WML CONSULTING

Civil, Structural and Geotechnical Engineers

Remediation Strategy

For a site at

Mayton Street, Openshaw

Undertaken for

One Manchester

8755G-WML-XX-ZZ RP-G-0003A
October 2020

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Drafted By:	**T P Booth**
Authorised By:	**S C Seddon**

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Revision Status / History

Rev	Date	Issue / Purpose/ Comment	Prepared	Checked	Authorised
-	12/10/2020	Original Issue	TPB	SCS	SCS
A	19/04/2021	Amended ground floor details to Section 4.17 to included suspended and ventilated beam and block floors.	-	-	SCS

WML Consulting Ltd
No. 8 Oak Green,
Earl Road,
Stanley Green Business Park,
Cheadle Hulme,
Cheshire
SK8 6QL

Tel: 0161 482 0600
Email:info@wmlconsulting.com
www.wmlconsulting.com

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1.0 INTRODUCTION

Appointment

1.1 WML Consulting has been commissioned by Eco-Res LLP on behalf of One Manchester to prepare a Remediation Strategy in relation to development of land located at Mayton Street, Openshaw.

Proposed Development

1.2 It is currently proposed to construct 23no low-rise residential structures with private gardens and external hardstanding for parking.

1.3 A copy of the proposed development plans by GWPA, referenced 1914-GWP-01-01-DR-A-(PA)-0003, is presented in Appendix 01.

Background

1.4 WML were initially commissioned to undertake a Phase 1 Desk Study and Phase 2 Investigation and Assessment. These culminated in the following reports.

- Phase 1 Desk Study and Preliminary Geoenvironmental Assessment Report, Reference 8755G-WML-00-XX-RP-G-0001, dated June 2019.
- Phase 2 Geo-environmental Investigation and Assessment, Reference 8775G-WML-00-XX-RP-G-0002, dated July 2020.

1.5 The reports have been presented to Manchester City Council Planning Division in support of Planning Application No. 125474/FO/2019.

1.6 This report has been compiled in consideration of the need for remedial measures to be outlined and agreed as a pre-development requirement.

1.7 The findings of the Phase 1 and Phase 2 reports are summarised in the following sections.

2.0 SITE LOCATION AND DESCRIPTION

Site Location

2.1 The site comprises land off Mayton Street, Openshaw, Manchester. It is centred on approximate Ordnance Survey National Grid Reference 387518E, 397619N with an indicative postcode of M11 2FN.

2.2 The site is bounded by:-

- North – Dulgar Street / Beede Street.
- East – Residential properties off Parkhouse Street and Herne Street.
- South – Herne Street.
- West – Residential properties and Herne Street.

Site Description

2.3 At the time of the investigation in June 2020, the majority of the site was landscaped and surfaced with grass intersected with several asphalt and paved pedestrian footpaths generally providing access through the landscaped areas.

2.4 The north-eastern apex of the site comprised Thames Close, an asphalt-surfaced road providing residential access to two areas of parking off Herne Street to the east.

2.5 Additional areas of residential parking are located off Mayton Street in the north-west and a small car park off Herne Street to the south.

2.6 The south-eastern section of the site comprises a rectangular children's playground surfaced with asphalt.

2.7 Mature deciduous trees are located sporadically around the site and in particular within the central and southern sections.

Summary of Salient Environmental Considerations

2.8 The site is indicated by the BGS to be underlain by Devensian Glacial Till comprising mainly clay but possibly with interbedded sand and gravel horizons. The till is underlain by the Carboniferous Pennine Upper Coal Measures Formation (PUCM). These generally comprise interbedded mudstone, siltstone, sandstone and coal seams.

2.9 A geological fault, which extends generally north-east to south-west, with downthrow to the east, is inferred to truncate the PUCM in the eastern section of the site. To the east of the fault, the superficial deposits are underlain by the Triassic Chester Formation of the Sherwood Sandstone Group which generally comprise sandstone. These are underlain by the PUCM at greater depth.

2.10 The Openshaw coal seam is inferred to sub-outcrop 27m north of the site with the Charlotte Coal and Bradford Three Quarters Coal some 270m and 396m north respectively. Solid strata are indicated to dip to the south-west at angles of around 16 degrees. Therefore, due to the strata dip and dip direction, the Openshaw Coal, Charlotte Coal and Bradford Three Quarters Coal are likely to underlie the site at unknown depths.

2.11 The Coal Authority (CA) Mining Report indicates that the property is in the likely zone of influence from 8no seams of coal between 130m to 1,050m depth, these being last worked in 1957. The report goes on to state that ground movements from these workings should have stopped by now.

2.12 However, the site is within an area where the CA believes there is coal at or close to the surface, which may have been worked (but not recorded) at some time in the past. The CA states that there are no known mine entries at, or within 100m of the boundary of the property.

2.13 The property is not in a radon affected area as defined by the BGS/Public Health England as less than 1% of properties are above the action level of exposure.

2.14 The superficial deposits underlying the site are classified as a 'Secondary (Undifferentiated) Aquifer'. The underlying bedrock is classified as a 'Secondary (A) Aquifer'. However, the Chester Formation, inferred to underlie the eastern area of the site, is classified as a Principal Aquifer.

2.15 The site is not within an Environment Agency Source Protection Zone (SPZ) and there are no groundwater abstraction licences within 250m of the site.

2.16 Corn Brook extends roughly east to west, some 154m south of the site. However, early historical plans indicate that Clayton Brook extended north to south through the central section of the site and may have been diverted or culverted by 1891.

2.17 There are no active or closed landfills within 250m of the site. Although a former clay-pit located immediately south of the site ws infilled by 1891.

Site History

2.18 The earliest map dated 1848 indicates the site to have been undeveloped and in rural / agricultural use. The plans indicate that Clayton Brook extended roughly southwards through the central section before being culverted beneath High Bank to the south.

2.19 Historical maps indicate that between 1891 and 1906 the site was developed as residential housing around a series of roads including Clayton Lane South, which extended generally north to south within the eastern section. At this time Clayton Brook appears to have been diverted or culverted beneath the site.

2.20 The site remained relatively unchanged until the mid-1970's when the terraced housing and roads were cleared and the site redeveloped with lower density residential housing. Phased clearance of the structures was then undertaken between 2002 and 2014 and the site landscaped into its current configuration.

3.0 SUMMARY OF PHASE 2 INVESTIGATION

Ground Investigation

3.1 Ground investigation work was undertaken by Geoventures UK Ltd between 25th and 26th June 2020. This comprised the formation of 9no window sample probeholes to a maximum depth of 5.00 metres below ground level (mbgl) and 2no rotary boreholes to a maximum depth of 40.00mbgl.

Ground Conditions

3.2 Ground conditions encountered during the intrusive investigation comprised made ground to depths of between 0.60 and 1.80mbgl, this being underlain by glacial till to depths of 22.20 and 23.10mbgl where sandstone and mudstone of the Pennine Upper Coal Measures was encountered. No coal seams were encountered within the boreholes, although traces of coal were noted in BH01 between 28.40 and 30.60mbgl and within BH02 from 29.10m to 31.80mbgl. In addition, no voids or loss of drilling flush, which could indicate the presence of shallow mine workings were noted within the exploratory holes during formation.

3.3 No significant visual and/or olfactory evidence of significant ground contamination was identified during the investigation.

3.4 Perched groundwater seepages were encountered within the granular made ground during the formation of WS05 and WS06 at depths of 1.80 and 1.50mbgl respectively.

3.5 During the monitoring visits, standing groundwater was recorded at depths of between 1.02 and 4.14mbgl.

Chemical Analysis

3.6 Chemical analysis indicated several exceedances of CoC's within the Made Ground, when compared to the current LQM/CIEH Suitable 4 Use Levels (S4ULs) reference values for residential with plant uptake. These relate to localised concentrations of arsenic, lead and PAH compounds, namely benzo[a]anthracene benzo[b]fluoranthene, benzo[a]pyrene and dibenz[a,h]anthracene within samples of shallow made ground all obtained from <0.40mbgl.

3.7 Asbestos in the form of amosite insulation was detected in a single sample in WS06 at 0.20mbgl.

3.8 Risks to controlled waters from the site were considered low with no specific environmental remediation considered necessary.

4.0 UPDATED GROUND GAS RISK ASSESSMENT

Methodology

4.1 Current guidance for the assessment of risk associated with the presence of hazardous ground gases (principally methane and carbon dioxide) is provided in two key documents, namely:

- Code of practice for the Characterisation and remediation from Ground Gas in Affected Developments. British Standard Institution (BS 8485: 2015 & A1:2019); and
- Assessing Risks posed by Hazardous Ground Gases to Buildings CIRIA (C665, 2007).

4.2 The assessment presented herein is primarily based on the BS8485 document.

4.3 Hazardous ground gas qualitative risk assessment is based on a conceptual model similar to that used for soil and groundwater contamination sources (i.e., source-pathway-receptor pollutant linkages). A semi-quantitative estimate of risk can be assessed based on knowledge of the conceptual model and a measure of hazardous gas concentration and gas flow at the site within monitoring standpipes.

4.4 Based on the measured flow rates and hazardous gas concentrations, individual "hazardous gas flow rates" (Qhg) can be derived for each monitoring point, from which the "site characteristic hazardous gas flow rate" (Qhgs), and then the "Characteristic Situation" (CS) can be determined.

4.5 BS8485 provides guidance on the level of gas protection requirements based upon the characteristic situation and the proposed development based on building type as outlined in Table 3.

Table 3 - Building Types

	Type A	Type B	Type C	Type D
Ownership	Private	Private or commercial/ Public, possible multiple	Commercial / Public	Commercial / Industrial
Control (Change of use)	None	Some but not all	Full	Full
Room Sizes	Small	Small/ medium	Small to Large	Large Industrial/ Retail Park

4.6 The proposed development therefore is indicated to comprise the construction of Type A buildings which include:

- Private ownership with no building management controls on alterations to the internal structure, the use of rooms, the ventilation of rooms or the structural fabric of the building. Some small rooms present. Probably conventional building construction (rather than civil engineering). Examples include private housing and some retail premises.

Ground Gas Conceptual Model

4.7 The property is not in a radon affected area as defined by UK Radon as less than 1% of properties are above the action level of exposure. Therefore, no radon protection measures are necessary for new structures as described in publication BR211 by the Building Research Establishment.

4.8 There are no active or historic landfills recorded within 250m of the site.

4.9 Due to the age since infilling and the size of the clay pit (pre 1891) at the southern boundary, the potential to generate significant volumes of ground gas is considered unlikely.

4.10 No appreciable thickness of organic degradable natural soils or made ground from historical in-filling have been encountered beneath the site during the investigations.

4.11 The presence of relatively impermeable glacial till will significantly reduce the potential for any ground gas to migrate towards the site from any unrecorded sources.

4.12 In consideration of the above, the preliminary risk to the development from ground gas has been assessed as low. However, it has been considered prudent to undertake ground gas monitoring, primarily for methane and carbon dioxide, with associated flow rates, on 6no occasions between 6th July and 4th September 2020.

Results and Recommendations

4.13 The results indicate concentrations of peak and steady state methane not exceeding 0.1% by volume in air (v/v) with peak and steady state carbon dioxide concentrations ranging from 2.3 to 9.0% by volume in air (v/v).

4.14 A maximum peak ground gas flow of 84.8l/hr has been detected within WS09 on one occasion, however this is considered to be a function of water rising within the sealed zone of the pipe with a corresponding groundwater measurement of 0.84mbgl and as such can be discounted. Further peak ground gas flows of 0.7l/hr recorded within WS05 and WS09 on one occasion each. No further detectable ground gas flows have been recorded during the monitoring visits.

4.15 The results for each individual standpipe have been assessed with reference to guidance provided in BS8485:2015. Based on the measured flow rates and hazardous gas concentrations, individual "hazardous gas flow rates" (Qhg) have been derived for each monitoring point, from which an individual "Characteristic Situation" (CS) has been determined, in accordance with Table 2 of BS8485:2015. The determined CS for each standpipe, for both methane and carbon dioxide per visit, is presented on the ground gas monitoring sheets within Appendix 02. A copy of the methodology and gas monitoring calibration certificates is also presented within Appendix 02.

4.16 The results give a maximum individual Qhg value of 0.0090l/hr with the worst case maximum combined value being 0.0630l/hr. These both indicate the site to classify as Characteristic Situation (CS) 1 – Very Low Gas Risk'. However, as carbon dioxide concentrations exceed 5% it is considered that the classification would need to be increased to Characteristic Situation (CS) 2 – 'Low Gas Risk' in accordance with BS8485:2015.

4.17 Consequently, all proposed new structures will require ground gas protection measures to ensure an adequate score of protection is provided. In light of current structural design considerations, which include a suspended floor slab of beam and block construction, the following site specific gas protection measures are to be incorporated into the required structures to satisfy Characteristic Gas Situation 2 as outlined in BS8485 to achieve a score of 3.5.

- Passive sub-floor dispersal (minimum 150mm clear void) with cross ventilation to internal sleeper walls and swan neck vents connected to the sub floor void (Score 1.5).
- Lapped and taped gas resistant membrane (compliant with BS8485:2015 and Amber 2 (NHBC), in the floor slab construction (Score 2.0).

4.18 The membrane would need to be compliant with BS8485:2015+A1:2019/Amber 2 (NHBC).

4.19 The gas protection system as outlined above will also require verification as outlined in Section 6.0.

5.0 REMEDIATION STRATEGY

Asbestos - General

5.1 Asbestos in the form of amosite insulation was detected in a single sample in WS06 at 0.20mbgl. Therefore, although not considered to be particularly widespread. There is always the risk that further asbestos could be encountered during earthworks.

5.2 Therefore, site operations will be under the full-time control of Site Manager who will ensure that all asbestos management personnel hold necessary certificates relating to asbestos awareness.

5.3 Site induction for site operatives and visitors will include a specific tool box talk relating to asbestos. This will cover basic identification of possible Asbestos Containing Material (ACM) and the procedure to be adopted if any such material is suspected.

Asbestos Control Measures – Where Significant / Widespread

5.4 If / where significant and or further asbestos contamination is identified or suspected, a specialist consultant in the identification of ACM would need to be present during any significant earth moving operations.

5.5 The asbestos specialist will be UKAS accredited and will set up perimeter background monitoring stations around the site boundary and at strategic locations within the site as considered necessary during the earthworks. In addition, personal monitoring equipment will be deployed around working areas for work location monitoring.

5.6 It is envisaged that, during earthworks within these areas, air tests will be undertaken with asbestos fibre counting being undertaken in consultation with the asbestos specialist.

5.7 Furthermore, during periods of dry weather, the site surface will be dampened down to minimise the potential for airborne dust. Water sprays may also be employed at excavation locations to minimise the production of airborne dust. A detailed Method Statement for the control and management of dust on site will be contained within the main contractor's Environmental Management Plan.

5.8 The asbestos consultant will initially undertake a detailed walk-over of the site with selected samples of any suspected fibrous material so identified on the surface being sent to the laboratory for asbestos identification.

5.9 Where such materials are identified as ACM, similar fragments identified by further inspection will be located on plan and marked on site for subsequent removal by a licensed asbestos contractor. Where considered appropriate, further samples of such materials will be taken for laboratory identification.

5.10 The consultant will similarly identify any suspected ACM during the subsequent earthworks/groundworks. Where obvious fragments of ACM are identified, they will be hand-picked where practical and removal from site by the licensed asbestos contractor as soon as reasonably practical. Where such materials cannot be removed immediately, the ACM will be covered by impermeable membrane and clearly marked on site for subsequent removal.

5.11 Following the surface hand-picking exercise, samples of soil will be taken from the surface over the site and subjected to asbestos quantification analysis in the laboratory. Where the percentage of asbestos fibres are identified to be in excess of 0.1% by volume of the sample, further inspection of the soil in that area will be undertaken with removal of identified ACM where appropriate.

5.12 At the discretion of the asbestos consultant further samples may also be taken for quantification analysis at the laboratory.

5.13 The licensed asbestos contractor will arrange for the necessary disposal of hand-picked ACM to an appropriately licensed landfill facility. Records in the form of Duty of Care documentation will be kept by the site manager for presentation where required.

Capping Requirements for Private Gardens

5.14 As the level of contamination in the Made Ground renders it unsuitable for direct use beneath proposed garden/landscaped areas, development will need to include the provision of a clean cover over the Made Ground to break the direct contact pollution linkage as set out below.

5.15 Therefore, new private garden and landscaped areas will need to be capped with a nominal 600mm clean cover over the existing Made Ground to break the direct contact pollution linkage. The make-up of the 600mm cover would be expected to consist of:

- 150mm of clean imported Topsoil;
- 450mm of clean imported sub-soil.

Unexpected Ground Contamination - Soils

5.16 It cannot be wholly discounted that unidentified contamination sources could be encountered during site enabling works.

5.17 Should any visual / olfactory evidence of contamination be encountered, WML will advise of the most appropriate measures to deal with such contamination. This may include taking samples for chemical analysis and advising of appropriate routes for disposal to landfill.

5.18 Any unsuitable contaminated soil encountered during the site strip/enabling works will be segregated and stockpiled on impermeable sheeting and demarcated as contaminated soil for removal off-site.

5.19 Any contaminated soil will be stockpiled a sufficient distance from any other stockpiled clean soil such as arisings of natural soils, to prevent cross-contamination if immediate disposal to landfill is not possible.

5.20 A photographic record of any should be made available for inclusion within the validation report.

5.21 Removal dockets and receiving landfill information for any contaminated materials removed from the site will need to be retained for inclusion in the validation report.

Unexpected Ground Contamination - Groundwater

5.22 If mobile contaminants, or localised groundwater suspected to be contaminated, were encountered during the redevelopment ground works', the following actions should be undertaken.

5.23 Works should cease and the suspect groundwater should be sampled and submitted for chemical analyses. The results of which would allow the most appropriate remedial action to be determined and undertaken.

5.24 A photographic record of any groundwater removal should be made available for inclusion within the validation report.

5.25 Removal dockets and disposal information for any contaminated materials removed from the site will need to be retained for inclusion in the Validation report.

Water Supply Pipes

5.26 United Utilities Water will need to be consulted with regards the selection of suitable water supply pipe materials for the development. However, in light of the ground conditions encountered, the requirement

for specific materials and measures to protect the water supply from ground contamination is not anticipated.

5.27 A copy of the United Utilities Risk Assessment is included within Appendix 04.

6.0 VALIDATION

Asbestos Control Measures – Significant / Widespread Occurrences

6.1 Validation that the asbestos control measures have been successfully implemented will be recorded in the Health and Safety File which will be held by the Client at their premises or other designated location.

6.2 Where relevant such documentation will primarily include:

- A record of the extent and results of all asbestos monitoring carried out to demonstrate that the concentration of asbestos in air have not exceeded the control limit of 0.1 fibres per cubic centimetre of air averaged over a continuous period of 4 hours.
- A record of physical control measures which have been adopted to minimise the risk of the control limit being exceeded.
- A record of ACM encountered and the measures adopted to deal with such materials.
- A record of all ACM removed from site and details of the Duty of Care documentation identifying the licensed facility to which it has been disposed to.
- A record of any incidents, accidents and emergencies.
- Photographic evidence of material movement and remedial works such as hand-picking activities.

Gas Protection Measures

6.3 The installation of the gas membrane will be undertaken by a suitably contractor who will be requested to issue all necessary specifications and method statements for the work prior to commencement. This will include adequate information on the specification of the materials to be used, including membrane type, sealing material, lapping thickness etc. Prior to any work commencing, the Site Manager or his advisor will inspect such specifications and method statements to check that they meet the works requirements.

6.4 The Site Manager and suitably trained contractor will agree lines of communication regarding programme, issues regarding installation, inspection and validation. Appropriate lines of communication will be set up for record keeping, daily reporting etc.

6.5 The Site Manager/ suitably trained contractor will keep a record of all delivery notes for the materials which will be inspected to confirm that they comply with the specification. Photographs of the product and packaging will also be taken by the Site Manager in the event that delivery notes are mislaid.

6.6 The Site Manager and WML will visually inspect (where practical) internal and external details to witness appropriate installation and integrity. Sample photographs of details for the validation file will then be taken. Where possible, this process will be repeated on all internal and external details. Any defects will be recorded and made good for subsequent inspection.

6.7 The Site Manager / geoenvironmental engineer will together carry out inspection (where practical) to all pipe/duct penetrations to witness appropriate integrity of the seal. Sample photographs of pipe penetrations for the validation file will then be taken.

6.8 The date of all inspections will be recorded together with all observations made on the gas validation records in Appendix 02. Any defects will be recorded and made good for subsequent inspection.

6.9 The Site Manager / geoenvironmental engineer will visually inspect the floor membrane joints to witness appropriate lapping and sealing measures. Sample photographs of membrane joints for the validation file will then be taken. The date of the inspection will be recorded together with all observations made. Any defects will be recorded and made good for subsequent inspection.

6.10 The Site Manager / geoenvironmental engineer together will carry out a thorough visual inspection of the gas barrier to check for any damage and check any repairs that have already been requested and

carried out. Sample photographs of any repairs for the validation file will then be taken. The date of the inspection will be recorded together with all observations made.

6.11 The Site Manager will inform the Installation Contractor's supervisor on any remedial and/or repair work required. Where practical, the Installation Contractor's supervisor will remain on site while the works are undertaken if practicable. All remedial and repair work will then be re-inspected and photographs taken for the validation file.

6.12 Immediately on completion of the installation and any repair works, a general inspection will be carried out by the Site Manager, and Installation Contractor's supervisor to agree that all works have been satisfactorily completed. Where practical, a written record of completion will be signed by all parties prior to any further construction works on the floor commencing. The membrane will then, where practical, be covered immediately by the insulation and/or floor screed construction or alternatively, be protected from further damage as agreed by all parties.

Unexpected Ground Contamination

6.13 It cannot be wholly discounted that unidentified contamination sources could be encountered during site enabling works. The removal of ground contamination would need to be witnessed by a geoenvironmental engineer who would take independent site records, including photographs to demonstrate appropriate compliance with the Remediation Strategy and subsequent Method Statements.

6.14 Removal of hotspots would also need to be validated by visual inspection to include photographs and measurements of the resulting excavations and / or sampling of suspected groundwater. Samples will be taken from the sides and, where practical, the bases of excavations for chemical analysis to demonstrate that remaining soils do not exceed the SAC.

6.15 Records of all material removed from site will be kept by the Site Manager to demonstrate compliance with Duty of Care regulations. This will include a record of volumes of waste taken from site and details of the landfill facility receiving the waste.

6.16 Where necessary, EA pre-notification requirements will be complied with for the removal and disposal of waste considered to be Hazardous, backed up where necessary by Waste Acceptance Criteria (WAC) testing.

Imported Topsoil / Subsoil

6.17 The source of all imported materials will be clearly identified by reference to the site of origin. This will be accompanied by the results of appropriate chemical analysis from the supplier to certify material suitability. Certificates will be required for inspection prior to any imported material being brought to site.

6.18 Imported Topsoil and sub-soil will be stockpiled separately from other materials and clearly marked on site.

6.19 The site manager will keep records of the volumes of all imported Topsoil and sub-soil delivered to site in the form of delivery slips. The records will be presented as confirmation that sufficient analysis has been undertaken on imported Topsoil/sub-soil.

6.20 Notwithstanding the above, material delivered to site will be subject to further chemical analysis to confirm suitability. In this respect, the following testing strata per soil source will be required as outlined in the MCC Planning Guidance Document.

Source	Soils	Testing Regime
Greenfield	Topsoil / subsoil	1:200m^3
Remediated		1:100m^3
Brownfield/unknown		1:50m^3

6.21 The results of the analysis will be compared against Site Specific Assessment Criteria for 'Residential with home-grown produce' as presented in Appendix 03.

6.22 Should the results of such analysis significantly exceed the relevant Site Specific Assessment Criteria in a significant number of samples the soil will be removed from site and replaced with material which meets the site requirements.

Clean Cover Thickness

6.23 Where a clean cover is to be incorporated over areas of remaining Made Ground, the thickness of sub-soil and Topsoil will be validated by undertaking hand-dug trial pits with photographic records following placement.

6.24 Hand dug trial pits will be undertaken through the full thickness of the capping soils at a frequency of one pit per three garden plots.

6.25 The photographic record will confirm the required clean cover thickness by use of a levelling staff. Each photograph will also clearly show the plot number relating to each trial pit excavation.

7.0 VALIDATION REPORT

7.1 On completion of the Remediation Works to the site, a Validation Report will be produced by the geo-environmental engineer, which will be submitted to MCC for approval.

7.2 Where applicable the Validation Report will include:

- Documentation in relation to asbestos control measures.
- Details of any unexpected ground contamination and the measures undertaken to deal with this, to include records of excavation, the results of chemical analysis resulting from the removal of contaminated soil and / or groundwater.
- Results of subsequent chemical analysis of imported Topsoil/sub-soil to confirm compliance with the Site Specific Assessment Criteria.
- Records of the volumes and suitability of all imported fill, Topsoil and sub-soil delivered to site in the form of delivery slips and certificates.
- Sample waste management records confirming compliance with Duty of Care regulations;
- Photographic evidence of suitable sub-soil/Topsoil cover in gardens where underlain by Made Ground.
- Confirmation of potable water supply pipe materials.

7.3 The Validation Report will also incorporate details of the as built ground gas protection measures, to include:

- As built drawings and records of the gas protection measures;
- Materials specifications;
- Gas Validation inspection records with photographs of the installations, to include sealing details to penetrations, corner details and joints, telescopic vent details etc.
- Defect repair details and subsequent photographs.

APPENDIX 01

Drawings

This drawing is the property of GWP Architecture. Copyright is reserved by them and the drawing is issued on the condition that it is not copied, reproduced, retained, or disclosed to any unauthorised person, either wholly or in part, without the consent in writing of GWP Architecture.

All drawings and specifications should be read in conjunction with the project health and safety plan, any possible conflicts should be presented to the Planning Coordinator.

All work to be carried out in accordance with current Building Regulations.

Contractors must verify all dimensions at the job before commencing any work or making shop drawings.

Written dimensions should be taken.

Do not scale off drawing.

Do not take digital dimensions from this drawing.

Any discrepancies to be reported to the Architect.

0 5m 10m 20 30 40

Scale - 1:750 @A3

- Tarmac Roads / Paths
- Screening Planing
- Green Spaces / Gardens
- Existing Trees - To be retained where possible location & size subject to tree survey
- Recently Planted Trees - - To be retained where possible, subject to tree survey
- Omitted Trees
- Proposed Trees
- Proposed Site Development Boundary
- 40m 4-arm Rotary Clothes Drying Line & associated ground fixing
- Bike Store - Tiger Low Pent Compact 7X3 Timber Bike Shed. Capacity- 2x Bicycles (refer to drawing 0008-Bike storage)
- 200l Water butts
- Existing Levels
- Proposed Levels
- Electric Vehicle Charging Point

Rev	Date	Comment	Dr	Ch
P03	30.01.20	in response to planning comments	CT	DT
P02	27.11.19	General update	CT	DT
P01	06.11.19	Issued for planning	CT	DT

CHARTERED ARCHITECTS
INTERIOR DESIGNERS
SPACE PLANNERS
PROJECT MANAGERS
LANDSCAPE ARCHITECTS

Bracken House Leeds LS8 1PQ UK
+44(0)1132666044 (t) | +44(0)1132681859 (f)
architecture@gwp-arch.com | www.gwp-arch.com

GWP Job Reference (299)1914

Job Title Mayton Street

Client one manchester

Hard Surfacing

- Tarmac Roads / Paths
- Dwelling Paving. 450 x 450 concrete flags in natural grey
- Private car parking. Plasmor Modena 50 - Granite Stone
- Tactile Paving
- Play Area (Retained)

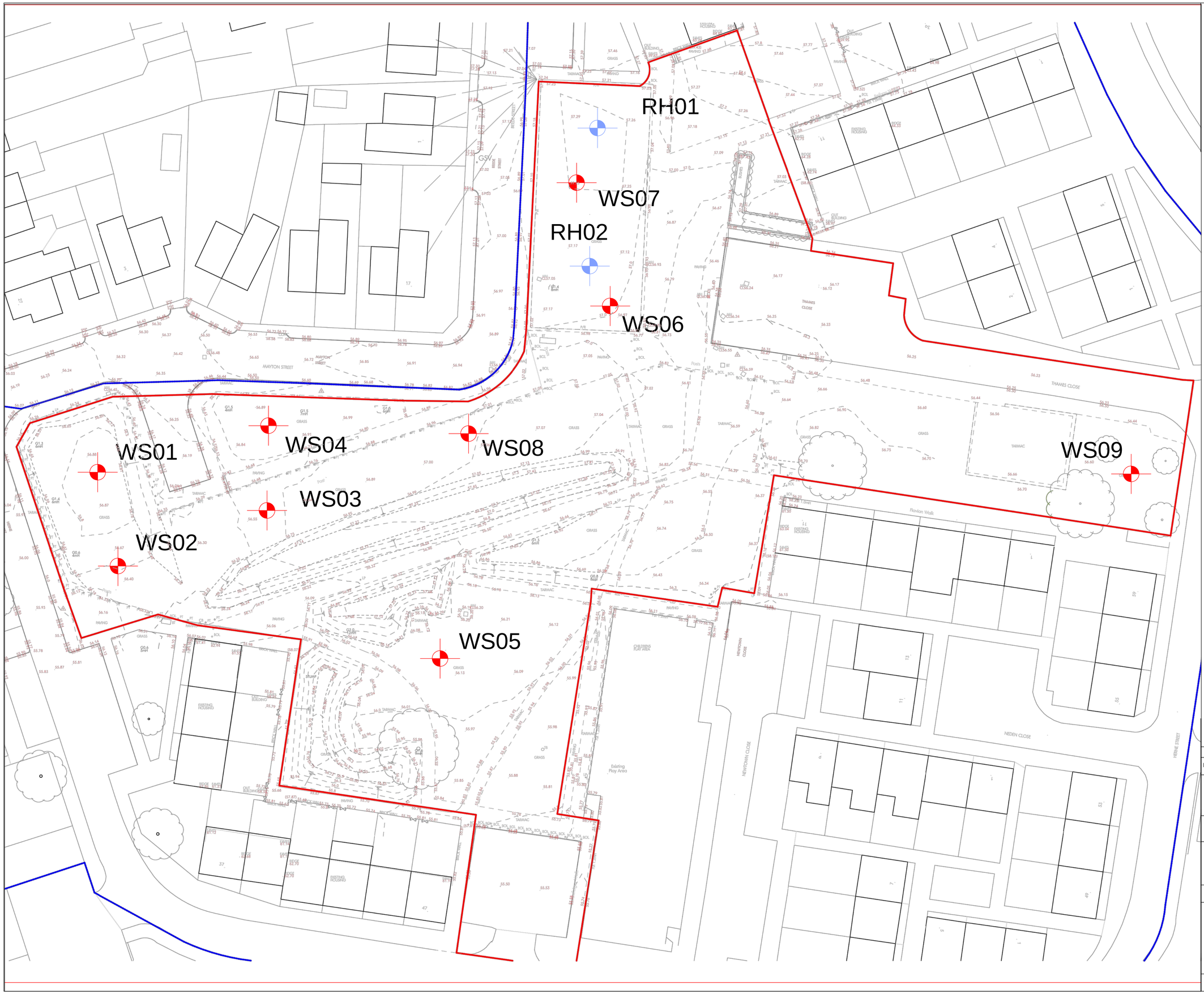
Accommodation Schedule

Existing Development	
3b4p Home	13
2b3p Home	10
Total Dwellings	23

Proposed Site Plan

Name	1914-GWP-01-01-DR-A-(PA)-0003		
Scale	1:750@A3	Revision	P03
Drawn/Checked	DT/JW	First Issue	06.11.19
Drawing Status	D - Planning		

BIMcloud: BIMServer-HP - BIMcloud Basic for ARCHICAD 22/Mayton - (299)1914 GWP-01-DR-A-Manchester-One-P07



GENERAL NOTES

1. DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.
2. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.
3. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
4. THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH & SAFETY PLAN.

KEY

	APPROXIMATE DEVELOPMENT BOUNDARY
RH01	ROTARY BOREHOLE
WS01	WINDOW SAMPLE PROBEHOLE

Rev.	Amendment	Date	By	Chkd
P1	FIRST PRELIMINARY ISSUE.	JAN'20	SCS	PGD

Project
MAYTON STREET

Client
ECO-RES

Title
EXPLORATORY HOLE
LOCATION PLAN

Drawn	Checked	Date	Scale
SCS	PGD	06-07-20	1:250@A1

WML CONSULTING
Chartered Civil and Structural Engineers
No.8 Oak Green
Earl Road
Stanley Green Business Park
Cheadle Hulme
Cheshire SK8 6QL
Tel 0161 482 0600
Fax 0161 486 9210
e-mail info@wmlconsulting.com
www.wmlconsulting.com

Job No. 8755G
Drawing No. SK-01-

APPENDIX 02

Ground Gas Monitoring Records, Calibration Certificates & Ground Gas Validation Records

Gas & Groundwater Monitoring Record Sheet

WML CONSULTING

Project Name:- Mayton Street
Project No:- 8755G
Client:- Eco-Res

Date:- 06/07/2020
Start Time:- 08:00
End Time:- 08:30
Ground Conditions:- Damp
Weather Conditions:- Overcast

Atmospheric Pressure
Start:- 1008mb
End:- 1008mb
Trend:- Rising

Instrument:- Gas Data GFM436

Operator:- T Booth

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Peak CO ppm	Hexane %	Water Level mbgl	Base of Hole mbgl
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr						
WS01	<0.1	<0.1	0	-0.2	-0.2	-0.0002	4.5	4.5	0.0045	15.2	0	0	0.000	dry	4.20
WS05	<0.1	<0.1	0	-0.2	-0.2	-0.0002	7.8	7.8	0.0078	11.6	0	0	0.000	1.46	2.05
WS06	<0.1	<0.1	0	-0.2	-0.2	-0.0002	2.3	2.3	0.0023	10.6	0	0	0.000	1.95	4.03
WS09	<0.1	<0.1	0	-0.2	-0.2	-0.0002	3.1	3.1	0.0031	16.1	0	0	0.000	2.47	4.02

Additional Comments

Gas & Groundwater Monitoring Record Sheet

WML CONSULTING

Project Name:- Mayton Street
Project No:- 8755G
Client:- Eco-Res

Date:- 23/07/2020
Start Time:- 08:10
End Time:- 08:40
Ground Conditions:- Dry
Weather Conditions:- Overcast

Atmospheric Pressure
Start:- 1008mb
End:- 1008mb
Trend:- Falling

Instrument:- Gas Data GFM436

Operator:- T Booth

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Peak CO ppm	Hexane %	Water Level mbgl	Base of Hole mbgl
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr						
WS01	<0.1	<0.1	0	-0.2	-0.2	-0.0002	4.7	4.7	0.0047	15.4	0	0	0.000	4.14	4.18
WS05	0.7	<0.1	0	-0.2	-0.2	-0.0002	7.8	7.8	0.0078	12.2	0	0	0.000	1.52	2.04
WS06	<0.1	<0.1	0	-0.2	-0.2	-0.0002	3.6	3.6	0.0036	14.2	0	0	0.000	2.01	4.01
WS09	<0.1	<0.1	0	-0.2	-0.2	-0.0002	2.4	2.4	0.0024	17.5	0	0	0.000	1.02	4.02

Additional Comments

Gas & Groundwater Monitoring Record Sheet

WML CONSULTING

Project Name:- Mayton Street
Project No:- 8755G
Client:- Eco-Res

Date:- 03/08/2020
Start Time:- 08:00
End Time:- 08:30
Ground Conditions:- Damp
Weather Conditions:- Overcast

Atmospheric Pressure
Start:- 1008mb
End:- 1008mb
Trend:- Rising

Instrument:- Gas Data GFM436

Operator:- T Booth

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Peak CO ppm	Hexane %	Water Level mbgl	Base of Hole mbgl
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr						
WS01	<0.1	<0.1	0	-0.2	-0.2	-0.0002	5.0	5.0	0.0050	15.2	0	0	0.000	3.69	4.19
WS05	<0.1	<0.1	0	-0.2	-0.2	-0.0002	8.7	8.7	0.0087	12.2	0	0	0.000	1.50	2.04
WS06	<0.1	<0.1	0	-0.2	-0.2	-0.0002	4.2	4.2	0.0042	13.5	0	0	0.000	2.03	4.02
WS09	<0.1	<0.1	0	-0.2	-0.2	-0.0002	5.3	5.3	0.0053	14.8	0	0	0.000	1.64	4.02

Additional Comments

Gas & Groundwater Monitoring Record Sheet

WML CONSULTING

Project Name:- Mayton Street
Project No:- 8755G
Client:- Eco-Res

Date:- 18/08/2020
Start Time:- 08:00
End Time:- 08:30
Ground Conditions:- Wet
Weather Conditions:- Rain

Atmospheric Pressure
Start:- 997mb
End:- 997mb
Trend:- Falling

Instrument:- Gas Data GFM436

Operator:- T Booth

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Peak CO ppm	Hexane %	Water Level mbgl	Base of Hole mbgl
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr						
WS01	<0.1	<0.1	0	-0.2	-0.2	-0.0002	4.5	4.5	0.0045	16.5	0	0	0.000	3.32	4.19
WS05	<0.1	<0.1	0	-0.2	-0.2	-0.0002	8.1	8.1	0.0081	12.0	0	0	0.000	1.52	2.04
WS06	<0.1	<0.1	0	-0.2	-0.2	-0.0002	4.7	4.7	0.0047	13.2	0	0	0.000	2.18	4.02
WS09	0.7	<0.1	0	-0.2	-0.2	-0.0002	5.8	5.8	0.0058	15.1	0	0	0.000	1.76	4.02

Additional Comments

Gas & Groundwater Monitoring Record Sheet

WML CONSULTING

Project Name:- Mayton Street
Project No:- 8755G
Client:- Eco-Res

Date:- 24/08/2020
Start Time:- 09:30
End Time:- 10:00
Ground Conditions:- Dry
Weather Conditions:- Sunny

Atmospheric Pressure
Start:- 1008mb
End:- 1008mb
Trend:- Steady

Instrument:- Gas Data GFM436

Operator:- T Booth

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Peak CO ppm	Hexane %	Water Level mbgl	Base of Hole mbgl
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr						
WS01	<0.1	<0.1	0	-0.2	-0.2	-0.0002	4.9	4.9	0.0049	14.8	0	0	0.000	3.19	4.19
WS05	<0.1	<0.1	0	-0.2	-0.2	-0.0002	9.0	9.0	0.0090	10.9	0	0	0.000	1.36	2.04
WS06	<0.1	<0.1	0	-0.2	-0.2	-0.0002	5.0	5.0	0.0050	11.1	0	0	0.000	1.78	4.02
WS09	<0.1	<0.1	0	-0.2	-0.2	-0.0002	5.9	5.9	0.0059	13.2	0	0	0.000	1.77	4.02

Additional Comments

Gas & Groundwater Monitoring Record Sheet

WML CONSULTING

Project Name:- Mayton Street
Project No:- 8755G
Client:- Eco-Res

Date:- 04/09/2020
Start Time:- 08:00
End Time:- 08:30
Ground Conditions:- Dry
Weather Conditions:- Sunny

Atmospheric Pressure
Start:- 1010mb
End:- 1010mb
Trend:- Rising

Instrument:- Gas Data GFM436

Operator:- T Booth

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Peak CO ppm	Hexane %	Water Level mbgl	Base of Hole mbgl
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr						
WS01	<0.1	<0.1	0	-0.3	-0.3	-0.0003	5.6	5.6	0.0056	12.6	0	0	0.000	3.03	4.19
WS05	<0.1	<0.1	0	-0.2	-0.2	-0.0002	7.7	7.7	0.0077	12.3	0	0	0.000	1.39	2.04
WS06	<0.1	<0.1	0	-0.2	-0.2	-0.0002	5.2	5.2	0.0052	14.6	0	0	0.000	1.82	4.02
WS09	84.8	<0.1	0	-0.2	-0.2	-0.0002	2.3	2.3	0.0023	17.0	0	0	0.000	0.84	4.02

Additional Comments

GAS MONITORING METHODOLOGY

1. The following are recorded upon arrival or at each location as the monitoring progresses:-

   - Operator name;
   - Instrumentation name i.e. Gas Data - GFM436;
   - Atmospheric pressure;
   - Time of commencement of the monitoring visit;
   - Ground conditions e.g. wet, dry waterlogged etc.;
   - General weather conditions, as the prevailing conditions may affect the results; and
   - Condition of the monitoring point e.g. damaged, covered etc.

2. The background oxygen concentration in the vicinity of the monitoring point is recorded to ensure that the instrument is zeroed.

3. Where appropriate, both the flow and pressure differential are recorded at each monitoring point prior to obtaining the gas concentrations.

4. Concentrations of light hydrocarbon gas, comprising methane (%v/v), carbon dioxide (%v/v), oxygen (%v/v), hydrogen sulphide (ppm), carbon monoxide (ppm) and hexane % are monitored continuously over a 90 seconds period. The highest concentrations of methane, carbon dioxide, carbon monoxide and hydrogen sulphide and the lowest concentration of oxygen are then recorded.

5. If/where concentrations stabilise after 90 seconds, the steady-state concentrations are recorded. If concentrations are still varying, monitoring is continued until steady-state conditions are attained and concentrations then recorded. The accuracy for light hydrocarbon gases is :-

   - Methane - +/-0.2% at 5%.
   - Carbon dioxide - +/-0.1% at 10%.

6. Depth to water level and base of installation are recorded as the movement of groundwater can affect gas migration and migration pathways to monitoring points.

7. The above steps are to be repeated at each monitoring point.

8. The following are then recorded upon completion of the monitoring process:-

   - Atmospheric pressure;
   - Time of completion of the monitoring visit.

Key For Gas Monitoring Records

BH/WS	- Readings taken from gas valve within borehole or window sample probehole.
Flow	- Gas flow measured in litres per hour
<0.1	- Where flows are less than 0.1l/hr are recorded
Co_2	- Carbon Dioxide
O_2	- Oxygen
H_2S	- Hydrogen Sulphide
CO	- Carbon Monoxide
PD	- Pressure differential measured in millibars
%	- Percentage
ppm	- Parts Per Million
l/hr	- Litres per hour
CH_4	- Methane
mbgl	- Metres below ground level
GSV	- Gas Screening Value

TEST DATE AND CONDITIONS		
Date	14/08/19	
Atmospheric Pressure	993	mB
Ambient Temperature	21.9	°C
Environics Serial No.	5089	

GAS DATA LTD
Unit 4, Fairfield Court
Seven Stars Estate
Wheler Rd
Coventry
CV3 4LJ
Tel 02476303311 Fax 02476307711

GFM436 Final Inspection & Calibration Check Certificate

Customer	WML Consulting Ltd
Certificate Number	121220
Order Number	323564

Serial Number	12969
Software Version	G436-00.0027/0010

Recalibration DUE Date
14/08/20

Instrument Checks					
Keyboard	✓		Display Contrast	✓	
Pump Flow In	500	*Accept > 200 cc/min*	Pump Flow @ -200mB	300	*Accept > 200 cc/min*
Clock Set / Running	✓		Labels Fitted	✓	

Gas Checks						
	CH_4		CO_2		O_2	
	Instrument Gas Readings %	True Gas Value %	Instrument Gas Readings %	True Gas Value %	Instrument Gas Readings %	True Gas Value %
Sensor	60	60	40	40	20.9	20.9
	Accept ±3.0		*Accept ±3.0*		*Accept ±0.5*	
	5	5	5	5	6	6
	Accept ±0.3		*Accept ±0.3*		*Accept ±0.3*	
Zero Reading 100% N2	0	0	0	0	0	0
	Accept ±0.0		*Accept ±0.0*		*Accept ±0.1*	

Optional Gas Checks						
Applied Gas & Range		Concentration Tested @ (ppm)	Instrument Readings *(ppm)*			
Gas Type	Range *(ppm)*		Zero Reading		Instrument Gas Reading	
H2S	5000	*1500*	0	*Accept ±0.0*	1500	*Accept ±5.0*
CO	2000	*1000*	0	*Accept ±0.0*	1000	*Accept ±5.0*
Hexane	*2.0%*	2.0%	0	*Accept ±0.0*	1.99	*Accept ±10.0*

Cross Gas Effects									
Applied Gas *(ppm)*		Instrument Readings *(ppm)*							
Gas Type	Concentration	Toxic 1:	H2S	Toxic 2:	CO	Toxic 3:	HEX		
H2S	*1500*	1500		0		0			
CO	*1000*	40		1000		0			
Hexane	*2.0%*	0		0		1.99			

Pressure Checks			
Atmospheric Pressure [AP] *(mB)*			
Current Atmospheric Pressure (mB)		Instrument Atmospheric Pressure Reading (mB)	
AP Open Ports		993	*Accept ±2.0*
AP Port (Internal)	*+800 mB*	800	*Accept ±5.0*
	+1200mb	1200	*Accept ±5.0*

Flow Checks					
Borehole Flow			Differential Pressure		
Applied Reading *(l/h)*	Instrument Reading *(l/h)*		Applied Pressure *(Pa)*	Instrument Reading *(Pa)*	
-30	-30.3	*Accept ±3.0*	-556	-570	*Accept ±50*
-3	-3	*Accept ±1.0*	-23	-22	*Accept ±6.0*
0	0	*Accept ±0.0*	0	0	*Accept ±0.5*
3	3	*Accept ±0.5*	17	17	*Accept ±3.0*
30	30	*Accept ±3.0*	385	384	*Accept ±50*
60	60	*Accept ±6.0*	1192	1193	*Accept ±130*
90	90.4	*Accept ±9.0*	2362	>>>>>	*Accept ±250*

Temperature Checks		
Calibration Temperature	Instrument Temperature Reading °C	
Applied Temperature °C		
-10	-10	*Accept ±2.0*
0	0	*Accept ±1.0*
30	30	*Accept ±1.0*
60	60	*Accept ±1.0*
100	100	*Accept ±1.0*

Technician:	Date Tested:
Jack Rutland	*15/08/19*

The instrument identified by the serial number stated above has been tested by Gas Data personnel for calibration accuracy on the date and under the ambient conditions stated. Gas Data Ltd internal BS EN ISO9001:2015 compliant workshop procedures were followed to apply known calibration test gases, gas flow rates, pressures and temperatures of the values stated. The results displayed on the instrument at each stage are recorded above.

Gas Data Ltd is certified to BS EN ISO9001:2015. Certificate NQA 8374. Valid until 21/03/2022

APPENDIX 03

Soil Assessment Criteria

Site Specific Assessment Criteria for Residential (with homegrown produce) assuming a 1% SOM for Hydrocarbons

Contaminant	Assessment Criteria for Residential (mg/kg)
Metals	
Arsenic	37
Boron	290
Cadmium	26
Chromium III	910
Chromium VI	6
Copper	2,400
Lead*	200
Mercury	1.2
Nickel	130
Selenium	250
Vanadium	410
Zinc	3,700
Non – Metals	
Phenol	120
Polyaromatic Hydrocarbons (PAH)	
Benz[a]anthracene	7.2
Benzo[a]pyrene	2.2
Benzo[b]fluoranthene	2.6
Benzo[ghi]perylene	320
Benzo[k]fluoranthene	77
Chrysene	15
Dibenz[ah]anthracene	0.24
Fluoranthene	280
Indeno[123-cd]pyrene	27
Naphthalene	2.3
Pyrene	620

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* Where not included in the S4UL's criteria for a limited number of contaminants, namely lead, have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.

Contaminant	Criteria for Residential End Use (mg/kg)
Volatile Organic Compounds (VOCs)	
Benzene	0.087
Ethylbenzene	47
Toluene	130
Xylene	56
1,2-Dichloroethane	0.0071
1,1,1-Trichloroethane	8.8
Tetrachloroethane	1.6
Tetrachloroethene (PCE)	0.18
Tetrachloromethane	0.026
Trichloroethene (TCE)	0.016
Trichloromethane	0.91
Vinyl Chloride	0.00064
Semi-Volatile Organic Compounds (SVOCs)	
1,2-Dichlorobenzene	23
1,4-Dichlorobenzene	61[f]
1,2,4-Trichlorobenzene	2.6
Hexachlorobenzene	1.8 (0.2)[vap]
Total Petroleum Hydrocarbons (TPH)	
Aliphatic C5-6	42
Aliphatic C6-8	100
Aliphatic C8-10	27
Aliphatic C10-12	130(48)[vap]
Aliphatic C12-16	1,100(24)[sol]
Aliphatic C16-35	65,000(8.48)[f,sol]
Aliphatic C35 - 44	65,000(8.84)[f,sol]
Aromatic C5 – 7 (benzene)	70
Aromatic C7 – 8 (toluene)	130
Aromatic C8-10	34
Aromatic C10-12	74
Aromatic C12-16	140
Aromatic C16-21	260[f]
Aromatic C21-35	1,100[f]
Aromatic C35 - 44	1,100[f]

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* Where not included in the S4UL's criteria for a limited number of contaminants, namely lead, have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.

APPENDIX 04

United Utilities Risk Assessment

Supplementary guidance for the selection of water pipes in land potentially affected by contamination

United Utilities
Water for the North West

Introduction

In January 2011, UK Water Industry Research (UKWIR) published "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref 10/WM/03/21; the 'UKWIR Guidance'). Its aim is to ensure that the correct materials are selected for water pipes and components to be used below ground in brownfield sites to protect the quality of drinking water whilst taking into account the service life of the water distribution system. It supersedes the Water Regulations Advisory Scheme (WRAS) Information and Guidance Note 9-04-03 "Laying Pipes in Contaminated Land" which has been withdrawn.

The UKWIR Guidance is for use by developers, self-lay organisations, water companies and consultants when planning, designing and constructing water mains and/or services in brownfield sites. It defines brownfield sites as "land or premises that have previously been used or developed. They may also be vacant or derelict. However, they are not necessarily contaminated." The UKWIR Guidance states that it does not apply to greenfield sites; however, we consider this supplementary guidance and the relevant sections of the UKWIR guidance as being equally suitable for application to those greenfield sites considered to be potentially affected by contamination. Where greenfield sites are not affected by contamination a preliminary risk assessment (see below) will suffice.

The UKWIR Guidance also states that there should be no departure from its provisions *"except where formally approved by the Water Company, such departure being technically justifiable or representing advances in knowledge or product development"*.

We have adopted the UKWIR Guidance in principle and produced this company specific supplementary guidance (the 'UUW Guidance') which includes the Risk Assessment for Water Pipes (the 'RA').

This guidance does not cover operative safety, health exposure modelling or accidental pipe damage.

Risk Assessment for Water Pipes in Land Potentially Affected by Contamination

Any application for new water supplies to a development (construction of new properties, or renovation or conversion of existing buildings) in land potentially affected by contamination shall include a completed RA.

As a minimum a desk study (preliminary risk assessment) shall be provided with the RA in accordance with the framework in Environment Agency publication "Model Procedures for the Management of Land Contamination" (ref: CLR11) that sets out whether the land through which the pipes are to be laid may be affected by contamination. The application of the source, pathway, receptor concept will be an integral part of any pipeline risk assessment. For each potential source (the contamination) and each potential receptor (the water pipe), consideration shall be given to whether a potential pathway between source and receptor exists, or may exist in the future, linking the two. There are normally only three pathways by which contamination may come into contact with water pipes. These are direct contact with the soil or backfill, an excessive vapour phase or a contaminated groundwater regime. If none of these conditions exist on site (adopting the source, pathway, receptor concept) then it is likely that extended and/or targeted soil testing will not be required and a simple risk assessment will suffice. For those sites where land may be affected by contamination appropriate testing shall be undertaken on the materials within which the pipes are to be laid, whether that be existing ground materials, remediated materials or imported capping materials. The testing requirements are as described in the following section.

The signatories of the Water Supply Application Form and the RA must ensure that all assessments of land condition have been carried out in accordance with applicable current standards and guidelines by or under the direction of a suitably qualified competent person.

We require the competent person to be a) a chartered member of an appropriate professional body (such as the Institution of Civil Engineers, the Geological Society of London or the Royal Institution of Chartered Surveyors) with relevant experience of investigating contaminated sites or b) a Specialist in Land Condition (SiLC) with appropriate geo-environmental experience.

How to contact us about the information in this leaflet

DeveloperServicesWater@uuplc.co.uk

0345 072 6067
Opening hours:
8am-5pm Mon to Thurs
8am-4.30pm Fri

Testing Requirements

The soil, rock and if appropriate groundwater tests that are required on all sites where the potential for organic contamination has been identified in the desk study and where water pipes are proposed to be laid must be accredited by United Kingdom Accreditation Service (UKAS) as a minimum and where commercially available the Environment Agency's Monitoring Certification Service (MCERTS). These accredited tests should be undertaken for:

Banded hydrocarbons EC5-EC10, EC10-EC16, EC16-EC40 (Total aliphatic and aromatic hydrocarbons for each banding may be summed). Aliphatic/aromatic fractionation and subsequent banding may be required should a more detailed site specific risk assessment be undertaken. The bandings have been amended to take into account readily available laboratory tests. The equivalent carbon number (EC) is used to assess petroleum hydrocarbon mixtures rather than the actual number of carbon atoms in the molecule in line with guidance issued by the Environment Agency (2005).

Volatile organic compounds (VOCs) (method by head space or purge & trap GCMS) with tentative identification of compounds greater than 20µg/kg. The method used should be capable of detecting a wide range of compounds listed in US EPA Method 8260C or similar. The method should include analysis of naphthalene.

BTEX (Benzene, toluene, ethyl benzene and xylenes) plus MTBE (Methyl-tertiary butyl ether) (by head space GCMS)

Semi-Volatile Organic Compounds (SVOCs) (method by GCMS) with tentative identification of compounds greater than 20µg/kg The method used should be capable of detecting the compounds listed in US EPA Method 8270D or similar. The total concentration of SVOCs excludes polycyclic aromatic hydrocarbons, ethers, nitrobenzene, ketones, aldehydes, phenols, cresols and chlorinated phenols. Phenols, cresols and chlorinated phenols which are detected by the SVOC analysis are given their own assessment criteria.

We do not consider Table G1 and Table 3.1 of the UKWIR Guidance to be a definitive guide for assessing total concentrations. Table 1 in the RA below replaces Table 3.1 of the UKWIR Guidance.

Where previous site uses include the use, storage, treatment, disposal or manufacture of any of the following, appropriate testing for these substances will be required:

- Ethers, nitrobenzene, ketones, aldehydes and amines. Note that the presence of amines on any site at the proposed pipe depth +/- 1.0m precludes the use of polyethylene. The methods of analysis and method of calculation of total concentrations of these compounds will need to be agreed with UUW.

To comply with the testing requirements, the suites of tests that are required on all brownfield sites where wrapped steel, wrapped ductile iron or copper pipes are to be laid as minimum must include:

- pH, Conductivity and redox potential

Sufficiency of Testing

Water pipes are normally laid at between 0.75 and 1.35m from finished ground level to crown of pipe. Samples taken and tested must represent both a) the soil in which the water pipes are to be laid and b) the soil down to at least 500mm below the underside of the proposed pipe. Where the proposed depth of the pipes is unknown at the time of application, soil samples representative of the ground condition between surface level and 1.5m below finished ground level shall be taken as a minimum. Where appropriate (see UKWIR Guidance) groundwater sampling and groundwater monitoring will also be necessary. Photo-ionisation detection (PID) monitoring along the proposed route of the pipeline may be employed, though this does not provide a definitive guide to the suitability of water pipe materials.

Where required a sufficient number of test results should be obtained from the material in which the pipes are to be laid. CLAIRE/CIEH 2008 "Guidance on comparing soil contamination data with a critical concentration" may be used, where appropriate, to justify the number of soil samples tested; however, this statistical model should not be used on heterogeneous materials or used to average test results from different types of materials.

Further guidance on representative sampling is contained within BS10175:2011 Code of Practice for the Investigation of Potentially Contaminated Sites, the Department of the Environment's Contaminated Land Research Report "Sampling strategies for contaminated land" prepared by The Centre for Research into the Built Environment, Nottingham Trent University (Ref: CLR 4; 1994) and the Environment Agency's "Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination" (ref: R&D Technical Report P5-066/TR; 2000).

Where remediation has been carried out on the site, the test results obtained from validation samples will be used in the assessment. Where a horizontal capping system has been or will be employed using materials spread across a site, sufficient samples will need to be taken to characterise the capping material used and the results presented to UUW. However, the sufficiency of sampling on the horizontal capping system, in which the pipeline will be placed, may be assessed on the basis of the source, quantity and type of materials used.

Detection Limits

Only positive concentrations, ie those above the limit of detection should be used in summation of VOC and SVOC (or other test groups of compounds ie phenols, cresols and chlorinated phenols). Laboratory methods shall provide a minimum limit of detection of 10µg/kg for each individual VOC or SVOC (or other test groups of compounds) quantitatively detected in accordance with the methods described above. For tentatively identified compounds (TICs), only those compounds with a concentration of 20µg/kg or greater shall be used in the summation of VOC and SVOC (or other test groups of compounds).

Protective Measures

Where polyethylene, ductile iron, steel or copper pipes are to be laid on a brownfield site or other land potentially affected by contamination (whether or not it has been remediated) and where the concentrations exceed the generic guideline values set out in Table 1 of the RA, the developer shall provide either:

a) a robust risk assessment to show how any contaminants will not significantly impact on proposed water supplies or buried assets over the lifetime of the assets; or

b) more suitable pipe materials; or

c) an engineering solution to protect the pipe work backed up by an adequate assessment of the risk.

Liquid free phase product (e.g. oil or free solvent layers) shall not remain in the ground or groundwater in the vicinity of water pipes, whether barrier pipe or any other pipe materials are used.

When designing pipe routes on land potentially affected by contamination, new preferential contamination pathways along the route of new water pipes shall not be created. Particular measures may be required to prevent the possible migration of contamination through pipe bedding and into controlled waters.

References

BS10175: 2011
"Investigation of Potentially Contaminated Sites Code of Practice"

CLAIRE/CIEH
"Guidance on comparing soil contamination data with a critical concentration" 2008

Department of the Environment Contaminated Land Research Report
"Sampling strategies for contaminated land" prepared by The Centre for Research into the Built Environment, Nottingham Trent University (Ref: CLR 4) 1994

Environment Agency
"Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination"
(ref: R&D Technical Report P5-066/TR) 2000

Environment Agency
"Model Procedures for the Management of Land Contamination" (ref: CLR11), 2004

Environment Agency P5-080/TR3
"The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils", 2005

UK Water Industry Research (UKWIR)
"Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref 10/WM/03/21) January 2011

Water Regulations Advisory Scheme (WRAS) Information and Guidance Note 9-04-03
"Laying Pipes in Contaminated Land" 2002

Frequently asked questions

Why has UUW published supplementary guidance to the 'UKWIR Guidance for the Selection of Water Pipes to be used in Brownfield Sites'?

UUW agrees with the UKWIR Guidance in principle; we have published supplementary guidance to clarify some of the areas in which it will operate.

Does the UKWIR Guidance only apply to 'brownfield sites'?

Yes, the UKWIR Guidance does apply to brownfield sites; in addition United Utilities Water will apply this guidance and the UUW supplementary guidance to any greenfield sites which are potentially affected by contamination.

Who is responsible for completing/ signing the Risk Assessment for Water Pipes (RA)?

This may be the Developer, the Developers representative, or the competent person directing the land assessment. The signatory of the Risk Assessment for Water Pipes (RA) must ensure that all land assessments have been carried out in accordance with current standards and guidelines by or under the direction of a suitably qualified competent person. For water supply applications on land potentially affected by contamination, UUW requires the competent person to be either a chartered member of an appropriate professional body (such as the Institution of Civil Engineers, the Geological Society of London or the Royal Institution of Chartered Surveyors) with relevant experience of investigating contaminated sites or a Specialist in Land Condition (SiLC). This level of competency is intended to promote good practice and high professional standards and is no greater than that required for planning purposes by Local Authorities.

Do we need to agree the number and location of soil samples with the Water Company as indicated by the UKWIR guidance following the Preliminary Risk Assessment (PRA)?

Where a preliminary risk assessment (PRA) highlights the need for a site investigation UUW considers it is a responsibility of the qualified competent person directing the land assessment to determine the location and frequency of sampling. UUW's role would be to confirm that the appropriate choice of pipe material has been made on the basis of the information provided.

What do we do if the pipe route is not known when the Site Investigation report is commissioned?

Where the route of the pipe is not known at the site investigation stage, then any resultant pipe selection needs to take account of any contamination found on the site. Consideration should be given to identifying the route and depth of the pipeline at the site investigation stage to avoid unnecessary testing.

Is it acceptable not to undertake a site investigation and specify the use of barrier pipe which seems to be suitable for all conditions?

Not all brownfield land is contaminated, and because of that a default to barrier pipe is not an acceptable approach to UUW, due to the possibility of higher installation and future maintenance costs. The approach as to whether a site investigation is needed should be risk based. For those sites where land may be affected by contamination appropriate testing shall be undertaken on the ground materials within which the pipes are to be laid, whether that be existing ground materials, remediated materials or imported capping materials.

Examples where defaulting to barrier pipe would not be acceptable:

- Where a capping layer (non-contaminated) is introduced within which the pipes will be installed.
- Sites with a potential low risk for contamination.
- Where liquid free phase product (e.g. oil or free solvent layers) is in the ground or groundwater in the vicinity of water pipes.
- Where the route of the pipe could be diverted to another suitable location free from contamination.

Are UUW employees who will assess the Design Proposals for contaminated sites suitably qualified?

It is the role of the Developer's suitably qualified competent person to deal with or direct the assessment of land. UUW's role is to assess the Risk Assessment for Water Pipes and supporting Site Assessment Report (SAR) which is provided with any new water supply application (ie. it has been provided in the correct format, proposals for pipe selection are included, the methodology is in line with the UKWIR Guidance and UUW Supplementary Guidance, it has been directed by a suitably qualified competent person etc.). If UUW do need to provide assistance or information in deciding pipe materials then the assessment would be carried out under the direction of a suitably qualified competent person.

What happens to existing PE that is in the ground under the "old" guidelines?

The latest UKWIR guidance and UUW's supplementary guidance are intended to be used to decide what pipe materials will be used for new water mains and services. It will have no effect for developers with regard to any parts of UUW's existing network.

Will the Developer be required to submit a fully completed Risk Assessment for Water Pipes (RA) and supporting Site Assessment Report (SAR), including pipe material recommendation, for both the option of a mains requisition application and the option of a self-lay application?

Yes, UUW expect the 'Developer', as defined in UUW Supplementary Guidance, to submit a Risk Assessment for Water Pipes (RA) and supporting Site Assessment Report (SAR), including pipe material recommendation, in respect of any water pipes being installed on the development irrespective of who is to install them.

Does Table 1 in UUW's Risk Assessment for Water Pipes (RA) replace any of the tables to be completed in the Site Assessment Report (SAR) as required in the UKWIR Guidance?

UUW does not consider Table G1 and Table 3.1 of the UKWIR Guidance to be a definitive guide for assessing total concentrations. Table 1 in UUW's RA replaces Table 3.1 of the UKWIR Guidance.

Have any other Water Companies adopted the UKWIR Guidance yet?

You will need to contact the water company concerned if you are intending to install water pipes outside UUW's licensed area.

United Utilities
Water for the North West

About us

United Utilities is the North West's water company. We keep the taps flowing and toilets flushing for seven million customers every day. From Crewe to Carlisle, we work hard behind the scenes to help your life flow smoothly.

United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Warrington WA5 3LP.
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11/19/SD/8483f-1

Risk assessment for water pipes (RA)

United Utilities
Water for the North West

The risk assessment for water pipes will help you choose appropriate materials for your development. We are happy to deal with a risk assessment for water pipes in advance of any formal application for a new water supply.

If you need any help completing the form please call us on **0345 072 6067.**

Section 1: Development details	
Development name *(if it has one)*	
Development address	
OS Grid reference *(mid point)*	
Developer's name	
UUW reference number *(for UU use only)*	

Please provide details below of the current and historical use of the site and adjacent sites.

If your supporting information has details of the current and historical site use, please reference below the relevant sections of your report.

Section 2: Preliminary risk assessment	
Has your desk study and site walkover identified any land potentially affected by contamination?	☐ Yes ☐ No

If the site is potentially affected by contamination but you have not completed any intrusive site investigation please provide details below of the rationale behind the intended pipe selection.

If your supporting information has details of the rationale behind the intended pipe selection, please reference below the relevant sections of your report.

Section 3: Intrusive site investigation

Have you completed any intrusive site investigation?	☐ Yes ☐ No
Have you completed any none intrusive site investigation?	☐ Yes ☐ No
Date(s) when the site investigation(s) undertaken	D D M M Y Y Y Y D D M M Y Y Y Y D D M M Y Y Y Y
At what level has groundwater been encountered?	metres below ground level or ☐ Not encountered

Table 1 (Pipeline Selection Risk Assessment Summary (PSRAS)) below classifies testing required where the preliminary risk assessment has identified land potentially affected by contamination. Please provide details below of any test groups which have not been tested and the rationale for not testing.

If your supporting information has details of the rationale behind not testing any particular test groups, please reference below the relevant sections of your report.

If the intrusive site investigation has identified concentrations above the PE threshold (see PSRAS) and your intended pipe selection is PE. Please provide details below of the rationale behind the intended pipe selection.

If your supporting information has details of the rationale behind the intended pipe selection, please reference below the relevant sections of your report.

Section 4: Site remediation

Please provide details below of any site remediation (which may include a change in site levels) already completed.

If your supporting information has details of the site remediation already completed, please reference below the relevant sections of your report.

Has the PSRAS (Table 1) been completed using appropriate data after remediation?	☐ Yes ☐ No ☐ N/A

Please provide details below of any proposed site remediation and an analysis of whether this will affect your intended pipe selection.

If your supporting information has details of any proposed site remediation and whether this will affect your intended pipe selection, please reference below the relevant sections of your report.

Section 5: Final use of site

Please provide details below of any chemicals (including fuel) to be stored on site and any other future contamination risks which may affect your intended pipe selection.

If your supporting information has details of potential contamination risks which may affect your intended pipe selection, please reference below the relevant sections of your report.

What water pipe materials are intended to be used on site?	☐ PE ☐ PE Barrier Pipe Type A ☐ PE Barrier Pipe Type B Other *(please specify):*

Section 6: Additional information

Please use the section below to provide any additional details to support your intended pipe selection.

Section 7: Risk assessor

Name and relevant qualifications of person directing the risk assessment for water pipes	
Name and address of risk assessor's company	
Date risk assessment performed	D D M M Y Y Y Y

Section 8: Declaration

I confirm I have completed this form and provided supporting information in accordance with 'UKWIR Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' and UUW's Supplementary Guidance. I also confirm that if any further site investigation is needed and carried out, I will be required to submit an additional Risk Assessment for Water Pipes with the relevant supporting information.
I understand that failure to supply any of the required information may delay my application being processed.

Name		Company	
Telephone		Date	D D M M Y Y Y Y

Please email the completed form and supporting information to **DeveloperServicesWater@uuplc.co.uk** or post to us at United Utilities Water, Developer Services, Second floor Grasmere House, Lingley Mere, Warrington WA5 3LP.

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Table 1 - Pipe selection risk assessment summary (PSRAS)

1. Testing must be undertaken on the materials within which the pipes are to be laid, whether that be existing ground materials, remediated materials or imported capping materials. Please use the appropriate testing data to complete Table 1 below.

2. If more than one pipe selection is being made, for example, for pipes in different areas of a large site, a completed PSRAS is required for each selection.

What materials have been tested to populate Table 1 below?	☐ Existing ground materials ☐ Remediated materials ☐ Imported capping materials

All concentrations in mg/kg

Test Group	Testing Required?	PE threshold	Metal Pipes/ Barrier Pipe	Laboratory Detection Limit	Testing UKAS accredited Y/N	Maximum concentration at proposed pipeline depth *See Note [2]*	Maximum site concentration *See Note [3]*	Locations and depths where concentrations exceed proposed pipeline threshold
Total VOCs	Where Preliminary Risk Assessment (PRA) has identified land potentially affected by contamination	0.5	Pass					
Total BTEX & MTBE		0.1	Pass					
Total SVOCs (excluding PAHs and those substances marked with an *)		2	Pass					
EC5-EC10 aliphatic and aromatic hydrocarbons		2	Pass					
EC10-EC16 aliphatic and aromatic hydrocarbons		10	Pass					
EC16-EC40 aliphatic and aromatic hydrocarbons		500	Pass					
Phenols* (from SVOC analysis)		2	Pass					
Cresols and chlorinated phenols* (from SVOC analysis)		2	Pass					
Ethers*	Only where identified	0.5	Pass					
Nitrobenzene*		0.5	Pass					
Ketones*		0.5	Pass					
Aldehydes*		0.5	Pass					
Amines		Fail	Pass					
Corrosive	Conductivity, Redox and pH	Pass	*See Note [1]*					

Note [1] Threshold: For wrapped steel, corrosive if pH<7 and conductivity > 400µS/cm. For wrapped ductile iron corrosive if pH<5, Eh not neutral and conductivity > 400µS/cm. For copper, corrosive if pH<5 or >8 and Eh positive.

Note [2] Water pipes are normally laid at 0.75-1.35m below finished ground level.

Note [3] Also state if liquid free product is present in soil or groundwater.