



LAND AT BLACKLEY MERE, CRUMPSALL, MANCHESTER

SUPPLEMENTARY GROUNDWATER RISK ASSESSMENT REPORT

FOR

BLACKLEY DEVELOPMENTS LTD

Mr. C. S. Eccles - Brownfield Land Consultant

Contaminated Land Assessments, Options Appraisals, Remediation Strategy & Verification,
Geotechnical Design, Earthworks & Materials Reuse, Waste Assessments & Classification

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

DOCUMENT CONTROL SHEET

Report Title: Land at Blackley Mere, Crumpsall, Manchester:
Supplementary Groundwater Risk Assessment
Report

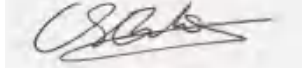
Client: Blackley Developments Ltd

Report Reference: 182.02.03

Report Status: For Issue

Version: 2.0

Report Date: 31st January 2021

Partially prepared by: Catherine Kenny MSc FGS CGeol, Consultant Geologist	
Report Completed & Approved by: Chris Eccles BEng, MSc, DIC, FGS, CGeol, CSci, CEnv, SiLC, UK RoGEP Adviser CL:AIRE DoWCoP QP 020, NQMS Suitably Qualified Person	
	31 st January 2021

This report has been prepared for Blackley Developments by C S Eccles Brownfield Consultancy with reasonable skill, care and diligence and taking account of the contract terms and conditions, manpower and resources devoted to it in agreement with the client. C S Eccles Brownfield Consultancy disclaims any responsibility to the client and others in respect of any matters outside the scope of the above.

The report is only valid when it is used in its entirety.

This report is confidential to the client and C S Eccles Brownfield Consultancy accepts no responsibility to third parties to whom the report, or any part thereof, is made known. Any such party using any information contained within the report does so at their own risk.

CONTENTS

1	INTRODUCTION	1
1.1	Remediation Strategy Scope	2
2	PREVIOUS WORK	3
2.1	Initial Investigation Works	3
2.2	Commencement of Development	3
2.3	Stop Notice	3
2.4	Investigation Works of Imported Materials	3
2.5	Meeting with Environment Agency	4
2.6	Correspondence with Environment Agency November 2020	5
2.7	Works November 2020 to January 2021	6
3	THE SITE	7
3.1	Site Location	7
3.2	Site Description and Surrounding Area	7
3.3	Re-Development Plan	8
3.4	Summary of Relevant Interested Parties	9
3.5	Planning	9
4	SITE SUMMARY FROM PREVIOUS REPORTS	10
4.1	E3P Report 2016	10
4.2	LKC Report 2019: Eastern (Lower) Site Area	14
4.3	LKC Report 2019: Western (Upper) Site Area – Reservoir R1	17
4.4	Ecological Assessment (EBLC Report 19 th November 2020)	19
4.5	Reservoir R1 Waste Removal (EBLC Report 182.02.2 of January 2021)	24

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

5	SCOPE OF GROUNDWATER RISK ASSESSMENT	25
5.1	Summary of Previous Site Investigations	25
5.2	Proposed Scope of Groundwater Investigation & Risk Assessment	26
6	FIELDWORK & LABORATORY TESTING	29
6.1	General Observations	29
6.2	Dynamic (Window) Sample Boreholes	29
6.3	Samples and Sample Containers	29
6.4	Monitoring	30
6.5	Laboratory Testing	30
7	GROUND CONDITIONS	31
7.1	General	31
7.2	Anthropogenic Materials	31
7.3	Drift Deposits	32
7.4	Solid Geology	33
7.5	Conceptual Site Cross Section	33
8	HUMAN HEALTH RISK ASSESSMENT	35
8.1	Summary of E3P Soil Results	35
8.2	Summary of Soil Results – Supplementary Investigation	35
8.3	Summary of Soil Results – Imported Fill	35
8.4	Human Health Risk Assessment & Mitigation	36
9	GROUND GAS RISK ASSESSMENT	37
10	CONTROLLED WATERS RISK ASSESSMENT	38
10.1	Outline of Risk Assessment Process	38
10.2	Site Setting & Sensitivity	39
10.3	Soil Leachate Concentrations	40
10.4	Groundwater Concentrations	44

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

10.5	Surface Water Concentrations	46
10.6	Controlled Waters Risk Assessment	48
11	CONCLUSION	50
11.1	Summary of Groundwater Risk Assessment	50
11.2	Summary of Other Geo-environmental Risks	50
11.3	Summary of Further Works Required	51

Appendices

Appendix A: Exploratory Hole Location Plan

Appendix B: Exploratory Hole Records

Appendix C: Laboratory Chemical Test Results

Appendix D: Summary of Chemical Test Results of Soil Samples

Appendix E: Summary of Chemical Test Results of Water and Leachate Samples

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

1 INTRODUCTION

C S Eccles Brownfield Land Consultancy (EBLC) was commissioned by Blackley Developments Ltd (The Client) to provide a remediation strategy for a site at Blackley Mere, Crumpsall. Lagan Construction Aviation Ltd are the Principal Contractors for the site.

The site, which is around 4.5ha, is shown in Figure 1 and comprises an eastern area which was formerly occupied by an industrial estate and other historical industries, and a western area, which is occupied by two reservoirs (R1 and R2 in Figure 1), one of which (R1) has been infilled.

The site has planning permission for a residential development totalling 76 Units which are divided between two different planning permissions:

- Planning Permission 114849/JO/2016 – 48 Units Western Area
- Planning Permission 114850/JO/2016 – 28 Units Eastern Area

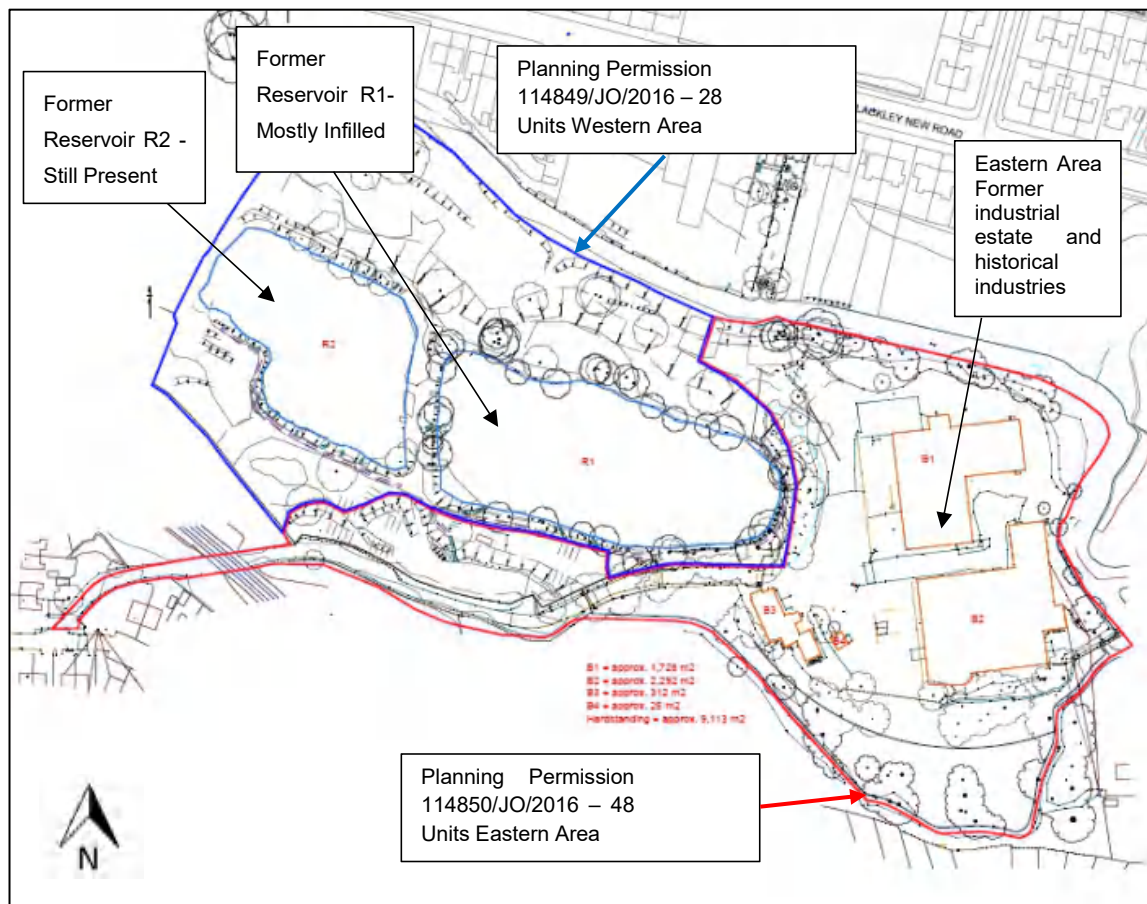


Figure 1: Planning Application Areas and Site Features

The purpose of this report is to set out a strategy for remediation of the site and the imported materials, based on the existing information provided by the Client and the recent supplementary site investigation and risk assessment report carried out for the developer by EBLC.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

1.1 Remediation Strategy Scope

The objectives of this report are to:

- Set out an overview of Contaminated Land Remediation requirements;
- Review previous site investigation reports for the site;
- Justify scope of further investigation and assessment requirements;
- Present new factual site data;
- Carry out Groundwater Risk Assessment;
- Review findings of previous assessment of risks to human health and ground gas in light of latest site investigation and determine whether these are still valid;
- Develop an updated Conceptual Site Model; and
- Determine whether any remediation is required due to the risks to controlled waters.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

2 PREVIOUS WORK

2.1 Initial Investigation Works

Previous investigation work has been undertaken on the site for the Client in 2016 and limited chemical contamination was identified. This work was carried out by E3P with their report titled "*Blackley Mere, Blackley, Manchester M8 4LL: Phase Land Phase II Geo-Environmental Site Assessment*". Report Reference: 11-164-R1. October 2016, which should be read in conjunction with this report.

There were other constraints including ecology (e.g. invasive weeds), areas of hard standing and foundations requiring removal, demolition of remaining building and a requirement to import soils in order to form a suitable development platform.

2.2 Commencement of Development

Planning permissions were gained. Development works commenced in 2017 and around 60,000 m³ of materials were imported to create a development platform. The material was placed in two areas:

- Around 7,000 m³ of material was imported and placed within the reservoir which is central in the site (Reservoir R1). This material filled about three quarters of this reservoir.
- The majority of the material (circa 53,000 m³) was placed in the eastern area of the former industrial estate.

2.3 Stop Notice

The Environment Agency visited the site on 17th October 2017 and assessed the imported materials. They concluded that:

- the importation and placement of the soils in Reservoir R1 was illegal and may lead to prosecution. They issued a STOP Notice (letter of 19th October 2017) and all works ceased on the site. The material being placed in Reservoir R1 included soils and also domestic type waste materials. The earthworks contractor was also not able to provide adequate information on the source material.
- Information pertaining to the sources and volume of the materials imported to the eastern r area of the former industrial estate was collated by the earthworks contractor and Client and issued to the Environment Agency. This included source site addresses, supporting ground investigation reports and consignment notes. The Environment Agency did not object to the material placed in this area and currently do not assess this material to have been imported illegally.

2.4 Investigation Works of Imported Materials

The Client employed LK Consult to undertake site investigation works of the imported soils and these works were reported as two separate reports:

- Report on fill placed in eastern area of former industrial estate: LK Consulting "Land at Blackley Mere Lower, Manchester. Geo-Environmental Investigation". Report reference LKC 17 1257, May 2019
- Report on material placed in area of former Reservoir R1: LK Consulting "Land at Blackley Mere Upper Reservoir, Manchester. Geo-Environmental Investigation". Report reference LKC 19 1139, May 2019

These reports should be consulted in conjunction with this report.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

2.5 Meeting with Environment Agency

On 17th October 2019 there was a meeting held with the Environment Agency, the Developer, LK Consult and Lagan to discuss the investigation works and potential way forward. A record of this meeting was made by Lagan and notes from this are set out below:

1. *This meeting commenced with LK Consult summarising the current situation:*
 - a. *LK Consult tested materials on both bottom (eastern area) and top (Reservoir R1) sections of Blackley. 'Elegant solution' under CL:AIRE protocols agreed for transfer of materials from bottom site up to reservoir now disrupted by illegal dumping of circa 7,100 cube into reservoir.*
 - b. *Materials tested by LK Consult on bottom site a known quantum and generally suitable for geo-engineering raised levels required across the site.*
 - c. *Materials tested by LK Consult on top site have pockets of visible asbestos and asbestos fibres amongst other contaminants. This effectively makes the material HAZARDOUS waste of unknown origin, albeit its clear from onsite visits its construction demolition and excavation waste.*
 - d. *Purpose of this meeting is to see if proposal provided by Lagan – is acceptable to Lee Beveridge (LB) of the Environment Agency.*
2. *Proposal from Lagan, set up MPP to sort waste into streams, test at 1/200m3 and remove waste from site.*
3. *LB explained that the proposal is a 'process' rather than a 'treatment' and that a treatment based solution is required. After significant discussion and LB drawing and revising several times an 'END OF WASTE TREATMENT PROCESS' outlined by LB as the desired outcome so the material can be declassified as NON-WASTE and utilised as geotechnical fill onsite.*
4. *As an example, in addition to the Lagan proposal, there is the potential to utilise STABILISATION techniques to bind the asbestos containing material to allow it to remain onsite. Other solutions such as soil washing/chemical treatment/bioremediation amongst 26 recognised materials treatments need to be examined to show TREATMENT has taken place in addition to the PROCESS outlined by Lagan.*
5. *To allow this proposal to be presented to the EA (at National Level rather than directly with LB – but with acknowledgement that LB approves) a BESPOKE ENVIRONMENTAL PERMIT would be required and a DEPLOYMENT PLAN needs to be put together.*
6. *This DEPLOYMENT PLAN will encompass aspects of:*
 - a. *Site Environmental Management Plan*
 - b. *Construction Environmental Management Plan*
 - c. *Waste Management Plan*
 - d. *Waste Recovery Plan*
7. *It will demonstrate how to utilise the Lagan process onsite to generate a MATRIX of materials which can be tested and characterised. Any hazardous material is taken offsite to licensed waste facility. A detailed Materials Management Plan can be put in place under an S2 application (LK Consult to check) to allow the materials to remain onsite. This MATRIX then undergoes an agreed TREATMENT plan to allow it to remain*

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

onsite for use as Geotechnical Fill and is no longer HAZARDOUS WASTE in the eyes of the EA. Lagan also pointed out to LB that the availability of the Mobile Processing Plant onsite treating the reservoir material would also allow the processing of the material on the bottom site faster. LK Consult pointed out that as all the material is known from 'cradle to grave' that the CLARE protocol was proposed to be utilised but admits that its processing would be significantly faster with a Mobile Processing Plant than via sifting with a Riddle Bucket. LB had already written to clarify that the EA were not seeking the removal of the material on the bottom site, however given the illegal dumping has disrupted the ability to move it from bottom site to reservoir site it may also be a good idea to screen it with the Mobile Plant when onsite.

8. *LB advised that the permit application should be via the 'ENHANCED PRE-APPLICATION ROUTE' with the EA. Effectively agree an hourly rate for their input and they will work quicker at agreeing the paperwork for the DEPLOYMENT PLAN as per Point 7 above.*

Notwithstanding the process to treatment above the EA's preferred option was removal of the materials classified as being a waste to be removed from the development site.

No further works were carried out at the site following the above meeting for about a year.

2.6 Correspondence with Environment Agency November 2020

In autumn 2020, Lagan appointed a new project team to resolve the illegal waste issue and progress the development. EBLC were appointed to provide technical advice and further discussions were held with LB of the Environment Agency. In a series of emails on 18th November 2020 between EBLC and LB of Environment Agency the EA confirmed that:

1. *As long ago as 2017 we were in correspondence through Manchester CC with Blackley Development advising them that they needed to undertake additional GI on the Eastern phase as the work that e3p had done was insufficient (limited groundwater sampling, little or no meaningful surface water sampling and little in the way of assessment of this information). As I understand that is still the case*
2. *In as far as the Western side of the site (Reservoir R1) is concerned.*
 - *An illegal waste disposal operation was reported to the EA in late 2017. EA enforcement officers attended site on the day as GM Police.*
 - *A stop notice was issued.*
 - *LK undertook a limited GI which identified elevated contaminants of concern and hazardous substances.*
 - *Letters from the EA to the developer and their environmental consultant were very clear in that the material was illegally deposited at site; the material should be removed to a suitably licensed facility. The remaining landform should then be subject to additional GI to identify any and all deleterious impacts arising from this illegal deposit of waste.*
 - *The Environment Agency have responded to the developers legal advisor confirming our position and affirming that the EA will not fund the removal. That responsibility lies with the landowner and it still does.*
 - *The meeting in October 2019 identified a method by which the illegal waste deposit could be removed, processed on site and potentially re-used.*

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

- *The use of the DoWCoP for this illegal deposit of materials was rejected as there is no scope within the code of practice to do this and, on confirmation from CL:AIRE itself, the treatment of waste like this was specifically excluded.*
- 3. *The material (in Reservoir L1) is a waste as it was discarded by the person(s) that put it there – it was placed with the intention of no further use or intended use. It is an illegal deposit of waste as there is no regulatory regime that governed its placement and/or disposal. The level of contamination is secondary to that and only categorises it as non-haz and/or Hazardous accordingly to the testing LK undertook i.e. it contained hazardous substances.*
- 4. *At this moment, and as I discussed with Blackley Development/LK, the EA's default position is that it should be removed from site. But, as I discussed with them at the time or on many occasions, the material could be treated to meet an end of waste standard and meet the criteria for end of waste then there is a possibility that may be able to be retained but those standards/criteria will have to be agreed by the EA beforehand along with the treatment train meeting an agreed end-of-waste process.*

2.7 Works November 2020 to January 2021

Following these discussions with the Environment Agency the way forward to sort out the illegal waste in Reservoir R1 was discussed. The relative merits of contractual certainty, the costs, time-scales and environmental benefits associated with removal of this material compared to application for a Bespoke Recovery Permit was discussed between EBLC, the client and Lagan. The developer and Lang decided on the following actions:

- Ecological Update required.
- Removal of the illegal waste materials from the site to suitably permitted treatment or disposal facilities.
- Carry out additional groundwater investigation and risk assessment of the eastern area.
- Produce an updated Remediation Strategy.

The ecological report was produced by EBLC (Report 182.02.1 of 19th November 2020) and Clive Hurt Plant Hire Ltd were commissioned to remove the illegal waste. EBLC were commissioned for:

- The technical supervision of the removal of the waste (EBLC Report 182.02.2 to be issued late February 2021)
- Additional groundwater investigation and risk assessment of the eastern area (this report).
- Produce an updated Remediation Strategy & Verification Plan (EBLC Report 182.02.4 of January 2021)

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

3 THE SITE

3.1 Site Location

The site is centred on National Grid co-ordinates 383980,403010 approximately 5km north of Manchester city centre in the Crumpsall area, between Blackley New Road, Bowker Bank Avenue and the A576 Middleton Road.

The development's address is Blackley Mere, Bowker Bank Avenue, Manchester, M8 4LL. The postcode for the Former Bowker Bank Industrial Estate, Bowker Bank Avenue, was M8 4LD.

The site location is shown in Figure 2, below.



Figure 2: Site Location

3.2 Site Description and Surrounding Area

The site is irregularly shaped and approximately 4.5 ha in area. The northern and eastern site boundaries are defined by the meandering right bank of the River Irk. The western site boundary runs along the rear boundary fences of residential properties which front onto Bowker Vale Gardens. The southern boundary is defined by Bowker Bank Avenue. The south western boundary is the base of an

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

embankment to a railway which crosses over Bowker Bank Avenue to the south west of the site. Bowker Bank Avenue is included within the site area.

The site slopes down towards the east with a significant difference in site levels between the far west (c. 6-7m higher in elevation) and far east of the site.

Figure 3 depicts the current site status. A reservoir (R2) is present in the western sector of the site. The central sector comprises an infilled reservoir (R1). The eastern sector is partially covered with imported materials. A derelict building is present on the southern boundary. The immediate surrounding areas are predominantly residential but there is a cemetery on the far bank of the River Irk to the east of the site.



Figure 3: Site Aerial Photograph

3.3 Re-Development Plan

The proposed residential redevelopment of the site is depicted in Figure 4, below.

The planning permission 114849/JO/2016 includes for the infilling of the reservoir which is located centrally on the site (R1 in Figure 1) and most of this has already been infilled with the illegal waste. The Western reservoir (R2) is to be retained. There will be provision for public access around the reservoir with dedicated car parking spaces. Woodland in the south eastern corner of the site will be retained. The retained reservoir will have a discharge via a swale to the river and there will also be three surface water attenuation lagoons.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment**Figure 4: Proposed Development Plan****3.4 Summary of Relevant Interested Parties**

Table 1 - Summary of Relevant Interested Parties	
Party	Involvement
Blackley Developments Ltd	Site Owner
Lagan Construction & Aviation Ltd	Principal Contractor
Clive Hurt Plant Hire Ltd	Remediation/Enabling Works Contractor
Mr. C. S. Eccles - Brownfield Land Consultant	Environmental Consultant
Manchester City Council	Local Planning Authority
Environmental Protection, Manchester City Council.	Human Health Regulator
Environment Agency	Controlled Waters & Waste Regulator

3.5 Planning

Planning Applications have been made to Manchester City Council. Two separate planning permissions cover the site (See Figure 1).

- Planning Permission 114849/JO/2016 – 28 Units Western Area
- Planning Permission 114850/JO/2016 – 48 Units Eastern Area

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

4 SITE SUMMARY FROM PREVIOUS REPORTS

The following information is summarised from the reports identified in Section 1.1. For the avoidance of doubt these reports should be read in conjunction with this remediation strategy.

4.1 E3P Report 2016

The following executive summary has been taken from the E3P report (2016). The area of the investigation covered by this report is depicted in Figure 5, below.

The investigation was undertaken after the Reservoir R1 had been drained and before infilling.

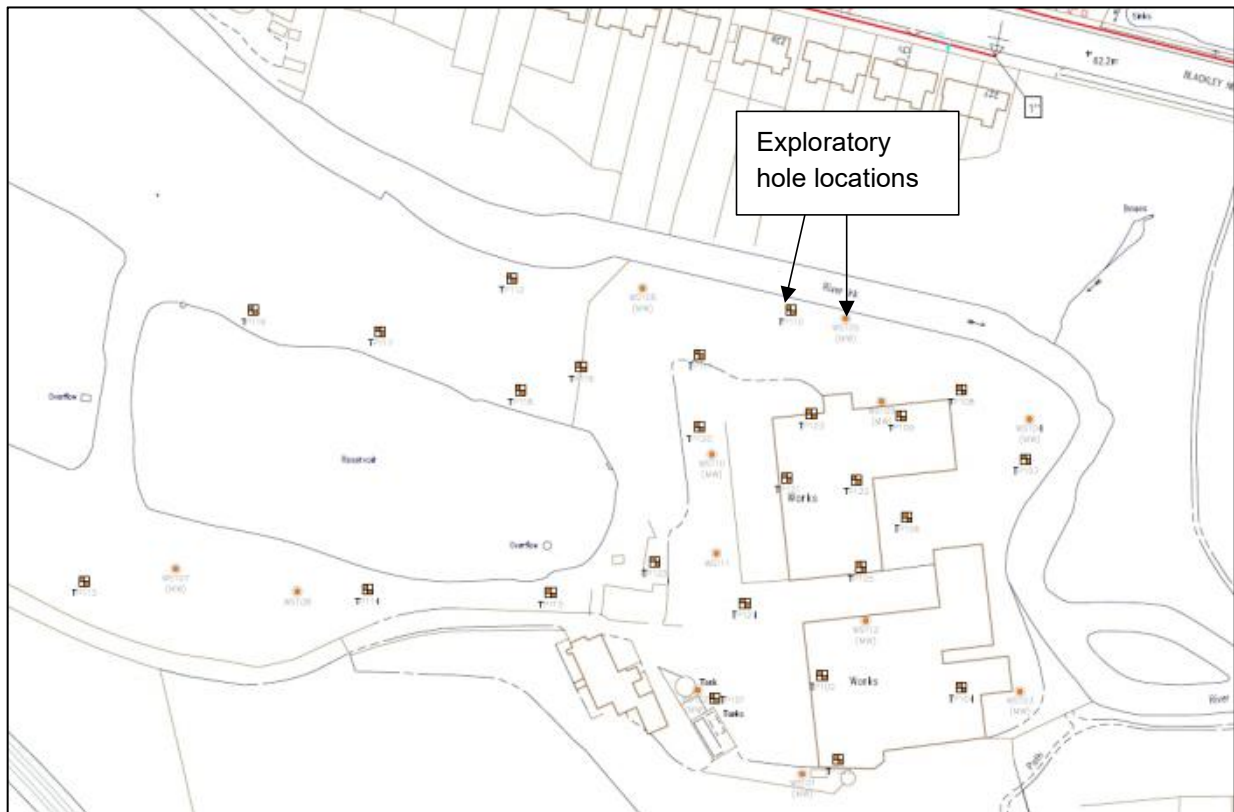


Figure 5: E3P Area Investigated (Taken from E3P drawing 11-164 19.08.2016 Exploratory Hole Location Plan)

The executive summary from the E3P report is presented below:

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

EXECUTIVE SUMMARY	
Site Address	Blackley Mere, Bowker Bank Avenue, Manchester M8 4LL
Grid Reference	E 383980, N 403010
Site Area	3.16 Ha
Current Site Use	The site is an irregular shaped parcel of land located off Bowker Bank Avenue, Blackley approximately 4km north of Manchester City Centre. The site comprises two distinct sectors; the western portion predominantly occupied by a drained reservoir basin which sits c. 4-5m higher in elevation than the eastern sector which comprises a concrete slab associated with the former site works.
Proposed Development	E3P understands that site will be developed with the construction of 76 No. dwellings with associated access and estate roads, driveways, garden and landscaped areas and adopted utility infrastructure.
Previous Reports	E3P has not been provided with any previous reports for the site.
Environmental Setting	<i>Drift Geology</i> West - Glacial Till (Clay) East - Alluvium (Sand & Gravel)
	<i>Bedrock Geology</i> Cheshire Pebble Beds Formation (Sandstone).
	<i>Hydrogeology</i> Unproductive (west) / Secondary A (east) overlying Principal Aquifer (bedrock).
	<i>Groundwater Source Protection</i> The site is not located within a Groundwater Source Protection Zone or Drinking Water Safeguard Zone.
	<i>Hydrology</i> The River Irk lies downgradient immediately adjacent to the north and eastern site boundary.
	<i>Flood Risk</i> The SE sector is affected by flooding from rivers (FZ3). Remaining area unaffected by flooding (FZ1).
	<i>Ecology</i> Potential risk to ecological and aquatic ecosystems within River Irk.
	<i>Sensitive Land Uses</i> The River Irk is considered a critical receptor.
	<i>Industrial Land Use</i> No industrial land uses identified on-site or the immediate locality that may potentially prejudice the future development of the site for residential use.
	<i>Subsidence Hazard</i> Moderate compressible ground hazard to the NE; Moderate landslide hazard to the SE.
Site History	A review of the pertinent Ordnance Survey mapping dating from late 1850s confirms the presence of the reservoir and print works which later became a bleach works and more recently a textile works.
Utility Locations	A review of service plans has indicated that drainage infrastructure is present within Bowker Bank Avenue to the west.
Landfill Sites & Ground Gases	A historic landfill site is located to the northeast of the site on the opposite side of the River Irk. Made Ground associated with the landfill to the NE and in-filled reservoirs on-site may be a source of hazardous ground gas and may pose a low-level risk to construction workers and residential end users.
Radon	Unaffected – No special precautions required.
Coal Mining / Land Stability	The site is not located within an area deemed to be at risk from ground instability arising from historic coal mining activities.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

EXECUTIVE SUMMARY

E3P Intrusive Ground Investigation

Ground Conditions	E3P completed a Ground Investigation comprising 12 No. Window Sample Probeholes and 25 No. mechanically excavated Trial Pits. The ground conditions encountered are summarised below: Topsoil A 250mm horizon of gravelly SILT (Topsoil) was encountered at TP114. Made Ground Made Ground was encountered within all exploratory locations to a maximum proven depth of 3.45m bgl (WS112) underlying the former bleach works, although generally to depths in excess of 1.0m bgl across the wider site. Made Ground deposits were generally uniform and comprised a silty and/or sandy gravel of concrete, brick, ash, mudstone, sandstone, slate, plastic, timber and metal believed to be associated with historic fill material resulting from construction and demolition activities. Localised discontinuous sandy and/or gravelly clay soils and reworked sand were recorded. Drift Drift deposits were encountered within all exploratory hole locations where the Made Ground could be fully penetrated to a proven depth of 5.45m bgl and generally comprised a silty and/or gravelly dense SAND with localised areas of sandy SILT within the eastern portion in close proximity to the River Irk. A number of stiff to very stiff medium to high strength gravelly CLAY bands were recorded underlying the Made Ground soils, typically across the central portion of the site. Solid No solid geology was encountered as part of the site investigation. Groundwater Groundwater has been recorded at depths of 0.50-3.50m bgl; generally shallower in close proximity to the River Irk.
Human Health	The preliminary Tier I Human Health risk assessment has identified the presence of site wide elevated heavy metals, non-volatile PAHs / TPH compounds and asbestos within the Made Ground soils. Asbestos has been identified within the shallow Made Ground, and as such it will be necessary to carefully manage these impacted soils and place them in a legislatively compliant manner that will negate any possibility of future exposure. External areas will be covered by hard-standing or a chemically suitable cover system within all private garden and landscaped areas thereby removing the exposure pathway to future site users. It is possible that as yet unidentified hydrocarbon impact is present within localised hotspots underlying the existing structures and location of former tanks. It is considered that any such contamination could be addressed by the delineation, excavation and treatment of impacted soils.
Controlled Waters	Given the absence of any elevated soluble contaminants within the groundwater or River Irk and thus a complete pollutant linkage the site is not deemed to pose a significant degree of risk to controlled waters.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

EXECUTIVE SUMMARY	
Ground Gas	Ground gas monitoring to date (ongoing) indicates the site falls into classification Characteristic Situation 2 / Amber 1 due to elevated carbon dioxide concentrations and special precautions will be required as part of the residential development.
Radon	Unaffected – No special protection measures required.
Potable Water Infrastructure	It is considered that a well designed and implemented programme of remediation and enabling works should negate the need for contaminant resistant infrastructure. A full UKWIR assessment will be required.
Geotechnical Assessment	
Underground Obstructions	Extensive buried obstructions have been encountered and the presence of further relict foundations is anticipated. These features pose a constraint and will require grubbing out in their entirety as part of the proposed residential development to facilitate the construction of a suitable development platform.
Allowable Bearing Pressure (ABP)	It is anticipated that on completion of the proposed site remediation and enabling works, the ground will generally comprise circa 2.00-3.00m of variable Made Ground. The Made Ground is not considered suitable founding stratum (in its current condition) due to its inherent variability and unquantifiable potential for long term total and differential settlement. The natural stiff to very stiff medium-high strength gravelly CLAY and loose to medium dense SAND have been assessed and at a depth of between 3.00-5.45m bgl a variable ABP of between 50-190kN/m² can be achieved.
Foundation Options	The presence of variable Made Ground and localised very loose sands within the near surface drift deposits to depths of ~3.0m would indicate that (based on current elevations) the depth to competent founding stratum would preclude the use of a traditional spread (strip / trench fill) type foundation. It is therefore recommended that due consideration be given to the use of vibro replacement stone columns or a piled foundation capable of transferring structural loads to competent stratum. However, the final foundation solution will be dependent on the structural loadings and elevation and should be designed by a suitably qualified structural engineer.
Building Floor Slabs	Ground bearing floor slabs are not viable given the depth of Made Ground and compressible alluvial deposits.
Heave Precautions	Given the localised underlying clay is of low plasticity and low volume change potential, heave precautions will not be required to the internal face of a foundation. However, heave precautions will be required to the underside of floor slabs (where there is no 200mm void) or ground beams within the modelled influencing distance of trees.
Soakaway Drainage	The underlying predominantly granular drift deposits are likely to provide the required degree of infiltration to make soak-away drainage infrastructure viable on this site. However full BRE 365 test will be required if the use of soak-away drainage is considered.
Sulphate Assessment	This site meets Class DS-1 and (ACEC) AC-1s. However, localised areas which meet Class DS-2 and (ACEC) AC-2s have been encountered.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

EXECUTIVE SUMMARY	
CBR Design %	It is considered that the shallow Made Ground soils can be re-engineered in accordance with Class 1 (a-c) material under favourable climatic conditions to achieve a CBR of 2-4%. Where compressible ground is present to the northeast of the site, beneath proposed roads, adopted drainage infrastructure, driveways and hard stand consideration must be given to the potential for consolidation which will induce unacceptable degrees of total and differential settlement at the surface. It is therefore likely that the compressible alluvial deposits will need to be excavated where present beneath proposed infrastructure.
Cut / Fill	Development levels unknown at this time, however due to significant elevation changes between the eastern and western sector, a substantial cut / fill exercise will be required in order to create a suitable graded development platform for the proposed residential development.
Waste Characterisation	Stable Non-Reactive - Non-Hazardous / Inert; and ACM may be Hazardous (depending on quantification analysis).
Invasive Plants	Extensive infestations of Japanese Knotweed are present at the site boundaries with the adjacent river. A programme of treatment, eradication and continued control will need to be established prior to the commencement of any works in this area. All invasive plant species should be fenced at the first available opportunity.
Recommendations	Based on the findings of the intrusive site investigation, the following additional works are recommended to be completed in due course: • Specification for the eradication of invasive plants and long term maintenance; • Further assessment for Sodium Hypochlorite and SVOCs within footprint of former the bleach works (post sub-structure demolition); • Further assessment for PCBs in proximity to electrical substation (post demolition); • Remediation & Enabling Works Strategy; • Arboriculture Survey; • Plot Specific Foundation Schedule (upon receipt FFLs); • Geotechnical Earthworks Compaction Specification (Infrastructure); • Foundations to be designed by suitably qualified Structural Engineer.

4.2 LKC Report 2019: Eastern (Lower) Site Area

This report details an investigation carried out on 21st and 26th March 2019 comprising 31no. trial pits (TP101 to TP131) excavated to depths of 2.00-4.70m from the top of the stockpiled imported materials on the eastern sector of site.

The trial pits were extended thorough the height of the stockpiles in order to characterise the material. The sampling frequency was approximately 1 sample per 1,000m³ of material.

The area sampled is shown in Figure 6.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment



Figure 6 Investigation Locations LKC (Eastern Area) Report (Taken from LKC Drawing no LKC 17 1257 Apr 2018)

A summary of the information presented in the report is presented in Table 2:

Table 2: Summary of LKC 2019 Report (Eastern Area)	
Criteria	Report Description
Material Description	Gravelly sandy clay / gravelly clayey sand with brick, concrete (gravel to cobble size) with localised inclusions of waste wrappers, ash, clinker, metal and ceramics. This material was mainly classified as a Class 2C earthworks material but it was locally a Class 1A or 6F2. <u>Exceptions:</u> - topsoil type material was identified to a depth of 1.2m in TP108 - material with a strong organic / putrid odour was noted in TP120 between depths of 0.30-1.80m.
Contamination Testing (31 samples)	Localised elevated PAHs and metals (arsenic and lead). All were screened against residential land use and most passed these criteria apart from the following which are higher than the residential criteria: • Arsenic - three results between 46 & 71 mg/kg

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

	- Lead - three results between 320 and 560 mg/kg - Benzo(a)pyrene - 9 results between 5.5 and 45 mg/kg (sample S126) - Naphthalene – One result of 16 mg/kg (TP126), SOM was 9.1 %. Fibres / clumps of Chrysotile were identified in TP104 only
Waste Classification (31 samples)	Not Hazardous
WAC (13 samples)	The samples exceeded various criteria for inert waste. TOC higher than the limit for non-hazardous waste in some locations.
Leachate Testing (16 samples)	Exceedances for organic contaminants: - Chromium – five samples - Copper - All 16 samples - Lead - three samples - Nickel – 2 samples - Zinc - 11 samples - Sulphate - 6 samples Generally organic contaminants met appropriate assessment criteria but there were localised elevated levels of heavy end petroleum hydrocarbons in 5 out of 16 samples. It is considered that the localised organic contamination is related to the leaching test analytical method and not representative of site conditions. The material is not considered to comprise a significant risk to River Irk or the underlying aquifers as rainfall infiltration and leaching potential will be limited and controlled by development surface water drainage infrastructure.
Ground Gas	SOM 1.7 to 9.1 plus one of 17 % (TP108). Mean 5.1 %. Based on CL:AIRE RB17 methodology CS2 ground gas conditions likely to be applicable.
Grading (23 samples)	This demonstrated much of the material was cohesive in nature (2C) with a limited number of stockpiles complying with a granular specification (1A or 6F2).
pH and water soluble sulphate	pH 7.6 – 10.1 0.06-1.5 g/l Sulphate

The report recommended that:

- Putrescible material identified in TP120 is delineated and segregated pending further treatment for reuse or disposal off site.
- The topsoil type material encountered in TP102 should be delineated and segregated pending further assessment as to whether it may be used in the proposed garden clean soil capping layers.
- Additional precautions be taken during site earthworks and construction with regards to asbestos, in the areas of concern. The report suggested careful procedures and site monitoring to reduce the risk of airborne fibres, and an appropriate 'Asbestos Management Strategy' in line with CIRIA C733.
- Further boreholes be drilled and gas monitoring carried out to identify if the previously proposed CS2 / Amber 1 protection measures remain applicable for the development, post deposition, compaction and creation of the construction platform.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment**4.3 LKC Report 2019: Western (Upper) Site Area – Reservoir R1**

This report details an investigation carried out on 9th and 10th April 2019 comprising 19 no. trial pits (TP101 to TP119) excavated to depths of 1.40 to 2.40m from the top of the materials that had been used to infill R1. The trial pits were extended through the infill material with few of these fully penetrating the waste. The majority of these trial pits were terminated on encountering groundwater seepages with two trial pits terminated after encountering possible asbestos in the waste. In summary this investigation found that:

- The material was a clay or construction / demolition waste,
- Elevated PAHs and metals (arsenic and lead) and TPH in one location (TP118)
- Asbestos was noted in 12 no. out of 27 no. samples.
 - No asbestos: 17 samples
 - Asbestos present <0.001 to 0.004 % 10 samples
 - Asbestos present 0.67 % and 5.7 % two samples (TP117 & TP118)
- Many pieces of potential asbestos containing materials (ACMs) noted in one limited area of fly-tipping.
- Potential Asbestos found in base of TP111 & TP116 but not tested.
- The presence of visible asbestos was only found in one part of the 'Waste' (see Figure 7 below) and within the 'Waste' and also on the surface in the limited area of fly-tipping.

Whilst visible asbestos has only been proven in one area of the 'waste' and the fly-tipping, given the size of the site, the presence on the surface of ACMs and the number of samples containing ACMs, ACMs could be present throughout the material which was used to infill Reservoir R1.

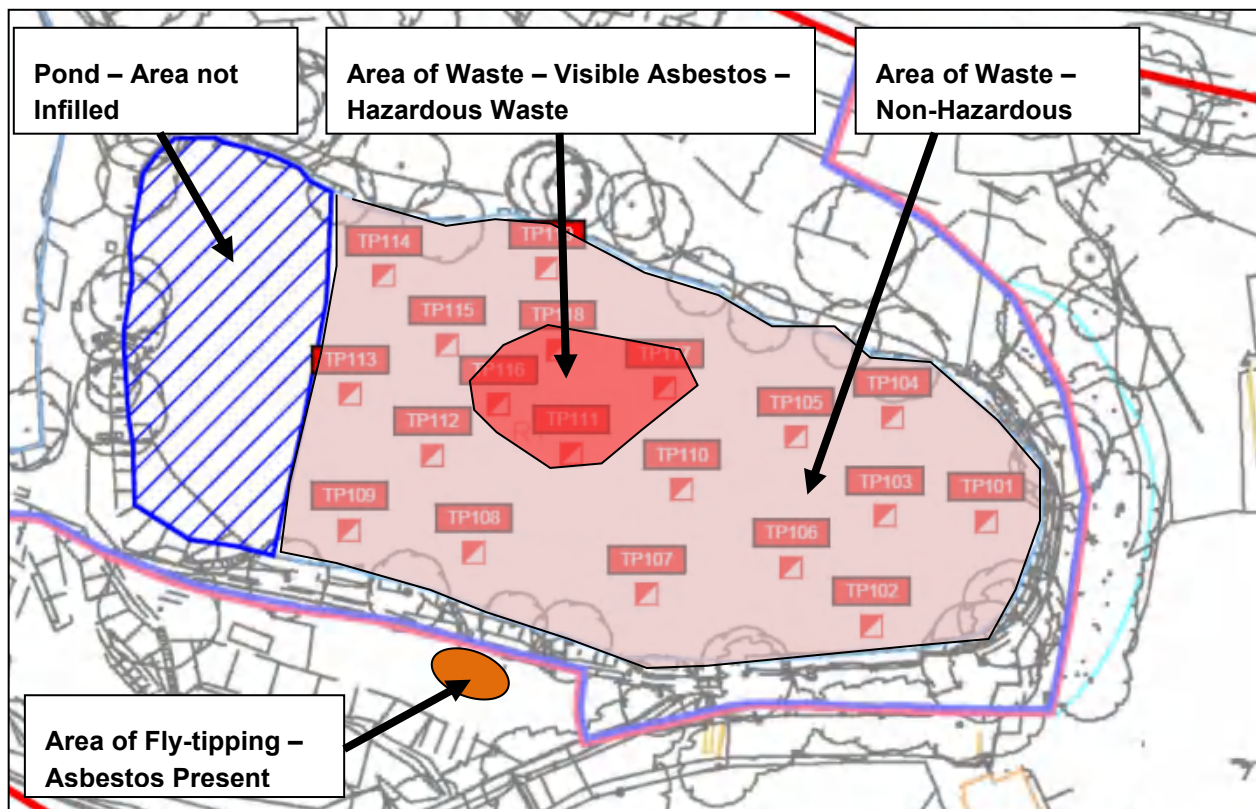


Figure 7: Location of Asbestos (TP118 also TPH, is within the 'Asbestos' area)

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

A summary of the information presented in the report is presented in Table 3:

Table 3: Summary of LKC 2019 Report (Western Area – Reservoir R1)	
Criteria	Report Description
Material Description	The infill material (1.2 to 2.4m bgl) comprised a gravelly sandy clay / gravelly clayey sand with brick, concrete (gravel to cobble size) with inclusions of waste wrappers, ash, clinker, metal and plastics. An organic / putrid odour was noted in each trial pit and a hydrocarbon odour was noted in TP112 Natural strata comprising soft to firm silty clay was encountered in TP107-TP109.
Groundwater	Perched water was encountered during the investigation in the trial pits, generally at or just above the base of the fill materials.
Contamination Testing (27 samples)	Localised elevated PAHs and metals (arsenic and lead). All were screened against residential land use and most passed these criteria apart from the following which are higher than the residential criteria: - Arsenic - two results between 58 & 84 mg/kg - Lead - 11 results between 210 to 500 mg/kg - Benzo(a)pyrene - 7 results between 5.1 and 8.9 mg/kg TPH elevated in one location – TP118. Asbestos was noted in 12no. out of 27no. samples: - No asbestos: 17 samples - Asbestos present <0.001 to 0.004 % 10 samples - Asbestos present 0.67 % and 5.7 % two samples (TP117 & TP118) Many pieces of potential asbestos containing materials (ACMs) noted in one area of fly-tipping. Potential Asbestos found in base of TP111 & TP116 but not tested. The presence of visible asbestos is in one area indicated in Figure 7 within the 'Waste' and on the surface in the limited area of fly-tipping.
Waste Classification (19 samples)	Two of the soil samples were identified as hazardous waste due to asbestos quantities. One sample was also classified as hazardous waste due to the petroleum hydrocarbons content. Notwithstanding this, with regards to the visible pieces of ACMs on the site surface and in the soil, WM3 notes that: <i>"Where the waste contains identifiable pieces of asbestos containing material (i.e. any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye), then these pieces must be assessed separately. The waste is hazardous if the concentration of asbestos in the piece of asbestos containing material is 0.1% or more. The waste is regarded as a mixed waste and classified accordingly."</i>
WAC (14 samples)	A total of 14no. samples were subjected to Waste Acceptance Criteria testing. When compared to Inert Landfill Waste Acceptance Criteria Limits exceedances of Total Organic Carbon (5 No.), TPH Total WAC (3 No.), Total PAH (2 No.), antimony (3 No.), sulphate (13 No.) and total dissolved solids (10 No.) were detected. In

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

	general, non-hazardous apart from the limited hazardous areas indicated above.
Leachate Testing (17 samples)	Generally elevated concentrations of inorganic contaminants were present across the samples with limited and localised elevated levels of naphthalene and lighter fraction petroleum hydrocarbons in TP118. The majority of the material is not considered to comprise a significant risk to River Irk or the underlying aquifers as rainfall infiltration and leaching potential will be limited and controlled by development surface water drainage infrastructure. However it would be prudent to remove or isolate hydrocarbon impacted material present in TP112 and TP118.
Grading (22 samples)	Much of the material was broadly cohesive in nature (2C, 2A/2B) with a limited number of stockpiles complying with a granular specification (1A, 1B). The re-engineering of this material may be constrained by the presence of ACMs and the volume of deleterious material in the soils.
pH and water soluble sulphate	<u>Made Ground:</u> pH: 7.9-10.0. 0.034-1.6 g/l Sulphate <u>Natural Ground:</u> pH: 7.4-7.8 0.049-0.072 g/l Sulphate

The report recommended that:

- The material presents an immediate risk to human health in its current state to nearby receptors and trespassers from airborne fibres. Control measures including removal of visible surface pieces of asbestos and possible capping should be carried out to mitigate this risk.
- Hydrocarbon impacted material around TP112 and TP118 should be removed from site or sealed to mitigate any unacceptable risk to controlled waters.
- The proposed development has a shortfall of materials. The ideal scenario would be for the material to be placed as bulk fill at depth and capped and hydraulically sealed to mitigate any risk to human health and controlled waters. The presence of ACMs and deleterious material in its current state would render any earthworks processing (such as screening) and re-deposition and compaction unviable.
- If the material is to remain on site, further boreholes and gas monitoring to be carried out to identify if the proposed CS2 / Amber 1 protection measures remain applicable for the development.

4.4 Ecological Assessment Report (EBLC Rpt 182.01.1 19th November 2020)

Prior to the planning application ecological assessments and reports had been carried out and these had recommended:

- **Habitat Protection:**
 - The Site contains a Site of Biological Importance (SBI) (the western reservoir R2 and woodland to the east of the site). This area requires habitat protection;
 - Habitat protection is also required along the banks of the River Irk
- **Species Protection:**
 - The Site has the potential to support roosting bats, badgers and a range of nesting birds;
- **Invasive Non-Native Species**
 - The Site contains a number of Invasive Non-Native Species of plant, notably Japanese Knotweed.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

Proposed control measures include programme constraints to avoid works within some months of the year, and an Ecological Mitigation Scheme comprising:

- A Wetland Management Scheme
- A Woodland Management Scheme
- An Invasive Non-Native Species (INNS) Management Scheme



Figure 8: Areas Which Require Habitat Protection

In 2017 the following invasive species were noted on the site:

- Japanese Knotweed
- Himalayan Balsam
- Canadian Pondweed
- Rhododendron
- Cotoneaster

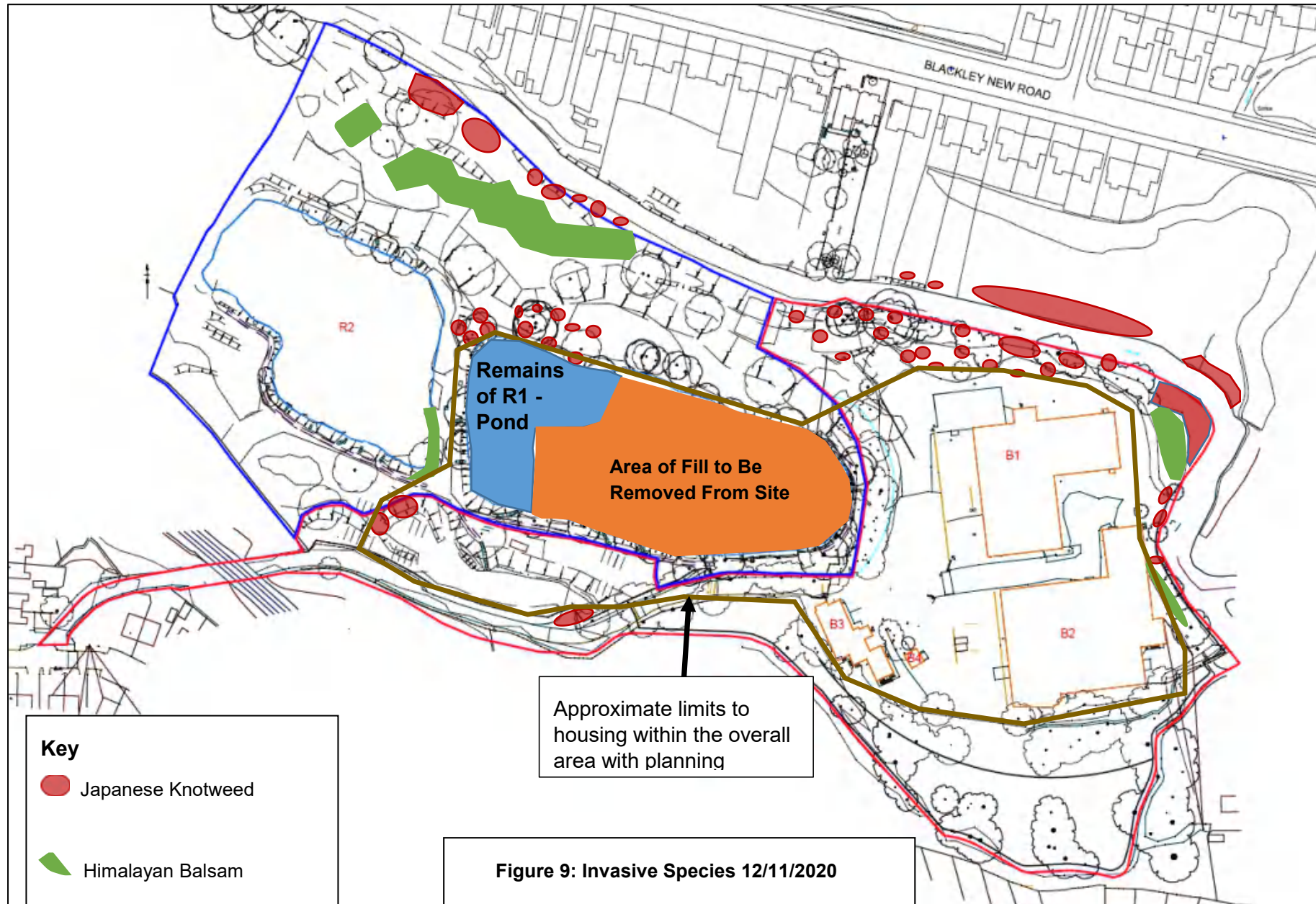
A senior ecologist visited the site on 12th November 2020 and carried out a site walkover. This most recent survey was outside the main survey periods for effective assessment so the survey was mainly for invasive species assessment. The areas of invasive species mapped broadly concurred with the previous report (shown in Figure 9).

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

The findings of this assessment are:

- The site contains many areas of Japanese Knotweed and Himalayan Balsam but these are mainly confined to the slopes along the River Irk. These have been mapped (shown in Figure 9).
- The Japanese Knotweed and Himalayan Balsam will require treatment as explained in the previous invasive species report and all works on site must leave a 7 metres buffer zone around the stands.
- There are areas near the existing building containing wood horsetail but this species is native and can be buried during works on the site. It is not the damaging field horsetail that often grows through asphalt.
- There was no evidence of badgers on the site during the walkover survey.
- The derelict building needs to have a bat survey to determine if it is used by bats either to hibernate or roost.
- A water vole survey of the ponds and River Irk will need to be carried out between April and October 2021 to determine if they are present on the site.
- A pond eDNA survey will be required between April and October 2021 to determine the presence of great crested newts in the ponds.
- All the other recommendations from the previous surveys should be implemented to comply with ecological regulations and planning regulations.
- For the proposed fill removal from Reservoir R1:
 - There is no Japanese Knotweed or Himalayan Balsam located within an area 10 m larger in plan of the area of fill in Reservoir R1 which is to be removed.
 - The pond in the northwest of the infilled Reservoir R1 should be retained until a water vole and newt survey can be carried out next April 2021 and appropriate mitigation measures can be designed if these are required

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment



Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

Some areas of the site are designated as high risk in terms of ecology. These areas require special protection measures during the works.

An Ecological Mitigation Scheme is has previously been proposed and will be implemented. The Ecological Mitigation Scheme comprises:

- A Wetland Management Scheme
- A Woodland Management Scheme
- An Invasive Non-Native Species (INNS) Management Scheme

A programme of works is required for the removal of invasive species, some of which needs to be carried out by an invasive weeds contractor.

Further protected species surveys are required and are summarised in Table 4.

Table 4: Further Surveys Required	
Survey	Time of Year to be undertaken
Bats	April - September
Newts (pond eDNA Survey)	April - October
Voles	April - October

For the proposed fill removal from Reservoir R1:

- Wetland Management - The pond in the northwest of the infilled Reservoir R1 should be retained until a water vole and newt survey can be carried out next April 2021 and appropriate mitigation measures can be designed if these are required before this is drained/backfilled.
- Woodland Management - No specific measures to be implemented
- Invasive Non-Native Species - There is no Japanese Knotweed or Himalayan Balsam located within an area 10 m larger in plan of the area of fill in Reservoir R1 which is to be removed so there are no specific mitigation measures other than ensuring all personnel and vehicles stay out of the areas in the wider site where invasive species as presented in Figure 10.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment**4.5 Reservoir R1 Waste Removal (EBLC Report 182.02.2 of February 2021)**

Blackley Developments Ltd engaged Lagan Construction to remove 'waste' soils from former Reservoir R1 with Clive Hurt Plant Hire Ltd (Hurt) subcontracted to carry out the works. This work is currently on-going and is anticipated to be completed in mid-February 2021 with this Completion Report produced late February 2021.

Based on the LK Consult report for this area, the waste materials are principally a non-hazardous waste but asbestos was present locally at concentrations high enough for this to be a hazardous waste. In accordance with the Waste Regulations there is a duty to minimise the production of hazardous waste so it was proposed to segregate the visible asbestos from the hazardous soils so these can be re-classified as being non-hazardous. Processing waste requires an Environmental Permit but the quantity of hazardous soil to be processed is less than 1,000 m³. Therefore this work is carried out in accordance with: Regulatory Position Statement 215: Land Contamination pilot trial and small scale remediation schemes.

Clive Hurt produced an Environmental Management Plan which was issued to the Client and the regulators prior to commencement of these works. This plan detailed the controls and mitigation procedures that were put in place to ensure that the removal of the 'waste' and the processing/segregation of the hazardous waste by Hurt were undertaken in an environmentally safe and sustainable manner and in accordance with the RPS and other environmental and waste requirements.

Additional precautions be taken during site works and construction with regards to asbestos. The report suggested careful procedures and site monitoring to reduce the risk of airborne fibres, and an appropriate 'Asbestos Management Strategy' in line with CIRIA C733 and CL:AIRE CAR-Soil

The soil contamination results as presented in Appendix 2 have been used to help determine the waste classification for off-site disposal with the 'HAZ-WASTESOIL' software.

The results show that the ground in TP117 (0.2-2.4m) and TP118 (0.1-1.8m) are classified as HAZARDOUS WASTE. TP117 is due to the ACM content and TP118 is due to ACM and petroleum hydrocarbon content.

The remaining samples based upon the analytical results would be classified as NON-HAZARDOUS WASTE. The output sheets are provided in Appendix 3.

The area of fly tipping is < 20T of material and this is classified as HAZARDOUS WASTE.

There are three different areas of waste to be removed:

Non-hazardous soils	9,086 m ³
Hazardous Soils	782 m ³
Fly-tipping	<10 m ³
TOTAL	9,878 m³

The Hazardous Soils and the Fly-tipping are effectively two different waste types:

- The asbestos – Hazardous Waste; and
- The soils/demolition materials forming the bulk of the volume which do not have visible asbestos present – Non-hazardous Waste.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

In accordance with the UK Government requirements waste segregation will be carried out.

Non-hazardous Soils: It is proposed that the material classified as Non-hazardous will be excavated and removed directly to a suitably permitted location off-site, this being a landfill or a site with an Environmental Recovery Permit or a permitted treatment facility. A watching brief will be carried out during this work by a banksman for any visible asbestos. If any visible asbestos is found in this material it will be treated as Hazardous as per below

Hazardous Soils: This material will be slowly excavated and any visible asbestos will be hand-picked. This will result in a limited volume of hazardous asbestos waste recovered (expect <100T) and the remaining soils being reclassified (after testing) as non-hazardous. The asbestos will be disposed of to an appropriate landfill and the segregated non-hazardous soils will be disposed of as per the other non-hazardous soil.

Within the Hazardous Soils there is the area with both asbestos and TPH contamination. This will be disposed of as hazardous waste. Additional testing will be carried out to delineate the area with TPH to appropriately classify the material.

Fly-tipping: This material will be hand-picked in a similar manner to the Hazardous Soils.

EBLC is carrying out part time technical supervision of the works which are on-going. The completion report for this work will be presented in Report 182.02.2 of February 2021. At the time of issue of this Supplementary Risk Assessment report about 60 % of the 'Waste' has been removed from the site.

5 SCOPE OF GROUNDWATER RISK ASSESSMENT

5.1 Summary of Previous Site Investigations

Overall, the E3P site investigation indicated localised slightly elevated concentrations of contaminants including heavy metals, non-volatile PAHs/TPH compounds and asbestos. With a substantial thickness of imported engineered soils being brought in as part of the proposed development, no remediation would be required in terms of the risk to human health given that the majority of the Made Ground would be covered by more than 1.0 m of the imported material. E3P's assessment of the risk to controlled waters was low, without any elevated concentrations of soluble contaminants in the groundwater or River Irk. They stated that "*the site is not deemed to pose a significant risk to controlled waters.*" The Environment Agency disagree with this because they state that the E3P assessment was not detailed enough and they had not approved the assessment or the remediation strategy for the site.

The importing of fill for the development platform commenced with about three quarters of the required material having been imported when the development was issued a 'Stop Notice.' This was due to the material being imported and placed in Reservoir R1 being assessed as 'Waste' which was illegally imported. The material deemed to be illegal waste was investigated and shown to have a limited quantity of hazardous waste within it (principally due to asbestos) but it also included some domestic type waste. The material deemed to be a waste is in the process of being removed from site and this will be completed by the end of February 2021.

The imported materials stockpiled in the area of the former industrial buildings has been investigated to confirm its composition and this investigation showed that:

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

- There were localised slightly elevated concentrations of PAHs and metals (arsenic and lead) when screened against residential land use but most passed these criteria.
- All the test results pass assessment criteria for this fill being located deeper than 600 mm below clean cover.
- Leachate testing of sixteen samples indicates localised exceedances for:
 - Metals (e.g. Chromium, Copper, Lead, Nickel & Zinc)
 - Sulphate - 6 samples
 - Generally organic contaminants met appropriate assessment criteria but there were localised elevated levels of heavy end petroleum hydrocarbons in 5 out of 16 samples.
- It is considered that the localised organic contamination is related to the leaching test analytical method and not representative of site conditions.
- The imported material is not considered to present a significant risk to the River Irk or the underlying aquifers as rainfall infiltration and leaching potential will be limited and controlled by the development's surface water drainage infrastructure.

5.2 Proposed Scope of Groundwater Investigation & Risk Assessment

To address the Environment Agency's requirement for an updated groundwater risk assessment, nine additional site investigation boreholes with monitoring wells were proposed. Each well would be sampled and the groundwater tested. Testing of the surface waters would also be carried out. The proposed locations are summarised below:

Table 5: Purpose of Exploratory Holes & Surface Water Sampling Locations	
Exploratory Holes	Target Area
WS201	Located in an up-gradient location to north of the lake remaining in Reservoir R1.
WS202	Located to the north of the infilling within Reservoir R1.
WS203 to WS206	Located in site, avoiding underground services. To install monitoring wells.
WS207	Installed close to former tank and generally upstream of the former works.
WS208	Installed relatively centrally on the site.
WS209	Located in an up-gradient location to south of Reservoir R1.
RS1 to RS3	Samples from River Irk (similar locations to E3P sampling locations of same name): • RS1 upstream of any new development works, • RS2 located adjacent to former works and imported soils; and • RS3 located at downstream end of site.
R1	Sample from water still remaining in western end of Reservoir R1.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

The proposed locations are indicated in Figure 10:

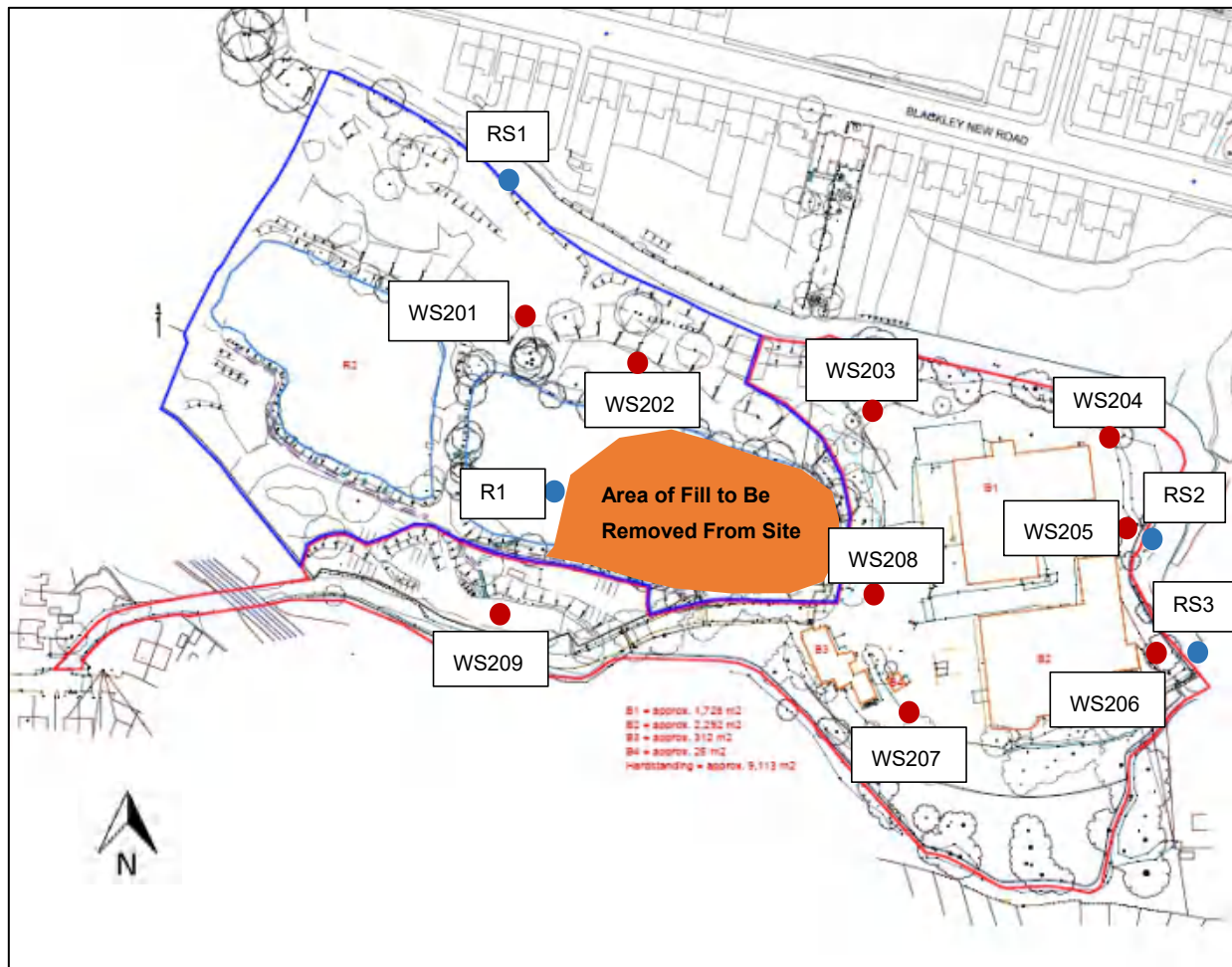


Figure 10: Proposed Boreholes (WS201-209 & Surface Water Sampling Locations (RS1-3, R1)

Note that the monitoring wells were to be targeted in the natural sand where Made Ground is absent, or have a filter zone over the both the Made Ground and underlying natural sand where there was a cohesive layer. The sands are a possible secondary aquifer and could be a pathway for contaminants migrating into the River Irk (which is the principal Controlled Waters receptor).

Suites of testing were based on the previous use of the site including print works, bleach works, textiles and with imported soils. The laboratory analysis was to include metals, anions, PAH, TPH and VOCs. The testing was to include pH, sodium and chloride in order to test for common contaminants from the former bleach works (including sodium hypochlorite) which cannot be tested for directly because they are soluble/ionic compounds.

Laboratory testing of nine recovered samples of Made Ground would be tested for both total concentrations of contaminants and also for leachates.

- Asbestos – total soils only
- pH & conductivity
- Metals: As, B, Cd, Cr (total & hexavalent), Cu Hg, Ni, Pb, Sb, Se, V, Zn, Na
- Chlorine, Sulphate, Cyanide (total)
- Dissolved Organic Carbon, Phenol

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

- PAHs (USEPA Speciated)
- TPH CWG, BTEX, VOC

The water samples would be tested for a suite of water quality parameters using a multi parameter meter. The laboratory testing suite for all water samples was to be:

- pH & conductivity
- Metals: As, Cd, Cr (total & hexavalent), Cu Hg, Ni, Pb, Se, Zn, Ca, Mn, Na
- Chlorine, Sulphate Cyanide (total)
- Dissolved Organic Carbon (DOC), Phenol
- PAHs (USEPA Speciated)
- TPH CWG, BTEX, VOC

In order to be able to run the M-BAT model on water samples to take into account bioaccessibility of copper, manganese, zinc and nickel, the testing suite includes calcium. No testing was carried out for SVOCs because the E3P investigation test data indicated that all SVOC concentrations were less than the detection limits.

The information from these new boreholes and associated testing will be used to update the Conceptual Site Model so that the new groundwater risk assessment can be undertaken and the validity of the previous human health and ground gas risk assessments can be checked.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

6 FIELDWORK & LABORATORY TESTING

6.1 General Observations

The drilling of the boreholes was carried out on 14th and 15th December 2020. The works were supervised by a geologist who described the ground encountered and decided on the depths and response zones of monitoring wells. A services search was carried out prior to the site work and a CAT scan performed at the location of each exploratory hole. Fieldwork procedures were undertaken in accordance with the relevant sections of:

- British Drilling Association "Guidance for Safe Intrusive Activities on contaminated or Potentially Contaminated Land" (2008);
- BS5930:2015 + A1 2020: "Code of Practice for Site Investigations;"
- BS10175:2011 + A2:2017 "Investigation of potentially contaminated sites – Code of practice."

6.2 Dynamic (Window) Sample Boreholes

The dynamic sampling boreholes were carried out using a tracked Dando Competitor rig. A 12T tracked excavator was used to carry out some clearance works and to assist moving the rig onto position. The holes were drilled to depths up to 6.0 mbgl. Hole numbers WS201 to WS207 and WS209 were carried out as planned and wells installed. Three attempts at carrying out WS208 were attempted but multiple obstructions were encountered and these were not penetrated with the excavator or the rig so this location was abandoned.

The wells comprised 51 mm ID HDPE pipework with the slotted sections having a 425um filter sock.

On completion the holes were surveyed by Lagan.

The dynamic sample locations are presented in Appendix A and the logs are presented in Appendix B.

6.3 Samples and Sample Containers

Soil samples for chemical analysis each comprised a pair of samples: a plastic tub for metals and inorganics analysis, and an amber glass jar for organics analysis.

The wells were developed on 18th December 2020 to check on recharge rates. Prior to taking the water samples on 4th January 2021, the wells were purged with three well volumes of water purged from the wells using dedicated disposable bailers (also called a grab sampler). Where recharge was relatively slow (WS201, WS204, WS205, WS209) and not sufficient to allow a purging three well volumes prior to the groundwater samples being taken, then the volume of purged water was reduced to a single well volume and these wells were purged on the day of sampling prior to any of the water sampling being carried out in order that there was time for these wells to recharge.

The water samples were tested on site in accordance with EA recommendations for pH, conductivity, redox potential, temperature, salinity and dissolved oxygen. A range of different sample containers were used for sampling groundwater:

- 1 litre plastic bottles metals and inorganics;
- 1 litre glass bottles for SVOCs
- Amber glass vial for VOCs

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

Soil and water samples for organic analysis were stored in a cool box, with plastic tubs stored in a plastic crate and sent directly to the testing laboratory.

6.4 Monitoring

After completion of well installation, three visits to the site were made over a period of a month to carry out groundwater level monitoring. The results of this monitoring are presented in Table 6. It should be noted that no free phase hydrocarbons were encountered in any of the monitoring wells.

Table 6: Groundwater Level Monitoring Data

Location	Ground Level (m OD)	Base (m bgl)	Depth to Groundwater (mbgl)			Groundwater Level (mOD)		
			18/12/2020	04/01/2021	18/01/2021	18/12/2020	04/01/2021	18/01/2021
WS201	56.20	4.70	3.43	3.54	3.36	52.77	52.66	52.84
WS202	60.66	4.88	3.09	3.18	2.85	57.57	57.48	57.81
WS203	54.96	4.06	2.51	2.03	1.85	52.45	52.93	53.11
WS204	53.86	3.25	2.43	2.38	2.21	51.43	51.48	51.65
WS205	53.52	2.98	2.00	1.89	1.77	51.52	51.63	51.75
WS206	52.91	2.50	0.13	0.16	0.08	52.78	52.75	52.83
WS207	56.00	3.92	0.26	0.31	0.10	55.74	55.69	55.90
WS209	68.53	3.12	1.36	1.17	1.29	67.17	67.36	67.24
Note 1. All Wells purged on 18/12/20 2. All wells sampled on 04/01/21								

6.5 Laboratory Testing

The following numbers of samples were tested for the suites of analysis indicated in Section 5.2:

- 9 No. Soils – total concentrations
- 9 No. Soils- leachate analysis
- 8 No. Groundwater
- 4 No. Surface water

The laboratory was Eurofins Chemtest. The results of the analysis are presented in Appendix C.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

7 GROUND CONDITIONS

7.1 General

The strata encountered are summarised in the Table 7 below, with more detailed description given in the following sub sections.

Table 7: Summary of Strata Encountered								
Strata	Strata Thickness (m)							
	WS201	WS202	WS203	WS204	WS205	WS206	WS207	WS209
Topsoil	0.20	0.45	-	-	-	-	-	-
Hard Standing	-	-	-	-	-	-	0.20	-
Made Ground	-	-	2.20	2.40	2.30	0.70	2.40	0.30
Clay (Alluvium)	-	-	0.50	-	-	-	0.90	-
Sand (Alluvium)	4.50	5.35	2.30 p	2.60 p	2.70 p	3.30 p	1.50p	-
Glacial Till - Clay	0.30 p	0.20 p	-	-	-	-	-	1.90
Glacial Till - Sand	-	-	-	-	-	-	-	2.80 p
Note: p = thickness penetrated (borehole terminated in this strata)								

In the following sections the ground encountered in this current investigation and the previous E3P and LKC investigation for the fill on the Works area are discussed.

7.2 Anthropogenic Materials

In the E3P investigation they stated that:

Made Ground was encountered within all exploratory locations to a maximum proven depth of 3.45m bgl (WS112) underlying the former bleach work, although generally to depth in excess of 1.0m bgl across the wider site.

Made Ground deposits were generally uniform and comprised a silty and/or sandy gravel of concrete, brick, ash, mudstone, sandstone, slate, plastic, timber and metal believed to be associated with historic fill material resulting from construction and demolition activities. Localised discontinuous sandy and/or gravelly clay soils and reworked sand were recorded.

A hydrocarbon odour was noted at five locations (TP101-TP104 & TP106) across the southeast portion of the site all of which lie downgradient of the former ASTs. The impact was noted within both the Made Ground and underlying natural granular soils.

In addition, an organic / chemical odour was noted at a number of location predominantly

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

underlying the historic (since demolished) bleach works. The odours are likely associated with the storage and use of chemicals (including sodium hypochlorite) and detergents / solvents to produce bleach or disinfectant as part of the bleaching and dyeing process.

This supplementary investigation covered only a limited part of the site, mainly around the perimeter, in order to gain details of the site up-gradient and down-gradient adjacent to the River Irk. The Made Ground generally appeared to be a reworked glacial clay:

brown sandy slightly gravelly CLAY with subangular cobbles of brick and concrete. Gravel is angular to subrounded fine to coarse brick and concrete, locally with glass.

Locally there was ashy Made Ground (WS203 & WS207) and rare metal and plastic present in WS206. No asbestos or odours of hydrocarbons or bleach or other chemicals were encountered.

Note that the historic hardstanding and foundations from the former Works remains in situ and this has had imported fill stockpiled on top, described by LKC as: gravelly sandy clay / gravelly clayey sand with brick, concrete (gravel to cobble size) with localised inclusions of waste wrappers, ash, clinker, metal and ceramics. This was generally a clay but it was locally non-cohesive. LKC noted the following exceptions:

- topsoil type material was identified to a depth of 1.2m in TP108
- material with a strong organic / putrid odour was noted in TP120 between depths of 0.30-1.80m.

7.3 Drift Deposits

In the E3P investigation they stated that:

The superficial glacial soil deposits generally comprised a silty and/gravelly very loose to medium dense SAND with localised areas of very loose to loose sandy SILT within the eastern portion in close proximity to the River Irk.

A number of stiff to very stiff medium to high strength gravelly CLAY bands were recorded underlying the Made Ground soils, typically across the central portion of the site.

Around the perimeter of the former Works the supplementary investigation encountered natural sand which is possibly alluvium, described as brownish grey slightly silty fine SAND.

In the western area to the north of R1 there was what was assessed to be glacial sand described as:

Grey slightly silty slightly gravelly fine to coarse (predominantly fine) SAND. Gravel is subangular to rounded fine to medium sandstone and mudstone.

In the base of WS201 and WS202 glacial clay was encountered:

Soft grey sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium mudstone and rare coal.

In WS209, to the south of Reservoir R1, there was 1.90 m thickness of the glacial clay overlying sand, with gravel being absent at this location.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

7.4 Solid Geology

The solid geology was not encountered as part of any of the intrusive site investigations. Note that the bedrock on geological maps is sandstone of the Triassic Cheshire Pebble Beds Formation.

7.5 Conceptual Site Cross Section

The current ground and groundwater conditions are summarised in Figure 11 below:

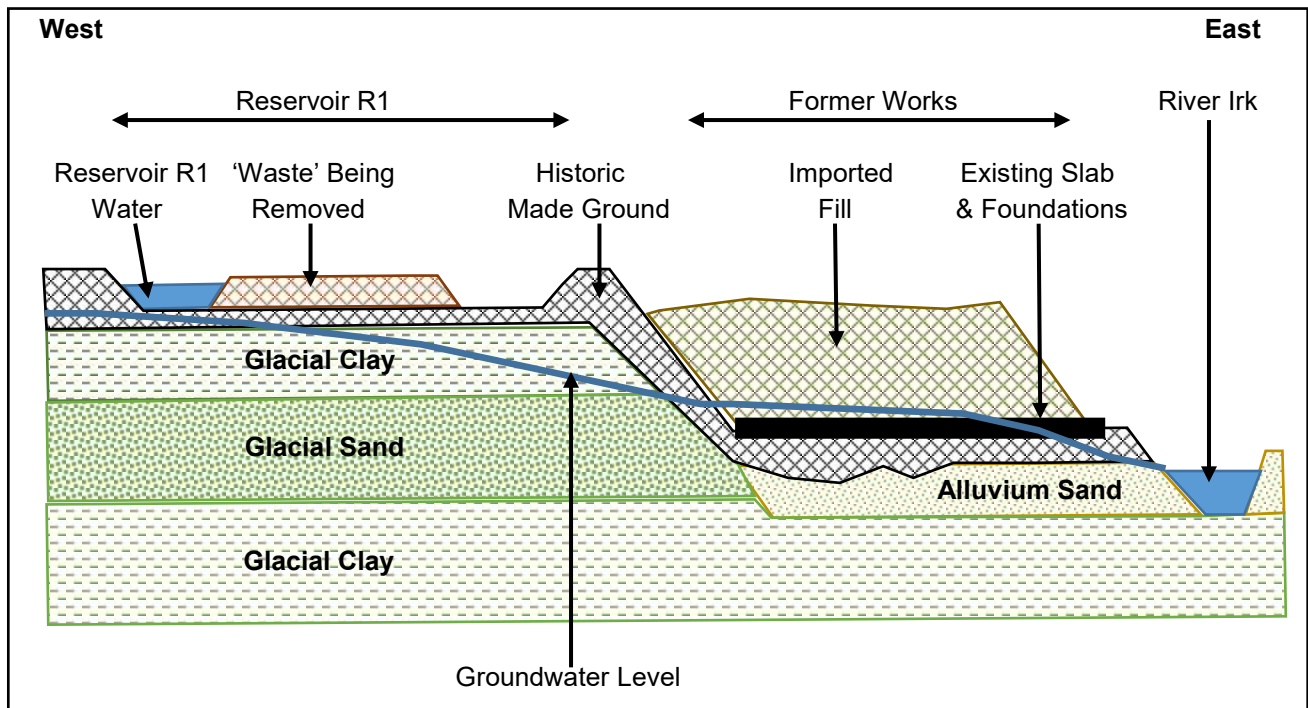


Figure 11: Schematic Cross-section - Current Ground and Groundwater Conditions

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

In the following section regarding the risk assessments, the existing ground conditions and also the proposed ground conditions due to the proposed development need to be taken into account. The proposed ground and groundwater conditions when the site has been developed are summarised in Figure 12 below. In outline, the remediation and development will include:

- Any remediation and hot spot removal carried out if required.
- Some of the stockpiled previously imported fill will be used to infill Reservoir R1.
- The slab and foundations of the former Works will be removed.
- The rest of the imported fill will be recompacted to form the development platform
- New general fill imported and placed to complete the formation of the development platform.
- The housing development will then be carried out and a further 600 mm thick layer of validated clean cover imported:

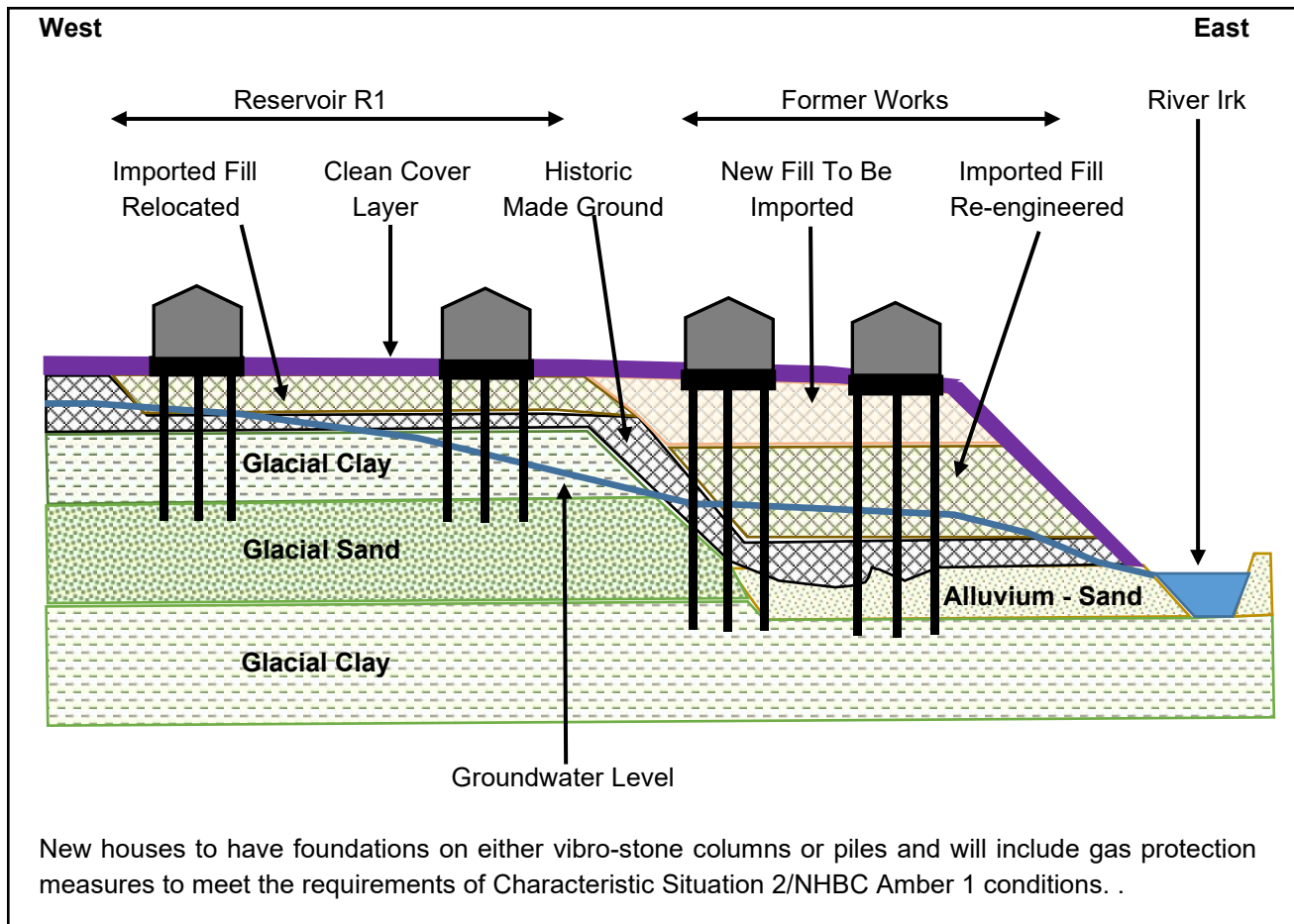


Figure 12: Schematic Cross-section – Post Development Ground and Groundwater Conditions

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

8 HUMAN HEALTH RISK ASSESSMENT

8.1 Summary of E3P Soil Results

Of the eighteen soil samples tested by E3P all of these had concentrations of potential contaminants less than the residential screening criteria apart from:

- Arsenic: 8 exceedances, seven between 45 and 330 mg/kg and one of 3,300 mg/kg;
- Lead: 10 exceedances, concentrations between 270 and 870 mg/kg;
- Benzo(b/k)Fluoranthene: single exceedance, concentration of 4.5 mg/kg;
- Benzo(ghi)perylene: six exceedances, concentrations between 0.64 and 1.70 mg/kg;
- TPH C₂₁-C₃₅ Aromatic: single exceedance, concentration of 320 mg/kg;
- Asbestos: Present in 7 samples of Made Ground, results just from screening test, no quantification of concentration.

All the exceedances were in the area of the former Works.

Note that the area of the former electrical substation has not been investigated for PCBs by either E3P or as part of this supplementary investigation.

8.2 Summary of Soil Results – Supplementary Investigation

Of the nine soil samples tested from WS201 to WS209, again most of the concentrations of potential contaminants were less than the residential screening criteria. See Appendix D for a summary of these test results. There were exceedances in the Made Ground of a relatively similar range of contaminants to the E3P investigation in the holes around the area of the former Works. There were no exceedances measured in the samples tested from the three locations to the north and south of Reservoir R1.

Measured exceedances in soil samples from the area around the former Works in relation to residential end use are:

- Arsenic: All 6 samples with exceedances, concentrations between 87 and 550 mg/kg;
- Lead: All 6 samples with exceedances, concentrations between 270 and 870 mg/kg;
- Nickel: 4 samples, with exceedances, concentrations 48 and 89 mg/kg;
- Vanadium: 2 samples with exceedances, concentrations 93 and 140 mg/kg;
- Indeno(123)pyrene: single exceedance, concentration of 14.2 mg/kg;
- Benzo(a)pyrene: single exceedance, concentration of 1.70 mg/kg;
- TPH C₈-C₁₀ Aromatic: single exceedance, concentration of 69 mg/kg – in WS205;
- TPH C₂₁-C₃₅ Aromatic: single exceedance, concentration of 910 mg/kg – in WS205;
- Asbestos: Present in two samples of Made Ground from WS205 with concentrations of 0.06 and 0.16 %.

8.3 Summary of Soil Results – Imported Fill

The results of the testing of the stockpiled imported fill are summarised in Section 4.2 and again there were localised elevated PAHs and metals (arsenic and lead) with asbestos present in one sample out of the thirty three tested.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

8.4 Human Health Risk Assessment & Mitigation

For the localised elevated concentrations of metals, non-volatile PAHs and TPH compounds around the Works area, the viable exposure pathways (soil ingestion and/or dermal contact) will not occur as part of the development due to this material being below imported fill which itself will be overlain by imported validated clean cover. As indicated in the E3P report there will be the following minimum depths of certified clean cover:

- Private Gardens where home-grown vegetables can be cultivated – 600mm
- Landscaped areas within private dwellings – 300mm
- Public Open Space – 300mm

In terms of risk from asbestos, this is limited to the period of earthworks when the former foundations of the Works will be removed and again the risk is mitigated in the long term due to this material being below imported fill which itself will be overlain by imported validated clean cover.

However, it should be noted that:

- Investigation and assessment of the risk from PCBs in the area of the historic substation is still required:
- When re-engineering the stockpiled imported soils:
 - Continuous inspection of this material during excavation for unsuitable material;
 - The material with a strong organic / putrid odour as noted in TP120 between depths of 0.30-1.80m needs to be excavated, re-stockpiled assessed and potentially removed from site.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

9 GROUND GAS RISK ASSESSMENT

E3P carried out ground gas monitoring and they concluded that:

Ground gas measures in accordance with Characteristic Situation 2 will require construction in line with BS8485 which requires a minimum of 3.5 points

An assessment of the ground gas generating potential of the imported fill based on the LKC investigation using the CL:AIRE RB17 methodology based on TOC indicates that ground gas protection measures will also be required in accordance with BS8475 Characteristic Situation 2 / NHBC Amber 1.

As part of the supplementary investigation, samples with elevated TOC of between 7.2 and 18.0 % were measured in WS203 to WS205 indicating a potentially higher risk from ground gas than previously indicated. However, because these locations are around the perimeter of the site and not below proposed housing it is assessed that ground gas protection measures in accordance with BS8475 Characteristic Situation 2 / NHBC Amber 1 will be appropriate for this development.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

10 CONTROLLED WATERS RISK ASSESSMENT

10.1 Outline of Risk Assessment Process

The risks to controlled waters (groundwater and surface waters) from contaminants on-site have been assessed in accordance with the EA documents “The Environment Agency’s Approach to Groundwater Protection” (2017) and Remedial Targets Methodology (RTM, 2006). Pollutant inputs from contaminated land sites are considered as passive inputs under the European Water Framework Directive (2000/60/EC) (WFD) and its daughter Directives, and as such are regulated under the Agency’s ‘limit’ pollution objective. Acceptable water quality targets (WQT) are defined for protection of human health (based on Drinking Water Standards (DWS)) and for protection of aquatic ecosystems (Environmental Quality Standards (EQS)).

The hierarchy of standards used in this assessment is as follows:

- River Basin District Standards and updated Water Framework Directive for Annual Average / Maximum Allowable Concentration Environmental Quality Standards (AA-MAC-EQS) for priority substances (surface water risk).
- 2001 Environment Agency Values for Environmental Quality Standards (EQS) and UK Drinking Water Standard (UKDWS).
- 2009 UK Drinking Water Standard (UKDWS).
- Surface Water Abstraction Directive (SWAD) based on A2 treatment (TPH only).
- Resource Protection Values (RPVs).
- Minimal Reporting Values (MRVs).

The SWAD criteria are considered appropriate for TPH and would be more realistic criteria than UKDWS. For example the UKDWS for hydrocarbons (dissolved/emulsified) is $10 \mu\text{g/l}$, whereas it would be $200 \mu\text{g/l}$ using SWAD for normal physical/chemical treatment (A2 treatment). This standard has been repealed in 2007³¹, but values have not been replaced currently in the Water Framework Directive. A recent document by the EA on risk from petroleum hydrocarbons in groundwater has not derived EQS values for emulsified hydrocarbons but state that it must not form distinctive films or produce harmful effect to fish. It is understood that the EA are working on providing guideline values for individual carbon bands. Until this has occurred LKC considers the use of SWAD to be still acceptable for TPH for surface waters. A more conservative screening value of $50 \mu\text{g/l}$ has been used in this report (compared to the $200 \mu\text{g/l}$) based on the solubility of TPH $>C_{12}$.

The risk from List 2 compounds (EC Dangerous Substance Directive 76/464/EEC) in a freshwater ecosystem is governed by the hardness of the water. Where applicable the hardness was taken into account for these contaminants.

Additionally to run the M-BAT model to take into account bioaccessibility of copper, zinc and nickel the Dissolved Organic Carbon (DOC), pH and calcium concentrations will be used.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

10.2 Site Setting & Sensitivity

The site sensitivity with respect to controlled waters is summarised within Table 8:

Table 8: Controlled Waters Sensitivity Profile		
Risk Profile	Comment	Risk Rating & Rationale
Groundwater Source Protection Zone or Drinking Water Safeguard Zone	No	Low
Distance to the closest groundwater extraction well.	469m	Low – The abstraction is for general industrial cooling purposes. There are no potable groundwater abstractions boreholes within a 1 km radius of the site.
Aquifer Classification in Superficial Drift Deposits.	Secondary	Low – The superficial aquifer is not considered a sensitive receptor in this instance. The Superficial Drift Deposits are a potential contaminant pathway
Aquifer Classification in Bedrock.	Secondary A / Principal	Moderate – The Principal Aquifer is a not considered a strategic water resource given the absence of any potable groundwater abstraction licences within the locality.
Viability for Anthropogenic soil in direct contact with Drift Secondary Aquifer.	Yes	Moderate – Made Ground deposits to depths of up to 3.45m bgl were recorded at the site directly overlying predominantly granular drift soils.
Viability for groundwater pathway from anthropogenic soil to Secondary A/Principal Bedrock Aquifer.	No	Low – Whilst the ground below the Made Ground site is predominantly underlain by granular soils, there are beds of low permeability clay in the drift deposits above the bedrock aquifer. However the thickness of the drift deposits is likely to be less than 10.0 m adjacent to the River Irk.
Is the site located within 50m of a surface watercourse?	Yes	High – The River Irk forms the north and eastern boundary of the site.

In the context of the site setting the Conceptual Site Model has identified a viable contaminant linkage; being the vertical migration of any mobile contaminants from hotspots in the eastern area below the former Works, into the underlying secondary drift aquifer (sand) and then laterally towards the River Irk which lies immediately downgradient to the north and east of the site.

The underlying Principal Aquifer is not considered a critical receptor in this instance given the absence of any potable groundwater abstraction boreholes within close proximity to the site.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

10.3 Soil Leachate Concentrations

E3P Investigation

E3P did carry out leaching tests on two soil samples as part of their investigation but they discussed them with the groundwater test results. They also undertook an initial qualitative assessment of the measured total concentrations in their soil analysis to assess the potential for a source of separate phase or dissolved phase contamination originating from either a defined on-site source or from impacted soils. This assessment is summarised in E3P's Table 9.3 below.

Table 9.3 Qualitative Risk to Controlled Waters from Soil Analytical Results

BTEX - <1ppm	The soil data analysis has not identified any detectable concentrations of TPH C5 to C6 that might otherwise be indicative of BTEX and/or SVOC / VOC impact
Total VOC - <1ppm	
Total SVOC - <1ppm	
C5-C10 <5ppm	All concentrations are below the laboratory LOD.
C10-C12 <10ppm	Concentrations above 10mg/kg have not been recorded.
C12-C16 <50ppm	Concentrations above 50mg/kg have not been recorded.
Phenols - <2ppm	All concentrations are below the laboratory LOD.
Naphthalene - <2ppm	The most soluble SVOC (Naphthalene) has not been identified at concentrations greater than 2mg/kg.
Total PAH <10ppm	Concentrations of low solubility PAH compounds greater than 10mg/kg have not been detected in the soil analysis.
PCB < 1ppm	An electrical substation is located in the eastern sector. Further assessment of the potential for PCBs will be required as part of the Remediation and Enabling Works when made safe.
Heavy metals - <500ppm	Localised concentrations of arsenic and lead above 500mg/kg have been recorded.

LKC Investigation of Stockpiled Fill in Area of Former Works

In total 16 leaching tests were undertaken. With regards to inorganic contaminants elevated concentrations of chromium (5 samples), copper (16 samples), lead (3 samples), nickel (2 samples), zinc (11 samples) and sulphate (6 samples) were encountered.

The leachate testing data included Total Organic Carbon (TOC). This data was included in the M-BAT model (Appendix E) in the absence of DOC data. This is a highly conservative approach as the TOC values used were often above the upper limit of the validated DOC range within the model.

LKC stated leachate testing is aggressive (de-ionised water) and is not in aqueous equilibrium (steady state) with the solid sample. This can cause rapid dissolution and overestimation of the aqueous phase concentrations compared to groundwater in contact with contaminated soils. Although dissolution may be reduced for highly hydrophobic contaminants (such as B(a)P) it is likely that the initial leaching will remove the most readily available hydrocarbons and subsequent flushing would reduce the leachable

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

concentrations. Traditionally the leaching test was developed for inorganic constituents and the leaching of organics is poorly understood.

LKC's assessment of inorganic contaminants in leachate indicated that the measured concentrations were all lower than the Tier 1 thresholds after using the M-BAT tool for copper, nickel and zinc.

With regards to organic contaminants LKC stated that: *"elevated concentrations of heavy end aromatic petroleum hydrocarbons were encountered 5 samples. These exceedances are above theoretical solubility limits and suggest free product. However, no visual or olfactory evidence of such was noted in the soils. These high concentrations are likely related to be weathered congealed hydrocarbon globules and/or hydrocarbon film around grains and colloids, which is picked up as a spike by the GC-machine. This then may not be a true residual or dissolved phase. It is known that heavy end hydrocarbons are considered recalcitrant and hydrophobic in behaviour."*

LKC concluded that the imported fill stockpiles in the eastern former Works area *"is not considered to comprise a significant risk to the River Irk or the underlying Secondary A and Principal Aquifers."*

This Supplementary Investigation

Nine leachate tests were carried out as part of this investigation and these are presented in Appendix E and summarised in Table 9.

Table 9: Summary of Leachate Test Results from Supplementary Investigation									
Sample Location	Units	Drinking Water Standard	EQS Freshwater		Other Standard	Number of Tests	Max. concentration	Location of Exceedance	Assessment
			Annual Average	Maximum Admissible Concentration					
Water Quality									
pH	pH units					-	8.0 - 8.5		-
Electrical Conductivity	uS/cm					-	-		-
Metals									
Arsenic	ug/l	10	50	-	50	9	250	WS203, WS204, WS205, WS207	Further Assessment
Cadmium	ug/l	5	0.15	0.45	5	9	<0.080	N/A	N/A
Chromium (Total)	ug/l	50	4.6	-	-	9	76.0	WS204	Further Assessment
Chromium (VI)	ug/l	-	3.4	-	-	9	<20	WS204	Further Assessment
Copper	ug/l	2000	1	-	28	9	8.5	8 out of 9	Further Assessment
Mercury	ug/l	1	-	0.07	-	9	<0.05	N/A	N/A
Nickel	ug/l	20	4	34	200	9	<1.0	N/A	N/A
Lead	ug/l	25	1.2	14	-	9	3.1	WS201, WS202, WS203, WS204, WS206, WS209	N/A

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

Antimony	ug/l	10	-	-	10	9	14.0	WS204	Further Assessment
Selenium	ug/l	5000	10.9	-	500	9	3.9	N/A	N/A
Vanadium	ug/l	250	-	-		9	13	N/A	N/A
Zinc	ug/l	50	30	-		9	31	WS205	Further Assessment
Sodium	mg/l	200	-	-	170	9	3	N/A	N/A
Inorganic									
Chloride	mg/l	250	250	-	250	9	0.85	N/A	N/A
Sulphate (as SO ₄)	mg/l	250	400	-	250	9	32	N/A	N/A
Total Cyanide	ug/l	50	5	-	70	9	<50	N/A	N/A
DOC	mg/l	-	-	-	-	9	20.00	N/A	N/A
PAH									
Naphthalene	ug/l	10 ^[2]	2.0	130	10	9	< 0.10	N/A	N/A
Anthracene	ug/l	-	0.10	0.10	-	9	< 0.10	N/A	N/A
Fluoranthene	ug/l	-	0.01	0.12	0.10	9	< 0.10	N/A	N/A
Benzo[b]fluoranthene	ug/l	-	1.70	0.017	-	9	< 0.10	N/A	N/A
Benzo[k]fluoranthene	ug/l	-	1.70	0.017	-	9	< 0.10	N/A	N/A
Benzo[a]pyrene	ug/l	0.01	1.70	0.27	0.70	9	< 0.10	N/A	N/A
Benzo[ghi]perylene	ug/l	-	1.70	8.2	-	9	< 0.10	N/A	N/A
PAH Total 4 DWS [#]	ug/l	0.1		-	0.1	9	<0.1	N/A	N/A
TPH									
Total TPH (C5 - C44)	ug/l	10	50	50	-	9	370.00	WS205	Further Assessment
Other Organic									
BTEX	ug/l	Various				9	All < Detection Limit	<1	N/A
VOC - Suite of 51 VOCs	ug/l	Various				9		<DL	N/A

From the above results it can be seen that there is a potential source of six different metals and TPH within the soils encountered with measured concentrations higher than the EQS as follows:

- Arsenic: four out of 9 locations, all locations around the former Works;
- Chromium: one location only;
- Copper: eight out of 9 locations including up-gradient exploratory holes such as WS201 and WS209 indicating this is likely to be due to natural background;
- Lead: six out of 9 locations including all three up-gradient exploratory holes WS201, WS202 and WS209 indicating this is likely to be due to natural background. The exceedances were more than two thirds lower than the Maximum Admissible Concentrations.
- Antimony: one location exceeding EQS by 40%.
- Zinc: one location (WS205) with a marginal exceedance of 31 µg/l compared to EQS of 30 µg/l
- TPH: one location (WS205) with a concentration of 370 µg/l in aliphatic C₁₀ to C₁₆.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

The technical limitations of leachate testing as summarised from the LKC report and as discussed above should be noted. Exceedances are discussed further in Section 10.6 below.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

10.4 Groundwater Concentrations

E3P Investigation

E3P's Tier assessment of the two leachate test results and the results of testing of six groundwater samples was that there was only localised elevated concentration of Chromium (VI), Selenium and Cyanide (total). In addition to this there were measured concentrations of copper (maximum 14 µg/l), nickel (maximum 9.1 µg/l) and zinc (maximum 18 µg/l) which were in excess of the current Tier 1 concentrations but they did not use the M-BAT tool to assess these metals. E3P noted that the highest measured concentrations of metals were in the two soil leachates and not in the groundwater samples and they qualitatively assessed these slightly elevated concentrations to not be a significant risk.

The maximum concentrations of metals which had slightly elevated concentrations in the six groundwater samples were as follows:

- Arsenic maximum 25.9 µg/l,
- Cadmium maximum 0.21 µg/l,
- Chromium (VI) maximum <5.0 µg/l
- Chromium (Total) maximum 3.3 µg/l
- Copper maximum 7.2 µg/l
- Nickel maximum 16 µg/l
- Lead maximum 8.5 µg/l
- Selenium maximum 4.4 µg/l
- Zinc maximum 110 µg/l
- Cyanide (total) <10 µg/l.

The measured concentrations of PAHs, TPH, SVOCs and VOCs in the groundwater were all lower than the detection limits.

E3P's summary of the assessment of the risk to controlled waters was that: *"the site is considered to pose no unacceptable level of risk to controlled water or the wider environ."*

This Supplementary Investigation

Eight test results on groundwater samples were carried out as part of this investigation and these are presented in Appendix E and summarised in Table 10:

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

Table 10: Summary of Groundwater Test Results from Supplementary Investigation

Sample Location	Units	Drinking Water Standard	EQS Freshwater		Other Standard	Number of Tests	Max. Concentration	Location of Exceedance	Assessment
			Annual Average	Maximum Admissible Concentr.					
Water Quality									
pH	pH units	-	6.0 - 9.0		-	8	7.7-8.6	N/A	N/A
Electrical Cond.	uS/cm	-	-		-	8			
Metals (Note * = See text on M-BAT in text following table)									
Arsenic	ug/l	10	50	-	50	8	7.6	N/A	N/A
Cadmium	ug/l	5	0.15	0.45	5	8	0.85	WS205	Further Assessment
Chromium (Total)	ug/l	50	4.6	-	-	8	4.0	N/A	N/A
Chromium (VI)	ug/l	-	3.4	-	-	8	<20	N/A	N/A
Copper	ug/l	2000	1*	-	28	8	36	All 8	Further Assessment
Mercury	ug/l	1	-	0.07	-	8	<0.05	N/A	N/A
Nickel	ug/l	20	4*	34	200	8	12.0	WS202, WS204, WS205, WS209	Further Assessment
Lead	ug/l	25	1.2	14	-	8	<1	N/A	N/A
Selenium	ug/l	10	-	-	10	8	9.7	N/A	N/A
Zinc	ug/l	5000	10.9*	-	500	8	58.0	WS201-WS205	Further Assessment
Calcium	mg/l	250	-	-		8	330	WS202 & WS203	Further Assessment
Manganese	ug/l	50	30*	-		8	930	All 8	Further Assessment
Sodium	mg/l	200	-	-	170	8	110	N/A	N/A
Inorganic									
Chloride	mg/l	250	250	-	250	8	82	N/A	N/A
Sulphate (as SO4)	mg/l	250	400	-	250	8	340	N/A	N/A
Total Cyanide	ug/l	50	5	-	70	8	<50	N/A	N/A
DOC	mg/l	-	-	-	-	8	6.9	N/A	N/A
PAH									
Naphthalene	ug/l	10 ^[2]	2.0	130	10	8	< 0.10	N/A	N/A
Anthracene	ug/l	-	0.10	0.10	-	8	< 0.10	N/A	N/A
Fluoranthene	ug/l	-	0.01	0.12	0.10	8	< 0.10	N/A	N/A
Benzo[b]fluoranthene	ug/l	-	1.70	0.017	-	8	< 0.10	N/A	N/A
Benzo[k]fluoranthene	ug/l	-	1.70	0.017	-	8	< 0.10	N/A	N/A
Benzo[a]pyrene	ug/l	0.01	1.70	0.27	0.70	8	< 0.10	N/A	N/A
Benzo[ghi]perylene	ug/l	-	1.70	8.2	-	8	< 0.10	N/A	N/A
PAH Total 4 DWS [#]	ug/l	0.1		-	0.1	8	<0.1	N/A	N/A
TPH, BTEX, VOCs									
Total TPH (C5 - C44)	ug/l	10	50	50	-	8	<10	N/A	N/A
BTEX	ug/l	Various				8	All < Det	<1	N/A

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

VOC - Suite of 51	ug/l	Various	8	Limit	<DL	N/A
-------------------	------	---------	---	-------	-----	-----

A second tier of assessment has been carried out on the Copper, Manganese, Nickel and Zinc results using the M-BAT tool. The output from the assessment is presented in Appendix E and the findings for these four metals and the other exceedances noted in Table 10 are:

- Arsenic: No exceedances in the groundwater even though there are locally elevated total concentrations in soils and leachates;
- Chromium: No exceedances in the groundwater even though there are locally elevated total concentrations in soils and leachates;
- Copper: After using M-BAT, only a single exceedance in location WS204 with the assessed bioavailable copper concentration being 1.9 times the EQS annual average;
- Nickel: After using M-BAT, only a single exceedance in location WS205 with the assessed bioavailable nickel concentration being 1.22 times the EQS annual average limit;
- Lead: No exceedances in the groundwater even though there are locally elevated total concentrations in soils marginal exceedances of the lead concentrations in the leachate tests;
- Zinc: After using M-BAT, two exceedances in locations WS204 and WS205 with the assessed bioavailable zinc concentration being 1.7 and 1.2 times the EQS annual average limit;
- Manganese: Seven out of eight locations still exceeded the EQS even after using the M-BAT tool including up-gradient exploratory holes WS201, WS202 and WS209 indicating this is likely to be due to natural background;
- TPH: No exceedances in the groundwater even though there are locally elevated total concentrations in soils and leachates.

Overall once the M-BAT tool had been used for Copper, Manganese, Nickel and Zinc there were four individual exceedances for three different metals plus the manganese results which appear to be representative of background concentrations.

10.5 Surface Water Concentrations

Four test results on surface water samples were carried out as part of this investigation and these are presented in Appendix E and summarised in Table 11:

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

Table 11: Summary of Surface Water Test Results from Supplementary Investigation

Sample Location	Units	Drinking Water Standard	EQS Freshwater		Other Standard	Number of Locations	Max. Concentration	Location of Exceedance	Assessment
			Annual Average	Maximum Admissible Concentration					
Water Quality									
pH	pH units	-	6.0 - 9.0		-	4	8.3-8.4	N/A	N/A
Electrical Cond	uS/cm	-	-		-	4			
Metals (Note * = See text on M-BAT in text following table)									
Arsenic	ug/l	10	50	-	50	4	2.30	N/A	N/A
Cadmium	ug/l	5	0.08	0.45	5	4	<0.080	N/A	N/A
Chromium (Total)	ug/l	50	4.7	-	-	4	4.50	N/A	N/A
Chromium (Hexavalent)	ug/l	-	3.400	-	-	4	<20	N/A	N/A
Copper	ug/l	2000	1*	-	28	4	8.3	All	Further Assessment
Mercury	ug/l	1	-	0.07	-	4	0.00	N/A	N/A
Nickel	ug/l	20	4*	34	200	4	1.80	N/A	N/A
Lead	ug/l	25	1.2	14	-	4	0.00	N/A	N/A
Selenium	ug/l	10	-	-	10	4	0.00	N/A	N/A
Zinc	ug/l	5000	10.9*	-	500	4	17.0	RS1, RS2, RS3	Further Assessment
Calcium	mg/l	250	-	-		4	170	N/A	N/A
Manganese	ug/l	50	30*	-		4	680	All 4	Further Assessment
Sodium	mg/l	200	-	-	170	4	89	N/A	N/A
Inorganic									
Chloride	mg/l	250	250	-	250	4	120	N/A	N/A
Sulphate (as SO4)	mg/l	250	400	-	250	4	50	N/A	N/A
Total Cyanide	ug/l	50	5	-	70	4	<50	N/A	N/A
DOC	mg/l	-	-	-	-	4	7.0	N/A	N/A
PAH									
Naphthalene	ug/l	10 ^[2]	2.0	130	10	4	< 0.10	N/A	N/A
Anthracene	ug/l	-	0.10	0.10	-	4	< 0.10	N/A	N/A
Fluoranthene	ug/l	-	0.01	0.12	0.10	4	< 0.10	N/A	N/A
Benzo[b]fluoranthene	ug/l	-	1.70	0.017	-	4	< 0.10	N/A	N/A
Benzo[k]fluoranthene	ug/l	-	1.70	0.017	-	4	< 0.10	N/A	N/A
Benzo[a]pyrene	ug/l	0.01	1.70	0.27	0.70	4	< 0.10	N/A	N/A
Benzo[ghi]perylene	ug/l	-	1.70	8.2	-	4	< 0.10	N/A	N/A
PAH Total 4 DWS [#]	ug/l	0.1		-	0.1	4	<0.1	N/A	N/A
TPH, BTEX & VOC									
Total TPH (C5 - C44)	ug/l	10	50	50	-	4	<10	N/A	N/A
BTEX	ug/l	Various				4	All < Detection Limit	<1	N/A
VOC - Suite of 51 VOCs	ug/l	Various				4		<DL	N/A

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

The only exceedance in the sample from Reservoir R1 is for manganese after using the M-BAT tool. This mirrors the concentrations in the groundwater samples and is assessed to be indicative of natural background concentrations. However, the concentrations of manganese in the River Irk are lower than the screening criteria indicating there to be a negligible risk to the environment.

In the above summary, the only exceedances in samples from the River Irk are for Copper, Manganese and Zinc. However, after using the M-BAT tool all of the measured concentrations pass the assessment. Therefore the River Irk is not being impacted by the occurrence of localised slightly elevated concentrations of potential contaminants within the Made Ground or groundwater at the site.

10.6 Controlled Waters Risk Assessment

The Conceptual Site Model and contaminant linkages comprise:

- The schematic cross sections in Section 7.5:
 - Figure 11 presenting the current conditions and
 - Figure 12 presenting the post development situation.
 - Controlled waters receptors:
 - Main receptor River Irk adjacent to north and east of the site
 - Secondary receptor underlying secondary drift aquifer (sand)
 - Underlying Principal Aquifer is not considered a critical receptor in this instance given the absence of any potable groundwater abstraction boreholes within close proximity to the site.
- Contaminant Sources
 - The site investigations at this site has found slightly elevated concentrations of potential contaminants locally in the soils at relatively low concentrations. The maximum concentrations do not exceed the human health limits for commercial development and none of the soil would be classified as hazardous waste (other than due to the limited presence of asbestos).
 - Leachate testing of the soils locally slightly elevated concentrations of some metals and TPH in leachate. Some metals in the soil appear to be present in almost insoluble forms (e.g. lead) which is not found in the leachate. It should be noted that leachate testing is 'conservative' with leached concentrations generally being higher than occurs naturally in the ground. The contaminants in the soils and leachates are of low solubility and mobility in real-ground where the groundwater is not deionised and has elevated concentrations of background ions (e.g. manganese, iron, anions, etc.) which reduce the solubility and mobility of potential contaminants.
 - The shallow groundwater itself potentially becomes a source. Concentrations within the groundwater close to the River Irk are generally compliant with the relevant Freshwater EQS's. The few exceedances of these screening criteria are limited in their occurrence and concentrations:

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

- Copper: Only a single exceedance in location WS204 with the assessed bioavailable copper concentration being 1.9 times the EQS annual average;
 - Nickel: Only a single exceedance in location WS205 with the assessed bioavailable nickel concentration being 1.22 times the EQS annual average limit;
 - Zinc: Two exceedances in locations WS204 and WS205 with the assessed bioavailable zinc concentration being 1.7 and 1.2 times the EQS annual average limit;
 - Manganese: Seven out of eight locations still exceeded the EQS even after using the M-BAT tool including up-gradient exploratory holes WS201, WS202 and WS209 indicating this is likely to be due to natural background;
 - TPH: No exceedances in the groundwater even though there are locally elevated total concentrations in soils and leachates.
- Contaminant Pathway: There is a viable contaminant pathway:
 - the vertical migration of any mobile contaminants from hotspots in the eastern area below the former Works, into the underlying secondary drift aquifer (sand)
 - then lateral migration towards and potentially into the River Irk which lies immediately down-gradient to the north and east of the site.
 - Critical receptor: River Irk:
 - Chemical analysis of the River Irk (by E3P in previous investigations and three samples tested as part of the current investigation) all have concentrations less than the Freshwater EQSs.
 - Therefore the River Irk is not being impacted by the occurrence of localised slightly elevated concentrations of potential contaminants within the Made Ground or groundwater at the site.

In conclusion, the assessment of the site investigation data following the contaminant linkage system has demonstrated that whilst there are low level contaminant sources locally present and a potential pathway via migrating groundwater into the adjacent River Irk (the principal controlled waters receptor), there is no overall contaminant linkage and there is a negligible risk to controlled waters. Therefore no remediation is required in relation to the potential risks to controlled waters.

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

11 CONCLUSION

11.1 Summary of Groundwater Risk Assessment

A supplementary site investigation has been carried out comprising additional boreholes and chemical testing of soils and water samples. This data has been assessed alongside previous site investigation information (note that this assessment has been carried out based on the Waste in Reservoir R1 having been removed, this work is currently in progress with more than 65% of the waste already removed). This has shown that there are elevated concentrations of some metals and localised TPH. Asbestos is present in isolated locations. However, there is an absence of very high concentrations of contaminants that would indicate 'gross' contamination, such as those which would cause the soils to be classified as hazardous waste.

There are slightly elevated concentrations of leachates derived in the laboratory from samples of Made Ground but again there are limited exceedances in excess of the appropriate screening criteria (i.e. the Freshwater EQS).

Within groundwater samples the only exceedances of Freshwater EQSs are

- Copper: Only a single exceedance in location WS204 with the assessed bioavailable copper concentration being 1.9 times the EQS annual average;
- Nickel: Only a single exceedance in location WS205 with the assessed bioavailable nickel concentration being 1.22 times the EQS annual average limit;
- Zinc: Two exceedances in locations WS204 and WS205 with the assessed bioavailable zinc concentration being 1.7 and 1.2 times the EQS annual average limit;
- Manganese: Seven out of eight locations still exceeded the EQS even after using the M-BAT tool including up-gradient exploratory holes WS201, WS202 and WS209 indicating this is likely to be due to natural background;
- TPH: No exceedances in the groundwater even though there are locally elevated total concentrations in soils and leachates.

The above concentrations exceeding the Tier 1 Screening criteria are limited in the locations and are only just above the thresholds and do not warrant further Tiers of risk assessment. It should also be noted that there are no elevated measured concentrations of any contaminants in the adjacent River Irk as measured in the earlier E3P investigation and also as part of this investigation.

Whilst there are low level contaminant sources locally present and a potential pathway via migrating groundwater into the adjacent River Irk (the principal controlled waters receptor), there is no overall contaminant linkage and there is a negligible risk to controlled waters. Therefore no remediation is required in relation to the potential risks to controlled waters.

11.2 Summary of Other Geo-environmental Risks

Risk to Human Health

There are localised elevated concentrations of metals, non-volatile PAHs and TPH compounds around the Works area but 'gross' contamination has not been encountered. Post development the viable exposure pathways (soil ingestion and/or dermal contact) will not occur post development due to any material with slightly elevated concentration of contaminants being below imported fill which itself will be overlain by imported validated clean cover. There is a requirement for the following minimum depths of certified clean cover to be placed as part of the development:

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

- Private Gardens where home-grown vegetables can be cultivated – 600mm
- Landscaped areas within private dwellings – 300mm
- Public Open Space – 300mm

In terms of risk from asbestos, this is limited to the period of earthworks when the former foundations of the Works will be removed and as such it will be necessary to carefully manage these impacted soils and place them in a legislatively compliant manner that will negate any possibility of future exposure. The risk is mitigated in the long term due to this material being below imported fill which itself will be overlain by imported validated clean cover.

However, it should be noted that:

- Investigation and assessment of the risk from PCBs in the area of the historic substation is still required:
- When re-engineering the stockpiled imported soils:
 - Continuous inspection of this material during excavation for unsuitable material;
 - The material with a strong organic / putrid odour as noted in TP120 between depths of 0.30-1.80m needs to be excavated, re-stockpiled assessed and potentially removed from site.

Ground Gas Risk Assessment

There is no mitigation required due to the risk from radon.

It is assessed that the development will require ground gas protection measures in accordance with Characteristic Situation 2 will require construction in line with BS8485 which requires a minimum of 3.5 points.

11.3 Summary of Further Works Required

The following works need to be completed in relation to the ground conditions in order that the 'Stop Notice' can be rescinded and development works can recommence:

- Complete the removal of the "Waste" from Reservoir R1 and produce a Completion Report for the waste removal works; this work is expected to be completed in February 2021;
- Produce a new Remediation Strategy & Verification Plan; this is due to be completed in January 2021;
- Issue this report and the above two reports to the Environment Agency plus the EHO at Manchester City Council and gain their approval; and
- A suitable UU approved risk assessment should be carried out following the remediation works to determine suitability for potable water pipe installation.

Appendix A:

Site Plans and Investigation Locations

Exploratory Hole Location Plan

C S Eccles Brownfield Land
Consultant



Legend Key
Locations By Type -
WLS



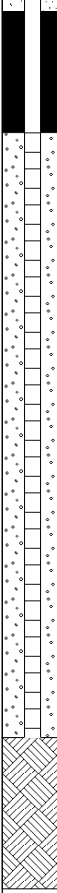
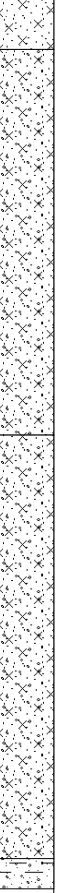
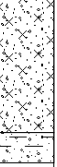
 Issue: DRAFT Scale: 1:1500	Project: Blackley Mere Project No: 182.01 Client: Lagan Aviation & Infrastructure	Drawing No:
--	--	------------------------

Appendix B

Exploratory Hole Records

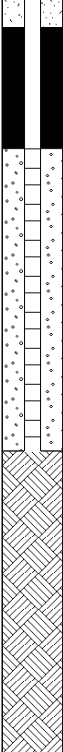
Dynamic Sample Log										FINAL (05/01/21 10:01)		Exploratory ID: WS201 Sheet 1 of 1	
Location details: mE: 383904.73 mN: 403081.60 mOD: 56.20 Grid: OSGB				General Remarks:				Project ID: 182.01 Project: Blackley Mere Client: Lagan Aviation & Infrastructure					
Backfill/ Instaln	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing				Run Details (Diameter/ Duration/ Recovery):			
						Water	Casing	Depth	Type		Results/Remarks		
	(52)		56.00	(0.20) 0.20	Black slightly clayey fine SAND with abundant fine rootlets. (TOPSOIL) Orangish brown slightly silty fine SAND. (ALLVIUM)			0.10	ES				
				(4.50)									
					3.50 m: Becomes damp and greyish brown.								
			51.50	4.70 (0.30)	Soft grey sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium mudstone and rare coal. (GLACIAL TILL)								
			51.20	5.00	Dynamic sample ends at 5.00 m (Target depth)								
Borehole Formation													
Type:	From:	To:	Start Date:	End Date:	Crew:	Plant:	Logger:	Date Logged:	Checker:	Remarks:			
WLS	0.00	5.00	14/12/2020	14/12/2020	RT	Dando Terrier Rig	GB	14-12-20	CSE				
Groundwater Entries:					Depth Related Remarks:					Scale: 1:50			
Struck:	Rose to:	Casing:	Sealed:	Remarks:	From:	To:	Remarks:						
3.50	3.50				2.00	3.00	No sample recovery						
								Notes: For explanation of symbols and abbreviations see Key Sheet. All depths and reduced levels are in metres.					

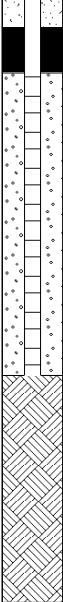
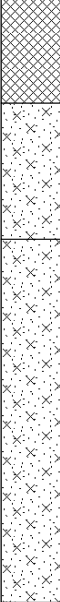
Sheet 1 of 1

Location details:				General Remarks:		Project ID: 182.01					
mE: 383945.82 mN: 403070.81 mOD: 60.66 Grid: OSGB						Project: Blackley Mere Client: Lagan Aviation & Infrastructure					
Backfill / Instal'n	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing					Run Details (Diameter/ Duration/ Recovery):
						Water	Casing	Depth	Type	Results/Remarks	
	(52)		60.21	(0.45)	Orangish brown slightly silty fine SAND. (ALLVIUM)			0.90	ES		
				0.45	Grey slightly silty slightly gravelly fine to coarse (predominantly fine) SAND. Gravel is subangular to rounded fine to medium sandstone and mudstone. (ALLVIUM)						
				(2.55)							
				57.66	3.00						2.90 m: Becomes damp.
				(2.80)							
(52)	SP		54.86	5.80	Soft grey sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium mudstone and rare coal. (GLACIAL TILL) Dynamic sample ends at 6.00 m (Target depth)						
			54.66	(0.20) 6.00							
Borehole Formation											
Type:	From:	To:	Start Date:	End Date:	Crew:	Plant:	Logger:	Date Logged:	Checker:	Remarks:	
WLS	0.00	6.00	14/12/2020	14/12/2020	RT	Dando Terrier Rig	GB	14-12-20	CSE		
Groundwater Entries:					Depth Related Remarks:					Scale: 1:50	
Struck:	Rose to:	Casing:	Sealed:	Remarks:	From:	To:	Remarks:	 Notes: For explanation of symbols and abbreviations see Key Sheet. All depths and reduced levels are in metres.			
3.00	3.00										

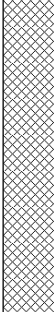
Dynamic Sample Log										FINAL (05/01/21 10:01)		Exploratory ID: WS203 Sheet 1 of 1	
Location details: mE: 384015.64 mN: 403065.11 mOD: 54.96 Grid: OSGB				General Remarks:				Project ID: 182.01 Project: Blackley Mere Client: Lagan Aviation & Infrastructure					
Backfill/ Instaln	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing				Run Details (Diameter/ Duration/ Recovery):			
						Water	Casing	Depth	Type		Results/Remarks		
			54.86	(0.10)	Very soft dark brown sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium brick, metal.								
			0.10	(0.45)	(MADE GROUND)								
			54.41	0.55	Soft light grey gravelly slightly sandy CLAY. Gravel is subangular to subrounded limestone.			0.70	ES				
			(0.45)	(MADE GROUND)									
			53.96	1.00	Red and dark grey sandy angular to subrounded fine to medium GRAVEL of brick and ash.								
				(1.20)	Dark grey sandy angular to subrounded fine to medium GRAVEL of ash.								
			(0.45)	(MADE GROUND)									
			52.76	2.20	Soft dark brown sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium mudstone.								
			(0.50)	(ALLUVIUM)									
			52.26	2.70	Orangish brown slightly silty fine SAND.								
				(2.30)									
			(0.45)	(MADE GROUND)									

Dynamic Sample Log										FINAL (05/01/21 10:01)		Exploratory ID: WS204 Sheet 1 of 1	
Location details: mE: 384127.15 mN: 403049.84 mOD: 53.86 Grid: OSGB				General Remarks:				Project ID: 182.01 Project: Blackley Mere Client: Lagan Aviation & Infrastructure					
Backfill / Instaln	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing				Run Details (Diameter/ Duration/ Recovery):			
						Water	Casing	Depth	Type		Results/Remarks		
	(52)		(0.40)	(0.40)	Firm brown sandy slightly gravelly CLAY with subangular cobbles of brick and concrete. Gravel is angular to subrounded fine to coarse brick and concrete. (MADE GROUND)			0.50	ES				
			(0.70)		Black silty slightly gravelly fine SAND. Gravel is subangular to subrounded fine to medium brick. (MADE GROUND)								
			52.76	1.10	Brown silty gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse brick, glass and concrete. (MADE GROUND)								
			(1.30)										
	(52)		51.46	2.40	Dark brown slightly silty fine SAND. (ALLUVIUM)								
			(2.60)		3.75 m: Becomes orangish brown.								
SP			48.86	5.00	Dynamic sample ends at 5.00 m (Target depth)								
Borehole Formation													
Type:	From:	To:	Start Date:	End Date:	Crew:	Plant:	Logger:	Date Logged:	Checker:	Remarks:			
WLS	0.00	5.00	15/12/2020	15/12/2020	RT	Dando Terrier Rig	GB	15-12-20	CSE				
Groundwater Entries:					Depth Related Remarks:					Scale: 1:50			
Struck:	Rose to:	Casing:	Sealed:	Remarks:	From:	To:	Remarks:	 Notes: For explanation of symbols and abbreviations see Key Sheet. All depths and reduced levels are in metres.					
2.40	2.40				1.40	1.40	Obstruction hole terminated and relocated						

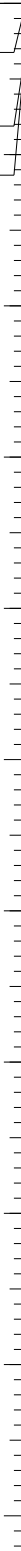
Dynamic Sample Log										FINAL (05/01/21 10:01)		Exploratory ID: WS205 Sheet 1 of 1	
Location details: mE: 384121.20 mN: 403029.91 mOD: 53.52 Grid: OSGB				General Remarks:				Project ID: 182.01 Project: Blackley Mere Client: Lagan Aviation & Infrastructure					
Backfill / Instaln	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing				Run Details (Diameter/ Duration/ Recovery):			
						Water	Casing	Depth	Type		Results/Remarks		
	(52)		53.12	(0.40) 0.40	Firm brown sandy slightly gravelly CLAY with subangular cobbles of brick and concrete. Gravel is angular to subrounded fine to coarse brick and concrete. (MADE GROUND)			0.50	ES				
			52.32	(0.80) 1.20	Brown gravelly slightly silty fine SAND. Gravel is angular to subrounded fine to coarse brick and concrete. (MADE GROUND)			1.30	ES				
			51.22	(1.10) 2.30	Dark grey clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse brick and concrete with rare tile, metal and plastic. (MADE GROUND)								
			48.52	(2.70) 5.00	Brown slightly silty fine SAND. (ALLUVIUM)								
Dynamic sample ends at 5.00 m (Target depth)													
Borehole Formation													
Type:	From:	To:	Start Date:	End Date:	Crew:	Plant:	Logger:	Date Logged:	Checker:	Remarks:			
WLS	0.00	5.00	15/12/2020	15/12/2020	RT	Dando Terrier Rig	GB	15-12-20	CSE				
Groundwater Entries:					Depth Related Remarks:					Scale: 1:50			
Struck:	Rose to:	Casing:	Sealed:	Remarks:	From:	To:	Remarks:						
2.30	2.30							Notes: For explanation of symbols and abbreviations see Key Sheet. All depths and reduced levels are in metres.					

Dynamic Sample Log										FINAL (05/01/21 10:01)		Exploratory ID: WS206 Sheet 1 of 1	
Location details: mE: 384117.40 mN: 402971.30 mOD: 52.91 Grid: OSGB				General Remarks:				Project ID: 182.01 Project: Blackley Mere Client: Lagan Aviation & Infrastructure					
Backfill / Instaln	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing				Run Details (Diameter/ Duration/ Recovery):			
						Water	Casing	Depth	Type		Results/Remarks		
	(52)			(0.70)	Firm brown sandy slightly gravelly CLAY with subangular cobbles of brick and concrete. Gravel is angular to subrounded fine to coarse brick and concrete. (MADE GROUND)			0.30	ES				
			52.21	0.70	Brown very silty fine SAND. (ALLUVIUM)								
				(0.90)									
			51.31	1.60	Grey slightly silty fine SAND with an organic odour. (ALLUVIUM)								
	(52)			(2.40)									
	SP		48.91	4.00	Dynamic sample ends at 4.00 m (Target depth)								
Borehole Formation													
Type:	From:	To:	Start Date:	End Date:	Crew:	Plant:	Logger:	Date Logged:	Checker:	Remarks:			
WLS	0.00	4.00	15/12/2020	15/12/2020	RT	Dando Terrier Rig	GB	15-12-20	CSE				
Groundwater Entries:					Depth Related Remarks:					Scale: 1:50			
Struck:	Rose to:	Casing:	Sealed:	Remarks:	From:	To:	Remarks:	 Notes: For explanation of symbols and abbreviations see Key Sheet. All depths and reduced levels are in metres.					
0.70	0.70												

Sheet 1 of 1

Location details:		General Remarks:		Project ID: 182.01							
mE: 384027.66 mN: 402959.26 mOD: 56.00 Grid: OSGB				Project: Blackley Mere Client: Lagan Aviation & Infrastructure							
Backfill / Instal'n	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing					Run Details (Diameter/ Duration/ Recovery):
						Water	Casing	Depth	Type	Results/Remarks	
			55.95	(0.05)	Asphalt			0.50	ES		
			55.85	0.05	(MADE GROUND)						
			55.75	(0.10)	Light grey sandy subangular to subrounded fine to medium						
			55.60	0.15	GRAVEL of limestone [sub-base].						
				(0.10)	(MADE GROUND)						
				0.25	Red subangular COBBLE of brick.						
				(0.15)	(MADE GROUND)						
				0.40	Black clayey sandy subangular to subrounded fine to medium						
					GRAVEL of ash and coal.						
				(2.20)	(MADE GROUND)						
					Soft dark greyish brown sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse brick and concrete. (MADE GROUND)						
			53.40	2.60	Greyish brown silty slightly gravelly fine SAND. Gravel is subangular to rounded fine to medium sandstone and mudstone. (ALLUVIUM)						
				(0.90)							
			52.50	3.50	Browish grey slightly silty fine SAND. (ALLUVIUM)						
				(1.50)							
			SP	51.00	5.00	Dynamic sample ends at 5.00 m (Target depth)					
Borehole Formation											
Type:	From:	To:	Start Date:	End Date:	Crew:	Plant:	Logger:	Date Logged:	Checker:	Remarks:	
WLS	0.00	5.00	14/12/2020	14/12/2020	RT	Dando Terrier Rig	GB	14-12-20	CSE		
Groundwater Entries:					Depth Related Remarks:					Scale: 1:50	
Struck:	Rose to:	Casing:	Sealed:	Remarks:	From:	To:	Remarks:	 Notes: For explanation of symbols and abbreviations see Key Sheet. All depths and reduced levels are in metres.			
0.50	0.50										

Dynamic Sample Log										FINAL (05/01/21 10:01)		Exploratory ID: WS208 Sheet 1 of 1	
Location details:				General Remarks:				Project ID: 182.01					
mE: 384027.98 mN: 402988.43 mOD: 54.71 Grid: OSGB								Project: Blackley Mere Client: Lagan Aviation & Infrastructure					
Backfill / Instal'n	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing					Run Details (Diameter/ Duration/ Recovery):		
						Water	Casing	Depth	Type	Results/Remarks			
			54.66	(0.05)	Asphalt								
			0.05	(MADE GROUND)									
			54.33	(0.33)	Light brownish grey sandy subangular to subrounded fine to								
			54.31	0.38	medium GRAVEL of limestone [sub-base].								
			(0.02)	(MADE GROUND)									
0.40	Concrete												
					(MADE GROUND)								
					Dynamic sample ends at 0.40 m (Obstruction)								
Borehole Formation													
Type:	From:	To:	Start Date:	End Date:	Crew:	Plant:	Logger:	Date Logged:	Checker:	Remarks:			
WLS	0.00	0.40	15/12/2020	15/12/2020	RT	Dando Terrier Rig	GB	15-12-20	CSE				
Groundwater Entries:					Depth Related Remarks:					Scale: 1:50			
Struck:	Rose to:	Casing:	Sealed:	Remarks:	From:	To:	Remarks:	 Notes: For explanation of symbols and abbreviations see Key Sheet. All depths and reduced levels are in metres.					
					0.40	0.40	Concrete obstruction						

Dynamic Sample Log										FINAL (05/01/21 10:01)		Exploratory ID: WS208A Sheet 1 of 1	
Location details:				General Remarks:				Project ID: 182.01					
mE: 384027.97 mN: 402991.75 mOD: 54.67 Grid: OSGB								Project: Blackley Mere Client: Lagan Aviation & Infrastructure					
Backfill / Instal'n	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing					Run Details (Diameter/ Duration/ Recovery):		
						Water	Casing	Depth	Type	Results/Remarks			
			54.62	(0.05)	Asphalt								
			0.05	(MADE GROUND)									
			54.29	(0.33)	Light brownish grey sandy subangular to subrounded fine to								
			54.27	0.38	medium GRAVEL of limestone [sub-base].								
			(0.02)	(MADE GROUND)									
0.40	Concrete												
					(MADE GROUND)								
					Dynamic sample ends at 0.40 m (Obstruction)								
Borehole Formation													
Type:	From:	To:	Start Date:	End Date:	Crew:	Plant:	Logger:	Date Logged:	Checker:	Remarks:			
WLS	0.00	0.40	15/12/2020	15/12/2020	RT	Dando Terrier Rig	GB	15-12-20	CSE				
Groundwater Entries:					Depth Related Remarks:					Scale: 1:50			
Struck:	Rose to:	Casing:	Sealed:	Remarks:	From:	To:	Remarks:				 Notes: For explanation of symbols and abbreviations see Key Sheet. All depths and reduced levels are in metres.		
					0.40	0.40	Concrete obstruction						

Dynamic Sample Log										FINAL (05/01/21 10:01)		Exploratory ID: WS208B Sheet 1 of 1	
Location details:				General Remarks:				Project ID: 182.01					
mE: 384011.81 mN: 402993.32 mOD: 55.31 Grid: OSGB								Project: Blackley Mere Client: Lagan Aviation & Infrastructure					
Backfill/ Instal'n	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing				Run Details (Diameter/ Duration/ Recovery):			
						Water	Casing	Depth	Type		Results/Remarks		
			55.21	(0.10) 0.10	Concrete (MADE GROUND) Dynamic sample ends at 0.10 m (Obstruction)								
Borehole Formation													
Type:	From:	To:	Start Date:	End Date:	Crew:	Plant:	Logger:	Date Logged:	Checker:	Remarks:			
WLS	0.00	0.10	15/12/2020	15/12/2020	RT	Dando Terrier Rig	GB	15-12-20	CSE				
Groundwater Entries:					Depth Related Remarks:					Scale: 1:50			
Struck: Rose to: Casing: Sealed: Remarks:					From: To: Remarks:					 Notes: For explanation of symbols and abbreviations see Key Sheet. All depths and reduced levels are in metres.			

Dynamic Sample Log										FINAL (05/01/21 10:01)		Exploratory ID: WS209 Sheet 1 of 1	
Location details: mE: 383916.14 mN: 402986.74 mOD: 68.53 Grid: OSGB				General Remarks:				Project ID: 182.01 Project: Blackley Mere Client: Lagan Aviation & Infrastructure					
Backfill / Instaln	Water- strike	Legend	Level (mOD)	Depth (m bgl)	Stratum Description	Samples and In-Situ Testing				Run Details (Diameter/ Duration/ Recovery):			
						Water	Casing	Depth	Type		Results/Remarks		
	(52)			(0.30)	Soft dark brown sandy slightly gravelly CLAY with abundant rootlets. Gravel is subangular to subrounded fine to medium brick.								
			68.23	0.30									
			67.93	0.60	(MADE GROUND)								
					Soft light greyish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium mudstone. (GLACIAL TILL)								
				(1.60)	Firm brown sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium mudstone. (GLACIAL TILL)								
			66.33	2.20	Brown silty fine SAND. (GLACIAL TILL)								
	(52)												
				(2.80)									
					4.50 m: Becomes orangish brown.								
	SP		63.53	5.00	Dynamic sample ends at 5.00 m (Target depth)								
Borehole Formation													
Type:	From:	To:	Start Date:	End Date:	Crew:	Plant:	Logger:	Date Logged:	Checker:	Remarks:			
WLS	0.00	5.00	14/12/2020	14/12/2020	RT	Dando Terrier Rig	GB	14-12-20	CSE				
Groundwater Entries:					Depth Related Remarks:					Scale: 1:50			
Struck:	Rose to:	Casing:	Sealed:	Remarks:	From:	To:	Remarks:						
2.10	2.10							Notes: For explanation of symbols and abbreviations see Key Sheet. All depths and reduced levels are in metres.					

Exploratory Hole Key Sheet

SAMPLES:

Undisturbed:	
U	Driven tube sample
UT	Thin wall driven tube sample
TW	Pushed thin wall tube sample
P	Pushed piston sample
L	Liner sample (from windowless or similar sampler), full recovery unless otherwise stated
CBR	CBR mould sample
BLK	Block sample
C	Core sample (from rotary core) taken for laboratory testing
Disturbed:	
D	Small sample
B	Bulk sample
AMAL	Amalgamated sample
Environmental:	
ES	Environmental soil sample
EW	Environmental water sample
Comments:	Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that an attempt was made to take a tube sample; however, there was no recovery. Sample recovery is given as a percentage.

TESTS:

SPT S or SPT C	Standard Penetration Test, open shoe (S) or solid cone (C)
	The Standard Penetration Test is defined in BS EN ISO 22476-3 (2005). The incremental blow counts are given in the Field Records column; each increment is 75mm unless stated otherwise and any penetration under self weight in mm (SW) is noted. Where the full 300mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 (either in total or for a single increment) the total blow count beyond the seating drive is given (without the N = prefix).
ICBR	In situ CBR
IV	In situ vane shear strength, peak (p) and remoulded (r), kPa
HV	Hand vane shear strength, peak (p) and remoulded (r), kPa
PP	Pocket penetrometer test, converted to shear strength, kPa
KFH, KRH, KPI	Variable head permeability tests (KFH = falling head test, KRH = rising head test, KPI = packer test), permeability value
PID/FID	Photo-ionisation detector/Flame-ionisation detector
	Test results provided in Field Records column

DRILLING RECORDS:

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930: 2015 and BS EN ISO 22575-1 (2006)

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm. Minimum, typical and maximum spacings are presented.
NI	Non intact is used where the core is fragmented.
CRF	Core recovered (length in m) in the following run
AZCL	Assessed zone of core loss
NR	Not recovered

GROUNDWATER:



Groundwater strike



Groundwater level after standing period

DEPTH REMARKS:

EoS	End of Shift
SoS	Start of Shift
EoBH	End of Borehole

INSTRUMENTATION:

Details of installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill. The type of instrument installed is indicated by a code adjacent to the Legend column at the base of the instrument.

SP	Standpipe
SPIE	Standpipe piezometer
PPIE	Pneumatic piezometer
EPIE	Electronic piezometer
AP	Access pipe
GMP	Gas monitoring standpipe
(xx)	Internal diameter (mm)
ICE	Biaxial inclinometer
ICM	Inclinometer tubing for use with probe
SLIP	Slip indicator
ESET	Electronic settlement cell/gauge
ETM	Magnetic extensometer settlement point
ETR	Rod extensometer

EXPLORATORY HOLE TYPE:

CP	Cable percussion
DP	Dynamic probe
DCP	Dynamic cone penetrometer
HA	Hand auger
IP	Inspection pit
OP	Observation pit/trench
PC	Pavement core
RC	Rotary core
RO	Rotary open hole
SH	Shaft
SNC	Sonic (resonance)
TP	Trial pit/trench
TRAV	Traverse
WLS	Windowless (dynamic) sample
WS	Window (dynamic) sample



Project: **Blackley Mere**
Project No: **182.01**
Client: **Lagan Aviation & Infrastructure**

Reference

KEY SHEET

Sheet 1 of 1

Appendix C

Laboratory Chemical Test Results



Final Report

Report No.:	20-34762-1		
Initial Date of Issue:	24-Dec-2020		
Client	Mr C S Eccles		
Client Address:	55 St Catherine Drive Hartford Cheshire CW8 2FE		
Contact(s):	Chris Eccles		
Project	182.01 Blackley Mere, Crumpsall		
Quotation No.:	Q20-22307	Date Received:	17-Dec-2020
Order No.:	182.01	Date Instructed:	17-Dec-2020
No. of Samples:	9		
Turnaround (Wkdays):	5	Results Due:	23-Dec-2020
Date Approved:	24-Dec-2020		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Leachate

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:					20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762
Quotation No.: Q20-22307	Chemtest Sample ID.:					1115586	1115587	1115588	1115589	1115590	1115591	1115592	1115593	1115594
	Sample Location:					WS201	WS202	WS203	WS204	WS205	WS205	WS206	WS207	WS209
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):					0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50	0.20
	Bottom Depth (m):					0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50	0.20
	Date Sampled:					14-Dec-2020	14-Dec-2020	14-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	14-Dec-2020
Determinand	Accred.	SOP	Type	Units	LOD									
pH	U	1010	10:1		N/A	8.1	8.2	8.3	8.3	8.5	8.3	8.2	8.1	8.0
Electrical Conductivity	U	1020	10:1	µS/cm	1.0	78	40	130	140	120	190	180	200	340
Chloride	U	1220	10:1	mg/l	1.0	2.0	2.4	< 1.0	< 1.0	< 1.0	< 1.0	1.1	< 1.0	1.0
Sulphate	U	1220	10:1	mg/l	1.0	< 1.0	5.7	12	9.9	3.8	18	29	32	1.9
Cyanide (Total)	U	1300	10:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Sodium	U	1415	10:1	mg/l	0.50	0.90	1.1	1.2	0.96	0.78	1.3	2.2	3.1	< 0.50
Arsenic (Dissolved)	U	1450	10:1	µg/l	1.0	13	1.4	87	58	250	4.2	16	67	1.5
Cadmium (Dissolved)	U	1450	10:1	µg/l	0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	10:1	µg/l	1.0	< 1.0	< 1.0	1.1	76	2.6	9.3	< 1.0	< 1.0	< 1.0
Copper (Dissolved)	U	1450	10:1	µg/l	1.0	8.5	1.8	3.1	7.0	4.0	5.2	2.5	< 1.0	3.0
Mercury (Dissolved)	U	1450	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Nickel (Dissolved)	U	1450	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lead (Dissolved)	U	1450	10:1	µg/l	1.0	2.5	1.7	1.7	2.2	1.1	< 1.0	3.1	< 1.0	1.7
Antimony (Dissolved)	U	1450	10:1	µg/l	1.0	< 1.0	< 1.0	6.2	14	4.1	10	5.6	5.6	< 1.0
Selenium (Dissolved)	U	1450	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	3.9	< 1.0	1.6	< 1.0	< 1.0	< 1.0
Vanadium (Dissolved)	U	1450	10:1	µg/l	1.0	2.3	1.3	13	3.2	12	< 1.0	3.2	1.8	1.1
Zinc (Dissolved)	U	1450	10:1	µg/l	1.0	6.0	2.1	2.2	3.0	< 1.0	31	2.2	2.2	8.8
Chromium (Hexavalent)	U	1490	10:1	µg/l	20	< 20	< 20	< 20	84	< 20	< 20	< 20	< 20	< 20
Total Organic Carbon	U	1610	10:1	mg/l	2.0	18	20	16	41	12	4.6	12	11	13
Aliphatic TPH >C5-C6	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	140	< 0.10	4.6	6.4	< 0.10
Aliphatic TPH >C12-C16	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	220	< 0.10	9.3	9.9	< 0.10
Aliphatic TPH >C16-C21	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	370	< 5.0	14	16	< 5.0
Aromatic TPH >C5-C7	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1680	10:1	µg/l	50.00	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Total Aromatic Hydrocarbons	N	1675	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	10:1	µg/l	10	< 10	< 10	< 10	< 10	370	< 10	14	16	< 10
Naphthalene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Leachate

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:						20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762
Quotation No.: Q20-22307	Chemtest Sample ID.:						1115586	1115587	1115588	1115589	1115590	1115591	1115592	1115593
	Sample Location:						WS201	WS202	WS203	WS204	WS205	WS205	WS206	WS207
	Sample Type:						SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):						0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50
	Bottom Depth (m):						0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50
	Date Sampled:						14-Dec-2020	14-Dec-2020	14-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	14-Dec-2020
Determinand	Accred.	SOP	Type	Units	LOD									
Acenaphthylene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dichlorodifluoromethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	1760	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloroethane	U	1760	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	10:1	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Bromodichloromethane	U	1760	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	1760	10:1	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Toluene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Leachate

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:					20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762
Quotation No.: Q20-22307	Chemtest Sample ID.:					1115586	1115587	1115588	1115589	1115590	1115591	1115592	1115593	1115594
	Sample Location:					WS201	WS202	WS203	WS204	WS205	WS205	WS206	WS207	WS209
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):					0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50	0.20
	Bottom Depth (m):					0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50	0.20
	Date Sampled:					14-Dec-2020	14-Dec-2020	14-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	14-Dec-2020
Determinand	Accred.	SOP	Type	Units	LOD									
Trans-1,3-Dichloropropene	N	1760	10:1	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	10:1	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	10:1	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	N	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	10:1	µg/l	50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
N-Propylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	10:1	µg/l	50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	1920	10:1	mg/l	0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030

Results - Soil

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:				20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762
Quotation No.: Q20-22307	Chemtest Sample ID.:				1115586	1115587	1115588	1115589	1115590	1115591	1115592	1115593
	Sample Location:				WS201	WS202	WS203	WS204	WS205	WS205	WS206	WS207
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50
	Bottom Depth (m):				0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50
	Date Sampled:				14-Dec-2020	14-Dec-2020	14-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD								
ACM Type	U	2192		N/A	-	-	-	-	Fibres/Clumps	Fibres/Clumps	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	Amosite Chrysotile	Amosite Chrysotile Crocidolite	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	Stereo Microscopy	Stereo Microscopy	-	-
Asbestos by Gravimetry	U	2192	%	0.001					0.058	0.16		
Total Asbestos	U	2192	%	0.001					0.058	0.16		
Moisture	N	2030	%	0.020	21	6.0	15	19	13	16	15	14
pH	U	2010		4.0	5.2	8.4	7.6	8.0	8.4	8.3	8.3	8.3
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.56	< 0.40	0.89	1.4	0.77	1.5	0.95	1.1
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	0.012	< 0.010	0.073	0.057	0.065	0.081
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	5.2	< 0.50	0.80	7.7	< 0.50
Sodium (Total)	N	2430	mg/kg	10	25	16	320	600	730	550	230	160
Sulphate (Total)	U	2430	%	0.010	0.18	0.013	0.30	0.94	0.39	0.30	0.17	0.69
Arsenic	U	2450	mg/kg	1.0	50	4.0	87	550	260	94	140	190
Cadmium	U	2450	mg/kg	0.10	0.15	< 0.10	0.46	0.35	0.60	1.7	0.35	0.29
Chromium	U	2450	mg/kg	1.0	17	6.7	20	430	79	230	90	33
Antimony	N	2450	mg/kg	2.0	4.6	< 2.0	5.3	29	8.3	18	4.3	4.4
Copper	U	2450	mg/kg	0.50	48	6.8	200	970	280	950	160	160
Mercury	U	2450	mg/kg	0.10	0.40	< 0.10	< 0.10	0.64	12	1.2	0.55	0.25
Nickel	U	2450	mg/kg	0.50	15	7.2	48	89	66	72	29	29
Lead	U	2450	mg/kg	0.50	150	6.7	400	590	280	830	940	480
Selenium	U	2450	mg/kg	0.20	1.5	< 0.20	0.69	11	0.96	1.1	0.93	0.97
Vanadium	U	2450	mg/kg	5.0	32	7.3	59	140	93	69	33	31
Zinc	U	2450	mg/kg	0.50	44	15	170	210	230	1800	290	190
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	U	2625	%	0.20	7.2	< 0.20	18	16	7.2	11	4.0	2.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.9	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.9	8.6	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	8.3	12	1.8	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	57	< 1.0	12	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	67	28	14	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:				20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762
Quotation No.: Q20-22307	Chemtest Sample ID.:				1115586	1115587	1115588	1115589	1115590	1115591	1115592	1115593
	Sample Location:				WS201	WS202	WS203	WS204	WS205	WS205	WS206	WS207
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50
	Bottom Depth (m):				0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50
	Date Sampled:				14-Dec-2020	14-Dec-2020	14-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD								
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	69	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.1	49	7.2	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	120	910	88	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	120	1000	96	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10	190	1100	110	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.73	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.7	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.23	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.28	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.0	1.1	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.64	0.22	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	0.64	< 0.10	< 0.10	0.94	0.91	4.1	1.0	< 0.10
Pyrene	U	2700	mg/kg	0.10	0.79	< 0.10	< 0.10	1.1	0.93	4.1	1.1	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.0	0.60	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.9	0.45	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.4	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.6	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.7	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	4.2	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.50	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.7	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	2.0	< 2.0	30	4.5	< 2.0
Dichlorodifluoromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	2760	µg/kg	20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Chloroethane	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	2760	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	2760	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:				20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762
Quotation No.: Q20-22307	Chemtest Sample ID.:				1115586	1115587	1115588	1115589	1115590	1115591	1115592	1115593
	Sample Location:				WS201	WS202	WS203	WS204	WS205	WS205	WS206	WS207
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50
	Bottom Depth (m):				0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50
	Date Sampled:				14-Dec-2020	14-Dec-2020	14-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD								
1,1,1-Trichloroethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.1	< 1.0	< 1.0
1,2-Dichloropropane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	U	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.5	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.5	< 1.0	< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	U	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
N-Propylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:				20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762	20-34762
Quotation No.: Q20-22307	Chemtest Sample ID.:				1115586	1115587	1115588	1115589	1115590	1115591	1115592	1115593
	Sample Location:				WS201	WS202	WS203	WS204	WS205	WS205	WS206	WS207
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50
	Bottom Depth (m):				0.10	0.90	0.70	0.50	0.50	1.30	0.30	0.50
	Date Sampled:				14-Dec-2020	14-Dec-2020	14-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD								
1,2-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Results - Soil

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:		20-34762		
Quotation No.: Q20-22307	Chemtest Sample ID.:		1115594		
	Sample Location:		WS209		
	Sample Type:		SOIL		
	Top Depth (m):		0.20		
	Bottom Depth (m):		0.20		
	Date Sampled:		14-Dec-2020		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-
Asbestos by Gravimetry	U	2192	%	0.001	
Total Asbestos	U	2192	%	0.001	
Moisture	N	2030	%	0.020	14
pH	U	2010		4.0	6.8
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.52
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50
Sodium (Total)	N	2430	mg/kg	10	37
Sulphate (Total)	U	2430	%	0.010	0.071
Arsenic	U	2450	mg/kg	1.0	25
Cadmium	U	2450	mg/kg	0.10	0.25
Chromium	U	2450	mg/kg	1.0	15
Antimony	N	2450	mg/kg	2.0	< 2.0
Copper	U	2450	mg/kg	0.50	37
Mercury	U	2450	mg/kg	0.10	1.4
Nickel	U	2450	mg/kg	0.50	17
Lead	U	2450	mg/kg	0.50	82
Selenium	U	2450	mg/kg	0.20	0.80
Vanadium	U	2450	mg/kg	5.0	23
Zinc	U	2450	mg/kg	0.50	75
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Total Organic Carbon	U	2625	%	0.20	1.7
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0

Results - Soil

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:		20-34762		
Quotation No.: Q20-22307	Chemtest Sample ID.:		1115594		
	Sample Location:		WS209		
	Sample Type:		SOIL		
	Top Depth (m):		0.20		
	Bottom Depth (m):		0.20		
	Date Sampled:		14-Dec-2020		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	0.86
Pyrene	U	2700	mg/kg	0.10	1.1
Benzo[a]anthracene	U	2700	mg/kg	0.10	0.77
Chrysene	U	2700	mg/kg	0.10	0.45
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	3.2
Dichlorodifluoromethane	U	2760	µg/kg	1.0	< 1.0
Chloromethane	U	2760	µg/kg	1.0	< 1.0
Vinyl Chloride	U	2760	µg/kg	1.0	< 1.0
Bromomethane	U	2760	µg/kg	20	< 20
Chloroethane	U	2760	µg/kg	2.0	< 2.0
Trichlorofluoromethane	U	2760	µg/kg	1.0	< 1.0
1,1-Dichloroethene	U	2760	mg/kg	1.0	< 1.0
Trans 1,2-Dichloroethene	U	2760	mg/kg	1.0	< 1.0
1,1-Dichloroethane	U	2760	µg/kg	1.0	< 1.0
cis 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0
Bromochloromethane	U	2760	µg/kg	5.0	< 5.0
Trichloromethane	U	2760	µg/kg	1.0	< 1.0

Results - Soil

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:		20-34762		
Quotation No.: Q20-22307	Chemtest Sample ID.:		1115594		
	Sample Location:		WS209		
	Sample Type:		SOIL		
	Top Depth (m):		0.20		
	Bottom Depth (m):		0.20		
	Date Sampled:		14-Dec-2020		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
1,1,1-Trichloroethane	U	2760	µg/kg	1.0	< 1.0
Tetrachloromethane	U	2760	µg/kg	1.0	< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1.0	< 1.0
Benzene	U	2760	µg/kg	1.0	< 1.0
1,2-Dichloroethane	U	2760	µg/kg	2.0	< 2.0
Trichloroethene	N	2760	µg/kg	1.0	< 1.0
1,2-Dichloropropane	U	2760	µg/kg	1.0	< 1.0
Dibromomethane	U	2760	µg/kg	1.0	< 1.0
Bromodichloromethane	U	2760	µg/kg	5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10
Toluene	U	2760	µg/kg	1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10
1,1,2-Trichloroethane	U	2760	µg/kg	10	< 10
Tetrachloroethene	U	2760	µg/kg	1.0	< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2.0	< 2.0
Dibromochloromethane	U	2760	µg/kg	10	< 10
1,2-Dibromoethane	U	2760	µg/kg	5.0	< 5.0
Chlorobenzene	U	2760	µg/kg	1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	2760	µg/kg	2.0	< 2.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0
Styrene	U	2760	µg/kg	1.0	< 1.0
Tribromomethane	U	2760	µg/kg	1.0	< 1.0
Isopropylbenzene	U	2760	µg/kg	1.0	< 1.0
Bromobenzene	U	2760	µg/kg	1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50
N-Propylbenzene	U	2760	µg/kg	1.0	< 1.0
2-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0
1,3,5-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0
4-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1.0	< 1.0
1,2,4-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0
Sec-Butylbenzene	U	2760	µg/kg	1.0	< 1.0
1,3-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1.0	< 1.0
1,4-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0
N-Butylbenzene	U	2760	µg/kg	1.0	< 1.0

Results - Soil

Project: 182.01 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:		20-34762		
Quotation No.: Q20-22307	Chemtest Sample ID.:		1115594		
	Sample Location:		WS209		
	Sample Type:		SOIL		
	Top Depth (m):		0.20		
	Bottom Depth (m):		0.20		
	Date Sampled:		14-Dec-2020		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
1,2-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50
1,2,4-Trichlorobenzene	U	2760	µg/kg	1.0	< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1.0	< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	< 2.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1680	Extractable Petroleum Hydrocarbons	Aliphatics: >C5–C6, >C6–C8, >C8– C10*, >C10–C12*, >C12–C16*, >C16–C21*, >C21–C35*, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10*, >C10–C12*, >C12–C16*, >C16–C21*, >C21– C35*, >C35– C44	Dichloromethane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.

Test Methods

SOP	Title	Parameters included	Method summary
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com



Final Report

Report No.:	21-00082-1		
Initial Date of Issue:	11-Jan-2021		
Client	Mr C S Eccles		
Client Address:	55 St Catherine Drive Hartford Cheshire CW8 2FE		
Contact(s):	Chris Eccles		
Project	182.02.3 Blackley Mere, Crumpsall		
Quotation No.:	Q20-22307	Date Received:	06-Jan-2021
Order No.:	182.02.3	Date Instructed:	06-Jan-2021
No. of Samples:	12		
Turnaround (Wkdays):	5	Results Due:	12-Jan-2021
Date Approved:	11-Jan-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Water

Project: 182.02.3 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:				21-00082	21-00082	21-00082	21-00082	21-00082	21-00082	21-00082	21-00082	21-00082
Quotation No.: Q20-22307	Chemtest Sample ID.:				1120797	1120798	1120799	1120800	1120801	1120802	1120803	1120804	1120805
	Sample Location:				RS1 (U/S)	RS2 (ADJ)	RS3 (D/S)	R1	WS201	WS202	WS203	WS204	WS205
	Sample Type:				WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Date Sampled:				04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021
Determinand	Accred.	SOP	Units	LOD									
pH	U	1010		N/A	8.4	8.3	8.3	8.3	7.7	7.8	8.1	8.1	8.1
Electrical Conductivity	U	1020	µS/cm	1.0	720	730	740	480	800	990	1000	920	890
Chloride	U	1220	mg/l	1.0	110	120	120	16	21	25	12	30	7.6
Sulphate	U	1220	mg/l	1.0	49	50	50	41	140	340	130	250	86
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Calcium	U	1415	mg/l	5.0	170	150	140	98	160	330	260	190	230
Sodium	U	1415	mg/l	0.50	86	89	89	13	55	27	15	75	68
Arsenic (Dissolved)	U	1450	µg/l	1.0	2.3	2.3	2.2	1.9	2.1	1.1	4.0	3.6	7.6
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	0.13	< 0.080	0.85	0.13
Chromium (Dissolved)	U	1450	µg/l	1.0	4.5	3.5	3.0	1.6	2.6	1.6	3.8	2.4	4.0
Copper (Dissolved)	U	1450	µg/l	1.0	3.1	3.5	3.3	1.9	6.1	2.2	3.0	36	5.6
Mercury (Dissolved)	U	1450	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Manganese (Dissolved)	U	1450	µg/l	1.0	46	50	45	680	930	780	410	880	920
Nickel (Dissolved)	U	1450	µg/l	1.0	1.5	1.5	1.4	1.8	< 1.0	5.8	2.9	7.0	12
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Antimony (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.2	4.8	8.5
Selenium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.5	2.9	2.9	2.3	9.7
Vanadium (Dissolved)	U	1450	µg/l	1.0	1.3	1.1	1.2	< 1.0	< 1.0	< 1.0	< 1.0	1.9	1.8
Zinc (Dissolved)	U	1450	µg/l	1.0	12	11	17	5.9	23	26	15	58	34
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Total Organic Carbon	U	1610	mg/l	2.0	5.7	5.6	5.8	7.0	6.9	4.6	4.7	6.4	5.2
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: 182.02.3 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:				21-00082	21-00082	21-00082	21-00082	21-00082	21-00082	21-00082	21-00082	21-00082
Quotation No.: Q20-22307	Chemtest Sample ID.:				1120797	1120798	1120799	1120800	1120801	1120802	1120803	1120804	1120805
	Sample Location:				RS1 (U/S)	RS2 (ADJ)	RS3 (D/S)	R1	WS201	WS202	WS203	WS204	WS205
	Sample Type:				WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Date Sampled:				04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021
Determinand	Accred.	SOP	Units	LOD									
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Results - Water

Project: 182.02.3 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:				21-00082	21-00082	21-00082	21-00082	21-00082	21-00082	21-00082	21-00082	21-00082
Quotation No.: Q20-22307	Chemtest Sample ID.:				1120797	1120798	1120799	1120800	1120801	1120802	1120803	1120804	1120805
	Sample Location:				RS1 (U/S)	RS2 (ADJ)	RS3 (D/S)	R1	WS201	WS202	WS203	WS204	WS205
	Sample Type:				WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Date Sampled:				04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021	04-Jan-2021
Determinand	Accred.	SOP	Units	LOD									
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030

Results - Water

Project: 182.02.3 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:				21-00082	21-00082	21-00082
Quotation No.: Q20-22307	Chemtest Sample ID.:				1120806	1120807	1120808
	Sample Location:				WS206	WS207	WS208
	Sample Type:				WATER	WATER	WATER
	Date Sampled:				04-Jan-2021	04-Jan-2021	04-Jan-2021
Determinand	Accred.	SOP	Units	LOD			
pH	U	1010		N/A	8.3	8.6	7.8
Electrical Conductivity	U	1020	µS/cm	1.0	890	440	540
Chloride	U	1220	mg/l	1.0	82	31	9.5
Sulphate	U	1220	mg/l	1.0	3.9	53	69
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Calcium	U	1415	mg/l	5.0	99	110	110
Sodium	U	1415	mg/l	0.50	110	17	17
Arsenic (Dissolved)	U	1450	µg/l	1.0	4.2	5.0	1.5
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	2.6	1.0	1.3
Copper (Dissolved)	U	1450	µg/l	1.0	1.7	< 1.0	1.4
Mercury (Dissolved)	U	1450	µg/l	0.50	< 0.50	< 0.50	< 0.50
Manganese (Dissolved)	U	1450	µg/l	1.0	330	33	510
Nickel (Dissolved)	U	1450	µg/l	1.0	2.7	< 1.0	4.4
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Antimony (Dissolved)	U	1450	µg/l	1.0	< 1.0	1.8	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	1.3	< 1.0	< 1.0
Vanadium (Dissolved)	U	1450	µg/l	1.0	2.0	11	< 1.0
Zinc (Dissolved)	U	1450	µg/l	1.0	6.3	4.9	6.5
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20
Total Organic Carbon	U	1610	mg/l	2.0	5.6	4.9	5.8
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: 182.02.3 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:				21-00082	21-00082	21-00082
Quotation No.: Q20-22307	Chemtest Sample ID.:				1120806	1120807	1120808
	Sample Location:				WS206	WS207	WS208
	Sample Type:				WATER	WATER	WATER
	Date Sampled:				04-Jan-2021	04-Jan-2021	04-Jan-2021
Determinand	Accred.	SOP	Units	LOD			
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10	< 10

Results - Water

Project: 182.02.3 Blackley Mere, Crumpsall

Client: Mr C S Eccles	Chemtest Job No.:				21-00082	21-00082	21-00082
Quotation No.: Q20-22307	Chemtest Sample ID.:				1120806	1120807	1120808
	Sample Location:				WS206	WS207	WS208
	Sample Type:				WATER	WATER	WATER
	Date Sampled:				04-Jan-2021	04-Jan-2021	04-Jan-2021
Determinand	Accred.	SOP	Units	LOD			
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix D:

Summary of Chemical Test Results of Soil Samples

Site: Blackley Mere, Crumpsall

CHEMICAL STATISTICAL ANALYSIS - based on CLEA v1.06 (Sandy Loam 1% SOM)

Job No: 182.02.3

Analyte	Limit of Detection	Statistical Analysis								SGV / GAC		SGV / GAC		SGV / GAC		pC4SL		pC4SL		pC4SL		pC4SL		LQM/CIH S4UL		LQM/CIH S4UL		LQM/CIH S4UL		LQM/CIH S4UL		LQM/CIH S4UL								
		EBLC	EBLC	EBLC	EBLC	EBLC	EBLC	EBLC	EBLC	n	Minimum	Average	Maximum	Maximum	Residential With Veg Update Tier 1 Screening Criteria	Pass/ Fail	Maximum	Residential Without Veg Update Tier 1 Screening Criteria	Pass/ Fail	Source of Screening Criteria	Source of Toxicological Data	Residential with Home Grown Produce	Pass/ Fail	Residential without Home Grown Produce	Pass/ Fail	POS(res)	Pass/ Fail	Source of Screening Criteria	Source of Toxicological Data	Commercial	Pass/ Fail	Residential with Home Grown Produce	Pass/ Fail	Residential without Home Grown Produce	Pass/ Fail	POS(res)	Pass/ Fail	Source of Screening Criteria	Source of Toxicological Data	
		W5201	W5202	W5203	W5204	W5205	W5206	W5207	W5209																															
ACM Type	N/A	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Adhesion Identification	N/A	No Adhesion Detected	No Adhesion Detected	No Adhesion Detected	No Adhesion Detected	No Adhesion Detected	No Adhesion Detected	No Adhesion Detected	No Adhesion Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ACM Detection Stage	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Adhesion by Gravimetry	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Total Adhesion	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Miscellaneous	-	21	8.6	35	39	13	36	35	34	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Metals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Asbestos (total)	<1 mg/kg	26	4	4	4	4	4	4	4	25	9	4	156	550	550.0	32	156	550	35	156	550	32	156	550	32	156	550	32	156	550	32	156	550	32	156	550	32	156	550	32
Boron (water soluble)	<0.1 mg/kg	0.6	0.4	0.9	1.4	0.8	1.5	1.0	1.1	0.5	9	0.4	0.9	1.4	1.4	291	Pass	1.50	10300	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cadmium (total)	<0.1 mg/kg	0.2	0.1	0.5	0.4	0.6	1.7	0.4	0.3	0.3	9	0.1	0.5	1.7	1.7	10	Pass	1.70	17.7	Pass	CLEA v1.06	LQM 2009	22	Pass	150	Pass	220	Pass	CLEA v1.06	Delta 2014	190	Pass	11	Pass	86	Pass	130	Pass		
Chromium (hexavalent)	<0.1 mg/kg	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	9	0.5	0.5	0.5	0.5	4.3	Pass	0.50	4.3	Pass	CLEA v1.06	LQM 2009	23	Pass	23	Pass	23	Pass	CLEA v1.06	Delta 2014	31	Pass	6	Pass	6	Pass	6	Pass		
Chromium (total) (for S4ULs)	<2 mg/kg	17	6.7	20	430	79	230	50	33	15	9	7	102	430	430.0	3010	Pass	430.00	3010	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper (total)	<1 mg/kg	66	9.6	200	970	200	950	60	150	37	9	7	312	970	970.0	2330	Pass	970.00	2000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lead (total)	<1 mg/kg	150	6.7	400	590	280	550	350	480	82	9	7	418	590	590.0	N/A	Pass	590.00	N/A	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mercury (total inorganic)	<0.1 mg/kg	0.40	0.40	0.10	0.64	12.0	1.2	0.55	0.25	1.4	9	0.10	2	12	12.0	170	Pass	12.00	230	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (total)	<1 mg/kg	15	1.7	48	89	66	72	29	29	17	9	7	41	89	89.0	43	Pass	89.00	39	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium (total)	<0.20 mg/kg	1.5	0.20	0.7	1.0	1.1	0.9	1.0	1.0	0.8	9	0.50	2	11	11.0	390	Pass	11.00	390	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (total)	<1 mg/kg	44	1.5	170	210	210	1800	200	150	75	9	15	336	1800	1800.0	3740	Pass	1800.00	40300	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Antimony	<2 mg/kg	5	2.0	5	20	8	18	4	4	2.0	9	2	9	29	29.0	7	Pass	29.00	550	Pass	CLEA v1.06	SCAGSCLAR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Vanadium	<0.1 mg/kg	15	1.5	15	15	15	15	15	15	15	9	1.1	15	15	15.0	43	Pass	15.00	43	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium	<0.20 mg/kg	25	16	320	400	730	550	230	350	37	9	16	256	730	730.0	N/A	Pass	730.00	N/A	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Boron	<1 mg/kg	5.2	8.4	7.6	8.0	8.4	8.3	8.3	8.3	6.8	9	5.2	8	8.4	8.40	1	Pass	8.40	1	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cyanide (total)	<1 mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	9	0.5	2	7.7	7.70	34	Pass	7.70	34	Pass	ATRISK SOL	ATRISK SOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate (2+)	<0.02 g/l	0.005	0.010	0.012	0.008	0.073	0.057	0.065	0.08	0.019	9	0.005	0	0	0	0	Pass	0.08	0	Pass	ATRISK SOL	ATRISK SOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate (total)	0.150	0.013	0.300	0.040	0.350	0.350	0.370	0.350	0.370	0.370	9	0.01	0	0	0	0	Pass	0.35	0	Pass	ATRISK SOL	ATRISK SOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Organic	<0.2	7.2	< 0.2	18.0	18.0	7.2	11.0	4.0	2.8	1.7	8	1.7	8	18.00	18.00	-	Pass	18.00	-	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phenol (Total Monophenols)	<2 mg/kg	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.30	9	0.3	0.3	0.3	0.30	210	Pass	0.30	310	Pass	CLEA v1.06	SCIP0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PAHs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Naphthalene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	0.7	0.10	0.10	0.10	9	0.1	0.17	0.7	0.7	1.54	Pass	0.7	1.64	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Acenaphthylene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	9	0.1	0.20	1.7	1.7	1.68	Pass	1.7	1.60	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Acenaphthene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	0.2	0.10	0.10	0.10	9	0.1	0.11	0.2	0.2	205	Pass	0.2	2020	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Fluorene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	9	0.1	0.12	0.3	0.3	183	Pass	0.3	1860	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phenanthrene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	2.0	1.1	0.10	0.10	9	0.1	0.42	2.0	2.0	92	Pass	2.0	837	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Anthracene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	0.6	0.2	0.10	0.10	9	0.1	0.17	0.6	0.6	2260	Pass	0.6	1990	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Fluoranthene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	9	0.1	0.07	4.1	4.1	257	Pass	4.1	972	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pyrene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	1.1	0.9	4.1	0.1	9	0.1	1.05	4.1	4.1	563	Pass	4.1	2330	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Benzo(a)fluoranthene	<0.1 mg/kg	0.010	0.10	0.10	0.10	0.10	2.0	0.6	0.10	0.10	9	0.1	0.44	2.0	2.0	3.1	Pass	2.0	3.11	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chrysene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	1.9	0.5	0.10	0.10	9	0.1	0.38	1.9	1.9	6	Pass	1.9	834	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Benzo(b)fluoranthene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	2.4	0.60	0.10	0.10	9	0.1	0.86	2.4	2.4	5.6	Pass	2.4	7	Pass	CLEA v1.06	LQM 2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Benzo(k)fluoranthene	<0.1 mg/kg	0.10	0.10	0.10	0.10	0.10	1.6	0.30	0.10	0.10	9	0.1	0.47	1.																										

Appendix E

Summary of Chemical Test Results of Water and Leachate Samples

C S Eccles Brownfield Land Consultant

Note:	
Fail: Above UK EQS Maximum Admissible Concentration	Fail: Above UK EQS Mean Annual Concentration
Fail: Above UK DWS	Result below Detection Limit

* EQS for substances based on CaCO3 Hardness and second stage assessment with m-BAT tool required if exceeded
 # Solubility <0.01 ug/l

* Total of 4 Drinking Water Standard PAHs: Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno[1,2,3-cd]pyrene, Benzo[ghi]perylene

C S Eccles Brownfield Land Consultant

Note:	
	Fail: Above UK EQS Maximum Admissible Concentration
	Fail: Above UK DWS
* EQS for substances based on CaCO3 Hardness and second stage assessment with m-BAT tool required if exceeded	
# Total of 4 Drinking Water Standard PAHs: Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno[1,2,3-cd]pyrene, Benzo[ghi]perylene	

Job No:
Site:
Summary of Surface Water Analysis - Tier 1 Screening

182.02
Blackley Mere, Crumpsall

C S Eccles Brownfield Land Consultant

Sample Location	Units	Drinking Water Standard	EQS Freshwater		Other	Surface Water			
			Annual Average	Maximum Admissible Concentration		RS1	RS2	RS3	R1
						Upstream River lrk	Adjacent to WS205 River lrk	Downstream River lrk	Reservoir
						04/01/2021	04/01/2021	04/01/2021	04/01/2021
Water Quality									
pH	pH units	-	6.0 - 9.0		-	8.4	8.3	8.3	8.3
Electrical Conductivity	uS/cm	-	-		-	720	730	740	480
Metals									
Arsenic	ug/l	10	50	-	50	2.3	2.3	2.2	1.9
Cadmium	ug/l	5	0.15	0.45	5	< 0.080	< 0.080	< 0.080	< 0.080
Chromium (Total)	ug/l	50	4.7	-	-	4.5	3.5	3.0	1.6
Chromium (Hexavalent)	ug/l	-	3.4	-	-	< 20	< 20	< 20	< 20
Copper	ug/l	2000	1*	-	28	3.1	3.5	8.3	1.9
Mercury	ug/l	1	-	0.07	-	< 0.50	< 0.50	< 0.50	< 0.50
Nickel	ug/l	20	4*	34	200	1.5	1.5	1.4	1.8
Lead	ug/l	25	1.2	14	-	< 1.0	< 1.0	< 1.0	< 1.0
Antimony	ug/l	-	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0
Selenium	ug/l	10	-	-	10	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium	ug/l	20	-	-	-	1.3	1.1	1.2	< 1.0
Zinc	ug/l	5000	10.9*	-	500	12.0	11.0	17.0	5.9
Calcium	mg/l	250	-	-	-	170	150	140	98
Manganese	ug/l	50	30*	-	-	46	50	45	680
Sodium	mg/l	200	-	-	170	86	89	89	13
Inorganic									
Chloride	mg/l	250	250	-	250	110	120	120	16
Sulphate (as SO4)	mg/l	250	400	-	250	49	50	50	41
Total Cyanide	ug/l	50	5	-	70	<50	<50	<50	<50
Dissolved Organic Carbon	mg/l	-	-	-	-	5.7	5.6	5.8	7.0
Organics									
Phenol	mg/l	-	0.045	-	0.300	< 0.030	< 0.030	< 0.030	< 0.030
PAH									
Naphthalene	ug/l	10 ^[2]	2.0	130	10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	ug/l	-	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	ug/l	-	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	ug/l	-	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	ug/l	-	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	ug/l	-	0.10	0.10	-	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	ug/l	-	0.01	0.12	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	ug/l	-	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	ug/l	-	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	ug/l	-	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	ug/l	-	1.70	0.017	-	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	ug/l	-	1.70	0.017	-	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	ug/l	0.01	1.70	0.27	0.70	< 0.10	< 0.10	< 0.10	< 0.10
indeno[1,2,3-cd]pyrene	ug/l	-	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
dibenzo[a,h]anthracene	ug/l	-	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[ghi]perylene	ug/l	-	1.70	8.2	-	< 0.10	< 0.10	< 0.10	< 0.10
Total EPA-16 PAHs	ug/l	-	-	-	-	< 2.0	< 2.0	< 2.0	< 2.0
PAH Total 4 DWS ^g	ug/l	0.1	-	-	0.1	<0.1	<0.1	<0.1	<0.1
TPH									
Aliphatic >C5 - C6	ug/l	10	-	200	-	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic >C6 - C8	ug/l	10	-	200	-	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic >C8 - C10	ug/l	10	-	200	-	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic >C10 - C12	ug/l	10	-	200	-	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic >C12 - C16	ug/l	10	-	200	-	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic >C16 - C21	ug/l	10	-	200	-	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic >C21 - C34	ug/l	10	-	200	-	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic >C35 - C44	ug/l	10	-	200	-	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic (C5 - C44)	ug/l	10	-	200	-	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic >C5 - C7 (benzene)	ug/l	10	10	50.0	-	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic >C7 - C8 (tolulene)	ug/l	10	50	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic >C8 - C10 (ethyl benzene)	ug/l	10	20	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic >C10 - C12 (xylene)	ug/l	10	30	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic >C12 - C16 (naphthalene)	ug/l	10	2	130.0	-	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic >C16 - C21	ug/l	10	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic >C21 - C34	ug/l	10	-	-	-	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic >C35 - C44	ug/l	10	-	-	-	< 50	< 50	< 50	< 50
Aromatic (C5 - C44)	ug/l	10	-	-	-	< 5.0	< 5.0	< 5.0	< 5.0
Total TPH (C5 - C44)	ug/l	10	50##	50##	-	< 10	< 10	< 10	< 10
BTEX									
Benzene	ug/l	1	10	50	10	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/l	-	74	-	700	< 1.0	< 1.0	< 1.0	< 1.0
EthylBenzene	ug/l	-	20	-	300	< 1.0	< 1.0	< 1.0	< 1.0
M/P Xylene	ug/l	-	30	-	500	< 1.0	< 1.0	< 1.0	< 1.0
O Xylene	ug/l	-	30	-	500	< 1.0	< 1.0	< 1.0	< 1.0
VOC - Suite of 51 VOCs						All < DL	All < DL	All < DL	All < DL

Note:

Fail: Above UK EQS Maximum Admissible Concentration

Fail: Above UK DWS

Fail: Above UK EQS Mean Annual Concentration

Result below Detection Limit

* EQS for substances based on CaCO3 Hardness and second stage assessment with m-BAT tool required if exceeded

Solubility <0.01 ug/l

Total of 4 Drinking Water Standard PAHs: Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno[1,2,3-cd]pyrene, Benzo[ghi]perylene

Blackley Mere, Crumpsall - Supplementary Groundwater Risk Assessment

Metal Bioavailability Assessment Tool (M-BAT)

INPUT DATA											RESULTS (Copper)				RESULTS (Zinc)				RESULTS (Mn)				RESULTS (Ni)			
ID	Location	Waterbody	Date	Measured Cu Concentration (dissolved) (µg l ⁻¹)	Measured Zn Concentration (dissolved) (µg l ⁻¹)	Measured Mn Concentration (dissolved) (µg l ⁻¹)	Measured Ni Concentration (dissolved) (µg l ⁻¹)	pH	DOC	Ca	Site-specific PNEC Dissolved Copper (µg l ⁻¹)	BioF	Bioavailable Copper Concentration (µg l ⁻¹)	Risk Characterisation Ratio	Site-specific PNEC Dissolved Zinc (µg l ⁻¹)	BioF	Bioavailable Zinc Concentration (µg l ⁻¹)	Risk Characterisation Ratio	Site-specific PNEC Dissolved Manganese (µg l ⁻¹)	BioF	Bioavailable Manganese Concentration (µg l ⁻¹)	Risk Characterisation Ratio	Site-specific PNEC Dissolved Nickel (µg l ⁻¹)	BioF	Bioavailable Nickel Concentration (µg l ⁻¹)	Risk Characterisation Ratio
1	RS1	Upstream River Irk	4/01/2021	3.1	12	46	1.5	8.4	5.7	170	10.68	0.09	0.29	0.29	31.89	0.34	4.10	0.38	123.00	1.00	46.00	0.37	6.77	0.39	0.89	0.22
2	RS2	Adjacent to WS205 River Irk	4/01/2021	3.5	11	50	1.5	8.3	5.6	150	12.06	0.08	0.29	0.29	31.53	0.35	3.80	0.35	123.00	1.00	50.00	0.41	7.92	0.51	0.76	0.19
3	RS3	Downstream River Irk	4/01/2021	8.3	17	45	1.4	8.3	5.8	140	12.61	0.08	0.66	0.66	32.17	0.34	5.76	0.53	123.00	1.00	45.00	0.37	8.10	0.48	0.69	0.17
4	R1	Reservoir	4/01/2021	1.9	5.9	680	1.8	8.3	7	98	15.54	0.06	0.12	0.12	36.31	0.30	1.77	0.16	123.00	1.00	680.00	5.53	9.20	0.43	0.78	0.20
5	WS201	Groundwater	4/01/2021	6.1	23	930	1	7.7	6.9	160	29.05	0.03	0.21	0.21	33.58	0.32	7.47	0.68	381.43	0.33	293.48	2.37	16.50	0.24	0.24	0.06
6	WS202	Groundwater	4/01/2021	2.2	26	780	5.8	7.8	4.6	330	17.09	0.06	0.13	0.13	27.61	0.39	10.26	0.94	323.58	0.38	296.79	3.41	12.27	0.33	1.89	0.47
7	WS203	Groundwater	4/01/2021	3	15	410	2.9	8.1	4.7	260	12.73	0.08	0.24	0.24	28.84	0.38	5.71	0.52	180.91	0.68	278.75	2.27	9.27	0.43	1.25	0.31
8	WS204	Groundwater	4/01/2021	36	58	880	7	8.1	6.4	190	18.58	0.05	1.94	1.94	34.20	0.32	18.49	1.20	180.91	0.68	508.31	4.86	11.17	0.36	2.51	0.63
9	WS205	Groundwater	4/01/2021	5.6	34	920	12	8.1	5.2	230	14.51	0.07	0.39	0.39	30.24	0.36	12.25	1.12	180.91	0.68	625.50	5.09	9.83	0.41	4.88	1.22
10	WS206	Groundwater	4/01/2021	1.7	6.3	330	2.7	8.3	5.6	99	12.06	0.08	0.14	0.14	31.35	0.35	2.19	0.20	123.00	1.00	330.60	2.68	7.92	0.51	1.36	0.34
11	WS207	Groundwater	4/01/2021	1	4.9	33	1	8.6	4.9	110	7.66	0.13	0.13	0.13	29.00	0.38	1.84	0.17	123.00	1.00	33.00	0.27	4.00	1.00	1.00	0.25
12	WS209	Groundwater	4/01/2021	1.4	6.5	510	4.4	7.8	5.8	110	22.44	0.04	0.06	0.06	30.95	0.35	2.29	0.21	323.36	0.36	193.49	1.58	13.88	0.29	1.27	0.32

END OF REPORT