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Phase III Remediation & Validation Proposals

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Client: Interserve
Our ref: 30186LG – R03
Date: February 2020

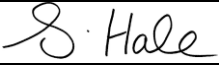
SUTCLIFFE INVESTIGATIONS

Phase III Remediation & Validation Proposals

Document Control Sheet

Report Reference: 30186LG – R03 Issue: 0 Date: February 2020

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Revision History:

Rev	Date	Description	Prepared	Checked	Approved
0	February 2020	Phase III Remediation Validation Proposals	SH	AL	AL

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1 Terms of Reference

Sutcliffe Investigations were instructed by Interserve to design an appropriate remediation strategy for the proposed development at Prospect House, Bank House Road, Blackley, Manchester M9 8TL.

The site is centred on National Grid Reference (NGR) 385159, 403511. The site area is approximately 1.00ha.

This report provides details on the protocols to be adopted during remedial works required to be undertaken on the site to ensure that any risks associated with long term human health are mitigated.

The soil sampling strategy and chemical analysis proposals set out in this document are produced in light of a Phase 1 Geo-Environmental Desk Study Report produced by HSP Consulting and Phase II investigations produced by HSP and Sutcliffe.

Additionally, reference has also been made to a Geo-Environmental Investigation carried out by Sinclair Knight Mertz (SKM) for the site adjacent to Prospect House.

Further details for these reports are noted below:

- *Phase 1 Geo-Environmental Desk Study Report produced by HSP Consulting (Report Reference C2729 / PI-Hillside Centre) – February 2018.*
- *Phase II Geo-Environmental Assessment Report produced by HSP Consulting (Report Reference C2729 / PII-Hillside Centre) – April 2018 HSP Consulting.*
- *Geo-Environmental Investigation produced by Sinclair Knight Merz (SKM) for the adjacent Co-Operative Academy – November 2008 – Reviewed for the purpose of ground gas risk assessment.*
- *Phase II Interpretive Ground Assessment (Report Reference 30186LG – R02 REV A) reported October 2019.*

2 Development Proposals & Legislation Context

2.1 Development Proposal

It is understood that a new SEN teaching facility is proposed which is to include an indoor swimming pool. Externally, soft and hardstanding areas, external individual play areas with artificial grass and a muga are proposed on the site. Based on discussions with the client, soft landscaping is proposed, with artificial surfacing proposed in most outdoor play areas. The proposed plan is shown on Drawing Number FS0831-JMA-01-00-DR-A-90-0003 REV P3 produced by jm architects.

2.2 Pre Development Works

According to the Phase I Geo-Environmental Desk Study Report completed by HSP consulting the site was shown as open fields from the earliest mapping, up until 1975-1980 when Telford School was recorded on site, this school building remaining until 2019 but was not operational. In 2019 a fire destroyed this on-site building.

Following the site investigation carried out by Sutcliffe, a chemical assessment was undertaken of the onsite material with full details of these works forming part of the Phase II Interpretive Ground Assessment Report.

The results of the chemical testing indicated elevated levels of Arsenic, Lead, Cyanide, C21 to C35 Aromatic, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene.

It should be noted that further works are scheduled to be completed on site and will include the following:

- Progression of 3No. Cable Percussion Boreholes beneath the footprint of the proposed new builds for the purpose of pile design.
- Trial pitting exercise to further delineate landfilling activities known to have taken place on site.
- An additional trial pitting exercise across site, and additional sampling to identify asbestos following the fire and demolition of the existing school.

On completion of these works, the Phase II Interpretive Ground Assessment Report and Phase III Remediation Strategy will be updated.

2.3 Legislative Context

The presence of contaminants which may pose a risk to human health or the environment is a material planning consideration and it remains the responsibility of the developer to ensure safe development. For planning it should be considered whether the site is suitable for its new use, and the responsibility for securing a safe development rests with the developer and/or landowner.

The level of contamination is expected to be low relative to the level of risk and the concern is for the site's proposed use not its current use. This is the opposite to Part 2A which considers high levels (significant harm) and the current use of the site.

Section 57 of the Environment Act 1995, adds Part 2A (ss.78A-18YC) to the Environmental Protection Act 1990 and contains the legislative framework for identifying and dealing with contaminated land. Where development is undertaken on land which may be affected by contamination, the National Planning Policy Framework, paragraphs 120 to 122 consider pollution. This links the contaminated land regime within the development process.

3 Aims & Objectives

This report provides details of the remedial options applicable for a SEN teaching facility which is to include an indoor swimming pool and external soft and hardstanding areas.

It also provides procedures to be implemented, in order to verify the remedial measures. The remediation strategy report is required to provide information to regulatory authorities to satisfy planning conditions relating to contaminated land aspects on the site.

This document outlines Sutcliffe Investigations proposals for Remediation Strategies, and includes the following:

- (i) *Additional Trial Pitting exercise for further delineation of the landfill and to supplement the initial chemical dataset.*
- (ii) *To ensure Asbestos testing and swabbing has been undertaken following the fire that destroyed the on-site building.*
- (iii) *Validation of installed gas protection measures compliant with a Characteristic Situation 4 as agreed by the local authority, which is also to provide protection for hydrocarbon vapours.*
- (iv) *Validation of imported top and sub soils to facilitate a suitable capping layer.*

4 Conceptual Site Model Prior to Remediation

4.1 Soils

Methodology

Based on the Preliminary Risk Assessment (presented in the Desk Study) and Ground Model as completed by Sutcliffe for this site, a Generic Quantitative Risk Assessment for human health has been undertaken in accordance with CLR and SR (SC050021 series) (DEFRA) guidance and comprised the following:

- *Selection of appropriate generic screening values for human health assessment;*
- *Assessment of contamination distribution and comparison of site data to screening values using the mean and maximum value test (in accordance with CLR7 and CIEH/CL:AIRE Guidance);*
- *Assessment of risks to receptors; and,*
- *Determination of requirements for further investigation or remediation.*

Selection of Soil Screening Values

As there are no specific screening values for an education facility, soil screening values appropriate for a residential without plant uptake end use scenario were selected. Details of the soil assessment criteria are detailed in *Section 4.1*.

Assessment

The soil analytical data has been assessed following CL:AIRE/CIEH guidance 2008 “Guidance on Comparing Soil Contamination Data with a Critical Concentration”, CLR11 Model Procedures Section 2.3 and CLR7 and using the Mean Value Test as laid out in CLR7. Where determinands analysed for could not be detected, the limit of detection has been used as a worst-case scenario.

Summary of Results

Ten made ground samples were recovered in total and compared against the relevant GACs for 5% soil organic matter (SOM), six of the Made Ground samples contained exceedances of screening criteria. These are tabulated below.

Contaminant	Screening Value (mg/kg)	Normalised 95% UCL of Mean (mg/kg)	Mean Value Test	Max Value Test	No. of Outliers removed to pass
Arsenic	40 (LQM 5%)	163.03986	Fails	1 Outlier	Outlier removed - inconclusive
Lead	310 (C4SL)	970.52938	Fails	1 Outlier	1 (TP101 0.60 – 1.00m)
Cyanide	34 (Atkins)	20.566684	Passes	1 Outlier	N/A
C21 to C35 Aromatic	1900 (LQM 5%)	1516.3315	Passes	1 Outlier	N/A
Benzo(a)anthracene	15 (LQM 5%)	20.845832	Inconclusive	0 Outliers	N/A
Benzo(b)fluoranthene	4 (LQM 5%)	17.6706275	Fails	0 Outliers	N/A
Benzo(a)pyrene	3.2 (LQM 5%)	14.6721	Fails	0 Outliers	N/A
Dibenzo(ah)anthracene	0.32 (LQM 5%)	1.6279708	Fails	0 Outliers	N/A

Discussion

Within the made ground exceedances were encountered for Arsenic, Lead, Cyanide, C21 to C35 Aromatic, Benzo(a)anthracene Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene. Statistical analysis undertaken with regards to identified contaminants has been completed by Sutcliffe, statistical analysis is presented within the *Phase II Interpretive Ground Assessment, Report 30186LG-R02*.

Statistical analysis has revealed that Arsenic, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene pose a site wide risk of contamination, along with a hotspot area of Lead contamination in TP101 and a hotspot area of C21 to C35 Aromatic contamination in the area of BH101.

Analytical test certificates the screening table is presented in *Appendix A*.

A plan detailing the sampling locations is presented as *Drawing No. 30186-700-P1*.

Based on the results of the statistical analysis site wide contamination has been noted that will require remediation for the site to be suitable for the proposed end users.

A review of this risk assessment will be undertaken on completion of the additional works.

Conclusions

Potential risks associated with Long Term Human Health and the contaminants identified as part of the Ground Assessment completed by Sutcliffe and listed in *Section 5* have identified potential localised risks to human health.

4.2 Ground Gas

Methodology

A ground gas risk assessment was undertaken by Sutcliffe as part of the ground Assessment and completed in general accordance with the British Standard BS8485:2007, “Code of Practice for the Characterization and Remediation from Ground Gas in Affected Developments”. The guidance is written specifically for use by designers of gas protection measures relating to the development of a site. Reference has also been made to the CIRIA document C665:2007, “Assessing Risks Posed By Hazardous Ground Gases To Buildings” and to the Health and Safety Executive document EH40/2005 “Workplace Exposure Limits”. Our assessment comprises the following:

- *Review of results*
- *Qualitative Assessment and the calculation of Gas Screening Values for methane (CH₄) and carbon dioxide (CO₂).*
- *Assessment of risks from ground gas.*
- *Development options.*

Review of Field Data

Gas monitoring was undertaken by Sutcliffe using a fully calibrated GA2000 gas monitor which measured concentrations of oxygen, carbon dioxide, methane and carbon monoxide as well as gas flow emission rates.

Gas flow and concentrations were recorded at a range of atmospheric pressures varying between 989m bar and 1016m bar. It should be noted that before ground gas monitoring was complete, a fire destroyed the on-site building. Therefore, four rounds of ground gas monitoring complete before the fire and the ground gas conditions on site have been assessed against CIRIA C665.

Calculation of Gas Screening Values

Elevated levels of carbon dioxide (up to 11.6%) and methane (up to 0.2%) concentrations were recorded before the fire. In accordance with CIRIA C665 the ground gas monitoring results indicate that the site has a Gas Screening Value (GSV) of 0.0812 l/hr for carbon dioxide and 0.0014 l/hr for methane. This results in the site being classified as Characterisation Situation 2 for Carbon Dioxide and a Characterisation Situation 1 for Methane.

Additionally, samples were also collected from site for the purpose of forensic testing. Samples retrieved from site revealed an average TOC value of 3.78%. Using the Pragmatic Approach to Ground Gas Risk Assessment (RB17) the TOC and forensic testing has given a site wide average TOC value of 3.78% with the levels of TOC ranging from 0.88% to 7.43%. This classifies the site as a Characteristic Situation 3.

Further Consideration of the Ground Gas Classification

A review of HSPs Consulting classification revealed a Characteristic Situation 4, based on the GSV calculation. In light of this classification further investigation was undertaken to determine the ground gas classification of the adjacent school. Sinclair Knight Merz (SKM) carried out a PHII Geo-Environmental Investigation on the Co-Operative Academy adjacent to the site in November 2008, based on this report the adjacent site was also classified as a Characterisation Situation 4.

Conclusions

Taking into account the above classifications, the fact that our ground gas monitoring data is incomplete due to a fire on the premises, and correspondence with the local authority, Sutcliffe believe that a worst-case scenario of a Characterisation Situation 4 should be adopted, and has been agreed with the EHO case officer.

As per the guidance, for a Characteristic Situation 4 classification a typical scope of protection measures would include:

- *A reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 2000g DPM2*
- *All joints and penetration sealed*
- *A proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space with monitoring facility.*

All gas protection measures should be designed by a specialist contactor.

In addition, in light of several PAHs being identified within the ground, the proposed membrane should also provide protection for hydrocarbon vapours.

4.3 Controlled Waters Risk Assessment

Methodology

Based on the Preliminary Risk Assessment and Ground Model for this site, a Level 1 Screening Assessment was undertaken by Sutcliffe in general accordance with Environment Agency guidance Environment Agency Remedial Targets Methodology, Hydrogeological Risk Assessment for Land Contamination, 2006.

The methodology comprises:

- *Identification of potential contaminant linkages;*
- *Selection of appropriate generic screening values for controlled waters;*
- *Screening measured concentrations of leachate and groundwater against the generic screening values;*
- *Assessment of contaminant distribution and risk to receptors;*
- *Identification of contaminants of concern and relevant contaminant linkages;*
- *Identification of potential contaminants and contaminant linkages which are no longer of concern.*

Identification of Potential Pollutant Linkages

Contaminant linkages have been identified as part of the Ground Assessment report completed by Sutcliffe between the made ground and the underlying aquifer via infiltration and/or migration of dissolved phase contaminants.

Selection of Generic Screening Values

Screening values for Drinking Water Standards (DWS) have been used to assess leachability and perched water; DWS are relevant to potable receptors (Secondary B Aquifer).

Environmental Quality Standards (EQS) screening values have been used to assess risks to surface water resources.

Leachate Screening

Metals and Speciated PAHs were assessed. Exceedances of screening criteria were encountered, details of which are presented in the Ground Assessment Report completed by Sutcliffe.

Contaminant Distributions and Risk to Receptors

Several determinants slightly exceeded the UK DWS and EQS screening values. However, the risk to controlled waters (groundwater & surface waters) is diminished as a result of the following:

The site is underlain by a layer of Glacial Till which is classified as Unproductive Strata that will act as an aquiclude impeding the flow of water to the underlying Secondary B Aquifer.

A full assessment of the leachate analytical results is presented within the *Phase II Interpretive Ground Assessment, Report 30186LG*.

Conclusions

Exceedances of DWS and EQS screening criteria are not considered significant given the likely depth to groundwater, effects of natural attenuation, lack of nearby groundwater abstractions and the absence of any surface water courses that could be in continuity with ground water beneath the site.

5 Land Contamination Risks

5.1 Revised Conceptual Model

Based on the findings of the human health risk assessment as completed by Sutcliffe, the conceptual model has been revised and has been presented within the Ground Assessment report.

5.2 Discounted Contaminant Linkages

Groundwater Resources

No contaminant linkages remain for groundwater. No further action is required.

Surface Water Resources

No contaminant linkages remain for surface water. No further action is required.

5.3 Remaining Potential Contaminant Linkages

5.4 Human Health Remediation Strategy

Residential Development Site Area

Site wide contamination was identified requiring remedial works to ensure the site is “fit for purpose”. Remedial works will require a membrane and 450mm capping system in all soft landscaped areas. It is anticipated that playground areas will be segregated and will largely comprise artificial grass.

A **Characterisation Situation 4** classification has been given to the site for ground gas, requiring gas protection measures. All gas protection measures should be designed by a specialist contractor. In addition, in light of several PAHs being identified within the ground, the proposed membrane should also provide protection for hydrocarbon vapours.

Remediation details for remaining contaminant linkages are presented in *Section 6*.

6 Remediation Strategy

6.1 Overview

The recommendations provided below are considered appropriate for the site based on the site investigation and the combined risk assessments completed by Sutcliffe (controlled waters, ground gas and long-term human health) and details recommended remediation and validation works.

6.2 Additional Works Required to Assess Outstanding Contaminant Linkages

The following additional works are required to assess the outstanding contaminant linkage:

- *Additional Trial Pitting exercise for further delineation of the landfill and to supplement the initial chemical dataset.*
- *To ensure Asbestos testing and swabbing has been undertaken following the fire that destroyed the on-site building.*
- *Validation of installed gas protection measures compliant with a Characteristic Situation 4 as agreed by the local authority which is also to provide protection for hydrocarbon vapours.*
- *Validation of imported top and sub soils to facilitate a suitable capping layer.*

6.3 Regulatory Approval

Consultation with Manchester City Council Contaminated Land Officer is recommended regarding the acceptability of the validation proposal.

Manchester City Council, Council Planning Guidance in Relation to Ground Contamination is presented in *Appendix B*.

6.4 Remedial Works

Soft Landscaped Areas

Given the extent of the identified contamination and the identified long-term human health risks, remedial works will be required to ensure that the site is “fit for purpose”,

assuming an education facility end use. The proposed remediation includes a membrane and capping layer to a minimum depth of 450mm. This capping layer is to comprise of clean imported tested material. Elsewhere on site (areas of hardstanding) reduced site levels will be as per foundation design.

It would be anticipated that the remainder of the site that is not formed of gardens/landscaping will be covered by hardstanding, this along with the capping system would provide a break layer to source pathway receptor linkages.

It is recommended that good hygiene practices should be employed during construction work, in addition, the findings of this investigation should be included within the contractors H&S file and an assessment of risks associated with short term human health completed. No consumption of food or smoking should occur without prior hand-washing. If dust is encountered, dust masks should be worn and dust suppression employed.

Human Health - Ground Gas

Ground gas monitoring has indicated elevated levels of Carbon Dioxide. The highest recorded concentration and the calculated GSV recommending the site be classified as a Characterisation Situation 2. Forensic sampling undertaken indicated the site should be classified as a Characterisation Situation 3.

Based on the above, further consideration was given to the ground gas risk assessment including a review of HSPs Consulting Geo-Environmental Assessment Report along with the PHII Geo-Environmental Investigation completed by Sinclair Knight Merz (SKM) on the Co-Operative Academy adjacent to this site.

Taking all the information into account, the fact that our ground gas monitoring data is incomplete due to a fire on the premises, and also considering correspondence with the local authority, Sutcliffe believe that a worst-case scenario of a Characterisation Situation 4 should be adopted.

6.5 Proposed Capping Thickness – Soft Landscaping Area

The proposed remediation includes a capping layer to a minimum depth of 450mm in all soft landscaped areas. This capping layer is to comprise of validated topsoil and topsoil / sub soils, overlaying a geotextile membrane.

6.6 Imported Soil Validation

All imported soil will be chemically validated at a rate of 1 sample per 50m³ for topsoil and 1 sample per 100m³ for subsoil. A minimum of 3 samples per soil source will be undertaken.

Imported material needs to be compliant *with BS3882: 2015 Specification for Topsoil and BS8601: 2013 Specification for Subsoil* and requirements for use.

The typical testing suite will comprise:

Arsenic, boron, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, vanadium, zinc, water soluble sulphate, pH, USEPA PAH 16, asbestos (presence or absence) and organic matter.

Where the source is 'brownfield' or to site source unknown the soil will additionally be tested for the following:

Speciated banded petroleum hydrocarbons (TPHCWG), benzene, toluene, ethylbenzene and xylene (BTEX), MTBE, cyanide suite, boron and phenol.

6.7 Soil Validation – Site Won

All material proposed for reuse and derived for the site strip of the emplaced capping medium will be chemically validated at a rate of 1 sample per 50m³ for topsoil and 1 sample per 100m³ for subsoil. A minimum of 3 samples will be chemically tested.

The typical testing suite will comprise:

Arsenic, boron, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, vanadium, zinc, water soluble sulphate, pH, USEPA PAH 16, asbestos (presence or absence) and organic matter.

Where the source is 'brownfield' or to site source unknown the soil will additionally be tested for the following:

Speciated banded petroleum hydrocarbons (TPHCWG), benzene, toluene, ethylbenzene and xylene (BTEX), MTBE, cyanide suite, boron and phenol.

6.8 Soil Validation Criteria

Generic Soil Assessment Criteria – Imported Top & Sub soils

The results of the topsoil and subsoil samples may be contrasted to contemporary UK soil assessment criteria.

With regards to the soil risk assessment for imported top and sub soils Sutcliffe will use the following hierarchy:

- *LQM Suitable 4 Use Levels (S4ULs).*
- *ATRISK Soil Screening Values (SSVs) and DEFRA Generic Assessment Criteria (GACs).*
- *DEFRA Category 4 Screening Levels (C4SLs) for Lead.*

Based upon the above we will use the LQM S4ULs. These use similar assumptions and land uses to C4SLs. However, toxicological information has been based on 'minimal risk' as per previous guidelines and assumptions.

If contaminants are not present as S4ULs, then we propose to use ATRISK SSVs or CL:AIRE GACs. These follow the 'minimal' risk principle and more stringent exposure parameters and will be conservative. The only exception to this is for Lead where the C4SL is used.

6.9 Capping Layer Depth Validation

The depth of the capping layer on site will be demonstrated by excavating a hole and collecting photographic evidence. The photographs will show the location of the validation, the downhole view and the depth using a levelling staff.

6.10 Site Completion Report

The site completion report will include details of the imported soil validation and photographs of the soil depth placed across the site.

The site wide planning conditions may only be discharged once Manchester City Council are satisfied that, in accordance with the National Planning Policy Framework (NPPF):

- The site is suitable for its new use

- Adequate site investigation information, prepared by a competent person, is presented.

6.11 Additional Remedial Requirements

Site Material Management Plan (SMMP)

It is advised that an appropriate SMMP is designed for the scheme and prior to the commencement of any works and maintained throughout the development of the scheme. All waste transfer notes will need to be retained and documented to allow ease of review by the regulators.

Material Reuse

Should any material from the site be reused an assessment for suitability for use would be required.

Unexpected Contamination

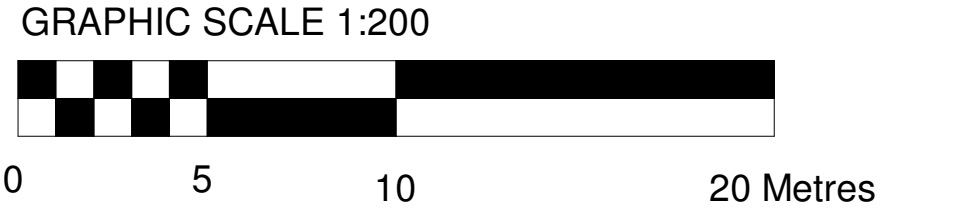
In the event that during the development works if unexpected contamination is identified then all works should cease and the appointed environmental consultant notified.

Documentation

On completion of the remedial works detailed within Section 9.5 of this report a Phase IV Completion Report will be required and will need to include the following documentation:

- Details of any additional testing and update of Phase II and III reports
- Waste consignment notes for contaminated material removed from site, including details of the recipient waste facility.
- Consignment notes for top/sub soils imported to site.
- Photographic log pre & post site reduction if required.
- Photographic log of the gas membrane installation.
- Independent certification of guarantee from third party confirming the suitability of gas membrane installation.

Drawing No: FS0831-JMA-01-00-DR-A-90-0003 REV P3 - Proposed Site Layout



- PROPOSED MUGA FACING 3 m
(continuation of secure boundary)
- PROPOSED SECONDARY SECURE LINE
(1.2 m height paladin fencing)
- PROPOSED PRIMARY SECURE
(2.5 m height paladin fencing)
- EXISTING BOUNDARY FENCING
RETAINED
- PROPOSED AHU COMPOUND FENCING
(2 m height Closeboard Timber Fencing)



P1	Planning Issue	06.05.19	LM	SDH
P2	Updated Landscape Plan	12.07.19	LM	SDH
P3	Masterplan Gateway Submission	12.08.19	LM	SDH
Rev	Description	Date	Chk By	Ck By

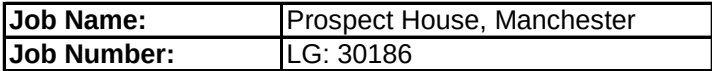
Project	Manchester SEND - Prospect House	3A: 54 Princess Street Manchester M1 6HS
Title	Proposed Site Plan	T : 0161 2006300
Client	Interserve Construction Ltd	man@jimarchitects.net jimarchitects.net
Project	Gateway submission	Scale : 1 : 200
Drawing Number	FS0831-JMA-01-00-DR-A-90-0003	Status : Revision :

Appendix A – Analytical Test Certificates & Screening Table



Job Name:	Prospect House, Manchester
Job Number:	LG: 30186

Sutcliffe		ATKINS REVISED 31/03/11, CATEGORY 4 - APRIL 2014, LQM JAN 2015					MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
		RESIDENTIAL WITHOUT PLANT UPTAKE					19/05826	19/05826	19/05826	19/05826	19/05826	19/05826	19/05826	19/05826	19/05826	19/05826
							19/05826/1	19/05826/2	19/05826/4	19/05826/6	19/05826/8	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/15
		Category 4 Screening Levels (6%)	Atkins Atrisk	LQM			BH101	TP101	TP102	TP103	TP104	WS101	WS101	WS102	WS103	WS105
Contaminant	Units			SOM 1%	SOM 2.5%	SOM 5%	0.20 - 0.60m	0.60 - 1.00m	0.30 - 0.70m	1.10 - 1.60m	0.30 - 0.80m	0.20 - 0.60m	3.00 - 3.50m	0.30 - 0.70m	0.20 - 0.60m	0.30 - 0.70m
Arsenic (Total)	mg/kg	40			40		10	276	61	57	29	11	12	16	29	6
Boron (Soluble)	mg/kg				11000		<1.0	1	5.6	2.7	1.5	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium (Total)	mg/kg	149			85		0.8	3	3.6	2.1	2.2	0.5	1.3	0.8	42.3	0.8
Chromium III	mg/kg				910		24	37	51	46	40	14	29	23	41	39
Chromium VI	mg/kg	21			6		<1	<1	<1	<2	<1	<1	<1	<1	<1	<1
Copper (Total)	mg/kg				7100		48	668	1220	234	333	37	67	55	46	23
Lead (Total)	mg/kg	310					260	1650	332	243	193	89	72	112	72	29
Mercury (Total)	mg/kg				56		0.65	9.66	0.82	1.65	1.06	<0.17	<0.17	<0.17	0.74	0.54
Nickel (Total)	mg/kg				180		19	73	86	61	46	14	27	23	34	36
Selenium (Total)	mg/kg				430		<1	4	2	3	<1	<1	<1	<1	2	1
Zinc (Total)	mg/kg				40000		113	1160	370	402	2240	77	131	115	4140	61
Cyanide (Total)	mg/kg		34				2	37	4	1	3	<1	<1	<1	<1	<1
Phenols (Total)	mg/kg				750		<0.2	<0.2	1.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Organic matter	%						5.6	33.3	14.2	15.7	8.6	7.8	4.9	1.9	9.4	6.4
Sulphate (Acid Soluble)	mg/kg						930	7200	2500	3800	2800	280	1100	390	690	390
Sulphate as Water Soluble	g/l						0.05	0.67	0.79	1.23	0.78	<0.01	0.21	0.02	0.01	0.03
Sulphide	mg/kg						<5	<5	45	51	<5	<5	<5	<5	<5	<5
pH	pH units						7.52	7.31	7.38	7.32	7.67	8.2	7.17	7.91	8.15	8.61
Sulphur (Elemental)	mg/kg						710	31	2100	1300	45	8	330	<5	<5	310
Asbestos							NAD	Amosite Loose Fibres	NAD	NAD	NAD	Amosite Loose Fibres	NAD	NAD	NAD	NAD
Asbestos Quantification							N/A	<0.001	N/A	N/A	N/A	<0.001	N/A	N/A	N/A	N/A
>> TPH SUITE <<																
Total Aliphatic																
>C5 to C6 aliphatic	mg/kg				42		<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C6 to C8 aliphatic	mg/kg				100		<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C8 to C10 aliphatic	mg/kg				27		<5	<1	12	2	<1	<1	<1	<1	124	<5
>C10 to C12 aliphatic	mg/kg				130		<5	<1	112	5	<1	<1	1	<1	334	<5
>C12 to C16 aliphatic	mg/kg				1100		13	<1	160	6	7	<1	4	<1	13	6
>C16 to C21 aliphatic	mg/kg				65000		30	3	236	10	31	2	5	<1	2	224
>C21 to C35 aliphatic	mg/kg				65000		231	21	1020	59	31	7	58	13	10	352
>C35 to C44 aliphatic	mg/kg				65000		45	10	405	35	10	5	25	4	1	7
Total Aromatic																
>C5 to C7 aromatic (Benzene)	mg/kg				370		<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C7 to C8 aromatic (Toluene)	mg/kg				860		<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C8 to C10 aromatic	mg/kg				47		<5	1	<5	3	3	1	4	1	67	9
>C10 to C12 aromatic	mg/kg				250		<5	<1	37	5	2	1	3	<1	128	12
>C12 to C16 aromatic	mg/kg				1800		106	3	101	6	5	3	8	1	27	24
>C16 to C21 aromatic	mg/kg				1900		1160	18	193	32	27	15	22	4	16	726
>C21 to C35 aromatic	mg/kg				1900		1900	1900	2680	62	438	159	48	59	73	20
>C35 to C44 aromatic	mg/kg				1900		1900	1900	33	8	49	20	12	6	16	10
>> BTEX SUITE <<																
benzene	mg/kg	3.3			0.38		<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
toluene	mg/kg				880		<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
ethylbenzene	mg/kg				83		<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
m&p-xylene	mg/kg				79		<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
o-xylene	mg/kg				88		<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>> PAH SUITE <<																
naphthalene	mg/kg				2.3		0.1	<0.03	2.49	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03
acenaphthylene	mg/kg				2900		0.36	<0.01	0.07	0.03	<0.01	0.03	0.01	<0.01	<0.01	0.57
acenaphthene	mg/kg				3000		4.72	<0.01	7.51	0.1	0.01	0.12	0.13	<0.01	0.01	2.61
fluorene	mg/kg				2800		5.57	<0.01	5.23	0.17	<0.01	0.12	0.13	<0.01	<0.01	2.53
phenanthrene	mg/kg				1300		61.9	0.46	12.4	1.11	0.14	1.45	0.79	0.1	0.13	25.5
anthracene	mg/kg				31000		18.6	0.08	2.8	0.28	0.03	0.43	0.25	<0.02	0.04	8.57
fluoranthene	mg/kg				1500		1600	1600	62.7	1	12.8	1.84	0.34	2.21	1.62	0.21
pyrene	mg/kg				3700		3800	3800	50.9	0.87	10.9	1.62	0.31	1.99	1.29	0.19
benzo(a)anthracene	mg/kg				11		14	15	29.3	0.41	3.9	0.91	0.22	1.05	0.49	0.11
chrysene	mg/kg				30		31	32	26.6	0.46	4.59	1.01	0.18	0.96	0.51	0.14
benzo(b)fluoranthene	mg/kg				3.9		4	4	22.4	0.56	4.54	1.23	0.23	1.14	0.6	0.2
benzo(k)fluoranthene	mg/kg				110		110	110	8.71	0.2	1.61	0.37	0.11	0.44	0.2	<0.07
benzo(a)pyrene	mg/kg	5.3			3.2		3.2	3.2	18.3	0.34	2.9	0.8	0.21	0.91	0.39	0.14
dibenzo(ah)anthracene	mg/kg				0.31		0.32	0.32	1.84	<0.04	0.48	0.14	<0.04	0.12	<0.04	<0.04
benzo(ghi)perylene	mg/kg				360		360	360	6.53	0.27	2.03	0.54	0.11	0.51	0.22	0.11
indeno(123cd)pyrene	mg/kg				45		46	46	8.65	0.28	2.3	0.57	0.12	0.57	0.25	0.13



Job Name:	Prospect House, Manchester
Job Number:	LG: 30186

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/05826
Issue Number: 1

Date: 28 June, 2019

Client: Sutcliffe
18-20 Harrington Street
Liverpool
L2 9QA

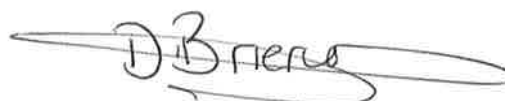
Project Manager: Alex Tosh; Kelly Davies, Adrian Lewis; David Bowen
Project Name: Prospect House Primary School, Blackley, Manchester
Project Ref: 30186LG
Order No: 7677
Date Samples Received: 13/06/19
Date Instructions Received: 19/06/19
Date Analysis Completed: 27/06/19

Prepared by:



Holly Neary-King
Client Manager

Approved by:



Danielle Brierley
Client Manager

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
% Moisture at <40C _A	16.1	28.9	-	24.8	29.4	25.3	14.7	% w/w	0.1	A-T-044
% Stones >10mm _A	<0.1	<0.1	-	10.4	8.8	13.5	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	7.52	7.31	-	7.38	-	7.32	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.05	0.67	-	0.79	-	1.23	-	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	930	7200	-	2500	-	3800	-	mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	2	37	-	4	-	1	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	-	1.1	-	<0.2	-	mg/kg	0.2	A-T-050s
Sulphide _A	<5	<5	-	45	-	51	-	mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	710	31	-	2100	-	1300	-	mg/kg	5	A-T-029s
Organic matter _D ^{M#}	5.6	33.3	-	14.2	-	15.7	-	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	10	276	-	61	-	57	-	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	<1.0	1.0	-	5.6	-	2.7	-	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	0.8	3.0	-	3.6	-	2.1	-	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	48	668	-	1220	-	234	-	mg/kg	1	A-T-024s
Chromium _D ^{M#}	24	37	-	51	-	46	-	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	-	<1	-	<2	-	mg/kg	1	A-T-040s
Chromium (trivalent)	24	37	-	51	-	46	-	mg/kg	1	Calc
Lead _D ^{M#}	260	1650	-	332	-	243	-	mg/kg	1	A-T-024s
Mercury _D	0.65	9.66	-	0.82	-	1.65	-	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	19	73	-	86	-	61	-	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	4	-	2	-	3	-	mg/kg	1	A-T-024s
Zinc _D ^{M#}	113	1160	-	370	-	402	-	mg/kg	5	A-T-024s
Leachate Prep NRA (10:1) _A	*	*	-	-	*	-	*			A-T-001
pH (leachable) _A [#]	7.47	7.28	-	-	7.89	-	7.28	pH	0.01	A-T-031w
Sulphate (leachable) _A [#]	4.77	186.36	-	-	253.66	-	32.52	mg/l	1	A-T-026w
Cyanide (total) (leachable) _A	0.015	<0.005	-	-	<0.005	-	<0.005	mg/l	0.005	A-T-042wTCN
Phenols (total by HPLC) (leachable) _A	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/l	0.01	A-T-050w
Sulphide (leachable) _A	<0.1	<0.1	-	-	<0.1	-	<0.1	mg/l	0.1	A-T-S2-w
DOC (leachable) _A [#]	3.5	1.7	-	-	3.5	-	1.7	mg/l	0.2	A-T-032w
Arsenic (leachable) _A [#]	3	2	-	-	9	-	<1	µg/l	1	A-T-025w
Boron (leachable) _A [#]	14	47	-	-	166	-	47	µg/l	10	A-T-025w
Cadmium (leachable) _A [#]	<1	<1	-	-	<1	-	<1	µg/l	1	A-T-025w
Copper (leachable) _A [#]	7	8	-	-	2	-	11	µg/l	1	A-T-025w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
Chromium (leachable) _A [#]	5	<1	-	-	<1	-	1	µg/l	1	A-T-025w
Chromium (hexavalent) (leachable) _A	<0.05	<0.05	-	-	<0.05	-	<0.05	mg/l	0.05	A-T-040w
Chromium (trivalent) (leachable)	<0.05	<0.05	-	-	<0.05	-	<0.05	mg/l	0.05	Calc
Lead (leachable) _A [#]	13	<1	-	-	<1	-	4	µg/l	1	A-T-025w
Mercury (leachable) _A [#]	<0.1	<0.1	-	-	<0.1	-	<0.1	µg/l	0.1	A-T-025w
Nickel (leachable) _A [#]	<1	9	-	-	2	-	4	µg/l	1	A-T-025w
Selenium (leachable) _A [#]	<1	2	-	-	<1	-	<1	µg/l	1	A-T-025w
Sulphur (elemental/free) (leachable) _A	<0.1	<0.1	-	-	<0.1	-	<0.1	mg/l	0.1	A-T-029w
Zinc (leachable) _A [#]	4	82	-	-	2	-	8	µg/l	1	A-T-025w
TPH total (>C6-C40) (leachable) _A	292	<80	-	-	84	-	<80	µg/l	80	A-T-007w

Envirolab Job Number: 19/05826

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Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	Amosite	-	NAD	-	NAD	-			A-T-045
Asbestos Matrix (microscope) _o	-	Loose Fibres	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	-	N/A	-	N/A	-			
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _o	-	<0.001	-	-	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 19/05826

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Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
PAH-16MS										
Acenaphthene _A ^{M#}	4.72	<0.01	-	7.51	-	0.10	-	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.36	<0.01	-	0.07	-	0.03	-	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	18.6	0.08	-	2.80	-	0.28	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	29.3	0.41	-	3.90	-	0.91	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	18.3	0.34	-	2.90	-	0.80	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	22.4	0.56	-	4.54	-	1.23	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	6.53	0.27	-	2.03	-	0.54	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	8.71	0.20	-	1.61	-	0.37	-	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	26.6	0.46	-	4.59	-	1.01	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	1.84	<0.04	-	0.48	-	0.14	-	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	62.7	1.00	-	12.8	-	1.84	-	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	5.57	<0.01	-	5.23	-	0.17	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	8.65	0.28	-	2.30	-	0.57	-	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	0.10	<0.03	-	2.49	-	0.03	-	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	61.9	0.46	-	12.4	-	1.11	-	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	50.9	0.87	-	10.9	-	1.62	-	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	327	4.93	-	76.5	-	10.8	-	mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
PAH-16MS (leachable)										
Acenaphthene (leachable) _A	0.19	0.10	-	-	0.91	-	0.24	µg/l	0.01	A-T-019w
Acenaphthylene (leachable) _A	0.02	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Anthracene (leachable) _A	0.07	<0.01	-	-	0.04	-	0.06	µg/l	0.01	A-T-019w
Benzo(a)anthracene (leachable) _A	0.44	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Benzo(a)pyrene (leachable) _A	0.15	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (leachable) _A	0.20	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Benzo(ghi)perylene (leachable) _A	0.05	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (leachable) _A	0.08	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Chrysene (leachable) _A	0.33	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (leachable) _A	<0.01	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Fluoranthene (leachable) _A	1.71	<0.01	-	-	0.03	-	0.10	µg/l	0.01	A-T-019w
Fluorene (leachable) _A	0.11	<0.01	-	-	0.34	-	0.19	µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (leachable) _A	0.06	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Naphthalene (leachable) _A	<0.01	0.10	-	-	1.97	-	0.06	µg/l	0.01	A-T-019w
Phenanthrene (leachable) _A	0.03	<0.01	-	-	0.25	-	0.11	µg/l	0.01	A-T-019w
Pyrene (leachable) _A	1.48	<0.01	-	-	0.02	-	0.08	µg/l	0.01	A-T-019w
Total PAH-16MS (leachable) _A	4.92	0.20	-	-	3.56	-	0.84	µg/l	0.01	A-T-019w

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Client Project Name: Prospect House Primary School,
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Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<5	<1	-	12	-	2	-	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<5	<1	-	112	-	5	-	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	13	<1	-	160	-	6	-	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	30	3	-	236	-	10	-	mg/kg	1	A-T-055s
Ali >C21-C35 _A	231	21	-	1020	-	59	-	mg/kg	1	A-T-055s
Ali >C35-C44 _A	45	10	-	405	-	35	-	mg/kg	1	A-T-055s
Total Aliphatics _A	273	24	-	1540	-	83	-	mg/kg	1	A-T-055s
Total Aliphatics _A	318	34	-	1950	-	118	-	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<5	1	-	<5	-	3	-	mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<5	<1	-	37	-	5	-	mg/kg	1	A-T-055s
Aro >C12-C16 _A	106	3	-	101	-	6	-	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	1160	18	-	193	-	32	-	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	2680	62	-	438	-	159	-	mg/kg	1	A-T-055s
Aro >C35-C44 _A	33	8	-	49	-	20	-	mg/kg	1	A-T-055s
Total Aromatics _A	3950	84	-	769	-	206	-	mg/kg	1	A-T-055s
Total Aromatics _A	3980	93	-	819	-	226	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	4220	108	-	2310	-	289	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	4300	127	-	2770	-	343	-	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
Forensic Description										
% of total sample Inert >10mm	26.65	-	6.71	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Wood >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones

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Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
% of total sample Vegetation >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Cloth >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Other Inert Material >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Paper >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Other Degradable Material >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Fine Soil and Gravel <10mm	73.35	-	93.29	-	-	-	-	% w/w	0.1	Calc-no stones
Total Organic Carbon (Fine Soil) [#]	2.71	-	7.43	-	-	-	-	% w/w	0.03	Calc-no stones

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Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
% Moisture at <40C _A	20.9	18.2	11.7	24.6	21.4	17.7	18.2	% w/w	0.1	A-T-044
% Stones >10mm _A	13.4	<0.1	<0.1	4.5	<0.1	<0.1	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	7.67	-	8.20	7.17	7.91	8.15	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.78	-	<0.01	0.21	0.02	0.01	-	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	2800	-	280	1100	390	690	-	mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	3	-	<1	<1	<1	<1	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	mg/kg	0.2	A-T-050s
Sulphide _A	<5	-	<5	<5	<5	<5	-	mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	45	-	8	330	<5	<5	-	mg/kg	5	A-T-029s
Organic matter _D ^{M#}	8.6	-	7.8	4.9	1.9	9.4	-	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	29	-	11	12	16	29	-	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	1.5	-	<1.0	<1.0	<1.0	<1.0	-	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	2.2	-	0.5	1.3	0.8	42.3	-	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	333	-	37	67	55	46	-	mg/kg	1	A-T-024s
Chromium _D ^{M#}	40	-	14	29	23	41	-	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	-	<1	<1	<1	<1	-	mg/kg	1	A-T-040s
Chromium (trivalent)	40	-	14	29	23	41	-	mg/kg	1	Calc
Lead _D ^{M#}	193	-	89	72	112	72	-	mg/kg	1	A-T-024s
Mercury _D	1.06	-	<0.17	<0.17	<0.17	0.74	-	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	46	-	14	27	23	34	-	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	-	<1	<1	<1	2	-	mg/kg	1	A-T-024s
Zinc _D ^{M#}	2240	-	77	131	115	4140	-	mg/kg	5	A-T-024s
Leachate Prep NRA (10:1) _A	-	*	*	-	*	*	*			A-T-001
pH (leachable) _A [#]	-	6.82	7.17	-	7.33	7.43	6.91	pH	0.01	A-T-031w
Sulphate (leachable) _A [#]	-	75.20	5.01	-	4.17	1.79	44.09	mg/l	1	A-T-026w
Cyanide (total) (leachable) _A	-	<0.005	0.017	-	0.011	<0.005	<0.005	mg/l	0.005	A-T-042wTCN
Phenols (total by HPLC) (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	mg/l	0.01	A-T-050w
Sulphide (leachable) _A	-	0.1	<0.1	-	<0.1	<0.1	0.1	mg/l	0.1	A-T-S2-w
DOC (leachable) _A [#]	-	6.4	3.3	-	3.3	2.5	5.7	mg/l	0.2	A-T-032w
Arsenic (leachable) _A [#]	-	7	3	-	3	6	2	µg/l	1	A-T-025w
Boron (leachable) _A [#]	-	54	14	-	12	<10	62	µg/l	10	A-T-025w
Cadmium (leachable) _A [#]	-	<1	<1	-	<1	<1	<1	µg/l	1	A-T-025w
Copper (leachable) _A [#]	-	11	11	-	10	6	29	µg/l	1	A-T-025w

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Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
Chromium (leachable) _A [#]	-	<1	2	-	2	<1	<1	µg/l	1	A-T-025w
Chromium (hexavalent) (leachable) _A	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	mg/l	0.05	A-T-040w
Chromium (trivalent) (leachable)	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	mg/l	0.05	Calc
Lead (leachable) _A [#]	-	24	15	-	21	10	11	µg/l	1	A-T-025w
Mercury (leachable) _A [#]	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	µg/l	0.1	A-T-025w
Nickel (leachable) _A [#]	-	2	<1	-	<1	3	<1	µg/l	1	A-T-025w
Selenium (leachable) _A [#]	-	<1	<1	-	<1	<1	<1	µg/l	1	A-T-025w
Sulphur (elemental/free) (leachable) _A	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/l	0.1	A-T-029w
Zinc (leachable) _A [#]	-	10	11	-	6	10	4	µg/l	1	A-T-025w
TPH total (>C6-C40) (leachable) _A	-	<80	<80	-	<80	126	<80	µg/l	80	A-T-007w

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Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	-	Amosite	NAD	NAD	NAD	-			A-T-045
Asbestos Matrix (microscope) _o	-	-	Loose Fibres	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-	N/A	N/A	N/A	N/A	-			
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _o	-	-	<0.001	-	-	-	-	% w/w	0.001	A-T-054

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Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
PAH-16MS										
Acenaphthene _A ^{M#}	0.01	-	0.12	0.13	<0.01	0.01	-	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	-	0.03	0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.03	-	0.43	0.25	<0.02	0.04	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.22	-	1.05	0.49	0.11	0.09	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.21	-	0.91	0.39	0.14	0.07	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.23	-	1.14	0.60	0.20	0.11	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.11	-	0.51	0.22	0.11	<0.05	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.11	-	0.44	0.20	<0.07	<0.07	-	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.18	-	0.96	0.51	0.14	0.11	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	-	0.12	<0.04	<0.04	<0.04	-	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.34	-	2.21	1.62	0.24	0.21	-	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	-	0.12	0.13	<0.01	<0.01	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.12	-	0.57	0.25	0.13	0.05	-	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	-	<0.03	<0.03	<0.03	<0.03	-	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.14	-	1.45	0.79	0.10	0.13	-	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.31	-	1.99	1.29	0.23	0.19	-	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	2.01	-	12.1	6.88	1.40	1.01	-	mg/kg	0.01	A-T-019s

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Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
PAH-16MS (leachable)										
Acenaphthene (leachable) _A	-	0.27	0.22	-	0.08	0.19	0.93	µg/l	0.01	A-T-019w
Acenaphthylene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	0.23	µg/l	0.01	A-T-019w
Anthracene (leachable) _A	-	0.09	0.05	-	0.02	0.05	0.19	µg/l	0.01	A-T-019w
Benzo(a)anthracene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Benzo(a)pyrene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Benzo(ghi)perylene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Chrysene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Fluoranthene (leachable) _A	-	0.15	0.09	-	0.04	0.08	0.21	µg/l	0.01	A-T-019w
Fluorene (leachable) _A	-	0.26	0.15	-	0.07	0.15	0.70	µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Naphthalene (leachable) _A	-	0.08	0.13	-	0.06	0.04	0.22	µg/l	0.01	A-T-019w
Phenanthrene (leachable) _A	-	0.36	0.23	-	0.14	0.20	0.54	µg/l	0.01	A-T-019w
Pyrene (leachable) _A	-	0.11	0.06	-	0.03	0.05	0.12	µg/l	0.01	A-T-019w
Total PAH-16MS (leachable) _A	-	1.32	0.93	-	0.44	0.76	3.14	µg/l	0.01	A-T-019w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	-	<1	<1	<1	124	-	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	-	<1	1	<1	334	-	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	7	-	<1	4	<1	13	-	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	31	-	2	5	<1	2	-	mg/kg	1	A-T-055s
Ali >C21-C35 _A	31	-	7	58	13	10	-	mg/kg	1	A-T-055s
Ali >C35-C44 _A	10	-	5	25	4	1	-	mg/kg	1	A-T-055s
Total Aliphatics _A	69	-	9	68	13	484	-	mg/kg	1	A-T-055s
Total Aliphatics _A	78	-	14	95	17	486	-	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	3	-	1	4	1	67	-	mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	2	-	1	3	<1	128	-	mg/kg	1	A-T-055s
Aro >C12-C16 _A	5	-	3	8	1	27	-	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	27	-	15	22	4	16	-	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	48	-	59	73	20	63	-	mg/kg	1	A-T-055s
Aro >C35-C44 _A	12	-	6	16	10	4	-	mg/kg	1	A-T-055s
Total Aromatics _A	85	-	80	109	27	300	-	mg/kg	1	A-T-055s
Total Aromatics _A	97	-	85	124	37	304	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	154	-	89	177	39	785	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	176	-	99	219	53	790	-	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Forensic Description										
% of total sample Inert >10mm	-	-	-	-	14.58	37.61	-	% w/w	0.1	Calc-no stones
% of total sample Wood >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
% of total sample Vegetation >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones
% of total sample Cloth >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones
% of total sample Other Inert Material >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones
% of total sample Paper >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones
% of total sample Other Degradable Material >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones
% of total sample Fine Soil and Gravel <10mm	-	-	-	-	85.42	62.39	-	% w/w	0.1	Calc-no stones
Total Organic Carbon (Fine Soil) [#]	-	-	-	-	0.88	4.50	-	% w/w	0.03	Calc-no stones

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15									
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
% Moisture at <40C _A	9.2							% w/w	0.1	A-T-044
% Stones >10mm _A	<0.1							% w/w	0.1	A-T-044
pH _D ^{M#}	8.61							pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.03							g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	390							mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2							mg/kg	0.2	A-T-050s
Sulphide _A	<5							mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	310							mg/kg	5	A-T-029s
Organic matter _D ^{M#}	6.4							% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	6							mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	<1.0							mg/kg	1	A-T-027s
Cadmium _D ^{M#}	0.8							mg/kg	0.5	A-T-024s
Copper _D ^{M#}	23							mg/kg	1	A-T-024s
Chromium _D ^{M#}	39							mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1							mg/kg	1	A-T-040s
Chromium (trivalent)	39							mg/kg	1	Calc
Lead _D ^{M#}	29							mg/kg	1	A-T-024s
Mercury _D	0.54							mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	36							mg/kg	1	A-T-024s
Selenium _D ^{M#}	1							mg/kg	1	A-T-024s
Zinc _D ^{M#}	61							mg/kg	5	A-T-024s
Leachate Prep NRA (10:1) _A	*									A-T-001
pH (leachable) _A [#]	7.31							pH	0.01	A-T-031w
Sulphate (leachable) _A [#]	3.86							mg/l	1	A-T-026w
Cyanide (total) (leachable) _A	<0.005							mg/l	0.005	A-T-042wTCN
Phenols (total by HPLC) (leachable) _A	<0.01							mg/l	0.01	A-T-050w
Sulphide (leachable) _A	<0.1							mg/l	0.1	A-T-S2-w
DOC (leachable) _A [#]	1.7							mg/l	0.2	A-T-032w
Arsenic (leachable) _A [#]	2							µg/l	1	A-T-025w
Boron (leachable) _A [#]	<10							µg/l	10	A-T-025w
Cadmium (leachable) _A [#]	<1							µg/l	1	A-T-025w
Copper (leachable) _A [#]	6							µg/l	1	A-T-025w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
Chromium (leachable) _A [#]	<1							µg/l	1	A-T-025w
Chromium (hexavalent) (leachable) _A	<0.05							mg/l	0.05	A-T-040w
Chromium (trivalent) (leachable)	<0.05							mg/l	0.05	Calc
Lead (leachable) _A [#]	7							µg/l	1	A-T-025w
Mercury (leachable) _A [#]	<0.1							µg/l	0.1	A-T-025w
Nickel (leachable) _A [#]	<1							µg/l	1	A-T-025w
Selenium (leachable) _A [#]	<1							µg/l	1	A-T-025w
Sulphur (elemental/free) (leachable) _A	<0.1							mg/l	0.1	A-T-029w
Zinc (leachable) _A [#]	5							µg/l	1	A-T-025w
TPH total (>C6-C40) (leachable) _A	355							µg/l	80	A-T-007w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A									

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
PAH-16MS										
Acenaphthene _A ^{M#}	2.61							mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.57							mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	8.57							mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	23							mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	18.7							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	22							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	8.30							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	9.10							mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	20.9							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	2.21							mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	43							mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	2.53							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	10.6							mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	0.03							mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	25.5							mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	35.8							mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	233							mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
PAH-16MS (leachable)										
Acenaphthene (leachable) _A	2.19							µg/l	0.01	A-T-019w
Acenaphthylene (leachable) _A	0.09							µg/l	0.01	A-T-019w
Anthracene (leachable) _A	1.04							µg/l	0.01	A-T-019w
Benzo(a)anthracene (leachable) _A	1.22							µg/l	0.01	A-T-019w
Benzo(a)pyrene (leachable) _A	0.47							µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (leachable) _A	0.61							µg/l	0.01	A-T-019w
Benzo(ghi)perylene (leachable) _A	0.16							µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (leachable) _A	0.25							µg/l	0.01	A-T-019w
Chrysene (leachable) _A	1.02							µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (leachable) _A	0.04							µg/l	0.01	A-T-019w
Fluoranthene (leachable) _A	5.26							µg/l	0.01	A-T-019w
Fluorene (leachable) _A	1.06							µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (leachable) _A	0.19							µg/l	0.01	A-T-019w
Naphthalene (leachable) _A	0.28							µg/l	0.01	A-T-019w
Phenanthrene (leachable) _A	0.90							µg/l	0.01	A-T-019w
Pyrene (leachable) _A	4.09							µg/l	0.01	A-T-019w
Total PAH-16MS (leachable) _A	18.9							µg/l	0.01	A-T-019w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15									
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<5							mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<5							mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	6							mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	224							mg/kg	1	A-T-055s
Ali >C21-C35 _A	352							mg/kg	1	A-T-055s
Ali >C35-C44 _A	7							mg/kg	1	A-T-055s
Total Aliphatics _A	581							mg/kg	1	A-T-055s
Total Aliphatics _A	588							mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	9							mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	12							mg/kg	1	A-T-055s
Aro >C12-C16 _A	24							mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	726							mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	323							mg/kg	1	A-T-055s
Aro >C35-C44 _A	10							mg/kg	1	A-T-055s
Total Aromatics _A	1090							mg/kg	1	A-T-055s
Total Aromatics _A	1100							mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	1670							mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	1700							mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01							mg/kg	0.01	A-T-022s
Forensic Description										
% of total sample Inert >10mm	55.15							% w/w	0.1	Calc-no stones
% of total sample Wood >10mm	<0.10							% w/w	0.1	Calc-no stones

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
% of total sample Vegetation >10mm	<0.10							% w/w	0.1	Calc-no stones
% of total sample Cloth >10mm	<0.10							% w/w	0.1	Calc-no stones
% of total sample Other Inert Material >10mm	<0.10							% w/w	0.1	Calc-no stones
% of total sample Paper >10mm	<0.10							% w/w	0.1	Calc-no stones
% of total sample Other Degradable Material >10mm	<0.10							% w/w	0.1	Calc-no stones
% of total sample Fine Soil and Gravel <10mm	44.85							% w/w	0.1	Calc-no stones
Total Organic Carbon (Fine Soil) [#]	3.38							% w/w	0.03	Calc-no stones

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts. All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Appendix B – Manchester City Council, Council Planning Guidance in Relation to Ground Contamination

Planning Guidance in Relation to Ground Contamination: Guidance Note for Applicants, Developers, Land Owners and Consultants

**Version 6.00
September 2016**

**Environmental Protection Group
Contaminated Land Section**

A flow chart showing a typical example of the contaminated land planning procedure can be found in Appendix A, together with a checklist in Appendix B outlining the information required in support of a planning application. It is strongly recommended these are consulted prior to submission of information, as reports which fail to consider the issues outlined in this document will be considered unsatisfactory.



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OVERVIEW

Many areas of the City have previously been occupied by a variety of industrial activities. Historically, the predominant industries included textile and dye works, heavy engineering works, chemical works, gas works and brickworks. In general, early industrialists had little or no knowledge of the environmental effects of their manufacturing processes or operating practices. Consequently, over a period of time a particular site may have been home to a variety of industries, each of which may have left substances in the ground that may be hazardous to human health and the environment. Additionally, more recent activities may also have had a detrimental impact on the environment. As the Government encourages more redevelopment on brownfield land, developers now have to take into account the possibility of land contamination. The purpose of this guide is to make applicants, developers and their advisors aware of the information that Manchester City Council (MCC) requires in assessing an application for planning consent on land that may be affected by the presence of contamination.

In order to assess submitted information, the Contaminated Land Section (CLS) would expect a developer to demonstrate that due consideration has been given to the guidance contained within this document.

For more detail on the underpinning principles on which this document is based, the reader is directed to CLR11 Model Procedures for the Management of Land Contamination¹ (CLR 11), which can be downloaded free of charge from the Environment Agency website (www.environment-agency.gov.uk) and National Planning Policy Framework (NPPF) which is also available free of charge, from the Office of the Deputy Prime Minister website, (www.odpm.gov.uk).

IMPORTANT

This Guidance Note is written to serve as an informative and helpful source of advice. Readers must note that legislation, guidance and practical methods may be subject to change. This Council has taken all reasonable precautions to ensure the information is correct. However, the Council, its officers, servants, or agents, will not accept any liability for loss or damage caused by any person relying on this information, or for any errors or omissions in the information provided.

1.0 WHAT IS CONTAMINATED LAND?

Local Authorities are responsible for addressing contaminated land issues within two separate regimes: the Contaminated Land Regime (commonly known as Part 2A) and the Planning Regime (Development Control).

1.1 Definition under Part 2A of the Environmental Protection Act 1990

The definition of contaminated land (from Section 78A(2) of the Environmental Protection Act 1990) is:

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

(a) significant harm is being caused or there is the significant possibility of such harm being caused; or

(b) pollution of controlled waters is being, or is likely to be, caused...”

With respect to controlled waters, the Water Act 2003 (Chapter 37, Section 86) has amended the second limb of the definition so that it applies only where:

*“**significant** pollution of controlled waters is being caused, or there is a **significant possibility** of such pollution being caused ”*

Part 2A of the Environmental Protection Act 1990, as inserted by Section 57 of the Environment Act 1995, was brought into force on 01 April 2000. It requires all local authorities to identify contaminated land in its area and secure its remediation to a condition suitable for its current use.

To fall within the Part 2A definition, the land when assessed in the context of its current use must be capable of causing significant harm to human health or other specified receptors and/or pollution of controlled waters. Development of land will have to take into account Part 2A because a change in the use of the land may bring the development inside the statutory definition of contaminated land by creating a pollutant linkage.

A key element of the Part 2A regime is the **Source-Pathway-Receptor pollutant linkage** concept. Each element is defined as follows:

- the **source** is the contamination in, on or under the land
- the **pathway** is the route by which the contamination reaches the receptor;
- and, the **receptor** is defined as living organisms, ecological systems or property which may be harmed.

Without the clear identification of all three elements of the pollutant linkage, land cannot be identified as contaminated land under the regime (Table 1).

Table 1 Examples of Pathways and Effects from Land Contamination

HUMAN HEALTH
1) <i>Uptake of contaminants by food plants grown in contaminated soil</i> – heavy metals (e.g. cadmium, lead) and persistent organic pollutants including certain pesticides and veterinary products may result in an accumulation in food plants to concentrations where they exceed legal limits and/or may pose a hazard to human health. Uptake will depend on concentration in soil, its chemical form, soil pH, plant species and prominence in diet.
2) <i>Ingestion and inhalation</i> – substances may be ingested directly by young children playing on contaminated soil, by eating plants which have absorbed metals or are contaminated with soil or dust. Ingestion may also occur via contaminated water supplies. Metals, some organic materials and radioactive substances may be inhaled from dusts and soils.
3) <i>Skin contact</i> – soils containing tars, oils and corrosive substances may cause irritation to the skin through direct contact. Some substances (e.g. phenols) may be absorbed into the body through the skin or through cuts and abrasions.
4) <i>Irradiation</i> – As well as being inhaled and absorbed through the skin, radioactive materials emitting gamma rays can cause a radiation response at a distance from the material itself.
5) <i>Fire and explosion</i> – materials such as coal, coke particles, oil, tar, pitch, rubber, plastic and domestic waste are all combustible. If heated by contact with buried power cables or careless disposal of hot ashes they may ignite and burn underground. Both underground fires and biodegradation of organic materials may produce toxic or flammable gases. Methane and other gases may explode if allowed to accumulate in confined spaces.
BUILDINGS
1) <i>Fire and explosion</i> – underground fires may cause ground subsidence and cause structural damage to buildings. Accumulations of flammable gases in confined spaces leads to a risk of explosion. Underground fires may damage building services.
2) <i>Chemical attack on building materials and services</i> – sulphates may attack concrete structures. Acids, oils and tarry substances may accelerate corrosion of metals or attack plastics, rubber and other polymeric materials used in pipe work and service conduits or as jointing seals and protective coatings to concrete and metals.
3) <i>Physical</i> – blast-furnace and steel making slag (and some natural materials) may expand if ground conditions are changed by development. Degradation of fills may cause settlement and voids in buried tanks and drums may collapse as corrosion occurs or under loading from construction traffic.
NATURAL ENVIRONMENT
1) <i>Phytotoxicity (prevention/inhibition of plant growth)</i> – some metals essential for plant growth at low levels are phytotoxic at higher concentrations. Methane and other gases may give rise to phytotoxic effects by depleting the oxygen content in the root zone.
2) <i>Contamination of water resources</i> – soil has a limited capacity to absorb, degrade or attenuate the effects of pollutants. When this is exceeded, polluting substances may enter into surface and groundwater.
3) <i>Ecotoxicological effects</i> – contaminants in soil may affect microbial, animal and plant populations. Ecosystems or individual species on the site, in surface waters or areas affected by migration from the site may be affected.

1.2 Planning definition

The planning system uses a slightly different definition for contaminated land, which is not based solely on the legal definition set out in Part 2A. A wider range of contamination and receptors is relevant to planning but the degree of harm or pollution and the approach to remediation are essentially the same.

However, to avoid confusion with the term 'Contaminated Land' the planning regime uses the wider term "*land affected by contamination*". This is intended to cover all cases where:

"the actual or suspected presence of substances in, on or under the land may cause risks to people, human activities or the environment, regardless of whether or not the land meets the statutory definition in Part 2A .

The NPPF states that:

"As a minimum, the land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990"

The principal difference is that under the planning system, risks have to be assessed based upon the new or intended use of the land, rather than the existing use.

However, the principles underlying both regimes are fundamentally the same, namely, the identification and remediation of land that may pose a risk to human health and/or the environment.

Typical causes of land contamination include previous industrial or commercial usage, mining, and the landfilling of wastes. Land can also become contaminated due to its proximity to contaminated areas.

Part 2A was designed and intended to encourage voluntary remediation and should only be used where no appropriate alternative solution exists. The Contaminated Land Strategy published by the Council provides details of the planning system to ensure land is made suitable for use when it is redeveloped and/or encouraging polluters and owners of land to deal with problems without the need for Part 2A to be used directly.

1.3 Types of contamination

Contaminating substances may include,

- Metals e.g. cadmium, arsenic, lead, iron, nickel, chromium
- Inorganic compounds e.g. cyanide, ammonium, chlorides
- Organic substances e.g. oils, petrol, solvents, phenols, PAHs, PCBs
- Gases e.g. methane, carbon dioxide, hydrogen sulphide, volatiles
- High or low pH

Contamination may not occur solely as a result of human activities and land can be contaminated as a result of its natural state. For example, in Greater Manchester, marsh gas can cause a contamination problem, particularly in areas previously occupied by moss land.

2.0 ROLES AND RESPONSIBILITIES

2.1 Role of the Owner/Developer

Where development is proposed, the developer is responsible for ensuring that development is safe and suitable for use for the purpose for which it is intended.

The developer is therefore responsible for determining whether land is suitable for a particular development, or can be made so by remedial action. In order to demonstrate this, the developer should determine:

- i whether the land in question is already affected by contamination through source – pathway – receptor pollutant linkages;
- ii whether the proposed development will create new linkages, e.g. new pathways by which existing contaminants might reach existing or proposed receptors; and
- iii what action is needed to break those linkages and avoid new ones, deal with any unacceptable risks and enable safe development and future occupancy of the site and neighbouring land.

A potential developer will need to satisfy the local authority that unacceptable risk from contamination will be successfully addressed through remediation without undue environmental impact during and following the development.

In doing so, a developer should be aware that actions or omissions on their part could lead to liability being incurred under Part 2A, e.g. where development fails to address an existing unacceptable risk or creates such a risk by introducing a new receptor or pathway.

Where an agreed remediation scheme includes future monitoring and maintenance schemes, arrangements will need to be made to ensure that any subsequent owner is fully aware of these requirements and assumes ongoing responsibilities that remain with the new landowner.

2.2 Role of the LPA

The LPA has a duty to take account of all material planning considerations including land contamination during the preparation of Local Plans and when considering an application for planning permission. Usually where there is reason to believe land may be contaminated, or the proposed development is of particular sensitivity e.g. housing a full assessment may be required in advance of planning approval being issued, a planning condition requiring assessment of possible contamination may be recommended by the LPA and applied to the decision notice.

When considering development on land affected by contamination, the principal objective of the LPA is to ensure that any unacceptable risks to human health, property and/or the wider environment are identified so that appropriate action can be considered and then taken to address those risks. In achieving this objective, the LPA should assist in providing the necessary confidence to owners and occupiers of

the land after development, regarding the condition and the ranking of the land in relation to relevant environmental protection regimes, such as Part 2A.

2.3 Role of the Environmental Protection Team

Neighbourhood Officers within the Environmental Protection team are responsible for addressing contaminated land issues using Part 2A and the planning system. The Environmental Protection Team and also the EA act as consultees to the LPA regarding risks to human health and controlled waters.

2.4 Role of other organisations

The EA are a consultee for any planning applications, where development is proposed on potentially contaminated land. Where the EA are consulted and land contamination is an issue they will seek to implement the objective of the water framework directive to prevent and limit the entry of pollutants into groundwater.

Within the LPA, Building Control will also need to be satisfied that any risks to the development from potential contamination have been adequately addressed. The Building Regulations 2000 require developers to demonstrate that hazards from potential contamination have been properly assessed and appropriate measures put in place to address any risk.

3.0 THE PLANNING PROCEDURE

The actual or possible presence of contamination is a material planning consideration. Planning advises that as a precautionary approach, the possibility of contamination should be assumed when considering planning applications in relation to all land subject to or adjacent to previous industrial use and also where uses are being considered that are particularly sensitive to contamination, e.g. housing, schools, hospitals and children's play areas.

Where development is proposed on land that is or may be affected by contamination, an assessment of risk should be carried out by the applicant for consideration by the Local Planning Authority (LPA) before the application is determined. Any existing or new unacceptable risks should be identified and proposals made to deal with them effectively as part of the development process.

When a planning application is made, the planning officer will consult with the Contaminated Land Section and the application (with supporting information) will be assessed to determine whether there is the potential for contamination to influence the site, whether suitable measures have been proposed to address any risks and whether the proposed development is acceptable.

Other statutory bodies and relevant local authority departments may also be consulted as necessary, including English Nature, Natural England and the departments for building control, conservation and archaeology, and engineering.

If there is the potential for contamination to affect the site, or the end-use is particularly sensitive, recommendations will be made that certain conditions be imposed upon the development. These are intended to ensure that the site is made suitable for its proposed end use and ensure the safety of site workers, future site users and the protection of the environment.

It is essential that the developer and their agents provide as much information to the LPA at every stage of the planning process. Withholding information, however trivial, may cause a delay to the application. The onus is on the applicant to keep the LPA well informed about the development at all times so that decisions can be made swiftly and the application process completed as quickly as possible.

For large developments on sites where serious contamination is known, or is likely to be present, it is strongly recommended that a pre-application consultation with the LPA be undertaken. It may save both time and money if a thorough pre-application consultation takes place prior to submission of a full planning application.

A flowchart showing a typical example of the contaminated land planning procedure can be found in Appendix A.

4.0 CRITERIA USED FOR ASSESSING THE SUBMITTED INFORMATION

Information submitted in support of planning applications must be of an acceptable minimum standard in order to satisfy the LPA. The guidance contained within this section aims to inform developers of the procedural requirements of a risk-based approach to land contamination, as defined in current UK legislation and guidance.

A detailed technical framework for investigating and dealing with land affected by contamination is contained within CLR 11. The process involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a way that is consistent with government policies and legislation within the UK.

The approach outlined in this Manchester City Council Guidance Note is consistent with the CLR 11 technical framework and is based on a staged or tiered approach to risk assessment, which includes the following three key elements:

- Risk Screening
- Generic Quantitative Risk Assessment (GQRA)
- Detailed Quantitative Risk Assessment (DQRA)

Risk screening generally involves developing a conceptual model (Section 4.1), which identifies whether there could be any potentially unacceptable risks at the site. The conceptual model may then be used to determine if any further assessment is required. If this preliminary assessment clearly demonstrates that contamination at the site poses no unacceptable risks (i.e. no source-pathway-receptor relationships) then quantitative assessments may not be required.

The procedure for investigating a potentially contaminated site would be expected to meet the criteria outlined in British Standard (BS) 10175 (2011) Investigation of Potentially Contaminated Sites – Code of Practice³. Typical components of a report submitted in support of a planning application would generally include the following four components:

- Preliminary Risk Assessment (PRA) (often referred to as a Phase 1 Investigation or Desk Study)
- Phase 2 Investigation (intrusive investigation)
- Remediation Strategy
- Verification Report

A more detailed checklist of LPA requirements in relation to each of these components can be found in Appendix B.

4.1 Preliminary Risk Assessment (PRA)

A PRA (sometimes referred to as a Phase 1 investigation) should provide a preliminary qualitative assessment of risk by interpreting information on a site's history, considering the likelihood of contamination being present and making an initial hazard assessment. The PRA typically consists of a **desk study**, **site reconnaissance**, development of a **conceptual model** and a basic **hazard assessment**.

The **desk study** comprises a search of available information and historical maps, which can be used to identify the likelihood of contamination being present. The two main indicators for the likely presence of contamination at a site are past industrial uses and/or close proximity to a landfill. A detailed appraisal of documentary research can be found in CLR 3 Documentary Research on Industrial Sites⁴. For details of information required for a typical desk study see Appendix B.

A simple **site reconnaissance** survey of the site is conducted to identify if there are any obvious signs of contamination at the surface. Further information regarding site inspection can be found in CLR 2 Guidance on Preliminary Site Inspection of Contaminated Land⁵.

A **conceptual model** is a representation (text and/or graphics) of the relationship(s) between contamination source(s), pathway(s) and receptor(s) developed on the basis of hazard identification. Developing a conceptual model should be viewed as an iterative process that should be refined during subsequent phases of assessment. For details of information required for a conceptual model see Appendix B.

Using the information gathered, the conceptual model of the site is constructed and a basic **hazard assessment** is carried out.

4.2 Phase 2 investigation

A Phase II investigation aims to reduce the uncertainties identified in the initial conceptual model by quantifying potential contamination at the site. The data obtained will be used to inform a decision as to whether the site is potentially harmful. A Phase II report generally consists of an intrusive site investigation and a subsequent risk assessment. The investigation process should seek to clearly identify and characterise plausible source-pathway-receptor linkages at the site and provide information for the refinement of the initial conceptual model.

4.3 Remediation strategy

This is a document detailing what action is to be carried out so that contamination no longer presents a risk to site users, property or ecological systems. It may include measures such as the removal of contamination, encapsulation of the contaminants, treatment of the contaminants or measures to break the pollution linkages. Please note that Government policy encourages sustainable methods of remediation.

A remediation strategy should be submitted where a site investigation identifies levels of contamination that will require remediation prior to the site being suitable for its intended use. This statement should include full details of how the contamination problem at the site will be addressed and demonstrate that the standard of remediation work complies with current best practice and guidance. This must be approved by the LPA before any remedial actions at the site commence.

4.4 Verification report

Where contamination has been found and/or remediated, the developer will be required to submit a verification report. In certain circumstances it may be necessary for the developer to conduct post-completion monitoring. This should be undertaken

to the approval of the LPA and results of the monitoring should be submitted for review. For limited remediation works or protective works a verification statement alone may be acceptable, but prior confirmation of this should be obtained from the LPA.

The verification report should provide confirmation that all measures outlined in the approved remediation statement have been successfully completed, including where appropriate, validation testing.

Recommendations to discharge contaminated land conditions will only be made once the Contaminated Land Section has received and approved a satisfactory verification report.

5.0 GENERIC GUIDANCE

The complexity of contaminated land technical guidance, coupled with individual site variability, makes it difficult to produce comprehensive guidance applicable to every situation.

However, when assessing the adequacy of a site investigation, a number of common problems frequently arise. These generally relate to areas where technical guidance may be complex or incomplete. In an attempt to minimise the occurrence of these problems, the CLS apply consistent criteria for certain technical aspects of a site investigation. This section is intended to highlight recurring problem areas and key points that are of particular importance.

5.1 Obtaining representative samples

All sampling strategies should be designed to provide data that is representative of the site conditions as a whole. Sampling should be undertaken in accordance with recognised sample collection methodology and guidance, with reference made to recommendations within BS 10175. Reference to the historical site information obtained from the desk study is essential in order to target possible sources of contamination and to ensure that an appropriate suite of analysis is performed. Justification for the chosen sampling regime and analysis suite should be clearly set out in the site investigation report.

5.2 Sample analysis

A suitably accredited laboratory should be used to undertake analysis of samples. The site investigation should include a detailed plan showing the location of sampling points and accreditation details of the laboratory used, together with summary tables of results. A full set of results should be included in the report submitted and an electronic (pdf) form from the laboratory that undertook the analysis should also be submitted.

5.3 Generic and detailed quantitative risk assessment (GQRA and DQRA)

The Department for Environment, Food and Rural Affairs (Defra) formally withdrew the 1987 ICRCL trigger and action values in December 2002, following the implementation of the Contaminated Land Exposure Assessment Model (CLEA) and associated publication of the Soil Guideline Values (SGVs).

In 2008, the CLEA UK model and the SGVs were withdrawn by Defra and a revised CLEA model known as CLEA 1.04 was launched. MCC would expect all future site investigations to make no reference to the withdrawn standards.

Generic and detailed QRA should now be carried out using assessment criteria derived using the new CLEA model (1.06). Where site-specific target levels are used they should be calculated based on suitable and reasonable assumptions as well as current best practice and associated briefing notes and guidance. Reference should also be made to statistical analysis of the resulting data from the intrusive

investigation.

More recently the following criteria have been released Category 4 Screening Levels (C4SLs) (replaced SGVs) and Suitable 4 Use Values (S4ULs) (replaced LQM/CIEH GACs). Where these values exist they should be used instead of the SGVs and LQM/CIEH GACs

The CLR7 report '*Assessment of Risks to Human Health from Land Contamination: An Overview of the Development of Soil Guideline Values and Related Research*' was withdrawn in 2008. Consultants when assessing site investigation data should adopt a suitable statistical approach. The CIEH and CL:AIRE set out in the document '*Guidance on Comparing Soil Contamination Data with a Critical Concentration*'⁶ an approach that is a useful starting point for statistically assessing data.

It is usually inappropriate to apply quantitative criteria developed outside the UK, to UK sites, as assumptions underlying the models used to derive these criteria often reflect different behaviour patterns, local soil types or other technical factors.

Where other contaminated land quantitative criteria are used e.g. Dutch or USEPA, the reasoning behind not using current UK guidance should be given and their use must be fully justified and referenced within the report. This would be expected to include a discussion of the conceptual model and assumptions used to derive the generic criteria together with an assessment of the underpinning toxicological data.

5.4 Assessment criteria for ground gas

If the development is situated within 250m of a landfill site, or is suspected of having the potential to generate ground gas, it will be necessary to assess the potential risk and, if required, to incorporate appropriate gas protection measures into the development design.

Guidance for assessment of the risks associated with the presence of methane and carbon dioxide within ground gas can be found in;

- Assessing Risks Posed by Hazardous Gas Ground Gases to Buildings (CIRIA C665)⁷
- BRE Report 414 publication Protective Measures for Housing on Gas Contaminated Land⁸
- Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are present⁹
- Code of Practice for the characterisation and remediation of ground gas in affected developments¹⁰
- Local Authority Guide to Ground Gas¹¹, and
- Development on Land Potentially Affected by Hazardous Ground Gas¹².

The guidance in CIRIA C665 sets out a phased, risk-based approach to ground gas assessment. An assessment should comprise:

- A desk study and development of conceptual site model.
- A site investigation and risk assessment.
- A remediation strategy, if required.
- A validation report to confirm that the remedial measures have been

successfully implemented.

Where the desk study identifies a potential ground gas risk, gas monitoring is required. Measurements should be taken from suitably installed and equipped monitoring boreholes and the details and locations of the boreholes should be supplied. The spacing and number of the monitoring wells required at a site depends on the generating potential of the gas source (identified during the desk study and first phase site investigation) and the sensitivity of the end-use (housing being the most sensitive). The response zone of a borehole should be designed to intersect the suspected sources of gas. Spike testing and data obtained from trial pit installations are not acceptable for gas risk assessment.

The number of monitoring visits required, and the length of time monitoring should be carried out over, depends on the generating potential of the gas source and sensitivity of the end-use. For example, a site which is to be developed for residential properties with gardens, which is situated over a very low gas generating source (i.e. made ground greater than 1 metre thick) may require a minimum of 6 visits over 3 months, while residential with housing over a very high gas generating source (i.e. a modern landfill) may require 24 visits over 24 months. In order to obtain any worthwhile data to use in a risk assessment, at least two readings over the monitoring period should cover the 'worst case' scenario i.e. low and falling atmospheric pressure (below 1000 millibars) and different weather conditions such as rainfall, frost and dry.

Monitoring should be undertaken in accordance with the CIRIA C665 guidance; where deeper made ground (greater than 1 metre deep), organic material or hydrocarbon spills are unexpectedly encountered, additional monitoring should be considered.

Once sufficient gas monitoring data has been obtained, a ground gas risk assessment should be carried out to determine if gas protection measures are required. CIRIA C665 sets out two risk assessment methodologies:

- Modified Wilson and Card methodology (for use on all development types except low rise houses with gardens). The gas regime characteristic situation determines the number and type of protection measures required.
- NHBC Traffic Light System, proposed by Boyle and Witherington (for use on developments with conventional low-rise housing with gardens with block and beam floor and ventilated underfloor void only). Gas results are initially compared to Typical Maximum Concentrations and then to Gas Screening Values if the Typical Maximum Concentrations are exceeded. The worst-case protection measures are adopted.

It should also be noted that when submitting ground gas monitoring data a current calibration certificate for all machines used for the gas monitoring should also be submitted.

5.5 Cover Systems

The main function of an **engineered cover system** should be to provide a safe and permanent barrier between any 'significant' levels of buried contamination and residents/site users.

It is not uncommon for developers to include a **simple cover system** into garden and landscaped areas. This is done in order to provide a reduction in the hazard to human health in situations where ‘marginally’ elevated levels of contaminants have been encountered, as well as to provide a suitable medium for plant growth.

There is currently no definitive guidance available that is able to adequately address the design of either of these cover systems. Therefore the CLS considers that where cover systems are used there should be no distinction between ‘marginal’ and ‘significant’ levels of contamination.

5.5.1 Depth of cover systems and capping layers

Where used as a capping layer of cover system, fill materials should be installed at prescribed depths according to their soil type and the role they play within the cover system. As cover systems are almost always site-specific, the various depth of fill can vary greatly depending on how complex or engineered the cover system is to be, but there are a few minimum standards to be observed, which are described below.

Typical cover system design requires a capillary break layer at its base, which is then overlain by various depths/types of fill material. These individual layers working in unison form the cover system or capping layer.

The minimum acceptable total depth for fill materials (including the break layer) within private garden areas should be 600 mm. This figure is recommended and has been adopted for the following reasons:

1. Root systems for shrubs are typically up to 600 mm;
2. Excavations are unlikely to be deeper than 600 mm in typical gardening activities;
3. Bio-turbation (soil-mixing by biological organisms) is typically limited to the top 600 mm of the soil profile;
4. Excavations by children or pets are unlikely to exceed 600 mm.

The minimum acceptable total depth for fill materials (including the break layer) within areas of soft-landscaping, common areas or public open spaces is 450 mm. This relaxation of cover depth is designed to reflect the reduced risk afforded by diminished exposure of human health receptors to potentially contaminated soils within these public areas via direct contact (dermal, ingestion, inhalation).

5.5.2 Depth of growing medium and planting

In certain circumstances, where it can be demonstrated that future activities will not result in soil mixing, it may be acceptable to use a shallower depth of cover material. A robust case would need to first be presented for prior approval from the LPA. An additional consideration when planting landscaped areas is that BS 3882¹³ recommends the rooting depths in Table 2.

Table 2 Idealised total growth medium rooting depths for various vegetation types

Total Minimum Rooting Depth	Vegetation Type			
	GRASS	PLANTS	SHRUBS	TREES
	450mm	450mm	600mm	900mm

5.5.3 Sampling Ratios

When a cover system is used, a desk study should be provided with details of the source of the cover material. It should be demonstrated that the soil is free from contamination by supplying results of analytical tests. Justification for the analytical suite used should be included. Sampling densities should be justified and based on the findings of a desk study. It would be expected as an absolute minimum sampling would consist of at least three samples for each source used. One sample for every 200m³ from proven 'greenfield' sources and one sample every 50m³ from 'unknown', 'mixed' or 'brownfield' sources. MCC would also expect to see on site sampling and not just sampling at source to confirm that the soil delivered to the site is suitable for use. Table 3 summarises the recommended sampling frequencies depending on the soil source and end use.

Table 3 Sampling frequencies recommended by the Environmental Protection Team for imported or site-won fill materials

Intended End-Use	SOURCE/ORIGIN OF FILL MATERIAL			
	GREENFIELD	REMEDIATED	BROWNFIELD	UNKNOWN
GARDENS	1:200m ³	1:100m ³	1:50m ³	1:50m ³
SOFT-LANDSCAPING	1:200m ³	1:150m ³	1:150m ³	1:150m ³
OTHER	1:200m ³	1:200m ³	1:200m ³	1:200m ³

5.5.4 On-site of Off-site Validation

Fill material imported onto site should be stored in a designated area, which is clearly identified on an appropriate scale plan. Stockpile management protocols consistent with best practice apply.

The Environmental Protection Team does not routinely accept off-site validation of fill material (whether this is top-soil, sub-soil or other substrate), as this often results in chemical testing of different material to that actually imported to site. It is therefore difficult to prove the exact chemical nature of the material eventually imported, as off-site validation tends to involve composite samples taken from a 'typical batch' of the material intended for import. As such, validation testing of imported fill materials should be carried out in-situ, after materials have been imported to site.

5.5.5 Documentary Evidence

- **Chemical analysis:** All raw laboratory data should be submitted with the analytical test certificate;

- **Statistical analysis of datasets:** Calculations in line with CIEH/CL:AIRE guidance should be provided;
- **Photographic evidence:** Photographs of installed remedial measures (of any type) are required. Photographic evidence should be representative and where necessary, include a scale/ruler. This is of particular importance when photographing cover depths to verify the agreed depth of cover has been installed;
- **Plans:** Showing pertinent information relating to remediation, such as stockpile locations, areas subject to remedial measures or areas of further investigation;
- **Import/export data:** Pertinent data relating to fill materials/wastes, including volumetric data (i.e. how much was imported to site), source data (i.e. where the material came from) and waste transfer data (where applicable).

5.5.6 Obtaining Representative Samples

All sampling strategies should be designed to provide data that is representative of the site conditions as a whole. Sampling should be undertaken in accordance with recognised sample collection methodology and guidance, with reference made to recommendations within the British Standard BS10175 guidance document. It is essential to derive a CSM using the information obtained from the PRA to target possible sources of contamination and also to ensure that an appropriate suite of analysis is performed. Justification for the chosen sampling regime and analysis suite should be clearly set out in the site investigation report.

A suitably accredited laboratory should be used to undertake analysis of samples. The site investigation should include a detailed plan showing the location of sampling points and accreditation details of the laboratory used, together with summary tables of results. A full set of results, including exploratory hole logs, should be submitted.

5.6 Human Remains and / or Burial Sites

If you have been made aware through means such as historical records that the site is on or adjacent to an existing or former burial ground that may contain human remains, you must contact Environmental Health at the earliest opportunity.

If at any time during site investigation works, ground-works or excavating on a site within the boundary of Manchester City Council you discover human remains, suspected human remains or bones of an unknown type you must stop all works, secure the area and contact the Police and Environmental Health for advice. Environmental Health can be contacted through the City Councils contact centre on 0161 234 5004.

5.7 Japanese Knotweed

Japanese knotweed is a very invasive species of plant which is not native to the British Isles. Since it was introduced into the UK as an ornamental garden plant in the mid-nineteenth century it has spread across the UK, particularly along watercourses, transport routes and waste areas. Japanese knotweed is not just a problem for our

native wildlife; the vigorous growth can also damage buildings and hard surfaces. Once established underneath or around the built environment, it can be particularly hard to control.

Neither the Environment Agency or the Local Authority are responsible for controlling Japanese Knotweed, other than that growing on their own land. Managing knotweed is the responsibility of the owner/occupier of a site.

Link to Environment Agency **Japanese Knotweed** Guidance:

<http://www.environment-agency.gov.uk/homeandleisure/wildlife/31364.aspx>

Link to Environment Agency **Invasive Species** Guidance:

<http://www.environment-agency.gov.uk/homeandleisure/wildlife/31350.aspx>

Contact Details for the **Environment Agency**

Telephone: 08708 506 506 (Mon-Fri, 8am - 6pm)

E-mail: enquiries@environment-agency.gov.uk

Postal Address: National Customer Contact Centre, PO Box 544 Rotherham S60 1B

5.8 Asbestos

With regard to the MCC CLS there are three issues related to asbestos that we may be contacted in relation to and they are;

1. Dealing with asbestos as part of a contaminated land condition or in relation to the planning process,
2. Concerned members of the public thinking about asbestos in their homes, in/on neighbours property or on current developments close by, and;
3. Members of the public working and being exposed to asbestos in their workplace.

Asbestos and Contaminated Land

If the presence of asbestos within made ground is suspected or within a building due for demolition then contact the Environmental Protection Team on Tel: 0161 234 5004

Asbestos, Neighbours and Current Developments

If the issue is with members of the public having concerns with their house, neighbours or building sites dealing with asbestos sheeting or similar, then please see our guidance document:

<http://www.manchester.gov.uk/downloads/download/4234/asbestos>

Asbestos at Work

If the issue is work related then please review the Health and Safety Executive website at the following link for information and contact details:

<http://www.hse.gov.uk/asbestos/>

6.0 REFERENCES

1. Department of Environment, Food & Rural Affairs/Environment Agency, 2004, CLR Report No 11, **Model Procedures for the Management of Land Contamination.**
2. Department of the Environment, 2004, PPS23, **Planning & Pollution Control.**
3. British Standards Institute, 2011, BS10175, **Investigation of Potentially Contaminated Sites – Code of Practice.**
4. Department of the Environment, 1994, CLR Report No 3, **Documentary Research on Industrial Sites.**
5. Department of the Environment, 1994, CLR Report No 2, **Guidance on Preliminary Site Inspection of Contaminated Land.**
6. Chartered Institute of Environmental Health (CIEH) / Contaminated Land: Applications in Real Environments (CL:AIRE), 2008, **Guidance on Comparing Soil Contamination Data with a Critical Concentration.**
7. CIRIA, C665, 2007, **Assessing risks posed by hazardous ground gases to buildings.**
8. Building Research Establishment 414 (2001) **Protective Measures for Housing on Gas Contaminated Land.**
9. National House Building Council (NHBC), Report Edition No. 4 (March 2007) **Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are present.**
10. British Standards Institute BS 8485 (2007) **Code of practice for the characterisation and remediation of ground gas in affected development,** Draft for Public Comment.
11. Chartered Institute of Environmental Health (2008) **Local Authority Guide to Ground Gas.**
12. Greater Manchester Public Protection Partnership (GMPPP) Briefing Note BN01/2008 (2008) **Development on Land Potentially Affected by Hazardous Ground Gas.**
13. British Standards Institute BS 3882 (2007) **Specification for Topsoil and requirements for use.**

Additional Reference Material

- Chartered Institute of Environmental Health, 2001, **Local Authority Guide to the Application of Part 2A of the Environmental Protection Act 1990.**
- Department of the Environment, 1994, CLR Report No 1, **A Framework for Assessing the Impact of Contaminated Land on Groundwater and Surface Water.**
- Department of Environment, Transport and Regions, Circular 02/2000 **Contaminated Land: Implementation of the Part 2A of the Environmental Protection Act 1990.**

- Department of the Environment, 1994, CLR Report No 4, **Sampling Strategies for Contaminated Land**.
- Department of Environment, Transport and Regions, 1997, CLR Report No 12, **A Quality Approach for Contaminated Land Consultancy** [section 3.4 'Reporting'].
- Department of Environment, Transport and Regions, 2000, **Guidelines for Environmental Risk Assessment & Management**, Revised Departmental Guidance.
- Environment Agency, 1999, R&D Publication 20, **Methodology for the Derivation of Remedial Targets for Soil and Groundwater to Protect Water Resources**.
- Environment Agency, March 2010, GPLC1 – **Guiding Principles for Land Contamination**.
- Environment Agency, March 2010, GPLC2 – **FAQs, Technical Information, Detailed**.

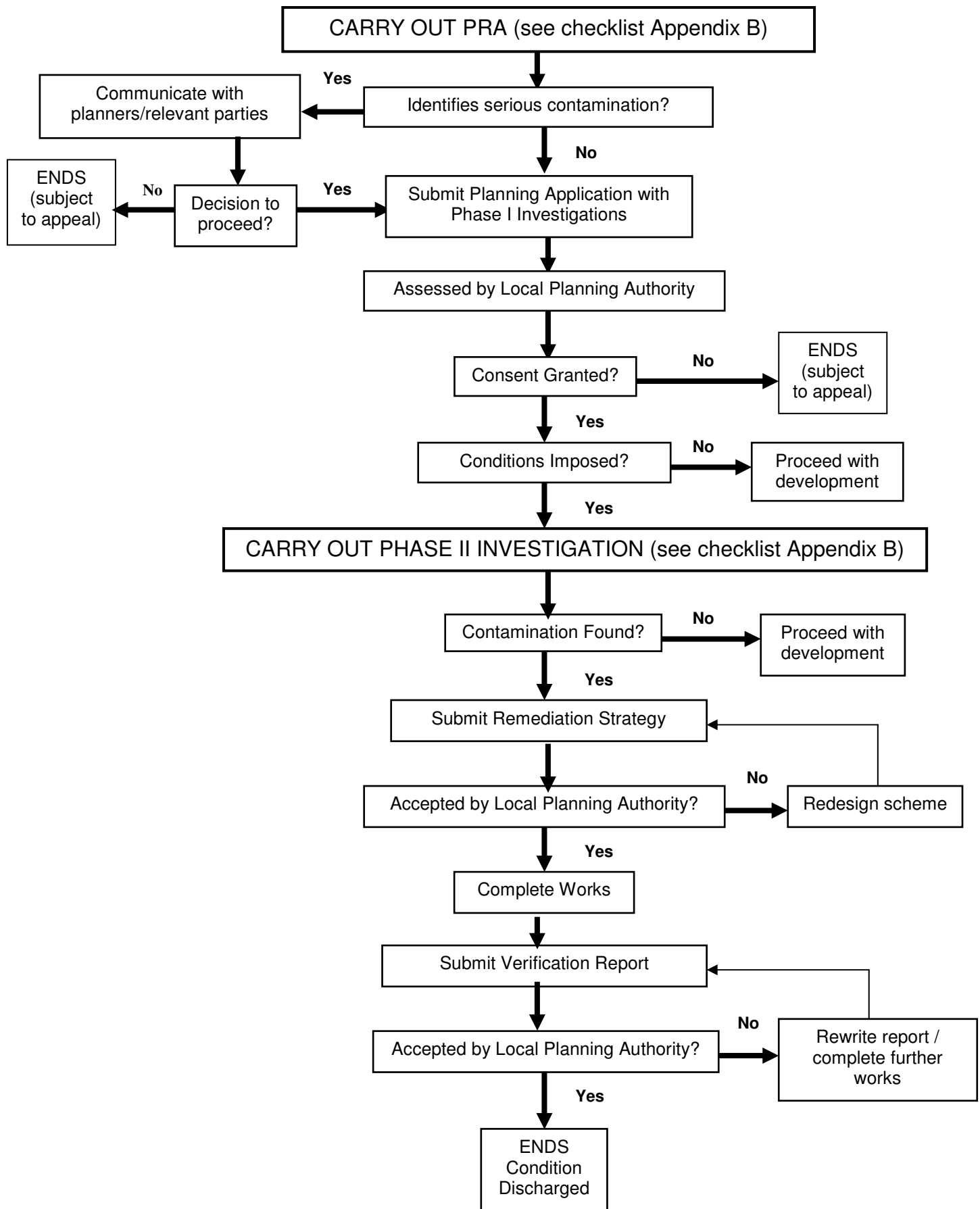
Advice and References

- Environment Agency, March 2010, GPLC3 – **Reporting Checklists**
- Environment Agency, February 2010, SC030114, **Evidence, Verification of Remediation of Land Contamination**
- Harris, M R, Herbert, S M & Smith, M A, 1995-1998, CIRIA Special Publications 101-112, **Remedial Treatment for Contaminated Land, 12 Volumes**
- Health & Safety Executive, 1991, **Protection of Workers & the General Public during the Development of Contaminated Land**
- National House Building Council (NHBC), 1999, NHBC Standards Chapter 4.1, **Land Quality – Managing Ground Conditions**
- The LQM/CIEH **Generic Assessment Criteria for Human Health Risk Assessment**, 2nd Edition, Land Quality Press, 2009.

Acknowledgements

MCC would like to acknowledge the work of the MAPAC planning guidance sub-group.

APPENDIX A - FLOWCHART SHOWING A TYPICAL EXAMPLE OF THE CONTAMINATED LAND PLANNING PROCEDURE



APPENDIX B – CHECKLIST OUTLINING THE INFORMATION REQUIRED IN SUPPORT OF A PLANNING APPLICATION

PRELIMINARY RISK ASSESSMENT
Desk Study • A site description. • A detailed site plan showing the site location, extent and boundary. • A review of historical information including copies of historical maps where available. • Background information on past and present uses of the site and its surrounding area. • Background information on the nature of any hazards and potential sources identified. • An appraisal of the site's environmental setting including: - Geology, hydrology and hydrogeology. - Information on coal workings and other extractive industries. - Waste management issues and landfill sites. - Water abstractions and discharges, pollution incidents, IPPC Part A and B, and radon. - Drainage and services. • A review of previous desk studies or site investigations. • Risk screening by means of an initial conceptual model, which should generally include the following. - Source characterisation. - Migration pathway descriptions. - Environmental receptor identification and discussion. - Identification of potential pollution linkages. - Description of the limitations and uncertainties inherent in the conceptual model. • Recommendations and conclusions.
PHASE II INVESTIGATION

Site Investigation

Site Investigation Methodology including:

- A clear investigation scheme, based on findings of desk study.
- Methods of investigation with justification of the methodology and investigation techniques used.
- Justification of exploration locations and a plan showing their position.
- Sampling and analytical strategy.
- Coverage of investigations (statistical significance - targeted and non-targeted)
- Environmental monitoring including water sampling and gas monitoring/sampling.

Results and findings of investigation including:

- Ground, groundwater and gas conditions encountered.
- Presentation of laboratory analysis, sampling and monitoring results.
- Discussion of any ground contamination (soil/gas/water) encountered.

Refine conceptual model.

Qualitative and quantitative risk assessments (clearly identifying pollutant linkages).

Recommendations for remediation.

Recommendations for further investigation (if required).

REMEDIATION STRATEGY

- Clear remediation strategy.
- Detailed outline of works to be carried out.
 - Description of ground conditions.
 - Type, form and scale of contamination to be remediated.
- Consents, agreements and licenses (waste management issues).
- Implementation and validation of remediation.
 - Use of on-site observations and visual evidence.
 - Chemical analysis/monitoring data.
 - Proposed clean up standard.
 - Construction Quality Assurance.

VERIFICATION REPORT

- Details of works carried out and contamination encountered during investigation.
- Details and justification of any changes from the original remediation strategy.
- Demonstration of compliance and description of validation methods.
 - Laboratory and *in-situ* results.
 - Monitoring results for groundwater and gases.
 - Summary data plots and tables relating to clean up criteria.
 - Plans showing treatment areas and details of any differences from the original remediation strategy.
 - Photographic and other media records.
 - Waste management details and records.

- Ongoing environmental monitoring or works to be carried out.
- Confirmation that remediation objectives have been met.

APPENDIX C – FREQUENTLY ASKED QUESTIONS

How much of the work can I do without employing a consultant?

Simply determining whether land contamination is likely to be an issue is relatively straight-forward. Researching the history and uses of a site at the local studies unit of a library, and making enquiries of the Council and other agencies, can be carried out by competent developers.

Can the Council advise on employing a consultant or contractor?

The Council cannot recommend any consultant or contractor. Lists can be found in telephone and trade directories. There are websites that may help to identify consultants and contractors with suitable experience. Advice may be given as to the type of expertise a consultant or contractor might be expected to demonstrate.

Who should I address correspondence to within the Council?

Once a contaminated land condition has been placed on an application all correspondence relating to the subsequent assessment process should be directed to the Contaminated Land Section.

Contaminated Land Section
Environmental Services
Manchester City Council
Hammerstone Road
Gorton
Manchester
M18 8EQ

Telephone 0161 234 1363

A contaminated land officer assigned to the development whilst it is being built will then deal with the application and keep the appropriate planning officer informed of the progress of the application.

When should I contact the Environment Agency?

Although local authorities are the primary regulators of Part 2A, the Environment Agency assume the role when contamination is found to impact on controlled waters. Therefore, if a development is likely to impact on either surface waters or groundwater the advice of the Agency should be sought.

APPENDIX D – USEFUL CONTACTS

British Standards Institute (BSI)
389 Chiswick High Road
London
W4 4AL
Tel: 020 8996 9001
Fax: 020 8996 7001
www.bsi-global.com

Construction Industry Research & Information Group (CIRIA)
6 Storey's Gate
Westminster
London
SW1 P 3AU
Tel: 020 722 8891
Fax: 020 7222 1708
www.ciria.org.uk

Department of Environment, Food and Rural Affairs (DEFRA)
3/B4 Ashdown House
123 Victoria Street, London
SW1 6DE
Tel: 020 7944 5287
Fax: 020 7944 5279
www.defra.gov.uk

Environment Agency (EA)
Contaminated Land Section

Appleton House,
430 Birchwood Boulevard,
Warrington, Cheshire,
WA3 7WD
Tel: 08708 506506
www.environment-agency.gov.uk

Land Condition Specialists
www.silc.org.uk

Manchester Area Pollution Advisory Committee
www.mapac.org.uk

The National House Building Council
Buildmark House, Chiltern Avenue
Amersham, Bucks
HP6 5AP
Tel: 01494 735363
www.nhbc.org.uk

WRc Plc
Frankland Road, Blagrove
Swindon, Wiltshire
SN5 8YF
Tel: 01793 865000
Fax: 01793 865001
www.wrcplc.co.uk