PADDOCK GEO ENGINEERING

Farm Buildings, Manor Farm, Church End, Woodwalton, PE28 5YU

Remediation Strategy



AgReserves UK Ltd

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ISSUE	DATE	Written By	Comments
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For and on behalf of Paddock Geo Engineering Limited			

1.0 INTRODUCTION

Paddock Geo Engineering Limited (PGE) was instructed by the Client, AgReserves UK Ltd, to prepare a Remediation Options Appraisal and Method Statement (RMS) as Stage 2 Tier 1 and 2 (formerly Phase 3) of a Site Contamination Assessment in relation to a proposed residential redevelopment of the subject site, Farm Buildings, Manor Farm, Church End, Woodwalton, PE28 5YU.

1.1 Site Description

The site comprises a roughly rectangular shaped plot of land, accessible via a privately owned access road adjoining to the south site boundary, which in turn is accessed off the public road 'New Road' some 200m south of the subject site.

The site is situated some 11km north of Huntingdon High Street and some 16km south of Peterborough town centre. The subject site covers an area of approximately 0.32 hectares, with the centre of the site at approximate national grid reference 521030, 282980.

Site Location Plans and an Aerial Photograph are presented in Appendix A.

The following descriptions and assessment relate to the area depicted as the red-line site provided within Appendix A.

1.2 Terms of Reference

- British Standards BS 10175:2011 Investigation of Potentially Contaminated Sites – Code of Practice.
- British Standard (BS) 8485:2015+A1:2019 Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings.
- British Standard (BS) 8576:2013 Guidance on Investigations for Ground Gas - Permanent Gases and Volatile Organic Compounds (VOC)
- SC030114/R1 Verification of Remediation of Land Contamination Guidance Document, 2010, Environment Agency.
- BRE414: 2001 Protective measures for housing on gas-contaminated land. Building Research Establishment: 2001
- BS8576: 2013. Guidance on Investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs). British Standard Institute. 2013.
- PPG23 (PPS23) Planning and pollution control (contaminated land aspects), 2002 (withdrawn)
- GPLC1 Guiding Principles for Land Contamination, 2010, Environment Agency
- Environmental Protection Act: 1990 – Contaminated Land Statutory Guidance, April 2012, DEFRA
- NHBC Standards Chapter 4.2 2006, Building Near Trees
- TRL Laboratory Report 1132:1984 – The Structure of Bituminous Road, Appendix C Table C1
- BS 5930:1999+A2:2010 Site Investigation Code of Practice
- BS EN 1997-2, Eurocode 7. Geotechnical design. Ground investigation and testing
- BRE412 1996 Desiccation in Clay Soils
- BRE240 1993 Low Rise Buildings on Shrinkable Clay Soils: Part 1
- BRE241 1990 Low Rise Buildings on Shrinkable Clay Soils: Part 2
- BS 8485:2015 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings
- CIRIA C665 Assessing risks posed by hazardous ground gases to buildings. CIRIA 2007
- NHBC report No 10627-R01(04) Guidance on development proposals on sites where methane and carbon dioxide are present (March 2007)
- CL:AIRE Research Bulletin RB17 A pragmatic approach to ground gas risk assessment (November 2012)

- CIRIA C735 Good practice and verification of protection systems for buildings against hazardous ground gases.
- Land Contamination Risk Management (LCRM) 2023, Environment Agency.

1.3 Proposed Development

The proposed development scheme is understood to comprise the demolition of existing farm barns and associated hardstanding followed by the construction of three new residential dwellings along with associated infrastructure, hardstanding as parking and roadways and private gardens.

As the proposed development includes private garden areas, the soil contamination exposure characteristics for the proposed development will be comparable to residential with plant uptake.

A proposed development plan is presented within Appendix A.

2.0 OVERVIEW OF PREVIOUS WORKS

PGE were instructed by the Client to undertake the following assessments and intrusive works at the subject site:

- Preliminary Risk Assessment (PRA), report reference P24-294pra dated December 2024, and subsequently:
- Site Contamination Assessment (SCA) including contamination testing carried, report reference P24-294sca dated December 2024.

This report should be read in conjunction with the above reports for the previous phases of the Site Contamination Assessment.

2.1 PGE, December 2024 PRA Summary

A site walkover was undertaken by PGE on 6th November 2024. At the time of the site walkover the site was located within a wider active farm site, extending to the south and east, comprising numerous silos, chemical stores and office buildings. The site was occupied by two concrete sheet clad barns utilised for the storage of chemical fertilizers and machinery maintenance equipment. The general topography of the site was flat and the site was surfaced with concrete. Between the two barns was a stretch of exposed soil which was overgrown with vegetation.

There were two large above ground fuel tanks noted during the survey, both used for diesel for farm machinery and located off-site adjacent to the west of the site. At the time of the site walkover, both tanks appeared to be in good order.

- the site was unoccupied land until c.1979 when it was developed with the current structures.
- Manor Farm was shown to be present adjacent south of the subject site and was progressively developed with changes of layout noted in c.1926, c.1979 and c.2006, from when it remains unchanged up to the present. A series of ponds are shown from 1887 in the site area and no longer depicted in 1926.
- the geology at the site is anticipated to comprise nominal Made Ground overlying the Oxford Clay Formation (bedrock deposits).
- the site is not in an area affected by past coal mining activities;
- the nearest surface water feature likely to be deemed controlled waters is an inland river situated 6m north of the site within the Cam Ely Ouse and South Level catchment.
- the Environment Agency (EA) has no records of any licensed discharge consents within 1km of the site;

- based on current information provided by the EA, included in the Envirocheck Report, the site is not mapped in an area likely to be at risk of river flooding;
- the Oxford Clay Formation is classified by the EA as 'Unproductive Strata';
- the EA has no records of active licensed groundwater abstractions within 1km of the site;
- the site is not mapped by the EA to be within a groundwater Source Protection Zone;
- the EA has no records of any active landfills within 500m of the site;
- the EA and Local Authority (LA) have no records of any historic landfills within 500m of the site;
- the EA has no records of any recent and significant/major pollution incidents to controlled waters within 500m of the site;
- the EA has no records of any sites within 500m of the study area that are a potential pollution hazard or potential sources of industrial pollution and regulated under the EC Integrated Pollution Prevention and Control Directive (IPPC);
- the Local Authority (LA) has no records of any sites within 500m of the study area that are a potential pollution hazard or potential sources of industrial pollution and regulated under LA Pollution Prevention and Controls (PPC);
- information contained in the Envirocheck Report provided by the British Geological Survey (BGS) indicates that radon protection measures are not required for the proposed development at the site.

2.2 PGE, December 2024 SCA Summary

A ground investigation was undertaken by PGE at the site in November 2024. The ground investigation comprised of 4no. percussion liner sampler boreholes. The ground conditions generally comprised Topsoil to a maximum depth of 0.30m bgl, followed by Made Ground to a maximum depth of 1.20m bgl, followed by the Oxford Clay Formation to a maximum unproven depth of 3.00m bgl. The Topsoil was typically recorded as a slightly sandy organic Clay; the Made Ground was typically recorded as a slightly sandy organic clay with brick, flint and gravel content; and the Oxford Clay Formation was typically recorded as a firm sandy clay. On-site assessment of the arisings was undertaken using a Photoionization Detector (PID) did not indicate any detectable Volatile Organic Compounds (VOCs). No olfactory evidence of contamination was reported. Groundwater was not encountered during progression of the exploratory holes. Three boreholes were installed with monitoring wells, screened within the Oxford Clay Formation.

In total, 7no. environmental samples (5no. Made Ground and 2no. natural soils) were analysed for asbestos, metals and inorganic compounds, total petroleum hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAHs) and pesticides. The soil sample results were screened against a residential with homegrown produce end-use. The following exceedances were identified:

Table 1: Soil Exceedances

Determinand	Assessment Criteria ($mgkg^{-1}$)	Location and Depth (m bgl) (strata)	Maximum Reported Concentration ($mgkg^{-1}$)
Beryllium	1.7	WS03 at 0.1m WS03 at 0.6m	2.2 2

The beryllium exceedances are located within the Made Ground at WS03.

A total of 5no. samples were screened for the presence of asbestos fibres with a single sample returning a positive result of chrysotile fibres, quantified as 0.010% (at WS01 within the Made Ground). Additionally, no soil samples contained obvious visible ACM materials.

It should be noted that when the SCA report was prepared, the laboratory chemical results for pesticides were outstanding. These have been reported and are presented in Appendix D. PGE has screened the pesticide results against the relevant assessment criteria and no exceedances have been recorded.

Groundwater level monitoring was undertaken on three occasions and typically recorded groundwater levels between 0.78m bgl and 2.70m bgl. A detailed controlled water risk assessment was outside the scope of the report. However, it was stated that significant contamination was not encountered in the shallow soils which suggests that a very low risk is posed to any surface water receptors near the site or controlled aquifers beneath the site.

A total of 3no. rounds of ground gas monitoring was undertaken during November and December 2024. A maximum carbon dioxide concentration of 3.50% and a maximum methane concentration of 0.1% was recorded. Elevated sustained gas flows were not recorded. It was stated that based upon the calculated Gas Screening Values (GSVs), the site falls into Characteristic Situation 1 (CS1) as per Table 2 within BS 8485:2015+A1:2019.

As no significant volatile hydrocarbon impacted soils were observed during the site works and no significant VOCs were recorded during the monitoring, volatile contamination protection measures were deemed to not be required.

An assessment of the risk posed by the identified contaminant concentrations was carried out employing the Source-Pathway-Receptor (S-P-R) methodology detailed within the CLEA methodology. This has been updated following screening of the pesticide laboratory results.

Table 2: Updated SPR Flowchart

Potential On-Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete
ONSITE **Elevated beryllium (at WS03) compared to Human Health thresholds.** **No significant deposits of Putrescible Made Ground.** **Asbestos detected at 1no. location (WS01).** **Ground Gas Risk CS1.**	Dermal/Direct Contact	Current site users (disused site)	No
	Direct Ingestion		No
	Direct Inhalation		No
	Inhalation of Radon Gas		No
	Inhalation of Wind Blown Dust		No
	Vapour Migration		No
	Gas Migration		No
	Dermal/Direct Contact	Future site users (equivalent to residential use with plant uptake)	Yes
	Direct Ingestion		Yes
	Direct Inhalation		Yes
	Inhalation of Radon Gas		No
	Inhalation of Wind Blown Dust		Yes
	Vapour Migration		No
	Ground Gas Migration		No
	Direct Contact	Services (following redevelopment)	Yes
	Migration of Contaminants – Non-Aqueous Phased		Yes
	Migration of Contaminants – Aqueous Phased		Yes

Potential On-Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete
Intermediate Radon Risk (<1% of homes above action levels).	Dermal/Direct Contact	Adjacent Properties	No
	Direct Ingestion		No
	Direct Inhalation		No
	Inhalation of Radon Gas		No
	Inhalation of Wind Blown Dust		Yes
	Vapour Migration		No
	Gas Migration		No
	Direct Contact	Ecological Impacts (Trees)	Yes
	Migration of Contaminants – Non-Aqueous Phased		No
	Migration of Contaminants – Aqueous Phased		No
	Migration of Contaminants from site – Non-Aqueous Phased	Controlled groundwater	No
	Migration of Contaminants from site – Aqueous Phased		No
	Migration of Contaminants – Non-Aqueous Phased	Surface Waters	No
	Migration of Contaminants – Aqueous Phased		No

As stated in the report, the following works are deemed necessary on the subject site to address the risks associated with identified contamination. These recommendations do not constitute a formal Remedial Method Statement (RMS) and are provided as guidance only at this stage.

1. Removal of physically unsuitable Made Ground down to the underlying natural soils in all areas of soft landscaping areas.
2. Delineation and removal of beryllium and asbestos impacted Made Ground from the areas of WS01 and WS03 down to the underlying natural soils or 600mm in all areas of soft landscaping areas.
3. Possible importation of clean certified Topsoil for soft landscaped areas, due to limited site-won Topsoil being available.
4. Careful watching brief during groundworks for any unforeseen pockets of contamination.
5. Verification of correct installation of cover layers.

The above summary is intended for reference purposes only and specific details should be obtained by reading the entire report.

3.0 PARTIES AND RESPONSIBILITIES

The parties involved in the design, construction and operation of the remediation are categorised according to their roles as follows:

Current Owner	AgReserves

Developer	AgReserves
Architects / Designers	MK40 Architects
RQA Supervision	Paddock Geo Engineering Limited (PGE)
Remediation Design	Paddock Geo Engineering Limited (PGE)
Regulators	Huntingdonshire District Councils Environment Agency National House Building Council (NHBC)
Analytical Testing Laboratory	I2 Analytical Limited, Watford (UKAS Accredited Testing Laboratory No. 4041)
Waste Haulier	TBC
Waste Disposal Site	TBC
Remediation Contractor	TBC

4.0 RISK MANAGEMENT OPTIONS APPRAISAL

4.1 Introduction

The proposed development (as detailed in Section 1.3) will comprise the demolition of existing farm barns and associated hardstanding followed by the construction of three new residential dwellings along with associated infrastructure, hardstanding as parking and roadways and private gardens.

Soft landscaping forms part of the proposed development both as potentially productive garden areas and as peripheral landscaping. The nature of the proposed development is considered highly sensitive as the private garden soft landscaping areas may at some point be used for the growth of produce for human consumption.

The intrusive investigation and risk assessment phase of the site contamination assessment identified the following:

1. Elevated concentrations of asbestos and beryllium were located in the Made Ground at WS01 and WS03, respectively.
2. No significant volatile hydrocarbon impacted soils were observed during the site works and no significant VOCs were recorded during the monitoring.
3. A Characteristic Situation 1 ground gas risk was concluded (i.e. ground gas protection measures not required).
4. Volatile vapour contamination protection measures were deemed to not be required.

4.2 Remedial Objectives

Remedial works are regarded as a form of risk management, the aim of which is to demonstrably break the chain of any potentially unacceptable pollutant linkages that connect contaminant sources to receptors via pathways on site. The aims of the remedial works are:

- To ensure that human health (site end-users including future residents, visitors and ground workers including construction and future maintenance workers) are not exposed to elevated concentrations of hazardous substances on site.
- Ensure that any remedial works overcome any perceived risks or blight associated with the previous use of the site and any potential associated contamination.

4.2.1 Source, Pathway and Receptor Management

There are three potential options to break the pollutant linkages at the site. These options are presented below:

4.2.2 Source Reduction

This involves the reduction, removal, modification or destruction of the contamination source. Applicable techniques include:

- Source removal through excavation and disposal of contaminated soils and any associated contaminated infrastructure.
- In-situ or ex-situ physical, chemical, biological and thermal source reduction methods.

4.2.3 Pathway Management

This involves the prevention of movement of contaminants on route to receptors. Applicable techniques include:

- Removal or destruction of contaminants e.g., bioactive zones.
- Preventing pathways from operating e.g., separation-layer or clean-soil cover layer capping system (cover system), stabilisation, slurry walls and correctly installed gas protection measures, such as membranes.

4.2.4 Receptor Protection

This protects the receptor by modifying activities and behaviour to reduce exposure and is not normally classed as remediation, but as risk reduction. It is generally a less favourable method for mitigating the risk from contamination. Applicable techniques include:

- Restricting or changing the land use e.g., change to residential use without gardens.
- Changing the design, layout or the proposed construction e.g., adding hardstanding to problem areas.
- Restricting access of the receptor e.g., fencing or walls.

4.2.5 Viable Remediation Techniques

As with any proposed remedial works, the size, scale and nature of the site, site characteristics, quantity, type and extent of contaminated material present in soils and groundwater, the time frame, cost / benefit analysis and value and the sustainability of the remedial method must all be considered when exploring remedial options. A Remediation Option Matrix for the site is presented in Appendix C.

A range of remedial technologies exist and have been explored and the methods considered most viable for the site are listed below. Descriptions of various remedial technologies are provided in Appendix C.

4.2.6 Remedial Sustainability

As discussed in Section 4.2.5, a range of remedial options have been investigated and several factors considered within the option appraisal process including efficiency, sustainability and effectiveness of the remedial technique, potential costs, haulage movements on and off-site and potential carbon emissions, other environmental factors, accurate focusing of remedial works, timescales and the general overall benefits.

4.2.7 Most Viable Remedial Options

It is considered that the most viable remediation method for the site, based on potential risks from the identified impacted shallow Made Ground (asbestos and beryllium) encountered on the site is source reduction through the excavation and disposal of the contaminant impacted material with the construction of a cover system consisting of clean soils, with a high visibility geo-textile membrane, to protect the end site users from any remaining legacy contamination and break the associated identified S-P-R linkage.

This is considered to be the most viable method due to the proposed development. None of the remaining remedial options are considered practical or suitable for the site.

5.0 REMEDIATION ACTIONS

5.1 Introduction

When determining the remediation methods, it has been assumed that the current and proposed site levels will remain relatively consistent. The remedial measures required to make the site suitable for its proposed residential with plant uptake land use are detailed in this section of the report and generally comprise:

1. Watching brief for previously unseen contamination.
2. Delineation and removal of the asbestos and beryllium impacted Made Ground soils that are located in areas of proposed soft landscaping areas, to a depth of 600mm or natural soils.
3. Placement of a high visibility geo-textile membrane where residual Made Ground remains.
4. Construction of a cover layer system of clean imported soils which is 600mm in thickness, comprising 150mm of clean topsoil and 450mm of clean subsoil.
5. Validation of construction cover system.

A Remediation Plan of the approximate remediation area is presented in Appendix B.

5.2 Horizontal Delineation and Removal of the Impacted Made Ground Soils to a Depth of 600mm or Natural Soils.

When determining the remediation requirements, it has been assumed that the current and proposed site levels will remain relatively consistent.

Elevated concentrations of asbestos and beryllium were located in the Made Ground at WS01 and WS03, respectively.

Prior to starting remediation works at the site, it is considered practical to undertake a delineation exercise to identify the horizontal extents of the impacted Made Ground. Unless visual and/or olfactory evidence of contamination is identified during the delineation exercise, it is only considered to analyse the soil samples for the contaminants of concern (i.e. asbestos at WS01 and beryllium at WS03).

Areas of proposed hardstanding (such as building footprints, paved areas and driveways) are considered to break the pathway between the impacted soils and end-user. As such, remediation/mitigation is not considered to be required in these areas.

Impacted areas of the site that will comprise of soft landscaping will require excavation and removal of 600mm of the Made Ground soils, or to the underlying natural soils (if a shallower depth).

A Remediation Plan of the approximate remediation areas is presented in Appendix B.

All soils excavated as part of the works on site should be loaded immediately into a haulage vehicle or covered skip for removal or placed on bunded geo-membrane and covered to prevent the generation of wind-blown dust. The material should be removed off-site once a disposal destination has been selected. A soil waste classification was outside the scope of this investigation. An appropriate Waste Classification Assessment should be undertaken of the excavated soils and provided to the proposed receiving landfill site in order to confirm they are suitably licensed to accept the waste.

5.3 Construction of a Cover System

In addition to the removal of the impacted Made Ground soils, a cover system consisting of clean soils (minimum 150mm of clean Topsoil material with the remainder being clean subsoil) with a high visibility geo-textile membrane base (if Made Ground soils remain), will also be required to provide a suitable growing medium within proposed soft landscaping areas. The membrane is not considered to be required in areas of proposed trees.

The cover system is required in soft landscaped areas (as corresponds to the areas that required Made Ground excavation and removal) and should comprise the placement of clean BS3882:2015 certified Topsoil and BS8601:2013 Subsoils.

In the first instance it is preferred to use site won soils to construct the cover system. However, these soils are considered limited on the site and imported soil is likely to be required.

The imported Topsoil should be a good quality growing medium and have been subjected to chemical testing (at the rate of a minimum of two samples per source and one sample per 1000m^3 thereafter (minimum 3no. samples).

The imported materials are required to meet the British Standard for Topsoil (BS 3882: 2015) and BS8601:2013 for Sub-Soil and also the PGE In-House total soil contaminant concentration GACs for a residential with plant uptake land-use scenario, which are included in Appendix D.

A schematic section is presented in Appendix B detailing the ideal remediation cover system cross section.

5.4 Ground Gas Protection Measures

Based upon the current guidance the calculated GSVs from monitoring undertaken to date, the site falls into Characteristic Situation 1 (CS1) as per Table 2 within BS 8485:2015 or as Green based upon NHBC traffic light system outlined in NHBC report No 10627-R01(04).

Therefore, no ground gas protection measures are required for any new buildings at the subject site.

5.4.1 Buried Water Pipes

Guidance on the type of potable water supply pipe to be employed on residential development sites is given by the UKWIR published guidance document 10/WM/03/21 for the type of potable water supply pipework to be employed for new structures on reused land.

Given the low-level hydrocarbon concentrations recorded at the site, conventional PE pipe may be suitable for the potable water supply pipework on the site.

The classification will be decided by the local water company and their advice should be sought prior to the laying of any potable water supply pipework. The local water company may require further, more detailed sampling, testing and assessment prior to pipe selection.

5.4.2 Previously Unidentified Contamination

The Remediation Engineer should be consulted if any unexpected or previously unidentified contamination is discovered during the site development works, so any further assessment required can be carried out.

5.5 Remediation Action Summary

It is the responsibility of the Client to ensure they or their contractor carries out the remediation works as detailed above and agreed by the regulatory authorities. PGE can supervise the works as required but are not responsible for the management of remediation sub-contractors and/or the quality of their work when not under direct supervision by PGE.

The following table summarises the required remedial actions which are required to be undertaken by the contractors during the redevelopment of the site.

Table 3: Summary of Remedial Actions Required

	Remedial Action	Reason
1	Delineation and removal of the impacted Made Ground soil that is located in areas of proposed soft standing to a depth of 600mm or natural soils.	To remove the 'source' of contamination which poses a risk to human health in areas of soft landscaping as per the risk assessment.
2	Verification of removal of impacted soils in all above areas by suitably qualified and experienced geo-environmental engineer.	To confirm complete removal of impacted soils prior to placement of membranes/barriers (if required).
3	Installation of a no-dig membrane (if required) in soft landscaping area.	To provide a warning/separation layer between the placed clean cover system and residual Made Ground soils.
4	Construction of a cover system of clean imported soils that is 600mm in thickness, comprising 150mm of clean topsoil and 450mm of clean subsoil.	To ensure remediation cover system is constructed in suitable clean soils.

	Remedial Action	Reason
5	Installation of suitable water pipes in clean soils corridor with pipes specification as specified from water authority.	To break the pathway between any remaining contaminated soils and the receptor, which in this case would be the potable water supply to the properties.
6	Watching Brief for unforeseen contamination.	To protect both ground groundworkers and future residents from sources of potential unforeseen contamination.

5.6 Remediation Quantities

It is unclear at the present how much material will need to be excavated and disposed as part of the remediation process.

6.0 REMEDIATION VALIDATION

6.1 Introduction

The delineation and remedial works shall be performed under the supervision of a suitably qualified person, who will fill the role of a Remedial Quality Assurance (RQA) Engineer which is required for validation purposes.

During the remedial works and following general site clearance, a watching brief shall be maintained such that should the sub-soil conditions in other areas of the site appear to be inconsistent with those found in the areas sampled, then this can be bought to the attention of the RQA Engineer, and these recommendations reviewed.

6.2 Remediation Supervision

Soil Remediation

PGE should be in attendance to supervise the delineation of the asbestos and beryllium impacted Made Ground soils.

Site visit(s) should also be undertaken by PGE to inspect the excavation once the delineated impacted Made Ground has been excavated to confirm a suitable depth has been removed and if a geotextile membrane is required in open soft landscaped areas.

It is not deemed necessary for PGE to supervise the placement of the verified clean sub-soils and Topsoil to construct the Cover System as this would occur later in the build to mitigate damage to the cover system during construction.

However, the suitability of any soils used in the cover system construction should be validated through visual and laboratory assessment with the results approved by PGE prior to importation and use.

6.3 Post Remediation Validation

Soil Remediation

Following the remediation works hand excavations should be formed to validate the placement of sufficient soils for the required cover system in remediation areas. Further to this the placement of the geotextile marker layer, if employed, should be validated at this time.

These pits should be formed at the frequency of one for every plot or a minimum of 3no. validation pits.

Samples should be recovered from the Topsoil and sub-soils and analysis carried out to the same suite (excluding pesticides) as the associated SCA to ensure the soils used are suitably clean.

6.4 Validation Reporting

A Validation Report will be prepared by PGE on completion of the remedial works to confirm the removal of the impacted soils, placement of no dig barrier membrane (if required) and the correct placement /construction of the cover system.

The objective of the Validation Report will be to document all aspects of the works undertaken and will include all records collected and maintained by the Client and their appointed construction team / remediation contractor throughout the duration of the project.

The Validation Report will be prepared in accordance with the Environment Agency guidance document Verification of Remediation of Land Contamination (report SC030114/R1 dated 2010).

The Validation Report will describe the site, remediation objectives, remediation technique, verification data, supported by sketches and as-built drawings, figures, photographic records and any additional information that may supplement the report. For the validation of the remediation works detailed records should be maintained of:

- Soil Remediation
    - Details of the delineation and removal of impacted Made Ground.
    - Details of the placement of a no-dig membrane where residual Made Ground remains in open soft landscaped areas.
    - Details of the remediation arisings removed from the site following excavation and disposal destination (licensed facility).
    - Details of construction of the cover systems, inc. details of the soils used.
    - A photographic record of the works.

Copies of the Validation Report will be provided to the concerned regulatory authorities, who will be asked to state whether they are satisfied with the level of detail provided and confirm that it appears to be reasonable given the data presented. Based on the information supplied, they will then make a statement about whether the site is fit for its proposed residential end use to allow discharge of the related planning conditions.

Any substantial change to the remediation objectives will be agreed with the Local Planning Authority, as appropriate, prior to commencement and communicated to all relevant parties.

6.5 Validation Data Collection

It is the responsibility of the Client to ensure they or their contractor carries out the remediation works as detailed above and agreed by the regulatory authorities.

The following table summarises the data collection and validation points during the remedial works and who is the party responsible for collecting the data.

Table 4: Validation Data Collection Responsibilities

Location	Required Remedial Data	Responsible Party
Remediation Areas per Appendix B	Details of the delineation exercise and removal of soils in above mentioned areas.	Main Contractor, PGE
	Placement of alert membrane (if required)	Main Contractor, PGE
	Post Cover system Placement Soil Thickness Validation	PGE
	Collation of imported soil consignment notes, validation and testing (if required)	Main Contractor
	Imported validation and testing (if required)	PGE
	Soil waste consignment notes	Main Contractor
Buried Services	Suitable pipework for incoming services	Main Contractor

6.6 Health, Safety and Environmental Requirements

The construction operatives working on this site should take precautions commensurate with the degree of contamination identified in the previous contamination assessment reports produced for the site and detailed within the Construction Phase Health and Safety Plan.

Best practicable environmental protection should always be employed during the remediation and construction works.

Appropriate Health & Safety precautions including the use of signage, site inductions and toolbox talks to raise awareness of the risks on site, regular dampening down of stockpiles and site surfaces to minimise the generation of wind-blown dusts and the covering of stockpiles (where possible) and the use of PPE should be adopted. Respiratory PPE may be required for use by ground workers where asbestos-containing materials and impacted soils are considered possible or encountered.

Groundwater is unlikely to be encountered on site during the remedial works at the proposed depths. However, any groundwater encountered should be left in-situ if possible and if it is necessary to be removed off site, the water must be removed off site by a suitable tanker.

7.0 REMEDIATION QUALITY ASSURANCE

The site remediation should be considered as a comprehensive process which requires clear and effective management. The Remediation Quality Assurance procedures detailed in the Sections above have been included within the Remediation Method Statement to ensure that the objectives are achieved and that:

- The remediation is competent and of a high standard.

- The approach and actions taken are well documented.
- The Client should be confident that the remediation works are suitable for the indicated proposed end site use.

Throughout the site remediation works a suitably qualified and experienced Engineer or Scientist (the RQA Engineer) shall direct the operations for remediation and maintain records of the works carried out whilst supervising all site work. A Validation Report will then be produced and forwarded to the concerned parties.

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Remediation Targets Methodology: Hydrogeological Risk Assessment for Land Contamination, Environment Agency. 2006

LFTGN01. Hydrogeological Risk Assessment for landfill and the derivation of groundwater control and trigger levels. Environment Agency 2003

NOTES AND LIMITATIONS

This report is produced for the sole use of the Client, and no responsibility of any kind, whether for negligence or otherwise, can be accepted for any Third Party who may rely upon it.

The conclusions and recommendations given in this report are based on our understanding of the proposed plans for the site in the future. If, however, the site is developed for a varying use, then a different interpretation might be appropriate.

The report has been prepared following the guidelines and principles established in the British Standards. It necessarily relies on the co-operation of other organisations and the free availability of information and total access. Where data supplied by the Client, including that from previous site investigations, have been used, it has been assumed that the information is correct. No responsibility can be accepted by PGE for inaccuracies within the data supplied.

No responsibility can, therefore, be accepted for conditions arising from information that was not available to the investigating team because of information being withheld or access being denied.

The scope of this Ground Investigation was discussed and agreed with the Client. No responsibility is accepted for conditions not encountered, which are outside of the agreed scope of work.

This report may suggest an opinion on a possible configuration of strata or conditions between exploratory points and below the maximum depth of investigation. However, this is for guidance only and no liability can be accepted for its accuracy. Comments on the groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. It should be noted, however, that groundwater levels might vary due to seasonal or other effects.

It should be noted that this report is based solely on the samples collected in the borehole locations investigated. During the works and following general site clearance, should the sub-soil conditions in other areas of the site appear to be inconsistent with those found in the areas sampled then this geotechnical appraisal and site contamination assessment may need to be reviewed.

This report is prepared and written in the context of the proposals stated in the introduction to this report and it should not be used in a differing context. Furthermore, new information, improved practices and changes in legislation may require an alteration to the report in whole or in part after its submission. Therefore, with any changes in circumstances, or after one year from the date of the report, the report should be referred to Paddock Geo Engineering Limited for re-assessment (and, if necessary, for an estimate for the cost of such).

The copyright of this report and any associated plans and documents prepared by Paddock Geo Engineering Limited is owned by them and should not be reproduced, published or adapted, in whole or part, without their written consent.

The report is provided for the sole use by the Client and is confidential to him/her and his/her professional advisors. No responsibility whatsoever for the contents of this report will be accepted to any other person other than the Client.

APPENDIX A

Maps Plans and Figures

Site Location Plan
Existing Site Plan
Proposed Development Plan

SITE LOCATION PLAN

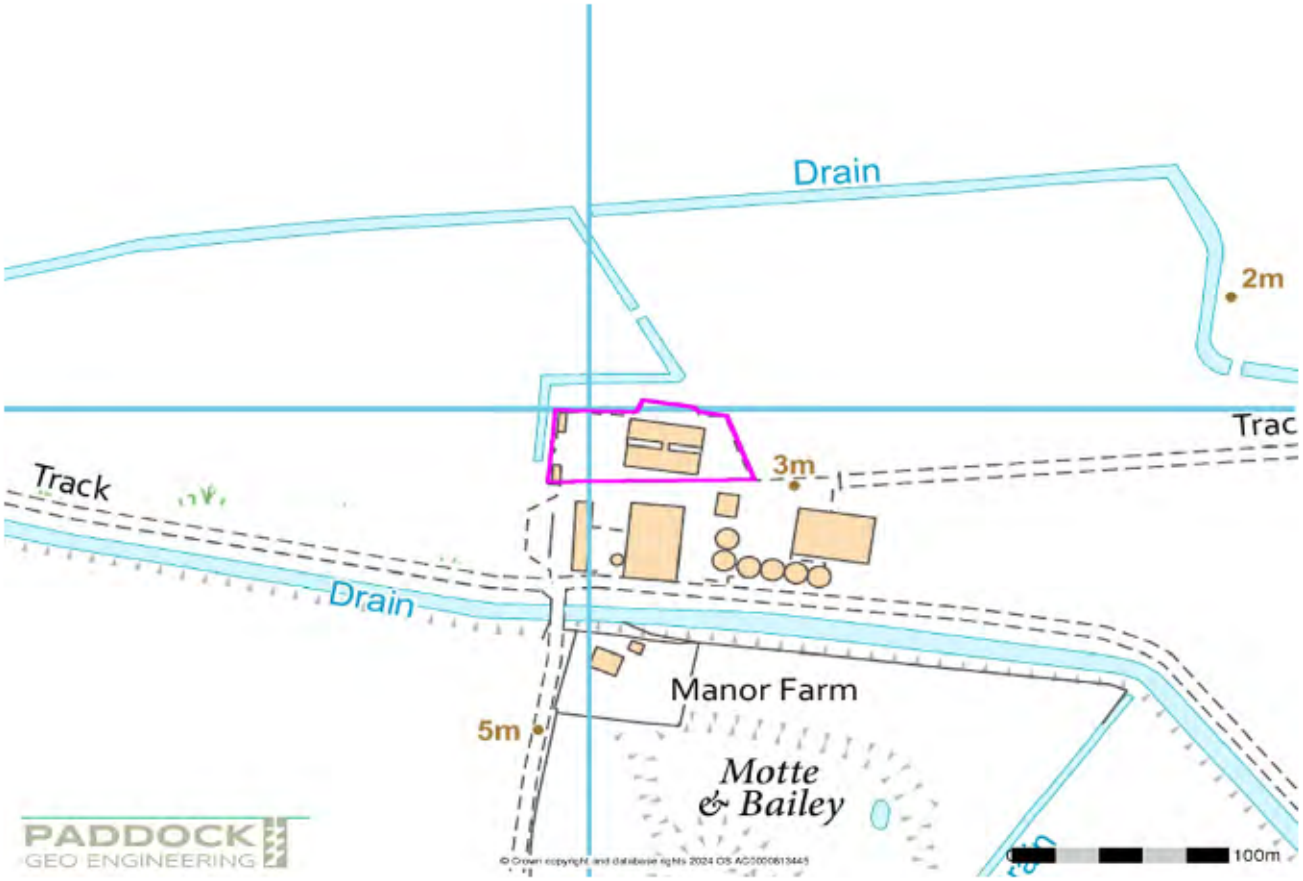


Site Location



PADDOCK GEO ENGINEERING	**CLIENT:**	AgReserves UK Ltd
	PROJECT No:	P24-294
	PROJECT TITLE:	Farm Buildings, Manor Farm, Church End, Woodwalton, PE28 5YU

SITE PLAN

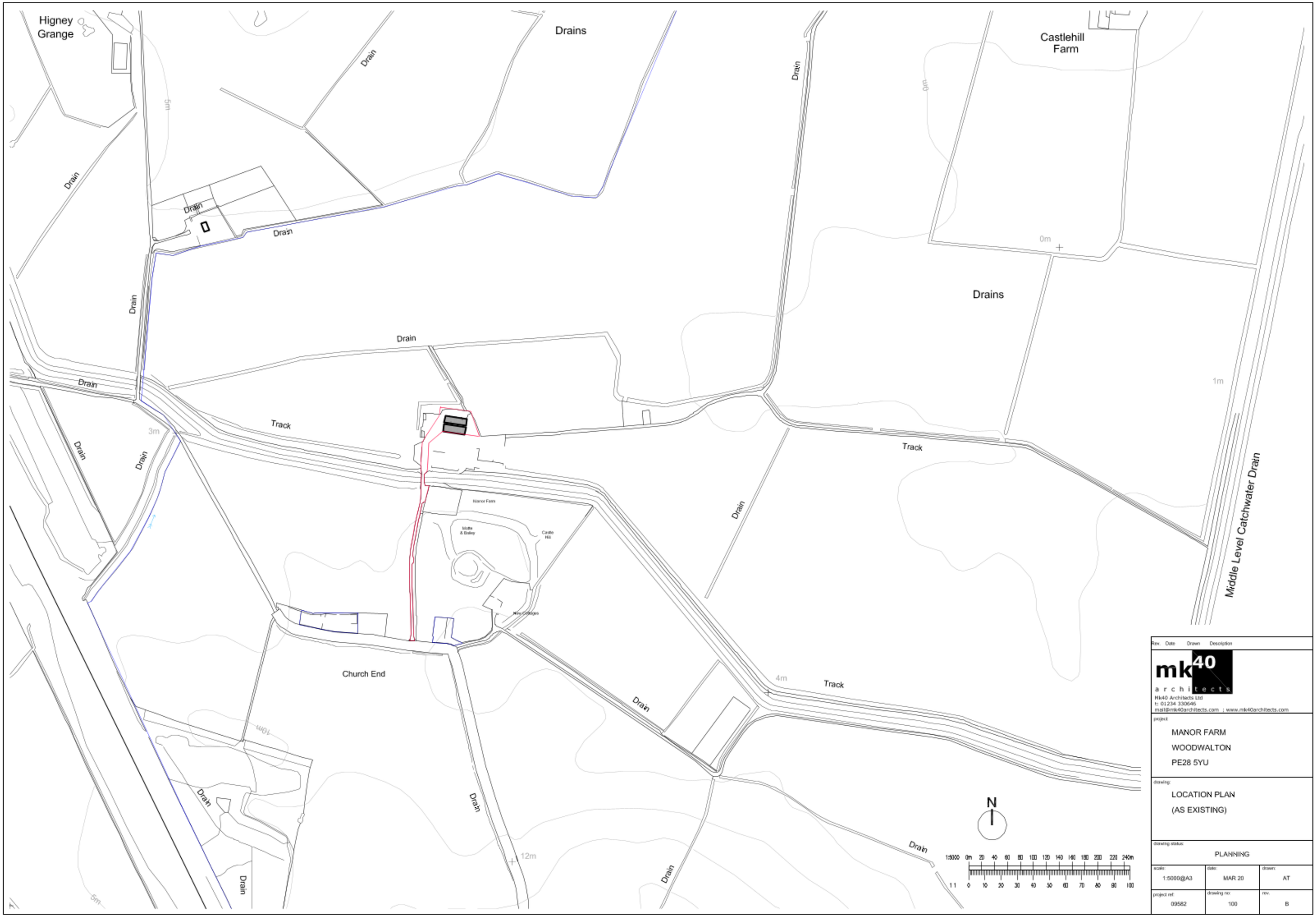


PADDOCK GEO ENGINEERING	**CLIENT:**	AgReserves UK Ltd
	PROJECT No:	P24-294
	PROJECT TITLE:	Farm Buildings, Manor Farm, Church End, Woodwalton, PE28 5YU

AERIAL PHOTOGRAPH



PADDOCK GEO ENGINEERING	**CLIENT:**	AgReserves UK Ltd
	PROJECT No:	P24-294
	PROJECT TITLE:	Farm Buildings, Manor Farm, Church End, Woodwalton, PE28 5YU



Rev. Date Drawn Description

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Mk40 Architects Ltd
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project:

MANOR FARM
WOODWALTON
PE28 5YU

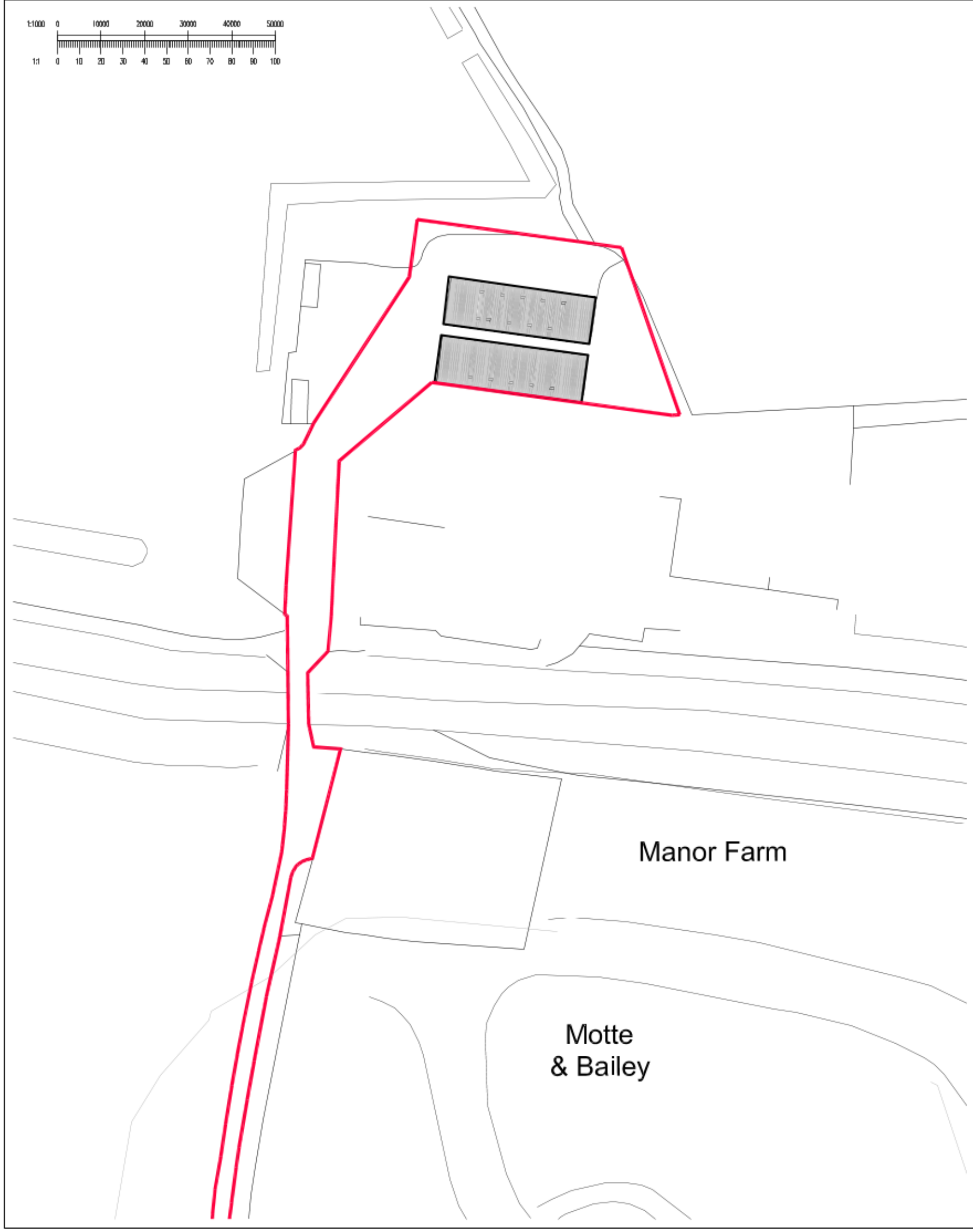
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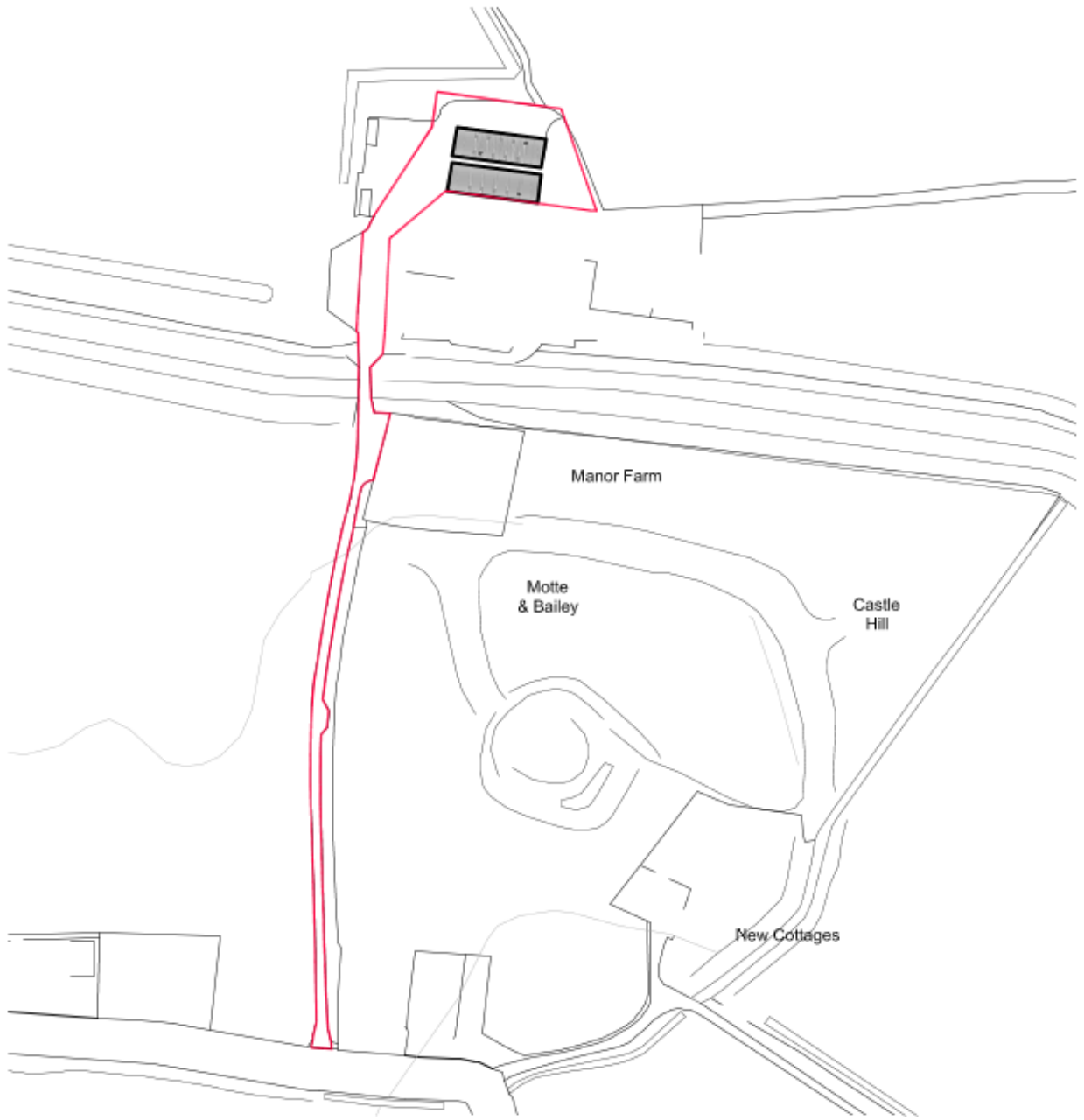
LOCATION PLAN
(AS EXISTING)

drawing status:

PLANNING

scale:	date:	drawn:
1:5000@A3	MAR 20	AT
project ref:	drawing no:	rev:
09582	100	B





Rev. Date Drawn Description

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drawing:

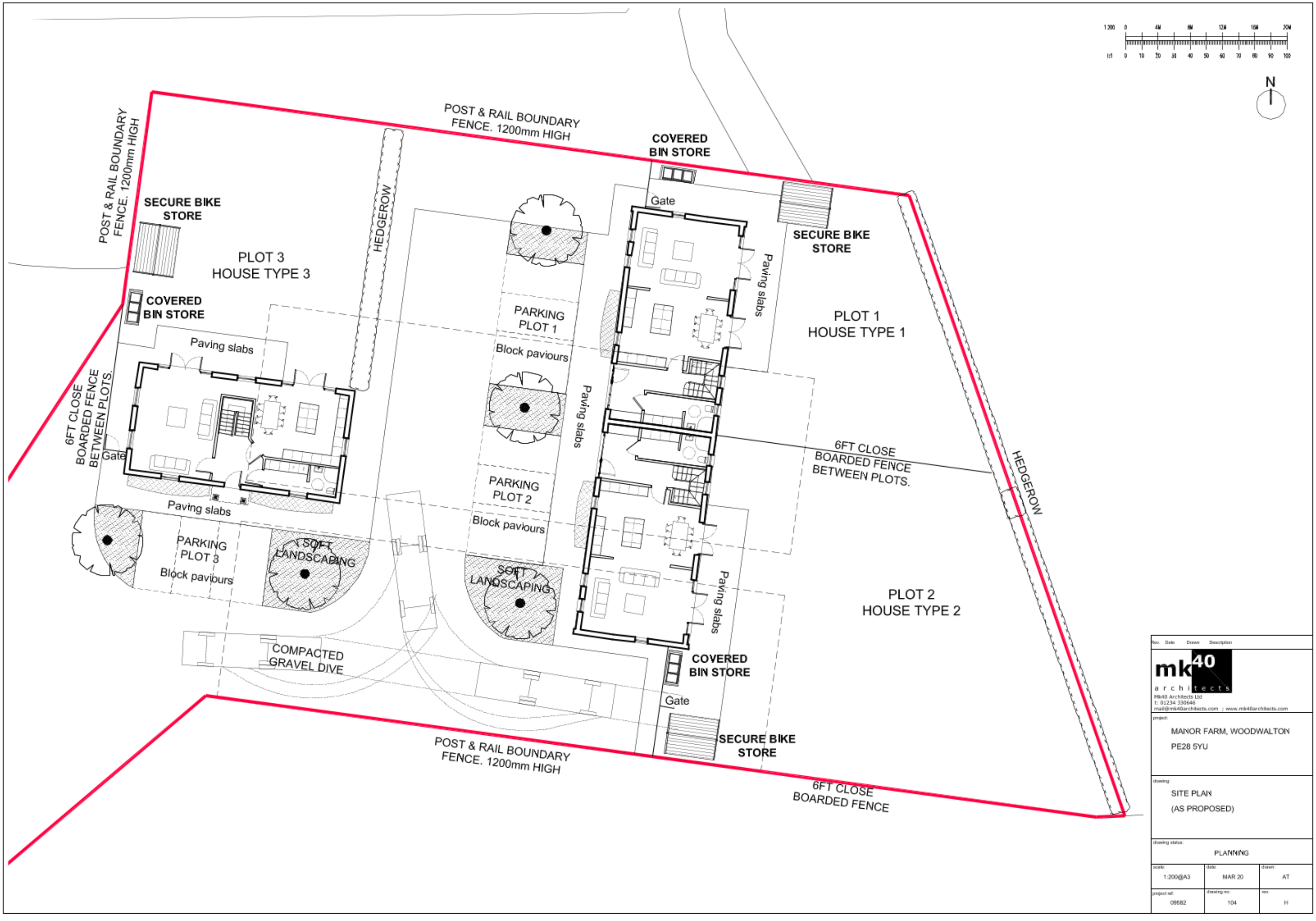
SITE PLAN
(AS EXISTING)

drawing status:

PLANNING

scale:	date:	drawn:
1:1000 / 2500@A3	MAR 20	AT

project ref:	drawing no:	rev:
09582	101	B



Rev.	Date	Drawn	Description

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drawing:

SITE PLAN

(AS PROPOSED)

drawing status:

PLANNING

scale:	date:	drawn:
1:200@A3	MAR 20	AT
project ref:	drawing no:	rev:
09582	104	H

APPENDIX B

Remediation Plan

Contamination Plan – Proposed layout
Remediation Plan – Proposed layout
Schematic Section of Ideal Cover System



PADDOCK GEO ENGINEERING

Remediation Plan (Proposed layout)

Farm Buildings,
Manor Farm,
Church End,
Woodwalton,
PE28 5YU

AgReserves

January 2025

Legend:

- **Percussion Liner Sampling Borehole Locations**
- **Percussion Liner Sampling Borehole Locations (Install)**
- **Beryllium Hotspot to be delineated at cross-over of soft landscaping**
- **Asbestos Hotspot to be delineated at cross-over of soft landscaping**
- **Area of proposed soft landscaping**

Notes:

1) Not to scale
2) Dimensions as shown
3) All positions are approximate
4) Drawing to be viewed in colour
5) Drawing to be viewed digitally
6) Not for construction detail
7) Based on plans provided the Client

PADDOCK
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Contamination Plan (Proposed layout)

**Farm Buildings,
Manor Farm,
Church End,
Woodwalton,
PE28 5YU**

AgReserves

January 2025



Legend:

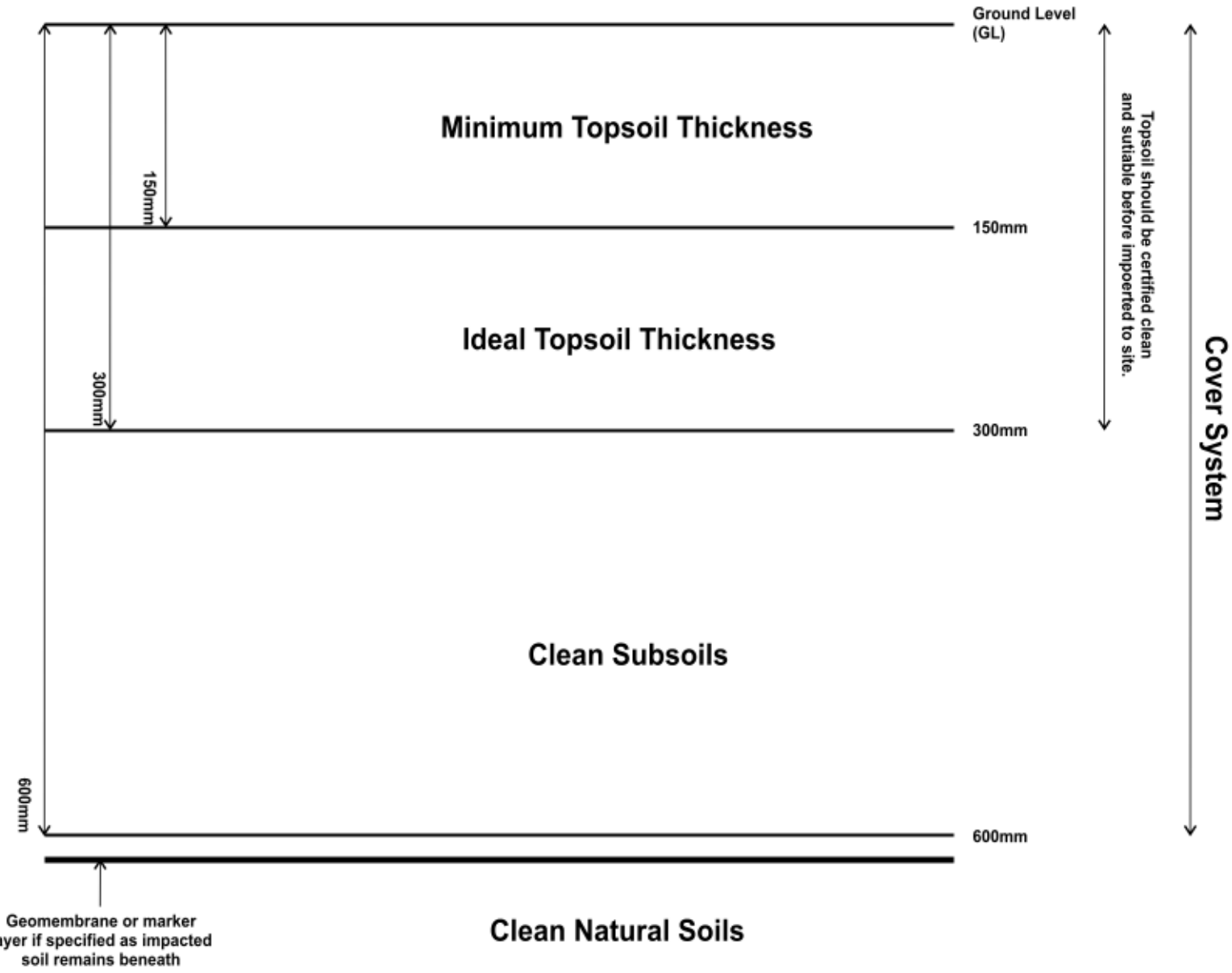
- Percussion Liner Sampling Borehole Locations
- Percussion Liner Sampling Borehole Locations (Install)
- Beryllium Hotspot to be delineated at cross-over of soft landscaping
- Asbestos Hotspot to be delineated at cross-over of soft landscaping
- Area of proposed soft landscaping

Notes:

1) Not to scale
2) Dimensions as shown
3) All positions are approximate
4) Drawing to be viewed in colour
5) Drawing to be viewed digitally
6) Not for construction detail
7) Based on plans provided the Client

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Ideal Cover System
Schematic Cross Sections



APPENDIX C

Remediation Options

Remediation Options Matrix

Remediation Options Descriptions

Remediation Option Applicability Matrix: Organic Substances

Remediation Option	Applicable Media	Applicable Substances						
		VOCs	Halogenated hydrocarbons	Non-halogenated hydrocarbons	PAHs + TPH	PCBs	Dioxins + Furans	Pesticides + herbicides
Civil Engineering Methods								
Containment - Cover systems	S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Containment - Hydraulic barriers	W	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Containment - In-ground barriers	S, W	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Excavation and Disposal	S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Biological Methods								
Natural Attenuation	W	Yes	Yes	Yes	Yes	No	No	Yes
Biopiles	S	Yes	No	Yes	Yes	No	No	Yes
Bioventing	S	Yes	Yes	Yes	Yes	No	No	No
Biosparging	S, W	Yes	Yes	Yes	Yes	No	No	Yes
Landfarming	S	Yes	No	Yes	Yes	No	No	Yes
Slurry phase biotreatment	S	Yes	Yes	Yes	Yes	No	?	Yes
Windrow turning	S	Yes	No	Yes	Yes	No	No	Yes
Chemical Methods								
Chemical oxidation	S, W	Yes	Yes	Yes	Yes	No	No	Yes
Chemical dehalogenation	S	Yes	Yes	Yes	No	No	Yes	No
Soil flushing	S	Yes	Yes	Yes	Yes	No	No	No
Solvent extraction	S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surface amendments	S	No	No	No	No	No	No	No
Physical Methods								
Dual Phase SVE	S, W	Yes	Yes	Yes	No	No	No	No
Air sparging	W	Yes	Yes	Yes	No	No	No	No
Soil vapour extraction (SVE)	S	Yes	Yes	Yes	No	No	No	No
Permeable reactive barriers (PRBs)	W	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Soil washing	S	No	Yes	Yes	Yes	Yes	No	Yes
Stabilisation and Solidification Methods								
Hydraulic binders (e.g., cement)	S	No	No	?	Yes	Yes	Yes	?
Vitrification	S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Thermal Methods								
Incineration	S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Thermal desorption	S	Yes	Yes	Yes	Yes	Yes	No	Yes

Yes	Most Suitable Method
Yes	Potentially applicable
No	Not applicable
?	A pre-treatment step may be necessary prior to the method being suitable
S	Soils, made ground and sediments
W	Groundwater and surface water

PADDOCK GEO ENGINEERING

CLIENT:	AgReserves UK Ltd
PROJECT No:	P25-294
PROJECT TITLE:	Farm Buildings, Manor Farm, Woodwalton, PE28 5YU

Remediation Option Applicability Matrix: Inorganic Substances

Remediation Option	Applicable Media	Applicable Substances				
		Heavy metals	Non-metals	Asbestos	Cyanides	Explosives
Civil Engineering Methods						
Containment - Cover systems	S	Yes	Yes	Yes	Yes	Yes
Containment - Hydraulic barriers	W	Yes	Yes	Yes	Yes	Yes
Containment - In-ground barriers	S, W	Yes	Yes	Yes	Yes	Yes
Excavation and Disposal	S	Yes	Yes	Yes	Yes	Yes
Biological Methods						
Natural Attenuation	W	Yes	Yes	No	No	Yes
Biopiles	S	No	No	No	No	Yes
Bioventing	S	No	No	No	No	No
Biosparging	S, W	No	No	No	No	No
Landfarming	S	No	No	No	No	Yes
Slurry phase biotreatment	S	No	No	No	Yes	Yes
Windrow turning	S	No	No	No	No	Yes
Chemical Methods						
Chemical oxidation	S, W	No	Yes	No	No	No
Chemical dehalogenation	S	No	No	No	No	No
Soil flushing	S	Yes	No	No	No	No
Solvent extraction	S	No	No	No	No	Yes
Surface amendments	S	Yes	Yes	No	No	No
Physical Methods						
Dual Phase SVE	S, W	No	Yes	No	No	No
Air sparging	W	No	No	No	No	No
Soil vapour extraction (SVE)	S	Yes	No	No	No	No
Permeable reactive barriers (PRBs)	W	No	No	No	No	Yes
Soil washing	S	Yes	Yes	No	No	No
Stabilisation and Solidification Methods						
Hydraulic binders (e.g., cement)	S	Yes	Yes	Yes	?	No
Vitrification	S	Yes	Yes	Yes	Yes	Yes
Thermal Methods						
Incineration	S	Yes	Yes	Yes	Yes	Yes
Thermal desorption	S	Yes	No	No	Yes	No

Yes	Most Suitable Method
Yes	Potentially applicable
No	Not applicable
?	A pre-treatment step may be necessary prior to the method being suitable
S	Soils, made ground and sediments
W	Groundwater and surface water

REMEDIATION OPTIONS DESCRIPTIONS

Excavation and Disposal

Excavation and disposal of impacted soils is the most basic of remedial techniques, but often most effective. Contaminated soils and any associated infrastructure i.e., buried pipework and impacted materials are removed either in their entirety or to an acceptable depth to allow the inclusion of an inert capping layer with a geomembrane marker at the base if not all impacted material is removed.

Contaminated materials are generally disposed of to landfill void, material recovery or soil treatment facilities. Some materials may be physically suitable for reuse on site, such as impacted sub-base, which can be reused under new roadways and permanent hardstanding as capped by the hardsurfacing.

The drawback of this technique is unknown volumes and associated costs and low sustainability. This method is also generally not considered suitable for deep contamination deeper than 2m bgl due to large volumes which would require disposal and the potential for ground instability from such an excavation.

This is considered to be a practical, cost effective and environmental-friendly approach for the remediation of the shallow impacted Made Ground soils in open soft landscaped and gardens areas of the proposed development.

Soil Stabilisation

Soil stabilisation is achieved by the reaction of contaminants with reagents to promote sorption, precipitation or incorporation into crystal lattices.

This is not deemed viable at the site due to the presence of residential garden areas on site.

Solidification

Solidification is a remediation technology that involves the addition of reagents to a contaminated material to impart physical and dimensional stability to contain contaminants in a solid product and reduce access by external agents (e.g., air and rainfall). This technology is not viable within the proposed residential garden areas or within or close to the residential dwelling building footprint due to potential drainage issues.

This method is not viable on the site due to the presence of residential garden areas in which the drainage would be adversely impacted.

Chemical Oxidation

In its simplest form, chemical oxidation remediation comprises the introduction of an oxidation agent into the ground or a stockpiled material to allow an oxidation reaction to occur (in soil and groundwater) and convert the contaminants to a lower risk form.

For in-situ treatment, this method requires permeable soils to allow the circulation of treatment chemicals which are generally in an aqueous form.

Given the site geology and nature of the contamination present at the site, this method is considered to be a potentially viable, practical, cost effective and environmental-friendly approach should these deeper contaminated soils require further remediation.

Monitored Natural Attenuation

This method comprises the natural attenuation of contaminants in soil and groundwater through various means such as natural bio-gradation, abiotic oxidation, sorption, volatilisation and dispersion, with monitoring to assess the progress of the attenuation.

For this method to be viable, the affected soil must be physically and chemically suitable and demonstrate that natural attenuation is occurring or could have the ability to occur.

Given the site geology and nature of the heavy metal contamination present at the site this method is not deemed viable at the site due to arsenic not readily attenuating/degrading over time, therefore concentrations are unlikely to significantly decrease over time.

APPENDIX D

Guidance Thresholds

PGE In-House GACs

Pesticide Analysis Results

GENERIC HUMAN HEALTH SCREENING TOTAL SOIL CONCENTRATION ASSESSMENT CRITERIA (GAC)

DETERMINAND		RESIDENTIAL (mg/kg)		COMMERCIAL (mg/kg)
Chemical	**GAC Sources and units**	**With Home Grown produce**	**Without Home Grown produce**	
Asbestos Screen & ID*	-	Detected	Detected	Detected
Cyanide - Total	SNIFFER	53.25	53.25	53.25
Cyanide - Free	SNIFFER	53.25	53.25	53.25
Loss on Ignition @ 450°C	-	-	-	-
Sulphate (as SO_4) - Total	BRE****	2400	2400	2400
Sulphide	ICRCL	2500	2500	2500
Sulphur - Total	ICRCL	2500	2500	2500
Phenol (Total Monohydric)	CLEA	420	420	3200
pH	ICRCL	<5,>12	<5,>12	-
Metals and Metalloids (CLEA Metals)				
Arsenic	LQM S4UL	37	40	640
Beryllium	LQM S4UL	1.7	1.7	12
Cadmium	LQM S4UL	11	85	190
Chromium III	LQM S4UL	910	910	8600
Lead	DEFRA C4SL	190	310	2300
Mercury (Total)	LQM S4UL (Inorganic)	40	56	1100
Selenium	LQM S4UL	250	430	12000
Copper (phytotoxicity)	LQM S4UL	2400 (111)	7100	68000
Nickel	LQM S4UL	180	180	980
Zinc (phytotoxicity)	LQM S4UL	3700 (330)	40000	730000
Vanadium	LQM S4UL	410	1200	9000
Boron - Water Soluble	LQM S4UL	290	11000	240000
Total Petroleum Hydrocarbons**				
TPH (EC6-EC10) - PRO	LQM S4UL (2.5% SOM)	65	100	4800
TPH (EC10-EC21) - DRO	LQM S4UL (2.5% SOM)	300	600	23000
TPH (EC21-EC40) - Min. Oil	LQM S4UL (2.5% SOM)	1500	1900	28000
Total TPH (EC10-EC40)	LQM S4UL (2.5% SOM)	600	900	23000
Polycyclic Aromatic Hydrocarbons***				
Benzo(a)anthracene	LQM S4UL (2.5% SOM)	11	14	170
Benzo(b)fluoranthene	LQM S4UL (2.5% SOM)	3.3	4	44
Naphthalene	LQM S4UL (2.5% SOM)	5.6	5.6	460
Flourene	LQM S4UL (2.5% SOM)	400	3800	68000
Benzo[a]pyrene	LQM S4UL (2.5% SOM)	2.7	3.2	35
Dibenzo[a,h]anthracene	LQM S4UL (2.5% SOM)	0.28	0.32	3.6

Notes

The Generic Assessment Criteria (GAC) are based on CLEA Soil Guidance Values published values and CIEH/LQM S4CLs where available or ICRCL, DoE, BRE and HSE levels where necessary.
Where gaps remain GACs were calculated using the latest CLEA spreadsheet using DEFRA C4SL toxicology and physiochemical parameters from DEFRA SP1010.

* Guidance level set at any fibre identification.

** TPH 3 band is employed as a screening tool to instigate detailed speciated analysis to the TPHCWG methodology. Based on mean of fractions included

*** Testing based on USEPA Priority 16 compounds. GACs for four compounds and total PAH with published GACs only, used as a screening tool.

**** BRE SD1 - DS-1 Concrete Sulphate Design Class limit. Sulphate is not considered to pose a significant risk to human health under normal circumstances.

PADDOCK GEO ENGINEERING

CLIENT:	Agreserves UK Ltd
PROJECT No:	P24-294
PROJECT TITLE:	Farm Buildings, Manor Farm, Church End, Woodwalton, PE28 5YU

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Analytical Report Number : 24-058564

Project / Site name:	P24-294 - Farm Buildings, Manor Farm, Church End, Wood	**Samples received on:**	10/12/2024
Your job number:		**Samples instructed on/ Analysis started on:**	10/12/2024
Your order number:		**Analysis completed by:**	17/12/2024
Report Issue Number:	1	**Report issued on:**	19/12/2024
Samples Analysed:	1 soil sample		

Signed:

Trevor Hill
Customer Service Advisor
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-058564
Project / Site name: P24-294 - Farm Buildings, Manor Farm, Church End, Wood

Lab Sample Number				403643
Sample Reference				TP01
Sample Number				C
Water Matrix				N/A
Depth (m)				0.10
Date Sampled				05/12/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	21
Total mass of sample received	kg	0.1	NONE	0.3
Pesticides				
Alpha-BHC (Benzene Hexachloride)	µg/kg	10	NONE	< 10
Alachlor	µg/kg	10	NONE	< 10
Bifenthrin	µg/kg	10	NONE	< 10
Cyhalothrin (Lambda)	µg/kg	10	NONE	< 10
Gamma-BHC (Lindane, gamma HCH)	µg/kg	10	NONE	< 10
Omethoate	µg/kg	10	NONE	< 10
1,2,3-Trichlorobenzene	µg/kg	10	NONE	< 10
1,3,5-Trichlorobenzene	µg/kg	10	NONE	< 10
2,6-Dichlorobenzonitrile	µg/kg	10	NONE	< 10
Dimethylvinphos	µg/kg	10	NONE	< 10
Demeton-O	µg/kg	10	NONE	< 10
Demeton-S	µg/kg	10	NONE	< 10
Endrin Aldehyde	µg/kg	10	NONE	< 10
Endrin Ketone	µg/kg	10	NONE	< 10
Hexachlorobutadiene	µg/kg	10	NONE	< 10
Phosphamidon (Sum)	µg/kg	10	NONE	< 10
1,2,4,5-Tetrachlorobenzene	µg/kg	10	NONE	< 10
Cis-Permethrin	µg/kg	10	NONE	< 10
Endosulfan sulfate	µg/kg	10	NONE	< 10
Etrimfos	µg/kg	10	NONE	< 10
Fenvalerate (Sum)	µg/kg	10	NONE	< 10
Hexachlorobenzene	µg/kg	10	NONE	< 10
Mevinphos, E+Z	µg/kg	10	NONE	< 10
Pentachlorobenzene	µg/kg	10	NONE	< 10
Pirimiphos-ethyl	µg/kg	10	NONE	< 10
Propetamphos	µg/kg	10	NONE	< 10
Tecnazene	µg/kg	10	NONE	< 10
Triadimefon	µg/kg	10	NONE	< 10
Trans-Permethrin	µg/kg	10	NONE	< 10
Aldrin	µg/kg	10	NONE	< 10
Azinphos-methyl	µg/kg	10	NONE	< 10
Beta-BHC	µg/kg	10	NONE	< 10
Cis-Chlordane	µg/kg	10	NONE	< 10
Chlorfenvinphos	µg/kg	10	NONE	< 10
Chlorpyrifos	µg/kg	10	NONE	< 10
Chlorothalonil	µg/kg	10	NONE	< 10
Carbophenothion	µg/kg	10	NONE	< 10
Cyfluthrin (Sum)	µg/kg	10	NONE	< 10
Delta-BHC	µg/kg	10	NONE	< 10
Dieldrin	µg/kg	10	NONE	< 10
Deltamethrin	µg/kg	10	NONE	< 10
Heptachlor Exo-epoxide	µg/kg	10	NONE	< 10
Endrin	µg/kg	10	NONE	< 10
Endosulfan I (alpha isomer)	µg/kg	10	NONE	< 10
Endosulfan II (beta isomer)	µg/kg	10	NONE	< 10

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Lab Sample Number				403643
Sample Reference				TP01
Sample Number				C
Water Matrix				N/A
Depth (m)				0.10
Date Sampled				05/12/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	
Fenthion	µg/kg	10	NONE	< 10
Isodrin	µg/kg	10	NONE	< 10
Methacrifos	µg/kg	10	NONE	< 10
O,p'-DDD	µg/kg	10	NONE	< 10
O,p'-DDE	µg/kg	10	NONE	< 10
O,p'-DDT	µg/kg	10	NONE	< 10
Parathion	µg/kg	10	NONE	< 10
Parathion-methyl	µg/kg	10	NONE	< 10
Pendimethalin	µg/kg	10	NONE	< 10
Phorate	µg/kg	10	NONE	< 10
Phosalone	µg/kg	10	NONE	< 10
P,p'-DDD	µg/kg	10	NONE	< 10
P,p'-DDE	µg/kg	10	NONE	< 10
P,p'-DDT	µg/kg	10	NONE	< 10
P,p'-Methoxychlor	µg/kg	10	NONE	< 10
Propyzamide	µg/kg	10	NONE	< 10
Triazophos	µg/kg	10	NONE	< 10
Trans-Chlordane	µg/kg	10	NONE	< 10
Cypermethrin (Sum)	µg/kg	10	NONE	< 10
Dichlorvos	µg/kg	10	NONE	< 10
Dimethoate	µg/kg	10	NONE	< 10
Diazinon	µg/kg	10	NONE	< 10
Ethion	µg/kg	10	NONE	< 10
Fenitrothion	µg/kg	10	NONE	< 10
Malathion	µg/kg	10	NONE	< 10
Pirimiphos-methyl	µg/kg	10	NONE	< 10
Trifluralin	µg/kg	10	NONE	< 10
Azinphos-ethyl	µg/kg	10	NONE	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
403643	TP01	C	0.1	Brown loam and clay with gravel and vegetation

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Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Pesticides by GC-MS/MS	Detemination of Pesticides in soil by GC MS/MS	In-house method	L055B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution