded fragments of mixed lithologies.		1.00		PID	1.00-1.50	3.6				1	
MADE GROUND: Very clayey fine to coarse subrounded to subangular mixed lithology GRAVEL.		1.50		PID	1.50-2.00	3.6					
MADE GROUND: Soft to firm brown mottled red sandy gravelly CLAY. Gravel is medium subrounded fragments of mixed lithologies.		2.10		PID	2.00-2.50	4.7				2	
Silty sandy clayey cobbly medium to coarse subangular to subrounded mixed lithology GRAVEL.				PID	2.70-3.00	5					
				PID	3.00-3.50	<1				3	
				PID	3.50-4.00	<1					
				PID	4.00-4.50	<1				4	
				PID	4.50-5.00	1.9					
				PID	5.00-5.50	1.1				5	
Firm brown slightly sandy gravelly CLAY. Gravel is medium to coarse subangular to subrounded fragments of mixed lithologies. Red/brown mottled green weathered MUDSTONE.		5.10		PID	5.50-6.00	1.1					
		5.20		PID	6.00-6.50	1.2				6	
				PID	6.50-7.00	3.2					
				PID	7.00-7.50	2.3				7	
				PID	7.50-8.00	2.7					
				PID	8.00-8.50	3.9					
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Key:






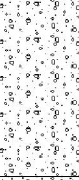

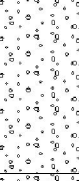
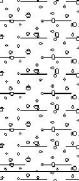

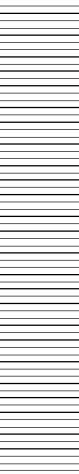
D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

[illegible]

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: T.Costema
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 08/05/2012	Method: Rotary Sonic		Checked by:

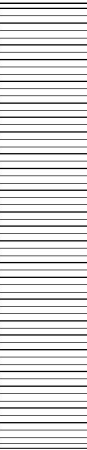
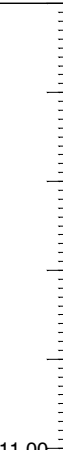
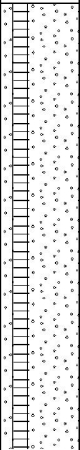
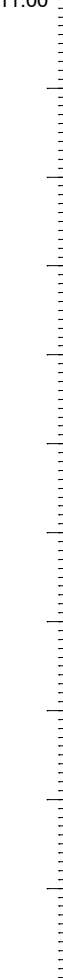
STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.20-0.30	3051					
MADE GROUND: Dark brown to black very sandy fine to coarse angular to subangular GRAVEL.		0.42		PID	0.50-0.60	2245					
MADE GROUND: Soft orange to brown slightly gravelly very silty CLAY. Gravel is fine to coarse subangular with fragments of concrete.		0.86		PID	0.90-1.00	1729				1	
MADE GROUND: Orange to brown silty sandy fine to coarse angular to subrounded GRAVEL.		1.20									
Soft light brown mottled grey to orange cobbly sandy gravelly CLAY. Gravel is fine to coarse subangular to rounded fragments of mixed lithologies. Cobbles are rounded sandstone fragments.		2.20		PID	2.00-2.80	87.8				2	
Light brown to grey cobbly SAND and GRAVEL. Gravel is fine to coarse rounded to subangular fragments of mixed lithologies. Cobbles are subangular to rounded sandstone fragments.		3.20		PID	3.00-3.80	392				3	
Light brown to grey cobbly GRAVEL. Gravel is fine to coarse subrounded to subangular fragments of mixed lithologies. Cobbles are subangular to rounded sandstone fragments.		4.20		PID	4.00-4.80	65				4	
Red to brown clayey cobbly fine to coarse subangular to rounded GRAVEL of mixed lithologies. Cobbles are subrounded to subangular sandstone fragments.		5.20								5	
Red to brown very clayey fine to coarse subangular to rounded mixed lithology GRAVEL.		5.71		PID	5.50-5.60	30.1					
Red brown mottled grey weathered MUDSTONE.				PID	6.10-6.20	29.3				6	
				PID	6.60-6.70	101.3					
				PID	7.00-7.10	13.8			7		
				PID	7.30-7.40	8.4					
				PID	7.60-7.70	9.1					
				PID	8.10-8.20	10.4					
				PID	8.40-8.50	4.4					
Continued next sheet											



Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		









Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 08/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 2 of 2		
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
Red brown mottled grey weathered MUDSTONE.				PID	8.90-9.00	3.9				9	
				PID	9.40-9.50	7.5					
				PID	9.90-10.00	10.1				10	
End of Borehole at 11.00 m		11.00								11	
										12	
											13
											14
											15

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample  Water Strike  Standing Water Level	Remarks:
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Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 50	Logged by: T.Costema
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 11/05/2012	Method: Rotary Sonic		Checked by:

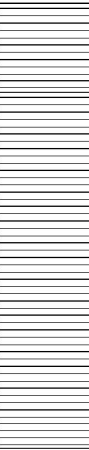
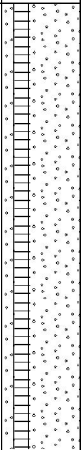
STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.30-0.40	51.6					
(Poor recovery ~60%). MADE GROUND: Black very sandy angular to subrounded fine to coarse fragments of hardcore.		0.50									
MADE GROUND: Soft brown/orange very silty slightly gravelly CLAY. Gravel is rounded to subangular fine to coarse fragments of mixed lithologies. Rare subangular cobbles of red brick and concrete.		1.37		PID	0.90-1.00	365.4				1	
Orange brown clayey GRAVEL. Gravel is subrounded to subangular fine to coarse fragments of mixed lithologies.		1.72		PID	1.40-1.50	95.8					
Light brown/grey clayey sandy GRAVEL. Gravel is rounded to subangular fine to coarse fragments of sandstone and mixed lithologies.		2.00		PID PID	1.90-2.00 2.00-2.50	80.3 73.6				2	
Brown grey sandy clayey slightly cobbly GRAVEL. Gravel is rounded to subangular fine to coarse fragments of mixed lithologies. Cobbles are subangular to rounded fragments of sandstone and limestone.				PID	3.00-3.50	74.5				3	
				PID	4.00-4.50	2.7				4	
				PID	5.20-5.30	20.1				5	
Red/brown mottled grey very weathered MUDSTONE.		5.52		PID	5.70-5.80	7.5				6	
				PID	6.40-6.50	1588					
				PID	6.90-7.00	1632				7	
				PID	7.70-7.80	>5000					
				PID	8.40-8.50	165.9					
Continued next sheet											

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		






Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 11/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 2 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red/brown mottled grey very weathered MUDSTONE.		9.00		PID	8.90-9.00	289.7				9
No recovery due to drilling technique, assumed as above.				PID	9.00-9.50	25.7				
				PID	9.50-10.00	63				
End of Borehole at 11.00 m		11.00								11
										12
										13
										14
										15

Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test (Uncorrected) J Jar Sample ▽ Water Strike ▼ Standing Water Level	Remarks:
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Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 10/05/2012	Method: Rotary Sonic		Checked by:

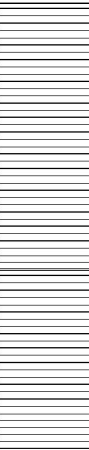
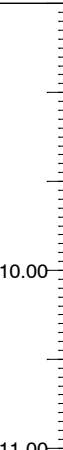
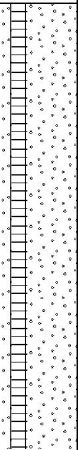
STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.		0.20		PID	0.20-0.30	3.8				
MADE GROUND: Light grey/brown GRAVEL. Gravel is angular to subrounded medium to coarse fragments of hardcore.		0.37		PID	0.50-0.60	3.6				
MADE GROUND: Soft orange/brown silty slightly gravelly CLAY. Gravel is subrounded to subangular fine to coarse fragments of mixed lithologies. Rare angular to subangular cobbles of red brick.		1.28		PID	0.90-1.00	5.3				
Soft/firm brown/grey very silty gravelly slightly cobbly CLAY. Gravel is subangular to rounded fine to coarse fragments of mixed lithologies. Cobbles are rounded to subrounded fragments of sandstone.		1.85		PID	1.40-1.50	2.7				
Brown/grey clayey sandy slightly cobbly GRAVEL. Gravel is subangular to subrounded fine to coarse fragments of mixed lithologies. Cobbles are rounded to subrounded fragments of sandstone.		1.85		PID	1.90-2.00	3.6				
		PID	2.40-2.50	4.5						
		PID	3.00-3.50	3.5						
		PID	4.00-4.50	3.3						
		PID	5.20-5.30	2.8						
Red/brown mottled grey very weathered MUDSTONE.		5.56		PID	5.70-5.80	2.7				
				PID	5.90-6.00	3				
				PID	6.40-6.50	3.1				
				PID	6.90-7.00	2.9				
				PID	7.40-7.50	2.5				
				PID	7.90-8.00	3.4				
				PID	8.40-8.50	2.4				
Continued next sheet										

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 10/05/2012	Method: Rotary Sonic		Checked by:

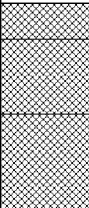
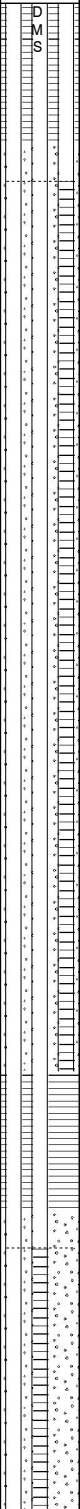
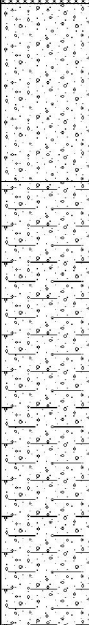

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 2 of 2	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
Red/brown mottled grey very weathered MUDSTONE.				PID	8.90-9.00	6.6				9
				PID	9.40-9.50	3.9				
				PID	9.90-10.00	5.2				
No recovery due to drilling technique, assumed as above.										10
End of Borehole at 11.00 m										11
										12
										13
										14
										15

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

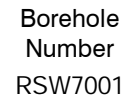
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 08/05/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 3		
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.20-0.30	4.8					
MADE GROUND: Dark brown black clayey sandy subangular to subrounded fine to coarse GRAVEL. Gravel is fragments of hardcore.		0.62		PID	0.70-0.80	6.1				1	
MADE GROUND: Soft light grey brown silty CLAY with rare subangular cobbles of red brick.		1.20		PID	1.70-1.80	10.7				2	
(Poor recovery ~15%) MADE GROUND: Soft brown grey silty slightly gravelly CLAY. Gravel is subangular fine to coarse fragments of sandstone.		2.20		PID	2.90-3.00	8.2				3	
(Poor recovery ~35%) Brown grey very sandy subangular to subrounded fine to coarse GRAVEL of mixed lithologies. Occasional subrounded cobbles of sandstone.		3.20		PID	3.40-3.50	4.6					
Saturated sample. Grey brown clayey sandy subrounded to subangular fine to coarse GRAVEL of mixed lithologies. Occasional subrounded cobbles of sandstone.				PID	3.90-4.00	44.5					4
				PID	4.20-4.80	49.7					
				PID	5.20-5.30	73.9					5
				PID	5.70-5.80	55.1					
Very weathered red mottled grey MUDSTONE.				PID	6.10-6.20	37.5					6
			PID	6.70-6.80	10.7						
			PID	7.10-7.20	8.1			7			
			PID	7.60-7.70	16.8						
			PID	8.10-8.20	10.7						
Continued next sheet											

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:



STRATA RECORD	IN SITU TESTS / SAMPLES	Sheet 2 of 3
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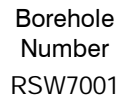
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Key: D Disturbed Sample PPT Pocket Penetrometer Test B Bulk Sample PID Photoionisation Detector U Undisturbed Sample SPT Standard Penetration Test J Jar Sample (Uncorrected)  Water Strike  Standing Water Level	Remarks:
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Remarks:

Key:			Remarks:
D	Disturbed Sample	PPT	Oily sheen on sample at 3.5 mbgl. Separate phase LNAPL in sample from 4.0-5.0 mbgl.
B	Bulk Sample	PID	
U	Undisturbed Sample	SPT	
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: V.Morten
Project: 90936.41	Date: 10/04/2012	Method: Rotary sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 2 of 3	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
hard and very dry. Poor recovery approximately 35%.										
Red mottled grey MUDSTONE. Recovered as soft to firm clayey weathered type mudstone until 9.8 mbgl when it becomes red, gravel sized fragments of very hard mudstone.		9.00		PID	9.00-9.50	5				9
				PID	9.50-10.00	<1				
Red mottled grey MUDSTONE. Recovered as wet soft clayey weak and weathered mudstone with red and grey gravel sized fragments of firm mudstone.		10.00		PID	10.20-10.40	8.8				10
		10.40								
Firm red mottled grey MUDSTONE. Recovered dry.				PID	10.80-11.00	5.9				
		11.00								11
Red mottled grey MUDSTONE. Recovered as wet soft clayey gravelly mudstone. Gravels are fragments of firm red and grey weak and weathered mudstone.		11.40		PID	11.20-11.40	6.8				
Firm red mottled grey MUDSTONE. Recovered dry.				PID	11.80-12.00	15.1				
		12.00		PID	12.20-12.40	5.9				12
Firm red mottled grey MUDSTONE. Recovered dry.		12.60								
				PID	12.80-13.00	7.1				
Red mottled grey MUDSTONE. Recovered as wet soft clayey gravelly mudstone. Gravels are fragments of firm red and grey weak and weathered mudstone.		13.00		PID	13.00-13.20	13				13
		13.20								
Firm red mottled grey MUDSTONE. Recovered dry.				PID	13.80-14.00	13.8				
		14.00								14
Red mottled grey MUDSTONE. Recovered as wet soft clayey gravelly mudstone. Gravels are fragments of firm red and grey weak and weathered mudstone.				PID	14.20-14.40	7.9				
		14.70		PID	14.80-15.00	20.5				
Red mottled grey weak and weathered MUDSTONE.		15.00		PID	15.00-16.00	32.2				15
Red mottled grey MUDSTONE. Recovered as wet soft clayey gravelly mudstone. Gravels are fragments of firm red and grey weak and weathered mudstone.		16.00		PID	16.20-16.40	6.2				
Continued next sheet		16.80		PID	16.80-17.00	7.9				

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▽	Standing Water Level		

Remarks: Oily sheen on sample at 3.5 mbgl. Separate phase LNAPL in sample from 4.0-5.0 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: V.Morten
Project: 90936.41	Date: 10/04/2012	Method: Rotary sonic		Checked by:















STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 3 of 3	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
Red mottled grey weak and weathered MUDSTONE.		17.00		PID	17.20-17.40	3.5					
Red mottled grey MUDSTONE. Mudstone is very soft and clayey with gravel sized fragments of firm red and grey mudstone.				PID	17.80-18.00	12.7					
Red mottled grey weak weathered MUDSTONE. Mudstone is soft clayey with fine to medium firm gravel sized fragments of mudstone.		18.00		PID	18.40-18.60	4.3				18	
Red mottled grey MUDSTONE. Mudstone is soft and clayey with gravel sized fragments of firm red and grey mudstone.		19.00		PID	19.20-19.40	5.2				19	
				PID	19.80-20.00	12.8				20	
End of Borehole at 20.00 m		20.00									
										21	
										22	
										23	
										24	

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: Oily sheen on sample at 3.5 mbgl. Separate phase LNAPL in sample from 4.0-5.0 mbgl.

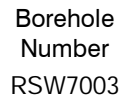
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 19/04/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 3	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20							D M S		
MADE GROUND: Grey fine to coarse angular GRAVEL.		0.50		PID	0.50-0.60	1.3					
MADE GROUND: Soft orange brown mottled yellow brown to grey slightly gravelly sandy CLAY. Gravel is fine to coarse rounded to angular of mixed lithology. Fragments of brick.				PID	0.90-1.00	3.2				1	
				PID	1.30-1.40	3.1					
		1.52		PID	1.70-1.80	4.1				2	
MADE GROUND: Soft dark brown to black gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology with fragments of brick.		2.17									
Soft light brown to grey silty CLAY.		2.83		PID	2.40-2.50	3.6					
Soft grey sandy gravelly cobbly CLAY. Gravel is fine to coarse subrounded to subangular . Cobbles are rounded fragments of sandstone.		3.00		PID	2.90-3.00	2.5				3	
				PID	3.20-3.30	2.3					
Dark brown grey clayey sandy cobbly GRAVEL. Gravel is fine to coarse angular to subrounded fragments of mixed lithology. Cobbles are rounded fragments of sandstone.		3.49									
Soft grey sandy gravelly CLAY. Gravel is fine to coarse subrounded to subangular fragments of mixed lithology.		4.00		PID	3.90-4.00	2.5				▽ 4	
				PID	4.00-5.00	3.3					
Dark brown grey sandy fine to coarse rounded to subangular mixed lithology GRAVEL.		5.00									
Dark brown grey fine to coarse rounded to angular mixed lithology GRAVEL.				PID	5.00-5.10	3.7				5	
				PID	5.50-5.60	3					
				PID	5.70-5.80	3.6					
Red mottled brown to grey very weathered MUDSTONE.		5.77		PID	5.90-6.00	4.2				6	
				PID	6.20-6.30	5.3					
Red to brown grey clayey SAND.		6.25									
Red mottled brown to grey weathered MUDSTONE.		6.43		PID	6.40-6.50	4.9					
				PID	6.90-7.00	5.4				7	
				PID	7.40-7.50	5.9					
Red brown mottled grey MUDSTONE recovered as fine to coarse subangular to subrounded fragments.		8.05		PID	7.90-8.00	6.3					
				PID	8.10-8.20	4.1					
Continued next sheet		8.35									

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:





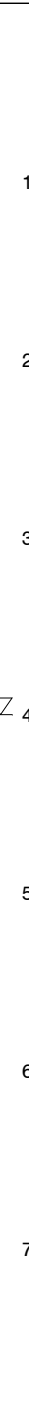




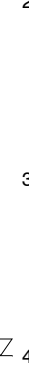




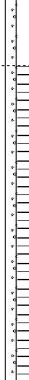



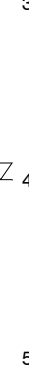






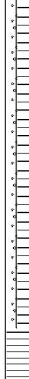






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Logged by:
T.Costema

Checked by:

Sheet 3 of 3

Key:				Remarks:
D	Disturbed Sample	PPT	Pocket Penetrometer Test	
B	Bulk Sample	PID	Photoionisation Detector	
U	Undisturbed Sample	SPT	Standard Penetration Test	
J	Jar Sample		(Uncorrected)	
▽	Water Strike			
▼	Standing Water Level			

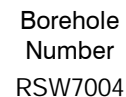
Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 19/04/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 3		
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level		
MADE GROUND: Concrete.		0.20		PID	0.20-0.30	<1						
MADE GROUND: Orange to brown slightly sandy fine to coarse angular to subrounded GRAVEL.		0.50		PID	0.70-0.80	<1						
MADE GROUND: Soft orange brown gravelly CLAY. Gravel is fine to coarse angular to subrounded fragments of sandstone with fragments of brick.				PID	1.20-1.30	1.4						
				PID	1.60-1.70	<1						
				PID	1.80-1.90	2.3						
MADE GROUND: Soft black to brown sandy CLAY with fragments of ash.		1.79		PID	2.00-2.10	<1						
		2.00		PID	2.10-2.20	<1						
MADE GROUND: Soft dark brown grey silty gravelly cobbly CLAY. Gravel is fine to coarse subangular to subrounded fragments of red brick and mixed lithologies. Cobbles are rounded fragments of sandstone.		2.15		PID	2.50-2.60	1.2						
				PID	2.90-3.00	1.2						
Soft grey brown silty cobbly gravelly CLAY. Gravel is fine to coarse angular to subrounded sandstone fragments. Cobbles are rounded fragments of sandstone.		2.55		PID	3.40-3.50	2.5						
		2.75		PID	3.70-3.80	2.8						
Grey to brown very sandy cobbly fine to coarse subangular to subrounded sandstone GRAVEL of mixed lithologies. Cobbles are rounded fragments of sandstone.		3.58		PID	4.00-4.50	3.6						
				PID								
Soft grey to brown gravelly CLAY. Gravel is fine to coarse subrounded to subangular fragments of mixed lithology.		4.00										
Grey brown clayey sandy fine to coarse rounded to subangular mixed lithology GRAVEL.				PID	5.00	6.5						
Dark brown clayey sandy cobbly fine to coarse rounded to subangular mixed lithology GRAVEL. Cobbles are subrounded to subangular.				PID	5.40-5.50	13.4						
				PID	5.90-6.00	14.3						
Red brown mottled grey weathered MUDSTONE.		5.73		PID	6.40-6.50	7.8						
				PID	6.90-7.00	6.8						
				PID	7.40-7.50	5.4						
Red brown MUDSTONE recovered as fine to coarse subrounded to subangular gravel sized fragments.		7.41										
		7.67										
Red brown mottled grey weathered MUDSTONE.				PID	8.10-8.20	10.4						
Red brown MUDSTONE recovered as fine to coarse		8.12		PID	8.40-8.50	25.6						
Continued next sheet		8.36										

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:





STRATA RECORD	IN SITU TESTS / SAMPLES	Sheet 2 of 3
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[illegible]

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 50 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 19/04/2012	Method: Rotary Sonic		Checked by:













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Key:			
D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test
J	Jar Sample		(Uncorrected)
	Water Strike		
	Standing Water Level		

Remarks:

Appendix E
LNAPL Extraction Well Borehole Logs

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 125 Filter Material: Gravel	Logged by: C.Nielsen
Project: 90936.41	Date: 28/03/2012	Method: Rotary sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.		0.19								
MADE GROUND: Medium to coarse GRAVEL.		0.45								
Soft red to brown sandy gravelly CLAY. Gravel is medium to coarse subangular to subrounded fragments of mixed lithologies.		0.85		PID	0.50-0.60	73.5				
Soft grey mottled yellow to brown slightly sandy CLAY.		1.25		PID	1.05-1.25	142				1
Red mottled yellow gravelly CLAY. Gravel is medium subrounded fragments of mixed lithologies.		1.55		PID	1.50-1.70	38.5				
Red to brown sandy clayey medium to cobble sized subrounded to subangular mixed lithology GRAVEL.		2.00		PID	1.80-2.00	14.5				2
Soft red mottled light grey to brown gravelly CLAY. Gravel is medium subangular to subrounded fragments of mixed lithologies.		2.60		PID	2.20-2.40	39.5				
Grey gravelly SAND. Gravel is fine to medium subangular to subrounded fragments of mixed lithologies.		3.00		PID	2.70-2.90	53.7				
Brown slightly sandy medium to coarse subrounded to subangular mixed lithology GRAVEL.				PID	3.00-3.20	184				3
				PID	3.70-3.90	115				4
				PID	4.20-4.40	307				
				PID	4.80-5.00	302				5
Brown slightly sandy slightly clayey medium to cobble sized subangular to subrounded mixed lithology GRAVEL.		5.00		PID	5.50-5.70	152				6
				PID	6.40-6.60	142				
Red/brown very weathered MUDSTONE.		6.90		PID	6.90-7.00	71.2				7
Red mottled grey very weathered MUDSTONE.		7.00		PID	7.20-7.40	76.2				
				PID	7.80-8.00	98.7				
End of Borehole at 8.00 m		8.00								

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: Odour noted at 2.6- 3.0 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 125 Filter Material: Gravel	Logged by: C.Nielsen
Project: 90936.41	Date: 29/03/2012	Method: Rotary sonic		Checked by:




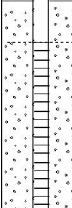

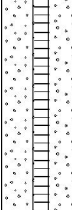

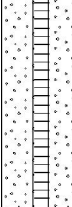

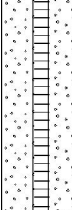

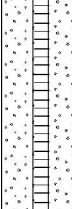

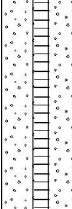

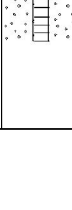

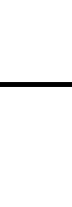





























STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20									
MADE GROUND: Medium to coarse GRAVEL.		0.25		PID	0.35-0.45	67.5					
MADE GROUND: Soft black to brown mottled red slightly sandy gravelly CLAY. Gravel is fine to medium subangular to subrounded fragments of red brick, concrete, and mixed lithologies.		0.70		PID	0.70-0.90	48.2					
		0.90		PID	0.90-1.00	46.5					
MADE GROUND: Black gravel sized fragments of bituminous material.		1.25		PID	1.25-1.35	57					
MADE GROUND: Black mottled red sandy gravelly CLAY. Gravel is fine to medium subangular of mixed lithologies and gravel sized fragments of bituminous material.		1.35		PID	1.60-1.70	10.6					
		MADE GROUND: Black slightly sandy gravelly CLAY. Gravel is fine to medium subangular fragments of mixed lithologies.	2.25								
MADE GROUND: Soft brown mottled red to grey gravelly CLAY. Gravel is medium to coarse fragments of clay pipe and mixed lithologies.					PID	2.40-2.60	7.8				
Soft brown mottled grey slightly sandy gravelly CLAY. Gravel is fine to medium subangular to subrounded fragments of mixed lithologies.		3.25		PID	3.05-3.25	27.5					
		Soft brown sandy gravelly CLAY. Gravel is medium to cobble sized subangular to subrounded fragments of mixed lithologies.			PID	3.50-3.70	18.7				
Brown slightly clayey sandy medium to coarse subangular to subrounded mixed lithology GRAVEL.	4.25			PID	4.25-5.25	62.6					
	Slightly clayey sandy fine to cobbled sized subangular to subrounded mixed lithology GRAVEL.	5.25									
				PID	5.70-5.90	68					
Red mottled grey very weathered MUDSTONE.		6.25		PID	6.30-6.50	47.7					
				PID	6.70-6.90	77					
				PID	7.40-7.60	19.2					
End of Borehole at 8.10 m		8.00		PID	8.05-8.25	63.2					

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▽	Standing Water Level		

Remarks: Odour noted at 0.2 - 5.25 m bgl. Strong odour noted at 5.25 - 6.25 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 125 Filter Material: Gravel	Logged by: C.Nielsen
Project: 90936.41	Date: 29/03/2012	Method: Rotary sonic		Checked by:











STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.		0.23								
MADE GROUND: Medium to coarse GRAVEL.		0.25		PID	0.30-0.50	1.8				
MADE GROUND: Soft sandy gravelly CLAY. Gravel is medium to coarse subrounded to subangular fragments of concrete and mixed lithologies.		0.55		PID	0.70-0.90	9.2				
MADE GROUND: Soft red to brown sandy CLAY.		0.90		PID	0.90-1.00	6				
MADE GROUND: Soft black slightly sandy CLAY.		1.00		PID	1.00-1.20	71.6				
MADE GROUND: Soft black to brown cobbly CLAY. Cobbles are subangular to subrounded fragments of concrete and sandstone.		1.20								1
				PID	1.70-1.90	73.5				
Soft red mottled grey CLAY.										
Soft red to brown mottled grey sandy CLAY.		2.00								2
Brown mottled yellow to grey gravelly sandy slightly cobbly CLAY. Gravel is medium to coarse subrounded fragments of mixed lithologies. Cobbles are subrounded fragments of sandstone.		2.40								
Soft brown sandy gravelly slightly cobbly CLAY. Gravel is fine to coarse subrounded fragments of mixed lithologies. Cobbles are subrounded fragments of sandstone.		3.00								3
										
Brown slightly clayey sandy fine to medium subangular to subrounded mixed lithology GRAVEL.		4.00								4
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: Odour noted at 2.4 - 5.0m bgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 125 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 16/04/2012	Method: Rotary sonic		Checked by:


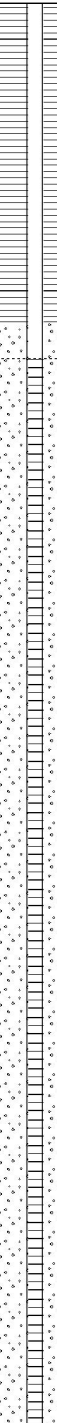

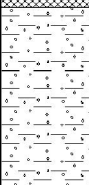
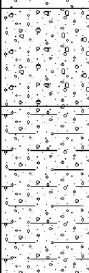
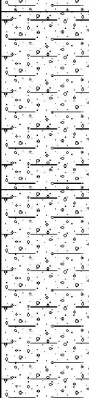
STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.00-0.20	1.2					
MADE GROUND: Soft black banded orange very sandy CLAY.				PID	0.40-0.50	<1					
MADE GROUND: Light brown grey gravelly SAND with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse fragments of sandstone.		0.90		PID	0.90-1.00	1.8				1	
MADE GROUND: Soft dark grey brown slightly sandy gravelly CLAY with rare subrounded sandstone cobbles. Gravel is angular to subrounded fine to coarse fragments of sandstone, ash, and mixed lithologies.		1.60		PID	1.40-1.50	<1					
Soft to firm light orange/brown mottled grey gravelly CLAY with occasional subrounded sandstone cobbles. Gravel is angular to subrounded fine to coarse fragments of mixed lithologies.		1.90		PID	1.90-2.00	1.6				2	
		2.35		PID	2.40-2.50	2.9					
Soft light yellow/brown mottled grey very sandy CLAY.		2.57		PID	2.60-2.70	2.8					
		2.75		PID	2.90-3.00	3.6				3	
Light yellow brown occasionally grey subrounded to subangular fine to coarse GRAVEL.		3.00		PID	3.20-3.30	4.3					
Soft to firm light yellow/brown sandy gravelly CLAY . Gravel is subrounded to subangular fine to coarse.		4.00		PID	4.00-5.00	7.8					
(Poor recovery ~ 35%). Recovered as stiff dark brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse fragments of mixed lithologies.											
Saturated sample. Recovered as dark brown grey sandy clayey subangular to subrounded GRAVEL.											
(Poor recovery ~ 20%). Saturated sample. Dark brown sandy slightly cobbly subangular to subrounded GRAVEL.		5.00								5	
Stiff to very stiff red brown mottled grey CLAY.		5.40		PID	5.40-5.50	15.9					
Red/brown mottled grey weathered MUDSTONE.		5.65									
				PID	5.90-6.00	17.8				6	
				PID	6.40-6.50	16					
				PID	6.90-7.00	21				7	
				PID	7.20-7.30	6.4					
				PID	7.40-7.50	6.5					
				PID	7.90-8.00	8.7					
End of Borehole at 8.00 m		8.00									

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 125 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 17/04/2012	Method: Rotary sonic		Checked by:












STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.00-0.10	4.3					
MADE GROUND: Dark orange/brown very sandy angular to subangular fine to coarse GRAVEL of hardcore.		0.51		PID	0.20-0.30	2.3					
MADE GROUND: Soft black mottled orange silty gravelly CLAY. Gravel is angular to subrounded coarse fragments of concrete and sandstone. Occasional rootlets.				PID	0.70-0.80	3.3					
				PID	1.10-1.18	2.9					
Soft to firm orange/brown mottled grey silty slightly gravelly CLAY. Occasional medium bands of sand. Gravel is subrounded to subangular fine to coarse fragments of sandstone.		1.41		PID	1.70-1.80	3.2				1	
				PID	2.20-2.30	3.3				2	
Dark brown/grey very sandy slightly cobbly rounded to subrounded fine to coarse GRAVEL of sandstone. Cobbles are rounded to subrounded coarse fragments of sandstone.		2.45		PID	2.70-2.80	4.2					
				PID	2.90-3.00	4.1				3	
(Poor recovery ~40%). Dark brown/grey slightly clayey sandy GRAVEL. Gravel is angular to subrounded fine to coarse fragments sandstone and mixed lithologies.		3.00		PID	3.20-3.30	4					
				PID	4.00-4.50	18.5				4	
(Poor recovery ~ 15%). Saturated sample. Recovered as dark brown grey clayey sandy angular to rounded fine to coarse GRAVEL of sandstone and mixed lithologies.		4.00		PID	5.00-5.50	9.2				5	
				PID	5.90-6.00	10.8				6	
(Poor recovery ~60%). Saturated sample. Recovered as dark brown /grey clayey sandy slightly cobbly rounded to subangular fine to coarse GRAVEL. Cobbles are rounded fragments of sandstone.		5.00		PID	6.40-6.50	221.7				7	
				PID	6.90-7.00	6.1					
Red/brown mottled grey weathered MUDSTONE.		6.20		PID	7.40-7.50	1.4					
				PID	7.90-8.00	4.3					
End of Borehole at 8.00 m		8.00									

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 125 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 17/04/2012	Method: Rotary sonic		Checked by:


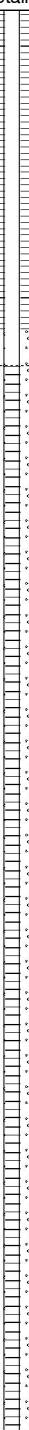
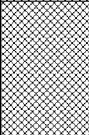
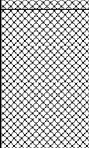





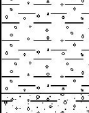

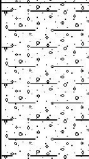

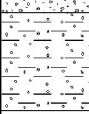





STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.00-0.20	1.8					
MADE GROUND: Soft light brown /orange occasionally black silty gravelly CLAY.				PID	1.20-1.30	2.8					
				PID	1.40-1.50	4.2					
MADE GROUND: Black sandy fine to coarse angular GRAVEL. Frequent ash.		1.41		PID	1.40-1.50	4.2					
		1.68		PID	1.70-1.80	2.8					
MADE GROUND: Soft dark grey/black/brown CLAY. Occasional rootlets.		1.92		PID	1.90-2.00	2.9					
Soft orange mottled grey silty CLAY. Rare gravel of angular fragments of sandstone.				PID	2.40-2.50	2.7					
Soft light grey mottled orange very sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		2.48									
		3.00		PID	2.90-3.00	3					
				PID	3.10-3.20	2.9					
(Poor recovery ~60%). Saturated sample from 3.1m bgl. Recovered as soft brown/grey gravelly cobbly CLAY. Cobbles are coarse rounded fragments of sandstone.		3.50									
				PID	3.60-3.70	2.3					
				PID	3.90-4.00	3.1					
Brown grey clayey sandy GRAVEL. Gravel is rounded to subangular fine to coarse fragments of mixed lithologies.		4.00									
				PID	4.40-4.50	23.1					
				PID	4.90-5.00	8					
(Poor recovery ~40%). Saturated sample. Recovered as dark brown grey sandy clayey GRAVEL. Gravel is rounded to subangular fine to coarse.		5.00									
				PID	5.50-5.60	6.1					
				PID	5.90-6.00	11.1					
Dark brown grey clayey sandy cobbly GRAVEL. Gravel is rounded to subrounded fine to coarse.		5.48									
				PID	6.40-6.50	12.4					
				PID	6.90-7.00	8.5					
Firm red/brown mottled grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse fragments of mixed lithologies.		5.72									
				PID	7.40-7.50	11.7					
				PID	7.90-8.00	5.5					
Red/brown mottled grey weathered MUDSTONE.											
End of Borehole at 8.00 m		8.00									

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 125 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 18/04/2012	Method: Rotary sonic		Checked by:




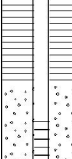
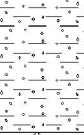
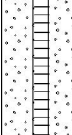
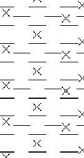
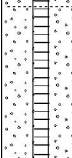


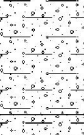
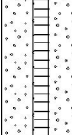
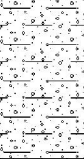
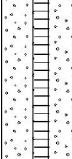










STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.00-1.00	3.9					
(Poor recovery ~10%). MADE GROUND: Recovered as light grey /brown very gravelly SAND with frequent cobbles of concrete.											
MADE GROUND: Soft to firm dark grey/orange silty gravelly CLAY. Gravel is angular to subrounded fine to coarse.		1.00								1	
MADE GROUND: Soft to firm dark grey/orange silty gravelly CLAY. Gravel is angular to subrounded fine to coarse.				PID	1.40-1.54	5.7					
MADE GROUND: Light brown slightly gravelly SAND. Gravel is angular to subrounded fine to medium.		1.84		PID	1.85	26.7					
MADE GROUND: Light brown slightly gravelly SAND. Gravel is angular to subrounded fine to medium.			1.91		PID	1.95	23.9				
MADE GROUND: Light brown slightly gravelly SAND. Gravel is angular to subrounded fine to medium.		2.00		PID	2.10-2.20	7.9				2	
MADE GROUND: Black very sandy GRAVEL. Gravel is angular to subangular fine to coarse fragments of clinker and ash.		2.34		PID	2.40-2.50	4					
MADE GROUND: Soft dark brown/grey silty CLAY with occasional cobbles of concrete and sandstone.				PID	2.90-3.00	5.4				3	
Soft orange mottled grey slightly silty gravelly slightly cobbly CLAY. Gravel is rounded to subangular fine to coarse fragments of sandstone. Cobbles are rounded to subrounded fragments of sandstone.		3.50		PID	3.40-3.50	6					
Dark brown/grey clayey sandy rounded to subrounded GRAVEL of sandstone fragments.				PID	3.70-3.80	10.9					
(Poor recovery ~60%). Saturated sample. Recovered as dark brown/grey clayey sandy slightly cobbly rounded to subangular fine to coarse GRAVEL. Cobbles are rounded fragments of sandstone.		4.00		PID	4.00-5.00	22.4				4	
		5.00		PID	5.00-5.50	16.4				5	
(Poor recovery ~35%). Saturated sample. Recovered as dark brown grey SAND and GRAVEL. Rare large rounded cobbles of sandstone.		5.95									
(Poor recovery ~65%). Stiff to very stiff red/brown gravelly CLAY. Gravel is subangular to rounded fine to medium fragments of mudstone.		6.50		PID	6.20-6.30	13.9				6	
Red/brown mottled grey weathered MUDSTONE.				PID	6.90-7.00	30.7					
				PID	7.40-7.50	28.8				7	
											
				PID	7.90-8.00	21.9					
End of Borehole at 8.00 m		8.00									

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 125 Filter Material: Gravel	Logged by: T.Costema
Project: 90936.41	Date: 18/04/2012	Method: Rotary sonic		Checked by:

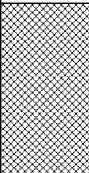


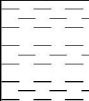
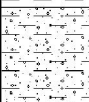
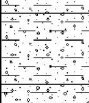
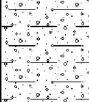
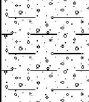
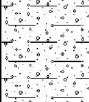
STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Grey GRAVEL. Gravel is fragments of concrete and hardcore.		0.30		PID	0.20-1.20	4.1					
(Poor recovery ~50%) Soft dark brown/orange very gravelly cobbly CLAY. Cobbles are coarse subrounded fragments of sandstone. Gravel is angular to subrounded fine to coarse fragments of sandstone.		1.20		PID	1.40-1.50	2.1				1	
Soft orange/brown mottled grey/black gravelly slightly cobbly CLAY. Gravel is subangular to subrounded fine to coarse fragments of sandstone. Cobbles are rounded fragments of sandstone.		1.95		PID	2.00-2.10	3.8				2	
Soft dark grey brown silty CLAY. Hydrocarbon odour noted.		2.90		PID	2.40-2.50	3.1					
Soft dark grey brown very sandy CLAY with rare rounded to subangular fine to coarse gravel of mixed lithologies.		3.00		PID	2.90-3.00	3.7				3	
(Poor recovery ~45%) Recovered as dark brown/grey clayey sandy slightly cobbly GRAVEL. Gravel is subangular to rounded fine to coarse fragments of sandstone. Cobbles are rounded fragments of sandstone.		4.00		PID	3.00-3.50	4.9					
(Poor recovery ~10%) Saturated sample. Recovered as dark brown/grey clayey sandy subrounded to subangular fine to coarse GRAVEL of mixed lithologies. Rare rounded sandstone cobble.		5.00		PID	4.00-4.50	5.3				4	
Dark brown/grey clayey sandy subrounded to angular fine to coarse slightly cobbly GRAVEL of mixed lithologies. Cobbles are rounded fragments of sandstone.		5.42		PID	5.10-5.20	6.7				5	
Red/brown mottled grey weathered MUDSTONE.				PID	5.50	7.4					
				PID	5.90-6.00	6.1				6	
				PID	6.10-6.20	8.1					
				PID	6.70-6.80	10.8				7	
				PID	6.90-7.00	8.1					
				PID	7.40-7.50	9.1					
				PID	7.90-8.00	9.5					
End of Borehole at 8.00 m		8.00									

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: Hydrocarbon odour noted between 1.95-2.9 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 125 Filter Material: Gravel	Logged by: C. Nielsen
Project: 90936.41	Date: 13/04/2012	Method: Rotary sonic		Checked by:


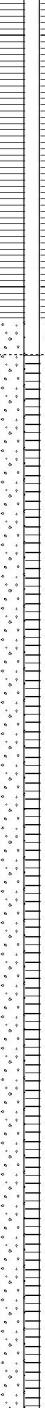





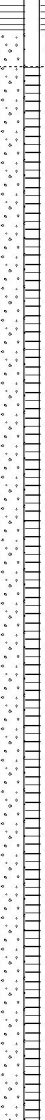














STRATA RECORD			IN SITU TESTS / SAMPLES						Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level
MADE GROUND: Concrete.				PID	0.10-1.00	2				
MADE GROUND: Grey/brown sandy gravelly CLAY. Gravel is fine to medium subangular to subrounded fragments of concrete. Organic odour noted.		1.00		PID	1.20-1.40	6.9				1
Soft red mottled grey CLAY. Occasional medium subrounded gravels of chert and mixed lithologies.		1.40		PID	1.80-2.00	7.5				
Soft red/brown mottled grey sandy slightly gravelly CLAY. Gravel is subrounded fine to medium fragments of mixed lithologies. Strong solvent odour noted.		2.00		PID	2.20-2.40	7.8				2
Soft brown mottled grey sandy gravelly CLAY. Gravel is subrounded fine to medium fragments of mixed lithologies. Strong solvent odour noted.		2.60		PID	2.80-3.00	12				
(Poor recovery ~ 30%). Saturated sample. Recovered as brown clayey sandy GRAVEL. Gravel is fine to medium rounded to subrounded fragments of mixed lithologies.		3.00		PID	3.00-4.00	3.7				3
				PID	4.00-5.00	23.7				4
Saturated sample. Brown clayey sandy slightly cobbly GRAVEL. Gravel is fine to medium subangular to subrounded fragments of mixed lithologies.		5.00		PID	5.00-6.00	26.6				5
Red mottled grey weak weathered MUDSTONE.		6.00		PID	6.00-6.20	6.8				6
				PID	6.80-7.00	6.7				
				PID	7.40-7.50	6.4				7
				PID	7.90-8.00	5.9				
End of Borehole at 8.00 m		8.00								

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: Organic odour noted between 1.0-1.4 mbgl. Strong solvent odour noted between 2.0-3.0 mbgl.

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting:	Well Diameter (mm): 125	Logged by: T. Costema
		Northing:	Filter Material: Gravel	
Project: 90936.41	Date: 05/04/2012	Method: Rotary sonic		Checked by:

















STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.		0.20		PID	0.00-0.10	1.9					
MADE GROUND: Dark brown/black slightly clayey GRAVEL. Gravel is fine to coarse subangular hardcore with frequent ash and concrete fragments.		0.80		PID	0.40-0.50	5.3					
MADE GROUND: Concrete.		1.00		PID	0.90-1.00	6.5				1	
MADE GROUND: Dark brown/grey clayey GRAVEL. Gravel is fine subangular.		1.15									
Soft to firm dark grey/brown occasionally red slightly silty CLAY.		1.70		PID	1.40-1.50	5.5					
Soft dark grey banded yellow very sandy CLAY with frequent gravels and cobbles. Cobbles are rounded to subrounded fragments of sandstone. Gravels are medium rounded fragments of sandstone.		2.00		PID	1.90-2.00	11.4				2	
Soft orange/brown slightly silty CLAY with rare gravels. Gravels are medium subrounded fragments of sandstone.		2.30		PID	2.40-2.50	12.3					
Dark grey very sandy GRAVEL. Gravels are fine to coarse subrounded to subangular fragments of sandstone.		2.60									
Firm to stiff dark brown/orange mottled grey slightly gravelly CLAY. Gravel is fine to medium subrounded to subangular fragments of sandstone.		2.80		PID	2.90-3.00	4.6				3	
Firm to stiff dark brown/grey very gravelly CLAY with frequent cobbles. Cobbles are fragments of sandstone. Gravels are fine to medium rounded to subrounded fragments of sandstone.		3.90		PID	3.40-3.50	4.7					
Soft dark brown/grey very sandy CLAY with frequent gravels. Gravels are fine to coarse rounded to subangular fragments of sandstone.		4.23		PID	3.90-4.00	4.5				4	
Dark brown/grey slightly clayey slightly sandy GRAVEL with rare cobbles. Cobbles are fragments of rounded sandstone. Gravel is fine to coarse rounded to subangular.		5.61		PID	4.40-4.50	7.1					
Stiff red/brown mottled grey slightly gravelly CLAY. Gravel is fine to coarse subrounded to subangular fragments of mudstone and sandstone.		5.84		PID	4.90-5.00	10.1				5	
Red/brown mottled grey weathered MUDSTONE.		6.05									
Red/brown MUDSTONE. Recovered as clayey and gravelly. Gravels are fine to medium subrounded to angular weathered fragments of mudstone.		6.25		PID	5.40-5.50	18.8					
Red/brown mottled grey weathered MUDSTONE.				PID	5.90-6.00	20				6	
				PID	6.40-6.50	8.4					
				PID	6.90-7.00	8.2				7	
				PID	7.40-7.50	8.1					
End of Borehole at 8.00 m		8.00		PID	7.90-8.00	15.3					

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks:

Site: Cwmbran	Location: Grange Road, Cwmbran, NP44 3XU	Ground Level (mAOD):	Hole Diameter (mm): 200	Scale 1:43
Client: Meritor HVBS (UK) Ltd		Easting: Northing:	Well Diameter (mm): 125 Filter Material: Gravel	Logged by: S.Barton
Project: 90936.41	Date: 24/04/2012	Method: Rotary Sonic		Checked by:

STRATA RECORD			IN SITU TESTS / SAMPLES							Sheet 1 of 1	
Description	Legend	Depth (m bgl)	Level (mAOD)	Sample Type	Sample Depth (m)	PID (ppm)	PPT (kPa)	SPT N Value	Well Details	Water Level	
MADE GROUND: Concrete.											
MADE GROUND: Silty sandy GRAVEL. Gravel is fragments of concrete.		0.30		PID	0.30-0.50	2.3					
		0.50		PID	0.50-1.00	2.9					
MADE GROUND: Black clayey gravelly SILT. Gravel is subangular, medium to coarse fragments of brick and concrete.		0.70									
		1.00		PID	1.00-1.50	3.1				1	
MADE GROUND: Soft brown/orange clayey SILT with occasional subangular medium fragments of clinker and brick.		1.30									
MADE GROUND: Clayey silty GRAVEL. Gravel is fragments of brick, clinker and concrete.		1.90		PID	1.90-2.00	4					
MADE GROUND: Soft grey/brown SILT with occasional gravels. Gravels are fragments of grey brick.		1.95		PID	2.00-2.20	5.3				2	
		2.00									
MADE GROUND: Red brick cobble.		2.40		PID	2.40-2.50	6.4					
Soft light brown SILT.		2.70		PID	2.70-2.90	5.5					
Soft grey/brown gravelly very clayey SILT. Gravel is subrounded to subangular medium to coarse fragments and rare cobbles of sandstone, mudstone and mixed lithologies.		3.00		PID	3.00-3.50	5.3				3	
Brown/orange very sandy gravelly SILT.											
Brown silty gravelly SAND. Sand is medium to coarse. Gravel is subrounded to subangular fragments of mixed lithologies.				PID	3.50-4.00	3.4					
				PID	4.00-4.50	3.8				4	
Very gravelly CLAY. Gravels are subrounded medium to coarse fragments and rare cobble of mixed lithologies. Large cobble present at 3.95m-4.0m bgl.		4.10									
Very clayey sandy GRAVEL. Gravel is subrounded to subangular medium to coarse fragments of mixed lithologies.				PID	4.50-5.00	14.6					
		5.00		PID	5.00-5.50	14.7				5	
Brown/black organic clayey sandy gravelly SILT. Gravel is subrounded to subangular fine to medium fragments of mixed lithologies.				PID	5.50-6.00	8.2					
		5.70									
Red clayey gravelly SAND. Sand is medium to coarse. Gravel is medium to coarse fragments and rare cobbles of mixed lithologies.		6.00		PID	6.00-6.50	3.1				6	
Red mottled grey/green weathered MUDSTONE.				PID	6.50-7.00	17.7					
				PID	7.00-7.50	5.7				7	
				PID	7.50-8.00	7.1					
End of Borehole at 8.00 m		8.00									

Key:

D	Disturbed Sample	PPT	Pocket Penetrometer Test
B	Bulk Sample	PID	Photoionisation Detector
U	Undisturbed Sample	SPT	Standard Penetration Test (Uncorrected)
J	Jar Sample		
▽	Water Strike		
▼	Standing Water Level		

Remarks: