



CALDIC UK Ltd

Peterborough Road, Crowland
Verification Report

02 May 2019

DOCUMENT CONTROL SHEET

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1. INTRODUCTION

1.1 Terms of Reference

FLI QDS Remediation Limited (FLI QDS) was appointed by Caldic UK (the Client) in November 2018 to complete remediation works at its 35 Peterborough Road site, Crowland, South Holland, PE6 0BB (the Site) in preparation for the redevelopment as residential housing.

The scope of the required remediation works were outlined in the Desk Study, Quantitative Risk Assessment and Remedial Strategy (Hydrock Consultants report ref. CRO-HYD-XX-RS-RP-GE-0001).

The Hydrock document was submitted to the Local Planning Authority, South Holland District Council (SHDC), and to the Environment Agency in advance of the submission of planning by the Developer of the Site. FLI QDS presented their Remedial Implementation Plan to SHDC in November 2018 to outline the planned verification of the site. SHDC agreed with the principles of the remediation approach and confirmed that the works could commence.

Subsequent to the completion of the Enabling Phase Remediation works in December 2018, draft planning conditions were established for the proposed development by SHDC in March 2019 (refer to Appendix F).

This Verification Report has been written to document the Enabling Phase Remediation works and to thereby satisfy Conditions 3 a) and 3 b) of the draft planning document, namely:

"To ensure that the site does not pose any further risk to human health or the water environment by demonstrating that the requirements of the approved verification plan have been met and that remediation of the site is complete."

In a meeting between SHDC and FLI QDS on 19 March 2019, it was agreed that the draft conditions would apply to the Site only and not the off-site contamination to the west of the Site. This will therefore allow the development to proceed once the Enabling Phase Remediation works have been determined to satisfy Conditions 3 a) and 3 b).

The off-site dissolved phase plume is to be remediated as a separate phase of works. This is being undertaken by the current site owner and is not directly linked to the future redevelopment of the site. Therefore, any works associated with this element of works have not been included in this report as this document relates solely to the remediation activities required to permit redevelopment of the site.

1.2 Environmental Licencing

As there was no treatment of material on the site, FLI QDS were not required to obtain an Environmental Permit for the works. Notification of small-scale remediation activities was provided to the local Environment Agency office in advance of the works. Due to the absence of draft planning conditions at the time of the Enabling Phase Remediation works in late 2018, it was not possible for FLI QDS to comply with the CL:aire Definition of Waste Code of Practice (DoWCoP). As such a Material Management Plan was not produced, the works being completed on a voluntary basis. No excavated site material was re-used during the works. All excavated material was removed to a licenced facility, and all backfill material was an imported virgin quarried medium.

2. BACKGROUND INFORMATION

2.1 Previous Reports

Several phases of site investigations and remedial works have been completed at the Peterborough Road site. The two most recent documents pertinent to the remediation works are listed below:

- QDS Remediation, October 2017. *Letter Report* Re: Peterborough Road, Crowland – July 2017 Site Investigation, Ref: Q-05483/RT/01; and
- Hydrock Consultants Limited, July 2017. Desk Study, Quantitative Risk Assessment and Remedial Strategy, Hydrock ref CRO-HYD-XX-RS-RP-GE-0001.

2.2 Conceptual Site Model – Pre-remediation

The site is underlain by a variable thickness of generally granular Made Ground with concrete surfacing present over much of the site. Underlying the Made Ground is Peat and/or Tidal Flat Deposits, generally comprising very soft to soft, organic rich, slightly sandy clay or clay loam, over the Abbey Sand and Gravel, generally comprising sand and fine to medium flint gravel or gravelly sand, over the Oxford Clay, comprising stiff to very stiff, mottled clay.

The Abbey Sand and Gravel is classified as a Secondary A aquifer while the Peat and Tidal Flat Deposits are classified as Unproductive Strata. The underlying Oxford Clay is also classified as Unproductive Strata.

Groundwater levels beneath the site range from 1m to 2.5m bgl. Previous investigations have determined that groundwater flow beneath the site is towards the northeast. However, it is considered that shallow groundwater flow beneath the site is likely to be complex, and that groundwater monitoring by Harrison (2010) indicates at least a proportion of flow towards the west.

Investigations completed by QDS in July 2017 identified minimal groundwater occurrences suggesting the groundwater is perched in nature where encountered.

There are numerous field drains and drainage ditches in the vicinity of the site. The site lies within the 'Welland – conf Greatford Cut to tidal' surface water catchment with the River Welland located 1.4km northwest of the site. Surface water runoff at the site is considered to generally flow northwestwards towards the River Welland.

2.3 On-site Sources of Contamination

Chlorinated solvent contamination has been encountered within soils and groundwater beneath the site. Contamination is principally located in two hot spots; one in the western part of the site, Hotspot A, and one towards the east of the site, Hotspot B. There is also evidence of groundwater contamination off-site, immediately to the west.

Degradation has been observed at the site and field monitoring has shown that subsurface conditions are favourable for reductive dechlorination.

2.4 Identified Receptors

There are two potential receptors; future site users (human health) and shallow groundwater (controlled waters). For the human health receptor, a pathway of volatilisation of chlorinated solvents in soil and groundwater, followed by migration

through the unsaturated zone to outdoor air on-site followed by inhalation was identified. An indoor vapour pathway to the proposed new residential properties was omitted due to the proposed use of a vapour membrane within the construction phase.

For the controlled waters receptor, a pathway of leaching contaminants from shallow soils by infiltration, followed by dilution within the underlying groundwater and lateral migration and attenuation within granular deposits.

For contamination already dissolved in groundwater, a pathway of lateral migration and attenuation within granular deposits.

In addition, asbestos sheeting has been encountered in localised areas above ground and within fill materials. Asbestos fibres have also been encountered at 0.7m bgl within the Made Ground at one location in the west of the site. These localised occurrences of asbestos at the site pose a risk to site workers and future site users via a dust inhalation pathway.

2.5 Detailed Quantitative Risk Assessment (DQRA)

Hydrock completed a Detailed Quantitative Risk Assessment based on the findings of QDS' July 2017 site investigations and the previous works completed at the site.

The key risk drivers identified in the DQRA are:

Human Health

- VOCs in soils and groundwater; and
- Asbestos at surface and within soils.

Controlled Waters

- VOCs in soils and groundwater.

2.6 Revised Remedial Target Values

On review of the Remedial Strategy, the Environment Agency requested that the DQRA was revisited in order to model the fate and transport of VOCs within the soils underlying the site using Drinking Water Standards where Environmental Quality Standards were not present. Additional targets were subsequently calculated using the Remedial Targets Methodology (RTM) for Tier 3 soil concentrations.

Technical Note TN-DQRA update 23-11-18 is included within Appendix F of this report. The revised RTVs are presented in Table 1.

Table 1 Revised Re-use Criteria Below Cover System, Hardstanding or Built Environment

Chemical of Concern	Controlled Waters RTV (mg/kg)	Human Health RTV (Outdoor air vapour pathway) (mg/kg)	Proposed RTV mg/kg	Notes
Toluene	-	1,920	1,920	Solubility Limit
Ethylbenzene	-	1,220	1,220	Solubility Limit
m,p-xylene	-	1,350	1,350	Solubility Limit
o-xylene	-	1,120	1,120	Solubility Limit
1,2-DCA	0.201	4,290	0.201	
Vinyl Chloride	3.58	112	3.58	
TCE	136	3,220	136	
1,1,1-TCA	974	2,920	974	
PCE	8,300	951	951	
Benzene	21.2	2,260	21.2	
1,1,2-trichloroethane	1,340	8,210	1,340	
Dichloromethane	0.173	9,860	0.173	
Cis 1,2 DCE	22,203	-	22,203	
Trans 1,2 DCE	27,355	-	27,355	

3. SCOPE OF WORKS

The Enabling Works Phase remediation activities to be completed at the Site were as listed below. A detailed description of the Enabling Works were included within the Remediation Implementation Plan.

- Task E1: Project setup and management including liaison with the Local Authority, Environment Agency and Health and Safety Executive, where necessary, with appropriate permits / licences / consents / approvals granted.
- Task E2: Appointment of an appropriate enabling works contractor and appropriate permits / licences / consents / approvals.
- Task E3: Removal of hardstanding.
- Task E4: Hand picking visible asbestos containing materials (ACM) from the site surface and during excavation as required.
- Task E5: Excavation of materials for re-use on-site or disposal off-site.
- Task E6: Implementation of in-situ enhanced reductive dechlorination techniques.
- Task E7: Air quality boundary monitoring for VOCs and asbestos during excavation works.
- Task E8: Backfilling of void.
- Task E9: Supervision, validation and verification reporting for Enabling Works Phase.

The required Construction Phase activities to be completed by the Developer are follows:

- Task C1: Appointment of an appropriate construction phase contractor and appropriate permits / licences / consents / approvals.
- Task C2: Placement of clean validated service corridors.
- Task C3: Installation of cover system for landscaping areas.
- Task C4: Installation of vapour resistant gas proof membrane for proposed buildings.
- Task C5: Validation and verification reporting for Construction Phase.

It is anticipated that the Developer will require the appointment of a third-party consultant to verify the cover system and vapour membrane installation.

This report covers the Enablement Phase of works only. Tasks associated with the Construction Phase are outside of the QDS scope of works. Details of these works and supporting verification will be provided by the developer upon completion of the Construction phase.

4. REMEDIAL IMPLEMENTATION

The implementation of the required remediation works are detailed in the following section. Table 2 below highlights key dates for the works.

Table 2: Remediation key dates

Task	Start Date	End Date
Site Mobilisation	19 Nov 2018	
Removal of vegetation and 1st Phase concrete removal	22 Nov 2018	28 Nov 2018
Hotspot A excavation	27 Nov 2018	14 Dec 2018
Hotspot B excavation	17 Dec 2018	19 Dec 2018
Removal of asbestos impacted soils	17 Dec 2018	18 Dec 2018
Import of backfill media	04 Dec 2018	20 Dec 2018
Backfill Hotspot A	06 Dec 2018	19 Dec 2018
Backfill Hotspot B	20 Dec 2018	20 Dec 2018
Concrete removal 2nd phase	19 Dec 2018	21 Dec 2018
Site Clearance and demobilisation		21 Dec 2018

4.1 Task E3: Removal of Hardstanding

Initial enabling works included the stripping and removal of vegetation from across the site followed by the removal of concrete from the main remedial dig area, Hotspot A.

All concrete was taken by eight-wheeled tipper lorry to Lyndon Thomas Ltd, Birchfield Springs, Desborough, Northamptonshire, NN14 2QN for processing and eventual reuse.

Copies of the Material Conveyance Notes are included within Appendix D, the loads being summarised in Table D1. 481.52 tonnes of concrete were removed from the site during the Enabling Phase works.

4.2 Task E4: Hand picking visible asbestos containing materials (ACM) from the site surface and during excavation as required

Operatives involved with the clearance activities were briefed on the potential for asbestos containing materials to be present below the hardstanding prior to commencement of the works and within imported crushed fill materials used in the previous shallow source removal works.

Asbestos cement sheet fragments were observed stuck to the base of overlying concrete immediately to the east of the Hotspot B remedial excavation. The concrete was segregated into a separate stockpile (SP03) and later sent for disposal to Eye Landfill. The accompanying Consignment Note is included within Appendix D. A total of 10.94 tonnes of asbestos contaminated materials and concrete were removed from the site.

4.3 Task E5: Excavation of materials for re-use on-site or disposal off-site

Due to the nature of the chlorinated solvent contamination, there was significant possibility of odour generation during the works which would pose no human health risks to either site workers or the local residents, but could have been perceived as a nuisance. As such, control measures were implemented throughout the works to manage and control this aspect of the works. These control measures included:

- Minimising open excavation areas / exposed soils;
- Covering all material as soon as practically possible; and
- Use of odour atomisers to target any odours generated.

On completion of the vegetation and hardstanding clearance, soil source removal works commence. A 360° excavator fitted with a 1.4m grading bucket was used for the remedial excavation works. All excavated materials were loaded onto a forward tipping dumper and temporarily stockpiled under instruction and supervision by either the Remediation Engineer or Site Manager. The stockpiles were sealed with the back of the excavator's bucket and covered with plastic membrane in order to minimise rainwater infiltration.

Segregation of the stockpiled materials included removal of hard materials including large concrete fragments and drainage and removal of plastic sheeting and deleterious materials

Analytical testing was completed on representative samples obtained from the stockpiles in order to determine waste classification and the most suitable disposal route. Further detail on the stockpile sampling methodology is included in Section 5 of this report.

The extents of the remedial excavations, and, validation sample locations, are indicated on FLI QDS drawing Q-05483-010 (Appendix A). Photographs of the remedial excavations are included in Appendix B.

4.3.1 Hotspot A

The Hotspot A remedial excavation was advanced to a maximum depth of 4.0m bgl. The encountered geology was consistent with the previous site investigations and remediation works with Made Ground observed to overlie peaty gravelly clay. Below the peaty clay, firm grey clay was encountered. Gravel lenses on top of the clay were found to be highly odorous in nature with a distinct smell of chlorinated solvents.

No significant groundwater was observed to enter the remedial excavation which further suggests that the groundwater at the site is perched in nature. No free product was observed on the limited groundwater that entered the base of the open excavation.

The excavation extents were limited by the proximity of the public footpath to the south and the residential properties to the west and north.

A total volume of 568m³ was removed from the Hotspot A remedial dig area and was later exported off site as non-hazardous material to Biffa Waste Services Limited's Eye Landfill, Eyebury Road, Peterborough, PE7 7TH. Copies of the Duty of Care documentation are included within Appendix D.

4.3.2 Hotspot B

Hotspot B was centred around borehole BH206 and was excavated on completion of the western remedial dig.

During the excavation of the upper 0.5m, asbestos cement tiles were identified within the Made Ground (refer to Plates 41 and 42 in Appendix B). The impacted materials were excavated and stockpiled whilst a receiving facility could be sourced. A total of 12.5m³ were sent for treatment at Dunton Environmental's Wolverhampton Treatment Hub, Horseley Fields, WV1 3DW. A copy of the completed Consignment Note is included within Appendix D.

The remainder of the excavation was advanced to a maximum depth of 4m bgl, the excavated soils being stockpiled within SP06 and later sent off-site to Eye Landfill.

4.4 Task E6: Implementation of in-situ enhanced reductive dechlorination techniques

It was previously identified in the Remedial Strategy that the conditions in the subsurface were favourable at the site for reductive dechlorination to occur. During the initial backfill of the excavations, a reductive dechlorination compound was added to the base in order to encourage anaerobic bio-stimulation of residual contaminants. 300 ltr of a Hydrogen releasing substrate was pumped into the excavations once an initial granular layer had been placed on the base (See Section 4.6 below). This material will provide a long-term nutrient source for naturally occurring microbes resulting in enhanced natural attenuation of dissolved phase chlorinated compounds.

4.5 Task E7: Air quality boundary monitoring for VOCs and asbestos during excavation works

Lucion Environmental Ltd completed six asbestos reassurance monitoring events during the site works. The position of the monitoring stations were determined on the activities being carried out at the site at the time of monitoring, however all events featured boundary monitoring.

In all of the six monitoring events, all air samples gave results below 0.01 fibres per cubic centimetre of air.

The Lucion asbestos reports are included within Appendix E of this report.

The Remediation Engineer completed VOC boundary monitoring on a daily basis using a handheld Photo Ionisation Detection meter (PID). The PIDs was calibrated with a 100ppm isobutylene. Monitoring was completed at each boundary monitoring point for a minute period. No readings above the 5ppm isobutylene equivalent were recorded during the monitoring events.

4.6 Task E8: Backfilling of void

Backfilling of the excavations was undertaken using both imported limestone and clay. A 250mm thick layer of limestone was placed at the base of the excavations. This provided a suitable stratum for the addition of the reductive dechlorination substrate and provide a geotechnically suitable base layer. Once the granular layer was in-situ, a liquid substrate to promote anaerobic degradation was applied.

Virgin clay was then placed in 300mm layers and compacted with the excavator bucket, and 'tracking in' by the excavator. Limestone was used for the final 300mm layer of the backfill. This provides a capping to the excavations and could double up as the hard dig layer required as part of the cover system for garden areas.

Verification sampling was completed at the source and at the site at a frequency of one sample per 250m³.

Copies of the Material Conveyance Notes are included within Appendix D.

4.7 Task E9: Supervision, validation and verification reporting for Enabling Works Phase

All site works were supervised by QDS' experienced Remediation Engineer, supported by the Site Manager. Further details on the verification of the remedial mitigation measures are outlined in the Section 5.

5. REMEDIAL VERIFICATION – SOIL SOURCE REMOVAL LINES OF EVIDENCE

The following section details the verification measures completed at the site to demonstrate that the source removal activities meet the requirements of the Remedial Strategy.

5.1 Verification Sampling Methodology

During the excavation works, samples representative of the soils remaining in situ were obtained from the sides base of the remedial excavations by the Remediation Engineer using the bucket of the excavator.

The samples were placed into appropriate sample jars and placed into coolboxes with icepacks and sent to a UKAS and MCERTs accredited laboratory complete with a chain of custody. Samples were submitted for the analysis of VOCs. To aid in the identification of contaminated material, headspace analysis using a PID was carried out. A representative soil sample was broken up into small fragments and placed into a polythene bag, sealed and then agitated. After a period of 5 minutes, a hole was made in the headspace of the bag and the nozzle of the PID inserted in order to gain a VOC reading.

Verification samples for the main dig were obtained at a sample frequency of every 5m linear length for the sidewalls and on a 5 x 5m grid for the excavation base. For the smaller excavation, samples were obtained from the four sides and base of the resulting excavation.

Stockpile testing of the excavated materials was completed at a frequency of one sample per 50m³ using the same methodology listed above.

5.2 Excavation Verification Sample Results

The results of the chemical analyses are included within Appendix C and are summarised in Table C1 where they are compared to the applicable RTVs. The locations are shown on FLI QDS drawing Q-05483-010 (Appendix A). The final extents of the remedial excavations are shown on the topographical survey included as drawing Q-05483-012 in Appendix A.

5.2.1 Hotspot A

The main remedial dig was extended on three occasions. The first was towards the east after sidewall exceedances of the RTVs for TCE and PCE (samples 9, 10 and 11). Second level sampling of the extended dig indicated compliance with the RTVs for soils remaining in situ aside from sample 16(11)-Side-North which had a minor exceedance of dichloromethane (0.235mg/kg compared to the RTV of 0.173mg/kg). Due to the proximity of the northern site boundary to this sample location, no further remedial excavation was possible without risk to the integrity of the boundary fence and the neighbouring property's garden beyond.

The remedial excavation was extended to the west up until the site boundary on exceedance of the RTV for PCE in sample 6. Additional sampling (samples 22 to 24) indicate that soils remaining in situ are in compliance with the remediation criteria.

Further excavation was completed to the west of verification sample 4 given the previously high concentrations of VOCs detected in BH409 during previous groundwater monitoring events. All representative verification samples (24 to 26) were in compliance with the RTVs.

Basal samples 1 (3.4m) and 3 (4.0m) were also found to be in slight exceedance of the RTV for dichloromethane (0.531 and 0.249mg/kg respectively). Both of these exceedances are considered to be minor and were also recorded in silty clay at the maximum depth of excavation. Therefore no further excavation work was required.

5.2.2 Hotspot B

The representative verification samples from the sides and base were all below the applicable RTVs.

5.3 Stockpile Sample Results

The stockpile sample results are summarised in Table C2 within Appendix C.

Stockpiles SP05 and SP06 were both tested for VOCs and asbestos to determine waste classification. The results confirmed the material to be non-hazardous and was sent to Eye Landfill for disposal.

Copies of the Duty of Care Documentation is included within Appendix D.

5.4 Photographs of Remedial Excavations

Photographs of the remedial works are included within Appendix B of this report.

Plates 1 to 40 document the Hotspot A remedial excavation. Plates 41 to 44 represent Hotspot B.

5.5 Import Backfill Materials Sampling

Sampling of the imported backfill materials was completed at a frequency of one sample per 250m³ of material. All samples were submitted for the analysis of As, B (water soluble), Be, Cd, Cr (total), Cr(VI), Cu, Hg, Ni, Pb, S (elemental), Se, V, Zn, cyanide (total), sulphide, pH, asbestos fibres, speciated polycyclic aromatic hydrocarbons (PAH, by GC-FID), total phenols, total TPH and fraction of organic carbon. VOC testing was also completed on the import samples for reassurance purposes.

The import verification sample results are summarised in Table C3 within Appendix C. All representative import samples are considered in compliance with the Remedial Strategy.

5.6 Surface Sampling

Post works surface samples were obtained from eight locations across the site after the completion of Enabling Phase Remediation works and the removal of the hardstanding. The sample locations are shown on the FLI QDS drawing Q-05483-11 (Appendix A). The results are compared to the RTVs in Table C4 (Appendix C).

Whilst there are measured concentrations of VOCs present in these samples, they are at least a magnitude less than the applicable RTV. The placement of the cover system and the incorporation of vapour membranes within the properties during the Construction Phase will mitigate against the risk of these residual concentrations to future site users.

6. FINAL SITE CONDITIONS AND CONCLUDING REMARKS

Remediation works completed at the Site to address historic contamination associated with its use as a former chemical storage and dry cleaning facility.

The primary soil source of contamination was located in the west of the site below the previous 2012 shallow remedial dig (Hotspot A). Excavation works were completed to remove the contaminated soils to a maximum depth of 4m bgl.

A second remedial dig (Hotspot B) was completed around historic borehole BH206 in which vinyl chloride and trichloroethene was previously detected.

In total 1483 tonnes of material was removed from the site as part of these works. This can be split into the following categories:

Table 3: Summary of materials removed.

Material Type	Removed
Vegetation/ Green waste	62 tonnes
Concrete hard standing	481 tonnes
Contaminated soils	909 tonnes
Asbestos impacted concrete	11 tonnes
Asbestos impacted soils	20 tonnes

Extensive verification sampling has been completed at the site which demonstrates that the soils remaining in situ meet the requirements of the revised RTVs in both the Hotspot A main dig and the smaller Hotspot B dig.

Imported virgin material was used to backfill all excavations. This comprised both Limestone and Clay material. All import was sampled to confirm it met the import criteria as defined within the Hydrock Remediation Strategy document.

The final topographic levels are presented on FLI QDS drawing Q-05483-12 in Appendix A.

The completion of the Enabling Phase Remediation works has successfully removed the identified risks associated with contaminated soils and has rendered the Site suitable for the proposed residential redevelopment.

Appendix A Drawings



	FIRST ISSUE		07/11/18
Rev.	Description	Revised By	Date



Soil & Groundwater Remediation Solutions

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☒ Guildford Office: Tel: 01483 303070
☐ Rotherham Office: Tel: 01709 300800

Site Address: Peterborough Road Crowland PE6 0BB		Rev: REV
Title: SITE LOCATION PLAN		
Client: CALDIC UK LTD		
Drawn: WM	Checked: RT	Approved: RT
Dwg: Q-05483-04	Contract: Q-05483	Scale: NTS

- Legend
- Indicative extent of Hotspot A deep excavation
 - Maximum indicative extent of Hotspot A remedial excavation
 - Indicative location of Hotspot B remedial excavation (further delineation required)
 - Indicative environmental monitoring point
 - Previous remedial excavation



Rev.	Description	Revised By	Date
A	Previous excavation added		14/11/18
	FIRST ISSUE		07/11/18

FLI QDS Soil & Groundwater Remediation Solutions

email: info@fli-qds.co.uk
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Site Address: Peterborough Road Crowland PE6 0BB	Rev. A
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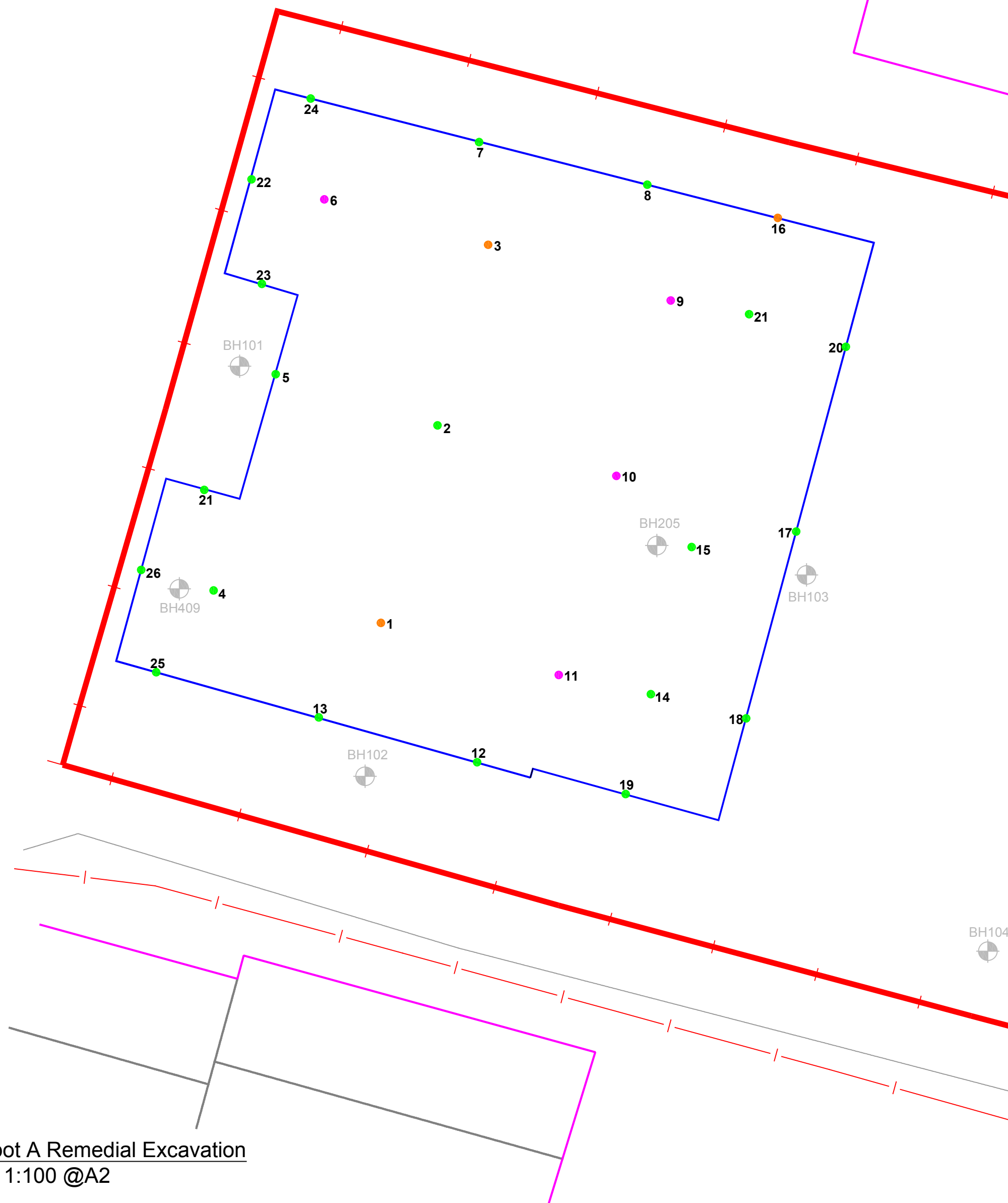
Title: INDICATIVE REMEDIAL EXCAVATION AREAS

Client: CALDIC UK LTD

Drawn: WM	Checked: RT	Approved: RT
Dwg: Q-05483-05	Contract: Q-05483	Scale: 1:200



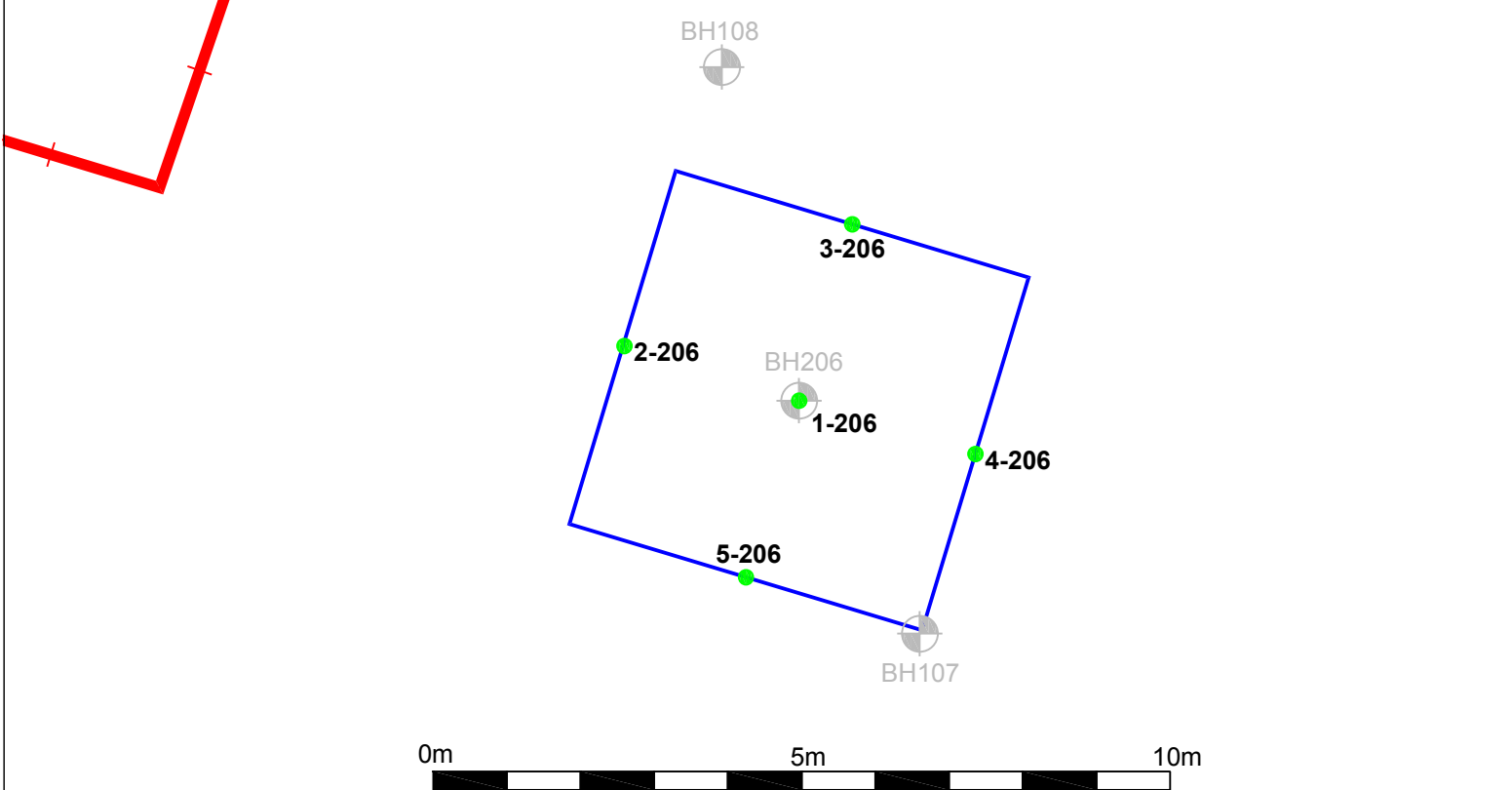
0m 5m 10m



Hotspot A Remedial Excavation
scale 1:100 @A2



Site Plan
scale 1:500 @A2



0m 5m 10m

Hotspot B Remedial Excavation
scale 1:100 @A2

Legend

- Remedial excavation extents
- Verification sample <RTV
- Verification sample >RTV (removed)
- Verification sample minor exceedence dichloromethane (remains in situ)
- Former monitoring well (removed)

A2

FIRST ISSUE		11/01/19	
Rev.	Description	Revised By	Date



Soil & Groundwater
Remediation Solutions

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■

Guildford Office:

Tel: 01483 303070

□

Rotherham Office:

Tel: 01709 300800

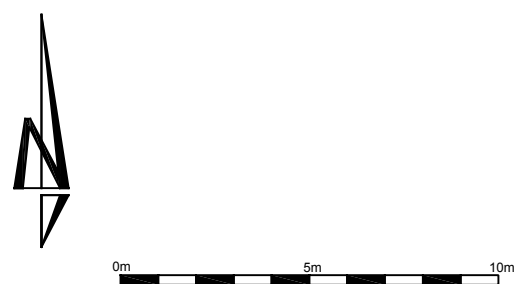
Site Address: Peterborough Road Crowland PE6 0BB	Rev: -
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Title: VERIFICATION SAMPLE LOCATION PLAN

Client: CALDIC UK LTD

Drawn: WM	Checked: RT	Approved: RT
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Dwg: Q-05483-10	Contract: Q-05483	Scale: AS SHOWN
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Legend

— Remedial excavation extents

X Post works surface sample



	FIRST ISSUE		21/01/19
Rev.	Description	Revised By	Date



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■ Guildford Office: Tel: 01483 303070

□ Rotherham Office: Tel: 01709 300800

Site Address:
Peterborough Road
Crowland
PE6 0BB

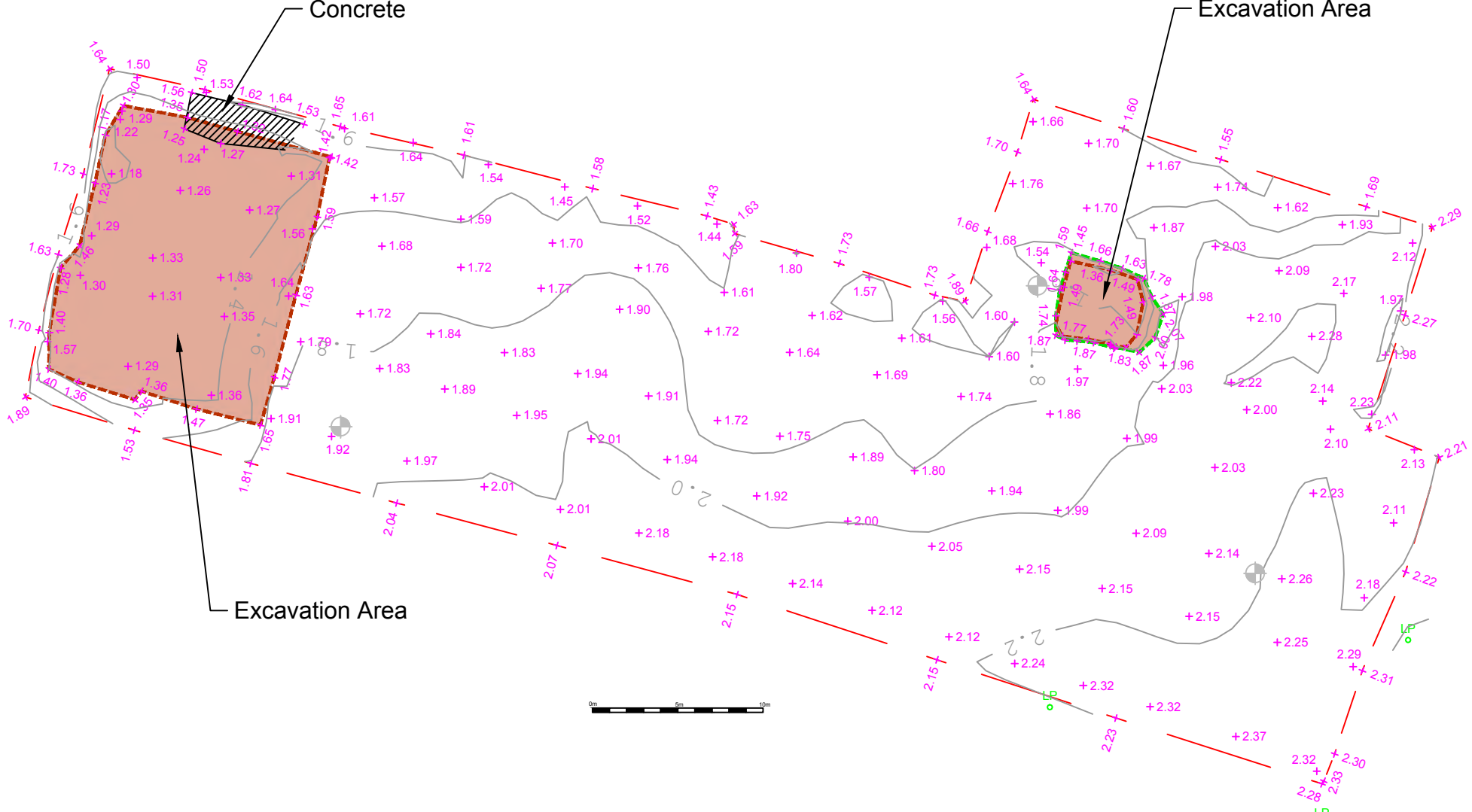
Rev

Title: POST WORKS SURFACE SAMPLES

Client: CALDIC UK LTD

Drawn: WM	Checked: RT	Approved: RT
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Dwg: Q-05483-11	Contract: Q-05483	Scale: 1:500
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Legend

- 
- The diagram shows a cross-section of a river channel. At the top, a red line represents the 'Fence'. Below it, a grey line represents the 'Contours (0.2m)'. The 'Top of Bank' is indicated by a green line with the text 'x x x x x' above it. The 'Bottom of Bank' is indicated by a brown line with the text 'x x x x x' below it. The 'Levels (mAOD)' are shown as a pink number '+2.09'. At the bottom, a grey circle with a crosshair represents the 'Borehole'.

FIRST ISSUE

24-01-19

Rev.	Description	Revised By	Date
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Guildford Office: Tel: 01483 303070

☐ Rotherham Office: Tel: 01709 300800

Site Address:
Peterborough Road
Crowland

Rev:

Title: Topographical Survey 24-01-19

Client: Caldic UK Ltd

Drawn: MRG

Checked: RT

Approved: RT

Dwg: Q-05483-?

Contract: Q-05483

Scale: See Dwg

Appendix B Photographs



Plate 1: Sample 1, Hotspot A



Plate 2: Sample 1, Hotspot A



Plate 3: Sample 2, Hotspot A



Plate 4: Sample 2, Hotspot A



Plate 5: Sample 3, Hotspot A



Plate 6: Sample 3, Hotspot A



Plate 7: Sample 4, Hotspot A



Plate 8: Sample 4, Hotspot A



Plate 9: Sample 5, Hotspot A



Plate 10: Sample 5, Hotspot A



Plate 11: Sample 6, Hotspot A



Plate 12: Sample 7, Hotspot A



Plate 13: Sample 7, Hotspot A



Plate 14: Sample 8, Hotspot A



Plate 15: Sample 8, Hotspot A



Plate 16: Sample 9, Hotspot A



Plate 17: Sample 9, Hotspot A



Plate 18: Sample 10, Hotspot A



Plate 19: Sample 10, Hotspot A



Plate 20: Sample 11, Hotspot A



Plate 21: Sample 11, Hotspot A



Plate 22: Sample 12, Hotspot A



Plate 23: Sample 13, Hotspot A



Plate 24: Sample 13, Hotspot A



Plate 25: Sample 14, Hotspot A



Plate 26: Sample 14, Hotspot A



Plate 27: Sample 15, Hotspot A



Plate 28: Sample 15, Hotspot A



Plate 29: Sample 16, Hotspot A



Plate 30: Sample 16, Hotspot A



Plate 31: Sample 17, Hotspot A



Plate 32: Sample 18, Hotspot A



Plate 33: Sample 22, Hotspot A



Plate 34: Sample 22, Hotspot A



Plate 35: Sample 23, Hotspot A



Plate 36: Sample 24, Hotspot A



Plate 37: Hotspot A



Plate 38: Placement of imported limestone aggregate in excavation base



Plate 39: Placement of imported clay in Hotspot A remedial excavation



Plate 40: Imported limestone placed in 200mm layer at top of Hotspot A remedial excavation



Plate 41: Asbestos cement tile fragments encountered in upper 0.5m of Hotspot B (BH206) remedial excavation



Plate 42: Asbestos cement tile fragments encountered in upper 0.5m of Hotspot B (BH206) remedial excavation – materials excavated and exported off site to



Plate 43: Completed Hotspot B (BH206) remedial excavation



Plate 44: Hotspot B basal sample

Appendix C Chemical Testing Certificates

Table C1 Remedial Excavation Verification Samples	Sample ID		1-Base-North	2-Base-Center	3-Base-South	4-Side-West(S)	5-Side-West	6-Side-West(N)	7-Side-North(W)	8-Side-North(E)	9-Side-East(N)	10-Side-East	11-Side-East(S)	12-Side-South(E)	13-Side-South(W)
	Depth		3.40-3.40	3.60-3.60	0.20-4.00	0.20-3.40	0.20-3.60	0.20-4.00	0.20-4.00	0.20-4.00	0.20-4.00	0.20-3.60	0.20-3.40	0.20-3.40	0.20-3.40
		Table 7.1 Criteria	Hotspot A												
Vinyl Chloride	µg/kg	3580	36.7	<6	<6	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120
Bromomethane	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Chloroethane	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Trichlorofluoromethane	µg/kg		<6	<6	<6	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120
1,1-Dichloroethene	µg/kg		265	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Carbon Disulphide	µg/kg		9.48	34.9	<7	358	<140	210	<140	<140	<140	217	<140	<140	<140
Dichloromethane	µg/kg	173	531	29.8	249	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Methyl Tertiary Butyl Ether	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
trans-1,2-Dichloroethene	µg/kg	27355000	233	<10	23.5	<200	<200	<200	<200	<200	836	453	1760	<200	1010
1,1-Dichloroethane	µg/kg		676	55.1	250	4330	7520	4310	298	5070	16500	20800	15100	649	4110
cis-1,2-Dichloroethene	µg/kg	22203000	2950	44.1	244	15800	8620	4840	495	16200	34000	7840	131000	9930	32900
2,2-Dichloropropane	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Bromochloromethane	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Chloroform	µg/kg		17.2	<8	<8	<160	<160	<160	<160	<160	<160	<160	<160	<160	<160
1,1,1-Trichloroethane	µg/kg	974000	115	14	276	4230	9590	7760	889	295	68400	318000	7420	<140	<140
1,1-Dichloropropene	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Carbontetrachloride	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
1,2-Dichloroethane	µg/kg	201	153	<5	73.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Benzene	µg/kg	21200	<9	<9	<9	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180
Trichloroethene	µg/kg	136000	2250	456	3820	44800	53100	68300	8170	47300	225000	802000	735000	32900	25400
1,2-Dichloropropane	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Dibromomethane	µg/kg		<9	<9	<9	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180
Bromodichloromethane	µg/kg		<7	<7	<7	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140
cis-1,3-Dichloropropene	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Toluene	µg/kg	1920000	<7	<7	8.93	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140
trans-1,3-Dichloropropene	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
1,1,2-Trichloroethane	µg/kg	1340000	66.9	38.4	153	<200	<200	<200	<200	<200	902	650	331	<200	<200
1,3-Dichloropropane	µg/kg		<7	<7	<7	<140	<140	<140	<140	<140	<140	<140	<140	<140	<140
Tetrachloroethene	µg/kg	951000	12200	3350	97500	541000	347000	2490000	440000	702000	1210000	4860000	3310000	102000	1950
Dibromochloromethane	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
1,2-Dibromoethane	µg/kg		<10	<10		<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Chlorobenzene	µg/kg		<5	<5	<5	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
1,1,1,2-Tetrachloroethane	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Ethylbenzene	µg/kg	1220000	<4	<4	9.76	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80
p/m-Xylene	µg/kg	1350000	<10	<10	26.7	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
o-Xylene	µg/kg	1120000	<10	<10	15.3	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Styrene	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Bromoform	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Isopropylbenzene	µg/kg		<5	<5	<5	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
1,1,2,2-Tetrachloroethane	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
1,2,3-Trichloropropane	µg/kg		<16	<16	<16	<320	<320	<320	<320	<320	<320	<320	<320	<320	<320
Bromobenzene	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Propylbenzene	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
2-Chlorotoluene	µg/kg		<9	<9	<9	<180	<180	<180	<180	<180	<180	<180	<180	<180	<180
1,3,5-Trimethylbenzene	µg/kg		<8	<8	10.6	<160	<160	<160	<160	<160	<160	<160	<160	<160	<160
4-Chlorotoluene	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
tert-Butylbenzene	µg/kg		<14	<14	<14	<280	<280	<280	<280	<280	<280	<280	<280	<280	<280
1,2,4-Trimethylbenzene	µg/kg		<9	<9	61.6	<180	<180	<180	<180	<180	<180	1120	<180	<180	<180
sec-Butylbenzene	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
4-Isopropyltoluene	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
1,3-Dichlorobenzene	µg/kg		<8	<8	<8	<160	<160	<160	<160	<160	<160	<160	<160	<160	<160
1,4-Dichlorobenzene	µg/kg		<5	<5	<5	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
n-Butylbenzene	µg/kg		<11	<11	<11	<220	<220	<220	<220	<220	<220	<220	<220	<220	<220
1,2-Dichlorobenzene	µg/kg		<10	<10	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
1,2-Dibromo-3-chloropropane	µg/kg		<14	<14	<14	<280	<280	<280	<280	<280	<280	<280	<280	<280	<280
Tert-amyl methyl ether	µg/kg		<10	<100	<10	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
1,2,4-Trichlorobenzene	µg/kg		<20	<20	<20	<400	<400	<400	<400	<400	<400	<400	<400	<400	<400
Hexachlorobutadiene	µg/kg		<20	<20	<20	<400	<400	<400	<400	<400	<400	<400	<400	<400	<400
Naphthalene	µg/kg		<13	<13	75.8	<260	<260	<260	<260	<260	<260	<260	<260	<260	<260
1,2,3-Trichlorobenzene	µg/kg		<20	<20	<20	<400	<400	<400	<400	<400	<400	<400	<400	<400	<400

Notes:

Verification Sample <RTV

Verification Sample >RTV (removed)

Verification Sample Dichloromethane (remains in situ)



Table C1 Remedial Excavation Verification Samples	Sample ID		14(11)-Base-South	15(11)-Base-Center	16(11)-Side-North	17(11)-Side-East	18(11)-Side-East(S)	19(11)-Side-South	20(11)-Side-East(N)	21(11)-Base-North	22(6)-Side-West	23(6)-Side-South	24(6)-Side-North	25(4)-Side-South	26(4)-Side-West
	Depth		2.90-2.90	4.00-4.00	0.00-4.00	0.00-4.00	0.00-3.00	0.00-3.00	0.00-4.00	0.00-0.00	0.00-4.00	0.00-4.00	0.00-4.00	0.00-4.00	0.00-4.00
		Table 7.1 Criteria	Hotspot A												
Vinyl Chloride	µg/kg	3580	<6	<6	<6	<6	39.5	<60	<60	<6	<120	<60	<60	<120	<120
Bromomethane	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Chloroethane	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Trichlorofluoromethane	µg/kg		<6	<6	<6	<6	<6	<60	<60	<6	<120	<60	<60	<120	<120
1,1-Dichloroethene	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Carbon Disulphide	µg/kg		28.9	<7	140	54.7	10.9	<70	<70	<7	<140	<70	<70	<140	<140
Dichloromethane	µg/kg	173	38.8	136	235	50	89.6	<100	<100	58.5	<200	<100	<100	<200	<200
Methyl Tertiary Butyl Ether	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
trans-1,2-Dichloroethene	µg/kg	27355000	<10	17.4	144	<10	66.5	164	<100	<10	<200	<100	<100	<200	<200
1,1-Dichloroethane	µg/kg		42.2	224	1180	135	24.4	124	<80	32	<160	<80	181	<160	2530
cis-1,2-Dichloroethene	µg/kg	22203000	472	1830	5790	1710	2840	3360	286	97.3	675	<60	483	210	5270
2,2-Dichloropropane	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Bromochloromethane	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Chloroform	µg/kg		<8	<8	<8	<8	<8	<80	<80	<8	<160	<80	<80	<160	<160
1,1,1-Trichloroethane	µg/kg	974000	<7	926	<7	17.9	<7	<70	320	279	270	144	713	<140	<140
1,1-Dichloropropene	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Carbontetrachloride	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
1,2-Dichloroethane	µg/kg	201	<5	6.67	<5	<5	<5	<50	<50	<5	<100	<50	<50	<100	<100
Benzene	µg/kg	21200	<9	<9	<9	<9	<9	<90	<90	<9	<180	<90	<90	<180	<180
Trichloroethene	µg/kg	136000	579	1990	41900	2290	37.1	<90	2470	1050	1060	727	6880	23400	9370
1,2-Dichloropropane	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Dibromomethane	µg/kg		<9	<9	<9	<9	<9	<90	<90	<9	<180	<90	<90	<180	<180
Bromodichloromethane	µg/kg		<7	<7	<7	<7	<7	<70	<70	<7	<140	<70	<70	<140	<140
cis-1,3-Dichloropropene	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Toluene	µg/kg	1920000	<7	<7	145	<7	<7	<70	<70	<7	<140	<70	<70	<140	<140
trans-1,3-Dichloropropene	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
1,1,2-Trichloroethane	µg/kg	1340000	<10	23.7	19	28.2	<10	<100	<100	50.9	<200	<100	<100	<200	<200
1,3-Dichloropropane	µg/kg		<7	<7	<7	<7	<7	<70	<70	<7	<140	<70	<70	<140	<140
Tetrachloroethene	µg/kg	951000	18300	14800	607000	3920	464	109	218000	9670	6240	9660	28700	184000	86000
Dibromochloromethane	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
1,2-Dibromoethane	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Chlorobenzene	µg/kg		<5	<5	32	<5	47.3	<50	<50	<5	<100	<50	<50	<100	<100
1,1,1,2-Tetrachloroethane	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Ethylbenzene	µg/kg	1220000	<4	<4	13.7	<4	32.8	<40	<40	7.37	<80	<40	<40	<80	<80
p/m-Xylene	µg/kg	1350000	<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
o-Xylene	µg/kg	1120000	<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Styrene	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Bromoform	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Isopropylbenzene	µg/kg		<5	<5	<5	<5	37.4	<50	<50	6.71	<100	<50	<50	<100	<100
1,1,2,2-Tetrachloroethane	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
1,2,3-Trichloropropane	µg/kg		<16	<16	<16	<16	<16	<160	<160	<16	<320	<160	<160	<320	<320
Bromobenzene	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
Propylbenzene	µg/kg		<10	<10	<10	<10	20.5	<100	<100	16.6	<200	<100	<100	<200	<200
2-Chlorotoluene	µg/kg		<9	<9	<9	<9	<9	<90	<90	<9	<180	<90	<90	<180	<180
1,3,5-Trimethylbenzene	µg/kg		<8	<8	<8	<8	<8	<80	<80	<8	<160	<80	<80	<160	<160
4-Chlorotoluene	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
tert-Butylbenzene	µg/kg		<14	<14	<14	<14	<14	<140	<140	<14	<280	<140	<140	<280	<280
1,2,4-Trimethylbenzene	µg/kg		<9	<9	101	<9	18.8	<90	134	212	<180	<90	<90	<180	<180
sec-Butylbenzene	µg/kg		<10	<10	22.1	<10	108	<100	<100	33.7	<200	<100	<100	<200	<200
4-Isopropyltoluene	µg/kg		<10	<10	<10	<10	<10	<100	<100	44.9	<200	<100	<100	<200	<200
1,3-Dichlorobenzene	µg/kg		<8	<8	<8	<8	<8	<80	<80	<8	<160	<80	<80	<160	<160
1,4-Dichlorobenzene	µg/kg		<5	<5	<5	<5	<5	<50	<50	<5	<100	<50	<50	<100	<100
n-Butylbenzene	µg/kg		<11	<11	<11	<11	<11	<110	<110	34.8	<220	<110	<110	<220	<220
1,2-Dichlorobenzene	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
1,2-Dibromo-3-chloropropane	µg/kg		<14	<14	<14	<14	<14	<140	<140	<14	<280	<140	<140	<280	<280
Tert-amyl methyl ether	µg/kg		<10	<10	<10	<10	<10	<100	<100	<10	<200	<100	<100	<200	<200
1,2,4-Trichlorobenzene	µg/kg		<20	<20	<20	<20	<20	<200	<200	<20	<400	<200	<200	<400	<400
Hexachlorobutadiene	µg/kg		<20	<20	<20	<20	<20	<200	<200	<20	<400	<200	<200	<400	<400
Naphthalene	µg/kg		<13	<13	<13	<13	<13	<130	<130	24.1	<260	<130	<130	<260	<260
1,2,3-Trichlorobenzene	µg/kg		<20	<20	<20	<20	<20	<200	<200	<20	<400	<200	<200	<400	<400

Notes:

Verification Sample <RTV

Verification Sample >RTV (removed)

Verification Sample Dichloromethane (remains in situ)



Table C1 Remedial Excavation Verification Samples	Sample ID		27(4)-Side-North	1-206-Base	4-206-Side-East	3-206-Side-North	5-206-Side-South	2-206-Side-West
	Depth		0.00-4.00	4.00-4.00	0.00-4.00	0.00-4.00	0.00-4.00	0.00-4.00
		Table 7.1 Criteria	Hotspot A	Hotspot B				
Vinyl Chloride	µg/kg	3580	<120	<120	<60	<120	<120	<120
Bromomethane	µg/kg		<200	<200	<100	<200	<200	<200
Chloroethane	µg/kg		<200	<200	<100	<200	<200	<200
Trichlorofluorormethane	µg/kg		<120	<120	<60	<120	<120	<120
1,1-Dichloroethene	µg/kg		<200	<200	<100	<200	<200	<200
Carbon Disulphide	µg/kg		<140	<140	<70	<140	<140	<140
Dichloromethane	µg/kg	173	<200	<200	<100	<200	<200	<200
Methyl Tertiary Butyl Ether	µg/kg		<200	<200	<100	<200	<200	<200
trans-1,2-Dichloroethene	µg/kg	27355000	<200	1320	<100	<200	339	<200
1,1-Dichloroethane	µg/kg		256	<160	<80	<160	<160	<160
cis-1,2-Dichloroethene	µg/kg	22203000	2300	14500	<60	518	974	<120
2,2-Dichloropropane	µg/kg		<200	<200	<100	<200	<200	<200
Bromochloromethane	µg/kg		<200	<200	<100	<200	<200	<200
Chloroform	µg/kg		<160	<160	<80	<160	<160	<160
1,1,1-Trichloroethane	µg/kg	974000	763	<140	<70	<140	<140	<140
1,1-Dichloropropene	µg/kg		<200	<200	<100	<200	<200	<200
Carbontetrachloride	µg/kg		<200	<200	<100	<200	<200	<200
1,2-Dichloroethane	µg/kg	201	<100	<100	<50	<100	<100	<100
Benzene	µg/kg	21200	<180	<180	<90	<180	<180	<180
Trichloroethene	µg/kg	136000	14600	35500	208	<180	423	285
1,2-Dichloropropane	µg/kg		<200	<200	<100	<200	<200	<200
Dibromomethane	µg/kg		<180	<180	<90	<180	<180	<180
Bromodichloromethane	µg/kg		<140	<140	<70	<140	<140	<140
cis-1,3-Dichloropropene	µg/kg		<200	<200	<100	<200	<200	<200
Toluene	µg/kg	1920000	<140	<140	<70	<140	<140	<140
trans-1,3-Dichloropropene	µg/kg		<200	<200	<100	<200	<200	<200
1,1,2-Trichloroethane	µg/kg	1340000	<200	<200	<100	<200	<200	<200
1,3-Dichloropropane	µg/kg		<140	<140	<70	<140	<140	<140
Tetrachloroethene	µg/kg	951000	129000	<100	452	219	805	502
Dibromochloromethane	µg/kg		<200	<200	<100	<200	<200	<200
1,2-Dibromoethane	µg/kg		<200	<200	<100	<200	<200	<200
Chlorobenzene	µg/kg		<100	639	<50	<100	182	<100
1,1,1,2-Tetrachloroethane	µg/kg		<200	<200	<100	<200	<200	<200
Ethylbenzene	µg/kg	1220000	<80	974	<40	<80	<80	<80
p/m-Xylene	µg/kg	1350000	<200	3410	<100	<200	<200	<200
o-Xylene	µg/kg	1120000	<200	1880	<100	<200	<200	<200
Styrene	µg/kg		<200	<200	<100	<200	<200	<200
Bromoform	µg/kg		<200	<200	<100	<200	<200	<200
Isopropylbenzene	µg/kg		<100	<100	<50	<100	<100	<100
1,1,2,2-Tetrachloroethane	µg/kg		<200	<200	<100	<200	<200	<200
1,2,3-Trichloropropane	µg/kg		<320	<320	<160	<320	<320	<320
Bromobenzene	µg/kg		<200	<200	<100	<200	<200	<200
Propylbenzene	µg/kg		<200	<200	<100	<200	<200	<200
2-Chlorotoluene	µg/kg		<180	<180	<90	<180	<180	<180
1,3,5-Trimethylbenzene	µg/kg		<160	407	<80	<160	<160	<160
4-Chlorotoluene	µg/kg		<200	<200	<100	<200	<200	<200
tert-Butylbenzene	µg/kg		<280	<280	<140	<280	<280	<280
1,2,4-Trimethylbenzene	µg/kg		<180	<180	<90	<180	<180	<180
sec-Butylbenzene	µg/kg		<200	<200	<100	<200	<200	<200
4-Isopropyltoluene	µg/kg		<200	<200	<100	<200	<200	<200
1,3-Dichlorobenzene	µg/kg		<160	<160	<80	<160	<160	<160
1,4-Dichlorobenzene	µg/kg		<100	<100	<50	<100	<100	<100
n-Butylbenzene	µg/kg		<220	<220	<110	<220	<220	<220
1,2-Dichlorobenzene	µg/kg		<200	<200	<100	<200	<200	<200
1,2-Dibromo-3-chloropropane	µg/kg		<280	<280	<140	<280	<280	<280
Tert-amyl methyl ether	µg/kg		<200	<200	<100	<200	<200	<200
1,2,4-Trichlorobenzene	µg/kg		<400	<400	<200	<400	<400	<400
Hexachlorobutadiene	µg/kg		<400	<400	<200	<400	<400	<400
Naphthalene	µg/kg		<260	<260	<130	<260	<260	<260
1,2,3-Trichlorobenzene	µg/kg		<400	<400	<200	<400	<400	<400

Notes:

Verification Sample <RTV

Verification Sample >RTV (removed)

Verification Sample Dichloromethane (remains in situ)



Table C2 Stockpile Verification Samples		Sample ID	SP03-Asb-ID	SP04-A	SP05-A	SP05-B	SP04-A-VOC	SP05-A-VOC	SP05-B-VOC	SP06-A-VOC	SP07-A-VOC	SP06-Asb-1	SP06-Asb-2	SP06-Asb-3	SP06-Asb-4	SP06-B-VOC
Asbestos	Units	Table 7.1 Criteria	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site
Asbestos Quantification - Gravimetric - %	%	<0.001	-	-	-	0.0033	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	%		-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	No units		-	-	-	Amosite detected	-	-	-	-	-	-	-	-	-	-
Analysts Comments	No units		-	-	-	Loose fibres in soil	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	%		-	-	-	0.0043	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	No units		-	Not Detected	Not Detected	Detected	-	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	No units		-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	No units		-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	No units		-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	No units		-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	No units		-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	No units		-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-
Comments	No units		-	0	0	Fibre bundles in soil	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Gravimetric - %	%		-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	-	<0.001
Asbestos Quantification - PCOM Evaluation - %	%		-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	-	<0.001
Additional Asbestos Components (Using TM048)	No units		-	-	-	-	-	-	-	-	-	-	None	None	-	None
Comments	No units		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	No units		-	-	-	-	-	-	-	-	-	-	N/C	N/C	-	N/C
Asbestos, Chrysotile (white)	No units		-	Detected	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	%		-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	-	<0.001
Asbestos, Amosite (brown)	No units		-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos, Crocidolite (blue)	No units		-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Anthophyllite, Fibrous	No units		-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Tremolite, Fibrous	No units		-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Actinolite, Fibrous	No units		-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Non-asbestos fibre	No units		-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	No units		-	-	Not Detected	Not Detected	Detected	-	-	-	-	-	Detected	Not Detected	Not Detected	Detected
Amosite (Brown) Asbestos	No units		-	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	No units		-	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	No units		-	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	No units		-	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	No units		-	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	No units		-	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Comments	No units		-	0	0	Fibre bundles in soil	-	-	-	-	-	-	Loose fibres in soil	loose fibres in soil	0	Loose fibres in soil
Carbon																
Fraction Organic Carbon (FOC)	No units	-	-	0.0473	0.0561	0.106	-	-	-	-	-	-	-	-	-	-
Inorganics																
pH	pH Units	-	-	7.5	7.75	7.2	-	-	-	-	-	-	-	-	-	-
Sulphide, Easily liberated	mg/kg	-	-	<15	<15	<15	-	-	-	-	-	-	-	-	-	-
Sulphur, Elemental	mg/kg	-	-	108	35	31.4	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals - (Solids)																
Chromium, Hexavalent	mg/kg	-	-	<0.6	<0.6	<0.6	-	-	-	-	-	-	-	-	-	-
Boron, water soluble	mg/kg	-	-	1.5	<1	2.44	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	-	-	26.3	27.7	28.2	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/kg	-	-	1.25	1.15	1.89	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/kg	-	-	0.739	1.05	0.834	-	-	-	-	-	-	-	-	-	-
Chromium	mg/kg	-	-	13.5	13.8	35.1	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg	-	-	62.8	63.8	87.9	-	-	-	-	-	-	-	-	-	-
Lead	mg/kg	-	-	231	234	211	-	-	-	-	-	-	-	-	-	-
Mercury	mg/kg	-	-	<0.14	<0.14	<0.14	-	-	-	-	-	-	-	-	-	-
Nickel	mg/kg	-	-	28.3	31.6	40.5	-	-	-	-	-	-	-	-	-	-
Selenium	mg/kg	-	-	<1	<1	<1	-	-	-	-	-	-	-	-	-	-
Zinc	mg/kg	-	-	199	281	308	-	-	-	-	-	-	-	-	-	-
Phenols																
Phenol	mg/kg	-	-	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-
Cresols	mg/kg	-	-	0.0125	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-
Xylenols	mg/kg	-	-	<0.015	<0.015	<0.015	-	-	-	-	-	-	-	-	-	-
2,3,5-Trimethylphenol	mg/kg	-	-	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-
2-Isopropylphenol	mg/kg	-	-	<0.015	<0.015	<0.015	-	-	-	-	-	-	-	-	-	-
Phenols, Total Detected 5 specified	mg/kg	-	-	<0.06	<0.06	<0.06	-	-	-	-	-	-	-	-	-	-
Gasoline Range Organics (GRO)																
GRO >C5-C10	µg/kg	-	-	608	3310	16800	-	-	-	-	-	-	-	-	-	-
EPH (Extractable Petroleum Hydrocarbons)																
EPH Range >C10 - C40	mg/kg	-	-	99.7	207	105	-	-	-	-	-	-	-	-	-	-
TPH Criteria Working Group (TPH CWG)																
EPH (C5-C40)	mg/kg	-	-	100	210	121	-	-	-	-	-	-	-	-	-	-
Polyaromatic Hydrocarbons (PAHs)																
Naphthalene-d8 % recovery**	%	-	-	172	165	174	-	-	-	-	-	-	-	-	-	-
Acenaphthene-d10 % recovery**	%	-	-	174	166	174	-	-	-	-	-	-	-	-	-	-
Phenanthrene-d10 % recovery**	%	-	-	174	166	174	-	-	-	-	-	-	-	-	-	-
Chrysene-d12 % recovery**	%	-	-	167	160	167	-	-	-	-	-	-	-	-	-	-
Perylene-d12 % recovery**	%	-	-	162	158	166	-	-	-	-	-	-	-	-	-	-
Naphthalene	µg/kg	-	-	22.5	<45	14	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	µg/kg	-	-	102	131	92.3	-	-	-	-	-	-	-	-	-	-
Acenaphthene	µg/kg	-	-	39.6	142	<8	-	-	-	-	-	-	-	-	-	-
Fluorene	µg/kg	-	-	53	132	16.7	-	-	-	-	-	-	-	-	-	-
Phenanthrene	µg/kg	-	-	533	994	177	-	-	-	-	-	-	-	-	-	-
Anthracene	µg/kg	-	-	146	375	61.3	-	-	-	-	-	-	-	-	-	-
Fluoranthene	µg/kg	-	-	1290	1970	591	-	-	-	-	-	-	-	-	-	-
Pyrene	µg/kg	-	-	1170	1780	578	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	µg/kg	-	-	674	915	316	-	-	-	-	-	-	-	-	-	-
Chrysene	µg/kg	-	-	670	927	431	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	µg/kg	-	-	1050	1570	718	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	µg/kg	-	-	494	692	226	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	µg/kg	-	-	799	1190	433	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	µg/kg	-	-	731	1060	498	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)anthracene	µg/kg	-	-	134	204	102	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	µg/kg	-	-	663	958	441	-	-	-	-	-	-	-	-	-	-
PAH, Total Detected USEPA 16	µg/kg	-	-	8560	13000	4700	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	%	-	-	103	103	102	-	-	-	-	-	-				

Table C3 Imported Material Verification Samples		Sample ID	IMP02-Source-A	IMP02-Source-B	IMP02-Source-A	IMP02-Source-B	IMP02-A	IMP02-B	IMP02-C	IMP02-D	IMP02-A	IMP02-B	IMP02-C	IMP02-D
Asbestos	Units	Table 7.1 Criteria												
Chrysotile (White) Asbestos	No units		-	-	Not Detected	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Amosite (Brown) Asbestos	No units		-	-	Not Detected	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	No units		-	-	Not Detected	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	No units		-	-	Not Detected	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	No units		-	-	Not Detected	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	No units		-	-	Not Detected	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	No units		-	-	Not Detected	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected
Comments	No units		-	-	0	0	-	-	-	-	0	0	0	0
Carbon														
Fraction Organic Carbon (FOC)	No units		-	-	0.0129	0.0124	-	-	-	-	0.015	0.0144	0.0125	0.0124
Inorganics														
pH	pH Units		-	-	7.57	7.33	-	-	-	-	7.76	7.68	7.53	7.44
Sulphide, Easily liberated	mg/kg		-	-	<15	<15	-	-	-	-	<15	<15	<15	<15
Sulphur, Elemental	mg/kg		-	-	44.5	26.1	-	-	-	-	21.8	52.5	37.3	37
Cyanide, Total	mg/kg		-	-	<1	<1	-	-	-	-	<1	<1	<1	<1
Metals - (Solids)														
Chromium, Hexavalent	mg/kg		-	-	<0.6	<0.6	-	-	-	-	<0.6	<0.6	<0.6	<0.6
Boron, water soluble	mg/kg		-	-	4.66	3.8	-	-	-	-	7.15	7.45	4.12	6.35
Arsenic	mg/kg		-	-	15.7	16.2	-	-	-	-	10.1	10.8	14.4	14.5
Beryllium	mg/kg		-	-	0.955	0.87	-	-	-	-	0.999	0.989	0.996	0.9
Cadmium	mg/kg		-	-	0.105	0.0229	-	-	-	-	0.0866	0.0853	0.086	<0.02
Chromium	mg/kg		-	-	36.9	33.3	-	-	-	-	36.9	36.2	36.1	34.4
Copper	mg/kg		-	-	21.4	20.1	-	-	-	-	22	21.1	19.1	20.8
Lead	mg/kg		-	-	16.3	14.4	-	-	-	-	15.2	17.5	12.5	15.4
Mercury	mg/kg		-	-	<0.14	<0.14	-	-	-	-	<0.14	<0.14	<0.14	<0.14
Nickel	mg/kg		-	-	34.8	32.7	-	-	-	-	35.4	33.8	29.1	34.7
Selenium	mg/kg		-	-	<1	<1	-	-	-	-	<1	<1	<1	<1
Zinc	mg/kg		-	-	68.1	70.1	-	-	-	-	69.2	68.2	61.6	67.8
Phenols														
Phenol	mg/kg		-	-	<0.01	<0.01	-	-	-	-	<0.01	<0.01	<0.01	<0.01
Cresols	mg/kg		-	-	<0.01	<0.01	-	-	-	-	<0.01	<0.01	<0.01	<0.01
Xylenols	mg/kg		-	-	<0.015	<0.015	-	-	-	-	<0.015	<0.015	<0.015	<0.015
2,3,5-Trimethylphenol	mg/kg		-	-	<0.01	<0.01	-	-	-	-	<0.01	<0.01	<0.01	<0.01
2-Isopropylphenol	mg/kg		-	-	<0.015	<0.015	-	-	-	-	<0.015	<0.015	<0.015	<0.015
Phenols, Total Detected 5 specified	mg/kg		-	-	<0.06	<0.06	-	-	-	-	<0.06	<0.06	<0.06	<0.06
Gasoline Range Organics (GRO)														
GRO >C5-C10	µg/kg		-	-	<20	57.5	-	-	-	-	165	582	<20	93.2
EPH (Extractable Petroleum Hydrocarbons)														
EPH Range >C10 - C40	mg/kg		-	-	<35	<35	-	-	-	-	64.2	39.8	<35	<35
TPH Criteria Working Group (TPH CWG)														
EPH (C5-C40)	mg/kg		-	-	<35	<35	-	-	-	-	64.4	40.4	<35	<35
Polyaromatic Hydrocarbons (PAHs)														
Naphthalene-d8 % recovery**	%		-	-	88.7	89.5	-	-	-	-	91.4	90.3	91.9	90.1
Acenaphthene-d10 % recovery**	%		-	-	89.6	87.3	-	-	-	-	89.5	87.8	90.4	90.7
Phenanthrene-d10 % recovery**	%		-	-	94.9	95.2	-	-	-	-	95.5	95.8	97.8	96
Chrysene-d12 % recovery**	%		-	-	83.1	80.5	-	-	-	-	84.6	80.8	86.6	83.9
Perylene-d12 % recovery**	%		-	-	82.4	78.9	-	-	-	-	83.7	80.3	86	82.8
Naphthalene	µg/kg		-	-	<9	<9	-	-	-	-	<9	<9	<9	<9
Acenaphthylene	µg/kg		-	-	<12	<12	-	-	-	-	<12	<12	<12	<12
Acenaphthene	µg/kg		-	-	<8	<8	-	-	-	-	14.1	12.1	<8	<8
Fluorene	µg/kg		-	-	<10	<10	-	-	-	-	<10	<10	<10	<10
Phenanthrene	µg/kg		-	-	19.8	<15	-	-	-	-	69.1	<15	<15	<15
Anthracene	µg/kg		-	-	<16	<16	-	-	-	-	<16	<16	<16	<16
Fluoranthene	µg/kg		-	-	29.4	<17	-	-	-	-	151	<17	<17	<17
Pyrene	µg/kg		-	-	34	<15	-	-	-	-	153	21.3	<15	<15
Benz(a)anthracene	µg/kg		-	-	<14	<14	-	-	-	-	52.1	<14	<14	<14
Chrysene	µg/kg		-	-	<10	<10	-	-	-	-	47.1	<10	<10	<10
Benzo(b)fluoranthene	µg/kg		-	-	<15	<15	-	-	-	-	42.8	<15	<15	<15
Benzo(k)fluoranthene	µg/kg		-	-	<14	<14	-	-	-	-	23.1	<14	<14	<14
Benzo(a)pyrene	µg/kg		-	-	<15	<15	-	-	-	-	52.4	<15	<15	<15
Indeno(1,2,3-cd)pyrene	µg/kg		-	-	<18	<18	-	-	-	-	23.9	<18	<18	<18
Dibenzo(a,h)anthracene	µg/kg		-	-	<23	<23	-	-	-	-	<23	<23	<23	<23
Benzo(g,h,i)perylene	µg/kg		-	-	<24	<24	-	-	-	-	50.2	<24	<24	<24
PAH, Total Detected USEPA 16	µg/kg		-	-	<118	<118	-	-	-	-	679	<118	<118	<118
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	%		103	103	-	-	104	102	103	114	-	-	-	-
Toluene-d8**	%		96	97.4	-	-	96.7	97.3	97.3	97.1	-	-	-	-
4-Bromofluorobenzene**	%		90.2	89.9	-	-	90.6	84.5	91.9	90.3	-	-	-	-
Dichlorodifluoromethane	µg/kg		<120	<120	-	-	<120	<120	<120	<120	-	-	-	-
Chloromethane	µg/kg		<140	<140	-	-	<140	<140	<140	<140	-	-	-	-
Vinyl Chloride	µg/kg	3580	<120	<120	-	-	<120	<120	<120	<120	-	-	-	-
Bromomethane	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Chloroethane	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Trichlorofluoromethane	µg/kg		<120	<120	-	-	<120	<120	<120	<120	-	-	-	-
1,1-Dichloroethene	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Carbon Disulphide	µg/kg		<140	<140	-	-	<140	<140	<140	<140	-	-	-	-
Dichloromethane	µg/kg	173	<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Methyl Tertiary Butyl Ether	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
trans-1,2-Dichloroethene	µg/kg	27355000	<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
1,1-Dichloroethane	µg/kg		<160	<160	-	-	<160	<160	<160	<160	-	-	-	-
cis-1,2-Dichloroethene	µg/kg	22203000	<120	<120	-	-	<120	<120	<120	<120	-	-	-	-
2,2-Dichloropropane	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Bromochloromethane	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Chloroform	µg/kg		<160	<160	-	-	<160	<160	<160	<160	-	-	-	-
1,1,1-Trichloroethane	µg/kg	974000	<140	<140	-	-	<140	<140	<140	<140	-	-	-	-
1,1-Dichloropropene	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Carbontetrachloride	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
1,2-Dichloroethane	µg/kg	201	<100	<100	-	-	<100	<100	<100	<100	-	-	-	-
Benzene	µg/kg	21200	<180	<180	-	-	<180	<180	<180	<180	-	-	-	-
Trichloroethene	µg/kg	136000	<180	<180	-	-	<180	<180	<180	<180	-	-	-	-
1,2-Dichloropropane	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Dibromomethane	µg/kg		<180	<180	-	-	<180	<180	<180	<180	-	-	-	-
Bromodichloromethane	µg/kg		<140	<140	-	-	<140	<140	<140	<140	-	-	-	-
cis-1,3-Dichloropropene	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Toluene	µg/kg	1920000	<140	<140	-	-	<140	<140	<140	<140	-	-	-	-
trans-1,3-Dichloropropene	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1340000	<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
1,3-Dichloropropane	µg/kg		<140	<140	-	-	<140	<140	<140	<140	-	-	-	-
Tetrachloroethene	µg/kg	951000	<100	<100	-	-	<100	<100	<100	<100	-	-	-	-
Dibromochloromethane	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
1,2-Dibromoethane	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Chlorobenzene	µg/kg		<100	<100	-	-	<100	<100	<100	<100	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Ethylbenzene	µg/kg	1220000	<80	<80	-	-	<80	<80	<80	<80	-	-	-	-
p/m-Xylene	µg/kg	1350000	<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
o-Xylene	µg/kg	1120000	<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Styrene	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Bromoform	µg/kg		<200	<200	-	-	<200	<200	<200	<200	-	-	-	-
Isopropylbenzene	µg/kg		<100	<100	-	-	<100	<100	<100	<100	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg		<200	<200	-	-	<20							



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date: 11 December 2018
Customer: H_FLIQDS_GUI
Sample Delivery Group (SDG): 181205-28
Your Reference: Crowland
Location: Crowland
Report No: 484824

This report has been revised and directly supersedes 484714 in its entirety.

We received 13 samples on Wednesday December 05, 2018 and 13 of these samples were scheduled for analysis which was completed on Tuesday December 11, 2018. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-28
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 484824
Superseded Report: 484714

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18883321	2-Base-Center		3.60 - 3.60	03/12/2018
18883302	1-Base-North		3.40 - 3.40	03/12/2018
18883324	3-Base-South		0.20 - 4.00	03/12/2018
18883307	10-Side-East		0.20 - 3.60	03/12/2018
18883350	9-Side-East(N)		0.20 - 4.00	03/12/2018
18883310	11-Side-East(S)		0.20 - 3.40	03/12/2018
18883343	8-Side-North(E)		0.20 - 4.00	03/12/2018
18883340	7-Side-North(W)		0.20 - 4.00	03/12/2018
18883313	12-Side-South(E)		0.20 - 3.40	03/12/2018
18883318	13-Side-South(W)		0.20 - 3.40	03/12/2018
18883332	5-Side-West		0.20 - 3.60	03/12/2018
18883336	6-Side-West(N)		0.20 - 4.00	03/12/2018
18883329	4-Side-West(S)		0.20 - 3.40	03/12/2018

Maximum Sample/Coolbox Temperature (°C) :

8.4

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-28
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 484824
Superseded Report: 484714

Results Legend

- X** Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Sample description

VOC MS (S)

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

NDPs: 0
Tests: 13

NDPs: 0
Tests: 13

1883329	4-Side-West(S)		0.20 - 3.40	60g VOC (ALE215)	S
1883336	6-Side-West(N)		0.20 - 4.00	60g VOC (ALE215)	S
1883332	5-Side-West		0.20 - 3.60	60g VOC (ALE215)	S
1883318	13-Side-South(W)		0.20 - 3.40	60g VOC (ALE215)	S
1883313	12-Side-South(E)		0.20 - 3.40	60g VOC (ALE215)	S
1883340	7-Side-North(W)		0.20 - 4.00	60g VOC (ALE215)	S
1883343	8-Side-North(E)		0.20 - 4.00	60g VOC (ALE215)	S
1883310	11-Side-East(S)		0.20 - 3.40	60g VOC (ALE215)	S
1883350	9-Side-East(N)		0.20 - 4.00	60g VOC (ALE215)	S
1883307	10-Side-East		0.20 - 3.60	60g VOC (ALE215)	S
1883324	3-Base-South		0.20 - 4.00	60g VOC (ALE215)	S
1883302	1-Base-North		3.40 - 3.40	60g VOC (ALE215)	S
1883321	2-Base-Center		3.60 - 3.60	60g VOC (ALE215)	S



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-28
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 484824
Superseded Report: 484714

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	Inclusions	Inclusions 2
18883321	2-Base-Center	3.60 - 3.60	Light Brown	Clay	Vegetation	None
18883302	1-Base-North	3.40 - 3.40	Light Brown	Silty Clay Loam	Vegetation	Stones
18883324	3-Base-South	0.20 - 4.00	Grey	Silty Clay Loam	None	None
18883307	10-Side-East	0.20 - 3.60	Dark Brown	Silty Clay Loam	Vegetation	None
18883350	9-Side-East(N)	0.20 - 4.00	Dark Brown	Silty Clay Loam	Oil/Petroleum	Vegetation
18883310	11-Side-East(S)	0.20 - 3.40	Dark Brown	Silty Clay Loam	Vegetation	Stones
18883343	8-Side-North(E)	0.20 - 4.00	Dark Brown	Silty Clay Loam	Vegetation	Stones
18883340	7-Side-North(W)	0.20 - 4.00	Dark Brown	Silty Clay Loam	None	None
18883313	12-Side-South(E)	0.20 - 3.40	Dark Brown	Silty Clay Loam	Vegetation	None
18883318	13-Side-South(W)	0.20 - 3.40	Dark Brown	Silty Clay Loam	Vegetation	None
18883332	5-Side-West	0.20 - 3.60	Dark Brown	Silty Clay Loam	Vegetation	Stones
18883336	6-Side-West(N)	0.20 - 4.00	Dark Brown	Silty Clay Loam	Vegetation	Stones
18883329	4-Side-West(S)	0.20 - 3.40	Dark Brown	Silty Clay Loam	Vegetation	None

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

Validated

SDG: 181205-28
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 484824
Superseded Report: 484714

VOC MS (S)

Results Legend		Customer Sample Ref.	2-Base-Center	1-Base-North	3-Base-South	10-Side-East	9-Side-East(N)	11-Side-East(S)
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	3.60 - 3.60	3.40 - 3.40	0.20 - 4.00	0.20 - 3.60	0.20 - 4.00	0.20 - 3.40
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq	Aqueous / settled sample.		03/12/2018	03/12/2018	03/12/2018	03/12/2018	03/12/2018	03/12/2018
diss.filt	Dissolved / filtered sample.		05/12/2018	05/12/2018	05/12/2018	05/12/2018	05/12/2018	05/12/2018
tot.unfilt	Total / unfiltered sample.		181205-28	181205-28	181205-28	181205-28	181205-28	181205-28
*	Subcontracted test.		18883321	18883302	18883324	18883307	18883350	18883310
**	% 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							
1-5&5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM116	119	123	121	102	111	110
Toluene-d8**	%	TM116	100	100	97	96.9	99.8	99.3
4-Bromofluorobenzene**	%	TM116	94.5	95.4	81.4	97.8	96	95.5
Dichlorodifluoromethane	<6 µg/kg	TM116	<6	<6	<6	<120	<120	<120
Chloromethane	<7 µg/kg	TM116	<7	<7	<7	<140	<140	<140
Vinyl Chloride	<6 µg/kg	TM116	<6	36.7	<6	<120	<120	<120
Bromomethane	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
Chloroethane	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<6	<6	<120	<120	<120
1,1-Dichloroethene	<10 µg/kg	TM116	<10	265	<10	<200	<200	<200
Carbon Disulphide	<7 µg/kg	TM116	34.9	9.48	<7	217	<140	<140
Dichloromethane	<10 µg/kg	TM116	29.8	531	249	<200	<200	<200
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<10	233	23.5	453	836	1760
1,1-Dichloroethane	<8 µg/kg	TM116	55.1	676	250	20800	16500	15100
cis-1,2-Dichloroethene	<6 µg/kg	TM116	44.1	2950	244	7840	34000	131000
2,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
Bromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
Chloroform	<8 µg/kg	TM116	<8	17.2	<8	<160	<160	<160
1,1,1-Trichloroethane	<7 µg/kg	TM116	14	115	276	318000	68400	7420
1,1-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
Carbontetrachloride	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
1,2-Dichloroethane	<5 µg/kg	TM116	<5	153	73.7	<100	<100	<100
Benzene	<9 µg/kg	TM116	<9	<9	<9	<180	<180	<180
Trichloroethene	<9 µg/kg	TM116	456	2250	3820	802000	225000	735000
1,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
Dibromomethane	<9 µg/kg	TM116	<9	<9	<9	<180	<180	<180
Bromodichloromethane	<7 µg/kg	TM116	<7	<7	<7	<140	<140	<140
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
Toluene	<7 µg/kg	TM116	<7	<7	8.93	<140	<140	<140
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
1,1,2-Trichloroethane	<10 µg/kg	TM116	38.4	66.9	153	650	902	331
1,3-Dichloropropane	<7 µg/kg	TM116	<7	<7	<7	<140	<140	<140



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-28
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 484824
Superseded Report: 484714

VOC MS (S)

Results Legend		Customer Sample Ref.	2-Base-Center	1-Base-North	3-Base-South	10-Side-East	9-Side-East(N)	11-Side-East(S)
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	3.60 - 3.60	3.40 - 3.40	0.20 - 4.00	0.20 - 3.60	0.20 - 4.00	0.20 - 3.40
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq	Aqueous / settled sample.		03/12/2018	03/12/2018	03/12/2018	03/12/2018	03/12/2018	03/12/2018
diss.filt	Dissolved / filtered sample.		05/12/2018	05/12/2018	05/12/2018	05/12/2018	05/12/2018	05/12/2018
tot.unfilt	Total / unfiltered sample.		181205-28	181205-28	181205-28	181205-28	181205-28	181205-28
*	Subcontracted test.		18883321	18883302	18883324	18883307	18883350	18883310
**	% 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							
1-5&5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Tetrachloroethene	<5 µg/kg	TM116	3350	12200	97500	4860000	1210000	3310000
			M	M	M	3 M	3 M	3 M
Dibromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			M	M	M	M	M	M
1,2-Dibromoethane	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			M	M	M	M	M	M
Chlorobenzene	<5 µg/kg	TM116	<5	<5	<5	<100	<100	<100
			M	M	M	M	M	M
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			M	M	M	M	M	M
Ethylbenzene	<4 µg/kg	TM116	<4	<4	9.76	<80	<80	<80
			M	M	M	M	M	M
p/m-Xylene	<10 µg/kg	TM116	<10	<10	26.7	<200	<200	<200
			#	#	#	#	#	#
o-Xylene	<10 µg/kg	TM116	<10	<10	15.3	<200	<200	<200
			M	M	M	M	M	M
Styrene	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			#	#	#	#	#	#
Bromoform	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			M	M	M	M	M	M
Isopropylbenzene	<5 µg/kg	TM116	<5	<5	<5	<100	<100	<100
			#	#	#	#	#	#
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			#	#	#	#	#	#
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16	<16	<16	<320	<320	<320
			M	M	M	M	M	M
Bromobenzene	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			M	M	M	M	M	M
Propylbenzene	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			M	M	M	M	M	M
2-Chlorotoluene	<9 µg/kg	TM116	<9	<9	<9	<180	<180	<180
			M	M	M	M	M	M
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8	<8	10.6	<160	<160	<160
			M	M	M	M	M	M
4-Chlorotoluene	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			M	M	M	M	M	M
tert-Butylbenzene	<14 µg/kg	TM116	<14	<14	<14	<280	<280	<280
			M	M	M	M	M	M
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9	<9	61.6	1120	<180	<180
			#	#	#	#	#	#
sec-Butylbenzene	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
4-Isopropyltoluene	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			M	M	M	M	M	M
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8	<8	<8	<160	<160	<160
			M	M	M	M	M	M
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5	<5	<5	<100	<100	<100
			M	M	M	M	M	M
n-Butylbenzene	<11 µg/kg	TM116	<11	<11	<11	<220	<220	<220
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10	<10	<10	<200	<200	<200
			M	M	M	M	M	M
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14	<14	<14	<280	<280	<280
			M	M	M	M	M	M
Tert-amyl methyl ether	<10 µg/kg	TM116	<100	<10	<10	<200	<200	<200
			#	#	#	#	#	#
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20	<20	<20	<400	<400	<400
Hexachlorobutadiene	<20 µg/kg	TM116	<20	<20	<20	<400	<400	<400
Naphthalene	<13 µg/kg	TM116	<13	<13	75.8	<260	<260	<260
			M	M	M	M	M	M
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<20	<20	<20	<400	<400	<400
			#	#	#	#	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-28
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 484824
Superseded Report: 484714

VOC MS (S)

Results Legend		Customer Sample Ref.	8-Side-North(E)	7-Side-North(W)	12-Side-South(E)	13-Side-South(W)	5-Side-West	6-Side-West(N)
#	ISO17025 accredited.							
M	mCERTS accredited.							
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							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM116	109	105	105	111	112	112
Toluene-d8**	%	TM116	99.9	92.3	96.8	99	101	99.4
4-Bromofluorobenzene**	%	TM116	101	84.1	91.7	97.8	99.5	94.8
Dichlorodifluoromethane	<6 µg/kg	TM116	<120	<120	<120	<120	<120	<120
Chloromethane	<7 µg/kg	TM116	<140	<140	<140	<140	<140	<140
Vinyl Chloride	<6 µg/kg	TM116	<120	<120	<120	<120	<120	<120
Bromomethane	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
Chloroethane	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
Trichlorofluoromethane	<6 µg/kg	TM116	<120	<120	<120	<120	<120	<120
1,1-Dichloroethene	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
Carbon Disulphide	<7 µg/kg	TM116	<140	<140	<140	<140	<140	210
Dichloromethane	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<200	<200	<200	1010	<200	<200
1,1-Dichloroethane	<8 µg/kg	TM116	5070	298	649	4110	7520	4310
cis-1,2-Dichloroethene	<6 µg/kg	TM116	16200	495	9930	32900	8620	4840
2,2-Dichloropropane	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
Bromochloromethane	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
Chloroform	<8 µg/kg	TM116	<160	<160	<160	<160	<160	<160
1,1,1-Trichloroethane	<7 µg/kg	TM116	295	889	<140	<140	9590	7760
1,1-Dichloropropene	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
Carbontetrachloride	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
1,2-Dichloroethane	<5 µg/kg	TM116	<100	<100	<100	<100	<100	<100
Benzene	<9 µg/kg	TM116	<180	<180	<180	<180	<180	<180
Trichloroethene	<9 µg/kg	TM116	47300	8170	32900	25400	53100	68300
1,2-Dichloropropane	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
Dibromomethane	<9 µg/kg	TM116	<180	<180	<180	<180	<180	<180
Bromodichloromethane	<7 µg/kg	TM116	<140	<140	<140	<140	<140	<140
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
Toluene	<7 µg/kg	TM116	<140	<140	<140	<140	<140	<140
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
1,1,2-Trichloroethane	<10 µg/kg	TM116	<200	<200	<200	<200	<200	<200
1,3-Dichloropropane	<7 µg/kg	TM116	<140	<140	<140	<140	<140	<140



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-28
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 484824
Superseded Report: 484714

VOC MS (S)

Results Legend		Customer Sample Ref.	8-Side-North(E)	7-Side-North(W)	12-Side-South(E)	13-Side-South(W)	5-Side-West	6-Side-West(N)
#	ISO17025 accredited.							
M	mCERTS accredited.							
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							
1-5&	Sample deviation (see appendix)							
		Depth (m)	0.20 - 4.00	0.20 - 4.00	0.20 - 3.40	0.20 - 3.40	0.20 - 3.60	0.20 - 4.00
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
		Date Sampled	03/12/2018	03/12/2018	03/12/2018	03/12/2018	03/12/2018	03/12/2018
		Sample Time	.	.	.	.	.	.
		Date Received	05/12/2018	05/12/2018	05/12/2018	05/12/2018	05/12/2018	05/12/2018
		SDG Ref	181205-28	181205-28	181205-28	181205-28	181205-28	181205-28
		Lab Sample No.(s)	18883343	18883340	18883313	18883318	18883332	18883336
		AGS Reference						
Component		LOD/Units	Method					
Tetrachloroethene		<5 µg/kg	TM116	702000	440000	102000	1950	347000
				M	M	M	M	3 M
Dibromochloromethane		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				M	M	M	M	M
1,2-Dibromoethane		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				M	M	M	M	M
Chlorobenzene		<5 µg/kg	TM116	<100	<100	<100	<100	<100
				M	M	M	M	M
1,1,1,2-Tetrachloroethane		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				M	M	M	M	M
Ethylbenzene		<4 µg/kg	TM116	<80	<80	<80	<80	<80
				M	M	M	M	M
p/m-Xylene		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				#	#	#	#	#
o-Xylene		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				M	M	M	M	M
Styrene		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				#	#	#	#	#
Bromoform		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				M	M	M	M	M
Isopropylbenzene		<5 µg/kg	TM116	<100	<100	<100	<100	<100
				#	#	#	#	#
1,1,2,2-Tetrachloroethane		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				#	#	#	#	#
1,2,3-Trichloropropane		<16 µg/kg	TM116	<320	<320	<320	<320	<320
				M	M	M	M	M
Bromobenzene		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				M	M	M	M	M
Propylbenzene		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				M	M	M	M	M
2-Chlorotoluene		<9 µg/kg	TM116	<180	<180	<180	<180	<180
				M	M	M	M	M
1,3,5-Trimethylbenzene		<8 µg/kg	TM116	<160	<160	<160	<160	<160
				M	M	M	M	M
4-Chlorotoluene		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				M	M	M	M	M
tert-Butylbenzene		<14 µg/kg	TM116	<280	<280	<280	<280	<280
				M	M	M	M	M
1,2,4-Trimethylbenzene		<9 µg/kg	TM116	<180	<180	<180	<180	<180
				#	#	#	#	#
sec-Butylbenzene		<10 µg/kg	TM116	<200	<200	<200	<200	<200
4-Isopropyltoluene		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				M	M	M	M	M
1,3-Dichlorobenzene		<8 µg/kg	TM116	<160	<160	<160	<160	<160
				M	M	M	M	M
1,4-Dichlorobenzene		<5 µg/kg	TM116	<100	<100	<100	<100	<100
				M	M	M	M	M
n-Butylbenzene		<11 µg/kg	TM116	<220	<220	<220	<220	<220
1,2-Dichlorobenzene		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				M	M	M	M	M
1,2-Dibromo-3-chloropropane		<14 µg/kg	TM116	<280	<280	<280	<280	<280
				M	M	M	M	M
Tert-amyl methyl ether		<10 µg/kg	TM116	<200	<200	<200	<200	<200
				#	#	#	#	#
1,2,4-Trichlorobenzene		<20 µg/kg	TM116	<400	<400	<400	<400	<400
Hexachlorobutadiene		<20 µg/kg	TM116	<400	<400	<400	<400	<400
Naphthalene		<13 µg/kg	TM116	<260	<260	<260	<260	<260
				M	M	M	M	M
1,2,3-Trichlorobenzene		<20 µg/kg	TM116	<400	<400	<400	<400	<400
				#	#	#	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-28
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 484824
Superseded Report: 484714

VOC MS (S)

Results Legend		Customer Sample Ref.	4-Side-West(S)				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.20 - 3.40 Soil/Solid (S) 03/12/2018 05/12/2018 181205-28 18883329				
M	mCERTS accredited.						
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						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM116	110				
Toluene-d8**	%	TM116	98.6				
4-Bromofluorobenzene**	%	TM116	94.5				
Dichlorodifluoromethane	<6 µg/kg	TM116	<120				
Chloromethane	<7 µg/kg	TM116	<140				
Vinyl Chloride	<6 µg/kg	TM116	<120				
Bromomethane	<10 µg/kg	TM116	<200				
Chloroethane	<10 µg/kg	TM116	<200				
Trichlorofluoromethane	<6 µg/kg	TM116	<120				
1,1-Dichloroethene	<10 µg/kg	TM116	<200				
Carbon Disulphide	<7 µg/kg	TM116	358				
Dichloromethane	<10 µg/kg	TM116	<200				
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<200				
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<200				
1,1-Dichloroethane	<8 µg/kg	TM116	4330				
cis-1,2-Dichloroethene	<6 µg/kg	TM116	15800				
2,2-Dichloropropane	<10 µg/kg	TM116	<200				
Bromochloromethane	<10 µg/kg	TM116	<200				
Chloroform	<8 µg/kg	TM116	<160				
1,1,1-Trichloroethane	<7 µg/kg	TM116	4230				
1,1-Dichloropropene	<10 µg/kg	TM116	<200				
Carbontetrachloride	<10 µg/kg	TM116	<200				
1,2-Dichloroethane	<5 µg/kg	TM116	<100				
Benzene	<9 µg/kg	TM116	<180				
Trichloroethene	<9 µg/kg	TM116	44800				
1,2-Dichloropropane	<10 µg/kg	TM116	<200				
Dibromomethane	<9 µg/kg	TM116	<180				
Bromodichloromethane	<7 µg/kg	TM116	<140				
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<200				
Toluene	<7 µg/kg	TM116	<140				
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<200				
1,1,2-Trichloroethane	<10 µg/kg	TM116	<200				
1,3-Dichloropropane	<7 µg/kg	TM116	<140				



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-28
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 484824
Superseded Report: 484714

VOC MS (S)

Results Legend		Customer Sample Ref.	4-Side-West(S)				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.20 - 3.40 Soil/Solid (S) 03/12/2018 - 05/12/2018 181205-28 18883329				
M	mCERTS accredited.						
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						
1-5&\$@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Tetrachloroethene	<5 µg/kg	TM116	541000				
			M				
Dibromochloromethane	<10 µg/kg	TM116	<200				
			M				
1,2-Dibromoethane	<10 µg/kg	TM116	<200				
			M				
Chlorobenzene	<5 µg/kg	TM116	<100				
			M				
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<200				
			M				
Ethylbenzene	<4 µg/kg	TM116	<80				
			M				
p/m-Xylene	<10 µg/kg	TM116	<200				
			#				
o-Xylene	<10 µg/kg	TM116	<200				
			M				
Styrene	<10 µg/kg	TM116	<200				
			#				
Bromoform	<10 µg/kg	TM116	<200				
			M				
Isopropylbenzene	<5 µg/kg	TM116	<100				
			#				
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<200				
			#				
1,2,3-Trichloropropane	<16 µg/kg	TM116	<320				
			M				
Bromobenzene	<10 µg/kg	TM116	<200				
			M				
Propylbenzene	<10 µg/kg	TM116	<200				
			M				
2-Chlorotoluene	<9 µg/kg	TM116	<180				
			M				
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<160				
			M				
4-Chlorotoluene	<10 µg/kg	TM116	<200				
			M				
tert-Butylbenzene	<14 µg/kg	TM116	<280				
			M				
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<180				
			#				
sec-Butylbenzene	<10 µg/kg	TM116	<200				
4-Isopropyltoluene	<10 µg/kg	TM116	<200				
			M				
1,3-Dichlorobenzene	<8 µg/kg	TM116	<160				
			M				
1,4-Dichlorobenzene	<5 µg/kg	TM116	<100				
			M				
n-Butylbenzene	<11 µg/kg	TM116	<220				
1,2-Dichlorobenzene	<10 µg/kg	TM116	<200				
			M				
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<280				
			M				
Tert-amyl methyl ether	<10 µg/kg	TM116	<200				
			#				
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<400				
Hexachlorobutadiene	<20 µg/kg	TM116	<400				
Naphthalene	<13 µg/kg	TM116	<260				
			M				
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<400				
			#				



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-28
Location: Crowland

Client Reference: Crowland
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Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



Validated

CERTIFICATE OF ANALYSIS

SDG: 181205-28
Location: CrowlandClient Reference: Crowland
Order Number: PO-0000307Report Number: 484824
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Test Completion Dates

Lab Sample No(s)	18883321	18883302	18883324	18883307	18883350	18883310	18883343	18883340	18883313	18883318
Customer Sample Ref.	2-Base-Center	1-Base-North	3-Base-South	10-Side-East	9-Side-East(N)	11-Side-East(S)	8-Side-North(E)	7-Side-North(W)	12-Side-South(E))	13-Side-South(W))
AGS Ref.										
Depth	3.60 - 3.60	3.40 - 3.40	0.20 - 4.00	0.20 - 3.60	0.20 - 4.00	0.20 - 3.40	0.20 - 4.00	0.20 - 4.00	0.20 - 3.40	0.20 - 3.40
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Sample description	07-Dec-2018	07-Dec-2018	07-Dec-2018	07-Dec-2018	07-Dec-2018	07-Dec-2018	07-Dec-2018	07-Dec-2018	07-Dec-2018	07-Dec-2018
VOC MS (S)	11-Dec-2018	10-Dec-2018	10-Dec-2018	11-Dec-2018	10-Dec-2018	10-Dec-2018	10-Dec-2018	11-Dec-2018	11-Dec-2018	10-Dec-2018

Lab Sample No(s)	18883332	18883336	18883329
Customer Sample Ref.	5-Side-West	6-Side-West(N)	4-Side-West(S)
AGS Ref.			
Depth	0.20 - 3.60	0.20 - 4.00	0.20 - 3.40
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Sample description	07-Dec-2018	07-Dec-2018	07-Dec-2018
VOC MS (S)	10-Dec-2018	10-Dec-2018	10-Dec-2018



CERTIFICATE OF ANALYSIS

SDG:	181205-28	Client Reference:	Crowland	Report Number:	484824
Location:	Crowland	Order Number:	PO-0000307	Superseded Report:	484714

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 (BTX). For total volatiles in the C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date: 19 December 2018
Customer: H_FLIQDS_GUI
Sample Delivery Group (SDG): 181208-22
Your Reference: Crowland
Location: Crowland
Report No: 485819

This report has been revised and directly supersedes 485713 in its entirety.

We received 5 samples on Saturday December 08, 2018 and 5 of these samples were scheduled for analysis which was completed on Wednesday December 19, 2018. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181208-22
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 485819
Superseded Report: 485713

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18912444	15(11)-Base-Center		4.00 - 4.00	07/12/2018
18912440	14(11)-Base-South		2.90 - 2.90	07/12/2018
18912448	17(11)-Side-East		0.00 - 4.00	07/12/2018
18912454	18(11)-Side-East(S)		0.00 - 3.00	07/12/2018
18912458	19(11)-Side-South		0.00 - 3.00	07/12/2018

Maximum Sample/Coolbox Temperature (°C) :

7.8

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181208-22
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 485819
Superseded Report: 485713

Results Legend



Test


No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

Customer
Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Sample description

All

NDPs: 0
Tests: 5

X X X X X

VOC MS (S)

All

NDPs: 0
Tests: 5

X X X X X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181208-22
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 485819
Superseded Report: 485713

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
------------------	----------	-------------	-----------------	---------------	-------------	---------------	------------	--------------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
18912444	15(11)-Base-Center	4.00 - 4.00	Dark Brown	Loamy Sand	Vegetation	Stones
18912440	14(11)-Base-South	2.90 - 2.90	Dark Brown	Loamy Sand	Vegetation	Stones
18912448	17(11)-Side-East	0.00 - 4.00	Dark Brown	Loamy Sand	Stones	Vegetation
18912454	18(11)-Side-East(S)	0.00 - 3.00	Dark Brown	Sandy Loam	Stones	Vegetation
18912458	19(11)-Side-South	0.00 - 3.00	Dark Brown	Loamy Sand	Stones	Vegetation

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

Validated

SDG: 181208-22
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 485819
Superseded Report: 485713

VOC MS (S)

Results Legend		Customer Sample Ref.	15(11)-Base-Cen ter	14(11)-Base-Sou th	17(11)-Side-Eas t	18(11)-Side-Eas t(S)	19(11)-Side-Sou th	
#	ISO17025 accredited.							
M	mCERTS accredited.							
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							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM116	103	107	102	101	123	
Toluene-d8**	%	TM116	98.7	99.1	97.9	94.2	97.6	
4-Bromofluorobenzene**	%	TM116	91.8	94.6	93.8	82.7	92	
Dichlorodifluoromethane	<6 µg/kg	TM116	<6	<6	<6	<6	<60	
Chloromethane	<7 µg/kg	TM116	<7	<7	<7	<7	<70	
Vinyl Chloride	<6 µg/kg	TM116	<6	<6	<6	39.5	<60	
Bromomethane	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
Chloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<6	<6	<6	<60	
1,1-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
Carbon Disulphide	<7 µg/kg	TM116	<7	28.9	54.7	10.9	<70	
Dichloromethane	<10 µg/kg	TM116	136	38.8	50	89.6	<100	
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
trans-1,2-Dichloroethene	<10 µg/kg	TM116	17.4	<10	<10	66.5	164	
1,1-Dichloroethane	<8 µg/kg	TM116	224	42.2	135	24.4	124	
cis-1,2-Dichloroethene	<6 µg/kg	TM116	1830	472	1710	2840	3360	
2,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
Bromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
Chloroform	<8 µg/kg	TM116	<8	<8	<8	<8	<80	
1,1,1-Trichloroethane	<7 µg/kg	TM116	926	<7	17.9	<7	<70	
1,1-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
Carbontetrachloride	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
1,2-Dichloroethane	<5 µg/kg	TM116	6.67	<5	<5	<5	<50	
Benzene	<9 µg/kg	TM116	<9	<9	<9	<9	<90	
Trichloroethene	<9 µg/kg	TM116	1990	579	2290	37.1	<90	
1,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
Dibromomethane	<9 µg/kg	TM116	<9	<9	<9	<9	<90	
Bromodichloromethane	<7 µg/kg	TM116	<7	<7	<7	<7	<70	
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
Toluene	<7 µg/kg	TM116	<7	<7	<7	<7	<70	
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
1,1,2-Trichloroethane	<10 µg/kg	TM116	23.7	<10	28.2	<10	<100	
1,3-Dichloropropane	<7 µg/kg	TM116	<7	<7	<7	<7	<70	



CERTIFICATE OF ANALYSIS

Validated

SDG: 181208-22
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 485819
Superseded Report: 485713

VOC MS (S)

Results Legend		Customer Sample Ref.	15(11)-Base-Cen ter	14(11)-Base-Sou th	17(11)-Side-Eas t	18(11)-Side-Eas t(S)	19(11)-Side-Sou th	
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	4.00 - 4.00	2.90 - 2.90	0.00 - 4.00	0.00 - 3.00	0.00 - 3.00	
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
aq	Aqueous / settled sample.		07/12/2018	07/12/2018	07/12/2018	07/12/2018	07/12/2018	
diss.filt	Dissolved / filtered sample.		.	.	.	.	.	
tot.unfilt	Total / unfiltered sample.		08/12/2018	08/12/2018	08/12/2018	08/12/2018	08/12/2018	
*	Subcontracted test.		181208-22	181208-22	181208-22	181208-22	181208-22	
**	% 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		18912444	18912440	18912448	18912454	18912458	
(F)	Trigger breach confirmed							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Tetrachloroethene	<5 µg/kg	TM116	14800	18300	3920	464	109	
			M	M	M	M	M	
Dibromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			M	M	M	M	M	
1,2-Dibromoethane	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			M	M	M	M	M	
Chlorobenzene	<5 µg/kg	TM116	<5	<5	<5	47.3	<50	
			M	M	M	M	M	
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			M	M	M	M	M	
Ethylbenzene	<4 µg/kg	TM116	<4	<4	<4	32.8	<40	
			M	M	M	M	M	
p/m-Xylene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			#	#	#	#	#	
o-Xylene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			M	M	M	M	M	
Styrene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			#	#	#	#	#	
Bromoform	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			M	M	M	M	M	
Isopropylbenzene	<5 µg/kg	TM116	<5	<5	<5	37.4	<50	
			#	#	#	#	#	
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			#	#	#	#	#	
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16	<16	<16	<16	<160	
			M	M	M	M	M	
Bromobenzene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			M	M	M	M	M	
Propylbenzene	<10 µg/kg	TM116	<10	<10	<10	20.5	<100	
			M	M	M	M	M	
2-Chlorotoluene	<9 µg/kg	TM116	<9	<9	<9	<9	<90	
			M	M	M	M	M	
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8	<8	<8	<8	<80	
			M	M	M	M	M	
4-Chlorotoluene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			M	M	M	M	M	
tert-Butylbenzene	<14 µg/kg	TM116	<14	<14	<14	<14	<140	
			M	M	M	M	M	
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9	<9	<9	18.8	<90	
			#	#	#	#	#	
sec-Butylbenzene	<10 µg/kg	TM116	<10	<10	<10	108	<100	
4-Isopropyltoluene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			M	M	M	M	M	
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8	<8	<8	<8	<80	
			M	M	M	M	M	
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5	<5	<5	<5	<50	
			M	M	M	M	M	
n-Butylbenzene	<11 µg/kg	TM116	<11	<11	<11	<11	<110	
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			M	M	M	M	M	
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14	<14	<14	<14	<140	
			M	M	M	M	M	
Tert-amyl methyl ether	<10 µg/kg	TM116	<10	<10	<10	<10	<100	
			#	#	#	#	#	
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20	<20	<20	<20	<200	
Hexachlorobutadiene	<20 µg/kg	TM116	<20	<20	<20	<20	<200	
Naphthalene	<13 µg/kg	TM116	<13	<13	<13	<13	<130	
			M	M	M	M	M	
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<20	<20	<20	<20	<200	
			#	#	#	#	#	



CERTIFICATE OF ANALYSIS

Validated

SDG: 181208-22
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 485819
Superseded Report: 485713

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181208-22
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 485819
Superseded Report: 485713

Test Completion Dates

Lab Sample No(s)	18912444	18912440	18912448	18912454	18912458
Customer Sample Ref.	15(11)-Base-Cen ter	14(11)-Base-Sou th	17(11)-Side-Eas t	18(11)-Side-Eas t(S)	19(11)-Side-Sou th
AGS Ref.					
Depth	4.00 - 4.00	2.90 - 2.90	0.00 - 4.00	0.00 - 3.00	0.00 - 3.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Sample description	10-Dec-2018	10-Dec-2018	10-Dec-2018	10-Dec-2018	10-Dec-2018
VOC MS (S)	19-Dec-2018	19-Dec-2018	19-Dec-2018	18-Dec-2018	19-Dec-2018



CERTIFICATE OF ANALYSIS

SDG:	181208-22	Client Reference:	Crowland	Report Number:	485819
Location:	Crowland	Order Number:	PO-0000313	Superseded Report:	485713

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 (BTX). For total volatiles in the C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



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FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date: 27 December 2018
Customer: H_FLIQDS_GUI
Sample Delivery Group (SDG): 181211-103
Your Reference: Crowland
Location: Crowland
Report No: 486375

This report has been revised and directly supersedes 486149 in its entirety.

We received 2 samples on Tuesday December 11, 2018 and 2 of these samples were scheduled for analysis which was completed on Thursday December 27, 2018. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-103
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486375
Superseded Report: 486149

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18935246	20(11)-Side-East(N)		0.00 - 4.00	10/12/2018
18935243	16(11)-Side-North		0.00 - 4.00	10/12/2018

Maximum Sample/Coolbox Temperature (°C) :

8.4

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-103
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486375
Superseded Report: 486149

Results Legend

X Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

18935246
18935243

Customer
Sample Reference

20(11)-Side-East(N)
16(11)-Side-North

AGS Reference

Depth (m)

0.00 - 4.00
0.00 - 4.00

Container

60g VOC (ALE215)
60g VOC (ALE215)

Sample Type

S
S

Sample description

All

NDPs: 0
Tests: 2

X X

VOC MS (S)

All

NDPs: 0
Tests: 2

X X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-103
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486375
Superseded Report: 486149

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	Inclusions	Inclusions 2
18935246	20(11)-Side-East(N)	0.00 - 4.00	Dark Brown	Silty Clay Loam	None	None
18935243	16(11)-Side-North	0.00 - 4.00	Dark Brown	Silty Clay Loam	None	None

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

Validated

SDG: 181211-103
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486375
Superseded Report: 486149

VOC MS (S)

Results Legend		Customer Sample Ref.	20(11)-Side-Eas t(N)	16(11)-Side-Nor th			
#	ISO17025 accredited.						
M	mCERTS accredited.	Depth (m)	0.00 - 4.00	0.00 - 4.00			
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.	Sample Type	Soil/Solid (S)	Soil/Solid (S)			
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.	Date Sampled	10/12/2018	10/12/2018			
**	% 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	Sample Time	.	.			
(F)	Trigger breach confirmed	Date Received	11/12/2018	11/12/2018			
1-5&*\$@	Sample deviation (see appendix)	SDG Ref	181211-103	181211-103			
		Lab Sample No.(s)	18935246	18935243			
		AGS Reference					
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM116	117	89.2			
Toluene-d8**	%	TM116	97.4	84.5			
4-Bromofluorobenzene**	%	TM116	87.3	71.1			
Dichlorodifluoromethane	<6 µg/kg	TM116	<60	<6			
Chloromethane	<7 µg/kg	TM116	<70	<7			
Vinyl Chloride	<6 µg/kg	TM116	<60	<6			
Bromomethane	<10 µg/kg	TM116	<100	<10			
Chloroethane	<10 µg/kg	TM116	<100	<10			
Trichlorofluoromethane	<6 µg/kg	TM116	<60	<6			
1,1-Dichloroethene	<10 µg/kg	TM116	<100	<10			
Carbon Disulphide	<7 µg/kg	TM116	<70	140			
Dichloromethane	<10 µg/kg	TM116	<100	235			
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<100	<10			
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<100	144			
1,1-Dichloroethane	<8 µg/kg	TM116	<80	1180			
cis-1,2-Dichloroethene	<6 µg/kg	TM116	286	5790			
2,2-Dichloropropane	<10 µg/kg	TM116	<100	<10			
Bromochloromethane	<10 µg/kg	TM116	<100	<10			
Chloroform	<8 µg/kg	TM116	<80	<8			
1,1,1-Trichloroethane	<7 µg/kg	TM116	320	<7			
1,1-Dichloropropene	<10 µg/kg	TM116	<100	<10			
Carbontetrachloride	<10 µg/kg	TM116	<100	<10			
1,2-Dichloroethane	<5 µg/kg	TM116	<50	<5			
Benzene	<9 µg/kg	TM116	<90	<9			
Trichloroethene	<9 µg/kg	TM116	2470	41900			
1,2-Dichloropropane	<10 µg/kg	TM116	<100	<10			
Dibromomethane	<9 µg/kg	TM116	<90	<9			
Bromodichloromethane	<7 µg/kg	TM116	<70	<7			
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<100	<10			
Toluene	<7 µg/kg	TM116	<70	145			
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<100	<10			
1,1,2-Trichloroethane	<10 µg/kg	TM116	<100	19			
1,3-Dichloropropane	<7 µg/kg	TM116	<70	<7			



CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-103
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486375
Superseded Report: 486149

VOC MS (S)

Results Legend		Customer Sample Ref.	20(11)-Side-Eas t(N)	16(11)-Side-Nor th				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 4.00	0.00 - 4.00				
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)				
aq	Aqueous / settled sample.		10/12/2018	10/12/2018				
diss.filt	Dissolved / filtered sample.		.	.				
tot.unfilt	Total / unfiltered sample.		11/12/2018	11/12/2018				
*	Subcontracted test.		181211-103	181211-103				
**	% 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		18935246	18935243				
(F)	Trigger breach confirmed							
1-5&\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Tetrachloroethene	<5 µg/kg	TM116	218000	607000				
			3 M	M				
Dibromochloromethane	<10 µg/kg	TM116	<100	<10				
			M	M				
1,2-Dibromoethane	<10 µg/kg	TM116	<100	<10				
			M	M				
Chlorobenzene	<5 µg/kg	TM116	<50	32				
			M	M				
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<100	<10				
			M	M				
Ethylbenzene	<4 µg/kg	TM116	<40	13.7				
			M	M				
p/m-Xylene	<10 µg/kg	TM116	<100	<10				
			#	#				
o-Xylene	<10 µg/kg	TM116	<100	<10				
			M	M				
Styrene	<10 µg/kg	TM116	<100	<10				
			#	#				
Bromoform	<10 µg/kg	TM116	<100	<10				
			M	M				
Isopropylbenzene	<5 µg/kg	TM116	<50	<5				
			#	#				
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<100	<10				
			#	#				
1,2,3-Trichloropropane	<16 µg/kg	TM116	<160	<16				
			M	M				
Bromobenzene	<10 µg/kg	TM116	<100	<10				
			M	M				
Propylbenzene	<10 µg/kg	TM116	<100	<10				
			M	M				
2-Chlorotoluene	<9 µg/kg	TM116	<90	<9				
			M	M				
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<80	<8				
			M	M				
4-Chlorotoluene	<10 µg/kg	TM116	<100	<10				
			M	M				
tert-Butylbenzene	<14 µg/kg	TM116	<140	<14				
			M	M				
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	134	101				
			#	#				
sec-Butylbenzene	<10 µg/kg	TM116	<100	22.1				
4-Isopropyltoluene	<10 µg/kg	TM116	<100	<10				
			M	M				
1,3-Dichlorobenzene	<8 µg/kg	TM116	<80	<8				
			M	M				
1,4-Dichlorobenzene	<5 µg/kg	TM116	<50	<5				
			M	M				
n-Butylbenzene	<11 µg/kg	TM116	<110	<11				
1,2-Dichlorobenzene	<10 µg/kg	TM116	<100	<10				
			M	M				
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<140	<14				
			M	M				
Tert-amyl methyl ether	<10 µg/kg	TM116	<100	<10				
			#	#				
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<200	<20				
Hexachlorobutadiene	<20 µg/kg	TM116	<200	<20				
Naphthalene	<13 µg/kg	TM116	<130	<13				
			M	M				
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<200	<20				
			#	#				



CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-103
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486375
Superseded Report: 486149

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-103
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486375
Superseded Report: 486149

Test Completion Dates

Lab Sample No(s)	18935246	18935243
Customer Sample Ref.	20(11)-Side-East(N)	16(11)-Side-North
AGS Ref.		
Depth	0.00 - 4.00	0.00 - 4.00
Type	Soil/Solid (S)	Soil/Solid (S)
Sample description	11-Dec-2018	11-Dec-2018
VOC MS (S)	27-Dec-2018	27-Dec-2018



CERTIFICATE OF ANALYSIS

SDG:	181211-103	Client Reference:	Crowland	Report Number:	486375
Location:	Crowland	Order Number:	PO-0000313	Superseded Report:	486149

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 (BTX). For total volatiles in the C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



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Website: www.alsenvironmental.co.uk

FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date: 27 December 2018
Customer: H_FLIQDS_GUI
Sample Delivery Group (SDG): 181211-104
Your Reference: Crowland
Location: Crowland
Report No: 486376

This report has been revised and directly supersedes 486132 in its entirety.

We received 1 sample on Tuesday December 11, 2018 and 1 of these samples were scheduled for analysis which was completed on Thursday December 27, 2018. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-104
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486376
Superseded Report: 486132

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18935256	21(11)-Base-North		0.00 - 0.00	10/12/2018

Maximum Sample/Coolbox Temperature (°C) :

8.4

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-104
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486376
Superseded Report: 486132

Results Legend

X Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

18935256

Customer
Sample Reference

21(11)-Base-North

AGS Reference

Depth (m)

0.00 - 0.00

Container

60g VOC (ALE215)

Sample Type

S

Sample description

All

NDPs: 0
Tests: 1

X

VOC MS (S)

All

NDPs: 0
Tests: 1

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-104
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486376
Superseded Report: 486132

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	Inclusions	Inclusions 2
18935256	21(11)-Base-North	0.00 - 0.00	Grey	Clay	None	None

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

Validated

SDG: 181211-104
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486376
Superseded Report: 486132

VOC MS (S)

Results Legend		Customer Sample Ref.	21(11)-Base-Nor th				
#	ISO17025 accredited.						
M	mCERTS accredited.						
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						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM116	164				
Toluene-d8**	%	TM116	103				
4-Bromofluorobenzene**	%	TM116	96.2				
Dichlorodifluoromethane	<6 µg/kg	TM116	<6				
Chloromethane	<7 µg/kg	TM116	<7				
Vinyl Chloride	<6 µg/kg	TM116	<6				
Bromomethane	<10 µg/kg	TM116	<10				
Chloroethane	<10 µg/kg	TM116	<10				
Trichlorofluoromethane	<6 µg/kg	TM116	<6				
1,1-Dichloroethene	<10 µg/kg	TM116	<10				
Carbon Disulphide	<7 µg/kg	TM116	<7				
Dichloromethane	<10 µg/kg	TM116	58.5				
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10				
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<10				
1,1-Dichloroethane	<8 µg/kg	TM116	32				
cis-1,2-Dichloroethene	<6 µg/kg	TM116	97.3				
2,2-Dichloropropane	<10 µg/kg	TM116	<10				
Bromochloromethane	<10 µg/kg	TM116	<10				
Chloroform	<8 µg/kg	TM116	<8				
1,1,1-Trichloroethane	<7 µg/kg	TM116	279				
1,1-Dichloropropene	<10 µg/kg	TM116	<10				
Carbontetrachloride	<10 µg/kg	TM116	<10				
1,2-Dichloroethane	<5 µg/kg	TM116	<5				
Benzene	<9 µg/kg	TM116	<9				
Trichloroethene	<9 µg/kg	TM116	1050				
1,2-Dichloropropane	<10 µg/kg	TM116	<10				
Dibromomethane	<9 µg/kg	TM116	<9				
Bromodichloromethane	<7 µg/kg	TM116	<7				
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10				
Toluene	<7 µg/kg	TM116	<7				
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10				
1,1,2-Trichloroethane	<10 µg/kg	TM116	50.9				
1,3-Dichloropropane	<7 µg/kg	TM116	<7				



CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-104
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486376
Superseded Report: 486132

VOC MS (S)

Results Legend		Customer Sample Ref.	21(11)-Base-Nor th				
#	ISO17025 accredited.						
M	mCERTS accredited.						
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						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Tetrachloroethene	<5 µg/kg	TM116	9670				
			M				
Dibromochloromethane	<10 µg/kg	TM116	<10				
			M				
1,2-Dibromoethane	<10 µg/kg	TM116	<10				
			M				
Chlorobenzene	<5 µg/kg	TM116	<5				
			M				
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10				
			M				
Ethylbenzene	<4 µg/kg	TM116	7.37				
			M				
p/m-Xylene	<10 µg/kg	TM116	<10				
			#				
o-Xylene	<10 µg/kg	TM116	<10				
			M				
Styrene	<10 µg/kg	TM116	<10				
			#				
Bromoform	<10 µg/kg	TM116	<10				
			M				
Isopropylbenzene	<5 µg/kg	TM116	6.71				
			#				
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10				
			#				
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16				
			M				
Bromobenzene	<10 µg/kg	TM116	<10				
			M				
Propylbenzene	<10 µg/kg	TM116	16.6				
			M				
2-Chlorotoluene	<9 µg/kg	TM116	<9				
			M				
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8				
			M				
4-Chlorotoluene	<10 µg/kg	TM116	<10				
			M				
tert-Butylbenzene	<14 µg/kg	TM116	<14				
			M				
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	212				
			#				
sec-Butylbenzene	<10 µg/kg	TM116	33.7				
4-Isopropyltoluene	<10 µg/kg	TM116	44.9				
			M				
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8				
			M				
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5				
			M				
n-Butylbenzene	<11 µg/kg	TM116	34.8				
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10				
			M				
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14				
			M				
Tert-amyl methyl ether	<10 µg/kg	TM116	<10				
			#				
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20				
Hexachlorobutadiene	<20 µg/kg	TM116	<20				
Naphthalene	<13 µg/kg	TM116	24.1				
			M				
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<20				
			#				



CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-104
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486376
Superseded Report: 486132

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181211-104
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000313

Report Number: 486376
Superseded Report: 486132

Test Completion Dates

Lab Sample No(s)	18935256
Customer Sample Ref.	21(11)-Base-Nor th
AGS Ref.	
Depth	0.00 - 0.00
Type	Soil/Solid (S)

Sample description	11-Dec-2018
VOC MS (S)	27-Dec-2018



CERTIFICATE OF ANALYSIS

SDG:	181211-104	Client Reference:	Crowland	Report Number:	486376
Location:	Crowland	Order Number:	PO-0000313	Superseded Report:	486132

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 (BTX). For total volatiles in the C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date: 04 January 2019
Customer: H_FLIQDS_GUI
Sample Delivery Group (SDG): 181214-121
Your Reference: Crowland
Location: Crowland
Report No: 487004

This report has been revised and directly supersedes 485720 in its entirety.

We received 3 samples on Friday December 14, 2018 and 3 of these samples were scheduled for analysis which was completed on Thursday January 03, 2019. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181214-121
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000317

Report Number: 487004
Superseded Report: 485720

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18965741	24(6)-Side-North		0.00 - 4.00	12/12/2018
18965735	23(6)-Side-South		0.00 - 4.00	12/12/2018
18965728	22(6)-Side-West		0.00 - 4.00	12/12/2018

Maximum Sample/Coolbox Temperature (°C) :

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

4.4

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181214-121
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000317

Report Number: 487004
Superseded Report: 485720

Results Legend



Test



No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

18965741

18965735

18965728

Customer
Sample Reference

24(6)-Side-North

23(6)-Side-South

22(6)-Side-West

AGS Reference

Depth (m)

0.00 - 4.00

0.00 - 4.00

0.00 - 4.00

Container

60g VOC (ALE215)

60g VOC (ALE215)

60g VOC (ALE215)

Sample Type

S

S

S

Sample description

All

NDPs: 0
Tests: 3

X

X

X

VOC MS (S)

All

NDPs: 0
Tests: 3

X

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181214-121
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000317

Report Number: 487004
Superseded Report: 485720

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
------------------	----------	-------------	-----------------	---------------	-------------	---------------	------------	--------------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
18965741	24(6)-Side-North	0.00 - 4.00	Dark Brown	Sandy Loam	Stones	Vegetation
18965735	23(6)-Side-South	0.00 - 4.00	Dark Brown	Sandy Loam	Vegetation	Stones
18965728	22(6)-Side-West	0.00 - 4.00	Dark Brown	Sandy Loam	Vegetation	Stones

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

Validated

SDG: 181214-121
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000317

Report Number: 487004
Superseded Report: 485720

VOC MS (S)

Results Legend		Customer Sample Ref.	24(6)-Side-North h	23(6)-Side-South h	22(6)-Side-West h			
#	ISO17025 accredited.							
M	mCERTS accredited.	Depth (m)	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00			
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.	Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.	Date Sampled	12/12/2018	12/12/2018	12/12/2018			
**	% 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	Date Received	14/12/2018	14/12/2018	14/12/2018			
1-5&*\$@	Sample deviation (see appendix)							
AGS Reference		Lab Sample No.(s)	181214-121 18965741	181214-121 18965735	181214-121 18965728			
Component	LOD/Units							
Dibromofluoromethane**	%	TM116	109	103	105			
			♦	♦	♦			
Toluene-d8**	%	TM116	97.3	96.3	99.2			
			♦	♦	♦			
4-Bromofluorobenzene**	%	TM116	95.5	89.8	98.3			
			♦	♦	♦			
Dichlorodifluoromethane	<6 µg/kg	TM116	<60	<60	<120			
			♦ M	♦ M	♦ M			
Chloromethane	<7 µg/kg	TM116	<70	<70	<140			
			♦ #	♦ #	♦ #			
Vinyl Chloride	<6 µg/kg	TM116	<60	<60	<120			
			♦ M	♦ M	♦ M			
Bromomethane	<10 µg/kg	TM116	<100	<100	<200			
			♦ M	♦ M	♦ M			
Chloroethane	<10 µg/kg	TM116	<100	<100	<200			
			♦ M	♦ M	♦ M			
Trichlorofluoromethane	<6 µg/kg	TM116	<60	<60	<120			
			♦ M	♦ M	♦ M			
1,1-Dichloroethene	<10 µg/kg	TM116	<100	<100	<200			
			♦ #	♦ #	♦ #			
Carbon Disulphide	<7 µg/kg	TM116	<70	<70	<140			
			♦ M	♦ M	♦ M			
Dichloromethane	<10 µg/kg	TM116	<100	<100	<200			
			♦ #	♦ #	♦ #			
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<100	<100	<200			
			♦ M	♦ M	♦ M			
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<100	<100	<200			
			♦ M	♦ M	♦ M			
1,1-Dichloroethane	<8 µg/kg	TM116	181	<80	<160			
			♦ M	♦ M	♦ M			
cis-1,2-Dichloroethene	<6 µg/kg	TM116	483	<60	675			
			♦ M	♦ M	♦ M			
2,2-Dichloropropane	<10 µg/kg	TM116	<100	<100	<200			
			♦	♦	♦			
Bromochloromethane	<10 µg/kg	TM116	<100	<100	<200			
			♦ M	♦ M	♦ M			
Chloroform	<8 µg/kg	TM116	<80	<80	<160			
			♦ M	♦ M	♦ M			
1,1,1-Trichloroethane	<7 µg/kg	TM116	713	144	270			
			♦ M	♦ M	♦ M			
1,1-Dichloropropene	<10 µg/kg	TM116	<100	<100	<200			
			♦ M	♦ M	♦ M			
Carbontetrachloride	<10 µg/kg	TM116	<100	<100	<200			
			♦ M	♦ M	♦ M			
1,2-Dichloroethane	<5 µg/kg	TM116	<50	<50	<100			
			♦ M	♦ M	♦ M			
Benzene	<9 µg/kg	TM116	<90	<90	<180			
			♦ M	♦ M	♦ M			
Trichloroethene	<9 µg/kg	TM116	6880	727	1060			
			♦ #	♦ #	♦ #			
1,2-Dichloropropane	<10 µg/kg	TM116	<100	<100	<200			
			♦ M	♦ M	♦ M			
Dibromomethane	<9 µg/kg	TM116	<90	<90	<180			
			♦ M	♦ M	♦ M			
Bromodichloromethane	<7 µg/kg	TM116	<70	<70	<140			
			♦ M	♦ M	♦ M			
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<100	<100	<200			
			♦ M	♦ M	♦ M			
Toluene	<7 µg/kg	TM116	<70	<70	<140			
			♦ M	♦ M	♦ M			
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<100	<100	<200			
			♦	♦	♦			
1,1,2-Trichloroethane	<10 µg/kg	TM116	<100	<100	<200			
			♦ M	♦ M	♦ M			
1,3-Dichloropropane	<7 µg/kg	TM116	<70	<70	<140			
			♦ M	♦ M	♦ M			



CERTIFICATE OF ANALYSIS

Validated

SDG: 181214-121
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000317

Report Number: 487004
Superseded Report: 485720

VOC MS (S)

Results Legend		Customer Sample Ref.	24(6)-Side-Nort h	23(6)-Side-Sout h	22(6)-Side-West			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00			
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
aq	Aqueous / settled sample.		12/12/2018	12/12/2018	12/12/2018			
diss.filt	Dissolved / filtered sample.		.	.	.			
tot.unfilt	Total / unfiltered sample.		14/12/2018	14/12/2018	14/12/2018			
*	Subcontracted test.		181214-121	181214-121	181214-121			
**	% 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		18965741	18965735	18965728			
(F)	Trigger breach confirmed							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Tetrachloroethene	<5 µg/kg	TM116	28700 ♦ M	9660 ♦ M	6240 ♦ M			
Dibromochloromethane	<10 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<200 ♦ M			
1,2-Dibromoethane	<10 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<200 ♦ M			
Chlorobenzene	<5 µg/kg	TM116	<50 ♦ M	<50 ♦ M	<100 ♦ M			
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<200 ♦ M			
Ethylbenzene	<4 µg/kg	TM116	<40 ♦ M	<40 ♦ M	<80 ♦ M			
p/m-Xylene	<10 µg/kg	TM116	<100 ♦ #	<100 ♦ #	<200 ♦ #			
o-Xylene	<10 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<200 ♦ M			
Styrene	<10 µg/kg	TM116	<100 ♦ #	<100 ♦ #	<200 ♦ #			
Bromoform	<10 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<200 ♦ M			
Isopropylbenzene	<5 µg/kg	TM116	<50 ♦ #	<50 ♦ #	<100 ♦ #			
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<100 ♦ #	<100 ♦ #	<200 ♦ #			
1,2,3-Trichloropropane	<16 µg/kg	TM116	<160 ♦ M	<160 ♦ M	<320 ♦ M			
Bromobenzene	<10 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<200 ♦ M			
Propylbenzene	<10 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<200 ♦ M			
2-Chlorotoluene	<9 µg/kg	TM116	<90 ♦ M	<90 ♦ M	<180 ♦ M			
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<80 ♦ M	<80 ♦ M	<160 ♦ M			
4-Chlorotoluene	<10 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<200 ♦ M			
tert-Butylbenzene	<14 µg/kg	TM116	<140 ♦ M	<140 ♦ M	<280 ♦ M			
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<90 ♦ #	<90 ♦ #	<180 ♦ #			
sec-Butylbenzene	<10 µg/kg	TM116	<100 ♦	<100 ♦	<200 ♦			
4-Isopropyltoluene	<10 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<200 ♦ M			
1,3-Dichlorobenzene	<8 µg/kg	TM116	<80 ♦ M	<80 ♦ M	<160 ♦ M			
1,4-Dichlorobenzene	<5 µg/kg	TM116	<50 ♦ M	<50 ♦ M	<100 ♦ M			
n-Butylbenzene	<11 µg/kg	TM116	<110 ♦	<110 ♦	<220 ♦			
1,2-Dichlorobenzene	<10 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<200 ♦ M			
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<140 ♦ M	<140 ♦ M	<280 ♦ M			
Tert-amyl methyl ether	<10 µg/kg	TM116	<100 ♦ #	<100 ♦ #	<200 ♦ #			
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<200 ♦	<200 ♦	<400 ♦			
Hexachlorobutadiene	<20 µg/kg	TM116	<200 ♦	<200 ♦	<400 ♦			
Naphthalene	<13 µg/kg	TM116	<130 ♦ M	<130 ♦ M	<260 ♦ M			
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<200 ♦ #	<200 ♦ #	<400 ♦ #			



CERTIFICATE OF ANALYSIS

Validated

SDG: 181214-121
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000317

Report Number: 487004
Superseded Report: 485720

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181214-121
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000317

Report Number: 487004
Superseded Report: 485720

Test Completion Dates

Lab Sample No(s)	18965741	18965735	18965728
Customer Sample Ref.	24(6)-Side-North	23(6)-Side-South	22(6)-Side-West
AGS Ref.			
Depth	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Sample description	18-Dec-2018	18-Dec-2018	18-Dec-2018
VOC MS (S)	03-Jan-2019	03-Jan-2019	03-Jan-2019



CERTIFICATE OF ANALYSIS

SDG:	181214-121	Client Reference:	Crowland	Report Number:	487004
Location:	Crowland	Order Number:	PO-0000317	Superseded Report:	485720

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



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FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date of report Generation:	09 January 2019
Customer:	H_FLIQDS_GUI
Sample Delivery Group (SDG):	181219-62
Your Reference:	Crowland
Location:	Crowland
Report No:	487626

We received 3 samples on Wednesday December 19, 2018 and 3 of these samples were scheduled for analysis which was completed on Wednesday January 09, 2019. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-62
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487626
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
19000070	27(4)-Side-North		0.00 - 4.00	18/12/2018
19000083	25(4)-Side-South		0.00 - 4.00	18/12/2018
19000064	26(4)-Side-West		0.00 - 4.00	18/12/2018

Maximum Sample/Coolbox Temperature (°C) :

7..0

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-62
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487626
Superseded Report:

Results Legend

- X** Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

19000070
19000083
19000064

Customer Sample Reference

27(4)-Side-North
25(4)-Side-South
26(4)-Side-West

AGS Reference

Depth (m)

0.00 - 4.00
0.00 - 4.00
0.00 - 4.00

Container

60g VOC (ALE215)
60g VOC (ALE215)
60g VOC (ALE215)

Sample Type

S
S
S

Sample description

All

NDPs: 0
Tests: 3

X X X

VOC MS (S)

All

NDPs: 0
Tests: 3

X X X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-62
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487626
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	Inclusions	Inclusions 2
19000070	27(4)-Side-North	0.00 - 4.00	Dark Brown	Silt Loam	None	None
19000083	25(4)-Side-South	0.00 - 4.00	Dark Brown	Loamy Sand	Stones	Vegetation
19000064	26(4)-Side-West	0.00 - 4.00	Black	Loamy Sand	Stones	Vegetation

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

Validated

SDG: 181219-62
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487626
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	27(4)-Side-North h	25(4)-Side-South h	26(4)-Side-West h			
#	ISO17025 accredited.							
M	mCERTS accredited.	Depth (m)	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00			
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.	Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.	Date Sampled	18/12/2018	18/12/2018	18/12/2018			
**	% 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	Date Received	19/12/2018	19/12/2018	19/12/2018			
1-5&+@	Sample deviation (see appendix)							
AGS Reference		Lab Sample No.(s)	181219-62 19000070	181219-62 19000083	181219-62 19000064			
Component	LOD/Units							
Dibromofluoromethane**	%	TM116	114	105	106			
			♦	♦	♦			
Toluene-d8**	%	TM116	97.6	95.6	97			
			♦	♦	♦			
4-Bromofluorobenzene**	%	TM116	96.9	92.3	91.2			
			♦	♦	♦			
Dichlorodifluoromethane	<6 µg/kg	TM116	<120	<120	<120			
			♦ M	♦ M	♦ M			
Chloromethane	<7 µg/kg	TM116	<140	<140	<140			
			♦ #	♦ #	♦ #			
Vinyl Chloride	<6 µg/kg	TM116	<120	<120	<120			
			♦ M	♦ M	♦ M			
Bromomethane	<10 µg/kg	TM116	<200	<200	<200			
			♦ M	♦ M	♦ M			
Chloroethane	<10 µg/kg	TM116	<200	<200	<200			
			♦ M	♦ M	♦ M			
Trichlorofluoromethane	<6 µg/kg	TM116	<120	<120	<120			
			♦ M	♦ M	♦ M			
1,1-Dichloroethene	<10 µg/kg	TM116	<200	<200	<200			
			♦ #	♦ #	♦ #			
Carbon Disulphide	<7 µg/kg	TM116	<140	<140	<140			
			♦ M	♦ M	♦ M			
Dichloromethane	<10 µg/kg	TM116	<200	<200	<200			
			♦ #	♦ #	♦ #			
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<200	<200	<200			
			♦ M	♦ M	♦ M			
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<200	<200	<200			
			♦ M	♦ M	♦ M			
1,1-Dichloroethane	<8 µg/kg	TM116	256	<160	2530			
			♦ M	♦ M	♦ M			
cis-1,2-Dichloroethene	<6 µg/kg	TM116	2300	210	5270			
			♦ M	♦ M	♦ M			
2,2-Dichloropropane	<10 µg/kg	TM116	<200	<200	<200			
			♦	♦	♦			
Bromochloromethane	<10 µg/kg	TM116	<200	<200	<200			
			♦ M	♦ M	♦ M			
Chloroform	<8 µg/kg	TM116	<160	<160	<160			
			♦ M	♦ M	♦ M			
1,1,1-Trichloroethane	<7 µg/kg	TM116	763	<140	<140			
			♦ M	♦ M	♦ M			
1,1-Dichloropropene	<10 µg/kg	TM116	<200	<200	<200			
			♦ M	♦ M	♦ M			
Carbontetrachloride	<10 µg/kg	TM116	<200	<200	<200			
			♦ M	♦ M	♦ M			
1,2-Dichloroethane	<5 µg/kg	TM116	<100	<100	<100			
			♦ M	♦ M	♦ M			
Benzene	<9 µg/kg	TM116	<180	<180	<180			
			♦ M	♦ M	♦ M			
Trichloroethene	<9 µg/kg	TM116	14600	23400	9370			
			♦ #	♦ #	♦ #			
1,2-Dichloropropane	<10 µg/kg	TM116	<200	<200	<200			
			♦ M	♦ M	♦ M			
Dibromomethane	<9 µg/kg	TM116	<180	<180	<180			
			♦ M	♦ M	♦ M			
Bromodichloromethane	<7 µg/kg	TM116	<140	<140	<140			
			♦ M	♦ M	♦ M			
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<200	<200	<200			
			♦ M	♦ M	♦ M			
Toluene	<7 µg/kg	TM116	<140	<140	<140			
			♦ M	♦ M	♦ M			
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<200	<200	<200			
			♦	♦	♦			
1,1,2-Trichloroethane	<10 µg/kg	TM116	<200	<200	<200			
			♦ M	♦ M	♦ M			
1,3-Dichloropropane	<7 µg/kg	TM116	<140	<140	<140			
			♦ M	♦ M	♦ M			



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-62
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487626
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	27(4)-Side-North h	25(4)-Side-South h	26(4)-Side-West h			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00			
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
aq	Aqueous / settled sample.		18/12/2018	18/12/2018	18/12/2018			
diss.filt	Dissolved / filtered sample.		.	.	.			
tot.unfilt	Total / unfiltered sample.		19/12/2018	19/12/2018	19/12/2018			
*	Subcontracted test.		181219-62	181219-62	181219-62			
**	% 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		19000070	19000083	19000064			
(F)	Trigger breach confirmed							
1-5&\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Tetrachloroethene	<5 µg/kg	TM116	129000 ♦ M	184000 ♦ M	86000 ♦ M			
Dibromochloromethane	<10 µg/kg	TM116	<200 ♦ M	<200 ♦ M	<200 ♦ M			
1,2-Dibromoethane	<10 µg/kg	TM116	<200 ♦ M	<200 ♦ M	<200 ♦ M			
Chlorobenzene	<5 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<100 ♦ M			
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<200 ♦ M	<200 ♦ M	<200 ♦ M			
Ethylbenzene	<4 µg/kg	TM116	<80 ♦ M	<80 ♦ M	<80 ♦ M			
p/m-Xylene	<10 µg/kg	TM116	<200 ♦ #	<200 ♦ #	<200 ♦ #			
o-Xylene	<10 µg/kg	TM116	<200 ♦ M	<200 ♦ M	<200 ♦ M			
Styrene	<10 µg/kg	TM116	<200 ♦ #	<200 ♦ #	<200 ♦ #			
Bromoform	<10 µg/kg	TM116	<200 ♦ M	<200 ♦ M	<200 ♦ M			
Isopropylbenzene	<5 µg/kg	TM116	<100 ♦ #	<100 ♦ #	<100 ♦ #			
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<200 ♦ #	<200 ♦ #	<200 ♦ #			
1,2,3-Trichloropropane	<16 µg/kg	TM116	<320 ♦ M	<320 ♦ M	<320 ♦ M			
Bromobenzene	<10 µg/kg	TM116	<200 ♦ M	<200 ♦ M	<200 ♦ M			
Propylbenzene	<10 µg/kg	TM116	<200 ♦ M	<200 ♦ M	<200 ♦ M			
2-Chlorotoluene	<9 µg/kg	TM116	<180 ♦ M	<180 ♦ M	<180 ♦ M			
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<160 ♦ M	<160 ♦ M	<160 ♦ M			
4-Chlorotoluene	<10 µg/kg	TM116	<200 ♦ M	<200 ♦ M	<200 ♦ M			
tert-Butylbenzene	<14 µg/kg	TM116	<280 ♦ M	<280 ♦ M	<280 ♦ M			
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<180 ♦ #	<180 ♦ #	<180 ♦ #			
sec-Butylbenzene	<10 µg/kg	TM116	<200 ♦	<200 ♦	<200 ♦			
4-Isopropyltoluene	<10 µg/kg	TM116	<200 ♦ M	<200 ♦ M	<200 ♦ M			
1,3-Dichlorobenzene	<8 µg/kg	TM116	<160 ♦ M	<160 ♦ M	<160 ♦ M			
1,4-Dichlorobenzene	<5 µg/kg	TM116	<100 ♦ M	<100 ♦ M	<100 ♦ M			
n-Butylbenzene	<11 µg/kg	TM116	<220 ♦	<220 ♦	<220 ♦			
1,2-Dichlorobenzene	<10 µg/kg	TM116	<200 ♦ M	<200 ♦ M	<200 ♦ M			
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<280 ♦ M	<280 ♦ M	<280 ♦ M			
Tert-amyl methyl ether	<10 µg/kg	TM116	<200 ♦ #	<200 ♦ #	<200 ♦ #			
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<400 ♦	<400 ♦	<400 ♦			
Hexachlorobutadiene	<20 µg/kg	TM116	<400 ♦	<400 ♦	<400 ♦			
Naphthalene	<13 µg/kg	TM116	<260 3 ♦ M	<260 3 ♦ M	<260 ♦ M			
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<400 ♦ #	<400 ♦ #	<400 ♦ #			



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-62
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487626
Superseded Report:



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-62
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487626
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-62
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487626
Superseded Report:

Test Completion Dates

Lab Sample No(s)	19000070	19000083	19000064
Customer Sample Ref.	27(4)-Side-North	25(4)-Side-South	26(4)-Side-West
AGS Ref.			
Depth	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Sample description	29-Dec-2018	29-Dec-2018	29-Dec-2018
VOC MS (S)	09-Jan-2019	08-Jan-2019	09-Jan-2019



CERTIFICATE OF ANALYSIS

SDG:	181219-62	Client Reference:	Crowland	Report Number:	487626
Location:	Crowland	Order Number:	PO-0000322	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 and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



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FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date of report Generation:	09 January 2019
Customer:	H_FLIQDS_GUI
Sample Delivery Group (SDG):	181219-63
Your Reference:	Crowland
Location:	Crowland
Report No:	487627

We received 5 samples on Wednesday December 19, 2018 and 5 of these samples were scheduled for analysis which was completed on Wednesday January 09, 2019. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-63
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487627
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
19000137	1-206-Base		4.00 - 4.00	18/12/2018
19000164	4-206-Side-East		0.00 - 4.00	18/12/2018
19000157	3-206-Side-North		0.00 - 4.00	18/12/2018
19000170	5-206-Side-South		0.00 - 4.00	18/12/2018
19000149	2-206-Side-West		0.00 - 4.00	18/12/2018

Maximum Sample/Coolbox Temperature (°C) :

7..0

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-63
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487627
Superseded Report:

Results Legend



Test


No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

Customer
Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Sample description

All

NDPs: 0
Tests: 5

X X X X X

VOC MS (S)

All

NDPs: 0
Tests: 5

X X X X X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-63
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487627
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	Inclusions	Inclusions 2
19000137	1-206-Base	4.00 - 4.00	Grey	Silt Loam	None	None
19000164	4-206-Side-East	0.00 - 4.00	Light Brown	Silt Loam	None	None
19000157	3-206-Side-North	0.00 - 4.00	Dark Brown	Clay Loam	None	None
19000170	5-206-Side-South	0.00 - 4.00	Dark Brown	Sandy Loam	Stones	Vegetation
19000149	2-206-Side-West	0.00 - 4.00	Light Brown	Silt Loam	None	None

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

Validated

SDG: 181219-63
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487627
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	1-206-Base	4-206-Side-East	3-206-Side-North	5-206-Side-South	2-206-Side-West	
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	4.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
aq	Aqueous / settled sample.		18/12/2018	18/12/2018	18/12/2018	18/12/2018	18/12/2018	
diss.filt	Dissolved / filtered sample.		19/12/2018	19/12/2018	19/12/2018	19/12/2018	19/12/2018	
tot.unfilt	Total / unfiltered sample.		181219-63	181219-63	181219-63	181219-63	181219-63	
*	Subcontracted test.		19000137	19000164	19000157	19000170	19000149	
**	% 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							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM116	106	107	107	107	115	
			♦	♦	♦	♦	♦	
Toluene-d8**	%	TM116	100	99.5	98.8	98.7	98.2	
			♦	♦	♦	♦	♦	
4-Bromofluorobenzene**	%	TM116	102	94	96.1	95.6	97.1	
			♦	♦	♦	♦	♦	
Dichlorodifluoromethane	<6 µg/kg	TM116	<120	<60	<120	<120	<120	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Chloromethane	<7 µg/kg	TM116	<140	<70	<140	<140	<140	
			♦ #	♦ #	♦ #	♦ #	♦ #	
Vinyl Chloride	<6 µg/kg	TM116	<120	<60	<120	<120	<120	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Bromomethane	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Chloroethane	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Trichlorofluoromethane	<6 µg/kg	TM116	<120	<60	<120	<120	<120	
			♦ M	♦ M	♦ M	♦ M	♦ M	
1,1-Dichloroethene	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ #	♦ #	♦ #	♦ #	♦ #	
Carbon Disulphide	<7 µg/kg	TM116	<140	<70	<140	<140	<140	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Dichloromethane	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ #	♦ #	♦ #	♦ #	♦ #	
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ M	♦ M	♦ M	♦ M	♦ M	
trans-1,2-Dichloroethene	<10 µg/kg	TM116	1320	<100	<200	339	<200	
			♦ M	♦ M	♦ M	♦ M	♦ M	
1,1-Dichloroethane	<8 µg/kg	TM116	<160	<80	<160	<160	<160	
			♦ M	♦ M	♦ M	♦ M	♦ M	
cis-1,2-Dichloroethene	<6 µg/kg	TM116	14500	<60	518	974	<120	
			♦ M	♦ M	♦ M	♦ M	♦ M	
2,2-Dichloropropane	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦	♦	♦	♦	♦	
Bromochloromethane	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Chloroform	<8 µg/kg	TM116	<160	<80	<160	<160	<160	
			♦ M	♦ M	♦ M	♦ M	♦ M	
1,1,1-Trichloroethane	<7 µg/kg	TM116	<140	<70	<140	<140	<140	
			♦ M	♦ M	♦ M	♦ M	♦ M	
1,1-Dichloropropene	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Carbontetrachloride	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ M	♦ M	♦ M	♦ M	♦ M	
1,2-Dichloroethane	<5 µg/kg	TM116	<100	<50	<100	<100	<100	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Benzene	<9 µg/kg	TM116	<180	<90	<180	<180	<180	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Trichloroethene	<9 µg/kg	TM116	35500	208	<180	423	285	
			♦ #	♦ #	♦ #	♦ #	♦ #	
1,2-Dichloropropane	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Dibromomethane	<9 µg/kg	TM116	<180	<90	<180	<180	<180	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Bromodichloromethane	<7 µg/kg	TM116	<140	<70	<140	<140	<140	
			♦ M	♦ M	♦ M	♦ M	♦ M	
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ M	♦ M	♦ M	♦ M	♦ M	
Toluene	<7 µg/kg	TM116	<140	<70	<140	<140	<140	
			♦ M	♦ M	♦ M	♦ M	♦ M	
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦	♦	♦	♦	♦	
1,1,2-Trichloroethane	<10 µg/kg	TM116	<200	<100	<200	<200	<200	
			♦ M	♦ M	♦ M	♦ M	♦ M	
1,3-Dichloropropane	<7 µg/kg	TM116	<140	<70	<140	<140	<140	
			♦ M	♦ M	♦ M	♦ M	♦ M	



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-63
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487627
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	1-206-Base	4-206-Side-East	3-206-Side-Nort h	5-206-Side-Sout h	2-206-Side-West	
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	4.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
aq	Aqueous / settled sample.		18/12/2018	18/12/2018	18/12/2018	18/12/2018	18/12/2018	
diss.filt	Dissolved / filtered sample.		.	.	.	.	.	
tot.unfilt	Total / unfiltered sample.		19/12/2018	19/12/2018	19/12/2018	19/12/2018	19/12/2018	
*	Subcontracted test.		181219-63	181219-63	181219-63	181219-63	181219-63	
**	% 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		19000137	19000164	19000157	19000170	19000149	
(F)	Trigger breach confirmed							
1-5&5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Tetrachloroethene	<5 µg/kg	TM116	<100 ♦ M	452 ♦ M	219 ♦ M	805 ♦ M	502 ♦ M	
Dibromochloromethane	<10 µg/kg	TM116	<200 ♦ M	<100 ♦ M	<200 ♦ M	<200 ♦ M	<200 ♦ M	
1,2-Dibromoethane	<10 µg/kg	TM116	<200 ♦ M	<100 ♦ M	<200 ♦ M	<200 ♦ M	<200 ♦ M	
Chlorobenzene	<5 µg/kg	TM116	639 ♦ M	<50 ♦ M	<100 ♦ M	182 ♦ M	<100 ♦ M	
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<200 ♦ M	<100 ♦ M	<200 ♦ M	<200 ♦ M	<200 ♦ M	
Ethylbenzene	<4 µg/kg	TM116	974 ♦ M	<40 ♦ M	<80 ♦ M	<80 ♦ M	<80 ♦ M	
p/m-Xylene	<10 µg/kg	TM116	3410 ♦ #	<100 ♦ #	<200 ♦ #	<200 ♦ #	<200 ♦ #	
o-Xylene	<10 µg/kg	TM116	1880 ♦ M	<100 ♦ M	<200 ♦ M	<200 ♦ M	<200 ♦ M	
Styrene	<10 µg/kg	TM116	<200 ♦ #	<100 ♦ #	<200 ♦ #	<200 ♦ #	<200 ♦ #	
Bromoform	<10 µg/kg	TM116	<200 ♦ M	<100 ♦ M	<200 ♦ M	<200 ♦ M	<200 ♦ M	
Isopropylbenzene	<5 µg/kg	TM116	<100 ♦ #	<50 ♦ #	<100 ♦ #	<100 ♦ #	<100 ♦ #	
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<200 ♦ #	<100 ♦ #	<200 ♦ #	<200 ♦ #	<200 ♦ #	
1,2,3-Trichloropropane	<16 µg/kg	TM116	<320 ♦ M	<160 ♦ M	<320 ♦ M	<320 ♦ M	<320 ♦ M	
Bromobenzene	<10 µg/kg	TM116	<200 ♦ M	<100 ♦ M	<200 ♦ M	<200 ♦ M	<200 ♦ M	
Propylbenzene	<10 µg/kg	TM116	<200 ♦ M	<100 ♦ M	<200 ♦ M	<200 ♦ M	<200 ♦ M	
2-Chlorotoluene	<9 µg/kg	TM116	<180 ♦ M	<90 ♦ M	<180 ♦ M	<180 ♦ M	<180 ♦ M	
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	407 ♦ M	<80 ♦ M	<160 ♦ M	<160 ♦ M	<160 ♦ M	
4-Chlorotoluene	<10 µg/kg	TM116	<200 ♦ M	<100 ♦ M	<200 ♦ M	<200 ♦ M	<200 ♦ M	
tert-Butylbenzene	<14 µg/kg	TM116	<280 ♦ M	<140 ♦ M	<280 ♦ M	<280 ♦ M	<280 ♦ M	
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<180 ♦ #	<90 ♦ #	<180 ♦ #	<180 ♦ #	<180 ♦ #	
sec-Butylbenzene	<10 µg/kg	TM116	<200 ♦	<100 ♦	<200 ♦	<200 ♦	<200 ♦	
4-Isopropyltoluene	<10 µg/kg	TM116	<200 ♦ M	<100 ♦ M	<200 ♦ M	<200 ♦ M	<200 ♦ M	
1,3-Dichlorobenzene	<8 µg/kg	TM116	<160 ♦ M	<80 ♦ M	<160 ♦ M	<160 ♦ M	<160 ♦ M	
1,4-Dichlorobenzene	<5 µg/kg	TM116	<100 ♦ M	<50 ♦ M	<100 ♦ M	<100 ♦ M	<100 ♦ M	
n-Butylbenzene	<11 µg/kg	TM116	<220 ♦	<110 ♦	<220 ♦	<220 ♦	<220 ♦	
1,2-Dichlorobenzene	<10 µg/kg	TM116	<200 ♦ M	<100 ♦ M	<200 ♦ M	<200 ♦ M	<200 ♦ M	
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<280 ♦ M	<140 ♦ M	<280 ♦ M	<280 ♦ M	<280 ♦ M	
Tert-amyl methyl ether	<10 µg/kg	TM116	<200 ♦ #	<100 ♦ #	<200 ♦ #	<200 ♦ #	<200 ♦ #	
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<400 ♦	<200 ♦	<400 ♦	<400 ♦	<400 ♦	
Hexachlorobutadiene	<20 µg/kg	TM116	<400 ♦	<200 ♦	<400 ♦	<400 ♦	<400 ♦	
Naphthalene	<13 µg/kg	TM116	<260 3 ♦ M	<130 ♦ M	<260 ♦ M	<260 3 ♦ M	<260 3 ♦ M	
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<400 ♦ #	<200 ♦ #	<400 ♦ #	<400 ♦ #	<400 ♦ #	



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-63
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487627
Superseded Report:



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-63
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487627
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181219-63
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000322

Report Number: 487627
Superseded Report:

Test Completion Dates

Lab Sample No(s)	19000137	19000164	19000157	19000170	19000149
Customer Sample Ref.	1-206-Base	4-206-Side-East	3-206-Side-North	5-206-Side-South	2-206-Side-West
AGS Ref.					
Depth	4.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Sample description	29-Dec-2018	29-Dec-2018	29-Dec-2018	29-Dec-2018	29-Dec-2018
VOC MS (S)	09-Jan-2019	08-Jan-2019	08-Jan-2019	09-Jan-2019	09-Jan-2019



CERTIFICATE OF ANALYSIS

SDG:	181219-63	Client Reference:	Crowland	Report Number:	487627
Location:	Crowland	Order Number:	PO-0000322	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 and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



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Website: www.alsenvironmental.co.uk

FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date:	06 December 2018
Customer:	H_FLIQDS_GUI
Sample Delivery Group (SDG):	181129-115
Your Reference:	Crowland
Location:	Crowland
Report No:	484133

We received 1 sample on Thursday November 29, 2018 and 1 of these samples were scheduled for analysis which was completed on Thursday December 06, 2018. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-115
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000293

Report Number: 484133
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18846207	SP03-Asb-ID		0.00 - 0.00	27/11/2018

Maximum Sample/Coolbox Temperature (°C) :

8.2

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-115
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000293

Report Number: 484133
Superseded Report:

Results Legend

- X** Test
- N** No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

18846207

Customer
Sample Reference

SP03-Asb-ID

AGS Reference

Depth (m)

0.00 - 0.00

Container

1kg TUB

Sample Type

S

Asbestos Identification

All

NDPs: 0
Tests: 1

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-115

Client Reference: Crowland

Report Number: 484133

Location: Crowland

Order Number: PO-0000293

Superseded Report:

Asbestos Identification - Bulk

		Date of Analysis	Analysed by	Comments	Actinolite, Fibrous	Anthophyllite, Fibrous	Asbestos, Amosite (brown)	Asbestos, Chrysotile (white)	Asbestos, Crocidolite (blue)	Non-asbestos fibre	Tremolite, Fibrous
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP03-Asb-ID 0.00 - 0.00 SOLID 27/11/2018 00:00:00 29/11/2018 15:55:25 181129-115 18846207 TM048	06/12/2018	Marcin Magdziarek	Material typical of Asbestos Cement	Not Detected (#)	Not Detected (#)	Not Detected (#)	Detected (#)	Not Detected (#)	Not Detected	Not Detected (#)



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-115
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000293

Report Number: 484133
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-115
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000293

Report Number: 484133
Superseded Report:

Test Completion Dates

Lab Sample No(s)	18846207
Customer Sample Ref.	SP03-Asb-ID
AGS Ref.	
Depth	0.00 - 0.00
Type	Soil/Solid (S)
Asbestos Identification	06-Dec-2018



CERTIFICATE OF ANALYSIS

SDG:	181129-115	Client Reference:	Crowland	Report Number:	484133
Location:	Crowland	Order Number:	PO-0000293	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 and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



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FLI QDS
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Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date: 11 December 2018
Customer: H_FLIQDS_GUI
Sample Delivery Group (SDG): 181129-109
Your Reference: Crowland
Location: Crowland
Report No: 484745

This report has been revised and directly supersedes 484378 in its entirety.

We received 3 samples on Thursday November 29, 2018 and 3 of these samples were scheduled for analysis which was completed on Tuesday December 11, 2018. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-109
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484745
Superseded Report: 484378

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18846031	SP04-A		0.00 - 0.00	28/11/2018
18846034	SP05-A		0.00 - 0.00	28/11/2018
18846037	SP05-B		0.00 - 0.00	28/11/2018

Maximum Sample/Coolbox Temperature (°C) :

8.2

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



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SDG: 181129-109
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Results Legend

- X** Test
- N** No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Results Legend	Lab Sample No(s)		18846031	18846034	18846037
	Customer Sample Reference		SP04-A	SP05-A	SP05-B
	AGS Reference				
	Depth (m)		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
	Container		250g Amber Jar (ALE210) 1kg TUB	250g Amber Jar (ALE210) 1kg TUB	250g Amber Jar (ALE210) 1kg TUB
	Sample Type		S	S	S
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 3	X	X	X
Asbestos Quantification - Full	All	NDPs: 0 Tests: 1			X
Boron Water Soluble	All	NDPs: 0 Tests: 3	X	X	X
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 3	X	X	X
Easily Liberated Sulphide	All	NDPs: 0 Tests: 3	X	X	X
Elemental Sulphur	All	NDPs: 0 Tests: 3	X	X	X
EPH	All	NDPs: 0 Tests: 3	X	X	X
EPH by FID	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: 3	X	X	X
Metals in solid samples by OES	All	NDPs: 0 Tests: 3	X	X	X
PAH by GCMS	All	NDPs: 0 Tests: 3	X	X	X
pH	All	NDPs: 0 Tests: 3	X	X	X
Phenols by HPLC (S)	All	NDPs: 0 Tests: 3	X	X	X
Sample description	All	NDPs: 0 Tests: 3	X	X	X



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Results Legend

X Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
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SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

	Lab Sample No(s)		18846031	18846034	18846037
	Customer Sample Reference		SP04-A	SP05-A	SP05-B
	AGS Reference				
	Depth (m)		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
	Container		250g Amber Jar (ALE210) 1kg TUB	250g Amber Jar (ALE210) 1kg TUB	250g Amber Jar (ALE210) 1kg TUB
	Sample Type		S	S	S
Total Organic Carbon	All	NDPs: 0 Tests: 3	X	X	X
VOC MS (S)	All	NDPs: 0 Tests: 3	X	X	X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-109
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484745
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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	Inclusions	Inclusions 2
18846031	SP04-A	0.00 - 0.00	Dark Brown	Loamy Sand	Vegetation	Stones
18846034	SP05-A	0.00 - 0.00	Dark Brown	Sandy Loam	Vegetation	Stones
18846037	SP05-B	0.00 - 0.00	Dark Brown	Sandy Loam	Vegetation	Stones

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

Validated

SDG: 181129-109
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484745
Superseded Report: 484378

Results Legend		Customer Sample Ref.	SP04-A	SP05-A	SP05-B			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
M	mCERTS accredited.							
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							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Moisture Content Ratio (% of as received sample)	%	PM024	20	18	25			
EPH (C5-C40)	<35 mg/kg	TM061	100	210	121			
EPH Range >C10 - C40	<35 mg/kg	TM061	99.7 M	207 M	105 M			
Phenol	<0.01 mg/kg	TM062 (S)	<0.01 M	<0.01 M	<0.01 M			
Cresols	<0.01 mg/kg	TM062 (S)	0.0125 M	<0.01 M	<0.01 M			
Xylenols	<0.015 mg/kg	TM062 (S)	<0.015 M	<0.015 M	<0.015 M			
2,3,5-Trimethylphenol	<0.01 mg/kg	TM062 (S)	<0.01 M	<0.01 M	<0.01 M			
2-Isopropylphenol	<0.015 mg/kg	TM062 (S)	<0.015 M	<0.015 M	<0.015 M			
Phenols, Total Detected 5 speciated	<0.06 mg/kg	TM062 (S)	<0.06 M	<0.06 M	<0.06 M			
Fraction Organic Carbon (FOC)	<0.002	TM132	0.0473 #	0.0561 #	0.106 #			
pH	1 pH Units	TM133	7.5 M	7.75 M	7.2 M			
Sulphur, Elemental	<10 mg/kg	TM136	108 M	35 M	31.4 M			
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6 #	<0.6 #	<0.6 #			
Cyanide, Total	<1 mg/kg	TM153	<1 M	<1 M	<1 M			
Sulphide, Easily liberated	<15 mg/kg	TM180	<15 M	<15 M	<15 M			
Arsenic	<0.6 mg/kg	TM181	26.3 M	27.7 M	28.2 M			
Beryllium	<0.01 mg/kg	TM181	1.25 M	1.15 M	1.89 M			
Cadmium	<0.02 mg/kg	TM181	0.739 M	1.05 M	0.834 M			
Chromium	<0.9 mg/kg	TM181	13.5 M	13.8 M	35.1 M			
Copper	<1.4 mg/kg	TM181	62.8 M	63.8 M	87.9 M			
Lead	<0.7 mg/kg	TM181	231 M	234 M	211 M			
Mercury	<0.14 mg/kg	TM181	<0.14 M	<0.14 M	<0.14 M			
Nickel	<0.2 mg/kg	TM181	28.3 M	31.6 M	40.5 M			
Selenium	<1 mg/kg	TM181	<1 #	<1 #	<1 #			
Zinc	<1.9 mg/kg	TM181	199 M	281 M	308 M			
Boron, water soluble	<1 mg/kg	TM222	1.5 M	<1 M	2.44 M			
Asbestos Quantification - Gravimetric - %	<0.001 %	TM304			0.0033 #			
Asbestos Quantification - PCOM Evaluation - %	<0.001 %	TM304			0.001 #			
Additional Asbestos Components (Using TM048)		TM304			Amosite detected #			
Analysts Comments		TM304			Loose fibres in soil			
Asbestos Quantification - Total - %	<0.001 %	TM304			0.0043 #			



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-109
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484745
Superseded Report: 484378

Asbestos Identification - Solid Samples

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP04-A 0.00 - 0.00 SOLID 28/11/2018 00:00:00 30/11/2018 13:32:17 181129-109 18846031 TM048	05/12/2018	Andrzej Ferfecki	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP05-A 0.00 - 0.00 SOLID 28/11/2018 00:00:00 30/11/2018 13:28:48 181129-109 18846034 TM048	05/12/2018	Andrzej Ferfecki	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP05-B 0.00 - 0.00 SOLID 28/11/2018 00:00:00 30/11/2018 13:34:09 181129-109 18846037 TM048	05/12/2018	Lucy Caroe	Fibre bundles in soil	Not Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



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Report Number: 484745
Superseded Report: 484378

Asbestos Quantification - Full

Additional Asbestos Components (Using TM048)	Analysts Comments	Asbestos Quantification - Gravimetric - %	Asbestos Quantification - PCOM Evaluation - %	Asbestos Quantification - Total - %
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Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP05-B 0.00 - 0.00 SOLID 28/11/2018 00:00:00 06/12/2018 11:39:26 181129-109 18846037 TM304	Amosite detected (#)	Loose fibres in soil	0.0033 (#)	0.0010 (#)	0.0043 (#)
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CERTIFICATE OF ANALYSIS

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SDG: 181129-109
Location: Crowland

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Superseded Report: 484378

Table of Results - Appendix

Method No	Reference	Description
ASB_PREP		
PM001		Preparation of Samples for Metals Analysis
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) 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
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer
TM304	HSE Contract research Report no 83/1996	Asbestos Quantification in Soil: Fibres identified by morphology only

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-109
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484745
Superseded Report: 484378

Test Completion Dates

Lab Sample No(s)	18846031	18846034	18846037
Customer Sample Ref.	SP04-A	SP05-A	SP05-B
AGS Ref.			
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)

Asbestos ID in Solid Samples	05-Dec-2018	05-Dec-2018	05-Dec-2018
Asbestos Quantification - Full			11-Dec-2018
Boron Water Soluble	06-Dec-2018	06-Dec-2018	06-Dec-2018
Cyanide Comp/Free/Total/Thiocyanate	07-Dec-2018	07-Dec-2018	07-Dec-2018
Easily Liberated Sulphide	05-Dec-2018	05-Dec-2018	05-Dec-2018
Elemental Sulphur	06-Dec-2018	06-Dec-2018	06-Dec-2018
EPH	07-Dec-2018	07-Dec-2018	07-Dec-2018
EPH by FID	07-Dec-2018	07-Dec-2018	07-Dec-2018
GRO by GC-FID (S)	05-Dec-2018	05-Dec-2018	05-Dec-2018
Hexavalent Chromium (s)	05-Dec-2018	05-Dec-2018	05-Dec-2018
Metals in solid samples by OES	06-Dec-2018	06-Dec-2018	06-Dec-2018
PAH by GCMS	05-Dec-2018	05-Dec-2018	05-Dec-2018
pH	05-Dec-2018	05-Dec-2018	05-Dec-2018
Phenols by HPLC (S)	06-Dec-2018	06-Dec-2018	06-Dec-2018
Sample description	30-Nov-2018	30-Nov-2018	30-Nov-2018
Total Organic Carbon	06-Dec-2018	06-Dec-2018	05-Dec-2018
VOC MS (S)	05-Dec-2018	05-Dec-2018	05-Dec-2018



CERTIFICATE OF ANALYSIS

SDG:	181129-109	Client Reference:	Crowland	Report Number:	484745
Location:	Crowland	Order Number:	PO-0000300	Superseded Report:	484378

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date: 07 December 2018
Customer: H_FLIQDS_GUI
Sample Delivery Group (SDG): 181129-123
Your Reference: Crowland
Location: Crowland
Report No: 484328

This report has been revised and directly supersedes 484327 in its entirety.

We received 3 samples on Thursday November 29, 2018 and 3 of these samples were scheduled for analysis which was completed on Thursday December 06, 2018. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-123
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484328
Superseded Report: 484327

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18846858	SP04-A-VOC		0.00 - 0.00	28/11/2018
18846864	SP05-A-VOC		0.00 - 0.00	28/11/2018
18846869	SP05-B-VOC		0.00 - 0.00	28/11/2018

Maximum Sample/Coolbox Temperature (°C) :

8.2

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-123
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484328
Superseded Report: 484327

Results Legend

- X** Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

18846868
18846864
18846869

Customer
Sample Reference

SP04-A-VOC
SP05-A-VOC
SP05-B-VOC

AGS Reference

Depth (m)

0.00 - 0.00
0.00 - 0.00
0.00 - 0.00

Container

60g VOC (ALE215)
60g VOC (ALE215)
60g VOC (ALE215)

Sample Type

S
S
S

Sample description

All

NDPs: 0
Tests: 3

X X X

VOC MS (S)

All

NDPs: 0
Tests: 3

X X X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-123
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484328
Superseded Report: 484327

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
------------------	----------	-------------	-----------------	---------------	-------------	---------------	------------	--------------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
18846858	SP04-A-VOC	0.00 - 0.00	Dark Brown	Sandy Loam	Vegetation	Stones
18846864	SP05-A-VOC	0.00 - 0.00	Dark Brown	Sandy Loam	Vegetation	Stones
18846869	SP05-B-VOC	0.00 - 0.00	Dark Brown	Sandy Loam	Vegetation	Stones

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

Validated

SDG: 181129-123
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484328
Superseded Report: 484327

VOC MS (S)

Results Legend		Customer Sample Ref.	SP04-A-VOC	SP05-A-VOC	SP05-B-VOC			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
M	mCERTS accredited.							
aq	Aqueous / settled sample.		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
diss.filt	Dissolved / filtered sample.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
tot.unfilt	Total / unfiltered sample.		28/11/2018	28/11/2018	28/11/2018			
*	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		29/11/2018	29/11/2018	29/11/2018			
(F)	Trigger breach confirmed		181129-123	181129-123	181129-123			
1-5&+@	Sample deviation (see appendix)		18846858	18846864	18846869			
Component	LOD/Units	Method						
Dichlorodifluoromethane	<6 µg/kg	TM116	<6	<6	<6			
			M	M	M			
Chloromethane	<7 µg/kg	TM116	<7	<7	<7			
			#	#	#			
Vinyl Chloride	<6 µg/kg	TM116	<6	<6	<6			
			M	M	M			
Bromomethane	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
Chloroethane	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<6	<6			
			M	M	M			
1,1-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10			
			#	#	#			
Carbon Disulphide	<7 µg/kg	TM116	<7	<7	<7			
			M	M	M			
Dichloromethane	<10 µg/kg	TM116	<10	<10	<10			
			#	#	#			
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<10	17	29.6			
			M	M	M			
1,1-Dichloroethane	<8 µg/kg	TM116	<8	14.5	69.7			
			M	M	M			
cis-1,2-Dichloroethene	<6 µg/kg	TM116	21.5	181	848			
			M	M	M			
2,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10			
Bromochloromethane	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
Chloroform	<8 µg/kg	TM116	<8	<8	<8			
			M	M	M			
1,1,1-Trichloroethane	<7 µg/kg	TM116	44.7	62.1	457			
			M	M	M			
1,1-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
Carbontetrachloride	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
1,2-Dichloroethane	<5 µg/kg	TM116	<5	<5	<5			
			M	M	M			
Benzene	<9 µg/kg	TM116	<9	<9	<9			
			M	M	M			
Trichloroethene	<9 µg/kg	TM116	197	928	5430			
			#	#	#			
1,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
Dibromomethane	<9 µg/kg	TM116	<9	<9	<9			
			M	M	M			
Bromodichloromethane	<7 µg/kg	TM116	<7	<7	<7			
			M	M	M			
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
Toluene	<7 µg/kg	TM116	<7	<7	<7			
			M	M	M			
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10			
1,1,2-Trichloroethane	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
1,3-Dichloropropane	<7 µg/kg	TM116	<7	<7	<7			
			M	M	M			
Tetrachloroethene	<5 µg/kg	TM116	2410	15500	88200			
			M	M	M			
Dibromochloromethane	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
1,2-Dibromoethane	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-123
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484328
Superseded Report: 484327

VOC MS (S)

Results Legend		Customer Sample Ref.	SP04-A-VOC	SP05-A-VOC	SP05-B-VOC			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
aq	Aqueous / settled sample.		28/11/2018	28/11/2018	28/11/2018			
diss.filt	Dissolved / filtered sample.		-	-	-			
tot.unfilt	Total / unfiltered sample.		29/11/2018	29/11/2018	29/11/2018			
*	Subcontracted test.		181129-123	181129-123	181129-123			
**	% 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		18846858	18846864	18846869			
(F)	Trigger breach confirmed							
1-5&\$\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Chlorobenzene	<5 µg/kg	TM116	<5	<5	12.7			
			M	M	M			
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
Ethylbenzene	<4 µg/kg	TM116	<4	<4	<4			
			M	M	M			
p/m-Xylene	<10 µg/kg	TM116	<10	<10	<10			
			#	#	#			
o-Xylene	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
Styrene	<10 µg/kg	TM116	<10	<10	<10			
			#	#	#			
Bromoform	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
Isopropylbenzene	<5 µg/kg	TM116	<5	<5	<5			
			#	#	#			
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10			
			#	#	#			
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16	<16	<16			
			M	M	M			
Bromobenzene	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
Propylbenzene	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
2-Chlorotoluene	<9 µg/kg	TM116	<9	<9	<9			
			M	M	M			
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8	<8	<8			
			M	M	M			
4-Chlorotoluene	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
tert-Butylbenzene	<14 µg/kg	TM116	<14	<14	<14			
			M	M	M			
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9	19.2	13.4			
			#	#	#			
sec-Butylbenzene	<10 µg/kg	TM116	<10	<10	<10			
4-Isopropyltoluene	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8	<8	<8			
			M	M	M			
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5	<5	<5			
			M	M	M			
n-Butylbenzene	<11 µg/kg	TM116	<11	<11	<11			
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10	<10	<10			
			M	M	M			
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14	<14	<14			
			M	M	M			
Tert-amyl methyl ether	<10 µg/kg	TM116	<10	<10	<10			
			#	#	#			
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20	<20	<20			
Hexachlorobutadiene	<20 µg/kg	TM116	<20	<20	<20			
Naphthalene	<13 µg/kg	TM116	<13	<13	<13			
			M	M	M			
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<20	<20	<20			
			#	#	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-123
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484328
Superseded Report: 484327

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-123
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484328
Superseded Report: 484327

Test Completion Dates

Lab Sample No(s)	18846858	18846864	18846869
Customer Sample Ref.	SP04-A-VOC	SP05-A-VOC	SP05-B-VOC
AGS Ref.			
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Sample description	03-Dec-2018	03-Dec-2018	03-Dec-2018
VOC MS (S)	06-Dec-2018	06-Dec-2018	06-Dec-2018



CERTIFICATE OF ANALYSIS

SDG:	181129-123	Client Reference:	Crowland	Report Number:	484328
Location:	Crowland	Order Number:	PO-0000300	Superseded Report:	484327

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 (BTX). For total volatiles in the C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date: 07 December 2018
Customer: H_FLIQDS_GUI
Sample Delivery Group (SDG): 181129-120
Your Reference: Crowland
Location: Crowland
Report No: 484319

This report has been revised and directly supersedes 484150 in its entirety.

We received 2 samples on Thursday November 29, 2018 and 2 of these samples were scheduled for analysis which was completed on Thursday December 06, 2018. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-120
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484319
Superseded Report: 484150

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18846720	SP06-A-VOC		0.00 - 0.00	28/11/2018
18846727	SP07-A-VOC		0.00 - 0.00	28/11/2018

Maximum Sample/Coolbox Temperature (°C) :

8.2

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-120
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484319
Superseded Report: 484150

Results Legend



Test



No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

18846720

18846727

Customer
Sample Reference

SP06-A-VOC

SP07-A-VOC

AGS Reference

Depth (m)

0.00 - 0.00

0.00 - 0.00

Container

60g VOC (ALE215)

60g VOC (ALE215)

Sample Type

S

S

Sample description

All

NDPs: 0
Tests: 2

X

X

VOC MS (S)

All

NDPs: 0
Tests: 2

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-120
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484319
Superseded Report: 484150

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
------------------	----------	-------------	-----------------	---------------	-------------	---------------	------------	--------------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
18846720	SP06-A-VOC	0.00 - 0.00	Dark Brown	Sandy Loam	Vegetation	Stones
18846727	SP07-A-VOC	0.00 - 0.00	Dark Brown	Sandy Loam	Vegetation	Stones

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

Validated

SDG: 181129-120
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484319
Superseded Report: 484150

VOC MS (S)

Results Legend		Customer Sample Ref.	SP06-A-VOC	SP07-A-VOC				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Soil/Solid (S) 28/11/2018	0.00 - 0.00 Soil/Solid (S) 28/11/2018				
M	mCERTS accredited.							
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							
1-5&+5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dichlorodifluoromethane	<6 µg/kg	TM116	<1200	<6				
			M	M				
Chloromethane	<7 µg/kg	TM116	<1400	<7				
			#	#				
Vinyl Chloride	<6 µg/kg	TM116	<1200	<6				
			M	M				
Bromomethane	<10 µg/kg	TM116	<2000	<10				
			M	M				
Chloroethane	<10 µg/kg	TM116	<2000	<10				
			M	M				
Trichlorofluoromethane	<6 µg/kg	TM116	<1200	<6				
			M	M				
1,1-Dichloroethene	<10 µg/kg	TM116	<2000	<10				
			#	#				
Carbon Disulphide	<7 µg/kg	TM116	<1400	<7				
			M	M				
Dichloromethane	<10 µg/kg	TM116	<2000	<10				
			#	#				
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<2000	<10				
			M	M				
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<2000	<10				
			M	M				
1,1-Dichloroethane	<8 µg/kg	TM116	<1600	139				
			M	M				
cis-1,2-Dichloroethene	<6 µg/kg	TM116	<1200	321				
			M	M				
2,2-Dichloropropane	<10 µg/kg	TM116	<2000	<10				
Bromochloromethane	<10 µg/kg	TM116	<2000	<10				
			M	M				
Chloroform	<8 µg/kg	TM116	<1600	<8				
			M	M				
1,1,1-Trichloroethane	<7 µg/kg	TM116	39500	1360				
			M	M				
1,1-Dichloropropene	<10 µg/kg	TM116	<2000	<10				
			M	M				
Carbontetrachloride	<10 µg/kg	TM116	<2000	<10				
			M	M				
1,2-Dichloroethane	<5 µg/kg	TM116	<1000	<5				
			M	M				
Benzene	<9 µg/kg	TM116	<1800	<9				
			M	M				
Trichloroethene	<9 µg/kg	TM116	226000	5910				
			#	#				
1,2-Dichloropropane	<10 µg/kg	TM116	<2000	<10				
			M	M				
Dibromomethane	<9 µg/kg	TM116	<1800	<9				
			M	M				
Bromodichloromethane	<7 µg/kg	TM116	<1400	<7				
			M	M				
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<2000	<10				
			M	M				
Toluene	<7 µg/kg	TM116	<1400	<7				
			M	M				
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<2000	<10				
1,1,2-Trichloroethane	<10 µg/kg	TM116	<2000	<10				
			M	M				
1,3-Dichloropropane	<7 µg/kg	TM116	<1400	<7				
			M	M				
Tetrachloroethene	<5 µg/kg	TM116	2700000	69100				
			3 M	M				
Dibromochloromethane	<10 µg/kg	TM116	<2000	<10				
			M	M				
1,2-Dibromoethane	<10 µg/kg	TM116	<2000	<10				
			M	M				



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-120
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484319
Superseded Report: 484150

VOC MS (S)

Results Legend		Customer Sample Ref.	SP06-A-VOC	SP07-A-VOC				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00				
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)				
aq	Aqueous / settled sample.		28/11/2018	28/11/2018				
diss.filt	Dissolved / filtered sample.		.	.				
tot.unfilt	Total / unfiltered sample.		29/11/2018	29/11/2018				
*	Subcontracted test.		181129-120	181129-120				
**	% 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		18846720	18846727				
(F)	Trigger breach confirmed							
1-5&\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Chlorobenzene	<5 µg/kg	TM116	<1000	<5				
			M	M				
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<2000	<10				
			M	M				
Ethylbenzene	<4 µg/kg	TM116	<800	<4				
			M	M				
p/m-Xylene	<10 µg/kg	TM116	<2000	<10				
			#	#				
o-Xylene	<10 µg/kg	TM116	<2000	<10				
			M	M				
Styrene	<10 µg/kg	TM116	<2000	<10				
			#	#				
Bromofom	<10 µg/kg	TM116	<2000	<10				
			M	M				
Isopropylbenzene	<5 µg/kg	TM116	<1000	<5				
			#	#				
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<2000	<10				
			#	#				
1,2,3-Trichloropropane	<16 µg/kg	TM116	<3200	<16				
			M	M				
Bromobenzene	<10 µg/kg	TM116	<2000	<10				
			M	M				
Propylbenzene	<10 µg/kg	TM116	<2000	<10				
			M	M				
2-Chlorotoluene	<9 µg/kg	TM116	<1800	<9				
			M	M				
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<1600	<8				
			M	M				
4-Chlorotoluene	<10 µg/kg	TM116	<2000	<10				
			M	M				
tert-Butylbenzene	<14 µg/kg	TM116	<2800	<14				
			M	M				
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<1800	<9				
			#	#				
sec-Butylbenzene	<10 µg/kg	TM116	<2000	<10				
4-Isopropyltoluene	<10 µg/kg	TM116	<2000	<10				
			M	M				
1,3-Dichlorobenzene	<8 µg/kg	TM116	<1600	<8				
			M	M				
1,4-Dichlorobenzene	<5 µg/kg	TM116	<1000	<5				
			M	M				
n-Butylbenzene	<11 µg/kg	TM116	<2200	<11				
1,2-Dichlorobenzene	<10 µg/kg	TM116	<2000	<10				
			M	M				
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<2800	<14				
			M	M				
Tert-amyl methyl ether	<10 µg/kg	TM116	<2000	<10				
			#	#				
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<4000	<20				
Hexachlorobutadiene	<20 µg/kg	TM116	<4000	<20				
Naphthalene	<13 µg/kg	TM116	<2600	<13				
			M	M				
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<4000	<20				
			#	#				



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-120
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484319
Superseded Report: 484150

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181129-120
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000300

Report Number: 484319
Superseded Report: 484150

Test Completion Dates

Lab Sample No(s)	18846720	18846727
Customer Sample Ref.	SP06-A-VOC	SP07-A-VOC
AGS Ref.		
Depth	0.00 - 0.00	0.00 - 0.00
Type	Soil/Solid (S)	Soil/Solid (S)
Sample description	03-Dec-2018	03-Dec-2018
VOC MS (S)	06-Dec-2018	06-Dec-2018



CERTIFICATE OF ANALYSIS

SDG:	181129-120	Client Reference:	Crowland	Report Number:	484319
Location:	Crowland	Order Number:	PO-0000300	Superseded Report:	484150

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 (BTX). For total volatiles in the C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Astos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
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.



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Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

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email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date:	06 December 2018
Customer:	H_FLIQDS_GUI
Sample Delivery Group (SDG):	181201-9
Your Reference:	Crowland
Location:	Crowland
Report No:	484291

We received 4 samples on Saturday December 01, 2018 and 4 of these samples were scheduled for analysis which was completed on Thursday December 06, 2018. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181201-9
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000304

Report Number: 484291
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18860034	SP06-Asb-1		0.00 - 0.00	29/11/2018
18860036	SP06-Asb-2		0.00 - 0.00	29/11/2018
18860039	SP06-Asb-3		0.00 - 0.00	29/11/2018
18860041	SP06-Asb-4		0.00 - 0.00	29/11/2018

Maximum Sample/Coolbox Temperature (°C) :

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

6.2

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181201-9
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000304

Report Number: 484291
Superseded Report:

Results Legend



Test


No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

18860034

18860036

18860039

18860041

Customer
Sample Reference

SP06-Asb-1

SP06-Asb-2

SP06-Asb-3

SP06-Asb-4

AGS Reference

Depth (m)

0.00 - 0.00

0.00 - 0.00

0.00 - 0.00

0.00 - 0.00

Container

1kg TUB

1kg TUB

1kg TUB

1kg TUB

Sample Type

S

S

S

S

Asbestos ID in Solid Samples

All

NDPs: 0
Tests: 4

X

X

X

X

Asbestos Quantification - Full

All

NDPs: 0
Tests: 3

X

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181201-9
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000304

Report Number: 484291
Superseded Report:

Asbestos Identification - Solid Samples

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP06-Asb-1 0.00 - 0.00 SOLID 29/11/2018 00:00:00 04/12/2018 09:48:04 181201-9 18860034 TM048	06/12/2018	Lucy Caroe	Loose fibres in soil	Not Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP06-Asb-2 0.00 - 0.00 SOLID 29/11/2018 00:00:00 04/12/2018 10:18:16 181201-9 18860036 TM048	06/12/2018	Andrzej Ferfecki	loose fibres in soil	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP06-Asb-3 0.00 - 0.00 SOLID 29/11/2018 00:00:00 04/12/2018 09:58:10 181201-9 18860039 TM048	06/12/2018	Lucy Caroe	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP06-Asb-4 0.00 - 0.00 SOLID 29/11/2018 00:00:00 04/12/2018 09:51:49 181201-9 18860041 TM048	06/12/2018	Lucy Caroe	Loose fibres in soil	Not Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 181201-9
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000304

Report Number: 484291
Superseded Report:

Asbestos Quantification - Full

		Additional Asbestos Components (Using TM048)	Analysts Comments	Asbestos Quantification - Gravimetric - %	Asbestos Quantification - PCOM Evaluation - %	Asbestos Quantification - Total - %
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP06-Asb-1 0.00 - 0.00 SOLID 29/11/2018 00:00:00 04/12/2018 09:50:09 181201-9 18860034 TM304	None (#)	N/C	<0.001 (#)	<0.001 (#)	<0.001 (#)
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP06-Asb-2 0.00 - 0.00 SOLID 29/11/2018 00:00:00 04/12/2018 10:20:31 181201-9 18860036 TM304	None (#)	N/C	<0.001 (#)	<0.001 (#)	<0.001 (#)
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SP06-Asb-4 0.00 - 0.00 SOLID 29/11/2018 00:00:00 04/12/2018 09:55:43 181201-9 18860041 TM304	None (#)	N/C	<0.001 (#)	<0.001 (#)	<0.001 (#)



CERTIFICATE OF ANALYSIS

Validated

SDG: 181201-9
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000304

Report Number: 484291
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM304	HSE Contract research Report no 83/1996	Asbestos Quantification in Soil: Fibres identified by morphology only

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181201-9
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000304

Report Number: 484291
Superseded Report:

Test Completion Dates

Lab Sample No(s)	18860034	18860036	18860039	18860041
Customer Sample Ref.	SP06-Asb-1	SP06-Asb-2	SP06-Asb-3	SP06-Asb-4
AGS Ref.				
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	06-Dec-2018	06-Dec-2018	06-Dec-2018	06-Dec-2018
Asbestos Quantification - Full	06-Dec-2018	06-Dec-2018		06-Dec-2018



CERTIFICATE OF ANALYSIS

SDG:	181201-9	Client Reference:	Crowland	Report Number:	484291
Location:	Crowland	Order Number:	PO-0000304	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 and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



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Website: www.alsenvironmental.co.uk

FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date:	12 December 2018
Customer:	H_FLIQDS_GUI
Sample Delivery Group (SDG):	181205-29
Your Reference:	Crowland
Location:	Crowland
Report No:	485000

We received 2 samples on Wednesday December 05, 2018 and 2 of these samples were scheduled for analysis which was completed on Wednesday December 12, 2018. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-29
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 485000
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18883366	SP06-B-VOC		0.00 - 0.00	03/12/2018
18883372	SP06-C-VOC		0.00 - 0.00	03/12/2018

Maximum Sample/Coolbox Temperature (°C) :

8.4

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-29
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 485000
Superseded Report:

Results Legend



Test



No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

18883366

18883372

Customer
Sample Reference

SP06-B-VOC

SP06-C-VOC

AGS Reference

Depth (m)

0.00 - 0.00

0.00 - 0.00

Container

60g VOC (ALE215)

60g VOC (ALE215)

Sample Type

S

S

Sample description

All

NDPs: 0
Tests: 2

X

X

VOC MS (S)

All

NDPs: 0
Tests: 2

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-29
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 485000
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	Inclusions	Inclusions 2
18883366	SP06-B-VOC	0.00 - 0.00	Dark Brown	Silty Clay Loam	Stones	Vegetation
18883372	SP06-C-VOC	0.00 - 0.00	Dark Brown	Silty Clay Loam	Stones	None

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

Validated

SDG: 181205-29
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 485000
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	SP06-B-VOC	SP06-C-VOC				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00				
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)				
aq	Aqueous / settled sample.		03/12/2018	03/12/2018				
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.		05/12/2018	05/12/2018				
**	% 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		181205-29	181205-29				
(F)	Trigger breach confirmed		18883366	18883372				
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM116	113	111				
Toluene-d8**	%	TM116	98.3	99.2				
4-Bromofluorobenzene**	%	TM116	87.4	90.9				
Dichlorodifluoromethane	<6 µg/kg	TM116	<120	<120				
Chloromethane	<7 µg/kg	TM116	<140	<140				
Vinyl Chloride	<6 µg/kg	TM116	<120	<120				
Bromomethane	<10 µg/kg	TM116	<200	<200				
Chloroethane	<10 µg/kg	TM116	<200	<200				
Trichlorofluoromethane	<6 µg/kg	TM116	<120	<120				
1,1-Dichloroethene	<10 µg/kg	TM116	<200	<200				
Carbon Disulphide	<7 µg/kg	TM116	<140	<140				
Dichloromethane	<10 µg/kg	TM116	<200	<200				
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<200	<200				
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<200	<200				
1,1-Dichloroethane	<8 µg/kg	TM116	552	1590				
cis-1,2-Dichloroethene	<6 µg/kg	TM116	3120	16100				
2,2-Dichloropropane	<10 µg/kg	TM116	<200	<200				
Bromochloromethane	<10 µg/kg	TM116	<200	<200				
Chloroform	<8 µg/kg	TM116	<160	<160				
1,1,1-Trichloroethane	<7 µg/kg	TM116	784	6080				
1,1-Dichloropropene	<10 µg/kg	TM116	<200	<200				
Carbontetrachloride	<10 µg/kg	TM116	<200	<200				
1,2-Dichloroethane	<5 µg/kg	TM116	<100	<100				
Benzene	<9 µg/kg	TM116	<180	<180				
Trichloroethene	<9 µg/kg	TM116	25000	35300				
1,2-Dichloropropane	<10 µg/kg	TM116	<200	<200				
Dibromomethane	<9 µg/kg	TM116	<180	<180				
Bromodichloromethane	<7 µg/kg	TM116	<140	<140				
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<200	<200				
Toluene	<7 µg/kg	TM116	<140	<140				
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<200	<200				
1,1,2-Trichloroethane	<10 µg/kg	TM116	<200	<200				
1,3-Dichloropropane	<7 µg/kg	TM116	<140	<140				



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-29
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 485000
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	SP06-B-VOC	SP06-C-VOC				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00				
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)				
aq	Aqueous / settled sample.		03/12/2018	03/12/2018				
diss.filt	Dissolved / filtered sample.		.	.				
tot.unfilt	Total / unfiltered sample.		05/12/2018	05/12/2018				
*	Subcontracted test.		181205-29	181205-29				
**	% 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		18883366	18883372				
(F)	Trigger breach confirmed							
1-5&\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Tetrachloroethene	<5 µg/kg	TM116	186000	283000				
			M	M				
Dibromochloromethane	<10 µg/kg	TM116	<200	<200				
			M	M				
1,2-Dibromoethane	<10 µg/kg	TM116	<200	<200				
			M	M				
Chlorobenzene	<5 µg/kg	TM116	<100	<100				
			M	M				
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<200	<200				
			M	M				
Ethylbenzene	<4 µg/kg	TM116	<80	<80				
			M	M				
p/m-Xylene	<10 µg/kg	TM116	<200	<200				
			#	#				
o-Xylene	<10 µg/kg	TM116	<200	<200				
			M	M				
Styrene	<10 µg/kg	TM116	<200	<200				
			#	#				
Bromoform	<10 µg/kg	TM116	<200	<200				
			M	M				
Isopropylbenzene	<5 µg/kg	TM116	<100	<100				
			#	#				
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<200	<200				
			#	#				
1,2,3-Trichloropropane	<16 µg/kg	TM116	<320	<320				
			M	M				
Bromobenzene	<10 µg/kg	TM116	<200	<200				
			M	M				
Propylbenzene	<10 µg/kg	TM116	<200	<200				
			M	M				
2-Chlorotoluene	<9 µg/kg	TM116	<180	<180				
			M	M				
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<160	<160				
			M	M				
4-Chlorotoluene	<10 µg/kg	TM116	<200	<200				
			M	M				
tert-Butylbenzene	<14 µg/kg	TM116	<280	<280				
			M	M				
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<180	581				
			#	#				
sec-Butylbenzene	<10 µg/kg	TM116	<200	<200				
4-Isopropyltoluene	<10 µg/kg	TM116	<200	<200				
			M	M				
1,3-Dichlorobenzene	<8 µg/kg	TM116	<160	<160				
			M	M				
1,4-Dichlorobenzene	<5 µg/kg	TM116	<100	<100				
			M	M				
n-Butylbenzene	<11 µg/kg	TM116	<220	<220				
1,2-Dichlorobenzene	<10 µg/kg	TM116	<200	<200				
			M	M				
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<280	<280				
			M	M				
Tert-amyl methyl ether	<10 µg/kg	TM116	<200	<200				
			#	#				
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<400	<400				
Hexachlorobutadiene	<20 µg/kg	TM116	<400	<400				
Naphthalene	<13 µg/kg	TM116	<260	<260				
			M	M				
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<400	<400				
			#	#				



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-29
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 485000
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 181205-29
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000307

Report Number: 485000
Superseded Report:

Test Completion Dates

Lab Sample No(s)	18883366	18883372
Customer Sample Ref.	SP06-B-VOC	SP06-C-VOC
AGS Ref.		
Depth	0.00 - 0.00	0.00 - 0.00
Type	Soil/Solid (S)	Soil/Solid (S)
Sample description	07-Dec-2018	07-Dec-2018
VOC MS (S)	12-Dec-2018	12-Dec-2018



CERTIFICATE OF ANALYSIS

SDG:	181205-29	Client Reference:	Crowland	Report Number:	485000
Location:	Crowland	Order Number:	PO-0000307	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 and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 (BTX). For total volatiles in the C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (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 Anthophyllite	-
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.



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email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

FLI QDS
18 The Pines Business Park
Broad Street
GU3 3BH

Attention: Ellie Cotterill

CERTIFICATE OF ANALYSIS

Date of report Generation:	14 January 2019
Customer:	H_FLIQDS_GUI
Sample Delivery Group (SDG):	190105-19
Your Reference:	Crowland
Location:	Crowland
Report No:	488292

We received 8 samples on Saturday January 05, 2019 and 8 of these samples were scheduled for analysis which was completed on Monday January 14, 2019. 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.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 190105-19
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000330

Report Number: 488292
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
19060012	Surface-A		0.00 - 0.00	03/01/2019
19060014	Surface-B		0.00 - 0.00	03/01/2019
19060016	Surface-C		0.00 - 0.00	03/01/2019
19060018	Surface-D		0.00 - 0.00	03/01/2019
19060020	Surface-E		0.00 - 0.00	03/01/2019
19060022	Surface-F		0.00 - 0.00	03/01/2019
19060026	Surface-G		0.00 - 0.00	03/01/2019
19060028	Surface-H		0.00 - 0.00	03/01/2019

Maximum Sample/Coolbox Temperature (°C) :

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

6.2

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190105-19
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000330

Report Number: 488292
Superseded Report:

Results Legend



Test



No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

Customer
Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Sample description

All

NDPs: 0
Tests: 8

X X X X X X X X X

VOC MS (S)

All

NDPs: 0
Tests: 8

X X X X X X X X X



CERTIFICATE OF ANALYSIS

Validated

SDG: 190105-19
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000330

Report Number: 488292
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
------------------	----------	-------------	-----------------	---------------	-------------	---------------	------------	--------------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
19060012	Surface-A	0.00 - 0.00	Dark Brown	Silty Clay Loam	Stones	None
19060014	Surface-B	0.00 - 0.00	Dark Brown	Silty Clay Loam	Stones	None
19060016	Surface-C	0.00 - 0.00	Dark Brown	Loamy Sand	Stones	None
19060018	Surface-D	0.00 - 0.00	Dark Brown	Silty Clay Loam	Stones	Vegetation
19060020	Surface-E	0.00 - 0.00	Light Brown	Loamy Sand	Stones	Vegetation
19060022	Surface-F	0.00 - 0.00	Dark Brown	Silty Clay Loam	Stones	None
19060026	Surface-G	0.00 - 0.00	Dark Brown	Silty Clay Loam	Stones	None
19060028	Surface-H	0.00 - 0.00	Light Brown	Loamy Sand	Stones	Vegetation

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

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SDG: 190105-19
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000330

Report Number: 488292
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	Surface-A		Surface-B		Surface-C		Surface-D		Surface-E		Surface-F		
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s)	0.00 - 0.00		0.00 - 0.00		0.00 - 0.00		0.00 - 0.00		0.00 - 0.00		0.00 - 0.00	
M	mCERTS accredited.			Soil/Solid (S)		Soil/Solid (S)		Soil/Solid (S)		Soil/Solid (S)		Soil/Solid (S)		Soil/Solid (S)	
aq	Aqueous / settled sample.			03/01/2019		03/01/2019		03/01/2019		03/01/2019		03/01/2019		03/01/2019	
diss.filt	Dissolved / filtered sample.			05/01/2019		05/01/2019		05/01/2019		05/01/2019		05/01/2019		05/01/2019	
tot.unfilt	Total / unfiltered sample.			190105-19		190105-19		190105-19		190105-19		190105-19		190105-19	
unfit	Subcontracted test.			19060012		19060014		19060016		19060018		19060020		19060022	
**	% 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														
1-5&*\$@	Sample deviation (see appendix)														
AGS Reference															
Component		LOD/Units	Method												
Dibromofluoromethane**		%	TM116	101	128	101	102	115	121						
Toluene-d8**		%	TM116	89.7	91.7	95.9	91.5	97.1	93						
4-Bromofluorobenzene**		%	TM116	71.8	71.2	83.7	71.4	83.5	74.7						
Dichlorodifluoromethane		<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6						
Chloromethane		<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7						
Vinyl Chloride		<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6						
Bromomethane		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
Chloroethane		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
Trichlorofluoromethane		<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6						
1,1-Dichloroethene		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
Carbon Disulphide		<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7						
Dichloromethane		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
Methyl Tertiary Butyl Ether		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
trans-1,2-Dichloroethene		<10 µg/kg	TM116	<10	19.4	<10	<10	<10	<10						
1,1-Dichloroethane		<8 µg/kg	TM116	<8	15.5	<8	24.2	<8	23.3						
cis-1,2-Dichloroethene		<6 µg/kg	TM116	105	318	<6	129	<6	372						
2,2-Dichloropropane		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
Bromochloromethane		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
Chloroform		<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8						
1,1,1-Trichloroethane		<7 µg/kg	TM116	53.7	111	<7	80.9	<7	75.8						
1,1-Dichloropropene		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
Carbontetrachloride		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
1,2-Dichloroethane		<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5						
Benzene		<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9						
Trichloroethene		<9 µg/kg	TM116	750	1980	37.3	616	23.3	1030						
1,2-Dichloropropane		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
Dibromomethane		<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9						
Bromodichloromethane		<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7						
cis-1,3-Dichloropropene		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
Toluene		<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7						
trans-1,3-Dichloropropene		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
1,1,2-Trichloroethane		<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10						
1,3-Dichloropropane		<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7						



CERTIFICATE OF ANALYSIS

Validated

SDG: 190105-19
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000330

Report Number: 488292
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	Surface-A	Surface-B	Surface-C	Surface-D	Surface-E	Surface-F
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq	Aqueous / settled sample.		03/01/2019	03/01/2019	03/01/2019	03/01/2019	03/01/2019	03/01/2019
diss.filt	Dissolved / filtered sample.		05/01/2019	05/01/2019	05/01/2019	05/01/2019	05/01/2019	05/01/2019
tot.unfilt	Total / unfiltered sample.		190105-19	190105-19	190105-19	190105-19	190105-19	190105-19
*	Subcontracted test.		19060012	19060014	19060016	19060018	19060020	19060022
**	% 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							
1-5&5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Tetrachloroethene	<5 µg/kg	TM116	52100	16900	339	10500	221	24500
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
Dibromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
1,2-Dibromoethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
Chlorobenzene	<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
Ethylbenzene	<4 µg/kg	TM116	<4	<4	<4	<4	<4	<4
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
p/m-Xylene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ #	♦ #	♦ #	♦ #	♦ #	♦ #
o-Xylene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
Styrene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ #	♦ #	♦ #	♦ #	♦ #	♦ #
Bromoform	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
Isopropylbenzene	<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5
			♦ #	♦ #	♦ #	♦ #	♦ #	♦ #
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ #	♦ #	♦ #	♦ #	♦ #	♦ #
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16	<16	<16	<16	<16	<16
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
Bromobenzene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
Propylbenzene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
2-Chlorotoluene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
4-Chlorotoluene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
tert-Butylbenzene	<14 µg/kg	TM116	<14	<14	<14	<14	<14	<14
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9
			♦ #	♦ #	♦ #	♦ #	♦ #	♦ #
sec-Butylbenzene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦	♦	♦	♦	♦	♦
4-Isopropyltoluene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
n-Butylbenzene	<11 µg/kg	TM116	<11	<11	<11	<11	<11	<11
			♦	♦	♦	♦	♦	♦
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14	<14	<14	<14	<14	<14
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
Tert-amyl methyl ether	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			♦ #	♦ #	♦ #	♦ #	♦ #	♦ #
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20	<20	<20	<20	<20	<20
			♦	♦	♦	♦	♦	♦
Hexachlorobutadiene	<20 µg/kg	TM116	<20	<20	<20	<20	<20	<20
			♦	♦	♦	♦	♦	♦
Naphthalene	<13 µg/kg	TM116	<13	<13	<13	<13	<13	<13
			♦ M	♦ M	♦ M	♦ M	♦ M	♦ M
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<20	<20	<20	<20	<20	<20
			♦ #	♦ #	♦ #	♦ #	♦ #	♦ #



CERTIFICATE OF ANALYSIS

Validated

SDG: 190105-19
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000330

Report Number: 488292
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	Surface-G	Surface-H				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00				
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)				
aq	Aqueous / settled sample.		03/01/2019	03/01/2019				
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.		05/01/2019	05/01/2019				
**	% 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		190105-19	190105-19				
(F)	Trigger breach confirmed		19060026	19060028				
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM116	109	102				
			♦	♦				
Toluene-d8**	%	TM116	92.6	95.9				
			♦	♦				
4-Bromofluorobenzene**	%	TM116	74.4	87.6				
			♦	♦				
Dichlorodifluoromethane	<6 µg/kg	TM116	<6	<6				
			♦ M	♦ M				
Chloromethane	<7 µg/kg	TM116	<7	<7				
			♦ #	♦ #				
Vinyl Chloride	<6 µg/kg	TM116	<6	<6				
			♦ M	♦ M				
Bromomethane	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Chloroethane	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<6				
			♦ M	♦ M				
1,1-Dichloroethene	<10 µg/kg	TM116	<10	<10				
			♦ #	♦ #				
Carbon Disulphide	<7 µg/kg	TM116	<7	<7				
			♦ M	♦ M				
Dichloromethane	<10 µg/kg	TM116	<10	<10				
			♦ #	♦ #				
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
trans-1,2-Dichloroethene	<10 µg/kg	TM116	14.8	<10				
			♦ M	♦ M				
1,1-Dichloroethane	<8 µg/kg	TM116	66.9	<8				
			♦ M	♦ M				
cis-1,2-Dichloroethene	<6 µg/kg	TM116	307	<6				
			♦ M	♦ M				
2,2-Dichloropropane	<10 µg/kg	TM116	<10	<10				
			♦	♦				
Bromochloromethane	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Chloroform	<8 µg/kg	TM116	<8	<8				
			♦ M	♦ M				
1,1,1-Trichloroethane	<7 µg/kg	TM116	69.2	<7				
			♦ M	♦ M				
1,1-Dichloropropene	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Carbontetrachloride	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
1,2-Dichloroethane	<5 µg/kg	TM116	<5	<5				
			♦ M	♦ M				
Benzene	<9 µg/kg	TM116	<9	<9				
			♦ M	♦ M				
Trichloroethene	<9 µg/kg	TM116	1100	47.9				
			♦ #	♦ #				
1,2-Dichloropropane	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Dibromomethane	<9 µg/kg	TM116	<9	<9				
			♦ M	♦ M				
Bromodichloromethane	<7 µg/kg	TM116	<7	<7				
			♦ M	♦ M				
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Toluene	<7 µg/kg	TM116	<7	<7				
			♦ M	♦ M				
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10				
			♦	♦				
1,1,2-Trichloroethane	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
1,3-Dichloropropane	<7 µg/kg	TM116	<7	<7				
			♦ M	♦ M				



CERTIFICATE OF ANALYSIS

Validated

SDG: 190105-19
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000330

Report Number: 488292
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	Surface-G	Surface-H				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00				
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)				
aq	Aqueous / settled sample.		03/01/2019	03/01/2019				
diss.filt	Dissolved / filtered sample.		.	.				
tot.unfilt	Total / unfiltered sample.		05/01/2019	05/01/2019				
*	Subcontracted test.		190105-19	190105-19				
**	% 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		19060026	19060028				
(F)	Trigger breach confirmed							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Tetrachloroethene	<5 µg/kg	TM116	24700	406				
			♦ M	♦ M				
Dibromochloromethane	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
1,2-Dibromoethane	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Chlorobenzene	<5 µg/kg	TM116	<5	<5				
			♦ M	♦ M				
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Ethylbenzene	<4 µg/kg	TM116	<4	<4				
			♦ M	♦ M				
p/m-Xylene	<10 µg/kg	TM116	<10	<10				
			♦ #	♦ #				
o-Xylene	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Styrene	<10 µg/kg	TM116	<10	<10				
			♦ #	♦ #				
Bromoform	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Isopropylbenzene	<5 µg/kg	TM116	<5	<5				
			♦ #	♦ #				
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10				
			♦ #	♦ #				
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16	<16				
			♦ M	♦ M				
Bromobenzene	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
Propylbenzene	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
2-Chlorotoluene	<9 µg/kg	TM116	<9	<9				
			♦ M	♦ M				
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8	<8				
			♦ M	♦ M				
4-Chlorotoluene	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
tert-Butylbenzene	<14 µg/kg	TM116	<14	<14				
			♦ M	♦ M				
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	16.1	<9				
			♦ #	♦ #				
sec-Butylbenzene	<10 µg/kg	TM116	<10	<10				
			♦	♦				
4-Isopropyltoluene	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8	<8				
			♦ M	♦ M				
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5	<5				
			♦ M	♦ M				
n-Butylbenzene	<11 µg/kg	TM116	<11	<11				
			♦	♦				
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10	<10				
			♦ M	♦ M				
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14	<14				
			♦ M	♦ M				
Tert-amyl methyl ether	<10 µg/kg	TM116	<10	<10				
			♦ #	♦ #				
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20	<20				
			♦	♦				
Hexachlorobutadiene	<20 µg/kg	TM116	<20	<20				
			♦	♦				
Naphthalene	<13 µg/kg	TM116	<13	<13				
			♦ M	♦ M				
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<20	<20				
			♦ #	♦ #				



CERTIFICATE OF ANALYSIS

Validated

SDG: 190105-19
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000330

Report Number: 488292
Superseded Report:



CERTIFICATE OF ANALYSIS

Validated

SDG: 190105-19
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000330

Report Number: 488292
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 190105-19
Location: Crowland

Client Reference: Crowland
Order Number: PO-0000330

Report Number: 488292
Superseded Report:

Test Completion Dates

Lab Sample No(s)	19060012	19060014	19060016	19060018	19060020	19060022	19060026	19060028
Customer Sample Ref.	Surface-A	Surface-B	Surface-C	Surface-D	Surface-E	Surface-F	Surface-G	Surface-H
AGS Ref.								
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Sample description	12-Jan-2019	12-Jan-2019	12-Jan-2019	12-Jan-2019	12-Jan-2019	12-Jan-2019	12-Jan-2019	12-Jan-2019
VOC MS (S)	14-Jan-2019	14-Jan-2019	14-Jan-2019	14-Jan-2019	14-Jan-2019	14-Jan-2019	14-Jan-2019	14-Jan-2019



CERTIFICATE OF ANALYSIS

SDG:	190105-19	Client Reference:	Crowland	Report Number:	488292
Location:	Crowland	Order Number:	PO-0000330	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 and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC 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 all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples 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. ALS 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 analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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 (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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 leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

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. 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 C5-C12 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.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (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 ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Astos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
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 D Materials and Waste Management

FLI QDS Offsite Disposal Register - 35 Peterborough Road



Contract No.	3716	Site Name	Crowland	Site Manager	Darren Wood	Period	Dec-18
Document Controller	Elie Cotterill						

Date	Waste Transfer Note No	EWC	Description / Classification	Source / Origin	Disposal Destination	Vehicle / Skip (type / size)	Vehicle Reg.	Actual Weight (t)
4/12/2018	34090	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.94
4/12/2018	34091	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	19.08
4/12/2018	34092	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.30
4/12/2018	34093	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.72
5/12/2018	34095	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.42
5/12/2018	36444	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	16.24
5/12/2018	34097	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	19.02
5/12/2018	36445	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.24
5/12/2018	34096	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	14.44
10/12/2018	35815	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.36
10/12/2018	35816	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.58
10/12/2018	35817	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.92
10/12/2018	35818	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.58
10/12/2018	35819	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.72
11/12/2018	35821	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.64
11/12/2018	35822	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.22
11/12/2018	36465	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	16.90
11/12/2018	35782	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AU18 DXS	18.42
11/12/2018	36466	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	16.70
11/12/2018	35784	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AU18 DXS	18.44
11/12/2018	35823	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.76
11/12/2018	36467	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.26
11/12/2018	35785	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AU18 DXS	19.04
11/12/2018	35824	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.66
11/12/2018	36468	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	18.38
11/12/2018	35786	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AU18 DXS	18.50
11/12/2018	35825	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.56
11/12/2018	36469	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.10
11/12/2018	35787	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AU18 DXS	18.46
11/12/2018	35826	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	19.62
11/12/2018	36470	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.14
14/12/2018	36480	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	18.00
14/12/2018	36481	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.98
14/12/2018	36482	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	18.70
14/12/2018	36483	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.80
14/12/2018	36484	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.96
14/12/2018	36485	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	18.28
17/12/2018	35828	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.54
17/12/2018	35829	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	19.40
17/12/2018	35830	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.70
18/12/2018	35846	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.58
18/12/2018	35847	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.24
18/12/2018	35848	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	19.10
18/12/2018	35849	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.04
18/12/2018	35850	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.46
18/12/2018	35851	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXT	18.26
19/12/2018	36495	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.74
19/12/2018	36496	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.34
19/12/2018	36497	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.86
19/12/2018	36498	170504	Clay, Non Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	17.44
17/12/2018	24655	170503	Asbestos contaminated soils, Hazardous	35 Crowland Road, PE6 0BB	Dunton Environmental, Wolverhampton Treatment Hub, WV1 3DW	8 wheel tipper	BK65ONP	20.00
19/12/2018	FLIQDS/37161	170605	Hardcore with asbestos sheets, Hazardous	35 Crowland Road, PE6 0BB	Biffa Waste Services, Eye Landfill, PE7 7TH	8 wheel tipper	AV18 DXU	10.94

FLI QDS Imported Material Register - 35 Peterborough Road



Contract No.	3716	Site Name	Crowland	Site Manager	Darren Wood	Period	Dec-18
Document Controller	Ellie Cotterill						
Date	Material Conveyance Number	Vehicle / Skip (type / size)	Supplier	Description	Source / Origin	Tonnage	Cumulative Tonnage
4/12/2018	35757	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.10	19.10
5/12/2018	34094	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	38.10
5/12/2018	36443	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	57.10
5/12/2018	36304	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.50	76.60
5/12/2018	35758	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.10	95.70
5/12/2018	35760	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.13	114.83
5/12/2018	36306	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.20	134.03
5/12/2018	34098	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	153.03
5/12/2018	36305	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.65	172.68
5/12/2018	35759	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.17	191.85
5/12/2018	36446	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	210.85
10/12/2018	36462	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	229.85
10/12/2018	36463	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	248.85
11/12/2018	36464	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	267.85
11/12/2018	35820	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	286.85
12/12/2018	35827	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	305.85
12/12/2018	36471	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	324.85
12/12/2018	36474	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	343.85
12/12/2018	36473	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	362.85
12/12/2018	35832	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	381.85
12/12/2018	35834	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	400.85
13/12/2018	35836	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	419.85
13/12/2018	36476	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	438.85
13/12/2018	35837	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	457.85
13/12/2018	36477	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	476.85
14/12/2018	36479	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	495.85
14/12/2018	36506	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.56	515.41
14/12/2018	35839	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	534.41
14/12/2018	35841	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	553.41
14/12/2018	36507	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.50	572.91
17/12/2018	36510	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.50	592.41
17/12/2018	36511	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.30	611.71
17/12/2018	35843	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	630.71
17/12/2018	36512	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.50	650.21
17/12/2018	35844	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	669.21
18/12/2018	36490	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	688.21
18/12/2018	35845	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	707.21
18/12/2018	36513	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.40	726.61
18/12/2018	36516	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.50	746.11
18/12/2018	36493	8 wheel tipper	Lyndon Thomas	Blue clay	Trout Farm, Rothewell	19.00	765.11
4/12/2018	34089	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	18.80	18.80
4/12/2018	34088	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	19.80	38.60
10/12/2018	35814	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	19.10	57.70
10/12/2018	36461	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	19.00	76.70
11/12/2018	35781	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	19.18	95.88
17/12/2018	36486	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	19.00	114.88
17/12/2018	36487	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	19.02	133.90
17/12/2018	36488	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	18.92	152.82
17/12/2018	36489	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	19.02	171.84
19/12/2018	36494	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	18.98	190.82
20/12/2018	36151	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	19.00	209.82
20/12/2018	35855	8 wheel tipper	Mick George	75mm crushed limestone	Wakerley Quarry, Laxton	18.88	228.70

Copies of waste transfer notes can be provided if requested

Appendix E Asbestos Monitoring

Asbestos Analyst's Job Summary Report

Job Ref No: **299527**, Account Ref No: **22435**, Contract Ref No: **41752**

35 Peterborough Road, Crowland, PE6 0BB

Title: Reassurance air testing at 35 Peterborough Road



on site photo

Passed Certificates	Failed Certificates
1	0

First Visit to Site: Thursday, 22nd November, 2018, **Last Visit to Site:** Tuesday, 18th December, 2018

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Intro

This document is a summary of findings relating to asbestos analytical works at **35 Peterborough Road, Crowland, PE6 0BB** from **Thursday, 22nd November, 2018** to **Tuesday, 18th December, 2018**. It is intended to give an overview of testing and must be read only in conjunction with the certificates it references. The document should never be read in isolation as asbestos analysts reports often contain additional notes and advice that should be referred to.

A report is provided electronically via the NexGen web-portal. Rendering of the report will create a unique pdf version identified in the the footer of the document where date and time of rendering is recorded. Document history can be reviewed via the 'View File History' when viewing the report online. Prior to commencing any works or review of the report, the most current version should be obtained via the link to the NexGen web-portal; any local pdf copies should not be relied on as containing the most current information.

As per the client's specification, materials previously identified as containing asbestos (by other asbestos consultancies) have had this positive identification transferred to this report. Lucion Environmental Ltd cannot accept any liability for errors in this information.

Furthermore, this document contains a summary of analyst notes and comments made in relation to works at this site.

Please note this document may contain findings from more than one analyst on more than one date.

Key to Air-Test Icons

To aid ease of reading the following icons have been used in this document to reference commonly undertaken activities.

-  Clearance Stage 1
-  Clearance Stage 2
-  Clearance Stage 3
-  Clearance Stage 4
-  DCU Stage 2
-  DCU Stage 3
-  Reassurance
-  Background
-  Leak Testing
-  Personal
-  Smoke Test Witness
-  Report Acknowledgement

A **WARNING** is used by the analyst to draw the readers attention to a particular area of the report.

Overview of Works

To view a complete air-certificate, follow the relevant link

 **Certificate: External; excavations**

**Building: 35 Peterborough Road,
Crowland**

Level: 0

Passed 

View the Full Certificate Here: http://web.lucion.co.uk/air_cert/50464?s=27853435076a3f1870c3535cb0274ea0

Type	Test-ID	Start Time	End Time	Date	Operative	# Samples	
 Reassurance	299527-1			22-11-2018	 Ashley Barrett	7	
 Reassurance	299527-2			28-11-2018	 Ashley Barrett	7	
 Reassurance	299527-3			29-11-2018	 Douglas Alexander	7	
 Reassurance	299527-4			04-12-2018	 Ashley Barrett	7	
 Reassurance	299527-5			06-12-2018	 David Wilcox	5	
 Personal	299527-6			06-12-2018	 David Wilcox	2	
 Report Acknowledgement	299527-7			06-12-2018	 David Wilcox	--	
 Reassurance	299527-8			18-12-2018	 Douglas Alexander	7	

Attachments

The following documents accompany this report and should be regarded as an integral part of this report.

They can be downloaded from <http://web.lucion.co.uk/reports/299527/attachments>.

- [Method Statement \[http://web.lucion.co.uk/method_statements/299527?s=732129d63f11405e5b58a2b420e67b4b \]](http://web.lucion.co.uk/method_statements/299527?s=732129d63f11405e5b58a2b420e67b4b)
- [Risk Assessment \[http://web.lucion.co.uk/risk_assessment/299527?s=c987d870cee3d10be1af402906f95c9e \]](http://web.lucion.co.uk/risk_assessment/299527?s=c987d870cee3d10be1af402906f95c9e)

Asbestos Analyst's Certificate Report

Job Ref No: **299527**, Cert Ref No: **50464**, Account Ref No: **22435**, Contract Ref No: **41752**

35 Peterborough Road, Crowland, PE6 0BB



on site photo



general works area photo

Building	Level	Works-Area	Enclosure Used?	Certificate Issue Date
35 Peterborough Road, Crowland	0	External; excavations	No	Tuesday, 18th December, 2018

Overall Certificate Status	Passed Tests	Failed Tests	WARNINGS
PASSED	0	0	0

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Intro

This certificate is for the attention of

Rob Timson
FLI QDS Remediation Limited
FLI QDS Remediation Limited Midland Road Rotherham S61 1TF

Sampling & Evaluation Methods

In-house methods TOP02.08 & TOP02.09 in accordance with HSG 248 Asbestos - The Analyst's Guide to Sampling, Analysis and Clearance Procedures.

Notes: The samples referred to in this report will be retained for 6 months unless requested otherwise. Unless otherwise stated, there are no departures from the sampling and evaluation methods specified. Results detailed in this report relate only to the time, and corresponding conditions prevailing, when the sampling and examination were undertaken.

Notes to Test Accuracy

Airflow measured on site is recorded against a correction chart. Flow meters are calibrated against a UKAS certified master flow meter accurate to $\pm 0.5\%$. In accordance with HSG248, if the combined effect of ambient temperature and pressure between calibration and sampling location exceeds 5% a correction is applied to the air sample volume. The calculated fibre concentration is given for each air sample taken. Where the corresponding reported fibre concentration is preceded by "<", the lower limit of quantification (LOQ) of the method has not been reached. For a 480 litre air sample with 200 graticule areas counted, the (LOQ) of this method is 0.010 fibres per cubic centimetre of air; samples of less volume/graticules will be reported to a lower LOQ (refer count sheet). While counting randomly distributed fibres, an expected degree of variation of 1.5 standard deviations from the mean count may occur. At clearance indicator level (0.01 fibres per cubic centimetre of air) a 480-litre air sample yielding a count of 20 fibres over 200 fields would have an expected standard deviation of ± 8 fibres.

Sampling

When testing within an Enclosure and conducting a 4-Stage Clearance - the number of samples (Ns) is calculated by $A^{1/3}-1$. Where enclosure is less than 3m in height: A is denoted by area. Where enclosure is greater than 3m in height: A is denoted by volume/3. Refer air sampling and fibre counting sheet.

When testing within a decontamination unit (DCU) - where the combined floor area of shower and dirty areas is less than 10m²; 1 air test has been carried out. During this test the door between these areas has been propped open. For combined floor areas exceeding 10m² a sample in each area (i.e. shower and dirty end) will be taken.

For tests other than those associated with 4-Stage Clearance testing the analyst will apply the principles of current HSE guidance and experience combined with situational circumstances.

Where a photograph of the completed decontamination unit certificate appears in this report the analyst has completed an abridged report to be left inside the DCU; this abridged report should not be used in lieu of this comprehensive report.

Where sampling plans have been supplied; please note these are not to scale.

Where a sample filter has been deemed uncountable or biased the analyst will record this as "uncountable" in the count-sheet.

Field Blanks - Where site sampling and counting is carried out in a field laboratory a field blank is carried out by the analyst prior to the start of sampling and counting. The field blank constitutes a filter taken from a loaded but unused filter head that is mounted in the usual way and assigned a sample number which is recorded on the slide and the count sheet. Following sampling and analysis of the air tests, the results shall be assessed; where low counts ($<0.01 \text{ fcm}^{-3}$) are obtained from some of the field samples, analysis of the field blank will not be necessary. Where elevated counts ($>0.01 \text{ fcm}^{-3}$) are obtained on all field samples, then the field blank must be counted to exclude the possibility of contamination.

Disclaimers

Any opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This certificate is valid only when it bears the signature of an authorised member of Lucion personnel. Please note the witnessing of smoke tests is outwith the scope of UKAS accreditation.

Representatives Signature - The signatory on report acknowledgement agrees to findings of this report being accurate and correct and Lucion Environmental Ltd issuing this report to the email address held on record for the job and does not require a copy of this report to be left on site. Furthermore Lucion Environmental Ltd cannot be held responsible for any actions undertaken following the issue of this report.

This certificate *may* be part of a series of works and should be read in conjunction with the Asbestos Analyst's Job Summary Report.

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Test: Reassurance (299527-1)

Number of samples being taken	7
Air sample results	All air samples gave results below 0.01 fibres per cc of air.
Analyst Signature Signature Date	 Thursday, 22nd November, 2018 @ 14:54:55
Additional Photo 1	 To front of site boundary right hand corner of concrete slab adjacent excavation
Additional Photo 2	 To left of site boundary adjacent midway point of public footpath

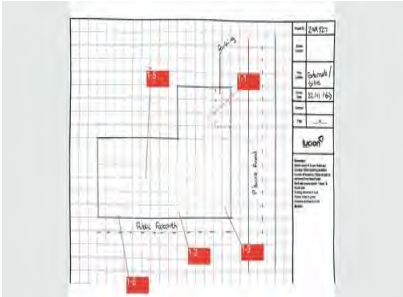
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Additional Photo 3



Adjacent welfare cabin at site entrance

Additional Photo 4



Air sampling location plan - 22/11/2018

Test: Reassurance (299527-1) - Count Sheet

Lucion Report Number		Test Date		Sampled By		Counted By									
299527-1		Thursday, 22nd November, 2018		Ashley Barrett		Ashley Barrett									
Air Volume Correction Detail															
T Cal (K)		T Site (C)		T Pcal (hPa)											
293		4		1013											
Microscope & Calculation Detail															
P Site (hPa)	Correction Required	Micro No.		Graticule Dia (µm)		Test Slide Result (Grid No.)	Filter Dia. Exposed (mm)								
1018	1	PCM -59		100		5	22.5								
Instrument Detail															
Thermometer, Barometer, Timepiece		Flow (Hi)		Flow (Low)		HSE/NPL	Graticule Slide								
TMP -136		HIFLO -147		LOFLO -146		HSLNPL -305	SM768								
Sample Details															
Sample No.	Sample Location	Head No.	Pump No.	Time On (hh:mm)	Time Off (hh:mm)	Run Time (mins)	Start Flow (lmin-1)	Int Flow (lmin-1)	End Flow (lmin-1)	Calc. Volume (l)	Corr. Volume (l)	Fibres	Fields	Calc. Conc. (Fibres cm ⁻³)	Report. Conc. (Fibres cm ⁻³)
299527-1-1	To front of site boundary right hand corner of concrete slab adjacent excavation	347	32	11:38:00	12:20:00	42	16.0		16.0	672	672	3.0	200	0.001	<0.01
299527-1-2	To left of site boundary adjacent midway point of public footpath	349	42	11:40:00	12:26:00	46	16.0		16.0	736	736	2.0	200	0.001	<0.01
299527-1-3	Adjacent welfare cabin at site entrance	351	42	12:21:00	13:13:00	52	16.0		16.0	832	832	2.5	200	0.001	<0.01
299527-1-4	To right hand side of site boundary adjacent residential timber fence	348	42	12:25:00	13:14:00	49	16.0		16.0	784	784	0.5	200	0.000	<0.01
299527-1-5	Over concrete stock pile situated middle of site	347	42	13:15:00	14:13:00	58	16.0		16.0	928	928	0.5	200	0.000	<0.01
299527-1-6	To left of site boundary adjacent far end point of public footpath	349	32	13:16:00	13:52:00	36	16.0		16.0	576	576	1.0	200	0.000	<0.01
299527-1-7	Field Blank	350													

Test: Reassurance (299527-2)

Number of samples being taken	7
Air sample results	All air samples gave results below 0.01 fibres per cc of air.
Analyst Signature Signature Date	 Wednesday, 28th November, 2018 @ 12:19:15
Additional Photo 1	 Adjacent welfare cabin at site entrance: 2-1
Additional Photo 2	 To front of site boundary right hand corner of concrete slab adjacent excavation and residential fencing: 2-2

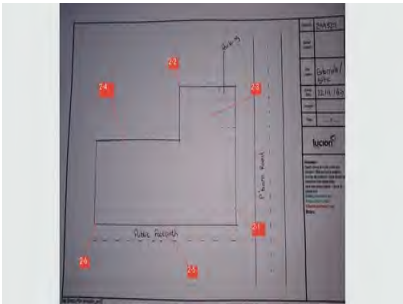
[table continued from previous page...](#)

Additional Photo 3



To front of site boundary right hand corner of concrete slab excavation adjacent residential fencing: 2-3

Additional Photo 4



Air sampling location plan

Test: Reassurance (299527-2) - Count Sheet

Lucion Report Number		Test Date		Sampled By		Counted By									
299527-2		Wednesday, 28th November, 2018		Ashley Barrett		Ashley Barrett									
Air Volume Correction Detail															
T Cal (K)		T Site (C)		T Pcal (hPa)											
293		9		1013											
Microscope & Calculation Detail															
P Site (hPa)	Correction Required	Micro No.		Graticule Dia (µm)		Test Slide Result (Grid No.)	Filter Dia. Exposed (mm)								
1004	1	PCM -59		100		5	22.5								
Instrument Detail															
Thermometer, Barometer, Timepiece		Flow (Hi)		Flow (Low)		HSE/NPL	Graticule Slide								
TMP -136		HIFLO -147		LOFLO -146		HSLNPL -305	SM768								
Sample Details															
Sample No.	Sample Location	Head No.	Pump No.	Time On (hh:mm)	Time Off (hh:mm)	Run Time (mins)	Start Flow (lmin-1)	Int Flow (lmin-1)	End Flow (lmin-1)	Calc. Volume (l)	Corr. Volume (l)	Fibres	Fields	Calc. Conc. (Fibres cm ⁻³)	Report. Conc. (Fibres cm ⁻³)
299527-2-1	Adjacent welfare cabin at site entrance	347	42	09:05:00	10:05:00	60	8.0		8.0	480	480	0.5	200	0.000	<0.01
299527-2-2	To front of site boundary right hand corner of concrete slab excavation adjacent residential fencing	349	43	09:16:00	10:21:00	65	8.0		8.0	520	520	0.5	200	0.000	<0.01
299527-2-3	To front of site boundary right hand corner of concrete slab excavation adjacent parking area	348	44	09:15:00	10:20:00	65	8.0		8.0	520	520	1.0	200	0.000	<0.01
299527-2-4	To concrete stockpile by rear floodlights adjacent residential fence	350	43	10:39:00	11:55:00	76	8.0		8.0	608	608	2.5	200	0.001	<0.01
299527-2-5	To left side of site boundary adjacent midway point of footpath	370	44	10:36:00	11:53:00	77	8.0		8.0	616	616	1.0	200	0.000	<0.01
299527-2-6	To rear left corner of site boundary adjacent footpath	347	42	10:41:00	11:54:00	73	8.0		8.0	584	584	1.0	200	0.000	<0.01
299527-2-7	Field Blank	351													

Test: Reassurance (299527-3)

Number of samples being taken	6
Air sample results	All air samples gave results below 0.01 fibres per cc of air.
Stage Warning?	No
Analyst Signature Signature Date	 Thursday, 29th November, 2018 @ 10:49:12
Additional Photo 1	 works area

Test: Reassurance (299527-3) - Count Sheet

Lucion Report Number		Test Date		Sampled By		Counted By									
299527-3		Thursday, 29th November, 2018		Douglas Alexander		Douglas Alexander									
Air Volume Correction Detail															
T Cal (K)		T Site (C)		T Pcal (hPa)											
293		13		1013											
Microscope & Calculation Detail															
P Site (hPa)	Correction Required	Micro No.		Graticule Dia (µm)		Test Slide Result (Grid No.)	Filter Dia. Exposed (mm)								
1001	1	PCM -21		100		5	22.5								
Instrument Detail															
Thermometer, Barometer, Timepiece		Flow (Hi)		Flow (Low)		HSE/NPL	Graticule Slide								
TMP -117		HIFLO -39		LOFLO -		HSLNPL -4443	SM58								
Sample Details															
Sample No.	Sample Location	Head No.	Pump No.	Time On (hh:mm)	Time Off (hh:mm)	Run Time (mins)	Start Flow (lmin-1)	Int Flow (lmin-1)	End Flow (lmin-1)	Calc. Volume (l)	Corr. Volume (l)	Fibres	Fields	Calc. Conc. (Fibres cm ⁻³)	Report. Conc. (Fibres cm ⁻³)
299527-3-1	Field Blank	130													
299527-3-2	corner of works area behind work vehicles	130	103	09:20:00	09:52:00	32	15.0		15.0	480	480	0.5	200	0.000	<0.01
299527-3-3	corner of fence line behind brick pile	161	91	09:21:00	09:53:00	32	15.0		15.0	480	480	1.0	200	0.001	<0.01
299527-3-4	far corner of fence line adjacent to house (by excavation)	743	70	09:22:00	09:54:00	32	15.0		15.0	480	480	0.5	200	0.000	<0.01
299527-3-5	far corner of fence line adjacent to footpath (by excavation)	177	168	09:23:00	09:55:00	32	15.0		15.0	480	480	2.0	200	0.001	<0.01
299527-3-6	fenceline adjacent to contaminated stockpile	750	230	09:20:00	10:20:00	60	8.0		8.0	480	480	0.5	200	0.000	<0.01
299527-3-7	opposite welfare cabin	744	229	09:19:00	10:19:00	60	8.0		8.0	480	480	4.0	200	0.002	<0.01

Test: Reassurance (299527-4)

Number of samples being taken	7
Air sample results	All air samples gave results below 0.01 fibres per cc of air.
Analyst Signature Signature Date	 Tuesday, 4th December, 2018 @ 16:56:53
Additional Photo 1	 To front of site boundary right hand corner of concrete slab excavation adjacent parking area
Additional Photo 2	 To front of site boundary right hand corner of concrete slab excavation adjacent residential fencing

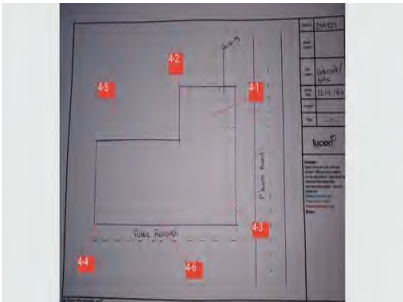
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Additional Photo 3



Adjacent welfare cabin at site entrance

Additional Photo 4



Air sampling location plan- 4-1 to 4-6 (4/12/18)

Test: Reassurance (299527-4) - Count Sheet

Lucion Report Number		Test Date		Sampled By		Counted By									
299527-4		Tuesday, 4th December, 2018		Ashley Barrett		Ashley Barrett									
Air Volume Correction Detail															
T Cal (K)		T Site (C)		T Pcal (hPa)											
293		6		1013											
Microscope & Calculation Detail															
P Site (hPa)	Correction Required	Micro No.		Graticule Dia (µm)		Test Slide Result (Grid No.)	Filter Dia. Exposed (mm)								
1026	1	PCM -59		100		5	22.5								
Instrument Detail															
Thermometer, Barometer, Timepiece		Flow (Hi)		Flow (Low)		HSE/NPL									
TMP -136		HIFLO -147		LOFLO -146		HSLNPL -305									
Graticule Slide															
SM768															
Sample Details															
Sample No.	Sample Location	Head No.	Pump No.	Time On (hh:mm)	Time Off (hh:mm)	Run Time (mins)	Start Flow (lmin-1)	Int Flow (lmin-1)	End Flow (lmin-1)	Calc. Volume (l)	Corr. Volume (l)	Fibres	Fields	Calc. Conc. (Fibres cm ⁻³)	Report. Conc. (Fibres cm ⁻³)
299527-4-1	To front of site boundary right hand corner of concrete slab excavation adjacent parking area	349	111	14:52:00	15:42:00	50	16.0		16.0	800	800	1.0	200	0.000	<0.01
299527-4-2	To front of site boundary right hand corner of concrete slab excavation adjacent residential fencing	348	53	14:54:00	15:43:00	49	16.0		16.0	784	784	1.0	200	0.000	<0.01
299527-4-3	Adjacent welfare cabin at site entrance	350	42	14:56:00	15:39:00	43	16.0		16.0	688	688	0.5	200	0.000	<0.01
299527-4-4	To far left corner of site boundary adjacent footpath	347	53	15:54:00	16:34:00	40	16.0		16.0	640	640	1.5	200	0.001	<0.01
299527-4-5	To right side of site boundary adjacent right side spoil	349	111	15:54:00	16:33:00	39	16.0		16.0	624	624	2.0	200	0.001	<0.01
299527-4-6	To left side of site boundary adjacent left side spoil and footpath midway point	350	42	15:56:00	16:33:00	37	16.0		16.0	592	592	0.5	200	0.000	<0.01
299527-4-7	Field Blank	351													

Test: Reassurance (299527-5)

Number of samples being taken	4
Air sample results	All final results below 0.01 fibres per cc of air.
Stage Warning?	No
Analyst Signature Signature Date	 Thursday, 6th December, 2018 @ 13:08:03
Additional Photo 1	 299527-5-2
Additional Photo 2	 299527-5-3

table continued from previous page...

Additional Photo 3



299527-5-4

Additional Photo 4



299527-5-5

Test: Reassurance (299527-5) - Count Sheet

Lucion Report Number		Test Date		Sampled By		Counted By									
299527-5		Thursday, 6th December, 2018		David Wilcox		David Wilcox									
Air Volume Correction Detail															
T Cal (K)		T Site (C)		T Pcal (hPa)											
293		13		1013											
Microscope & Calculation Detail															
P Site (hPa)	Correction Required	Micro No.	Graticule Dia (µm)	Test Slide Result (Grid No.)	Filter Dia. Exposed (mm)										
1006	1	PCM280	101	5	22.5										
Instrument Detail															
Thermometer, Barometer, Timepiece	Flow (Hi)	Flow (Low)	HSE/NPL	Graticule Slide											
WS69	FM133	FM139	NPL321	SMS770											
Sample Details															
Sample No.	Sample Location	Head No.	Pump No.	Time On (hh:mm)	Time Off (hh:mm)	Run Time (mins)	Start Flow (lmin-1)	Int Flow (lmin-1)	End Flow (lmin-1)	Calc. Volume (l)	Corr. Volume (l)	Fibres	Fields	Calc. Conc. (Fibres cm ⁻³)	Report. Conc. (Fibres cm ⁻³)
299527-5-1	Field Blank	758													
299527-5-2	Perimeter of excavation works	759	223	10:00:00	11:21:00	81	8.0		8.0	648	648	1.0	200	0.000	<0.01
299527-5-3	Perimeter of excavation works	760	473	10:01:00	11:28:00	87	8.0		7.8	685	685	1.0	200	0.000	<0.01
299527-5-4	Perimeter of excavation works	760	02	11:03:00	12:23:00	80	8.0		8.0	640	640	1.0	200	0.000	<0.01
299527-5-5	Perimeter of excavation works	761	705	11:04:00	12:24:00	80	8.0		8.0	640	640	1.0	200	0.000	<0.01

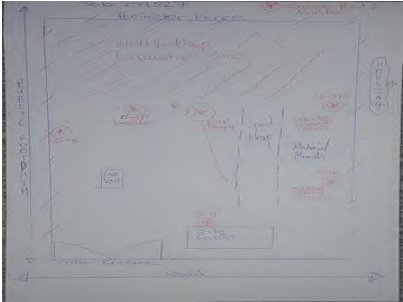
Test: Personal (299527-6)

Number of samples being taken	2
RPE used for works	None
Description of works / product removed	Excavation of old industrial site contaminated spoil, contamination may include ACMs
Asbestos Contractor	SCP
Client Representative or Contractor	Lee McLaurie & Keenen Nickelchason
Air sample results	All final results below 0.08 fibres per ccm of air.
Stage Warning?	No
Analyst Signature Signature Date	 Thursday, 6th December, 2018 @ 13:16:46
Additional Photo 1	 299527-6-1
Additional Photo 2	 299527-6-2

Test: Personal (299527-6) - Count Sheet

Lucion Report Number		Test Date		Sampled By		Counted By									
299527-6		Thursday, 6th December, 2018		David Wilcox		David Wilcox									
Air Volume Correction Detail															
T Cal (K)		T Site (C)		T Pcal (hPa)											
293		13		1013											
Microscope & Calculation Detail															
P Site (hPa)	Correction Required	Micro No.	Graticule Dia (µm)	Test Slide Result (Grid No.)	Filter Dia. Exposed (mm)										
1006	1	PCM280	101	5	22.5										
Instrument Detail															
Thermometer, Barometer, Timepiece	Flow (Hi)	Flow (Low)	HSE/NPL	Graticule Slide											
WS69	FM139	FM133	NPL321	SMS770											
Sample Details															
Sample No.	Sample Location	Head No.	Pump No.	Time On (hh:mm)	Time Off (hh:mm)	Run Time (mins)	Start Flow (lmin-1)	Int Flow (lmin-1)	End Flow (lmin-1)	Calc. Volume (l)	Corr. Volume (l)	Fibres	Fields	Calc. Conc. (Fibres cm ⁻³)	Report. Conc. (Fibres cm ⁻³)
299527-6-1	On Operative Lee McLaurie during operation of excavator to exavate contaminated ground	762	41577	11:09:00	11:47:00	38	2.0		2.0	76	76	1.0	200	0.003	<0.06
299527-6-2	On Operative Keenan Nickelchoson during operation of dumper with contaminated land	762	41577	11:48:00	12:18:00	30	2.0		2.0	60	60	1.0	200	0.004	<0.08

Test: Report Acknowledgement (299527-7)

Analyst Signature Signature Date	 Thursday, 6th December, 2018 @ 13:00:14
Additional notes	Air tests satisfactory. Site Diagram bellow.
Additional Photo 1	 Site Diagram 06/12/2018

Test: Reassurance (299527-8)

Number of samples being taken	6
Air sample results	All air samples gave results below 0.01 fibres per cc of air.
Stage Warning?	No
Analyst Signature Signature Date	 Tuesday, 18th December, 2018 @ 10:20:41
Additional Photo 1	 sample location 8-2
Additional Photo 2	 sample location 8-3

table continued from previous page...

Additional Photo 3



sample location 8-7

Additional Photo 4



general works area

Test: Reassurance (299527-8) - Count Sheet

Lucion Report Number		Test Date		Sampled By		Counted By									
299527-8		Tuesday, 18th December, 2018		Douglas Alexander		Douglas Alexander									
Air Volume Correction Detail															
T Cal (K)		T Site (C)		T Pcal (hPa)											
293		9		1013											
Microscope & Calculation Detail															
P Site (hPa)	Correction Required	Micro No.	Graticule Dia (µm)	Test Slide Result (Grid No.)	Filter Dia. Exposed (mm)										
998	1	PCM -21	100	5	22.5										
Instrument Detail															
Thermometer, Barometer, Timepiece	Flow (Hi)	Flow (Low)	HSE/NPL	Graticule Slide											
TMP -117	HIFLO -39	LOFLO -	HSLNPL -4443	SM58											
Sample Details															
Sample No.	Sample Location	Head No.	Pump No.	Time On (hh:mm)	Time Off (hh:mm)	Run Time (mins)	Start Flow (lmin-1)	Int Flow (lmin-1)	End Flow (lmin-1)	Calc. Volume (l)	Corr. Volume (l)	Fibres	Fields	Calc. Conc. (Fibres cm ⁻³)	Report. Conc. (Fibres cm ⁻³)
299527-8-1	Field Blank	130													
299527-8-2	fenceline behind work car park	161	91	08:58:00	09:30:00	32	15.0		15.0	480	480	0.5	200	0.000	<0.01
299527-8-3	fence line behind small excavation	130	103	08:59:00	09:31:00	32	15.0		15.0	480	480	1.0	200	0.001	<0.01
299527-8-4	fence line adjacent to stockpiles	750	169	09:00:00	09:32:00	32	15.0		15.0	480	480	2.0	200	0.001	<0.01
299527-8-5	in front of rear excavation	177	70	09:01:00	09:33:00	32	15.0		15.0	480	480	1.5	200	0.001	<0.01
299527-8-6	top left corner of rear excavation	743	230	09:02:00	09:50:00	48	10.0		10.0	480	480	2.0	200	0.001	<0.01
299527-8-7	in front of welfare cabin	744	229	09:03:00	09:51:00	48	10.0		10.0	480	480	2.5	200	0.001	<0.01

Appendix F Regulatory Correspondence and Revised DQRA

Archi-tec Architectural Design
8 Brabham Close
Silverstone
Northants
NN12 8UL

Council Offices
Priory Road
Spalding
Lincolnshire
PE11 2XE
Admin 01775 764723
DC Officers 01775 761161
Facsimile 01775 762937
planningadvice@sholland.gov.uk
www.sholland.gov.uk

TOWN AND COUNTRY PLANNING ACT 1990

DRAFT

Reference:	H02-0901-18	Date of Decision:
Applicant:	Blackjack Estates Ltd C/O Archi-Tec Architectural Design 8 Brabham Close Silverstone Northants	
Location:	35 Peterborough Road Crowland Peterborough	
Description:	Proposed erection of 5 dwellings and garaging	

- 1 The development must be begun not later than the expiration of three years beginning with the date of this permission.

Reason: As required by Section 91 of the Town and Country Planning Act 1990 as amended by the Planning and Compulsory Purchase Act 2004.

- 2 The development hereby permitted shall be carried out in accordance with the following approved plans:
C36-200B;
C36-201A;
C36-202A;
C36-203A;
C36-204A;
C36-205;
Flood Risk Assessment (prepared by WtFR Ltd, dated 19th October 2018);
Remediation Implementation Plan (prepared by FLI QDS, dated 7th November 2018);
Technical Note (prepared by FLI QDS, dated 23rd November 2018);
July 2017 Site Investigation (ref. Q-05483/RT/01, prepared by QDS Remediation);
Q-05483-05 Rev A;

Document ref: CRO-HYD-XX-ZZ-CO-GE-0001-S2-P1 (prepared by Hydrock, dated 1st February 2019); and
Appendix A of Desk Study, Quantitative Risk Assessment and Remedial Strategy at Crowland (ref. CRO-HYD-XX-RA-RP-GE-0001, prepared by Hydrock).

Reason: For the avoidance of doubt and in the interests of proper planning.

- 3
- a) No development other than that required to be carried out as part of the Enabling Phase approved scheme of remediation shall take place until the approved Enabling Phase remediation scheme has been carried out in accordance with its terms.
 - b) Following completion of measures identified in the Enabling Phase approved remediation scheme, and prior to the commencement of any additional works on site, an interim verification report that demonstrates the effectiveness of the remediation carried out must be submitted to and approved in writing by the Local Planning Authority.
 - c) Prior to any part of the permitted development being occupied, a final Enabling Phase verification report demonstrating the completion of works set out in the approved Enabling Phase remediation strategy and the effectiveness of the remediation shall be submitted to, and approved in writing by the Local Planning Authority. The report shall include results of sampling and monitoring over at least 12 months and demonstrate that the site remediation criteria have been met.

The verification must ensure that the site will not qualify as contaminated land under Part 2A of the Environmental Protection Act 1990 in relation to the intended use of the land after remediation, and that offsite contamination has been reduced to an acceptable level.

Reason: To ensure that the site does not pose any further risk to human health or the water environment by demonstrating that the requirements of the approved verification plan have been met and that remediation of the site is complete. This issue is integral to the development and therefore the Enabling Phase remediation scheme must be completed prior to the commencement of any other works.

This Condition is imposed in accordance with Policy SG13 of the South Holland Local Plan, 2006.

- 4
- a) The development hereby permitted shall not be commenced until a Remediation Method Statement for Construction Phase Remediation relating to human health exposure has been submitted to and approved in writing by the Local Planning Authority. This shall include detailed information on:
 - i) the extent and method(s) by which the site is to be remediated (to ensure that unacceptable risks are not posed to identified receptors at the site and details of the information to be included in a validation report) and any additional requirements that it may specify, prior to the remediation being commenced on site.
 - ii) the specification of the vapour proof membrane to be installed across all properties, including the manufacturer's agreement that it is appropriate at this location, site specific drawings, details of the qualified installers and proposals for third party verification.
 - iii) the specification of an engineered cover system not less than 1m thick to protect future site users in garden areas.
 - iv) confirmation that appropriate steps have been taken to protect the potable water supply.

Prior to the commencement of remediation works, the Local Planning Authority shall be

given a minimum of two weeks written notice.

b) Prior to the first occupation of any dwelling a verification report that demonstrates the effectiveness of the Construction Phase remediation carried out shall be submitted to and approved in writing by the Local Planning Authority.

Reason: To ensure satisfactory remediation of the contamination identified.

This Condition is imposed in accordance with Policy SG13 of the South Holland Local Plan, 2006.

- 5 The cover system installed as part of Condition 4(a)(ii) above shall not be altered in any way without the prior written consent of the Local Planning Authority.

Reason: To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised.

This Condition is imposed in accordance with Policy SG13 of the South Holland Local Plan, 2006.

- 6 No infiltration of surface water drainage into the ground shall be permitted other than with the written consent of the Local Planning Authority. The development shall be carried out in accordance with the approved details.

Reason: To ensure that the development does not contribute to, or is not put at an unacceptable risk from, or adversely affected by, unacceptable levels of water pollution caused by mobilised contaminants.

This Condition is imposed in accordance with Policy SG13 of the South Holland Local Plan, 2006 and Paragraph 178 of the National Planning Policy Framework, 2018.

- 7 Notwithstanding the provisions of the Town and Country Planning (General Permitted Development) Order 2015, (or any Order or Statutory Instrument revoking and re-enacting that Order), none of the following developments or alterations shall be carried out.

- i) the erection of freestanding curtilage buildings or structures including car ports, garages, sheds, greenhouses, pergolas or raised decks;
- ii) the erection of house extensions including conservatories, garages, car ports, porches or pergolas;
- iii) internal or external alterations to any garage which would preclude its use for housing vehicles.

Reason: The historical use of the site means that the site is contaminated and remediation is required. In the interests of public health, it is necessary for the Local Planning Authority to retain control over the future extension and alteration of the development.

This Condition is imposed in accordance with Policy SG13 of the South Holland Local Plan, 2006.

- 8 If, during development, contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the Local Planning Authority) shall be carried out until an investigation and risk assessment has been undertaken in accordance with details to be agreed with the Local Planning Authority. Where remediation is necessary, a remediation scheme must be submitted to

and approved in writing by the Local Planning Authority. The remediation strategy shall be implemented as approved and, following completion of remediation, a verification report shall be submitted to and approved by the Local Planning Authority.

Reason: To ensure that the development does not contribute to, or is not put at an unacceptable risk from, or adversely affected by, unacceptable levels of water pollution caused by mobilised contaminants. in line with paragraph 178 of the National Planning Policy Framework, 2018.

This Condition is imposed in accordance with Policy SG13 of the South Holland Local Plan, 2006 and Paragraph 178 of the National Planning Policy Framework, 2018.

- 9 Before the commencement of the development hereby permitted, full details of the existing and proposed site levels and proposed floor levels of the buildings and hard surfaced areas shall be submitted to and approved in writing by the Local Planning Authority. The development shall be constructed in accordance with the details so approved.

Reason: To reduce the risk of flooding of the development. This issue is integral to the development and therefore full details need to be finalised prior to the commencement of works.

This Condition is imposed in accordance with national guidance contained in Section 14 of the National Planning Policy Framework, 2018.

- 10 Before the commencement of the development hereby permitted beyond oversite a schedule of external materials of construction of buildings and hard surfaced areas shall be submitted to and approved in writing by the Local Planning Authority. The development shall be constructed in accordance with the materials so approved.

Reason: To ensure that the Local Planning Authority retains control over the external materials of construction of the development in the interests of the character and appearance of the development and the visual amenity of the area in which it is set.

This Condition is imposed in accordance with Policy SG14 of the South Holland Local Plan, 2006.

- 11 Before the commencement of the development hereby permitted beyond oversite, the approval of the Local Planning Authority is required to a scheme of landscaping and tree planting for the site indicating, inter alia, the number, species, heights on planting and positions of all the trees, together with details of post-planting maintenance. Such scheme as is approved by the Local Planning Authority shall be carried out in its entirety within a period of twelve months beginning with the date on which development is commenced. All trees, shrubs and bushes shall be maintained by the owner or owners of the land on which they are situated for the period of five years beginning with the date of completion of the scheme and during that period all losses shall be made good as and when necessary.

Note: The applicant is recommended to employ a qualified and experienced landscape designer to produce a landscaping scheme for the development.

Reason: To ensure that the development is adequately landscaped, in the interests of its visual amenity and that of the area in which it is set.

This Condition is imposed in accordance with Policy SG18 of the South Holland Local Plan, 2006.

- 12 Details of the design and positions of all external boxes for gas and electricity supplies and of any gas flues and soil vent pipes shall be submitted to and approved in writing by the Local Planning Authority prior to their installation and there shall be no variation from the details so approved.

Reason: To ensure that the Local Planning Authority retains control over these details of the development in the interests of the character and appearance of the development and the visual amenity of the area in which it is set.

This Condition is imposed in accordance with Policy SG14 of the South Holland Local Plan, 2006.

- 13 No part of the development hereby permitted shall be occupied before details of the means of storage and disposal of refuse and recycling have been submitted to and approved in writing by the Local Planning Authority. The approved scheme shall be fully implemented before any dwelling is occupied and shall thereafter be retained.

Reason: To ensure that adequate facilities are made available for refuse storage and disposal to avoid pollution, to protect residential amenity, and in the interests of the appearance of the site and the area within which it is set. This issue is integral to the development and therefore full details need to be finalised prior to the commencement of works.

This Condition is imposed in accordance with Policies SG13 and SG17 of the South Holland Local Plan, 2006.

- 14 The development hereby permitted shall be carried out in accordance with the measures set out in the Flood Risk Assessment (prepared by WtFR Ltd, dated 19th October 2018) forming part of this planning application, unless otherwise agreed in writing by the Local Planning Authority, in particular the following measures shall be fully implemented before the property is first occupied:

- Dwellings must be a minimum of 2 storey;
- Finished floor levels shall be set at a minimum of 1m above existing ground level; and
- Flood resilient construction shall be incorporated up to a minimum of 300mm above the predicted flood depths.

Reason: To ensure that the development does not increase the risk of flooding or be at risk of flooding.

This Condition is imposed in accordance with national guidance contained in Section 14 of the National Planning Policy Framework, 2018.

Notes:

The Local Planning Authority has acted positively and proactively in determining this application by assessing it against all material considerations, including national guidance, planning policies and representations that have been received during the public consultation exercise, and by identifying matters of concern within the application and negotiating, with the

Applicant, acceptable amendments to the proposal to address those concerns. As a result, the Local Planning Authority has been able to grant planning permission for an acceptable proposal.

This decision notice, the relevant accompanying report and the determined plans can be viewed online at <http://planning.sholland.gov.uk/OcellaWeb/planningSearch>

Note: This development is approved subject to the remediation scheme as set out in the document 'Peterborough Road, Crowland Remediation Implementation Plan' FLI QDS Document ref. Q-05843-C-RIP Issue 1 dated 07/11/2018.

The permitted development requires the formation of a new/amended vehicular access. Applicants should note the provisions of Section 184 of the Highways Act 1980. The works should be constructed to the satisfaction of the Highway Authority in accordance with the Authority's specification that is current at the time of construction. For further information, please telephone 01522 782070.

The road serving the permitted development is approved as a private road which will not be adopted as a Highway Maintainable at the Public Expense (under the Highways Act 1980). As such, the liability for the future maintenance of the road will rest with those who gain access to their property from it.

Please contact the Lincolnshire County Council Streetworks and Permitting Team on 01522 782070 to discuss any proposed statutory utility connections and any other works which will be required within the public highway in association with the development permitted under this Consent. This will enable Lincolnshire County Council to assist in the coordination and timings of these works.



Phil Norman
Planning and Building Control Manager
South Holland District Council

19th March 2019

Technical Note



Author: Jamie Harris

Date: 23-11-18

To: EA

Subject: 35 Peterborough Road, Crowland - Revision of DQRA targets

Following review of the Remediation Strategy (Ref: CRO-HYD-XX-RS-RP-GE-0001), the Environment Agency requested additional Detailed Quantitative Risk Assessment (DQRA) to model the fate and transport of Volatile Organic Compounds (VOCs) within the soils underlying the Peterborough Road site. Additional assessment was undertaken using Drinking Water Standards (DWS) as a reference concentration for the VOCs in Table 1.

In line with GP3 guidance, a compliance point of 50m was used for hazardous substances and 250 m for non-hazardous substances. There are no abstraction points within 250 m.

Half lives for vinyl chloride were derived from EA2002 R&D Technical Report P2-228/TR and an anaerobic rate of 100 days was determined. This was based on the remediation design which includes the implementation of an anaerobic bioremediation substrate to maintain reducing conditions over the following 2-5 years.

Additional targets were calculated using the Remedial Targets Methodology (RTM) for Tier 3 soil concentrations.

Table 1: Additional compounds assessed

Determinand	EQS (µg/l)	DWS (µg/l)	Notes	RTM target (mg/kg)
vinyl chloride	None	0.5	Source: UK DWS. Note – hazardous substance.	3.580
<i>trans</i> -1,2-dichloroethene*	None	50	Source: WHO (2018) Note – non-hazardous substance.	28,203
<i>cis</i> -1,2-dichloroethene*	None	50	Source: WHO (2018) Note – non-hazardous substance.	27,355
* using non specific half-life of 750 days for total chlorinated solvents, as reported in Hydrock report CRO-HYD-XX-RS-RP-GE-0001				

Vinyl chloride was identified as a potential risk with reductions required from current site maximum of 7.6 mg/kg to a target of 3.5 mg/kg. Dichloroethene was found to not present a risk at current concentrations.

On the basis of the additional assessment the remediation criteria for re-use of soils below cover (Table 7.1 of Remediation Strategy) will be re-issued to include the above. The complete criteria are as shown in Table 2.

Table 2: Revised Re-use Criteria Below Cover System, Hardstanding or Built Environment

Chemical of Concern	Controlled Waters RTV (mg/kg)	Human Health RTV (Outdoor air vapour pathway) (mg/kg)	Proposed RTV mg/kg	Notes
Toluene	-	1,920	1,920	Solubility Limit
Ethylbenzene	-	1,220	1,220	Solubility Limit
m,p-xylene	-	1,350	1,350	Solubility Limit
o-xylene	-	1,120	1,120	Solubility Limit
1,2-DCA	0.201	4,290	0.201	
Vinyl Chloride	3.58	112	3.58	
TCE	136	3,220	136	
1,1,1-TCA	974	2,920	974	
PCE	8,300	951	951	
Benzene	21.2	2,260	21.2	
1,1,2-trichloroethane	1,340	8,210	1,340	
Dichloromethane	0.173	9,860	0.173	
Cis 1,2 DCE	22,203	-	22,203	
Trans 1,2 DCE	27,355	-	27,355	

Enclosed

3 x RTM Model Sheets