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GEO ENGINEERING



Barn In OS Parcel 0545, West of Withycombe Farm, Wiggington, OX15 4LE

PRELIMINARY CONTAMINATION RISK ASSESSMENT



Report prepared on behalf of Gill and Patrick Fennessy

June 2022

P22-126pra

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ISSUE	DATE	Written By:	Comments
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		Matthew Paddock MSc FGS	
For and on behalf of Paddock Geo Engineering Limited			

1.0 INTRODUCTION

Paddock Geo Engineering Limited (PGE) were instructed by Gill and Patrick Fennessy (the Client), to undertake a Preliminary Contamination Risk Assessment (Stage 1 Tier 1, formerly Phase 1, of a Site Contamination Assessment) of the subject site, referred to as Barn in OS Parcel 0545, West of Withycombe Farm, Wigginton, OX15 4LE.

The overall objective of the Preliminary Contamination Risk Assessment was to inform the Client of the ground conditions and any potential environmental or ground-related risks associated with the development of the site. The Risk Assessment undertaken relates to the proposed redevelopment of the site with the erection of several linked detached residential properties with hardstanding for associated new access and parking with soft landscaping as private gardens.

1.1 Terms of Reference

- British Standard BS10175:2011 Investigation of Potentially Contaminated Sites - Code of Practice;
- CLR7 Assessment of Risks to Human Health from Land Contamination 2002, DEFRA / Environment Agency (withdrawn);
- CLR8 Potential Contaminants for the assessment of Land 2002, DEFRA / Environment Agency (withdrawn);
- CLR11 Model Procedures for the Management of Land Contamination 2010, DEFRA / Environment Agency (withdrawn);
- Land Contamination Risk Management (LCRM), 2020, Environment Agency;
- PPG23 (PPS23) Planning and pollution control (contaminated land aspects) 2002;
- GPLC1 Guiding Principles for Land Contamination 2010, Environment Agency;
- Environmental Protection Act: 1990 – Contaminated Land Statutory Guidance, April 2012, DEFRA;
- CIRIA C665 Assessing risks posed by hazardous ground gases to buildings, CIRIA 2007; and
- BS 8576:2013 Guidance on investigations for ground gas - Permanent Gases and Volatile Organic Compounds (VOCs).

2.0 THE SITE

2.1 Site Description

The subject site is located c.650m to the west-northwest of Wigginton, a small village in Oxfordshire. The site lies approximately 7.2km southwest of Banbury and 9.5km northeast of Chipping Norton. The study area covers an area of approximately 2.31 hectares, with the centre of the site at approximate national grid reference 437970, 233500 and the nearest postcode being OX15 4LE.

The site is an irregularly shaped plot of land currently not in active use. The northern part of site comprises an area of woodland with a lake northeast of centre and the southern part of the site is

northern most corner of an agricultural field to the south of the lake and woodland area with a derelict barn present in this area. Access onto the site is via a compact gravel driveway currently providing access to the surrounding agricultural fields and the proposed development site.

The site is located within a rural setting with open fields surrounding the site in all directions and isolated farms and small villages in the wider area over 500m from site.

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

2.2 Proposed Development

The proposals development comprises the erection of a residential property on the northeast of the existing lake. The structures comprise a series of three “wings” which are linked with stone footpaths to form walkways and formal communal and private garden areas. A detached garage is also proposed to the north of the dwellings. A courtyard will be present centrally with the access road running south in a meandering route along the eastern boundary.

Significant landscaping around the lake is also proposed including reshaping of the lake itself along with new areas of lawns, natural meadows, areas of mixed native woodland, and a timber structure to provide a folly to the west of the lake.

The existing derelict barn will be refurbished as part of the proposals for use as a machinery and equipment shed.

The development in the area of the existing access track is limited to provision of a new access track to provide vehicular access to the new machinery shed and residential properties as described above.

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

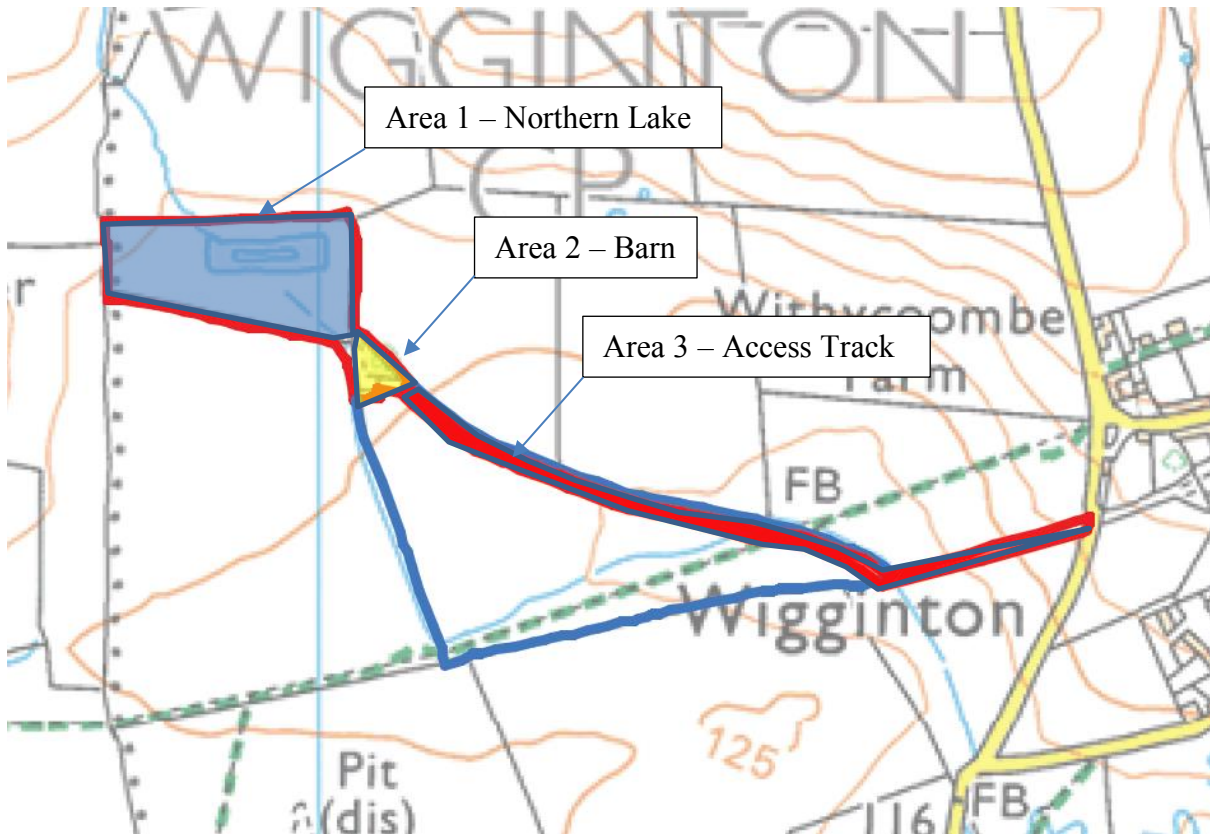
A proposed development plan is presented within Appendix A.

2.3 Walkover Survey

2.3.1 Site Area

A site walkover survey was conducted on 19th May 2022 by a representative of Paddock Geo Engineering Limited. A series of photographs taken during the walkover survey are presented in Appendix B along with a Site Walkover Survey Plan.

As detailed in Section 2.1 of this report, the site as a whole is an irregularly shaped parcel of land. The site has been divided into three areas for ease of description as indicated on the diagram below.



Area 1 covers the majority of the site area and is the northernmost area of the site. A lake is present just northeast of centre of this portion of site. The lake appears to be artificial. It is unknown if this feature is an area liable to natural flooding or was created by excavation and/or damming of the unnamed stream that previously flowed through the site. This flowed from northwest to southeast and now feeds the lake entering at the northwest corner of the lake and issues a two stream from the southeast corner of the lake and flows south / southeast of site. An island is present in the centre of the lake and this island and the remaining area of this portion of the site is currently occupied by woodland with the trees comprising a mixture of species and maturity. Tree considered likely to be Ash, Willow, Oak and Hawthorn were all noted, however, the advice of a specialist arboriculturist should be sought to confirm tree species. It is conjectured that some of the trees may have been planted as opposed to being natural woodland, based upon the regular grid pattern along with the regular spacing of trees around the lake noted in several locations.

A shed constructed of corrugated metal sheeting is also present, located on the southeast corner near to the boundary hedge of this area. This appeared to be empty at time of walkover.

Area 2 is roughly triangular in shape and is located to the southeast of Area 1. This part of the site is located on the northern corner of a large field that appears to be agricultural land; likely pastureland based upon the surrounding land use. This area of site was occupied by a derelict single storey barn of traditional masonry construction and metal framed and corrugated metal roof. The structure was empty at the time of the walkover except for a small pile of demolition type rubble. Field boundaries marked by hedgerows and occasional trees run along the western boundary with the stream from the lake running along this same hedgerow line. A second field boundary hedgerow runs along the northeast boundary and to the southeast of site. A drainage ditch runs along the hedgerow. The two

field boundaries almost meet at the northern end of the area with a footpath between and linking to Area 1 to the north.

Topographically, the site was noted to fall in elevation from northwest to southeast.

Area 3 is an existing compacted gravel track way that runs roughly southeast from Area 2 along field boundary that marks the northeast boundary of the agricultural field and then along the northern edge of another agricultural field to the southeast. The trackway provides access to the site from an unnamed road (possibly Tadmarton Road) at a point c.620m to the east. The road is aligned roughly north-south at the junction with the trackway and runs along the western edge of Wigginton. Although part of the planning red line boundary the proposed for this area are limited to the provision of access to the site. As such this area of the site has not been considered further in this assessment.

The site is located within a rural setting with open fields surrounding the site in all directions. Manor Farm and a cluster of associated agricultural buildings are located approximately 550m west with the nearest residential centre being Wigginton, the western edge of which is located approximately 650m east and extends to c.1.0km east.

2.3.2 Surrounding Area

The site is located within a rural setting with open fields surrounding the site in all directions most of which appear to be overgrown to varying degrees and not cropped. Manor Farm and a cluster of associated agricultural buildings are located approximately 550m west with the nearest residential centre being Wigginton, the western edge of which is located approximately 650m east and extends to c.1.0km east.

The Envirocheck Report records no cotemporary trade directories within 1km of the site.

No active fuel filling stations are recorded within 1km of the site.

2.4 ENVIRONMENTAL DATABASE SEARCH

The Envirocheck Report for the site was commissioned on behalf of the Client, to gather significant data relating to the site and the immediate vicinity. A copy of this report is provided in Appendix E. The table below and overleaf summarises the key environmental disclosure data for the site.

Date type	No. of listings (distance from site)				Details
	On-Site	0m to 250m	251m to 500m	501m to 1km	
Geological					
Radon	Yes				The property is in an Intermediate to Higher probability radon area with 3-30% of homes being at or above the Action Level. Full radon protective measures are necessary in the construction of new residential dwellings or extensions.
BGS Recorded Mineral Sites			1	7	One site located within 500m, and seven sites located up to 1km from location. The nearest listing is located 383m S. All of the listed operations produced limestone or

Date type	No. of listings (distance from site)				Details
	On-Site	0m to 250m	251m to 500m	501m to 1km	
					ironstone via opencast methods, and all have now ceased operation.
Man-made cavities					None identified within 1km of the site.
Natural Cavities					None identified within 1km of the site.
Agency and Hydrological					
Contaminated Land Register Entries and Notices					None identified within 1km of the site.
Enforcement and Prohibition Notices					None identified within 1km of the site.
Nearest surface water feature	Yes				The closest surface water feature is stated to be on site. This is the lake and associated stream on the northwest area of the site.
Pollution or Prevention Controls					None identified within 1km of the site.
Groundwater Vulnerability	Yes				See details in Section 2.6.
Discharge Consents				10	Nearest located 916m W for treated sewage discharges into freshwater stream/river.
Water Abstractions				(*4)	None within 1km of site.
Source Protection Zones					None identified within 1km of the site.
Pollution Incidents to Controlled Waters				1	One identified 524m N from site, listed as Category 3 – minor incident.
Substantiated Pollution Incident Register					None identified within 1km of the site.
BGS Groundwater Flooding Susceptibility	Yes	Yes	Yes		Potential for groundwater flooding to occur at surface on site and in the surrounding areas. Areas with potential for groundwater flooding of property below ground level and limited potential for groundwater flooding to occur at surface located 7m and 48m south respectively at the nearest point.
Flooding from rivers and seas					None identified within 250m of the site.
Waste					
BGS Recorded landfill sites					None identified within 1km of the site.
Historical landfill sites					None identified within 1km of the site.
Licensed waste management facilities					None identified within 1km of the site.

Date type	No. of listings (distance from site)				Details
	On-Site	0m to 250m	251m to 500m	501m to 1km	
Local authority recorded landfill sites					None identified within 1km of the site.
Registered waste transfer sites					None identified within 1km of the site.
Hazardous Substances					
Control of Major Accident Hazard Sites					None identified within 1km of the site.
Explosive sites					None identified within 1km of the site.
Planning Hazardous Substance Consents or explosive sites					None identified within 1km of the site.
Notification of Installations Handling Hazardous Substances					None identified within 1km of the site.
Industrial Land Use					
Contemporary Trade Directory Entries					None identified within 1km of the site.
Fuel Station Entries					None identified within 1km of the site.
Sensitive Land Uses					
Areas of Adopted Greenbelt					None identified within 1km of the site.
Ancient Woodland					None identified within 1km of the site.
Areas of Outstanding Natural Beauty (AONB)					None identified within 1km of the site.
RAMSAR sites					None identified within 1km of the site.
Sites of Special Scientific Interest (SSSI)					None identified within 1km of the site.
National Parks and Nature Reserves					None identified within 1km of the site.
Local Nature Reserves					None identified within 1km of the site.
Special Protection Areas and Areas of Conservation					None identified within 1km of the site.
Environmentally Sensitive Areas					None identified within 1km of the site.
Nitrate Vulnerable Zones	1				Site is located within Cherwell and Woodeaton Brook NVZ for surface water.

2.5 Geology

Information on the underlying geology at the site has been obtained from the British Geological Survey (BGS) Sheet 218 for Chipping Norton (scale: 1:50,000 dated 1968), the BGS Geological Map Viewer and Geological Mapping provided by Landmark within the Envirocheck Report (a copy of which is provided in Appendix C).

The superficial deposits at the site are indicated to comprise of Alluvium comprising clay, silt, sand, and gravel. The superficial deposits formed up to 2 million years ago during the Quaternary Period.

The bedrock across the majority of the site (Area 1) is indicated to comprise the Whitby Mudstone Formation comprising mudstone, formed up to 174 to 183 million years ago during the Jurassic Period in an environment previously dominated by shallow seas.

The bedrock on the southeast corner of Area 1 and Area 2 is indicated to comprise the Marlstone Rock Formation comprising ferruginous limestone and ironstone, formed up to 174 to 191 million years ago during the Jurassic Period in an environment previously dominated by shallow seas.

The geological maps provided within the Envirocheck Report (Appendix C) identifies no areas of Worked Ground or Made Ground on or in close proximity to the site. Several large area of worked ground (undivided) are mapped to the west, the nearest c.900 distant from the site.

2.5.1 Borehole Records

A search was made on the online BGS database for published borehole records within the area. One borehole was identified 200m southeast of the subject site. The sub-surface geology was noted as Sandy Clay Soil to 0.46m depth, Buff Clay to 1.07m and Blue Clay to 5.00m.

2.6 Hydrogeology

The groundwater vulnerability maps for the site and the surrounding area indicates the Whitby Mudstone Formation bedrock is designated as Unproductive. These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

The mapping also indicates the bedrock Marlstone Rock Formation and the overlying superficial Alluvium are classified as a Secondary A Aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

No discharge consents are listed within the Envirocheck Report within over 900m of the site.

The combined groundwater vulnerability on site is considered by Envirocheck to be at worst 'high'. The rating is issued due to the superficial and bedrock secondary A aquifer underlying the site.

The site and surrounding area are not located within a groundwater Source Protection Zone (SPZ).

No groundwater abstractions are located within 1.5km of the site.

Given the hydrogeological status of the site, the groundwater beneath the site is considered to be of moderate sensitivity with regards to near surface contamination given the underlying secondary A

aquifer classification of the superficial and bedrock strata, however, the risk level is considered to be reduce to low due to the absence of SPZs and water abstractions within the vicinity of the site.

The BGS groundwater flood susceptibility mapping indicates that the site is within an area with potential for groundwater flooding to occur at surface. Areas with potential for groundwater flooding of property below ground level and limited potential for groundwater flooding to occur at surface located 7m and 48m south respective at the nearest point.

2.7 Hydrology

The Envirocheck report indicates that the nearest surface water feature to be located on site which appears to relate to an unnamed lake. A stream feeds the lake on the northwest corner and issues on the southeast corner and flows southwards from site eventually feeding into the River Sweve c.900m southeast. No other significant surface water features appear to be located within 1km of the subject site.

No pollution incidents to controlled waters are recorded by Envirocheck within 500m of the site and all those greater than 500m from the site resulted in Category 3 – minor incident.

No surface water abstractions are located within 2km of the subject site.

The site and surrounding area do not fall within a flood risk zone and is not at risk of flooding and / or at risk of extreme flooding from rivers or seas without defences. The site and surrounding area do not benefit from flooding defences and there are no flood water storage areas nearby.

2.8 Geotechnical Risks

The geotechnical risks that could impact the site and any shallow foundations present are listed below.

Hazard	Assessed On-Site Risk (and area within 10m of the site)	
	Present	Level
Potential for Collapsible Ground Stability	✓	Very low
Potential for Compressive Ground Stability	✓	Moderate
Potential for Ground Dissolution Stability	✗	No hazard
Potential for Landslide Ground Stability	✓	Very Low
Potential for Running Sand Ground Stability	✓	Low
Potential for Shrinking or Swelling Clay	✓	Low

The geotechnical risks to the site are indicated to be at maximum Moderate due to the risks posed by Compressive Ground stability hazards.

The compressible ground stability risk is likely related to the Alluvium deposits mapped on the site. Alluvium deposits typically comprise unconsolidated clay, silt, sand and gravel locally with organic deposits.

2.9 Ground Stability and Mining

The site is not located within an area with a history of coal mining and no mining records or records of man-made or natural cavities are listed within 1km.

2.10 Radon

The property is in an Intermediate to Higher probability radon area with 3-30% of homes being at or above the Action Level. Full radon protective measures are necessary in the construction of new residential dwellings or extensions.

2.11 Waste Management and Landfill

The Envirocheck Report indicates that there are no landfill sites within 1km of the site.

2.12 Sensitive Land Uses

The Envirocheck Report indicates the site is located within the Cherwell (Ray to Thames) And Woodeaton Brook Nitrate Vulnerable Zone (NVZ) for surface water

3.0 HISTORIC LAND USE MAPPING SUMMARY

A review of available historical topographic mapping obtained from the Envirocheck Report has been carried out and comprises County Series, Ordnance Survey Plans and Unpublished Survey Information (at scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560). Maps covering the site were published between 1881 and 2022. Extracts from this mapping data set are presented in Appendix D.

The maps are reproduced in accordance with Landmark Information Group Limited's Ordnance Survey License. All directions and distances are therefore approximate. A summary of the history of the site and immediate area is provided in the table below.

Date of mapping	Site History	History of the area surrounding the site
1881-1885	The site appears to be a parcel of open, most likely agricultural land associated with the possible farm building already present on the southwest. A stream runs through the site from northwest to southeast.	The site is located in a rural area with similar likely agricultural open land immediately surrounding in all directions. Wigginton is the nearest residential centre located some 650m east at the nearest point. Manor Farm is located some 700m southwest. A railway line is located some 500m north of site aligned east-west.
1900	No apparent changes.	No significant changes were recorded in the surrounding area.
1922 - 1923	No apparent changes.	Two old quarries are indicated c.350m south and c.750m with kilns shown c.1.0km northwest.
1951	No apparent changes.	No significant changes were recorded in the surrounding area.
1955	No apparent changes.	No significant changes were recorded in the surrounding area.
1971 – 1972	No apparent changes.	No significant changes were recorded in the surrounding area.
1977	No apparent changes.	The kiln to the northwest is now shown as disused. A quarry (disused) is indicated c.1.0km southwest. Minor residential expansion of Wigginton some 700m southeast of the subject site.

Date of mapping	Site History	History of the area surrounding the site
1994	No apparent changes.	No significant changes were recorded in the surrounding area.
1999	The lake in the northern sector of the site is now present.	No significant changes were recorded in the surrounding area.
2022	The site is now shown as being an area of woodland.	No significant changes were recorded in the surrounding area.

3.1 Historical Mapping Summary

The available historical maps span a period of 141 years, dating back to 1881. The site initially appeared to be a parcel of open land, most likely agricultural land associated with the possible farm building on the southwest, the now derelict barn still located on site. A stream is shown to run through the site from northwest to southeast.

The only significant change noted on site was the formation of the existing lake sometime between 1994 and 1999. The site was noted to be shown as woodland on the 2022 map.

The surrounding area was initially agricultural with isolated rural dwelling and farmsteads and little change was observed in the subsequent map extracts. A railway line was located some 500m north. Wigginton is the nearest residential centre and was present some 650m east at the nearest point and underwent some minor residential expansion sometime between 1955-1977. Several old quarries were noted to the southwest some 350m at the nearest point.

4.0 PLANNING SEARCH

A search of the Cherwell District Council North Oxfordshire planning register was undertaken for the site and the immediate area using the site postcode and plan location as search terms on the 9th of June 2022 to gather details of relevant planning applications. The relevant search results are as follows:

On-Site

Four application were listed on site, however, two of these were withdrawn / refused. The remaining two application are listed below.

- 18/00063/Q56 - Change of use of agricultural building to a dwellinghouse and associated operational development. Application Permitted on 06/06/2018 however the works do not appear to have very been carried out.
- 20/01933/F - Erection of one residential dwelling for multi-generational living and landscape enhancements and associated works. Application Permitted on 19/05/2021

Off-Site

- 06/00526/AGN – Erection of agricultural barn. Prior approval not required 13/04/2006.
- 11/01347/AGN – Steel framed agricultural building. Prior approval not required 03/02/2012.
- 21/00226/F - Erection of a general purpose agricultural building. Permitted 01/06/2021.
- 00/00122/CLUE – Certificate of Lawfulness (EXISTING) to allow use of land for keeping, breeding and exercising of greyhounds including the retention of a schooling track for greyhounds and an associated building. Refused 04/05/2000.

- 00/02022/CLUE – Certificate of Lawfulness (EXISTING) to allow use of land and building for keeping, breeding, rearing and schooling of greyhounds. Permitted 19/12/2000.
- 00/01717/F – Erection of open-sided cattle shelter building. Refused 17/11/2000.

The planning search has not identified any recent significant potentially contaminative uses within 500m of the subject site.

5.0 SUMMARY OF ENVIRONMENTAL SEARCH DATA

A review of the environmental data obtained from the Envirocheck Report and the site walkover survey has indicated the following potential contamination risk driver features generally within 500m of the site (or further if considered significant):

Current or Recent Land Uses

- Site is currently a mixture of agricultural land and wooded: **Very Low Risk.**
- Derelict agricultural building on southeast area of site: **Very Low Risk.**
- Surrounding agricultural land – predominantly pastureland: **Very Low Risk.**
- Site is situated within an area where full radon protection is required: **Moderate Risk.**

Historical Land Uses

- Historical use of site and surrounding area as agricultural land – likely pastureland: **Very Low Risk.**
- Earthworks related to construction of existing lake on site: **Very Low Risk.**
- Former mineral extraction to the west (>900m from site) with potential for infilling: **Low Risk.**

Site environmental features

- Superficial deposits are mapped on site as Alluvium. The bedrock at the site is indicated to comprise the Whitby Mudstone Formation and Marlstone Rock Formation.
- The Whitby Mudstone Formation bedrock is designated as Unproductive. The superficial Alluvium and bedrock Marlstone Rock Formation deposits are designated as Secondary A Aquifers.
- The nearest body of water is located on site and relates to an unnamed lake with an associated stream.
- Site is located within an area of NVZ for groundwater and surface water.

6.0 PRELIMINARY CONCEPTUAL SITE MODEL AND RISK ASSESSMENT

6.1 Risk Assessment Guidance

Guidance has been published by the Department of the Environment, Transport and the Regions (DEFRA) 'Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance'

(DEFRA April 2012) which promotes the ‘risk-based approach’ for defining contaminated land. The statutory guidance states:

“Part 2A takes a risk-based approach to defining contaminated land. For the purposes of this Guidance, “risk” means the combination of: (a) the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land; and (b) the scale and seriousness of such harm or pollution if it did occur.”

A means to assess the risk posed by potential contamination on or under a site is to carry out a preliminary contaminated land risk assessment. The risk assessment process is defined within the statutory guidance:

“For a relevant risk to exist there needs to be one or more contaminant- pathway-receptor linkages – “contaminant linkage” – by which a relevant receptor might be affected by the contaminants in question. In other words, for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters. For the purposes of this Guidance:

(a) A “contaminant” is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters.

(b) A “receptor” is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property, or controlled waters. The various types of receptors that are relevant under the Part 2A regime are explained in later sections.

C) A “pathway” is a route by which a receptor is or might be affected by a contaminant.

The contaminant linkage is described within the statutory guidance as:

“The term “contaminant linkage” means the relationship between a contaminant, a pathway and a receptor. All three elements of a contaminant linkage must exist in relation to particular land before the land can be considered potentially to be contaminated land under Part2A, including evidence of the actual presence of contaminants.

The term “significant contaminant linkage”, as used in this Guidance, means a contaminant linkage which gives rise to a level of risk sufficient to justify a piece of land being determined as contaminated land. The term “significant contaminant” means the contaminant which forms part of a significant contaminant linkage”.

The following sections relate to a qualitative risk assessment of the site and surrounding environs.

The data within this assessment will be employed to produce a Conceptual Site Model which will be tested to assess if a ‘significant possibility of significant harm’ to human health, non-human health or significant pollution to controlled waters is likely to occur and the risk level posed by any such linkages. The risk level classification system employed in the risk assessment is generally based upon those described in CIRIA C552¹.

¹ Rudland, D., Lancefield, R.M., Mayal, P.N. (2001) Contaminated Land Risk Assessment: A Guide to Good Practice. CIRIA C552. UK.

6.2 Potential Contaminant Sources

The potential contamination sources identified as part of this Preliminary Contamination Risk Assessment are summarised in the table below. The potential contaminants are based on the data within CL8, Department of the Environment (DoE) Industry Profiles, the current and historic site uses.

Current Potential On-Site Contaminant Sources	Potential Contaminants
Woodland.	No significant contaminants.
Lake with build up of organic matter and silt sediments	Ground Gases.
Derelict agricultural building.	No significant contaminants.
Intermediate to Higher Radon risk area.	Radon.
Historic Potential On-Site Sources	Potential Contaminants
Agricultural land – likely pastureland.	No significant contaminants.
Potential earthwork for construction of lake.	No significant contaminants.
Current Potential Off-Site Contaminant Sources	Potential Contaminants
Agricultural land – likely pastureland.	No significant contaminants.
Historical Potential Off-Site Contaminant Sources	Potential Contaminants
Historical agricultural open field in surrounding area.	No significant contaminants.
Historical mineral extraction to west with potential for backfilling.	Ground Gases.

6.3 Conceptual Contaminant-Pathway-Receptor Model

The information gathered in this Preliminary Contamination Risk Assessment has been compiled to produce a Contaminant-Pathway-Receptor (C-P-R) model, which is summarised in the table below and overleaf. A Contamination Conceptual Site Model Cross Section is presented in Appendix F.

The risk posed to site construction workers has not been assessed as any risks are mitigated through good site practices such as dust suppression and the use of Personal Protective Equipment (PPE).

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Current Woodland and lake with derelict agricultural outbuildings.	Dermal / direct contact	Current site users (Lake, woodland and agricultural land – no occupied structures)	Yes	Very Low
	Direct ingestion		Yes	Very Low
	Direct inhalation		Yes	Very Low
	Inhalation of Radon		No	
	Inhalation of wind-blown dust		Yes	Very Low
	Vapour migration		No	

Report on behalf of Gill and Patrick Fennessy

P22-126pra – Barn in OS Parcel 0545 West of Withycombe Farm, Wigginton, OX15 4LE

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification	
Southern area of site and surrounding agricultural (pasture) land. Situated within a Higher Radon risk area with full radon protection measures required.	Ground gas migration	Future site users (equivalent to residential use with plant uptake)	No		
	Dermal / direct contact		Yes	Very Low	
	Direct ingestion		Yes	Very Low	
	Direct inhalation		Yes	Very Low	
	Inhalation of Radon gas		Yes	Moderate - Full Radon Protection Required	
	Inhalation of wind-blown dust		Yes	Very Low	
	Vapour Migration onto the site		No		
Lake with potential for build up of organic matter in lake silts. Historical	Ground gas generation or migration	Services (Following development)	Yes	Very Low	
	Direct contact		Yes	Very Low	
	Migration of contaminants: non-aqueous phase		Yes	Very Low	
Historical use of site and surrounding area as agricultural land, Construction of pond.	Migration of contaminants: aqueous phase	Adjacent Properties	Yes	Very Low	
	Migration of contaminants off-site: non-aqueous phase		No		
	Migration of contaminants off site: aqueous phase		No		
Former mineral extraction with possible backfill c.900m to west.	Vapour migration	Ecological Impacts	No		
	Inhalation of wind-blown dust		No		
	Migration of contaminants: non-aqueous phase		No		
	Migration of contaminants: aqueous phase		No		
	Migration of contaminants from site: non-aqueous phase		Controlled groundwater (Secondary A Aquifer)	Yes	Very Low
	Migration of contaminants from site: aqueous phase		Yes	Very Low	
	Migration of Contaminants: non-aqueous phase		Surface Waters	Yes	Very Low
Migration of contaminants: aqueous phase	Yes	Very Low			

6.4 Potential Contamination Risk Summary

The preliminary contamination risk assessment has identified complete Contaminant-Pathway-Receptor (CPR) linkages with a maximum **Moderate** risk level from the potential contamination sources and risk drivers identified on the site and surrounding area.

The most significant of these potential source drivers representing the greatest potential to impact the proposed site user (equivalent to residential with plant uptake) is considered to be that the site is situated within an area of higher radon risk. Full radon protective measures are necessary in the construction of new residential dwellings or extensions.

The site and surrounding land appear to have been used as agricultural land which could have resulted in the use of agrochemicals on site. However, the surrounding land use at the time of the walkover was noted to be pastureland, which is typical of this area and as such the likelihood of the use of agrochemicals on site is considerably reduced. In addition, the site itself has not been in use as agricultural land for several years with significant vegetation growing on site. On this basis the risk considered to be lower bound.

The derelict former agricultural structure on site may also have been utilised for storage of such agrochemicals, or fuel if machinery was used on site. No evidence of storage of such materials, odours or staining of the floor was noted during the walkover survey. The proposals for this structure are for the renovation of the barn for use as a machinery and equipment store. Given the dilapidated state of the existing building inferring significant time since active agricultural use, and the proposed new use post development, the risk from such substances is considered to be lower bound.

No landfills are indicated within 1km of the site. Several former BGS mineral recorded for quarries are indicated in the surrounding areas, the nearest 380m south, and several large areas of worked ground are indicated on the BGS mapping over 900m west of the site. Such quarries are typically backfilled with overburden material; however, some were used as unrecorded landfills. There is no significant evidence that these former quarries have been backfilled with material liable to generate significant quantities of ground gases. In addition, the residential structures on the site are proposed on an area of the site mapped with bedrock geology of Whitby Mudstone Formation which is likely to be impermeable clay and as such there is no viable potential pathway for migration of ground gases onto the site from the off site sources.

The method of construction of the lake is unknown. The lake may have been created as the area was liable to flooding naturally, via damming of the existing stream, or earthworks to create the feature. Given the size, rectangular shaping and topography, it is considered likely that at least some landscaping or removal of material occurred. The construction of such a feature would likely result in reworking or removal of natural soils as opposed to infilling, and as such, this is not considered likely to represent a potential source of contamination or ground gases. Significant organic matter may have accumulated at the base of the lake which could result in generation of some ground gases, however, given the natural limited source this is likely to produce low concentrations with the water body also providing a barrier to migration into proposed structures.

Furthermore, as the site is listed as requiring Full Radon protection which will require installation of a radon suitable membrane and sub-floor ventilation and / or sumps, which will likely provide a similar level of protection to Characteristic Situation 2 (CS2) based upon CIRIA C665 / BS 8485:2015.

On this basis, there is not considered to be a significant risk from ground gases to the proposed end users of the site, and as full radon protection is required, this is likely to provide sufficient mitigation as a preventative measure for such low risk sources.

The relevant regulators opinion should be sought on the use of Full Radon as a preventative measure for the low ground gas risk source identified.

Given the discussion above, it is considered unlikely that 'Significant Possibility of Significant Harm' is posed to the proposed future end users of the site from potential contamination sources identified.

However, to confirm the above assumption it is recommended that a watching brief is maintained during the site works in case of unidentified contamination being encountered during earthworks.

Should any unexpected contamination be identified during the future groundworks, then a suitably qualified and experienced Geo-Environmental Engineer should be consulted and if necessary further assessment should be undertaken. At this stage, no further work relating to contaminated land risk is required.

6.5 Potential Geotechnical Risk Summary

A maximum moderate potential geotechnical risk was identified with the Envirocheck Report due to compressible ground stability risk.

The proposed structures are likely to lie on Alluvium deposits which are the likely source of the compressible ground stability risk. In addition, one of the structure is shown to extend out over the lake. Due to the significant landscaping planned around the lake it is also possible that some earth works design may be required. It is recommended that a geotechnical appraisal of the site be carried out as best practice, to confirm the desk based assessment and to derive foundation design and earth works design criteria.

7.0 CERTIFICATION

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 site walkover survey was carried out within reasonably accessible areas of the site. No responsibility of any kind can be accepted for any conditions or features not identified due to inaccessibility of areas such as locked, unstable, or unsafe buildings and heavily overgrown areas.

The conclusions and recommendations given in this report are based on our understanding of the future plans for the site and based on a scope of works agreed by the Client and afforded by the agreed budget. No responsibility is accepted for conditions not encountered, which are outside of the agreed scope of work or if construction is commenced before regulatory approval of designs.

If the future plans for the site are changed, such as the site is developed for a more or less sensitive use, then a different interpretation might be appropriate.

The report has been prepared following the guidelines and principles established in the British Standards, BS 10175:2011, entitled 'Investigation of Potentially Contaminated Sites – Code of Practice' and the DEFRA / EA Contaminated Land Reports CLR7 and CLR8. It necessarily relies on the co-operation of other organisations and the free availability of information and total access. 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.

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.

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Report on behalf of Gill and Patrick Fennessy

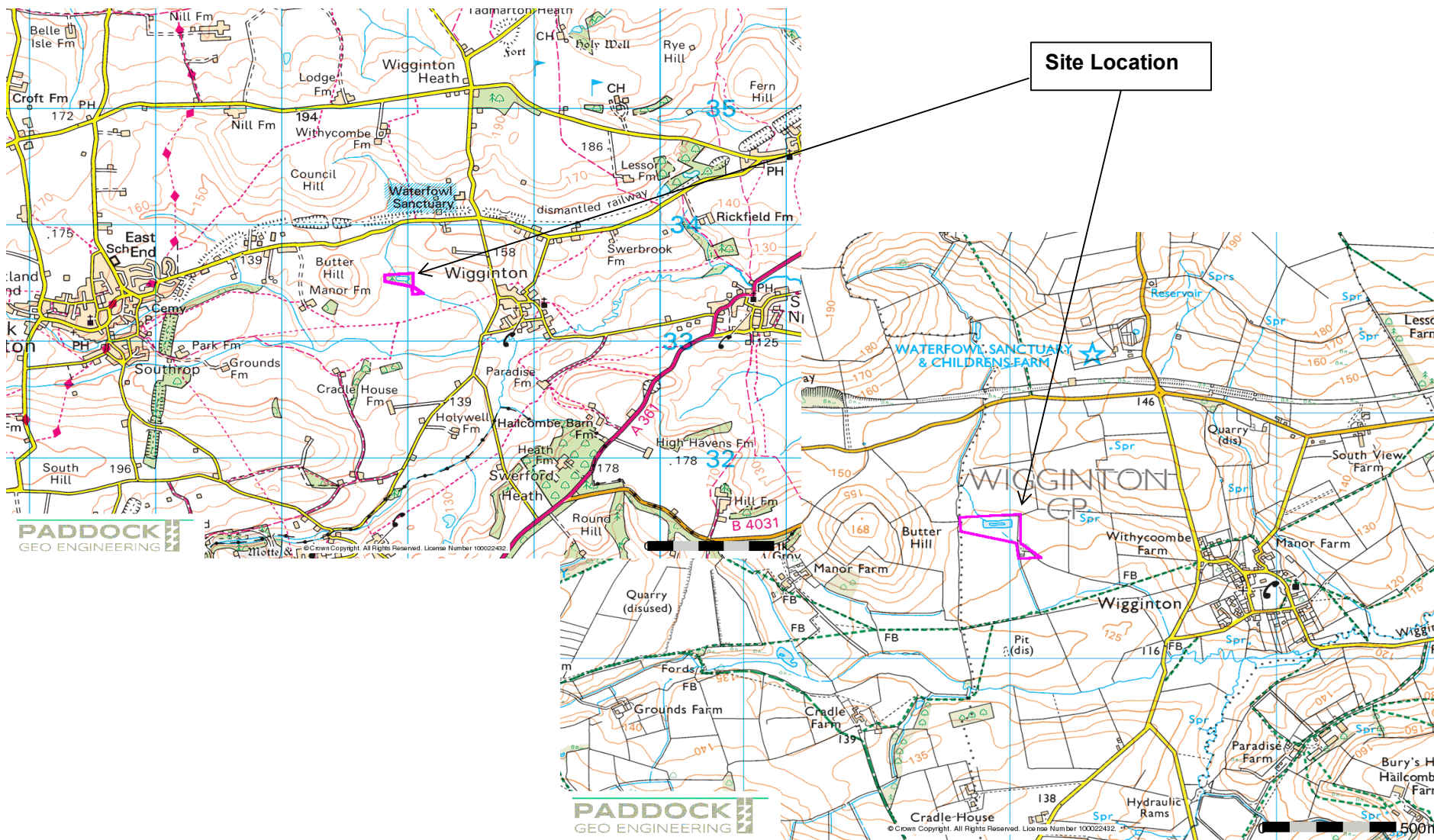
P22-126pra – Barn in OS Parcel 0545 West of Withycombe Farm, Wigginton, OX15 4LE

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APPENDIX A

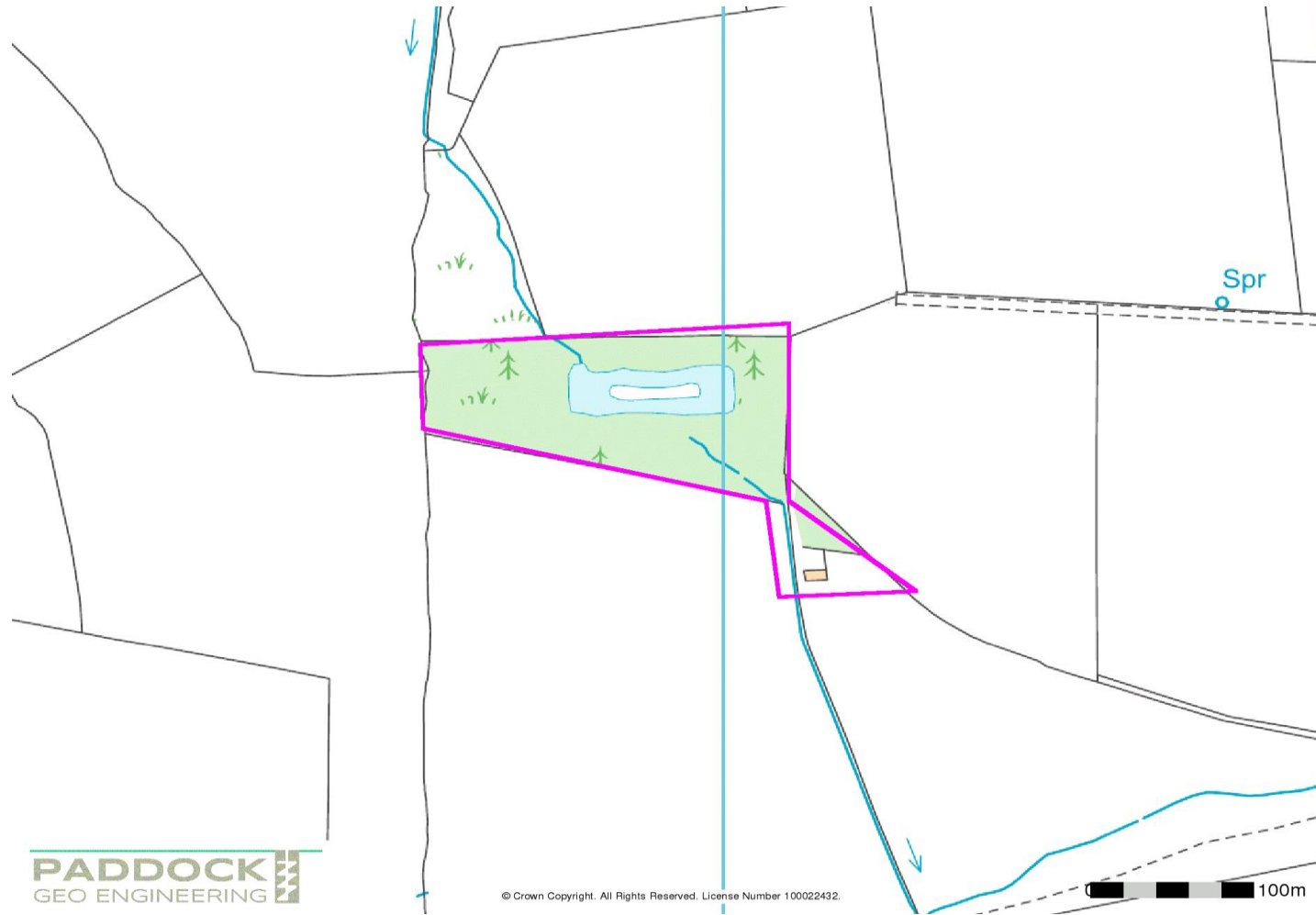
Site Location Plan
Site Plan
Aerial Photograph
Proposed Development Plan

SITE LOCATION PLAN



CLIENT: Gill and Patrick Fennessy
PROJECT No: P22-126
PROJECT TITLE: Barn in OS Parcel 0545, West of Withycombe Farm, Wigginton, OX15 4LE

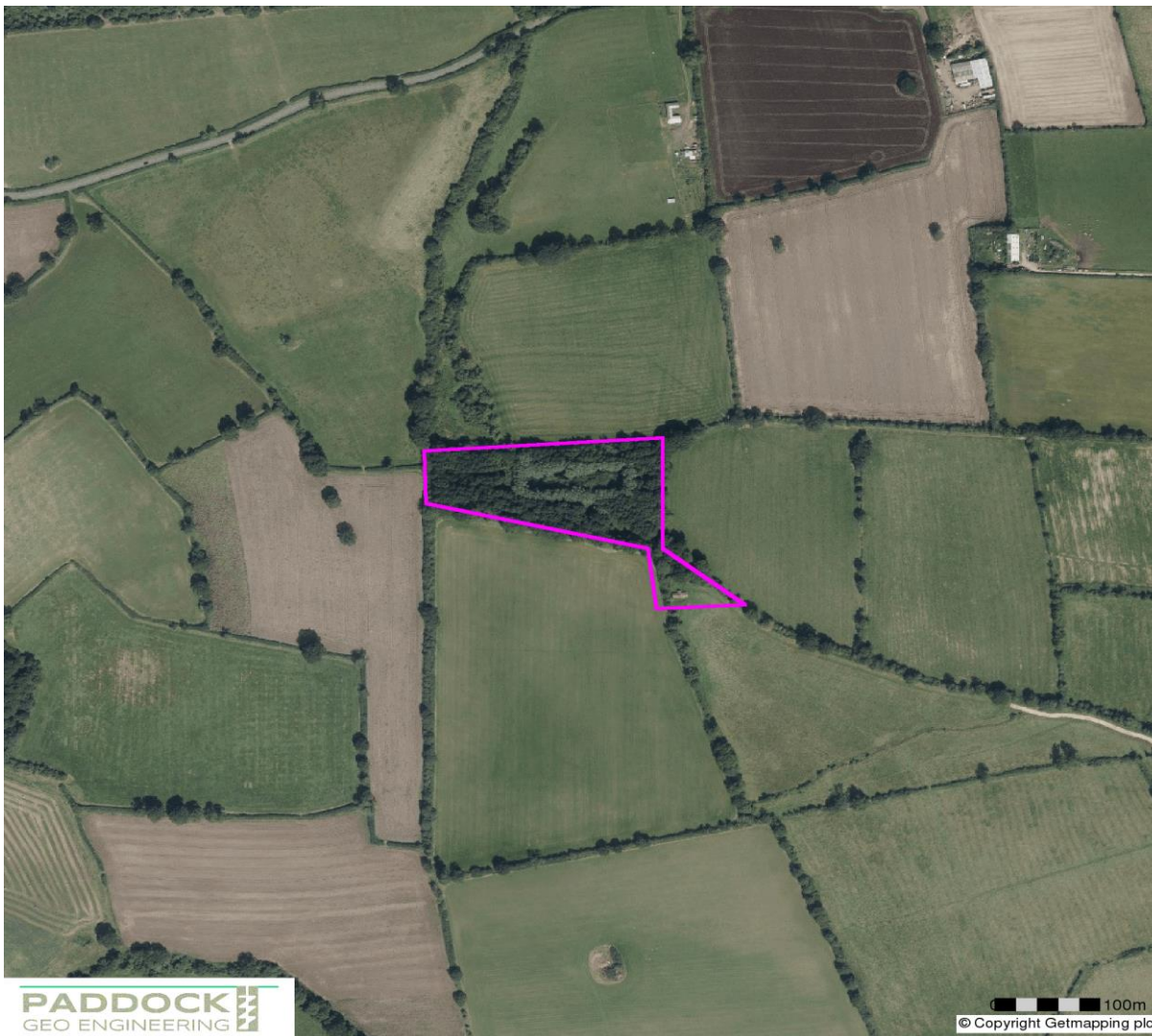
SITE PLAN



PADDOCK
GEO ENGINEERING

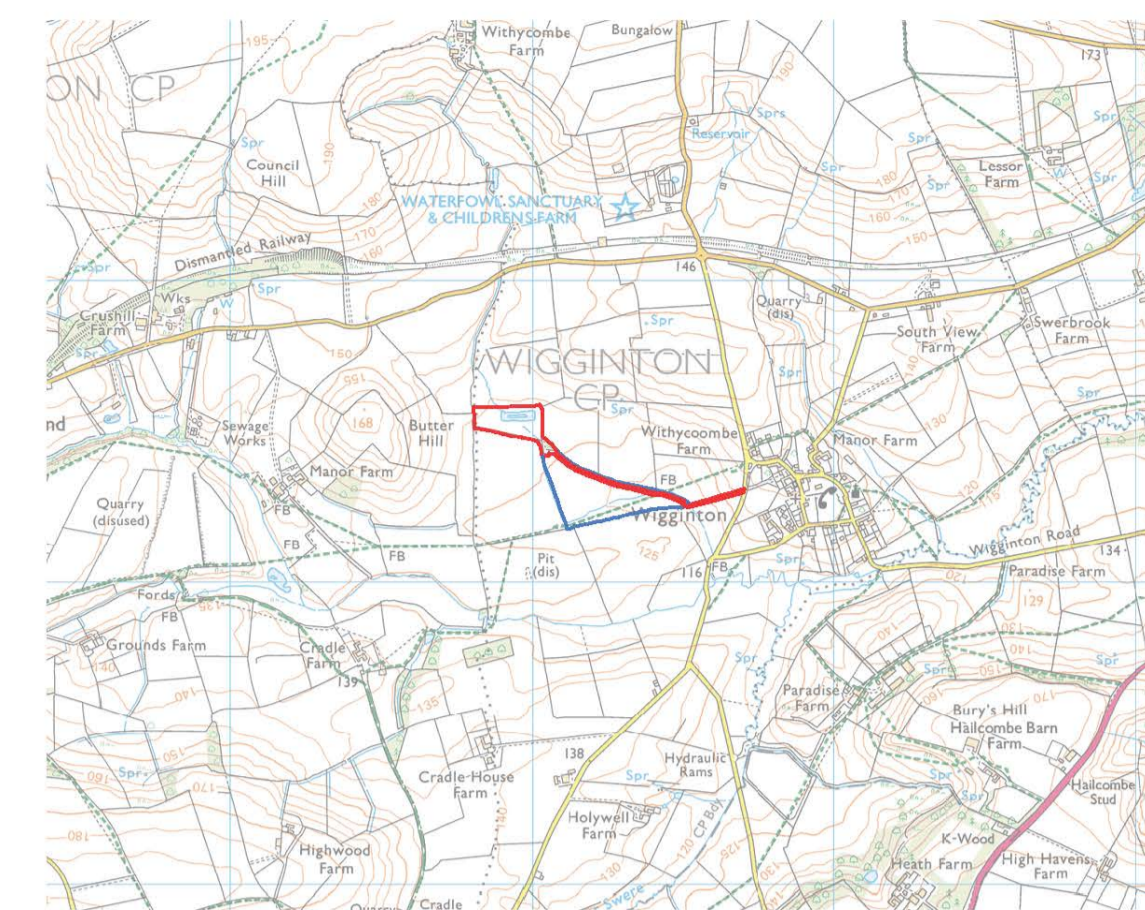
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PROJECT No: P22-126
PROJECT TITLE: Barn in OS Parcel 0545, West of Withycombe Farm, Wigginton, OX15 4LE

AERIAL PHOTOGRAPH

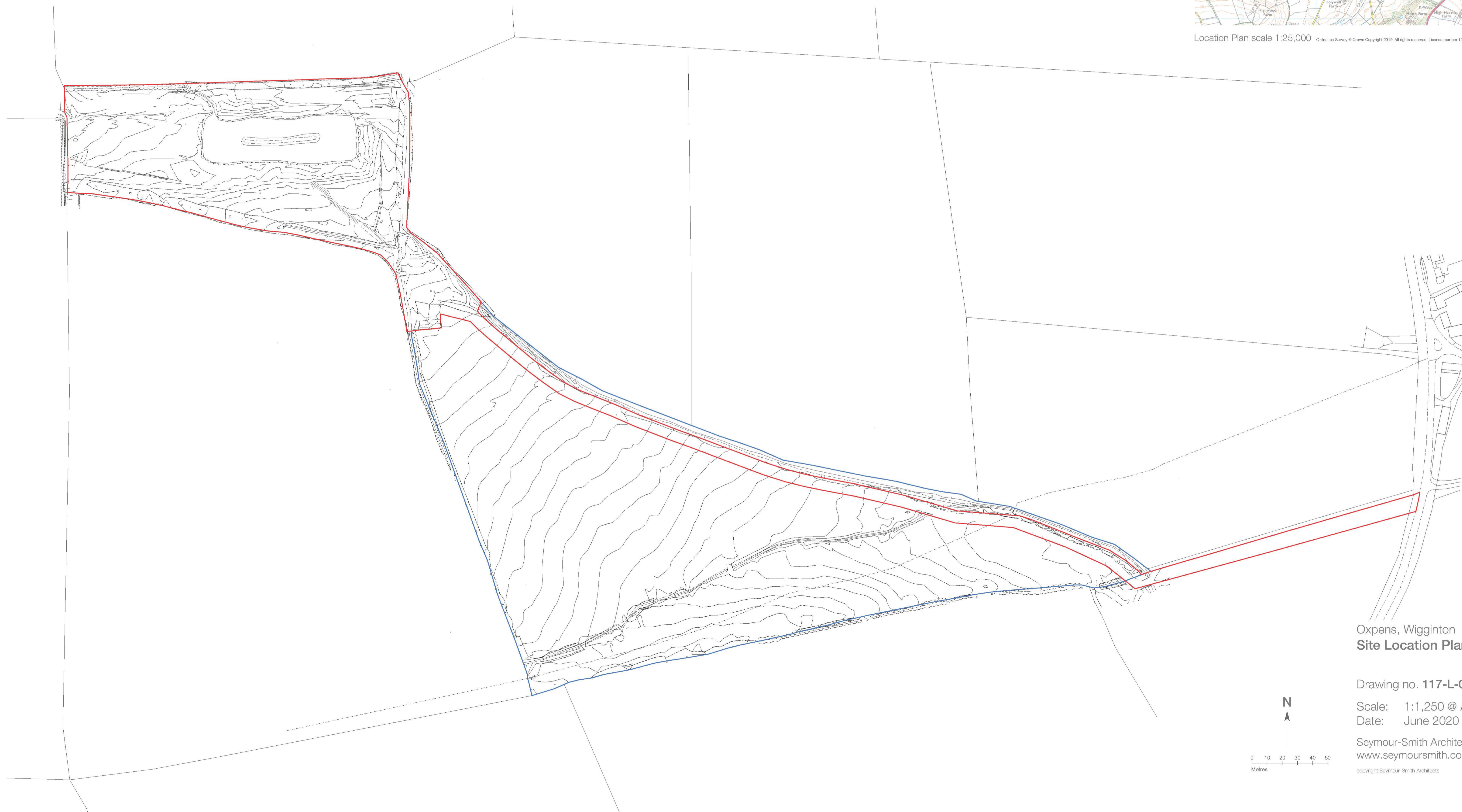


PADDOCK
GEO ENGINEERING

CLIENT: Gill and Patrick Fennessy
PROJECT No: P22-126
PROJECT TITLE: Barn in OS Parcel 0545, West of Withycombe Farm, Wigginton, OX15 4LE



Location Plan scale 1:25,000 Ordnance Survey © Crown Copyright 2018. All rights reserved. Licence number 100029432



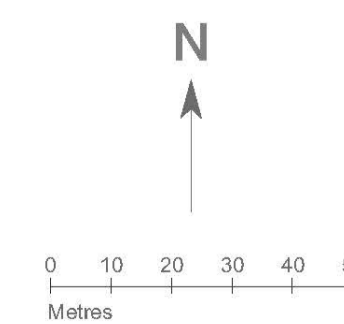
Oxpens, Wigginton
Site Location Plan

Drawing no. **117-L-01**

Scale: 1:1,250 @ A1
Date: June 2020

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THE FILTER WETLAND
 Any surface water run off will enter the lake via this wetland. The planting will be naturalistic and native.

THE RILL GARDEN
 A wide stone lined rill will take surface water run off into the lake. The garden will be planted with clump loving plants. During times of heavy rain, water will be retained within the garden and slowly released into the lake. Access to Virginia's front door will be via a wide concrete bridge.

THE ENTRANCE COURTYARD
 The centre of the courtyard will be stone setts. The paths will be linear stone or concrete paving bringing family front doors and garage.

EMMA'S FRONT WOODLAND GARDEN
 The building will emerge from a native woodland to the east into a more naturalistic woodland garden. A formal stone or concrete path will link the garage to the front door and before the threshold into the domestic courtyard.

THE DAMP WOODLAND
 The building will emerge through a grove of birch and alder, through a lake margin of reeds and rushes. A simple, wide timber sitting slip will wrap around the inner corner of the building and an informal, un surfaced path leads to the timber bridge.

New shallow drift living field run off into the filter pond

Guest parking for 2 cars on reinforced grass system.

THE WOODLAND
 The existing soft plantation will be replaced with a mixed native woodland.

THE FOLLY
 A simple timber structure will temperate the view from Virginia's lake terrace. The hedge to the west of the folly will be laid to allow views out to the landscape beyond.

VIRGINIA WING
 ROBERT WING
 EMMA WING
 FAMILY GARAGE

EMMA'S FAMILY GARDEN
 Stone paved terrace is accessed from the building via wide timber steps. The terrace overlooks the play lawn that will be enclosed with a species rich lawn mix.

ACCESS TRACK
 8m wide gravel for and chip tyre access track. Gravel will be locally sourced and chosen to be recessive in the landscape.

Reinforced grass paving place

THE GATHERING TERRACE
 This timber terrace at the end of the timber bridge will be the communal focal point in the landscape.

THE WOODLAND
 The existing soft plantation will be replaced with a mixed native woodland.

Informal gathering area moved into the meadow with views out to the landscape and back to the house.

Land existing hedge to open up views out

Informal gathering area moved into the meadow with views out to the landscape and back to the house.

Timber bridge across the stream

ACCESS TRACK
 8m wide gravel for and chip tyre access track. Gravel will be locally sourced and chosen to be recessive in the landscape.

THE MEADOW
 Around the lake a new native meadow / grassland will be created. This will be an additional habitat to the site and add to the naturalistic setting of the building. Informal paths will be moved encouraging exploration to the different areas of the landscape.

THE LAKE
 The existing water body will be reshaped to create a more naturalistic setting for the building. The edges will be reinforced to allow a much more diverse water's edge habitat.

THE OLD BARN
 The surrounding walls will be rebuilt, the entrance repositioned to the centre of the wall and a new sitting gate fitted. A new concrete yard will be laid with planted expansion joints. The barn will be repurposed for landscape maintenance equipment and a barn owl box.



Oxpens, Wigginton
Stone Barn in NW of Damp Meadow
Plans and Elevations as Existing

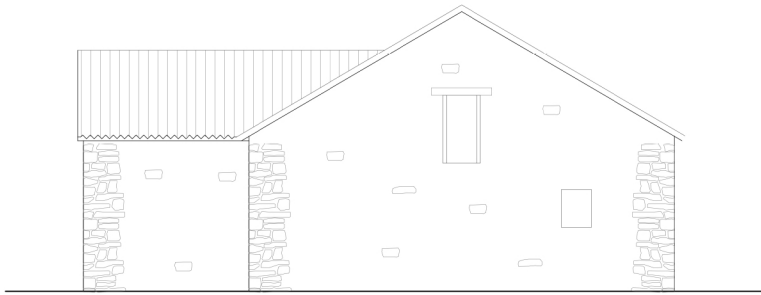
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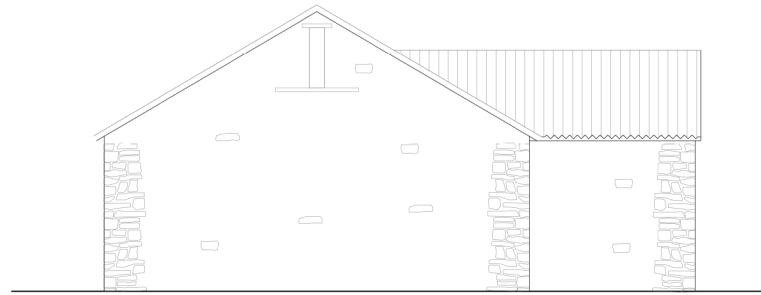
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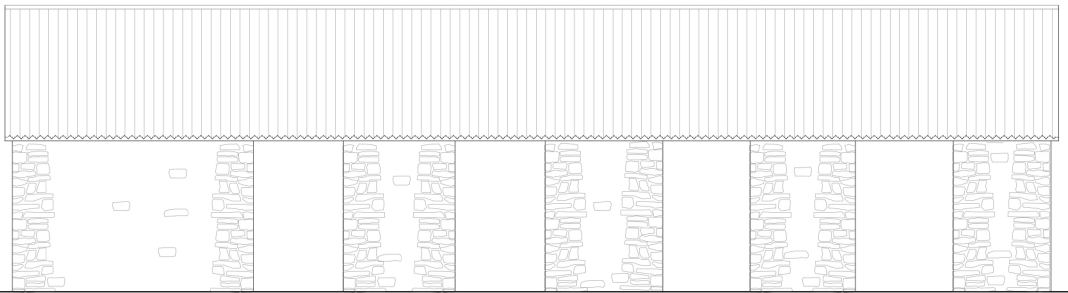
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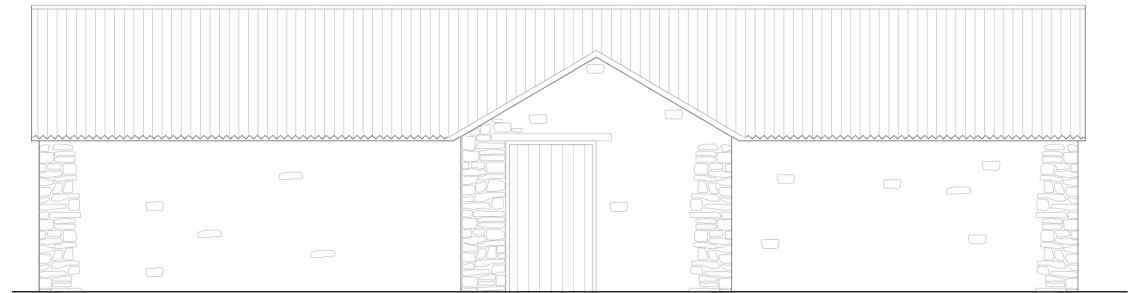
West Elevation



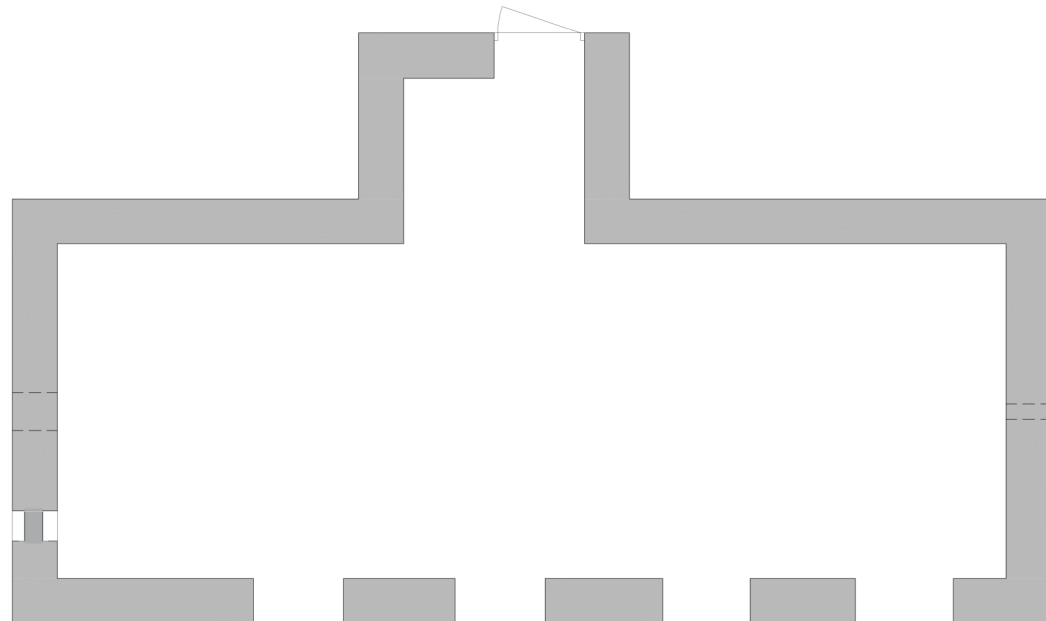
East Elevation



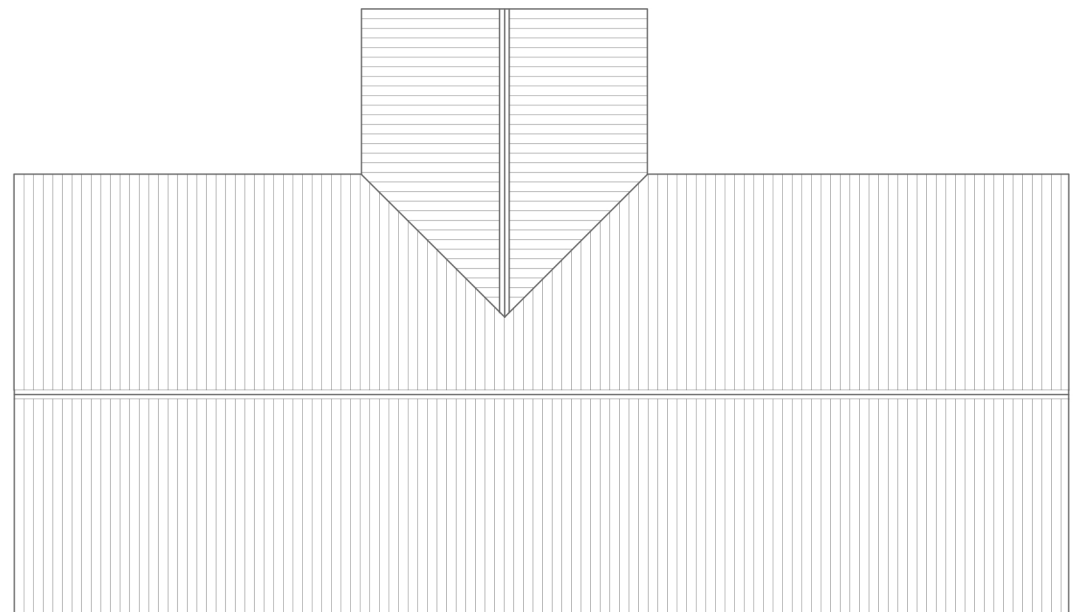
South Elevation



North Elevation



Ground Floor Plan



Roof Plan

Oxpens, Wigginton
Stone Barn in NW of Damp Meadow
Plans and Elevations as Proposed

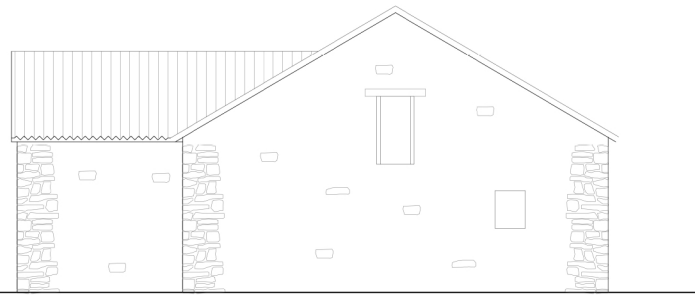
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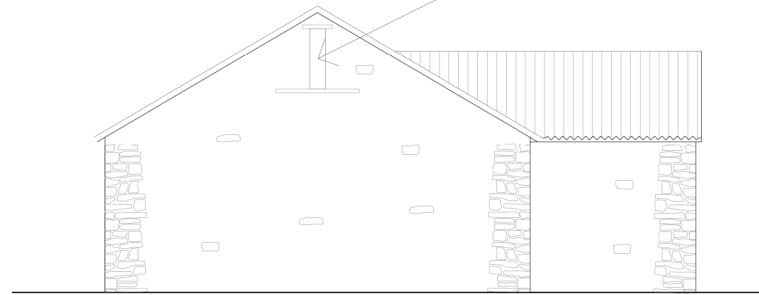
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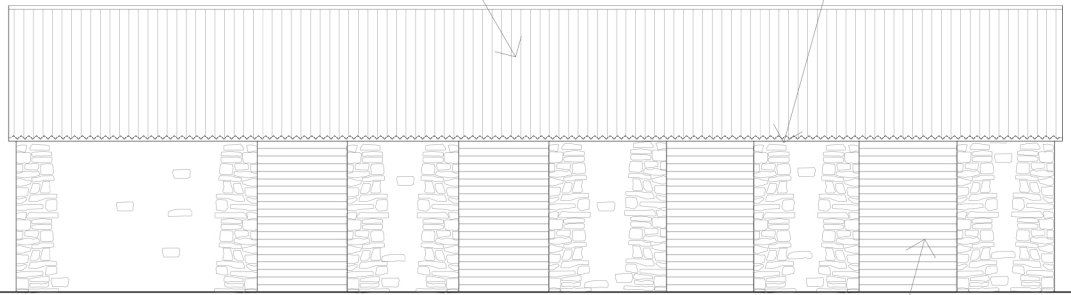
West Elevation



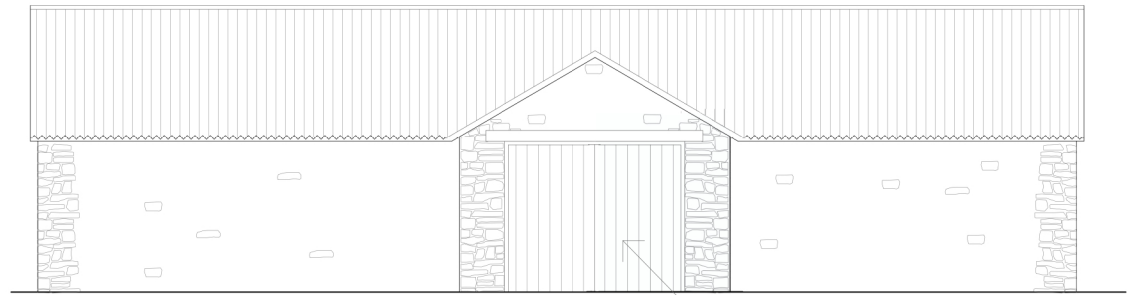
East Elevation

existing rusting sheet roofing all replaced with dark grey corrugated steel sheeting

bat boxes to be built in to eaves



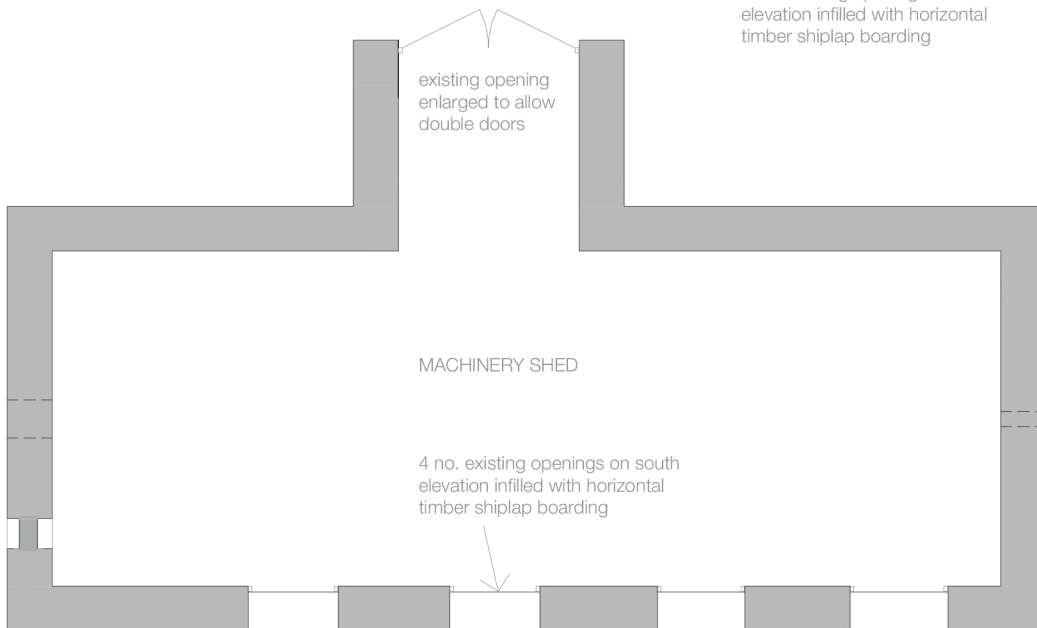
South Elevation



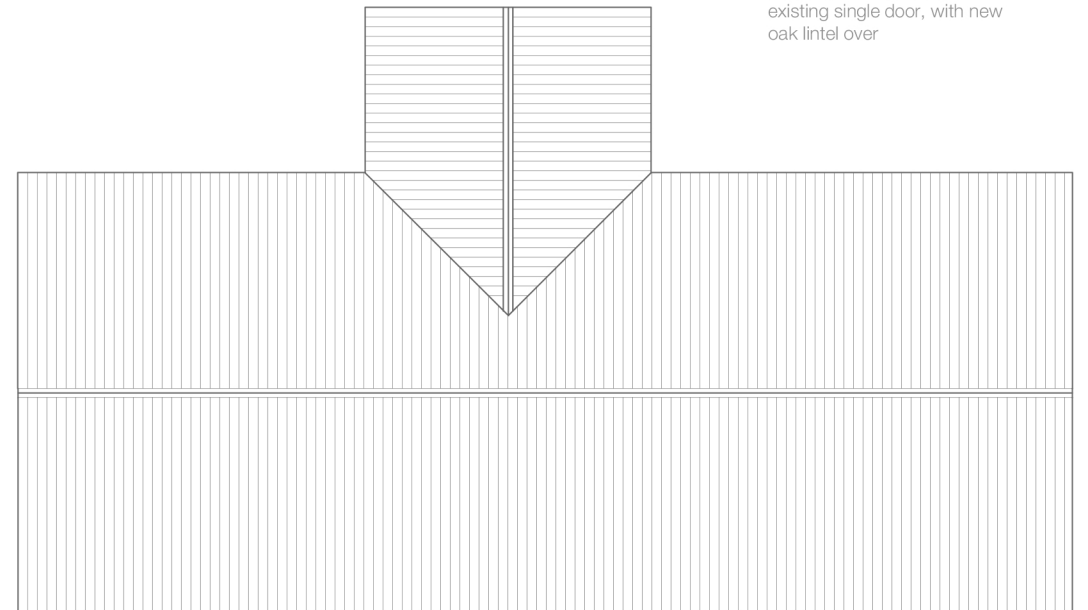
North Elevation

4 no. existing openings on south elevation infilled with horizontal timber shiplap boarding

existing opening enlarged to allow double doors



Ground Floor Plan



Roof Plan