



NQMS SQP Declaration of Document Adequacy

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N17 0SG

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Remediation design for works to address unacceptable contaminant linkages identified in previous work stages. This design relates to the second phase of remediation at the site in advance of substation extension works and relates to Development Consent Order HGY/2014/3601.

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0626-K1591



NGET ARRIVA BUS DEPOT, TOTTENHAM (8021)



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Report Type	Contamination	Retention Period	Indefinitely
Site Code	8021	Author (Company)	AtkinsRéalis
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Work Stage*	Remediation		
Brief description of contents	Phase 2 Detailed Design for the former depot site located off Leaside Road, Tottenham (8021).		
Access Permitted	NGET Land Regeneration Team	NGET Contact	LRM: Gareth Taylor LRA: Matthew Lush



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Client signoff

Client	National Grid Electricity Transmission
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1. Introduction

1.1 General

AtkinsRéalis UK Ltd (AtkinsRéalis) has been commissioned by National Grid Electricity Transmission (NGET) to undertake the design of the Phase 2 remediation for the Former Bus Depot, located off Leaside Road, Tottenham, N17 0SG (herein referred to as 'the site').

The site is proposed for redevelopment as part of the wider North London Reinforcement Project (NLRP), which will see the site redeveloped to facilitate an upgrade to the adjacent NGET owned substation to the east and south. Remediation of the site is required to enable the development works to continue, and to ensure that the site is suitable for use as an operational substation site.

A development led Phase 1 remediation commenced in January 2025 to excavate shallow Made Ground and superficial soils in the locations of proposed cable corridors, and remove any non-aqueous phase liquids (NAPL), where encountered. The Phase 1 remediation was paused during the works due to design challenges and the former buried cable design has now been replaced by a pylon design, that is being developed by NGET. As the remainder of the Phase 1 trench will not be excavated, outstanding areas where 'gross contamination' was previously identified will be added to the scope of the Phase 2 remediation. This is detailed in the AtkinsRéalis Technical Note summarising the Phase 1 remediation [1], that has been approved by the Environment Agency.

The intention of this document is to provide the remediation detailed design for the Phase 2 remediation proposed for the site. This document provides the details to partially discharge Requirement 11 of the NLRP Development Consent Order (DCO) (2014 No. 1052), related to Phase 2, for Stage 3a of the development works. NGET propose to undertake the Phase 2 remediation to mitigate against unacceptable risks to controlled waters and off-site human health.

Stage 3a of the works constitutes the preparatory stages of work to clear the site and demolish the on-site structures, to enable Stages 3b and 4 to take place, which comprises the construction of the infrastructure to upgrade the adjacent substation (application reference HGY/2026/0364). The NGET Tottenham Substation forms part of the NLRP to upgrade the 275kV overhead lines between Waltham Cross and Tottenham to a higher voltage (400kV). Demolition of the on-site buildings to concrete slab level was completed in August 2024.

This report builds on the documentation that was submitted for the Phase 1 remediation ([2], [3], [4], [5]) and an additional four documents that have been submitted to support the discharge of the Phase 2 sub-requirements of Requirement 11 of the DCO listed below:

- AtkinsRéalis, NGET Former Bus Depot, Tottenham (8021). Factual Site Investigation Report. 2025 [6];
- AtkinsRéalis, NGET Former Bus Depot, Tottenham (8021). Interpretative Site Investigation Report. 2025 [7];
- AtkinsRéalis, Former Bus Depot, Tottenham (8021). CW DQRA Update and NAPL Assessment. 2025 [8]; and
- AtkinsRéalis, NGET Arriva Bus Depot, Tottenham (8021). Phase 2 Remediation Options Appraisal. 2025 [9] (provided in Appendix A).

These documents should be consulted for full details on the site and any pertinent details are summarised in this report.



As it was necessary to demolish the on-site buildings to carry out further source characterisation and delineation work at the site, the remediation has been designed in phases. This phasing approach has allowed for refinement of the remediation design throughout the process. The phasing plan and chronological context is summarised as:

- Phase 0: Demolition of the former depot building. This was completed in August 2024;
- Phase 1: Shallow remediation to enable the development works associated with the underground cables, and removal of NAPL, where encountered. This began in January 2025 and was paused in March 2025, when the design was replaced with a pylon development and the footprint was remediated. Approximately 60% of the total volume of soils were remediated and as Phase 1 was development led, the objectives of the Phase 1 remediation are considered to have been met. This has been approved by the Environment Agency; and,
- Phase 2: Remediation to mitigate risks to controlled waters across the wider site and possible off-site human health receptors to comprise source reduction of 'gross contamination'. The design of which is informed by targeted ground investigation and assessment carried out in 2024 and 2025.

There are no further phases of remediation planned beyond the Phase 2 remediation.

This report has been produced in line with guidance outlined in the Environment Agency's Land Contamination Risk Management [10], National Planning Policy Framework [11] and Planning Policy Guidance [12].

AtkinsRéalis have continuously engaged with the Environment Agency throughout the Phase 1 remediation design process, regarding the conclusions of the 2025 Controlled Waters Detailed Quantitative Risk Assessment (CW DQRA) [8] and to introduce the key drivers for the Phase 2 remediation. The Environment Agency has agreed with the conclusions drawn in the 2025 CW DQRA [8], a betterment approach to remediation at the site and the rationalisation of the source areas presented in this document.

This document includes the design for the Phase 2 remediation only. A Remediation Options Appraisal [9] has already been completed and approved by the Environment Agency. This is provided in Appendix A.

1.2 Background

The site is located off Leaside Road, Tottenham, London and is situated in the north-east of the Mowlem Trading Estate, approximately 1.5 km to the east of Tottenham. A site location plan and site layout plan are provided in Figure 1 and Figure 2.

The recent site arrangement comprised a building and plumbing merchants, steel fabricators, and a storage and logistics yard before these were demolished in the summer of 2024. This demolition was carried out to clear the site for development works, associated with the NLRP.

Historically the site has been used as a bus depot which included associated infrastructure such as above and below ground oil tanks. Prior to this, the north of the site was occupied by an engineering works and an infilled pond is indicated to be present beneath the south of the site. A historical sludge pond is understood to have been located in the central extent of the site, in the footprint of a central infilled pond. The land off-site to the north of the site was used as a gasworks and other heavy industrial uses were present within the local area such as a chemical works.

Previous site investigations and assessments by other consultants have taken place at the site between 2013 and 2016 [13], [14], [15] and pertinent data has been incorporated into the 2025 assessments [6], [7], [8].



Contamination in soils and groundwater has been identified across the site, including exceedances of risk-based criteria in the north and south of the site identified by the 2025 CW DQRA. Dense non-aqueous phase liquid (DNAPL) has been recorded at the base of the superficial deposits in the centre and south of the site.

1.3 Objectives and scope

NGET is proposing to undertake voluntary remediation of identified potential contaminant linkages (PCLs) related to unacceptable risks at the former depot site in order to deem the site suitable for use as an operational substation.

The objective of this document is to provide a detailed design for the Phase 2 remediation at the site that takes into consideration recommended remediation options from the Phase 2 Remediation Options Appraisal [9], sustainability, and on-site and off-site neighbouring constraints.

This remediation design is to address relevant pollutant linkages as far as is reasonably practicable, which have been identified by ground investigations undertaken for Phase 2 [6, 7] and subsequent controlled waters detailed quantitative risk assessment [8] to enable the site to be suitable for use.

The remediation shall focus on betterment of the site to address unacceptable risks to controlled waters and reduce gross contamination, that will include the recovery of DNAPL in the central and southern infilled pond areas, as far as is reasonable and practicable.

This report has been produced to align with Stage 2 of Land Contamination Risk Management (LCRM) guidance [10].

1.4 Report limitations

This report has been produced subject to the following exclusions and limitations:

- This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission.
- Data from previous reports undertaken by third parties have been incorporated into this report. This data has been assumed to be correct for the purposes of this assessment. AtkinsRéalis does not accept responsibility for inaccuracies in the data supplied by any other party.
- The accuracy of historical maps cannot be guaranteed, and it should be recognised that different conditions on site may have existed between and subsequent to the various map surveys.
- Any borehole data from British Geological Survey (BGS) sources are included on the basis that "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation".
- This report draws upon data from the intrusive ground investigation and monitoring of a relatively small proportion of the sub-surface site conditions. Therefore, this information is not necessarily exhaustive and further information relevant to the site may be available from other sources. Inferences drawn from these assessments are subject to the inherent limitations of any such study.
- Climate change impacts to the site have been considered in the interpretative reporting based on the UKCP18 projections, current at the time of writing. This report has been based on the conclusions. Any future changes to climate change projections which may significantly alter the relevant modelling parameters have not been accounted for.



- This report has been compiled on the basis of the current ground conditions and the current information provided on the development design. Changes to the ground conditions and development design could result in further assessments being required. NGET has provided information about the proposed end development that AtkinsRéalis has used in modelling future ground conditions. AtkinsRéalis does not take any responsibility for any inaccuracies in the information that NGET has provided. This report contains information related to the Phase 2 remediation only.



2. Site Summary

2.1 Site setting

A summary of relevant background information is presented in Table 2-1 and full information is detailed in the AtkinsRéalis 2025 factual site investigation report [6].

Table 2-1 Site Information

Site Details	Site Address: NGET Arriva Bus Depot, Leaside Road, Tottenham N17 0SG Site access is from Leaside Road. Ordnance Survey (OS) Grid reference: 535413, 191516 A site location plan is provided in Figure 1.
Site Description	The site is approximately rectangular and covers an area of approximately 1.2 hectares (ha). The site is vacant and secured by BNP Paribas.
Site Ownership and boundaries	The site is owned by NGET and the former buildings have since been demolished. The site plan is provided as Figure 2. Palisade fencing bounds the site in all directions. The entrance gate to the site is present in the north.
Adjoining and nearby land uses, including sensitive and contaminative	North: Former gas works, currently active construction site for a multi-storey building; East: NGET owned substation infrastructure and the Pymmes Brook surface water course 30 m to the east; South: NGET Tottenham Substation; and West: Mowlem Trading Estate (various commercial and industrial uses).
Site Topography	The site is largely flat, with localised depressions, and is located at approximately 10 m Above Ordnance Datum (AOD).
Ground cover and description	The site is covered by concrete, asphalt hardstanding, and engineered fill in remediation footprints and trial trench locations. A narrow soft landscaping area is present along the eastern boundary, with fly tipped materials.
Services	A composite drawing that presents information from service providers that have assets on, or in the near vicinity of the site is included in the Atkins 2023 Factual Site Investigation Report [6]. The BT telecommunications, Virgin Media, UK Power Networks (low voltage) services were disconnected as part of the demolition phase of works in May and June 2024. The services at the site are shown in Figure 4. As part of these works, the gas main was confirmed to have been disconnected by the supplier previously. The following services are understood to be located on-site: - A surface drain entering from Leaside Road crossing the site in a north-east to south-west alignment before exiting the site at the eastern boundary. - The water remains live.



Proposed development	An upgrade of the substation to the east and south of the site, that formerly comprised of an underground cable and sealing end compound design but now consists of a pylon only in the southern half of the site.
Geology	Made Ground was encountered to a maximum depth of 6.0 m below ground level (bgl), underlain by superficial deposits of Alluvium to a maximum depth of 5.85 m bgl and River Terrace Deposits (RTD), namely the Kempton Park Gravels (KPGR), to a maximum depth of 7.8 m bgl. Alluvium was not found to be present within the southern portion of the site, in the vicinity of the anticipated southern and central infilled ponds (noting the central pond was labelled as a 'sludge pit'). Cohesive soils are present in the southern infilled pond area. The bedrock geology comprises the London Clay Formation (LCF) proven off-site (approximately 40 m to the north east) to a depth of 19 m bgl [14]. This formation is in turn underlain by the Lambeth Group, Thanet Sand and White Chalk Group at depth. There is one Brit Pit reported within 250 m of site associated with the Tottenham Marshes sand and gravel commodity to the south.
Hydrogeology	Superficial: Alluvium – secondary undifferentiated aquifer Superficial: Kempton Park Gravel (KPGR) – secondary A aquifer Bedrock: London Clay Formation – unproductive strata Bedrock: Lambeth Group, Thanet Sand – secondary A aquifer AtkinsRéalis consider there to be a continuous groundwater body above the London Clay within the Made Ground and Kempton Park Gravels where the Alluvium is not present (the central and southern areas of site). During the 2024 groundwater monitoring [6], groundwater elevation within the Kempton Park Gravels ranged from 7.63 m to 7.77 m Above Ordnance Datum (AOD), in the north at BH24-02, and between 7.59 m to 7.63 m AOD at BH11, located within the centre of the site. Groundwater elevations within boreholes installed within the Kempton Park Gravels, coincident with the historical southern infilled pond, were noted to be higher than other locations with levels of between 8.88 m to 8.99 m AOD at BH24-12. Further to the south of the infilled pond, groundwater elevation within the Kempton Park Gravels were between 7.83 m to 8.72 m AOD at BH12-02D. It is anticipated that the Made Ground and Kempton Park Gravels are typically separate groundwater bodies and the groundwater within the Made Ground is continuous, which is consistent with the findings of the 2023 groundwater monitoring and the 2024 CW DQRA [8]. Where the Alluvium is absent (in the south of the site), the two groundwater bodies are considered to be in hydraulic continuity. Groundwater levels indicate that groundwater within the Kempton Park Gravels has a southerly and easterly flow direction.
Hydrology	The closest surface water feature to the site is the Pymmes Brook located approximately 30 m to the east of the site parallel to the eastern site boundary. The Brook flows from the north-north-east to the south-west in direction. The River Lea Navigation Canal is located 230 m to the east of the site and the River Lea is located approximately 250 m to the east of the site. Other surface water features include the Banbury Reservoir located approximately 360 m to the east of the site and the Lockwood Reservoir located approximately 530 m to the south of the site. It is understood that the Lee River Reservoir Chain are primarily fed by surface waters, including the Pymmes Brook, River Lee Diversion and River Lee Flood Relief Channel. There are no reported licensed surface water abstractions within 1 km of the site.



2.2 Site history

A full review of historical maps for the site and the surrounding area provided in the Groundsure report has previously been undertaken and is included in the 2023 AtkinsRéalis Factual Site Investigation report [6].

In summary, the site remained largely undeveloped until 1955, between 1955 and 1956 a pond is shown to be present in the south of the site with buildings shown to be present from 1967 and the pond no longer shown and assumed to have been infilled. A second pond is shown in the centre of the site circa 1967 until 1981, also labelled as a sludge pit. The buildings on-site present from 1967 were demolished and redeveloped in 2001, with a tank shown to be present east of centre of the site on mapping dating from 2001. All on-site buildings were demolished by August 2024 and the site is currently vacant.

Off-site to the north, significant development has taken place including the presence of the Tottenham and Edmonton Gasworks and the Gothic Gasworks. Additionally, off-site development includes the Leaside Depot and a chemical works, the NGET Tottenham Substation and industrial warehouses.

A historical features plan for the site is provided in Figure 3.

2.3 Summary of remediation drivers

Information related to the previous site investigations is summarised in the AtkinsRéalis 2023 [2] and 2025 Factual Reports [6] and these should be consulted for full details.

AtkinsRéalis has completed generic quantitative risk assessment and DQRA in 2023 [3], 2024 [4] and 2025 [7] [8], and a remediation options appraisal completed in 2025 [9]. The findings of these reports form the basis of the Phase 2 remediation detailed design and these reports should be sought for full details.

The principal drivers for remediation are provided herein and comprise of gross contamination indicators and risk-based exceedances.

2.3.1 Observations of NAPL

NAPL was detected at variable thicknesses during the groundwater monitoring between 2013 and 2024 in 13 locations as summarised in Table 2-2. It should be noted that due to degraded and emulsified nature of the NAPL recorded during the groundwater monitoring, measurable thicknesses of phase-separated NAPL were not always possible to be recorded using an interface probe.

The distribution of NAPL identified during groundwater monitoring between 2013 and 2024 is presented on Figure 4. The distribution of NAPL and, in particular DNAPL, is located centrally and in the south of the site, which is coincident with the historically infilled ponds.

A total of six product samples were obtained for whole oil analysis from five exploratory holes (BH12-01, BH12-03, BH11, BH24-10 and BH24-13). The sample results recorded the product as 'coal tar' in BH12-01 (2013 and 2023), BH12-03 (2013) and BH11 (2023 and 2024) and the recorded densities range between 1.0395 kg/m³ and 1.0754 kg/m³, which is consistent with the range for coal tar as presented in the Environment Agency DNAPL handbook [16]. No determination possible (NDP) was presented for product samples where the sample was listed as 'unsuitable for this test' at BH24-10 and BH24-13. Moreover, NDP was also presented for viscosity across all product samples as the product was found to be "too thin to register a result".



Table 2-2 Summary of NAPL distribution and thickness

Borehole	No. of monitoring rounds	No. of NAPL detections	NAPL thickness (m)	NAPL thickness adjusted with sump in London Clay Formation (m)*	Period
BH11*	8	5	0.40 to 1.74 DNAPL	0.30 to 1.64 DNAPL	May 2013 to October 2024
BH12-01*	9	6	0.10 to 1.00 DNAPL	0.00 to 0.90 DNAPL	February 2013 to October 2024
BH12-02D*	9	3	0.05 to 0.30 DNAPL	0.00 DNAPL	June 2023 to October 2024
BH12-03	3	3	n/a – presence indicated but no thickness recorded	n/a	February to March 2013
BH23-03	6	4	n/a – NAPL evidence on monitoring equipment but no measurable thickness recorded	n/a	May 2023 to October 2024
BH24-09	3	3	0.42 to 0.67 DNAPL	n/a	September to October 2024
BH24-10	3	3	0.15 to 0.40 DNAPL	n/a	September to October 2024
BH24-12*	3	2	0.08 DNAPL	0.00 DNAPL	September to October 2024
BH24-13*	3	3	<0.01 LNAPL 0.22 to 0.83 DNAPL	<0.01 LNAPL 0.00 to 0.33 DNAPL	September to October 2024
BH24-14	3	2	0.22 to 1.00 DNAPL	n/a	September to October 2024
WS12-01	9	5	0.05 DNAPL	n/a	March 2013 to October 2024
WS12-02	9	5	0.01 to 0.15 DNAPL	n/a	May 2023 to October 2024
WS12-06	9	1	0.30 possible DNAPL	n/a	September 2024

*The response zone at BH11, BH12-01 and BH12-03 (0.10 m), BH12-02D and BH24-12 (0.30 m) and BH24-13 (0.50 m) extends into the impermeable London Clay Formation. This may act as a sump where DNAPL could pool to a greater thickness. Therefore, the thicknesses recorded at these locations as been adjusted in a separate column where encountered.



2.3.2 Soil, leachate and groundwater exceedances of risk-based criteria

Screening of site-specific assessment criteria (SSACs) with Level 4 dilution derived by CW DQRAs ([4], [8]) at the site against available site data indicated that exceedances were identified for organic contaminants such as benzene, PAHs (such as naphthalene, anthracene and fluoranthene) and 1, 2 dichloroethane. These exceedances were largely associated with locations where evidence of NAPL was present.

When comparing the aromatic TPH >EC5-EC7 concentration against the benzene SSAC with Level 4 dilution for soils, there are five exceedances out of a total of 48 soil samples across three locations (BH24-03, BH24-08 and BH24-12).

When comparing the benzene concentrations in soil leachate, five out of a total of 17 samples exceeded the soil leachate SSAC with Level 4 dilution (17.1 mg/l) where the maximum recorded concentration of >10 mg/l was reported by the laboratory. For aromatic TPH >EC5-EC7 concentrations, no exceedances were identified in all 17 soil leachate samples analysed when compared with the benzene soil leachate SSAC with Level 4 dilution. Out of a total of 77 groundwater samples obtained between 2023 and 2024 across the site, 31 exceedances of the benzene groundwater SSAC with Level 4 dilution was identified (40% of groundwater samples obtained between 2023 and 2024). These locations are presented on Figure 4.

Overall, a lower number of exceedances of the SSAC with Level 4 dilution were noted for PAHs in soil, soil leachate and groundwater and were often seen at the same locations where benzene exceeds the SSAC with Level 4 dilution. The locations of PAHs exceedances were generally located centrally at BH24-07, BH24-08 and BH24-09 and in the south of the site such as BH12-01, BH24-12, BH24-13 and WS12-01.

Similarly, a lower number of exceedances of the SSAC with Level 4 dilution was noted for 1,2 dichloroethane in groundwater and these were located centrally (BH24-09, BH24-10 and BH24-11) and in the south of the site (BH12-01, BH24-12 and BH24-13). An additional 1,2 dichloroethane exceedance was also noted in the northern area of site at BH24-03.



3. Phase 2 Remedial Conceptual Site Model

3.1 Introduction

Land contamination is evaluated through the identification and assessment of Potential Contaminant Linkages (PCL) denoting where plausible source-pathway-receptor relationships have been identified and a potential risk to the receptor is present.

The approach adopted involves the development of a Conceptual Site Model (CSM) to describe sources of contamination, potential migration/exposure pathways and potential receptors that may exist at the site, and subsequently identified PCLs.

The PCLs that are relevant to the Phase 2 remediation zone are outlined in the Remediation Options Appraisal Report [9] and have been determined in accordance with guidance provided in LCRM [10].

This CSM developed as part of the remediation options appraisal, considers the future use of the site as an operational substation, including the construction of a cable sealing end compound in the north-east. This 'open storage' configuration is consistent with a commercial end use and will remain unoccupied, with no operational buildings across the site. The site will be fully covered with hardstanding and will not include any areas of soft landscaping, significantly limiting direct exposure and infiltration pathways.

Key contamination sources include volatile organic compounds (VOCs) in the unsaturated soils in the north and DNAPL in the saturated zones in the south. The primary pathways are vapour migration to off-site receptors to the west and leaching to groundwater, with receptors comprising off-site commercial users and the underlying Kempton Park Gravels aquifer. Construction phase risks such as risks to construction workers and those associated with piling into the aquifer are not covered in this CSM and are outside of the scope of this report. A separate piling risk assessment has been produced by AtkinsRéalis [17].

The model supports the selection of targeted in-situ remediation techniques to address both unacceptable and precautionary risks. Further detail is provided in the Remediation Options Appraisal Report [9].

3.2 Potential contaminant linkages

Following the earlier phases of investigation [2] [3] [4], targeted investigation across the site in 2024 [6], GQRA [7] and DQRA [8], and a Phase 1 remediation [18] in the north east and centre of the site, a summary of the CSM and remaining PCLs relevant to the site which were addressed in the options appraisal [9] are summarised within Table 3-1. PCLs have been classified in accordance with CIRIA 552 guidance [19] and the risk rating provided is in absence of any mitigation.



Table 3-1 Conceptual Site Model and Risk Assessment

Source and Area/Structure	Critical Receptors and Scenarios	Pathway	Potential Consequence of Complete Contaminant Linkage	Likelihood of Complete Contaminant Linkage	Risk Rating	PCL included in remediation scope
Source 1 – Hydrocarbon impacted Made Ground across the site.	Secondary A aquifer (Kempton Park Gravels) Secondary undifferentiated aquifer (Alluvium)	Leaching/dissolution from contaminated soil/NAPL	Medium	Low likelihood	Moderate / Low	Yes – Source remediation to be carried out in distinct areas.
		Leaching/dissolution from contaminated soil/NAPL followed by migration in groundwater	Medium	Low likelihood	Moderate / Low	
	Surface water (Pymmes Brook)	Migration via surface water/drainage	Medium	Low likelihood	Moderate / Low	
		NAPL migration and discharge to surface water	Medium	Low likelihood	Moderate / Low	
Source 2 – Potential asbestos within Made Ground associated with the historical demolition and re-development of the site, and possible disposal on site. ACM encountered in BH24-06 and BH24-07.	On-site workers	Dust/fibre inhalation	Severe	Very unlikely	Low	No – No active PCL under existing or future end use. Risk to construction workers to be mitigated through worker controls
	Off-site workers	Inhalation/direct contact with dusts that have blown off-site	Severe	Very unlikely	Low	



Source and Area/Structure	Critical Receptors and Scenarios	Pathway	Potential Consequence of Complete Contaminant Linkage	Likelihood of Complete Contaminant Linkage	Risk Rating	PCL included in remediation scope
Source 3 – Made Ground associated with southern and central infilled ponds (formerly recorded as a sludge pit).	Off-site workers	Inhalation of ground gases / ground vapours from contaminated soils	Severe	Unlikely	Moderate/Low	Yes – Source remediation to be carried out in distinct areas. PCL indirectly remediated.
	Secondary A aquifer (Kempton Park Gravels) Secondary undifferentiated aquifer (Alluvium)	Leaching/dissolution from contaminated soil/NAPL	Medium	Likely	Moderate	Yes – PCL included in remediation scope and addressed.
	Surface water (Pymmes Brook)	Leaching/dissolution from contaminated soil/NAPL followed by migration in groundwater	Medium	Likely	Moderate	
		Migration via surface water/drainage	Medium	Likely	Moderate	
		NAPL migration and discharge to surface water	Medium	Likely	Moderate	
		Soil erosion/surface flooding resulting in discharge of contaminants to surface water	Medium	Likely	Moderate	



Source and Area/Structure	Critical Receptors and Scenarios	Pathway	Potential Consequence of Complete Contaminant Linkage	Likelihood of Complete Contaminant Linkage	Risk Rating	PCL included in remediation scope
Source 6 – Contaminated groundwater perched in the Made Ground and in the Kempton Park Gravels;	Secondary A aquifer (Kempton Park Gravels) Secondary undifferentiated aquifer (Alluvium)	Migration to aquifer	Medium	Likely	Moderate	Yes – PCL indirectly remediated, as a result of source reduction across the site.
		Migration in groundwater	Medium	Likely	Moderate	
	Surface water (Pymmes Brook)	Migration via surface water drainage	Medium	Likely	Moderate	
	Off-site workers	Inhalation of ground gases / ground vapours from contaminated soils	Severe	Unlikely	Moderate/Low	
Source 7a – LNAPL in the Made Ground, Alluvium and Kempton Park Gravels within the southern and central infilled pond areas.	Off-site workers	Inhalation of ground vapours from contaminated soils	Severe	Unlikely	Moderate/Low	Yes – PCL indirectly remediated, as a result of source reduction in these areas
	Secondary A aquifer (Kempton Park Gravels)	Leaching/dissolution from contaminated soil/NAPL	Medium	Unlikely	Low	
	Secondary undifferentiated aquifer (Alluvium)	Migration to aquifer	Medium	Unlikely	Low	
	Surface Water (Pymmes Brook)	Leaching/dissolution from contaminated soil/NAPL followed by migration in groundwater	Medium	Unlikely	Low	
		Migration via surface water drainage	Medium	Unlikely	Low	



Source and Area/Structure	Critical Receptors and Scenarios	Pathway	Potential Consequence of Complete Contaminant Linkage	Likelihood of Complete Contaminant Linkage	Risk Rating	PCL included in remediation scope
		NAPL migration and discharge to surface water	Medium	Unlikely	Low	
Source 7b – DNAPL in the Made Ground, Alluvium and Kempton Park Gravels within the southern and central infilled pond areas. The DNAPL has been identified as coal tar.	Off-site workers	Inhalation of ground vapours from contaminated soils	Severe	Unlikely	Moderate/Low	Yes – PCL indirectly remediated, as a result of source reduction in these areas
	Secondary A aquifer (Kempton Park Gravels)	Leaching/dissolution from contaminated soil/NAPL	Medium	Likely	Moderate	Yes – PCL included in remediation scope and addressed.
	Secondary undifferentiated aquifer (Alluvium)	Migration to aquifer	Medium	Likely	Moderate	
	Surface water (Pymmes Brook)	Leaching/dissolution from contaminated soil/NAPL followed by migration in groundwater	Medium	Likely	Moderate	
		Migration via surface water drainage	Medium	Likely	Moderate	
		NAPL migration and discharge to surface water	Medium	Likely	Moderate	
Source 8 – Organic contamination in the Made	Off-site workers	Inhalation of ground vapours from contaminated soils	Severe	Unlikely	Moderate/Low	Yes – PCL included in



Source and Area/Structure	Critical Receptors and Scenarios	Pathway	Potential Consequence of Complete Contaminant Linkage	Likelihood of Complete Contaminant Linkage	Risk Rating	PCL included in remediation scope
Ground and Alluvium in the north of the site.	Secondary A aquifer (Kempton Park Gravels) Secondary undifferentiated aquifer (Alluvium)	Leaching/dissolution from contaminated soil/NAPL	Medium	Likely	Moderate	remediation scope and addressed.
		Leaching/dissolution from contaminated soil/NAPL followed by migration in groundwater	Medium	Likely	Moderate	
	Surface water (Pymmes Brook)	Migration via surface water/drainage	Medium	Likely	Moderate	
		NAPL migration and discharge to surface water	Medium	Likely	Moderate	
		Soil erosion/surface flooding resulting in discharge of contaminants to surface water	Medium	Likely	Moderate	



3.3 Summary of human health PCLs

Table 3-1 shows that the human health PCLs are related to the potential vapour risk to off-site workers associated with the presence of gross contaminated soils, impacted groundwater, LNAPL and DNAPL, classified as a moderate/low risk.

The Phase 2 remediation will comprise remediation of DNAPL across the site and gross contamination risk drivers to controlled waters, this mitigation will also mitigate the source of the potential off-site vapour risk PCL to the south-west of the site (Source 3). Unsaturated zone contamination mitigation will also be targeted in the north of the site (Source 8).

Detailed considerations and justification for the PCLs selected for remediation are provided in the AtkinsRéalis Remediation Options Appraisal [9] and this report should be sought for full details (included in Appendix A). A summary of the PCLs taken forward for remediation is provided below:

- Source 3: Vapour migration from VOCs in unsaturated soils to off-site receptors from of the Made Ground
 - PCL: remediation recommended to mitigate potential vapour risk.
- Source 8: Direct contact with contaminated soils (unsaturated zone hotspots)
 - PCL: remediation recommended for site betterment and precautionary mitigation.

3.4 Summary of controlled waters PCLs

As detailed in Table 3-1, risks to controlled waters across the site are considered to be moderate. The 2024 investigation aimed to delineate areas potentially posing unacceptable risks to controlled water receptors, which were identified in the AtkinsRéalis reporting [7] [8], and can be broadly termed: the northern area, the central infilled pond and the southern infilled pond (referred to as the southern area).

The CW DQRA [8] identified exceedances of Level 4 SSAC across the site for soil, soil leachate and groundwater. Remediation at the site will therefore be defined by these exceedances and the presence of NAPL.

Further detail and justification for the PCLs selected for remediation are provided in the AtkinsRéalis Remediation Options Appraisal [9]. All PCLs associated with the following sources will be remediated with the principal objective of site betterment:

- Source 1 – Hydrocarbon impacted Made Ground across the site.
- Source 3 – Made Ground associated with southern and central infilled ponds (formerly recorded as a sludge pit).
- Source 6 – Contaminated groundwater perched in the Made Ground and in the Kempton Park Gravels.
- Source 7a – LNAPL in the Made Ground, Alluvium and Kempton Park Gravels within the southern and central infilled pond areas.
- Source 7b – DNAPL in the Made Ground, Alluvium and Kempton Park Gravels within the southern and central infilled pond areas. The DNAPL has been identified as coal tar.
- Source 8 – Organic contamination in the Made Ground and Alluvium in the north of the site.



4. Remediation Strategy and Options Appraisal

4.1 Objectives

The primary technical objectives for both the Phase 1 and Phase 2 remediation are detailed in the AtkinsRéalis Remediation Strategy [5]. The objectives specific to Phase 2 are as follows:

- to address PCLs identified in Section 3, as far as is reasonably practicable, and to render the site suitable for use as an operational substation. This comprises addressing unacceptable risks present in unsaturated soils in the north east and precautionary risks in the north west of the site;
- to undertake betterment of the site to address unacceptable risks to controlled waters and reduce gross contamination, that will include the recovery of DNAPL in the central and southern infilled pond areas, as far as is reasonable and practicable, taking into account the likelihood that DNAPL may also be present beyond the site boundaries;
- to implement a sustainable remediation scheme, involving the aspiration to reduce waste, limit impact on the local community in terms of nuisance, and embody health and safety, as far as is reasonably practicable in the context of proposed development to render the site suitable for use as an operational substation;
- remediation detailed design should be agreed and implemented within the agreed programme so that it does not delay the construction phase of the proposed substation upgrade scheme (this will be submitted to London Borough of Haringey to partially discharge sub-requirements of the DCO application); and
- to regularly engage with the Environment Agency.

4.2 Remediation rationale

The proposed substation development shall comprise of a pylon to the south of centre of the site. Remediation is required at this stage to enable development and ensure the site is suitable for the intended future use.

The Phase 2 remediation objectives and scope have been developed to address identified PCLs, particularly those relating to risks to controlled waters and off-site receptors, and to achieve site betterment through the reduction of gross contamination and DNAPL.

While the scope of works may evolve as the design is finalised, the remediation detailed design has been prepared to align with the current development programme. The approach reflects a pragmatic and flexible strategy, targeting known contamination sources.

4.3 Remediation options appraisal summary

A remediation options appraisal was produced by AtkinsRéalis [9] in accordance with the Environment LCRM guidance [10], considering the future use of the site as an operational substation and building on experience from the Phase 1 remediation. This is provided in Appendix A.

The appraisal focused on technically and commercially feasible remediation technologies for both the northern and southern areas of the site, with separate consideration of the unsaturated and saturated zones. A range of engineering and process-based solutions were reviewed, including in situ stabilisation/solidification, bioventing, thermal desorption, soil vapour extraction (SVE), hydraulic containment, and DNAPL recovery. A detailed numerical



appraisal of each remediation technology is provided in the AtkinsRéalis remediation options appraisal report provided in 0, which should be referred to for further detail.

A summary of the recommended options for the northern and southern areas is provided in Table 4-1.

Table 4-1 Remediation Recommendations

Source	Location	Proposed remedial technique	Rationale
Sources 1 and 3 - Made Ground associated with southern and central infilled ponds (formerly recorded as a sludge pit).	Southern Area	SVE	Targeted unsaturated zone remediation where risk-based criteria has been found to exceed in soils. This approach will also mitigate potential off-site vapour risks to commercial users to the west.
Source 6 – Dissolved phase impact in groundwater perched in the Made Ground and in the Kempton Park Gravels.	Site-wide	No specific groundwater remediation is proposed.	The remediation objectives are to perform site betterment and mitigate unacceptable risks to groundwater. Whilst no targeted groundwater remediation techniques are proposed, the remediation works will improve the overall groundwater quality at the site and across the wider area. This approach has been agreed in-principle with the Environment Agency.
Source 7a – LNAPL in the Made Ground, Alluvium and Kempton Park Gravels within the southern and central infilled pond areas	Southern Area	No targeted remediation proposed.	LNAPL has been occasionally monitored within localised monitoring wells and is not considered to be continuous in any areas of the site. No targeted remediation is proposed; however, if encountered as part of any site-wide monitoring or further ground investigation to install wider diameter wells, it will be recovered by extraction.
Source 7b – DNAPL in the Made Ground, Alluvium and Kempton Park Gravels within the southern and central infilled pond areas. The DNAPL has been identified as coal tar.	Southern Area	DNAPL recovery by extraction, nominally by fabric extraction technique or similar.	DNAPL recovery in the saturated zone, at the base of the Kempton Park Gravels is recommended. The targeted areas will be selected based the results of the pilot trials, critical DNAPL pool height exceedances and low points at the top of the London Clay. Considering the construction programme, the remedial end point will be the end of the remediation period, likely to be 12 weeks.



Source	Location	Proposed remedial technique	Rationale
Sources 1 and 8 – Organic contamination in the Made Ground and Alluvium in the north of the site.	Northern Area	SVE	Unsaturated zone remediation is recommended where risk-based criteria is exceeded. An indicative remediation area is provided that also includes a precautionary extension that will also mitigate potential off-site vapour risks to commercial users to the west.

4.4 Unsaturated zone remediation

Subsequent to issue of the remediation options appraisal [9], the Phase 1 remediation was terminated following excavation of approximately 60% of the initial proposed cable route excavation. This was a result of the cable sealing end compound design no longer being developed by NGET and the replacement with a finalised pylon design, as detailed in the AtkinsRéalis Summary Note [1]. A trial trenching exercise across the Phase 1 remediation footprint was completed as part of the Phase 1 remediation and provided information on the presence of 'gross contamination' within the remaining Phase 1 trench. This data has been appraised to inform a need to carry out further unsaturated zone remediation of soils in the remainder of the unexcavated trench.

In addition, a review of all ground investigation data for boreholes in the south of the site together with the conclusions from the 2025 CW DQRA and NAPL assessment [8] has been carried out to determine the presence of 'gross contamination' risk in the unsaturated zone elsewhere at the site. Soil exceedances of Level 4 SSAC in the 2025 CW DQRA and NAPL assessment [7] have been utilised as these may denote unsaturated zone sources with a potential to present an unacceptable risk to Controlled Waters receptors. Photoionisation detector (PID) data has also been incorporated to provide information on the volatile organic compound (VOC) concentration within the unsaturated zone alongside evidence of contamination.

The review is provided in Table 4-2 and informs areas where further remediation of unsaturated zone soils may be required across the site based on the definition for 'gross contamination' set out in Section 6.0 and the exceedances of risk-based criteria in the 2025 CW DQRA and NAPL assessment [7].



Table 4-2 Summary of Gross Contamination in Unsaturated Zone

Borehole	Chemical of Concern	Sample depth (m)	Groundwater level (m bgl)	Maximum unsaturated [VOC] (ppm)*	Visual and/or olfactory evidence of contamination within unsaturated zone
BH12-01	Anthracene	2.0-2.2	2.17	180.0 @ 1.0 m	0.25 – 1.20 m. Slight hydrocarbon odour 1.20 – 2.30 m. Hydrocarbon odour.
BH12-04	Benzene Anthracene Fluoranthene	1.0-1.1	3.05	5000.0 @ 1.0 m	0.40 – 1.05 m. Strong hydrocarbon odour. 1.05 – 1.40 m. Tarry and strong hydrocarbon odour. 1.40 – 2.55 m. Hydrocarbon odour, hydrocarbon in fissures. 2.55 – 2.85 m. Black hydrocarbon staining and odour. 2.85 – 4.60 m. Potential hydrocarbon staining.
BH24-07	Fluoranthene	0.2	2.89	361.4 @ 2.5 m	None.
BH24-08	Aromatic TPH>EC5-EC7 Anthracene Fluoranthene	2.7; 3.5; 6.5	2.48	n/a – no recovery 1.5 - 2.5 m	None.
BH24-09	Anthracene Fluoranthene	0.8	3.03	171.9 @ 0.8 m	1.20 m. Hydrocarbon odour and seepage. 2.30 – 3.10 m. Strong hydrocarbon odour.
BH24-12	Aromatic TPH>EC5-EC7 Anthracene Fluoranthene Naphthalene	1.5; 3.5; 4.8	1.64	904.3 @ 1.5 m	0.20 – 1.20 m. Mild hydrocarbon odour. 1.20 – 2.00 m. Black gravelly clay.
BH24-13	Anthracene Fluoranthene	4.0	2.50	101.0 @ 1.0 m	None.

*Data obtained from in field photoionisation detector (PID) readings recorded at 0.5 m intervals during borehole drilling during the AtkinsRéalis ground investigations.



Considering the exceedance of risk-based criteria, unsaturated zone VOC concentrations (up to 5000 ppm) and evidence of contamination throughout the Made Ground and Alluvium, it is recommended that unsaturated zone remediation is carried out in the vicinity of BH12-04. This area corresponds with the data collected from the trial trenching exercise completed as part of the Phase 1 remediation [1], that evidenced a presence of gross contamination in the east of the remaining Phase 1 trench. These areas are shown on Figure 5 and further detail is provided in the Phase 1 Verification Report [18]. Considering the depth of this contamination, unsaturated zone excavation is recommended in these areas rather than via SVE techniques, and gross contamination should be chased out laterally and horizontally as far as is reasonable and practicable.

At the BH24-12 location, in the south of the site, a high VOC concentration of 904.3 ppm at 1.50 m bgl necessitates further consideration. This concentration was recorded very close to the water level and mild hydrocarbon odours and low VOC concentrations were detected from 1.0-1.2 m bgl. NAPL is present throughout the Alluvium from 2.5 to 6.2 m bgl at this location and this area will be targeted for DNAPL recovery during the remediation. If encountered, LNAPL will also be recovered as far as is reasonably practicable. As such, further unsaturated zone mitigation is not recommended in this area.

Although exceedances of risk-based criteria in soils have been identified at other locations in the centre and south of the site, further unsaturated zone mitigation is not recommended. At BH12-01 and BH24-13, the identified exceedances in soil are below or very close to the water table and thus excavation or SVE is not considered to be practical. At locations BH24-07 and BH24-09, the evidence of contamination and VOC concentrations do not meet the criteria for 'gross contamination' (detailed in Section 6.0) within the site context. DNAPL is present at the base of the superficial deposits in BH24-09 and this area will be targeted for DNAPL recovery. Considering the data available for BH24-08, the soil samples that exceed risk-based criteria are below the water table; however, 'no recovery' was possible within the unsaturated zone during drilling. This area falls within the zone that shall be targeted for DNAPL recovery and therefore, any free product shall be recovered at this location as part of the works.

Soils verification data obtained from the base and sides of the Phase 1 trench excavation contained within the Phase 1 Verification report [18] indicates exceedances of soil saturation limits (at 6% soil organic matter) for aliphatic and aromatic TPH C10-C12 and TPH C12-C16, potentially indicative of the presence of NAPL in shallow soils. These were largely within the same order of magnitude where identified. Areas where the saturation limits were exceeded by at least one order of magnitude were mainly present within the eastern batter, where it is not possible to carry out further excavation due to the presence of the site boundary, and NGET infrastructure to the east. An additional soil exceedance was identified at the base, in the south of the trench excavation. As the base of the excavation was very close to or within the water table, further mitigation is not considered to be practical. This location is to the north of the unsaturated zone excavation area already proposed as part of the Phase 2 remediation and as such, any contamination shall be chased out laterally as part of the works.



5. Pilot trial

As per recommendations of the Remediation Options Appraisal [9], AtkinsRéalis carried out a pilot trial at the site in February and March 2026, to determine if the DNAPL encountered was sufficiently transmissive to be recovered. This was carried out using the NET system, which is a belt skimmer type, at various locations across the site. The report is included in Appendix C and should be sought for full details.

The NET system was successful in recovering DNAPL from all attempted monitoring wells (BH11, BH12-01, BH24-09 and BH24-14) and a relatively low volume of water was extracted as part of the process. This concluded that the DNAPL at the site was sufficiently transmissive to be recovered by this system, despite the degraded and emulsified nature of the weathered coal tar present.

A higher volume of DNAPL was recovered from monitoring wells at the site by matching the system recovery rate of the DNAPL to recharge rate within the monitoring well. An estimate of up to 18 L/day DNAPL could be recovered from monitoring wells in the vicinity of BH24-09. This may vary across the site considering the DNAPL composition, volume of DNAPL present in vicinity of a given well and topography of the underlying London Clay.

There was an indication that biofouling may be occurring within historical monitoring wells and as such, it was recommended that fit-for-purpose wells are installed across the relevant areas of the site in a tight array, around monitoring wells with thickness of DNAPL present above or close to critical levels.



6. Phase 2 Remediation Design

6.1 Pre-mobilisation works

The following pre-mobilisation works will be undertaken prior to the commencement of the main works to mitigate identified constraints and facilitate the works:

- Liaison with stakeholders in conjunction with NGET's community relations consultant. This will include, but is not limited to, liaison with the adjacent commercial site users in relation to their site access to agree:
 - Emergency procedures;
 - 24-hour vehicle access routes for NGET to the electricity infrastructure to the east of the site; and,
 - Protection of the adjacent electricity infrastructure, including adherence to NGET's Electricity Safety Rules and Guidance. Any easement from these rules should be demarcated.
- obtain all applicable licenses and consents required for the works;
- prior to the works commencing a full condition survey (including photographs) to establish the conditions of walls, fences, roads and structures surrounding the site. A full condition survey shall also be undertaken following completion of the works;
- site establishment including traffic management plans and security;
- install dust and debris netting along the eastern perimeter and external boundaries to prevent nuisance to neighbouring site users;
- baseline monitoring of all environmental monitoring parameters;
- topographical survey to confirm current levels, existing well positions and levels and any new wells constructed; and,
- service clearance, including positive identification of services within the eastern excavation area and areas where intrusive works will be undertaken.

6.2 Remediation specific ground investigation

Ground investigation shall be carried out prior to the remediation to install new well arrays around targeted areas.

For the SVE system, the following is recommended:

- Installation of monitoring wells on a 5 m grid to a depth of 2.5 m bgl, with PVC pipework left above ground for connection ease; and
- Use of bentonite plugs within the monitoring well to limit the potential for short circuiting of the system.

For DNAPL recovery works, the following is recommended:

- Boreholes on a 20 m grid system across the south of the site, and on a 10 m grid system in the central DNAPL area (BH11 to BH24-10). This information shall be used for further delineation of DNAPL at the site and the installation of wider diameter monitoring wells, where DNAPL is encountered;
- Installation of a higher density array at areas where productive wells were established and transmissive DNAPL was encountered as part of the pilot trial (BH24-09, BH11 and BH12-01) – well spacing to be confirmed based on information obtained during initial delineation works;
- Installation of a suitable depth sump into the underlying London Clay to maximise DNAPL recovery; and



- Measurement of the DNAPL recharge rate (bail down or pump recovery) at each monitoring well prior to the commencement of remedial works.

A watching brief shall be maintained during the ground investigation and any areas of unforeseen contamination shall be managed by AtkinsRéalis and documented in the Phase 2 Verification Report.

6.3 Remediation design

The techniques proposed for the Phase 2 remediation are detailed herein. The areas in which the proposed methodologies are to be implemented are shown on Figure 5.

6.3.1 SVE

The SVE methodology is to be utilised in the north of the site only, in the remediation area shown on Figure 5. These limits have been defined following a review of all ground investigation information and subsequent assessments, set out in the Remediation Options Appraisal [9]. The SVE works are to comprise:

- Installation of the SVE system on a 5 m grid to a maximum depth of 2.5 m bgl within the unsaturated zone;
- Establishment of an appropriate zone of influence that considers the ground surfacing, superficial geology and contaminants of concern present;
- Operation of the system for a period of 12 weeks;
- Optimising of the SVE system to achieve asymptotic recovery through monitoring and rebound testing; and
- Decommissioning of all monitoring wells to be undertaken in accordance with Environment Agency guidance.

6.3.2 DNAPL recovery

AtkinsRéalis have recently undertaken a pilot trial to assess the potential recoverability of NAPL at the site from the saturated zone, the findings of which are presented in Section 5.0.

In summary, the remediation shall comprise:

- Operation of a low to moderate intensity extraction system for dense non aqueous phase liquid (DNAPL) extraction, such as belt skimmers or similar. These systems do not recover high volumes of contaminated groundwater.
- Installation of a well network that considers the DNAPL identified, the elevation of the surface of the London Clay and the proposed development area (i.e. this area shall be prioritised to maximise the remediation programme);
- Operation of the system for a period of 12 weeks at multiple locations across the south of the site;
- Optimising of DNAPL recovery rates within each well to match the DNAPL recharge rates to maximise the volume recovered (as evidenced by the AtkinsRéalis pilot trial);
- DNAPL storage in drums, suitably banded and disposed of off-site by a registered waste carrier to a suitable disposal facility; and
- Decommissioning of all monitoring wells to be undertaken in accordance with Environment Agency guidance subsequent to works.



6.3.3 Excavation of gross contamination areas

The shallow excavation of gross contamination areas identified within the unsaturated zone as part of the Phase 1 remediation and discussed in Section 4.4 will be undertaken. These works comprise:

- excavation of surface asphalt and hardstanding, followed by unsaturated Made Ground and Alluvium (where present) to a depth of 2.0 m bgl (ranging between 8.49 m to 8.85 m AOD). As excavated soils are unlikely to be suitable for re-use under a Material Management Plan (MMP), export of material to a hazardous landfill is likely to be required due to the gross contamination present. This is based on experience from the Phase 1 remediation;
- excavation to the pre-determined limits shown on Figure 5 and to the specification presented in Figure 6. The excavation should allow for a 1 m easement from the eastern fence line that is being retained. When the excavation extent has been reached, the excavation side shall be battered and made safe. Validation samples should be undertaken from the base and sides of the excavation. Battered clay barrier walls and clay layers at the base are required to seal the excavation sides and base, respectively;
- excavation and removal of any below ground tanks and / or obstructions and / or pipework that are within the excavation extents, if encountered;
- removal of perched and shallow groundwater from within excavations, storage and disposal off-site by tanker for treatment;
- should NAPL be encountered at any point during excavation works on site, this will be excavated and any unsaturated zone NAPL encountered will be chased out;
- excavations shall be backfilled to match original ground levels utilising clean, validated, imported material that is suitable for use; and
- environmental monitoring (noise, dust, vibration, odours, and asbestos) during the works.

The volumes of the anticipated excavation works are provided in Table 6-1.

Table 6-1 Remediation Requirements Summary

Description of Proposed Remediation Area	Estimated Remediation Zone Area (m ²)	Estimated Remediation Zone Depth (m)	Estimated Remediation Zone Volume (m ³)	Requirements
Areas of gross contamination previously identified by investigation as part of the Phase 1 remediation. These areas are within the section of the trench that was not remediated.	300	2.0	600	Localised excavation of soils to 2.0 m. Installation of a clay base and external barrier walls. Removal of perched water and NAPL, where encountered. Over excavation of trench, terminating above the water table to excavate gross contaminated soils and NAPL, if present.
Over excavation below identified zones	75 (assumed 25% of total area of 300 m ²)	0.86 (distance from the bottom of the excavation to the groundwater table)	65	Excavation to chase out contamination to the groundwater table.



Description of Proposed Remediation Area	Estimated Remediation Zone Area (m ²)	Estimated Remediation Zone Depth (m)	Estimated Remediation Zone Volume (m ³)	Requirements
Lateral over excavation beyond identified zones	75 (assumed 25% of total area of 300 m ²)	2.0	150	Excavation to chase out contamination laterally to the north, south and west beyond the remediation area. The eastern extent is constrained by the site boundary and easement.

6.4 Remedial end point

The remediation end point is defined for each of the techniques proposed herein. The programme for the remediation is 12 weeks due to the construction of the pylon that is due to commence in September 2026; this date is governed by NGET planned power outages for the upgrade of the wider NLRP route.

6.4.1 DNAPL recovery

DNAPL shall be recovered from the southern and central infilled pond areas for the full duration of the 12 week remediation programme. Wide diameter boreholes for DNAPL recovery shall target areas where DNAPL is considered to have a high transmissivity and shall be installed at a high density in these areas. The intention shall be to recover as much DNAPL as is reasonable and practicable, to achieve source reduction.

DNAPL recovery shall continue until either of the following is met:

- A) the end of remediation programme;
- B) asymptotic conditions; or
- C) <1 l/day recovery, to be verified during the works under reasonable operational conditions.

6.4.2 SVE

SVE shall be operated in the north of the site for the full duration of the 12 week remediation programme. Shallow monitoring wells specific for SVE shall be installed at a high density across the SVE zone.

SVE shall continue until either of the following is met:

- A) the end of remediation programme; or
- B) asymptotic conditions. Pulsing the system may be required to account for contaminant rebound.

6.5 Remediation criteria

Remediation verification compliance criteria are presented in Appendix B. In addition, where gross contamination is visually encountered, the affected material shall be actively remediated as far as is reasonably practicable



regardless of whether the verification chemical criteria are met. It is noted that it may not be possible to chase out impacted soils to the east due to the presence of the site boundary.

Indicators of gross contamination that may be present at the site included in Table 6-2.

Table 6-2 Gross Contamination Indicators

Contaminant / Indicator ¹	Criteria
Free Cyanide	Visual: Blue oxide staining.
Polycyclic Aromatic Hydrocarbons (PAHs) and Coal Tar	Visual: Black liquid or semi-solid tar in veins or zones. Heavily stained or coated surfaces. Solid tar/bitumen. Headspace ² : Over 500 parts per million (ppm) ³ , olfactory ⁴
Mineral Oils (Total Petroleum Hydrocarbons)	Visual: Liquid oil, oil saturated solids in veins or zones. Heavily stained or coated surfaces. Headspace ² : Over 500 ppm ³ , olfactory ⁴
Asbestos	Visible asbestos containing material (ACM) ⁵

Table 6-2 should be read with the following associated notes:

1. Where multiple contaminants are present, the selection criteria for each contaminant will be applied sequentially, starting with the perceived major contaminant.
2. Headspace analysis criteria shall be subject to calibration of instruments.
3. 500 ppm headspace reading is an absolute threshold. Considering the site conditions, this is considered appropriate.
4. Olfactory assessment shall always be confirmed by headspace analysis.
5. Asbestos content within the soil matrix to be confirmed by laboratory testing of soil samples surrounding the ACM identified.

6.6 Verification testing

Verification testing shall be undertaken by the Contractor as per the following sections.

6.6.1 Soil vapour extraction

Optimisation of the system shall be carried out to maximise recovery, this can be performed by cycling the system through monitoring asymptotic conditions and rebound. This can be used to support the remedial end point of asymptotic recovery or expiry of remediation window.

The influent and effluent vapour contaminant concentrations shall be provided to AtkinsRéalis for review on a weekly basis. The continuous recording of influent concentrations trends over time will be used to evidence asymptotic conditions. The data from vapour samples collected at periodic intervals shall be used to track declining contaminant mass over time.

6.6.2 DNAPL recovery

The following shall be provided to AtkinsRéalis for review on a weekly basis:

- Daily DNAPL recovery rates per well and operation time;
- The total DNAPL and groundwater recovery;
- Measurable thickness of DNAPL per monitoring well; and



- Recharge/rebound monitoring in periods where the system is switched off.

The data collected can be compared with recovery data obtained prior to commencing the remediation, providing evidence to support the remedial end point.

Verification of any DNAPL treatment will be determined on a betterment approach to evidence improvement to the groundwater quality. It is recognised that removal of 100% of the DNAPL on the site is neither practicable nor verifiable and is not considered necessary on a risk basis.

6.6.3 Excavation works

The remediation excavations will be inspected for visual/olfactory indicators of potential contamination in the first instance. Although the extents are based on extensive trial pitting as part of the Phase 1 remediation, it may be necessary to chase out contamination laterally. This will be based on a combination of visual and olfactory evidence of contamination, field PID readings and the magnitude of exceedances of the verification criteria, with the determination of any additional excavation extents to be undertaken by an AtkinsRéalis suitably competent person. A watching brief shall also be maintained during the excavation works and managed by AtkinsRéalis.

Verification of the excavation and validation samples should still be undertaken at a frequency of one per 50 m² from the base and at 5 m intervals from the sides of the excavation. At each sample location, a soil description, photograph and PID reading shall also be provided. The *Contractor* is responsible for the organisation, collection, and analysis of verification samples, which will be collected for information purposes to quantify any residual contamination present. Samples will be submitted to a UKAS accredited laboratory for analysis of the suite of determinants defined in Appendix B and compared with the remediation criteria defined in Appendix B.

Re-use of soils on site is not recommended. Validation of the imported material shall also be undertaken and shall accord with the criteria included in Appendix B. A frequency of one sample per 100 m³ of material is required, with a minimum of three samples per source. Geotechnical testing of the import material is also recommended.

6.7 Segregation and containment

Excavation within remediation areas shall be undertaken ensuring material is appropriately segregated and stockpiled according to type and origin. Site-derived materials of a similar nature shall be stockpiled together with any changes in the physical and/or chemical properties noted and separate material stockpiles to be produced if necessary. Stockpiles shall be kept to a maximum volume of 300 m³.

All skips and stockpiles shall be labelled and an up-to-date stockpile register shall be kept on site.

All material stockpiled on site shall be located on low permeability materials or geo-membranes with adequate perimeter bunding to ensure any precipitation generated leachate cannot discharge into the local drainage. All stockpile drainage shall be collected and treated using a water treatment system and then pumped to a holding tank, sampled and disposed of, either via the foul sewer using a discharge consent or tankered off-site.

Excavated materials shall be managed efficiently, and all movements shall be recorded to supplement the requirements for re-use on site and/or consignment documentation. The working area shall be operated as a contaminated site in accordance with HSE guidance [20]. The categorisation of all excavated soils for disposal shall be confirmed by laboratory analysis of samples of the material.



6.8 Waste soil handling and disposal

Appropriate waste classification shall be undertaken to support off-site disposal and off-site treatment of excavated materials, in accordance with a Sampling Plan produced by the Contractor. This should include asbestos screening and quantification tests, where positively identified.

Waste stockpiles shall be segregated based on visual and olfactory evidence of contamination and kept to a maximum volume of 300 m³ per stockpile. Composite samples shall be taken from site-derived material to confirm the preliminary classifications and requirements for disposal, in accordance with ISO 18400 104:2018.

Prior to removal from site, the material excavated may require Waste Acceptance Criteria (WAC) testing if the material is destined for landfill. The waste classification chemical data and WAC testing shall be provided to the receiving facility. All analysis, where relevant, shall be of MCERTS standard and in line with consultation notes.

Prior to disposal, formal classification of the material as non-hazardous or hazardous shall be undertaken. The Contractor shall be the Producer of the waste and all associated responsibilities and duties as the Producer (as defined within the Landfill (England and Wales) Regulations 2002 (as amended)) shall apply. The Contractor shall maintain a log of all waste removed from site and provide a copy of this together with all waste delivery records to the Supervisor on completion of the Works.

6.9 Backfilling the excavation area

The excavation voids shall be backfilled to match existing ground levels as per the cross section included as Figure 6. The Contractor should submit evidence, in the form of chemical and geotechnical certificates, to the Supervisor for approval prior to importing material on to the site.

The excavation shall utilise imported material for the bulk fill and capping layer. Due to the presence of hydrocarbon impact throughout the unsaturated zone, soils and concrete arising from the remediation excavation are unlikely to be suitable for re-use at the site.

As presented on Figure 6, a compacted layer of Class 7J (in accordance with Series 600 of the Specification for Highways Works [21]) low permeability clay with a thickness of 0.3 m shall be placed at the base and lateral extents of the excavations.

A starter layer of coarse granular material shall be placed at the base of excavations if standing water is present, particularly where NAPL is chased out in the unsaturated zone. The starter layer shall comprise suitable Class 6A material, free from deleterious materials.

Imported material for use as bulk fill shall comprise suitable Class 1A material that confirms with the Specification for Highways Works [21].

The top 0.3 m of backfill shall comprise a capping layer utilising chemically suitable class 6F5 materials, free from deleterious materials. The surface shall be left level to match existing conditions.

All imported materials shall be analysed for the testing suite presented in Appendix B and compared to the import criteria also presented in Appendix B at a frequency of 1 sample per 100 m³, with a minimum of three samples per source. Geotechnical testing shall be undertaken on imported material to confirm compliance with the limits for Class 1 materials, at a frequency of 1 sample per 250 m³, with a minimum three samples per source.



Sources of fill materials shall be identified at the outset of the project, and samples shall be obtained and scheduled for the chemical analyses detailed above prior to the materials being imported to site.

The excavation sides shall be appropriately battered to maintain the stability of the earthworks.

The anticipated backfill volumes are presented in Table 6-3. Re-use of site won soils and aggregate shall not be carried out.

Table 6-3 Backfill Summary

Remediation Area	Required Backfill Volume (m ³)
Trench excavation and other identified potential source areas	815
Backfill type and volume for the above areas	
6F5 Capping Layer	90
Class 1A Fill	522
Class 7J Low Permeability Clay	138
Class 6A Self Compacting Fill (assumed 25% requirement to over dig the excavation due to the presence of gross contamination)	65

*Based on compacted volumes and does not consider bulking.

6.10 Groundwater management

Shallow groundwater/perched water encountered within excavations shall be removed, collected and, pumped into a holding tank and then disposed of off-site via a tanker. Any treatment will be undertaken off-site. Should free phase hydrocarbon product be encountered at any point during intrusive works on site, this will be removed via pumping/excavation, stored safely and suitably disposed of.

6.11 Controlling nuisance to local residents

All reasonable measures to prevent site operations becoming a nuisance to the occupiers of on-site and adjacent land will be undertaken. If, for any reason, complaints from occupiers occur, these shall be duly recorded and brought to the immediate attention of the client, their community relations consultant and the Local Authority. Measures to alleviate or eliminate the nuisance caused by Contractor operations will be undertaken where practicable and implemented from the start of the works.

The working areas, including all excavations and stockpiles will be maintained in a tidy and controlled manner at all times. The Contractor shall also be mindful that the site is located in a commercial setting, with neighbouring commercial site users. The safety of the public is paramount and the Contractor's method statements shall consider the health and safety implications of working within this environment.



7. Verification Plan

7.1 Verification plan

The verification of remediation excavations will be based on a combination of screening of verification samples against the criteria included in Appendix B, a visual and olfactory assessment and in-situ PID results.

A photographic record and topographical survey shall be undertaken of excavation extents. Observations of residual contamination and structures shall be recorded.

The records detailed in Section 6.0 shall be reviewed on a weekly basis to monitor the progress of the SVE and DNAPL recovery works.

7.2 Verification reporting

A Verification Report shall be produced by AtkinsRéalis for the remediation and submitted to the Local Authority (London Borough of Haringey). This report may follow the commencement of enablement and construction works at the site, where necessary.

The report shall provide a complete record of all remediation activities on site and the data collected to support compliance with agreed remediation objectives and criteria. The Verification Report will include details of the final strategy, works undertaken (including volumes disposed), third-party approvals, verification, quality assessment, monitoring, final site conditions, wayleaves, warranties and contact details of involved parties/consultees, tip locations, excavation profiles, copies of waste transfer documents and health and safety information.

With reference to the LCRM [10] the verification report shall include the following information:

- background information (site details, personnel and roles, reasons and objectives for the remediation);
- remediation:
 - methodology and programme (to include criteria);
 - verification;
 - monitoring;
 - testing regime; and
 - ongoing works.
- final site condition (monitoring requirements, restrictions on site use);
- details of residual contamination (soil, groundwater, NAPL);
- third party agreements (records of regulator liaison);
- supporting information (plans, drawings, photographs, field and laboratory test results, progress reports and meeting minutes); and,
- a risk assessment for any residual contamination identified at the site.

The verification report shall also be produced to accord with waste guidance and industry good practice, including (but may not be limited to):

- materials tracking;
- transfer notes;



- delivery notes;
- weighbridge tickets;
- site plans which show sample locations;
- site plans showing areas of excavation and material placement (for imported material); and,
- photographic record of earthworks movements.



8. Monitoring Requirements

8.1 Groundwater monitoring requirements

In line with the Phase 2 remedial objectives, a groundwater monitoring regime is not proposed for the Phase 2 remediation but DNAPL monitoring shall be carried out on a daily basis and utilised to monitor progress of the remediation. This data shall be reported in the Phase 2 Verification Report.

8.2 Dust

Dust monitoring and control shall be implemented throughout the works. Dust monitoring locations shall be located at the site boundaries to ensure levels remain acceptable. Baseline levels shall be monitored by the Contractor prior to works commencing. The results shall be reported on a weekly basis at a minimum in order to identify scenarios where mitigation may be required and allow for appropriate measures to be put in place. HSE Workplace Exposure Limits should be used as target levels. Targets shall be agreed with the local authority prior to commencement of the works.

Should elevated dust levels be recorded, then dust mitigation measures shall be used where appropriate such as dampening down during periods of dry and / or windy weather. Other measures could include dust screens and semi-permeable fabric to catch / divert airborne particles from sensitive areas.

An ongoing visual assessment of dust levels shall be carried out and the Contractor shall react immediately in the event of dust generation.

8.3 Asbestos

Asbestos should be presumed to be present in shallow soils and as such, asbestos monitoring and control shall be implemented throughout the works in line with CAR-SOIL industry guidelines [22] and HSE guidance.

Asbestos monitoring locations shall be located at the excavation boundaries, particularly in the west where commercial off-site users are situated. Baseline levels shall be monitored by the Contractor prior to works commencing. The results shall be reported on a weekly basis to the Consultant / Supervisor and the Contractor should then identify scenarios where mitigation may be required and allow for appropriate measures to be put in place.

Asbestos mitigation measures shall be adopted during periods of dry and / or windy weather such as dampening down.

8.4 Odours, vapours and gases

The site is vacant but commercial off-site users are located to the, north west and south of the site. The footpath to the north of the site is used by pedestrians to access Tottenham Marshes. An appropriate standard of odour control will be maintained when excavating soils or undertaking works with a potential to release odours or vapours and may include:

- personal monitors and handheld PIDs for site staff working at the vapour source;



- continuous PID readings at the site boundary close to sensitive receptors. The site alarm system will be set at a conservative 1 ppm total VOCs, for a 15-minute time weighted average (TWA). An exceedance of this threshold should trigger an investigation into the source and appropriate mitigation, if necessary;
- low detection limit VOC monitoring, including passive and active sampling, to obtain speciation of individual VOC's and enable comparison to short-term and long-term air quality standards. Baseline sampling shall also be carried out. Wind direction data shall also be collected; and
- odour "sniff testing" by trained personnel at the site boundary and in the site's vicinity.

Odour suppression shall also be considered such as chemical sprays or physical barriers.

HSE Workplace Exposure Limits shall be used to assess the vapour levels. The exact requirements shall be discussed by the Contractor with the local Environment Health Officer prior to the commencement of the works.

Baseline odour and vapour levels shall be monitored by the Contractor prior to works commencing.

8.5 Noise and vibration

Excess noise shall be controlled during the remediation works. A baseline background noise monitoring survey shall be undertaken prior to the commencement of the works. A Section 60 or Section 61 permit in accordance with the Control of Pollution Act (COPA) (1974) shall be obtained where appropriate after liaison with the Local Authority. Periodic noise monitoring shall be undertaken throughout the works to ensure levels remain acceptable and below agreed thresholds.

Vibration monitoring shall be undertaken during work activities likely to cause concern such as the breakout of hardstanding. A Section 60 or Section 61 permit in accordance with the Control of Pollution Act (COPA) shall be obtained where appropriate.



9. Materials Management Framework

9.1 Introduction

It is anticipated that soils and concrete encountered as part of the excavation works will be unsuitable for re-use considering the level of gross contamination. Re-use of soils and crushed concrete at the site is not recommended.

9.2 Management strategy

9.2.1 Excavation materials

Excavation of material shall be undertaken to ensure material is appropriately segregated and stockpiled according to type and origin. Particular care shall be taken to ensure that visibly contaminated materials are stockpiled separately.

Site-derived materials of a similar nature shall be stockpiled together and any changes in the physical and/or chemical properties shall require separate material stockpiles to be produced.

The Contractor is to carry out testing of soils in situ to determine whether soils are likely to be hazardous or non-hazardous (pre-classification), to limit the period in which the soils are stockpiled prior to disposal from site.

9.2.2 Preliminary material stockpile classification

During and following excavation/import, site derived and import material shall be appropriately segregated and given a preliminary unique identification code according to the following criteria:

- type and location of origin;
- the perceived requirement for treatment, if any (e.g. screening or crushing, treatment at a STC, etc.) (not applicable for import material);
- material source; and
- date of deposition.

All material stockpiles classification codes will include the date of deposition and formatted as follows DD.MM.YYYY.

9.2.3 Segregation and containment

Material stockpile areas shall be defined and suitably separated to prevent cross contamination:

- site-derived materials that are perceived to be for off-site disposal to landfill;
- site-derived materials that are perceived to be for off-site disposal to soil treatment centre; and,
- import material.

All material stockpiles (site-derived and imported) shall be located either on bunded hardstanding with managed drainage, or on impermeable material with the same measures. This is to ensure accurate delineation between the material stockpiles and the current ground level and facilitate collection and subsequent disposal of any leachate generated by material stockpiles. Leachate generated from the material stockpiles shall be collected and, treated using pumped to a holding tank, sampled and tankered off-site to a suitably permitted waste facility. If water is to be transferred off-site to a suitably permitted waste facility the wastewater must be classified in line with waste classification guidance WM3 [23] prior to being tankered off-site.



Material to be imported to the site shall be assessed and certified as suitable for use prior to delivery to the site.

Site-derived material shall be kept covered using sheeting due to the potential for asbestos fibres to be present within it and the potential for odour release.

9.2.4 Waste classification

For waste soils, samples will be collected and analysed and an assessment undertaken in line with WM3 [23] to provide a waste classification. The contractor will be responsible for all sampling and classifying soils in line with WM3.

9.2.5 Management of import material

Material imported onto site must be chemically and geotechnically suitable for the proposed end use and supplied with appropriate supporting documentation demonstrating this is the case. This should include certification demonstrating that the material is free from Japanese Knotweed and other invasive species. Delivery tickets for imported recycled product must include a statement that the product was produced in compliance with the WRAP QP [24].

For validation purposes, composite samples shall be taken from each import material stockpile at a frequency stated in Section 6.9. Samples shall be analysed for the suite of constituents and screened against the pertinent soil criteria presented in Appendix B.

9.2.6 Laboratory testing

All testing will be undertaken in a UKAS accredited laboratory to MCERTS standards (where applicable), with the analytical limits of detection preferably at least an order of magnitude beneath the individual reuse criteria.

Appointed laboratories must have the ability to complete testing within five working days of receipt of samples.

9.3 Site records

9.3.1 Material tracking database

An on-site material tracking database, providing details of each of the stockpiled materials, shall be maintained.

As a minimum, the material tracking database shall provide the following information for each material stockpile:

- annotated plans showing excavation areas, stockpile locations and subsequent placement locations;
- inspection procedures, including visual and olfactory inspection, field tests and laboratory tests;
- registered waste carrier and non-waste haulier;
- tracking form and control sheets including running tallies;
- movement through authorised STC (if applicable);
- material treatment records (if applicable);
- off-site disposal records (if applicable); and,
- acceptance procedures for any imported materials, including visual and olfactory inspection, field tests and laboratory tests, signed delivery tickets and a record of placement.



9.3.2 Waste records

Detailed records of off-site transfer of waste shall be maintained. This shall include any waste classification information, including analytical results, the destination of the material, the confirmation of receipt from the waste facility and any waste transfer notes or hazardous waste consignment notes.

9.3.3 Import material delivery notes

A detailed record of all material imported on to site shall be maintained. This shall comprise any information provided by the material supplier and haulage contractor, which as a minimum should include details of the source, type, chemical and geotechnical properties and volume of any material. Delivery tickets for imported recycled product must include a statement that the product was produced in compliance with the WRAP QP .



10. References

- [1] AtkinsRéalis, “NGET Former Depot, Tottenham. Phase 1 Remediation Update.,” 2026.
- [2] Atkins, “NGET Arriva Bus Depot, Tottenham. Factual Site Investigation Report.,” 2023a.
- [3] Atkins, “NGET Arriva Bus Depot, Tottenham (8021). Interpretative Site Investigation Report.,” 2023b.
- [4] Atkins, “NGET Arriva Bus Depot. Controlled Waters Detailed Quantitative Risk Assessment Report,” 2024.
- [5] Atkins, “NGET Former Bus Depot, Tottenham (8021). Outline Remediation Strategy.,” 2024.
- [6] AtkinsRéalis, “NGET Former Bus Depot, Tottenham (8021). Factual Site Investigation Report.,” 2025.
- [7] AtkinsRéalis, “NGET Arriva Bus Depot, Tottenham (8021). Interpretative Site Investigation Report.,” 2025.
- [8] AtkinsRéalis, “NGET Former Bus Depot, Tottenham (8021). CW DQRA Update and NAPL Assessment,” 2025.
- [9] AtkinsRéalis, “NGET Arriva Bus Depot, Tottenham (8021). Remediation Options Appraisal,” 2025.
- [10] Environment Agency, “Land Contamination Risk Management (LCRM),” 2020.
- [11] Department for Levelling Up, Housing and Communities, National Planning Policy Framework, UK Government, 2021.
- [12] Department for Levelling Up, Housing and Communities, Land Affected by Contamination, UK Government, 2019.
- [13] Advisian, “Indoor Air Quality Assessment Letter Report, Tottenham Arriva Bus Depot Ref 51576-03,” 2016.
- [14] Worley Parsons, “Geotechnical and Environmental Assessment Site Investigation Factual Report. Proposed Cable Route, Tottenham.,” 2013c.
- [15] Worley Parsons, “Environmental Assessment, Factual Site Investigation Report, Arriva Bus Depot, Tottenham,” 2013a.
- [16] Environment Agency, “An illustrated handbook of DNAPL transport and fate in the subsurface,” 2003.
- [17] AtkinsRéalis, “NGET Former Bus Depot, Tottenham (8021). Piling Risk Assessment,” 2025.
- [18] AtkinsRéalis, “NGET Arriva Bus Depot, Tottenham (Side Code 8021). Phase 1 Remediation Verification Report.,” 2026.



- [19] CIRIA, "Contaminated land risk assessment. A guide to good practice (C552)," January 2001.
- [20] HSE, "Construction - Safety Topics: Site Organisation," [Online]. Available: <https://www.hse.gov.uk/construction/safetytopics/siteorg.htm>. [Accessed 01 July 2023].
- [21] Standards for Highways, "Series 0600 Earthworks. Specification for Highways Works," 2017.
- [22] CL:AIRE, "CAR-SOIL. Control of Asbestos Regulations 2012. Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials.," 2012.
- [23] Environment Agency, Waste Classification: Guidance on the classification and assessment of waste. Technical guidance WM3., 2015.
- [24] Environment Agency, "Quality Protocol: Aggregates from inert waste.," 2012.



Figures

