Highgate Newtown Community Centre
Bertram Street
London
N19 5DQ

Remediation Validation

London Borough of Camden Development Council

December 2023

J16021C
Rev 0

Report prepared by

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Report checked and approved by

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Managing Director

Rev No	Status	Revision Details	Date	Approved for Issue
0	Final		22 December 2023	

This report has been issued by the GEA office indicated below. Any enquiries regarding the report should be directed to the report project engineer at the office indicated or to Steve Branch in our main Herts office.

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	Nottinghamshire	tel 01509 674888
	Manchester	tel 0161 209 3032

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The report has been prepared by GEA on the basis of available information obtained during the period that the work was carried out.. Although reasonable effort has been made to gather all relevant information, not all potential environmental constraints or liabilities associated with the site may have been revealed.

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Contents

1.0 Introduction

It is understood that the redevelopment of the above site has been completed through the construction of four new residential blocks, including a new community centre and double height sports hall. The site has previously been the subject of a site investigation and basement impact assessment report (report reference J16021 Report Issue 4, dated 22nd October 2018) and a supplementary ground investigation and remediation method statement report (J16021B Report Issue 4, dated 15th October 2020) each prepared by GEA. A ground investigation has also been carried out by Connaughts Site Investigation Ltd to determine the condition of a buried fuel tank known to be present on site (report ref SW/JW/0488, dated 14th April, 2015). A copy of the report was provided by the former consulting engineers for the project and it was reviewed as part of the previous GEA report. The previous reports contain data pertinent to the site and should therefore be read in conjunction with this report.

The remedial proposals for this development included the removal of the fuel tank, pipework and any surrounding contaminated soil, the removal of soil in the area of Borehole No 5, which contained low concentrations of asbestos fibres, the installation of a clean capping layer in the landscaped areas and the installation of new buried services using barrier pipe.

This report has been prepared to provide the information to discharge the planning condition relating to verification of the remediation implemented at the site. This report confirms that the objectives of the Remediation Method Statement have been achieved satisfactorily.

2.0 The Site

The site is located to the south of Highgate, approximately 650 m south-southwest of Archway London Underground station. It is accessed via Bertram Street which, along with the associated houses, borders the site to the north. It is bounded to the east by an apartment block and to the southwest and northwest by the rear gardens of houses and blocks of apartments fronting onto Croftdown Road. The site may be additionally located by National Grid Reference 528811, 186534. A full description of the site is included in the previous reports.

3.0 Ground Model

The desk study revealed that the site has not had a potentially contaminative historical use as it has been occupied by the existing buildings for its entire known developed history which were used as a school, Territorial Army centre and a community centre, and on the basis of the findings of the investigations carried out to date, the ground conditions at this site can be characterised as follows:

- the investigation encountered a generally moderate thickness of made ground, overlying London Clay;
- below the concrete surface the made ground generally comprises brown and occasionally grey slightly sandy clay or clayey sand with variable amounts of gravel, brick, concrete and ash fragments and extends to depths of between 0.10 m and 1.70 m with the depth of the made ground increasing in the proximity of the buried tank;
- the London Clay initially comprises firm becoming stiff moderate becoming high and locally very high strength fissured brown clay with bluish grey veins, occasional pockets of orange-brown fine sand, occasional fine selenite fragments and occasional shell fragments extending to depths of between 10.50 m and 12.00 m;
- below this depth the London Clay comprises stiff high becoming very high and locally extremely high strength fissured dark brownish grey clay with rare pockets of pale grey sand and occasional shell fragments and extends to the full depth of the investigation, of 25.00 m;
- groundwater was encountered in Trial Pit No 4 within the made ground at a depth of 0.83 m and has been measured at depths of between 1.82 m and 5.21 m within the standpipe during a subsequent monitoring visit, which is likely to represent inflows of perched groundwater from within the made ground;
- contamination testing revealed three samples to contain an elevated concentration of lead, and a total of six samples to contain elevated concentrations of total PAH, including benzo(a)pyrene; and
- a single sample of the made ground was found to contain fibres or clumps of amosite asbestos at a concentration of 0.003%.

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4.0 Risk Assessment

The table below sets out the risk pathways that could potentially be present following the redevelopment of the site, which will have a residential without plant uptake end use. This conceptual model is based upon the findings of the ground model developed in the light of the investigation findings and highlights areas where remedial work should be considered.

SOURCE	RECEPTOR	PATHWAY	COMMENT
Metal and PAH concentrations	End users	Direct soil and dust ingestion, consumption of homegrown produce, consumption of soil adhering to homegrown produce, skin contact with soils and dust and inhalation of dust and vapours	Contaminants identified are considered to be largely insoluble and given the length of time the site has been uncovered and subjected to infiltration any readily soluble contamination is likely to have migrated from site. The proposed development will result in a large proportion of the site being hard covered which will prevent infiltration. Garden areas will either have the made ground removed in its entirety or a minimum depth of 600 mm removed.
	Vegetation	Uptake via soil through roots in landscaped areas and private gardens	
	Adjacent sites	Migration through made ground and Taplow Gravel	
	Ground workers and future site workers	Accidental ingestion of soil and inhalation and ingestion of soil derived dust, direct contact with contaminated soils	Skin contact with soil will be minimized through the use of appropriate PPE and washing facilities will be provided. Soil will be kept damp to prevent fugitive dust emissions. The presence of contamination should be noted on the construction file.
	Groundwater	Percolation and leaching of surface run-off in areas of soft landscaping and permeable paving	The lead contamination identified is unlikely to be in a soluble form so it is unlikely that there will be leaching of contaminants from the made ground into adjacent sites. The site is underlain by the London Clay, which has extremely low vertical permeability, thus the risk posed to the groundwater within the deep aquifer is considered to be minimal.
	Buried services	Direct contact	Contamination will be isolated from buried services through the use of barrier pipe
Asbestos fibres within made ground in the area of Borehole No 5	End users	Inhalation of fibres	The soil in this area is to be removed and a clean cover system will be installed in areas of soft landscaping.
	Site Workers	Inhalation of fibres	Appropriate protective equipment and working practices will be required during groundworks.

5.0 Remedial Recommendations

Based on the above risk assessment the following remedial objectives were established for this development:

- removal of the fuel tank, all associated pipe work and any surrounding contaminated soil;
- protect end users and provide a suitable growing medium for plant growth in areas of soft landscaping;
- protect ground workers who will be exposed to the soil, through minimising their potential exposure and the potential for dust generation; and
- provide buried water supply pipes with protection to minimise the potential for permeation or degradation by contaminants and to minimise the potential exposure of future maintenance personnel.

In order to address the above remedial objectives the following remedial measures have included:

- removal of the made ground in its entirety from garden/landscaped areas or installation of a cover thickness of clean imported soil in all areas of soft landscaping;
- the removal of soils containing asbestos; and
- installation of buried services within barrier pipe.

The details of these remedial measures are set out below.

5.1 Buried Fuel Tank

The fuel tank and any associated fuel lines were removed from site along with any grossly contaminated surrounding soils.

5.2 Soil Containing Asbestos

The made ground in the area of Borehole No 5 was found to contain elevated concentrations of asbestos. The made ground in this area was removed to its full depth of 0.80 m as part of the removal of the buried fuel tank.

5.3 Soft Landscaped Areas

Within all areas of soft landscaping, the existing soil was removed to variable depths of between 600 mm and 750 mm below proposed ground level, and in some places, where the proposed soft landscaping was underlain by new foundation, the soil was removed to a depth of around 3.00 m below ground level. A plan detailing the areas of landscaping is included below for reference.

The lower 300 mm of the 750 mm thickness installed in the soft landscaped areas to the north and south of Block A and the West of Block D comprised clean imported 6F5 and Type 1 MOT material, creating a boundary layer between the underlying soil and the imparted material, deterring future excavations. Therefore a membrane, as detailed in the remediation method statement, was not installed. A 450 mm thickness of clean imported topsoil was then installed above.

In the area to the rear (northwest) of Block A, where raised planted bends were installed, new drainage was installed, surrounded by a bed of clean imported shingle, with a membrane at the top and base of the shingle. This was then overlain by a 450 mm thickness of imported topsoil, resulting in a minimum of 600 mm of clean imported materials with the membrane and shingle creating an anti-dig separation layer.

Remedial works required in the soft landscaping area to the south of the walkway from Croftdown Road lie outside of the scope of this report as the work in this area is to be carried out by Camden Highways and should be validated under separate cover, once complete.

5.4 Services

Potable Water supply pipes have been installed using barrier pipe. This will protect water supply pipes from degradation and the permeation of organic compounds.

5.5 Site Workers

The site contractor has confirmed that the method of site working was in accordance with guidelines set out by HSE and CIRIA. Hand washing facilities were provided and site workers were encouraged to wash prior to eat and to use appropriate PPE when on site to minimise skin contact with the soil.

The site contractor has confirmed that suspicious soils were not encountered during the construction works, However, the demolition contractor identified potential asbestos containing material in two locations during the removal of the hardstanding on the site. The use of EN140 protective respiratory equipment with P3 filters, localised mechanical dust suppression and enhanced personal decontamination facilities were advised by GEA and the mater was referred to an asbestos specialist with respect to the removal of the material, therefore the measures used fall outside of the scope of this report. This is discussed further in the following section.

5.6 Unknown Contamination

A watching brief was maintained by the contractor throughout the demolition and construction works and no potentially contaminated material was encountered during the construction works. However, during the removal of the hardstanding carried out as part of the demolition works, potential fragments of asbestos containing material were encountered in two parts of the site. One of the areas was in the vicinity of Borehole No 5, where asbestos was found during the ground investigation. The other area was below the hardstanding in part of the former courtyard. The contractor contacted GEA on the 6th November 2020 and works were ceased in the affected areas. GEA instructed the use of EN140 RPE with P3 filters, localised mechanical dust suppression and enhanced personal decontamination units be put in place until the extent of the contamination could be ascertained. An engineer attended site on 11th November to inspect the site for the presence of fragments of ACM and sample any that were found. During the visit, five samples (S1-S5) were taken for asbestos screening and two samples were taken for WAC testing as it was decided that the soil in the affected areas would be excavated to the full depth of the made ground with the soil being removed from site. The results of the testing are also appended and showed that the material in the area of Borehole No 5 was hard fragments of ACM containing Chrysotile asbestos. The results indicated that the material in the other area of the site was generally loose chrysotile fibres and fragments of insulation board containing amosite. The presence of insulation board required the removal works to be classified as notifiable licensed work and GEA therefore instructed the contractor to use an asbestos specialist to oversee the removal of the material. GEA had no further part in this remediation.

6.0 Validation of Remedial Measures

This section sets out how the remedial measures have been carried out and validated.

6.1 Buried Fuel Tank

The fuel tank and any associated fuel lines were removed from site along with any grossly contaminated surrounding soils. An engineer from GEA attended site on the 4th December 2020, following the removal of the buried tank and the associated bund to inspect the completed excavation and ensure any residual contamination was further removed. As well as the visual inspection, headspace testing of a total of 25 samples from within the edges and base of the excavation was carried out using a Photo-ionisation Detector (PID). Of these, 24 samples were found to contain less than 0.1 ppm of VOCs while one of the samples was found to contain a concentration of 10 ppm of VOCs. These figures are both sufficiently low for the soil to be deemed not contaminated when coupled with the visual inspection. Furthermore, four samples of the soil from the edges of the excavation were taken for a suite of contamination testing, and the results indicated all of the concentrations to be below the screening values for the residential end use, with the exception of some elevated concentration of lead, which were consistent with the lead concentrations found elsewhere on site during the investigation, and therefore did not require further consideration or remedial works. A copy of the test results are appended.

6.2 Soil Containing Asbestos

The made ground in the area of Borehole No 5 was found to contain elevated concentrations of asbestos during the investigation. The made ground in this area was removed to its full depth of 0.80 m as part of the removal of the buried fuel tank. The samples taken to validate the excavation in the area of the fuel tank were also screened for the presence of asbestos and none was detected. As a result, this contamination is considered to have been successfully remediated by removal.

6.3 Soft Landscaped Areas

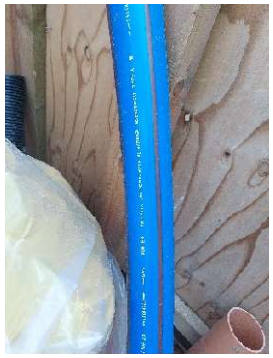
GEA attend site on the 22nd May 2023. During the visit, the excavations for all of the areas of soft landscaping were inspected and it was confirmed that the made ground had been removed to depths in excess of 0.60 m below ground level. The imported material was stockpiled in 1 tonne bags in the northern corner of the site, and four samples were retrieved from the bags and were sent for contamination testing to ensure suitability for use. Additionally, three trial pits were excavated in the raised planters at the rear of Block A, which was the only location at the site where the topsoil had been installed. These trial pits found that the topsoil had been installed to a depth of 450 mm below finished level, and were underlain by a membrane. Reference to photographs taken by the contractor during the installation phase in this area shows the membrane, drainage and shingle installed below the topsoil. The remaining installation of topsoil was carried out in September and October 2023, during which the contractor provided photographs confirming the depth of any imported materials installed. As GEA had already observed the excavations, no further visits were required.

A total of four samples of the imported soil was submitted for contamination. As the total imported topsoil at the site is less than 200 m^3, the frequency of sampling was approximately 1 sample per 50 m^3 of imported soil. This is considered to be a suitable frequency and is in line with the minimum standard detailed in the Remediation Method Statement. The results of the testing are appended, and show that the soil contains no elevated concentrations of contaminants, with all concentrations being well below the threshold values. Additionally, no asbestos fibres were recorded within the samples. As a result, the soil is considered suitable for use.

Photographs of all of the soil installations across the site are provided in the appendix. Although the membrane detailed in the Remediation Method Statement was not installed across the site, the installation of type 1 MOT and 6F5 materials is considered to provide an anti-dig separation layer, which will perform better than a simple membrane, and therefore the remedial works are considered to have been carried out to a suitable standard.

6.5 Services

Photographs of the installation of the new services in barrier pipes are included below, which was installed in September 2022.



6.5 Site Workers

Site work was carried out in accordance with guidelines set out by HSE and CIRIA and all appropriate PPE was work.

During the demolition works potential asbestos containing material was identified in two locations. The use of EN140 protective respiratory equipment with P3 filters, localised mechanical dust suppression and enhanced personal decontamination facilities were advised by GEA and the mater was referred to an asbestos specialist with respect to the removal of the material, therefore the measures used fall outside of the scope of this report.

The contractor confirmed that odorous, discoloured, fibrous or suspicious material was not encountered during the construction phase.

Appendix

Asbestos Sampling Plan
Asbestos Test Results
WAC Test Results
Verification Test Results For Tank Excavation
Validation Test Results For Imported Soil
Site Photographs

GEA

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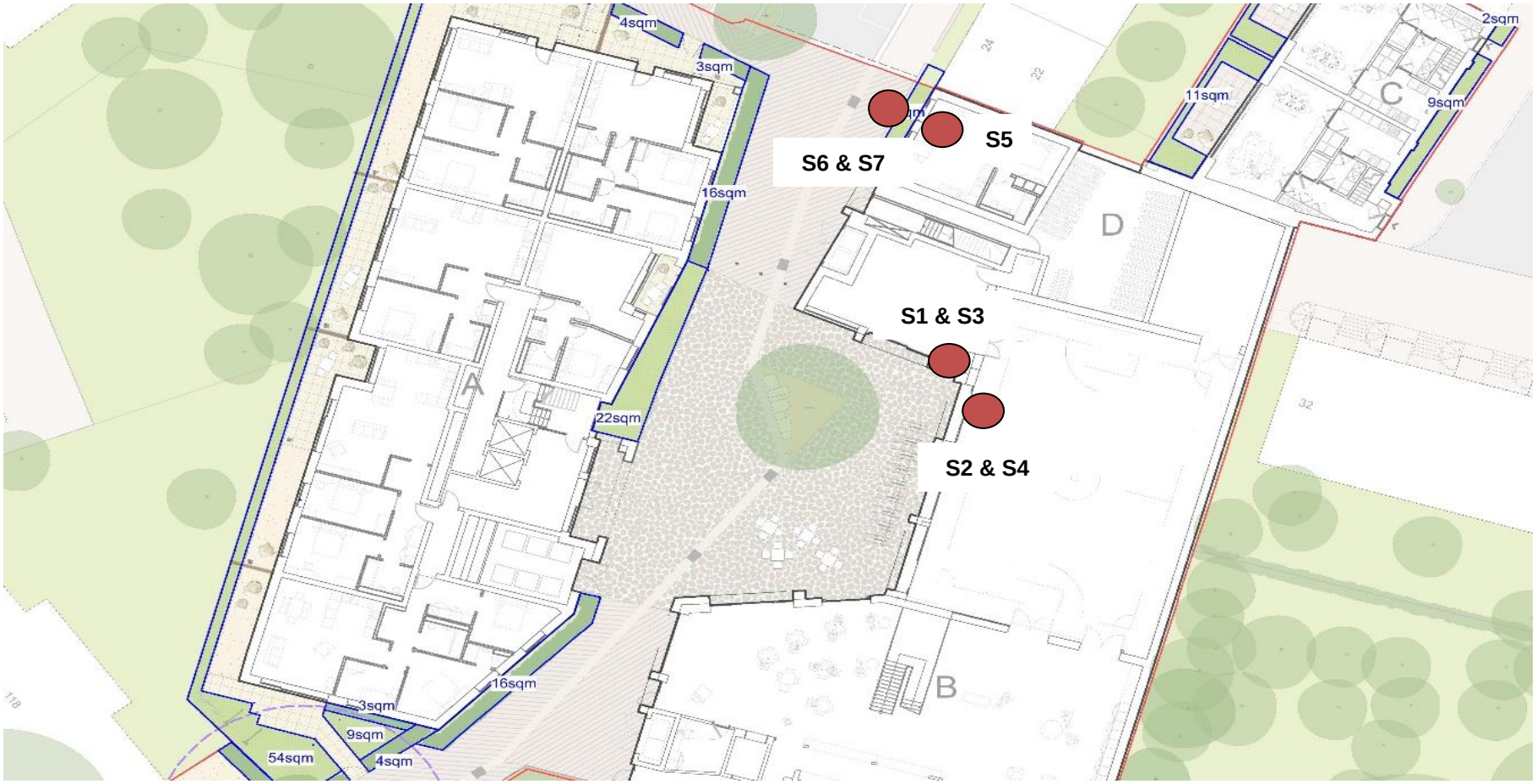
Sampling Plan

Site	HNCC Camden
Client	
Engineer	

Job Number

Sheet 1 / 1



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Analytical Report Number : 20-41902

Project / Site name:	Highgate Newtown Community Centre HNCC	**Samples received on:**	11/11/2020
Your job number:	J16021C	**Samples instructed on/ Analysis started on:**	17/11/2020
Your order number:	J16021C	**Analysis completed by:**	24/11/2020
Report Issue Number:	1	**Report issued on:**	24/11/2020
Samples Analysed:	3 bulk samples - 2 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 20-41902
Project / Site name: Highgate Newtown Community Centre HNCC
Your Order No: J16021C

Lab Sample Number				1687192	1687193
Sample Reference				S1	S2
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				11/11/2020	11/11/2020
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile - Loose Fibres	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected

U/S = Unsuitable Sample I/S = Insufficient Sample

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 20-41902
Project / Site name: Highgate Newtown Community Centre HNCC

Your Order No: J16021C

Lab Sample Number				1687194	1687195	1687196
Sample Reference				S3	S4	S5
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				11/11/2020	11/11/2020	11/11/2020
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Bulk Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Asbestos Identification	Type	N/A	ISO 17025	Amosite - Insulation Board/Tile	Amosite - Insulation Board/Tile	Chrysotile - Hard/Cement Type Material

U/S = Unsuitable Sample I/S = Insufficient Sample

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Analytical Report Number : 20-41902
Project / Site name: Highgate Newtown Community Centre HNCC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos identification in Bulks	Asbestos Identification in bulk material with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 20-41905

Project / Site name:	Highgate Newtown Community Centre HNCC	**Samples received on:**	11/11/2020
Your job number:	J16021C	**Samples instructed on/ Analysis started on:**	17/11/2020
Your order number:	J16021C	**Analysis completed by:**	24/11/2020
Report Issue Number:	1	**Report issued on:**	24/11/2020
Samples Analysed:	2 10:1 WAC samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report are representative of the samples submitted for analysis.

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Waste Acceptance Criteria Analytical Results

Report No:	**20-41905**						
					Client:	**GEA**	
Location	**Highgate Newtown Community Centre HNCC**						
Lab Reference (Sample Number)	1687207 / 1687208				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	11/11/2020				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	S6						
Depth (m)							
Solid Waste Analysis							
TOC (%)**	0.9				3%	5%	6%
Loss on Ignition (%) **	3.8				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	200				500	--	--
Total PAH (WAC-17) (mg/kg)	43.8				100	--	--
pH (units)**	8.2				--	>6	--
Acid Neutralisation Capacity (mol / kg)	2.7				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.0010			< 0.0100	0.5	2	25
Barium *	0.0477			0.366	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	< 0.0004			< 0.0040	0.5	10	70
Copper *	0.0028			0.022	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	< 0.0004			< 0.0040	0.5	10	30
Nickel *	0.0007			0.0052	0.4	10	40
Lead *	0.0048			0.037	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0029			0.023	4	50	200
Chloride *	3.4			26	800	15000	25000
Fluoride	1.7			13	10	150	500
Sulphate *	13			96	1000	20000	50000
TDS*	110			830	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	8.27			63.5	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	79						
Moisture (%)	21						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.
*= UKAS accredited (liquid eluate analysis only)
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation
** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Waste Acceptance Criteria Analytical Results

Report No:	**20-41905**						
					Client:	**GEA**	
Location	**Highgate Newtown Community Centre HNCC**						
Lab Reference (Sample Number)	1687209 / 1687210				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	11/11/2020				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	S7						
Depth (m)							
Solid Waste Analysis							
TOC (%)**	1.7				3%	5%	6%
Loss on Ignition (%) **	5.2				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	35				500	--	--
Total PAH (WAC-17) (mg/kg)	3.02				100	--	--
pH (units)**	7.3				--	>6	--
Acid Neutralisation Capacity (mol / kg)	3.8				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0038			0.0293	0.5	2	25
Barium *	0.0393			0.300	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0011			0.0087	0.5	10	70
Copper *	0.0068			0.052	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0449			0.343	0.5	10	30
Nickel *	0.0027			0.020	0.4	10	40
Lead *	0.0058			0.045	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0040			0.031	4	50	200
Chloride *	14			110	800	15000	25000
Fluoride	0.52			4.0	10	150	500
Sulphate *	22			170	1000	20000	50000
TDS*	130			1000	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	22.9			175	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	81						
Moisture (%)	19						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.
*= UKAS accredited (liquid eluate analysis only)
Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation
** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 20-41905
Project / Site name: Highgate Newtown Community Centre HNCC

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1687207	S6	None Supplied	None Supplied	Brown clay.
1687209	S7	None Supplied	None Supplied	Brown sandy clay with gravel.

Analytical Report Number : 20-41905
Project / Site name: Highgate Newtown Community Centre HNCC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270. MCERTS accredited except Coronene.	L064-PL	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Total BTEX in soil (Poland)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073-PL	W	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025

Analytical Report Number : 20-41905
Project / Site name: Highgate Newtown Community Centre HNCC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	ISO 17025
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 20-46354

Replaces Analytical Report Number: 20-46354, issue no. 1
Additional analysis undertaken.

Project / Site name:	Highgate Newton Community Centre (HNCC)	**Samples received on:**	09/12/2020
Your job number:	J16021C	**Samples instructed on/ Analysis started on:**	09/12/2020
Your order number:		**Analysis completed by:**	22/12/2020
Report Issue Number:	2	**Report issued on:**	22/12/2020
Samples Analysed:	4 soil samples		

Signed:

Will Fardon
Technical Reviewer (CS Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 20-46354
Project / Site name: Highgate Newton Community Centre (HNCC)

Lab Sample Number				1711435	1711436	1711437	1711438
Sample Reference				S101	S102	S103	S104
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				04/12/2020	04/12/2020	04/12/2020	04/12/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	37	47	31	25
Total mass of sample received	kg	0.001	NONE	1.0	1.0	1.0	1.0
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	8.9	11.1	8.1	9.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	600	9600	470	810
Water Soluble SO4 16hr extraction (2:1 Leachate Equivale	g/l	0.00125	MCERTS	0.12	1.4	0.086	0.16
Sulphide	mg/kg	1	MCERTS	9.2	25	20	17
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	37	70	50	44
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.3	1.8	0.8	1.1
Total Phenols							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.51
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.32	< 0.05	0.23
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.37	< 0.05	0.33
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	3.6	< 0.05	6.8
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.86	< 0.05	1.2
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	6.5	< 0.05	10
Pyrene	mg/kg	0.05	MCERTS	< 0.05	5.8	< 0.05	9.5
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	4.1	< 0.05	8.8
Chrysene	mg/kg	0.05	MCERTS	< 0.05	2.7	< 0.05	5
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	3.1	< 0.05	6.2
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	2.1	< 0.05	4.4
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	3.3	< 0.05	5.8
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.8	< 0.05	4.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	2.4	< 0.05	5.2
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	37	< 0.80	68.3
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	15	13	13
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	51	31	37	38
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	47	22	25
Lead (aqua regia extractable)	mg/kg	1	MCERTS	21	220	32	160
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.6	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	36	27	16	35
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	66	150	52	90
Petroleum Hydrocarbons							

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Analytical Report Number: 20-46354
Project / Site name: Highgate Newton Community Centre (HNCC)

Lab Sample Number				1711435	1711436	1711437	1711438
Sample Reference				S101	S102	S103	S104
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				04/12/2020	04/12/2020	04/12/2020	04/12/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
TPH C10 - C40	mg/kg	10	MCERTS	< 10	140	38	310
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	25
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	7.3	5.3	80
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	25	11	100
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	83	19	97

U/S = Unsuitable Sample I/S = Insufficient Sample

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Analytical Report Number : 20-46354
Project / Site name: Highgate Newton Community Centre (HNCC)

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1711435	S101	None Supplied	None Supplied	Brown clay with gravel.
1711436	S102	None Supplied	None Supplied	Brown clay.
1711437	S103	None Supplied	None Supplied	Brown clay and sand with gravel.
1711438	S104	None Supplied	None Supplied	Brown clay and sand with gravel.

Analytical Report Number : 20-46354
Project / Site name: Highgate Newton Community Centre (HNCC)

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

Analytical Report Number : 20-46354
Project / Site name: Highgate Newton Community Centre (HNCC)

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.