



Richard Jackson
Engineering Consultants



Brook Hall Farm, Church Road, Crowfield, Suffolk, IP6 9TG

Joy Cox

January 2024

Project no: 60742

Document Review Sheet: -

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Title: REVISION A - REMEDIATION METHOD STATEMENT
 Project: Brook Hall Farm, Church Road, Crowfield, Suffolk, IP6 9TG
 Client: Joy Cox
 Project No.: 60742

Contents:-

1. Introduction	1
1.1. RMS Objectives	1
2. Limitations of Use	2
3. Site Location and Description	2
4. Review of Previous Investigations.....	2
4.1. RJI Phase One Desk Study Report, ref. 60742 (June 2020).....	2
4.2. RJI Phase Two Geo-Environmental Assessment, ref. 60742 (May 2023) ...	3
4.3. RJI Gas Monitoring Letter Report, ref. CW/60742/GML (July 2023)	4
5. Delineation Investigation – Infilled Pond	4
5.1. Fieldwork.....	4
5.2. Ground Conditions	5
5.3. Soil Analysis	5
6. Potential Contaminant Linkages	6
6.1. Summary of Identified Significant Potential Contaminant Linkages	6
6.2. Breaking the Contaminant Linkages.....	7
7. Remedial Strategy	7
7.1. Preparatory Works	8
7.2. Health Safety and Environment.....	8
7.2.1. Contractor & CDM Regulations	8
7.2.2. Control of Dust	8
7.3. Preliminary Tasks	9
7.3.1. Site Briefing	9
7.4. Watching Brief - Generic	9
7.5. Areas of Proposed Soft Landscaping	10
7.6. Barrier Pipe.....	11
7.7. Waste Soils.....	11
8. Verification Plan	12
9. Validation Report.....	13

Appendix

Appendix A: Drawings & Figures

Appendix B: Supplementary Investigation Information

Appendix C: Tier One Screening Values

Appendix D: Discovery Strategy

1. Introduction

Richard Jackson Ltd (RJL) received an instruction to prepare a remediation method statement (RMS) in connection with the proposed redevelopment at Brook Hall Farm, Church Road, Crowfield, Suffolk, IP6 9TG.

The works were instructed by Whymark & Moulton Chartered Surveyors on behalf of the Client, Joy Cox and were carried out in accordance with our fee proposal of 23rd May 2023, ref. JG/60742/RMS_FQ.

This RMS relates to the proposed redevelopment of the site for residential end use. The proposed redevelopment scheme is understood to comprise the demolition of existing buildings on site, and the construction of 3no. detached residential dwellings with associated garages and garden areas. Proposed development plans are presented in Appendix A on drawing no. 19/070-104.

Richard Jackson Ltd has previously undertaken works at the site in connection with the proposed redevelopment, as detailed in the following reports:

- Phase One Desk Study Report, dated June 2020, ref. 60742;
- Phase Two Geo-Environmental Assessment, dated May 2023, ref. 60742;
- Gas Monitoring Letter Report, dated 25th July 2023, ref. CW/60742/GML.

The above reports are reviewed briefly as part of this RMS.

Babergh and Mid Suffolk District Council, planning ref. DC/22/00958, relates to the proposed redevelopment of the site. This report should be considered in respect to Condition 18 – Contaminated Land, and should be used to assist in the discharge of this condition. The above phase two and gas monitoring reports have previously been submitted in connection with the contaminated land planning condition.

1.1. RMS Objectives

This RMS provides a detailed strategy for the implementation of the required remedial measures for the proposed development. The specific objectives of the RMS are as follows:

- To summarise the site investigations and risk assessment work undertaken to date;
- To present the requirements of the remediation scheme to break the significant contaminant linkages which have been identified;
- To identify and designate the roles and responsibilities of various involved parties;
- To state how remediation should be recorded and verified.

2. Limitations of Use

This RMS sets out the measures which will be carried out to mitigate potentially significant risks as identified by the site investigation in relation to the proposed end-use of the site. It also provides a strategy for addressing risk arising from unexpected conditions which may be encountered during the redevelopment of the site.

This report does not provide a completion statement for the works, such verification will be provided at the appropriate time as a Validation Report.

3. Site Location and Description

The site was located to the north of Church Road, Crowfield, Suffolk, IP6 9TG. The approximate Ordnance Survey grid reference for the centre of the site was TM 148 581. A site location plan is presented as Figure 1 in Appendix A.

The site was irregular in shape, with approximate dimensions of 50m east to west, and 40m north to south.

At the time of the investigation, the site comprised a large barn (Barn A) and breeze-block garage in the north, and a smaller barn (Barn B) and adjacent silo to the south. Concrete hardstanding was present across the interjoining central area of the site. The southern area comprised an overgrown area of depressed topography, understood to comprise an infilled pond, with mature trees adjacent.

A detailed site description is presented as Section 2 of RJL's Phase Two Geo-Environmental Assessment, dated May 2023, ref. 60742.

4. Review of Previous Investigations

As mentioned in Section 1, previous investigations have been undertaken at the site. The pertinent findings of these works are summarised in the following sections.

4.1. RJL Phase One Desk Study Report, ref. 60742 (June 2020)

At the time of the desk study report, the site was in use as an active farm and comprised a number of barns/farm outbuildings together with areas of soft and hard landscaping. Two large barns were present on-site, with a silo adjacent to the southern barn.

The surrounding area comprised further farm buildings to the southwest and east together with a number of off-site ponds.

The British Geological Survey (BGS) 1:50,000 scale series online mapping of the area indicated that the site was underlain by the Lowestoft Formation (diamicton). The bedrock geology was indicated to be the Undifferentiated Lewes Nodular, Seaford, Newhaven and Culver Chalk Formations.

The underlying Lowestoft Formation was classified as a Secondary Undifferentiated Aquifer. The underlying Undifferentiated Chalk Formations were classified as a Principal Aquifer.

Based on the historical map review, the site had undergone various phases of development and redevelopment associated with a farm, since 1884. A pond was shown in the southern part of the site until the early 2000s when it is believed to have been infilled.

The surrounding area was characterised by open farmland from the start of the examined period (1883), with the site itself located within a cluster of buildings associated with Brook Hall Farm.

Potential sources of contamination on-site were identified as made ground and the infilled pond, in addition to farming activities both on and off-site.

Several potential receptors of contamination were identified including residential end users, construction workers, flora, controlled waters, structures and services.

A moderate risk from soil and groundwater contamination to the identified sensitive receptors at the site was considered to exist. A high risk was presented to the site from ground gases.

It was recommended that intrusive ground investigations were undertaken at the site to confirm the prevailing ground conditions, establish the presence and extent of made ground and assess the contamination status, including the gassing regime, of the site.

4.2. R JL Phase Two Geo-Environmental Assessment, ref. 60742 (May 2023)

The intrusive investigation on which this report was based comprised the formation of 6no. windowless sampler (WLS) boreholes (WS01-WS02/A, WS03-WS05), including the installation of 3no. semi-permanent gas monitoring standpipes to facilitate a ground gas monitoring programme.

The investigation encountered the prevailing sequence of ground conditions to comprise concrete / made ground to a maximum depth of 2.00m below ground level (bgl) overlying the Lowestoft Formation.

Chemical analyses for a broad suite of potential contaminations was undertaken on a number of recovered soil samples, with the results compared to screening criteria for a residential end use. Elevated concentrations of PAH compounds and asbestos fibres/clumps were recorded within the infilled pond, with elevated PAH compounds also recorded in the shallow made ground beneath Barn A (WS03). Delineation of the encountered contamination was recommended, with remediation of soft landscaping required.

4.3. RJL Gas Monitoring Letter Report, ref. CW/60742/GML (July 2023)

A gas monitoring programme was undertaken in accordance with CIRIA 665, comprising 6no. visits over a period of 3no. months. The monitored wells were installed in accordance with BS 8576, as part of the above discussed phase two investigative works.

The monitoring programme recorded the following results:

- Max CO₂ concentration: 3.7% by volume (% v/v);
- Max CH₄ concentration: 1.5% v/v;
- Min O₂ concentration: 6.4% v/v;
- Max VOC concentration: 1.4ppm;
- Max positive steady flow rate: 2.0l/hr.

In accordance with CIRIA 665, the site was characterised as a characteristic situation 1 (CS-1), with gas protection measures not required.

5. Delineation Investigation – Infilled Pond

In accordance with the recommendations presented in the above referenced Phase Two Geo-Environmental Assessment, intrusive investigations have been undertaken to delineate the extent of the previously disclosed contamination.

The delineation investigation was undertaken on 29th November 2023 and targeted the former infilled pond in the south of the site, which was observed to be a shallow overgrown depression, with mature trees adjacent to the south at the time of the works.

5.1. Fieldwork

The works comprised the mechanical excavation of 7no. trial pits (TP01-TP07) to depths of between 1.00m below ground level (bgl) (TP03) and 1.50m bgl (TP01-TP02, TP04-TP07):

- TP01, TP02 & TP05 were advanced through the former infilled pond;
- TP03, TP04, TP06 & TP07 were not advanced through the infilled pond.

Exploratory hole logs are presented in Appendix B and give descriptions and depths of the strata encountered, together with details of samples taken and other relevant information.

Samples recovered for chemical analysis were transported to the analytical laboratory, Eurofins Chemtest Ltd, in cool boxes under chain of custody protocols.

Where applicable, investigative techniques, sampling, logging of soils and in-situ testing complied with the requirements of British Standard BS5930:2015- 'Code of Practice for Site Investigations'.

Exploratory hole location plans are presented as FIG02 Rev A & FIG03 Rev B in Appendix A, with respect to the existing and proposed site plans respectively.

5.2. Ground Conditions

The ground conditions encountered within the area of delineation investigation varied between the area of former infilled pond, and those outside the infilled area. The disclosed ground conditions can be summarised as follows:

Outside of infilled pond

- Topsoil – in 3no. locations (TP04 & TP06-TP07) to max. depth 0.25m bgl, typically comprising a slightly gravelly, clayey silt;
- Made Ground – in 1no. location (TP03) to max. depth of 0.30m bgl, comprising a gravelly clayey silt overlying a sandy gravelly clay, with the gravel composed of flint and brick rubble;
- Lowestoft Formation – in 4no. locations (TP03-TP04, TP06-TP07), base unproven at 1.50m bgl (max. depth of this investigation), typically comprising a slightly sandy, slightly gravelly clay.

Area of Infilled Pond

- Made Ground - in 4no. locations (TP01-TP02 & TP05) to max. depth of this investigation of 1.50m bgl. Encountered as a highly variable material typically comprising both cohesive and granular soils, with gravel noted to include brick and concrete rubble, wood, metal and plastic together with decayed organic material. This was underlain by a soft silty, organic clay, with decayed plant material, inferred to be associated with the base of the former pond.
- Groundwater - in 3no. locations (TP01-TP02 & TP05) at a minimum depth of 0.80m bgl (TP02) during this investigation.

The soils encountered were broadly consistent with those disclosed in this southern area during the previous investigation.

5.3. Soil Analysis

Analyses for asbestos and PAH compounds was undertaken on soil samples recovered from each of the 7no. excavated trial pits. Results of the chemical analyses are presented in full in Appendix B.

Screening values have been adopted for the site to reflect site-specific parameters, such as, intended end use and the Soil Organic Matter (SOM). Screening values have been developed on the basis of current guidance as given in The Land Quality Management / Chartered Institute of Environmental Health document, 'The LQM / CIEH S4ULS for human health assessment', (2015) publication no. S4UL3379.

In line with the previous assessments undertaken across the wider site area, screening values specific to residential land use with homegrown produce have been adopted for the site.

A conservative SOM of 1% has been adopted for organic chemicals for the purposes of the initial assessment. A SOM of 6% has been adopted for inorganic chemicals as detailed in 'The LQM / CIEH S4ULS for human health assessment', (2015).

In the absence of published S4UL for lead, the DEFRA Category 4 Screening Level (C4SL) for lead has been adopted.

Full details of the reference criteria used to derive the screening values, including the adopted values, are provided in Appendix C.

Table 1 below summarises the contaminants which recorded concentrations in excess of their tier one screening values for human health in the delineation investigation.

Table 1: Summary of Encountered Soil Contamination

Contaminant	Exploratory Hole	Depth (m bgl)	Stratum
Benzo(a)pyrene & Dibenz(a,h)anthracene	TP02	0.50	Made Ground – Infilled Pond
	TP05	0.60	Made Ground – Infilled Pond

As detailed above, elevated concentrations of PAH compounds have been encountered within the infilled pond materials. Based on these results it is considered that remediation will be required in this part of the site. This is detailed further in the following sections.

Samples of natural soils analysed from this area of investigation did not return concentrations of contaminants of concern which exceed tier one screening values. Asbestos was not detected in the samples which underwent asbestos screening.

6. Potential Contaminant Linkages

6.1. Summary of Identified Significant Potential Contaminant Linkages

On the basis of the above summarised previous investigations and risk assessments, together with the sites proposed end use, a number of unacceptable potential contaminant linkages have been identified, which will require remediation. These are summarised in Table 2 below.

Table 2: Summary of identified unacceptable potential pollutant linkages

Source(s)	Pathway(s)	Receptor(s)	Comments
Asbestos in localised areas of the infilled pond materials in the south of the site	Direct contact with soils in areas of soft landscaping	Residential End Users Construction Workers, Maintenance Workers & the Public	The sum of exposure via these pathways is considered to have the potential to cause significant harm to the receptor, should the site be occupied prior to remediation.
	Ingestion of soils and dust.		
PAH in infilled pond materials in the south of the site, and in a localised area in the north of the site (WS03)	Direct contact with soils in areas of soft landscaping.	Residential End Users	The sum of exposure via these pathways is considered to have potential to cause significant harm to the identified receptor, should the site be occupied prior to remediation.
	Ingestion of soils and dust. Either directly or via the consumption of home-grown produce		
	Direct Contact	Water Supply Services	Consideration should be given to the adoption of barrier pipe for new water supply services.

6.2. Breaking the Contaminant Linkages

In order to break the contaminant linkages identified in Table 2, one or more elements of the potentially significant contaminant linkages should be removed by the remediation so that there is no longer a potential linkage. The contaminant linkages may be broken via one of the following remediation types:

- Removal of the potential receptors of contamination;
- Removal of the contaminant source;
- Removal/management of the contaminant pathways.

7. Remedial Strategy

Remedial measures are considered to be required to address the unacceptable potential pollutant linkage identified in Table 2. The following sections provide details on the required remediation and how it is to be implemented.

For the purposes of these works 'clean' means validated materials that are physically and chemically suitable for their intended end use.

7.1. Preparatory Works

The following works are to be undertaken prior to remediation commencing at the site:

- Final site levels will be agreed;
- The positions of all services (above-ground and below-ground) shall be determined and clearly identified on site. This is to include the depth to below ground services;
- Enabling works will be completed, including vegetation clearance / demolition of structures.

7.2. Health Safety and Environment

Reference should be made to CIRIA Report No.132 'A Guide for Safe Working on Contaminated Sites' (1996), and Health and Safety Guidance Document, 'Protection of Workers and the General Public during the Development of Contaminated Land' (1991).

7.2.1. Contractor & CDM Regulations

It is understood that the remediation works are to be undertaken by a groundworks contractor working on behalf of the Principal Contactor.

It is also envisaged that the works would be undertaken within the requirements of the Construction (Design and Management) Regulations 2015, which details specific duties for clients, designers and contractors to ensure that appropriate arrangements are put in place so that the work can be carried out without risk to the health and safety of any person. To that end any site operatives should be made aware of the possibility of encountering elevated concentrations of contaminants in the ground, including the potential for localised asbestos within the infilled pond. Therefore, the precautions detailed within the RJL Phase Two Geo-Environmental Assessment, dated May 2023, ref. 60742, with respect to risks to construction workers should be incorporated into the groundworks contractor's method statements and risk assessments and adhered to during the works.

All site staff and visitors should maintain high levels of personal hygiene, utilize appropriate personal protective equipment (including respiratory protective equipment if deemed necessary) and pay attention to staff inductions and briefings.

The contractor is to ensure that all necessary welfare facilities are available for the staff and site visitors.

7.2.2. Control of Dust

It is recommended that measures to control the production of dust should be employed from a health and safety and nuisance perspective. All material excavated should ideally be loaded directly into waiting lorries, but should

stockpiling be necessary, they should be placed on suitable impermeable plastic sheeting and covered to prevent the run-off or leaching of contamination and the generation of dust. Ideally stockpiles should be sited on areas of hardstanding. Measures should be taken to ensure that contaminated materials are not accidentally transferred off site, for example on vehicle tyres.

7.3. Preliminary Tasks

7.3.1. Site Briefing

All site staff and site contractors will be briefed on the potential for soil contamination to be encountered prior to commencing works on site. This is particularly applicable to areas in the south where the historic infilled pond is located, and beneath Barn A in the north of the site. In addition to the standard health and safety procedures, outlined above, this briefing will include the following information:

- A summary of the nature of contamination which may be encountered at the site. Soil contaminants previously recorded in the soils beneath the site have included PAH compounds, with localised asbestos contamination also disclosed within the former infilled pond;
- Specific areas of the site in which contamination is considered likely to be encountered. Staff and contractors should be specifically aware of the potential for asbestos contamination to be encountered in the infilled pond materials in the south of the site;
- Responsibilities of individuals under the discovery strategy, which is discussed further below.

It will be the responsibility of the on-site manager to ensure written confirmation of staff briefing in accordance with the above, is retained and provided to the relevant person and authorities, if requested.

7.4. Watching Brief - Generic

In order to monitor the ground conditions for soil impacts on a regular basis during the redevelopment of the site, we would recommend that the following works are undertaken as a watching brief:

- A photographic record of the key stages of the development, e.g. formation level excavations, reduced levels and the formation of areas of soft landscaping.
- Any observations of contamination, including visual (to be supported by photographic evidence) and olfactory evidence, which are made during the course of the development by any member of site staff, contractor or site visitor.
- Where observations of contamination were 'unexpected' the methodologies detailed in the discovery strategy presented in Appendix D will be adhered to.

Written and signed statements will be obtained by the following parties on completion of the respective phases of work:

- Groundworks contractor(s) – on completion of groundworks.
- Environmental consultant - completion of groundworks and landscaping works.
- On-site manager – on completion of groundworks and landscaping works.

The written statements to be provided by the above specified persons are to include the following information:

- Site name and address.
- Name, company and role of the person signing the statement.
- Dates on which the works to which the statement refers were undertaken. Start and end dates must be specified.
- Confirmation of whether contamination was observed or not.

Where contamination was observed, the following additional information will be included in the signed, written statement:

- A description of the contamination observed, including reference to photographic evidence where appropriate.
- A plan indicating the locations where the contamination was observed.
- The details, including name and role of the person(s) notified of the observations.
- Details of the actions undertaken to mitigate the observed contamination.

In addition to the above information, the on-site manager will include confirmation that all site staff and contractors received appropriate briefing of the potential for contamination to be encountered at the site.

It will be the responsibility of the on-site manager to ensure that the watching brief is maintained.

7.5. Areas of Proposed Soft Landscaping

Based on the findings of the Phase Two Geo-Environmental Assessment, dated May 2023, ref. 60742, and the delineation investigation works detailed in Section 5 above, there is a requirement for remediation of soft landscaped areas located in the area of the historic infilled pond in the south of the site, and beneath Barn A in the north of the site.

Remediation of these proposed soft landscaped areas will be required for the protection of human health in a residential setting. The soft landscape areas requiring remediation are shown on FIG04 Rev A presented in Appendix A.

Remediation of the indicated areas will comprise the placement of a cover system of a minimum thickness of 600mm. The remediation will be achieved either via raising levels or via the excavation of soils from these areas to provide space for 600mm of 'clean' cover to be placed. This is in accordance with guidance given in BRE 465 'Cover Systems for Land Regeneration', 2004 and will be subject to the approval of the Local Authority.

The soft landscaped areas will be backfilled with certified 'clean' materials which are both physically and chemically suitable for their intended end use. The backfill material will comprise a minimum thickness of 150mm topsoil to be placed at the surface. An alternative subsoil certified 'clean' may be used to make up the required thickness of cover. A geotextile membrane will be installed as a marker layer at the base of the cover system.

Based upon the above requirements, a suggested composition for the cover system within the landscaped areas may be give as:

- 150mm Topsoil;
- 450mm Subsoil;
- Geotextile membrane as a marker layer.

The placed topsoil will comply with the specifications detailed in BS3882 – 2007, 'Specification for Topsoil and Requirements for Use'. Both the Topsoil and subsoil backfill will also comply with the screening values presented in Appendix C and should be sampled and tested prior to being used on site to confirm that they are suitable for their intended use.

7.6. Barrier Pipe

The encountered soil contamination may necessitate the adoption of specialist barrier pipe. It is the responsibility of the on-site developer to liaise with the water supply company to confirm this requirement.

If barrier pipe is required by the water supply company, it will be the responsibility of the developer to ensure that pipe of the appropriate specification is used on the site. If barrier pipe is to be installed at the site, its installation will be subject to a watching brief under the methodology specified in Section 7.4.

7.7. Waste Soils

The contractor undertaking the remediation works will at all times comply with all relevant legislation and best practice in relation to waste management.

Reference should be made to the EU Waste Framework Directive, Revised Directive 2008/98/EC and 'The definition of Waste: Development Industry

Code of Practice (CoP) Version 2' published by CL:AIRE (2011) to establish whether soils generated from on-site works are classified as waste.

A significant amount of waste will likely be generated from excavation works. There may be limited opportunities for re-use of materials on site, subject to compliance with the CoP.

There is, however, likely to be some waste to be disposed of off-site. The groundworks contractor should classify the waste in accordance with the document entitled 'Guidance on the classification and assessment of waste (1st Edition 2015), Technical Guidance WM3'.

Waste removed from the site must be classified according to the analytical methods criteria recommended by the Landfill (England and Wales) (Amendment) Regulations 2004 and 2005. The regulations set new acceptance criteria for wastes to be disposed of at landfill sites with effect from 16 July 2005. It is recommended that the soil analyses undertaken by Richard Jackson Limited, along with any subsequent Waste Acceptance Criteria testing are forwarded to the receiving landfill to confirm the classification of the waste soils. Waste Classification Assessment (WAC) testing will likely also be required.

Full and detailed records should be kept of all waste soils removed from the site for future reference purposes.

8. Verification Plan

Verification of the remedial strategy will be required in order to demonstrate that the site-specific objectives outlined in Section 1.1 have been met. This will comprise the following:

- Details of required additions to the remedial strategy if the watching brief across the site identifies unexpected contamination to be present. This should include details of the encountered contamination, together with the proposed remedial action and methodology for verifying the necessary remediation.
- All materials imported to the site will be certified as 'clean' (clean as defined in Section 7). They will need to be sampled and tested by a UKAS accredited analytical laboratory. Delivery tickets and weighbridge tickets are to be retained.
- The placement of 'clean' cover (as defined in Section 7.5) to soft landscaped areas will be verified by an experienced and appropriately qualified third-party consultant.
 - Verification will comprise visual inspection of the backfill materials including plans showing sample locations, photographs and depth measurements, to confirm that sufficient material was been placed.

- Soil samples of each cover material will then be recovered in appropriate containers, stored in cool boxes and transported to the analytical laboratory under chain of custody.
- All recovered samples will be analysed by an independent and appropriately qualified consultant and tested at a UKAS and MCerts accredited laboratory for the range of contaminants detailed in Appendix C.
- Details of the supplier and confirmation of the source(s) of materials used as the cover system will be provided.
- Sampling of the topsoil and subsoil materials to be placed as a cover system will be undertaken at a rate to be agreed with the Local Authority.
- Cover system materials will be chemically compliant with the screening values for soils presented in Appendix C. For the purposes of remediation, the concentration of individual TPH fractions will not exceed 500mg/kg. Where the applicable screening value for human health is less than 500mg/kg, backfill materials will comply with the lower value.
- The information and evidence gathered as part of the above tasks will be provided to the Local Authority as soon as it is available.

9. Validation Report

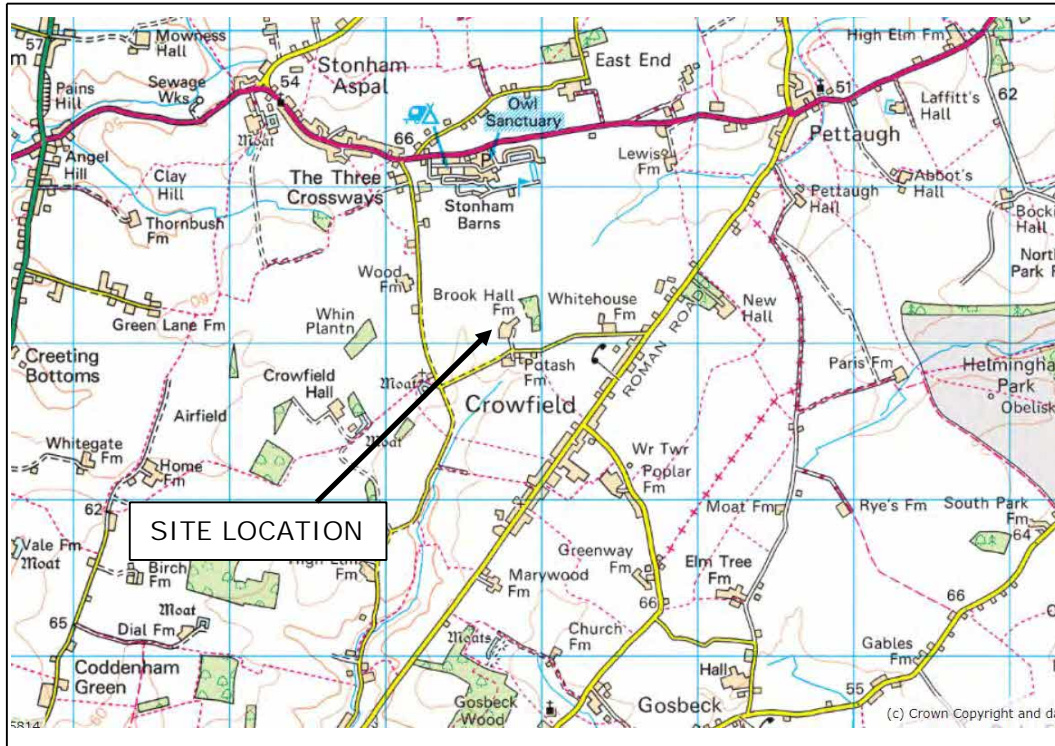
A full validation report will be issued upon completion of the remediation works to demonstrate that the requirements of the remediation method statement have been met. This will be submitted to the Local Authority.

The following items should be included in the validation report:

- Written accounts of the watching brief undertaken at the site, which as a minimum will include works in the vicinity of the infilled pond in the south, and areas beneath Barn A in the north, and all key stages of the development. Where appropriate, the watching brief will include details of any unexpected contamination encountered together with details of the proposed mitigation strategy.
 - Photographic evidence of the thickness and detail of the 'clean' cover placed to soft landscaped areas.
 - Details on the source and analytical laboratory data of the materials (topsoil and subsoil) making up the 'clean' cover system to soft landscaped areas.
 - Presentation of consignment notes for soils disposed off-site indicating which treatment centre or landfill they were sent to.
-

Appendix A

Figure & Drawings



REPRODUCED FROM ORDNANCE SURVEY MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE, © CROWN COPYRIGHT RICHARD JACKSON LTD – ACC No. 100002572



consulting civil & structural engineers
847 The Crescent, Colchester, CO4 9YQ
Tel: 01206 228 800

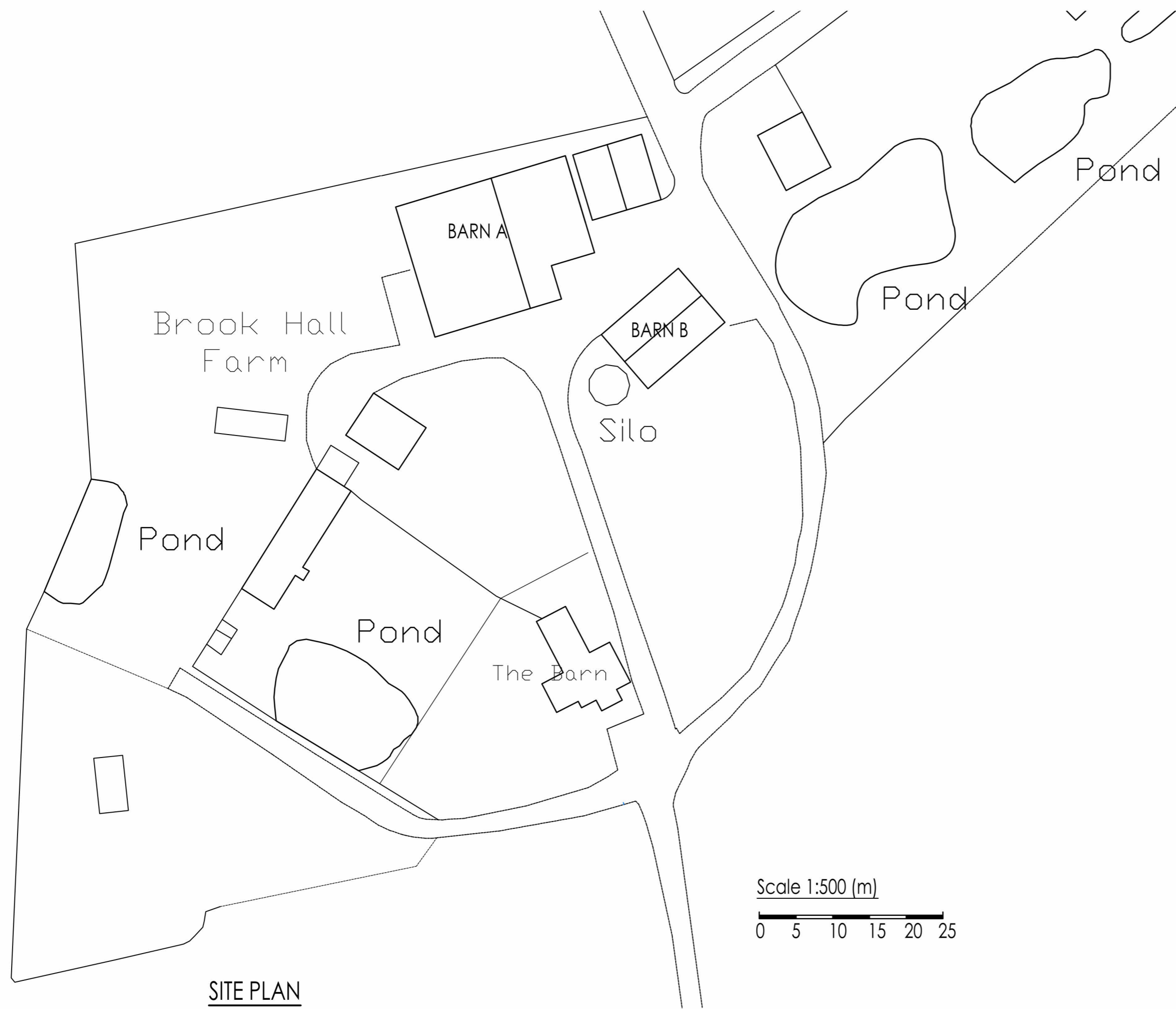
Brook Hall Farm, Church Road,
Crowfield, Suffolk, IP6 9TG

SITE LOCATION PLAN

FIGURE 1

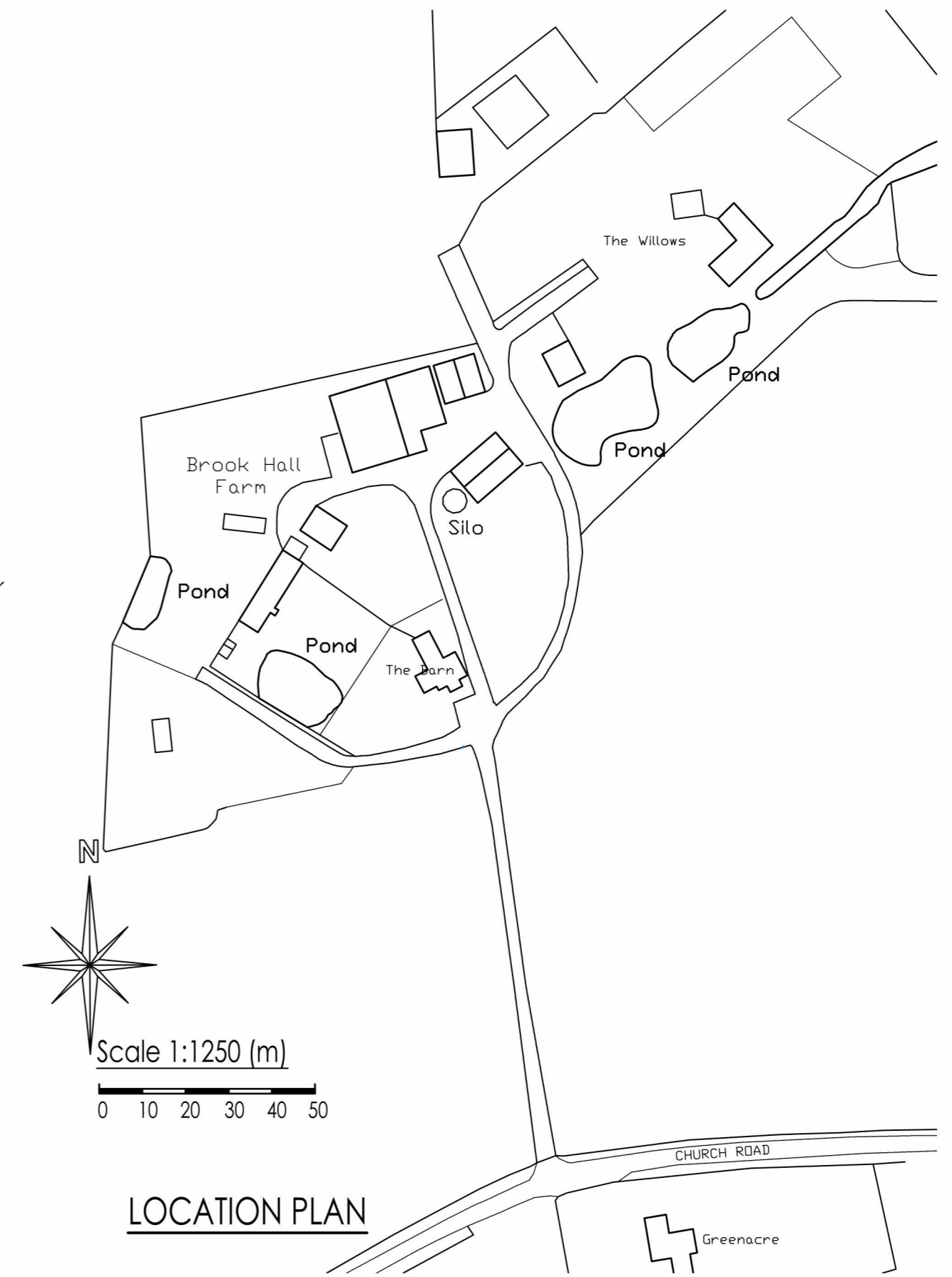
SCALE: N.T.S.

JOB NO: 60742





SITE PLAN

Scale 1:500 (m)
 0 5 10 15 20 25



Scale 1:1250 (m)
 0 10 20 30 40 50

LOCATION PLAN

 RICS	Whymark & Moulton Chartered Surveyors & Building Engineers	 <small>THE INSTITUTION OF BUILDING ENGINEERS</small>
	14 Cornard Road, Sudbury, Suffolk. CO10 2XA	

Project	BROOK HALL CHURCH ROAD CROWFIELD IPSWICH IP6 9TG	
	SITE PLAN AS EXISTING	
Scale	1:500, 1:1250	Date May 2020
Drawing No	19/070 - 01	

Amendments



ook Hall

BROOK HALL FARM

The Barn

THE BARN

- Bin storage
- Bin presentation space
- Cycle Storage shed, 2.4x1.8m
- Provide electric vehicle charging point capable of providing 7kw charge

Whymark & Moulton
 Chartered Surveyors &
 Building Engineers
 14 Comard Road, Sudbury,
 Suffolk, CO10 2XA

Project
**BROOK HALL
 CHURCH ROAD
 CROWFIELD
 IPSWICH
 IP6 9TG**

SITE LAYOUT PLAN

Scale 1:200 Date Sept 2021

Drawing No 19/070-104 D

Amendments

A May 2022 Layout redrawn
 B July 2022 Plot 3 roof plan amended
 C July 2022 Plot 3 roof plan amended
 D Oct 2022 Bin storage and collection, cycle storage and EV charging points shown

DO NOT SCALE

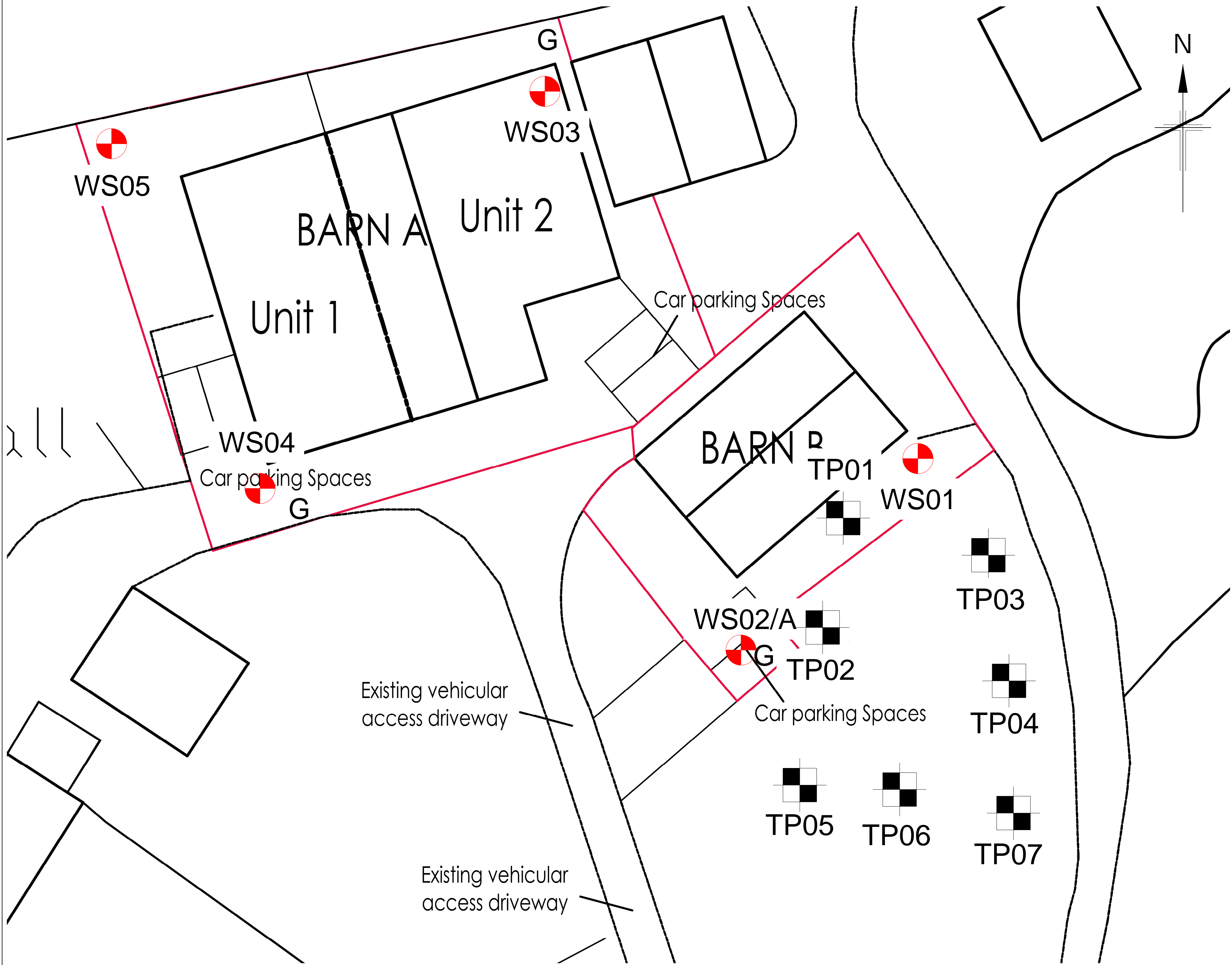
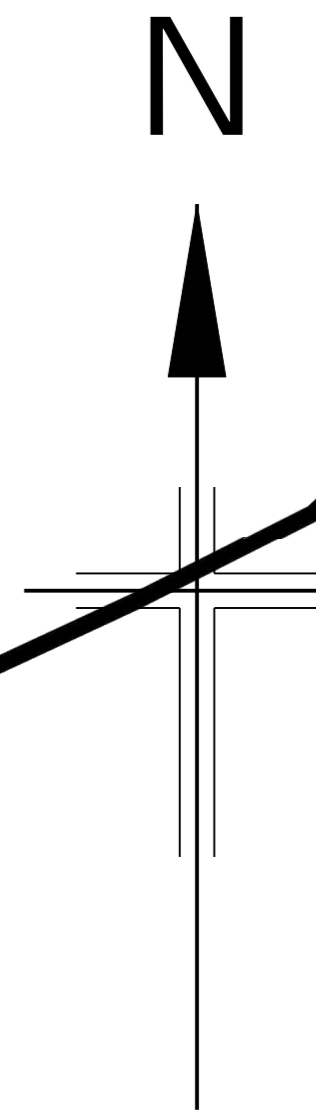
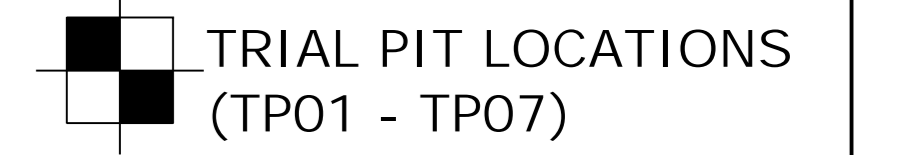
KEY

MARCH 2023
GEO-ENVIRONMENTAL
INVESTIGATION



MONITORING STANDPIPE
INSTALLED

NOVEMBER 2023
DELINEATION
INVESTIGATION



REV	DATE	DESCRIPTION	DRAWN	CHECKD
A	NOV 23	Delineation Investigation Trial Pitting	AJS	CW

REVISIONS
This drawing is to be read in conjunction with all other Engineer's drawings and all other project information. Any discrepancy between the Engineer's drawings and other project information is to be reported to the Engineer immediately.



Project
BROOK HALL FARM, CHURCH ROAD
CROWFIELD

Title
EXPLORATORY HOLE
LOCATION PLAN

Client
MS JOY COX

Scale	Drawn	Date
NTS/A0	MB	18/04/2023
Job Manager	Checked	Approved
JC	CW	CW

Richard Jackson
Engineering Consultants

1st Floor, The Old Coach, 25, Matthews Street, Norwich, Norfolk, NR1 1SP
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Fax: 01603 220142
Email: info@rjcs.co.uk

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Drawing No.	Revision
60742-G-FIG02	A

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DO NOT SCALE



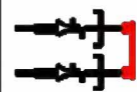



KEY
MARCH 2023
GEO-ENVIRONMENTAL
INVESTIGATION

-  WINDOWLESS SAMPLER BOREHOLE LOCATION
-  MONITORING STANDPIPE INSTALLED

NOVEMBER 2023
DELINEATION
INVESTIGATION

-  TRIAL PIT LOCATIONS (TP01 - TP07)

-  Bin storage
-  Bin presentation space
-  Cycle Storage shed, 2.4x1.8m
-  Provide electric vehicle charging point capable of providing 7kw charge

B	JAN 24	Updated Proposed Development Plan	AJS	CW
A	NOV 23	Delineation Investigation Trial Pitting	AJS	CW
REV	DATE	DESCRIPTION	DRAWN	CHKD

REVISIONS
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Project
BROOK HALL FARM, CHURCH ROAD CROWFIELD

Title
EXPLORATORY HOLE LOCATION PLAN - PROPOSED DEVELOPMENT LAYOUT

Client
MS JOY COX

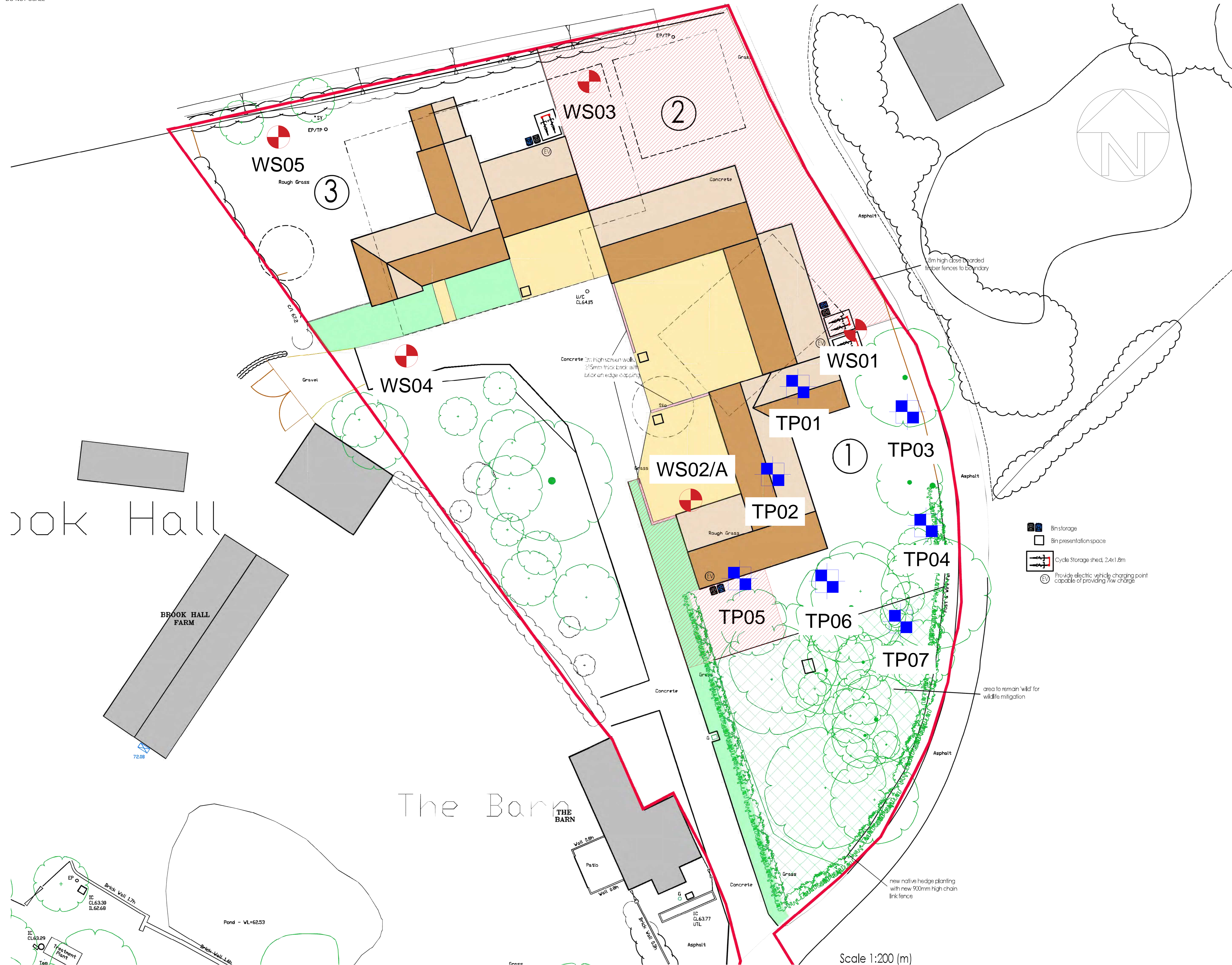
Scale	Drawn	Date
M15:8A0	HB	15/05/2023
Job Manager	Checked	Approved
JG	CW	CW

RichardJackson
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847 The Crescent, Chichester, Essex CO4 9TQ
 Unit 02/12, 6th Floor, 1 St. Katherine's Way, London, E1W 1UN
 20 Queen House, Mill Lane, Great Shelford, Cambs CB2 3EP
 4 The Old Church, St. Matthews Road, Norfolk, Norfolk NR5 1SP
 The Washhouse, Boreas Hill, Colchester, Essex CO1 3JF
 Website: <http://www.rjck.co.uk>

Drawing No.	Revision	
60742-G-FIG03	B	
Drawing Status		
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<input type="checkbox"/> TENDER	<input type="checkbox"/> CONSTRUCTION	<input type="checkbox"/> AS CONSTRUCTED

DO NOT SCALE



KEY

MARCH 2023
GEO-ENVIRONMENTAL
INVESTIGATION

WINDOWLESS SAMPLER
BOREHOLE LOCATION

MONITORING STANDPIPE
INSTALLED

NOVEMBER 2023
DELINEATION
INVESTIGATION

TRIAL PIT LOCATIONS
(TP01 - TP07)

REMEDIATION AREA

AREAS WHERE SOFT
LANDSCAPING
REQUIRES 600MM
CERTIFIED CLEAN
CAPPING SOILS

- Bin storage
- Bin presentation space
- Cycle Storage shed, 2.4x1.8m
- Provide electric vehicle charging point capable of providing 7kw charge

REV	DATE	DESCRIPTION	DRAWN	CHECKED
A	JAN 24	Updated Proposed Development Plan	AJS	CW

REVISIONS
This drawing is to be read in conjunction with all other Engineer's drawings and all other project information. Any discrepancy between the Engineer's drawings and other project information is to be reported to the Engineer immediately.



Project
**BROOK HALL FARM, CHURCH ROAD
CROWFIELD**

Title
REMEDIATION PLAN

Client
MS JOY COX

Scale	Drawn	Date
Natural	AJS	10/11/2023
Job Manager	Checked	Approved
JG	CW	CW

Richard Jackson
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Drawing No.	Revision
60742-G-FIG04	A

Drawing Status	APPROVAL	COSTING
<input checked="" type="checkbox"/> INFORMATION	<input type="checkbox"/> APPROVAL	<input type="checkbox"/> COSTING
<input type="checkbox"/> TENDER	<input type="checkbox"/> CONSTRUCTION	<input type="checkbox"/> AS CONSTRUCTED

Scale 1:200 (m)

Appendix B


Delineation Investigation Information

Ground water	Samples & In Situ Testing			Level (m)	Depth (m)	Legend
	Depth	Type	Results			
					0.20	
					0.50	
					1.20	
					1.50	

Ground water	Samples & In Situ Testing			Level (m)	Depth (m)	Legend
	Depth	Type	Results			
▼					0.15	
					0.30	
					1.10	
					1.50	

Ground water	Samples & In Situ Testing			Level (m)	Depth (m)	Legend
	Depth	Type	Results			
					0.15	
					0.30	
					1.00	

Ground water	Samples & In Situ Testing			Level (m)	Depth (m)	Legend
	Depth	Type	Results			
					0.25	
					1.50	

Ground water	Samples & In Situ Testing			Level (m)	Depth (m)	Legend
	Depth	Type	Results			
					0.25	
					0.40	
					1.30	
					1.50	

Ground water	Samples & In Situ Testing			Level (m)	Depth (m)	Legend
	Depth	Type	Results			
					0.20	
					1.50	

Ground water	Samples & In Situ Testing			Level (m)	Depth (m)	Legend
	Depth	Type	Results			
					0.20	
					1.50	



Final Report

Report No.: 23-39644-1

Initial Date of Issue: 04-Dec-2023

Re-Issue Details:

Client Richard Jackson Limited

Client Address: 847 The Crescent
Colchester Business Park
Colchester
Essex
CO4 9YQ

Contact(s): Joe Gooch
Camilla Watson

Project 60742 Brook Hall Farm, Crowfield

Quotation No.: **Date Received:** 30-Nov-2023

Order No.: 60742 **Date Instructed:** 30-Nov-2023

No. of Samples: 7

Turnaround (Wkdays): 5 **Results Due:** 06-Dec-2023

Date Approved: 04-Dec-2023

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: 60742 Brook Hall Farm, Crowfield

Client: Richard Jackson Limited		Chemtest Job No.:		23-39644	23-39644	23-39644	23-39644	23-39644	23-39644	23-39644	23-39644
Quotation No.:		Chemtest Sample ID.:		1738508	1738509	1738510	1738511	1738512	1738513	1738514	1738514
		Client Sample ID.:		1	1	1	1	1	1	1	1
		Sample Location:		TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP07
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.40	0.50	0.20	0.30	0.60	0.15	0.30	0.30
		Date Sampled:		29-Nov-2023	29-Nov-2023	29-Nov-2023	29-Nov-2023	29-Nov-2023	29-Nov-2023	29-Nov-2023	29-Nov-2023
		Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD							
ACM Type	U	2192		N/A	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	13	11	18	15	14	18	17
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones and Roots	Stones and Roots	Stones and Roots	Stones and Roots	Roots and Stones	Stones and Roots	Stones and Roots
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Clay	Sand	Sand	Sand
Naphthalene	M	2800	mg/kg	0.10	< 0.10	1.1	0.25	< 0.10	0.42	< 0.10	0.48
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	1.6	< 0.10	< 0.10	0.38	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	0.59	0.10	< 0.10	2.0	< 0.10	0.16
Fluorene	M	2800	mg/kg	0.10	< 0.10	0.66	< 0.10	< 0.10	2.7	< 0.10	0.13
Phenanthrene	M	2800	mg/kg	0.10	< 0.10	9.5	0.56	< 0.10	20	0.39	1.1
Anthracene	M	2800	mg/kg	0.10	< 0.10	3.5	0.13	< 0.10	5.4	< 0.10	0.13
Fluoranthene	M	2800	mg/kg	0.10	< 0.10	30	1.1	< 0.10	24	0.63	1.6
Pyrene	M	2800	mg/kg	0.10	< 0.10	27	0.86	< 0.10	18	0.50	1.2
Benzo[a]anthracene	M	2800	mg/kg	0.10	< 0.10	16	0.60	< 0.10	8.7	0.29	0.77
Chrysene	M	2800	mg/kg	0.10	< 0.10	16	0.60	< 0.10	7.6	0.23	0.77
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	< 0.10	23	0.77	< 0.10	10	0.43	1.1
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10	8.8	0.33	< 0.10	4.0	0.16	0.38
Benzo[a]pyrene	M	2800	mg/kg	0.10	< 0.10	19	0.57	< 0.10	8.4	0.32	0.66
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	12	0.31	< 0.10	4.6	0.20	0.46
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	2.1	< 0.10	< 0.10	0.96	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	11	0.39	< 0.10	4.5	0.19	0.47
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	180	6.6	< 2.0	120	3.3	9.4

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Appendix C

Tier One Screening Values

Reference Criteria for Soils

In 2014 Land Quality Management Ltd (LQM) and the Chartered Institute of Environmental Health (CIEH) published 'Suitable 4 Use Levels' (S4ULs) for human health risk assessment. The S4ULs have been derived in accordance with UK legislation, national and Environment Agency policy using a modified version of the Contaminated Land Exposure Assessment (CLEA) software. The S4ULs are based on minimal or tolerable risk as described in SR2 (Environment Agency, 2009a).

The S4ULs are intended to replace the 2nd edition of the LQM/CIEH Generic Assessment Criteria (GAC).

The S4ULs have also been used to replace the Environment Agency Soil Guideline Values (SGVs), which were defined in 2009 alongside updates to the CLEA methodology and software.

The parameters detailed in the LQM/CIEH S4ULs publication have been adapted using the CLEA software to reflect site specific conditions, including the Soil Organic Matter (SOM).

A global SOM of 1% has been adopted for organic chemicals for the purposes of the initial assessment. A SOM of 6% has been adopted for inorganic chemical as detailed in 'The LQM / CIEH S4ULS for human health assessment', (2015).

In the absence of a comprehensive toxicology and physical parameter data no S4UL has been derived for lead. In March 2014 DEFRA published Category 4 Screening Levels (C4SLs) for six contaminants including lead. The C4SLs are based on a unique toxicological benchmark, 'Low Level of Toxicological Concern' rather than the 'minimal or tolerable level of risk' which forms the basis for the S4ULs.

It is understood the site is to be developed for residential end use and as a result S4ULs for residential with home grown land use have been adopted as these generally represent the most conservative screening values and should be used to assess the suitability of 'clean' backfill. Furthermore the screening value concentrations of each of the TPH fractions has been limited to 500mg/kg unless the screening value for the protection of human health is less than 500mg/kg.

The screening values which are to be applied for backfill materials at the site are detailed in the below table.

Tier One Screening Values for Human Health

Contaminant	Source of Screening Value	Screening Value (mg/kg)
Arsenic	S4UL ¹	37
Cadmium	S4UL ¹	11
Chromium	S4UL ¹	910
Copper	S4UL ¹	2,400
Nickel	S4UL ¹	180
Lead	C4SL ³	200
Selenium	S4UL ¹	250
Mercury	S4UL ¹	40
Zinc	S4UL ¹	3,700
Benzo(a)pyrene	S4UL ²	2.2
Dibenz(a,h)anthracene	S4UL ²	0.24
Naphthalene	S4UL ²	2.3
TPH Aromatic C ₅ -C ₇	S4UL ²	70
TPH Aromatic C ₇ -C ₈	S4UL ²	130
TPH Aromatic C ₈ -C ₁₀	S4UL ²	34
TPH Aromatic C ₁₀ -C ₁₂	S4UL ²	74
TPH Aromatic C ₁₂ -C ₁₆	S4UL ²	140
TPH Aromatic C ₁₆ -C ₂₁	S4UL ²	260
TPH Aromatic C ₂₁ -C ₃₅	S4UL ²	1,100 / 500*
TPH Aliphatic C ₅ -C ₆	S4UL ²	42
TPH Aliphatic C ₆ -C ₈	S4UL ²	100
TPH Aliphatic C ₈ -C ₁₀	S4UL ²	27
TPH Aliphatic C ₁₀ -C ₁₂	S4UL ²	130
TPH Aliphatic C ₁₂ -C ₁₆	S4UL ²	1,100 / 500*
TPH Aliphatic C ₁₆ -C ₃₅	S4UL ²	65,000 / 500*
Sulphide	Assumed	250

¹Limit value adopted based upon Suitable 4 Use Level for non-organic contaminants, residential land use with homegrown produce and a soil organic matter (SOM) of 6%

² Limit value adopted based upon Suitable 4 Use Level for organic contaminants, residential land use with homegrown produce and a global SOM of 1%

³ Limit value adopted based upon DEFRA Category 4 Screening Level for residential land use with homegrown produce.

*These values shall be limited to 500mg/kg for validation purposes, as discussed above.

Appendix D

Discovery Strategy

Discovery Strategy

Should an area of unexpected contamination be identified or suspected by visual, olfactory or wellbeing means during the redevelopment of the site, the discovery strategy presented below should be implemented.

The following table outlines the responsibilities of persons in different roles when unexpected contamination is encountered:

Person Observing Contamination	To be reported to:	Action to be taken:
Site Visitor	<ul style="list-style-type: none"> Site Manager 	Site Manager to direct response (see below)
Contractor	<ul style="list-style-type: none"> Site Manager 	Where possible affected works are to cease. The area should be made safe and secure prior to reporting to the site manager.
Site Manager	<ul style="list-style-type: none"> Direct Manger (if applicable) Appointed Environmental Consultant Babergh and Mid Suffolk District Council Planning Authority; environmental health officer / case officer 	Where possible affected works are to cease. The area should be made safe and secure prior to reporting to the required persons.
Environmental Consultant	<ul style="list-style-type: none"> Site Manager Babergh and Mid Suffolk District Council Planning Authority; environmental health officer / case officer 	Advise persons working on the site that affected works are to cease and that the area is made safe and secure before reporting to required persons.

In accordance with the above responsibilities, the appointed Environmental Consultant will be informed, by the site-manager, of the instances of suspected contamination encountered during the redevelopment of the site. The Environmental Consultant should attend site to inspect the area of suspected contamination and develop a remedial strategy for the encountered contamination.

Unexpected contamination encountered during the redevelopment of the site should be isolated from other materials on site whilst a remedial strategy is prepared. The remedial strategy should include details on how to deal with the encountered contamination including how contaminated material should be disposed of.

The remedial strategy for the encountered contamination should be presented as an operational amendment to this RMS and submitted to Babergh and Mid Suffolk Country Council Environmental Health Officer (EHO) for consideration and approval. The required mitigation measures should be implemented.

It is possible that during the redevelopment of the site, contamination may be encountered which is considered to pose a risk or nuisance to site neighbours or the general public. In this instance the planning authority, pollution control team and the Health and Safety Executive should be informed. Where the encountered contamination is considered to pose a potential risk to life, the emergency services should be contacted immediately. If conditions encountered on-site during the development are considered to pose a potential risk of pollution to adjoining land, the owner of the adjoining land will be informed as will the planning authority and EHO.

