

Pyramid Park Enabling Works Remediation Strategy

For
Bury Council

Project No.
14111

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Campbell Reith Hill LLP
No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com
W: www.campbellreith.com

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1.0 INTRODUCTION

1.1 Appointment and Scope

- 1.1.1 This Remediation Strategy has been produced by Campbell Reith Hill LLP (CampbellReith) on behalf of Bury Council (the Client), in order to describe the necessary requirements relating to the remedial works and record keeping at Pyramid Park, Bury, to ensure it is suitable for its intended use. The limitations associated with this report follow the main text.
- 1.1.2 The overall objective of this Remediation Strategy is to present an implementation plan for the site for approval by the Local Planning Authority. It has been prepared in anticipation of specific land quality planning conditions associated with future submission of a planning application for the redevelopment of the Pyramid Park site. The site location and site layout are presented in Figures 1 and 2, respectively, in Appendix 1.
- 1.1.3 This Remediation Strategy has been prepared in general accordance with Environment Agency's Land Contamination Risk Management (LCRM), BS 5930:2015; BS 8576:2013, BS 8485: 2015 (+A1:2019) and BS 10175:2011 (+A1:2013). It is based upon a review of historical and current ground investigation data, soil, groundwater and ground gas risk assessment.
- 1.1.4 The objectives are to provide:
- A description of methodologies potentially adoptable for the remediation;
 - A description of the proposed Remediation Strategy;
 - A description of the Development Controls required to be in place to manage potential risks; and,
 - The information required to verify the remedial works have been implemented as agreed.
- 1.1.5 The Conceptual Site Model identified risks to human health and controlled waters, and the risk posed by hazardous ground gas which are detailed in the LQS Report [1] and discussed below in section 3.0.
- 1.1.6 This assessment considers the objectives of the National Planning Policy Framework which requires information to demonstrate that a site is suitable for its new use (taking account of ground conditions and land instability) and is not capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990 (after remediation). This also required adequate site investigation information prepared by a competent person.
- 1.1.7 The remediation works shall be cognisant of the proposed development, the soil mass balance at the site once this has been finalised, and the aim of retaining a maximal amount of contaminant impacted soil at the site in a manner that does not present a risk to potential receptors. This would represent the most sustainable, advantageous reuse of potential waste soil across the site, and shall require an appropriate Materials Management Plan (MMP) to be in place to permit this under the Definition of Waste Code of Practice (DoW CoP).

1.2 Previous Investigations and Other Information

- 1.2.1 Sources of information in relation to the site are summarised in the reports below and these should be read in conjunction with this Remediation Strategy:

Table 1.1 Existing Site Specific Information

Report Details		Author	Reference
Pyramid Park Land Quality Statement	Ref: 14111-CRH-XX-XX-RP-LQ-0001-P02 LQS Report, dated November 2024	CampbellReith	[1]
Phase 1 Habitat Survey	Drawing Number G9302.007A, dated October 2023	The Environment Partnership (TEP)	[2]
Geotechnical and Geo-Environmental Desk Study Report	Ref. 13819-CRH-XX-XX-LQ-RP—0001 Desk Study dated March 2022	CampbellReith	[3]
Phase 2 Interpretative Report (Contamination)/ Land Quality Statement	Ref: 13819-CRH-XX-XX-RP-LQ-0002 LQS Report, dated July 2022	CampbellReith	[4]

1.3 Regulatory and Planning Status

- 1.3.1 A planning application for the proposed site remediation works is to be submitted in due course. This is associated with the site remediation, creation of a new access road and reprofiling of the site to create a development platform only. A further planning application will be required in future associated with the final site development, which is anticipated to be a predominantly residential development.

- 1.3.2 Once planning permission is obtained for the remediation works, it is recommended that this Strategy is updated and the approach to the verification of the works is agreed in principle with the Local Planning Authority, prior to the commencement of works. This Remediation Strategy may need to be revised in line with planning approval and developers preferred remediation solution.

1.4 Site Health and Safety

- 1.4.1 The Contractor shall be responsible for the completion of the works in accordance with Health and Safety and related regulations including Construction Design and Management (CDM) Regulations. The information presented in this report should form part of the Pre-Construction Information presented to bidding and successful Contractors so that their works can be appropriately formulated in this regard.

- 1.4.2 It is anticipated the Contractor shall undertake the role of Principal Designer and Contractor for the works, as defined under the CDM Regulations (and summarised below). As such, they shall be responsible for the Health and Safety of all site workers and visitors to the site and must take suitable precautions particularly when working with contaminated materials, taking into account any guidance or requirements from HSE, particularly in respect of asbestos.

CDM Duty Holder	Main Duties
Principal designers - Designers appointed by the client in projects involving more than one contractor. They can be an organisation or an individual with sufficient knowledge, experience and ability to carry out the role.	Plan, manage, monitor and coordinate health and safety in the pre-construction phase of a project. This includes: identifying, eliminating or controlling foreseeable risks; and ensuring designers carry out their duties. Prepare and provide relevant information to other dutyholders. Liaise with the principal contractor to help in the planning, management, monitoring and coordination of the construction phase.
Principal contractors – Contractors appointed by the client to coordinate the construction phase of a project where it involves more than one contractor.	Plan, manage, monitor and coordinate health and safety in the construction phase of a project. This includes: liaising with the client and principal designer; preparing the construction phase plan; organising cooperation between contractors and coordinating their work. Make sure: suitable site inductions are provided; reasonable steps are taken to prevent unauthorised access; workers are consulted and engaged in securing their health and safety; welfare facilities are provided.

1.4.3 Asbestos has been detected in the Made Ground soils during the ground investigation works. Consideration of ACM should be included in the groundworks risk assessments and the associated existing information on ground risk should be included within the CDM 2015 Health and Safety file that forms the basis of the Construction Phase Health and Safety Plan. It is assumed that the Contractor's site team shall include competent persons who have received adequate information, instruction and training with respect to the potential occurrence of asbestos and the associated requirements. The Contractor should formulate their working arrangements in view of the requirements of the Control of Asbestos Regulations (2012) and the associated ACoP (L143).

1.4.4 Additional interpretation on the application of these regulations is presented in publications prepared by CL:AIRE and the Joint Industry Working Group (CAR-SOIL™ Control of Asbestos Regulations 2012, Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials, 2016; and the associated JIWG decision support tool, 2017). Additional guidance is provided in CIRIA C765, Asbestos in Soil and Made Ground Good Practice Site Guide, 2017. Additional guidance in relation to these provisions is presented herein but reference should be made to these guidance documents in full.

1.5 Designers Risk Assessment

1.5.1 The key design risk associated with the proposed remediation comprise the operations associated with working in Made Ground soils during construction and their presence at depth in the completed development. Precautions as outlined herein should be maintained when working in the Made Ground to control residual risks in this regard.

2.0 SITE DESCRIPTION

2.1 Site Location and Description

2.1.1 The site location is presented in Figure 1, Appendix 1. The site is located off Market Street in Bury, Greater Manchester. It is approximately 300m to the south of Bury town centre and the approximate National Grid Reference at the centre of the site is 380500, 410315, postcode BL9 0EQ.

2.1.2 Currently, the site comprises a low-lying central area of relatively flat land with slopes leading up to surrounding higher ground present along the northern and southern areas of the site. A masonry arch bridge (Market Street) forms the eastern section of the site. The bridge abutments are formed into the slopes in the north and south of the site. An access track slopes down along the southern boundary from vehicle access gates off Market Street. Pedestrian access can also be gained from the east via Town Fields Close.

2.1.3 Three large pyramid features, predominantly grass covered, are present in the western area of the site. A former pond is present in the central and eastern areas of the site. The ground in this area remained boggy / saturated (noting that the site visit was undertaken following a prolonged period of heavy rainfall) and small areas of standing water were noted.

2.1.4 The majority of the site comprises marsh/marshy grassland, semi-improved neutral grassland, continuous bramble scrub with small areas of broadleaved woodland. A stand of Japanese Knotweed is present adjacent the road overpass according to the updated TEP Phase 1 Habitat Survey [2].

2.2 Redevelopment Proposals

2.2.1 At this stage, final redevelopment proposals are at Masterplan stage and have not yet been finalised. Masterplan options currently include a variety of mixed-use residential and commercial schemes, with associated access, infrastructure, hardstanding and landscaped areas. Additionally, limited residential development, most likely in the eastern area of the site, is anticipated to include private garden areas.

2.2.2 The proposed site redevelopment is shown in Figure 3, Appendix 1.

2.2.3 Based on the above, the end user sensitivity following redevelopment of the site is considered as Moderate – High.

2.2.4 The presented strategy will need to be further developed for detailed design purposes once plans are finalised and regulatory approval will be required.

2.3 Environmental Setting

2.3.1 A full appraisal of the site's environmental setting is provided in the Land Quality Statement [1]. In summary:

2.3.2 Historically, the site was largely occupied by railway sidings with goods sheds and cattle pens in the west of the site, likely associated with the former abattoirs to the northwest. Extensive ground workings to reduce site levels around 1890's appear to have taken place to facilitate

the expansion of the railway sidings. Later, the site was used as public open space and a pond was present in the central and eastern section of the site along with three large pyramid features, still present today.

- 2.3.3 The site is underlain by Topsoil or Made Ground of varying thickness over superficial deposits of Glacial Till comprising a mix of clays and sands. The underlying mudstone bedrock of the Pennine Lower Coal Measures was encountered at several locations between 3m and 11m below ground level (bgl).
- 2.3.4 The site is considered to have a Moderate sensitivity with respect to hydrogeology due to the presence of a superficial and bedrock Secondary A Aquifer and the site is not located within 1km of a Source Protection Zone. The site is considered to have a Low/Moderate sensitivity with respect to hydrology due to the distance to the River Roch which is located 700m west of the site.

3.0 Conceptual Site Model

3.1 Information Used to Refine the Conceptual Site Model

3.1.1 Three phases of ground investigations have been undertaken by CampbellReith to date. The most recent intrusive ground investigation was to supplement the existing site information for the enabling works, which was undertaken in August 2024. The ground investigations were designed to inform the assessment of risk to the predominantly residential development.

3.1.2 The Desk Study Report [3], the Preliminary Interpretative Report (Contamination) [4] and the Land Quality Statement (LQS) [1] all included a detailed review of historical information and included risk assessments for both human health and controlled waters.

3.2 Summary of Pollutant Linkages

3.2.1 This section sets out a summary of the findings of the risk assessments and potential pollutant linkages as presented in the revised conceptual model presented in Tables 3.1 to 3.5.

Table 3.1 Groundworkers (Assuming Basic PPE)*

Pathway	Risk	Comments
Ingestion of soil/dust	Low	Redevelopment or maintenance of the site will involve ground workers coming into contact with the underlying soils and water.
Inhalation of soil/dust	Moderate	
Dermal contact with soil/dust/water	Low	
Inhalation of vapour from soil/dust	Low-Moderate	Elevated PAH compounds were identified in Made Ground samples from the pyramids associated with former railway materials.
Inhalation of vapour from groundwater	Low	
Migration of soil gases to confined spaces	Low-Moderate	The general soil chemical results are not considered indicative of significant contamination.
		Asbestos has been identified as chrysotile and amosite bundles (<0.001% to 0.009%) which present a risk of inhalation during the disturbance of soils.
		Practical measures such as dust suppression, wetting and reassurance air monitoring for dust and asbestos in air are recommended.
		Hydrocarbon and sweet odours were noted in several locations within the Made Ground soils.
		Concentrations of carbon dioxide above 1.5% and depleted oxygen concentrations have been recorded which poses a potential acute risk to groundworkers in excavations and confined spaces.

Pathway	Risk	Comments
		Normal Health and Safety precautions associated with a site where potential contamination may exist (of the levels identified), will mitigate the general risk. The type of RPE required for asbestos will be defined by the JIWG decision support tool. There is a potential risk if previously unforeseen contamination is later found to be present.

* Additional assessments are required by the Contractor in relation to asbestos risk.

Table 3.2 End Users during Occupation

Pathway	Risk	Comments
Inhalation of dust	Moderate	The proposed development plans have not been finalised, however it is anticipated that residential gardens may be present.
Ingestion of soil/dust	Low	
Dermal contact with soil/dust/water	Low	
Consumption of vegetables/plants	Low	Elevated PAH compounds were identified in Made Ground samples from the pyramids associated with former railway materials.
Inhalation of vapour from soil/dust	Low-Moderate	
Inhalation of vapour from groundwater	Low	
Migration of soil gases to confined spaces/structure	Low – Moderate	The general soil chemical results are not considered indicative of significant contamination.
Movement of contaminants to engineered structures (e.g. water pipes)	Low – Moderate	
Uptake by flora/fauna	Low	Asbestos has been identified as chrysotile and amosite bundles (<0.001% to 0.009%). Made Ground soils will require appropriate clean cover soils, which should be implemented as part of final site development. Soils impacted by hydrocarbons are not proposed for reuse on site without further risk assessment, treatment and verification. At this stage, a precautional CS2 classification has been determined due to the elevated carbon dioxide and sporadic flow rates. As positive flow rates are sporadic, further gas monitoring is advised to determine ground gas protection measures for the final development once confirmed. A watching brief should also be maintained throughout all groundworks.

Pathway	Risk	Comments
		There is a potential risk if previously unforeseen contamination is later found to be present.
		There is a potential risk if previously unforeseen contamination is later found to be present.

Table 3.3 Controlled Waters

Pathway	Risk	Comments
Migration of water borne contaminants from site to surface waters	Low	Nearest surface watercourse >700m from site.
Migration of water borne contamination from off site	Low	The site underlain by superficial and bedrock Secondary A Aquifers. The underling Aquifer has an overall poor water quality rating. Elevated PAH compounds were identified in Made Ground samples from the pyramids associated with former railway materials. No significant contamination identified on site from the analysis of the general soils. Hydrocarbon and sweet odours were noted in the Made Ground soils and a marginal DWS exceedance in benzo(a)pyrene was identified in the groundwater retrieved from BH105. However, low permeability clay (Glacial Till) encountered across the site will limit migration of dissolved phase contaminants. The site is not located within a source protection zone.
Migration of contamination from surface and/or subsurface to groundwater	Low	

Table 3.4 Buildings

Pathway	Risk	Comments
Movement of contaminants to engineered structures (e.g. water pipes)	Low - Moderate	Consideration will be required with respect to potable supply pipework due to the presence of Made Ground, which has been shown to contain hydrocarbons. Liaison with the water supply provider will be required to determine if remedial actions are required.

Pathway	Risk	Comments
Migration and accumulation of flammable gases beneath the building footprint.	Low	No elevated concentrations of methane were encountered during the ground gas monitoring.

Table 3.5 Offsite Receptors

Pathway	Risk	Comments
Dermal contact with soil/dust/water	Low	Asbestos has been identified as chrysotile and amosite bundles (<0.001% to 0.009%) which pose a risk via inhalation due to disturbance during the construction phase.
Inhalation/ingestion of dust	Low - Moderate	
Inhalation of vapour from soil/dust	Low	
Inhalation of vapour from groundwater	Low	Off site residential properties with gardens are located in close proximity to the southern boundary, however railway land separates the parcel of land.
Migration of soil gases to confined spaces/structure	Low	
Movement of contaminants to engineered structures (e.g. water pipes)	Low	Practical measures such as dust suppression, wetting and reassurance air monitoring for dust and asbestos in air are recommended. Hydrocarbon and sweet odours were noted in the Made Ground soils and a marginal DWS exceedance in benzo(a)pyrene was identified in the groundwater from BH105. However, the presence of low permeability clay will reduce the potential for migration of contamination to off-site receptors.

4.0 REMEDIATION STRATEGY

4.1 Remediation Principals and Objectives

4.1.1 The objective of the remediation strategy, in accordance with current UK regulatory guidance, LCRM, will be to:

- develop a proportionate and practicable strategy that addresses the identified relevant pollutant linkages (RPLs) by reducing or controlling the identified potentially unacceptable risks to a level agreed as satisfactory with the relevant statutory authorities
- seek to achieve this objective in a cost-effective and sustainable manner (where possible), cognisant of pertinent regulations (including health and safety) and without compromising local environmental quality during its implementation
- under Part 2A, the remediation should address those RPLs which have been determined as representing significant possibility of significant harm (SPOSH). It is intended that the remedial strategy selected for the site will address all of the RPLs identified
- follow a phased approach for risk assessment, options appraisal and implementation of a remediation strategy as described in LCRM

4.2 Scope of Works

4.2.1 The recommendations with respect to contaminated land constraints to the site development are based on those detailed in the LQS Report [1]. It should be noted that this Strategy may need to be revised following submission of a planning application.

4.2.2 A Remediation Options Appraisal (ROA) typically forms part of the preparation of a Remediation Strategy and is focused upon approaches which would address the RPLs defined by the risk assessment, and which form the basis of the determination. However, based on the generic quantitative risk assessments, the soils / waters at the site do not require remediation in themselves. Practical measures are needed such that excavations into the Made Ground and its potential reuse are controlled, and asbestos contaminated soils are placed beneath a validated capping layer with geotextile in soft landscaped areas.

4.2.3 A summary of the required remedial controls is summarised below:

Enabling works phase

- Provision of a watching brief for previously unforeseen contamination by a suitably qualified Nominated Person;
- Management / eradication of Japanese Knotweed and other invasive species;
- Control of works associated with low levels of asbestos in the Made Ground;
- The bulk excavation, processing by segregation/sorting/screening of materials within the pyramid structures and hydrocarbon impacted soils. This is to include a reduced level excavation of approximately 1.0m from existing surrounding ground level beneath the footprint of each pyramid structure;

- The bulk excavation, processing by segregation/sorting/screening of materials from within the former pond area, to approximately 1.0-1.5m from existing ground level.
- Reuse of suitable soils to restore site levels in the area of the former pond, within proposed soft landscaped areas or as general fill;
- Chemical verification of soils being treated and/or reused on site;
- Geotechnical suitability of treated materials reused on site;
- Disposal of materials which are unsuitable for reuse following treatment or which are surplus to requirements;
- Treat and/or dispose of contaminated groundwater which is excavated (or pumped) during the works;
- Breaking out of concrete obstructions where present beneath proposed development areas;
- Chemical validation of all imported materials against suitable thresholds

Development phase (not to be completed as part of the Enabling Works package)

- Placement of a validated soils cover and geotextile in areas of proposed soft landscaping;
- Chemical validation of all imported topsoil and subsoil against suitable thresholds;
- Installation of appropriate services;
- Installation and independent verification of gas protection measures (if required);
- Record keeping for subsequent verification reporting;

4.2.4 During earthworks and construction, occurrences of gross contamination / Unacceptable Materials may be encountered. Provisions to address such materials is presented herein but where identified these should be appropriately assessed by a suitably qualified Environmental Consultant.

4.2.5 It is envisaged that these provisions shall be adhered to within their Method Statements / Plans of work or alternative provisions be agreed subsequently with the Local Planning Authority. All provisions provided by the Contractor in this regard should accord with current practice and regulations.

4.3 [Provision of a Watching Brief](#)

4.3.1 Prior to works, the Contractor shall complete a Construction Phase Health and Safety plan cognisant of the ground investigation information presented in the CampbellReith Land Quality Statements. The Contractor shall determine appropriate methods of work and mitigation provisions for groundworks as required by current guidance and legislation.

4.3.2 A site wide watching brief shall be completed by the Contractor throughout the groundworks/earthworks, particularly during the excavation of the pyramid structures and reduced level excavation on the western section of the site. This shall be recorded in the form

of a daily written diary that records: the works being undertaken; area of site being worked; dates of inspection; observations in relation to potential unforeseen contamination (if any); notifications to an Environmental Consultant (if any).

4.3.3 The watching brief shall comprise a visual inspection of the groundworks area and the Formation level by the Contractor, to identify any areas of potentially unforeseen contamination, in particular an inspection shall be made for the presence of:

- Stained or malodorous soils, particularly those containing hydrocarbons or hydrocarbon free products, or other contaminated/noxious/toxic liquids/materials;
- Soils containing potential ACM or Construction and Demolition Wastes with the potential to do so;
- Materials that are susceptible to spontaneous combustion;
- Fibrous or friable materials of any form;
- Underground fuel storage tanks/interceptors/pipework;
- Organic or compostable material;
- Unacceptable Material as defined by the Highways Agency 'Specification for Highways Work'; and,
- Other forms of contamination suspected by the Nominated Person

4.3.4 Generally, if such soils/features are identified they shall be separately excavated and stockpiled on a non-permeable membrane and the Environmental Consultant notified to determine the requirements for testing. In respect to ACMs, a specialist Asbestos advisor should be contacted in the first instance and then notify the Environmental Consultant.

4.3.5 In the event of discovering unforeseen contamination the Contractor shall record in full with a written record which includes:

- a description of contamination encountered (dates, time, events);
- location of the affected area (drawn on a site plan);
- photographs of the affected area/contamination;
- actions/methods taken to deal with associated contamination;
- risk assessments / controls to protect people and the environment;
- details of notice / correspondence to the Environmental Consultant / other specialists; and,
- associated waste records.

4.3.6 Based on the ground conditions encountered on site during intrusive works and the potential for relict infrastructure associated with the historical railway land to be present beneath the pyramid structures, discovery of further and potentially gross contamination should be anticipated.

4.3.7 Should no further contamination be identified on completion of the ground works, written and photographic confirmation to this effect shall be provided Contractor to the Environmental Consultant.

4.4 Japanese Knotweed and Invasive Species

4.4.1 A stand of Japanese Knotweed was encountered adjacent the road overpass (Market Street) on site [2]. Therefore, specialist advice with regards to the management of Japanese knotweed and invasive species during remediation and site redevelopment works will be required.

4.4.2 It is likely that excavation of the plants and rhizomes will be required and that the material will need to be disposed of off-site at a suitable waste management facility. No ground remedial works should commence until an invasive species management plan is produced for the site.

4.5 Asbestos Remediation

4.5.1 Asbestos in the form of fibre bundles of amosite or chrysotile were recorded in 8 no. samples of Made Ground retrieved during the 2023 enabling works ground investigation [1]. The asbestos was quantified to be <0.001% to 0.009% w/w (chrysotile and amosite) as shown in Appendix 1, Figure 4.

4.5.2 It is not feasible to remove asbestos from Made Ground where this is encountered; however, reuse of the Made Ground within defined areas of the site is considered to be appropriate, provided certain measures are in place. As asbestos fibres were present within or adjacent the pyramid features to be excavated, it is advised that practical measures such as dust suppression, wetting and reassurance air monitoring for dust and asbestos are conducted.

4.5.3 Subject to wider geotechnical considerations the reuse of site won Made Ground, free from indications of gross contamination, can be replaced beneath a validated soils capping layer, or beneath the construction of roads, buildings or hard standing, without further work to remove ACMs. The Made Ground must be replaced at a depth >450mm in communal landscaped areas and >600mm in private garden areas.

4.5.4 The remedial works are not considered likely to be either notifiable or licensable under CAR 2012. However, works in the Made Ground encountered across the site area still require a work plan and risk assessments in line with JIWG guidance and an ongoing watching brief for asbestos throughout works therein. A suitably qualified and experienced asbestos consultant should be retained by the Contractor for support and guidance on this topic.

4.5.5 Should more onerous asbestos conditions (such as areas of dumped asbestos materials) be identified as works progress it may be required to proactively remove asbestos from Made Ground. If this occurs a review should be made by a qualified asbestos specialist.

4.5.6 Wherever a formation level is reached in Made Ground, prior to works being completed to effect the desired levels and/or end use, a warning layer geotextile shall be placed in order to denote the boundary between the respective media and provide a risk mitigation barrier for

future ground workers. An entry should also be made in the health and safety file for the site to provide onward communication of the potential for asbestos to be present beneath this.

- 4.5.7 Any ACMs gathered from Made Ground by any such remedial works undertaken shall be double-bagged and disposed of off-site as hazardous waste. Further details on asbestos control measures are included in section 6.3.

4.6 Excavation of Pyramid Structures and Hydrocarbon Impacted Soils

- 4.6.1 As part of the enabling works, the material from the existing pyramid structures on the western section of the site will be excavated to approximately 1.0m from existing surrounding ground level and the entire site relevelled. Further investigation of the soils beneath the pyramid structures will be required to determine if any contamination is present that presents a risk to end users and to finalise the foundation design for any proposed buildings in this area.
- 4.6.2 Made Ground with hydrocarbon/sweet odours, and inclusions of clinker, ash, coal and slag were noted within or adjacent the pyramid structures. Elevated PAH compounds were also identified in Made Ground samples retrieved from the pyramids during the 2024 ground investigation. Therefore, an experienced geo-environmental engineer will be present during excavation works to inspect for suspect materials and allow effective segregation, stockpiling and validation of soils. A plan showing the location of the malodorous soils is shown in Appendix 1, Figure 5.
- 4.6.3 It is anticipated the reuse of materials on site will be to a formation level designed to create platforms for development. As mentioned above in section 4.5, low concentrations of asbestos in soils were detected within and adjacent to the pyramid structures which will require careful replacement at a suitable depth beneath hardstanding, buildings or a cover system.
- 4.6.4 Mechanical screening, such as a 3-way screener, is likely to be required to remove larger items from excavated material. Segregated materials from the screener will be placed into further temporary stockpiles for further testing. As materials are screened, the stockpiles produced will be visually assessed to ensure the segregation process is optimised. It is anticipated that the screening process will potentially produce dust or odours, and this shall be monitored for asbestos and dampened down as the works progress.
- 4.6.5 Any hydrocarbon impacted soils encountered will require further excavation to the top of any natural strata/groundwater present. Chemical analysis of the base and sidewalls of excavations will be undertaken and compared to the proposed Limiting Values for the total petroleum hydrocarbon (TPH) species present.
- 4.6.6 For any large excavations an appropriate validation grid will be agreed in writing with the Local Authority, subject to a minimum of one validation sample per excavation base and sides in all instances. Large scale excavations to remove hydrocarbon impacted soils are considered highly unlikely to be required based on the ground conditions encountered to date and existing chemical results.

4.7 Excavation and Treatment of Materials in the Former Pond Area

4.7.1 The material within the former pond area will be excavated to approximately 1.0-1.5m below ground level to competent clay strata. The Made Ground material above will be screened, processed or treated after excavation for reuse on site as general fill. It is anticipated the material will be treated using solidification/stabilisation techniques prior to placement on site to ensure the material meets chemical and geotechnical criteria, to be established at detailed design stage. Laboratory testing shall be required after the material has been processed to determine the suitability.

4.7.2 The bulk excavation operation will also benefit from being able to deal with unforeseen contamination as it is encountered. The proposed options will allow the majority of site materials to be retained on site, however, it is likely that a proportion of material will be unsuitable for treatment and/or reuse on site and will require off-site disposal.

4.8 Concrete

4.8.1 There is the potential for concrete and stone blockwork associated with former railway infrastructure and associated buildings will be excavated as part of advanced enabling works. The former goods station and railway platforms were present beneath the area of the pyramid structures; therefore, it is anticipated that concrete slabs and relict foundations / substructures may be present. These will need to be excavated and cleared / grubbed out as part of the works. Some of the arisings will require crushing before they can be reused and this shall be carried out under appropriate Mobile Treatment Permitting. It is anticipated that the crushed materials won from the enabling works can be used as general fill or to create haul roads. Any reinforcing bars present within the excavated arisings will be separated from the concrete, stockpiled and recycled at an appropriately permitted site.

4.9 Geotechnical Reuse Criteria

4.9.1 Geotechnical reuse criteria will also need to be established to ensure that earthworks:

- Provide a suitable formation/development platform for the construction of buildings, highways and infrastructure
- Provide a suitable platform for the placement of materials and provides adequate geotechnical performance of materials across the site
- Minimises risk to foundation works for future development such as excavation and piling by avoiding the creation of in-ground obstructions

4.9.2 Geotechnical reuse criteria will be established at detailed design stage.

4.10 All Reused Made Ground Soils

4.10.1 All excavated Made Ground soils shall be inspected prior to reuse and should be demonstrated to be free of Unacceptable Materials (UM) including:

- Peat; materials from swamps, marshes and bogs;
- Logs, stumps and perishable material;

- Potentially noxious and/or deleterious materials;
- Potentially degradable material that presents a future source of gas;
- Material susceptible to spontaneous combustion;
- Material contaminated with vegetative matter including invasive plant species; and,
- Identifiable bulk asbestos containing materials (ACMs)

4.10.2 Should any visible potential asbestos containing material be encountered in soils during remediation works, consideration should be given to the requirement to employ an asbestos specialist with regard to appropriate segregation, handling and disposal of such materials as waste.

4.10.3 Where material is to be re-used, it will first be stockpiled, and representative sampling undertaken in order to assess its suitability for its proposed re-use. Based on the LQS report [1], the Made Ground soils will not be suitable for placement in the near surface environment in soft landscaped areas, unless under suitable validated cover soils, due to the presence of asbestos and elevated PAH compounds.

4.10.4 Granular Made Ground may be suitable for general fill. The minimum frequency of testing for site won material used under hardstanding and building footprints shall be one sample per 250m³ of soil, one test per material source and no less than three in total – whichever is the greater.

4.10.5 For site won soils proposed for reuse in proposed soft landscaping and private garden areas, the minimum frequency of testing shall be one sample per 50m³, one test per material source and no less than three in total – whichever is the greater.

4.10.6 Soils proposed for re-use under hardstanding and building footprints, or below 600mm in private gardens or communal landscaped areas should comply with the Limiting Values presented in Table 3, Appendix 2. Each sample shall be analysed for all the contaminants listed in the table.

4.10.7 It is not proposed to reuse hydrocarbon impacted materials within areas of proposed buildings without further risk assessment, compliance sampling and testing, noting that the proposed excavation and processing of the Made Ground will result in a degree of degradation of organic contaminants.

4.10.8 Any re-use of soils must be carried out in accordance with current waste guidance and, if appropriate, a Materials Management Plan (MMP) as defined in the CL:AIRE Code of Practice.

4.11 Waste Soil Arisings and Records

4.11.1 Any soil arisings proposed for off-site disposal shall be classified as 'Directive Waste' and subject to the current waste legislation.

4.11.2 Any soil or fill material imported to site shall comply with the requirements of the Groundworks Specification and the minimum requirements specified below. No waste materials shall be imported to site and only certified construction aggregates from material suppliers of non-waste status shall be used.

- 4.11.3 A hazardous properties assessment was carried out as part of the LQS for all ground investigations which identified that seven of the sixty-two Made Ground samples would be classified as hazardous waste if excavated for disposal due to elevated TPH concentrations. This material is generally restricted to the western section of the site within or adjacent to the existing pyramid structures. Another sample identified as potentially hazardous was located towards the northern boundary.
- 4.11.4 The Contractor shall utilise the existing chemical results included in the LQS Report, together with additional test results as necessary (such as analysis for Waste Acceptance Criteria (WAC), to classify surplus soils arisings prior to off-site disposal. It is noted that the existing data and reports are provided for information only and may not necessarily be representative of excavated soils in which case the Contractor shall be required to complete additional analysis to provide a representative description of the soils and classification in accordance with Environment Agency Guidance. It is the responsibility of the Contractor to ensure that sufficient data is available to inform the waste soils disposal aspect of the works and they shall carry out additional testing and/or assessment as required. If required, assistance and clarification should be sought from the Environmental Consultant.
- 4.11.5 The Contractor shall be fully responsible for the correct categorisation of inert, non-hazardous and hazardous waste, where appropriate, in accordance with best practice guidance prepared by the Environment Agency and provision of associated records.
- 4.11.6 If separate classifications of soil are excavated, then segregation of the different waste streams shall be required. This will ensure correct disposal and will avoid unnecessary increases to the costs associated with waste disposal.
- 4.11.7 Due to the costs associated with hazardous waste disposal, additional assessment should be carried out and subject to independent review prior to disposal to reduce the volume to the required minimum. For clarification, the requirement to remove soils for remedial purposes is driven by risk and not waste classification. Based on current data, soils that would be classified as hazardous waste if excavated for disposal do not require remedial excavation since no significant risk has been identified.
- 4.12 **Waste Management and Disposal**
- 4.12.1 The Contractor shall be responsible for obtaining all licenses and consents for waste operations and disposals associated with the works.
- 4.12.2 The Contractor shall ensure that the process of waste sorting and disposal will be managed by staff that recognise the subtlety of waste descriptions discussed herein and who have knowledge of the waste industry and appropriate contacts with landfill, and/or waste treatment, facilities.
- 4.12.3 Alternatives to landfilling of soils may be considered in order to provide a more cost effective and sustainable solution. The use of soil treatment centres should be investigated, particularly for the Made Ground, since these do not attract landfill tax. Alternatively, reuse of the validated natural soils on other sites could be possible if undertaken via a Materials Management Plan (MMP), as defined in the CL:AIRE Code of Practice.

- 4.12.4 All non-hazardous and hazardous waste should be treated, prior to disposal to landfill, in accordance with current waste guidance. It is noted that this may simply comprise segregation of appropriate waste streams but this is the responsibility of the Contractor
- 4.12.5 The Contractor shall comply with the Duty of Care requirements and ensure that Waste is deposited lawfully. The Contractor shall be responsible for providing necessary supervision, expertise and testing to ensure waste is lawfully classified and disposed of.
- 4.12.6 The Contractor shall maintain a record of all waste movements, which shall be provided to Environmental Consultant if a Verification Report is found to be required. The Waste Records shall comprise:
- Completed chain of custody documentation (both at the site gate and the receiving site (landfill etc.);
 - A copy of the receiving site's (i.e. landfill, treatment centre, treatment hub or appropriate other) environmental permit;
 - Description of the origin and type of waste;
 - List of Waste (European Waste Catalogue) Code;
 - Where necessary, Hazardous Properties Assessment
 - Waste characterisation, and
 - Waste carrier's licence.
- 4.12.7 Should any potentially asbestos containing material be encountered in soils during remediation works, the Contractor should seek the advice of an asbestos specialist with regard to appropriate handling and disposal of such materials.
- 4.13 **Placement of a Validated Soils Cover System in Areas of Proposed Soft Landscaping (Development Phase)**
- 4.13.1 Any soils imported for use within soft landscaping areas, including subsoil and topsoil, shall be of suitable chemical quality and shall only be sourced from reputable topsoil / sub-soil suppliers.
- 4.13.2 To protect end users of the site, imported validated cover soils will be required in all areas of proposed soft landscaping. This is predominantly due to the presence of asbestos fibres in the Made Ground and the risk of inhalation. However, elevated PAH compounds were also identified in Made Ground samples retrieved from the pyramids during the 2024 ground investigation. In addition, hydrocarbon/sweet odours and inclusions of clinker, ash, coal and slag were encountered in the Made Ground materials which are considered unsuitable for shallow soft landscaped areas.
- 4.13.3 It is anticipated that cover soils will be placed and validated as part of the site redevelopment works and not during the proposed enabling works.
- 4.13.4 For the imported validated cover soils, a minimum thickness of 450mm is required for communal soft landscaped areas and a minimum thickness of 600mm is required in private

soft landscaped gardens. Topsoil is to comprise no less than the upper 150mm of the cover soils.

4.13.5 A suitable geotextile membrane should be laid under any validated cover soils placed in order to provide a marker between the Made Ground and validated soils and to prevent upward migration of contaminants. Once the validated cover systems have been installed, they should be validated by the Environmental Consultant to ensure that the minimum thicknesses have been achieved.

4.13.6 It is recommended that verification of the soil cover system comprises pre and post placement topographical surveys of all areas where placed, photographic survey of the works and hand excavation of inspection pits to allow measurement of the thickness of the soils post placement.

4.14 Suitability of Imported (Sub/Top) Soil for Use in Soft Landscaping Areas (Development Phase)

4.14.1 In addition to the chemical criteria noted in Appendix 2, the soils imported for use within soft landscaping areas shall accord with the British Standard requirements for topsoil / subsoil and be free from indications of unacceptable material.

4.14.2 Soils for the purposes of a capping layer system will need to be demonstrably suitable for use for Human Health and be protective of Controlled Waters. The Contractor shall undertake sufficient testing and source validation to ensure imported soils comply with the Limiting Values, in the tables presented in Appendix 2. Each sample shall be analysed for all the contaminants listed in the tables.

4.14.3 The soils imported to a depth of 600mm in private residential soft landscaped gardens should comply with the Limiting Values present in Table 1. The soils imported to a depth of 450mm in communal soft landscaped areas should comply with the values for public open space residential presented in Table 2.

4.14.4 Analysis is required prior to import and then in-situ testing is required once installed: the minimum frequency of testing for soft landscaping shall be one sample per 50m³ of imported soil, one test per material source and no less than three in total – whichever is the greater. The Contractor shall determine the number of samples required to provide representative results of the imported soils to confirm that they comply with the Limiting Values.

4.14.5 Chemical certificates and information regarding the source of material shall be maintained to demonstrate the quality of this material. Samples shall be obtained and analysed in accordance with the BS 5930, BS 10175 and Environment Agency Guidance on soils sampling using MCERT / UKAS certified analysis with an associated Chain of Custody.

4.14.6 It should be recognised that, with the rise of materials transfer, there is a risk of importing contamination in soils used for soft landscaping. The Contractor shall implement any necessary additional testing to ensure that this does not occur.

4.15 Services (Development Phase)

4.15.1 Services shall be constructed in accordance with separate drainage and service specifications. The Contractor and/or the M&E Engineer shall select pipework particularly that for potable

water supply, with tolerance adequate to accommodate the chemical concentrations that have been identified in the soil and groundwater. Isolated observations of hydrocarbon odours were noted during the ground investigation works and it is likely that an increased specification for potable water pipes is required. Hydrocarbon observations were predominantly associated with Made Ground deposits within or adjacent the pyramid structures, or near the northern boundary, however, further occurrences of such cannot be ruled out at this stage. The Contractor and/or the M&E Engineer should consult the Utility Provider for the site and obtain written confirmation that pipework specification complies with their particular requirements.

4.16 Ground Gas Protection Measures (Development Phase)

- 4.16.1 The site has been preliminary classified as CIRIA Characteristic Situation 2 (low risk), however sporadic flow rates were encountered during the ground investigation [1]. Based on the current data, the requirement for ground gas protection measures should be confirmed following confirmation of final development plans and completion of additional monitoring post completion of the enabling works phase.
- 4.16.2 Should a CS2 Classification be confirmed following the additional monitoring, then ground gas protection measures will be required in all proposed buildings.
- 4.16.3 Reference to Table 4 of BS8485:2015+A1:2019¹ presents a matrix of different building types against CIRIA Characteristic Situations that provides indicative scores for gas protection. At this stage, the masterplan option includes terraces, apartment blocks and commercial buildings. The residential properties fall into Type A and Type B Building categories and a Gas Protection Score of 3.5 should be achieved. The commercial buildings fall into a Type C Building category and a Gas Protection Score of 2.5 should be achieved.
- 4.16.4 Tables 5 - 7 of BS8485:2015+A1:2019, attribute a score for each gas protection measure proposed. As such, the measures detailed below are appropriate to guard against potential risks arising from ground gas ingress through future building footprints. It is noted that the design of the measures should be carried out by a suitably qualified person / engineer for approval under the planning process:

Residential Properties

- The installation of a passive sub floor dispersal layer with a 'good performance' rating (score 1.5); and,
- Installation and independent verification of a proprietary ground gas resistant membrane in accordance with the requirements set out with CIRIA C735 (score 2).

Commercial Buildings

- The installation of a pressure relief pathway (usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building) (score 0.5); and,

¹ BS 8485:2015+A1:2019 Code of practice for the design of protection measures for methane and carbon dioxide ground gases for new buildings

- Installation and independent verification of a proprietary ground gas resistant membrane in accordance with the requirements set out with CIRIA C735² (score 2).

4.16.5 In accordance with BS8485:2015+A1:2019, the gas resistant membrane should meet the following criteria:

- Sufficiently impervious to the passage of methane and carbon dioxide through the membrane sheet and joints;
- Sufficiently strong to withstand the installation process, follow on construction activities and in-service stresses;
- Sufficiently durable to last for the anticipated lifespan of the building and duration of gas emissions;
- Chemically resistant to degradation by other contaminants that may be present on-site.

4.16.6 After installation, the membrane should be capable of providing a complete barrier to gas entry. If the installed gas membrane does not meet all the criteria mentioned above, then the 'score' is zero.

² CIRIA C735 Good practice on the testing and verification of protection systems for buildings against hazardous ground gases

5.0 CONTROLLED WATERS REMEDIATION

- 5.1.1 Targeted remedial works in relation to controlled waters are not considered to be required due to the absence of any significant contamination identified during the ground investigations.
- 5.1.2 Given the potential for more onerous ground conditions to be encountered during site development, the remedial recommendations presented herein are cognisant of the requirement to maintain good practice and environmental controls as works progress, such that any gross contamination encountered may be prevented from impacting potential controlled waters receptors.
- 5.1.3 In any event where free product is encountered, it should be removed from excavations by the installation of skimming pumps or use of adsorbent pads. The free phase product would be collected in above ground storage tanks and if required separated from water prior to disposal.
- 5.1.4 Should gross contamination be encountered during the works, the proposed approach to mitigating potential risks to controlled waters may be summarised as follows:
- Removal of any free product encountered from the site;
 - Removal of any Unacceptable Materials present;
 - Undertake validation sampling from base and sides of excavations completed to remove Unacceptable Materials;
 - Apply appropriate Limiting Values to results of validation sampling;
 - If any exceedances of Limiting Values are identified, undertake DQRA to develop appropriate criteria for the protection of controlled waters and re-assess validation sampling results against these; and,
 - If exceedances remain (considered unlikely), undertake further excavation of media exceeding developed criteria and repeat validation sampling.
- 5.1.5 The ground investigation boreholes shall be fully decommissioned in accordance with Environment Agency Guidance 'Decommissioning Redundant Boreholes and Wells'.

6.0 DEVELOPMENT CONTROLS

6.1 Regulatory Approval

6.1.1 As detailed above, at the time of this report, a planning application for the proposed redevelopment of Pyramid Park has not yet been submitted.

6.1.2 Once planning permission is obtained, it is recommended that this Strategy and the approach to the verification of the works is agreed in principle with the Local Planning Authority, prior to the commencement of works. At this stage, this Remediation Strategy may need to be revised in line with approved works.

6.2 Contractor's Method Statements and Risk Assessments

6.2.1 A specific working plan, method statements and risk assessments shall need to be prepared stating the methodology proposed to achieve the remedial targets, as well as control and mitigate potential unforeseen risks which may be encountered as the works progress.

6.2.2 It will require specific methods for:

- Health and safety controls to be employed throughout works undertaken, notably including risk assessment, method statement and Plans of Work relating to works within soil media potentially containing asbestos;
- Remediation works to be undertaken.
- Environmental preliminaries (minimising dusts, odours/gases and noise etc.) and adhere to guidance in CIRIA C741; and,
- Control of potential wastes.

6.2.3 It is recognised that supplemental specifications and documents relating to other works, engineered elements and works packages will be required in relation to the proposed development.

6.3 Implications of the Presence of Asbestos

6.3.1 The presence of asbestos in soils beneath the site is considered to have a number of implications with regards to the planning, management, undertaking and monitoring of works within potentially impacted media, i.e. Made Ground within the pyramid structures. Pertinent matters for consideration are summarised in the following sections noting that the Contractor shall be required to undertake their own assessment in order to properly control their works.

Applicability of the Control of Asbestos Regulations 2012

6.3.2 Guidance provided in ACoP L143³ states, in respect to the determination of asbestos in bulk materials, that any mixture containing one or more of these fibrous silicates at more than "trace" amounts (as defined in Appendix 2 of the first edition of HSG248⁴), is within this definition.

³ Control of Asbestos Regulations 2012, the approved Code of Practice (ACOP) and guidance text

⁴ Asbestos: The Analysts' Guide May 2021 HSG248

6.3.3 Section 4.23 of HSG248 states that “if during a search only 1 or 2 fibres are seen and identified as asbestos, the term “trace asbestos identified” should be used”.

6.3.4 Further to this, the Contaminated Land: Applications in Working Environments (CL:AIRE) and the Joint Industry Working Group (JIWG) produced the guidance document “Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction Demolition Materials”, published in 2016 (commonly known as CAR-SOIL). This included some additional detail regarding the quantification and definition of “trace asbestos”; and states:

“For samples of soil and construction and demolition materials where no fragments of ACMs are isolated and fewer than three asbestos fibres are identified during detailed and extended identification and gravimetric analysis procedures combined, the mass concentration of asbestos fibre is likely to be many orders of magnitude below the 0.0001% w/w Limit of Detection; this generally taken to mean “trace” asbestos fibre contamination”.

6.3.5 As such, based on the laboratory analysis results and descriptions, the above definition of “trace asbestos” is considered likely to have been exceeded in several of positive asbestos identifications made.

6.3.6 CAR-SOIL states that “work with asbestos” is defined in the CAR 2012 as including:

- Work which removes, repairs or disturbs asbestos;
- Work which is ancillary to such works; and,
- Supervising the work referred to in the two points above.

6.3.7 For soils and construction and demolition materials, this may include such works as excavations and earthworks, maintenance operations and ground investigations.

Sporadic and Low Intensity (SALI) exposure

6.3.8 For exposure to exceed SALI the concentration of asbestos in the breathing zone of workers should not exceed (or be liable to exceed) 0.6 fibres/cm³ (f/cm³) over a ten-minute period.

6.3.9 According to the HSE, significant visible quantities of bound ACMs will need to be present to give rise to exposures above 0.01f/cm³ (unless they are subjected to highly energetic processes). No such asbestos conditions are considered to have been encountered on site to date though a watching brief should be maintained in the event that more substantial asbestos exists in the ground.

Licensed Work

- 6.3.10 Some work with asbestos requires an appropriate licence, and is driven by exposure (must not exceed SALI), an inability to demonstrate that a control limit of fibres in air (0.1f/cm³ over a four hour period) will not be exceeded, and the nature of the asbestos products with which the work is associated.
- 6.3.11 No asbestos conditions which would potentially require an asbestos licence are considered to have been encountered at the site to date; however, the potential for such conditions to be identified as works progress has not been discounted.

Plan of Work

- 6.3.12 Regulation 7 of CAR 2012⁵ states that "An employer must not undertake any work with asbestos without having prepared a suitable written plan of work detailing how that work is to be carried out".
- 6.3.13 Given the instances of asbestos above "trace" identified at the site, this is considered to be applicable to any groundworks proposed within the Made Ground present on the site.
- 6.3.14 In addition to general details regarding the site, this plan must include details of methods and mitigation measures employed to control risks.
- 6.3.15 Given the generally low concentrations of asbestos identified, and the assertion that the generation of fibres is significantly impeded in soil environments, these mitigation measures are considered likely to entail requirements such as the provision of appropriate PPE to workers, the manual damping down of excavations within Made Ground, and similar measures as necessary wherever impacted materials may require stockpiling or transportation etc.

Training and Competence

- 6.3.16 Where works not requiring a licence are proposed, workers must still be trained and competent; and appropriate measures must be put in place to eliminate asbestos exposure or reduce it to as low as reasonable practicable.

Summary

- 6.3.17 Provisions will be required to control asbestos risks during all groundworks and demolition processes. It should be noted that CAR 2012 and ACoP L143 relate to all work with asbestos and where some asbestos is known to occur, and it will be necessary that any Contractor understands their obligations in this regard in order to complete their works.
- 6.3.18 Any contractor employed will therefore be required to have "competent persons", or employ such persons, to prepare documents such as risk assessments, Plans of Work and method statements in a manner which comply with the Regulations.
- 6.3.19 Workers involved with undertaking works with asbestos will need to have been suitably trained and instructed; and be provided with appropriate information in line with Regulation 10.

⁵ CAR-SOIL™ Control of Asbestos Regulations 2012. Interpretation for managing and working with asbestos in soil and construction and demolition materials: Industry guidance.

6.3.20 It is recommended that general provisions to minimise dust generation and control dust are considered a minimum, in addition to any other provisions potentially required by future work plans for ongoing air and dust monitoring as an additional control measure.

6.3.21 Although the current quantification of asbestos in soils is typically low, asbestos containing materials may be encountered within the Made Ground materials elsewhere, particularly during excavation of the pyramid structures and any relict railway infrastructure beneath. Therefore, provision should be made to readily identify and appropriately manage such instances should they occur during intrusive works coming into contact with this media.

6.4 Assessment of Asbestos Exposure

6.4.1 Regulation 6 requires employers to carry out an assessment to identify the risk of exposure to asbestos and identify any steps required to comply with the Regulations.

6.4.2 This assessment should also be capable of being responsive and adaptive in light of changing circumstances, such as more onerous asbestos conditions than those previously observed being encountered as works progress.

6.4.3 It is important to note that this risk assessment should also include other, non-asbestos related risks too, as required by Regulation 3 of the Management of Health and Safety at Works Regulations (1999).

6.4.4 As outlined above, a key threshold with regards to asbestos exposure is whether or not this is likely to be sporadic and of low intensity (SALI). Based on on-site observations and the laboratory results received, the asbestos conditions as they are currently understood are considered unlikely to exceed this. Section 6 of CAR-SOIL provides extensive further guidance on the undertaking of this risk assessment.

6.4.5 With regards to general requirements for the assessment and the competency of those producing it, these can be summarised as follows:

- It must be undertaken in a timely manner to allow any mitigation measures required to be put in place before works begin;
- It should be job-specific, covering the full scope of proposed works and potential exposure receptors;
- It should communicate significant findings to employees and any other relevant parties in an understandable way; and,
- It should be undertaken by someone:
 - o With adequate knowledge, training and expertise in understanding the risks from asbestos in the ground;
 - o Who can make informed, appropriate decisions about the risk present and precautions needed;
 - o Who understands how the works may disturb asbestos;
 - o Be familiar with and understand the requirements of the Regulations; and,

- o Be able to estimate the expected level of exposure to decide whether or not the control limit is likely to be exceeded.
 - It should be noted that Regulation 6 should be read in conjunction with Regulation 11(1), which places a duty on employers to entirely prevent such exposure so far as this is reasonably practicable, or reduce the risk of exposure as far as reasonably practicable if this is not achievable.
 - As such, provision for the implementation of basic control measures to reduce dust generation, control dust and provide air quality reassurance monitoring will be included as a minimum.

6.5 Notifiable Work

6.5.1 Regulation 9 of the CAR 2012 requires employers to notify the appropriate enforcing authority of some proposed work with asbestos.

6.5.2 All licensable work will require such a notification. For non-licensable works, these may be exempt from Regulation 9 if:

- a) The exposure to asbestos is SALI; and,
- b) It is clear from the risk assessment that the exposure to asbestos of any employee will not exceed the control limit; and,
- c) The work can be categorised as one of four lower risk processes, further details of which are provided in CAR 2012 but have not been repeated here.

6.5.3 Based on the ground conditions encountered to date the works are not considered to require notification. However, the potential for some asbestos containing materials which would potentially require the works to be notifiable to be encountered during the works cannot be discounted.

6.5.4 As stated in CAR-SOIL, the final decision in this regard is a matter of judgement and opinion and should be made by a person i) with sufficient experience and knowledge, ii) who has been trained according to the requirements of Regulation 10 of the CAR 2012, and iii) is capable of demonstrating their decision to be reasonable.

6.6 Control and Mitigation Measures

6.6.1 General and specific control and mitigation measures should be detailed in a Construction and Environmental Management Plan (CEMP), which should be submitted to the Local Planning Authority in due course. The following sections summarises relevant considerations during the remediation phase.

6.6.2 Site works should be undertaken in accordance with the Construction, Design and Management (CDM) Regulations 2015 and guidelines presented by the Health and Safety Executive (HSE).

6.6.3 It shall be a requirement of the Contractor to obtain any of the permits necessary which may include, but not necessarily be limited to:

- A Mobile Plant Permit (MPP) (Environmental Permit) for the treatment of contaminated soils, materials and substances; and,
- Discharge Consents for any surface water and/or groundwater.

6.6.4 On the basis of the chemical information available to date, the risks to Site works should be low and standard health and safety provisions should be acceptable (the adoption of good hygiene and the use of overalls, gloves and dust masks as necessary). However, where hydrocarbons are encountered, appropriate masks may be required and as such, supplies should be available on site.

6.6.5 During site works, detailed control measures will be required to include (but not limited to):

- Monitoring of actual changes to ensure mitigation of potential adverse effects;
- Education of construction workers to risks associated with contamination;
- Appropriate warning signage;
- Provision of suitable PPE and decontamination units (as required);
- Collection of appropriate validation information; and,
- Production of a Validation Report for the mitigation measures employed.

6.7 Dust and Asbestos in Air

6.7.1 Dust control will be a principal requirement, particularly in respect of working with Made Ground soils. The Contractor will ensure that measures to suppress dust are in place when dealing with the stockpiles or excavating and disposing of any fill material. The Control of Substances Hazardous to Health Regulations (COSHH) apply to such materials and HSE have issued a guidance note - Construction Information Sheet No 36 (revision 2) - laying out how the risks can be minimised, both to site users and neighbouring sites. The Contractor shall follow the advice in this and all appropriate guidance. Measures may include wheel washing and sheeting of vehicles, damping down of materials and appropriate personal protection equipment for workers.

6.8 Odour

6.8.1 From observations from the ground investigation phase, it is considered that Made Ground soils may exhibit hydrocarbon or sweet odours, particularly within the pyramid structures on the western section of the site and near the northern boundary.

6.8.2 Any odours are considered likely to be strongest during excavation and stockpiling and as such the stockpiling areas should be sited as far away from occupied areas as reasonably practicable and placed on a non-permeable membrane.

6.8.3 Daily monitoring shall be undertaken by the Contractor. In the event of excessive odours being produced, immediate action must be taken to stop operations producing odours and report it within the daily site diary.

6.9 Noise and Vibration

6.9.1 The site is located in a commercial and residential setting, and potential noise and vibration nuisance receptors are considered to be predominantly the Bury College building to the north and the residential properties to the east. In addition, a hotel is located beyond the tramlines on the western site boundary which may be impacted. Bury College and residential properties are present beyond the railway line on the southern site boundary which may also be impacted.

6.9.2 Working hours are not currently known and are likely to be dictated by the outstanding planning permission.

6.9.3 The Control of Noise at Work Regulations 2005 controls the protection of workers hearing. The Contractor must be aware of these controls and have suitable measures in place to avoid any nuisance.

6.10 Stockpile Management

6.10.1 All stockpiles shall be formed with good housekeeping in mind, covered where appropriate, with heights kept below 5.0m. Haul roads will also need to be kept validated and in good order.

6.10.2 There should be clear segregation of stockpiles such that the following materials are stockpiled and controlled in a manner which mitigates the potential risks posed by these to relevant receptors:

- Any Made Ground from the site, given the potential for this material to include asbestos;
- Suspect Materials, i.e. materials which present visual and/or olfactory evidence of possible contamination requiring further investigation (e.g., hydrocarbon odour); and,
- Unacceptable Materials, i.e. materials confirmed by chemical testing as containing contamination in excess of relevant reuse, and therefore requiring remediation or disposal off site as waste.

6.10.3 In addition, it should be noted that dependant on the mass balance at the site, site levels, and the sequences of works required to manage these; it may be necessary to stockpile site won soils for later reuse. The reuse requirements outlined in Section 4.9 and the chemical criteria provided in Appendix 2 should be applied to all stockpiled materials.

7.0 VERIFICATION REPORT

- 7.1.1 The Contractor shall provide their appointed Environmental Consultant with all of the necessary documentation detailed within this Remediation Strategy, in order to prepare a Verification Report for submission to the Local Authority.
- 7.1.2 For the avoidance of doubt the Contractor shall be solely responsible for the completion of works in order for the Environmental Consultant to produce the site Verification Report. This will confirm that a suitable level of remediation has been provided to address the environmental issues identified at the site, as indicated in the LQS report.
- 7.1.3 The Verification Report will include all the records referenced in this Remediation Strategy. Section 4.0 of this report should be referred to for the full details of the records required. In summary these comprise:

Enabling works phase

- Evidence of a watching brief (photographs and site diaries), including details of any unforeseen contamination encountered;
- Records associated with the removal and treatment of Japanese Knotweed by specialist contractors;
- Records associated with the movement and replacement of asbestos impacted soils, any boundary monitoring results, and disposal of any ACMs.
- Records associated with the excavation, stockpiling and screening of materials within the pyramid structures;
- Records associated with the excavation, stockpiling and screening of materials within the former pond area;
- Geotechnical testing results of any site-won soil materials following solidification/stabilisation techniques (if implemented).
- Records associated with waste management and disposal, including chain of custodies and permits;
- Chemical testing results of any site-won soil materials used as general fill;

Development phase

- Validation of the soil cover system including logs and photographic records of trial pits, evidence of soil thickness, pre and post topographical surveys;
- Chemical testing results for any imported soils in soft landscaped areas;
- Records to confirm installation of appropriate potable water services;
- If required, confirmation of the installation of gas protection measures to CIRIA C735 (Verification Report provided following independent inspection).

- 7.1.4 If no unforeseen contamination is encountered during groundworks, the Contractor shall provide the Environmental Consultant and Local Planning Authority with a written statement confirming that this was the case and present associated supporting records.

LIMITATIONS

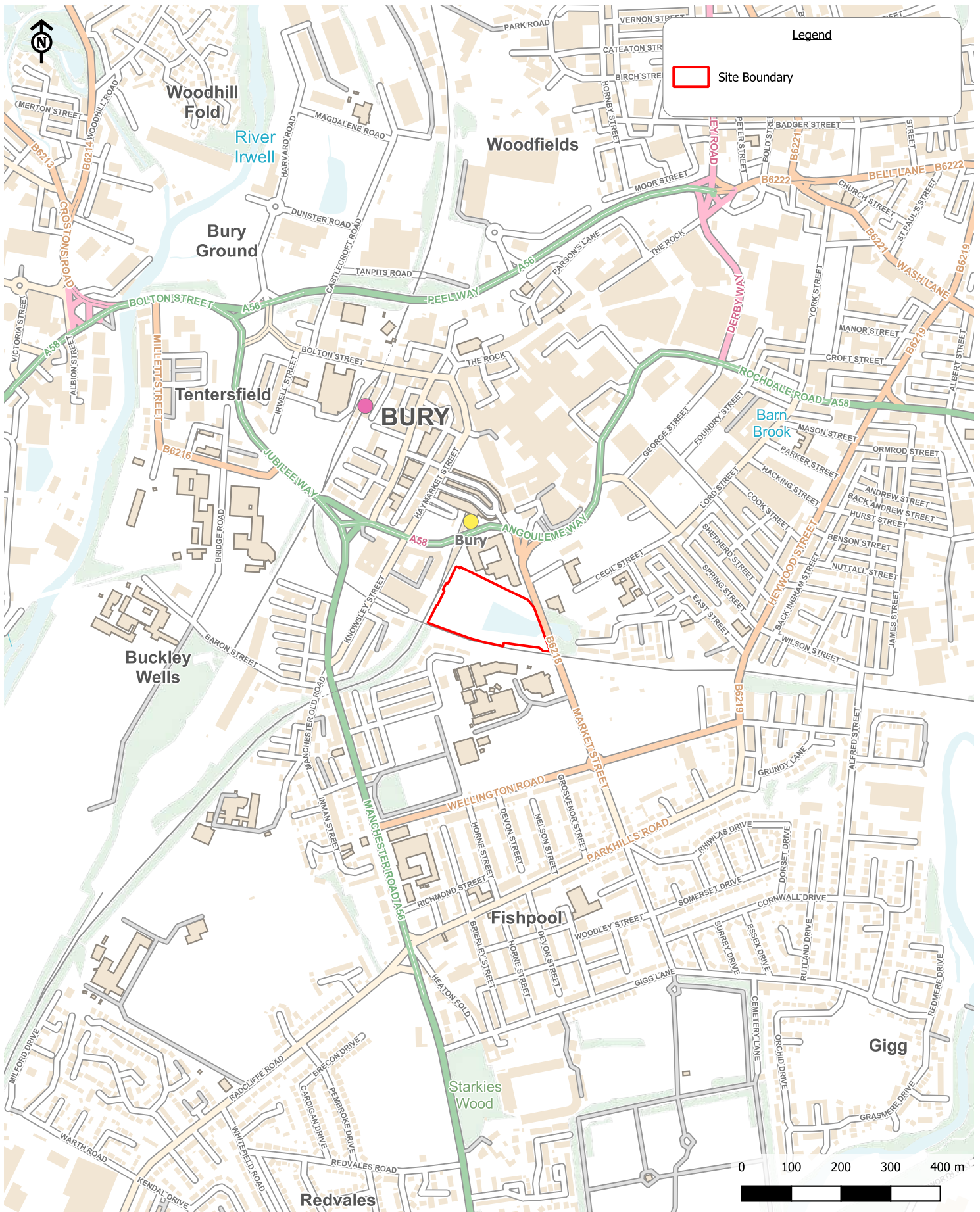
Environmental & Geotechnical Interpretative Reports

1. This report provides available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the client.
2. Where any data or information supplied by the client or other external source, including that from previous studies, has been used, it has been assumed that the information is correct. No responsibility can be accepted by CampbellReith for inaccuracies within this data or information. In relation to historic maps the accuracy of maps cannot be guaranteed and it should be recognized that different conditions on site may have existed between and subsequent to the various map surveys
3. This report is limited to those aspects of historical land use and enquiries related to environmental matters reported on and no liability is accepted for any other aspects. The opinions expressed cannot be absolute due to the limit of time and resources implicit within the agreed brief and the possibility of unrecorded previous uses of the site and adjacent land.
4. The material encountered and samples obtained during on-site investigations represent only a small proportion of the materials present on the site. There may be other conditions prevailing at the site which have not been revealed and which have therefore not been taken into account in this report. These risks can be minimised and reduced by additional investigations. If significant variations become evident, additional specialist advice should be sought to assess the implications of these few findings.
5. The generalised soil conditions described in the text are intended to convey trends in subsurface conditions. The boundaries between strata are approximate and have been developed on interpretations of the exploration locations and samples collected.
6. Water level and gas readings have been taken at times and under conditions stated on the exploration logs. It must be noted that fluctuations in the level of groundwater or gas may occur due to a variety of factors, which may differ from those prevailing at the time the measurements were taken.
7. Please note that CampbellReith cannot accept any liability for observations or opinions expressed regarding the absence or presence of asbestos or on any product or waste that may contain asbestos. We recommend that an asbestos specialist, with appropriate professional indemnity insurance, is employed directly by the client in every case where asbestos may be present on the site or within the buildings or installations. Any comments made in this report with respect to asbestos, or asbestos containing materials, are only included to assist the client with the initial appraisal of the project and should not be relied upon in any way.
8. The findings and opinions expressed are relevant to those dates of the reported site work and should not be relied upon to represent conditions at substantially later dates.
9. This report is produced solely for the benefit of the client, and no liability is accepted for any reliance placed upon it by any other party unless specifically agreed in writing.

Appendix 1

Figures

- Figure 1 Site Location
- Figure 2 Annotated Site Layout
- Figure 3 Proposed Masterplan Options
- Figure 4 Asbestos Encountered in Soils
- Figure 5 Malodorous Soils



Pyramid Park Enabling Works
 Client: Homes England

Figure 1:
 Site Location

Scale: 1:10000@A4
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 Contains Ordnance Survey data © Crown copyright and database right 2024.
 Job Number: 14111
 Drawn by - Checked by: RLF - RA/SM
 Drg No - Status/Revision: 14111-CRH-XX-FG-G-7010 - P2
 File location: N:\14000 - 14249\14111 M - Pyramid Park Enabling Works\Project_Workspaces\LQ5 (pdf in Outputs)
 Date (Revision History): 08/11/2024 (P1, First Issue, 07/03/24, RLF; P2, Site Boundary, 08/11/24, RLF)

CampbellReith
 consulting engineers
 LONDON 020 7340 1700 ■ MANCHESTER 0161 819 3060
 BRISTOL 0117 916 1066 □ BIRMINGHAM 01675 467 484
www.campbellreith.com



Legend

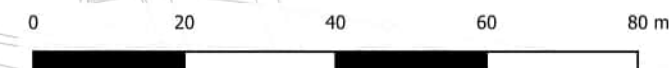
Site Boundary

Pyramid structures

Market Street overpass running over the site

Historical pond

Existing access ramp from Market Street



Pyramid Park Enabling Works

Client: Homes England

Figure 2:
Site Layout

Scale: 1:1000@A3
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InoRail - Topographical Survey: P-223-090-SUR-DWG-0001 (Feb 2022)
Job Number: 14111
Drawn by - Checked by: RLF - RA/SM
Drg No - Status/Revision: 14111-CRH-XX-XX-FG-G-7011 - P2
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Date (Revision History): 08/11/2024 (P1, First Issue, 08/03/24, RLF; P2, Site Boundary, 08/11/24, RLF)

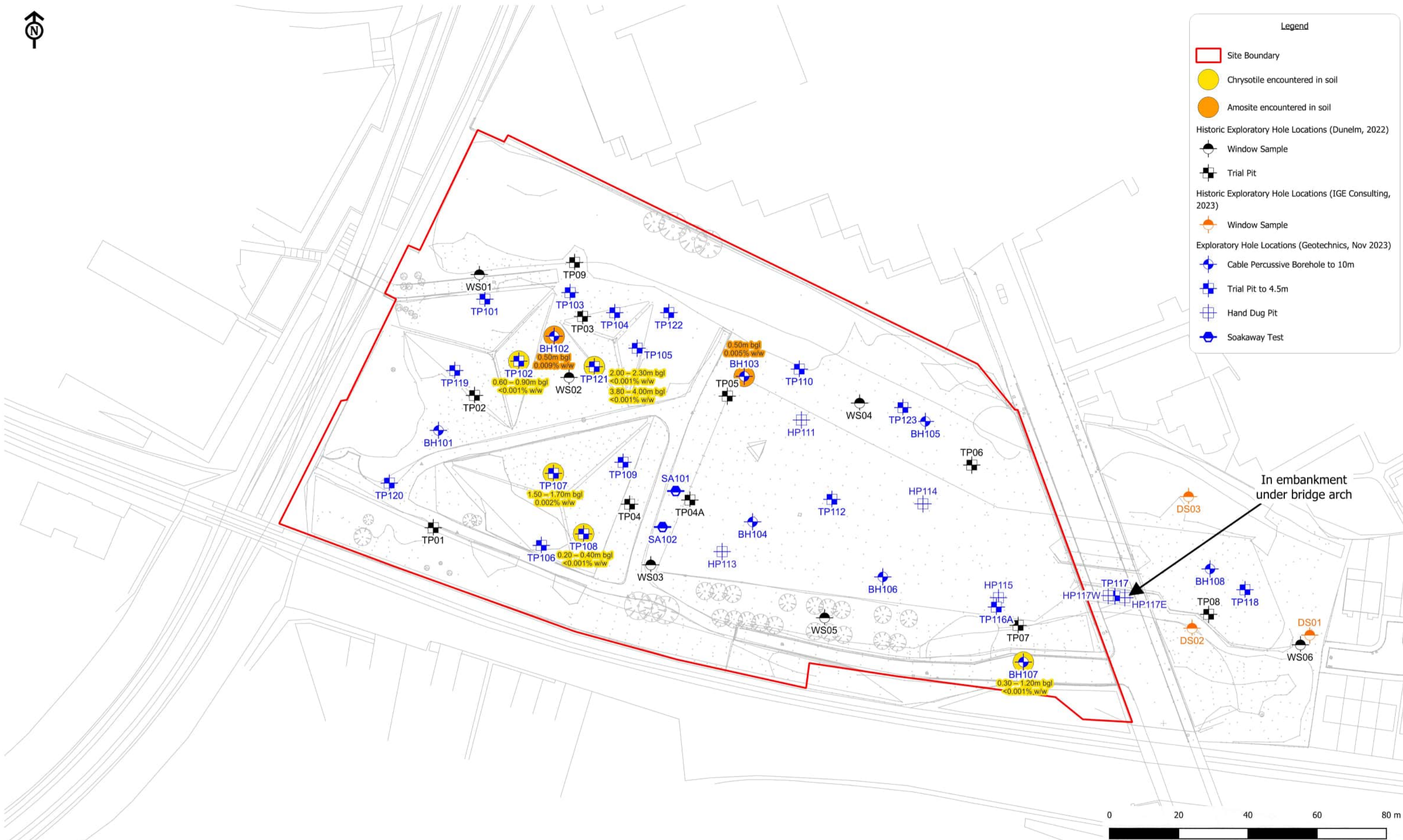
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consulting engineers
LONDON 020 7340 1700  MANCHESTER 0161 819 3060
BRISTOL 0117 916 1066  BIRMINGHAM 01675 467 484
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Pyramid Park Enabling Works

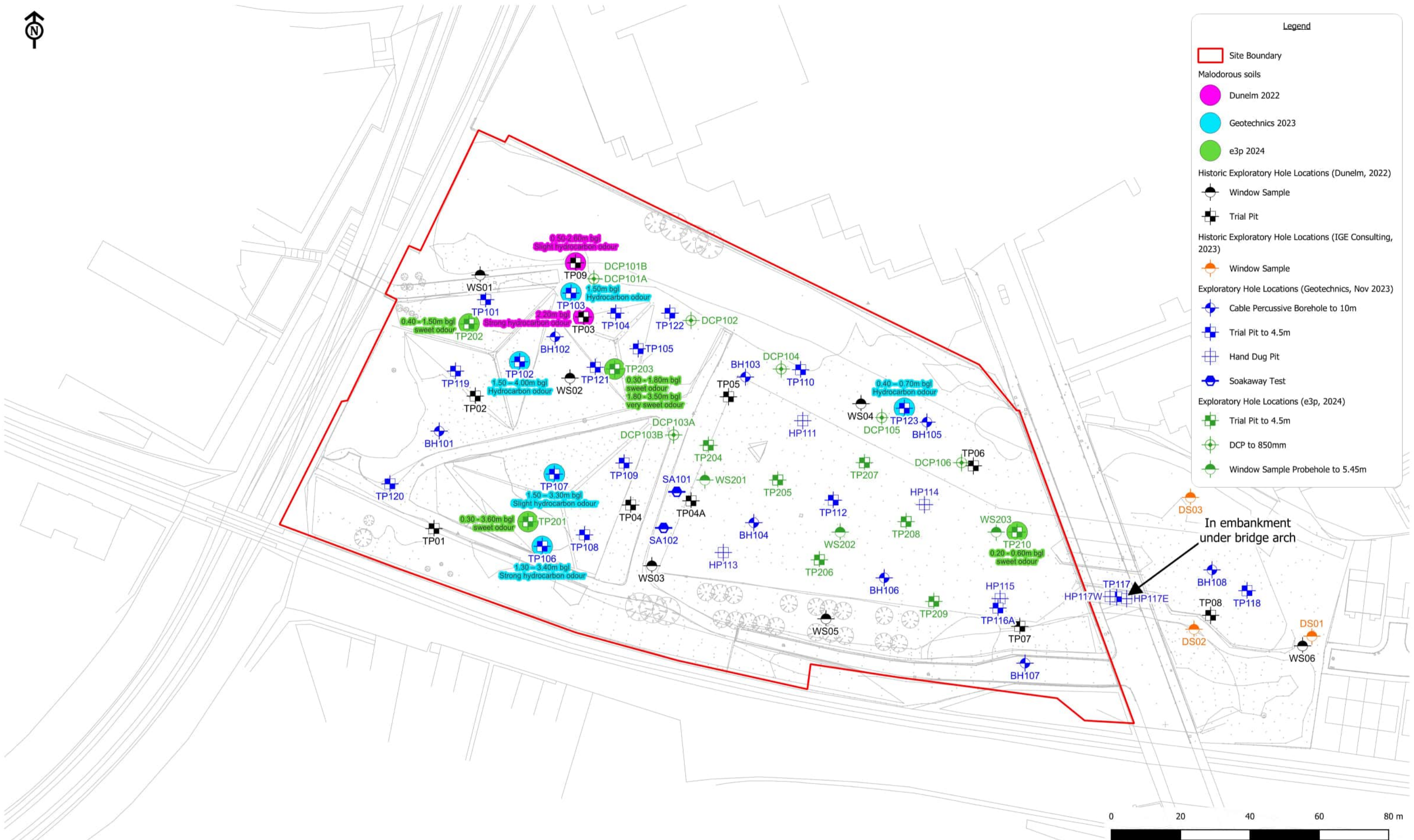
Client: Homes England

Figure 3:
Proposed Layout



Client: Homes England

Figure 4:
Asbestos Encountered in Soils



Pyramid Park Enabling Works

Client: Homes England

Figure 5:
Malodorous Soils

Appendix 2

Validation Criteria for Imported and Re-Use of Soil

Table 1 Imported Soil and In-situ Soil
Validation Criteria (Residential End Use
with Private Gardens)

Table 2 Imported Soil and In-situ Soil
Validation Criteria (Public Open Space -
Residential)

Table 3 In-situ Soil Validation Criteria for
Soils Reused Under Hardstanding,
Building Footprints or Below 600mm in
Soft Landscaped Areas

TABLE 1 Imported Soils and In-situ Soil Validation Screening Criteria (Residential End Use with Private Gardens)

SUBSTANCE	MAX SOIL CONCENTRATION (mg/kg)
Metals and cyanide	
Arsenic	37 ^A
Beryllium	1.7 ^A
Cadmium	22 ^B
Chromium (Total)	910 ^A
Copper	200 ^D
Inorganic Mercury (Total)	42 ^A
Selenium	270 ^A
Nickel	110 ^D
Lead	200 ^B
Vanadium	480 ^A
Zinc	300 ^D
Cyanide (Total)	24 ^C
Asbestos	
Asbestos	<0.001%
Asbestos containing material	not present
BTEX	
Benzene	0.20 ^A
Toluene	160 ^A
Ethylbenzene	50 ^A
Xylene (total)	59 ^A
Phenolics	
Phenol (total)	130 ^A
Polycyclic Aromatic Hydrocarbons	
Naphthalene	2.3 ^A
Acenaphthylene	190 ^A
Acenaphthene	230 ^A
Fluorene	180 ^A
Phenanthrene	100 ^A
Anthracene	2,600 ^A
Fluoranthene	310 ^A
Pyrene	670 ^A
Chrysene	16 ^A
Benzo(a)anthracene	7.4 ^A
Benzo(b)fluoranthene	2.6 ^A
Benzo(k)fluoranthene	78 ^A
Benzo(a)pyrene	5.0 ^A
Indeno(123-cd)pyrene	28 ^A
Benzo(ghi)perylene	320 ^A
Dibenzo(ah)anthracene	0.2 ^A
Total Petroleum Hydrocarbons	

TPH	EC>5-10	27 ^E
	EC>10-12	81 ^E
	EC>12-16	160 ^E
	EC>16-21	290 ^E
	EC>21-40	1,100 ^E

Notes: All values above assume 1% Soil Organic Matter (SOM). ^AS4UL for Residential end use with p/u. ^BC4SL for Residential end use with p/u. ^CSoBRA Acute Risk GAC. ^DBS3882:2015 Topsoil Requirements (assuming pH>7.0). ^ES4UL for Residential end use using lowest value for aliphatic/aromatic hydrocarbon fraction. Other requirements: all soils must be free from metal, plastic, wood, glass, bitumen macadam, paper, odours and organic matter (except within topsoil) and shall be sorted into an appropriate size fraction and comply with the requirements of the landscaping specification. Maintain the following records: a description of the source, type and quantity of material, documentation to demonstrate legality and a non-waste status of materials, analytical testing records that show suitability of the material. Sample storage and handling – All samples should be placed in prepared, analysis specific sample jars/bottles and labelled with sample record details, sample ID, time and date of collection. Each sample shall comprise a plastic tub, amber vial and volatile jar or methanol preservative vial, supplied by the laboratory. Ensure that all samples are stored and transported in a suitable manner for sample preservation. The analysis laboratory shall have UKAS accreditation for each of the test types required. The test data sheets shall show Limits of Detection, Laboratory accreditation to BS EN ISO/IEC17025:2000 and other supporting information if requested. All samples shall be retained by the specialist under suitable/refrigerated conditions for a period of one month after receipt of the final report by the Engineer. Asbestos analysis must be to HSG 248.

TABLE 2 Imported Soils and In-situ Soil Validation Screening Criteria (Public Open Space – Residential)

SUBSTANCE	MAX SOIL CONCENTRATION (mg/kg)
Metals and cyanide	
Arsenic	79 ^A
Beryllium	2.2 ^A
Cadmium	220 ^B
Chromium (Total)	1,500 ^A
Copper	200 ^D
Inorganic Mercury (Total)	120 ^A
Selenium	1,100 ^A
Nickel	110 ^D
Lead	630 ^B
Vanadium	2,000 ^A
Zinc	300 ^D
Cyanide (Total)	24 ^C
Asbestos	
Asbestos	<0.001% *
Asbestos containing material	not present *
BTEX	
Benzene	140 ^A
Toluene	56,000 ^A
Ethylbenzene	24,000 ^A
Xylene (total)	41,000 ^A
Phenolics	
Phenol (total)	440 ^A
Polycyclic Aromatic Hydrocarbons	
Naphthalene	4,900 ^A
Acenaphthylene	15,000 ^A
Acenaphthene	15,000 ^A
Fluorene	9,900 ^A
Phenanthrene	3,100 ^A
Anthracene	74,000 ^A
Fluoranthene	3,100 ^A
Pyrene	7,400 ^A
Chrysene	57 ^A
Benzo(a)anthracene	29 ^A
Benzo(b)fluoranthene	7.1 ^A
Benzo(k)fluoranthene	190 ^A
Benzo(a)pyrene	10 ^A
Indeno(123-cd)pyrene	82 ^A
Benzo(ghi)perylene	640 ^A
Dibenzo(ah)anthracene	0.57 ^A
Total Petroleum Hydrocarbons	

TPH	EC>5-10	5,000 ^E
	EC>10-12	5,000 ^E
	EC>12-16	5,100 ^E
	EC>16-21	3,800 ^E
	EC>21-40	3,800 ^E

Notes: All values above assume 1% Soil Organic Matter (SOM). ^AS4UL for Public Open Space Residential. ^BC4SL ^CSoBRA Acute Risk GAC. ^DBS3882:2015 Topsoil Requirements (assuming pH>7.0). ^ES4UL for Public Open Space Residential using lowest value for aliphatic/aromatic hydrocarbon fraction. Other requirements: all soils must be free from metal, plastic, wood, glass, bitumen macadam, paper, odours and organic matter (except within topsoil) and shall be sorted into an appropriate size fraction and comply with the requirements of the landscaping specification. Maintain the following records: a description of the source, type and quantity of material, documentation to demonstrate legality and a non-waste status of materials, analytical testing records that show suitability of the material. Sample storage and handling – All samples should be placed in prepared, analysis specific sample jars/bottles and labelled with sample record details, sample ID, time and date of collection. Each sample shall comprise a plastic tub, amber vial and volatile jar or methanol preservative vial, supplied by the laboratory. Ensure that all samples are stored and transported in a suitable manner for sample preservation. The analysis laboratory shall have UKAS accreditation for each of the test types required. The test data sheets shall show Limits of Detection, Laboratory accreditation to BS EN ISO/IEC17025:2000 and other supporting information if requested. All samples shall be retained by the specialist under suitable/refrigerated conditions for a period of one month after receipt of the final report by the Engineer. Asbestos analysis must be to HSG 248.

TABLE 3: In-situ Soil Validation Screening Criteria for Soils Reused Under Hardstanding, Building Footprints or Below 600mm in Soft Landscaped Areas

SUBSTANCE		MAX SOIL CONCENTRATION (mg/kg)
Metals and cyanide		
Arsenic		640 ^A
Beryllium		12 ^A
Cadmium		410 ^B
Chromium (Total)		8,600 ^A
Copper		200 ^D
Inorganic Mercury (Total)		1,100 ^A
Selenium		12,000 ^A
Nickel		110 ^D
Lead		2,300 ^B
Vanadium		9,000 ^A
Zinc		300 ^D
Cyanide (Total)		24 ^C
BTEX		
Benzene		0.20 ^F
Toluene		160 ^F
Ethylbenzene		50 ^F
Xylene (total)		59 ^F
Phenolics		
Phenol (total)		440 ^A
Polycyclic Aromatic Hydrocarbons		
Naphthalene		2.3 ^F
Acenaphthylene		83,000 ^A
Acenaphthene		84,000 ^A
Fluorene		63,000 ^A
Phenanthrene		22,000 ^A
Anthracene		520,000 ^A
Fluoranthene		23,000 ^A
Pyrene		54,000 ^A
Chrysene		350 ^A
Benzo(a)anthracene		170 ^A
Benzo(b)fluoranthene		44 ^A
Benzo(k)fluoranthene		1,200 ^A
Benzo(a)pyrene		77 ^A
Indeno(123-cd)pyrene		500 ^A
Benzo(ghi)perylene		3,900 ^A
Dibenzo(ah)anthracene		3.50 ^A
Total Petroleum Hydrocarbons		
TPH	EC>5-10	27 ^F
	EC>10-12	81 ^F

	EC>12-16	160 ^F
	EC>16-21	28,000 ^E
	EC>21-40	28,000 ^E

Notes: All values above assume 1% Soil Organic Matter (SOM). ^AS4UL for Commercial end use. ^BC4SL for Commercial end use. ^CSoBRA Acute Risk GAC. ^DBS3882:2015 Topsoil Requirements (assuming pH>7.0). ^ES4UL for Commercial end use using lowest value for aliphatic/aromatic hydrocarbon fraction. ^FS4UL for Residential with plant uptake and 1%SOM* - these may be relaxed for soils placed under proposed general hardstanding but not under buildings. Other requirements: all soils must be free from metal, plastic, wood, glass, bitumen macadam, paper, odours and organic matter (except within topsoil) and shall be sorted into an appropriate size fraction and comply with the requirements of the landscaping specification. Maintain the following records: a description of the source, type and quantity of material, documentation to demonstrate legality and a non-waste status of materials, analytical testing records that show suitability of the material. Sample storage and handling – All samples should be placed in prepared, analysis specific sample jars/bottles and labelled with sample record details, sample ID, time and date of collection. Each sample shall comprise a plastic tub, amber vial and volatile jar or methanol preservative vial, supplied by the laboratory. Ensure that all samples are stored and transported in a suitable manner for sample preservation. The analysis laboratory shall have UKAS accreditation for each of the test types required. The test data sheets shall show Limits of Detection, Laboratory accreditation to BS EN ISO/IEC17025:2000 and other supporting information if requested. All samples shall be retained by the specialist under suitable/refrigerated conditions for a period of one month after receipt of the final report by the Engineer. Asbestos analysis must be to HSG 248.

London

15 Bermondsey Square
London
SE1 3UN

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Bristol

Unit 5.03
HERE
470 Bath Road
Bristol BS4 3AP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

Manchester

10 Chapel Walks
Manchester
M2 1HL

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

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A list of Members is available at our Registered Office at: 15 Bermondsey Square, London, SE1 3UN
VAT No 974 8892 43