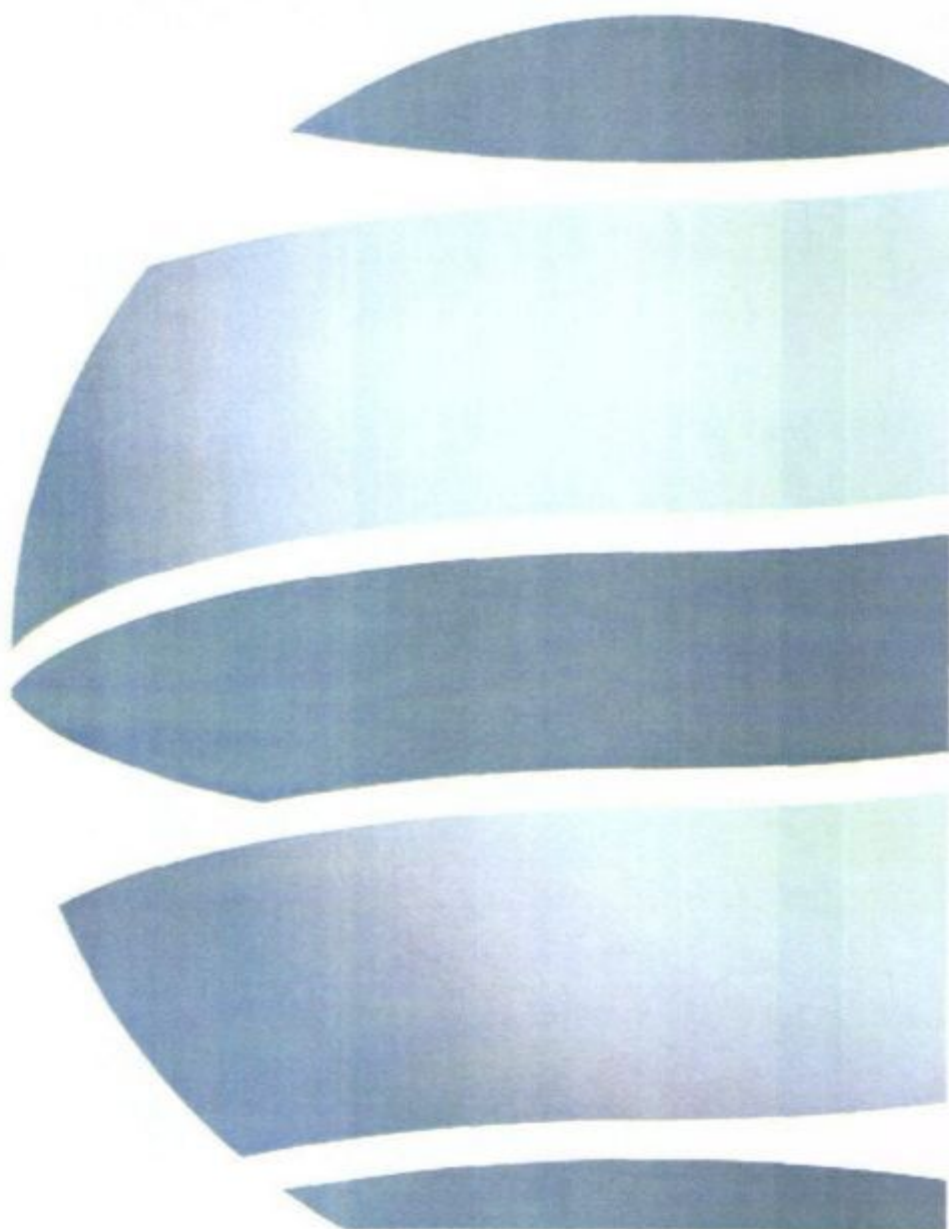




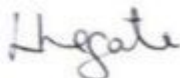
Geo-Environmental

VALIDATION REPORT
for the site at
LAND OFF NEW ROAD, HAVANT,
on behalf of
WOODFIELD BUILDERS (WATERLOOVILLE) LTD



Report: VALIDATION REPORT
Site: LAND OFF NEW ROAD, HAVANT,
Client: WOODFIELD BUILDERS (WATERLOOVILLE) LTD
Date: MARCH 2010
Reference: GE6175/VR
Version: Version V1

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1.0 INTRODUCTION

1.1 General

Following consultation with Havant Borough Council and the Environment Agency, Geo-Environmental Services Limited was instructed by Woodfield Builders (Waterlooville) Ltd to prepare a Validation Report for the residential development located at Land off New Road, Havant, Hampshire (see Figure 1).

This report presents the validation of monitoring and works completed in relation to development works undertaken at Land of New Land, Havant.

1.2 Reference Documents

The following reports have been prepared in relation to Land at New Road, Havant and represent earlier stages of assessment and identification of remediation requirements, thereby complying with initial elements of contaminated land related planning conditions, as set out in Section 1.4 below:

- Desk Study Report, Dig Geotech Limited, February 2006.
- Ground Investigation Report, Geo-Environmental ref. GE5529, July 2007. This report presented the findings of investigation, pollutant linkage assessment and development of remediation recommendations.
- Development Plan Report, Geo-Environmental ref. GE6175/Development Plan, May 2008. This report identified the pollutant linkages and remedial action to be taken.
- Groundwater Assessment Letter Report, Geo-Environmental ref. GE6175/GR01, February 2009.
- Validation Letter Report, Geo-Environmental ref. GE6175, February 2009. The remediation works presented herein were also presented within this letter.

The work up to and including the Development Plan had identified the presence of groundwater contamination beneath the site as a result of an off site source. The development plan and discussions with the regulatory authorities identified that groundwater remediation was not required at this time beneath the subject site, however the proposed development must not increase the associated risk identified and monitoring should be undertaken during and following the development in order to demonstrate no detrimental impact as a result of the works undertaken.

1.3 Planning Permission

The following planning conditions relating to contamination have been imposed on the planning permission granted (ref. 06/66809/001) for the site:

18) Prior to the commencement of development (including any site clearance) approved by this Planning Permission (or such other date or stage in development as may be agreed in writing with the Local Planning Authority), a scheme to deal with the risks associated with contamination of the site shall be submitted to and approved, in writing, by the Local Planning Authority. That scheme shall include all of the following elements unless specifically excluded, in writing, by the Local Planning Authority:

1. A desk study identifying:
 - All previous uses
 - Potential contaminants associated with those uses
 - A conceptual site model of the site indicating sources, pathways and receptors
 - Potentially unacceptable risks arising from contamination at the site.
2. A site investigation scheme, based on (1) to provide information for an assessment of the risk to all receptors that may be affected, including those off site.
3. The results of the site investigation and risk assessment (2) and a method statement based on those results giving full details of the remediation measures required and how they are to be undertaken.
4. A verification report on completion of the works set out in (3) by a competent consultant, independent of the company which has undertaken the approved remediation works, confirming the remediation measures that have been undertaken in accordance with the method statement and setting out measures for maintenance, further monitoring and reporting.

Any changes to these agreed elements require the express consent of the Local Planning Authority.

Reason - To protect future site users and the minor aquifer beneath the site and the surface waters to the west of the site. The site is likely to be affected by contamination due to the sites previous use as a petrol filling station which may pose a risk to controlled waters. Risk to groundwater and surface water has not yet been fully established at the site and having due regard to policies and proposal E2 of the Hampshire County Structure Plan 1996-2011 (Review) and PC3 of the Havant Borough District Wide Local Plan 1996-2011.

19) If, during development, contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the Local Planning Authority) shall be carried out until the developer has submitted and obtained written approval from the Local Planning Authority for an amendment to the method Statement detailing how this unsuspected contamination shall be dealt with.

Reason - To protect future site users and the minor aquifer beneath the site or the surface waters to the west of the site. There may be areas of the site, which cannot be fully characterised by a site investigation and unexpected contamination may be identified and having due regard to policies E2 of the Hampshire County Structure Plan 1996-2011 (Review) and PC3 of the Havant Borough District Wide Local Plan 1996-2011.

2.0 BACKGROUND

This Development Plan was developed following a ground investigation as reported by Geo-Environmental (Ref. GE5529 Ground Investigation Report, July 2007) together with subsequent discussions with the Local Authority Environmental Health Department and Environment Agency.

A review of a previous desk study undertaken by Dig-Geotech Limited in February 2006 was undertaken as part of the 2007 investigation by Geo-Environmental, ref.GE5529. The findings of the desk study and investigation undertaken by Geo-Environmental are summarised in the Ground Investigation Report referred to above.

2.1 Former site use and contamination Legacy

The site was historically part of a larger site encompassing the now Kwik Fit site and was owned/operated by Hendy Ford for car servicing, probably sales and as a petrol filling station (PFS). A review of the historical layout indicated the PFS forecourt to be located within the Kwik Fit site, with only an access/egress spur crossing the north-western tip of the subject site.

Underground storage tanks (USTs) were installed, in the 1960s, 5m and 16m to the north of the subject site. As part of the redevelopment works on the 'Kwik Fit' site in 1990, seven of the USTs were reportedly degassed and infilled with concrete (associated pipe-work left insitu). Replacement fuel USTs were installed within the 'Kwik Fit' site (stated 11m to the north of the subject site). The records indicate that since the 1960s at least nine USTs, with a combined capacity in excess of 30,000 gallons, have been installed and operated on the 'Kwik Fit' site (the USTs being within 20m of the subject site). These USTs comprise a potential source of significant mobile contamination which could migrate (assuming local groundwater flow is generally towards the south) on to the subject site.

Site investigation and groundwater monitoring undertaken on site identified the presence of hydrocarbon contamination within the groundwater, which was attributed to the off site source. As a result it was necessary to assess the risk to the proposed development and to ensure that development works would not hinder groundwater remediation if required and to ensure that the proposed development would not result in a detrimental impact. This was undertaken through regular groundwater monitoring.

2.2 Development

The development comprised the construction of two/three storey housing with private gardens, car parking and communal soft landscaping, access road and associated infrastructure.

2.3 Conceptual Site Model

The conceptual site model (CSM) developed following the investigation works reported identified an offsite hazard in the form of mobile hydrocarbons from the Kwik Fit Site migrating within groundwater onto and beneath the subject site. Thus, further works were required prior to, during and following the permitted development in order to

demonstrate that development works have not resulted in a detrimental impact to the environment and to ensure that groundwater remediation, should it be required at a later date is achievable and not hindered by the development, in order to mitigate the risk/potential risk of harm.

2.4 Approach for Remediation, Monitoring and Validation

Remediation works were proposed to remove areas of contaminated soils, where they had been identified (as part of the site investigation works undertaken) to fall within garden areas and posed a risk to end users and potentially where un-identified contamination was encountered. As such the contamination that was identified as most likely to pose a current/future risk to human health and controlled waters was removed, reducing the risk. Where material was excavated and validated (subject to analysis) as suitable for re-use, material was to be retained on site, thereby avoiding the removal of excessive volumes to landfill.

Contaminated water where encountered was to be disposed of following appropriate duty of care. Given the depth of groundwater encountered during investigations and subsequent monitoring on site and given the proposed shallow foundation design for development it is considered unlikely that groundwater would be encountered during or the groundwater flow regime altered by the development.

Where the investigation works undertaken had identified that a risk exists from gas/vapours present on site, appropriate gas and vapour membranes were to be installed.

The aim of the remediation was not to remove all contamination identified on site but to reduce the identified risk to an acceptable level with respect to human health, the built environment and controlled waters. Remediation of groundwater was not considered necessary at this time however, it was agreed with the Regulators that the proposed development would be undertaken in such a manner that it would not be prohibitive should it be demonstrated that groundwater remediation is required in due course.

3.0 GROUND GAS AND VAPOURS

In line with CIRIA and NHBC Guidance, ground gas monitoring was undertaken within monitoring wells installed on site. Positions on site were monitored for methane, carbon dioxide, volatile organic compound (VOC) concentrations and oxygen over a total period from May 2007 to June 2007. A further monitoring visit was then undertaken in May 2008. VOC monitoring was undertaken with a Photo-Ionisation Detector.

3.1 Ground Gas Assessment

A ground gas and vapour assessment was undertaken for the site and presented in the Ground Investigation Report (GE5529, July 2007) which identified the site's gassing regime to be representative of Characteristic Situation 1 (CIRIA) OR Green-Amber 1 (NHBC).

In addition to general ground gas, the investigations undertaken on the site also considered the potential vapour exposure hazard. Investigations undertaken identified VOC concentrations up to 3.6ppm. On the basis of the investigations reported on site it was considered that protection measures should be installed to migrate any potential risk associated with potential gas and vapours.

VOC concentrations up to 3.6ppm were detected on site at a time when hydrocarbon concentrations within groundwater were noted to be elevated, subsequent monitoring has demonstrated that groundwater concentrations have reduced by at least an order of magnitude and investigations have shown no source of hydrocarbon on the subject site itself, suggesting that the associated vapour risk is likely to be substantially reduced.

3.2 Gas Protection Measures

Within the Development Plan, May 2008 the following gas protection measures were proposed in order to protect the development and end users thereof:

- Suspended ground floor slabs with passively ventilated sub-floor.
- Minimum penetration of the floor slab by services;
- The provision of a gas membrane (suitable for protection against hydrocarbon and VOC vapours) across the floor slab and walls;
- All membrane joints and penetrations sealed into the membrane.

Whilst it was proposed within the Development Plan that a Visqueen GX Geomembrane (hydrocarbon) would be installed, the investigations reported on site did not identify any source of hydrocarbon contamination on the subject site, in addition hydrocarbon concentrations identified within groundwater were noted to reduce by at least an order of magnitude over the monitoring period and the maximum levels of VOC concentrations detected on site were 3.6ppm, an alternative, but similar membrane to that originally proposed was installed by Woodfield Builders (Waterlooville) Ltd. Given the demonstrable reductions in key contaminant concentrations over the monitoring and development period, the membrane installed is nonetheless considered to be protective of any potential gas and vapour risk on site.

Gas protection measures were installed in line with guidance set out in CIRIA C665, NHBC 10627-R01(04), BRE414 and BS8485:2007. Validation of the gas protection measures was undertaken by Geo-Environmental and photographic evidence is



provided in Appendix A.

4.0 GROUNDWATER ASSESSMENT

4.1 Background

The site has been the subject of several phases of assessment which identified that hydrocarbon impacted groundwater was present beneath the site. Groundwater modelling indicated a shallow hydraulic gradient flowing towards the south-west or south-south-west, i.e. broadly consistent with the nearby Hermitage Stream. The assessment also identified underground fuel storage tanks immediately up-gradient of the site's northern boundary. Therefore remediation of the groundwater beneath the subject site would have proved ineffective for as long as the up-gradient (off-site) source remained in place.

As such, the development was planned so as not to exacerbate the situation or create any new pollutant linkages. This was acknowledged in the letter dated 19 June 2008 from the Environment Agency, ref HA/2008/103947/02-L01, planning ref: 06/66809/001.

Notwithstanding this, the Development Plan set out a protocol for groundwater monitoring over a period of up to 24 months. The purpose of the monitoring was to demonstrate that natural attenuation was occurring and also that the development did not result in increased hydrocarbon concentrations in the groundwater.

4.2 Groundwater Monitoring Programme

The Development Plan set out the following monitoring proposals:

Locations	Frequency	Suite of Analysis	Phase
All	Monthly	Speciated PAH,	Initial 6 months
All	Bi Monthly	Speciated TPH,	6-12 months
All	Quarterly	BTEX, MTBE, Groundwater Level	12-24 months

Table 1 - Proposed Groundwater Monitoring Programme

Groundwater monitoring was proposed to be carried out during and/or after the remediation works and development works in order to demonstrate that the works undertaken have not resulted in a detrimental impact to controlled waters. The Plan also noted that free product, if present, would require removal from the groundwater.

The monitoring well locations are presented in Figure 1.

4.3 Groundwater Monitoring Results

Groundwater monitoring commenced in June 2008 and has been undertaken in line with the proposed frequency set out in Table 1 above. The results from this monitoring are presented in Table 2 below, which also includes monitoring presented within the Development Plan and original Ground Appraisal Report.

	12/06/2007	01/05/2008	09/06/2008	22/07/2008	01/09/2008	03/10/2008	07/11/2008	18/12/2008	14/01/2009
WS1	119132	2133	12	677	10	126	942	10	101
WS9	15079	2444	69	1796	10	10	190	10	10
WS101			15	484	10	10	10	12	10
WS102			10	319	10	834	207	14	36
WS103			444	40	10	10	30	26	538
WS104			135	1047	10	46	10	12	34
WS105			23	364	10	10	824	34	29
WS107			154	133	10	10	10		

Table 2 - C6-40 TPH Concentrations in Groundwater (ug/l)

Given the magnitude of the reduction in TPH concentrations in groundwater over this period, it was necessary to plot the results at two different scales, Figure 2 presents the results from June 2007 onwards and Figure 3 presents the results from May 2008 onwards. As can be seen from the presented results, concentrations in WS1 and WS9 have fallen by three to four orders of magnitude and three orders of magnitude, respectively, from those reported in 2007. Additionally, monitoring results from elsewhere across the site indicates the possible margin of a dissolved phase plume. Analysis for BTEX and MTBE compounds has not identified any concentrations which exceed Drinking Water Standards or Environmental Quality Standards.

Free product has not been encountered within any of the monitoring wells over the monitoring period from May 2008 onwards, as supported by the reported concentrations.

Groundwater levels have remained broadly consistent throughout the monitoring period and thus no change in the groundwater flow regime is apparent due to the development on the subject site. Groundwater flow remains generally towards the south-west or south-south-west.

As stated above, TPH concentrations in groundwater beneath the site have fallen by up to four orders of magnitude and since September 2008 have remained at concentrations of less than 1000ug/l, often considerably lower (<10ug/l). Given that the off-site source of the impact to groundwater remains in place (without remedial intervention) there is no benefit in undertaking any remedial action on the down hydraulic gradient plume which extends beneath the subject site. Moreover, the residual concentrations in groundwater beneath the site are not amenable to further reduction by remedial intervention, i.e. they are lower than concentrations which can be achieved by available remedial techniques.

4.4 Conclusions

The groundwater monitoring undertaken in line with the Development Plan has demonstrated a fall in hydrocarbon concentrations in groundwater by up to four orders of magnitude from those originally detected and concentrations beneath the site are lower than can be achieved through remedial intervention.

In-ground construction works have been undertaken during this monitoring period and thus it has been demonstrated that the development has not had any detrimental impact on groundwater quality.



Following discussions with the Environment Agency, it was considered that sufficient groundwater monitoring had been undertaken in order to demonstrate that development works on site had not resulted in any detrimental impact and that further monitoring was not required. A copy of the correspondence is presented in Appendix D. The Environment Agency did however recommend that one further groundwater monitoring visit be carried out to verify the monitoring and validation presented. This was undertaken in May 2009 and the results are provided with the groundwater results in Appendix C. The results of the further monitoring round undertaken support the interim assessment presented to and accepted by the Environment Agency.

It should be noted that when assessing the groundwater results that samples collected in December 2008 and January 2009 were labelled using the original borehole references. The following provides correlation of old and new borehole references.

WS1	WS2	WS3	WS4	WS5	WS8	WS9
=	=	=	=	=	=	=
WS1	WS105A	WS104	WS103	WS102	WS101	WS9

5.0 PERCHED WATER

5.1 General

A methodology for the handling and disposal of contaminated perched water was presented with the Development Plan. However no perched water was encountered during the development works undertaken on the site and thus no action was warranted.

6.0 TOPSOIL

6.1 Background

Given the former industrial/commercial use of the site and the presence of extensive hard cover or building, topsoil was absent from the site. Therefore it was necessary to import topsoil on to the site for placement within amenity soft landscaping areas and gardens with a minimum thickness of 500mm.

6.2 Import Criteria

Soils import criteria were defined within Section 7.5 and Appendix A of the Development Plan, May 2008.

6.3 Validation

In line with the above referenced soil importation criteria analytical results were presented by the topsoil provider (ECO Sustainable Solutions) for confirmation of physical and chemical suitability. These results were presented to Jonathan Driver, the Environmental Health Officer at Havant Borough Council within an email dated 8th May 2009. Acceptance of the soil analytical results was provided by Jonathan Driver within an email dated 20th May 2009, a copy of which is provided in Appendix E.



7.0 DISCOVERY STRATEGY

7.1 Abnormal Conditions

In line with the Development Plan Discovery Strategy, in the event of previously unidentified contamination or abnormal conditions were encountered; further investigation and assessment would be undertaken.

No abnormal conditions or evidence of previously unidentified contamination were encountered during the construction work undertaken on site. As such no further investigation or assessment was required.

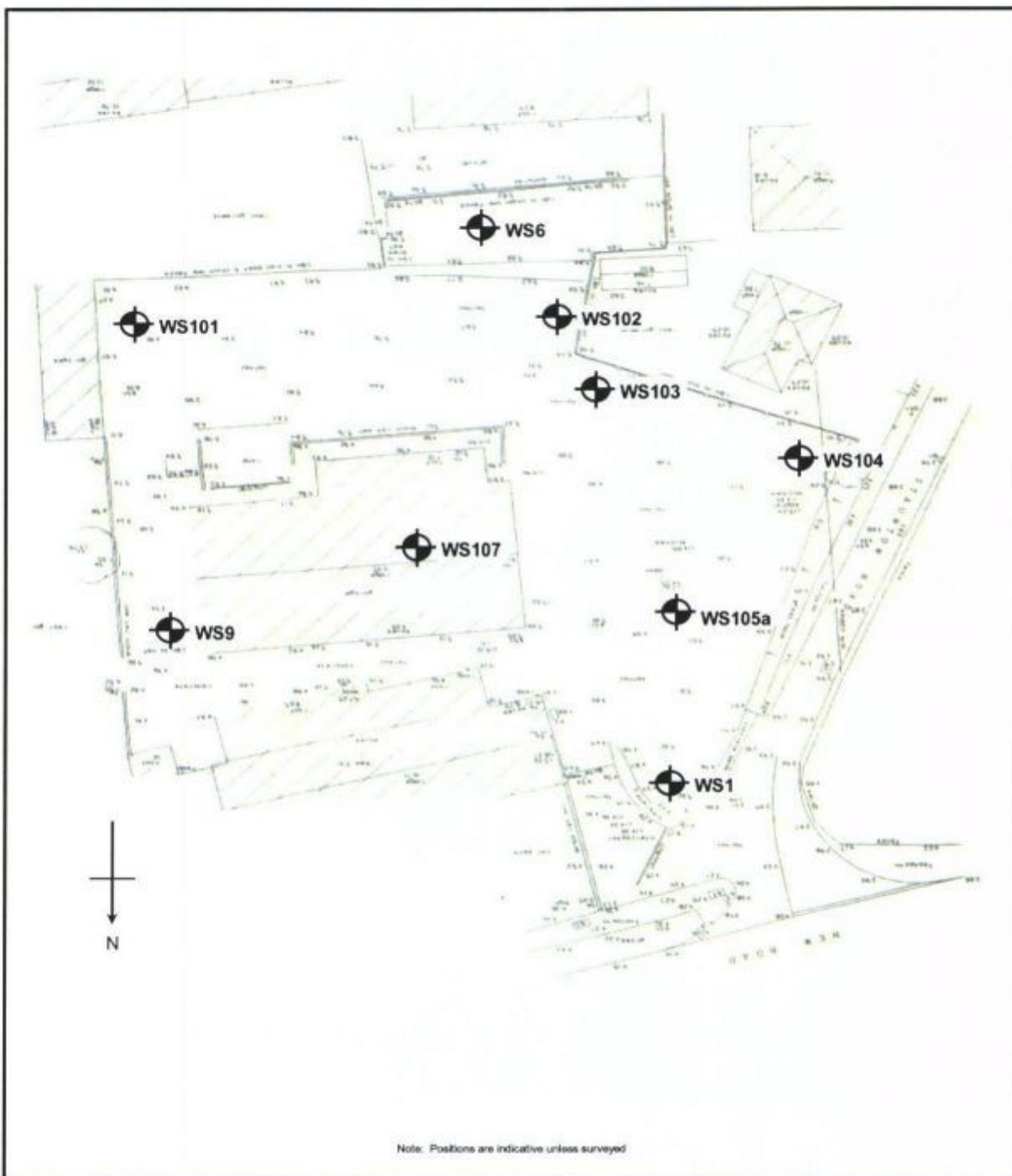


9.0 VALIDATION

On the basis of the observations, on site screening, laboratory analyses and inspection of constructed protection measures, it is concluded that remediation works as set out in the Development Plan have been completed and in doing so, the pollutant linkages which were identified during the assessment have been broken.

FIGURES

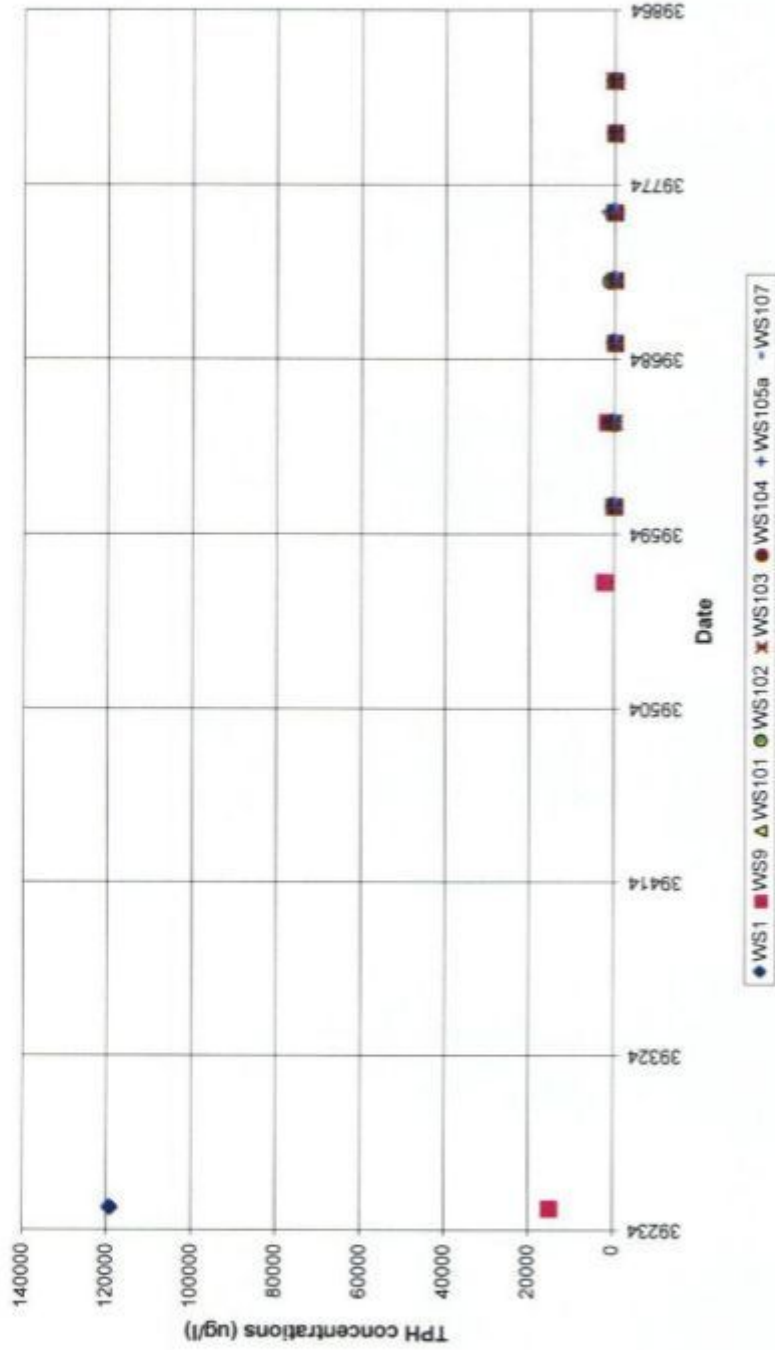




Project:	New Road, Havant			Title	Monitoring Well Locations
Client:	Woodfield Builders (Waterlooville) Limited			Geo-Environmental Services Ltd	 Geo-Environmental
Ref No:	GE6175	Revision:		28 Crescent Road, Brighton, BN2 3RP	
Drawn:	GR	Date:	17/02/2009	T: 01273 699 399 F: 01273 699 388	
Figure:	1	Scale:	Not To Scale	E: mail@gesl.net W: www.gesl.net	

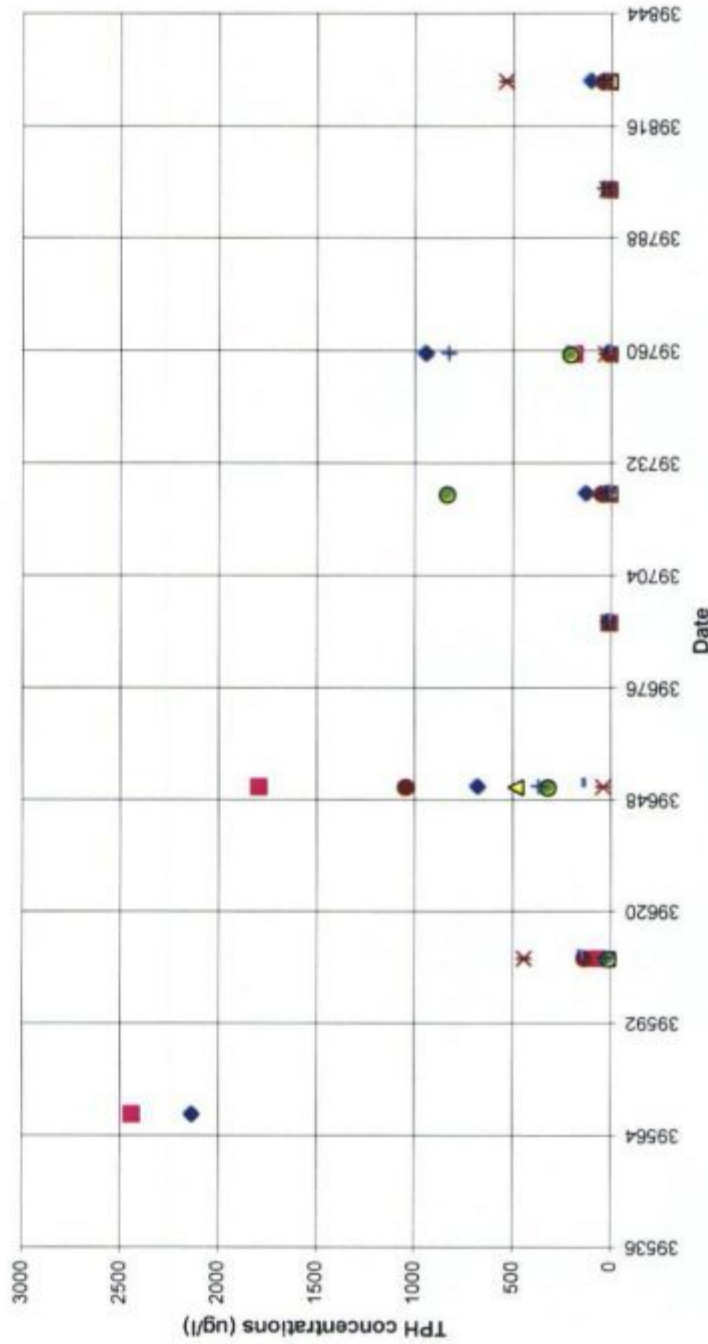


TPH concentrations 2007-2009



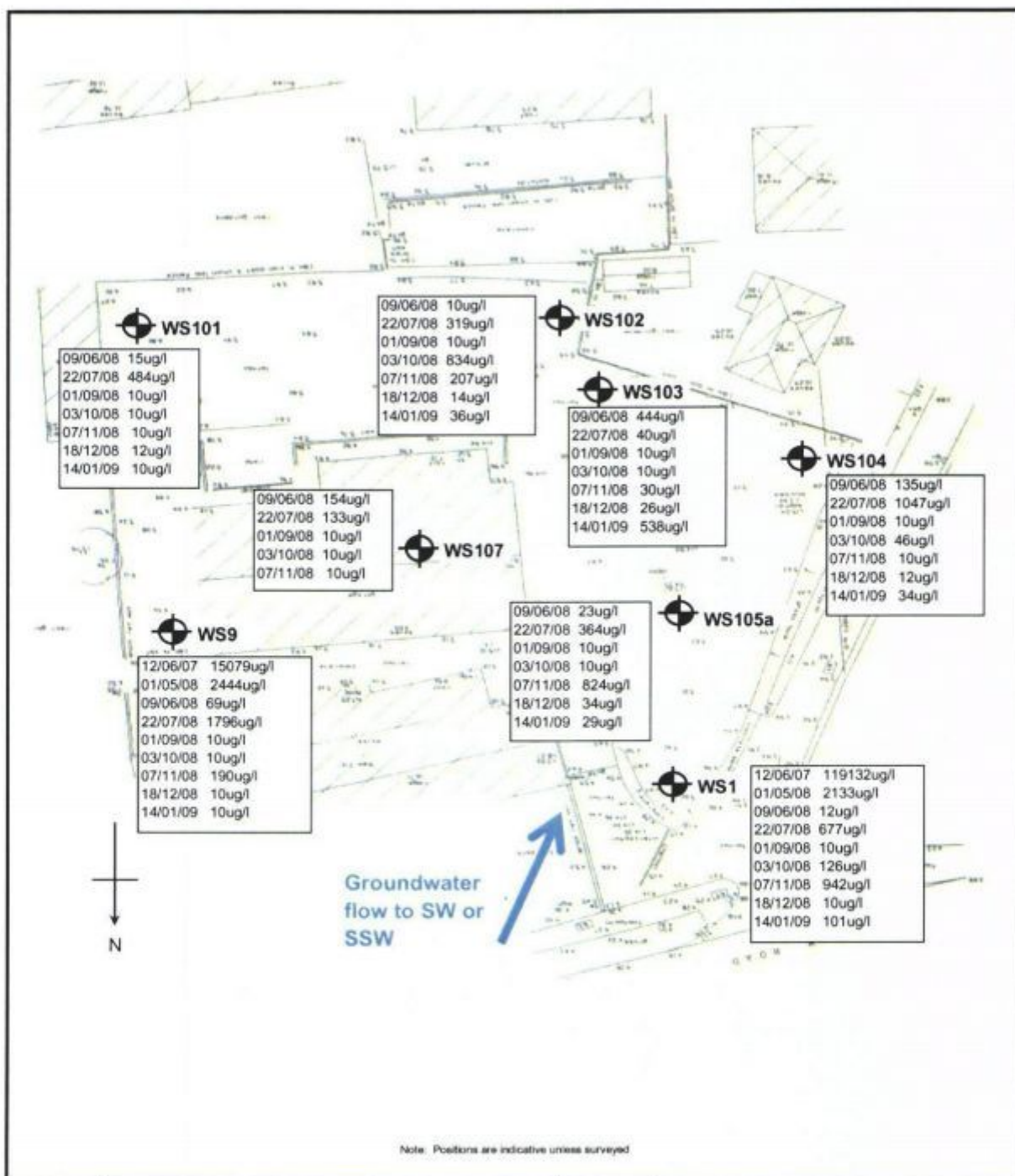
Project:	New Road, Havant			Title	TPH Concentrations in Groundwater 2007-2009
Client:	Woodfield Builders (Waterlooville) Limited			Geo Environmental Services	
Ref No:	GE6175	Revision:	28 Crescent Road, Brighton, BN2 3RP		
Drawn:	GR	Date:	T: 01273 699 399 F: 01273 699 388		
Figure:	2	Scale:	E: mail@gesl.net W: www.gesl.net		
				 Geo-Environmental	

TPH concentrations vs Time



Legend: WS1 (blue diamond), WS9 (red square), WS101 (green circle), WS102 (yellow triangle), WS103 (red cross), WS104 (red circle), WS105a (blue plus), WS107 (red asterisk)

Project:	New Road, Havant	Title		TPH Concentrations in Groundwater 2008-2009
Client:	Woodfield Builders (Waterlooville) Limited			
Ref No:	GE6175	Revision:		
Drawn:	GR	Date:	17/02/2009	
Figure:	3	Scale:	Not To Scale	
		Geo Environmental Services		 Geo-Environmental
		28 Crescent Road, Brighton, BN2 3RP		
		T: 01273 699 399 F: 01273 699 388		
		E: mail@gesl.net W: www.gesl.net		



Project: New Road, Havant			Title	TPH Concentrations overlaid on Site Plan
Client: Woodfield Builders (Waterlooville) Limited			Geo-Environmental Services Ltd	
Ref No: GE6175			28 Crescent Road, Brighton, BN2 3RP	
Drawn: GR			T: 01273 699 399 F: 01273 699 388	
Figure: 4			E: mail@gesl.net W: www.gesl.net	
Revision:				
Date: 17/02/2009				
Scale: Not To Scale				

GE6175 New Road, Havant
Water Sampling Reference Sheet

Samples collected in December 2008 and January 2009 were labelled incorrectly (using the original borehole references). The following provides correlation of old and new borehole references

WS1	WS2	WS3	WS4	WS5	WS8	WS9
↓	↓	↓	↓	↓	↓	↓
WS1	WS105a	WS104	WS103	WS102	WS101	WS9



APPENDIX A

Photographic Record of Gas Membrane Installation



Plate 1



Plate 2



Plate 3



Plate 4



Plate 5

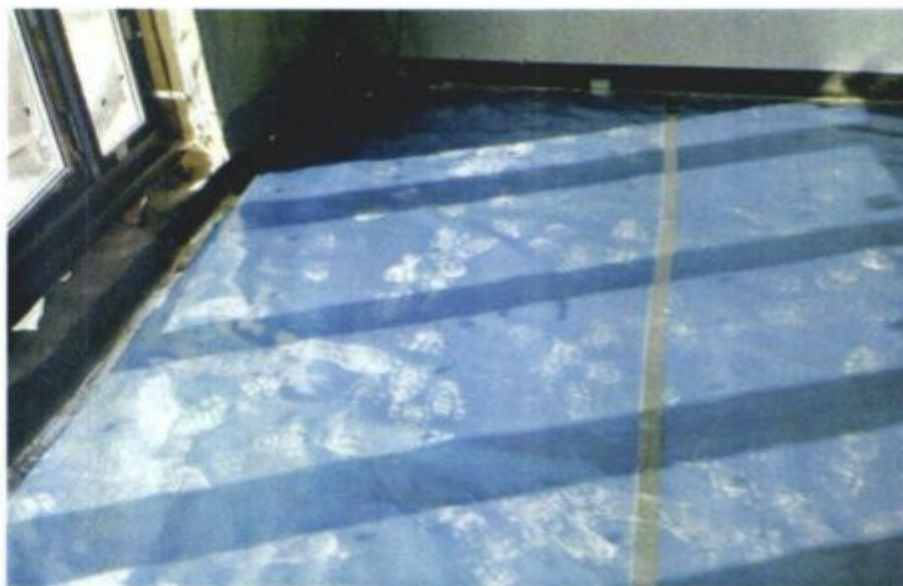


Plate 6



Plate 7



Plate 8



Plate 9



Plate 10



Plate 11



Plate 12



APPENDIX B

Groundwater Monitoring Results



The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex, BN2 3RP

Reporting Date: 13/05/2008

ANALYTICAL REPORT No. AR14559

Samples Received By:-	Laboratory Courier
Samples Received:-	28/04/08
Your Order No:	GE6175
Site Location:-	New Road Havant
No Samples Received:-	2

Report Checked By:-

Authorised By:-

Steve Knight
Laboratory Manager

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



2663

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The Harley Road Building, Unit C, Drury Lane, Portwood Industrial Estate, St Leonards-on-Sea, East Sussex, TN38 9BA

Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR14559

Location: New Road Havant



Your Order No: GE6175

Reporting Date: 13/05/2008

Waters

	TP/BH Our ref	WS1 80930	WS9 80931
Arsenic*	(µg/l)	10	<5
Cadmium*	(µg/l)	<1	<1
Chromium*	(µg/l)	<5	<5
Lead*	(µg/l)	<5	<5
Nickel*	(µg/l)	5	<1
Copper*	(µg/l)	24	20
Zinc*	(µg/l)	24	26
Mercury*	(µg/l)	<0.1	<0.1
Selenium*	(µg/l)	<5	<5
Boron	(µg/l)	121	79
Barium*	(µg/l)	50	78
Beryllium*	(µg/l)	<5	<5
Vanadium	(µg/l)	<5	<5
pH Value*	(Units)	8.4	8.1
Sulphate*	(mg/l)	14	81
Chloride*	(mg/l)	30	27
Total Cyanide*	(µg/l)	<5	<5
Sulphide	(mg/l)	<0.1	<0.1
Total Phenols	(µg/l)	<0.5	<0.5
Hexavalent Chromium	(µg/l)	<20	<20
Elemental Sulphur	(mg/l)	<0.1	<0.1

THE ENVIRONMENTAL LABORATORY LTD

The Harley Road Building, Unit C, Drury Lane, Portsmouth Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BA

Tel: 01424 718618 Fax: 01424 729911



ANALYTICAL REPORT No. AR14559

Location: New Road Havant

Your Order No: GE6175

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex, BN2 3RP

Reporting Date: 13/05/2008

Metals

	TP/BH	WS1	WS9
	Our ref	80930	80931
Naphthalene	(µg/l)	<0.01	<0.01
Acenaphthylene	(µg/l)	<0.01	<0.01
Acenaphthene	(µg/l)	<0.01	<0.01
Fluorene	(µg/l)	<0.01	<0.01
Phenanthrene	(µg/l)	<0.01	<0.01
Anthracene	(µg/l)	<0.01	<0.01
Fluoranthene	(µg/l)	<0.01	<0.01
Pyrene	(µg/l)	<0.01	<0.01
Benz[a]anthracene	(µg/l)	<0.01	<0.01
Chrysene	(µg/l)	<0.01	<0.01
Benz[b]fluoranthene	(µg/l)	<0.01	<0.01
Benz[k]fluoranthene	(µg/l)	<0.01	<0.01
Benzo[a]pyrene	(µg/l)	<0.01	<0.01
Indeno[1,2,3-cd]pyrene	(µg/l)	<0.01	<0.01
Dibenz[a,h]anthracene	(µg/l)	<0.01	<0.01
Benzo[ghi]perylene	(µg/l)	<0.01	<0.01
Total PAH	(µg/l)	<0.01	<0.01

THE ENVIRONMENTAL LABORATORY LTD

The Harkey Road Building, Unit C, Drury Lane, Portsmouth Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BA

Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR14559

Location: New Road Havant

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex, BN2 3RP



Your Order No: GE6175

Reporting Date: 13/05/08

TPH, Oils & Waters

	TP/BH Our ref	WS1 80930	WS9 80931
Aromatic			
>C ₅ -C ₇	(µg/l)	<10	<10
>C ₇ -C ₉	(µg/l)	<10	<10
>C ₉ -C ₁₀	(µg/l)	<10	<10
>C ₁₀ -C ₁₂	(µg/l)	<10	<10
>C ₁₂ -C ₁₄	(µg/l)	<10	<10
>C ₁₄ -C ₂₁	(µg/l)	<10	<10
>C ₂₁ -C ₃₀	(µg/l)	41	28
Aliphatic			
>C ₅ -C ₆	(µg/l)	<10	<10
>C ₆ -C ₈	(µg/l)	<10	<10
>C ₈ -C ₁₀	(µg/l)	65	<10
>C ₁₀ -C ₁₂	(µg/l)	268	39
>C ₁₂ -C ₁₄	(µg/l)	651	254
>C ₁₄ -C ₂₁	(µg/l)	827	461
>C ₂₁ -C ₃₀	(µg/l)	281	1662
TPH (C ₄ - C ₄₀)	(µg/l)	2133	2444
Benzene	(µg/l)	<1	<1
Toluene	(µg/l)	<1	<1
Ethyl Benzene	(µg/l)	<1	<1
Xylenes	(µg/l)	<1	<1
MTBE	(µg/l)	<1	<1



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THE ENVIRONMENTAL LABORATORY LTD

WATER SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number AR14559
Your Ref No: GE6175
Sample Receipt Date: 28/04/08
Reporting Date: 13/05/08

Registered: 28/04/08
Prepared: 29/04/08
Analysis complete: 13/05/08

WATER TEST METHOD SUMMARY

PARAMETER	Method Number	Technique
Arsenic*	101	ICPMS
Cadmium*	101	ICPMS
Chromium*	101	ICPMS
Lead*	101	ICPMS
Nickel*	101	ICPMS
Copper*	101	ICPMS
Zinc*	101	ICPMS
Mercury*	101	ICPMS
Selenium*	101	ICPMS
Boron	203	Colorimetry
pH Value*	113	Electrometric
Sulphate*	131	Ion Chromatography
Chloride*	131	Ion Chromatography
Total Cyanide*	130	Colorimetry
Sulphide	134	Colorimetry
Total Phenols	121	HPLC
Hexavalent Chromium	110	Colorimetry
Elemental Sulphur	122	HPLC
Speciated PAH	135	GCMS
Carbon Banding (TPH)	117	Gas chromatography

* = UKAS Accredited test

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THE ENVIRONMENTAL LABORATORY LTD

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
BN2 3RP

Reporting Date: 23/06/2008

ANALYTICAL REPORT No. AR15329

Samples Received By:-	Laboratory Courier
Samples Received:-	10/06/08
Your Ref No:	GE6175
Site Location:-	New Road, Havant
No Samples Received:-	8
Date of Sampling	09/06/08

Report Checked By:-

Steve Knight
Laboratory Manager

Authorised By:-

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

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Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR15329

Location: New Road, Havant

Your Ref No: GE6175

Reporting Date: 23/06/08

F.A.O. Laura Probert
Geo-Environmental Services Ltd
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Brighton
BN2 3RP

Waters

Aromatic

TP/BH	WS1	WS9	WS101	WS102	WS103	WS104	WS105A	WS107
Depth	1.70	1.55	3.80	2.50	2.35	2.60	2.10	2.00
Our ref	85975	85976	85977	85978	85979	85980	85981	85982
(µg/l)	<10	<10	<10	<10	<10	<10	<10	<10
>C ₅ -C ₇	<10	<10	<10	<10	10	<10	<10	<10
>C ₇ -C ₉	<10	<10	<10	<10	<10	<10	<10	14
>C ₉ -C ₁₀	<10	<10	<10	<10	<10	<10	<10	<10
>C ₁₀ -C ₁₂	<10	<10	<10	<10	<10	<10	<10	59
>C ₁₂ -C ₁₆	<10	<10	<10	<10	<10	48	<10	31
>C ₁₆ -C ₂₁	<10	<10	15	<10	<10	66	<10	<10
>C ₂₁ -C ₃₅	<10	<10	<10	<10	<10	<10	23	<10

Aliphatic

(µg/l)	<10	<10	<10	<10	<10	<10	<10	<10
>C ₅ -C ₆	<10	<10	<10	<10	<10	<10	<10	<10
>C ₆ -C ₈	<10	<10	<10	<10	<10	<10	<10	<10
>C ₈ -C ₁₀	<10	<10	<10	<10	<10	<10	<10	<10
>C ₁₀ -C ₁₂	<10	<10	<10	<10	39	21	<10	<10
>C ₁₂ -C ₁₆	<10	<10	<10	<10	148	<10	<10	<10
>C ₁₆ -C ₂₁	12	<10	<10	<10	71	<10	<10	<10
>C ₂₁ -C ₃₅	<10	69	<10	<10	176	<10	<10	50

TPH (C₆ - C₄₀)

(µg/l)	12	69	15	<10	444	135	23	154
(µg/l)	<1	<1	<1	<1	<1	<1	<1	<1
(µg/l)	<1	<1	<1	<1	4	<1	<1	<1
(µg/l)	<1	<1	<1	<1	10	<1	<1	<1
(µg/l)	<1	<1	<1	<1	<1	<1	<1	<1

Benzene
Toluene
Ethyl Benzene
Xylenes
MTBE



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WATER SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number AR15329
Your Ref No: GE6175
Sample Receipt Date: 10/06/08
Reporting Date: 23/06/08

Registered: 10/06/08
Prepared: 24/06/08
Analysis complete: 23/06/08

WATER TEST METHOD SUMMARY

PARAMETER	Method Number	Technique
Carbon Banding (TPH)	117	Gas chromatography
Benzene	154	GCMS
Toluene	154	GCMS
Ethyl Benzene	154	GCMS
Xylenes	154	GCMS
MTBE	154	GCMS

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THE ENVIRONMENTAL LABORATORY LTD

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
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East Sussex, BN2 3RP

Reporting Date: 06/08/2008

ANALYTICAL REPORT No. AR16111

Samples Received By:-	Laboratory Courier
Samples Received:-	22/07/08
Your Ref No:	GE6175
Site Location:-	New Road, Havant
No Samples Received:-	8

Report Checked By:-

Authorised By:-

Steve Knight
Laboratory Manager

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

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Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR16111

Location: New Road, Havant

Your Ref No: GE6175

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex, BN2 3RP

Reporting Date: 06/08/08



Waters

Aromatic

TP/BH	WS1	WS9	WS101	WS102	WS103	WS104	WS105A	WS107
Our ref	91115	91116	91117	91118	91119	91120	91121	91122
(µg/l)	<10	<10	<10	<10	<10	<10	<10	<10
>C ₉ -C ₇	<10	<10	<10	<10	<10	<10	<10	<10
>C ₇ -C ₆	<10	<10	<10	<10	<10	<10	<10	<10
>C ₆ -C ₁₀	<10	<10	<10	<10	<10	<10	<10	<10
>C ₁₀ -C ₁₂	43	<10	<10	<10	<10	<10	<10	<10
>C ₁₂ -C ₁₆	54	88	24	<10	<10	36	<10	12
>C ₁₆ -C ₂₁	82	102	<10	<10	<10	<10	<10	<10
>C ₂₁ -C ₃₅	<10	<10	<10	<10	<10	<10	<10	<10

Aliphatic

(µg/l)	<10	<10	<10	<10	<10	<10	<10	<10
>C ₅ -C ₆	<10	<10	<10	<10	<10	<10	<10	<10
>C ₆ -C ₈	22	<10	<10	<10	<10	<10	<10	<10
>C ₈ -C ₁₀	11	<10	41	<10	<10	38	<10	<10
>C ₁₀ -C ₁₂	83	29	75	<10	<10	183	<10	<10
>C ₁₂ -C ₁₆	153	258	<10	19	<10	184	<10	<10
>C ₁₆ -C ₂₁	219	383	52	98	<10	90	<10	<10
>C ₂₁ -C ₃₅	10	936	292	202	40	516	<10	121

TPH (C₆ - C₄₀)

(µg/l)	677	1796	484	319	40	1047	364	133
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Benzene
Toluene
Ethyl Benzene
Xylenes
MTBE

(µg/l)	<1	<1	<1	<1	<1	<1	<1	<1
(µg/l)	<1	<1	<1	<1	<1	<1	<1	<1
(µg/l)	<1	<1	<1	<1	1	<1	<1	<1
(µg/l)	<1	<1	2	<1	3	1	1	2
(µg/l)	<1	<1	<1	<1	<1	<1	<1	<1



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WATER SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number AR16111
Your Ref No: GE6175
Sample Receipt Date: 22/07/08
Reporting Date: 06/08/08

Registered: 22/07/08
Prepared: 07/08/08
Analysis complete: 06/08/08

WATER TEST METHOD SUMMARY

PARAMETER	Method Number	Technique
Carbon Banding (TPH)	117	Gas chromatography
Benzene	154	GCMS
Toluene	154	GCMS
Ethyl Benzene	154	GCMS
Xylenes	154	GCMS
MTBE	154	GCMS

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F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
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East Sussex, BN2 3RP

Reporting Date: 12/09/2008

ANALYTICAL REPORT No. AR16826

Samples Received By:-	Laboratory Courier
Samples Received:-	03/09/08
Your Ref No:	GE6175
Site Location:-	New Road Havant
No Samples Received:-	8
Date of Sampling	01/09/08

Report Checked By:-

Steve Knight
Laboratory Manager

Authorised By:-

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

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ANALYTICAL REPORT No. AR16826

Location: New Road Havant

Your Ref No: GE6175

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex, BN2 3RP

Reporting Date: 12/09/08

Date Sample	TP/BH	Our ref	01/09/08	01/09/08	01/09/08	01/09/08	01/09/08	01/09/08	01/09/08
			WS1	WS9	WS101	WS102	WS103	WS104	WS107
			96099	96100	96101	96102	96103	96104	96106
Waters									
Aromatic									
>C ₅ -C ₇	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₇ -C ₈	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₈ -C ₁₀	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₁₀ -C ₁₂	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₁₂ -C ₁₄	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₁₄ -C ₂₁	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₂₁ -C ₃₅	(µg/l)		<10	<10	<10	<10	<10	<10	<10
Aliphatic									
>C ₅ -C ₆	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₆ -C ₈	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₈ -C ₁₀	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₁₀ -C ₁₂	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₁₂ -C ₁₄	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₁₄ -C ₂₁	(µg/l)		<10	<10	<10	<10	<10	<10	<10
>C ₂₁ -C ₃₅	(µg/l)		<10	<10	<10	<10	<10	<10	<10
TPH (C₆ - C₄₀)									
	(µg/l)		<10	<10	<10	<10	<10	<10	<10
Benzene									
Toluene	(µg/l)		<1	<1	<1	<1	<1	<1	<1
Ethyl Benzene	(µg/l)		<1	<1	<1	<1	<1	<1	<1
Xylenes	(µg/l)		<1	<1	<1	<1	<1	<1	<1
MTBE	(µg/l)		<1	<1	<1	<1	<1	<1	<1



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THE ENVIRONMENTAL LABORATORY LTD

WATER SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number AR16826
Your Ref No: GE6175
Sample Receipt Date: 03/09/08
Reporting Date: 12/09/08

Registered: 03/09/08
Prepared: 04/09/08
Analysis complete: 12/09/08

WATER TEST METHOD SUMMARY

PARAMETER	Method Number	Technique
Carbon Banding (TPH)	117	Gas chromatography
Benzene	154	GCMS
Toluene	154	GCMS
Ethyl Benzene	154	GCMS
Xylenes	154	GCMS
MTBE	154	GCMS

Determinands not marked with * or ** are not accredited

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THE ENVIRONMENTAL LABORATORY LTD

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex, BN2 3RP

Reporting Date: 16/10/2008

ANALYTICAL REPORT No. AR17325

Samples Received By:-	Laboratory Courier
Samples Received:-	03/10/08
Site Location:-	New Road, Havant
Job Number:	GE6175
No Samples Received:-	8

Report Checked By:-

Steve Knight
Laboratory Manager

Authorised By:-

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

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Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR17325

Location: New Road, Havant



Your Job No:

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex, BN2 3RP

Reporting Date:

Waters

Aromatic

>C ₅ -C ₇	(µg/l)	WS1	WS9	WS101	WS102	W103	W104	WS105A	WS107
		98994	98995	98996	98997	98998	98999	99000	99001
>C ₇ -C ₈	(µg/l)	<10	<10	<10	<10	<10	<10	<10	<10
>C ₈ -C ₁₀	(µg/l)	<10	<10	<10	<10	<10	<10	<10	<10
>C ₁₀ -C ₁₂	(µg/l)	<10	<10	<10	<10	<10	<10	<10	<10
>C ₁₂ -C ₁₆	(µg/l)	<10	<10	<10	<10	<10	16	<10	<10
>C ₁₆ -C ₂₁	(µg/l)	<10	<10	<10	<10	<10	17	<10	<10
>C ₂₁ -C ₃₅	(µg/l)	<10	<10	<10	168	<10	12	<10	<10

Aliphatic

>C ₅ -C ₆	(µg/l)	<10	<10	<10	<10	<10	<10	<10	<10
>C ₆ -C ₈	(µg/l)	<10	<10	<10	<10	<10	<10	<10	<10
>C ₈ -C ₁₀	(µg/l)	<10	<10	<10	<10	<10	<10	<10	<10
>C ₁₀ -C ₁₂	(µg/l)	34	<10	<10	<10	<10	<10	<10	<10
>C ₁₂ -C ₁₆	(µg/l)	45	<10	<10	<10	<10	<10	<10	<10
>C ₁₆ -C ₂₁	(µg/l)	37	<10	<10	<10	<10	<10	<10	<10
>C ₂₁ -C ₃₅	(µg/l)	<10	<10	<10	666	<10	<10	<10	<10

TPH (C₆ - C₆₀)

	(µg/l)	126	<10	<10	834	<10	46	<10	<10
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Benzene
Toluene
Ethyl Benzene
Xylenes
MTBE

	(µg/l)	<1	<1	<1	<1	<1	<1	<1	<1
	(µg/l)	<1	<1	<1	<1	<1	<1	<1	<1
	(µg/l)	<1	<1	<1	<1	<1	<1	<1	<1
	(µg/l)	<1	<1	<1	<1	<1	<1	<1	<1
	(µg/l)	<1	<1	<1	<1	<1	<1	<1	<1



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THE ENVIRONMENTAL LABORATORY LTD

WATER SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number AR17325
Your Ref No: GE6175
Sample Receipt Date: 03/10/08
Reporting Date: 15/10/08

Registered: 03/10/08
Prepared: 04/10/08
Analysis complete: 15/10/08

WATER TEST METHOD SUMMARY

PARAMETER	Method Number	Technique
Carbon Banding (TPH)	117	Gas chromatography
Benzene	154	GCMS
Toluene	154	GCMS
Ethyl Benzene	154	GCMS
Xylenes	154	GCMS
MTBE	154	GCMS

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THE ENVIRONMENTAL LABORATORY LTD

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton, East Sussex
BN2 3RP

Reporting Date: 19/11/2008

ANALYTICAL REPORT No. AR17951

Samples Received By:-	Laboratory Courier
Samples Received:-	07/11/08
Your Job No:	GE6175
Site Location:-	New Road Havant
No Samples Received:-	8

Report Checked By:-

Authorised By:-

Steve Knight
Laboratory Manager

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

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THE ENVIRONMENTAL LABORATORY LTD

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Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR17951

Location: New Road Havant



Your Job No: GE6175

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton, East Sussex
BN2 3RP

Reporting Date: 19/11/2008

Sample reference	WS1	WS9	WS101	WS102	WS103	WS104	WS105A	WS107
Our ref	3571	3572	3573	3574	3575	3576	3577	3578
Aromatic								
>C ₅ -C ₇	<10	<10	<10	<10	<10	<10	<10	<10
>C ₇ -C ₉	<10	<10	<10	<10	<10	<10	<10	<10
>C ₉ -C ₁₀	<10	<10	<10	<10	<10	<10	<10	<10
>C ₁₀ -C ₁₂	17	<10	<10	10	<10	<10	<10	<10
>C ₁₂ -C ₁₄	79	<10	<10	<10	<10	<10	<10	<10
>C ₁₄ -C ₂₁	131	35	<10	11	<10	<10	198	<10
>C ₂₁ -C ₂₈	<10	<10	<10	67	<10	<10	301	<10
Aliphatic								
>C ₅ -C ₆	<10	<10	<10	<10	<10	<10	<10	<10
>C ₆ -C ₈	<10	<10	<10	<10	<10	<10	<10	<10
>C ₈ -C ₁₀	31	<10	<10	<10	<10	<10	<10	<10
>C ₁₀ -C ₁₂	105	<10	<10	<10	<10	10	<10	<10
>C ₁₂ -C ₁₄	253	24	<10	<10	<10	<10	<10	<10
>C ₁₄ -C ₂₁	287	47	<10	<10	<10	<10	18	<10
>C ₂₁ -C ₂₈	39	104	<10	119	30	<10	307	<10
TPH (C ₆ - C ₂₈)	942	190	<10	207	30	10	824	<10
Benzene	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	<1	<1	<1	<1	<1	<1	<1	<1
Ethyl Benzene	4	2	2	<1	<1	<1	<1	<1
Xylenes	5	2	2	<1	<1	<1	<1	<1
MTBE	<1	<1	<1	<1	<1	<1	<1	<1



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Facsimile (01424) 729911

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WATER SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number	AR17951
Your Ref No:	GE6175
Sample Receipt Date:	07/11/08
Reporting Date:	19/11/08
Registered:	07/11/08
Prepared:	08/11/08
Analysis complete:	19/11/08

WATER TEST METHOD SUMMARY

PARAMETER	Method Number	Technique
Carbon Banding (TPH)	117	Gas chromatography
Benzene	154	GCMS
Toluene	154	GCMS
Ethyl Benzene	154	GCMS
Xylenes	154	GCMS
MTBE	154	GCMS

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F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex, BN2 3RP

Reporting Date: 12/01/2009

ANALYTICAL REPORT No. AR18728

Samples Received By:-	Laboratory Courier
Samples Received:-	05/01/09
Your Job No:	GE6175
Site Location:-	New Road Havant
No Samples Received:-	7
Date of Sampling	18/12/08

Report Checked By:-

Steve Knight
Laboratory Manager

Authorised By:-

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

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Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT NO. AR18728

Location: New Road Havant

Your Job No: GE6175

F.A.O. Laura Probert
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex BN2 3RP

Reporting Date: 12/01/2009

Waters	Date Sampled TP/BH Our ref	18/12/08 WS1 8132	18/12/08 WS2 8133	18/12/08 WS3 8134	18/12/08 WS4 8135	18/12/08 WS5 8136	18/12/08 WS8 8137	18/12/08 WS9 8138
Aromatic								
>C ₉ -C ₇	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₉ -C ₆	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₉ -C ₁₀	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₁₁ -C ₁₂	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₁₂ -C ₁₄	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₁₄ -C ₂₁	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₁₇ -C ₂₆	(µg/l)	<10	<10	12	12	<10	12	<10
Aliphatic								
>C ₉ -C ₆	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₉ -C ₆	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₉ -C ₁₀	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₁₁ -C ₁₂	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₁₂ -C ₁₄	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₁₄ -C ₂₁	(µg/l)	<10	<10	<10	<10	<10	<10	<10
>C ₂₁ -C ₂₆	(µg/l)	<10	34	<10	14	14	<10	<10
TPH (C ₆ - C ₂₆)	(µg/l)	<10	34	12	26	14	12	<10
Benzene	(µg/l)	<1	<1	<1	<1	<1	<1	<1
Toluene	(µg/l)	<1	<1	<1	<1	<1	<1	<1
Ethyl Benzene	(µg/l)	<1	<1	<1	<1	<1	<1	<1
Xylenes	(µg/l)	<1	<1	<1	<1	<1	<1	<1
MTBE	(µg/l)	<1	<1	<1	<1	<1	<1	<1



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WATER SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number	AR18728
Your Ref No:	GE6175
Sample Receipt Date:	05/01/09
Reporting Date:	12/01/09
Registered:	05/01/09
Prepared:	06/01/09
Analysis complete:	12/01/09

WATER TEST METHOD SUMMARY

PARAMETER	Method Number	Technique
Carbon Banding (TPH)	117	Gas chromatography
Benzene	154	GCMS
Toluene	154	GCMS
Ethyl Benzene	154	GCMS
Xylenes	154	GCMS
MTBE	154	GCMS

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F.A.O. Gavin Roberts
Geo-Environmental Services Ltd
28 Crescent Road
Brighton, East Sussex
BN2 3RP

Reporting Date: 27/01/2009

ANALYTICAL REPORT No. AR18872

Samples Received By:-	Laboratory Courier
Samples Received:-	14/01/09
Your Job No:	GE6175
Site Location:-	New Road Havant, Woodfield Builders
No Samples Received:-	7

Report Checked By:-

Authorised By:-

Steve Knight
Laboratory Manager

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

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F.A.O. Gavin Roberts
Geo-Environmental Services Ltd
28 Crescent Road
Brighton, East Sussex
BN2 3RP

Waters

	WS1	WS2	WS3	WS4	WS5	WS8	WS9
TP/BH	9067	9088	9069	9070	9071	9072	9073
Our ref							

Aromatiza

[illegible]

Aliphatic

[illegible]TPH ($C_0 - C_{\infty}$)

Concentration ($\mu\text{g/l}$)	29	34	538	36	<10	<10
101						

Benzene

Year	1990	1991	1992	1993	1994
1990	1.0	1.0	1.0	1.0	1.0
1991	1.0	1.0	1.0	1.0	1.0
1992	1.0	1.0	1.0	1.0	1.0
1993	1.0	1.0	1.0	1.0	1.0
1994	1.0	1.0	1.0	1.0	1.0

Toluene

[illegible]

Ethyl Benzene

[illegible]

Xylenes

[illegible]

MTBE

Γ_1	Γ_2	Γ_3	Γ_4	Γ_5	(l_1/m_1)
Γ_1	Γ_1	Γ_1	Γ_1	Γ_1	
Γ_2	Γ_2	Γ_2	Γ_2	Γ_2	
Γ_3	Γ_3	Γ_3	Γ_3	Γ_3	
Γ_4	Γ_4	Γ_4	Γ_4	Γ_4	
Γ_5	Γ_5	Γ_5	Γ_5	Γ_5	



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THE ENVIRONMENTAL LABORATORY LTD

WATER SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number	AR18872
Your Ref No:	GE6175
Sample Receipt Date:	14/01/09
Reporting Date:	27/01/09
Registered:	14/01/09
Prepared:	15/01/09
Analysis complete:	27/01/09

WATER TEST METHOD SUMMARY

PARAMETER	Method Number	Technique
Carbon Banding (TPH)	117	Gas chromatography
Benzene	154	GCMS
Toluene	154	GCMS
Ethyl Benzene	154	GCMS
Xylenes	154	GCMS
MTBE	154	GCMS

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APPENDIX C

Interim Groundwater Validation Letter

17 February 2009

Your ref: HA/2008/103947
Planning ref: 06/66809/001
Our ref: GE6175/GR01



Environment Agency
Planning Liaison – South Downs
Guildbourne House
Chatsworth Road
Worthing
BN11 1LD

FAO Ms Catherine McLeod

Dear Sir/Madam,

RE: Land off New Road, Havant, Hampshire PO9 1DE

Further to issue of the Development Plan (Geo-Environmental ref. GE6175/Development Plan dated May 2008) and subsequent discussions with the Environment Agency, we write to present the assessment of groundwater monitoring on this site.

Background

The site has been the subject of several phases of assessment which identified that hydrocarbon impacted groundwater was present beneath the site. Groundwater modelling indicated a shallow hydraulic gradient flowing towards the south-west or south-south-west, i.e. broadly consistent with the nearby Hermitage Stream. The assessment also identified underground fuel storage tanks immediately up-gradient of the site's northern boundary. Therefore remediation of the groundwater beneath the subject site would have proved ineffective for as long as the up-gradient (off-site) source remained in place.

As such, the development was planned so as not to exacerbate the situation or create any new pollutant linkages. This was acknowledged in your letter dated 19 June 2008.

Notwithstanding this, the Development Plan set out a protocol for groundwater monitoring over a period of up to 24 months. The purpose of the monitoring was to demonstrate that natural attenuation was occurring and also that the development did not result in increased hydrocarbon concentrations in the groundwater.

Groundwater Monitoring Programme

The Development Plan set out the following monitoring proposals:

Locations	Frequency	Suite of analysis	Phase
All	Monthly	Speciated PAH,	Initial 6 month
All	Bi monthly	Speciated TPH, BTEX,	6-12 months
All	Quarterly	MTBE, Groundwater Level.	12-24 months

Table 1 – Proposed Groundwater Monitoring Programme

Geo-Environmental Services Ltd
28 Crescent Road, Brighton, East Sussex, BN2 3RP
T: 01273 699 399 F: 01273 699 388 E: mail@gesl.net W: www.gesl.net

Environmental Consultants | Geotechnical Engineers | Site Investigations

Geo-Environmental Services Ltd incorporated in England number 3214980 VAT number 679544479

Groundwater monitoring was proposed to be carried out during and/or after the remediation works and development works in order to demonstrate that the works undertaken have not resulted in a detrimental impact to controlled waters. The Plan also noted that free product, if present, would require removal from the groundwater.

The monitoring well locations are presented in Figure 1.

Monitoring Results

Groundwater monitoring commenced in June 2008 and has been undertaken in line with the proposed frequency set out in Table 1 above. The results from this monitoring are presented in Table 2 below, which also includes monitoring presented within the Development Plan and original Ground Appraisal Report.

	12/06/2007	01/05/2008	09/06/2008	22/07/2008	01/09/2008	03/10/2008	07/11/2008	18/12/2008	14/01/2009
WS1	119132	2133	12	677	10	126	942	10	101
WS9	15079	2444	69	1796	10	10	190	10	10
WS101			15	484	10	10	10	12	10
WS102			10	319	10	834	207	14	36
WS103			444	40	10	10	30	26	538
WS104			135	1047	10	46	10	12	34
WS105			23	364	10	10	824	34	29
WS107			154	133	10	10	10		

Table 2 C6-40 TPH Concentrations in Groundwater (µg/l)

Given the magnitude of the reduction in TPH concentrations in groundwater over this period, it was necessary to plot the results at two different scales, Figure 2 presents the results from June 2007 onwards and Figure 3 presents the results from May 2008 onwards. As can be seen from the presented results, concentrations in WS1 and WS9 have fallen by three to four orders of magnitude and three orders of magnitude, respectively, from those reported in 2007. Additionally, monitoring results from elsewhere across the site indicates the possible margin of a dissolved phase plume. Analysis for BTEX and MTBE compounds has not identified any concentrations which exceed Drinking Water Standards or Environmental Quality Standards.

Free product has not been encountered within any of the monitoring wells over the monitoring period from May 2008 onwards, as supported by the reported concentrations.

Groundwater levels have remained broadly consistent throughout the monitoring period and thus no change in the groundwater flow regime is apparent due to the development on the subject site. Groundwater flow remains generally towards the south-west or south-south-west.

As stated above, TPH concentrations in groundwater beneath the site have fallen by up to four orders of magnitude and since September 2008 have remained at concentrations of less than 1000µg/l, often considerably lower (<10µg/l). Given that the off-site source of the impact to groundwater remains in place (without remedial intervention) there is no benefit in undertaking any remedial action on the down hydraulic gradient plume which extends beneath the subject site. Moreover, the residual concentrations in groundwater beneath the site are not amenable to further

reduction by remedial intervention, i.e. they are lower than concentrations which can be achieved by available remedial techniques.

Conclusions and Recommendations

The groundwater monitoring undertaken in line with the Development Plan has demonstrated a fall in hydrocarbon concentrations in groundwater by up to four orders of magnitude from those originally detected and concentrations beneath the site are lower than can be achieved through remedial intervention.

In-ground construction works have been undertaken during this monitoring period and thus it has been demonstrated that the development has not had any detrimental impact on groundwater quality.

Whilst the Development Plan included proposals for monitoring to extend for up to 24 months, given the results presented herein from the first six months of that proposed period, it is requested that the Environment Agency now consider one of the two following options:

1. Approval to terminate groundwater monitoring;
2. Approval to shorten the groundwater monitoring period and move to bi-monthly monitoring for the next 6 months.

We look forward to receipt of your response at your earliest opportunity. Should you have any queries please do not hesitate to contact us.

Yours sincerely
For and on Behalf of GESL



GAVIN ROBERTS CGeol, BEng (Hons), MSc, FGS
Principal Geo-Environmental Engineer
Email: gavin@gesl.net

cc M Barber - Woodfield Builders (Waterlooville) Limited
Planning Department - Havant Borough Council
J Driver - Havant Borough Council

Enc Figure 1 - Monitoring Well Location Plan
Figure 2 - TPH concentrations in Groundwater 2007-2009
Figure 3 - TPH concentrations in Groundwater 2008-2009
Figure 4 - TPH concentrations overlaid on Site Plan
Laboratory Test Results - May 2008; June 2008; July 2008; September 2008; October 2008; November 2008;
December 2008; January 2009

APPENDIX D

EA Correspondence and Acceptance Letter

Gavin Roberts
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex
BN2 3RP

Our ref: HA/2008/103947/03-L01
Your ref: 06/66809/001
Date: 10 March 2009

Dear Gavin

**GROUNDWATER VALIDATION REPORT. DEMOLISH EXISTING WAREHOUSE,
CONSTRUCTION OF 10 NO. TERRACED AND SEMI DETACHED 2 AND 3
BEDROOM HOUSES AND 3 NO. 2 BEDROOM APARTMENTS. ASSOCIATED
CAR PARKING, BIN STORES AND CYCLE STORES AND NEW ACCESS TO
STAUNTON ROAD.
NEW ROAD, HAVANT, HAMPSHIRE, PO9 1DE.**

Thank you for your letter of 17 February 2009 (your ref GE6175/GR01) detailing the results of the groundwater monitoring completed to date and requesting changes to the groundwater monitoring programme.

Whilst we acknowledge comments made in the email of 20 February 2009 from Leonard Barber we do not feel it appropriate to cease groundwater monitoring at this time. We are happy for the period of monitoring to be reduced to six months(bi-monthly), providing that a review of data and need for additional monitoring is carried out following this period.

We recommend that groundwater monitoring continues in order to:

- demonstrate that residual contamination at the site (for example present in a smear zone) is not mobilised as the groundwater table fluctuates
- demonstrate that the development has not caused mobilisation of contaminants
- provide evidence that conditions are suitable for attenuation
- provide you with further information about the quality of groundwater entering your site

We note that concentrations in the monitoring wells have reduced. Please provide an explanation for these observations?

Following the next six months of monitoring we will be happy to review the data with you.

Environment Agency
Guildbourne House Chatsworth Road, Worthing, West Sussex, BN11 1LD.
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

Cont/d..

Evaluation of any risks to human health arising from the site should be discussed with the Environmental Health Department at Havant Borough Council.

I trust that the above comments are satisfactory but if you require any further information please contact me.

Yours sincerely

Miss Catherine McLeod
Planning Liaison Officer

Direct dial 01903 703858

Direct e-mail planning.southdowns@environment-agency.gov.uk

cc Planning Department, Havant Borough Council
Environmental Health, Havant Borough Council

From: Gavin Roberts
Sent: 30 October 2009 12:08
To: Laura Probert
Subject: FW: 06/66809/001 - Land off New Road, Havant

From: Sally Smith [mailto:Sally.Smith@havant.gov.uk]
Sent: 18 March 2009 15:18
To: Gavin Roberts; Mcleod, Catherine; Sally Smith DC
Cc: Accounts; Jonathan Driver
Subject: RE: 06/66809/001 - Land off New Road, Havant

There is two of us have passed on.

Sally Smith
 Waste Strategy Team Leader

Havant Borough Council
 Southmoor Depot
 2 Penner Road
 HAVANT
 Hants
 PO9 1QH

Tel No. 023 9244 6445

From: Gavin Roberts [mailto:Gavin@gesl.net]
Sent: 18 March 2009 15:07
To: Mcleod, Catherine; Sally Smith
Cc: Accounts; Jonathan Driver
Subject: RE: 06/66809/001 - Land off New Road, Havant

Catherine

Thanks for coming back to me. The aim of the meeting is to ascertain the reasons behind regulation of groundwater on this site and the impact that has been caused by the off-site source. Our client is at a loss as to understand why they are required to continue monitoring groundwater on this site when the following facts have been established:

1. There is an off-site (up gradient) source, i.e. an underground tank farm on the Kwik Fit site [former petrol filling station].
2. This off-site source has resulted in a hydrocarbon impact to groundwater. Plume concentrations have been highest in wells closest to the off-site source and reduced in the down gradient direction.
3. The developer has ensured that all in-ground engineering, i.e. foundations, drainage and the like are kept at a level such that they do not create, nor exacerbate any pathways (as agreed with regulators prior to commencement of works). This effectively means that whatever is happening to groundwater does not impact the development, nor does the development impact upon the groundwater (and condition thereof).
4. Six months of groundwater monitoring (over the autumn and winter period) has been undertaken during the ground works phase and has demonstrated that contaminant concentrations within the groundwater are reducing. Given that the source of the groundwater impact was off-site and thus outside of the developer's control, reasons for plume reduction cannot be confirmed but are most likely to be due to dilution and attenuation.

In summary, pollution of groundwater has occurred up-gradient of the site; the development has been designed and undertaken in such a manner so as not to create or exacerbate any pollutant linkages; and

monitoring has demonstrated a reduction in plume concentrations. Whilst no enforcement action has been taken against the source site (the Polluter), the developer is being required to undertake protracted monitoring. I would note that even in the event that concentrations increased again, the developer of this site cannot undertake any remedial measures as the contamination originates up-gradient, nor should they be held responsible for any such remediation. As such, there is no apparent benefit in undertaking further monitoring. If the EA require this monitoring to be undertaken in order to build a case against the Polluter, then the planning regime is not the correct legal instrument (should be pursued through Part IIa legislation against the Polluter) and the developer of this site is not the correct party to pursue, nor pay for the monitoring.

I hope this will help to identify the correct person(s) to attend any meeting.

Kind regards

Gavin

From: Mcleod, Catherine [mailto:Catherine.MCLEOD@environment-agency.gov.uk]
Sent: 18 March 2009 13:54
To: Gavin Roberts
Subject: RE: 06/66809/001 - Land off New Road, Havant

Dear Gavin

Many thanks for your email.

The dates that are likely to be best for us are the 26th or 2nd. However, due to other commitments would it be possible for you to explain more fully what you would like to discuss in the meeting so we can ensure that the most appropriate people can attend.

Regards

Catherine McLeod
Planning Liaison Officer - South Downs
Tel: 01903 703858

From: Gavin Roberts [mailto:Gavin@gesl.net]
Sent: 17 March 2009 16:48
To: Planning Liaison, South Downs; Jonathan Driver; planning.development@havant.gov.uk; sally.smith@havant.gov.uk
Cc: Accounts
Subject: 06/66809/001 - Land off New Road, Havant

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Further to our recent correspondence with the EA with regards to groundwater on this site (specifically the hydrocarbon impact from the off-site source) I would be grateful if you would confirm your ability to attend a meeting to discuss this issue further. I acknowledge that your time is valuable and hence maybe we could meet at Havant BC offices or EA offices to save your journey times.

With regards to EA attendees I would also request that the Groundwater Officer providing advice to the LPA attends the meeting as their input is essential.

I can make any of the following dates and times:

Wednesday 25th March 10:00-12:00

Thursday 26th March 10:00-12:00

Monday 30th March 10:00-12:00

Thursday 2nd April 09:00-16:00

Kind regards

For and on behalf of GESL

Gavin Roberts

Principal Engineer

Tel: 01273 699399

Mobile: 07789 907670

email: gavin@gesl.net



Geo-Environmental

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From: Gavin Roberts
Sent: 30 October 2009 12:10
To: Laura Probert
Subject: FW: Planning Ref: 06/66809/001 Condition 19

From: Jonathan Driver [mailto:Jonathan.Driver@havant.gov.uk]
Sent: 02 April 2009 13:29
To: Sally Smith DC
Cc: Gavin Roberts; Accounts; Nick Hebden; Mcleod, Catherine
Subject: RE: Planning Ref: 06/66809/001 Condition 19

Sally,

It is ultimately the responsibility of the developer, and appropriate agents / consultants acting on behalf of the developer; to ensure that the development is suitable for its intended use (and does not pose a risk to either construction workers or site end-users).

The letter attached to the email below is taken as confirmation that suitably a qualified environmental professional has over-seen groundworks on site; and it is therefore considered sufficient evidence to satisfy condition 19. In the absence of the discovery of any unexpected contamination, or an unexpected magnitude of previously identified contamination; it is difficult to envisage any further evidence that could reasonably be required.

I can therefore confirm that no objection will be made to any future application to discharge condition 19. However, Condition 18 (site investigation, risk assessment, scheme to mitigate identified risks, monitoring & validation of the mitigation / remediation works) is still open.

As an update to progress on this front, a reduction in concurrent / post development monitoring term from 12 months, to six months (bi-monthly) has been agreed. The continuation of monitoring for this 6 month period is considered appropriate in order to quantify fluctuations in concentrations with water table movement, and provide additional information to support the previously submitted groundwater monitoring results which indicated a significant drop-off in dissolved phase concentrations from those identified in the original investigation.

The developer has however requested that the requirement for continued monitoring be waived following the recorded decline in hydrocarbon concentrations in groundwater. In this regard, HBC are now awaiting the outcome of discussions with the Environment Agency legal team; which has expertise in determining the reasonableness of requiring such monitoring in cases where the majority of contamination is derived from off-site source.

Aside from the groundwater monitoring issue, confirmation that the mitigation measures undertaken for the protection of future site users (namely HC resistant membrane, HC resistant potable water supply pipework (or confirmation that Portsmouth Water do not deem this necessary), and confirmation of both the agreed thickness & quality of clean cover in soft landscaping or garden areas) is still required to satisfy the 'validation report' element of condition 18.

Environmental Health will not be in a position to recommend discharge of this condition until these matters are resolved; although I would stress that it is rare for all elements of the Ground Contamination conditions to be satisfied prior to development completion.

Please let me know if you require a more formal response for the planning files, otherwise, I shall respond accordingly to the application for discharge of C19 when it is made.

Best Regards,

Jon

From: Gavin Roberts [mailto:Gavin@gesl.net]
Sent: 02 April 2009 11:57
To: Sally Smith DC
Cc: Accounts; Nick Hebden; Jonathan Driver; Mcleod, Catherine
Subject: Planning Ref: 06/66809/001 Condition 19

Sally

Please find attached a copy of our letter relating to Condition 19 for the site off New Road, Havant PO9 1DE.

Kind regards
For and on behalf of Geo-Environmental

Gavin Roberts
Principal Engineer

Tel: 01273 699399
Mobile: 07789 907670
email: gavin@gesl.net



Geo-Environmental

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Mr Gavin Roberts
Geo-Environmental Services Ltd
28 Crescent Road
Brighton
East Sussex
BN2 3RP

Our ref: HA/2008/103947/03-L02
Your ref: 06/66809/001
Date: 02 April 2009

Dear Gavin

GROUNDWATER VALIDATION REPORT. DEMOLISH EXISTING WAREHOUSE, CONSTRUCTION OF 10 NO. TERRACED AND SEMI DETACHED 2 AND 3 BEDROOM HOUSES AND 3 NO. 2 BEDROOM APARTMENTS. ASSOCIATED CAR PARKING, BIN STORES AND CYCLE STORES AND NEW ACCESS TO STAUNTON ROAD. NEW ROAD, HAVANT, HAMPSHIRE, PO9 1DE.

Thank you for your recent emails requesting a meeting to discuss the issue of ongoing monitoring at the above site. At this stage we consider it unnecessary to hold a meeting our reasons are set out below.

In your email of 18 March 2009, you state that you are at a loss as to why groundwater monitoring should be continued on site. However, by agreeing to the 6 month (bi-monthly) monitoring program, we were simply agreeing to the recommendations as set out in Geo Environmental's groundwater validation report for the site provided to us by cover letter dated 17 February 2009. Your email goes on to set out a number of 'established facts' which I shall address in turn below.

1. *There is an off site (up gradient) source (i.e. an underground tank on the Kwik Fit Site [former petrol filling station] - based on the information provided to us, this is agreed, however it must be noted that the off site source may not be the sole source.*
2. *This off-site source has resulted in hydrocarbon impact to groundwater. Plume concentrations have been highest in wells closest to the off-site source and reduced in the down gradient direction - based on data provided to us, this does appear to be the case. However, as previously discussed, residual contamination may be present in a smear zone, which if present, could continue to impact groundwater quality.*

Environment Agency
Guildbourne House Chatsworth Road, Worthing, West Sussex, BN11 1LD.
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk
Cont/d..

3. *The developer has ensured that all in-ground engineering, i.e. foundations, drainage and the like are kept at a level such that they do not create, nor exacerbate any pathways (as agreed with the regulators prior to the commencement of the works). This effectively means that what ever is happening to the groundwater does not impact the development, nor does the development impact upon the groundwater and condition there-of - agreed in principal, however, we have not been provided with evidence that measures undertaken have been successful, and that the groundwater has not been impacted. Further groundwater monitoring would support this statement.*
4. *Six months groundwater monitoring (over the autumn and winter period) has been undertaken during the groundwork phase and has demonstrated that contaminant concentrations within the groundwater as reducing. Given that the source of the groundwater impact was off-site and thus mostly outside the developers control, reasons for plume reduction cannot be confirmed but are most likely to be due to dilution and attenuation - agreed, however this is not sufficient data to allow assessment of trends.*

Whilst it is agreed that any remediation measures on your site would not address the off site sources of groundwater impact, as stated previously, we consider it would be appropriate for you to continue monitoring the groundwater for the reasons set out in our letter of 10 March 2009, and below for your ease of reference, to:

1. demonstrate that residual contamination at the site (for example present in a smear zone) is not mobilised as the groundwater table fluctuates;
2. demonstrate that the development has not caused mobilisation if contaminants;
3. provide evidence that conditions are suitable for attenuation; and
4. provide you with further information about the quality of groundwater entering the site.

As discussed during our meeting, until the extent of contamination has been established and the risk associated with it assessed, we are unable to confirm whether groundwater underlying your site will require remediation. Where an unacceptable risk exists, we shall take appropriate action pursuant to the correct statutory regime.

This monitoring information is not 'required' in order to build a case against the 'polluter' as stated in your email of 18 March 2009, but has been **suggested** as an appropriate action for the benefit of your site.

In terms of planning condition 18, we are now happy to recommend to Havant Borough Council that it can be discharged. However, as stated above we would recommend that you continue monitoring the groundwater.

Evaluation of any risks to human health arising from the site should be discussed with the Environmental Health Department at Havant Borough Council.

I trust that the above comments are satisfactory but if you require any further information please contact me.

Yours sincerely

Miss Catherine McLeod
Planning Liaison Officer

Direct dial 01903 703858

Direct e-mail planning.southdowns@environment-agency.gov.uk

cc Havant Borough Council (Development Control),
Havant Borough Council (Environmental Health)

End

APPENDIX E

Topsoil Validation and EHO Acceptance Letter

Client: ECO Sustainable Solutions
 Site Location: ECO Sustainable Solutions
 Report Fao: Mr P. Hardy

Laboratory Test Report

Reference: 3762ph Page 1 of 6



ACSE Sample Ref.	ACSE/1541/1	ACSE/1541/2	ACSE/1541/3	ACSE/1541/4	ACSE/1541/5	ACSE/1541/6
Client Ref.	3762	3762	3762	3762	3762	3762
Location	DNS	DNS	DNS	DNS	DNS	DNS
Sample Number	1	2	3	4	5	6
Source	DNS	DNS	DNS	DNS	DNS	DNS
Date of Sampling	27.02.09	27.02.09	27.02.09	27.02.09	27.02.09	27.02.09
Matrix	Brown Silt	Brown Silt	Brown Silt	Brown Silt	Brown Silt	Brown Silt
Determinand	Method	Units	AS	Result	Result	Result
ECO Topsoil Suite						
Arsenic	AE16	mg/kg		2.2	1.8	2.3
Cadmium	AE16	mg/kg		<0.01	<0.01	<0.01
Chromium	AE16	mg/kg		8.2	7.3	9.8
Copper	AE16	mg/kg		11	10	15
Lead	AE16	mg/kg		49	40	60
Mercury	AE16	mg/kg		<0.3	<0.3	<0.3
Nickel	AE16	mg/kg		3.9	3.6	4.9
Selenium	AE16	mg/kg		<0.4	<0.4	<0.4
Zinc	AE16	mg/kg		60	60	73
Boron (Hot Water Soluble)	AE35	mg/kg	†	0.6	0.4	0.8
pH Value	BS 1377 3:1990	pH Units	†	7.6	7.8	7.7
Cyanide (Total)	AE44	mg/kg	†	<1	<1	<1
Acid Soluble Sulphate	BS 1377 3:1990	%	†	0.11	0.12	0.07
Soil Organic Matter (SOM)	IHP	mg/kg	†	4.0	3.3	3.5
Phenols (Total)	AE23	mg/kg	†	1.5	1.1	1.1
Poly Aromatic Hydrocarbons (PAH)	AE32	mg/kg	†	14	9.0	11
Benzo (a) Pyrene	AE32	mg/kg	†	0.9	0.6	0.8
Naphthalene	AE32	mg/kg	†	0.6	0.4	0.5
Remarks: None						

AS = Accreditation Status * denotes analyses not covered by our UKAS accreditation.

SC=Sub Contracted. S denotes analyses not covered by sub-contractors UKAS accreditation

Approved:

Report Date: 09/03/2009

Approved Signatories: [] S J White Managing Director [✓] M Rowley Laboratory Manager [] D Faulkner Quality Manager

† denotes analyses not covered by our MCERTS accreditation

denotes analyses not covered by sub-contractors MCERTS accreditation

IHP = In House Procedure / Calculation



Client: ECO Sustainable Solutions
 Site Location: ECO Sustainable Solutions
 Report Fao: Mr P. Hardy

Laboratory Test Report

Reference: 3762ph Page 3 of 6



ACSE Sample Ref.	ACSE/1541/1	ACSE/1541/2	ACSE/1541/3	ACSE/1541/4	ACSE/1541/5	ACSE/1541/6
Client Ref.	3762	3762	3762	3762	3762	3762
Location	DNS	DNS	DNS	DNS	DNS	DNS
Sample Number	1	2	3	4	5	6
Source	DNS	DNS	DNS	DNS	DNS	DNS
Date of Sampling	27.02.09	27.02.09	27.02.09	27.02.09	27.02.09	27.02.09
Matrix	Brown Silt	Brown Silt	Brown Silt	Brown Silt	Brown Silt	Brown Silt
Determinand	Method	Units	AS	Result	Result	Result
ECO Topsoil Suite						
Aliphatic						
EC 5-6	AE33	mg/kg	†*	<0.1	<0.1	<0.1
EC >6-8	AE33	mg/kg	†*	<0.1	<0.1	<0.1
EC >8-10	AE33	mg/kg	†*	<10	<10	<10
EC >10-12	AE33	mg/kg	†*	<10	<10	<10
EC >12-16	AE33	mg/kg	†*	<10	<10	<10
EC >16-35	AE33	mg/kg	†*	<10	<10	<10
EC >35-44	AE33	mg/kg	†*	<10	<10	<10
Aromatic						
EC 5-7 (benzene)	AE33	mg/kg	†*	<0.1	<0.1	<0.1
EC >7-8 (toluene)	AE33	mg/kg	†*	<0.1	<0.1	<0.1
EC >8-10	AE33	mg/kg	†*	<10	<10	<10
EC >10-12	AE33	mg/kg	†*	<10	<10	<10
EC >12-16	AE33	mg/kg	†*	<10	<10	<10
EC >16-21	AE33	mg/kg	†*	<10	<10	<10
EC >21-35	AE33	mg/kg	†*	<10	<10	<10
EC >35-44	AE33	mg/kg	†*	<10	<10	<10
Aliphatic and Aromatic						
EC >44-70	AE33	mg/kg	†*	<10	<10	<10
Remarks:	None					

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 # denotes analyses not covered by sub-contractors MCERTS accreditation
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Report Date: 09/03/2009

Approved Signatories: [J S J White Managing Director [✓] M Rowley Laboratory Manager [✓] D Faulkner Quality Manager

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Tel: 01202-628637 Fax: 01202-628642

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Laboratory Test Report

Client: ECO Sustainable Solutions
Site Location: ECO Sustainable Solutions
Report For: Mr P. Hardy

Reference: 3762ph Page 4 of 6

ACSE Sample Ref.	ACSE/1541/7	ACSE/1541/8	ACSE/1541/9	ACSE/1541/10	ACSE/1541/11	ACSE/1541/12
Client Ref.	3762	3762	3762	3762	3762	3762
Location	DNS	DNS	DNS	DNS	DNS	DNS
Sample Number	7	8	9	10	11	12
Source	DNS	DNS	DNS	DNS	DNS	DNS
Date of Sampling	27.02.09	27.02.09	27.02.09	27.02.09	27.02.09	27.02.09
Matrix	Brown Silt	Brown Silt	Brown Silt	Brown Silt	Brown Silt	Brown Silt
Determinand	Method	Units	AS	Result	Result	Result
ECO Topsoil Suite						
Arsenic	AE16	mg/kg		2.4	2.1	2.2
Cadmium	AE16	mg/kg		<0.01	<0.01	<0.01
Chromium	AE16	mg/kg		9.1	7.8	9.5
Copper	AE16	mg/kg		14	11	13
Lead	AE16	mg/kg		46	47	84
Mercury	AE16	mg/kg		<0.3	<0.3	<0.3
Nickel	AE16	mg/kg		4.3	4.1	4.9
Selenium	AE16	mg/kg		<0.4	<0.4	<0.4
Zinc	AE16	mg/kg		60	62	68
Boron (Hot Water Soluble)	AE35	mg/kg	†	0.9	1.2	0.6
pH Value	BS 1377.3.1990	pH Units	†	7.7	7.6	7.7
Cyanide (Total)	AE44	mg/kg	†	<1	<1	<1
Acid Soluble Sulphate	BS 1377.3.1990	%	†	0.06	0.06	0.04
Soil Organic Matter (SOM)	IHP	mg/kg	†	3.2	3.7	2.8
Phenols (Total)	AE23	mg/kg	†	1.2	1.5	1.2
Poly Aromatic Hydrocarbons (PAH)	AE32	mg/kg	†	7.6	14	12
Benzo (a) Pyrene	AE32	mg/kg	†	0.6	0.9	0.6
Napthalene	AE32	mg/kg	†	0.4	0.6	0.8
Remarks: None						

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Report Date: 09/03/2009

Approved Signatories: [] S J White Managing Director [✓] M Rowley Laboratory Manager [] D Faulkner Quality Manager



Laboratory Test Report

Reference: 3762ph

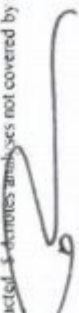
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Client: ECO Sustainable Solutions
Site Location: ECO Sustainable Solutions
Report For: Mr P. Hardy

ACSE Sample Ref.	ACSE/1541/7	ACSE/1541/8	ACSE/1541/9	ACSE/1541/10	ACSE/1541/11	ACSE/1541/12
Client Ref.	3762	3762	3762	3762	3762	3762
Location	DNS	DNS	DNS	DNS	DNS	DNS
Sample Number	7	8	9	10	11	12
Source	DNS	DNS	DNS	DNS	DNS	DNS
Date of Sampling	27.02.09	27.02.09	27.02.09	27.02.09	27.02.09	27.02.09
Matrix	Brown Silt	Brown Silt	Brown Silt	Brown Silt	Brown Silt	Brown Silt
Determinand	Method	Units	AS	Result	Result	Result
ECO Topsoil Suite						
Phosphorous	AE16	mg/kg	†*	449	326	398
Potassium	AE16	mg/kg	†*	1245	916	1042
Magnesium	AE16	mg/kg	†	655	572	656
Nitrogen	SC	mg/kg	‡#	Pending	Pending	Pending
Textural Classification	IHP	N/A	†*	Sandy Silt Loam	Sandy Silt Loam	Sandy Silt Loam
Loss on Ignition	BS 1377-3 1990	%	†	3.5	3.8	3.7
Maximum Stone Content >2mm	IHP	%	†*	15.5	22.8	25.2
Maximum Stone Content >20mm	IHP	%	†*	0	0	0
Maximum Stone Content >50mm	IHP	%	†*	0	0	0
Phosphorous				310	378	423
Potassium				862	1030	941
Magnesium				562	640	710
Nitrogen				Pending	Pending	Pending
Textural Classification				Sandy Silt Loam	Sandy Silt Loam	Sandy Silt Loam
Loss on Ignition				3.5	3.8	2.9
Maximum Stone Content >2mm				15.5	17	25.7
Maximum Stone Content >20mm				0	0	0
Maximum Stone Content >50mm				0	0	0

Remarks: None

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Client: ECO Sustainable Solutions
 Site Location: ECO Sustainable Solutions
 Report For: Mr P. Hardy

Laboratory Test Report

Reference: 3762ph

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ACSE Sample Ref.	ACSE/1541/7	ACSE/1541/8	ACSE/1541/9	ACSE/1541/10	ACSE/1541/11	ACSE/1541/12
Client Ref.	3762	3762	3762	3762	3762	3762
Location	DNS	DNS	DNS	DNS	DNS	DNS
Sample Number	7	8	9	10	11	12
Source	DNS	DNS	DNS	DNS	DNS	DNS
Date of Sampling	27.02.09	27.02.09	27.02.09	27.02.09	27.02.09	27.02.09
Matrix	Brown Silt	Brown Silt	Brown Silt	Brown Silt	Brown Silt	Brown Silt
Determinand	Method	Units	AS	Result	Result	Result
ECO Topsoil Suite						
Aliphatic						
EC 5-6	AE33	mg/kg	†	<0.1	<0.1	<0.1
EC >6-8	AE33	mg/kg	†	<0.1	<0.1	<0.1
EC >8-10	AE33	mg/kg	†	<10	<10	<10
EC >10-12	AE33	mg/kg	†	<10	<10	<10
EC >12-16	AE33	mg/kg	†	<10	<10	<10
EC >16-35	AE33	mg/kg	†	<10	<10	<10
EC >35-44	AE33	mg/kg	†	<10	<10	<10
Aromatic						
EC 5-7 (benzene)	AE33	mg/kg	†	<0.1	<0.1	<0.1
EC >7-8 (toluene)	AE33	mg/kg	†	<0.1	<0.1	<0.1
EC >8-10	AE33	mg/kg	†	<10	<10	<10
EC >10-12	AE33	mg/kg	†	<10	<10	<10
EC >12-16	AE33	mg/kg	†	<10	<10	<10
EC >16-21	AE33	mg/kg	†	<10	<10	<10
EC >21-35	AE33	mg/kg	†	<10	<10	<10
EC >35-44	AE33	mg/kg	†	<10	<10	<10
Aliphatic and Aromatic						
EC >44-70	AE33	mg/kg	†	<10	<10	<10
Remarks:	None					

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Approved: [Signature] Report Date: 09/03/2009

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IMP = In House Procedure / Calculation

Approved Signatories: [] S J White Managing Director [] M Rowley Laboratory Manager [] D Faulkner Quality Manager

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From: Gavin Roberts
Sent: 30 October 2009 12:23
To: Laura Probert
Subject: FW: Imported Soil (06/66809/001 c.18 Land to the rear of Kwik Fit, New Road, Havant)

From: Jonathan Driver [mailto:Jonathan.Driver@havant.gov.uk]
Sent: 20 May 2009 17:33
To: Gavin Roberts
Cc: Sally Smith DC; catherine.mcleod@environment-agency.gov.uk
Subject: RE: Imported Soil (06/66809/001 c.18 Land to the rear of Kwik Fit, New Road, Havant)

Dear Mr. Roberts,

Please accept my apologies for the delayed response. I have reviewed the supplied soil quality information, and can confirm that I am satisfied that the material tested does not represent a contamination source / pose a risk to future site users. Given the size of the development site, the anticipated depth of topsoil coverage & number of samples taken – I believe that sufficient sampling resolution has been achieved to give a good degree of confidence that the results are representative.

Similarly, I assume that given the maximum % stone content >20mm is listed as 0 for all samples, that the imported material is largely free from physical contamination.

I appreciate that given the time that has elapsed since the submission of this data and this response (10 working days), it is likely that this material has been imported & laid, however it is still useful for the completeness of records to have a formal agreement of acceptability. It is expected that confirmation of the thickness of clean cover applied will form part of the validation documentation (i.e. ensuring that 'clean cover' imported is as proposed in the reports previously submitted), in accordance with condition 18 of 06/66809/001.

I trust this meets with your requirements, if however you wish to discuss anything further, please don't hesitate to contact me.

Best Regards,



Jonathan Driver
Environmental Control Officer

Address: Environmental Health (Rm 261), Civic Offices, Civic Centre Road, Havant, PO9 2AX
Email: jonathan.driver@havant.gov.uk
Telephone: (023) 9244 6672
Fax: (023) 9244 6659
Mobile: 07810 504 957

From: Gavin Roberts [mailto:Gavin@gesl.net]
Sent: 08 May 2009 10:05
To: Jonathan Driver
Cc: Accounts; Sally Smith DC
Subject: Land to the rear of Kwik Fit, New Road, Havant
Importance: High

Jonathan

The development is progressing on this site and our Client is intending to import Topsoil to garden areas in the next few days. Please find attached topsoil testing results from the supplier (ECO Sustainable Solutions) which show general compliance with the Imported Soil Specification issued for this site and are considered to be protective of human health.

Having reviewed the results I would note that some of the nutritional results cannot be compared directly with the Spec due to difference in reported units, however, the topsoil blending process includes the addition of slow release fertilisers and the reported values indicate that nutrients are present.

If you have comments please can I ask that you call me on 07789 907670.

Kind regards
For and on behalf of Geo-Environmental

Gavin Roberts
Principal Engineer

Tel: 01273 699399
Mobile: 07789 907670
email: gavin@gesl.net



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