

**Cannock Chase District
Council**

**Environmental Protection Act
1990, Part 2A: Exploratory Site
Investigation**

**Infilled Land off Blake Close
and Burgoyne Street,
Chadsmoor, Cannock**

August 2011

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1 INTRODUCTION

1.1 Terms of Reference

In January 2010, Grontmij Limited (Grontmij) was appointed by Cannock Chase District Council (the Council) to assist in the implementation of the Council's Part 2A Contaminated Land inspection strategy. Part 2A of the Environmental Protection Act 1990 (Part 2A) requires each local authority to inspect areas of land which it believes may constitute Part 2A Contaminated Land.

Contaminated Land is defined in Section 78(2) of Part 2A of the Environmental Protection Act 1990 as:

“any land which appears to the local authority in whose area the land is situated to be in such a condition, by reason of substances in, on or under the land, that

- *significant harm is being caused or there is a significant possibility of such harm being caused; or*
- *pollution of controlled waters is being, or is likely to be, caused.*

Further information is provided in the Act and associated statutory guidance (DEFRA Circular 01/2006 – EPA 1990, Part 2A: Contaminated Land).

Grontmij assisted the Council to prioritise a list of sites which could constitute Part 2A contaminated land for inspection, on the basis of the Council's Part 2A Inspection Strategy. This site, which comprises the southern half of Blake Close, part of Burgoyne Street and open ground to the south of Burgoyne Street in Chadsmoor, Cannock, (hereafter referred to as 'the site') was identified as a priority for inspection as:

- The site is considered to be sensitive; 40 residential properties with gardens and public open space overly a former landfill, understood to have accepted inert and household waste
- The site is also underlain by a principal aquifer.

Following the completion of a desktop study (see Appendix A) and a successful application for funding from DEFRA, Grontmij was subsequently appointed by the Council to implement an initial exploratory investigation, which was undertaken in December 2010. Following a review of the investigation findings, supplementary fieldwork was undertaken in May 2011, as described in Section 3.

This report presents the findings of the exploratory investigation, assesses the significance of the contaminant concentrations detected, and makes recommendations for further work.

This report is subject to the limitations presented in Appendix B.

2 BACKGROUND INFORMATION

2.1 Site Setting

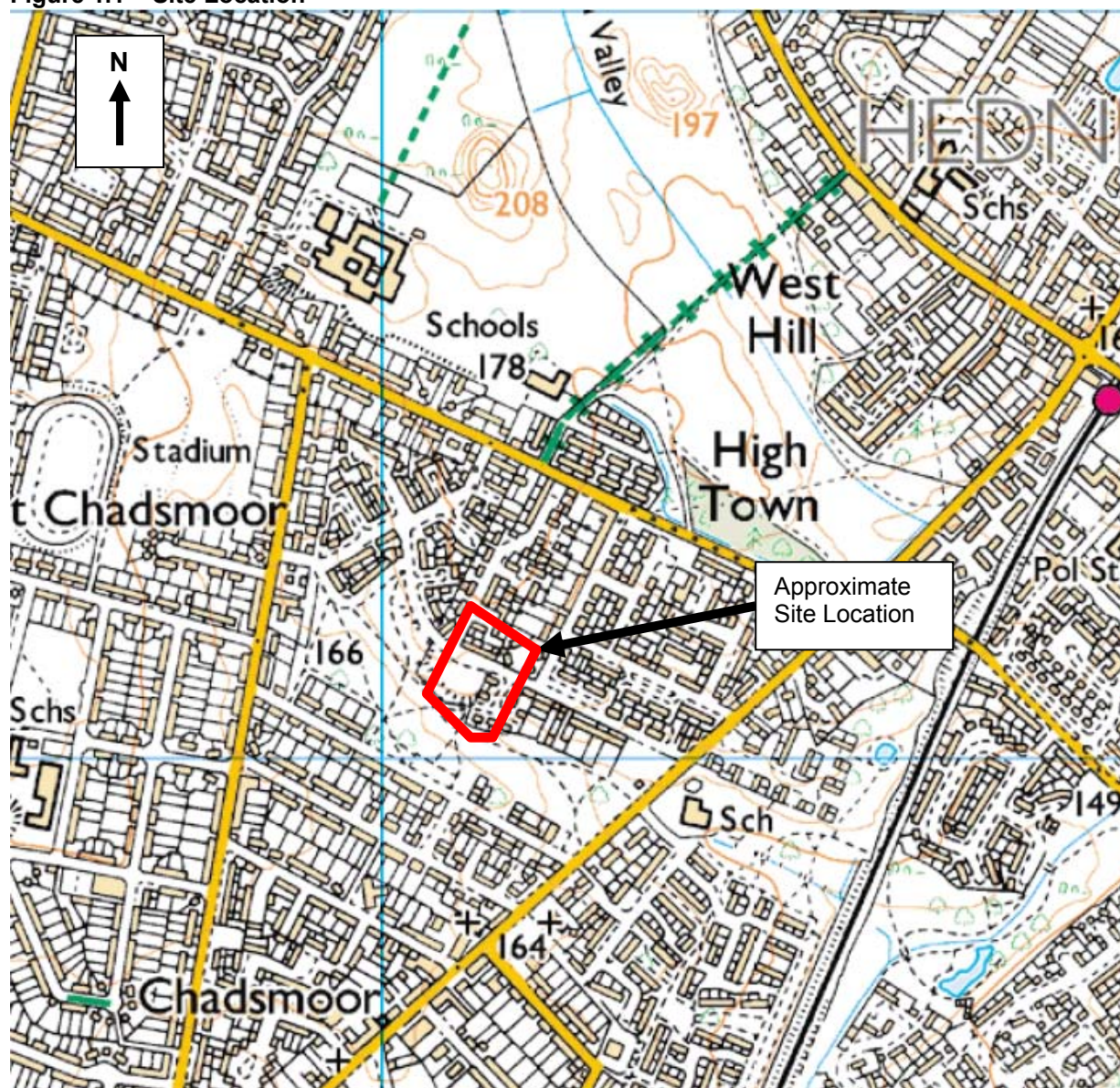
The site's setting and location are summarised in Table 2.1 and Figure 2.1. The site setting is also shown on Drawing 1.

Table 2.1 - Site Setting

Data	Information
Address	Blake Close / Burgoyne St, Chadsmoor, Cannock, Staffordshire, WS11 5TZ
Current site use:	Residential houses and gardens with public open space at the southern end of the site
Grid Reference:	Centre of site is located at approximate NGR 399130,312185
Site Area:	The site is approximately 1.3Ha
Topography:	Site slopes gently down towards the south
Surrounding land use	Residential properties surround the site sites with two schools approximately 450m to the east and west of the site
Mapped Geology	British Geological Survey (BGS) mapping indicates the site is underlain by superficial deposits of Devensian Till over solid geology of the Kidderminster Formation (Sherwood Sandstone Group)
Hydrogeology	The Environment Agency website indicates the sandstone as a principal aquifer. Principal Aquifers are layers of rock or drift deposits that have high inter-granular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
Source Protection Zones (SPZs)	The Environment Agency website indicates that the site does not lie within a SPZ
Surface Waters	Streams indicated 530m north east and 700m east of the site
Historical Land Use	On site: Environment Agency data provided to the council indicates that the site was formerly operated as a landfill site. Environment Agency "What's In Your Back Yard" (WIYBY) website indicates the site was operational between 1948 and 1952. The landfill is recorded to have received inert and household waste from dwellings of various types including houses, caravans, houseboats, campsites, prisons and wastes from schools, colleges and universities. The site pre-dates the Control of Pollution Act 1974 and thus is unlikely to have operated under a formal license. Surrounding land use: information supplied by the council indicates that further areas immediately to the south-west and approximately 100m to the north-east of the study site may also have been subject to landfilling operations. No further data provided on WIYBY.
Ecologically designated sites ¹	Multi Agency Geographic Information for the Countryside (MAGIC) search indicates none within 500m of site boundary
Archaeological sites	Pastscape website indicates no scheduled monuments beneath or in proximity of the site

¹ Includes sites designated as Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Special Area of Conservation (SAC, including candidate sites), Special Protection Area (SPA including potential sites), listed Wetlands of International Importance (Ramsar site) and Local Nature Reserves (LNR).

Figure 1.1 – Site Location



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Plan is not to scale.

2.2 Previous Reports

Grontmij has previously completed a desktop assessment of the site, as presented as Appendix A.

The assessment included the review of on-line data resources, in-house mapping and records provided by the council, and a site walkover.

The desk study report included an initial Conceptual Site Model (CSM) of potential pollutant linkages, developed in accordance with the model procedures² and statutory guidance³. The CSM is re-presented as Table 2.2 overleaf.

² CLR11 Model Procedures for the Management of Land Contamination (EA & DEFRA September 2004)

³ DEFRA Circular 02/2006, Environmental Protection Act 1990: Part IIA Contaminated Land, September 2006.

Table 2.2 - Potential Pollutant Linkages

No.	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage ¹	Probability Of Linkage Occuring ¹	Overall Risk ¹	Comments
1	Residents of properties above infilled ground (including children playing in gardens)	Contaminants potentially including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs) and asbestos within landfill material	Dermal contact and direct ingestion, inhalation of dust/vapours, consumption of home-grown vegetables	Medium	Likely	Moderate	Grass and/or topsoil coverage likely to mitigate risk to an extent – risk is greatest where possibly impacted soils are exposed or could be encountered, for example, when digging a vegetable patch or when children play outdoors. Properties are constructed directly above a potentially significant contamination source. Sample collection and analysis required to refine conclusion on risk
2	Residents of properties above infilled ground	Methane (CH ₄) /carbon dioxide (CO ₂) / carbon monoxide (CO) / hydrogen sulphide (H ₂ S) from decomposition of waste elements of landfill material	Movement into buildings, subsequent asphyxiation (CO ₂), explosion and oxygen depletion (CH ₄) and toxicity (CO, H ₂ S) risks	Severe	Low to likely	Moderate to high	Elapsed timeframe since end of landfilling dictates risks are likely to be lower, i.e. decomposition gases have probably been slowly released over time. Nonetheless, installation and monitoring of wells for gases and flow rates is required to refine conclusion on risk
3	Subsurface services serving the buildings (principally water supply)	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs) within landfill material.	Chemical attack and tainting of water supply could occur at high contaminant concentrations / severe pH levels	Mild	Likely	Low to moderate	Further investigation data needed to refine assessment/CSM
4	Property (Structures) – residential buildings on site	Decomposable or compressible elements of infill	Differential settlement of infill, causing structural failure of buildings	Medium	Low to likely	Moderate	Make preliminary inspection of structures during site investigation

No.	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage ¹	Probability Of Linkage Occuring ¹	Overall Risk ¹	Comments
5	Property - building foundations	Sulphate and pH	Contact between sulphate (as a contaminant) and concrete	Medium	Low to Likely	Low to moderate	Examine sulphate concentrations as a preliminary step
6	Principal aquifer (Sherwood Sandstone) beneath site	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs within landfill material.	Leaching of soil contaminants to aquifer – no aquiclude is indicated on BGS mapping	Medium	Likely	Moderate	Risk will depend upon depth and concentration of contaminants, confirmation of whether low permeability drift deposits are present beneath Made Ground and the leaching potential of contaminants. Investigation required to determine risk.

¹ Taken from Table 6.3, CIRIA report 552 (Contaminated Land Risk Assessment – A Guide to Good Practice). Severity classified as minor, mild, medium or severe. Probability classified as unlikely, low, likely or high. Overall risk considers both the severity and probability of the linkage (very low, low, moderate, high or very high). See extract in Appendix B

3 EXPLORATORY INVESTIGATION

In order to further examine the potential pollutant linkages identified in Table 2.2, and following a successful application for DEFRA funding, an exploratory site investigation was undertaken on the 6th and 10th of December 2010. This section describes the site investigation undertaken and results obtained.

3.1 Scope and Methodology

The intrusive site investigation included the following:

- A consultation exercise with residents living at the site, including a mailshot and a public open evening;
- Obtaining plans of underground services and CAT-scanning proposed drilling locations, using a Radiodetection CAT1 and signal generator;
- Drilling four hand held window sample holes (WS1 – WS4) to a maximum depth of 3.0m bgl, at the locations shown on Drawing 1. The window sample holes, which were drilled by Sherwood Drilling Services, were positioned in the rear gardens of housing located above the extent of infill, as indicated on historical mapping and by anecdotal evidence. Window sample hole positions were selected on the basis of achieving representative coverage of the site. The purpose of the window sample holes was to examine shallow and deeper soil conditions, enable the retention of soil samples for laboratory testing, and facilitate the installation of 50mm diameter dedicated gas monitoring wells in each borehole;
- Completion of five hand dug pits (PSWHP01 to PSWHP05) which were advanced to a maximum depth of 0.7m, to examine shallow soil conditions and supplement the coverage of the site provided by the above window sample holes;
- Logging soil arisings in accordance with BS5930:1999, and additionally noting any visual or olfactory evidence of potential contamination;
- Retaining representative soil samples of the strata encountered, which were selected on the basis of field observations of potential contamination and achieving good spatial and depth coverage of the site, in accordance with BS10175:2001 (since updated in 2011)
- Submitting retained samples to Alcontrol Geochem in cooled coolboxes and under chain of custody documentation, and instructing the analysis of samples, and;
- Undertaking four ground gas monitoring rounds, using a Gas Data Ltd GFM435 gas analyser with integral flow pod.

3.2 Results

3.2.1 Ground Conditions

The ground conditions encountered at the site generally comprised clayey topsoil (where present) over predominantly granular Made Ground, over residual soils (encountered either as sand, or as sand and gravel).

Made Ground

Made Ground was encountered as “fill” in exploratory holes – WS1, WS3 and WS4, and in hand dug pit locations PSWHP02 and PSWHP05. The Made Ground was encountered primarily in the east and south of the site, to a maximum depth of 1.9m bgl (in WS4) and was predominantly granular in nature, comprising silty sand and gravel grading to cobbles, occasionally clayey. The

gravel content of the Made Ground was variable, including fine to coarse quartz and sandstone, with occasional brick and concrete.

Made Ground was encountered as topsoil in WS2 and PSWHP01, PSWHP03 and PSWHP04, to a maximum depth of 0.4m bgl.

Municipal waste was not encountered.

Devensian Till /Kidderminster Formation

Weathered residual soils of the solid geology, comprising silty, clayey sands and gravels were encountered beneath the Made Ground (where present) or from 0.05m bgl, to exploratory hole termination at 3.0m bgl.

Groundwater

No groundwater entries were observed.

The above findings are discussed further in Section 4 (updated CSM). Window sample hole logs, providing full details of the strata encountered, are included within Appendix C.

3.2.2 Adequacy of Investigation Depth and Extent

Weathered residual soils (i.e. natural ground) were proven in all window sample holes drilled with the exception of WS3, which was terminated at the shallowest depth of the four window sample locations. Natural ground was also encountered in all hand dug pit locations, which were advanced to a maximum of 0.7m bgl, with the exception of PSWHP02.

While further exploratory holes would always be desirable in most investigations, the exploratory investigation is deemed to have provided reasonable spatial and depth coverage of the site.

3.2.3 Field Evidence of Contamination

The drilling arisings were inspected for visual and olfactory evidence of potential contamination. A summary of field observations recorded is presented in Table 3.1:

Table 3.1 – Field Evidence of Potential Contamination

Exploratory Hole	Visual and Olfactory Evidence of Contamination
WS3	1.0-1.5m bgl: Made Ground contains ash
WS4	0.11-1.79m bgl: Made Ground contains ash 1.79-1.9m bgl: Made Ground contains ash

3.2.4 Soil Analysis Results

Twelve samples were submitted for laboratory analysis, under chain of custody documentation and within chilled coolboxes, to ALcontrol Geochem of Deeside. ALcontrol is UKAS accredited and holds MCERTS accreditation for most analyses performed. The samples were selected for analysis on the basis of the observations of potential contamination made in the field, and to achieve good spatial coverage of the site.

Table 3.2 presents a summary of the analysis results. The results have been compared to screening values protective of human health, assuming the receptor is a residential property where plant uptake of contaminants occurs, and the plants (vegetables) are subsequently ingested by humans. The screening values used in preference comprise:

- 2009 Soil Guideline Values (SGVs) published by the Environment Agency / DEFRA, generated using the Contaminated Land Exposure Assessment (CLEA) model, version 1.04 (now available as V1.06)
- Generic Assessment Criteria (GAC) published by Land Quality Management Limited⁴ (LQM) and the Environmental Industries Commission⁵ (EIC), or calculated by Grontmij, all using CLEA⁶
- SGVs published by the Environment Agency / DEFRA between 2002 and 2007, calculated using prior versions of the CLEA model. This only applies to lead.

Full analytical testing results are included as Appendix D.

⁴ The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition). Land Quality Press, 2009

⁵ Soil Generic Acceptance Criteria for Human Health Risk Assessment. Environmental Industries Commission / AGS / CL:AIRE, January 2010

⁶ EIC used CLEA V1.06, LQM and Grontmij used CLEA 1.04

Table 3.1 – Soil Analysis Results Summary

Determinand	No. of Samples Tested	Minimum Value	Maximum Value	SGV / GAC (using 2.5% SOM where SOM-dependant) ¹	Locations where SGV or GAC are exceeded
Arsenic	11	2.5	7.1	32	-
Beryllium	11	0.22	0.97	51	-
Boron (water-soluble)	11	<1.0	<1.0	291	-
Cadmium	11	<0.02	0.53	10	-
Chromium, hexavalent	11	<0.60	<1.2	4.3	-
Chromium, total	11	5.6	13	3000 ²	-
Copper	11	8.6	40	2330	-
Lead	11	4.2	35	450 ³	-
Mercury ⁴	11	<0.14	<0.14	170	-
Nickel	11	5.3	14	130	-
Selenium	11	<1.0	<1.0	350	-
Vanadium	11	9.2	17	75	-
Zinc	11	21	96	3750	-
Asbestos screen	6	No fibres detected			-
BTEX and TPH-CWG ⁵	3	None of the banded aliphatic/aromatic TPH-CWG screening criteria, or criteria for BTEX, were exceeded. Full speciated results are presented in Appendix D			-
Polycyclic Aromatic Hydrocarbons (PAHs)	7	All concentrations below GAC for individual compounds, with exception of result below:			-
Benzo(a)pyrene	7	<0.02	3.6	0.94	WS3 @ 0.7m bgl; WS4, 0.3m, 0.7m and 1.5m bgl
Volatile Organic Compounds and Semi-Volatile Organic Compounds (excl results above)	3	Below laboratory detection limit, with exception of results below:			-
Dichloromethane	3	<0.01	0.013	0.98	-
Carbazole	3	<0.10	0.34	None ⁶	-

Values presented in mg/kg, correct to two significant figures (screening values presented without any rounding). **Bold values** indicate locations where observed concentrations exceed the screening value.

¹ Eleven samples were tested for Soil Organic Matter (%SOM) content. A minimum value of 0.9% and a maximum of 3.4% were recorded, with a mean of 2.3% and median of 2.4%. It is therefore justified, where SGVs or GAC are influenced by SOM, to use the SGVs and GAC generated using a 2.5% SOM value in CLEA in an initial screen.

² Value is for trivalent chromium; a screening value for total chromium has not been published. Screening a total chromium laboratory result against a trivalent chromium screening value is a conservative measure. Hexavalent chromium, the form considered to be of greater toxicity, was not detected at a concentration above the detection limit of the laboratory.

³ Earlier (2002) SGV published by DEFRA. An updated SGV may be published once the EA has evaluated a recent European Food Safety Authority toxicology report and confirmed the approach to be adopted for lead (CLEA may not be used).

⁴ Testing results presented represent total mercury, whereas SGV presented is for inorganic mercury. Although the most stringent of the SGVs is for elemental Mercury, the Environment Agency SGV for mercury in soil science report SC050021/Mercury SGV indicates that in cases where preliminary risk assessment has not identified a mercury issue at the site or conditions such as peaty or flooded soils then 'For general surface contamination and to simplify the assessment, the SGVs for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low'

⁵ Benzene, toluene ethyl benzene and xylenes, and Total Petroleum Hydrocarbon Criteria Working Group

⁶ GAC not published / calculated. The EIC (2010) considered calculating a GAC for carbazole but concluded that insufficient toxicological data was available at the time to derive a Heath Criteria Value (HCV), which is fundamental in the derivation of GAC in CLEA.

3.2.5 Soil Leachate Analysis Results

Three soil samples were submitted for soil leachate analysis (BS12457 2:1 single stage test, which supersedes the older NRA leachate test) at Alcontrol. The samples comprised the most likely soils to contain elevated contaminant concentrations, based upon field observations (and included a sample from WS1, 2.3m to 2.5m, from which elevated concentrations of metals were detected in the solid phase analysis). Table 3.2 presents a summary of the analysis results.

Where such threshold values have been published, the testing results have been compared to groundwater threshold values quoted in the River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Directions 2010 ("WFD values") and, where no WFD standard exists, UK Drinking Water Standards listed in the Water Supply (Water Quality) Regulations 2000 (as amended).

Full analytical testing results are included in Appendix D.

Table 3.2 - Soil Leachate Analysis Results Summary

Contaminant	No of Samples Tested	Minimum Value	Maximum Value	Groundwater Thresholds
Arsenic	3	1.1	1.2	7.5
Boron	3	19	22	750
Cadmium	3	<0.01	<0.01	3.75
Chromium	3	3.7	4.0	50
Copper	3	2.9	4.1	1500
Lead	3	0.37	0.45	10
Nickel	3	0.92	1.1	15
Vanadium	3	1.7	1.9	n/s
Zinc	3	1.2	2.0	3750
Mercury	3	0.01	0.03	0.75
Benzene	3	< 1.0	< 1.0	0.75
Toluene	3	< 1.0	< 1.0	n/s
Xylene	3	<2.5	<2.5	n/s
Naphthalene	3	<3.5	<3.5	n/s
Benzo(a)pyrene	3	<1.0	<1.0	0.01
Sum of Benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene*	3	<4.0	<4.0	0.10
Volatile Organic Compounds and Semi-Volatile Organic Compounds (excluding above)	3	All concentrations below laboratory detection limit		Various

Values are presented as ug/l and are rounded as applicable to the screening values used.

n/s – no standard

*There are no screening values in the WSWQ Regulations 2000 (as amended) for the remaining commonly analysed 16 PAH compounds

The concentrations of analytes in leachate were all below the adopted groundwater quality standards and/or below the laboratory method detection limit, indicating minimal leaching of contaminants.

3.2.6 Ground Gas Monitoring

Four rounds of ground gas monitoring were undertaken, using a Gas Data GFM435 gas analyser with internal flow pod. A summary of the maximum gas monitoring results recorded in each well is presented in Table 3.3, with full monitoring data in Appendix E.

Table 3.3 - Summary of Gas Monitoring Data

Well	Maximum Values Recorded During Monitoring Events:					Gas Screening Value ¹ (l/hr)	Situation "A" Characteristic Situation ¹
	Peak CH ₄ (%)	Steady CO ₂ (%)	Steady CO (ppm)	Steady H ₂ S (ppm)	Flow (l/hr)		
WS1	0.1	1.7	0	0	0.6	0.01	1
WS2	0.1	1.4	0	0	0.7	0.01	1
WS3	0.1	3.0	0	0	0.1	<0.01	1
WS4	0.1	0.9	0	0	1.4	0.01	1
Atmospheric Pressure:		28/01/2011			1009mb (Steady)		
		11/02/2011			995mb (falling trend)		
		25/02/2011			1006mb (steady)		
		11/03/2011			998mb (falling trend)		

Readings obtained within a 3 minute measurement period, obtained with a Gas Data 435 gas analyser with internal flow pod.
 CH₄ – methane; O₂ – oxygen; CO₂ carbon dioxide; CO – carbon monoxide;
 H₂S – hydrogen sulphide; mbgl – metres below ground level mb – millibars l/hr – litres per hour.

¹ Gas Screening Value and Characteristic Situation based on methodology presented in CIRIA Report C665, Assessing Risks Posed by Hazardous Gases to Buildings. Where the flow rate recorded in the field is zero or negative, a flow of 0.01 l/hr is assumed

The summary data presented above indicates that, in regard to methane and carbon dioxide, CIRIA characteristic situation CS1 applies to all of the wells. This is the lowest risk category (of six) presented in CIRIA report 665, and indicates that no special gas precautions would be required in the construction of new buildings.

Additionally, carbon monoxide and hydrogen sulphide were not detected at concentrations in excess of the gas analyser detection limit. This dataset indicates that the inhalation risk posed by these gases is negligible.

3.2.7 Safety of Water Supply Pipes

As a preliminary assessment, soil quality data was screened against WRAS guidelines⁷ (current at the time of the initial investigation, but now superseded) and UKWIR parameters⁸. This preliminary assessment, included as Appendix G, indicated that the concentration of contaminants in soil could potentially permeate into water supply pipes. The WRAS and UKWIR guidelines are conservative and are normally used for the selection of materials when laying new pipes.

To confirm whether the concentrations of contaminants in the shallow Made Ground pose a risk to drinking water quality at the site, samples of drinking water were collected from taps from two properties (Numbers 3A and 83 Blake Close) on 18th May 2011. The samples were taken from

⁷ 9-04-03 The Selection of Materials for Water Supply Pipes to be Laid in Contaminated Land. Water Regulations Advisory Scheme, October 2002.

⁸ 10/WM/03/21 Guidance for the Selection of Water Supply Pipes to be Used in Brownfield Sites. UK Water Industry Research, 2010 (as re-issued)

properties where the highest concentrations of contaminants were encountered in soil, i.e. at locations where the greatest risk to drinking water quality may be posed.

As agreed with Cannock Chase Council, samples were obtained after allowing the tap to run for one minute. The samples were submitted to Alcontrol Laboratories for chemical analysis for metals, BTEX and PAHs as commonly occurring contaminants and parameters for which drinking water standards can be applied. The results of the analyses are summarised in Table 3.4, along with a comparison to UK Drinking Water Standards (UKDWS) taken from the Water Supply (Water Quality) Regulations 2000 (as amended). Full testing results are included in Appendix D:

Table 3.4- Tap Water Analysis Results

Contaminant	No of Samples Tested	Minimum Value µg/l	Maximum Value µg/l	UKDWS µg/l
Arsenic	2	1.4	2.1	10
Boron	2	86	130	1000
Cadmium	2	0.12	0.20	5.0
Chromium	2	8.0	13	50
Copper	2	25	740	2000
Lead	2	0.17	0.31	10
Nickel	2	0.99	4.3	20
Zinc	2	15	610	5000
Mercury	2	<0.01	<0.01	1.0
Sum of Benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene*	2	<0.08	<0.08	0.10
Benzo(a)pyrene*	2	<0.009	<0.009	0.01

*There are no screening values in the WSWQ Regulations 2000 (as amended) for the remaining commonly analysed 16 PAH compounds

The maximum recorded metal and PAH concentrations within tap water did not exceed the corresponding UK Drinking Water Standards, where standards exist.

3.2.8 Concrete Attack

As a preliminary screen, soil samples were retained and analysed for pH (11 no) and water soluble sulphate to the BRE 2:1 extract method (3 no) at Alcontrol Laboratories. The range of results obtained were as follows:

- pH ranged from 7.1 to 8.6
- water soluble sulphate ranged from <0.008 g/l to 0.02 g/l

With reference to BRE Special Digest 1:2005 "Concrete in Aggressive Ground", these preliminary results suggest that the ground conditions at the site are unlikely to be particularly aggressive to subsurface concrete.

4 FURTHER ASSESSMENT OF HUMAN HEALTH RISK

The site investigation has established that the concentration of benzo(a)pyrene in four samples (of seven tested) exceeds the generic screening value applicable to the generic residential housing scenario, where plants are grown for human consumption. The remaining three samples obtained at <0.7m bgl depth and analysed at the laboratory did not contain benzo(a)pyrene concentrations in excess of the SGV.

Generic SGVs and generic acceptance criteria (GAC) represent concentrations of contaminants, above which unacceptable impacts may occur and further assessment is generally required. Exceedance of SGVs or GAC does not necessarily mean that a significant possibility of significant harm ("SPOSH" - i.e. unacceptable risk to human health or the environment) is posed to human health. The SGVs and GAC have been derived using the CLEA model by various parties (see Section 3.2.3), using conservative input parameter values to generate screening values applicable, theoretically, to all UK sites. Therefore, an exceedance of a SGV or GAC does not necessarily mean that SPOSH exists - only that a generic, conservative screening value has been exceeded, and further assessment is required.

4.1 Statistical Analysis Approach

Guidance regarding how data collection, data review and statistical testing interact to produce defensible conclusions regarding the condition of land is provided within Part 2A of the Environmental Protection Act 1990 and Guidance on Comparing Soil Contamination Data with a Critical Concentration⁹ ("the guidance").

In order for statistical analysis to be applied, the dataset under inspection should strictly be the result of an unbiased sampling strategy. While there are a number of reasons why the sampling strategy could be viewed as biased, we conclude that the strategy was as close to being unbiased as possible, as discussed below:

- Parts of the site, such as areas beneath houses and roads, were not accessible, thus some soils were much less likely to be sampled than others. However, it would be unreasonable to attempt to sample such soils in an initial investigation, and samples taken from garden areas are likely to be representative of infill material beneath the site as a whole (while acknowledging that recent additional made ground may have been placed to form structures)
- Residents were, in some cases, reluctant for some parts of their gardens to be disturbed, meaning that some soils were unlikely to be tested – but again, it is likely that the area available for sampling is likely to be representative of garden areas across the site as a whole
- Within each exploratory hole, contaminated land practitioners typically sample and analyse a "representative worst case" sample of the soil encountered – so, while a very small pocket of ash within otherwise "clean" soil may not be analysed, samples would typically be taken of a 0.2m wide band of ash, rather than from the "clean" soil above or below such a band. Such sampling and testing is desirable, as it gives an indication of "representative worst case" conditions. Thus, while such sampling is arguably biased, the bias is towards over-estimating typical concentrations of contaminants in the soil across the site. Thus, if the average concentration of such "representative worst case" samples is below the SGV or GAC, it follows that soil conditions across the site as a whole are also likely to be below the relevant SGV or GAC.

⁹ The Chartered Institute of Environmental Health, CL:AIRE and The Soil and Groundwater Technology Association; May 2008.

Statistical analysis of the dataset has therefore been undertaken, as described below.

4.2 Averaging Areas

The first step of statistical analysis is to define the “averaging area” over which data would be examined. An averaging area is an area of soil which, when sampled, is considered to provide a representative indicator of how much contaminant a receptor is exposed to.

Based on the history of the site (i.e. all the site is thought to be underlain by infill) and current use of the site (i.e. residential housing, with minor areas of lower sensitivity), the entire site was defined as a single averaging area, and all recorded benzo(a)pyrene concentrations in the soil obtained at <0.7m bgl depth were examined as a single dataset.

It could be argued that each residential property should be defined as a single averaging area, based upon the exposure of each individual receptor. However, as the goal of the investigation is to examine whether there is a significant possibility of significant harm (SPOSH) to sensitive receptors at the site *as a whole* (as characterised by the samples obtained and tested), and given that it was excessively intrusive to residents to obtain and test multiple samples from each garden during an initial investigation, such an approach was rejected.

4.3 Outlier Test

The second stage of statistical analysis requires a test to identify whether any outliers, potentially indicative of laboratory error or a separate population of data (for which a separate averaging area should be defined), are present.

The Guidance indicates that an outlier should only be excluded from a population of data if

The outlier is obviously and demonstrably the result of an error that can be identified and explained - in which case the correct value should be identified and the dataset amended, where possible, or the erroneous value excluded with justification, or

The outlier clearly indicates that more than one soil population exists within the dataset and this can be justified by (or informs the further development of) the conceptual model - in which case the different population expressed by the outlier(s) should be explored in more detail either by reviewing and refining zoning decisions and treating outlier values as a separate population or even individually or, if necessary, by undertaking further site sampling to verify conditions in the vicinity of outlier values.

In all other cases, outlying data should be assumed to be genuine and reflective of the full range of soil concentrations to which receptors may be exposed.

The ESI Limited Statistical Calculator has been used to test for outliers. The Calculator applies Grubb's Test to the entire dataset, but first requires the user to manually check that the dataset (excluding maximum value) is normally distributed, otherwise the test is not applicable. The dataset excluding maximum value was therefore checked, and was identified to be normally distributed.

The Calculator subsequently confirmed that there are no outliers within the dataset, which indicates that there are not “hotspots” of contamination, potentially representative of a separate data population, which could require further and separate assessment. .

4.4 Hypothesis Testing

The second stage of statistical analysis is to define a null and alternative hypothesis and examine whether the null hypothesis should be rejected.

In a Part 2A scenario, the null (H_0) and alternative (H_1) hypothesis to be tested is:

'Is there sufficient evidence that the true mean concentration of the contaminant (μ) is greater than the critical concentration (C_c)?'

The Null Hypothesis (H_0) and the Alternative Hypothesis (H_1) are therefore:

- $H_0 \quad \mu \leq C_c$ i.e. the true mean concentration is equal to or less than the critical concentration
- $H_1 \quad \mu > C_c$ i.e. the true mean concentration is greater than the critical concentration

The "critical concentration" is the adopted benzo(a)pyrene residential SGV at 2.5% SOM of 0.94mg/kg.

The Guidance provides a detailed explanation of the hypothesis testing procedure, which includes comparison of the lower confidence limit of the (estimated) mean value with the critical concentration, to provide additional assurance that the (true) mean is also below the critical concentration at a defined level of confidence (conventionally 95%; this value has been adopted in this case).

The guidance also states that in the Part 2A scenario, if the sample mean is less than the critical concentration (C_c), the lower confidence limit of the sample mean must also be below the critical concentration, and the Null Hypothesis cannot be rejected.

The ESI Calculator has been used to calculate the mean of the recorded benzo(a)pyrene concentrations across the averaging area (the site), which is **1.21mg/kg**. This value is above the critical concentration of 0.94mg/kg, so the lower confidence limit (LCL) of the sample mean is now considered. The LCL has been calculated to be 0.29mg/kg, i.e. less than the critical concentration.

On the basis of the above data, the null hypothesis cannot be rejected at a 95% level of confidence, as the LCL is less than the critical concentration. In this scenario, the Guidance indicates that the hypothesis test should be repeated on a "balance of probabilities" approach, whereby the null hypothesis should be rejected if the level of confidence against the null hypothesis is greater than 51%. The ESI calculator has been used to assess the level of confidence against the null hypothesis, which is reported to be **70%**.

On this basis, the null hypothesis is rejected, i.e. the statistical analysis indicates that with an 70% level of confidence, the true mean concentration of benzo(a)pyrene beneath the averaging area (whole site) is likely to exceed the adopted GAC of 0.94mg/kg. This finding theoretically indicates that further assessment of benzo(a)pyrene concentrations at the site, or possibly remediation, is necessary. However, remediation is unlikely to be necessary, as discussed in Section 4.5.

4.5 Discussion

While the above section indicates that the likely true average concentration of benzo(a)pyrene beneath the site may pose a risk to the health of residents at the site, it is important to consider the wider context of the assessment, as outlined below

1. The above assessment indicates that the true average concentration of benzo(a)pyrene at the site is likely to be around 1.2mg/kg. This value exceeds, slightly, the adopted GAC of 0.94mg/kg.
2. A GAC is a general screening value, applicable to all UK soils. Concentrations of contaminants below the GAC are highly unlikely to pose a health risk. Concentrations slightly above a GAC do not necessarily mean that the health of residents could be adversely affected; only that a conservative generic value has been exceeded.
3. GAC are calculated on the basis of a number of conservative assumptions in regard to human exposure to contaminants. GAC also draw upon the findings of high-dose experiments on laboratory animals, to extrapolate the effects of low doses of contaminants on humans. Given this uncertainty, a degree of conservatism is built into the GAC.
4. It is generally accepted within the industry that GAC for some compounds, including benzo(a)pyrene, are particularly conservative. Grontmij is aware of studies, using a "Margin of Exposure" assessment route, where benzo(a)pyrene residential screening values of 3.6mg/kg and 14mg/kg have been proposed by researchers or accepted by regulators. The Margin of Exposure assessment method involves, briefly:
 - a. Examination of the results of toxicological studies to determine a "point of departure" (PoD) concentration, above which adverse health effects are observed
 - b. Comparison of the point of departure to the estimated human exposure to the contaminant (i.e. probably the mean concentration observed at the site), to calculate Margin of Exposure (MoE), i.e. $MoE = PoD / \text{estimated exposure}$
 - c. $MoE > 100,000$ is considered to be acceptable, i.e. if excess lifetime risk of cancer is less than 1 in 100,000, risk is tolerable.

On the basis of the above points, it seems unlikely that a mean benzo(a)pyrene concentration of 1.2mg/kg poses a significant possibility of significant harm (SPOSH) to the health of residents at the site.

4.6 Conclusion

The objective of this Part 2A assessment is to determine whether a significant possibility of significant harm (SPOSH) to sensitive receptors could be caused by contaminants beneath the site. It is unlikely that a SPOSH to human health could be caused by the likely average concentration of benzo(a)pyrene beneath the site. Therefore, the available evidence does not indicate that the site constitutes Contaminated Land with respect to the benzo(a)pyrene concentrations recorded in soil.

5 UPDATED CONCEPTUAL SITE MODEL

The CSM presented in the earlier Grontmij desk study report (Appendix A) was updated, using the findings of the site investigation, as presented overleaf.

Table 5.1 – Pollutant Linkages, Post-Site Investigation

No	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage ¹	Probability of Linkage Occuring ¹	Overall Risk ¹	Comments
1	Residents of properties above infilled ground – inc. children playing in gardens	Contaminants potentially including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs) and asbestos within landfill material	Direct ingestion/dermal contact/inhalation of dust/inhalation of vapours/consumption of home-grown vegetables	Medium	Unlikely	Low	Benzo(a)pyrene was detected in shallow soils at concentrations of up to 3.6mg/kg, but statistical analysis indicates average b(a)p concentrations unlikely to pose a significant possibility of significant harm to human health. All other contaminant concentrations below SGVs / GAC. No further assessment required
2	Residents of properties above infilled ground	Methane (CH ₄) /carbon dioxide (CO ₂) / carbon monoxide (CO) / hydrogen sulphide (H ₂ S) from decomposition of waste elements of landfill material	Movement into buildings, subsequent asphyxiation (CO ₂), explosion and oxygen depletion (CH ₄) and toxicity (CO, H ₂ S) risks	Severe	Unlikely	Low/moderate	Low gas concentrations and flow rates identified. No further assessment required (risk level of “low/moderate” is the lowest possible rating where the potential severity of the hazard is considered “severe”)
3	Subsurface services serving the buildings (principally water supply)	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs) within landfill material.	Chemical attack and tainting of water supply could occur at severe pH levels	Medium	Low	Low / Moderate	Although contaminant concentrations in shallow soils exceed guidelines, samples from taps indicate dissolved contaminant concentrations below drinking water standards No further assessment proposed

No	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage ¹	Probability of Linkage Occuring ¹	Overall Risk ¹	Comments
4	Property (Structures) – residential buildings on site	Decomposable or compressible elements of infill	Differential settlement of infill, causing structural failure of buildings	Medium	Low	Low / moderate	Although a detailed inspection of buildings has not been undertaken, no obvious evidence of structural failure was noted and all properties at the site appear to be currently occupied. As buildings appear to be fit for occupancy, it is unlikely that significant harm to the building has been caused or is being caused (ref: DEFRA Circular 01/2006 p86 – this is statutory guidance accompanying the Environmental Protection Act 1990.
5	Property - building foundations	Sulphate and pH	Contact with foundations	Medium	Unlikely	Low	Preliminary testing suggests conditions are unlikely to be particularly aggressive to concrete. No further assessment proposed
6	Principal aquifer (Sherwood Sandstone) beneath the site	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs within landfill material.	Vertical contaminant migration within unsaturated zone (Made Ground and superficial deposits)	Medium	Unlikely	Low	Leachable concentrations of contaminants examined in preliminary analysis all less than adopted groundwater quality standards and/or below laboratory detection limit. No further assessment proposed

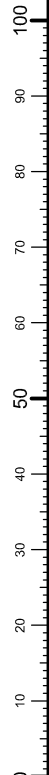
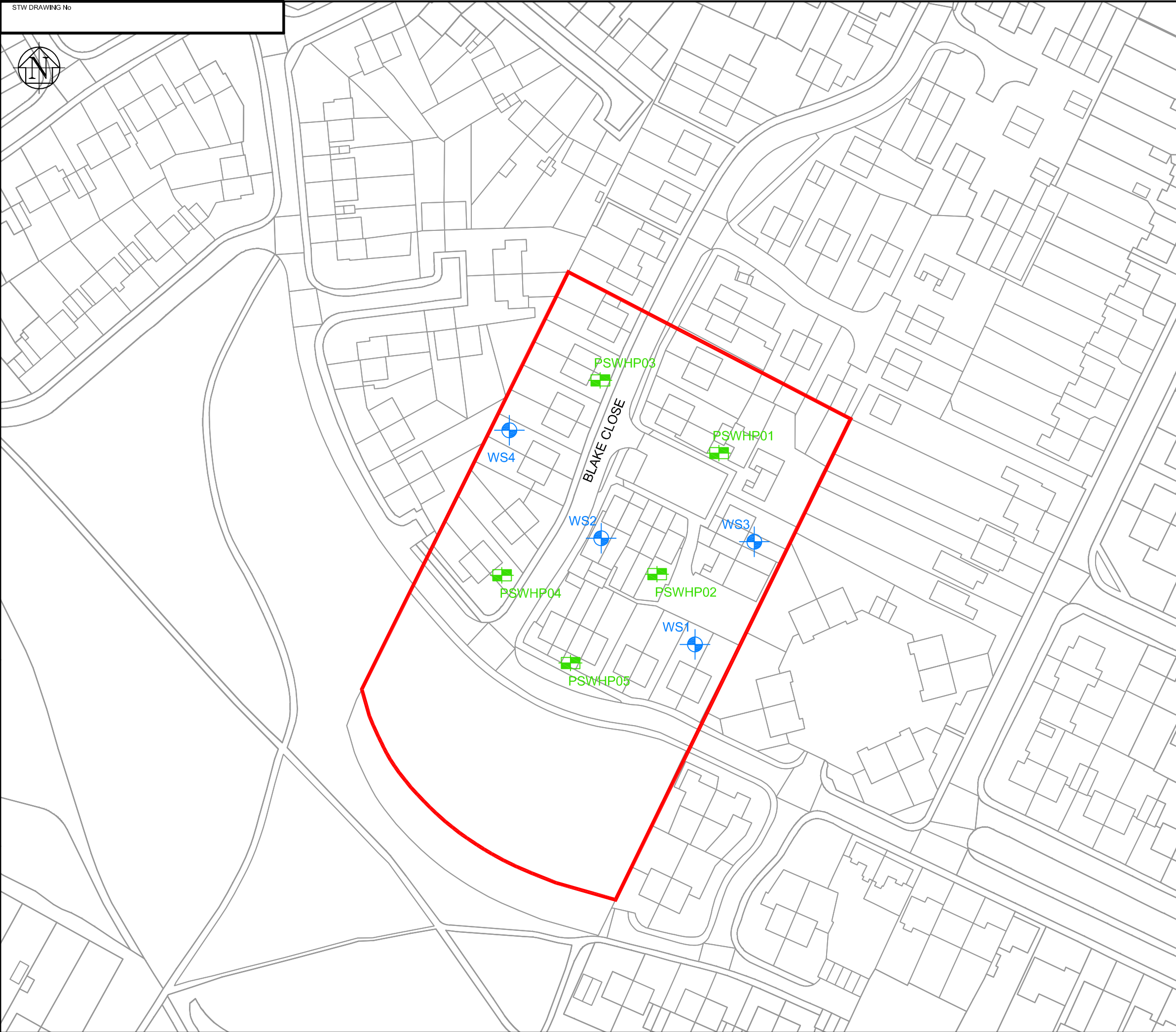
¹ Taken from Table 6.3, CIRIA report 552 (Contaminated Land Risk Assessment – A Guide to Good Practice. Severity classified as minor, mild, medium or severe. Probability classified as unlikely, low, likely or high. Overall risk considers both the severity and probability of the linkage (very low, low, moderate, high or very high). See Appendix F for further details

6 SUMMARY AND CONCLUSION

- Review of historical mapping and EA records provided to Cannock District Council, plus anecdotal evidence obtained during public consultation, identified that land at Blake Close / Burgoyne Street, Chadsmoor, Staffordshire was infilled with inert and household waste prior to 1974 (i.e. within an unregulated regime). The waste material potentially posed a risk to human health, water supply pipes and controlled waters.
- An exploratory investigation encountered a maximum of 1.9m of infill material, which was noted to contain ash within two of the nine exploratory holes advanced.
- Chemical analysis identified that concentrations of contaminants in Made Ground generally did not exceed generic human health screening criteria. Further analysis of benzo(a)pyrene data suggested that the concentrations of this chemical beneath the site are unlikely to pose a significant health risk. It is therefore considered that land beneath the site is unlikely to pose a significant risk of significant harm to human health..
- Concentrations of several chemicals in the soil exceeded conservative screening criteria adopted for the protection of water pipework. Sampling of drinking water quality at consumers' taps identified that dissolved contaminant concentrations were all below UK drinking water standards. No further assessment is proposed.
- Gas monitoring has identified that the concentrations and flow rates of hazardous gases beneath the site are unlikely to pose a human health or explosion risk to the housing at the site. No further assessment in regard to gas is proposed.
- The concentrations of contaminants that may leach from Made Ground to the underlying aquifer are all below screening criteria protective of the aquifer and/or the laboratory's detection limit. No further assessment is proposed.

On the basis of the preceding assessment and the limitations listed in Appendix B, we consider that the site is unlikely to meet the definition of Contaminated Land under Part 2A of the Environmental Protection Act 1990. No further assessment is proposed.

DRAWINGS



NOTES

- KEY:**
- INFERRED EXTENT OF INFILLING
 - WINDOW SAMPLER
WS1
 - HAND PIT
PSWHP01

REV	AMENDMENTS	ORIG	CHK'D	APR'D	DATE
-					



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PROJECT

BLAKE CLOSE

TITLE

**EXPLORATORY HOLE
LOCATION PLAN**

STATUS

FOR INFORMATION

ORIGINATOR MIC	CHECKED MJH	APPROVED GVT
DATE 31/03/11	DATE 31/03/11	DATE 31/03/11
SCALE 1:1000 @ A3		ORIGINAL DRAWING SIZE 297 x 420 - A3
DRAWING No 106270-001		REV. -

APPENDIX A

Cannock Chase District
Council

**Environmental Protection Act
1990, Part IIa: Initial Desktop
Study and Walkover**

**Site termed “Land Fronting
John Street and Moreton
Street”, located at:**

**Blake Close, Chadsmoor,
Cannock, Staffordshire**

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DRAWINGS

Drawing 1 – Site Location

APPENDICES

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Appendix B	Severity and Probability of Risk (after CIRIA report 552)

1 INTRODUCTION

1.1 Terms of Reference

In January 2010, Grontmij Limited (Grontmij) was appointed by Cannock Chase District Council (the Council) to assist in the implementation of the Council's Contaminated Land inspection strategy. Part IIa of the Environmental Protection Act 1990 (Part IIa) requires each local authority to inspect areas of land which it believes may comprise Part IIa Contaminated Land.

The scope of work agreed between Grontmij and the Council included:

- Prioritisation of an initial list of potentially contaminated sites for intrusive investigation work, based upon the sensitivity of each site, using existing limited desktop study data provided by the Council, and
- Undertaking desktop reviews and walkovers, culminating in the production of reports for each priority site to improve the understanding of the sites and inform the planning of intrusive site investigations.

The prioritisation exercise identified an initial 12 sites requiring detailed desktop study and walkovers, including the subject of this desk study. The site comprises the southern half of Blake Close, part of Burgoyne Street and open ground to the south of Burgoyne Street in Chads Moor, Cannock. The site consists of approximately 40 residential properties with gardens and public open space, occupying an area of approximately 1.3ha. The site is considered to be sensitive as the residential properties and public open space overlie a former landfill which is recorded to contain inert and household waste of various types and which was operational between 1948 and 1952. The site is also underlain by a principal aquifer.

Note that the site is termed "landfill fronting John St and Moreton St" on Environment Agency records. This appears to be a typographical error, as the site is located at Blake Close and Burgoyne Street. Note that there is an further former landfill site at Moreton Street, termed "landfill south of sites 41 and 37, Moreton St", which is not the subject of this desk study.

For the purpose of clarity, we have referenced the site in regard to Blake Close in the remainder of the report.

This report is subject to the limitations presented in Appendix A.

1.2 Site Setting

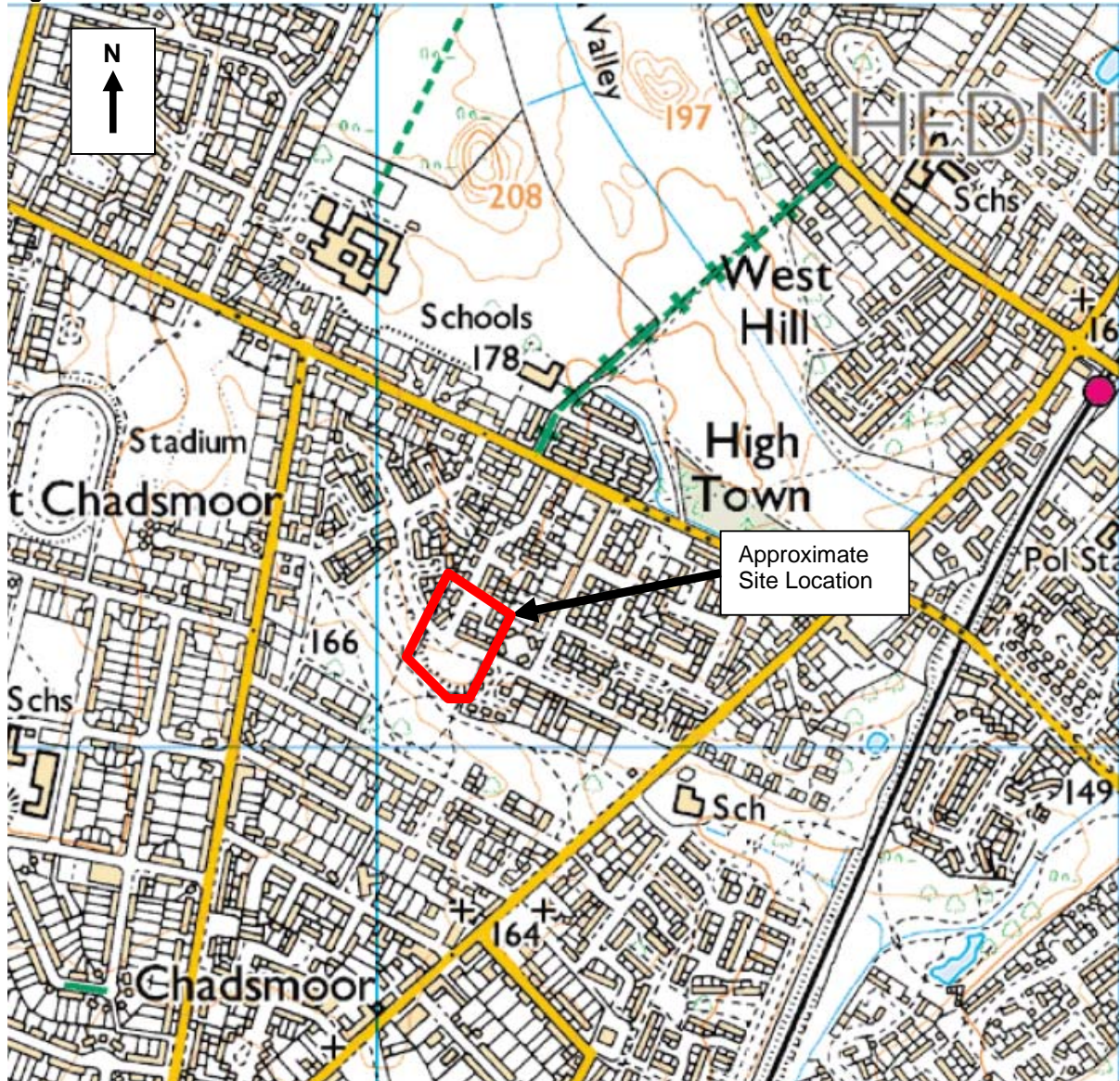
The site's setting and location are summarised in Table 2.1 and Figure 2.1. The site setting is also shown on Drawing 1.

Table 1.1 – Site Setting

Data	Information
Address	Blake Close Chadsmoor, Cannock, Staffordshire WS11 5TZ
Current site use:	Residential houses and gardens and rough public open space at the southern end of the site
Grid Reference:	Centre of site is located at approximate NGR 399130,312185
Site Area:	The site is approximately 1.3ha
Topography:	Generally flat
Surrounding land use	Residential properties surround the site sites with two schools approximately 450m to the east and west of the site
Mapped Geology	British Geological Survey (BGS) mapping indicates the site is underlain by superficial deposits Devensian Till over solid geology of the Kidderminster Formation (Sherwood Sandstone Group)
Hydrogeology	The Environment Agency website indicates the sandstone as a principal aquifer. Principal Aquifers are layers of rock or drift deposits that have high inter-granular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
Source Protection Zones (SPZs)	The Environment Agency website indicates that the sites do not lie within a SPZ
Surface Waters	Streams indicated 530m north east and 700m east of the site
Historical Land Use	Environment Agency data provided to the council indicates that the site was formerly operated as a landfill site; Environment Agency "What's In Your Back Yard" website indicates the site was operational between 1948 and 1952. The landfill is recorded to have received inert and household waste from dwellings of various types including houses, caravans, houseboats, campsites, prisons and wastes from schools, colleges and universities. The site pre-dates the Control of Pollution Act 1974 and thus is unlikely to have operated under a formal license.
Ecologically designated sites ¹	MAGIC search indicates none within 500m of site boundary

¹ Includes sites designated as Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Special Area of Conservation (SAC, including candidate sites), Special Protection Area (SPA including potential sites), listed Wetlands of International Importance (Ramsar site) and Local Nature Reserves (LNR).

Figure 1.1 – Site Location



Reproduced from Ordnance Survey Map under licence AL549878 with permission from the Controller of HMSO, © Crown Copyright
Plan is not to scale.

1.3 Summary of available site investigation information

At the time of writing this report no ground or site investigation information is available for the site.

1.4 Walkover

The site has been subject of a walkover, carried out from the public highway. . No obvious evidence of contamination was identified during the inspection, but such evidence is unlikely to be uncovered by a visual inspection of land occupied by residential properties.

2 PRELIMINARY CONCEPTUAL MODEL

2.1 Introduction

This section of the report presents a preliminary contaminated land assessment, on the basis of the available desktop data. The assessment presents an evaluation of the potential risks posed, should contaminants be present in the soil or groundwater beneath the site.

In the context of the Environmental Protection Act 1990 (EPA90), the Water Act 2003 and associated guidance^{2,3}, a preliminary (contaminated land) risk assessment should focus on whether the land at a subject site meets the statutory definition of Contaminated Land. Part IIA of the EPA90, as amended by the Water Act 2003, defines Contaminated Land as:

- *“any land which appears to the local authority in whose area it is situated to be in such condition by reason of substances in, on or under the land, that:*
- *significant harm is being caused or there is a significant possibility of significant harm being caused; or*
- *significant pollution of controlled waters is being caused or there is significant possibility of such pollution being caused*

The procedure for assessing contaminated land involves the development of a Conceptual Site Model (CSM) comprising the assessment of potential Contaminants, Pathways and Receptors.

2.1.1 Sources of Contaminants

The “contaminants” term in the conceptual model has been evaluated by inspection of existing desktop study data provided by Cannock Chase District Council, and a preliminary site walkover.

The following potential sources of contaminants have been identified:

- Landfill, which could contain contaminants including (but not limited to) metals, hydrocarbons, polyaromatic hydrocarbons (PAHs), volatile and semi-volatile organic compounds (VOCs and SVOCs).
- Methane and carbon dioxide gas, from the decomposition of any deleterious material within the made ground.

² CLR11 Model Procedures for the Management of Land Contamination (EA & DEFRA September 2004)

³ DEFRA Circular 02/2006, Environmental Protection Act 1990: Part IIA Contaminated Land, September 2006.

2.1.2 Receptors

DEFRA Circular 02/2006 defines a Receptor as:

- *“either (a) a living organism, a group of organisms, an ecological system or a piece of property which (i) is in a category listed in Table A as a type of receptor, and (ii) is being, or could be, harmed, by a contaminant; or (b) controlled waters which are being, or could be, polluted by a contaminant”.*

Table 2.1 lists all of the receptors to be considered by a Part IIA or PPS23⁴ assessment, and assesses whether the receptors are likely to be present at the site.

Table 2.1 - Potential Receptors

Receptor Type	Receptors	Present (✓/✗)	Notes
Humans	On-site residents	✓	Residential properties (houses and gardens) and public open space above indicative extent of landfill. Assumed to have vegetable patches.
	Construction staff and SI personnel.	✗	No known redevelopment proposed
	Future occupants of the site	✓	(Level of risk same as current residents so not considered further)
	Off site commercial workers or residents	✓	Possibly exposed to gases migrating off-site through permeable strata. Level of risk likely to be same, or lower, than on-site residents, and is not considered further
Ecosystems	Any designated ecological system ⁵ , or living organism forming part of such a system	✗	Inspection of MAGIC website has identified that the site does not lie within, or within 500m of, an ecologically designated site
Property (Flora and Fauna)	Crops, including timber	✗	Not present
	Produce grown domestically, or on allotments for consumption	✓	Gardens assumed to be used for growing food crops. Risk posed is considered to be covered by human health (residential with gardens) pathway and is not considered further.
	Livestock	✗	Not present.
	Other owned or domesticated animals	✓	Pets in residential properties. Risk posed is considered to be similar to that posed to on-site residents, and is not examined further
	Wild animals which are the subject of shooting or fishing rights	✗	Not present
Property (Buildings & Structures)	A 'building' means any structure, including any part below ground level, but does	✓	Residential houses (and in particular, water service pipes and foundations) above

⁴ Planning Policy Statement (PPS) 23: Planning and Pollution Control, Annex 2: Development on Land Affected by Contamination

⁵ Includes sites designated as Sites of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Special Area of Conservation (SAC, including candidate sites), Special Protection Area (SPA including potential sites), listed Wetlands of International Importance (Ramsar site) and Local Nature Reserves (LNR).

Receptor Type	Receptors	Present (✓/✗)	Notes
	not include plant or machinery within a building		indicative extent of landfill
Controlled Waters ¹	Territorial waters	✗	None feasibly close enough to be impacted
	Coastal waters	✗	None feasibly close enough to be impacted
	Inland Freshwaters	✗	The streams 530m to the north east and 700m to the east of the site are unlikely to be impacted by leachate originating from the subject site due to their distance from the site
	Groundwater	✓	Principal aquifer beneath site

¹ as defined in the Water Resources Act Section 104. Generally includes most surface water bodies excluding drains which discharge into sewers.

2.1.3 Pathways

DEFRA Circular 02/2006 defines a Pathway as:

- “one or more routes or means by, or through, which a receptor: (a) is being exposed to, or affected by, a contaminant; or (b) could be exposed or affected”

Pathways are examined as part of Table 2.2, overleaf.

2.1.4 Potential Pollutant Linkages

The pollutant linkages identified are also presented in Table 2.2.

Table 2.2 - Potential Pollutant Linkages

No.	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage ¹	Probability Of Linkage Occuring ¹	Overall Risk ¹	Comments
1	Residents of properties above infilled ground (including children playing in gardens)	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs) and asbestos within landfill material	Dermal contact and direct ingestion, inhalation of dust/vapours, consumption of home-grown vegetables	Medium	Likely	Moderate	Grass and/or topsoil coverage likely to mitigate risk to an extent – risk is greatest where possibly impacted soils are exposed or could be encountered, for example, when digging a vegetable patch or when children play outdoors. Properties are constructed directly above a potentially significant contamination source. Sample collection and analysis required to refine conclusion on risk
2	Residents of properties above infilled ground	Methane and carbon dioxide from decomposition of deleterious elements of landfill material	Movement into buildings, subsequent asphyxiation and explosion risk	Medium	Likely	Moderate	Installation and monitoring of wells for gases and flow rates is required to refine conclusion on risk
3	Subsurface services serving the buildings (principally water supply)	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs) within landfill material.	Chemical attack and tainting of water supply could occur at high contaminant concentrations / severe pH levels	Mild	Likely	Low to moderate	Further investigation data needed to refine assessment/CSM
4	Property (Structures) – sub-surface concrete	Sulphate and pH	Contact between contaminants and concrete	Mild	Likely	Low to moderate	Further investigation data needed to refine assessment/CSM

No.	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage ¹	Probability Of Linkage Occuring ¹	Overall Risk ¹	Comments
5	Principal aquifer (Sherwood Sandstone) beneath site	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs within landfill material.	Leaching of soil contaminants to aquifer – no aquiclude is indicated on BGS mapping	Medium	Likely	Moderate	Risk will depend upon depth and concentration of contaminants, confirmation that an aquiclude is absent, ,leaching potential of contaminants. Investigation required to determine risk.

¹ Taken from Table 6.3, CIRIA report 552 (Contaminated Land Risk Assessment – A Guide to Good Practice. Severity classified as minor, mild, medium or severe. Probability classified as unlikely, low, likely or high. Overall risk considers both the severity and probability of the linkage (very low, low, moderate, high or very high). See extract in Appendix B

3 CLOSING REMARKS

Potential pollutant linkages affecting the health of residents, controlled waters and property have been identified, and therefore an initial intrusive investigation should be undertaken to examine the likelihood of pollutant linkages existing at the site.

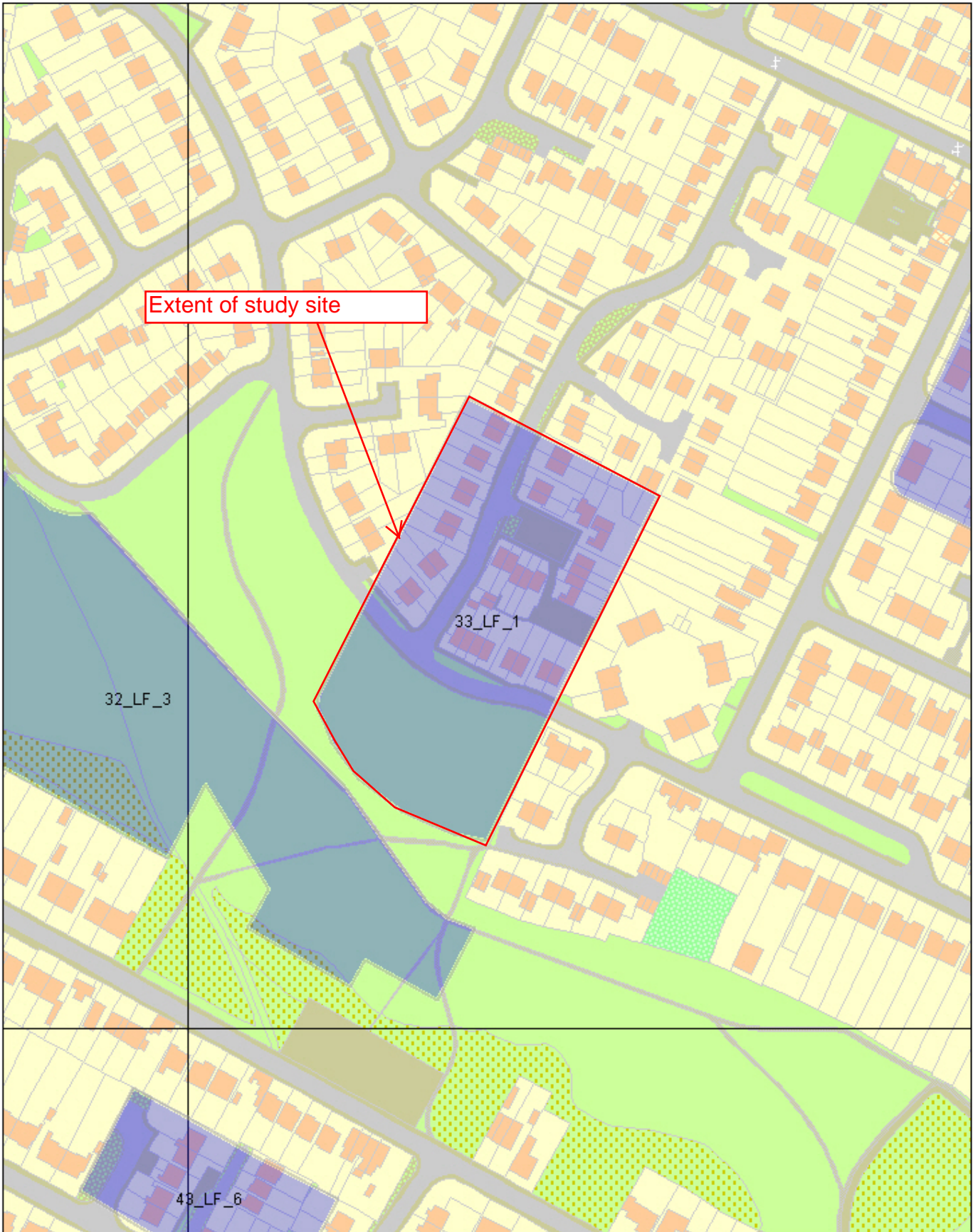


33 LF 1
Landfill site at Blake Close
Chadsmoor,
Cannock, Staffordshire



NOT TO SCALE

DATE



Appendix A (of desk study): Limitations Statement

1. This report has been prepared for the exclusive use of Cannock Chase District Council and copyright subsists with Grontmij Limited. Prior written permission must be obtained to reproduce all or part of the report.
2. This report and/or opinions have been prepared for the specific purpose stated in the document. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Grontmij Limited.
3. Observations were made of the site and of structures on the site as indicated within the report.
4. Grontmij has relied upon the existing data provided by Cannock Chase District Council to be accurate, and has not taken steps to independently check the accuracy of the data provided.
5. Our interpretation of any regulatory database information (including the MAGIC, the Environment Agency and British Geological Survey websites) assumes that the data provided is accurate. A disclaimer provided by database search companies is as follows: '...the data is derived from historical sources or information available in public records or from third parties and is supplied to us without warranty by data suppliers and we cannot warrant the accuracy or completeness of the data or the reports.' We cannot therefore accept any responsibility for the accuracy of the data used in this study, only that its interpretation has been carried out with due skill, care and diligence.
6. The scope of this study, as agreed with Cannock Chase Council, comprised a review of available information, and data was not purchased from a proprietary database.

Appendix B (of desk study): Severity and Probability of Risk in Conceptual Site Models (after CIRIA552, Tables 6.3 to 6.5)

This report draws on guidance presented in CIRIA report 552, "Contaminated Land Risk Assessment, A Guide for Good Practice", wherein the "severity" term in the Conceptual Site Model is classified with reference to the sensitivity of the hazard and the receptor, as follows:

Situation	Severity Category	Description	Examples
ACUTE PROBLEM	Severe	Acute risk to human health likely to result in "significant harm" as defined in EPA90, catastrophic damage to buildings or property, acute risk of major pollution of controlled waters, acute risk of harm to ecosystems (as defined in Contaminated Land Regulations 2006)	High cyanide concentrations at the surface of a recreation area Major spillage into controlled waters Explosion, causing building collapse
SIGNIFICANT HARM TO SENSITIVE RECEPTOR	Medium	Chronic risk to human health likely to result in "significant harm" as defined in EPA90, chronic pollution of sensitive controlled waters, significant change at a sensitive ecosystems or species, significant damage to buildings or structures	Contaminant concentrations at a site in excess of SGVs, GAC or similar screening values Leaching of contaminants to sensitive aquifer Death of a species within a nature reserve
SIGNIFICANT HARM TO LESS SENSITIVE RECEPTOR	Mild	Pollution of non-sensitive waters, significant damage to buildings, structures, services or crops, damage to sensitive buildings, structures, services or the environment, which nonetheless result in "significant harm"	Pollution to (former) non-aquifer or to non-controlled surface watercourse. Damage to building rendering it unsafe to occupy (e.g. foundation or structural damage)
NON-SIGNIFICANT HARM	Minor	Harm, not necessarily resulting in "significant harm" but probably requiring expenditure to resolve or financial loss. Non-permanent risks to human health that are easily mitigated, e.g. by wearing PPE. Easily-repairable damage to structures or services	Contaminant concentrations requiring the wearing of PPE during site work, but no other long-term mitigation. Discolouration of concrete

The likelihood of an event (probability) takes into account both the presence of hazard and receptor and the integrity of the pathway between hazard and receptor, and is assessed as follows:

Category	There is a pollution linkage and:
High	Event is likely in the short term and almost inevitable over the long term. Or there is evidence of actual harm at/to the receptor
Likely	Event is possible in the short term and likely over the long term
Low	Event is unlikely in the short term and possible over the long term
Unlikely	Event is unlikely, even in the long term

Potential severity and probability have been assessed in the following matrix, to give an overall risk rating:

	Severity			
Probability	Severe	Medium	Mild	Minor
High	Very high	High	Moderate	Low/moderate
Likely	High	Moderate	Low/moderate	Low
Low	Moderate	Low/moderate	Low	Very low
Unlikely	Low/moderate	Low	Very low	Very low

The above risk categories are likely to result in the following actions:

- Very high: urgent intervention / investigation needed, remediation likely to be required
- High: urgent intervention / investigation needed, remediation possibly required in short term and probably required in long term
- Moderate: investigation needed to clarify and refine risk; remediation may be required over the long term
- Low: it is possible that harm could arise to a receptor, but if realised, such harm is likely to be, at worst, mild
- Very low: it is possible that harm could arise to a receptor, but if realised, such harm is unlikely to be severe.

APPENDIX B

Appendix B: Limitations Statement

1. This report has been prepared for the exclusive use of Cannock Chase District Council and copyright subsists with Grontmij Limited. Prior written permission must be obtained to reproduce all or part of the report.
2. This report and/or opinions have been prepared for the specific purpose stated in the document. The recommendations should not be used for other purposes or adjacent sites without further reference to Grontmij Limited.
3. Observations were made of the site and soil arisings as indicated within the report. Where access to portions of the site was unavailable or limited, Grontmij Limited renders no opinion as to the environmental status of such parts of the site.
4. Grontmij has relied upon the existing desktop study data provided by Cannock Chase District Council to be accurate, and has not taken steps to independently check the accuracy of the data provided.
5. Our interpretation of any regulatory database information (including the MAGIC and British Geological Survey websites) within an earlier report, and relied upon in this report, assumes that the data provided is accurate. A disclaimer provided by database search companies is as follows: 'the data is derived from historical sources or information available in public records or from third parties and is supplied to us without warranty by data suppliers and we cannot warrant the accuracy or completeness of the data or the reports.' We cannot therefore accept any responsibility for the accuracy of the data used in this study, only that its interpretation has been carried out with due skill, care and diligence.
6. The conclusions and recommendations submitted in this report are based in part upon the data obtained from soil samples from exploratory holes. The nature and extent of variations between the exploratory holes is inferred in the report and could only be confirmed by further investigation. If variations or other latent conditions become evident, it will be necessary to re-evaluate the recommendations of this report.
7. The generalised soil profile described in the text is intended to convey trends in sub-surface conditions. The boundaries between strata are approximate and idealised and have been developed in interpretations of widely spaced explorations and samples; actual soil transitions may be more gradual. For specific information, refer to the exploration logs.
8. Water levels and/or gas readings have been taken in the borings and/or observation wells at times and under conditions stated on the exploration logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater or gas may occur due to variations in rainfall, atmospheric pressure and other factors different from those prevailing at the time the measurements were made.
9. The conclusions and recommendations of this report are based in part upon various types of chemical analysis of soil, water or gases, and are contingent upon their validity. These data have been reviewed and interpretations made in the report. Variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time and other factors. Should additional analytical or monitoring data

become available in the future, these data should be reviewed and conclusions and recommendations presented herein modified accordingly.

10. Chemical analyses have been performed for specific parameters during the course of this study, as detailed in the text. It must be noted that additional constituents not searched for during the current study may be present in soil, groundwater and soil voids at the site.

APPENDIX C



WINDOW SAMPLE LOG

WINDOW SAMPLE No
WS1

Project Blake Close		Client Cannock Chase DC		Logged By MJH
Job No 106270	Date 06-12-10 06-12-10	Ground Level (m)	Co-ordinates	Checked By GVT

SAMPLES & TESTS			Water	STRATA			Instrument Backfill
Depth	Type	Test Result		Reduced Level	Legend	Depth (Thickness)	
0.10	ES				0.14	MADE GROUND: Grass over brown very clayey fine grained SAND with many roots and rootlets. (Topsoil)	
0.30	ES				(0.98)	POSSIBLE MADE GROUND: Orange brown very silty coarse grained SAND.	
0.70	ES				1.12		
1.00	ES				(0.38)	Firm orange brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub rounded to rounded quartz. (Glacial Till)	
					1.50	Light brown very silty very sandy GRAVEL. Gravel is medium to coarse sub angular to sub rounded quartz. (Glacio - Fluvial Deposits)	
					(0.50)		
					2.00		
End of Hole at 2m bgl.							

GRONTMIJ WINDOW SAMPLE LOG 2006 BLAKE CLOSE WS.GPJ AGS3 ALL.GDT 12/21/10

Groundwater Strike Depth: (m) Rising to: (m) Groundwater Remarks None Encountered		General Remarks Location: Back garden of 44 Burgoyne Street in lawn. No groundwater encountered	Final Depth 2m bgl
Contractor Sherwood Drilling		Method/ Plant Used Hand held window sampling	All dimensions in metres Scale 1:50 Sheet 1 of 1



WINDOW SAMPLE LOG

WINDOW SAMPLE No
WS2

Project
Blake Close

Client
Cannock Chase DC

Logged By
MJH


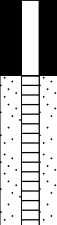



Job No
106270

Date
06-12-10
06-12-10

Ground Level (m)

Co-ordinates

Checked By
GVT

SAMPLES & TESTS			Water	STRATA				Instrument Backfill
Depth	Type	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.10	ES				0.05	Angular limestone GRAVEL over plastic membrane		
0.30	ES				0.17	MADE GROUND: Grass over brown very clayey fine grained SAND with many roots and rootlets. (Topsoil)		
0.70	ES				(1.33)	Brown very clayey very gravelly coarse grained SAND. Gravel is fine to coarse sub rounded to rounded quartz. (Glacio - Fluvial Deposits)		
1.00	ES				1.50	End of Hole at 1.5m bgl.		

GRONTMIJ WINDOW SAMPLE LOG 2006 BLAKE CLOSE WS.GPJ AGS3 ALL.GDT 12/21/10

Groundwater
Strike Depth: (m) Rising to: (m) Groundwater Remarks
None Encountered

General Remarks
Location: Back garden of 90 Blake Close in gravel patio area. No groundwater encountered

Final Depth
1.5m bgl

Contractor Sherwood Drilling

Method/
Plant Used
Hand tools

All dimensions in metres Scale 1:50
Sheet 1 of 1



WINDOW SAMPLE LOG

WINDOW SAMPLE No

WS3

Project

Blake Close

Client

Cannock Chase DC

Logged By

MJH

Job No

106270

Date

06-12-10
06-12-10

Ground Level (m)

Co-ordinates

Checked By

GVT

SAMPLES & TESTS**STRATA**

Depth	Type	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Instrument	Backfill
0.10	ES					(1.00)	MADE GROUND: Orange brown clayey gravelly fine to coarse grained SAND. Gravel is fine to coarse sub rounded to rounded quartz.		
0.30	ES								
0.70	ES					1.00			
1.00	ES					(0.50)	MADE GROUND: Dark brown silty very gravelly coarse grained SAND with occasional cobbles. Gravel is fine to coarse brick, concrete, ash, quartz and coal. Cobbles are angular brick and concrete		
						1.50	End of Hole at 1.5m bgl.		

Groundwater

Strike Depth: (m) Rising to: (m) Groundwater Remarks

None Encountered

General Remarks

Location: Back garden of 83 Blake Close in gravel patio area. No groundwater encountered

Final Depth**1.5m bgl**

Contractor Sherwood Drilling

Method/
Plant Used

Hand tools

All dimensions in metres Scale 1:50

Sheet 1 of 1

GRONTMIJ WINDOW SAMPLE LOG 2006 BLAKE CLOSE WS.GPJ AGS3 ALL.GDT 12/21/10



WINDOW SAMPLE LOG

WINDOW SAMPLE No
WS4

Project Blake Close		Client Cannock Chase DC		Logged By MJH
Job No 106270	Date 06-12-10 06-12-10	Ground Level (m)	Co-ordinates	Checked By GVT

SAMPLES & TESTS			Water	STRATA			Instrument Backfill
Depth	Type	Test Result		Reduced Level	Legend	Depth (Thickness)	
0.10	ES				0.11	MADE GROUND: Grass over brown very clayey fine grained SAND with many roots and rootlets. (Topsoil)	
0.30	ES				(1.68)	MADE GROUND: Orange brown very silty very gravelly coarse grained SAND with occasional cobbles. Gravel is fine to coarse angular to sub rounded quartz, brick, ash and occasional bitumen. Cobbles are angular brick	
0.50	ES						
0.70	ES						
1.00	ES						
1.20	ES						
1.50	ES						
					1.79		
					1.90	MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse quartz, brick and ash	
					(0.70)	Orange brown silty coarse grained SAND & GRAVEL. Gravel is medium to coarse sub rounded to well rounded quartz. (Glacial - Fluvial Deposits)	
					2.82		
					3.00	Very stiff reddish brown slightly sandy to sandy CLAY. (Glacial Till)	
						End of Hole at 3m bgl.	

Groundwater		General Remarks		Final Depth
Strike Depth: (m)	Rising to: (m)	Groundwater Remarks		3m bgl
None Encountered		Location: Back garden of 3a Blake Close in lawn. No groundwater encountered		

Contractor Sherwood Drilling	Method/ Plant Used Hand held window sampling	All dimensions in metres Scale 1:50 Sheet 1 of 1
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GRONTMIJ WINDOW SAMPLE LOG 2006 BLAKE CLOSE WS.GPJ AGS3 ALL.GDT 12/21/10



TRIAL PIT LOG

TRIAL PIT No
PSWHP01

Project Blake Close		Client Cannock Chase Council		Logged By GT
Job No 106270	Date 10-12-10 10-12-10	Ground Level (m)	Co-ordinates	Checked By

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Backfill
0.10	ES					(0.40)	TOPSOIL: Brown, soft, slightly silty, slightly gravelly, sandy CLAY. Gravel is of various lithologies, predominantly quartz, sub angular to rounded, fine to coarse, occasional rootlets.	
0.30	ES					0.40		
						(0.30)	Orange brown, slightly clayey SAND and GRAVEL. Gravel is sub rounded to rounded, fine to coarse grained, of quartz and sandstone, occasionally grading to cobbles.	
0.70	ES					0.70		
End of Trial Pit at 0.7m bgl.								

GRONTMIJ TP LOG BASIC BLAKE CLOSE PART 2A.GPJ AGS3 ALL GDT 2/22/11


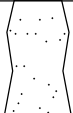




Shoring		Stability	
Groundwater Strike Depth: (m) Rising to: (m) Groundwater Remarks		General Remarks No 79 Blake Close	
None Encountered		Final Depth 0.7m bgl	
Contractor		Method/ Plant Used	



TRIAL PIT LOG

TRIAL PIT No
PSWHP02

Project Blake Close		Client Cannock Chase Council		Logged By GT
Job No 106270	Date 10-12-10 10-12-10	Ground Level (m)	Co-ordinates	Checked By

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Backfill
0.10	ES					0.10	MADE GROUND: Recreational bark chips over black geotextile membrane.	
0.30	ES					0.60	MADE GROUND: Brown, slightly clayey, silty, gravelly SAND. Gravel is sub angular to sub rounded, fine to coarse, consisting of quartz and sandstone.	
0.70	ES					0.70	End of Trial Pit at 0.7m bgl.	

GRONTMIJ TP LOG BASIC BLAKE CLOSE PART 2A.GPJ AGS3 ALL GDT 2/22/11

Shoring		Stability	
Groundwater Strike Depth: (m) Rising to: (m) Groundwater Remarks		General Remarks No 86 Blake Close	
None Encountered		Final Depth 0.7m bgl	
Contractor		Method/ Plant Used	



TRIAL PIT LOG

TRIAL PIT No
PSWHP03

Project Blake Close		Client Cannock Chase Council		Logged By GT
Job No 106270	Date 10-12-10 10-12-10	Ground Level (m)	Co-ordinates	Checked By

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Backfill
0.10	ES					0.25	TOPSOIL: Brown, soft, slightly silty, slightly gravelly, sandy CLAY. Gravel is of various lithologies, predominantly quartz, sub angular to rounded, fine to coarse, occasional rootlets.	
0.30	ES					0.45	Red brown, slightly silty, gravelly SAND. Gravel is sub-rounded to rounded, fine to coarse of quartz and sandstone.	
0.70	ES					0.70	End of Trial Pit at 0.7m bgl.	

GRONTMIJ TP LOG BASIC BLAKE CLOSE PART 2A.GPJ AGS3 ALL GDT 2/22/11

Shoring		Stability	
Groundwater Strike Depth: (m) Rising to: (m) Groundwater Remarks		General Remarks No 6 Blake Close	
None Encountered		Final Depth 0.7m bgl	
Contractor		Method/ Plant Used	



TRIAL PIT LOG

TRIAL PIT No
PSWHP04

Project Blake Close		Client Cannock Chase Council		Logged By GT
Job No 106270	Date 10-12-10 10-12-10	Ground Level (m)	Co-ordinates	Checked By

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Backfill
0.10	ES					(0.05) 0.05	TOPSOIL: Soft brown, slightly sandy, gravelly CLAY. Gravel is sub angular to sub rounded, fine to coarse, of various lithologies.	
0.30	ES					(0.65)	Red brown, slightly silty, gravelly SAND. Gravel is sub-rounded to rounded, fine to coarse of quartz and sandstone.	
0.70	ES					0.70	End of Trial Pit at 0.7m bgl.	

GRONTMIJ TP LOG BASIC BLAKE CLOSE PART 2A.GPJ AGS3 ALL GDT 2/22/11

Shoring		Stability	
Groundwater Strike Depth: (m) Rising to: (m) Groundwater Remarks		General Remarks No 1A Blake Close	
None Encountered		Final Depth 0.7m bgl	
Contractor		Method/ Plant Used	

TRIAL PIT LOG

TRIAL PIT No
PSWHP05

Project Blake Close		Client Cannock Chase Council		Logged By GT
Job No 106270	Date 10-12-10 10-12-10	Ground Level (m)	Co-ordinates	Checked By

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Backfill
0.10	ES					(0.05) 0.05	MADE BROWN: Yellow brown decorative gravel over black geotextile membrane.	
						(0.05) 0.10	MADE GROUND: Brown, slightly clayey, gravelly SAND. Gravel is sub angular to sub rounded, fine to medium grained of various lithologies.	
0.30	ES					(0.60)	Red brown, slightly silty, gravelly SAND (possibly reworked). Gravel is sub-rounded to rounded, fine to coarse of quartz and sandstone.	
0.70	ES					0.70	End of Trial Pit at 0.7m bgl.	

GRONTMIJ TP LOG BASIC BLAKE CLOSE PART 2A.GPJ AGS3 ALL GDT 2/22/11

Shoring		Stability	
Groundwater Strike Depth: (m) Rising to: (m) Groundwater Remarks		General Remarks No 52 Burgoyne Street	
None Encountered		Final Depth 0.7m bgl	
Contractor		Method/ Plant Used	

APPENDIX D



Grontmij
41 Corn Street
Bristol
Avon
BS1 1HS

Attention: Gareth Taylor

CERTIFICATE OF ANALYSIS

Date: 05 January 2011
Customer: H_GRONTMIJ_BRI
Sample Delivery Group (SDG): 101230-12
Your Reference:
Location: Blake Close
Report No: 109820

We received 15 samples on Saturday December 11, 2010 and 5 of these samples were scheduled for analysis which was completed on Wednesday January 05, 2011. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Approved By:

Sonia McWhan

Laboratory Manager



1291
GROUP



SDG: 101230-12
Job: H_GRONTMIJ_BRI-6
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 109820
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
2573497	PSWHP01		0.10	
2573498	PSWHP01		0.30	
2573501	PSWHP01		0.70	
2573502	PSWHP02		0.10	
2573503	PSWHP02		0.30	
2573504	PSWHP02		0.70	
2573506	PSWHP03		0.10	
2573507	PSWHP03		0.30	
2573508	PSWHP03		0.70	
2573509	PSWHP04		0.10	
2573510	PSWHP04		0.30	
2573511	PSWHP04		0.70	
2573512	PSWHP05		0.10	
2573513	PSWHP05		0.30	
2573514	PSWHP05		0.70	

Only received samples which have had analysis scheduled will be shown on the following pages.





SDG: 101230-12
 Job: H_GRONTMIJ_BRI-6
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 109820
 Superseded Report:

Test Schedule

SOLID Results Legend  Test  No Determination Possible	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	
		2573498	PSWHP01		0.30	250g Amber Jar 400g Tub
		2573804	PSWHP02		0.70	250g Amber Jar 400g Tub
		2573807	PSWHP03		0.30	250g Amber Jar 400g Tub
		2573811	PSWHP04		0.70	250g Amber Jar 400g Tub
		2573812	PSWHP05		0.10	400g Tub 250g Amber Jar
Boron Water Soluble	All	NDPs: 0 Tests: 5				
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 5				
Metals by iCap-OES (Soil)	Arsenic	NDPs: 0 Tests: 5				
	Barium	NDPs: 0 Tests: 5				
	Beryllium	NDPs: 0 Tests: 5				
	Cadmium	NDPs: 0 Tests: 5				
	Chromium	NDPs: 0 Tests: 5				
	Copper	NDPs: 0 Tests: 5				
	Lead	NDPs: 0 Tests: 5				
	Mercury	NDPs: 0 Tests: 5				
	Nickel	NDPs: 0 Tests: 5				
	Selenium	NDPs: 0 Tests: 5				
	Vanadium	NDPs: 0 Tests: 5				
	Zinc	NDPs: 0 Tests: 5				
	pH	All	NDPs: 0 Tests: 5			
Sample description	All	NDPs: 0 Tests: 5				
Total Organic Carbon	All	NDPs: 0 Tests: 5				



SDG: 101230-12
Job: H_GRONTMIJ_BRI-6
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 109820
Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
2573498	PSWHP01	0.30	Dark Brown	Sandy Clay	<0.063 mm	Vegetation	Stones
2573504	PSWHP02	0.70	Dark Brown	Silty Sand	0.063 - 0.1 mm	Vegetation	Stones
2573507	PSWHP03	0.30	Dark Brown	Sand	<0.063 mm	Vegetation	N/A
2573511	PSWHP04	0.70	Dark Brown	Sandy Clay	<0.063 mm	Stones	N/A
2573512	PSWHP05	0.10	Dark Brown	Silty Clay Loam	<0.063 mm	Stones	N/A

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

SDG: 101230-12
Job: H_GRONTMIJ_BRI-6
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 109820
Superseded Report:

Table with columns for Results Legend, Customer Sample R, PSWHP01-05, Component, LOD/Units, Method, and numerical data for various soil parameters like SOM, pH, Chromium, Arsenic, Barium, Beryllium, Cadmium, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, and Boron.



SDG: 101230-12
Job: H_GRONTMIJ_BRI-6
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 109820
Superseded Report:

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG: 101230-12
Job: H_GRONTMIJ_BRI-6
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 109820
Superseded Report:

Test Completion Dates

Lab Sample No(s)	2573498	2573504	2573507	2573511	2573512
Customer Sample Ref.	PSWHP01	PSWHP02	PSWHP03	PSWHP04	PSWHP05
AGS Ref.					
Depth	0.30	0.70	0.30	0.70	0.10
Type	SOLID	SOLID	SOLID	SOLID	SOLID
Boron Water Soluble	04-Jan-2011	04-Jan-2011	04-Jan-2011	04-Jan-2011	04-Jan-2011
Hexavalent Chromium (s)	04-Jan-2011	04-Jan-2011	04-Jan-2011	04-Jan-2011	04-Jan-2011
Metals by iCap-OES (Soil)	05-Jan-2011	05-Jan-2011	05-Jan-2011	05-Jan-2011	05-Jan-2011
pH	05-Jan-2011	05-Jan-2011	05-Jan-2011	05-Jan-2011	05-Jan-2011
Sample description	30-Dec-2010	30-Dec-2010	30-Dec-2010	30-Dec-2010	30-Dec-2010
Total Organic Carbon	04-Jan-2011	04-Jan-2011	04-Jan-2011	04-Jan-2011	04-Jan-2011

SDG: 101230-12
Job: H_GRONTMIJ_BRI-6
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 109820
Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH4 by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.

7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample -similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.

12. Results relate only to the items tested

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.

19. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

20. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

23. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials -whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

24. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 -C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY				
ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENT EXTRACTABLE MATTER	D&C	DOM	SOX THERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOX THERM	GRAVIMETRIC
THIN LAYER CHROMATOGRAPHY	D&C	DOM	SOX THERM	IATROSCAN
ELEMENTAL SULPHUR	D&C	DOM	SOX THERM	HPLC
PHENOLS BY GCMS	WET	DOM	SOX THERM	GCMS
HERBICIDES	D&C	HEXANE ACETONE	SOX THERM	GCMS
PESTICIDES	D&C	HEXANE ACETONE	SOX THERM	GCMS
EPH (DRO)	D&C	HEXANE ACETONE	END OVER END	GC/FID
EPH (MIN OIL)	D&C	HEXANE ACETONE	END OVER END	GC/FID
EPH (CLEANED UP)	D&C	HEXANE ACETONE	END OVER END	GC/FID
EPH CWG BY GC	D&C	HEXANE ACETONE	END OVER END	GC/FID
PCB TOT / PCB CON	D&C	HEXANE ACETONE	END OVER END	GCMS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE ACETONE	MICROWAVE TM28.	GCMS
C8-C10 (C8-C10) EZ FLASH	WET	HEXANE ACETONE	SHAWER	GC/EZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE ACETONE	SHAWER	GC/EZ
SEM VOLATILE ORGANIC COMPOUNDS	WET	DOM ACETONE	SONICATE	GCMS

LIQUID MATRICES EXTRACTION SUMMARY			
ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
SVOC	DOM	LIQUID/LIQUID SHAKE	GCMS
FREESULPHUR	DOM	SOLID PHASE EXTRACTION	HPLC
PEST COP/OPP	DOM	LIQUID/LIQUID SHAKE	GCMS
TRIAZINE HERBS	DOM	LIQUID/LIQUID SHAKE	GCMS
PHENOLS MS	DOM	SOLID PHASE EXTRACTION	GCMS
TPH by INFRARED (R)	TCE	LIQUID/LIQUID SHAKE	HPLC
MINERAL OIL BY R	TCE	LIQUID/LIQUID SHAKE	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GCMS

Identification of Asbestos in Bulk Materials

The results for asbestos identification for soil samples are obtained from possible Asbestos Containing Material, removed during the 'Screening of soils for Asbestos Containing Materials', which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anorthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in MDHS 100.

The identification of asbestos containing materials falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Grontmij
Radcliffe House
3rd Floor
Blenheim Court, Lode lane
Solihull
West Midlands
B912AA

Attention: Gareth Taylor

CERTIFICATE OF ANALYSIS

Date: 13 January 2011
Customer: H_GRONTMIJ_SOL
Sample Delivery Group (SDG): 101209-83
Your Reference:
Location: Blake Close
Report No: 110764

We received 19 samples on Thursday December 09, 2010 and 7 of these samples were scheduled for analysis which was completed on Thursday January 13, 2011. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Approved By:

Sonia McWhan

Laboratory Manager



1291
GROUP



SDG: 101209-83
Job: H_GRONTMIJ_SOL-40
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 110764
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
2554659	WS1		0.10	06/12/2010
2554661	WS1		0.30	06/12/2010
2554663	WS1		0.70	06/12/2010
2554660	WS1		1.00	06/12/2010
2554665	WS2		0.10	06/12/2010
2554664	WS2		0.30	06/12/2010
2554666	WS2		0.70	06/12/2010
2554667	WS2		1.00	06/12/2010
2554671	WS3		0.10	06/12/2010
2554669	WS3		0.30	06/12/2010
2554673	WS3		0.70	06/12/2010
2554668	WS3		1.00	06/12/2010
2554678	WS4		0.10	08/12/2010
2554674	WS4		0.30	08/12/2010
2554675	WS4		0.50	08/12/2010
2554676	WS4		0.70	08/12/2010
2554679	WS4		1.00	08/12/2010
2554680	WS4		1.20	08/12/2010
2554677	WS4		1.50	08/12/2010

Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

Test Schedule



SOLID	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	2554677	2554676	2554674	WS4	WS4	WS4	1.50	60g VOC 400g Tub	60g VOC 400g Tub	
Results Legend										
X Test										
N No Determination Possible										
Anions by Kone (soil)	All	NDPs: 0 Tests: 3								
Asbestos Containing Material Screen	All	NDPs: 0 Tests: 6		X	X	X	X	X	X	
Boron Water Soluble	All	NDPs: 0 Tests: 6		X	X	X	X	X	X	
CEN Readings	All	NDPs: 0 Tests: 3				X		X	X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 3				X		X	X	
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 3				X		X	X	
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 3				X		X	X	
GRO by GC-FID (S)	All	NDPs: 0 Tests: 3				X		X	X	
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 6		X	X	X	X	X	X	
Mercury Dissolved	All	NDPs: 0 Tests: 3				X		X	X	
Metals by iCap-OES (Soil)	Arsenic	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Barium	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Beryllium	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Cadmium	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Chromium	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Copper	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Lead	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Mercury	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Nickel	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Selenium	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Vanadium	NDPs: 0 Tests: 6		X	X	X	X	X	X	
	Zinc	NDPs: 0 Tests: 6		X	X	X	X	X	X	



SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

SOLID Results Legend  Test  No Determination Possible	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	
		2554677	WS4		1.50	60g VOC 400g Tub
		2554676	WS4		0.70	250g Amber Jar 400g Tub
		2554674	WS4		0.30	250g Amber Jar 60g VOC 400g Tub
		2554673	WS3		0.70	250g Amber Jar 400g Tub
	2554668	WS3		1.00	250g Amber Jar 60g VOC 400g Tub	
	2554665	WS2		0.10	250g Amber Jar 400g Tub	
	2554661	WS1		0.30	250g Amber Jar 400g Tub	
PAH by GCMS	All	NDPs: 0 Tests: 4				
pH	All	NDPs: 0 Tests: 6				
Sample description	All	NDPs: 0 Tests: 7				
Semi Volatile Organic Compounds	All	NDPs: 0 Tests: 3				
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 3				
Total Organic Carbon	All	NDPs: 0 Tests: 6				
TPH CWG GC (S)	All	NDPs: 0 Tests: 3				
VOC MS (S)	All	NDPs: 0 Tests: 3				
VOC MS (W)	All	NDPs: 0 Tests: 3				



SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
2554661	WS1	0.30	Light Brown	Silty Clay	0.063 - 0.1 mm	N/A	N/A
2554665	WS2	0.10	Red	Sand	0.1 - 2 mm	Stones	N/A
2554668	WS3	1.00	Dark Brown	Loamy Sand	0.1 - 2 mm	Stones	N/A
2554673	WS3	0.70	Dark Brown	Silty Clay	0.063 - 0.1 mm	N/A	Stones
2554674	WS4	0.30	Light Brown	Loamy Sand	0.1 - 2 mm	Stones	N/A
2554676	WS4	0.70	Light Brown	Loamy Sand	0.1 - 2 mm	Stones	N/A
2554677	WS4	1.50	Dark Brown	Sand	0.1 - 2 mm	Stones	N/A

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



SDG: 101209-83
Job: H_GRONTMIJ_SOL-40
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 110764
Superseded Report:

Results Legend		Customer Sample R	WS1	WS2	WS3	WS3	WS4	WS4
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference						
M	mCERTS accredited.		0.30	0.10	0.70	1.00	0.30	0.70
S	Non-conforming work.		Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
aq	Aqueous / settled sample.		06/12/2010	06/12/2010	06/12/2010	06/12/2010	08/12/2010	08/12/2010
diss.filt	Dissolved / filtered sample.		09/12/2010	09/12/2010	09/12/2010	09/12/2010	09/12/2010	09/12/2010
tot.unfilt	Total / unfiltered sample.		101209-83	101209-83	101209-83	101209-83	101209-83	101209-83
*	subcontracted test.	2554661	2554665	2554673	2554668	2554674	2554676	
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.							
Component	LOD/Units	Method						
Moisture	%	PM114				9.28		9.34
Moisture content ratio	%	PM114				10.2		10.3
Dry matter content ratio	%	PM114				90.7		90.7
Asbestos Containing Material Screen	-	TM001	No ACM Detected	No ACM Detected	No ACM Detected	No ACM Detected	No ACM Detected	No ACM Detected
Soil Organic Matter (SOM)	<0.35 %	TM132	1.6 #	<0.35 #	2.74 #	2.36 #	0.914 #	1.88 #
pH	1 pH Units	TM133	7.29 M	8.63 M	7.59 M	7.84 M	8.19 M	8.36 M
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #
Arsenic	<0.6 mg/kg	TM181	2.53 M	3.52 M	4.07 M	3.94 M	5.01 M	4.9 M
Barium	<0.6 mg/kg	TM181	56.7 #	70.5 #	109 #	93.5 #	59.4 #	104 #
Beryllium	<0.01 mg/kg	TM181	0.498 M	0.798 M	0.486 M	0.497 M	0.222 M	0.278 M
Cadmium	<0.02 mg/kg	TM181	0.377 M	0.532 M	0.452 M	0.475 M	0.253 M	0.364 M
Chromium	<0.9 mg/kg	TM181	13.3 M	11.4 M	6.92 M	8 M	5.6 M	9.26 M
Copper	<1.4 mg/kg	TM181	11 M	29.2 M	39.5 M	28 M	8.64 M	11.3 M
Lead	<0.7 mg/kg	TM181	13.9 M	4.15 M	35.2 M	25.1 M	16.2 M	22.8 M
Mercury	<0.14 mg/kg	TM181	<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M
Nickel	<0.2 mg/kg	TM181	10.5 M	9.55 M	8.73 M	9.56 M	5.33 M	7.89 M
Selenium	<1 mg/kg	TM181	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Vanadium	<0.2 mg/kg	TM181	14.5 #	12.8 #	15.9 #	12.1 #	9.21 #	14.8 #
Zinc	<1.9 mg/kg	TM181	43.5 M	20.7 M	96 M	78.8 M	33.8 M	50.5 M
Boron, water soluble	<1 mg/kg	TM222	<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
Water Soluble Sulphate as SO4 2:1 Extract	<0.008 g/l	TM243				0.0119 M	<0.008 M	



CERTIFICATE OF ANALYSIS

Validated

SDG: 101209-83
Job: H_GRONTMIJ_SOL-40
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 110764
Superseded Report:

Table with columns for Results Legend, Customer Sample R, Component, LOD/Units, Method, and numerical results. Includes rows for Moisture, Moisture content ratio, Dry matter content ratio, and Water Soluble Sulphate as SO4 2:1 Extract.



SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

PAH by GCMS

Results Legend		Customer Sample R	WS1	WS2	WS3	WS4			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference							
M	mCERTS accredited.		0.30	0.10	0.70	0.70			
S	Non-conforming work.		Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid			
aq	Aqueous / settled sample.		06/12/2010	06/12/2010	06/12/2010	08/12/2010			
diss.filt	Dissolved / filtered sample.		09/12/2010	09/12/2010	09/12/2010	09/12/2010			
tot.unfilt	Total / unfiltered sample.		101209-83	101209-83	101209-83	101209-83			
*	subcontracted test.		2554661	2554665	2554673	2554676			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.								
Component	LOD/Units		Method						
Naphthalene-d8 % recovery**	%		TM218	95.4	96.4	94.9	94.7		
Acenaphthene-d10 % recovery**	%	TM218	95.3	94.2	94.9	91.9			
Phenanthrene-d10 % recovery**	%	TM218	97.6	92.4	96.2	90.5			
Chrysene-d12 % recovery**	%	TM218	92.2	90.4	95.1	90.9			
Perylene-d12 % recovery**	%	TM218	88.1	94.3	102	91.1			
Naphthalene	<9 µg/kg	TM218	<9 M	<9 M	106 M	30 M			
Acenaphthylene	<12 µg/kg	TM218	<12 M	<12 M	18.6 M	73.9 M			
Acenaphthene	<8 µg/kg	TM218	<8 M	<8 M	635 M	75.7 M			
Fluorene	<10 µg/kg	TM218	<10 M	<10 M	609 M	140 M			
Phenanthrene	<15 µg/kg	TM218	<15 M	<15 M	4120 M	3150 M			
Anthracene	<16 µg/kg	TM218	<16 M	<16 M	1040 M	1100 M			
Fluoranthene	<17 µg/kg	TM218	<17 M	<17 M	4190 M	6650 M			
Pyrene	<15 µg/kg	TM218	<15 M	<15 M	3160 M	5700 M			
Benz(a)anthracene	<14 µg/kg	TM218	<14 M	<14 M	1390 M	4160 M			
Chrysene	<10 µg/kg	TM218	<10 M	<10 M	1300 M	3610 M			
Benzo(b)fluoranthene	<15 µg/kg	TM218	<15 M	<15 M	1480 M	3940 M			
Benzo(k)fluoranthene	<14 µg/kg	TM218	<14 M	<14 M	632 M	1640 M			
Benzo(a)pyrene	<15 µg/kg	TM218	<15 M	<15 M	1330 M	3610 M			
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18 M	<18 M	687 M	1670 M			
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23 M	<23 M	179 M	555 M			
Benzo(g,h,i)perylene	<24 µg/kg	TM218	<24 M	<24 M	817 M	2000 M			
Polyaromatic hydrocarbons, Total	<118 µg/kg	TM218	<118 M	<118 M	21700 M	38100 M			



SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

Semi Volatile Organic Compounds

Results Legend		Customer Sample R	WS3	WS4	WS4			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference						
M	mCERTS accredited.		1.00	0.30	1.50			
S	Non-conforming work.		Soil/Solid	Soil/Solid	Soil/Solid			
aq	Aqueous / settled sample.		06/12/2010	08/12/2010	08/12/2010			
diss.filt	Dissolved / filtered sample.		09/12/2010	09/12/2010	09/12/2010			
tot.unfilt	Total / unfiltered sample.		09/12/2010	09/12/2010	09/12/2010			
*	subcontracted test.		101209-83	101209-83	101209-83			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.		2554668	2554674	2554677			
Component	LOD/Units		Method					
Phenol	<100 µg/kg		TM157	<100	<100	<100		
Pentachlorophenol	<100 µg/kg	TM157	<100	<100	<100			
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157	<100	<100	<100			
Nitrobenzene	<100 µg/kg	TM157	<100	<100	<100			
Isophorone	<100 µg/kg	TM157	<100	<100	<100			
Hexachloroethane	<100 µg/kg	TM157	<100	<100	<100			
Hexachlorocyclopentadiene	<100 µg/kg	TM157	<100	<100	<100			
Hexachlorobutadiene	<100 µg/kg	TM157	<100	<100	<100			
Hexachlorobenzene	<100 µg/kg	TM157	<100	<100	<100			
n-Dioctyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
Dimethyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
Diethyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
n-Dibutyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
Dibenzofuran	<100 µg/kg	TM157	<100	<100	<100			
Carbazole	<100 µg/kg	TM157	<100	163	344			
Butylbenzyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157	<100	<100	<100			
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157	<100	<100	<100			
bis(2-Chloroethyl)ether	<100 µg/kg	TM157	<100	<100	<100			
Azobenzene	<100 µg/kg	TM157	<100	<100	<100			
4-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100			
4-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100			
4-Methylphenol	<100 µg/kg	TM157	<100	<100	<100			
4-Chlorophenylphenylether	<100 µg/kg	TM157	<100	<100	<100			
4-Chloroaniline	<100 µg/kg	TM157	<100	<100	<100			
4-Chloro-3-methylphenol	<100 µg/kg	TM157	<100	<100	<100			
4-Bromophenylphenylether	<100 µg/kg	TM157	<100	<100	<100			
3-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100			
2-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100			
2-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100			
2-Methylphenol	<100 µg/kg	TM157	<100	<100	<100			
1,2,4-Trichlorobenzene	<100 µg/kg	TM157	<100	<100	<100			
2-Chlorophenol	<100 µg/kg	TM157	<100	<100	<100			
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100			
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100			



SDG: 101209-83
 Job: H_Grontmij_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

TPH CWG (S)

Results Legend		Customer Sample R	WS3	WS4	WS4				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference							
M	mCERTS accredited.		1.00	0.30	1.50				
S	Non-conforming work.		Soil/Solid	Soil/Solid	Soil/Solid				
aq	Aqueous / settled sample.		06/12/2010	08/12/2010	08/12/2010				
diss.filt	Dissolved / filtered sample.		09/12/2010	09/12/2010	09/12/2010				
tot.unfilt	Total / unfiltered sample.		101209-83	101209-83	101209-83				
*	subcontracted test.		2554668	2554674	2554677				
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.								
Component	LOD/Units		Method						
GRO Surrogate % recovery**	%		TM089	64	133	130			
GRO >C5-C12	<44 µg/kg	TM089	<44	<44	<44				
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5	<5	<5				
Benzene	<10 µg/kg	TM089	<10	<10	<10				
Toluene	<2 µg/kg	TM089	<2	<2	<2				
Ethylbenzene	<3 µg/kg	TM089	3.33	<3	<3				
m,p-Xylene	<6 µg/kg	TM089	<6	<6	<6				
o-Xylene	<3 µg/kg	TM089	<3	<3	<3				
m,p,o-Xylene	<10 µg/kg	TM089	<10	<10	<10				
BTEX, Total	<10 µg/kg	TM089	<10	<10	<10				
Aliphatics >C5-C6	<10 µg/kg	TM089	<10	<10	<10				
Aliphatics >C6-C8	<10 µg/kg	TM089	<10	<10	<10				
Aliphatics >C8-C10	<10 µg/kg	TM089	<10	<10	<10				
Aliphatics >C10-C12	<10 µg/kg	TM089	<10	<10	<10				
Aliphatics >C12-C16	<100 µg/kg	TM173	1040	1480	1610				
Aliphatics >C16-C21	<100 µg/kg	TM173	1050	2000	1500				
Aliphatics >C21-C35	<100 µg/kg	TM173	8270	5070	5870				
Aliphatics >C35-C44	<100 µg/kg	TM173	1660	<100	902				
Total Aliphatics >C12-C44	<100 µg/kg	TM173	12000	8550	9880				
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10	<10				
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	<10	<10				
Aromatics >EC8-EC10	<10 µg/kg	TM089	<10	<10	<10				
Aromatics >EC10-EC12	<10 µg/kg	TM089	<10	<10	<10				
Aromatics >EC12-EC16	<100 µg/kg	TM173	4100	4640	601				
Aromatics >EC16-EC21	<100 µg/kg	TM173	11600	25400	14900				
Aromatics >EC21-EC35	<100 µg/kg	TM173	30700	51300	28600				
Aromatics >EC35-EC44	<100 µg/kg	TM173	17100	22900	13300				
Aromatics >EC40-EC44	<100 µg/kg	TM173	6600	8560	5800				
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	63400	104000	57400				
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	75400	113000	67300				
Total Aliphatics >C5-35	<100 µg/kg	TM173	10400	8550	8980				
Total Aromatics >C5-35	<100 µg/kg	TM173	46300	81300	44100				
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173	56700	89800	53100				



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

VOC MS (S)

Results Legend		Customer Sample R	WS3	WS4	WS4				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference							
M	mCERTS accredited.		1.00	0.30	1.50				
S	Non-conforming work.		Soil/Solid	Soil/Solid	Soil/Solid				
aq	Aqueous / settled sample.		06/12/2010	08/12/2010	08/12/2010				
diss.filt	Dissolved / filtered sample.		09/12/2010	09/12/2010	09/12/2010				
tot.unfilt	Total / unfiltered sample.		09/12/2010	09/12/2010	09/12/2010				
*	subcontracted test.		101209-83	101209-83	101209-83				
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.		2554668	2554674	2554677				
Component	LOD/Units		Method						
Dibromofluoromethane**	%		TM116	110	109	110			
Toluene-d8**	%	TM116	96.6	99.1	99.1				
4-Bromofluorobenzene**	%	TM116	134	108	112				
Dichlorodifluoromethane	<4 µg/kg	TM116	<4	<4	<4				
Chloromethane	<7 µg/kg	TM116	<7	<7	<7				
Vinyl Chloride	<10 µg/kg	TM116	<10	<10	<10				
Bromomethane	<13 µg/kg	TM116	<13	<13	<13				
Chloroethane	<14 µg/kg	TM116	<14	<14	<14				
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<6	<6				
1.1-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10				
Carbon Disulphide	<7 µg/kg	TM116	<7	<7	<7				
Dichloromethane	<10 µg/kg	TM116	13.2	<10	<10				
Methyl Tertiary Butyl Ether	<11 µg/kg	TM116	<11	<11	<11				
trans-1-2-Dichloroethene	<11 µg/kg	TM116	<11	<11	<11				
1.1-Dichloroethane	<8 µg/kg	TM116	<8	<8	<8				
cis-1-2-Dichloroethene	<5 µg/kg	TM116	<5	<5	<5				
2.2-Dichloropropane	<12 µg/kg	TM116	<12	<12	<12				
Bromochloromethane	<14 µg/kg	TM116	<14	<14	<14				
Chloroform	<8 µg/kg	TM116	<8	<8	<8				
1.1.1-Trichloroethane	<7 µg/kg	TM116	<7	<7	<7				
1.1-Dichloropropene	<11 µg/kg	TM116	<11	<11	<11				
Carbontetrachloride	<14 µg/kg	TM116	<14	<14	<14				
1.2-Dichloroethane	<5 µg/kg	TM116	<5	<5	<5				
Benzene	<9 µg/kg	TM116	<9	<9	<9				
Trichloroethene	<9 µg/kg	TM116	<9	<9	<9				
1.2-Dichloropropane	<12 µg/kg	TM116	<12	<12	<12				
Dibromomethane	<9 µg/kg	TM116	<9	<9	<9				
Bromodichloromethane	<7 µg/kg	TM116	<7	<7	<7				
cis-1-3-Dichloropropene	<14 µg/kg	TM116	<14	<14	<14				
Toluene	<5 µg/kg	TM116	8.24	<5	<5				
trans-1-3-Dichloropropene	<14 µg/kg	TM116	<14	<14	<14				
1.1.2-Trichloroethane	<10 µg/kg	TM116	<10	<10	<10				
1.3-Dichloropropane	<7 µg/kg	TM116	<7	<7	<7				
Tetrachloroethene	<5 µg/kg	TM116	<5	<5	<5				
Dibromochloromethane	<13 µg/kg	TM116	<13	<13	<13				



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

VOC MS (S)

Results Legend		Customer Sample R	WS3	WS4	WS4				
#	ISO17025 accredited.								
M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	1.00	0.30	1.50				
S	Non-conforming work.		Soil/Solid	Soil/Solid	Soil/Solid				
aq	Aqueous / settled sample.		06/12/2010	08/12/2010	08/12/2010				
diss.filt	Dissolved / filtered sample.		09/12/2010	09/12/2010	09/12/2010				
tot.unfilt	Total / unfiltered sample.		101209-83	101209-83	101209-83				
*	subcontracted test.		2554668	2554674	2554677				
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.								
Component	LOD/Units		Method						
1.2-Dibromoethane	<12 µg/kg		TM116	<12 M	<12 M	<12 M			
Chlorobenzene	<5 µg/kg		TM116	<5 M	<5 M	<5 M			
1.1.1.2-Tetrachloroethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M				
Ethylbenzene	<4 µg/kg	TM116	12.8 M	<4 M	<4 M				
p/m-Xylene	<14 µg/kg	TM116	<14 #	<14 #	<14 #				
o-Xylene	<10 µg/kg	TM116	<10 M	<10 M	<10 M				
Styrene	<10 µg/kg	TM116	<10 M	<10 M	<10 M				
Bromoform	<10 µg/kg	TM116	<10 M	<10 M	<10 M				
Isopropylbenzene	<5 µg/kg	TM116	<5 M	<5 M	<5 M				
1.1.2.2-Tetrachloroethane	<10 µg/kg	TM116	<10 #	<10 #	<10 #				
1.2.3-Trichloropropane	<17 µg/kg	TM116	<17 M	<17 M	<17 M				
Bromobenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M				
Propylbenzene	<11 µg/kg	TM116	<11 M	<11 M	<11 M				
2-Chlorotoluene	<9 µg/kg	TM116	<9 M	<9 M	<9 M				
1.3.5-Trimethylbenzene	<8 µg/kg	TM116	<8 #	<8 #	<8 #				
4-Chlorotoluene	<12 µg/kg	TM116	<12 M	<12 M	<12 M				
tert-Butylbenzene	<12 µg/kg	TM116	<12 #	<12 #	<12 #				
1.2.4-Trimethylbenzene	<9 µg/kg	TM116	<9 #	<9 #	<9 #				
sec-Butylbenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M				
4-Isopropyltoluene	<11 µg/kg	TM116	<11 M	<11 M	<11 M				
1.3-Dichlorobenzene	<6 µg/kg	TM116	<6 M	<6 M	<6 M				
1.4-Dichlorobenzene	<5 µg/kg	TM116	<5 M	<5 M	<5 M				
n-Butylbenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M				
1.2-Dichlorobenzene	<12 µg/kg	TM116	<12 M	<12 M	<12 M				
1.2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14 M	<14 M	<14 M				
Tert-amyl methyl ether	<15 µg/kg	TM116	<15	<15	<15				
1.2.4-Trichlorobenzene	<6 µg/kg	TM116	<6 #	<6 #	<6 #				
Hexachlorobutadiene	<12 µg/kg	TM116	<12	<12	<12				
Naphthalene	<13 µg/kg	TM116	<13 M	<13 M	<13 M				
1.2.3-Trichlorobenzene	<6 µg/kg	TM116	<6 M	<6 M	<6 M				

SDG: 101209-83	Location: Blake Close	Order Number:
Job: H_GRONTMIJ_SOL-40	Customer: Grontmij	Report Number: 110764
Client Reference:	Attention: Gareth Taylor	Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	Blake Close
Mass Sample taken (kg)	0.193	Moisture Content Ratio (%)	10.2
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	90.7
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554668
Sampled Date	06-Dec-2010
Customer Sample Ref.	WS3
Depth (m)	1.00

Solid Waste Analysis

Total Organic Carbon (%)	1.37	-	-	-
Loss on Ignition (%)	-	-	-	-
Sum of BTEX (mg/kg)	<0.01	-	-	-
Sum of 7 PCBs (mg/kg)	-	-	-	-
Mineral Oil (mg/kg)	-	-	-	-
PAH Sum of 17 (mg/kg)	-	-	-	-
pH (pH Units)	7.84	-	-	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.00124	<0.00012	0.00248	<0.0012	0.5	2	25
Barium	-	-	-	-	20	100	300
Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
Chromium	0.004	<0.00022	0.008	<0.0022	0.5	10	70
Copper	0.00405	<0.00085	0.0081	<0.0085	2	50	100
Mercury Dissolved (CVAf)	0.0000333	<0.00001	0.0000666	<0.0001	0.01	0.2	2
Molybdenum	-	-	-	-	0.5	10	30
Nickel	0.00106	<0.00015	0.00212	<0.0015	0.4	10	40
Lead	0.000366	<0.00002	0.000732	<0.0002	0.5	10	50
Antimony	-	-	-	-	0.06	0.7	5
Selenium	-	-	-	-	0.1	0.5	7
Zinc	0.002	<0.00041	0.004	<0.0041	4	50	200
Chloride	-	-	-	-	800	15000	25000
Fluoride	-	-	-	-	10	150	500
Sulphate (soluble)	-	-	-	-	1000	20000	50000
Total Dissolved Solids	-	-	-	-	4000	60000	100000
Total Monohydric Phenols (W)	-	-	-	-	1	-	-
Dissolved Organic Carbon	-	-	-	-	500	800	1000

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.13
Conductivity (µS/cm)	116.00
Temperature (°C)	13.50
Volume Leachant (Litres)	0.332
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference

Mass Sample taken (kg) 0.193
 Mass of dry sample (kg) 0.175
 Particle Size <4mm >95%

Site Location

Blake Close
 Moisture Content Ratio (%) 10.2
 Dry Matter Content Ratio (%) 90.7

Case

SDG 101209-83
 Lab Sample Number(s) 2554668
 Sampled Date 06-Dec-2010
 Customer Sample Ref. WS3
 Depth (m) 1.00

Solid Waste Analysis

Total Organic Carbon (%) 1.37
 Loss on Ignition (%) -
 Sum of BTEX (mg/kg) <0.01
 Sum of 7 PCBs (mg/kg) -
 Mineral Oil (mg/kg) -
 PAH Sum of 17 (mg/kg) -
 pH (pH Units) 7.84
 ANC to pH 6 (mol/kg) -
 ANC to pH 4 (mol/kg) -

Eluate Analysis

	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
Boron	0.0201	<0.0094	0.0402	<0.094	-
Vanadium	0.00186	<0.00024	0.00372	<0.0024	-

SVOC MS (W) - Aqueous

	Result	Limit of Detection	Result	Limit of Detection	
1,2,4-Trichlorobenzene	<0.0023	<0.0023	<0.0046	<0.023	-
1,2-Dichlorobenzene	<0.0037	<0.0037	<0.0074	<0.037	-
1,3-Dichlorobenzene	<0.0022	<0.0022	<0.0044	<0.022	-
1,4-Dichlorobenzene	<0.0027	<0.0027	<0.0054	<0.027	-
2,4,5-Trichlorophenol	<0.001	<0.001	<0.002	<0.01	-
2,4,6-Trichlorophenol	<0.001	<0.001	<0.002	<0.01	-
2,4-Dichlorophenol	<0.001	<0.001	<0.002	<0.01	-
2,4-Dimethylphenol	<0.001	<0.001	<0.002	<0.01	-
2,4-Dinitrotoluene	<0.001	<0.001	<0.002	<0.01	-
2,6-Dinitrotoluene	<0.001	<0.001	<0.002	<0.01	-
2-Chloronaphthalene	<0.001	<0.001	<0.002	<0.01	-
2-Chlorophenol	<0.001	<0.001	<0.002	<0.01	-
2-Methylnaphthalene	<0.001	<0.001	<0.002	<0.01	-
2-Methylphenol	<0.001	<0.001	<0.002	<0.01	-
2-Nitroaniline	<0.001	<0.001	<0.002	<0.01	-
2-Nitrophenol	<0.001	<0.001	<0.002	<0.01	-
3-Nitroaniline	<0.001	<0.001	<0.002	<0.01	-
4-Bromophenylphenylether	<0.001	<0.001	<0.002	<0.01	-
4-Chloro-3-methylphenol	<0.001	<0.001	<0.002	<0.01	-
4-Chloroaniline	<0.001	<0.001	<0.002	<0.01	-

Leach Test Information

Date Prepared 06-Jan-2011
 pH (pH Units) 8.13
 Conductivity (µS/cm) 116.00
 Temperature (°C) 13.50
 Volume Leachant (Litres) 0.332
 Volume of Eluate VE1 (Litres)

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

13/01/2011 06:04:32

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CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	
Mass Sample taken (kg)	0.193	Moisture Content Ratio (%)	Blake Close 10.2
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	90.7
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554668
Sampled Date	06-Dec-2010
Customer Sample Ref.	WS3
Depth (m)	1.00

Solid Waste Analysis

Total Organic Carbon (%)	1.37
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	<0.01
Sum of 7 PCBs (mg/kg)	-
Mineral Oil (mg/kg)	-
PAH Sum of 17 (mg/kg)	-
pH (pH Units)	7.84
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
SVOC MS (W) - Aqueous					
4-Chlorophenylphenylether	<0.001	<0.001	<0.002	<0.01	-
4-Methylphenol	<0.001	<0.001	<0.002	<0.01	-
4-Nitrophenol	<0.001	<0.001	<0.002	<0.01	-
4-Nitroaniline	<0.001	<0.001	<0.002	<0.01	-
Azobenzene	<0.001	<0.001	<0.002	<0.01	-
Acenaphthylene	<0.001	<0.001	<0.002	<0.01	-
Acenaphthene	<0.001	<0.001	<0.002	<0.01	-
Anthracene	<0.001	<0.001	<0.002	<0.01	-
Bis(2-chloroethyl)ether	<0.001	<0.001	<0.002	<0.01	-
Bis(2-chloroethoxy)methane	<0.001	<0.001	<0.002	<0.01	-
Bis(2-ethylhexyl) phthalate	<0.002	<0.002	<0.004	<0.02	-
Benzo(a)anthracene	<0.001	<0.001	<0.002	<0.01	-
Butylbenzyl phthalate	<0.001	<0.001	<0.002	<0.01	-
Benzo(b)fluoranthene	<0.001	<0.001	<0.002	<0.01	-
Benzo(k)fluoranthene	<0.001	<0.001	<0.002	<0.01	-
Benzo(a)pyrene	<0.001	<0.001	<0.002	<0.01	-
Benzo(ghi)perylene	<0.001	<0.001	<0.002	<0.01	-
Carbazole	<0.001	<0.001	<0.002	<0.01	-
Chrysene	<0.001	<0.001	<0.002	<0.01	-
Dibenzofuran	<0.001	<0.001	<0.002	<0.01	-
Di-n-butyl phthalate	<0.001	<0.001	<0.002	<0.01	-
Diethyl phthalate	<0.001	<0.001	<0.002	<0.01	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.13
Conductivity (µS/cm)	116.00
Temperature (°C)	13.50
Volume Leachant (Litres)	0.332
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
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 Mcerts Certification does not apply to leachates

13/01/2011 06:04:32

06:04:22 13/01/2011

SDG: 101209-83	Location: Blake Close	Order Number:
Job: H_GRONTMIJ_SOL-40	Customer: Grontmij	Report Number: 110764
Client Reference:	Attention: Gareth Taylor	Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	Blake Close
Mass Sample taken (kg)	0.193	Moisture Content Ratio (%)	10.2
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	90.7
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554668
Sampled Date	06-Dec-2010
Customer Sample Ref.	WS3
Depth (m)	1.00

Solid Waste Analysis

Total Organic Carbon (%)	1.37	-	-	-
Loss on Ignition (%)	-	-	-	-
Sum of BTEX (mg/kg)	<0.01	-	-	-
Sum of 7 PCBs (mg/kg)	-	-	-	-
Mineral Oil (mg/kg)	-	-	-	-
PAH Sum of 17 (mg/kg)	-	-	-	-
pH (pH Units)	7.84	-	-	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
SVOC MS (W) - Aqueous					
Dibenzo(a,h)anthracene	<0.001	<0.001	<0.002	<0.01	-
Dimethyl phthalate	<0.001	<0.001	<0.002	<0.01	-
Di-n-Octyl phthalate	<0.005	<0.005	<0.01	<0.05	-
Fluoranthene	<0.001	<0.001	<0.002	<0.01	-
Fluorene	<0.001	<0.001	<0.002	<0.01	-
Hexachlorobenzene	<0.001	<0.001	<0.002	<0.01	-
Hexachlorobutadiene	<0.0025	<0.0025	<0.005	<0.025	-
Pentachlorophenol	<0.001	<0.001	<0.002	<0.01	-
Phenol	<0.001	<0.001	<0.002	<0.01	-
N-nitrosodi-n-propylamine	<0.001	<0.001	<0.002	<0.01	-
Hexachloroethane	<0.001	<0.001	<0.002	<0.01	-
Nitrobenzene	<0.001	<0.001	<0.002	<0.01	-
Naphthalene	<0.0035	<0.0035	<0.007	<0.035	-
Isophorone	<0.001	<0.001	<0.002	<0.01	-
Hexachlorocyclopentadiene	<0.001	<0.001	<0.002	<0.01	-
Phenanthrene	<0.001	<0.001	<0.002	<0.01	-
Indeno (1,2,3-cd) Pyrene	<0.001	<0.001	<0.002	<0.01	-
Pyrene	<0.001	<0.001	<0.002	<0.01	-
VOC MS (W)					
Dibromofluoromethane	-	-	-	-	-
Toluene-d8	-	-	-	-	-
4-Bromofluorobenzene	-	-	-	-	-
Dichlorodifluoromethane	<0.007	<0.007	<0.014	<0.07	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.13
Conductivity (µS/cm)	116.00
Temperature (°C)	13.50
Volume Leachant (Litres)	0.332
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
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13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	
Mass Sample taken (kg)	0.193	Moisture Content Ratio (%)	10.2
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	90.7
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554668
Sampled Date	06-Dec-2010
Customer Sample Ref.	WS3
Depth (m)	1.00

Solid Waste Analysis

Total Organic Carbon (%)	1.37
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	<0.01
Sum of 7 PCBs (mg/kg)	-
Mineral Oil (mg/kg)	-
PAH Sum of 17 (mg/kg)	-
pH (pH Units)	7.84
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
VOC MS (W)					
Chloromethane	<0.009	<0.009	<0.018	<0.09	-
Vinyl Chloride	<0.0012	<0.0012	<0.0024	<0.012	-
Bromomethane	<0.002	<0.002	<0.004	<0.02	-
Chloroethane	<0.0025	<0.0025	<0.005	<0.025	-
Trichlorofluoromethane	<0.0013	<0.0013	<0.0026	<0.013	-
1,1-Dichloroethene	<0.0012	<0.0012	<0.0024	<0.012	-
Carbon Disulphide	<0.0013	<0.0013	<0.0026	<0.013	-
Dichloromethane	<0.0037	<0.0037	<0.0074	<0.037	-
Tert-butyl methyl ether	<0.0016	<0.0016	<0.0032	<0.016	-
Trans-1,2-Dichloroethene	<0.0019	<0.0019	<0.0038	<0.019	-
1,1-Dichloroethane	<0.0012	<0.0012	<0.0024	<0.012	-
Cis-1,2-Dichloroethene	<0.0023	<0.0023	<0.0046	<0.023	-
2,2-Dichloropropane	<0.0038	<0.0038	<0.0076	<0.038	-
Bromochloromethane	<0.0019	<0.0019	<0.0038	<0.019	-
Chloroform	<0.0018	<0.0018	<0.0036	<0.018	-
1,1,1-Trichloroethane	<0.0013	<0.0013	<0.0026	<0.013	-
1,1-Dichloropropene	<0.0013	<0.0013	<0.0026	<0.013	-
Carbontetrachloride	<0.0014	<0.0014	<0.0028	<0.014	-
1,2-Dichloroethane	<0.0033	<0.0033	<0.0066	<0.033	-
Benzene	<0.0013	<0.0013	<0.0026	<0.013	-
Trichloroethene	<0.0025	<0.0025	<0.005	<0.025	-
1,2-Dichloropropane	<0.003	<0.003	<0.006	<0.03	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.13
Conductivity (µS/cm)	116.00
Temperature (°C)	13.50
Volume Leachant (Litres)	0.332
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
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13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	Blake Close
Mass Sample taken (kg)	0.193	Moisture Content Ratio (%)	10.2
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	90.7
Particle Size <4mm	>95%		

Case

SDG	101209-83
Lab Sample Number(s)	2554668
Sampled Date	06-Dec-2010
Customer Sample Ref.	WS3
Depth (m)	1.00

Solid Waste Analysis

Total Organic Carbon (%)	1.37
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	<0.01
Sum of 7 PCBs (mg/kg)	-
Mineral Oil (mg/kg)	-
PAH Sum of 17 (mg/kg)	-
pH (pH Units)	7.84
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
VOC MS (W)					
Dibromomethane	<0.0027	<0.0027	<0.0054	<0.027	-
Bromodichloromethane	<0.0009	<0.0009	<0.0018	<0.009	-
Cis-1,3-Dichloropropene	<0.0019	<0.0019	<0.0038	<0.019	-
Toluene	<0.0014	<0.0014	<0.0028	<0.014	-
Trans-1,3-Dichloropropene	<0.0035	<0.0035	<0.007	<0.035	-
1,1,2-Trichloroethane	<0.0022	<0.0022	<0.0044	<0.022	-
1,3-Dichloropropane	<0.0022	<0.0022	<0.0044	<0.022	-
Tetrachloroethene	<0.0015	<0.0015	<0.003	<0.015	-
Dibromochloromethane	<0.0017	<0.0017	<0.0034	<0.017	-
1,2-Dibromoethane	<0.0023	<0.0023	<0.0046	<0.023	-
Chlorobenzene	<0.0035	<0.0035	<0.007	<0.035	-
1,1,1,2-Tetrachloroethane	<0.0013	<0.0013	<0.0026	<0.013	-
Ethylbenzene	<0.0025	<0.0025	<0.005	<0.025	-
p/m-Xylene	<0.0025	<0.0025	<0.005	<0.025	-
o-Xylene	<0.0017	<0.0017	<0.0034	<0.017	-
Styrene	<0.0012	<0.0012	<0.0024	<0.012	-
Bromoform	<0.003	<0.003	<0.006	<0.03	-
Isopropylbenzene	<0.0014	<0.0014	<0.0028	<0.014	-
1,1,2,2-Tetrachloroethane	<0.0052	<0.0052	<0.0104	<0.052	-
1,2,3-Trichloropropane	<0.0078	<0.0078	<0.0156	<0.078	-
Bromobenzene	<0.002	<0.002	<0.004	<0.02	-
Propylbenzene	<0.0026	<0.0026	<0.0052	<0.026	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.13
Conductivity (µS/cm)	116.00
Temperature (°C)	13.50
Volume Leachant (Litres)	0.332
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
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13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference

Mass Sample taken (kg) 0.193
 Mass of dry sample (kg) 0.175
 Particle Size <4mm >95%

Site Location

Blake Close
 Moisture Content Ratio (%) 10.2
 Dry Matter Content Ratio (%) 90.7

Case

SDG 101209-83
 Lab Sample Number(s) 2554668
 Sampled Date 06-Dec-2010
 Customer Sample Ref. WS3
 Depth (m) 1.00

Solid Waste Analysis

Total Organic Carbon (%) 1.37
 Loss on Ignition (%) -
 Sum of BTEX (mg/kg) <0.01
 Sum of 7 PCBs (mg/kg) -
 Mineral Oil (mg/kg) -
 PAH Sum of 17 (mg/kg) -
 pH (pH Units) 7.84
 ANC to pH 6 (mol/kg) -
 ANC to pH 4 (mol/kg) -

Eluate Analysis

	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
VOC MS (W)					
2-Chlorotoluene	<0.0019	<0.0019	<0.0038	<0.019	-
1,3,5-Trimethylbenzene	<0.0018	<0.0018	<0.0036	<0.018	-
4-Chlorotoluene	<0.0019	<0.0019	<0.0038	<0.019	-
Tert-Butylbenzene	<0.002	<0.002	<0.004	<0.02	-
1,2,4-Trimethylbenzene	<0.0017	<0.0017	<0.0034	<0.017	-
Sec-Butylbenzene	<0.0017	<0.0017	<0.0034	<0.017	-
4-Isopropyltoluene	<0.0026	<0.0026	<0.0052	<0.026	-
1,3-Dichlorobenzene	<0.0022	<0.0022	<0.0044	<0.022	-
1,4-Dichlorobenzene	<0.0027	<0.0027	<0.0054	<0.027	-
n-Butylbenzene	<0.002	<0.002	<0.004	<0.02	-
1,2-Dichlorobenzene	<0.0037	<0.0037	<0.0074	<0.037	-
1,2-Dibromo-3-Chloropropane	<0.0098	<0.0098	<0.0196	<0.098	-
1,2,4-Trichlorobenzene	<0.0023	<0.0023	<0.0046	<0.023	-
Hexachlorobutadiene	<0.0025	<0.0025	<0.005	<0.025	-
Tert-amyl methyl ether	<0.001	<0.001	<0.002	<0.01	-
Naphthalene	<0.0035	<0.0035	<0.007	<0.035	-
1,2,3-Trichlorobenzene	<0.0031	<0.0031	<0.0062	<0.031	-
1,3,5-Trichlorobenzene	<0.01	<0.01	<0.02	<0.1	-

Leach Test Information

Date Prepared 06-Jan-2011
 pH (pH Units) 8.13
 Conductivity (µS/cm) 116.00
 Temperature (°C) 13.50
 Volume Leachant (Litres) 0.332
 Volume of Eluate VE1 (Litres)

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	
Mass Sample taken (kg)	0.192	Moisture Content Ratio (%)	10.3
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	90.7
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554676
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	0.70

Solid Waste Analysis

Total Organic Carbon (%)	1.09
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	-
Sum of 7 PCBs (mg/kg)	-
Mineral Oil (mg/kg)	-
PAH Sum of 17 (mg/kg)	-
pH (pH Units)	8.36
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.00115	<0.00012	0.0023	<0.0012	0.5	2	25
Barium	-	-	-	-	20	100	300
Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
Chromium	0.00369	<0.00022	0.00738	<0.0022	0.5	10	70
Copper	0.00318	<0.00085	0.00636	<0.0085	2	50	100
Mercury Dissolved (CVAf)	0.0000105	<0.00001	0.000021	<0.0001	0.01	0.2	2
Molybdenum	-	-	-	-	0.5	10	30
Nickel	0.000919	<0.00015	0.00184	<0.0015	0.4	10	40
Lead	0.000374	<0.00002	0.000748	<0.0002	0.5	10	50
Antimony	-	-	-	-	0.06	0.7	5
Selenium	-	-	-	-	0.1	0.5	7
Zinc	0.00122	<0.00041	0.00244	<0.0041	4	50	200
Chloride	-	-	-	-	800	15000	25000
Fluoride	-	-	-	-	10	150	500
Sulphate (soluble)	-	-	-	-	1000	20000	50000
Total Dissolved Solids	-	-	-	-	4000	60000	100000
Total Monohydric Phenols (W)	-	-	-	-	1	-	-
Dissolved Organic Carbon	-	-	-	-	500	800	1000

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.28
Conductivity (µS/cm)	138.00
Temperature (°C)	13.90
Volume Leachant (Litres)	0.332
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_Grontmij_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	
Mass Sample taken (kg)	0.192	Moisture Content Ratio (%)	10.3
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	90.7
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554676
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	0.70

Solid Waste Analysis

Total Organic Carbon (%)	1.09
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	-
Sum of 7 PCBs (mg/kg)	-
Mineral Oil (mg/kg)	-
PAH Sum of 17 (mg/kg)	-
pH (pH Units)	8.36
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
Boron	0.0194	<0.0094	0.0388	<0.094	-
Vanadium	0.00186	<0.00024	0.00372	<0.0024	-

SVOC MS (W) - Aqueous

Compound	Result	Limit of Detection	Result	Limit of Detection	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
1,2,4-Trichlorobenzene	<0.0023	<0.0023	<0.0046	<0.023	-
1,2-Dichlorobenzene	<0.0037	<0.0037	<0.0074	<0.037	-
1,3-Dichlorobenzene	<0.0022	<0.0022	<0.0044	<0.022	-
1,4-Dichlorobenzene	<0.0027	<0.0027	<0.0054	<0.027	-
2,4,5-Trichlorophenol	<0.001	<0.001	<0.002	<0.01	-
2,4,6-Trichlorophenol	<0.001	<0.001	<0.002	<0.01	-
2,4-Dichlorophenol	<0.001	<0.001	<0.002	<0.01	-
2,4-Dimethylphenol	<0.001	<0.001	<0.002	<0.01	-
2,4-Dinitrotoluene	<0.001	<0.001	<0.002	<0.01	-
2,6-Dinitrotoluene	<0.001	<0.001	<0.002	<0.01	-
2-Chloronaphthalene	<0.001	<0.001	<0.002	<0.01	-
2-Chlorophenol	<0.001	<0.001	<0.002	<0.01	-
2-Methylnaphthalene	<0.001	<0.001	<0.002	<0.01	-
2-Methylphenol	<0.001	<0.001	<0.002	<0.01	-
2-Nitroaniline	<0.001	<0.001	<0.002	<0.01	-
2-Nitrophenol	<0.001	<0.001	<0.002	<0.01	-
3-Nitroaniline	<0.001	<0.001	<0.002	<0.01	-
4-Bromophenylphenylether	<0.001	<0.001	<0.002	<0.01	-
4-Chloro-3-methylphenol	<0.001	<0.001	<0.002	<0.01	-
4-Chloroaniline	<0.001	<0.001	<0.002	<0.01	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.28
Conductivity (µS/cm)	138.00
Temperature (°C)	13.90
Volume Leachant (Litres)	0.332
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

13/01/2011 06:04:32

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CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference	Site Location	Blake Close	
Mass Sample taken (kg)	0.192	Moisture Content Ratio (%)	10.3
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	90.7
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554676
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	0.70

Solid Waste Analysis

Total Organic Carbon (%)	1.09
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	-
Sum of 7 PCBs (mg/kg)	-
Mineral Oil (mg/kg)	-
PAH Sum of 17 (mg/kg)	-
pH (pH Units)	8.36
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

Eluate Analysis

	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
SVOC MS (W) - Aqueous					
4-Chlorophenylphenylether	<0.001	<0.001	<0.002	<0.01	-
4-Methylphenol	<0.001	<0.001	<0.002	<0.01	-
4-Nitrophenol	<0.001	<0.001	<0.002	<0.01	-
4-Nitroaniline	<0.001	<0.001	<0.002	<0.01	-
Azobenzene	<0.001	<0.001	<0.002	<0.01	-
Acenaphthylene	<0.001	<0.001	<0.002	<0.01	-
Acenaphthene	<0.001	<0.001	<0.002	<0.01	-
Anthracene	<0.001	<0.001	<0.002	<0.01	-
Bis(2-chloroethyl)ether	<0.001	<0.001	<0.002	<0.01	-
Bis(2-chloroethoxy)methane	<0.001	<0.001	<0.002	<0.01	-
Bis(2-ethylhexyl) phthalate	<0.002	<0.002	<0.004	<0.02	-
Benzo(a)anthracene	<0.001	<0.001	<0.002	<0.01	-
Butylbenzyl phthalate	<0.001	<0.001	<0.002	<0.01	-
Benzo(b)fluoranthene	<0.001	<0.001	<0.002	<0.01	-
Benzo(k)fluoranthene	<0.001	<0.001	<0.002	<0.01	-
Benzo(a)pyrene	<0.001	<0.001	<0.002	<0.01	-
Benzo(ghi)perylene	<0.001	<0.001	<0.002	<0.01	-
Carbazole	<0.001	<0.001	<0.002	<0.01	-
Chrysene	<0.001	<0.001	<0.002	<0.01	-
Dibenzofuran	<0.001	<0.001	<0.002	<0.01	-
Di-n-butyl phthalate	<0.001	<0.001	<0.002	<0.01	-
Diethyl phthalate	<0.001	<0.001	<0.002	<0.01	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.28
Conductivity (µS/cm)	138.00
Temperature (°C)	13.90
Volume Leachant (Litres)	0.332
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
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13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	
Mass Sample taken (kg)	0.192	Moisture Content Ratio (%)	Blake Close 10.3
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	90.7
Particle Size <4mm	>95%		

Case

SDG	101209-83
Lab Sample Number(s)	2554676
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	0.70

Solid Waste Analysis

Total Organic Carbon (%)	1.09
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	-
Sum of 7 PCBs (mg/kg)	-
Mineral Oil (mg/kg)	-
PAH Sum of 17 (mg/kg)	-
pH (pH Units)	8.36
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

Eluate Analysis

	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
SVOC MS (W) - Aqueous					
Dibenzo(a,h)anthracene	<0.001	<0.001	<0.002	<0.01	-
Dimethyl phthalate	<0.001	<0.001	<0.002	<0.01	-
Di-n-Octyl phthalate	<0.005	<0.005	<0.01	<0.05	-
Fluoranthene	<0.001	<0.001	<0.002	<0.01	-
Fluorene	<0.001	<0.001	<0.002	<0.01	-
Hexachlorobenzene	<0.001	<0.001	<0.002	<0.01	-
Hexachlorobutadiene	<0.0025	<0.0025	<0.005	<0.025	-
Pentachlorophenol	<0.001	<0.001	<0.002	<0.01	-
Phenol	<0.001	<0.001	<0.002	<0.01	-
N-nitrosodi-n-propylamine	<0.001	<0.001	<0.002	<0.01	-
Hexachloroethane	<0.001	<0.001	<0.002	<0.01	-
Nitrobenzene	<0.001	<0.001	<0.002	<0.01	-
Naphthalene	<0.0035	<0.0035	<0.007	<0.035	-
Isophorone	<0.001	<0.001	<0.002	<0.01	-
Hexachlorocyclopentadiene	<0.001	<0.001	<0.002	<0.01	-
Phenanthrene	<0.001	<0.001	<0.002	<0.01	-
Indeno (1,2,3-cd) Pyrene	<0.001	<0.001	<0.002	<0.01	-
Pyrene	<0.001	<0.001	<0.002	<0.01	-
VOC MS (W)					
Dibromofluoromethane	-	-	-	-	-
Toluene-d8	-	-	-	-	-
4-Bromofluorobenzene	-	-	-	-	-
Dichlorodifluoromethane	<0.007	<0.007	<0.014	<0.07	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.28
Conductivity (µS/cm)	138.00
Temperature (°C)	13.90
Volume Leachant (Litres)	0.332
Volume of Eluate VE1 (Litres)	

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CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	
Mass Sample taken (kg)	0.192	Moisture Content Ratio (%)	10.3
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	90.7
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554676
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	0.70

Solid Waste Analysis

Total Organic Carbon (%)	1.09
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	-
Sum of 7 PCBs (mg/kg)	-
Mineral Oil (mg/kg)	-
PAH Sum of 17 (mg/kg)	-
pH (pH Units)	8.36
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
VOC MS (W)					
Chloromethane	<0.009	<0.009	<0.018	<0.09	-
Vinyl Chloride	<0.0012	<0.0012	<0.0024	<0.012	-
Bromomethane	<0.002	<0.002	<0.004	<0.02	-
Chloroethane	<0.0025	<0.0025	<0.005	<0.025	-
Trichlorofluoromethane	<0.0013	<0.0013	<0.0026	<0.013	-
1,1-Dichloroethene	<0.0012	<0.0012	<0.0024	<0.012	-
Carbon Disulphide	<0.0013	<0.0013	<0.0026	<0.013	-
Dichloromethane	<0.0037	<0.0037	<0.0074	<0.037	-
Tert-butyl methyl ether	<0.0016	<0.0016	<0.0032	<0.016	-
Trans-1,2-Dichloroethene	<0.0019	<0.0019	<0.0038	<0.019	-
1,1-Dichloroethane	<0.0012	<0.0012	<0.0024	<0.012	-
Cis-1,2-Dichloroethene	<0.0023	<0.0023	<0.0046	<0.023	-
2,2-Dichloropropane	<0.0038	<0.0038	<0.0076	<0.038	-
Bromochloromethane	<0.0019	<0.0019	<0.0038	<0.019	-
Chloroform	<0.0018	<0.0018	<0.0036	<0.018	-
1,1,1-Trichloroethane	<0.0013	<0.0013	<0.0026	<0.013	-
1,1-Dichloropropene	<0.0013	<0.0013	<0.0026	<0.013	-
Carbontetrachloride	<0.0014	<0.0014	<0.0028	<0.014	-
1,2-Dichloroethane	<0.0033	<0.0033	<0.0066	<0.033	-
Benzene	<0.0013	<0.0013	<0.0026	<0.013	-
Trichloroethene	<0.0025	<0.0025	<0.005	<0.025	-
1,2-Dichloropropane	<0.003	<0.003	<0.006	<0.03	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.28
Conductivity (µS/cm)	138.00
Temperature (°C)	13.90
Volume Leachant (Litres)	0.332
Volume of Eluate VE1 (Litres)	

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13/01/2011 06:04:32

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CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference

Mass Sample taken (kg) 0.192
 Mass of dry sample (kg) 0.175
 Particle Size <4mm >95%

Site Location

Blake Close
 Moisture Content Ratio (%) 10.3
 Dry Matter Content Ratio (%) 90.7

Case

SDG 101209-83
 Lab Sample Number(s) 2554676
 Sampled Date 08-Dec-2010
 Customer Sample Ref. WS4
 Depth (m) 0.70

Solid Waste Analysis

Total Organic Carbon (%) 1.09
 Loss on Ignition (%) -
 Sum of BTEX (mg/kg) -
 Sum of 7 PCBs (mg/kg) -
 Mineral Oil (mg/kg) -
 PAH Sum of 17 (mg/kg) -
 pH (pH Units) 8.36
 ANC to pH 6 (mol/kg) -
 ANC to pH 4 (mol/kg) -

Eluate Analysis

	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
VOC MS (W)					
Dibromomethane	<0.0027	<0.0027	<0.0054	<0.027	-
Bromodichloromethane	<0.0009	<0.0009	<0.0018	<0.009	-
Cis-1,3-Dichloropropene	<0.0019	<0.0019	<0.0038	<0.019	-
Toluene	<0.0014	<0.0014	<0.0028	<0.014	-
Trans-1,3-Dichloropropene	<0.0035	<0.0035	<0.007	<0.035	-
1,1,2-Trichloroethane	<0.0022	<0.0022	<0.0044	<0.022	-
1,3-Dichloropropane	<0.0022	<0.0022	<0.0044	<0.022	-
Tetrachloroethene	<0.0015	<0.0015	<0.003	<0.015	-
Dibromochloromethane	<0.0017	<0.0017	<0.0034	<0.017	-
1,2-Dibromoethane	<0.0023	<0.0023	<0.0046	<0.023	-
Chlorobenzene	<0.0035	<0.0035	<0.007	<0.035	-
1,1,1,2-Tetrachloroethane	<0.0013	<0.0013	<0.0026	<0.013	-
Ethylbenzene	<0.0025	<0.0025	<0.005	<0.025	-
p/m-Xylene	<0.0025	<0.0025	<0.005	<0.025	-
o-Xylene	<0.0017	<0.0017	<0.0034	<0.017	-
Styrene	<0.0012	<0.0012	<0.0024	<0.012	-
Bromoform	<0.003	<0.003	<0.006	<0.03	-
Isopropylbenzene	<0.0014	<0.0014	<0.0028	<0.014	-
1,1,2,2-Tetrachloroethane	<0.0052	<0.0052	<0.0104	<0.052	-
1,2,3-Trichloropropane	<0.0078	<0.0078	<0.0156	<0.078	-
Bromobenzene	<0.002	<0.002	<0.004	<0.02	-
Propylbenzene	<0.0026	<0.0026	<0.0052	<0.026	-

Leach Test Information

Date Prepared 06-Jan-2011
 pH (pH Units) 8.28
 Conductivity (µS/cm) 138.00
 Temperature (°C) 13.90
 Volume Leachant (Litres) 0.332
 Volume of Eluate VE1 (Litres)

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
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13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference

Mass Sample taken (kg) 0.192
 Mass of dry sample (kg) 0.175
 Particle Size <4mm >95%

Site Location

Blake Close
 Moisture Content Ratio (%) 10.3
 Dry Matter Content Ratio (%) 90.7

Case

SDG 101209-83
 Lab Sample Number(s) 2554676
 Sampled Date 08-Dec-2010
 Customer Sample Ref. WS4
 Depth (m) 0.70

Solid Waste Analysis

Total Organic Carbon (%) 1.09
 Loss on Ignition (%) -
 Sum of BTEX (mg/kg) -
 Sum of 7 PCBs (mg/kg) -
 Mineral Oil (mg/kg) -
 PAH Sum of 17 (mg/kg) -
 pH (pH Units) 8.36
 ANC to pH 6 (mol/kg) -
 ANC to pH 4 (mol/kg) -

Eluate Analysis

	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
VOC MS (W)					
2-Chlorotoluene	<0.0019	<0.0019	<0.0038	<0.019	-
1,3,5-Trimethylbenzene	<0.0018	<0.0018	<0.0036	<0.018	-
4-Chlorotoluene	<0.0019	<0.0019	<0.0038	<0.019	-
Tert-Butylbenzene	<0.002	<0.002	<0.004	<0.02	-
1,2,4-Trimethylbenzene	<0.0017	<0.0017	<0.0034	<0.017	-
Sec-Butylbenzene	<0.0017	<0.0017	<0.0034	<0.017	-
4-Isopropyltoluene	<0.0026	<0.0026	<0.0052	<0.026	-
1,3-Dichlorobenzene	<0.0022	<0.0022	<0.0044	<0.022	-
1,4-Dichlorobenzene	<0.0027	<0.0027	<0.0054	<0.027	-
n-Butylbenzene	<0.002	<0.002	<0.004	<0.02	-
1,2-Dichlorobenzene	<0.0037	<0.0037	<0.0074	<0.037	-
1,2-Dibromo-3-Chloropropane	<0.0098	<0.0098	<0.0196	<0.098	-
1,2,4-Trichlorobenzene	<0.0023	<0.0023	<0.0046	<0.023	-
Hexachlorobutadiene	<0.0025	<0.0025	<0.005	<0.025	-
Tert-amyl methyl ether	<0.001	<0.001	<0.002	<0.01	-
Naphthalene	<0.0035	<0.0035	<0.007	<0.035	-
1,2,3-Trichlorobenzene	<0.0031	<0.0031	<0.0062	<0.031	-
1,3,5-Trichlorobenzene	<0.01	<0.01	<0.02	<0.1	-

Leach Test Information

Date Prepared 06-Jan-2011
 pH (pH Units) 8.28
 Conductivity (µS/cm) 138.00
 Temperature (°C) 13.90
 Volume Leachant (Litres) 0.332
 Volume of Eluate VE1 (Litres)

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
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13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	
Mass Sample taken (kg)	0.196	Moisture Content Ratio (%)	11.8
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	89.4
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554677
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	1.50

Solid Waste Analysis

Total Organic Carbon (%)	-
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	<0.01
Sum of 7 PCBs (mg/kg)	-
Mineral Oil (mg/kg)	-
PAH Sum of 17 (mg/kg)	-
pH (pH Units)	-
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.00106	<0.00012	0.00212	<0.0012	0.5	2	25
Barium	-	-	-	-	20	100	300
Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
Chromium	0.00377	<0.00022	0.00754	<0.0022	0.5	10	70
Copper	0.00286	<0.00085	0.00572	<0.0085	2	50	100
Mercury Dissolved (CVAf)	0.0000105	<0.00001	0.000021	<0.0001	0.01	0.2	2
Molybdenum	-	-	-	-	0.5	10	30
Nickel	0.000971	<0.00015	0.00194	<0.0015	0.4	10	40
Lead	0.000448	<0.00002	0.000896	<0.0002	0.5	10	50
Antimony	-	-	-	-	0.06	0.7	5
Selenium	-	-	-	-	0.1	0.5	7
Zinc	0.00116	<0.00041	0.00232	<0.0041	4	50	200
Chloride	-	-	-	-	800	15000	25000
Fluoride	-	-	-	-	10	150	500
Sulphate (soluble)	-	-	-	-	1000	20000	50000
Total Dissolved Solids	-	-	-	-	4000	60000	100000
Total Monohydric Phenols (W)	-	-	-	-	1	-	-
Dissolved Organic Carbon	-	-	-	-	500	800	1000

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.21
Conductivity (µS/cm)	137.00
Temperature (°C)	12.00
Volume Leachant (Litres)	0.329
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

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CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	
Blake Close		Blake Close	
Mass Sample taken (kg)	0.196	Moisture Content Ratio (%)	11.8
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	89.4
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554677
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	1.50

Solid Waste Analysis

Total Organic Carbon (%)	-	-	-
Loss on Ignition (%)	-	-	-
Sum of BTEX (mg/kg)	<0.01	-	-
Sum of 7 PCBs (mg/kg)	-	-	-
Mineral Oil (mg/kg)	-	-	-
PAH Sum of 17 (mg/kg)	-	-	-
pH (pH Units)	-	-	-
ANC to pH 6 (mol/kg)	-	-	-
ANC to pH 4 (mol/kg)	-	-	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
Boron	0.022	<0.0094	0.044	<0.094	-
Vanadium	0.00173	<0.00024	0.00346	<0.0024	-

SVOC MS (W) - Aqueous

Compound	Result	Limit of Detection	Result	Limit of Detection	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
1,2,4-Trichlorobenzene	<0.0023	<0.0023	<0.0046	<0.023	-
1,2-Dichlorobenzene	<0.0037	<0.0037	<0.0074	<0.037	-
1,3-Dichlorobenzene	<0.0022	<0.0022	<0.0044	<0.022	-
1,4-Dichlorobenzene	<0.0027	<0.0027	<0.0054	<0.027	-
2,4,5-Trichlorophenol	<0.001	<0.001	<0.002	<0.01	-
2,4,6-Trichlorophenol	<0.001	<0.001	<0.002	<0.01	-
2,4-Dichlorophenol	<0.001	<0.001	<0.002	<0.01	-
2,4-Dimethylphenol	<0.001	<0.001	<0.002	<0.01	-
2,4-Dinitrotoluene	<0.001	<0.001	<0.002	<0.01	-
2,6-Dinitrotoluene	<0.001	<0.001	<0.002	<0.01	-
2-Chloronaphthalene	<0.001	<0.001	<0.002	<0.01	-
2-Chlorophenol	<0.001	<0.001	<0.002	<0.01	-
2-Methylnaphthalene	<0.001	<0.001	<0.002	<0.01	-
2-Methylphenol	<0.001	<0.001	<0.002	<0.01	-
2-Nitroaniline	<0.001	<0.001	<0.002	<0.01	-
2-Nitrophenol	<0.001	<0.001	<0.002	<0.01	-
3-Nitroaniline	<0.001	<0.001	<0.002	<0.01	-
4-Bromophenylphenylether	<0.001	<0.001	<0.002	<0.01	-
4-Chloro-3-methylphenol	<0.001	<0.001	<0.002	<0.01	-
4-Chloroaniline	<0.001	<0.001	<0.002	<0.01	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.21
Conductivity (µS/cm)	137.00
Temperature (°C)	12.00
Volume Leachant (Litres)	0.329
Volume of Eluate VE1 (Litres)	

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13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	
Mass Sample taken (kg)	0.196	Moisture Content Ratio (%)	Blake Close 11.8
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	89.4
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554677
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	1.50

Solid Waste Analysis

Total Organic Carbon (%)	-	-	-
Loss on Ignition (%)	-	-	-
Sum of BTEX (mg/kg)	<0.01	-	-
Sum of 7 PCBs (mg/kg)	-	-	-
Mineral Oil (mg/kg)	-	-	-
PAH Sum of 17 (mg/kg)	-	-	-
pH (pH Units)	-	-	-
ANC to pH 6 (mol/kg)	-	-	-
ANC to pH 4 (mol/kg)	-	-	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
SVOC MS (W) - Aqueous					
4-Chlorophenylphenylether	<0.001	<0.001	<0.002	<0.01	-
4-Methylphenol	<0.001	<0.001	<0.002	<0.01	-
4-Nitrophenol	<0.001	<0.001	<0.002	<0.01	-
4-Nitroaniline	<0.001	<0.001	<0.002	<0.01	-
Azobenzene	<0.001	<0.001	<0.002	<0.01	-
Acenaphthylene	<0.001	<0.001	<0.002	<0.01	-
Acenaphthene	<0.001	<0.001	<0.002	<0.01	-
Anthracene	<0.001	<0.001	<0.002	<0.01	-
Bis(2-chloroethyl)ether	<0.001	<0.001	<0.002	<0.01	-
Bis(2-chloroethoxy)methane	<0.001	<0.001	<0.002	<0.01	-
Bis(2-ethylhexyl) phthalate	<0.002	<0.002	<0.004	<0.02	-
Benzo(a)anthracene	<0.001	<0.001	<0.002	<0.01	-
Butylbenzyl phthalate	<0.001	<0.001	<0.002	<0.01	-
Benzo(b)fluoranthene	<0.001	<0.001	<0.002	<0.01	-
Benzo(k)fluoranthene	<0.001	<0.001	<0.002	<0.01	-
Benzo(a)pyrene	<0.001	<0.001	<0.002	<0.01	-
Benzo(ghi)perylene	<0.001	<0.001	<0.002	<0.01	-
Carbazole	<0.001	<0.001	<0.002	<0.01	-
Chrysene	<0.001	<0.001	<0.002	<0.01	-
Dibenzofuran	<0.001	<0.001	<0.002	<0.01	-
Di-n-butyl phthalate	<0.001	<0.001	<0.002	<0.01	-
Diethyl phthalate	<0.001	<0.001	<0.002	<0.01	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.21
Conductivity (µS/cm)	137.00
Temperature (°C)	12.00
Volume Leachant (Litres)	0.329
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
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13/01/2011 06:04:32

06:04:22 13/01/2011

SDG: 101209-83	Location: Blake Close	Order Number:
Job: H_GRONTMIJ_SOL-40	Customer: Grontmij	Report Number: 110764
Client Reference:	Attention: Gareth Taylor	Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	Blake Close
Mass Sample taken (kg)	0.196	Moisture Content Ratio (%)	11.8
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	89.4
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554677
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	1.50

Solid Waste Analysis

Total Organic Carbon (%)	-	-	-
Loss on Ignition (%)	-	-	-
Sum of BTEX (mg/kg)	<0.01	-	-
Sum of 7 PCBs (mg/kg)	-	-	-
Mineral Oil (mg/kg)	-	-	-
PAH Sum of 17 (mg/kg)	-	-	-
pH (pH Units)	-	-	-
ANC to pH 6 (mol/kg)	-	-	-
ANC to pH 4 (mol/kg)	-	-	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
SVOC MS (W) - Aqueous					
Dibenzo(a,h)anthracene	<0.001	<0.001	<0.002	<0.01	-
Dimethyl phthalate	<0.001	<0.001	<0.002	<0.01	-
Di-n-Octyl phthalate	<0.005	<0.005	<0.01	<0.05	-
Fluoranthene	<0.001	<0.001	<0.002	<0.01	-
Fluorene	<0.001	<0.001	<0.002	<0.01	-
Hexachlorobenzene	<0.001	<0.001	<0.002	<0.01	-
Hexachlorobutadiene	<0.0025	<0.0025	<0.005	<0.025	-
Pentachlorophenol	<0.001	<0.001	<0.002	<0.01	-
Phenol	<0.001	<0.001	<0.002	<0.01	-
N-nitrosodi-n-propylamine	<0.001	<0.001	<0.002	<0.01	-
Hexachloroethane	<0.001	<0.001	<0.002	<0.01	-
Nitrobenzene	<0.001	<0.001	<0.002	<0.01	-
Naphthalene	<0.0035	<0.0035	<0.007	<0.035	-
Isophorone	<0.001	<0.001	<0.002	<0.01	-
Hexachlorocyclopentadiene	<0.001	<0.001	<0.002	<0.01	-
Phenanthrene	<0.001	<0.001	<0.002	<0.01	-
Indeno (1,2,3-cd) Pyrene	<0.001	<0.001	<0.002	<0.01	-
Pyrene	<0.001	<0.001	<0.002	<0.01	-
VOC MS (W)					
Dibromofluoromethane	-	-	-	-	-
Toluene-d8	-	-	-	-	-
4-Bromofluorobenzene	-	-	-	-	-
Dichlorodifluoromethane	<0.007	<0.007	<0.014	<0.07	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.21
Conductivity (µS/cm)	137.00
Temperature (°C)	12.00
Volume Leachant (Litres)	0.329
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
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13/01/2011 06:04:32

06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	
Mass Sample taken (kg)	0.196	Moisture Content Ratio (%)	11.8
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	89.4
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554677
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	1.50

Solid Waste Analysis

Total Organic Carbon (%)	-
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	<0.01
Sum of 7 PCBs (mg/kg)	-
Mineral Oil (mg/kg)	-
PAH Sum of 17 (mg/kg)	-
pH (pH Units)	-
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
VOC MS (W)					
Chloromethane	<0.009	<0.009	<0.018	<0.09	-
Vinyl Chloride	<0.0012	<0.0012	<0.0024	<0.012	-
Bromomethane	<0.002	<0.002	<0.004	<0.02	-
Chloroethane	<0.0025	<0.0025	<0.005	<0.025	-
Trichlorofluoromethane	<0.0013	<0.0013	<0.0026	<0.013	-
1,1-Dichloroethene	<0.0012	<0.0012	<0.0024	<0.012	-
Carbon Disulphide	<0.0013	<0.0013	<0.0026	<0.013	-
Dichloromethane	<0.0037	<0.0037	<0.0074	<0.037	-
Tert-butyl methyl ether	<0.0016	<0.0016	<0.0032	<0.016	-
Trans-1,2-Dichloroethene	<0.0019	<0.0019	<0.0038	<0.019	-
1,1-Dichloroethane	<0.0012	<0.0012	<0.0024	<0.012	-
Cis-1,2-Dichloroethene	<0.0023	<0.0023	<0.0046	<0.023	-
2,2-Dichloropropane	<0.0038	<0.0038	<0.0076	<0.038	-
Bromochloromethane	<0.0019	<0.0019	<0.0038	<0.019	-
Chloroform	<0.0018	<0.0018	<0.0036	<0.018	-
1,1,1-Trichloroethane	<0.0013	<0.0013	<0.0026	<0.013	-
1,1-Dichloropropene	<0.0013	<0.0013	<0.0026	<0.013	-
Carbontetrachloride	<0.0014	<0.0014	<0.0028	<0.014	-
1,2-Dichloroethane	<0.0033	<0.0033	<0.0066	<0.033	-
Benzene	<0.0013	<0.0013	<0.0026	<0.013	-
Trichloroethene	<0.0025	<0.0025	<0.005	<0.025	-
1,2-Dichloropropane	<0.003	<0.003	<0.006	<0.03	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.21
Conductivity (µS/cm)	137.00
Temperature (°C)	12.00
Volume Leachant (Litres)	0.329
Volume of Eluate VE1 (Litres)	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
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13/01/2011 06:04:32

06:04:22 13/01/2011

SDG: 101209-83	Location: Blake Close	Order Number:
Job: H_GRONTMIJ_SOL-40	Customer: Grontmij	Report Number: 110764
Client Reference:	Attention: Gareth Taylor	Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference		Site Location	Blake Close
Mass Sample taken (kg)	0.196	Moisture Content Ratio (%)	11.8
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	89.4
Particle Size <4mm	>95%		

Case	
SDG	101209-83
Lab Sample Number(s)	2554677
Sampled Date	08-Dec-2010
Customer Sample Ref.	WS4
Depth (m)	1.50

Solid Waste Analysis

Total Organic Carbon (%)	-	-	-
Loss on Ignition (%)	-	-	-
Sum of BTEX (mg/kg)	<0.01	-	-
Sum of 7 PCBs (mg/kg)	-	-	-
Mineral Oil (mg/kg)	-	-	-
PAH Sum of 17 (mg/kg)	-	-	-
pH (pH Units)	-	-	-
ANC to pH 6 (mol/kg)	-	-	-
ANC to pH 4 (mol/kg)	-	-	-

Eluate Analysis	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
VOC MS (W)					
Dibromomethane	<0.0027	<0.0027	<0.0054	<0.027	-
Bromodichloromethane	<0.0009	<0.0009	<0.0018	<0.009	-
Cis-1,3-Dichloropropene	<0.0019	<0.0019	<0.0038	<0.019	-
Toluene	<0.0014	<0.0014	<0.0028	<0.014	-
Trans-1,3-Dichloropropene	<0.0035	<0.0035	<0.007	<0.035	-
1,1,2-Trichloroethane	<0.0022	<0.0022	<0.0044	<0.022	-
1,3-Dichloropropane	<0.0022	<0.0022	<0.0044	<0.022	-
Tetrachloroethene	<0.0015	<0.0015	<0.003	<0.015	-
Dibromochloromethane	<0.0017	<0.0017	<0.0034	<0.017	-
1,2-Dibromoethane	<0.0023	<0.0023	<0.0046	<0.023	-
Chlorobenzene	<0.0035	<0.0035	<0.007	<0.035	-
1,1,1,2-Tetrachloroethane	<0.0013	<0.0013	<0.0026	<0.013	-
Ethylbenzene	<0.0025	<0.0025	<0.005	<0.025	-
p/m-Xylene	<0.0025	<0.0025	<0.005	<0.025	-
o-Xylene	<0.0017	<0.0017	<0.0034	<0.017	-
Styrene	<0.0012	<0.0012	<0.0024	<0.012	-
Bromoform	<0.003	<0.003	<0.006	<0.03	-
Isopropylbenzene	<0.0014	<0.0014	<0.0028	<0.014	-
1,1,2,2-Tetrachloroethane	<0.0052	<0.0052	<0.0104	<0.052	-
1,2,3-Trichloropropane	<0.0078	<0.0078	<0.0156	<0.078	-
Bromobenzene	<0.002	<0.002	<0.004	<0.02	-
Propylbenzene	<0.0026	<0.0026	<0.0052	<0.026	-

Leach Test Information

Date Prepared	06-Jan-2011
pH (pH Units)	8.21
Conductivity (µS/cm)	137.00
Temperature (°C)	12.00
Volume Leachant (Litres)	0.329
Volume of Eluate VE1 (Litres)	

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06:04:22 13/01/2011



CERTIFICATE OF ANALYSIS

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

CEN 2:1 STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/1

Client Reference

Mass Sample taken (kg) 0.196
 Mass of dry sample (kg) 0.175
 Particle Size <4mm >95%

Site Location

Blake Close
 Moisture Content Ratio (%) 11.8
 Dry Matter Content Ratio (%) 89.4

Case

SDG 101209-83
 Lab Sample Number(s) 2554677
 Sampled Date 08-Dec-2010
 Customer Sample Ref. WS4
 Depth (m) 1.50

Solid Waste Analysis

Total Organic Carbon (%) -
 Loss on Ignition (%) -
 Sum of BTEX (mg/kg) <0.01
 Sum of 7 PCBs (mg/kg) -
 Mineral Oil (mg/kg) -
 PAH Sum of 17 (mg/kg) -
 pH (pH Units) -
 ANC to pH 6 (mol/kg) -
 ANC to pH 4 (mol/kg) -

-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

Eluate Analysis

	Conc ⁿ in 2:1 eluate (mg/l)		2:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	
VOC MS (W)					
2-Chlorotoluene	<0.0019	<0.0019	<0.0038	<0.019	-
1,3,5-Trimethylbenzene	<0.0018	<0.0018	<0.0036	<0.018	-
4-Chlorotoluene	<0.0019	<0.0019	<0.0038	<0.019	-
Tert-Butylbenzene	<0.002	<0.002	<0.004	<0.02	-
1,2,4-Trimethylbenzene	<0.0017	<0.0017	<0.0034	<0.017	-
Sec-Butylbenzene	<0.0017	<0.0017	<0.0034	<0.017	-
4-Isopropyltoluene	<0.0026	<0.0026	<0.0052	<0.026	-
1,3-Dichlorobenzene	<0.0022	<0.0022	<0.0044	<0.022	-
1,4-Dichlorobenzene	<0.0027	<0.0027	<0.0054	<0.027	-
n-Butylbenzene	<0.002	<0.002	<0.004	<0.02	-
1,2-Dichlorobenzene	<0.0037	<0.0037	<0.0074	<0.037	-
1,2-Dibromo-3-Chloropropane	<0.0098	<0.0098	<0.0196	<0.098	-
1,2,4-Trichlorobenzene	<0.0023	<0.0023	<0.0046	<0.023	-
Hexachlorobutadiene	<0.0025	<0.0025	<0.005	<0.025	-
Tert-amyl methyl ether	<0.001	<0.001	<0.002	<0.01	-
Naphthalene	<0.0035	<0.0035	<0.007	<0.035	-
1,2,3-Trichlorobenzene	<0.0031	<0.0031	<0.0062	<0.031	-
1,3,5-Trichlorobenzene	<0.01	<0.01	<0.02	<0.1	-

Leach Test Information

Date Prepared 06-Jan-2011
 pH (pH Units) 8.21
 Conductivity (µS/cm) 137.00
 Temperature (°C) 12.00
 Volume Leachant (Litres) 0.329
 Volume of Eluate VE1 (Litres)

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
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13/01/2011 06:04:32

06:04:22 13/01/2011



SDG: 101209-83
Job: H_GRONTMIJ_SOL-40
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 110764
Superseded Report:

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM114		Leaching Procedure for CEN Two Stage Batch Test 2:1/8:1 Cumulative		
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step		
TM001	In - house Method	Determination of asbestos containing material by screening on solids		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM157	HP 6890 Gas Chromatograph (GC) system and HP 5973 Mass Selective Detector (MSD).	Determination of SVOC in Soils by GC-MS extracted by sonication in DCM/Acetone		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer		
TM243				

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG: 101209-83
Job: H_GRONTMIJ_SOL-40
Client Reference:

Location: Blake Close
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 110764
Superseded Report:

Test Completion Dates

Lab Sample No(s) Customer Sample Ref.	2554661	2554665	2554668	2554673	2554674	2554676	2554677
	WS1	WS2	WS3	WS3	WS4	WS4	WS4
AGS Ref.							
Depth	0.30	0.10	1.00	0.70	0.30	0.70	1.50
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Anions by Kone (soil)			10-Jan-2011		10-Jan-2011		06-Jan-2011
Asbestos Containing Material Screen	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011	
Boron Water Soluble	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	
CEN 2:1 Leachate (1 Stage)			06-Jan-2011			06-Jan-2011	06-Jan-2011
CEN Readings			07-Jan-2011			07-Jan-2011	07-Jan-2011
Dissolved Metals by ICP-MS			10-Jan-2011			10-Jan-2011	10-Jan-2011
EPH CWG (Aliphatic) GC (S)			11-Jan-2011		11-Jan-2011		10-Jan-2011
EPH CWG (Aromatic) GC (S)			11-Jan-2011		11-Jan-2011		10-Jan-2011
GRO by GC-FID (S)			13-Jan-2011		12-Jan-2011		12-Jan-2011
Hexavalent Chromium (s)	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	
Mercury Dissolved			10-Jan-2011			10-Jan-2011	10-Jan-2011
Metals by iCap-OES (Soil)	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	
PAH by GCMS	09-Jan-2011	11-Jan-2011		09-Jan-2011		10-Jan-2011	
pH	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	
Sample description	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011	05-Jan-2011
Semi Volatile Organic Compounds			10-Jan-2011		10-Jan-2011		10-Jan-2011
SVOC MS (W) - Aqueous			11-Jan-2011			11-Jan-2011	11-Jan-2011
Total Organic Carbon	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	
TPH CWG GC (S)			13-Jan-2011		12-Jan-2011		12-Jan-2011
VOC MS (S)			11-Jan-2011		11-Jan-2011		11-Jan-2011
VOC MS (W)			11-Jan-2011			11-Jan-2011	11-Jan-2011

SDG: 101209-83
 Job: H_GRONTMIJ_SOL-40
 Client Reference:

Location: Blake Close
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 110764
 Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH4 by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.

7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample -similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.

12. Results relate only to the items tested

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.

19. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

20. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

23. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials -whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

24. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 -C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY				
ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENT EXTRACTABLE MATTER	D&C	DOM	SOX THERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOX THERM	GRAVIMETRIC
THIN LAYER CHROMATOGRAPHY	D&C	DOM	SOX THERM	IATROSCAN
ELEMENTAL SULPHUR	D&C	DOM	SOX THERM	HPLC
PHENOLS BY GCMS	WET	DOM	SOX THERM	GCMS
HERBICIDES	D&C	HEXANE ACETONE	SOX THERM	GCMS
PESTICIDES	D&C	HEXANE ACETONE	SOX THERM	GCMS
EPH (DRO)	D&C	HEXANE ACETONE	END OVER END	GC/FID
EPH (MIN OIL)	D&C	HEXANE ACETONE	END OVER END	GC/FID
EPH (CLEANED UP)	D&C	HEXANE ACETONE	END OVER END	GC/FID
EPH CWG BY GC	D&C	HEXANE ACETONE	END OVER END	GC/FID
PCB TOT / PCB CON	D&C	HEXANE ACETONE	END OVER END	GCMS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE ACETONE	MICROWAVE TM28.	GCMS
C8-C10 (C8-C10) EZ FLASH	WET	HEXANE ACETONE	SHAKER	GC/EZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE ACETONE	SHAKER	GC/EZ
SEM VOLATILE ORGANIC COMPOUNDS	WET	DOM ACETONE	SONICATE	GCMS

LIQUID MATRICES EXTRACTION SUMMARY			
ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
SVOC	DOM	LIQUID/LIQUID SHAKE	GCMS
FREESULPHUR	DOM	SOLID PHASE EXTRACTION	HPLC
PEST COP/OPP	DOM	LIQUID/LIQUID SHAKE	GCMS
TRIAZINE HERBS	DOM	LIQUID/LIQUID SHAKE	GCMS
PHENOLS MS	DOM	SOLID PHASE EXTRACTION	GCMS
TPH by INFRARED (R)	TCE	LIQUID/LIQUID SHAKE	HPLC
MINERAL OIL BY R	TCE	LIQUID/LIQUID SHAKE	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GCMS

Identification of Asbestos in Bulk Materials

The results for asbestos identification for soil samples are obtained from possible Asbestos Containing Material, removed during the 'Screening of soils for Asbestos Containing Materials', which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anorthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in MDHS 100.

The identification of asbestos containing materials falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Grontmij
Radcliffe House
3rd Floor
Blenheim Court, Lode lane
Solihull
West Midlands
B912AA

Attention: Gareth Taylor

CERTIFICATE OF ANALYSIS

Date: 10 June 2011
Customer: H_GRONTMIJ_SOL
Sample Delivery Group (SDG): 110602-58
Your Reference:
Location: Part 2a Assistance
Report No: 133432

We received 29 samples on Thursday June 02, 2011 and 25 of these samples were scheduled for analysis which was completed on Friday June 10, 2011. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

PLEASE NOTE: THIS CERTIFICATE CONTAINS RESULTS FOR MULTIPLE SITES. ONLY THE SAMPLES FROM 3A AND 83 BLAKE CLOSE ARE RELEVANT TO THIS REPORT.

Approved By:

Sonia McWhan
Operations Manager





SDG: 110602-58
Job: H_GRONTMIJ_SOL-54
Client Reference:

Location: Part 2a Assistance
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
Report Number: 133432
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
3588820	1 NEWLANDS LANE FIVEWAYS		0.30	31/05/2011
3588809	10 WESTGATE			31/05/2011
3588808	11 GOODWOOD			31/05/2011
3588826	11 NEWLANDS COURT FIVEWAYS		0.30	31/05/2011
3588818	110 STAFFORD LANE			31/05/2011
3588805	121 ARMITAGE ROAD			31/05/2011
3588806	125 ARMITAGE ROAD			31/05/2011
3588811	2 SANDOWN			31/05/2011
3588819	21 HERONDALE			31/05/2011
3588807	3 SLADE VIEW RISE			31/05/2011
3588787	3A BLAKE CLOSE			31/05/2011
3588810	4 KEMPTON			31/05/2011
3588813	41 SWALLOWFIELDS			31/05/2011
3588822	5 NEWLANDS COURT FIVEWAYS		0.30	31/05/2011
3588814	73 STAGBOROUGH			31/05/2011
3588815	8 STAGBOROUGH WAY			31/05/2011
3588788	83 BLAKE CLOSE			31/05/2011
3588823	9 NEWLANDS COURT FIVEWAYS		0.30	31/05/2011
3588803	99 ARMITAGE ROAD			31/05/2011
3588802	FIVEWAYS 1 NEWLANDS LANE			31/05/2011
3588798	FIVEWAYS 11 NEWLANDS COURT			31/05/2011
3588799	FIVEWAYS 5 NEWLANDS COURT			31/05/2011
3588800	FIVEWAYS 9 NEWLANDS COURT			31/05/2011
3588795	VIEW ST. 32 FOSTERS AVE.			31/05/2011
3588793	VIEW ST. 53 VIEW ST.			31/05/2011
3588797	VIEW ST. 9 WARD ST.			31/05/2011
3588790	VIEW ST. WS2		1.20	31/05/2011
3588791	VIEW ST. WS3		1.10	31/05/2011
3588789	VIEW ST. WS4		1.60	31/05/2011

Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 110602-58
 Job: H_GRONTMIJ_SOL-54
 Client Reference:

Location: Part 2a Assistance
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 133432
 Superseded Report:

PAH Spec MS - Aqueous (W)

Results Legend			Customer Sample R	99 ARMITAGE ROA D	121 ARMITAGE RO AD	125 ARMITAGE RO AD	83 BLAKE CLOSE	3A BLAKE CLOSE	FIVEWAYS 5 NEWLANDS COURT
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588803	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588805	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588806	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588788	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588787	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588799
M	mCERTS accredited.								
S	Non-conforming work.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted test.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
Component	LOD/Units	Method							
Naphthalene (aq)	<0.1 µg/l	TM178	<0.1 #	<0.1 #	<0.1 #	0.11 #	<0.1 #	<0.1 #	
Acenaphthene (aq)	<0.015 µg/l	TM178	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	
Acenaphthylene (aq)	<0.011 µg/l	TM178	<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #	
Fluoranthene (aq)	<0.017 µg/l	TM178	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	
Anthracene (aq)	<0.015 µg/l	TM178	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	
Phenanthrene (aq)	<0.022 µg/l	TM178	<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #	
Fluorene (aq)	<0.014 µg/l	TM178	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	
Chrysene (aq)	<0.013 µg/l	TM178	<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #	
Pyrene (aq)	<0.015 µg/l	TM178	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	
Benzo(a)anthracene (aq)	<0.017 µg/l	TM178	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	
Benzo(b)fluoranthene (aq)	<0.023 µg/l	TM178	<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #	
Benzo(k)fluoranthene (aq)	<0.027 µg/l	TM178	<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #	
Benzo(a)pyrene (aq)	<0.009 µg/l	TM178	<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #	
Dibenzo(a,h)anthracene (aq)	<0.016 µg/l	TM178	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	
Benzo(g,h,i)perylene (aq)	<0.016 µg/l	TM178	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	
Indeno(1,2,3-cd)pyrene (aq)	<0.014 µg/l	TM178	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	
PAH, Total Detected USEPA 16 (aq)	µg/l	TM178	none detected	none detected	none detected	0.11	none detected	none detected	



SDG: 110602-58
 Job: H_GRONTMIJ_SOL-54
 Client Reference:

Location: Part 2a Assistance
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 133432
 Superseded Report:

PAH Spec MS - Aqueous (W)

Results Legend			Customer Sample R	11 GOODWOOD	21 HERONDALE	4 KEMPTON	FIVEWAYS 9 NEWL ANDS COURT	FIVEWAYS 11 NEW LANDS COURT	FIVEWAYS 1 NEWL ANDS LANE	
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	
M	mCERTS accredited.			31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011
S	Non-conforming work.			02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011
aq	Aqueous / settled sample.			110602-58	110602-58	110602-58	110602-58	110602-58	110602-58	110602-58
diss.filt	Dissolved / filtered sample.			3588808	3588819	3588810	3588800	3588798	3588802	
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
Component	LOD/Units	Method								
Naphthalene (aq)	<0.1 µg/l	TM178	<0.1 #	<0.1 #	<0.1 #	<0.1 #	0.121 #	<0.1 #	<0.1 #	
Acenaphthene (aq)	<0.015 µg/l	TM178	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	
Acenaphthylene (aq)	<0.011 µg/l	TM178	<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #	
Fluoranthene (aq)	<0.017 µg/l	TM178	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	
Anthracene (aq)	<0.015 µg/l	TM178	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	
Phenanthrene (aq)	<0.022 µg/l	TM178	<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #	
Fluorene (aq)	<0.014 µg/l	TM178	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	
Chrysene (aq)	<0.013 µg/l	TM178	<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #	
Pyrene (aq)	<0.015 µg/l	TM178	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	
Benzo(a)anthracene (aq)	<0.017 µg/l	TM178	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	
Benzo(b)fluoranthene (aq)	<0.023 µg/l	TM178	<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #	
Benzo(k)fluoranthene (aq)	<0.027 µg/l	TM178	<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #	
Benzo(a)pyrene (aq)	<0.009 µg/l	TM178	<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #	
Dibenzo(a,h)anthracene (aq)	<0.016 µg/l	TM178	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	
Benzo(g,h,i)perylene (aq)	<0.016 µg/l	TM178	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	
Indeno(1,2,3-cd)pyrene (aq)	<0.014 µg/l	TM178	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	
PAH, Total Detected USEPA 16 (aq)	µg/l	TM178	none detected	none detected	none detected	none detected	0.121	none detected	none detected	



SDG: 110602-58
 Job: H_GRONTMIJ_SOL-54
 Client Reference:

Location: Part 2a Assistance
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 133432
 Superseded Report:

PAH Spec MS - Aqueous (W)

Results Legend			Customer Sample R	2 SANDOWN	3 SLADE VIEW RI SE	110 STAFFORD LA NE	73 STAGBOROUGH	8 STAGBOROUGH W AY	41 SWALLOWFIELD S
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588811	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588807	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588818	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588814	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588815	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588813
M	mCERTS accredited.								
S	Non-conforming work.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted test.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
Component	LOD/Units	Method							
Naphthalene (aq)	<0.1 µg/l	TM178		<0.1 #	0.103 #	0.131 #	<0.1 #	<0.1 #	<0.1 #
Acenaphthene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Acenaphthylene (aq)	<0.011 µg/l	TM178		<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #
Fluoranthene (aq)	<0.017 µg/l	TM178		<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #
Anthracene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Phenanthrene (aq)	<0.022 µg/l	TM178		<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #
Fluorene (aq)	<0.014 µg/l	TM178		<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #
Chrysene (aq)	<0.013 µg/l	TM178		<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #
Pyrene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Benzo(a)anthracene (aq)	<0.017 µg/l	TM178		<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #
Benzo(b)fluoranthene (aq)	<0.023 µg/l	TM178		<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #
Benzo(k)fluoranthene (aq)	<0.027 µg/l	TM178		<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #
Benzo(a)pyrene (aq)	<0.009 µg/l	TM178		<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #
Dibenzo(a,h)anthracene (aq)	<0.016 µg/l	TM178		<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #
Benzo(g,h,i)perylene (aq)	<0.016 µg/l	TM178		<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #
Indeno(1,2,3-cd)pyrene (aq)	<0.014 µg/l	TM178		<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #
PAH, Total Detected USEPA 16 (aq)	µg/l	TM178		none detected	0.103	0.131	none detected	none detected	none detected



SDG: 110602-58
 Job: H_GRONTMIJ_SOL-54
 Client Reference:

Location: Part 2a Assistance
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 133432
 Superseded Report:

PAH Spec MS - Aqueous (W)

Results Legend			Customer Sample R	VIEW ST. 32 FOS TERS AVE.	VIEW ST. 53 VIE W ST.	VIEW ST. 9 WARD ST.	VIEW ST. WS2	VIEW ST. WS3	VIEW ST. WS4	
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference				1.20	1.10	1.60	
M	mCERTS accredited.			Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
S	Non-conforming work.			31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011
aq	Aqueous / settled sample.			02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011
diss.filt	Dissolved / filtered sample.			110602-58	110602-58	110602-58	110602-58	110602-58	110602-58	110602-58
tot.unfilt	Total / unfiltered sample.			3588795	3588793	3588797	3588790	3588791	3588789	3588789
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
Component	LOD/Units	Method								
Naphthalene (aq)	<0.1 µg/l	TM178	0.104	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Acenaphthene (aq)	<0.015 µg/l	TM178	<0.015	<0.015	<0.015	<0.015	<0.015	0.0225	0.0156	
Acenaphthylene (aq)	<0.011 µg/l	TM178	<0.011	<0.011	<0.011	<0.011	<0.011	0.0181	<0.011	
Fluoranthene (aq)	<0.017 µg/l	TM178	<0.017	<0.017	<0.017	<0.017	<0.017	0.981	0.465	
Anthracene (aq)	<0.015 µg/l	TM178	<0.015	<0.015	<0.015	<0.015	<0.015	0.0538	0.0302	
Phenanthrene (aq)	<0.022 µg/l	TM178	<0.022	<0.022	<0.022	<0.022	<0.022	0.217	0.13	
Fluorene (aq)	<0.014 µg/l	TM178	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	
Chrysene (aq)	<0.013 µg/l	TM178	<0.013	<0.013	<0.013	<0.013	<0.013	0.935	0.434	
Pyrene (aq)	<0.015 µg/l	TM178	<0.015	<0.015	<0.015	<0.015	<0.015	1.11	0.559	
Benzo(a)anthracene (aq)	<0.017 µg/l	TM178	<0.017	<0.017	<0.017	<0.017	<0.017	0.565	0.283	
Benzo(b)fluoranthene (aq)	<0.023 µg/l	TM178	<0.023	<0.023	<0.023	<0.023	<0.023	0.625	0.279	
Benzo(k)fluoranthene (aq)	<0.027 µg/l	TM178	<0.027	<0.027	<0.027	<0.027	<0.027	0.815	0.33	
Benzo(a)pyrene (aq)	<0.009 µg/l	TM178	<0.009	<0.009	<0.009	<0.009	<0.009	0.916	0.352	
Dibenzo(a,h)anthracene (aq)	<0.016 µg/l	TM178	<0.016	<0.016	<0.016	<0.016	<0.016	0.112	0.0359	
Benzo(g,h,i)perylene (aq)	<0.016 µg/l	TM178	<0.016	<0.016	<0.016	<0.016	<0.016	0.689	0.198	
Indeno(1,2,3-cd)pyrene (aq)	<0.014 µg/l	TM178	<0.014	<0.014	<0.014	<0.014	<0.014	0.54	0.164	
PAH, Total Detected USEPA 16 (aq)	µg/l	TM178	0.104	none detected	none detected	none detected	7.6	3.28		



SDG: 110602-58
 Job: H_GRONTMIJ_SOL-54
 Client Reference:

Location: Part 2a Assistance
 Customer: Grontmij
 Attention: Gareth Taylor

Order Number:
 Report Number: 133432
 Superseded Report:

PAH Spec MS - Aqueous (W)

Results Legend		Customer Sample R	10 WESTGATE					
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 31/05/2011 02/06/2011 110602-58 3588809					
M	mCERTS accredited.							
S	Non-conforming work.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
Component	LOD/Units			Method				
Naphthalene (aq)	<0.1 µg/l	TM178	<0.1	#				
Acenaphthene (aq)	<0.015 µg/l	TM178	<0.015	#				
Acenaphthylene (aq)	<0.011 µg/l	TM178	<0.011	#				
Fluoranthene (aq)	<0.017 µg/l	TM178	<0.017	#				
Anthracene (aq)	<0.015 µg/l	TM178	<0.015	#				
Phenanthrene (aq)	<0.022 µg/l	TM178	<0.022	#				
Fluorene (aq)	<0.014 µg/l	TM178	<0.014	#				
Chrysene (aq)	<0.013 µg/l	TM178	<0.013	#				
Pyrene (aq)	<0.015 µg/l	TM178	<0.015	#				
Benzo(a)anthracene (aq)	<0.017 µg/l	TM178	<0.017	#				
Benzo(b)fluoranthene (aq)	<0.023 µg/l	TM178	<0.023	#				
Benzo(k)fluoranthene (aq)	<0.027 µg/l	TM178	<0.027	#				
Benzo(a)pyrene (aq)	<0.009 µg/l	TM178	<0.009	#				
Dibenzo(a,h)anthracene (aq)	<0.016 µg/l	TM178	<0.016	#				
Benzo(g,h,i)perylene (aq)	<0.016 µg/l	TM178	<0.016	#				
Indeno(1,2,3-cd)pyrene (aq)	<0.014 µg/l	TM178	<0.014	#				
PAH, Total Detected USEPA 16 (aq)	µg/l	TM178	none detected					



CERTIFICATE OF ANALYSIS

SDG: 110602-58
Job: H_GRONTMIJ_SOL-54
Client Reference:

Location: Part 2a Assistance
Customer: Grontmij
Attention: Gareth Taylor

Order Number:
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VOC MS (W)

Table with columns: Results Legend, Customer Sample R, VIEW ST. WS2, VIEW ST. WS3, VIEW ST. WS4, Component, LOD/Units, Method. Rows include Toluene-d8**, Methyl tertiary butyl ether (MTBE), Benzene, Toluene, Ethylbenzene, m,p-Xylene, o-Xylene.



SDG: 110602-58
Job: H_GRONTMIJ_SOL-54
Client Reference:

Location: Part 2a Assistance
Customer: Grontmij
Attention: Gareth Taylor

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Superseded Report:

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG: 110602-58
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Test Completion Dates

Lab Sample No(s)	3588803	3588805	3588806	3588788	3588808	3588787	3588799	3588800	3588798	3588802
Customer Sample Ref.	99 ARMITAGE ROAD	121 ARMITAGE ROAD	125 ARMITAGE ROAD	83 BLAKE CLOSE	11 GOODWOOD	3A BLAKE CLOSE	FIVEWAYS 5 NEWLANDS COURT	FIVEWAYS 9 NEWLANDS COURT	FIVEWAYS 11 NEWLANDS COURT	FIVEWAYS 1 NEWLANDS LANE
AGS Ref.										
Depth										
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
Dissolved Metals by ICP-MS	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	07-Jun-2011	08-Jun-2011	09-Jun-2011	09-Jun-2011	08-Jun-2011	08-Jun-2011
Mercury Dissolved	07-Jun-2011	07-Jun-2011	08-Jun-2011	07-Jun-2011	07-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	07-Jun-2011	08-Jun-2011
PAH Spec MS - Aqueous (W)	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011

Lab Sample No(s)	3588819	3588810	3588811	3588807	3588818	3588814	3588815	3588813	3588795	3588793
Customer Sample Ref.	21 HERONDALE	4 KEMPTON	2 SANDOWN	3 SLADE VIEW RISE	110 STAFFORD LANE	73 STAGBOROUGH	STAGBOROUGH WAY	SWALLOWFIELDS	VIEW ST. 32 FOSTERS AVE.	VIEW ST. 53 VIEW ST.
AGS Ref.										
Depth										
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
Dissolved Metals by ICP-MS	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	09-Jun-2011
Mercury Dissolved	07-Jun-2011	08-Jun-2011	08-Jun-2011	07-Jun-2011	07-Jun-2011	08-Jun-2011	07-Jun-2011	07-Jun-2011	07-Jun-2011	08-Jun-2011
PAH Spec MS - Aqueous (W)	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011

Lab Sample No(s)	3588809	3588797	3588790	3588791	3588789
Customer Sample Ref.	10 WESTGATE	VIEW ST. 9 WARD ST.	VIEW ST. WS2	VIEW ST. WS3	VIEW ST. WS4
AGS Ref.					
Depth			1.20	1.10	1.60
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
Dissolved Metals by ICP-MS	07-Jun-2011	10-Jun-2011	08-Jun-2011	08-Jun-2011	09-Jun-2011
Mercury Dissolved	07-Jun-2011	07-Jun-2011	07-Jun-2011	07-Jun-2011	08-Jun-2011
PAH Spec MS - Aqueous (W)	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011
VOC MS (W)			09-Jun-2011	09-Jun-2011	09-Jun-2011

SDG: 110602-58
Job: H_GRONTMIJ_SOL-54
Client Reference:

Location: Part 2a Assistance
Customer: Grontmij
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Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH4 by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.

7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample -similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials -whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 -C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENT EXTRACTABLE MATTER	D&C	DOM	SOX THERM	GRAMMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOX THERM	GRAMMETRIC
THIN LAYER CHROMATOGRAPHY	D&C	DOM	SOX THERM	IATROSCAN
ELEMENTAL SULPHUR	D&C	DOM	SOX THERM	HPLC
PHENOLS BY GCMS	WET	DOM	SOX THERM	GCMS
HERBICIDES	D&C	HEXANE ACETONE	SOX THERM	GCMS
PESTICIDES	D&C	HEXANE ACETONE	SOX THERM	GCMS
EPH (GRO)	D&C	HEXANE ACETONE	END OVER END	GC/FID
EPH (MINOL)	D&C	HEXANE ACETONE	END OVER END	GC/FID
EPH (CLEANED UP)	D&C	HEXANE ACETONE	END OVER END	GC/FID
EPH CWG BY GC	D&C	HEXANE ACETONE	END OVER END	GC/FID
PCB TOT / PCB CON	D&C	HEXANE ACETONE	END OVER END	GCMS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE ACETONE	MICROWAVE TM218	GCMS
C8-C10 (C8-C10) EZ FLASH	WET	HEXANE ACETONE	SHAKER	GCEZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE ACETONE	SHAKER	GCEZ
SEM VOLATILE ORGANIC COMPOUNDS	WET	DOM ACETONE	SONICATE	GCMS

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
SVOC	DOM	LIQUID/LIQUID SHAKE	GCMS
FREE SULPHUR	DOM	SOLID PHASE EXTRACTION	HPLC
PEST COP/OPP	DOM	LIQUID/LIQUID SHAKE	GCMS
TRIAZINE HERBS	DOM	LIQUID/LIQUID SHAKE	GCMS
PHENOLS MS	DOM	SOLID PHASE EXTRACTION	GCMS
TPH by INFRARED (R)	TCE	LIQUID/LIQUID SHAKE	HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID SHAKE	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GCMS

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials or those identified as potentially asbestos containing during sample description which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anorthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

APPENDIX E

Site: <i>Blake Close</i>																		Job No.	106270
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Monitoring Well Sampling & Testing Record

BH	Date	Pipe Internal Diameter mm	Monitored By	Gas													Weather		Ambient Temp °C
				Borehole Pressure pa	Flow l/h	CH ₄ % v/v	CH ₄ GSV	CO ₂ % v/v	CO ₂ GSV	O ₂ % v/v	CO ppm	H ₂ S ppm	PID CF ppm	HEX %	LEL %	Gas Analyser	Atmospheric Pressure mbar	Conditions @ Monitoring	
WS01	28/01/2011		RJH	-5.00	-1.2	0	0	1.4	-0.0168	16.5	-1	-10	1	0	0	GFM	1011	Clear	-5
WS01	11/02/2011		KS	NM	0.6	0.1	0.0006	1.7	0.0102	17.7	-1	-10	NM	NM	NM	GFM	996	Overcast	8.0
WS01	25/02/2011		KAS	1.00	(0.6) <0.1	0.1	0.0001	1.7	0.0017	16.2	-3	-10	1	0.0001	0	GFM	1006	Overcast	11
WS01	11/03/2011		KAS	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Sunny	
WS02	28/01/2011		RJH	-5.00	-1.2	0	0	0.3	-0.0036	19.4	-1	-10	1	0.001	0	GFM	1009	Clear	-5.0
WS02	11/02/2011		KS	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Overcast	NM
WS02	25/02/2011		KAS	1.00	0.2	0.1	0.0002	1.4	0.0028	19.5	-1	-10	1	0.025	0	GFM	1006	Overcast	11.0
WS02	11/03/2011		KAS	1.00	(0.7) 0.1	0.1	0.0001	0.5	0.0005	19.5	0	-10	1	0	0	GFM	998	Sunny	
WS03	28/01/2011		RJH	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	GFM	NM	Clear	-5
WS03	11/02/2011		KS	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	GFM	NM	Overcast	NM
WS03	25/02/2011		KAS	0.00	0.1	0.1	0.0001	3	0.003	16.7	-1	-10	0.9	0	0	GFM	1007	Overcast	11.0
WS03	11/03/2011		KAS	0.00	0.1	0.1	0.0001	2.9	0.0029	16.6	-1	-10	0.9	0	0	GFM	999	Sunny	
							0		0										
WS04	28/01/2011		RJH	-5.00	-1.2	0	0	0.9	-0.0108	19	-3	-10	1	0	0	GFM	1011	Clear	-5
WS04	11/02/2011		KS	NM	0.1	0.1	0.0001	0.1	0.0001	19.8	-1	-10	NM	NM	NM	GFM	996	Overcast	8
WS04	25/02/2011		KAS	1.00	(0.8) <0.1	0.1	0.0001	0.8	0.0008	19.3	-1	-10	1	0	0	GFM	1006	Overcast	11.0
WS04	11/03/2011		KAS	2.00	(1.4) 0.4	0.1	0.0004	0.9	0.0036	19.3	-1	-10	1	0	0	GFM	998	Sunny	

APPENDIX F

Appendix F: Severity and Probability of Risk in Conceptual Site Models (after CIRIA552, Tables 6.3 to 6.5)

This report draws on guidance presented in CIRIA report 552, “Contaminated Land Risk Assessment, A Guide for Good Practice”, wherein the “severity” term in the Conceptual Site Model is classified with reference to the sensitivity of the hazard and the receptor, as follows:

Severity Category	Description	Examples
Severe	Acute risk to human health likely to result in “significant harm” as defined in EPA90, catastrophic damage to buildings or property, acute risk of major pollution of controlled waters, acute risk of harm to ecosystems (as defined in Contaminated Land Regulations 2006)	High cyanide concentrations at the surface of a recreation area Major spillage into controlled waters Explosion, causing building collapse
Medium	Chronic risk to human health likely to result in “significant harm” as defined in EPA90, chronic pollution of sensitive controlled waters, significant change at a sensitive ecosystems or species, significant damage to buildings or structures	Contaminant concentrations at a site in excess of SGVs, GAC or similar screening values Leaching of contaminants to sensitive aquifer Death of a species within a nature reserve
Mild	Pollution of non-sensitive waters, significant damage to buildings, structures, services or crops, damage to sensitive buildings, structures, services or the environment, which nonetheless result in “significant harm”	Pollution to (former) non-aquifer or to non-controlled surface watercourse. Damage to building rendering it unsafe to occupy (e.g. foundation or structural damage)
Minor	Harm, not necessarily resulting in “significant harm” but probably requiring expenditure to resolve or financial loss. Non-permanent risks to human health that are easily mitigated, e.g. by wearing PPE. Easily-repairable damage to structures or services	Contaminant concentrations requiring the wearing of PPE during site work, but no other long-term mitigation. Discolouration of concrete

The likelihood of an event (probability) takes into account both the presence of hazard and receptor and the integrity of the pathway between hazard and receptor, and is assessed as follows:

Category	There is a pollution linkage and:
High	Event is likely in the short term and almost inevitable over the long term. Or, there is evidence of actual harm at/to the receptor
Likely	Event is possible in the short term and likely over the long term
Low	Event is unlikely in the short term and possible over the long term
Unlikely	Event is unlikely, even in the long term

Potential severity and probability have been assessed in the following matrix, to give an overall risk rating:

	Severity			
Probability	Severe	Medium	Mild	Minor
High	Very high	High	Moderate	Low/moderate
Likely	High	Moderate	Low/moderate	Low
Low	Moderate	Low/moderate	Low	Very low
Unlikely	Low/moderate	Low	Very low	Very low

The above risk categories are likely to result in the following actions:

- Very high: urgent intervention / investigation needed, remediation likely to be required
- High: urgent intervention / investigation needed, remediation possibly required in short term and probably required in long term
- Moderate: investigation needed to clarify and refine risk; remediation may be required over the long term
- Low: it is possible that harm could arise to a receptor, but if realised, such harm is likely to be, at worst, mild
- Very low: it is possible that harm could arise to a receptor, but if realised, such harm is unlikely to be severe

APPENDIX G

Appendix G: Initial Assessment of Risk of Permeation into Water Supply Pipes

This appendix presents the findings of an initial screen of soil contaminant concentrations in regard to permeation risk into water supply pipes.

Two publications have been reviewed in regard to potential risks to water supply pipes posed by contaminants in the ground:

- “Guidance for the Protection of Water Supply Pipes to be Used in Brownfield Sites” (UK Water Industry Research {UKWIR}, ref 10/WM/03/21, 2010 (re-issued version))
- The Selection of Materials for Water Supply Pipes to be Laid in Contaminated Land (Water Regulations Advisory Scheme {WRAS}, ref 9-04-03, October 2002)

Both reports present methodologies for the assessment of soil conditions and the specification of appropriate pipework materials to mitigate the presence of contaminants.

WRAS Screen

A comparison between the chemical analysis results obtained from samples taken **from the top 1.2m of soil** at the site and the older WRAS screening values is presented in the table below. Only soils from the top 1.2m of the soil profile have been selected for comparison as 1.2m is the typical maximum depth at which water pipes are laid within the highway – with local service connections to properties typically much shallower. Note, the table below does not constitute a full screen against all WRAS parameters; e.g. sulphate, cyanide and coal tar have not been tested for.

WRAS Threshold Screen

Analyte	Test Result (mg/kg)	WRAS Threshold Value (mg/kg)
	max	
Sulphate	Not analysed	2000
Sulphur	Not analysed	5000
Sulphide	Not analysed	250
pH	7.05 to 8.63	<5 or >8
Antimony	Not analysed	10
Arsenic	7.1	10
Cadmium	0.53	3
Chromium (hexavalent)	<1.2	25
Chromium (total)	13	600
Cyanide (free)	Not analysed	25
Cyanide (complexed)	Not analysed	250
Lead	35	500
Mercury	<0.14	1
Selenium	<1.0	3
Thiocyanate	Not analysed	50
Coal Tar	Not analysed	50
Cyclohexane extractable	Not analysed	50
Phenol	Not analysed	5
Polyaromatic Hydrocarbons	38	50
Toluene extractable	<0.02	50
Petroleum Hydrocarbons	89	50

Bold values indicate exceedance of WRAS threshold value

The maximum concentration of petroleum hydrocarbons, and the maximum soil pH level recorded, exceed the WRAS threshold values.

UKWIR Screen

The UKWIR approach is the most recent and reflects further studies undertaken since the WRAS document was published in 2002. Key features of the UKWIR report include:

- A pipework material-specific assessment procedure (Table 3.1 of the report). This allows chemical analysis results to be compared to various threshold criteria associated with six possible pipework material types
- The discounting of metallic pipework (other than copper or steel/ductile iron with protective wrapping) as a modern pipework material
- The specification of a different chemical testing suite to that recommended in the earlier WRAS document – including the use of physio-chemical parameters and exclusion of analysis for metals (given the above discounting of metallic pipework).

The chemical analysis for the site was scheduled prior to the publication of the re-issued UKWIR report (despite a re-issue data of 2010, the report was not available until January 2011). Therefore, some of the parameters required for a UKWIR screen (as summarised in Appendix G) are not available. The available laboratory results from the top 1.2m of soil have been compared to the UKWIR thresholds. The screen indicates that:

- The total VOC (minus BTEX) concentrations recorded are acceptable
- Total BTEX concentrations are likely to be acceptable for PE pipe and PVC pipe

- Total SVOC (minus phenols and cresols) concentrations are unacceptable for PE or PVC pipe
- Concentrations of mineral oil C11-20 recorded are not acceptable for PE pipework
- Concentrations of mineral oil C21-40 recorded are acceptable for PE pipework.

Summary

It was possible that the concentrations of contaminants at the site could adversely affect drinking water quality, depending on the materials used for water distribution (South Staffordshire Water pipes) and local connections to the South Staffordshire network (probably installed by the house builder). Further assessment, in the form of sampling of residents' taps, was undertaken, as outlined in report Section 3.2.7.