

Gas Works Road, Reading

Environmental Investigation and Assessment

Final Factual Report

October 2010

National Grid Property Holdings Limited

Gas Works Road, Reading

Mentor No. 9147

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Notice

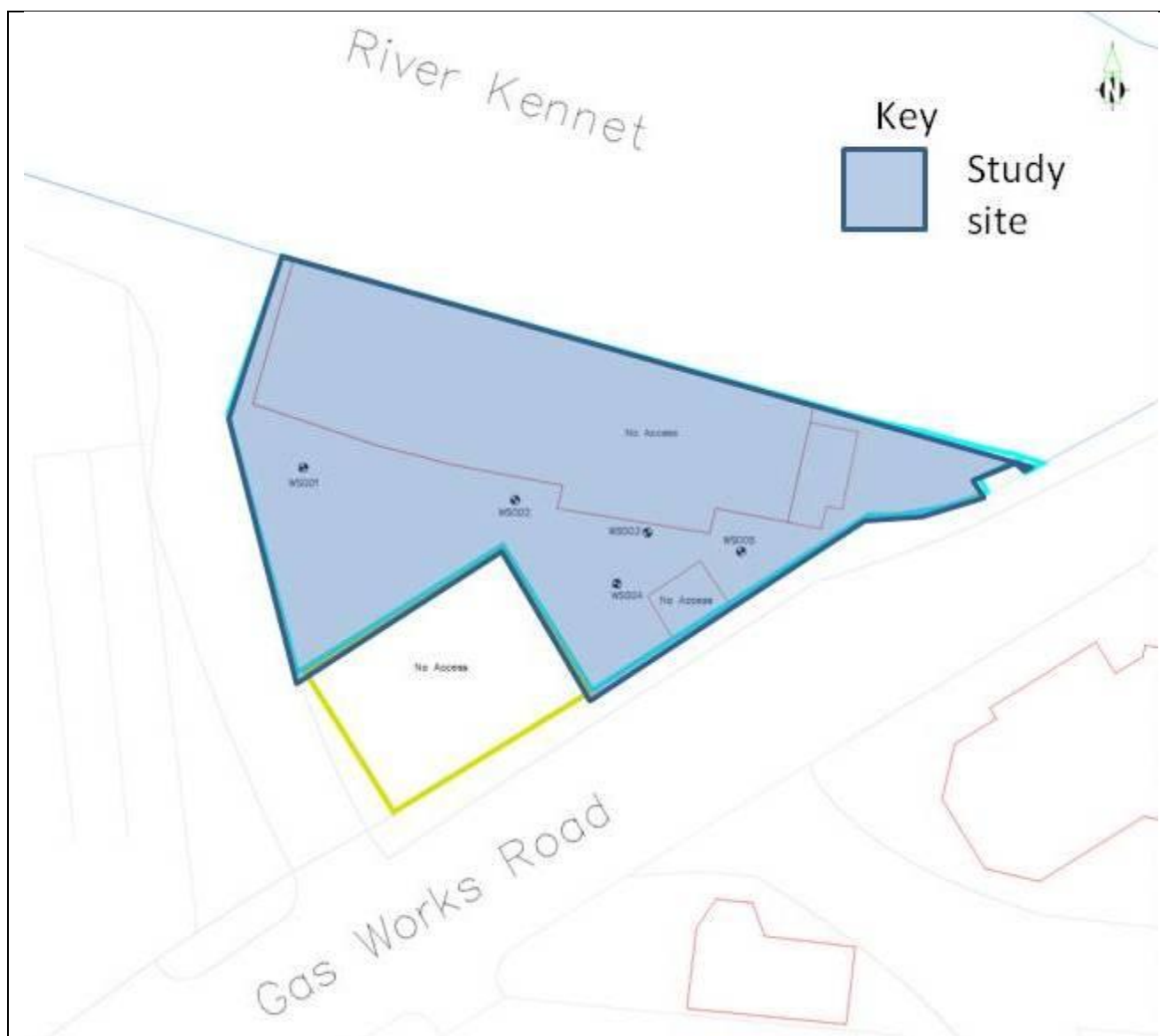
This report was produced by Atkins Limited (Atkins) for National Grid Property Holdings Limited (NGPH) for the specific purpose of assessing the land contamination risks at the former Social Club, Gas Works Road, Reading.

Atkins Limited

Document History

JOB NUMBER: 5027279			DOCUMENT REF: 5027279/GTG.20100598/Reading_2010/R002rev1			
0	Draft	L Allen	T Morgan	S McLaren M Worboys	M Worboys	Oct 2010
1	Final	L Allen	T Morgan	S McLaren M Worboys	M Worboys	Oct 2010
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date

Plan Design Enable



Site Address:	Gas Works Road, Reading	NGP Document Tracking Code	[LEAVE BLANK]
Report Title	Environmental Investigation and Assessment		
Report Type	Contamination	Retention Period	Indefinitely
Site Code	9147 (Mentor No.)	Author (Company)	Atkins Ltd
Report Date	September 2010	Factual/Interpretative	Factual
Draft/Final	Final	H&S File?	No
Work Stage*	Site Investigation and Generic Quantitative Risk Assessment		
Brief description of contents	Site investigation results and generic qualitative risk assessment for soils, groundwater and vapour.		
Access Permitted	NGPH LAND REGEN TEAM	NGPH Contact	Paul Mantell

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Glossary of Terms

Term	Meaning / Definition
AOD	above Ordnance Datum
ATD	Atomic Thermal Desorption
Atkins	Atkins Limited
bgl	below ground level
BTEX	benzene, toluene, ethylbenzene and xylene
CLEA	Contaminated Land Exposure Assessment
CoC	contaminant of concern
COMAH	Control of Major Accident Hazards
CSM	conceptual site model
CWG	criteria working group
DQRA	detailed quantitative risk assessment
DWS	Drinking Water Standard
GAC	generic assessment criteria
GQRA	generic quantitative risk assessment
ha	hectares
MDL	method detection limit
NGPH	National Grid Property Holdings Limited
NRA	National Rivers Authority
OS	Ordnance Survey
PAH	polycyclic aromatic hydrocarbon
PID	photo ionisation detector
PPL	potential pollutant linkage
ppm	parts per million
PRS	pressure reducing station
SSAC	site specific assessment criteria
SGV	Soil Guideline Value
SOM	soil organic matter
SR	Science Report
SSL	soil saturation limit
SSV	Soil Screening Value
TOC	total organic carbon
TPH	total petroleum hydrocarbon
UKRfC	United Kingdom Reference Concentration
VOC	volatile organic compound
WQS	water quality standard

1. Introduction

1.1 General

Atkins Limited (Atkins) was commissioned by National Grid Property Holdings Limited (NGPH) in June 2010 to undertake an environmental investigation and assessment of their former gasworks site located at Gas Works Road, Reading (herein referred to as 'the site'), shown in Figures 1 and 2.

The report presents the factual findings of the investigation and has been produced in accordance with Atkins' offer of services dated 3 June 2010 (Ref.i), guidance presented in Contaminated Land Report (CLR) 11 (Ref.ii) and NGPH guidance (Ref.iii).

This assessment should be read in conjunction with the following previous report:

- Atkins, March 2010, Factual Desk Study (Ref.iv).

1.2 Scope and Objectives

The primary objective of this assessment is to determine potential risks to human health and environmental receptors associated with historical contamination at the site, to inform NGPH's divestment of the site. It was agreed with the NGPH Land Regeneration Project Manager (LRPM) that the site will be assessed based on a commercial end use.

In summary, the scope of the investigation and assessment (detailed herein) comprised:

- intrusive phase investigation designed to obtain sufficient information to inform a quantitative risk assessment. The scope of this assessment took into account available information and findings from previous phases of work, where possible.

1.3 Limitations

Due to the poor structural condition of the Former Social Club building, no investigation locations were carried out within the structure, as initially proposed. Where possible vapour sampling wells have been located as close to the building as possible to provide a representative assessment of likely conditions beneath the building.

2. Site Status, History and Environmental Setting

2.1 Introduction

This section provides a summary of the site status, history and environmental setting. A more detailed description is presented within the Atkins 2010 desk study report (Ref.iv).

2.2 Site Status

2.2.1 Location

The site is located on Gas Works Road, Reading, RG1 3EQ and centred at National Grid Reference (NGR) 472340, 173465 (Ordnance Survey (OS) grid reference 72340E, 73465N).

The site is located approximately 500 m east of Reading town centre and approximately 600 m south east of Reading Rail Station and is bounded to the north-east by the River Kennet as shown on Figure 1. The site covers an area of approximately 0.09 hectares (ha) and encompasses the former Reading Social Club. A Southern Gas Network (SGN) governor house containing a pressure reducing station (PRS) is immediately adjacent. Both the NGP study site and adjacent SGN site are currently boarded up. A site layout plan detailing land ownership boundaries is present as Figure 2.

2.2.2 Site Layout and Access

The site currently comprises one two-storey brick building (the former Social Club) which runs approximately north west to south east along the north eastern boundary with the River Kennett. A single storey extension is located in the north-eastern part of the site. The remainder of the site is surfaced with hardstanding. The site boundary to the north-west and south is comprised of a 5feet high brick wall. The remaining boundaries of the site (west, east and part of the southern boundary) are comprised of the exterior walls of the buildings themselves.

Access to the site is via a 1.1 m wide gate on the southern boundary. There is no vehicle access to the site. Car parking on Gas Works Road immediately in front of the site is identified as for Visitor Parking for Blakes Quay (an adjacent development) only.

2.2.3 Ground Cover

Hardstanding covers approximately 50-60% of the ground surface and is in good condition, albeit with some overgrown areas. Buildings cover the remaining area of approximately 40-50%.

2.2.4 Surrounding Land Use

Land use in the immediate surrounding area comprises:

- West: SGN governor house adjacent;
- North west: footpath leading to river with Prudential office building beyond;
- East and north east: River Kennet and beyond a Toys R Us store, Bell and Dragon restaurant, riverside museum and flats;
- South: Gas Works Road and the residential developments of Blakes Quay and Harry Tee Court; and
- South west: SGN governor house containing a PRS which appears to be disused. However, a conversation with SGN during the site investigation suggested that the PRS remains in service. During the site walkover carried out by Atkins on 29th January 2010, the governor

house was identified by an inscription as being built in 1903 and was noted to contain extensive pipework both on the lower and upper levels, based on observations of the interior from outside the building.

No evidence of underground or above ground tanks was noted at the site during the site walkover and there were no visible signs of spillages or other indications of contamination at the surface. There was also no sign of settlement of the ground, however reinstated tarmacadam was noted which was in line with the remedial works detailed in the Waterman Environmental Consulting Engineers (Waterman) validation report (Ref. v), which was included as an appendix within the Atkins desk study (Ref. iv).

2.2.5 Services

Based on the available information issued from SGN there are no known live gas services on the site. The location of known gas services is presented in Figure 3a. Prior to commencement of works, underground services in the vicinity were traced and marked out by Amethyst Surveys Ltd, a specialist utilities clearance contractor. The survey findings are presented in Figure 3b and included:

- foul drainage;
- water supply;
- telecommunications cable;
- gas pipe; and
- electricity supply.

2.3 Site History

The on-site and adjacent site history, which is based on the historical maps included within the Envirocheck® report (Ref. vi) is presented in detail within the Atkins 2010 desk study report (Ref.iv), and is summarised in Tables 2.1 and 2.2 below.

The site was part of a larger gasworks which appears to have been present from 1879 until at least 1957. Review of the historical plans as well as the Waterman validation report (see Atkins desk study report) indicates that the wider gasworks were reduced in size by 1899. Figure 4 details the assumed changes of the gasworks boundary over time from 1879 in relation to the study sites location.

The study site appears to have had numerous structures present on-site during this period including an engine room, boiler room, pump room, possibly a purifying room and scrubbers until 1899. However, the majority of gas works structures were located to the south in the area now occupied by Blakes Quay.

There is some uncertainty over whether a retort house was also present on site. This is not shown on the maps included in the Envirocheck but is shown on a figure within the Waterman Report. Since the Waterman figure was used as a basis for Figure 4, this feature is included. From 1912 the Social Club building (on-site) and governor house (off-site) appear to have been present as observed in its current layout.

Table 2.1 - On-Site History

Date	Map	Scale	Details
1879	OS Historical Map and OS Historical Town Plan	1:2,500 1:500	The site forms part of an 'Experimental Gas Works' which covers an area between the Kennet & Avon Canal to the south and the River Kennet to the north. The following are present on site: • an engine room, boiler room, pump room, possibly a

Date	Map	Scale	Details
			purifying room and scrubbers in the northern part of the site; - two unidentified buildings present in the western part of the site; and - the site is divided in half by a linear feature running east to west (possible track or gas main) from a retort house in the west to the meter house in the east of the larger gasworks and leads to a building located to the east.
1899	OS Historical Map	1:2,500	The engine room, boiler room, pump room, possible purifying room in the north of the site now appear as one building. The two unidentified buildings in the west and the track/gas main crossing the site are no longer present.
1912	OS Historical Map	1:2,500	The building in the northern part of the site appears to have had an extension built on its western side.
1931-1934	OS Historical Map	1:2,500	There have been no significant changes to the site layout.
1957	OS Historical Map	1:1,250	The building in the southern part of the site remains as in previous years. The extension to the building in the northern part of the site is no longer present and the building is now a single unit covering largely the same footprint.
1957-1989	OS Historical Map	1:1,250	Slight changes have been made to the structure of the buildings, with very small extensions visible.
1966-1973	OS Historical Map	1:1,250	The map confirms the small changes noted on the 1957-1989 map.
1986-2006	OS Historical Map and OS Maps	1:1,250, 1:10,000	The site layout remains unchanged.

Table 2.2 - Off-Site History

Date	Map	Scale	Details
1879	OS Historical Map and OS Historical Town Plan	1:2,500, 1:500	The site is surrounded by the following industrial facilities and buildings: - a steam saw mill is present to the south with the Kennet and Avon Canal beyond (approx. 50 m). The majority of the area further to the south is comprised of terraced housing; - a biscuit factory is located approximately 50 m west with the county gaol located beyond; and - a sewage pumping station and other unknown (probably industrial) buildings are present on the eastern side of the River Kennet. The rest of the wider gasworks is located to the west, south and east of the site and include; - two retort houses to the west, with adjacent coal stores; - two unidentified buildings to the west; - a foreman's house and a governor house are present to the south; - a very small gasometer and a much larger gasometer are present to the south east; and

Date	Map	Scale	Details
			a meter house, purifying house and tar tank are present to the west.
1899	OS Historical Map	1:2,500	A new road (Gas Works Road) is now present. The road is shown to cross the Kennet and Avon Canal and runs along the southern edge of the site. The biscuit factory to the north and west of the site appears to have expanded eastwards, with the retort house and coal stores to the west now shown as part of the biscuit factory. The county gaol to the west has been renamed H.M. prison. The sewage pumping station located on the eastern side of the river appears to have expanded. A separate gasworks has been built to the east on Kenavon Drive and a retort house and associated buildings are visible.
1900	OS Historical Map	1:10,560	The retort house and a gasholder are visible at the Kenavon Drive gasworks to the east.
1901-1912	OS Historical Map	1:2,500	A new building (with a small unit attached) has been built adjacent to the southern part of the site. This is assumed to be the governor house which is still present on SGN land.
1913-1914	OS Historical Map	1:10,560	A second gasholder is visible at the Kenavon Drive gasworks to the east and a small amount of development of the biscuit factory to the north has occurred.
1931-1934	OS Historical Map	1:2,500	The biscuit factory to the north and the remainder of the larger gasworks to the south appear to have expanded slightly. Some further development of the western end of the Kenavon Drive gasworks to the north east is visible. A weir has been built in the River Kennet to the east.
1933	OS Historical Map	1:10,560	A third gasholder is visible at the Kenavon Drive gasworks and a number of further small structures have been added. A further small amount of development of the biscuit factory to the north has occurred.
1957	OS Historical Map	1:2,500	The wider gasworks located south of the study site has been replaced by a single large building of unknown use. The biscuit factory appears to have expanded further and replaced the saw mills to the south of the site. Further buildings have been added to the Kenavon Drive gasworks to the north east. A printing works has replaced residential housing approximately 100 m to the south west of the site.
1962	OS Historical Map	1:10,000	One of the gasholders at the Kenavon Drive gasworks has been replaced by a rectangular building.
1957-1989	OS Historical Map	1:1,250	Some of the biscuit factory buildings appear to have been removed and the railway tracks which connected the biscuit factory with the main Great Western Railway are no longer visible.
1966-1973	OS Historical Map	1:1,250	The footprint of the biscuit factory to the north and the building on the site of the larger gasworks to the south appear to have been reduced. Residential buildings located to the south of the Kennet & Avon Canal are no longer visible. The retort house of the Kenavon Drive gasworks is no longer visible although other structures still remain.
1986-1991	OS Historical Map (Southern part)	1:1,250	The printing works to the south west appear to have been replaced with a new building of unknown use. The footprint of the biscuit factory to the west appears to have been reduced. The configuration of the residential houses to the south of the Kennet and Avon Canal appears to have changed and some additional houses have been built.

Date	Map	Scale	Details
1993	OS Map	1:1,250	The wider gasworks building which was first identified in 1957 situated to the south east is no longer present on the map (currently Blakes Quay). Buildings on the site of the biscuit factory are no longer labelled. The biscuit factory buildings to the west appear to have been replaced by the offices which are currently present (as observed during the site walkover). Kenavon Drive has been built to the north east and the configuration of buildings on the gasworks site in this area has changed.
2006	OS Map	1:10,000	The gasworks site to the south remains empty. Forbury Retail Park is now labelled to the north west. A depot is identified on the site of the Kenavon Drive gasworks to the north east although a single gasholder remains.

From the information provided in the various available sources the following structures present on and off the site have been identified.

Table 2.3 - Known Structures On- and Off-Site

Building	On-site	Off-site	Date
Engine room, boiler room, pump room, purifying room	✓		1879-1899
Scrubbers	✓		1879-1899
Social Club	✓		1912/1957-Present
Governor house		✓	1912-Present
Retort Houses and coal stores	✓?	✓	1879-1899
Foreman's house		✓	1879-1957
Governor house		✓	1879-1957
Small gasometer		✓	1879-1957
Large gasometer		✓	1879-1957
Meter house		✓	1879-1957
Purifying house		✓	1879-1957
Tar tank		✓	1879-1957

Note: The off-site structures detailed only include the wider gasworks site which is in the immediate vicinity of the site.

The retort house for the works is not detailed on any of the OS town plans post 1899. However, it is considered unlikely that a gas works would have operated without an on-site retort house. As such, some uncertainty exists as to the presence and location of the retort houses on the wider gas works site. It is also noted that naphthalene washers have not been identified on the historical drawings and it is therefore not known if these were present at the site or, if present, where they were situated.

The approximate locations of former structures associated with the gasworks (as determined from historical plans within the Envirocheck and the Waterman validation report (Ref. v), rather than NGG Archive material) are presented on Figure 4.

2.4 Environmental Setting

2.4.1 Geology

Published Geology

Information from the Geological Survey of Great Britain map (Sheet 268) (Ref. vii) and National Rivers Authority (NRA) Solid Geology map of the Thames Region (Ref. viii) indicates that the site is located on Alluvium overlying Chalk (now classified as Seaford and Newhaven Chalk Formations). The hydrogeological map (Ref. ix) of this region indicates that the Alluvium consists mainly of clay and silt with local peat and tufa and is likely to be up to 3 m thick while the average thickness of Chalk is 75 m to 170 m.

The British Geological Survey (BGS) OpenGeoscience website (Ref. x) (1:50,000 scale) shows that Taplow Gravel is present approximately 50 m to the north (where it is underlain by Chalk) and approximately 300 m to the south of the site (where it is underlain by the Lambeth Group). Additionally Kempton Park Gravel is shown to be present approximately 75 m to the south of the site overlying Chalk. The website confirms that the site itself is underlain by Alluvium over Chalk and that Taplow Gravel and Kempton Park Gravel are absent along the river channel.

Previous Investigations

Of the previous site investigations recorded on the BGS GeoIndex online facility (Ref. xi), none were located on Gas Works Road. BGS borehole data was neither available for the site nor the adjacent developments at Blakes Quay or Harry Tee Court. Borehole records, primarily from the Blakes Quay development, included in the Waterman validation report (Ref. v), indicate a layer of Made Ground typically up to 4.0 m thick, over sandy clay and gravel (typically up to 3.0 m thick), assumed to be Alluvium, overlying Chalk (typically encountered at 6.0 – 8.0 m below ground level (bgl)).

Based on the information for the wider gasworks site, it appears that the top 2.5 m to 3.5 m of deposits consisted of fill/Made Ground. Below this, an approximately 1.5 m to 3 m thick layer of organic sandy clay was encountered. This layer is interpreted as being Alluvium and is sometimes overlain by a thin layer of silty clay. Underlying this is a layer of sand and gravel of variable thickness (approximately 1 m to 4 m thick). This is interpreted to be the part of the Alluvium rather than the Taplow Gravels or Kempton Park Gravels due to the limited thickness and also the description of the Alluvium provided by the BGS OpenGeoscience website which includes gravel. The Chalk was encountered beneath the Alluvium, although the total thickness was not proved.

Further details of the geology encountered are presented within the Atkins 2010 factual desk study report (Ref. iv).

2.5 Hydrogeology

In accordance with the aquifer classification system presented in the Water Framework Directive, as of April 2010, the Environment Agency website (Ref. xii) classifies the site to be underlain by the Alluvium Secondary A Aquifer (formerly Minor) which is defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. The Chalk is designated a Principal Aquifer (formerly Major) which represents deposits that have high intergranular and/or fracture permeability and therefore usually provide a high level of water storage.

The Taplow Gravels to the north west of the site are designated as a Secondary A Aquifer (formerly Minor). The Kempton Park Gravels and the underlying Lambeth Group to the south of the site are also designated a Secondary A Aquifer (formerly Minor).

Aquifer guidance is still being updated and does not include the classification of soils for potential leaching. According to the NRA Groundwater Vulnerability Sheet 39 (Ref. xiii) the soil beneath the site is classified as having high unclassified leaching potential. The soil classification is based on

the site being an urban area with relatively few observations and thus classified as high vulnerability until proven otherwise.

The Environment Agency 'What's in Your Back Yard' website (Ref. xii) shows the site to lie within a Total Catchment Protection Zone for an abstraction in the Whiteknights area of the town, approximately 2 km to the south east. The site is also shown to lie within the Thames Corridor catchment abstraction management strategy (CAMS) area.

According to hydrogeological data (Ref. ix) the potentiometric surface of the Chalk lies between +30 to +40 m relative to Ordnance Datum and the inferred groundwater flow based on this information for the general Reading area is to the east or south east. Based on the current OS map for the Reading and Windsor area (Ref. xiv) the site is at an approximate elevation of 40 m above Ordnance Datum (AOD) suggesting groundwater within the Chalk will be present at approximately (and possibly less than) 10 m bgl. Given the limited thickness of overlying strata this may mean that any groundwater at the site in the Alluvium is in continuity with the Chalk aquifer.

Based on the Envirocheck® report (Ref. vi), there is one licensed abstraction from groundwater (assumed to be from the Chalk) within 500 m of the site issued to MJ Gleeson Group for the former gasworks on Kenavon Drive. There is also one abstraction from groundwater within 1 km of the site, at the Royal Berkshire hospital to the south. However, the Total Catchment Protection Zone does not relate to any of these abstractions.

2.5.1 Hydrology

The nearest watercourses are the River Kennet (which flows in a south easterly direction along the site's north-eastern boundary) and a canalised section of the same river (called the Kennet and Avon Canal) which is located approximately 50 m to the south of the site and flows west to east. The River Thames, which also flows approximately from west to east, is located approximately 600 m to 700 m to the north east of the site.

The site is comprised of hard surfacing so infiltration is anticipated to be minimal. Rainwater is collected by guttering on the buildings which is assumed to feed into the site drainage. However, based on the site walkover it is unclear where this discharges.

Based on the information in the Envirocheck® report (Ref. vi), no discharge consents apply to the site itself although two have been issued for sites within 250 m. One consent is for Nabisco Group Ltd on Kings Road which was revoked in 1991 and the other is for British Gas at the main gasworks site off Kenavon Drive which lapsed in 1996.

There are no Local Authority Pollution Prevention and Control (PPC) permits issued within 250 m of the site. There have been 25 pollution incidents to controlled waters within 250 m of the site and 21 incidents within 250 m to 500 m of the site. However, a property responsible was not identified in any of these cases.

Further details can be found in the 2010 desk study report (Ref. iv).

2.5.2 Ecological Designations

Based on the information in the Envirocheck® report (Ref. vi), there are no statutory or non-statutory nature conservation designations on, or within 1 km, of the site and the site is not in an 'environmentally sensitive location'. Three nitrate vulnerable zones (designated in 2006 by Defra) have been identified located approximately 300 m to 550 m north of the site.

2.5.3 Archaeology

Review of the Envirocheck Report indicates that there are no archaeological concerns associated with the site.

2.5.4 Waste Facilities

Landfills and Waste Management Facilities

One historical landfill site has been identified approximately 500 m to the north east of the site. According to the Envirocheck® report the landfill received inert and industrial wastes. Further details can be found in the 2010 desk study report.

Control of Major Accident Hazards Sites

One Control of Major Accident Hazards (COMAH) site is located within 500 m of the site. This is identified as Transco Plc at Kenavon Drive, approximately 400 m to the north east and is assumed to be the former gasworks at this location. Further details can be found in the 2010 desk study report.

2.6 Previous Assessment Reports

A summary of the main previous reports produced for the site is provided below:

2.6.1 Waterman Factual Validation Report, April 2001

The Waterman Factual Validation Report (Ref. v) was supplied to Atkins by Reading Borough Council and is a validation report for remediation undertaken on the wider former gasworks site (including the study site and Blakes Quay development). The report states that the remediation work was undertaken on behalf of Lattice Property Holdings Limited on a statutory basis with the aim of removing any potential liability associated with contamination.

The development detailed in the validation report involved remediation work both at Blakes Quay and also on the study site. The works undertaken were based on the results of four previous phases of site investigation and supplementary work by Waterman. The report indicates that one area of contamination on the study site (Area A) and nine areas of contamination on the Blakes Quay site (Areas B to J) were identified.

The Waterman validation report states that an area referred to as 'Area A', located in the north western part of the study site to the west of the Social Club, was excavated between 11th and 28th February 2000.

2.6.2 Atkins Factual Desk Study, March 2010

Atkins was commissioned by NGP to undertake a desk study of the site in January 2010 (Ref. iv). The factual desk study included an initial assessment of environmental liabilities based on existing information sources, identification of potential ground conditions from historical and current operations, a preliminary conceptual site model (CSM) for the site identifying any potential PPLs and any associated environmental issues and recommendations with regards to investigating further any identified potential risks. Based on the identification of potential pollutant linkages at the site, a preliminary intrusive site investigation was recommended.

3. Intrusive Investigation

3.1 Introduction

The intrusive investigation was designed to provide the required information to inform a human health and controlled waters GQRA, based on the CSM outlined in Section 3.

The intrusive ground investigation was undertaken on 10th and 11th June 2010 with subsequent monitoring works undertaken between 17th and 24th June 2010. All works were undertaken under the full time supervision of a suitably qualified Atkins site engineer. Due to the (adjacent) presence of a SGN PRS, an engineer from SGN was also in attendance. All workers were subject to a full risk assessment and health and safety plan which was reviewed by Tim Knowles (safety advisor) prior to NGPH issuing a works commencement form approval.

3.2 Rationale

The scope of the intrusive phase investigation is summarised below:

- 5 No. window samples (two installed as vapour monitoring wells, the remaining three for groundwater monitoring);
- one round of groundwater level monitoring and sampling undertaken on 17th June 2010;
- two rounds of soil vapour sampling undertaken on 17th and 24th June 2010; and
- one surface water sampling round from the River Kennet (two samples, located up and downstream of the site were taken) undertaken on 24th June 2010.

Table 3.1 below, presents the rationale for each of the investigation locations. Figure 2 presents a site layout and investigation location plan.

Table 3.1 - Investigation Location Rationale

Location Number	Depth (m)	Rationale
WS01	5.0	Determine soil quality in area of previous remediation and enable groundwater monitoring well to be installed.
WS02	5.0	To determine soil conditions and enable a vapour monitoring point to be installed immediately adjacent to the onsite building.
WS03	2.0	To determine soil conditions and enable a vapour monitoring point to be installed immediately adjacent to the onsite building.
WS04	5.0	Determine soil quality in areas not previously remediated and enable groundwater monitoring well to be installed.
WS05	5.0	Determine soil quality in areas not previously remediated and enable groundwater monitoring well to be installed.

3.3 Methodology

3.3.1 Service clearance

Prior to commencement of works, underground services in the vicinity of all proposed intrusive investigation locations were traced and marked out by Amethyst Surveys Ltd, a specialist utilities clearance contractor. The service trace drawing provided by Amethyst is presented in Figure 3b. A cable avoidance tool (CAT) was also used at each location prior to drilling, to confirm the absence of underground services in shallow deposits, and all locations were hand dug to a depth of 1.2 m

bgl prior to drilling. It should also be noted that an SGN engineer was present for the works to ensure damage to SGN infrastructure was avoided.

3.3.2 Window Sample Boreholes and Hand Dug Pits

During the intrusive ground investigation, the following works were undertaken:

- a total of three window samples installed with 35 mm high density polyethylene (HDPE) monitoring wells to enable monitoring of groundwater. The response zone annulus between the well material and borehole was filled using 5 mm washed gravel. Bentonite pellets were used to create a seal over plain pipe sections; and
- a total of two window samples installed with narrow diameter vapour wells, in accordance with current good practice guidance, to allow vapour monitoring and sampling. These were installed for the purpose of assessing soil vapour concentrations. Each well comprised one response zone by installing narrow diameter (<5 mm) HDPE tube, air filter block and sampling tap. The annulus between the well material and borehole was filled using washed quartz sand around the filter block, and bentonite flakes to provide a seal over the plain pipe sections.

Due to various constraints associated with the structural stability of the building flooring and programme requirements investigation locations were not advanced within the building. The two vapour wells were therefore located immediately adjacent to the building.

During the progression of WS003 vapour well, a metal service pipe was encountered at 0.6 m (a possible domestic gas supply to the Social Club). Due to the limited space and the presence of an identified electrical service nearby, the location was hand augured beside the pipe and installed as a vapour well. All monitoring wells were surveyed to a known site datum and the difference in elevation between the site and the River Kennett was noted.

3.3.3 Sampling and Monitoring

Soil and Leachate Sampling

Appropriate soil sampling and logging (in line with current good practice) was undertaken at each investigation location. Sampling was informed by visual and olfactory indicators of contamination, and in-situ headspace screening of soils for volatile organic compounds (VOC) using a photo ionisation detector (PID). Sampling of soils was generally undertaken at the following rate:

- one sample within the top 1 m at each location;
- one sample at every metre thereafter to 3 m and at every change in strata; and
- below 3 m, only when contamination is suspected or at 2 m intervals.

A total of 10 soil samples were scheduled for the following analysis in line with the NGPH soils analytical suite:

- loss on ignition, moisture and stone content;
- inorganic parameters: pH, total organic carbon (TOC), total sulphate, sulphur, chloride, total cyanide, easily liberated cyanide, complex cyanide, thiocyanate, exchangeable ammonium, boron;
- metals: arsenic, chromium, copper, lead, selenium, zinc, cadmium, mercury and nickel;
- speciated phenols;
- speciated PAHs;
- benzene, toluene, ethylbenzene and xylene (BTEX); and
- TPH criteria working group (CWG).

Analysis was undertaken by Severn Trent Laboratories (STL), the results of which are presented in Appendix A.1.

In addition, two samples were scheduled for soil-derived leachate analysis (as per the above suite), with the results presented in Appendix A.2.

Groundwater and Surface Water Monitoring and Sampling

An initial groundwater sampling round of three window sample boreholes (WS001, WS004 and WS005) was undertaken on 17th June 2010. An additional duplicate sample was taken from WS001. The samples were taken using a low flow peristaltic pump.

In addition, two surface water samples were obtained on 24th June 2010 from the River Kennet, located up and downstream of the site. The upstream sample (SW1) was taken by directly sampling from the river using a suitable sample container. The downstream sample (SW2) was taken from the Gasworks Road bridge and involved dropping a sampling container suspended on string into the river. The groundwater and surface water samples were scheduled for analysis by STL for the following:

- inorganic parameters: pH, TOC, suspended solids, conductivity, total sulphate, chloride, total cyanide, easily liberated cyanide, complex cyanide, thiocyanate, total ammonium, boron;
- metals: arsenic, chromium, copper, iron, lead, selenium, zinc, cadmium, mercury and nickel;
- speciated phenols;
- speciated PAHs;
- BTEX;
- TPH CWG; and
- hardness.

Groundwater and surface water analysis results are presented in Appendix A.3

Soil Vapour Monitoring

Soil vapour samples were collected from the two locations installed with vapour wells on 17th and 24th June 2010. Prior to sampling the well volume was purged using a gas syringe. A low flow air sampling pump was used to draw a fixed volume through Atomic Thermal Desorption (ATD) tubes, pre-prepared by Chemex (a UKAS accredited laboratory) with 'Tenax' sorbant.

The tubes were submitted for thermal desorption-mass spectrometry analysis of the following:

- VOCs, Tentatively Identified Compounds (TICs) with results also banded and speciated to TPH CWG requirements.

Appendix A.4 presents the analytical results for the vapour samples.

Ground Gas Monitoring

The groundwater monitoring wells were installed as piezometers only, due to the encountered groundwater elevations and the fact that natural strata alone were screened to avoid cross contamination. Consequently no ground gas data could be collected from these wells. Two additional ground gas wells were subsequently installed on 24th September to 1.0 m within hand pits (HP1 and HP2) adjacent to existing wells (WS002 and WS005). Gas monitoring was undertaken on 6th October and the results are presented in Appendix D.

3.3.4 Quality Assurance/Quality Control (QA/QC)

Schewart Charts

Schewart charts from analysis undertaken during June have been requested from the laboratory. The Schewart charts were not available at the time of writing and will therefore be included in the final issue of this report.

Trip Blanks

A trip blank groundwater sample was taken and analysed at the same time as the groundwater analysis. This was provided by the laboratory to determine any potential cross contamination in the lab. The trip blank results do not display any significant discrepancies. The results for this trip blank are included in Appendix A.3.

A trip blank vapour sample was undertaken on 24th June and was analysed as a control sample to identify any cross-contamination with volatile constituents in the field. As such it was not subject to the sampling procedure and would not be expected to report measurable concentrations of contaminants. The results for this trip blank were all below the method detection limit (MDL), as would be expected, and are included in Appendix A.4.

Duplicate Analysis

A second (duplicate) groundwater sample was obtained from WS001 (labelled as WS001D within Appendix A.3). A comparison of the duplicate with the original sample showed that for the majority of compounds the difference in the concentrations was less than 10%. The remaining compounds were all within an order of magnitude. However, it is noted that there is poor agreement between the reported concentrations of naphthalene and consequently also Total PAH. The WS001D duplicate was found to have higher concentrations of some contaminants than the original sample (WS001). However, WS001D had only one additional exceedance of the screening criteria (for selenium) and therefore the differences are not considered to have significantly affected the assessment. The variation in the results is attributed to the inherent variability of sampling as the samples were not derived from a single original sample that was split, but were taken as two individual samples from the same location.

Two duplicate vapour samples were taken, one from WS003 on 17th June 2010 and one from WS002 on 24th June 2010. The results for WS003 and WS003D largely showed good agreement with detectable concentrations slightly lower in WS003D than WS003. Although there were some slight differences in the TPH results (with WS002 reporting higher concentrations), generally the concentrations were of the same order of magnitude and both samples recorded the same number of exceedances. The full analytical results for these samples are included in Appendix A.4.

3.4 Site Observations

3.4.1 Site Specific Geology

Appendix B provides the intrusive logs of Atkins 2010 site investigation, with a summary of the findings presented below. Appendix C presents a selection of photographs taken during the site works.

Made Ground

Made Ground was identified within all investigation locations to a maximum depth of 5.0 m bgl at WS001, however, the thickness of the Made Ground was not be proven at this location. The thickness of the Made Ground was proven in WS002, WS004 and WS005 at depths ranging between 2.0 m bgl and 2.5 m bgl. The composition of the Made Ground varied across the site; however, it was generally found to comprise loose dark brown/grey silty sandy gravel and soft grey, slightly sandy clay. Gravels comprise fine to coarse, subangular to angular flint, red brick, slate, sandstone, concrete, glass and slate.

Natural Strata

Alluvium was encountered at the site during the recent site investigation in three of the five locations (WS002, WS004 and WS005). The maximum proven depth of the Alluvium was 5.0 m bgl; the thickness was not proven in any of the three locations. The thickness encountered ranged from 1.0 m to 3.0 m. The composition of the Alluvium was typically soft to firm, dark grey clay with peat mottling and loose brown/grey silty sandy gravel. The gravels were fine to coarse, subrounded to angular flint.

3.4.2 Indications of Potential Contamination (Visual and Olfactory Observations)

A number of visual and olfactory indicators of potential contamination were identified during drilling. In addition, preliminary screening for VOC vapours present within the shallow unsaturated soils was undertaken using a photo-ionisation detector (PID) (MiniRAE 2000 VOC detector), capable of measuring VOC concentrations in parts per million (ppm). The results of the PID screening provide an initial indication of the presence of VOCs within the soil profile; however, this method is non-selective and does not identify specific compounds. PID screening helps to ascertain where volatile compounds may be expected to be identified during soil analysis.

Table 4.2 details visual and olfactory observations made on-site and the maximum positive PID readings identified at these depths.

Table 3.2 - Visual and Olfactory Observations and PID Readings

Location	Strata	Depth (m bgl)	Visual/Olfactory Observation	Max VOCs (ppm) and depth
WS001	MG	2.5-3.5*	Strong tarry hydrocarbon odour	2358 at 2.5 m
	MG	3.5-5.0*	Strong tarry hydrocarbon odour. Heavy black staining from 4.7 m.	268 at 3.5 m
WS002	MG	0.1-2.0*	Slight tarry hydrocarbon odour	755 at 2.0 m
	ALV	2.0-3.0*	Strong tarry hydrocarbon odour	1536 at 2.5 m
WS003	MG	0.1-2.0	Strong tarry hydrocarbon odour	1.7 at 0.5 m
WS004	MG	0.1-2.0*	Moderate tarry hydrocarbon odour	165 at 2.0 m
	ALV	2.0-2.5*	Strong tarry hydrocarbon odour	165 at 2.0 m
WS005	MG	0.1-2.5*	Strong tarry hydrocarbon odour and heavy staining	342 at 1.5 m

Notes:

1) MG – Made Ground and ALV – Alluvium

2) * Water was encountered between or above these depths and therefore the visual/olfactory indicators are for saturated soils.

3.4.3 Groundwater

Groundwater was encountered in all locations during the site investigation except for WS003, which was terminated at 2.0 m. Groundwater strikes in all other locations were between 1.0 m and 2.0 m. Groundwater monitoring was undertaken on 17th June 2010 at the three groundwater monitoring locations. WS001 was installed within the Made Ground (which was proven to be greater than 5.0 m depth at this location) and recorded a groundwater elevation at 1.255 m bgl. WS004 and WS005 were installed within the Alluvium and measured groundwater elevations at 1.285 and 1.905 m bgl, respectively. Appendix D presents the monitoring records.

The top of each monitoring location was surveyed relative to a site datum. This has allowed the groundwater depths in each monitoring locations to be compared. The adjusted groundwater levels show that groundwater was shallowest in WS004 (8.999 m above arbitrary site datum (ASD) and deepest in WS005 (8.421 m ASD). WS001 was found to have an adjusted

groundwater level of 8.745 m ASD. The results are presented in Appendix D. Based on these groundwater elevations it would appear that the flow direction is to the north and east (i.e. towards the river and also following the river flow downstream) and suggests that there is the potential for groundwater to be in continuity with the river.

Given that the resting water levels in all wells were found to be similar, and that these matched the depths of the water strikes it is considered that a continuous groundwater body is present and perched water is not present. In addition, since two wells are screened in the Alluvium and one in the Made Ground, and given the expected shallow depth of the Chalk, it is considered that groundwater within the Made Ground/Alluvium could be in continuity with the Chalk.

4. Analytical Results

Soil analytical results are included in Appendix A.1, leachate analytical results are included in Appendix A.2, groundwater and surface water analytical results are included in Appendix A.3 and vapour analytical results are included in Appendix A4. Ground gas monitoring results are included in Appendix D.

5. References

- i Atkins offer letter, dated 3rd June 2010, Ref. C001/Reading Fee Proposal/SM.
- ii Defra and Environment Agency (2004). Model Procedures for the Management of Land Contamination. Report CLR 11. Environment Agency R&D Dissemination Centre, WRc plc, Swindon.
- iii National Grid Property (2007). Guidance for Assessing and Managing Potential Contamination on National Grid Sites, Version 2.0, Appendix 7 – Site Investigation, May 2010.
- iv Atkins, May 2010, Gas Works Road, Reading - Factual Desk Study, ref. Gas Works Road, Reading Desk Study Factual Rev0.
- v Waterman Environmental Consulting Engineers, Factual Validation Report, April 2001, Ref No. R/EN997.HB.4.4.1.
- vi Landmark Information Group (January 2010), Envirocheck Report 29832263_1_1.
- vii Geological Survey of Great Britain (1946). Sheet 268, scale 1 inch:1 mile, Reading.
- viii National Rivers Authority (1991), Thames Region Solid Geology 1:250,000 geological map. Thames Water Cartographics, Reading.
- ix Institute of Geological Sciences (1978), Hydrogeological Map of the South West Chilterns and the Berkshire and Marlborough Downs, scale 1:100,000.
- x British Geological Survey, OpenGeoscience website, <http://www.bgs.ac.uk/opengeoscience/> accessed February 2010.
- xi British Geological Survey, GeoIndex website, <http://www.bgs.ac.uk/GeoIndex/index.htm> accessed February 2010.
- xii Environment Agency website – what's in your backyard?: <http://maps.environment-agency.gov.uk>.
- xiii National Rivers Authority (1994), Groundwater Vulnerability of West London map, Sheet 39, scale 1:100,000.
- xiv Ordnance Survey (1980), Reading, Windsor and Surrounding Area, Landranger 175, 1:50,000. Ordnance Survey, Southampton.

Figures



ATKINS
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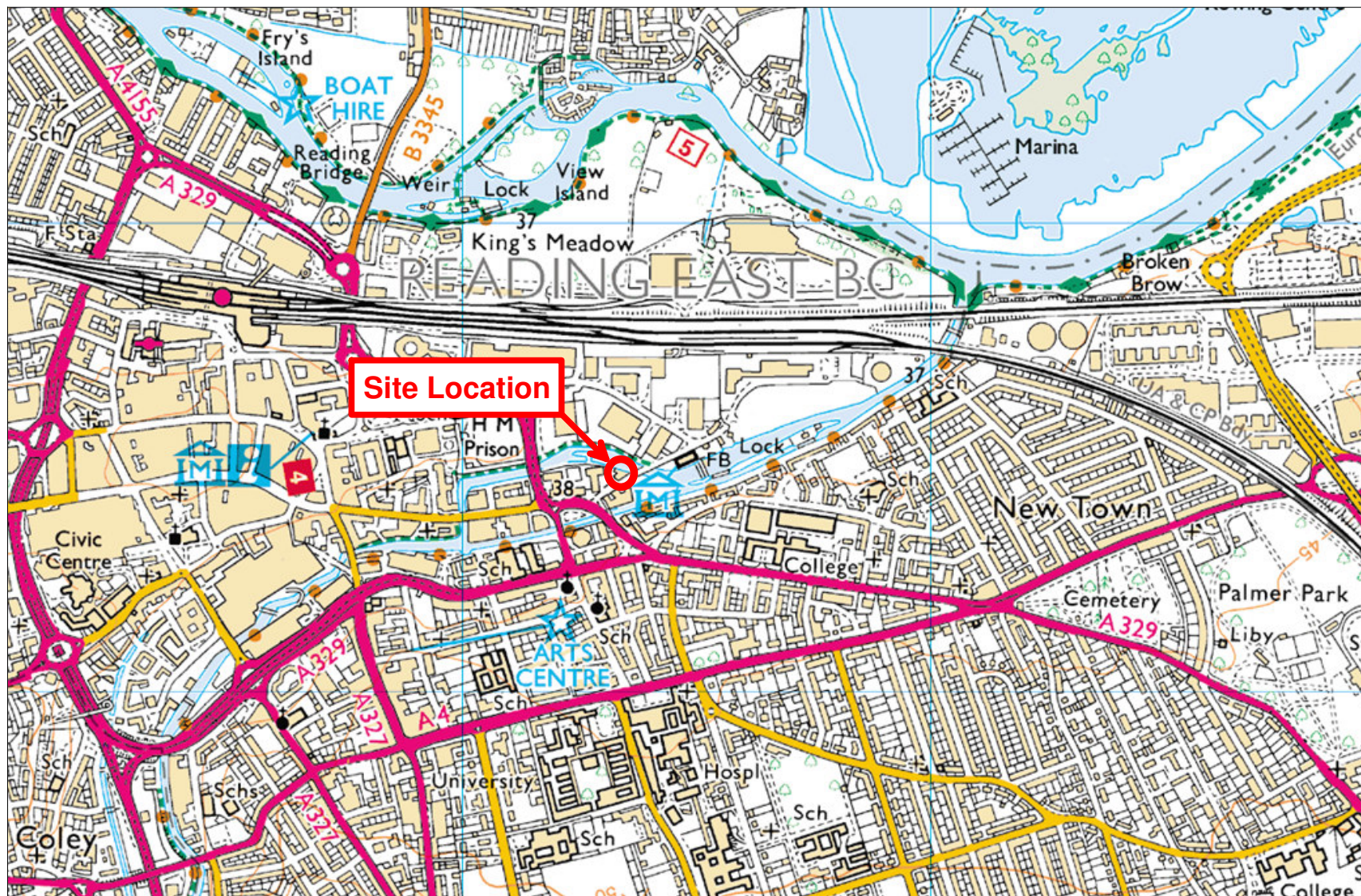
LEGEND

CLIENT
National Grid Property Limited

PROJECT
Reading Gas Works

TITLE
Site Location Plan

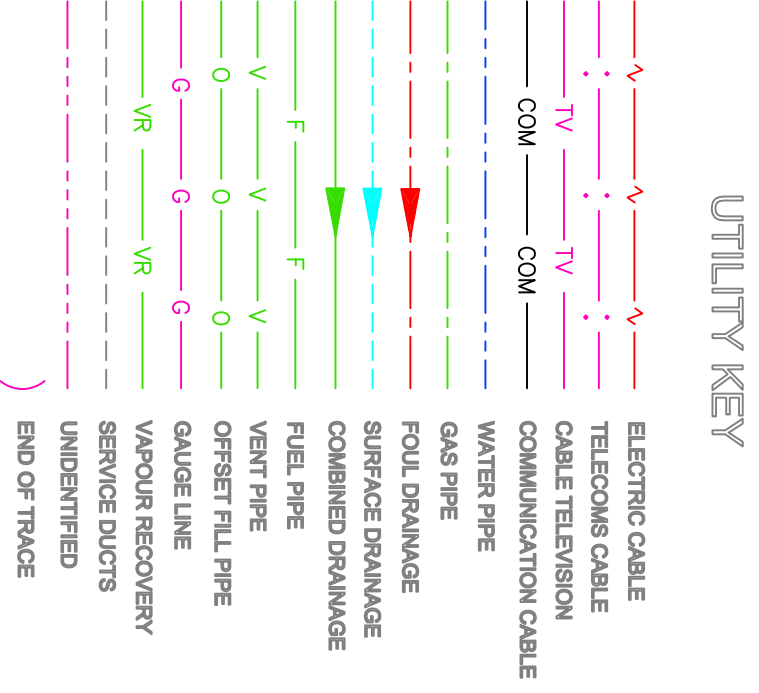
Figure 1



NOTES:

NO ACCESS TO BUILDINGS.

NO TRACE ON GAS POSSIBLY PVC.



ABBREVIATIONS

AR	ASSIGNED ROUTE	RE	PIPE RISER
BA	BACKLOG	RI	RODDING PIPE
BT	BURIED TIE	SA	SOFTWARY
CL	COVER LEVEL	SV	STOP VALVE
CR	CABLE RISER	SV	SOIL VENT PIPE
DN	DOWN PIPE	TR	TRUNK
ED	EDGE OF CURB	TR	TAKEN FROM RECORDS
EC	END OF PIPE	U	UNABLE TO LOCATE
EE	END OF TRACED	U	UNABLE TO SURVEY
ET	END OF HOPE	UTS	UNABLE TO SURVEY
FI	FIRE HYDRANT	VA	VENT PIPE
GA	GAS VALVE	VP	VENT PIPE
IC	INSPECTION CHAMBER	VP	VENT PIPE
IL	INVERT LEVEL	VR	VENT RECOVERY
LI	LINE	WM	WASH OUT VALVE
LP	LAMP POST		
LM	MANHOLE		
N	NOT LOCATED		
NVE	NO VISIBLE EXIT		
NS	NO SURFACE WATER SINKER		
PN	POLE WATER SINKER		
PS	PUMP		
PS	COMBINED WATER SEWER		

DISCLAIMER

[illegible]

CLIENT

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K
=
Z
S

THE

Figure 3b

AMETHYST
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www.amethystsurveys.com

LEGEND

- Site Area
- Extent of gas works based on Waterman remediation
- Historical extent of gas works in 1899 based on town plan
- Extent of remediation Area A based on Waterman validation report

STATUS

FOR INFORMATION ONLY

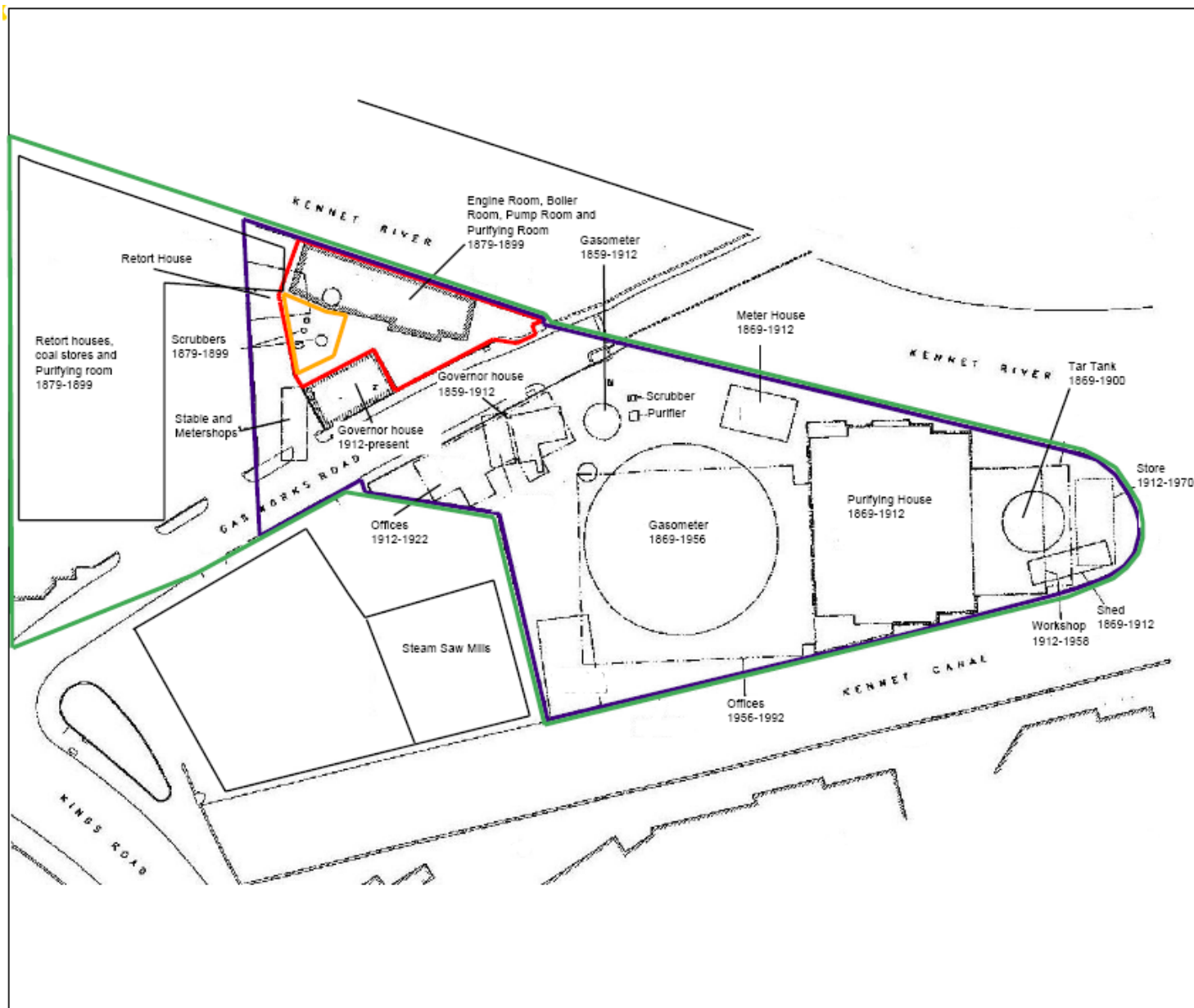
SCALE

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		CHECKED BY:	DOCUMENT PATH
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FIGURE

NO. 4



Appendix A

- Appendix A.1 Soil Laboratory Results
- Appendix A.2 Leachate Laboratory Results
- Appendix A.3 Groundwater and Surface Water Laboratory Results
- Appendix A.4 Vapour Laboratory Results

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS (SOIL)									
All analytical results reported as mg/kg ONLY									
Job Number: 701693									
Site Name: Gas Works Rd, Reading									
Date: 23/06/2010									
Laboratory: Severn Trent Laboratories									
Date Sampled	10/06/2010	10/06/2010	10/06/2010	10/06/2010	10/06/2010	10/06/2010	10/06/2010	10/06/2010	10/06/2010
Time Sampled									
Laboratory Sample Reference	11813886	11813887	11813888	11813889	11813890	11813891	11813892	11813893	11813894
Trial Pit/ Borehole No.	WS001 1.00m	WS002 0.50m	WS002 1.50m	WS003 0.50m	WS003 1.50m	WS004 0.50m	WS004 1.50m	WS005 0.50m	WS005 1.50m
Sampling Depth (m)									
Hardstanding at surface (Y/N)									
=====									
pH M	10.7	9.9	9.8	9.8	9.9	9.7	9.8	9.6	9.8
% Loss on Ignition M	3.8	12	11	10	9.1	9.1	9.6	12	12
% Moisture	45	49	37	35	39	41	47	38	37
% Stones	32	4.2	33	13	9	17	12	17	11
Phenol M	<0.11	0.16	<0.10	<0.12	<0.13	<0.12	<0.13	<0.12	<0.13
Catechol	<0.11	<0.14	<0.10	<0.12	<0.13	<0.12	<0.13	<0.12	<0.13
Resorcinol M	<0.11	<0.14	<0.10	<0.12	<0.13	<0.12	<0.13	<0.12	<0.13
Cresols M	<0.11	0.19	<0.10	<0.12	<0.13	<0.12	<0.13	<0.12	<0.13
Xylenols & Ethylphenols M	<0.11	0.89	0.23	<0.12	<0.13	<0.12	<0.13	0.19	0.18
Naphthols M	<0.11	<0.14	<0.10	<0.12	<0.13	<0.12	<0.13	<0.12	<0.13
Trimethylphenol M	<0.11	1.7	0.87	<0.12	<0.13	<0.12	<0.13	0.35	<0.13
Total Phenols M	<0.56	2.9	1.1	<0.61	<0.65	<0.62	<0.67	<0.61	<0.63
Naphthalene M	<1.0	24	18	15	11	10	9.6	12	18
Acenaphthylene M	<1.0	47	42	44	22	17	18	26	41
Acenaphthene M	<1.0	7.2	5.4	5.7	2.6	2.2	1.9	5.9	9.8
Fluorene M	<1.0	12	11	13	6.3	3.8	3.9	12	25
Phenanthrene M	1.2	170	130	260	130	63	77	170	290
Anthracene M	<1.0	80	66	84	42	25	27	58	89
Fluoranthene M	1.3	360	290	490	230	190	190	300	460
Pyrene M	1.2	290	230	390	190	170	170	250	380
Benzo(a)anthracene M	<1.0	160	130	180	100	91	88	120	170
Chrysene M	<1.0	140	110	150	89	79	77	110	150
Benzo(b)fluoranthene M	0.82	260	210	260	150	150	130	170	230
Benzo(k)fluoranthene M	<1.0	64	48	65	42	37	39	45	59
Benzo(a)pyrene M	<1.0	130	110	150	86	83	81	110	150
Indeno(1,2,3-cd)pyrene M	<1.0	110	94	120	71	75	68	92	120
Di-benz(a,h)anthracene M	<1.0	16	13	18	12	12	11	14	20
Benzo(g,h,i)perylene M	<1.0	94	80	100	61	65	58	79	110
Total PAH M	<10	2000	1600	2400	1300	1100	1100	1600	2300
Benzene M	<0.011	0.062	0.059	0.045	0.038	0.025	0.031	0.047	0.043
Toluene M	<0.011	0.052	0.05	0.026	0.023	0.014	0.019	0.029	0.036
Ethylbenzene M	<0.011	<0.014	<0.010	<0.012	<0.013	<0.012	<0.013	<0.012	<0.013
Xylene M	<0.011	0.043	0.028	<0.012	<0.013	<0.012	<0.013	0.013	0.014
Total Petroleum Hydrocarbons									
Easily-liberatable Cyanide M	<11	<14	<10	<12	<13	<12	<13	<12	<13
Complex Cyanide M	<11	25	<10	<12	<13	<12	<13	<12	<13
Total Cyanide M	<11	25	<10	<12	<13	<12	<13	<12	<13
Thiocyanate M	0.14	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Elemental Sulphur M	<100	530	430	500	280	290	260	320	430
Water Soluble Sulphate M	510	230	67	50	82	190	200	26	36
Water Soluble Chloride M	4.5	9	9.4	<2.5	3.7	17	18	<2.5	<2.5
Exchangeable Ammonium M	<150	<190	<140	<160	<170	<160	<180	<160	<160
Arsenic	12	30	27	21	18	28	27	22	24
Cadmium M	<0.50	0.96	0.87	0.71	<0.50	0.46	0.46	1	1.2
Chromium M	20	18	14	16	15	12	15	15	17
Lead M	68	1800	1100	810	420	720	430	760	980
Mercury M	<0.25	2	2.6	1.9	1	0.91	0.82	1.4	1.5
Selenium M	<0.30	0.51	0.49	0.37	<0.30	0.44	0.43	0.27	0.29
Copper M	27	83	74	72	48	70	67	83	89
Nickel M	14	40	30	25	25	20	25	27	29
Zinc M	95	240	190	230	120	180	150	380	490
Boron M	2.9	1.1	0.58	0.58	0.61	0.91	1.1	0.77	0.82
Analytes below to be determined if their presence on site is suspected, or if specically requested by consultant/contract									
Cobalt									
Vanadium									
Molybdenum									
Germanium									
Hex Cr									
>C6 to C8 Aliphatic M	<0.11	<0.14	<0.10	<0.12	<0.13	0.15	<0.13	<0.12	<0.13
>C8 to C10 Aliphatic M	<0.11	0.23	0.18	<0.12	<0.13	0.2	<0.13	<0.12	<0.13
>C10 to C12 Aliphatic M	<1.1	13	6.3	<1.2	<1.3	<1.2	<1.3	3.9	1.6
>C12 to C16 Aliphatic M	4.3	89	44	10	<1.3	5.5	8.1	43	21
>C16 to C21 Aliphatic M	17	140	73	48	9	16	13	96	66
>C21 to C40 Aliphatic M	100	320	190	240	25	57	31	400	210
Total Aliphatic	120	560	310	290	34	79	51	550	300
>C5 to C7 Aromatic M	<0.011	0.062	0.059	0.045	0.038	0.025	0.031	0.047	0.043
>C7 to C8 Aromatic M	<0.011	0.052	0.05	0.026	0.023	0.014	0.019	0.029	0.036
>C8 to C10 Aromatic M	<0.11	0.16	0.12	<0.12	<0.13	<0.12	<0.13	<0.12	<0.13
>C10 to C12 Aromatic M	<1.1	59	<1.0	29	<1.3	<1.2	6.1	<1.2	140
>C12 to C16 Aromatic M	11	360	210	220	40	32	34	290	500
>C16 to C21 Aromatic M	27	1900	1200	1700	330	300	260	2100	2400
>C21 to C40 Aromatic M	160	7800	5000	6300	1300	1700	1900	7700	7300
Total Aromatic	190	10000	6400	8300	1700	2000	2200	10000	10000
Total EPH Aliphatic/Aromatic	320	11000	6800	8700	1700	2100	2200	11000	11000
ICES7 PCB Congeners									

Key

I/S - Insufficient Sample
To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS (SOIL)									
All analytical results reported as mg/kg ONLY									
Job Number: 701693									
Site Name: Gas Works Rd, Reading									
Date: 23/06/2010									
Laboratory: Severn Trent Laboratories									
Date Sampled	10/06/2010	10/06/2010	10/06/2010	10/06/2010	10/06/2010	10/06/2010	10/06/2010	10/06/2010	10/06/2010
Time Sampled									
Laboratory Sample Reference	11813886	11813887	11813888	11813889	11813890	11813891	11813892	11813893	11813894
Trial Pit/ Borehole No.	WS001 1.00m	WS002 0.50m	WS002 1.50m	WS003 0.50m	WS003 1.50m	WS004 0.50m	WS004 1.50m	WS005 0.50m	WS005 1.50m
Sampling Depth (m)									
Hardstanding at surface (Y/N)									
=====									
PCB #28 M									
PCB #52 M									
PCB #101 M									
PCB #118 M									
PCB #138 M									
PCB #153 M									
PCB #180 M									
Asbestos									
ADDITIONAL ANALYTES									
Factor Dry NG Method	0.681977	0.957647	0.670339	0.870578	0.909832	0.829205	0.875673	0.832067	0.886374
Factor Wet NG Method	1.1273	1.44294	1.03898	1.21899	1.30168	1.24207	1.34661	1.21519	1.25173
Organic Matter (%)	1.1	11	9.4	10	7.2	6.1	6.9	12	14
TPH Chromatogram	SEE REPORT	SEE REPORT	SEE REPORT	SEE REPORT	SEE REPORT	SEE REPORT	SEE REPORT	SEE REPORT	SEE REPORT

Key

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS (SOIL)						
All analytical results reported as mg/kg ONLY						
Job Number: 701693						
Site Name: Gas Works Rd, Reading						
Date: 23/06/2010						
Laboratory: Severn Trent Laboratories						
Date Sampled	10/06/2010					
Time Sampled						
Laboratory Sample Reference	11813885					
Trial Pit/ Borehole No.	WS001 0.50m					
Sampling Depth (m)						
Hardstanding at surface (Y/N)						
=====						
pH M	11.1					
% Loss on Ignition M	5.4					
% Moisture	45					
% Stones	4.4					
Phenol M	<0.14					
Catechol	<0.14					
Resorcinol M	<0.14					
Cresols M	<0.14					
Xylenols & Ethylphenols M	<0.14					
Naphthols M	<0.14					
Trimethylphenol M	<0.14					
Total Phenols M	<0.70					
Naphthalene M	<1.0					
Acenaphthylene M	<1.0					
Acenaphthene M	<1.0					
Fluorene M	<1.0					
Phenanthrene M	3					
Anthracene M	1.1					
Fluoranthene M	6.8					
Pyrene M	5.7					
Benzo(a)anthracene M	4.5					
Chrysene M	6					
Benzo(b)fluoranthene M	8.1					
Benzo(k)fluoranthene M	2.8					
Benzo(a)pyrene M	4.3					
Indeno(1,2,3-cd)pyrene M	3.1					
Di-benz(a,h)anthracene M	<1.0					
Benzo(g,h,i)perylene M	2.8					
Total PAH M	48					
Benzene M	<0.014					
Toluene M	<0.014					
Ethylbenzene M	<0.014					
Xylene M	<0.014					
Total Petroleum Hydrocarbons						
Easily-liberatable Cyanide M	<14					
Complex Cyanide M	<14					
Total Cyanide M	<14					
Thiocyanate M	0.24					
Elemental Sulphur M	<100					
Water Soluble Sulphate M	800					
Water Soluble Chloride M	12					
Exchangeable Ammonium M	<180					
Arsenic	14					
Cadmium M	0.66					
Chromium M	24					
Lead M	130					
Mercury M	<0.25					
Selenium M	<0.30					
Copper M	29					
Nickel M	19					
Zinc M	170					
Boron M	3.5					
Analytes below to be determined if their presence on site is suspected, or if specically requested by consultant/contrac						
Cobalt						
Vanadium						
Molybdenum						
Germanium						
Hex Cr						
>C6 to C8 Aliphatic M	<0.14					
>C8 to C10 Aliphatic M	<0.14					
>C10 to C12 Aliphatic M	<1.4					
>C12 to C16 Aliphatic M	3.2					
>C16 to C21 Aliphatic M	21					
>C21 to C40 Aliphatic M	140					
Total Aliphatic	160					
>C5 to C7 Aromatic M	<0.014					
>C7 to C8 Aromatic M	<0.014					
>C8 to C10 Aromatic M	<0.14					
>C10 to C12 Aromatic M	<1.4					
>C12 to C16 Aromatic M	13					
>C16 to C21 Aromatic M	27					
>C21 to C40 Aromatic M	230					
Total Aromatic	270					
Total EPH Aliphatic/Aromatic	420					
ICES7 PCB Congeners						

Key

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS (SOIL)					
All analytical results reported as mg/kg ONLY					
Job Number: 701693					
Site Name: Gas Works Rd, Reading					
Date: 23/06/2010					
Laboratory: Severn Trent Laboratories					
Date Sampled	10/06/2010				
Time Sampled					
Laboratory Sample Reference	11813885				
Trial Pit/ Borehole No.	WS001 0.50m				
Sampling Depth (m)					
Hardstanding at surface (Y/N)					
=====					
PCB #28 M					
PCB #52 M					
PCB #101 M					
PCB #118 M					
PCB #138 M					
PCB #153 M					
PCB #180 M					
Asbestos					
ADDITIONAL ANALYTES					
Factor Dry NG Method	0.95595				
Factor Wet NG Method	1.40961				
Organic Matter (%)	1.7				
TPH Chromatogram	SEE REPORT				

Key

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS			
Job Number: 701693			
Site Name: Gas Works Rd, Reading			
Date: 23/06/2010			
Laboratory: Severn Trent Laboratories			
Laboratory	Trial Pit/	Sampling	
Sample Reference	Borehole No.	Depth (m)	MCERTS Visual Description
11813885	WS001 0.50m		brown,loam with some stone.
11813886	WS001 1.00m		brown,loam with some stone
11813887	WS002 0.50m		black,loam with some stone
11813888	WS002 1.50m		black,loam with some stone
11813889	WS003 0.50m		black,loam with some stone
11813890	WS003 1.50m		black,loam with some stone
11813891	WS004 0.50m		brown,loam with some stone
11813892	WS004 1.50m		black,loam with some stone
11813893	WS005 0.50m		black,loam with some stone
11813894	WS005 1.50m		black,loam with some stone

Key

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS		
Job Number: 701693		
Site Name: Gas Works Rd, Reading		
Date: 23/06/2010		
Laboratory: Severn Trent Laboratories		
Laboratory	Trial Pit/	
Sample Reference	Borehole No.	Comments

Key

I/S - Insufficient Sample
To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

Quality Control Results										
Client: Atkins Limited		Quality Control			Report				Page 1 of 1	
Job Location: Gas Works Rd, Reading										
Job Number: 701693										
Analytical Quality Control Sample										
Analyte	Units	Method	Batch	Line	Result	Upper 3s	Upper 2s	Mean	Lower 2s	Lower 3s
Cadmium as Cd, Total NG Method	mg/kg	LPH30	553439	21	2	2.23	2.08	1.78	1.48	1.33
Chromium as Cr, Total NG Test	mg/kg	LPH30	553439	21	26.901	36.5	34.3	29.9	25.5	23.3
Copper as Cu, Total NG Method	mg/kg	LPH30	553439	21	45.628	52.8	50.3	45.3	40.3	37.8
Lead as Pb, Total NG Method	mg/kg	LPH30	553439	21	454.591	518	493	443	393	368
Lead as Pb, Total NG Method	mg/kg	LPH30	553513	21	433.117	518	493	443	393	368
Mercury, Total as Hg	mg/kg	LPH30C	553454	21	2.026	2.924	2.658	2.126	1.594	1.328
Nickel as Ni, Total NG Method	mg/kg	LPH30	553439	21	79.265	90.8	87.8	81.8	75.8	72.8
Nickel as Ni, Total NG Method	mg/kg	LPH30	553513	21	75.117	90.8	87.8	81.8	75.8	72.8
Selenium, Total as Se	mg/kg	LPH30C	553454	21	2.285	3.467	3.248	2.81	2.372	2.153
Zinc as Zn, Total NG Method	mg/kg	LPH30	553439	21	107.262	137	131	119	107	101
Glossary:-										
Batch: - Laboratory analytical batch file number										
Line: - Sample position within analytical batch file										
Upper 3s & Lower 3s: - action limits set at ± 3 standard deviations either side of the mean										
Upper 2s & Lower 2s: - warning limits set at ± 2 standard deviations either side of the mean										
Assessment Criteria:-										
Action is taken if :-										
a) any single result exceeds the action limit i.e. ± 3 s line										
b) two consecutive results exceed the warning limit i.e. ± 2 s line, irrespective of the day analysed										
In both cases the affected results will be rejected										

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS	
Job Number: 701693	
Site Name: Gas Works Rd, Reading	
Date: 23/06/2010	
Laboratory: Severn Trent Laboratories	
Method	Description
16a	Thiocyanate is extracted from land samples by shaking with deionised water, followed by filtration. The resultant solution is gravity filtered and the measurement of the thiocyanate concentration on this extract is determined colorimetrically. This analysis is carried out on an air dried sample, ground to pass a 2mm sieve.
304	The method employs the use of Headspace extraction of the volatile hydrocarbons from as received soil samples using a commercial headspace sampler followed by gas chromatograph (GC). The effluent from the chromatographic column is split between a flame ionisation detector (FID) for the determination of total VPH and a mass selective detector (MSD) for the determination of aromatic volatile hydrocarbons. This analysis is carried out on an as received portion of sample.
317EPH	A known amount of soil, with a surrogate spike added, is shaken and sonicated in an extraction vial containing hexane and acetone. Water is added to the sample and then centrifuged; a test portion of the resulting hexane layer is transferred to a 2ml vial. The extract can then be analysed by FC-FID. Fractionation is done by solid phase extraction using an unmodified silica column. This analysis is carried out on an as received portion of sample.
322	Soil Sample is collected directly into a pre-weighed sample jar containing extraction solvent. On reaching the laboratory the sample is shaken for 30 minutes. A portion of sample is filtered using a gas tight syringe and a 0.45 micron syringe filter. This filtrate is analysed for phenols by reverse phase HPLC with electrochemical detection.
335	The chloride and sulphate content of land samples is extracted by shaking deionised water. The extract is then filtered through a 0.2µm pore size membrane filter before analysis by ion chromatography. This analysis is carried out on an air dried sample, ground to pass a 2mm sieve.
337	The loss on ignition of a pre-weighed portion of soil is determined by gravimetry after 4 hours at 450°C. This analysis is carried out on an air dried sample, ground to pass a 212µm sieve.
3A	Ammonia is extracted from land samples by shaking with aqueous potassium chloride solution. Magnesium oxide is added to an aliquot, which is then steam distilled into boric acid indicator solution. The ammonia content of this solution is then obtained titrimetrically against hydrochloric acid. This analysis is carried out on an as received portion of sample.
6	Boron is extracted from land samples using boiling deionised water followed by vacuum filtration. The measurement of boron in the filtrate is then determined directly by ICP-OES at the defined wavelength. This analysis is carried out on an air-dried sample, ground to pass a 2mm sieve. For analysis by National Grid - Version 1.0, the samples are ground to pass a 212µm sieve.
LPH 30/LPH30C	Based on Methods for the Collection & Analysis of Samples from National Grid Sites, Land Remediation Programme 2007. Version 1.0 Method 3.10
LPH14	Based on Methods for the Collection & Analysis of Samples from National Grid Sites, Land Remediation Programme 2007. Version 1.0 Method 3.11. This analysis is carried out on an as received portion of sample.
LPH30	Based on Methods for the Collection & Analysis of Samples from National Grid Sites, Land Remediation Programme 2007. Version 1.0 Method 3.10. This analysis is carried out on an air dried sample, ground to pass a 212µm sieve.
LPH307	Based on Methods for the Collection & Analysis of Samples from National Grid Sites, Land Remediation Programme 2007. Version 1.0 Method 3.5. This analysis is carried out on an air dried sample, ground to pass a 2mm sieve.
LPH30C	Based on Methods for the Collection & Analysis of Samples from National Grid Sites, Land Remediation Programme 2007. Version 1.0 Method 3.10. This analysis is carried out on an air dried sample, ground to pass a 212µm sieve.
LPH39	Based on Methods for the Collection & Analysis of Samples from National Grid Sites, Land Remediation Programme 2007. Version 1.0 Method 3.2. This analysis is carried out on an as received portion of sample.
LPH51	Based on Methods for the Collection & Analysis of Samples from National Grid Sites, Land Remediation Programme 2007. Version 1.0 Method 3.12. This analysis is carried out on an air dried sample, ground to pass a 2mm sieve.

Key

I/S - Insufficient Sample
 To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS (WATER)			
All analytical results reported as mg/l ONLY			
Job Number: 702593			
Site Name: Gas Works Road, Reading			
Date: 28/06/2010			
Laboratory: Severn Trent Laboratories			
Date Sampled			
Time Sampled			
Laboratory Sample Reference	11820636	11820637	
Trial Pit/ Borehole No.	WS001 @ 0.50m	WS004 @ 0.50m	
Sampling Depth (m)	0.5	0.5	
=====			
pH	9.8	9	
TOC	1.6	1.52	
Suspended Solids			
Conductivity(us/cm)	150	78	
Phenol	<0.0005	<0.0005	
Catechol	<0.0005	<0.0005	
Resorcinol	<0.0005	<0.0005	
Cresols	<0.0005	<0.0005	
Xylenols & Ethylphenols	<0.0005	<0.0005	
Naphthols	<0.0005	<0.0005	
Trimethylphenol	<0.0005	<0.0005	
Total Phenols	<0.0025	<0.0025	
Naphthalene	0.000275	0.000294	
Acenaphthylene	<0.00001	<0.00001	
Acenaphthene	0.000012	<0.00001	
Fluorene	<0.00001	<0.00001	
Phenanthrene	<0.00001	<0.00001	
Anthracene	<0.00001	0.000016	
Fluoranthene	<0.00001	0.000023	
Pyrene	<0.00001	0.000026	
Benzo(a)anthracene	<0.00001	0.000015	
Chrysene	<0.00001	0.000015	
Benzo(b)fluoranthene	<0.00001	0.000018	
Benzo(k)fluoranthene	<0.00001	<0.00001	
Benzo(a)pyrene	<0.00001	0.000017	
Indeno(1,2,3-cd)pyrene	<0.00001	0.000019	
Di-benz(a,h)anthracene	<0.00001	<0.00001	
Benzo(g,h,i)perylene	<0.00001	0.000024	
Total PAH	0.000287	0.000466	
Benzene	<0.001	<0.001	
Toluene	<0.001	<0.001	
Ethylbenzene	<0.001	<0.001	
Xylene	<0.001	<0.001	
Total Petroleum Hydrocarbons			
Easily-liberatable Cyanide	1	1	
Complex Cyanide	1	1	
Total Cyanide	2	2	
Thiocyanate	<0.1	<0.1	
Elemental Sulphur			
Sulphate	17.3	11.1	
Sulphide			
Chloride	4.84	5.75	
Total Ammonium	<0.50	<0.50	
Arsenic	0.0012	0.0091	
Cadmium	<0.0006	0.001	
Chromium	0.0064	0.0011	
Lead	0.0077	0.0133	
Mercury	<0.0001	<0.0001	
Selenium	<0.0016	<0.0016	
Copper	0.007	0.01	
Nickel	<0.002	<0.002	
Zinc	<0.003	0.005	
Iron	<0.19	<0.19	
Analytes below to be determined if their presence is suspected on site, or if specifically requested by consultant/con			
Cobalt			
Vanadium			
Molybdenum			
Germanium			
Hex Cr			
>C6 to C8 Aliphatic	<0.01	<0.01	
>C8 to C10 Aliphatic	<0.01	<0.01	
>C10 to C12 Aliphatic	<0.01	<0.01	
>C12 to C16 Aliphatic	<0.01	<0.01	
>C16 to C21 Aliphatic	<0.01	<0.01	
>C21 TO C40 Aliphatic	<0.01	<0.01	
Total Aliphatic	<0.01	<0.01	
>C5 to C7 Aromatic	<0.005	<0.005	
>C7 to C8 Aromatic	<0.005	<0.005	
>C8 to C10 Aromatic	<0.01	<0.01	
>C10 to C12 Aromatic	<0.01	<0.01	
>C12 to C16 Aromatic	<0.01	<0.01	
>C16 to C21 Aromatic	<0.01	<0.01	
>C21 TO C40 Aromatic	<0.01	<0.01	
Total Aromatic	<0.01	<0.01	
Total EPH aliphatic/Aromatic			
ICES7 PCB Congeners			

Key

I/S - Insufficient Sample
 To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS (WATER)					
All analytical results reported as mg/l ONLY					
Job Number: 702593					
Site Name: Gas Works Road, Reading					
Date: 28/06/2010					
Laboratory: Severn Trent Laboratories					
Date Sampled					
Time Sampled					
Laboratory Sample Reference		11820636	11820637		
Trial Pit/ Borehole No.		WS001 @ 0.50m	WS004 @ 0.50m		
Sampling Depth (m)		0.5	0.5		
=====					
PCB 28					
PCB 52					
PCB 101					
PCB 118					
PCB 138					
PCB 153					
PCB 180					
ADDITIONAL ANALYTES					
Cyanide (Total)					
Phosphate as P, Soluble					
Pres Enterococcus faecalis (cfu/ml)					
Presumptive E.coli (cfu/ml)					
NRA Leachate					
		Y	Y		
Sulphide as S		<0.029	<0.029		

Key

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NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS		
Job Number: 702593		
Site Name: Gas Works Road, Reading		
Date: 28/06/2010		
Laboratory: Severn Trent Laboratories		
Laboratory	Trial Pit/	
Sample Reference	Borehole No.	Comments

Key

I/S - Insufficient Sample
To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS	
Job Number: 702593	
Site Name: Gas Works Road, Reading	
Date: 28/06/2010	
Laboratory: Severn Trent Laboratories	
Method	Description

Key

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS (WATER)					
All analytical results reported as mg/l ONLY					
Job Number: 702898					
Site Name: Gas Works Rd Reading					
Date: 06/07/2010					
Laboratory: Severn Trent Laboratories					
Date Sampled	17/06/2010	17/06/2010	17/06/2010	17/06/2010	17/06/2010
Time Sampled					
Laboratory Sample Reference	11823144	11823145	11823146	11823147	11823148
Trial Pit/ Borehole No.	WS001	WS001D	WS004	WS005	Trip Blank
Sampling Depth (m)					
=====					
pH	7.9	7.9	7.3	7.2	6
TOC	15.8	15.5	8.15	7.82	<0.3
Suspended Solids	11	10	21	25	1
Conductivity(us/cm)	900	900	540	1000	6.9
Phenol	0.15	0.15	0.0059	<0.0005	<0.0005
Catechol	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Resorcinol	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cresols	0.32	0.34	<0.0005	<0.0005	<0.0005
Xylenols & Ethylphenols	0.33	0.34	<0.0005	<0.0005	<0.0005
Naphthols	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Trimethylphenol	0.072	0.059	<0.0005	<0.0005	<0.0005
Total Phenols	0.87	0.89	0.0059	<0.0025	<0.0025
Naphthalene	0.251	1.14	4.89	0.00177	0.000041
Acenaphthylene	0.0736	0.0629	0.00548	0.000403	<0.00001
Acenaphthene	0.0119	0.012	0.0144	0.0121	<0.00001
Fluorene	0.0325	0.031	0.00757	0.000276	<0.00001
Phenanthrene	0.0273	0.028	0.0174	0.000136	<0.00001
Anthracene	0.00545	0.0048	0.00408	0.000046	<0.00001
Fluoranthene	0.00181	0.00181	0.0112	0.000038	<0.00001
Pyrene	0.00108	0.00109	0.00852	0.000026	<0.00001
Benzo(a)anthracene	0.000028	0.000034	0.00345	<0.00002	<0.00001
Chrysene	0.000017	0.000016	0.00229	<0.00002	<0.00001
Benzo(b)fluoranthene	0.000024	0.00002	0.00228	<0.00002	<0.00001
Benzo(k)fluoranthene	<0.00001	<0.00001	0.000895	<0.00002	<0.00001
Benzo(a)pyrene	0.000022	0.000023	0.00238	<0.00002	<0.00001
Indeno(1,2,3-cd)pyrene	<0.00001	0.000014	0.00126	<0.00002	<0.00001
Di-benz(a,h)anthracene	<0.00001	<0.00001	0.000255	<0.00002	<0.00001
Benzo(g,h,i)perylene	<0.00001	<0.00001	0.00137	<0.00002	<0.00001
Total PAH	0.405	1.28	4.97	0.0148	0.000041
Benzene	0.844	0.824	0.423	0.0122	<0.001
Toluene	0.653	0.647	<0.02	0.0059	<0.001
Ethylbenzene	0.0848	0.0866	0.31	0.0023	<0.001
Xylene	0.661	0.67	0.144	0.0035	<0.001
Total Petroleum Hydrocarbons					
Easily-liberatable Cyanide	2	3	6	2	1
Complex Cyanide	2	4	6	2	1
Total Cyanide	4	7	12	4	2
Thiocyanate	<0.1	<0.1	<0.1	<0.1	<0.1
Elemental Sulphur					
Sulphate	224	220	10.6	31.7	<0.20
Sulphide					
Chloride	46.3	45.5	15.3	75.7	1.01
Total Ammonium	6.8	7.2	2.7	12	<0.50
Arsenic	0.0066	0.007	0.0048	0.0011	<0.0008
Cadmium	0.002	0.0011	<0.0006	0.0012	<0.0006
Chromium	0.0039	0.002	<0.0007	0.0014	<0.0007
Lead	0.023	0.016	0.0049	0.0122	0.0042
Mercury	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium	0.0099	0.0104	0.0022	0.0026	<0.0016
Copper	0.009	0.006	<0.001	<0.001	<0.001
Nickel	0.0067	0.0036	0.0014	0.0011	<0.002
Zinc	<0.003	<0.003	<0.003	<0.003	0.008
Iron	<0.19	<0.19	<0.19	<0.19	<0.19
Analytes below to be determined if their presence is suspected on site, or if specifically requested by consultant/contractor					
Cobalt					
Vanadium					
Molybdenum					
Germanium					
Hex Cr					
>C6 to C8 Aliphatic	<0.01	<0.01	<0.1	<0.02	
>C8 to C10 Aliphatic	<0.01	<0.01	<0.1	<0.02	
>C10 to C12 Aliphatic	<0.01	<0.01	0.528	<0.02	
>C12 to C16 Aliphatic	<0.01	<0.01	6.62	<0.02	
>C16 to C21 Aliphatic	<0.01	<0.01	2.71	<0.02	
>C21 TO C40 Aliphatic	<0.01	<0.01	0.33	<0.02	
Total Aliphatic	<0.01	<0.01	10.2	<0.02	
>C5 to C7 Aromatic	0.64	0.591	0.382	<0.01	
>C7 to C8 Aromatic	0.483	0.409	<0.05	<0.01	
>C8 to C10 Aromatic	0.68	0.616	1.04	<0.02	
>C10 to C12 Aromatic	1.33	2.34	7.85	0.077	
>C12 to C16 Aromatic	0.407	0.435	2.7	0.023	
>C16 to C21 Aromatic	0.085	0.05	1.05	<0.02	
>C21 TO C40 Aromatic	<0.01	<0.01	0.232	<0.02	
Total Aromatic	3.62	4.44	13.3	0.1	
Total EPH aliphatic/Aromatic					
ICES7 PCB Congeners					

Key

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS (WATER)					
All analytical results reported as mg/l ONLY					
Job Number: 702898					
Site Name: Gas Works Rd Reading					
Date: 06/07/2010					
Laboratory: Severn Trent Laboratories					
Date Sampled	17/06/2010	17/06/2010	17/06/2010	17/06/2010	17/06/2010
Time Sampled					
Laboratory Sample Reference	11823144	11823145	11823146	11823147	11823148
Trial Pit/ Borehole No.	WS001	WS001D	WS004	WS005	Trip Blank
Sampling Depth (m)					
=====					
PCB 28					
PCB 52					
PCB 101					
PCB 118					
PCB 138					
PCB 153					
PCB 180					
ADDITIONAL ANALYTES					
Cyanide (Total)					
Phosphate as P, Soluble					
Pres Enterococcus faecalis (cfu/ml)					
Presumptive E.coli (cfu/ml)					
Calcium, Total as Ca	95.4	92.4	75.5	124	<0.38
Magnesium, Total as Mg	3.87	4.11	6.38	7.91	<0.25
Total Hardness as CaCO3	255	248	215	342	<2
TPH >C6-C40					<0.01
TPH >C6-C8					<0.01
TPH >C8-C10					<0.01
TPH >C16-C24					<0.01
TPH >C24-C40					<0.01
TPH >C10-C16					<0.01
Sulphide as S	0.04	<0.029	<0.029	<0.029	<0.029

Key

I/S - Insufficient Sample
 To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS		
Job Number: 702898		
Site Name: Gas Works Rd Reading		
Date: 06/07/2010		
Laboratory: Severn Trent Laboratories		
Laboratory	Trial Pit/	
Sample Reference	Borehole No.	Comments
11823144	WS001	A dilution was performed for the following PAH compounds: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)Anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(123cd)pyrene, Dibenzo(ah)anthracene, Benzo(ghi)perylene. As these results are above the validated calibration range of the method, they may be an underestimate as the extraction efficiencies at these levels are unknown. Consequently, the PAH total result may also be an underestimate. VOC reporting limits raised due to the elevated levels of VOCs present in the sample.
11823145	WS001D	A dilution was performed for the following PAH compounds: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene. As these results are above the validated calibration range of the method, they may be an underestimate as the extraction efficiencies at these levels are unknown. Consequently, the PAH total result may also be an underestimate. VOC reporting limits raised due to the elevated levels of VOCs present in the sample.
11823146	WS004	A dilution was performed for the following PAH compounds: Naphthalene. As these results are above the validated calibration range of the method, they may be an underestimate as the extraction efficiencies at these levels are unknown. Consequently, the PAH total result may also be an underestimate. VOC reporting limits raised due to the elevated levels of VOCs present in the sample.
11823147	WS005	A dilution was performed for the following PAH compounds: Naphthalene. As these results are above the validated calibration range of the method, they may be an underestimate as the extraction efficiencies at these levels are unknown. Consequently, the PAH total result may also be an underestimate.
11823148	Trip Blank	Insufficient oil present for TPH fractionation.

Key

I/S - Insufficient Sample
 To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS	
Job Number: 702898	
Site Name: Gas Works Rd Reading	
Date: 06/07/2010	
Laboratory: Severn Trent Laboratories	
Method	Description

Key

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS (WATER)			
All analytical results reported as mg/l ONLY			
Job Number: 704378			
Site Name: Reading			
Date: 06/07/2010			
Laboratory: Severn Trent Laboratories			
Date Sampled	24/06/2010	24/06/2010	
Time Sampled			
Laboratory Sample Reference	11833618	11833619	
Trial Pit/ Borehole No.	SW1	SW2	
Sampling Depth (m)			
=====			
pH	8.2	8.5	
TOC	3.6	5.3	
Suspended Solids	29	12	
Conductivity(us/cm)	330	580	
Phenol	<0.0005	<0.0005	
Catechol	<0.0005	<0.0005	
Resorcinol	<0.0005	<0.0005	
Cresols	<0.0005	<0.0005	
Xylenols & Ethylphenols	<0.0005	<0.0005	
Naphthols	<0.0005	<0.0005	
Trimethylphenol	<0.0005	<0.0005	
Total Phenols	<0.0025	<0.0025	
Naphthalene	0.000125	0.000059	
Acenaphthylene	<0.00001	<0.00001	
Acenaphthene	<0.00001	<0.00001	
Fluorene	<0.00001	<0.00001	
Phenanthrene	<0.00001	0.000037	
Anthracene	<0.00001	<0.00001	
Fluoranthene	<0.00001	0.000026	
Pyrene	<0.00001	0.000028	
Benzo(a)anthracene	<0.00001	<0.00001	
Chrysene	<0.00001	<0.00001	
Benzo(b)fluoranthene	<0.00001	<0.00001	
Benzo(k)fluoranthene	<0.00001	<0.00001	
Benzo(a)pyrene	<0.00001	<0.00001	
Indeno(1,2,3-cd)pyrene	<0.00001	<0.00001	
Di-benz(a,h)anthracene	<0.00001	<0.00001	
Benzo(g,h,i)perylene	<0.00001	<0.00001	
Total PAH	0.000125	0.00015	
Benzene	<0.001	<0.001	
Toluene	<0.001	<0.001	
Ethylbenzene	<0.001	<0.001	
Xylene	<0.001	<0.001	
Total Petroleum Hydrocarbons			
Easily-liberatable Cyanide	2	1	
Complex Cyanide	2	1	
Total Cyanide	4	2	
Thiocyanate	<0.1	<0.1	
Elemental Sulphur			
Sulphate	13.3	12.2	
Sulphide			
Chloride	17.9	16.7	
Total Ammonium	<0.50	<0.50	
Arsenic	<0.0008	<0.0008	
Cadmium	<0.0006	<0.0006	
Chromium	<0.0007	<0.0007	
Lead	<0.005	<0.005	
Mercury	<0.0001	<0.0001	
Selenium	<0.0016	<0.0016	
Copper	0.001	0.006	
Nickel	<0.002	0.003	
Zinc	0.003	0.008	
Iron	<0.19	<0.19	
Analytes below to be determined if their presence is suspected on site, or if specifically requested by consultant/con			
Cobalt			
Vanadium			
Molybdenum			
Germanium			
Hex Cr			
>C6 to C8 Aliphatic		<0.01	
>C8 to C10 Aliphatic		<0.01	
>C10 to C12 Aliphatic		<0.01	
>C12 to C16 Aliphatic		<0.01	
>C16 to C21 Aliphatic		<0.01	
>C21 TO C40 Aliphatic		<0.01	
Total Aliphatic		<0.01	
>C5 to C7 Aromatic		<0.005	
>C7 to C8 Aromatic		<0.005	
>C8 to C10 Aromatic		<0.01	
>C10 to C12 Aromatic		<0.01	
>C12 to C16 Aromatic		<0.01	
>C16 to C21 Aromatic		<0.01	
>C21 TO C40 Aromatic		<0.01	
Total Aromatic		<0.01	
Total EPH aliphatic/Aromatic			
ICES7 PCB Congeners			

Key

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS (WATER)							
All analytical results reported as mg/l ONLY							
Job Number: 704378							
Site Name: Reading							
Date: 06/07/2010							
Laboratory: Severn Trent Laboratories							
Date Sampled	24/06/2010	24/06/2010					
Time Sampled							
Laboratory Sample Reference	11833618	11833619					
Trial Pit/ Borehole No.	SW1	SW2					
Sampling Depth (m)							
=====							
PCB 28							
PCB 52							
PCB 101							
PCB 118							
PCB 138							
PCB 153							
PCB 180							
ADDITIONAL ANALYTES							
Cyanide (Total)							
Phosphate as P, Soluble							
Pres Enterococcus faecalis (cfu/ml)							
Presumptive E.coli (cfu/ml)							
Total Hardness as CaCO3	124	140					
TPH >C6-C40	<0.01						
TPH >C6-C8	<0.01						
TPH >C8-C10	<0.01						
TPH >C16-C24	<0.01						
TPH >C24-C40	<0.01						
TPH >C10-C16	<0.01						
Sulphide as S	<0.029	<0.029					

Key

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS		
Job Number: 704378		
Site Name: Reading		
Date: 06/07/2010		
Laboratory: Severn Trent Laboratories		
Laboratory	Trial Pit/	
Sample Reference	Borehole No.	Comments
11833618	SW1	Insufficient oil present in the sample for TPH fractionation. Det 043 calculated using filtered metal results.
11833619	SW2	Det 043 calculated using filtered metal results.

Key

I/S - Insufficient Sample
 To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

NG 2007 PROFORMA FOR REPORTING ANALYTICAL RESULTS	
Job Number: 704378	
Site Name: Reading	
Date: 06/07/2010	
Laboratory: Severn Trent Laboratories	
Method	Description

Key

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

M=MCERTS accreditation

CHEMEX ENVIRONMENTAL INTERNATIONAL
VOLATILE ORGANICS IN AIR

Project No :	10F37A	Project code:	SWAH	Turnaround:	STD
12 Jul 10 11:41					
Lab Sample ID :	10F37A01A	10F37A02A	10F37A02B	0702BLKA	0706BLKA
Client ID :	WS002	WS003	WS003D	BLANK	BLANK
Bottle No :	F073209	G0124125	E064699	BLANK0702A	BLANK0706A
Matrix :	AIR	AIR	AIR	AIR	AIR
Volume/Weight :	Whole tube	Whole tube	Whole tube	Whole tube	Whole tube
Scaling Factor :	0.3	0.3	0.4	1.0	1.0
LITRES PUMPED:	2.9	3.2	2.9		

COMPOUND	Concentration ug/m3				
Dichlorodifluoromethane_____	<4.5	<4.5	<6	<15	<15
Chloromethane_____	<1.5	<1.5	<2	<5	<5
Vinyl chloride_____	<1.5	<1.5	<2	<5	<5
Bromomethane_____	<1.5	<1.5	<2	<5	<5
Chloroethane_____	<1.5	<1.5	<2	<5	<5
Trichlorofluoromethane_____	<1.5	<1.5	<2	<5	<5
Acetone_____	330	200	41	<50	<50
Diethyl ether_____	<3	<3	<4	<10	<10
1,1-Dichloroethene_____	<1.5	<1.5	<2	<5	<5
Carbon disulfide_____	9	3	<1.6	<4	<4
Allyl chloride_____	<3	<3	<4	<10	<10
Methylene chloride_____	2	12	<2	<5	<5
Trans-1,2-dichloroethene_____	<1.5	<1.5	<2	<5	<5
tert-methyl-butyl ether_____	<1.5	<1.5	<2	<5	<5
1,1-Dichloroethane_____	<1.5	<1.5	<2	<5	<5
2-Butanone_____	2500	2100	690	<50	<50
cis-1,2-Dichloroethene_____	<1.5	<1.5	<2	<5	<5
2,2-Dichloropropane_____	<1.5	<1.5	<2	<5	<5
Chloroform_____	4	14	2	<4	<4
Tetrahydrofuran_____	<30	<30	<40	<100	<100
1,1,1-Trichloroethane_____	<1.2	<1.2	<1.6	<4	<4
1,2-Dichloroethane_____	<1.5	<1.5	<2	<5	<5
1-Chlorobutane_____	<1.5	<1.5	<2	<5	<5
1,1-Dichloropropene_____	<1.5	<1.5	<2	<5	<5
Benzene_____	60	87	38	<4	<4
Carbon tetrachloride_____	<1.5	<1.5	<2	<5	<5
2-Nitropropane_____	<3	<3	<4	<10	<10
Methyl methacrylate_____	<3	<3	<4	<10	<10
2-Hexanone_____	<4.5	<4.5	<6	<15	<15
4-Methyl-2-pentanone_____	<7.5	<7.5	<10	<25	<25
1,2-Dichloropropane_____	<1.5	<1.5	<2	<5	<5
Trichloroethene_____	6	<1.5	<2	<5	<5
Dibromomethane_____	<1.5	<1.5	<2	<5	<5
Bromodichloromethane_____	<1.5	<1.5	<2	<5	<5
trans-1,3-Dichloropropene_____	<1.5	<1.5	<2	<5	<5
cis-1,3-Dichloropropene_____	<1.5	<1.5	<2	<5	<5
Toluene_____	780	540	120	<5	<5

CHEMEX ENVIRONMENTAL INTERNATIONAL
VOLATILE ORGANICS IN AIR

Project No :	10F37A	Project code:	SWAH	Turnaround:	STD
12 Jul 10 11:41					
Lab Sample ID :	10F37A01A	10F37A02A	10F37A02B	0702BLKA	0706BLKA
Client ID :	WS002	WS003	WS003D	BLANK	BLANK
Bottle No :	F073209	G0124125	E064699	BLANK0702A	BLANK0706A
Matrix :	AIR	AIR	AIR	AIR	AIR
Volume/Weight :	Whole tube	Whole tube	Whole tube	Whole tube	Whole tube
Scaling Factor :	0.3	0.3	0.4	1.0	1.0
LITRES PUMPED:	2.9	3.2	2.9		

COMPOUND	Concentration ug/m3				
1,1,2-Trichloroethane_____	<1.5	<1.5	<2	<5	<5
1,3-Dichloropropane_____	<1.5	<1.5	<2	<5	<5
Ethyl methacrylate_____	<3	<3	<4	<10	<10
Dibromochloromethane_____	<1.5	<1.5	<2	<5	<5
1,2-Dibromoethane_____	<1.5	<1.5	<2	<5	<5
Tetrachloroethene_____	4	14	9	<5	<5
Chlorobenzene_____	9	23	10	<4	<4
1,1,1,2-Tetrachloroethane____	<1.5	<1.5	<2	<5	<5
Ethyl benzene_____	34	52	22	<4	<4
m&p-Xylene_____	62	170	71	<7.5	<7.5
Styrene_____	12	8	3	<5	<5
Bromoform_____	<1.5	<1.5	<2	<5	<5
o-Xylene_____	43	83	40	<4	<4
1,1,2,2-Tetrachloroethane____	<1.5	<1.5	<2	<5	<5
1,2,3-Trichloropropane_____	<1.5	<1.5	<2	<5	<5
Isopropylbenzene_____	8	2	<1.8	<4.5	<4.5
trans-1,4-Dichloro-2-butene_	<3	<3	<4	<10	<10
Bromobenzene_____	<1.5	<1.5	<2	<5	<5
2-Chlorotoluene_____	<1.5	<1.5	<2	<5	<5
n-Propylbenzene_____	11	11	5	<5	<5
4-Chlorotoluene_____	<1.5	<1.5	<2	<5	<5
1,3,5-Trimethylbenzene_____	51	9	4	<5	<5
Pentachloroethane_____	<3	<3	<4	<10	<10
1,2,4-Trimethylbenzene_____	39	33	14	<5	<5
tert-Butylbenzene_____	<1.5	<1.5	<2	<5	<5
1,3-Dichlorobenzene_____	660	670	220	<5	<5
sec-Butylbenzene_____	<1.5	<1.5	<2	<5	<5
1,4-Dichlorobenzene_____	<1.5	<1.5	<2	<5	<5
4-Isopropyltoluene_____	8	8	3	<5	<5
1,2-Dichlorobenzene_____	<1.5	<1.5	<2	<5	<5
n-Butylbenzene_____	<1.4	3600	1000	<4.5	<4.5
Hexachloroethane_____	<3	<3	<4	<10	<10
1,2-Dibromo-3-chloropropane	<1.5	<1.5	<2	<5	<5
1,2,4-Trichlorobenzene_____	<1.5	<1.5	<2	<5	<5
Naphthalene_____	<1.5	<1.5	<2	<5	<5
1,2,3-Trichlorobenzene_____	<1.5	<1.5	<2	<5	<5
Hexachlorobutadiene_____	<1.5	<1.5	<2	<5	<5

Client Name: **ATKINS**Project No: **10F37A**Project Code: **SWAH**

Lab ID:	10F37A01A	10F37A02A	10F37A02B	0702BLKA	0706BLKA
Bottle No:	F073209	G0124125	E064699	BLANK0702A	BLANK0706A
Client ID:	WS002	WS003	WS003D	BLANK	BLANK
Lab QC No:	702	702	706	702	706
Matrix:	AIR	AIR	AIR	AIR	AIR

ALIPHATICS (ug/m3)

C5-C6	20	20	20	-	-
>C6-C8	120	52	70	-	-
>C8-C10	2	9	19	-	-
>C10-C12	9	-	-	-	-
>C12-C16	-	-	-	-	-
>C16-C21	-	-	-	-	-
>C21-C35	-	-	-	-	-

AROMATICS (ug/m3)

C5-C7	60	38	38	-	-
>C7-C8	780	120	120	-	-
>C8-C10	940	1070	390	-	-
>C10-C12	-	3600	1000	-	-
>C12-C16	-	-	-	-	-
>C16-C21	-	-	-	-	-
>C21-C35	-	-	-	-	-

Key: - = Not detected

CHEMEX ENVIRONMENTAL INTERNATIONAL
VOLATILE ORGANICS IN AIR

Project No :	10F37B	Project code:	SWAH		Turnaround:
12 Jul 10 14:01					
Lab Sample ID :	10F37B03A	10F37B04A	10F37B04B	10F37B05A	0709BLKA
Client ID :	WS003	WS002	WS002D	TRIP BLANK 5605	BLANK
Bottle No :	E068593	D026941	G0124352	D096742	BLANK0709A
Matrix :	AIR	AIR	AIR	AIR	AIR
Volume/Weight :	Whole tube	Whole tube	Whole tube	Whole tube	Whole tube
Scaling Factor :	0.4	0.4	0.4	1.0	1.0
LITRES PUMPED:	2.776	2.775	2.776		

COMPOUND	Concentration ug/m3				
Dichlorodifluoromethane_____	<6	<6	<6	<15	<15
Chloromethane_____	<2	<2	<2	<5	<5
Vinyl chloride_____	<2	<2	<2	<5	<5
Bromomethane_____	<2	<2	<2	<5	<5
Chloroethane_____	<2	<2	<2	<5	<5
Trichlorofluoromethane_____	<2	<2	<2	<5	<5
Acetone_____	<20	<20	<20	<50	<50
Diethyl ether_____	<4	<4	<4	<10	<10
1,1-Dichloroethene_____	<2	<2	<2	<5	<5
Carbon disulfide_____	<1.6	<1.6	<1.6	<4	<4
Allyl chloride_____	<4	<4	<4	<10	<10
Methylene chloride_____	<2	4	9	<5	<5
Trans-1,2-dichloroethene_____	<2	<2	<2	<5	<5
tert-methyl-butyl ether_____	<2	<2	<2	<5	<5
1,1-Dichloroethane_____	<2	<2	<2	<5	<5
2-Butanone_____	<20	<20	<20	<50	<50
cis-1,2-Dichloroethene_____	<2	<2	<2	<5	<5
2,2-Dichloropropane_____	<2	<2	<2	<5	<5
Chloroform_____	15	<1.6	<1.6	<4	<4
Tetrahydrofuran_____	<40	<40	<40	<100	<100
1,1,1-Trichloroethane_____	<1.6	<1.6	<1.6	<4	<4
1,2-Dichloroethane_____	<2	<2	<2	<5	<5
1-Chlorobutane_____	<2	<2	<2	<5	<5
1,1-Dichloropropene_____	<2	<2	<2	<5	<5
Benzene_____	92	18	15	<4	<4
Carbon tetrachloride_____	<2	<2	<2	<5	<5
2-Nitropropane_____	<4	<4	<4	<10	<10
Methyl methacrylate_____	<4	<4	<4	<10	<10
2-Hexanone_____	<6	<6	<6	<15	<15
4-Methyl-2-pentanone_____	<10	<10	<10	<25	<25
1,2-Dichloropropane_____	<2	<2	<2	<5	<5
Trichloroethene_____	<2	2	5	<5	<5
Dibromomethane_____	<2	<2	<2	<5	<5
Bromodichloromethane_____	<2	<2	<2	<5	<5
trans-1,3-Dichloropropene_____	<2	<2	<2	<5	<5
cis-1,3-Dichloropropene_____	<2	<2	<2	<5	<5
Toluene_____	57	45	43	<5	<5

CHEMEX ENVIRONMENTAL INTERNATIONAL
VOLATILE ORGANICS IN AIR

Project No :	10F37B	Project code:	SWAH		Turnaround:
12 Jul 10 14:01					
Lab Sample ID :	10F37B03A	10F37B04A	10F37B04B	10F37B05A	0709BLKA
Client ID :	WS003	WS002	WS002D	TRIP BLANK 5605	BLANK
Bottle No :	E068593	D026941	G0124352	D096742	BLANK0709A
Matrix :	AIR	AIR	AIR	AIR	AIR
Volume/Weight :	Whole tube	Whole tube	Whole tube	Whole tube	Whole tube
Scaling Factor :	0.4	0.4	0.4	1.0	1.0
LITRES PUMPED:	2.776	2.775	2.776		

COMPOUND	Concentration ug/m3				
1,1,2-Trichloroethane_____	<2	<2	<2	<5	<5
1,3-Dichloropropane_____	<2	<2	<2	<5	<5
Ethyl methacrylate_____	<4	<4	<4	<10	<10
Dibromochloromethane_____	<2	<2	<2	<5	<5
1,2-Dibromoethane_____	<2	<2	<2	<5	<5
Tetrachloroethene_____	9	2	3	<5	<5
Chlorobenzene_____	13	5	5	<4	<4
1,1,1,2-Tetrachloroethane___	<2	<2	<2	<5	<5
Ethyl benzene_____	8	9	8	<4	<4
m&p-Xylene_____	20	25	24	<7.5	<7.5
Styrene_____	2	4	4	<5	<5
Bromoform_____	<2	<2	<2	<5	<5
o-Xylene_____	8	11	12	<4	<4
1,1,2,2-Tetrachloroethane___	<2	<2	<2	<5	<5
1,2,3-Trichloropropane_____	<2	<2	<2	<5	<5
Isopropylbenzene_____	5	3	3	<4.5	<4.5
trans-1,4-Dichloro-2-butene_	<4	<4	<4	<10	<10
Bromobenzene_____	<2	<2	<2	<5	<5
2-Chlorotoluene_____	<2	<2	<2	<5	<5
n-Propylbenzene_____	6	3	4	<5	<5
4-Chlorotoluene_____	<2	<2	<2	<5	<5
1,3,5-Trimethylbenzene_____	4	7	9	<5	<5
Pentachloroethane_____	<4	<4	<4	<10	<10
1,2,4-Trimethylbenzene_____	18	20	25	<5	<5
tert-Butylbenzene_____	<2	<2	<2	<5	<5
1,3-Dichlorobenzene_____	17	25	37	<5	<5
sec-Butylbenzene_____	<2	<2	<2	<5	<5
1,4-Dichlorobenzene_____	<2	<2	<2	<5	<5
4-Isopropyltoluene_____	<2	<2	<2	<5	<5
1,2-Dichlorobenzene_____	<2	<2	<2	<5	<5
n-Butylbenzene_____	<1.8	<1.8	<1.8	<4.5	<4.5
Hexachloroethane_____	<4	<4	<4	<10	<10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<5	<5
1,2,4-Trichlorobenzene_____	<2	<2	<2	<5	<5
Naphthalene_____	<2	<2	<2	<5	<5
1,2,3-Trichlorobenzene_____	<2	<2	<2	<5	<5
Hexachlorobutadiene_____	<2	<2	<2	<5	<5

Client Name: **ATKINS**

Project No: **10F37B**

Project Code: **SWAH**

Lab ID:	10F37B03A	10F37B04A	10F37B04B	10F37B05A	0709BLKA
Bottle No:	E068593	D026941	G0124352	D096742	BLANK0709A
Client ID:	WS003	WS002	WS002D	TRIP BLANK 5605	BLANK
Lab QC No:	709	709	709	709	709
Matrix:	AIR	AIR	AIR	AIR	AIR

ALIPHATICS (ug/m3)

C5-C6	20	210	-	-	-
>C6-C8	42	310	450	-	-
>C8-C10	24	890	750	-	-
>C10-C12	-	45	43	-	-
>C12-C16	-	360	-	-	-
>C16-C21	-	30	-	-	-
>C21-C35	-	-	-	-	-

AROMATICS (ug/m3)

C5-C7	92	18	15	-	-
>C7-C8	57	45	43	-	-
>C8-C10	71	82	89	-	-
>C10-C12	-	-	-	-	-
>C12-C16	-	-	-	-	-
>C16-C21	-	-	-	-	-
>C21-C35	-	-	-	-	-

Key: - = Not detected

Appendix B

Atkins 2010 Site Investigations Borehole Logs

Project Name
Reading

Project No.
5027279

Co-ords: -

Hole Type
WS

Location: Gas Works Road, Reading

Casing diam. (mm)

Level: -

Scale
1:50

Client: NGPL

Monitoring well diam. (mm)
50

Dates: 10/06/2010

Logged By
LB

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10			MADE GROUND: Tarmacadam.	
		0.50	PID	1.40 ppm				MADE GROUND: Loose, light brown, silty sandy GRAVEL of fine to coarse, subangular to angular, concrete, red brick and sandstone. Occasional cobbles of concrete and red brick.	
		0.50	ES						
		1.00	PID	1.70 ppm					1
		1.00	ES						
		1.50	PID	0.90 ppm					
		2.00	PID	3.10 ppm					2
		2.50	PID	2358.00 ppm	2.50				
		3.00	PID	578.00 ppm				MADE GROUND: Soft, grey, slightly sandy CLAY. Strong hydrocarbon odour.	3
		3.50	PID	268.00 ppm	3.50				
		4.00	PID	67.40 ppm				MADE GROUND: Loose, dark grey to black, silty sandy GRAVEL of fine to coarse, subangular to angular, concrete, glass and brick. Strong hydrocarbon odour. Heavy black staining from 4.7m.	4
		4.50	PID	196.00 ppm					
					5.00			End of Borehole at 5.00 m	5
									6
									7
									8
									9

Remarks: Hand dug to 1.5 m.
Hole collapsing from 4.0 m.

Project Name
Reading

Project No.
5027279

Co-ords: -

Hole Type
WS

Location: Gas Works Road, Reading

Casing diam. (mm)

Level: -

Scale
1:50

Client: NGPL

Monitoring well diam. (mm)
-

Dates: 10/06/2010

Logged By
LB

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10			MADE GROUND: Tarmacadam.	
		0.50	PID	1.40 ppm				MADE GROUND: Loose, dark brown/grey, silty sandy GRAVEL of fine to coarse, subangular to angular, red brick, slate, sandstone and concrete. Slight hydrocarbon odour.	
		0.50	ES						
		1.00	PID	1.80 ppm					1
		1.50	PID	112.00 ppm					
		1.50	ES						
		2.00	PID	755.00 ppm	2.00			ALLUVIUM: Firm, dark grey CLAY with peat mottling. Strong hydrocarbon odour.	2
		2.50	PID	1536.00 ppm					
					3.00			No recovery.	3
		4.00	PID	3.50 ppm	4.00			ALLUVIUM: Soft, grey, slightly gravelly CLAY. Gravels are fine, angular sandstone.	4
		4.50	PID	0.50 ppm					
					4.80			ALLUVIUM: Grey thinly laminated, gravelly SAND with frequent fragments of peat. Gravels are fine to medium, subrounded to angular flint.	5
					5.00			End of Borehole at 5.00 m	
									6
									7
									8
									9

Remarks: Hand dug to 1.5 m.

Project Name
Reading

Project No.
5027279

Co-ords: -

Hole Type
WS

Location: Gas Works Road, Reading

Casing diam. (mm)

Level: -

Scale
1:50

Client: NGPL

Monitoring well diam. (mm)
-

Dates: 11/06/2010

Logged By
LB

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10			MADE GROUND: Tarmacadam.	
		0.50	PID	1.70 ppm				MADE GROUND: Dark brown, silty, sandy GRAVEL of fine to coarse, subangular to angular, red brick, concrete, sandstone and glass. Strong hydrocarbon odour. Metal 100 mm service pipe encountered at 0.6 m running E-W (possible domestic gas supply).	
		0.50	ES						
		1.00	PID	1.40 ppm					1
		1.50	PID	1.10 ppm					
		1.50	ES						
					2.00			End of Borehole at 2.00 m	2
									3
									4
									5
									6
									7
									8
									9

Remarks: Hand dug to 2.0 m.
Location progressed using hand auger beside service pipe.



Project Name
Reading

Project No.
5027279

Co-ords: -

Hole Type
WS

Location: Gas Works Road, Reading

Casing diam. (mm)

Level: -

Scale
1:50

Client: NGPL

Monitoring well diam. (mm)
50

Dates: 10/06/2010

Logged By
LB

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10			MADE GROUND: Tarmacadam.	
		0.50	PID	1.10 ppm				MADE GROUND: Loose, dark grey, silty sandy GRAVEL of fine to coarse, subangular to angular, concrete, red brick, slate, glass and sandstone. Frequent cobbles of red brick. Moderate hydrocarbon odour.	
		0.50	ES						
		1.00	PID	23.50 ppm					1
		1.50	PID	18.60 ppm					
		1.50	ES						
		2.00	PID	165.00 ppm	2.00			ALLUVIUM: Firm, dark grey CLAY with peat mottling. Strong hydrocarbon odour.	2
					2.50			No recovery.	3
		3.20			3.20			ALLUVIUM: Loose, grey, silty sandy GRAVEL of fine to coarse, subrounded to angular flint.	4
		3.50	PID	86.20 ppm					
		4.00	PID	28.50 ppm					
		4.50	PID	53.50 ppm					
					5.00			End of Borehole at 5.00 m	5
									6
									7
									8
									9

Remarks: Hand dug to 1.5 m.

Project Name
Reading

Project No.
5027279

Co-ords: -

Hole Type
WS

Location: Gas Works Road, Reading

Casing diam. (mm)

Level: -

Scale
1:50

Client: NGPL

Monitoring well diam. (mm)
50

Dates: 10/06/2010

Logged By
LB

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10			MADE GROUND: Tarmacadam.	
		0.50	PID	1.30 ppm				MADE GROUND: Loose, dark brown/grey, silty sandy GRAVEL of fine to coarse, subangular to angular, red brick, slate, sandstone, concrete, glass and slate. Strong hydrocarbon odour and heavy staining.	
		0.50	ES						
		1.00	PID	156.00 ppm					1
		1.50	PID	342.00 ppm					
		1.50	ES						
		2.00	PID	304.00 ppm					2
		2.50	PID	145.00 ppm	2.50				
					3.00			ALLUVIUM: Soft to firm, brown, peaty CLAY.	3
								No recovery.	4
		4.00	PID	78.40 ppm	4.00			ALLUVIUM: Loose, grey, silty, sandy GRAVEL of fine to coarse, subrounded to angular flint.	5
		4.50	PID	86.40 ppm					
					5.00			End of Borehole at 5.00 m	6
									7
									8
									9

Remarks: Hand dug to 1.5 m.

Appendix C

Atkins 2010 Site Investigation Photographs



Photo 1: Drilling rig and crew.



Photo 2: Typical Made Ground encountered at the site.



Photo 3: Fill material encountered in WS001 (in previously remediated area).



Photo 4: Window sample core from WS001. Note black hydrocarbon staining, indicating previous remediation in this area was not fully completed.



Photo 5: Evidence of flytipping at site.



Photo 6: Completed borehole.

Appendix D

Groundwater and Vapour Monitoring Results

Vapour Monitoring Template

Reading Vapour Monitoring - Round 1

Date: 17-Jun-10

[illegible]

Vapour Monitoring Template

Reading Vapour Monitoring - Round 2

Date: 24-Jun-10

[illegible]

Site: Reading	Personnel on Site: Lucas Bush and Lydia Allen	
Date of Visit: 17/06/2010	Arrival Time: 10:30	Departure Time: 15:00
Purpose of Visit: Low flow water sampling	Weather Conditions:	
Instrumentation used: Peristaltic pump Make: Model:	Instrumentation Calibration/Testing Details:	

[illegible]

Signed: Lydia Allen	Date:25/06/2010
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