PCL	PCL active?	Risk	Mitigation measures (refer to Section 8)	Residual risk
Ingestion, dermal contact and inhalation of soils, dust, asbestos fibres, gas and vapours by maintenance workers.	**Yes, but limited** Potential for exposure to contaminants in residual Made Ground during maintenance works.	Low	Appropriate PPE and hygiene controls to be implemented. Service trenches to be lined with a marker sheet and backfilled with clean imported materials. Works below the marker sheet will have control measures in accordance with CAR-SOIL.	Very low
Controlled waters during construction				
Creation of preferential pathways. Vertical and lateral migration of dissolved contaminants.	**Yes, but limited** Low contaminant concentrations in soil and groundwater. No perched water. Proposed piling methods will not create pathways.	Low	The tanks, associated pipework and any contaminated soils will be removed during groundworks and validated, prior to piling.	Very low
Surface runoff.	**Yes** Yeading Brook is adjacent to the east.	Moderate	Good construction practices and pollution prevention measures.	Very low
Controlled waters during operation				
Rainwater infiltration and leaching of contaminants. Vertical and lateral migration of dissolved contaminants via groundwater or drainage.	**Yes, but limited** Generally low concentrations in soil leachate. Most of the site will be hard surfacing limiting infiltration.	Low	Imported materials (unless natural or product materials) will be chemically tested and will meet relevant quality criteria. Existing drainage will be removed or sealed. Surface water drains will connect to sewers.	Very low
Building materials and services during operation				
Direct contact of concrete and services with contaminated soils or groundwater	**Yes, but limited** Low contaminant concentrations in soil and groundwater.	Low	Appropriate design and specification of concrete and materials for underground services.	Very low
Planting in landscaped areas during operation				
Uptake from contaminated soils or groundwater	**Yes** Low levels of contamination in soils and groundwater.	Low	Made Ground may remain within soft landscaped areas. All new planting will be within clean imported soils.	Very low

7 Preliminary soil waste assessment

7.1 Background and methodology

Excess material generated during groundworks and piling will likely require offsite disposal.

The waste classification background and methodology are outlined in Appendix B. The soil results have been compared against hazardous waste thresholds using a commercially available software package (HazWasteOnline^{TM}). The selection of chemical compounds is based on the most likely to be present in the soil considering the laboratory analytical reports and the conceptual site model. Justification for the selection is presented in the HazWasteOnline output reports (Appendix D).

Soil samples classified as hazardous (i.e. where hazardous substances were at concentrations above hazardous waste thresholds) have then been compared with hazardous WAC thresholds which indicates the suitability for disposal at landfill and potential for additional treatment before landfill. Soil samples not classified as hazardous have been compared with inert WAC thresholds to determine whether the sample indicates a potential classification as inert or non-hazardous (presented in Appendix D).

7.2 Hazardous waste

TPH concentrations greater than 1,000mg/kg were recorded in three samples; 1,420mg/kg in BH105 (0.3m), 7,700mg/kg in WS211 (0.3m) and 5,400mg/kg in TP304 (0.2m). This results in a potential hazardous classification due to hazard property (HP)7 (carcinogenic) and HP11 (mutagenic). WM3 [28] states that if the contaminating oil is unknown a marker compound can be used, whereby if the concentration of benzo(a)pyrene is <0.01% of the TPH concentration, the waste is not carcinogenic and mutagenic. The concentration of benzo(a)pyrene in the sample from BH105 is <0.05mg/kg (0.004% of the TPH concentration) and the concentration of benzo(a)pyrene in the sample from WS211 is 0.44mg/kg (0.006% of the TPH concentration). These two samples may therefore be classified as non-hazardous. The concentration of benzo(a)pyrene in the sample from TP304 is 5.9mg/kg (over 0.01% of the TPH concentration) and may therefore be classified as hazardous if disposed of.

Zinc was recorded at a concentration of 2,000mg/kg in WS214 at 1.0m, which results in a hazardous classification due to HP14 (ecotoxic). pH was recorded above 11.5 in three Made Ground samples (WS214 at 0.3m, BH104A at 0.3m and BH102B at 2.0m) which results in a hazardous classification due to HP8 (corrosive). Concrete was recorded as a constituent within the Made Ground at these three locations. It is therefore likely that the high pH results are due to concrete fragments being ground into the sample in the laboratory during the preparation process. An acid alkali reserve test and in-vitro testing may be undertaken to indicate that there are no substances in the waste that could generate a high pH and it is therefore not corrosive.

The ground investigation results indicate that five of the 55 samples (9%) may be classified as hazardous (as summarised in Table 18). If representative, this indicates that a low proportion of excavated Made Ground may be classified as hazardous for disposal. All natural samples analysed were below hazardous waste thresholds.

Total and leachable determinands recorded in the hazardous Made Ground samples from TP304, WS214 and BH104A were below the hazardous waste landfill WAC limits.

Table 18 Summary of Made Ground samples classified as hazardous waste

Sample location	Sample depth (m bgl)	Hazard properties (HP)	Hazardous determinand and concentration
WS214*	0.3	HP8	pH 11.5
WS214	1.0	HP14	Zinc 2,000mg/kg
BH104A*	0.3	HP8	pH 11.6
TP304	0.20	HP7 and HP11	TPH (C6 to C40) 5,400mg/kg
BH102B*	2.0	HP8	pH 11.8
Notes: HP7 – carcinogenic, HP8 – corrosive, HP11 – mutagenic, HP14 – ecotoxic * May not be considered hazardous if an acid alkali reserve test and in-vitro testing are undertaken			

HP3 (flammability) has been considered in the assessment, but hydrocarbon and solvent concentrations have not been recorded at sufficient levels for this HP to apply. No free product was encountered during the ground investigation or during monitoring. A flash point test can be undertaken to determine if the waste is flammable, defined as waste with a flash point of >55°C and <75°C.

Asbestos was recorded at very low to low quantities in 10 Made Ground samples which were below the hazardous waste threshold of 0.1%w/w. Fragments of ACM were encountered in two locations. The Environment Agency state that if fragments of ACM can be identified in the waste soils by the naked eye of a competent person, then the waste should be regarded as a mixed waste and segregation of the waste streams is required. If the ACM cannot be segregated, then the waste as a whole would be classified as hazardous if the concentration of asbestos in the ACM pieces alone is greater than 0.1% w/w. This has the potential to increase the volume of soil classified as hazardous for disposal.

7.3 Inert and non-hazardous waste

Total and leachable determinands recorded in 12 (of 29) Made Ground samples and six (of 26) natural soil samples were recorded above the inert landfill WAC limit.

Much of the Made Ground is unlikely to meet the inert classification due to the presence of leachable metals, occasionally high TOC values, asbestos fibres, occasional TPH and anthropogenic materials. Uncontaminated natural soils (Langley Silt, Lynch Hill Gravel and London Clay) are likely to be classified as

inert, although a small proportion may be classified as non-hazardous.. Chemical testing may be required by the receiving site prior to acceptance to confirm the inert classification.

7.4 Summary

The available ground investigation results indicate that the majority of material potentially generated from the development is likely to be classified as non-hazardous. The presence of leachable metals, occasionally high TOC values, asbestos fibres, occasional TPH and anthropogenic materials in the Made Ground makes disposal of that material as inert less likely. The amount of material classified as inert could be increased through screening of material to remove anthropogenic inclusions.

Natural materials, if separately excavated, are usually classified as inert without testing, provided that any soils are free of contamination and organic material. With the presence of sporadic levels of asbestos in the Made Ground, it will be important to segregate waste types and prevent cross contamination.

Five soil results exceeded the hazardous waste threshold due to hydrocarbon and metal content and pH. The potential for hazardous waste to be generated cannot be discounted unless further classification testing and assessment proves that the samples were not representative of the soil waste which may be generated from that area. Soils containing visible fragments of materials that might reasonably be ACM will be classed as hazardous waste unless that ACM can be segregated. Selective excavation might reduce the amount of material classed as hazardous or non-hazardous. This could be managed through the measures described later in this report (in Section 8.2).

The contractor will be responsible for undertaking sufficient testing of material to confirm their waste classification prior to off-site disposal.

8 Conclusions and recommendations

8.1 Conclusions

A combined geotechnical and geoenvironmental ground investigation was undertaken across most of the site between August and November 2021. The ground conditions encountered comprised Made Ground (0.20m to 3.13m thick), typically underlain by the Langley Silt and Lynch Hill Gravel. No ground investigation has been undertaken in the west of the site due to access restrictions.

The ground investigation coverage across the Phase 1 development area is good and no significant contamination was encountered onsite. Concentrations of contaminants in soil were low and below commercial GAC. Asbestos was detected in 10 of 47 Made Ground samples (21%) at very low or low quantities (<0.001% to 0.06% w/w).

Concentrations of determinands in soil leachate and groundwater were generally low and typical of the light industrial location of the site and typical of an urban setting in the London area. Based on the ground gas monitoring undertaken and the ground conditions encountered, the ground gas regime at the site has been assessed to be very low risk and there is no requirement for ground gas protection in new buildings.

Hydrocarbon concentrations were detected in two soil vapour samples at concentrations marginally above criteria set for indoor inhalation. Given the high level of inherent conservatism in the screening values and the form of the proposed development these concentrations are not assessed to pose a risk to human health. Potential sources such as tanks and hydrocarbon impacted soils in the location of these samples will be removed during the enabling works.

The environmental sensitivity of the site has been identified to be moderate to high due to the presence of a principal aquifer and surface water receptor close to the site. The development sensitivity is low based on the proposed commercial end use.

Based on the risk assessment for the proposed development, risks to human health and the environment have been assessed to be moderate, low to moderate, low or very low (without mitigation). Proposed mitigation measures including good and enhanced construction practices (e.g. health and safety, environmental controls) and the form of development (buildings and hard landscaping with some limited soft landscaped areas in clean imported material) will reduce any residual risk to very low (with mitigation). Table 19 summarises the findings of the risk assessment.

Table 19 Summary of risk assessment

Description	Classification
Contaminant sources and site sensitivity	
Environmental sensitivity	Moderate to high
Development sensitivity	Low

Description	Classification
Risk assessment	
Risk of harm to human health during construction	Very low (with mitigation)
Risk of harm to human health during operation	
Risk of pollution to groundwater	
Risk of pollution to surface water	
Risk to construction materials and services	
Risk to planting in landscaped areas	Very low

The results of the ground investigation show that a low proportion of soil results are above hazardous waste thresholds. If these results were representative of excavated materials, this would suggest that a small proportion of material may be classified as hazardous. Selective excavation might reduce the amount of material classed as hazardous or non-hazardous. However, it is possible that a larger proportion of excavated Made Ground could be classified as hazardous due to the potential for localised previously unidentified contamination or asbestos.

The presence of leachable metals, occasionally high TOC values, asbestos fibres, occasional TPH and anthropogenic materials in the Made Ground makes disposal of that material as inert less likely. With the presence of occasional asbestos in the Made Ground, it will be important to segregate waste types and prevent cross contamination.

8.2 Recommendations

8.2.1 Additional ground investigation

This report relates to the Phase 1 area of the site only and is intended to support partial discharge of the relevant planning condition. Consequently, further intrusive ground investigation is required in the west of the site within the Phase 2 area to assess potential contaminant linkages in this area associated with historical and current site uses. The investigation should also include vapour monitoring and sampling in the vicinity of WS210 where elevated PID readings were recorded but vapour monitoring was not possible.

The investigation is likely to be undertaken in 2024 following expiry of Veetec's lease and should be combined with a geotechnical investigation to inform foundation design for Building 2.

The results from this additional ground investigation will be used to inform an addendum to this quantitative risk assessment report and update of the conceptual site model. This will inform requirements for further health, safety and environmental controls or remedial works which may be required before or during development. The addendum risk assessment will be prepared to support full discharge of Condition 17 part (i); it will be submitted to and agreed with the Local Authority in advance of Phase 2 of the construction works commencing

8.3 Remediation strategy

No evidence of significant or gross contamination has been identified by the ground investigation and no significant risks to human health or controlled water receptors have been identified that require a specific advance phase of remediation. However, given the historical industrial site use, there is the potential for localised contamination to be present, principally further asbestos, and hydrocarbons which are more likely around tanks and operation areas. Even a detailed ground investigation samples a very proportion of soils on a site. The key provisions for site control and management are outlined below to support the partial discharge of planning Condition 17 part (i)(b).

8.3.1 Tank decommissioning and removal

A 70,000 litre fuel UST is located in the southeast of the site and a 70,000 litre diesel AST is located to the west of the Trinity Data Centre building. Pipework and petrol interceptors are also present and it is possible that further USTs may be present onsite. A previous ground investigation by Ramboll recorded a strong diesel odour in a location adjacent to the UST.

Decommissioning and removal of the AST, UST, interceptors and associated pipework should be undertaken as part of the enabling works by a specialist contractor in accordance with Groundwater Protection Code: Petrol Station and Other Fuel Dispensing Facilities Involving Underground Storage Tanks (Defra, November 2002) [29]. Best practice guidance for decommissioning is included in Guidance for Design, construction, modification, maintenance and decommissioning of filling stations (also known as the Blue Book) (APEA, 2018) [30] and 65/34: Leak Detection in Tanks and Pipework (HLP, 2000) [31]. The decommissioning and removal of fuel storage tanks and interceptors is also described in Environment Agency guidance [32].

The contents and condition of the tanks should be checked. If the tanks have not been decommissioned, this should be undertaken by removing residual product from the tank, pipes and interceptors (known as ‘bottoming’) and removing any explosive vapours (e.g. by filling with inert gasses or water).

Once decommissioning has been undertaken, the UST should be excavated under a watching brief from a suitably qualified and experienced geoenvironmental engineer. The concrete bund should be photographed and inspected for contamination. Once the concrete bund has been broken out, the base and sides of the excavation should be visually inspected by the geoenvironmental engineer and soil samples taken to check for subsurface contamination. The samples should be analysed for parameters appropriate to the type of product stored in the tanks. A PID should be used on each sample to measure VOCs. The sample testing frequency and the testing suite should be specified in the Contractor’s method statement and photographs of the excavation should be taken. Excavated soils should be stockpiled on impermeable sheeting and covered.

Where contaminated soils (e.g. high PID reading, visually discoloured, odorous) are encountered, this should be ‘chased out’ by excavating until uncontaminated soils are encountered. A sample testing frequency and the testing suite should be

specified for the excavated soils in the Contractor's method statement to demonstrate that the remaining soils are uncontaminated and the contamination has been successfully removed.

The soils surrounding the UST may be impacted and require disposal as hazardous waste, dependent on the soil sample results. The tanks, pipework, interceptors, residual liquid and sludge must be disposed of appropriately in accordance with the Duty of Care regulations.

For samples which fail WAC, it may still be possible to dispose of these materials as inert because some landfill sites have derogations which allow them to accept up to three times the WAC for certain parameters. Asbestos is most likely to prevent materials being classed as inert.

The works should be documented in the verification report, as described in Section 8.4.

8.3.2 Site safety and control

The contractor should implement and ensure compliance with any requirements and industry best practice relevant to their works. This should include, but is not necessarily limited to:

- client contractual requirements and Construction Environmental Management Plan (CEMP);
- Health & Safety and CDM regulations and provision of appropriate PPE and control measures;
- preparation of contractor specific documentation, such as method statements, risk assessments/health and safety plans and construction phase plans, undertaking as required any toolbox talks and site inductions;
- maintaining appropriate watching briefs (e.g. for contamination and asbestos where practical) and a discovery strategy for previously unidentified or unexpected ground conditions;
- robust material and waste management procedures, ensuring that all necessary permits and waste documentation are compliant with the relevant regulations and guidance;
- adoption of best practice construction guidance, such as CIRIA R132 'A guide for safe working on contaminated sites', including the adoption of hygiene protocols and provision of appropriate welfare facilities, minimisation of dust and particulate generation and tracking of dirt especially offsite and safe methods for confined space working (if required); and
- contractor(s) method statements and risk assessment for the proposed works should incorporate the above requirements and mitigation measures and any requirements as agreed with the Client and relevant regulators.

The mitigation measures should address the following:

- the creation of dust should be prevented and hence prevent fibre inhalation onsite and dust emissions from the works;
- very low and low levels of asbestos were identified in the Made Ground. Asbestos was detected by microscopic analysis (not visible to the naked eye)

and comprised loose fibres of chrysotile, and occasionally amosite and crocidolite within an ACM fragment. A cement type ACM fragment was also found during a previous investigation by Ramboll close to the UST. The requirements described in CAR-SOIL^{TM} [5], which is currently the most authoritative guide on the topic, should be followed where applicable. CAR-SOIL^{TM} confirms that all work with asbestos in soil should be carried out under a 'plan of work' by competent organisations and defines the contents of that plan. Should pieces of ACM or asbestos hotspots be encountered, these should be segregated, stored and disposed of where practical to do so. If material remains on site that should be recorded and be below hardstanding, outside of service corridors and not in landscaped soils etc.;

- air monitoring may be undertaken during the works to confirm the absence of respirable fibres above the CAR 2012 action levels. If the works will take place adjacent to occupied parts of the site, a lower detection limit (than used for occupational monitoring), i.e. 0.00001 f/ml, for air monitoring at the boundary, may be appropriate (this is a recommendation from CIRIA C733); and
- stockpiles of soils arising from construction should be appropriately managed to prevent the spread of material and potential cross contamination.

8.3.3 Contamination watching brief and discovery strategy

Condition 17 part (ii) states:

(ii) If during remedial or development works contamination not addressed in the submitted remediation scheme is identified an addendum to the remediation scheme shall be agreed with the LPA prior to implementation.

The Contractor will implement a contamination watching brief and discovery strategy throughout the works. The watching brief should be documented, reported on during progress meetings and the records compiled in the verification report (see Section 8.4). The minimum amount of information presented at the end of the project for this item, if nothing significant is encountered, will be a written statement from a competent individual confirming the watching brief was implemented and confirming the absence of unexpected contamination during the works.

The watching brief will include the following actions:

- a site manager will have overall responsibility for delivering the watching brief and may delegate specific actions to staff onsite;
- the contractor will prepare inductions, risk assessments, method statements and toolbox talks taking account of this strategy. This should emphasise the specific ground conditions expected and the responsibility to stop work and report any issues;
- the contractor will maintain a photographic record of the key stages of development and occurrences including unexpected or previously unidentified contamination;

- all staff should have general asbestos in soils awareness training which will include a description of what had been found onsite and what might be encountered during the works; and
- the toolbox talks onsite should include a specific section on ground contamination including the findings and recommendations in this report. Staff should be made aware of what actions to take if potential contamination is identified.

If gross contamination is encountered during groundworks this will be removed from site and details recorded for inclusion in the verification report. Soil arising from areas where visual or olfactory evidence of contamination is observed should be handled as potentially hazardous and temporarily stockpiled. All such stockpiled soils should be contained on and covered by membrane sheeting to prevent infiltration and possible leaching of soil contaminants to the ground. Where potentially contaminated material is excavated, validation sampling should be undertaken of the excavation faces and base for inclusion in the verification report.

8.3.4 Soft landscaping, imported soils and aggregates

Condition 17 part (iv) states:

(iv) No contaminated soils or other materials shall be imported to the site. All imported soils for landscaping purposes shall be clean and free of contamination. Before any part of the development or development phase is occupied, all imported soils for the development or development phase shall be independently tested for chemical contamination, and the results of this testing shall be submitted and approved in writing by the Local Planning Authority.

Imported materials are anticipated to comprise topsoil and subsoil for soft landscaping, tree pits and planters and 'product' material, such as concrete and 'virgin' quarry materials which may include drainage shingle, bedding sands and road/pavement aggregate. A marker sheet should be placed beneath the imported materials to demarcate the boundary between clean imported material and underlying Made Ground. Verification of imported material and the marker sheet should be undertaken by the production of a full audit trail of the suppliers' certificates, chemical testing, installation details and material movements onto the site.

All imported materials should conform to the following general environmental requirements:

- be free of anthropogenic and deleterious material, including asbestos and any evidence of contamination, such as staining and odours.
- be comprised of natural, virgin quarry or product material.
- recycled material should be from a certified source (for example meeting WRAP Quality protocol) and test results provided demonstrating it is free from contamination and asbestos.
- would not be classified as hazardous waste.

The contractor will document their import of material and placement of the marker sheet in their works method statement, but as a minimum will implement the following:

- prior to any import: review the suppliers' certificates, including chemical testing results (where/if available);
- upon arrival to site: visual inspection to ensure that the material is free of any obvious visual or olfactory evidence of contamination and is consistent with the expected material. If suspect material is identified, any lorry loads should either be rejected or chemically tested prior to placement;
- in situ validation chemical testing (or stockpile testing onsite): topsoil and sub-soil verification sampling on a frequency of one sample every $50m^3$ for a suite of chemical determinands consisting of metals, TPH, PAH and asbestos;
- the frequency may be subject to review, for example, based on Local Authority requirements or volume/consistency of source(s);
- if it proposed to import recycled material or use site won material, then testing for asbestos will be undertaken; and,
- 'product' materials will not be chemically tested on site.

Imported materials (apart from natural, virgin quarry or 'product' materials) will be chemically tested to demonstrate suitability for use at the intended location. The following on-site testing frequency for imported materials should be adhered to:

- Verification testing of imported soils shall be carried out as a minimum of three samples per source.
- If greater than $200m^3$ is imported, then further testing shall be carried out (one sample every $100m^3$).

The results of the testing will be compared against the criteria in Table 20. The criteria are based on residential criteria to ensure that any material at the surface, for example in soft landscaped areas, is suitable and will not pose a risk to human health. Some of the criteria have been further reduced to prevent the import of materials unsuitable for landscaping (effects on plants) and for protection of controlled waters.

Imported topsoil and subsoil must also comply with the requirements of BS3882:2015 Specification for topsoil [33] and BS8601:2013 Specification for subsoil [34].

Table 20 Chemical compliance criteria for imported materials

Parameter	**Criteria (mg/kg)**
Antimony	27
Arsenic	40
Beryllium	1.7
Cadmium	85
Chromium (III)	100

Parameter	Criteria (mg/kg)
Chromium (IV)	6
Copper	135
Lead	310
Mercury (inorganic)	56
Nickel	75
Selenium	10
Vanadium	188
Zinc	200
Total Cyanide	0.5
Phenol	<10
Benzene	<0.1
Toluene	<1
Ethylbenzene	<1
Xylene	<1
TPH Aliphatic (>C_5-C_6)	30
TPH Aliphatic (>C_6-C_8)	50
TPH Aliphatic (>C_8-C_{10})	20
TPH Aliphatic (>C_{10}-C_{12})	50
TPH Aliphatic (>C_{12}-C_{16})	100
TPH Aliphatic (>C_{16}-C_{35})	500
TPH Aromatic (>C_5-C_7)	30
TPH Aromatic (>C_7-C_8)	50
TPH Aromatic (>C_8-C_{10})	20
TPH Aromatic (>C_{10}-C_{12})	50
TPH Aromatic (>C_{12}-C_{16})	100
TPH Aromatic (>C_{16}-C_{21})	500
TPH Aromatic (>C_{21}-C_{35})	500
TPH C_5-C_{35}	1000
Acenaphthene	50
Acenaphthylene	50
Anthracene	50
Benzo[a]anthracene	11
Benzo[a]pyrene	1
Benzo[b]fluoranthene	3.9
Benzo[ghi]perylene	40
Benzo[k]fluoranthene	10
Chrysene	8

Parameter	Criteria (mg/kg)
Dibenzo[ah]anthracene	0.31
Fluoranthene	50
Fluorene	50
Indeno[123,cd]pyrene	18
Naphthalene	1
Phenanthrene	50
Pyrene	100
Total PAH	100
Total PCBs	1
Asbestos	Not present

8.3.5 Material reuse

The development is not expected to involve much (if any) reuse of soils. Assessment criteria may be used for classification of any material proposed for reuse but the contractor shall provide risk based justification as to how they are selected and used for site won material.

The acceptability criteria would not necessarily preclude use onsite if concentrations were above. It could be possible to reuse soil subject to further risk assessment. This should take into consideration the location where the soil would be placed, the volume and thickness of the placed soils.

8.3.6 Decommissioning monitoring wells

Prior to the ground being disturbed, the contractor should decommission any standpipes in the area that they are working, in accordance with Environment Agency Good Practice for Decommissioning Redundant Boreholes and Wells (2012). This is required to ensure that no preferential flow pathways are created during the development works from the surface/Made Ground to the underlying natural soils/aquifer. This shall be undertaken before any significant ground works takes place.

8.4 Verification plan

8.4.1 Introduction

A verification report will be required following completion of the works to demonstrate that the requirements of the remediation strategy and verification plan have been achieved. The verification report will be submitted to and approved by the LPA to support partial discharge of Condition 17 part (iii) in so far as it relates to Phase 1. Condition 17 part (iii) is reproduced below:

(iii) Upon completion of the approved remedial works, this condition will not be discharged until a comprehensive verification report for the development or

development phase has been submitted to and approved by the LPA. The report shall include the details of the final remediation works and their verification to show that the works for each phase have been carried out in full and in accordance with the approved methodology.

Typical information which is included in a verification report and which will need to be collected is set out in Table 21 below.

8.4.2 Contents

The verification report will include the information set out in Table 21. The verification report should form part of the health and safety file in accordance with the Construction Design and Management (CDM) Regulations 2015 and the development operations & maintenance (O&M) manual or maintenance plan. This enables the building management to protect against any residual ground contamination risks associated with future operations and maintenance.

Table 21 Requirements relating to verification

Requirement	Details
Details of works	Details of the parties involved. A summary of the works undertaken, including method of works, health and safety and environmental control measures implemented. As-built records. Photographs of key stages of the ground works.
Health and Safety	Method statement and risk assessment from earthworks contractor and specialist sub-contractors and/or consultants relating to contamination/waste/asbestos. Contamination and asbestos discovery strategies and records of communication to operatives via site induction and toolbox talks. Minutes of site progress meetings including a section on safety and environment.
Asbestos	Evidence of compliance with CAR 2012 and other legislation. CAR-SOIL assessment, plan of work and asbestos management plan. Evidence of induction and toolbox talks to operatives. Evidence of control measures. Records of results above relevant exposure limits and actions undertaken as a result to mitigate associated risks. Waste disposal records.
Tank removal	Detailed description of the tanks including the contents, locations and depth indicated on a plan. Details of the tank decommissioning and removal works undertaken, with supporting documentation. A photographic record. Relevant duty of care information for the tanks (and its contents), pipework, and any contaminated soils, demonstrating appropriate removal and disposal. Verification testing and assessment of the base and sides of the excavation (for the UST) to demonstrate that any residual contamination has been adequately removed if necessary.

Requirement	Details
Monitoring well decommissioning	Measurement of groundwater level prior to decommissioning. Type and quantity of backfilling and sealing materials. Depth and position of each layer of backfilling and sealing materials. Records including photos and drawings showing where boreholes have been decommissioned.
Marker sheet	Details of the marker sheet, including specification. Records and photographs of the placement of the marker sheet beneath imported topsoil and subsoil in soft landscaping areas and in service trenches. Drawings showing where residual Made Ground and the marker sheet is present to inform future maintenance works
Watching brief	Details of the responsible site manager Confirmation of inductions, toolbox talks and briefings Confirmation of asbestos awareness training. In the area(s) where no unexpected contamination was encountered, a written confirmation that the brief was undertaken and that nothing was identified.
Previously unidentified contamination	A general description of the situation including the background, location, depth, the events resulting in the find and the immediate steps taken to make the area safe. Location plan showing the full lateral and vertical extent of the unexpected contamination, the locations and depths of verification sampling. Photographs of the suspected contamination. Details of sampling and testing carried out. This should include details of sampling and laboratory analysis, accredited laboratory certificates and associated information. A record of the assessment carried out and the proposed actions. Records of consultation with the planning authority and additional measures agreed with the planning authority. Records of the implementation of the agreed actions and lines of evidence confirming it was dealt with.
Dust control	Mitigation measures to be detailed in contractor's method statements. Evidence that proactive dust control was implemented.
Imported material	Results of chemical testing of imported material at source (prior to import) and in situ testing following placement. This should include details of volumes, material sources and chemical testing, where appropriate, with assessment against compliance criteria. Record (including photographs) of the extent and thickness of imported topsoil and subsoil in soft landscaping areas.
Waste management	Results of waste classification testing (chemical laboratory results). Summary of waste disposal records, including conveyance tickets and evidence of compliance with the relevant waste regulations. Volumes or tonnage of each waste stream removed from site. Permits of all hauliers, treatment centres, landfills and other receiving facilities used to remove waste from site. Haulage/disposal tickets.

Requirement	Details
Regulatory correspondence	Details of communication with the regulators if undertaken, such as the LBH Contaminated Land Officer and Environment Agency. Evidence of compliance with any permit, consent and licence and relevant planning condition requirements.
Outstanding actions	Details of any outstanding actions and site constraints (if required) and how these will be addressed, including maintenance plan. Description of final site conditions

References

[1] Arup (2021), Contaminated Land Desk Study and Preliminary Risk Assessment, July 2021, document ref. DCS20190-ARUP-DC-CO-XX-RP-C-00022, revision P01.

[2] Arup (2021), Stage 3 Civil and Structural Engineering Report, December 2021, document ref. DCS20109-ARUP-DC-XX-XX-RP-S-0002, revision P01.

[3] Arup (2022), Project Specification for Piling, February 2022, document ref. DCS20109-ARUP-DC-XX-XX-SP-S-17001, revision P01.

[4] Environment Agency (2021), Land contamination risk management (LCRM). Available at: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

[5] CL:AIRE and JIWG (2016), Control of Asbestos Regulations 2012, Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials, Industry Guidance CAR-SOIL™.

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Drawings

A3

511400

511600

180200

WS05

WS04

WS03

WS02

WS01

consfield Rd

04/03/2022 16:50:03

Legend

- Site boundary
- Ramboll ground investigation (2020)
- 70,000 litre underground diesel storage tank
- 70,000 litre aboveground diesel storage tank

Client

Colt Data Centre Services Limited

Metres

0 12.5 25 50

Rev	Date	By	Chkd	Appd	Authd
F1	2022-03-04	CN	TM	CB	CB

Job Title

London4

Drawing Title

Previous ground investigation locations

ARUP

8 Fitzroy Street
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www.arup.com

Scale at A3

1:1,000

Drawing Status

For Issue

Job No	Drawing No	Rev
281528-00	001	F1

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A3

511400

511600

180200

07/03/2022 08:44:19

BH101
TP301
WS202
BH110
TP309
TP309A
BH107
WS201
WS212
BH103
BH103A
WS203
TP305
WS204
WS215
BH109
WS214
BH102
BH102A
WS211
TP307
TP308
BH108
WS216
BH102B
TP310
BH104
BH104B
BH104A
WS210
WS209
WS217
WS218
WS218A
WS205A
WS205
BH106
WS208
IT501
BH104C
WS206
TP306
TT401C
TP302
TP304
WS213
TP303
WS207C
BH105
WS207

consfield Rd

Legend

- Site boundary
- 70,000 litre underground diesel storage tank
- 70,000 litre aboveground diesel storage tank

Concept ground investigation (2021)

- Cable Percussion Borehole
- Dynamic Sampling Borehole
- Hand Excavated/ Diamond Cored Trial Pit
- Machine Excavated Trial Pit

Client
Colt Data Centre Services Limited

Metres
0 12.5 25 50

Rev	Date	By	Chkd	Appd	Authd
F1	2022-03-07	CN	TM	CB	CB

Job Title
London4

Drawing Title
Exploratory hole location plan

ARUP
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Scale at A3
1:1,000

Drawing Status
For Issue

Job No	Drawing No	Rev
281528-00	002	F1

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NW

SE

DISTANCE ALONG BASELINE (m)

ELEVATION (mOD)

BH101 (-0.8)
BH107 (32.8)
BH110 (-26.4)
WS205 (-28.0)
WS212 (36.2)
WS201 (15.3)
BH103A (-0.4)
WS211 (41.3)
WS203 (-23.6)
WS204 (-3.2)
BH108 (64.0)
WS210 (76.6)
BH109 (-20.3)
BH106 (87.8)
WS209 (62.4)
WS214 (-30.7)
TP302 (92.5)
BH104 (32.9)
BH102A (-59.7)
BH102B (-44.5)
TP304 (74.5)
BH104C (45.2)
WS217 (20.3)
TP303 (41.6)
WS213 (41.9)
WS206 (4.1)
WS205A (-36.6)
WS207C (18.1)
TT401A (8.3)
BH105 (0.0)

SCALE 1:111V 1:500H @ A3-L

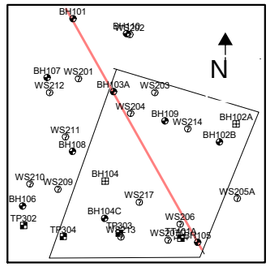
LEGEND

Hole offset is +ve to the RIGHT of the baseline

HoleID

(Offset)

PLAN



COLOUR LEGEND

- Made Ground [MG]
- Concrete [CONC]
- Langley Silt [LS]
- Lynch Hill Gravel Member [LHGR]
- Weathered London Clay [WLC]
- London Clay Formation- A3ii [LC-A3ii]
- London Clay Formation- A3i [LC-A3i]
- London Clay Formation- A2 [LC-A2]
- London Clay Formation- B [LC-B]

MATERIALS

- CONCRETE
- Fill (MADE GROUND)
- Sandy gravelly SILT
- Silty sandy CLAY
- Clayey sandy GRAVEL
- Silty gravelly CLAY
- Silty Clay
- Silty sandy gravelly CLAY
- Sandy GRAVEL
- Gravelly SAND
- CLAY
- Silty sandy GRAVEL
- Silty SAND
- SAND and GRAVEL
- Silty gravelly SAND
- Sandy gravelly CLAY
- Sandy CLAY
- Clayey SILT
- GRAVEL
- NO RECOVERY
- Gravelly SILT
- Gravelly CLAY

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Job No.	Drawing No.	Rev.
281528-00	**003**	**F1**