

Remediation Strategy

Client: Lidl Great Britain Ltd

Victoria Road, Ruislip

Report No: 952.02.03

April 2024





1. INTRODUCTION	2
1.1 PROPOSED DEVELOPMENT	2
1.2 OBJECTIVES.....	2
1.3 SCOPE OF WORKS	3
1.4 SUMMARY OF PREVIOUS INVESTIGATIONS.....	3
1.5 LIMITATIONS.....	4
2. BACKGROUND.....	5
2.1. REVIEW OF PREVIOUS REPORTS	5
2.2 PRE-REMEDIATION CONCEPTUAL SITE MODEL.....	6
3. REMEDIATION OPTIONS & OBJECTIVES	8
3.1 SAMPLING STRATEGY & METHODOLOGY.....	8
3.2 OBJECTIVES.....	8
4. REMEDIATION OUTLINE METHOD STATEMENT	11
4.1 GENERAL.....	11
4.2 SEQUENCE OF OPERATIONS	11
4.3 SOIL ACCEPTANCE CRITERIA	12
4.4 UNFORESEEN CONTAMINATION	12
4.5 STOCKPILE MANAGEMENT	12
5. MONITORING & VERIFICATION PLAN.....	14
5.1 MAIN REMEDIATION WORKS - GENERAL	14
5.2 ENGINEERED GROUND & IMPORTED FILL	14
5.3 ENGINEERED CAPPING MATERIAL	14
5.4 SAMPLING & ANALYSIS	14
5.5 UNFORESEEN CONTAMINATION	14
5.6 WASTE DISPOSAL RECORDS.....	14
5.7 FINAL VERIFICATION REPORT.....	14
STUDY LIMITATIONS.....	17

TABLES

Table 1	Pre-Remediation Conceptual Site Model
Table 2	General Fill Acceptance Criteria

FIGURES

Figure 1	Proposed Site Layout
Figure 2	Remediation Activities

Issue No	Date	Prepared By	Technical Review	Authorised
01	22.02.2022	J Jones <i>Joshua Jones</i>	P Dickinson <i>P.Dickinson</i>	G Jones <i>G Jones</i>
02 (update figures with new proposed layout)	28.02.2022	J Jones <i>Joshua Jones</i>	P Dickinson <i>P.Dickinson</i>	G Jones <i>G Jones</i>
03 (revised layout)	22.04.2024	P Dickinson <i>P.Dickinson</i>	P Dickinson <i>P.Dickinson</i>	G Jones <i>G Jones</i>



1. INTRODUCTION

Remada Ltd was commissioned by Lidl Great Britain Ltd ('the client') to prepare a Remediation Strategy for a proposed extension of the existing car park and demolition of an existing *Bensons For Beds* store at Victoria Road, Ruislip, HA4 0QQ. This report was prepared in response to a pre-approval condition set out by the Local Planning Authority (Hillingdon Council) which required the submission of a Remediation Strategy. This Remediation Strategy has been prepared to address the condition relating to land quality and to present suitable mitigative measures where required. The proposed site layout is presented on **Figure 1**.

1.1 Proposed Development

Lidl proposes to demolish the existing Bensons For Beds and extend the existing store car park over the Bensons For Beds footprint. The proposed development layout indicates the car park extension will cover approximately 600m² and will be predominantly hardstanding with some rare soft landscaping around trees. The current proposal also includes a plan to introduce a customer door on the eastern building elevation; this door provide access to a DRS room although there will be no increase to the existing store's footprint. The proposed development layout is presented on **Figure 1**.

1.2 Objectives

Remada has undertaken a Phase 1 Desk Study for the site which concluded that a Phase 2 Intrusive Ground Investigation was not required as there were no potential contaminant linkages associated with the proposed development and end-users. However, as part of the planning conditions for the site (8ic) a Remediation Strategy is required. The planning conditions for the extension of the car park are indicated below.

- 8 - (i) The development shall not commence until a scheme to deal with contamination has been submitted to and approved by the Local Planning Authority (LPA). All works which form part of the remediation scheme shall be completed before any part of the development is occupied or brought into use unless the Local Planning Authority dispenses with any such requirement specifically and in writing. The scheme shall include all of the following measures unless the LPA dispenses with any such requirement specifically and in writing:
- (a) A desk-top study carried out by a competent person to characterise the site and provide information on the history of the site/surrounding area and to identify and evaluate all potential sources of contamination and impacts on land and water and all other identified receptors relevant to the site;
 - b) A site investigation, including where relevant soil, soil gas, surface and groundwater sampling, together with the results of analysis and risk assessment shall be carried out by a suitably qualified and accredited consultant/contractor. The report should also clearly identify all risks, limitations and recommendations for remedial measures to make the site suitable for the proposed use; and
 - (c) A written method statement providing details of the remediation scheme and how the completion of the remedial works will be verified shall be agreed in writing with the LPA prior to commencement of each phase, along with the details of a watching brief to address undiscovered contamination. No deviation shall be made from this scheme without the express agreement of the LPA prior to its implementation.
- (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; and
- (iii) Upon completion of the approved remedial works, this condition will not be discharged until a comprehensive verification report 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 have been carried out in full and in accordance with the approved methodology.
- (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 is occupied, all imported soils 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.
- REASON:
To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems and the development can be carried out safely without unacceptable risks to workers, neighbours and other off site receptors in accordance with Hillingdon Local Plan: Part 2 (January 2020) Policies - DME1 11: Protection of Groundwater Resources and DME1 12: Development of Land Affected by Contamination.



Whilst a Phase 2 Intrusive Ground Investigation was not undertaken, the Phase 1 Desk Study concluded that some confirmatory chemical samples should be taken post demolition of the *Bensons For Beds* to assess the potential residual risk to human health and environmental receptors. Therefore, the objectives of this assessment are as follows:

- Summarise historical reporting;
- Satisfy planning condition 8ic;
- Define the works required to assess potential residual risk to human health and environmental receptors;
- Detail the method of work to be adopted for assessing the residual risk to human health and environmental receptors at the site.

1.3 Scope of Works

The scope and layout of this document has been designed in mind of the Environment Agency's Land Contamination Risk Management guidance for land contamination reports.

The scope of the work comprised:

- An assessment of previous site investigation work on-site;
- A review of regulatory correspondence pertaining to the proposed development;
- An update of earlier Conceptual Site Model;
- Defining the extent of contamination requiring remediation;
- An appraisal of the appropriate remediation technology;
- Detailing the scope of environmental and geotechnical remediation works to be implemented; and
- Defining verification and reporting requirements.

1.4 Summary of Previous Investigations

A summary of the available reports is tabulated below:

2013	<i>Phase 1 Preliminary Geoenvironmental Risk Assessment, Proposed Lidl Store, Victoria Road, Ruislip, Remada 276.01 November 2013</i>
2014	<i>Phase 2 Geoenvironmental Ground Investigation, Proposed Lidl Store, Victoria Road, Ruislip, Remada 276.02r1 August 2014</i>
2016	<i>Lidl Ruislip, Investigation at Former Comet Store, Letter Report 276.03 14th March 2016</i>
2022	<i>Phase 1 Site Investigation and Preliminary Risk Assessment, Lidl, Victoria Road, Ruislip Remada 952.01.01 February 2022</i>



1.5 Limitations

The comments given in this report and the opinions expressed are based on the information reviewed and observations during site work. However, there may be conditions pertaining to the site that have not been disclosed by this assessment and therefore could not be taken into account.



2. BACKGROUND

2.1. Review of Previous Reports

No exploratory holes were undertaken within the location of the existing *Bensons For Beds* store as part of the 2013, 2014 and 2016 reports listed in **Section 1.4**, therefore they do not pertain to the location where construction works are required. On this basis, only the Remada Phase 1 Report from February 2022 has been reviewed.

2.1.1 Remada Phase 1 Report (2022)

Remada undertook a search of historical mapping, regulatory records and published geological information pertaining to the Lidl store. The pertinent findings are reproduced below:

Site Setting

The existing store and car park occupy an irregular plot off Victoria Road to the north and Stonefield Way to the east. The existing store footprint is rectangular in shape and occupies the majority of the western zone of site with delivery ramp and loading bay at its southern perimeter. A Bensons for Beds occupies an area of land approximately 600m² in the centre of site. The remainder of the site area form the Lidl and Bensons for Beds car park.

The site boundary to the north is formed by soft landscaping and Victoria Road, to the east by Stonefield Road, to the south by palisade fencing and to the west by wood and concrete fencing. Residential dwellings are located to the north and north-west, whilst the surrounding land to the east, south and west forms Victoria Road Industrial Estate.

Site History

The earliest available historical maps show the site as open fields until 1960 when an engineering works and metallizing works were developed on the site. The engineering works and metallizing works buildings remained on historical maps until 2021 whereby the site was shown in its present day layout with the Lidl store to the west, Bensons for Beds in the centre and the rest of the site used as car parking.

Geological Mapping

Published geological maps record that there are no superficial or artificial deposits recorded beneath the site and the site is underlain by London Clay bedrock, designated as Unproductive Strata. The site is not located within an area which may be affected by coal mining activity.

Radon

The site is located in a Lower Probability Radon Area and no radon protective measures are considered necessary.

Potential Sources of Contamination

The study identified a number of on-site potential sources of contamination, including the sites historical use as metallizing/engineering works, presence of made ground, current use as Lidl/Bensons For Beds store and car parking as well as the off-site historical and current use as Victoria Road industrial estate. A number of receptors were identified, including human health (workers and nearby residents) and the Roxbourne River.

Actions



An intrusive ground investigation was not recommended for the site as there was indicated to be no potential contaminant linkages, based upon the sources and the proposed end-use at the site. However, it was considered that it would be prudent to gather some soil samples from beneath the building post demolition of the Bensons for Beds for chemical analysis to assess the potential residual risk to human health and environmental receptors. Further to this it would also be considered prudent to gather some samples of any crushed concrete/fill to submit for geotechnical classification tests.

2.2 Pre-Remediation Conceptual Site Model

The Conceptual Site Model presented in the Desk Study Report and subsequent Phase 2 report has been updated to form the Pre-Remediation Conceptual Model tabulated below in **Table 1**.



Potential Source Areas	Potential Contaminant of Concern	Pathways	Potential Receptor	Exposure Route (Human unless otherwise stated)	Potential Identified Linkage (unmitigated)	Findings of Ground investigation	Risk (Un-mitigated)	Proposed Remediation (Mitigation) Measures	Residual Risk Estimation
On-site Sources Made ground Metallizing works Engineering works Operation as Lidl store, Benson for Beds and car parking Off-site Sources Engineering works Blue Star Garage Copper tubing depot/warehouse Metalizing works Victoria Road industrial estate	Asbestos / Metals As, Be, Cd, Cu, Cr (VI), Cr (III), Hg, Ni, Se, Va, Zn, Boron, TPH /PAH, hazardous ground gases (carbon dioxide and methane)	Disturbance due to construction plant causing direct contact, dusts, vapours.	Occupants of the development / building fabric	• Direct Soil Ingestion	• No	A ground investigation was not required as there were no identified potential contaminant linkages.	Negligible	None	Negligible
				• Indoor Dust ingestion	• No		Negligible	None	Negligible
				• Skin Contact with Soils	• No		Negligible	None	Negligible
		Direct Contact with occupants of the proposed development		• Skin Contact with Dust	• No		Negligible	None	Negligible
				• Inhalation of Outdoor Dust	• No		Negligible	None	Negligible
		Inhalation of fibres / vapours / gases by occupants of proposed development	Adjacent residents during construction	• Inhalation of Outdoor Vapours	• No		Negligible	None	Negligible
				• Inhalation of Indoor Vapours	• No		Negligible	None	Negligible
				• Inhalation of ground gas	• No		Negligible	None	Negligible
		Permeation of water supply pipework		• Inhalation of radon gas	• No		Negligible	None	Negligible
				• Ingestion via permeated water supply pipework	• No		Negligible	None	Negligible
		Leachate	Roxbourne River	• Migration in groundwater to Roxbourne River	• No		Negligible	None	Negligible

Table 1: Pre-Remediation Conceptual Model

Direct contact with subsurface soil and/or groundwater during redevelopment works are not assessed as part of the CSM. It is considered that risks to workers will be managed as part of any the redevelopment works at the site through the application of health and safety procedures, where required.



3. REMEDIATION OPTIONS & OBJECTIVES

3.1 Sampling Strategy & Methodology

An appraisal of remediation options has not been considered as there are no specific remediation requirements for the site other than the demolition of the existing *Bensons For Beds* and gathering some soil samples for confirmatory chemical and geotechnical testing.

3.2 Objectives

3.2.1 Environmental Remediation Objectives

The principal environmental remediation objectives are to:

- Identify, manage and assess unforeseen contamination;
- Gather soil samples for confirmatory chemical testing; and
- Construct hard – cover surfacing beneath car park.

3.2.2 Geotechnical Remediation Objectives

The principal geotechnical remediation objectives are to:

- Demolish existing *Bensons For Beds* store;
- Partially remove relic foundations to formation levels;
- Excavate, screen and replace existing made ground material beneath the existing *Bensons For Beds* store as engineered fill below the proposed car park; and
- Crush, screen and emplace existing demolition rubble for re-use as engineered fill.

3.3 Reuse of Excavated Soils – General Notes for Guidance

3.3.1 Achieving Non-Waste Status

While clean uncontaminated natural soils can be reused directly on the site of origin, where soils have the potential to be contaminated it is necessary to prove that the materials are not considered a waste on completion of the works. Excavated soils can be reused at the site of origin or another site as long as the following four factors can be demonstrated (via appropriate permitting etc.):

- Factor 1: Protection of human health and protection of the environment;
- Factor 2: Suitability for use, without further treatment;
- Factor 3: Certainty of use; and
- Factor 4: Quantity of material.

It is important that materials that moved around the site or imported onto site are not classified as a waste (as defined by Waste Framework Directive) on completion of the works. There are several different waste regulatory options available, the suitability of which is dependent upon the complexity of the site and the quantity/composition of the material to be reused. These include:

- Quality Protocols – Allows for inert aggregate waste to be recovered and used subject to meeting set conditions.

- Waste Exemption – suitable for small volumes of non-hazardous waste;
- Standard Rules Environmental Permit – Suitable for non-hazardous waste with limits on the quantity. Can take several months to obtain from the Environment Agency;
- Bespoke Environmental Permit – Suitable for greater volumes of waste and includes hazardous waste. Can take several months to obtain from the Environment Agency;
- Application in accordance with CL:AIRE guidance 'Definition of Waste: Development Industry Code of Practice' (DoWCoP).

The following sections describe the procedures to be undertaken and testing requirements to ensure that materials reused at the site are suitable for use and on completion of the scheme are not classified as a waste.

3.3.3 Quality Protocols

Quality Protocols for converting waste into non-waste products in England have been jointly developed by the Environment Agency and the Waste and Resources Action Programme (WRAP). The main aim is to determine when specified wastes can be considered to have been fully recovered and no longer waste for the purposes of the WFD. Protocols are available for the following products, amongst others:

- Aggregates from inert waste; and
- Quality compost from source-segregated biodegradable waste.

Any recycled aggregate or manufactured topsoil should be produced in accordance with the Quality Protocols and evidence will be required to demonstrate that this is the case.

3.3.4 Waste Exemption

The purpose of the waste exemptions is to allow the use of suitable wastes for small scale construction instead of using virgin raw materials. There are very strict limits placed on the quantities and types of waste that can be reused. With respect to soil and stones it is possible to use up to 1,000 tonnes (approximately 500m³) with a U1 exemption. The soil and stones must be either inert or non-hazardous (no hazardous waste) and can either be directly reused or from a permitted remediation process.

3.3.5 Standard Rules and Bespoke Environmental Permits

Standard Rules Environmental Permits are available for a number of relatively low risk activities. There are application, transfer, surrender and subsistence fees associated with each of the standard rule permits payable to the EA. There are also restrictions placed on the operations that fall within the standard rule permits. For example, with respect to the use of waste in construction the waste must be either inert or non-hazardous (no hazardous waste). The activities must not be carried out within 500 metres of a European Site, Ramsar site or a Site of Special Scientific Interest (SSSI). The activities shall also not be within:

- Groundwater Source Protection Zones 1 or 2;
- 50 metres of any spring or well, or of any borehole not used to supply water for domestic or food production purposes; and
- 250 metres of any borehole used to supply water for domestic or food production.



It is therefore feasible that reuse of excavated materials could be undertaken under a standard rules permit. However, a potentially easier route is to carry out the work following the Definition of Waste: Development Industry Code of Practice.

3.3.6 Definition of Waste: Development Industry Code of Practice (DoWCoP)

The Environment Agency (EA) has worked with industry through CL:AIRE to prepare the DoWCoP. The purpose of the DoWCoP is to allow industry to regulate itself with respect to determining whether excavated materials have achieved non-waste status. The EA states that 'When a signed Declaration is sent to us (the EA) by a Qualified Person showing that excavated materials are to be dealt with as set out in the DoWCoP (including preparation of a verification report), we (the EA) will take the view that the materials on the site where they are to be used will not be waste.'

If materials are dealt within in accordance with the DoWCoP then the materials are unlikely to be waste. This is either due to the fact that the materials were never discarded in the first place or because they have been submitted to a recovery operation and have been completely recovered so that they have ceased to be waste.

In order to demonstrate that the four factors have been fulfilled will require preparation of various reports including:

- Site investigation report (Site Condition Report).
- Quantitative Risk Assessment (QRA);
- Remediation Strategy or Design Statement;
- Materials Management Plan (MMP); and
- Verification report (on completion of the works).

In addition to the risk assessment and remediation strategy, a materials management plan (MMP) will be required detailing where soils will be moved to and how they will be tracked. Approvals may need to be sought from the Local Authority and the Environment Agency (groundwater team) with respect to the remediation strategy. In addition, the Environment Agency (waste team) need to acknowledge that they have no objections to the use of the DoWCoP for the scheme. Planning permission is normally required.

The Materials Management and accompanying documentation will have to be reviewed by a Qualified Person prior to submitting a formal declaration to the Environment Agency (waste team), via CL:AIRE (the scheme administrators). On completion of the work a verification report will need to be completed. If a verification report is not prepared there is the potential that the materials reused will be viewed as a waste.



4. REMEDIATION OUTLINE METHOD STATEMENT

4.1 General

A summary of remediation activities with cognisance to the proposed indicative site layout is shown in **Figure 2**.

4.1.1 Remediation Formation Level

Formation levels for the remediation works are to be advised by the structural engineer in order to produce the development finished levels for the proposed car park as per **Figure 1**. It is not anticipated that any major change in levels is required.

4.1.2 Utilities

It is not anticipated that any new utilities will be required as part of the proposed works, however if they are the statutory service bodies should be consulted at an early stage with respect to the ground conditions within which the developer will install buried services in order to enable them to assess at an early stage any potential abnormal costs. It is possible that special water supply protective measures will be necessary, but this should be confirmed with United Utilities at the earliest opportunity. Further advice is contained in UKWIR Report 10/WM/03/21 – 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites'.

4.2 Sequence of Operations

4.2.1 Public Access

No public access is required to or through the site. However, the site requires full perimeter security fencing to be maintained throughout the demolition and construction works to prevent public access.

4.2.2 Demolition of Existing Building

The existing *Bensons For Beds* building requires demolition, any asbestos and asbestos containing material should be removed from the building prior to commencement of demolition. Any brick and concrete rubble should be crushed to produce 6F2 material suitable for re-use to achieve formation levels or stockpiled for later use.

4.2.3 Removal of Relict Floor Slabs

All brick and concrete rubble, ground floor concrete slabs and building foundations are to be excavated and crushed to produce 6F2 material to be used to achieve formation levels or stockpiled for later use.

4.2.4 Groundwater in Excavations

Any perched or shallow groundwater water that may collect in excavations is to be pumped out and either disposed at a suitably permitted facility or treated on-site and discharged to the public sewer system under licence / consent from the owner / operator of the public sewer system.

4.2.5 Drainage

All abandoned drainage runs encountered on-site during development works including those below the proposed footprint of the new car park must be chased out, excavated and removed from site. Water and sludges are to be pumped from the drainage system where necessary and disposed at a



suitably licensed facility. United Utilities and / or the appropriate utility owner should be consulted with regards to any modifications to existing site drainage.

4.3 Soil Acceptance Criteria

4.3.1 General Fill Geotechnical Requirements

Site won soils shall conform to either Class 1, Class 2 or Class 3 fill as appropriate and be placed and compacted in layers in accordance with the Specification for Highway Works 600 series. No general fill should be placed beneath structures. The designer will provide further details on which materials are deemed to be geotechnically suitable for reuse and testing requirements to demonstrate compliance.

4.3.2 Engineered Fill Geotechnical Requirements

Any on-site produced 6F2 material will be used as an engineered fill beneath proposed buildings and structures. The designer will provide further details on testing requirements to demonstrate compliance. However, as a minimum this will include the following:

- Particle size distribution testing.
- Plate bearing tests.

4.3.3 Reuse of Soil

The upper limits for general and engineering fill material being produced from the site shall not exceed the LQM/CIEH S4ULs for Commercial Land Use presented in **Table 2** below.

Remada will undertake geotechnical testing of crushed concrete and demolition rubble to inform re-use criteria. Remada will gather samples of the soils beneath the *Bensons For Beds* post-demolition and removal of the floor slab to confirm the absence of any contamination as per recommendations of the Phase 1 Desk Study.

4.4 Unforeseen Contamination

In the event that unforeseen contamination is encountered during the works, the suspected material will be quarantined for analysis and results compared with assessment criteria prior to selection for re-use, treatment or disposal. Advice should be sought from an environmental / contamination specialist on such occasions to prevent unnecessary delays or misuse of soil materials.

4.5 Stockpile Management

It should be ensured that the groundworker understands the need for good materials management. Most notably the importance of not mixing different materials within a given stockpile; i.e. there should be separate marked stockpiles of: Topsoil; made ground; demolition crush, excess clean, natural soil arisings; general construction waste etc.

CLEA Category	mg/kg 1% SOM	Commercial mg/kg 2% SOM	mg/kg 6% SOM	Reference
Contaminant				
Antimony	7500	7500	7500	EC/AGS/CL-AIRE 2010
Arsenic	640	640	640	LQM/CI/IEH S4UL
Barium	22000	22000	22000	EC/AGS/CL-AIRE 2010
Beryllium	12	12	12	LQM/CI/IEH S4UL
Boron	240000	240000	240000	LQM/CI/IEH S4UL
Cadmium	190	190	190	LQM/CI/IEH S4UL
Chromium III	8600	8600	8600	LQM/CI/IEH S4UL
Chromium VI	33	33	33	LQM/CI/IEH S4UL
Copper	68000	68000	68000	LQM/CI/IEH S4UL
Mercury (Elemental Hg 4)	58 ^{mg} (25.8)	58 ^{mg} (25.8)	58 ^{mg} (25.8)	LQM/CI/IEH S4UL
Manganese (Inorganic Mn 2 ⁺)	1100	1100	1100	LQM/CI/IEH S4UL
Manganese (Methyl 4 ⁺)	320	320	320	LQM/CI/IEH S4UL
Molybdenum	18000	18000	18000	EC/AGS/CL-AIRE 2010
Nickel	980	980	980	LQM/CI/IEH S4UL
Lead	NC	NC	2300	DEFRA C4SL
Selenium	12000	12000	12000	LQM/CI/IEH S4UL
Vanadium	9000	9000	9000	LQM/CI/IEH S4UL
Zinc	730000	730000	730000	LQM/CI/IEH S4UL
BTEX				
Benzene	27	47	90	LQM/CI/IEH S4UL
Toluene	56000 ^{mg} (869)	11000 ^{mg} (1500)	18000 ^{mg} (4360)	LQM/CI/IEH S4UL
Ethylbenzene	5700 ^{mg} (618)	13000 ^{mg} (1720)	77000 ^{mg} (7840)	LQM/CI/IEH S4UL
O-Xylene	6600 ^{mg} (478)	15000 ^{mg} (1120)	33000 ^{mg} (2620)	LQM/CI/IEH S4UL
M-Xylene	6200 ^{mg} (625)	14000 ^{mg} (1470)	31000 ^{mg} (3460)	LQM/CI/IEH S4UL
P-Xylene	5800 ^{mg} (576)	14000 ^{mg} (1350)	30000 ^{mg} (3170)	LQM/CI/IEH S4UL
TPH Aliphatics				
EC5-EC6	3000 ^{mg} (304)	5900 ^{mg} (558)	12000 ^{mg} (1150)	LQM/CI/IEH S4UL
>EC6-EC8	7800 ^{mg} (144)	17000 ^{mg} (322)	40000 ^{mg} (736)	LQM/CI/IEH S4UL
>EC8-EC10	2000 ^{mg} (78)	4800 ^{mg} (190)	11000 ^{mg} (451)	LQM/CI/IEH S4UL
>EC10-EC12	9700 ^{mg} (48)	23000 ^{mg} (118)	47000 ^{mg} (283)	LQM/CI/IEH S4UL
>EC12-EC16	58000 ^{mg} (24)	87000 ^{mg} (158)	90000 ^{mg} (147)	LQM/CI/IEH S4UL
>EC16-EC35	1600000	1700000	1800000	LQM/CI/IEH S4UL
>EC35-EC44	1600000	1700000	1800000	LQM/CI/IEH S4UL
>EC44-EC70 (all+amp)	28000	28000	28000	LQM/CI/IEH S4UL
TPH Aromatics				
EC5-EC7 (Benzene)	26000 ^{mg} (1270)	46000 ^{mg} (2260)	86000 ^{mg} (4710)	LQM/CI/IEH S4UL
>EC7-EC8 (Toluene)	56000 ^{mg} (869)	110000 ^{mg} (1500)	180000 ^{mg} (4360)	LQM/CI/IEH S4UL
>EC8-EC10	3500 ^{mg} (613)	8100 ^{mg} (1500)	17000 ^{mg} (3580)	LQM/CI/IEH S4UL
>EC10-EC12	16000 ^{mg} (364)	28000 ^{mg} (899)	34000 ^{mg} (2150)	LQM/CI/IEH S4UL
>EC12-EC16	36000 ^{mg} (169)	37000	38000	LQM/CI/IEH S4UL
>EC16-EC21	28000	28000	28000	LQM/CI/IEH S4UL
>EC21-EC35	28000	28000	28000	LQM/CI/IEH S4UL
>EC35-EC44	28000	28000	28000	LQM/CI/IEH S4UL
>EC44-EC70 (all+amp)	28000	28000	28000	LQM/CI/IEH S4UL
PAH				
Naphthalene	190 ^{mg} (76.4)	480 ^{mg} (183)	1100 ^{mg} (437)	LQM/CI/IEH S4UL
Acenaphthylene	83000 ^{mg} (86.1)	97000 ^{mg} (212)	100000	LQM/CI/IEH S4UL
Acenaphthene	84000 ^{mg} (57)	97000 ^{mg} (141)	100000	LQM/CI/IEH S4UL
Fluorene	63000 ^{mg} (30.9)	68000	71000	LQM/CI/IEH S4UL
Phenanthrene	22000	22000	23000	LQM/CI/IEH S4UL
Anthracene	520000	540000	540000	LQM/CI/IEH S4UL
Fluoranthene	23000	23000	23000	LQM/CI/IEH S4UL
Pyrene	54000	54000	54000	LQM/CI/IEH S4UL
Benzo(a)anthracene	170	170	180	LQM/CI/IEH S4UL
Chrysene	350	350	350	LQM/CI/IEH S4UL
Benzo(b)fluoranthene	44	45	45	LQM/CI/IEH S4UL
Benzo(k)fluoranthene	1200	1200	1200	LQM/CI/IEH S4UL
Benzo(a)pyrene ⁽¹⁾	35	35	36	LQM/CI/IEH S4UL
Indeno(1,2,3-c,d)pyrene	500	510	510	LQM/CI/IEH S4UL
Dibenzo(a,h)anthracene	3.5	3.6	3.6	LQM/CI/IEH S4UL
Benzo(g,h,i)perylene	3900	4000	4000	LQM/CI/IEH S4UL
Coal Tar ⁽¹⁾	15	15	15	LQM/CI/IEH S4UL
Chloroalkanes & alkenes				
1,2-Dichloroethane (DCA)	0.67	0.97	1.7	LQM/CI/IEH S4UL
1,1,1-Trichloroethane (TCA)	660	1300	3000	LQM/CI/IEH S4UL
1,1,2,2-Tetrachloroethane (PCA)	270	550	1100	LQM/CI/IEH S4UL
1,1,1,2-Tetrachloroethane (PCA)	110	250	560	LQM/CI/IEH S4UL
Tetrachloroethane (PCE)	19	42	95	LQM/CI/IEH S4UL
Tetrachloromethane (PCM)	2.9	6.3	14	LQM/CI/IEH S4UL
Trichloroethane (TGE)	1.2	2.6	5.7	LQM/CI/IEH S4UL
Trichloromethane (Chloroform)	89	170	350	LQM/CI/IEH S4UL
Chloroethene (Vinyl Chloride)	0.059	0.077	0.12	LQM/CI/IEH S4UL
Explosives				
2,4,6-Trinitrotoluene (TNT)	1000	1000	1000	LQM/CI/IEH S4UL
RDX	210000	210000	210000	LQM/CI/IEH S4UL
HMX	110000	110000	110000	LQM/CI/IEH S4UL
Pesticides				
Aldrin	170	170	170	LQM/CI/IEH S4UL
Dieldrin	170	170	170	LQM/CI/IEH S4UL
Atrazine	9300	9400	9400	LQM/CI/IEH S4UL
Dichlorvos	140	140	140	LQM/CI/IEH S4UL
alpha-Endosulfan	5600 ^{mg} (0.003)	7400 ^{mg} (0.007)	8400 ^{mg} (0.016)	LQM/CI/IEH S4UL
beta-Endosulfan	6300 ^{mg} (0.0007)	7800 ^{mg} (0.0007)	8700	LQM/CI/IEH S4UL
alpha-Hexachlorocyclohexane (HCH)	170	180	180	LQM/CI/IEH S4UL
beta-Hexachlorocyclohexane (HCH)	65	65	65	LQM/CI/IEH S4UL
gamma-Hexachlorocyclohexane (HCH)	67	69	70	LQM/CI/IEH S4UL
Chlorobenzenes				
Chlorobenzene (MCB)	56	130	290	LQM/CI/IEH S4UL
1,2-Dichlorobenzene (DCB)	2000 ^{mg} (571)	4800 ^{mg} (1370)	11000 ^{mg} (3040)	LQM/CI/IEH S4UL
1,3-Dichlorobenzene (DCB)	30	73	170	LQM/CI/IEH S4UL
1,4-Dichlorobenzene (DCB)	4400 ^{mg} (224)	10000 ^{mg} (540)	25000 ^{mg} (1280)	LQM/CI/IEH S4UL
1,2,3-Trichlorobenzene (TCB)	102	250	590	LQM/CI/IEH S4UL
1,2,4-Trichlorobenzene (TCB)	220	530	1300	LQM/CI/IEH S4UL
1,2,5-Trichlorobenzene (TCB)	23	55	130	LQM/CI/IEH S4UL
1,2,3,4-Tetrachlorobenzene (TeCB)	1700 ^{mg} (122)	3080 ^{mg} (304)	4400 ^{mg} (728)	LQM/CI/IEH S4UL
1,2,3,5-Tetrachlorobenzene (TeCB)	49 ^{mg} (39.4)	120 ^{mg} (98.1)	240 ^{mg} (235)	LQM/CI/IEH S4UL
1,2,4,5-Tetrachlorobenzene (TeCB)	42 ^{mg} (19.7)	72 ^{mg} (49.1)	96	LQM/CI/IEH S4UL
Pentachlorobenzene (PeCB)	640 ^{mg} (43.0)	770 ^{mg} (107)	830	LQM/CI/IEH S4UL
Hexachlorobenzene (HCB)	110 ^{mg} (0.20)	120	120	LQM/CI/IEH S4UL
Phenols & Chlorophenols				
Phenols	440 ^{mg} (26000)	690 ^{mg} (30000)	1300 ^{mg} (34000)	LQM/CI/IEH S4UL
Chlorophenols	3500	4000	4300	LQM/CI/IEH S4UL
Pentachlorophenol (PCP)	400	400	400	LQM/CI/IEH S4UL
Other				
Carbon Disulphide	11	22	47	LQM/CI/IEH S4UL
Hexachlorobutadiene (HCB / HCBD)	31	66	120	LQM/CI/IEH S4UL
Methyl tert-butyl ether	7800	13000	24000	EC/AGS/CL-AIRE 2010

NC: No published criteria

vap: Screening criteria presented exceed the vapour saturation limit, which is presented in brackets.

sol: Screening criteria presented exceed the solubility saturation limit, which is presented in brackets.

dir: Screening criteria based on threshold protective of direct skin contact (guideline in brackets based on health effects following long term exposure provided for illustration or (1). For assessment based on the use of the surrogate marker approach the GAC for Coal Tar must be used instead of benzo(a)pyrene.

Table 2: Imported Fill Acceptance Criteria



5. MONITORING & VERIFICATION PLAN

5.1 Main Remediation Works - General

A photographic record of all excavations and backfill operations will be maintained and compiled within a Verification Report. A photographic will be prepared by the Main Contractor for use by Remada in preparation of the Verification Report.

5.2 Engineered Ground & Imported Fill

Any engineered ground and imported fill will require testing to confirm it been correctly placed and suitably compacted in accordance with the Engineer's Specification. General and structural fill materials shall be tested at rate of 1/500m³ but not less than one sample per source and not less than three samples in total. Records are to be provided to Remada for compilation in the Verification Report. Engineered fill placed beneath the proposed store car park should be inspected to ensure that it is of the correct layer and total thickness and has been correctly placed and suitably compacted. CBR or Plate load tests will be necessary on the compacted fill immediately after placement and this should be directed / supervised by a geotechnical engineer.

Imported fill material and site-won material shall not contain concentrations of contaminants greater than the suitability for reuse criteria detailed in **Table 2**. Provided that it is placed at depths greater than 600mm or below buildings / hardstanding, these materials should be tested at a rate of one per 1000m³ with a minimum of four tests on any individual source material and at an ongoing frequency to ensure the assessment of representative contaminant concentrations.

Records are to be provided to Remada for compilation in the Verification Report.

5.3 Engineered Capping Material

Site won and imported engineering capping material (6F2/6F5 etc) shall not contain concentration of contaminants greater than **Table 2** shall be tested at rate of one per 1000m³. Records are to be provided to Remada for compilation in the Verification Report.

5.4 Sampling & Analysis

All verification sampling will be conducted by suitably qualified and experienced geo-environmental engineer. Samples are to be tested at a UKAS and MCERTS accredited laboratory.

5.5 Unforeseen Contamination

In the event that unforeseen contamination is encountered during the works, samples of the suspected soil or groundwater contamination shall be taken and submitted for laboratory analysis. The results will be assessed by Remada.

5.6 Waste Disposal Records

Any contaminated materials (including unforeseen contaminated soils) requiring removal from the site must be recorded and copies of Consignment notes or Duty of Care transfer notes must be retained by the Main Contractor for incorporation in the Verification Report.

5.7 Final Verification Report

On completion of the works a Verification Report will be compiled by Remada and submitted to the Hillingdon Council to demonstrate that the remediation criteria have been met and to discharge relevant planning conditions. The report will as a minimum include the following:

- Description of the works that have taken place.



- Present photographic records of the work undertaken.
- Provide material tracking forms.
- Provide results of laboratory analysis undertaken during earthworks.
- Geotechnical test results.
- Provide records of off-site disposal of soil and groundwater.
- Document variations due to unforeseen contamination; and
- Provide details and results of laboratory analysis for imported materials.



REFERENCES & GUIDANCE

- AGS, *Guidance on the Waste Classification for Soils – A Practitioners' Guide* 2019.
- Barnes, G. 2010, *Soil Mechanics Principles and Practice*. 3rd Edition.
- BRE, *Special Digest 1:2005 (3rd Edition), Concrete in Aggressive Ground*. 2005.
- BRE465 *Cover Systems for Land Regeneration* 2004
- BS 10175:2011+A1:2013, *Investigation of potentially contaminated sites: Code of practice*.
- BS 1377:1999. *Methods of test for soils for civil engineering purposes*.
- BS 5930:2015, *Code of practice for site investigations*.
- BS 8485:2015+A1 2019, *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*.
- BS 8576:2013, *Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)*.
- BS EN ISO 22476-3:2005, *Geotechnical investigation and testing: Field testing - Standard penetration test*.
- CIRIA, C504, *Engineering in glacial tills*, 1999.
- CIRIA, C665, *Assessing risks posed by hazardous ground gases to buildings*, 2007.
- CIRIA, C682, *The VOCs Handbook: Investigating, assessing and managing risks from inhalation of VOCs at land affected by contamination*, 2009.
- CIRIA, C716, *Remediating and mitigating risks from volatile organic compound (VOC) vapours from land affected by contamination*, 2012.
- CIRIA C733, *Asbestos in Soil and Made Ground: A Guide to Understanding & Managing Risks*.
- CIRIA 735, C735 *Good Practice on the Testing & Verification of Protection Systems for Buildings / Against Hazardous Ground Gases* (2014)
- CL:AIRE/EIC/AGS, *The Soil Generic Assessment Criteria for Human Health Risk Assessment*, 2009.
- CL:AIRE, SP1010, *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination -Final Project Report*. 2013.
- CL:AIRE, *The Definition of Waste: Development Industry Code of Practice Version 2*
- DEFRA, Circular 01/2006, *Contaminated Land Environmental Protection Act 1990, Part 2A*. 2006.
- DEFRA, SP1010, *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document*. March 2014.
- Environment Agency, *Verification of Remediation of Land Contamination Science Report – NC/00/38/SR*
- Environment Agency, *Waste Classification, Guidance on the classification and assessment of waste (1st Edition V1.2GB) Technical Guidance WM3*. October 2021.
- Health & Safety Executive, HSG 66, *Protection of Workers and the General Public During Redevelopment of Contaminated Land*. 1991.
- Highways Agency, IAN 73/06 Rev 1, *Design of Pavement Foundations*, 2009.
- Land Contamination Risk Management www.gov.uk 08.10.2020.
- LCM/CIEH, *The LQM/CIEH 54ULs for Human Health Risk Assessment*. Land Quality Press, 54UL3146, 2015.
- NHBC Standards, 2023.
- Tomlinson, M.J., 2001, *Foundation Design and Construction*, 7th Edition.
- The Water Framework Directive (Standards and Classification) Directions (England and Wales)* 2015
- The Definition of Waste: Development Industry Code of Practice*, CL:AIRE 2011.
- Guidance on the classification and assessment of waste (1st Edition v1.1) Technical Guidance WM3* 2018



STUDY LIMITATIONS

IMPORTANT. This section should be read before reliance is placed on any of the information, opinions, advice, recommendations or conclusions contained in this report.

1. This report has been prepared by Remada, Ltd with all reasonable skill, care and diligence within the terms of the Appointment and with the resources and manpower agreed with (the 'Client'). Remada does not accept responsibility for any matters outside the agreed scope.

2. This report has been prepared for the sole benefit of the Client unless agreed otherwise in writing.

3. Unless stated otherwise, no consultations with authorities or funders or other interested third parties have been carried out. Remada is unable to give categorical assurance that the findings will be accepted by these third parties as such bodies may have published, more stringent objectives. Further work may be required by these parties.

4. All work carried out in preparing this report has used, and is based on, Remada's professional knowledge and understanding of current relevant legislation. Changes in legislation or regulatory guidance may cause the opinion or advice contained in this report to become inappropriate or incorrect. In giving opinions and advice pending changes in legislation, of which Remada is aware, have been considered. Following delivery of the report Remada has no obligation to advise the Client or any other party of such changes or their repercussions.

5. This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report.

6. Whilst this report and the opinions made are to the best of Remada's belief, Remada cannot guarantee the accuracy or completeness of any information provided by third parties.

7. This report has been prepared based on the information reasonably available during the project programme. All information relevant to the scope may not have received

8. This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of changes in the condition of the site since the time of the investigation.

9. The content of this report represents the professional opinion of experienced environmental consultants. Remada does not provide specialist legal or other professional advice. The advice of other professionals may be required.

10. Where intrusive investigation techniques have been employed they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature of sampling, no investigation technique is capable of identifying all conditions present in all areas. In some cases the investigation is further limited by site operations, underground obstructions and above ground structures. Unless otherwise stated, areas beyond the boundary of the site have not been investigated.

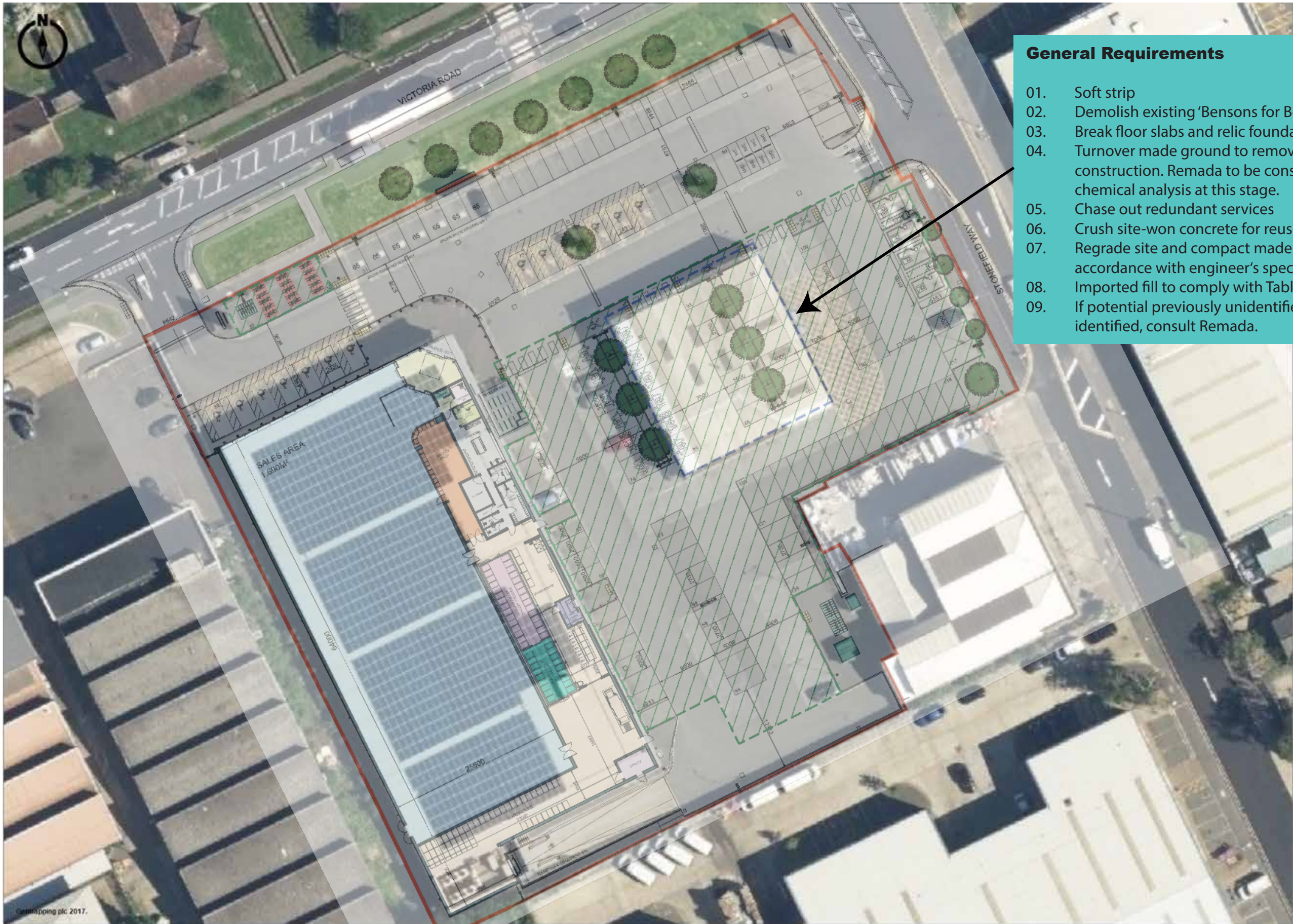
11. If below ground intrusive investigations have been conducted as part of the scope, service tracing for safe location of exploratory holes has been carried out. The location of underground services shown on any drawing in this report has been determined by visual observations and electromagnetic techniques. No guarantee can be given that all services have been identified. Additional services, structures or other below ground obstructions, not indicated on the drawing, may be present on site.

12. Unless otherwise stated the report provides no comment on the nature of building materials, operational integrity of the facility or on any regulatory compliance issues.

13. Unless otherwise stated, samples from the site (soil, groundwater, building fabric or other samples) have NOT been analysed or assessed for waste classification purposes.



FIGURES



General Requirements

- 01. Soft strip
- 02. Demolish existing 'Bensons for Beds' structure
- 03. Break floor slabs and relic foundations to formation level.
- 04. Turnover made ground to remove obstructions to construction. Remada to be consulted regarding chemical analysis at this stage.
- 05. Chase out redundant services
- 06. Crush site-won concrete for reuse
- 07. Regrade site and compact made ground / 6F2 in accordance with engineer's specification
- 08. Imported fill to comply with Table 2
- 09. If potential previously unidentified contamination is identified, consult Remada.

Notes
Existing site plan overlain with the client-supplied Proposed Indicative Site Layout Plan (KLH Architects' Site Plan as Proposed - Option C, drawing ref: 4908-0104 P11 issued in January 2023).

Revision	Approved	Date

Project Title
Victoria Road, Ruislip

Drawing Title
Figure 2 - Remediation Strategy

Client
Lidl Great Britain Ltd

Scale as shown	Drawn PD	Size A4
Date 22.04.24	Job No. 952.02	Figure No. 02



