



Dwyer Road

Remediation Strategy and Verification Plan

For Francis Construction Ltd

Date *13 November 2024*

Doc ref *26888-HYD-XX-XX-RP-GE-3000*

Document control sheet

Issued by	Hydrock Consultants Limited Over Court Barns Over Lane Almondsbury Bristol BS32 4DF United Kingdom	T +44 (0)1454 619533 F +44 (0)1454 614125 E bristol@hydrock.com hydrock.com
Client	Francis Construction Ltd	
Project name	Dwyer Road	
Title	Remediation Strategy and Verification Plan	
Doc ref	26888-HYD-XX-XX-RP-GE-3000	
Project number	26888	
Status	S2	
Date	13/11/2024	

Document production record

Issue number	P02	Name
Prepared by	Daniel Gadsby BSc (Hons)	
Checked & Approved by (Technical Director)	Simon Calkin BEng MSc	

Document revision record

Issue number	Status	Date	Revision details
P01	S2	18/07/2024	Issue 1
P02	S2	13/11/2024	Issue 2 - Update to Section 3.3

Hydrock Consultants Limited has prepared this report in accordance with the instructions of the above-named client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.

Contents

1.	INTRODUCTION.....	1
1.1	<i>Terms of Reference</i>	1
1.2	<i>Regulatory Approval.....</i>	1
1.3	<i>Objectives</i>	1
1.4	<i>Scope.....</i>	1
1.5	<i>Sources of Information</i>	2
1.6	<i>Limitations.....</i>	2
2.	Site Description and Ground Model	3
2.1	<i>Context</i>	3
2.2	<i>Site Location.....</i>	3
2.3	<i>Site Description</i>	3
2.4	<i>Site History</i>	4
2.5	<i>Unexploded Ordnance (UXO).....</i>	4
2.6	<i>Radon.....</i>	4
2.7	<i>Ground Conditions</i>	4
2.8	<i>Groundwater.....</i>	5
2.9	<i>Evidence of Contamination.....</i>	5
2.10	<i>Conceptual Site Model</i>	6
3.	REMEDIATION STRATEGY	7
3.1	<i>Introduction</i>	7
3.2	<i>Remediation Objectives</i>	7
3.3	<i>Additional Ground Investigation (if required)</i>	7
3.4	<i>Enabling Works: Site Clearance.....</i>	8
3.5	<i>Reuse of Site Won Material</i>	8
3.6	<i>Control of Asbestos.....</i>	9
3.7	<i>Removal of Unexpected Finds</i>	10
3.8	<i>Removal of Invasive Species</i>	10
3.9	<i>Installation of Clean Cover System</i>	10
3.10	<i>Off-site Disposal of Unsuitable Materials</i>	11
4.	MANAGEMENT OF MATERIALS.....	13
4.1	<i>Materials Management Strategy.....</i>	13
4.2	<i>Sourcing of Imported Materials.....</i>	13
4.3	<i>Chemical Properties of Imported Materials.....</i>	13
4.4	<i>Physical Requirements for Imported Materials.....</i>	14
4.5	<i>Stockpiling of Materials</i>	14

4.6	<i>Disposal of Construction Arisings</i>	14
5.	PROTOCOL IF UNEXPECTED CONTAMINATION IS ENCOUNTERED	16
6.	VERIFICATION AND REPORTING.....	17
6.1	<i>Objectives</i>	17
6.2	<i>Verification Works</i>	17
6.3	<i>Verification of Imported Materials</i>	17
6.4	<i>Verification of Removal of Made Ground or Unexpected Hotspots</i>	17
6.5	<i>Cover System Verification</i>	18
6.6	<i>Other requirements</i>	18
6.7	<i>Verification Reporting</i>	18

Appendices

Appendix A Drawings

Appendix B Soil Acceptance Criteria

1. INTRODUCTION

1.1 Terms of Reference

In June 2024, Hydrock Consultants Limited was commissioned by Francis Construction Ltd to prepare a Remediation Strategy and Verification Plan (RS&VP) at Dwyer Road, Reading, RG30 3PN.

The site was formerly a residential care facility; however, the site is currently an unoccupied parcel of land and the former structures demolished. A site location plan (Hydrock Drawing 26888-HYD-XX-XX-DR-GE-1000) is presented in Appendix A.

Hydrock understands that the proposed development is to comprise a 4-storey apartment block and two-and three-storey house terraces with associated gardens, parking and a biodiverse green space. A proposed development layout (HTA Design. January 2023. 'Proposed Ground Floor Plan', Ref: HTA-A_DR_0100) is presented in Appendix A.

This RS&VP has been undertaken in accordance with Hydrock's proposal (email from Graham Johnstone (Hydrock) dated 19th June 2023) and the Client's instruction to proceed (email from Rob Gale of Francis Construction dated 20th June 2023), to enable the suitable discharge of Planning Conditions.

1.2 Regulatory Approval

This RS&VP is subject to the approval of the regulators as part of the planning application process and should to be considered as a live working document. It may need to be updated in agreement with the relevant regulatory bodies at any stage during development, dependent on the ground and other conditions encountered.

1.3 Objectives

A ground investigation and risk assessment was completed at the site in June 2023.

The Hydrock documents listed in Section 1.5 are considered to fulfil 'Stage 1: Risk Assessment' of the Land Contamination Risk Management (LCRM) process.

The Stage 1 works have identified a requirement to undertake remediation to mitigate the effects of the unacceptable contamination risks that have been identified.

The Stage 2 options appraisal has been undertaken and included within this report.

The objective of this RS&VP is to fulfil Stage 3: Remediation and Verification of LCRM, specifically the development of a remediation strategy (Step1) to ensure that, on completion, the site can be shown to be suitable for its intended use without contamination risk to the identified receptors.

This document ultimately seeks to agree the remediation concept for the proposed development with the relevant regulatory authorities. Therefore, allowing the Contractor for the remedial works to be prepared with a level of confidence. Significant departures and / or variations to this strategy will require approval from the regulators.

It is recognised that prior to the implementation of this RS&VP, the appointed Contractor will be required to prepare a Detailed Remediation Method Statement to address, in detail, the design and working methods by which the requirements of this RS&VP will be implemented.

1.4 Scope

This RS&VP details the strategy for remediation with respect to the approach, targets and verification of the remedial works required in order to mitigate future risks to human health and controlled waters in relation to the proposed redevelopment.

The scope of this document is as follows:

- » A summary of the previous investigations;
- » To highlight the identified risks;
- » Presentation of the remedial measures recommended to mitigate the identified risks from contaminants at the site;
- » Outline the materials management for reuse and import of materials; and
- » To provide details of the appropriate verification procedures in order to demonstrate the successful implementation of the RS&VP.

This report provides an overview of the site development proposals and discusses remediation procedures. This document does not cover the geotechnical requirements for the development. Once the requirements for earthworks are known this document should be updated accordingly.

1.5 Sources of Information

The following reports have been completed in relation to the Site:

- » Middlemarch. September 2022. 'Tree Survey Plan', Ref: C-158951B-01-01.
- » Hydrock. February 2023. 'Phase 1 Desk Study Report', Ref: 26888-HYD-XX-XX-RP-GE-1000.
- » Soils Limited. May 2023. 'Factual Report'. Ref: 20763/FR Rev 1.0.
- » Hydrock. June 2023. 'Phase 2 Ground Investigation Interpretative Report', Ref: HYD-XX-XX-RP-GE-1001.

These reports should be read in conjunction with this report and Hydrock understands that the Client has commissioned or obtained assignment of the above documents, where not undertaken by Hydrock, and has full reliance upon their contents.

1.6 Limitations

This report has been prepared by Hydrock on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, all potential environmental constraints or liabilities associated with the site may not have been revealed.

The work has been carried out in general accordance with recognised best practice as detailed in guidance documents such as in the Land contamination risk management (LCRM) (EA, 2023), BS 5930:2015+A1:2020 and BS 10175:2011+A2:2017.

The report has been prepared for the exclusive benefit of Francis Construction Ltd and those parties designated by them for the purpose of providing information on the remediation and verification works to be undertaken during the enabling works and construction phases of the development. Third parties may require letters of reliance from Hydrock for the use of this report and clarification should be sought from Hydrock in this regard. The report contents should only be used in that context. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

Hydrock has used reasonable skill, care and diligence in the design of the remediation of the site. The inherent variation of ground conditions allows only definition of the actual conditions at the exploratory locations at the time of the investigation.

At intermediate locations, conditions can only be inferred. Information provided by third parties has been used in good faith and is taken at face value. However, Hydrock cannot guarantee the accuracy or completeness of any information provided by others.

2. Site Description and Ground Model

2.1 Context

This section presents a brief summary of the Conceptual Site Model (CSM) pertaining to the site, which has been developed from the ground investigations and assessment to date.

The exploratory hole locations undertaken during the ground investigation are presented on the Exploratory Hole Location Plan (Ref: Figure 3 - Exploratory Hole Location Plan, May 2023) in Appendix A.

It is assumed that the reader is familiar with the findings of all ground investigation undertaken at the site, which should be read in conjunction with this report.

2.2 Site Location

The site is referenced in Table 2.1 and shown on the Site Location Plan (Hydrock Drawing 26888-HYD-XX-XX-DR-GE-1000) presented in Appendix A.

Table 2.1: Site referencing information

Item	Brief Description
Site name	Dwyer Road
Site Address	Dwyer Road, Reading, RG30 3PN
Site location and grid reference	The site is located in Southcote, approximately 3.5km to the south-west of Reading city-centre. The National Grid Reference of the approximate centre of the site is 468234E, 171887N.

2.3 Site Description

The site is currently undeveloped and surrounded by hoarding. Visible evidence of the historical land use as a residential care facility is limited to an area of asphalt hardstanding in the south near the entrance from Dwyer Road. The site is roughly square in shape with an area of approximately 0.5 ha.

The northern section of the site has an approximate elevation of 50.5m above Ordnance Datum (OD), gently sloping downwards to 49m OD in the south of the site.

The site is located in a residential area, bordered by roads to the east, south and west, and by residential properties to the north.

A mixture of mature and semi-mature trees, and hedges, are present around all site boundaries. Additional trees are also sporadically present across the site.

Buddleias (an invasive species) are present across the site.

Fly tipped (seemingly innocuous) waste was identified during the site walkover undertaken as part of the Hydrock 2023 Desk Study, notably around the perimeter hoarding.

2.4 Site History

Review of historical Ordnance Survey mapping indicates:

- » The site was undeveloped (with exception to a north-east to south-west trending road) until the construction of a residential care facility in the late-1960s / early-1970s.
- » The care facility was demolished around 2010.
- » The surrounding area has been gradually developed into a suburban residential neighbourhood since the 1930s.

2.5 Unexploded Ordnance (UXO)

A non-specialist UXO screening exercise undertaken as part of the Hydrock 2023 Desk Study indicated that no further assessment with regards to UXO is considered necessary in relation to ground investigation.

Further assessment may be considered prudent for construction activities.

2.6 Radon

The Hydrock 2023 Desk Study indicated that the south-east corner of the site is recorded to be a Radon Affected Area where radon levels in 1 - 3% of homes are above the action level (remainder of the site is not in a Radon Affected Area). However, no radon protection measures are required for new buildings at this location in line with current guidance.

2.7 Ground Conditions

The ground conditions as proven by the ground investigation to date generally comprise:

Bituminous Bound Pavement

Encountered at TP5 only, from ground level to 0.13m below ground level (bgl).

Made Ground

Generally localised to the southern and eastern sections of the site at select locations (BH1 - 2, TP3 - 5 and DP5). The Made Ground was encountered from ground level to a maximum depth of 1.70m bgl.

Generally variable composition (either granular or cohesive) with varied sub fractions of materials. Anthropogenic material recorded including: brick, concrete, terracotta pipe, clinker, slate and asphalt.

Topsoil

Where the Made Ground was not encountered (TP1 - 2), the exploratory holes encountered topsoil overlying natural soils, from ground level to between 0.10m and 0.25m bgl.

The topsoil comprised brown slightly gravelly silt.

It should be noted that the Soils Limited 2023 Ground Investigation logs did not differentiate between topsoil and Made Ground soils. As such, Hydrock consider that topsoil is likely to be present across the majority of the site due to observations; however, the Soils Limited logs indicate a significant thickness of Made Ground from surface.

It was recommended as part of the Hydrock 2023 Ground Investigation Report that, should this material require re-use at the site, the above should be revisited as part of a supplementary ground investigation.

Lynch Hill Gravel Member

Whilst the BGS maps indicate no superficial deposits to be present at the site, the investigation encountered sands and flint gravels near surface across the site. These rounded gravels and sands are considered part of the Lynch Hill Gravel Member.

The Lynch Hill Gravel Member was encountered underlying the Made Ground / topsoil across the site to a maximum depth of 4.50m bgl and an average thickness of 2.53m.

This stratum generally consisted of brown sands with various clay / silt and gravel factions and multi coloured clays with various clay and gravel factions.

Lambeth Group

Encountered underlying the Lynch Hill Gravel Member (from 1.30m – 4.50m bgl), the Lambeth Group was noted to be between 0.80m and 2.60m thick, with an average thickness of 1.56m where the base was proven.

The Lambeth Group generally comprised brown / multi coloured clays with various sand and gravel factions.

Seaford Chalk Formation and Newhaven Chalk (Undifferentiated)

The Seaford Chalk Formation and Newhaven Chalk (Undifferentiated) was encountered underlying the Lambeth Group across the site to a maximum depth of 20.00m bgl (base not proven).

This generally consisted of structureless chalk recorded as white gravelly silt; clasts are of weak to moderate density. This corresponds to Grade Dm. Signs of historical dissolution of the chalk was evident in the form of very weathered profiles and zones of very soft silt. However, upon further investigation, it was deemed that no shallow voids were present below the site. Structured chalk was encountered below around 12m depth.

2.8 Groundwater

In general, groundwater was not encountered at shallow depths, being present between 12.50m - 13.30m bgl in the deep boreholes undertaken as part of the Soils Limited 2023 Ground Investigation. Post-investigation groundwater monitoring noted that shallow installed wells were, for the most part, dry and that the deeper installed wells recorded groundwater levels between 9.10m and 9.17m bgl.

2.9 Evidence of Contamination

2.9.1 Human Health

- » Significant exceedances of Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenzo(ah)anthracene within Made Ground soils.
- » Marginal exceedances of benzo(b)fluoranthene and Dibenzo(ah)anthracene in one sample (out of two) within the Topsoil.

2.9.2 Plant Life

- » No significant risk to plant life identified.

2.9.3 Controlled Waters

- » No significant risk to controlled waters identified.

2.9.4 Potable water supply pipes

The site is brownfield. However, the investigation to date has not detected organic contamination in exceedance of the threshold values and Hydrock believes standard pipework may be suitable for the site. However, confirmation should be sought from the water supply company at the earliest opportunity.

2.9.5 Ground Gas

Three ground gas monitoring rounds were undertaken as part of the Soils Limited 2023 Ground Investigation. The results indicate that the computed gas screening value (GSV) for carbon dioxide and methane indicates Characteristic Situation 1 (CS1) conditions and methane and carbon dioxide at concentrations typically below 1%.

As such, the site is classified as Characteristic Situation 1 (Situation A) and no mitigation measures are required.

2.10 Conceptual Site Model

The full scope and detailed findings of the risk assessment completed are presented in the documents listed in Section 1.5. Based on the risk evaluation process, the pollutant linkages that require mitigation to ensure the site is suitable for its intended use are summarised in Table 2.2 below.

Table 2.2: Residual risk following risk evaluation

Contaminant Linkage				Comments	
Pollutant Linkage	Sources	Pathways	Receptors	General	Mitigation
P 1 L	Pervasive PAHs the Made Ground.	Ingestion, inhalation or direct contact.	Human health.	Significant exceedance of the GAC.	Mitigation required in the form of an engineered cover system.
P 2 L	Fly-tipped waste, potentially including asbestos containing materials.	Inhalation	Site users and neighbours	Fly-tipped waste has been observed on site.	This material should be removed prior to construction and appropriately disposed of.
P 3 L	PAHs within the Topsoil.	Ingestion, inhalation or direct contact.	Human health.	Lack of data and understanding of the topsoil present on site.	If topsoil is to be reused onsite further investigation and testing to be undertaken.

3. REMEDIATION STRATEGY

3.1 Introduction

The RSVP detailed in the following sections is based on the Stage 2: Options Appraisal and Stage 3: Remediation and Verification of LCRM, specifically the development of a remediation strategy (Step 1), and is generally structured as follows:

- » Setting out the remediation objectives.
- » Summarising the options appraisal process (Stage 2: Options Appraisal of LCRM).
- » Summarising the key remediation criteria.
- » Summarising the remediation stages and their implementation.
- » Summarising the regulatory controls that need to be in place.
- » Detailing how the remediation will be verified.
- » Contingency planning and unexpected contamination.

It is recognised that prior to the implementation of this RSVP, the appointed Contractor will be required to prepare a Detailed Remediation Method Statement to address, in detail, the design and working methods by which the requirements of this strategy will be implemented.

3.2 Remediation Objectives

The overall objective of the remediation is to ensure that, on completion, the site can be shown to be suitable for its intended use, such that it will not pose an unacceptable contamination risk to the identified receptors, and will not put undue constraint on the development design and implementation.

The specific remediation objectives comprise:

- » Break the active pollutant linkages between the contamination in soils and identified receptors (e.g., future site users, neighbours and plant life).
- » Remediated ground to have predictable behaviour and avoid the requirement for long term monitoring or maintenance, or prolonged regulatory engagement.
- » Minimise off-site disposal and maximise on-site reuse of excavated materials as far as reasonably practicable.

3.3 Additional Ground Investigation (if required)

It is understood that the on-site topsoil is not proposed for re-use as part of the proposed development. Therefore, all imported topsoil will require assessment in accordance with Sections 4.2, 4.3 and 4.4.

However, if the proposals change to include the re-use of on-site topsoil as part of the proposed development, it should be noted that the Hydrock 2023 Ground Investigation Report recommended that, should the topsoil material require re-use at the site, the thickness and presence of topsoil should be further investigated. This is due to the fact that only two samples had been submitted for chemical analysis. As such, these two samples may not be representative of the whole site. This would further inform the risk that the topsoil may / may not pose and its re-use in gardens and POS.

Therefore, should the development proposals change and the use of on-site topsoil as part of the proposed development is required; soil samples are to be collected throughout the exploratory locations and submitted to the laboratory for subsequent analysis of the following suites:

- » Standard Hydrock Suite for Soils*, including metals, cyanide (total), asbestos fibres, speciated PAH, total phenol, fraction of organic carbon and pH.
- » Hydrock TPH Level 2 Suite (speciated), if visual / olfactory evidence of petroleum hydrocarbon contamination is identified.

*a full breakdown of the suite can be provided upon request.

The additional ground investigation works should be presented in an additional interpretative report that details the extent of any contamination (if identified) and also provides confirmation that the proposed mitigation measures herein are suitable.

3.4 Enabling Works: Site Clearance

The enabling works Contractor is to ensure that any relic structures are assessed prior to disturbance to avoid the uncontrolled release of contaminants (which could include but not limited to, asbestos fibres or petroleum hydrocarbons). If significantly impacted material is recorded during excavation, these materials should be segregated and stockpiled separately for testing prior to their disposal, or reused if determined to be suitable.

The enabling works Contractor is to undertake the clearance of vegetation and grubbing out of root balls (of vegetation that is to be removed, only), removal of stockpiles of material, as well as demolish, break up and remove all remaining above and below ground structures. These may include, but are not limited to slabs, drains, hardstanding, foundations, relic structures and service ducts.

The recovery of suitable material for crushing/reuse should be undertaken in accordance with the WRAP Quality Protocol. All broken up materials shall be segregated and stockpiled within an approved working area of the site. The crushing and screening should be undertaken in accordance with an agreed Specification and achieve a suitable capping class for reuse both geotechnically and chemically.

Where contamination is encountered upon breaking out of any concrete slabs and hardstanding, including, but not limited to, visual ACM above occasional/random fragments or significant petroleum hydrocarbon contamination not previously encountered during investigation, works should stop within this part of the site and the guidance provided in Section 4 and Section 5 is to be followed.

3.5 Reuse of Site Won Material

The site-won materials can be broken down into the main types as detailed in Section 2.7 (i.e. topsoil, Made Ground and natural soils). The re-use of site-won Made Ground, and the import of clean materials (if needed) will require the preparation and implementation of a Materials Management Plan or another suitable permitted route or exemption.

The primary concern with the reuse of site-won Made Ground is the presence of PAHs. This material can be reused on site provided that it is geotechnically suitable and it is placed beneath hardstanding or a clean cover system. It is not recommended that Made Ground is placed in proposed areas of soft landscaping.

The on-site topsoil requires further chemical testing should there be a need to re-use it as part of the development of the site, due to recorded exceedances of PAHs and a lack of data / understanding of the topsoil present on site.

The soils of the Lynch Hill Gravel Member are generally suitable for re-use (subject to their geotechnical suitability).

No chemical testing has been undertaken on the Lambeth Group or Seaford Chalk Formation and Newhaven Chalk (Undifferentiated). Whilst unlikely (due to the depths at which these strata are encountered), if these soils are proposed to be re-used as part of the investigation, testing will need to be undertaken in accordance with the testing outlined in Section 3.3.

Beyond this, there is also the potential to encounter unexpected finds, which may determine that the material is not suitable for reuse. These are dealt with separately in Section 5.

3.6 Control of Asbestos

No asbestos containing materials (ACM) or fibres were detected during the ground investigation undertaken to date (Soils Limited, 2023).

However, a residential care facility (now demolished) was constructed on-site pre-2000, when the use of ACM in buildings was abolished. Therefore, there is the potential this building contained ACM prior to its demolition. In addition to this, fly-tipped waste (with the potential to contain ACM) has been observed on site, notably around the perimeter hoarding.

All site staff are to be made aware that there is a possibility of encountering ACM and loose asbestos fibres within the Made Ground anywhere on the site, and at any stage of the development. It is advised that the Contractor should supply suitable and sufficient 'Asbestos Awareness' training (specific to asbestos in soils) to all site staff who are likely to be in contact with Made Ground at the site.

When asbestos is encountered or suspected, the enabling works Contractor must undertake a suitable and sufficient Risk Assessment in accordance with Regulation 6 of the Control of Asbestos Regulations 2012 (CAR 2012). The results of the assessment should be used to compile a methodology in accordance with Regulation 7 of CAR 2012, which limits potential exposure and spread of asbestos fibre. Appropriate training should be provided to all site staff identified within the risk assessment as having the potential to be exposed or encounter asbestos during their work in accordance with Regulation 10 of CAR 2012.

Care should be taken during any grubbing out of relic features so that ACM is not processed unknowingly, which would generate additional risk and remediation issues. It is the responsibility of the enabling works Contractor to ensure that mitigation measures are suitable and sufficient to prevent exposure to airborne asbestos so far as is reasonably practicable in accordance with Regulation 11 of CAR 2012.

Any processing of material to remove visible asbestos fragments should be completed in accordance with CAR 2012 and CARSOIL 2016. This should include (but not be limited to):

- » Method statements and risk assessments for the process and for the classification of the works (currently anticipated to be Notifiable non-licenced work but to be determined by the contractor):
- » Control of the works including dust suppression and general management.
- » Protection of workers.
- » Protection of the public.
- » Protection of future site users.
- » Stockpiling, storing and disposal of material.
- » Monitoring the works to prove no risk has been generated.
- » Processes for verification of the works such as:

- » Processing method (hand pick on belt, from excavator), volumetric output and a suitable number of pickers to ensure the process will work based on the number of passes expected.
- » Frequency of verification sampling and laboratory analysis (at UKAS/ MCERTS accredited laboratory) to show the process is compliant.
- » Record keeping of the works including waste transfer certificates and other paperwork to allow verification of the works.
- » Verification of the works:
- » Providing a report outlining the works completed and evidence to corroborate its effectiveness.

Any handpicking needs to be undertaken by suitably trained and qualified staff employed by competent Contractors in accordance with HSE guidance and an Environmental Permit. It should be noted that any processing of material (such as handpicking of asbestos) is on a 'as far as is reasonably practicable' basis. As such, any material that has been handpicked (with asbestos removed) should still only be reused with caution in suitable areas below hardstanding and not at the surface or within service trenches where the risk from future human contact is higher.

3.7 Removal of Unexpected Finds

Where previously unidentified hotspots of contamination are encountered, these should be delineated and removed where significant risk is deemed to be present (including but not limited to gross staining by hydrocarbons, loose asbestos fragments and asbestos fibres). Depending on levels of contamination found, some hotspots may be suitable to remain within the material under hardstanding or the soft landscaped areas (based on the cover system detailed in Section 3.9).

Where hotspots are to be removed, this should include the removal of all impacted material and suitable verification sampling of the excavation (i.e., a minimum of one sample per side and one on the base to be analysed for the contaminant of concern), although, depending on the size of the hotspot(s) the number of verification samples could be expanded.

Verification is to be undertaken by an experienced Geo-Environmental Engineer (working on behalf of the Contractor or the Client) in accordance with Section 5 and also with the Soil Acceptance Criteria as detailed in Appendix B.

3.8 Removal of Invasive Species

Buddleia shrubs were observed to be present across the site during the site-walkover undertaken as part of the 2023 Hydrock Desk Study. The Contractor should satisfy themselves that all invasive species have been appropriately identified.

Should Japanese Knotweed be discovered on the site; the treatment, management and disposal of this plant are licensed activities. Specialist Contractors will need to develop and confirm a management plan that sets out the control and management provisions to be adopted to remove the risk to future structures and infrastructure at the site or beyond the site boundary.

3.9 Installation of Clean Cover System

Where site levels are reduced to the proposed formation levels, Made Ground is able to remain *in situ* in certain circumstances;. These circumstances would be:

- » Where hardstanding is present, as this will sever the pathway from the Made Ground to future users at the site. However, the thickness of hardstanding (concrete, asphaltic material (i.e., not loose gravel or shingle at surface) and underlying sub base should be of the required thickness for the construction build up detailed in an agreed Specification.

- » Where beneath areas of soft landscaping in private gardens, a clean cover system of 600mm (combined topsoil / subsoil) is required, comprising:
 - » At least 150mm of topsoil.
 - » A maximum of 450mm of subsoil.
 - » A suitable basal geo-fabric separation layer.
- » Where beneath areas of soft landscaping in public open space, a clean cover system of 450mm (combined topsoil / subsoil) is required, comprising:
 - » At least 150mm of topsoil.
 - » A maximum of 300mm of subsoil.
 - » A suitable geo-fabric separation layer.

A depth to Made Ground drawing (Hydrock Drawing 26888-HYD-XX-XX-DR-GE-1003) is presented in Appendix A

The clean cover system installation should be undertaken in the following steps:

1. Check the elevation of the formation level to ensure that it is at the correct level and allows for the placement of the full required thickness of the clean cover system.
2. Install the basal geo-fabric separation layer.
3. Place the required thickness of topsoil and subsoil as detailed above for either private gardens or public open space (of which a minimum, 150mm is to be topsoil).

For areas of proposed trees, the depth of growing medium will be deeper and tree pits will need to be excavated as per the requirements of an arboriculturist and / or landscape architect.

Where existing trees are to be retained, provisions for the clean cover system should be agreed with an Arboriculturist / Landscape Architect. If the proposed thickness of clean cover is deemed unacceptable because of root protection issues, the use of 200mm thick geocell containment products is often accepted. Confirmation of this would be required from the Landscape Architect.

Verification of cover thickness should be completed. In areas of hardstanding a pre-construction and post-construction isopachyte will be sufficient. Where soft landscaping occurs, verification of the thickness of clean cover system is to be undertaken as outlined in Section 6.

Chemical testing of imported material as part of the cover system is required to ensure that the clean cover is suitable for use in accordance with the Soil Acceptance Criteria set out in Appendix B. The topsoil should also comply with any criteria stipulated by a horticulturalist or other suitable expert required for plants.

The clean cover system shall give consideration to its permeability and the consequential impact upon surface runoff and ground gas regimes. This principally relates to composition (granular, cohesive or composite). The capping material will generally satisfy the requirements of NHBC Standards Chapter 4.1 and 10.2.

3.10 Off-site Disposal of Unsuitable Materials

The works should seek to reduce and control impacts on the natural environment, therefore, the Contractor shall seek to reuse materials within the works, where appropriate. However, there may be areas in which the site levels mean that Made Ground will need to be removed and disposed of.

Where identified, any surplus (i.e., soils which cannot be re-used on site due to volumes), or unsuitable soils (i.e., soils which cannot be re-used in an appropriate location), or are geotechnically unsuitable for use in the earthworks, shall be disposed of off-site by the Contractor.

If a material does not comply with the relevant criteria for its intended use (e.g. reinstatement of excavations in line with Remediation Target Values (RTVs), clean cover system, etc.) then, by definition, the material is not suitable for use.

All waste materials generated during the works shall be dealt with in full compliance with the statutory Duty of Care as defined by the Environmental Protection Act (1990) and all subsequent amendments. The Contractor shall be the waste producer and is responsible for the production of all documentation required under relevant legislation, ensuring this is kept up to date and is available on-site for inspection.

4. MANAGEMENT OF MATERIALS

4.1 Materials Management Strategy

At the time of writing, it is not known if re-use of excavated materials are proposed as part of the development. Offsite disposal may be required if any grossly contaminated or unexpected materials are identified during groundworks.

The costs for disposal of non-hazardous and hazardous soils are significant compared to disposal of inert material.

Where proposed, the reuse and import of materials on site should be managed and reused in accordance with a Materials Management Plan, prepared in accordance with 'The Definition of Waste: Development Industry Code of Practice', Version 2 (CL:AIRE), known as the DoWCoP, or another suitable permitted route or exemption.

The Materials Management Plan will need to be signed-off and declared with CL:AIRE by a Qualified Person (QP).

4.2 Sourcing of Imported Materials

There may be a requirement to import soils to the site in order for design levels to be achieved and also for the installation of the clean cover system for areas of soft landscaping.

Every effort should be made to ensure soils to be imported are accompanied by proof of provenance to demonstrate that there is no potential for the soils to have been contaminated as a result of past land uses or in the process of their creation if a manufactured material. This information should be obtained in advance of the chemical tests being commissioned.

The following protocol applies to all imported soils.

- » The soil is from an identified site, which is clean and has no history of potentially contaminative uses.
- » A map and site plan showing the location of the source site, with an approximate grid reference, must be provided to the relevant Local Authority. When checking the source site, accurate details of where on site the soil was derived are required, not just where they were stockpiled or screened.
- » Written confirmation from the relevant Local Authority confirming that the source site has no known history of contamination.

4.3 Chemical Properties of Imported Materials

In the case of imported soil, the Soil Acceptance Criteria (SAC) presented in Appendix B shall be used. In this case, dependent on the location of the landscaped area, the following CLEA land use scenario designation should be adopted:

- » Residential with plant uptake (applicable for all areas of residential garden construction).
- » Public open Space (applicable for the areas of the proposed development that are to remain undeveloped).

If the proposed development changes, it may be necessary to reassess the soil acceptance criteria.

Soil organic matter is also required in order to apply the correct SAC, where applicable. In the absence of a soil organic matter value, a worst-case value of 1% should be assumed.

4.4 Physical Requirements for Imported Materials

Imported soils should be free of contamination, asbestos (non-detect), metal, plastic, wood, glass, tarmac, brick, paper, concrete or other potentially hazardous foreign material which could cause injury. In addition, all materials must be free from aggressive / invasive weeds (especially Japanese Knotweed and Giant Hogweed) and bulk vegetative growth, in order to ensure negligible risk of subsequent weed problems.

Furthermore, there shall be no visual contamination (oil staining, asphalt, etc.) as confirmed by the Contractor. Hydrock Consultants will be undertaking a watching brief to audit the absence of contamination.

4.5 Stockpiling of Materials

Any material generated from construction activities that is proposed for reuse shall be stockpiled separately by material type. Similarly, any materials being imported to site, for example clean topsoil or construction aggregates, or material awaiting disposal off site, shall be stockpiled separately. Stockpile management shall be undertaken in accordance with the following protocol:

- » Separate stockpiles shall be created for each material type, whether site-won or imported materials, and shall be appropriately labelled / identified on site.
- » Stockpiles shall not be cross-contaminated, double handling shall be avoided and stockpiles shall remain quarantined until ready for use.
- » Topsoil shall not be placed during or after heavy or prolonged periods of rainfall.
- » For imported materials, copies of the carrier's Transfer Notes shall be retained on site and made available for inspection by the supervising consultant and for inclusion within the Verification Report.
- » A record of all imported materials (i.e., deliveries) shall be maintained by the Site Manager recording details of material type, source of the imported material and Transfer Note reference numbers. In addition, the Site Manager shall record the status of each stockpile, in terms of material type, source site, volume and intended use on site.
- » The Contractor shall identify all stockpiles with clear signage.
- » Stockpiles of significantly contaminated materials (either generated during remediation of previously identified impacts or due to encountering unexpected contamination) are to be placed in lined above-ground treatment areas comprised of impermeable membranes to prevent leaching and run off of the potential contaminant(s).

4.6 Disposal of Construction Arisings

The Waste Framework Directive (WFD) (2009/98/EC) defines waste as '*any substance which the holder discards or intends to discard.*' In a geo-environmental context, the waste is most often 'soil' and the two main scenarios are off-site disposal of the material as a waste and/or reuse of the material on site. For cost and sustainability reasons, reuse is preferred to off-site disposal.

All waste classifications outlined below assume the removal of visible asbestos – visible asbestos will generally result in materials requiring disposal as 'hazardous material'.

Based on the site history and if suitable segregation of different types of waste is put in place, for soils to be disposed of, it is considered that:

- » Subject to further testing, the Topsoil is likely to be classified as chemically non-hazardous waste and subject to WAC testing may be able to be disposed of as non-hazardous or possibly inert landfill.
- » The natural uncontaminated subsoils are likely to be classified as 'inert' waste and based on the WAC testing should be able to be disposed of at an inert landfill.
- » The Made Ground is likely to be classified as non-hazardous waste and subject to WAC testing may be able to be disposed of at an inert landfill.
- » Any soils containing > 0.1% asbestos fibres or containing visible ACM would be considered as hazardous.

It should be noted that:

- » The above preliminary assessment has been made on the basis of the soils tested as part of the ground investigations. Prior to disposal, the characteristics of the actual soils to be disposed of will need testing and classification in consultation with landfill sites and waste disposal Contractors. The receiving landfill will make the final decision on the classification and acceptability of the waste.
- » Non-hazardous soils require pre-treatment (separation, sorting and screening) prior to disposal.
- » The costs for disposal of non-hazardous and hazardous soils are significant compared to disposal of inert material.

5. PROTOCOL IF UNEXPECTED CONTAMINATION IS ENCOUNTERED

As with any site, potential exists for encountering materials that were not recorded during the original ground investigations.

Should any material, suspected of being contaminated (in addition to the expected contamination described in this document), is unexpectedly encountered during the development of any Phase of the site (by visual or olfactory means), then the following protocol should be implemented:

- » Site activities in the immediate vicinity shall cease and an independent Geo-Environmental Engineer shall be contacted and provided with a summary of the observations made.
- » The Geo-Environmental Engineer shall attend site and undertake appropriate investigations to establish the extent of the materials in question. Depending upon the extent and volume of material present, the materials may be removed and temporarily stockpiled (on heavy grade polythene sheeting to prevent leaching/runoff) to enable construction activities to continue.
- » The Geo-Environmental Engineer shall identify an appropriate suite of chemical testing and agree this with the relevant regulator(s).
- » The resultant chemical analyses shall be compared with the appropriate trigger concentrations for the land use in question. The findings and recommendations shall be discussed and agreed with the relevant regulator(s).
- » Updates will be made to this RS&VP, if required. In the majority of cases, it would be proposed that unexpected contaminative issues are dealt with via independent correspondence, but on occasion it may be necessary to revisit and update the RS&VP.
- » If necessary, the Environmental Health / Contaminated Land team shall be contacted.
- » Should there be a perceived risk to Controlled Waters, the Environment Agency shall also be contacted.

Prior to implementing any amendments to the remedial strategy, as presented within this RS&VP, the Environmental Health / Contaminated Land team shall be consulted and the amendments agreed in writing.

6. VERIFICATION AND REPORTING

6.1 Objectives

This RS&VP has identified mitigation measures as being necessary at the subject site in order to provide a development that is fit for purpose/suitable for use.

These remedial requirements need verification such that the regulating bodies can be satisfied that the RS&VP has been fully complied with, and ultimately such that any associated Planning Conditions relating to land quality can be discharged.

The verification process is also required to provide a permanent record of the remedial works undertaken at the subject site. The sections below summarise the various activities requiring verification and also comment upon the verification reporting process.

Verification visits shall be made by a suitably experienced and qualified independent geo-environmental consultant who shall undertake the necessary works outlined below.

6.2 Verification Works

In summary, the verification works will comprise:

- » Verification of the removal of any expected and unexpected contamination, if found.
- » Verification of the quality and thickness of placed clean cover system in soft landscaping areas including gardens ensuring it meets the import criteria in Appendix B.

The verification should include photographic proof of activities undertaken, site inspection records and laboratory testing. A record of all material movements, imported material certifications and stockpile tracking and associated documentation shall be maintained by the Contractor(s).

6.3 Verification of Imported Materials

Where provenance is provided relating to the source of the soil, it should be tested at a minimum rate of three samples per source, or for larger sources one sample per 250 m³ of soil to be used on site. The sampled material shall be compared against the Soil Acceptance Criteria listed in Appendix B.

It is not advisable to rely on the quality of soil for which provenance is not known. Where this information isn't available testing frequency should be increased to a minimum of 1 sample per 100m³.

6.4 Verification of Removal of Made Ground or Unexpected Hotspots

6.4.1 Verification of removal of Made Ground

Should the option to remove Made Ground be adopted, either across part of or all of the development, confirmation of its removal will be required. This is to be undertaken when areas are completed by means of a visual inspection by a suitably experienced and qualified independent Geo-Environmental Engineer. Any obvious residual Made Ground identified during the inspection will be removed by the groundworks contractor and a photographic record will be retained for the stripped area.

6.4.2 Hotspot Verification

If previously unidentified hotspots of contamination are encountered, these should be delineated and removed where significant risk is deemed to be present (including but not limited to gross staining by hydrocarbons, free phase liquids, loose asbestos fragments and asbestos fibres [i.e., bundles, insulation board etc.]). Depending on the levels of contamination found some hotspots may be suitable to remain within the material under hardstanding or the cover system required within the soft landscaped areas but not beneath garden areas.

Where hotspots are to be removed, this is to include removal of all impacted material and suitable verification sampling of the excavation (i.e., a minimum of one sample per side and one on the base and analysed for the contaminant of concern), although, depending on the size of the hotspot(s) the number of verification samples could be expanded (i.e. for large excavations in excess of 100 m², a 5m verification grid (on all sides and the base) is proposed).

The works should be undertaken by an experienced Geo-Environmental Engineer (working on behalf of the Contractor or the Client) and in accordance with the Soil Acceptance Criteria as detailed in Appendix B. If hotspots for other contaminants of concern are identified during the development works, additional criteria will need to be developed.

6.5 Cover System Verification

Verification visits shall be made by a suitably experienced and qualified independent Geo-environmental Engineer who shall undertake the necessary works outlined above. Verification of the cover systems across the garden and landscaped areas shall comprise the following:

- » Trial pits to verify the thickness of clean cover (with photographs) at a minimum rate of 1 verification trial pit per POS landscaped area, or where larger 1 per 500 m² and collection of samples of both subsoil and topsoil for chemical analysis.
- » Trial pits to verify the thickness of clean cover (with photographs) and 1 verification trial pit per 4 garden areas with collection of subsoil and topsoil samples for chemical analysis.

Testing will be completed at random locations as designated by the Geo-Environmental Engineer. This will take the form of a photograph with scale marker and accompanying photographic board detailing the measured cover system thickness. This topsoil/subsoil will be analysed for compliance with the Soil Acceptance Criteria in Appendix B and it is recommended that the Contractor samples and analyses the material prior to placement to avoid the requirement for abortive works and removal of such materials. The topsoil should also comply with any criteria stipulated by the horticulturalist/landscape architect.

6.6 Other requirements

A UKAS and MCERTS accredited laboratory should undertake all chemical testing. Samples scheduled for chemical analysis should be representative of the stockpile or source being tested.

6.7 Verification Reporting

Verification visits shall be made by a suitably experienced and qualified independent Geo-environmental Engineer who shall undertake the necessary works outlined above.

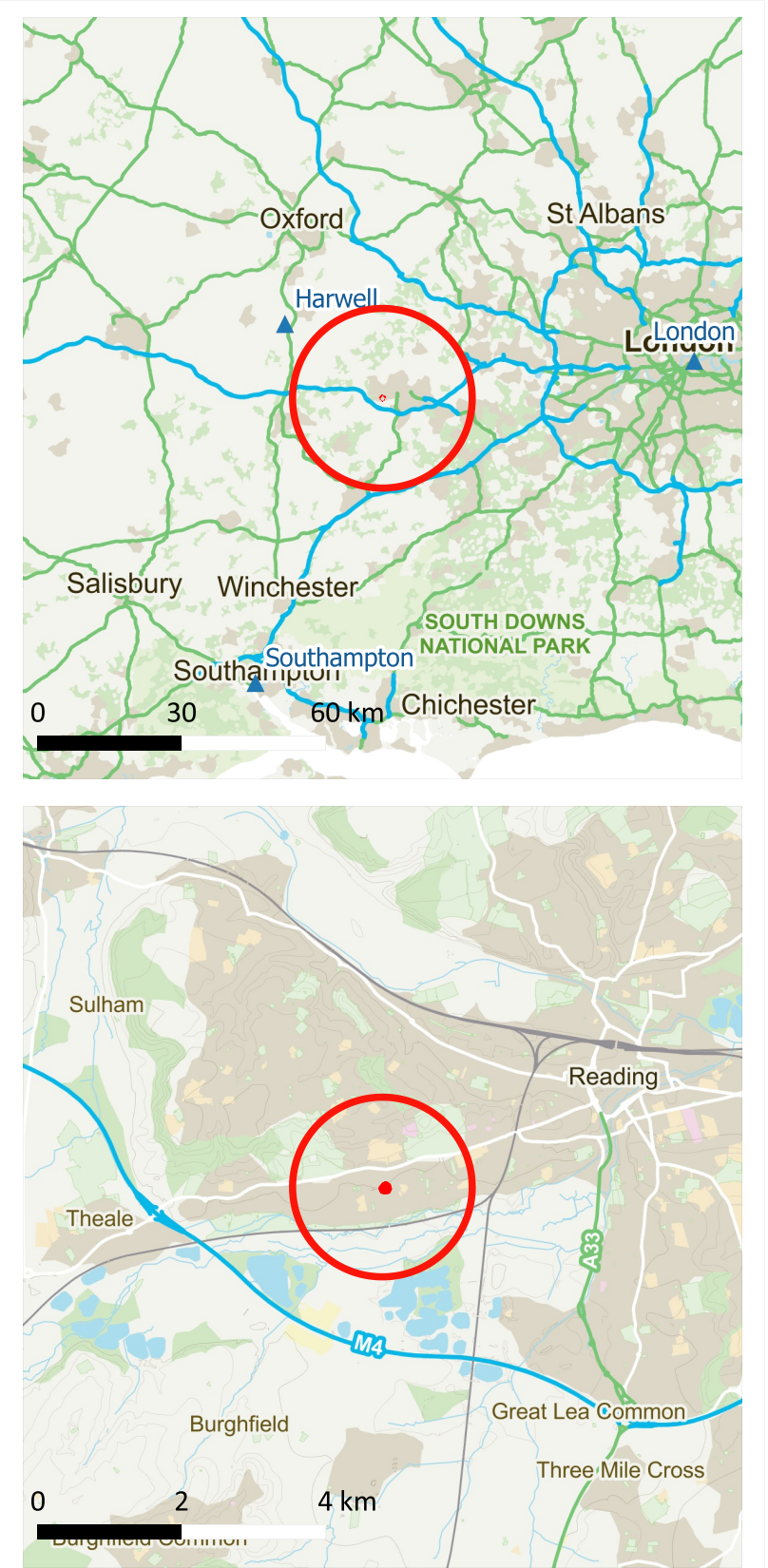
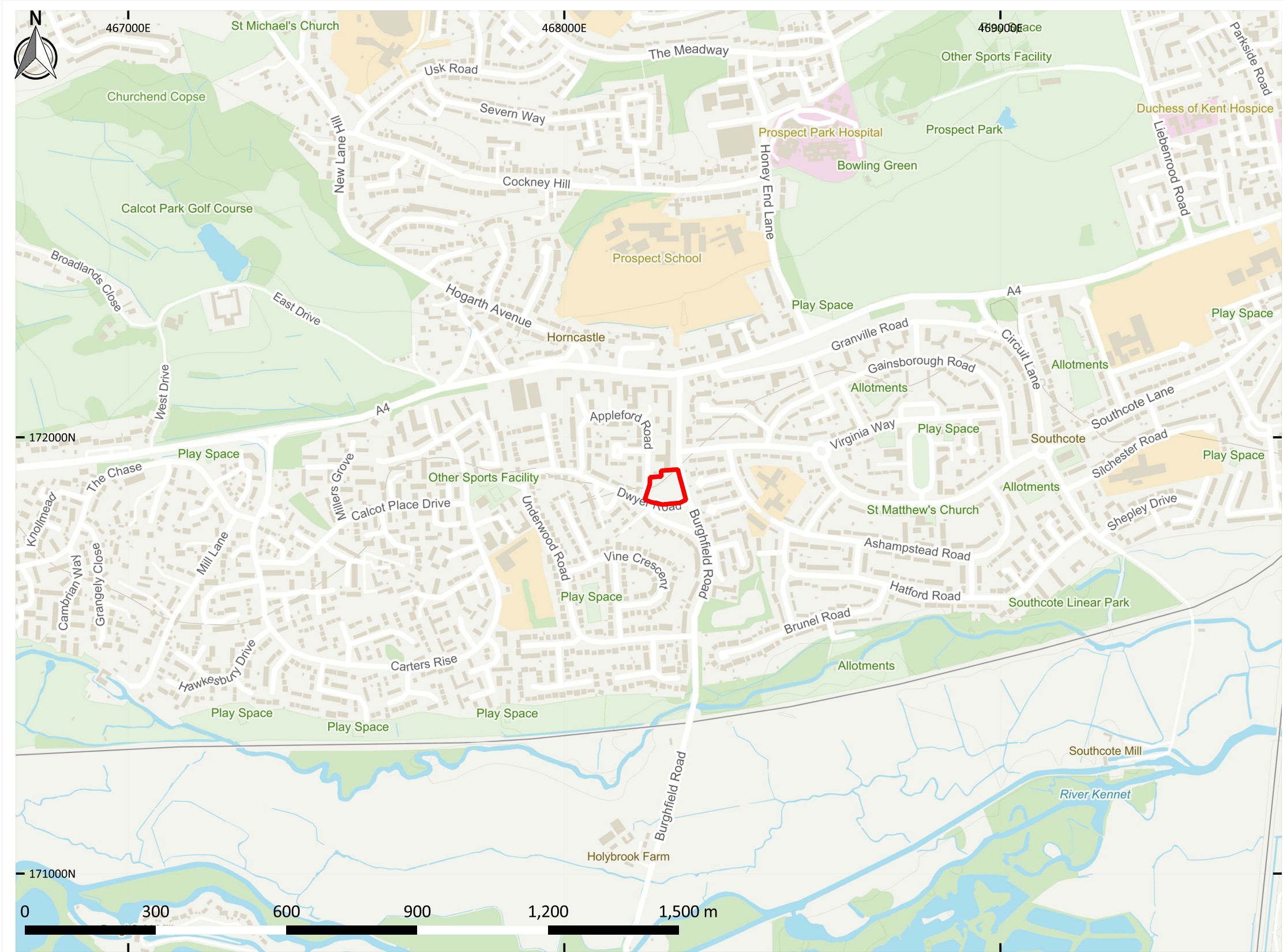
A Verification Report will need to be produced to demonstrate that the required mitigation measures have been undertaken and on completion should be issued to the local authority for approval.

The verification report(s) shall include the following as a minimum:

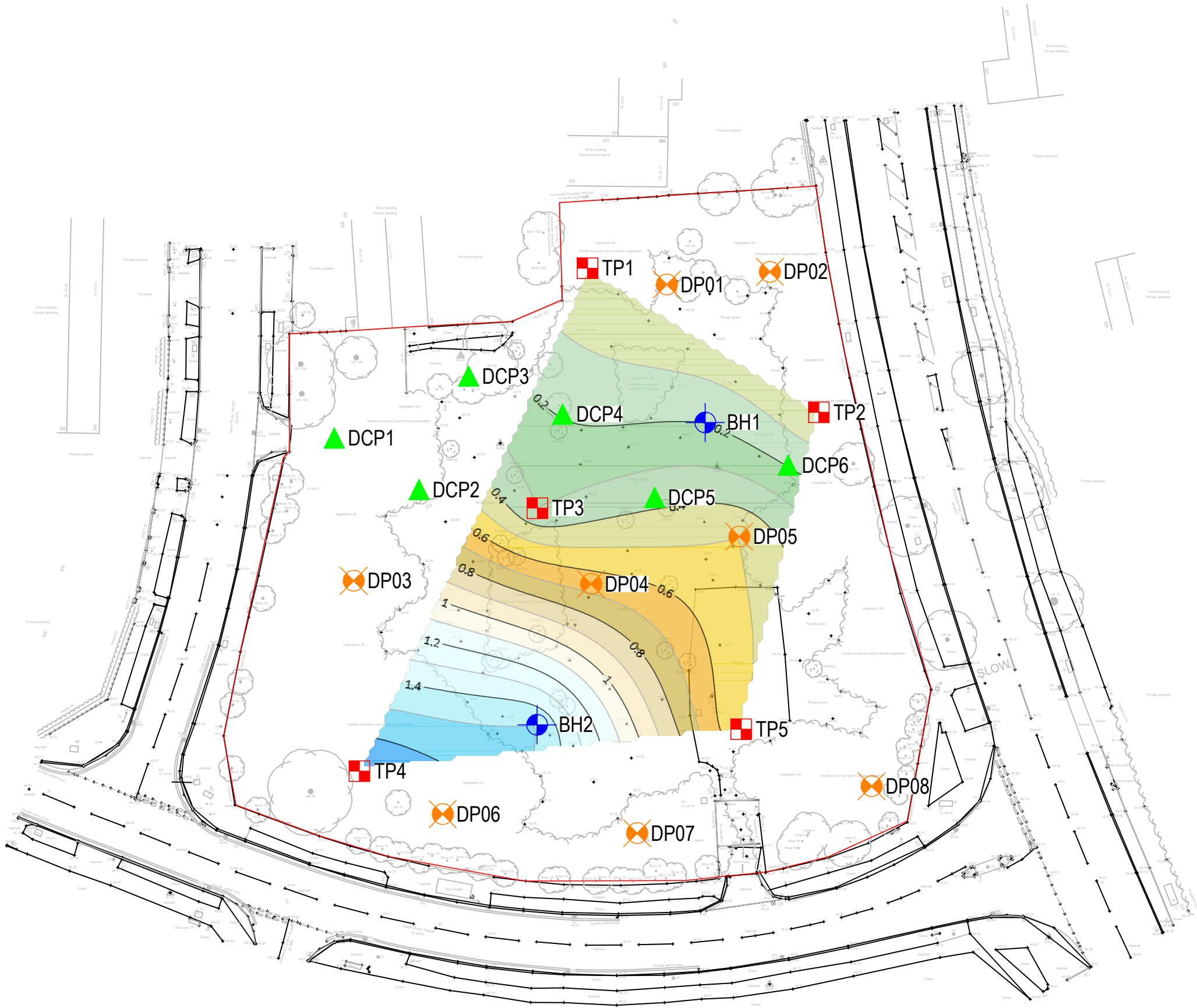
- » The organisation and staff carrying out the verification;
- » The remedial objectives that are being verified, including any numerical limits (such as minimum layer thicknesses and chemical testing results);
- » Relevant plans, sketches and photographs as documentary evidence
- » As built plans; and
- » A written statement that the remediation has been undertaken in accordance with this RS&VP and that the site is suitable for its intended use.

If a Materials Management Plan is used as part of the materials management strategy for the development, a separate Materials Management Verification Report (detailing volumes, suitability, etc.) is also required.

Appendix A Drawings



KEY PLAN		NOTES		REVISIONS			TITLE										
Site Boundary		1. Contains OS data © Crown copyright and database right (2022)		<table><tr><th>REV.</th><th>DRAWN BY INITIALS</th><th>CHECKED BY INITIALS</th><th>DATE</th><th>REVISION NOTES/COMMENTS</th></tr><tr><td>P01</td><td>MW</td><td>SC</td><td>21/01/23</td><td>First issue</td></tr></table>			REV.	DRAWN BY INITIALS	CHECKED BY INITIALS	DATE	REVISION NOTES/COMMENTS	P01	MW	SC	21/01/23	First issue	SITE LOCATION PLAN
REV.	DRAWN BY INITIALS	CHECKED BY INITIALS	DATE	REVISION NOTES/COMMENTS													
P01	MW	SC	21/01/23	First issue													
Reading Borough Council						HYDROCK PROJECT NO. 26888		SCALE @ A3 1:10,000									
PROJECT Dwyer Road						PURPOSE OF ISSUE SUITABLE FOR INFORMATION		STATUS S2									
						DRAWING NO. 26888-HYD-XX-XX-DR-GE-1000		REVISION P01									



KEY

Dynamic Probe

Trial Pit

Borehole

TRL DCP Test

Depth to Made Ground (m bgl)

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.

2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

P1	FIRST ISSUE				
	KB	18/07/24	DG	18/07/24	SC
REV.	REVISION NOTES/COMMENTS				
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY
Hydrock Over Court Barns Over Lane Almondsbury, Bristol BS32 4DF TEL: 01454 619 533 FAX: 01454 614 125 E-Mail: bristol@hydrock.com or visit www.hydrock.com					
CLIENT					
FRANCIS CONSTRUCTION LTD					
PROJECT					
DWYER ROAD					
TITLE					
DEPTH TO MADE GROUND					
HYDROCK PROJECT NO. 26888			SCALE @ A3 1:500		
PURPOSE OF ISSUE SUITABLE FOR INFORMATION					STATUS S2
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) 26888-HYD-XX-XX-DR-GE-1003					REVISION P1

Figure 3 – Exploratory Hole Plan

Project

Dwyer Road, Reading, Berkshire,
RG30 3PN

Client

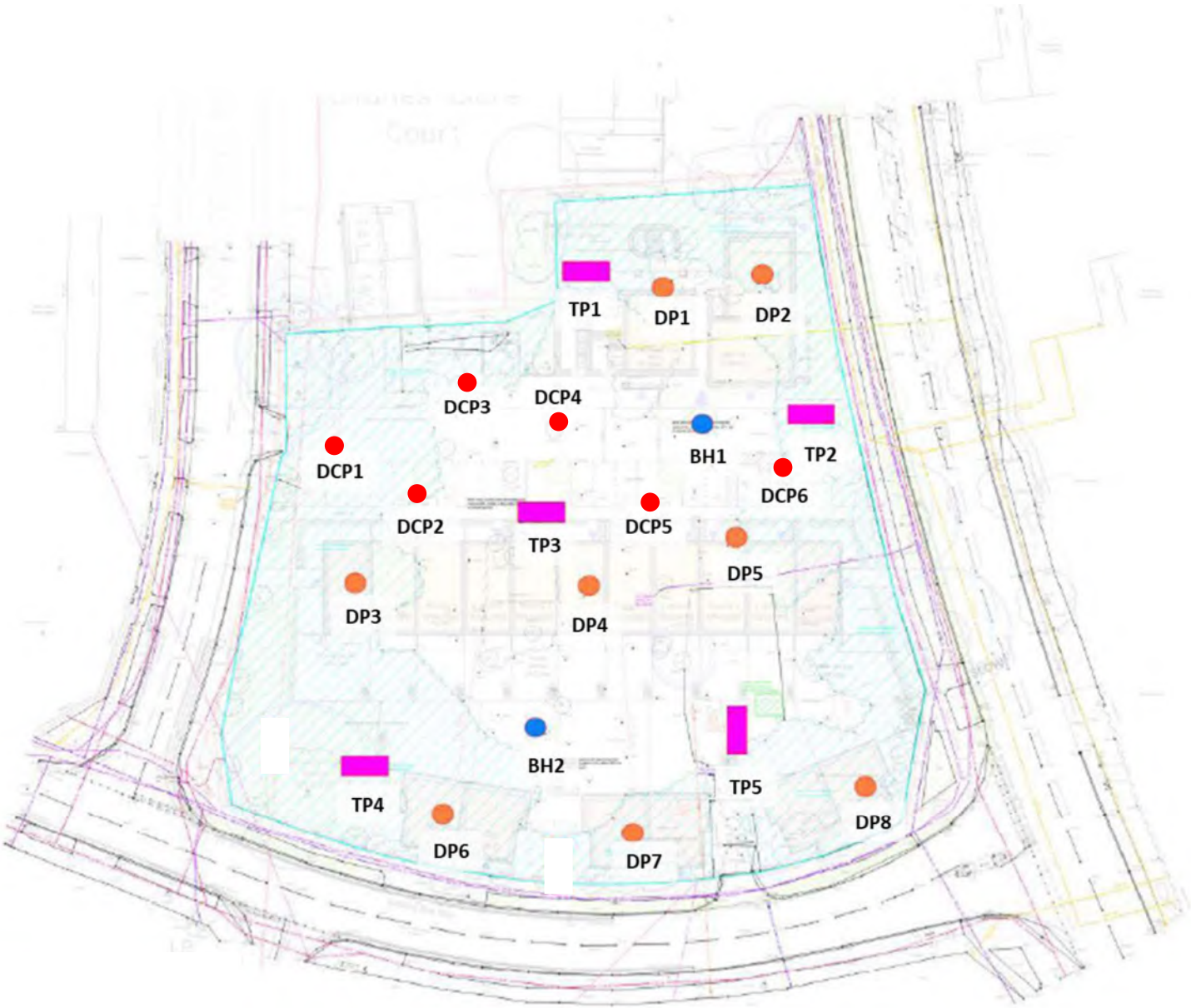
Reading Borough Council

Date

May 2023

Job Number

20763





FOR INFORMATION

Appendix B Soil Acceptance Criteria

Chemical Requirements for the Import of Topsoil and Subsoil for Private Gardens and POS

Contaminant	Proposed Import Criteria (mg/kg)	Justification
Arsenic	20	Natural background concentration (UKSO ¹)
Beryllium	<0.5	Below laboratory limit of detection (not detected on site)
Boron	<1.0	Below laboratory limit of detection (not detected on site)
Cadmium	0.6	Natural background concentration (UKSO)
Chromium (III)	71	Natural background concentration (total chromium) (UKSO)
Chromium (VI)	<2	Below laboratory limit of detection (not detected on site)
Copper	41	Natural background concentration (UKSO)
Lead	119	Natural background concentration (UKSO)
Mercury, inorganic	1.0	Below laboratory limit of detection (not detected on site)
Nickel	30	Maximum value recorded within natural site soils.
Vanadium	69	Natural background concentration (UKSO)
Zinc	163	Natural background concentration (UKSO)
Cyanide (free)	<1	Below laboratory limit of detection (not detected on site)
Total Phenols (Monohydric)	<2	Below laboratory limit of detection (not detected on site)
Sum of PAH 16	7.5	Natural background concentration (UK SHPS ³)
Sum of total petroleum hydrocarbons (C4-C44)	<30	Below laboratory limit of detection
Asbestos	<0.001%	Below laboratory limit of detection

Notes:

¹ Source: United Kingdom Soil Observatory. Available: <https://www.ukso.org/>.

² Generic Assessment Criteria (GAC) for human health

³ Source: Environment Agency. 2007. United Kingdom Soil and Herbage Pollutant Survey. Available: <https://www.gov.uk/government/publications/uk-soil-and-herbage-pollutant-survey>.

In addition, all imported soils must also comply with the following wider suitability criteria:

- » No visible anthropogenic materials (e.g., asbestos containing materials, brick, concrete, etc.).
- » No visible or olfactory evidence of organic contamination, including free phase liquids.
- » No visible evidence of invasive plant species (e.g., Japanese Knotweed or Giant Hogweed).
- » No visible organic or putrescible material that could constitute a source of ground gas (e.g., wood).
- » Meet any additional requirements set by the arboriculturist and/or landscape architect.

The import criteria above have been developed based on the understanding that imported material will be required as part of the clean cover systems that are required within landscaped areas.

The lowest concentration for each contaminant has typically been selected from the following sources:

- » Regional and/or local background concentrations (where available);
- » Range and mean of concentrations detected in natural soils on-site;
- » GAC protective of the relevant end use (e.g., residential with plant up take and Public Open Space) based on 1% SOM.
- » GAC protective of plant life (e.g., pH 7).

The use of the above values will ensure that soils imported will not significantly increase contaminant loading to the site. In addition, petroleum hydrocarbons are limited to a proposed 30 mg/kg to prevent import of odorous or visually oily material.

Chemical Requirements for the re-use of materials at the site beneath areas of buildings, hardstanding and Engineered Clean Cover Systems

Contaminant	Proposed Criteria mg/kg	Comment
Arsenic	22	Maximum value recorded within site soils.
Beryllium	1.7	GAC (residential with plant uptake 1% SOM) ²
Boron	<1.0	Below laboratory limit of detection (not detected on site)
Cadmium	0.6	Maximum value recorded within site soils.
Chromium (III)	71	Natural background concentration (total chromium) (UKSO)
Chromium (VI)	<2	Maximum value recorded within site soils.
Copper	41	Natural background concentration (UKSO)
Lead	119	Natural background concentration (UKSO)
Mercury, inorganic	<1	Maximum value recorded within site soils.
Nickel	30	Natural background concentration (UKSO)
Vanadium	69	Natural background concentration (UKSO)
Zinc	163	Natural background concentration (UKSO)
Cyanide (free)	<1	Maximum value recorded within site soils.
Total Phenols (Monohydric)	<2	Maximum value recorded within natural site soils.
Acenaphthene	0.60	Maximum value recorded within site soils.
Acenaphthylene	0.12	Maximum value recorded within natural site soils.
Anthracene	1.94	Maximum value recorded within site soils.
Benz(a)anthracene	8.31	Maximum value recorded within site soils.
Benzo(a)pyrene	8.77	Maximum value recorded within site soils.
Benzo(b)fluoranthene	10.5	Maximum value recorded within site soils.
Benzo(ghi)perylene	4.25	Maximum value recorded within site soils.
Benzo(k)fluoranthene	3.74	Maximum value recorded within site soils.
Chrysene	8.2	Maximum value recorded within site soils.
Dibenz(ah)anthracene	1.37	Maximum value recorded within site soils.
Fluoranthene	15.2	Maximum value recorded within site soils.
Fluorene	0.47	Maximum value recorded within site soils.

Contaminant	Proposed Criteria mg/kg	Comment
Indeno(123cd)pyrene	5.2	Maximum value recorded within site soils.
Naphthalene	0.1	Maximum value recorded within site soils.
Phenanthrene	5.65	Maximum value recorded within site soils.
Pyrene	11.3	Maximum value recorded within site soils.
(Total) Petroleum Hydrocarbons	<100	To prevent import of odorous or visually oily material.
Asbestos	<0.01%	Below hazardous waste criteria

In addition, all imported soils must also comply with the following wider suitability criteria:

- » No visible anthropogenic materials (e.g., asbestos containing materials, brick, concrete, etc.).
- » No visible or olfactory evidence of organic contamination, including free phase liquids.
- » No visible evidence of invasive plant species (e.g., Japanese Knotweed or Giant Hogweed).
- » No visible organic or putrescible material that could constitute a source of ground gas (e.g., wood).
- » Meet any additional requirements set by the arboriculturist and/or landscape architect.

The import criteria above have been developed based on the understanding that materials could be re-used below areas of buildings, hardstanding and Engineered Clean Cover Systems.

The lowest concentration for each contaminant has typically been selected from the following sources:

- » Regional and/or local background concentrations (where available);
- » Range and mean of concentrations detected in natural soils on-site;
- » GAC protective of the relevant end use (e.g., residential with plant up take and residential Public Open Space) based on 1% SOM.
- » GAC protective of plant life (e.g., pH 7).

The use of the above values will ensure that soils imported will not significantly increase contaminant loading to the site. In addition, petroleum hydrocarbons are limited to a proposed 100 mg/kg to prevent import of odorous or visually oily material.