



**Castledine
Environmental**

LAND CONTAMINATION SURVEYS

Phase 1 Land Contamination Risk Assessment

for

**The Proposed Conversion of a
Former Poultry Building into 3 No.
Residential Dwellings with all
Associated Building Works
on the site of
Woodcotes, Fears Green, Sandon,
Buntingford, Hertfordshire SG9 0QZ**

Date: October 2024

Status:

Final Report

Reference:

3823D P1 Jani - Buntingford

Date:

10/10/2024

EXECUTIVE SUMMARY

The site is currently occupied by a former poultry shed (now disused as such) within which the storage of classic vehicles, machinery (i.e. ride-on lawn mower), fuel storage and pesticide spraying equipment were noted, with fragmented PACM guttering noted without. The poultry shed has been present on site since at least circa.1975, prior to which the site was partially occupied by 3 No. barns (north western, south western and south eastern corners of site), before which the site remained unoccupied field. The surrounding areas to site have remained relatively consistent over time, with erection of the associated dwelling and farmyard directly south west and at least 6 No. barns south of site between the dates of circa.1896, 1922, 1947 and 1975, before being variously demolished by circa.2003 and 2010.

The initial arable agricultural usage of the site and the subsequent development and usage of the site for more intensive animal rearing purposes alongside various on site and proximate demolitions are considered potential sources of soil contamination, which should be investigated further.

Based on the information contained in this report, it is the opinion of Castledine Environmental that the site represents a **LOW** to **MODERATE** level of risk with respect to the proposed development.

It is recommended that further investigation inline with Section 16.0 is planned and carried out on site.

It is recommended that the poultry shed structure and fragmented cement gutting on site be subject to an asbestos survey (and subsequent removal, if required) by appropriately qualified personnel. This should be carried out prior to any demolition or redevelopment occurring in order to ensure site works do not cause future contamination of the site.

This report should be submitted to your Local Planning Authority for agreement to allow the Phase 2 intrusive testing to be undertaken.

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1.0 QUALITY ASSURANCE

Castledine Environmental confirm that all reasonable efforts have been made to ensure that the information outlined within this report is accurate.

Castledine Environmental would further confirm that due care, attention and technical skill were used in the creation of this report.

2.0 LIMITATIONS

The conclusions and recommendations made in this report are limited to those based on the findings of the investigation. Where comments are made based on information obtained from third parties, Castledine Environmental assumes that all third-party information is true and correct. No independent action has been undertaken to validate the findings of third parties. The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at the time.

This survey has not included asbestos within existing structures, invasive plant species, geotechnical considerations or any elements unconnected with potential ground contamination at the site. If required, such surveys should be undertaken by suitably accredited organisations.

There may be other conditions prevailing at the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

3.0 INTRODUCTION AND SITE PROPOSALS

Castledine Environmental have been appointed by Mrs. G. Jani to undertake a Phase 1 Desk study on a site at Woodcotes, Fears Green, Sandon, Buntingford, Hertfordshire SG9 0QZ.

4.0 SCOPE

Castledine Environmental have prepared this report for the sole use and reliance of Mrs. G. Jani and associated appointees for the purpose of ensuring compliance with:

- National Planning Policy Framework (NPPF) December 2023.
- Part C1 of the building regulations.
- Condition No.2 of the North Hertfordshire District Council planning approval reference 24/01733/PNQ.

2. a) No development approved by this permission shall be commenced prior to the submission to, and agreement of the Local Planning Authority of written information allowing a preliminary environmental risk assessment to be undertaken, which allows the creation of a Conceptual Site Model which indicates sources, pathways and receptors. It should identify the current and past land uses of this site (and adjacent sites), with a view to determining the presence of contamination likely to be harmful to human health, and the built and natural environment.

(b) If the Local Planning Authority is of the opinion that the report which discharges condition (a), above, indicates a reasonable likelihood of harmful contamination then no development approved by this permission shall be commenced until a Site Investigation (Phase II environmental risk assessment) report has been submitted to and approved by the Local Planning Authority which includes:

- *(i) A full identification of the location and concentration of all pollutants on this site and the presence of relevant receptors, and;*
- *(ii) The results from the application of an appropriate risk assessment methodology*

(c) No development approved by this permission (other than that necessary for the discharge of this condition) shall be commenced until a Remediation Method

Statement report; if required as a result of (b), above; has been submitted to and approved by the Local Planning Authority.

(d) This site shall not be occupied, or brought into use, until:

(i) All works which form part of the Remediation Method Statement report pursuant to the discharge of condition (c) above have been fully completed and if required a formal agreement is submitted that commits to ongoing monitoring and/or maintenance of the remediation scheme.

- (ii) A Remediation Verification Report confirming that the site is suitable for use has been submitted to, and agreed by, the Local Planning Authority.*

(e) Any contamination, other than that reported by virtue of condition (a) and (b), encountered during the development of this site shall be brought to the attention of the Local Planning Authority as soon as practically possible; a scheme to render this contamination harmless shall be submitted to, and agreed by, the Local Planning Authority and subsequently fully implemented prior to the occupation of this site.

Reason: To ensure that any contamination affecting the site is dealt with in a manner that safeguards human health, the built and natural environment and controlled waters.

This report may not be used or relied upon by any unauthorised third party, or for any other proposed use than that specified above, without the explicit written agreement of Castledine Environmental.

This report is to be regarded as a Preliminary Risk Assessment in accordance with the Environment Agency's Land Contamination Risk Management (LCRM – 2021), which replaces CLR11 "*Model Procedures for the Management of Land Contamination*", carried out in accordance with BS 10175:2011+A2:2017, "*Investigation of Potentially Contaminated Land - Code of Practice*" and relevant sections of BS5930:2015+A1:2020, "*Code of Practice for Ground Investigations*".

The objectives of the report are:-

- To assess historical activities at the site with respect to their potential impact on the site environment;
- To assess historical and current surrounding land use in relation to known or potential off-site contamination issues that may impact on the subject site;
- Review of geological, hydrological and hydrological conditions at the site, pertaining to land contamination issues;
- To characterise the environmental setting of the site, identify migration pathways and vulnerable receptors for contamination originating at the site, focusing on potential soil and groundwater liabilities; and
- To develop a preliminary conceptual site model (CSM).

This report has been produced in order to discharge any relevant planning conditions outlined by the Local Authority and Environment Agency; however, further requirements may be imposed after the findings of this report that may need to be addressed at a later date.

5.0 SITE DESCRIPTION

The site is located in Fears Green, Sandon, Buntingford at National Grid Reference: 532657,235494 and is approximately 0.08ha in area.

The site is rectangular in shape and is orientated east to west. The site is located in a predominantly rural area and is directly bounded by open field to the north, scrubland with field beyond to the east, a small field located within the wider, associated boundary of Woodcotes to the south, an associate dwelling and small farmyard directly south west and the access road west, with the public highway and field beyond this.

The site interior comprises a former poultry shed and a very limited extent of exterior space, seen to be heavily overgrown on the site walkover.

Access to site was provided via a gate to the west of site, before a gravelled access route leads to the site itself. The structure on site was seen to be constructed of timber structuring and cladding with concrete flooring through and corrugated metal roofing. Brackets formerly holding cement guttering were noted along the northern and southern faces, with some areas of fragmented, potentially asbestos containing cement guttering noted around these faces (including within dense overgrowth occupying the entirety of the exterior area outside the northern face of the shed). The interior of the shed was noted to be split into two halves, separated by a small room.

The western extent was seen to contain the storage of two classic vehicles, a ride-on lawn mower and various items and tools such as pesticide spraying equipment, jerry cans, smaller lawn mowers, timber, tyres, concrete bags and miscellaneous items such as furniture and bikes. The small room separating the eastern and western halves of the shed was seen to be largely unoccupied, beyond fragmented, rotten wood (fallen in from the roofing) and a water tank, suspended in the eaves (evidenced by blue piping and client information).

The remaining, eastern extent of the barn was seen to be of the same construction as the western, however the concrete flooring was noted to be in a poorer state of repair and water ingress and guano remained atop the concrete. A series of small animal pens were noted inside the northern face of this extent of the barn, which client information indicated had most recently been in use for the small-scale keeping of sheep.

The exterior area on site, located directly north of and parallel with the barn, was largely inaccessible on the day of the walkover due to heavy overgrowth; however, some further fragments of concrete guttering were noted in this area.

Potential sources of contamination noted on the site walkover include the general agricultural usage of the site and PACM guttering noted on and

fragmented around the building itself. Topographically, the site and surrounding areas are level.

Photos of the site are present in Appendix D.

6.0 REGULATORY AUTHORITY AND OTHER ENVIRONMENTAL DATA

An environmental search listing historical and environmental factors likely to affect the property has been reviewed.

The most pertinent information is summarised in the following sections.

A copy is presented in Appendix A.

Additional geological and hydrological data was obtained from the British Geological Survey.

6.1 HYDROLOGICAL

6.1.1 AQUIFER

6.1.1.1 SUPERFICIAL GEOLOGY

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary (Undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	45	NE	Secondary A	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

6.1.1.2 BEDROCK GEOLOGY

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

6.1.2 ABSTRACTIONS AND PRIVATE WATER SUPPLIES

None recorded within 1000m of site.

6.1.3 SOURCE PROTECTION ZONE

The site is located in a Type 3 Total Catchment source protection zone (SPZ). Source protection zones define the sensitivity of an area around a potable abstraction site to contamination.

6.1.4 GROUNDWATER VULNERABILITY AND SOIL LEACHING POTENTIAL

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one-kilometre square grid.

Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

ID	Location	Summary	Soil / Surface	Superficial Geology	Bedrock Geology
A	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures

6.1.5 GROUNDWATER VULNERABILITY

The Groundsure report records the site as being located in an area where:
“Very significant soluble rocks are likely to be present with a moderate possibility of localised natural subsidence or dissolution-related degradation of bedrock, especially in adverse conditions such as concentrated surface or subsurface waterflow”.

6.1.6 POTENTIAL SURFACE WATER

The Groundsure report records an unnamed, surface level watercourse located 83m south west of site.

6.1.7 FLOOD RISK

According to both the Groundsure report and Environment Agency interactive online maps, the site is recorded to be at a low risk of flooding from the River and Seas (RoFRaS), a negligible risk from surface water flooding on site and a moderate risk from groundwater flooding.

This report does not replace a full hydrogeological survey and specialist studies may need to be undertaken to fully assess the risks posed from flooding.

6.1.8 DISCHARGE CONSENTS

The Groundsure report records a historical licenced discharge consent formerly held 87m south of site. The consent related to final / treated sewage effluent discharges (not on behalf of the local water company) into a tributary of Cat Ditch (revoked by circa.1992).

6.2 PERMITTED PROCESSES

None recorded within 500m of site.

6.3 POLLUTION INCIDENTS

The Groundsure report records no pollution incidents located within 250m of site and no significant impact incidents located within 500m of site.

6.4 RADIOACTIVE SUBSTANCES REGISTRATIONS

None recorded within 500m of site.

6.5 WASTE**6.5.1 LICENSED WASTE MANAGEMENT FACILITIES (LOCATIONS)**

None recorded within 500m of site.

6.5.2 LANDFILL SITES

None recorded within 500m of site.

6.6 HAZARDOUS SUBSTANCES

None recorded within 500m of site.

6.7 ECOLOGICAL RECEPTORS

The Groundsure report records as being located within the Great Ouse and Lee surface waters Nitrate Vulnerable Zone (NVZ) and the Anglian Chalk groundwaters NVZ; with an area of Designated Ancient Woodland named Lords Wood located 404m south east of site and a Nitrate Sensitive Area named Slip End is located 902m south west of site.

No further sensitive land usages are recorded within 1000m of site.

6.8 SOILS AND GEOLOGY

"Contains British Geological Survey materials © NERC 2024" obtained from <http://www.bgs.ac.uk/data/mapViewers/home.html> under the [Open Government Licence](#)

6.8.1 SUPERFICIAL DEPOSITS

Both BGS geological mapping and the Groundsure report record superficial geological deposits of the Lowestoft Formation on site, comprising an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays. The till is characterised by its chalk and flint content.

Records of Glaciofluvial deposits, comprising similar deposits, sands and gravels are then located 45m north east and Glacial head deposits, again comprising similar deposits are located 151m north west of site.

6.8.2 SUPERFICIAL DEPOSITS PERMEABILITY

The Groundsure report records the site as being within an area where the maximum permeability of superficial deposits is recorded as 'moderate' and the minimum permeability as 'low' and facilitated by mixed flow mechanisms.

This is a qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

6.8.3 BEDROCK DEPOSITS

Both BGS geological mapping and the Groundsure report records bedrock geology of the Lewes Nodular Chalk Formation underlying site, comprising chalk with subsidiary calcareous mudstones and flints.

6.8.4 BEDROCK PERMEABILITY

The Groundsure report records the site as being within an area where the maximum permeability of bedrock geology is recorded as 'very high' and the minimum permeability as 'very high' and facilitated by fracture flow mechanisms.

6.8.5 ARTIFICIAL GROUND

BGS geological mapping records no artificial deposits located on or within 250m of site; however, evidence noted on the site walkover indicating overgrown / vegetated concrete and hardstanding gravels to form the present ground conditions on site.

6.8.6 COAL MINING

The site is not located in a coal mining reporting area and the local geology is not considered appropriate for such extraction. Accordingly, the risk from coal mining activities is considered to be negligible.

6.8.7 NON-COAL MINING

The Groundsure report records the site as being located in an area where the limited extraction of chalk may have taken place, the report states:

“Underground mine workings are uncommon, although the geology is similar to that worked elsewhere. The potential for difficult ground conditions are unlikely and are at a level where they need not be considered.”

6.8.8 SURFACE WORKINGS

None recorded within 250m of site.

6.8.9 RADON

The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level. No radon protective measures are necessary as described in publication BR211:2015 by the Building Research Establishment.

6.9 AERIAL PHOTOGRAPHY

Aerial photography shows the following:

6.9.1 GOOGLE EARTH

14 No. images are held in the historic imagery dataset, as follows:

Date	Description
December 2000	The site is shown as occupied by the east-west orientated poultry shed and the thin strip of exterior area directly north of the barn (remains grassed / vegetated at this time). The site remains located in a wider, predominantly rural area with an associated farmyard and dwelling directly SW of site.
February 2003	No discernible change on site nor site relevant change to the surrounding areas.
October 2003	No discernible change on site nor site relevant change to the surrounding areas.
October 2008	Animal huts / shelters are located directly NE of site, within the paddocked area forming the area directly north, NE and east of site – indicating this area of site remains in use for animal rearing.
July 2009	No discernible change on site nor site relevant change to the surrounding areas.
September 2012	No discernible change on site nor site relevant change to the surrounding areas.
August 2013	No discernible change on site nor site relevant change to the surrounding areas.
July 2014	No discernible change on site nor site relevant change to the surrounding areas.
March 2017	No discernible change on site nor site relevant change to the surrounding areas.
June 2018	Animal pens / shelters east of site no longer shown and area appears disused at this time.
April 2020	No discernible change on site nor site relevant change to the surrounding areas.
March 2020	No discernible change on site nor site relevant change to the surrounding areas.
March 2022	No discernible change on site nor site relevant change to the surrounding areas.
August 2022	Site remains occupied by the poultry shed with very little discernible change having taken place on site, however the exterior areas on site and those offsite directly NE and east appear to be disused at this time.

6.9.2 GOOGLE STREET VIEW

Google Street View imagery is unavailable for the site due to the site's location on a private access track, away from the roadside and being to the rear of foliage, structures or hedgerow.

6.10 HISTORIC MAPPING

The following historic maps have been reviewed as part of this assessment:

Map	Onsite	Offsite
OS County Series: 1877, 1:2,500	The site is shown as located within a wider agricultural field.	The immediate surroundings in all compass directions comprise open field, notable features include the roadside approx.52m west of site, as in the present-day and a farmstead approx.260m SE of site.
OS County Series: 1883, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1896, 1:10,560	No discernible change on site.	A structure, likely a dwelling, is now located approx.46m SW of site.
OS County Series: 1898, 1:2,500	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1922, 1:10,560	No discernible change on site.	There have been extensions and additional buildings erected adj. to the dwelling directly SW of site.
OS County Series: 1923, 1:2,500	No discernible change on site.	The area directly SW of site is now marked as occupied by a dwelling named 'Woodcote', a circular pond (remains persistent until the present-day) and outbuildings and a barn. An area approx.125m E of site is now marked as marshy.

Map	Onsite	Offsite
OS County Series: 1947, 1:10,560	Two barns partially transgress into the NW and SW corners of site.	Barns have been erected directly NW, SW and SE of the site area.
Provisional: 1960, 1:10,560	No discernible change on site.	Marshland area approx.125m SE of site no longer marked as such.
National Grid: 1975, 1:2,500	The site is now occupied by a linear poultry shed, as seen in the present-day.	Further barns and outbuildings erected adj. to site including 6 No. barns orientated north-south and located directly south of site. Surrounding areas to site now likely occupied by the present-day concrete hardstanding. Barns seen remaining in the present-day west and SW of site now present.
National Grid: 1981-1982, 1:10,000	No discernible change on site.	Mapping shows the series of barns directly south of site as merged into a single, large structure (likely a mapping error at this scale).
National Grid: 1993, 1:2,500	No discernible change on site.	Surrounding areas see little site relevant change.
National Grid: 2001, 1:10,000	No discernible change on site.	Surrounding areas see little site relevant change.
Landline: 2003, 1:1,250	No discernible change on site.	Only two barns remain directly south / SE of site with the remaining 4 No. likely demolished at this time.
National Grid: 2010, 1:10,000	No discernible change on site.	Remaining barns not seen in the present-day south of site now demolished and removed.
National Grid: 2024, 1:10,000	No discernible change on site.	Surrounding areas see little site relevant change.

6.11 CURRENT LAND USE DATA

None recorded within 500m of site.

6.12 PETROL AND FUEL SITES

None recorded within 500m of site.

6.13 HISTORICAL PETROL AND FUEL SITE DATABASE

None recorded within 500m of site.

6.14 POTENTIAL CONTAMINATIVE LAND USES IDENTIFIED ON MAPPING

None recorded within 500m of site.

6.15 HISTORICAL TANK DATABASE

None recorded within 500m of site.

6.16 HISTORICAL ENERGY FACILITIES

None recorded within 500m of site.

6.17 HISTORICAL GARAGE DATABASE

None recorded within 500m of site.

7.0 PRELIMINARY CONCEPTUAL SITE MODEL

The risk posed by any contaminants in soil or groundwater will depend on the nature of the hazard, the probability of exposure, the pathway by which exposure occurs, and the likely effects on the receptors. A contaminant is defined as a substance in, on or under land (or within groundwaters) that has the potential to cause harm, while a risk is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance. The following sections discuss all the identified potential on and off-site sources, pathways and receptors in the context of the proposed development and plausible pollutant linkages which may represent a risk to identified receptors from the data gained from the desk study. At this stage the assessment is qualitative and aimed to determine all pollutant linkages, irrespective of significance or allowing for uncertainty.

Source	A contaminant or pollutant that is in, on or under land that has the potential for cause harm or pollution to a receptor.
Pathway	The physical route by which a receptor is or could be affected by a contaminant or pollutant.

Receptor	Something or someone that could be adversely affected by a contaminant, i.e. people, controlled waters, ecological systems, buildings, crops, livestock.
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By considering each of the three elements above, an assessment of actual and potential hazards to receptors can be carried out, taking into account the significance and degree of risk of each. The three elements above can exist separately; however, they only create a risk where they are linked together, thus creating a contaminant linkage. During the Preliminary Risk Assessment Stage, the linkages are referred to as 'Potential Contaminant Linkages', until they are confirmed via intrusive sampling, thus becoming 'Relevant Contaminant Linkages'.

A tabled, diagrammatic or matrix of pollutant linkages is considered to be a Conceptual Site Model (CSM), the source-pathway-receptor linkages are reviewed and displayed, apportioning a risk-rating and mitigation suggestion after each summary.

Three impact potentials exist for any given site, these are:

- The site impacting upon itself;
- The site impacting on its surroundings; and
- The surroundings impacting on the site.

All three impacts need to be considered in a risk assessment.

7.1 SOURCES

The following potential sources of contamination have been identified:

7.1.1 ONSITE

- Initial agricultural usage of the site (at least circa.1877-1947)
- Partial development of site with barns (inside NW, SW and SE corners, circa.1947 and demolished by circa.1975)
- Development of site and usage of poultry shed (circa.1975 until recent-times)
- Storage of classic vehicles, jerry cans / fuel, machinery and pesticide spraying equipment within barn (noted on walkover, including small-scale staining)

- Made ground (associated with development of site, agricultural usage, subbases and onsite and proximate demolitions - circa.1947 and 1975)
- Fragmented PACM (noted on site walkover)

Potential Sources and Associated Contaminants Identified	
Source	Potential Contaminants of Concern
Initial agricultural usage of the site (at least circa.1877-1947)	Heavy metals, pesticides (SVOCs)
Partial development of site with barns (inside NW, SW and SE corners, circa.1947 and demolished by circa.1975)	Heavy metals, asbestos, PAHs, TPH CWG
Development of site and usage of poultry shed (circa.1975 until recent-times)	Heavy metals (made ground and animal excrement), asbestos, PAHs, TPH CWG, pesticides (SVOCs) – noted pesticide spraying equipment within barn
Storage of classic vehicles, jerry cans / fuel, machinery and pesticide spraying equipment within barn (noted on walkover, including small-scale staining)	TPH CWG, PAHs, heavy metals, pesticides (SVOCs) – noted pesticide spraying equipment within barn
Made ground (associated with development of site, agricultural usage, subbases and onsite and proximate demolitions - circa.1947 and 1975)	Heavy metals, asbestos, PAHs, TPH CWG
Fragmented PACM (noted on site walkover)	Asbestos

7.1.2 OFFSITE

- Erection and demolition of at least 6 No. barns (directly south of site, erected circa.1947 and 1975, partially demolished by circa.2003 and full removed by circa.2010)

Potential Sources and Associated Contaminants Identified	
Source	Potential Contaminants of Concern
Erection and demolition of at least 6 No. barns (directly south of site, erected circa.1947 and 1975, partially demolished by circa.2003 and full removed by circa.2010)	Heavy metals, asbestos, PAHs, TPH CWG, pesticides (SVOCs)

7.2 PATHWAYS

A pathway is defined as a mechanism or route by which a contaminant comes into contact with, or otherwise affects a receptor. Pathways by which the identified receptors may be impacted upon in the context of the proposed development are identified as follows:

- Ingestion (direct and indirect via crop uptake);
- Dermal contact;
- Inhalation;
- Plant uptake;
- Direct contact by buried structures (i.e. pipe degradation and leaching, pH & Sulphate attack on concrete); and
- Leaching of soluble contamination into groundwater.

7.3 RECEPTORS

Receptors are defined as people, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by contaminant(s).

- Human Health;
 - Current users of the site;
 - Future users of the site;
 - Users of neighbouring sites;
 - Construction workers;
 - Services personnel working in trenches;
 - Construction Materials;
- Buried concrete, which may be affected by high concentrations of sulphate and/or low pH, in the soils and groundwater underlying the site;
- Buried water pipes;
- Controlled Waters;
- Ecological Receptors; and
- Flora and fauna using the proposed development.

8.0 CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) is a hypothesis of the nature and sources of contamination, potential receptors that may be the recipient of contamination arising from those sources and any pathways that may exist. It creates a plausible source-pathway-receptor pollutant linkage

(hazard), set within the context of the ground and proposed end use of the site.

8.1 PRELIMINARY CONCEPTUAL SITE MODEL

8.1.1 SOIL CONTAMINATION

The site is currently occupied by a former poultry shed (now disused as such) within which the storage of classic vehicles, machinery (i.e. ride-on lawn mower), fuel storage and pesticide spraying equipment were noted, with fragmented PACM guttering noted without. The poultry shed has been present on site since at least circa.1975, prior to which the site was partially occupied by 3 No. barns (north western, south western and south eastern corners of site), before which the site remained unoccupied field. The surrounding areas have remained relatively consistent over time, with erection of the associated dwelling and farmyard directly south west and at least 6 No. barns south of site between the dates of circa.1896, 1922, 1947 and 1975, before being variously demolished by circa.2003 and 2010.

The initial arable agricultural usage of the site and the subsequent development and usage of the site for more intensive animal rearing alongside various on site and proximate demolitions are considered potential sources of soil contamination.

8.1.2 GROUND GAS AND HAZARDOUS VAPOURS

No significant potential sources of hazardous ground gas generation have been identified. An area of marshland located approximately 125m south east of site being discounted as a significant hazard to site – area remains as open field / marshland and as such, provides vertical pathway for any ground gas produced and guidance found in *BS8576:2013 The Standard for Guidance on Investigations for Ground Gas - Permanent Gases and Volatile Organic Compounds (VOCs)* states: “natural soil strata with a low degradable organic content e.g. alluvium or peat’ is a very low ground gas risk. The agricultural usage of the site and storages within the shed (i.e. vehicles, fuel storage) are considered limited potential sources of hazardous vapours.

TABLE 1. SUMMARY OF SIGNIFICANT POLLUTION LINKAGES

Contaminant	Pathway	Receptor	Probability of Pollutant Linkage	Conseq.	Risk	Possible Mitigation
Contaminated Soils (<i>initial arable usage, subsequent animal rearing usage, storage of vehicles, fuel & equipment, likely made ground deposits, asbestos</i>)	Direct Ingestion & Direct Contact	Site Workers (<i>during site works, excavations, eating and drinking</i>)	Lw	Md	M/L	Site workers to wear appropriate PPE for health and safety reasons, suitable usage and adherence to relevant HSE guidance during site works considered sufficient to mitigate hazards to LOW – following confirmation via proportionate Phase II SI.
Contaminated Soils (<i>initial arable usage, subsequent animal rearing usage, storage of vehicles, fuel & equipment, likely made ground deposits, asbestos</i>)	Inhalation of Dust, Dry Arisings	Site Workers (<i>during site works, excavations, eating and drinking</i>)	Lw	Md	M/L	
Contaminated Soils (<i>initial arable usage, subsequent animal rearing usage, storage of vehicles, fuel & equipment, likely made ground deposits, asbestos</i>)	Crop Uptake & Direct Ingestion, Direct Contact	End Users (<i>residents / tenants, children, visitors, service personnel</i>)	Li	Md	M	Potential sources of both soil and vaporous contamination identified which should be investigated further. Potential sources include prior arable usage, subsequent animal rearing agricultural usage, likely made ground and asbestos (noted fragmented in area of proposed soft-landscaping) presence on site and the storage of fuels, vehicles and machinery within the barns and various onsite and proximate demolitions. As such, it is recommended that a proportionate Phase II Site Investigation is planned and carried out on site. Trial pit formation within or below both wings of the barn and at least 2 No. pits within the exterior area on site will be sufficient to categorise ground conditions on site (i.e. made ground, natural or reworked natural deposits, their nature, extent and depth) alongside the taking of environmental samples (metals metalloids, PAHs, phenol, SOM, pH, organic matter alongside TPH CWG, asbestos and SVOC testing). Works will inform extent of remediation required and thus end-user, controlled waters and site worker safety.
Contaminated Soils (<i>initial arable usage, subsequent animal rearing usage, storage of vehicles, fuel & equipment, likely made ground deposits, asbestos</i>)	Inhalation of Dust, Dry Arisings	End Users (<i>residents / tenants, children, visitors, service personnel</i>)	Li	Md	M	
Contaminated Soils (<i>initial arable usage, subsequent animal rearing usage, storage of vehicles, fuel & equipment, likely made ground deposits, asbestos</i>)	Crop Uptake & Direct Ingestion, Direct Contact	Flora and Fauna (<i>on and offsite</i>)	Lw	Md	M/L	
Contaminated Soils (<i>initial arable usage, subsequent animal rearing usage, storage of vehicles, fuel & equipment, likely made ground deposits, asbestos</i>)	Vertical and lateral migration (<i>bedrock & superficial geology pathways</i>)	Controlled Waters (<i>Secondary Undifferentiated, A & Principal Aquifers, watercourse approx.83m SW</i>)	Lw	Md	M/L	
Contaminated Soils (<i>initial arable usage, subsequent animal rearing usage, storage of vehicles, fuel & equipment, likely made ground deposits, asbestos</i>)	Direct contact (<i>pipe degradation and leaching</i>)	Services (<i>impacted new potable supply piping</i>)	Li	Md	M	
Ground Gases (Methane and CO ₂) (<i>no significant potential sources identified</i>)	Vertical and lateral migration (<i>bedrock & superficial geology pathways</i>)	Site Workers & Excavations, End Users & Building Envelope (<i>ingress and build-up</i>)	UI	Md	L	
Volatile and Semi-volatile Organic Compounds (<i>agricultural development & usage, storage of vehicles, machinery & fuels</i>)	Vertical and lateral migration (<i>bedrock & superficial geology pathways</i>)	Site Workers & Excavations, End Users & Building Envelope (<i>ingress and build-up</i>)	Lw	Md	M/L	The agricultural usage of the site and storages within the shed (i.e. vehicles, fuel storage) are considered limited potential sources of hazardous vapours which should be investigated further.
Radon	Vertical and lateral migration	End Users & Building Envelope	UI	Md	L	Site is not located in a Radon Affected Area.

KEY: Probability of pollutant linkage Hi = Highly likely, Li = Likely, Lw = Low Likelihood, UI = Unlikely
Consequence Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor,
Overall Risk VH = Very High, H = High, M = Moderate, M/L = Moderate/Low, L = Low, VL = Very Low

Based on the preliminary CSM for the site, an environmental risk assessment has been undertaken. A simple matrix can provide a consistent basis for decision making. It should be used with caution, recognising the over-simplification that it will normally represent. The probability and consequences are defined according to parameters relevant to the situation; the boundaries of risk acceptability (and tolerability, where relevant) indicated on the matrix provided in Table 2, can be tailored to the factors influencing the significance of the risk. Individual situations are mapped onto the matrix to provide a ready and consistent indication of their acceptability or tolerability.

TABLE 2. RISK CLASSIFICATION MATRIX

		Consequence			
		Severe (Sv)	Medium (Md)	Mild (Mi)	Minor (Mr)
Probability	High (Hi)	Very high risk	High risk	Moderate Risk	Moderate/Low Risk
	Likely (Li)	High risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood (Lw)	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely (UI)	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

Source: CIRIA Report C552, Contaminated Land Risk Assessment. A Guide to Good Practice, 2001

These attributes are evaluated qualitatively against individual hazard assessments to determine the likelihood of a given hazard occurring. The risk evaluations for each plausible pollutant linkage are given in the last three columns of Table 1.

TABLE 3. CLASSIFICATION OF RISK

Very high risk (Vh)	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High risk (Hi)	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer term.
Moderate risk (Md)	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.
Low risk (Lw)	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very low risk (VI)	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Source: CIRIA Report C552, Contaminated Land Risk Assessment. A Guide to Good Practice, 2001

9.0 ENVIRONMENTAL RISK ASSESSMENT

Based on the information contained in this report, it is the opinion of Castledine Environmental that the site represents a **LOW** to **MODERATE** level of risk with respect to the proposed development.

It is recommended that further investigation inline with Section 16.0 is planned and carried out on site.

It is recommended that the poultry shed structure and fragmented cement gutting on site be subject to an asbestos survey (and subsequent removal, if required) by appropriately qualified personnel. This should be carried out prior to any demolition or redevelopment occurring in order to ensure site works do not cause future contamination of the site.

This report should be submitted to your Local Planning Authority for agreement to allow the Phase 2 intrusive testing to be undertaken.

10.0 SUMMARY OF RISKS**11.0 HUMAN HEALTH**

Agriculture is a potentially contaminative land usage and as such, agricultural sites and land may have been used for a wide range of potentially contaminative activities. Such activities include fuel, oil and lubricants storage (bunded and non-bunded, associated with agricultural machinery), the repair and maintenance of machinery and vehicles on site, the storage of silage and other feeds, animal wastes and excrements, agricultural chemicals and the likely presence of asbestos (prevalent on older farmyards).

11.1.1 RESIDENTS / END-USERS

The risks to end-users of the site are considered to be moderate when assessed against the sensitive, residential end-usage of the site and the site's historied legacy of agricultural usage (both arable and animal rearing). The site is proposed to be almost entirely encapsulated beneath building footprint; however, an extent of exterior area is proposed which is likely to form soft-landscaping areas. Whilst the hazards from soil contamination to end-users in the main site area are considered to be low (beyond potential vapour ingress and degradation of new potable piping), should onsite soils remain on site and in areas of proposed soft-landscaping, there remains risks to end-users of the site (i.e. inhalation of dusts, direct contact with soils, indirect and direct ingestion, surface water run-off).

11.1.2 SITE WORKERS

The risks to site workers during site works are considered to be low to moderate, due to the potential for asbestos contamination along with a significant extent of potentially impacted made ground deposits. The potential for the inhalation of asbestos fibres, direct contact with contaminated made ground or the build-up of vapours in excavations or building envelope during site works are considered risks to site workers. The provision for considered usage of PPE and adherence to relevant HSE guidance would be sufficient

to mitigate the risks to low, following confirmation of both soil and vapour hazards on site via an intrusive Phase II Site Investigation.

- Site workers are to maintain good hygiene standards during site works.
- If access to deep excavations is required, pre-monitoring should be carried out.
- In accordance with Control of Asbestos Regulation (CAR) 2012, a provision for RPE/PPE and suitable working protocol should be provided during any works with asbestos containing materials.

12.0 CONTROLLED WATERS

The risks to controlled waters are considered to be low to moderate, due to the largely impermeable superficial geology in the area inhibiting significant vertical migration, the lack of significant or significantly mobile contamination no site considered capable of impacting underlying aquifers and the lack of abstraction sites within 1000m of site; however, there exists a potential risk to the nearby superficial Secondary A Aquifer from onsite potential sources such as made ground deposits, fuel and vehicle storages and agricultural sources such as animal excrements, which should be investigated further.

13.0 STRUCTURES

13.1.1 GROUND GASES

No significant potential sources of hazardous ground gas generation have been identified with no significant infilled pits, ponds or ground workings identified and an area of marshland located approximately 125m south east of site being discounted as a significant hazard to site – area remains as open field / marshland and as such, provides vertical pathway for any ground gas produced and guidance found in *BS8576:2013 The Standard for Guidance on Investigations for Ground Gas - Permanent Gases and Volatile Organic Compounds (VOCs)* states: “natural soil strata with a low degradable organic content e.g. alluvium or peat’ is considered to be a very low ground gas risk.

13.1.2 HAZARDOUS VAPOURS

The agricultural usage of the site and noted storages within the shed (i.e. vehicles, fuel storage) are considered limited potential sources of hazardous vapours, which should be investigated further. TPH CWG samples and PID usage should be undertaken from beneath the present footprint of the barn / eastern and western wings.

13.1.3 POTABLE WATER SUPPLY PIPING

Due to the potential for both hydrocarbon (agricultural usage, made ground deposits, possibility for ash-based subbases, vehicle, machinery and fuel storage) on site, there exists the potential for new potable water piping to be impacted by residual site soils. Hydrocarbon degradation and leaching can impact potable supply piping and thus impact potable supplies themselves, offering a potential risk to end-users via impacted water supplies.

14.0 RECOMMENDATIONS

At this stage, based on the desk study information collected, it is considered that allowance be made for the following:

- A ground investigation designed to BS10175:2011 and BS5930:2015 and comprising trial pitting will be required to confirm ground conditions and collect samples for chemical analysis;
- At least 4 No. trial pits being formed on site (at least two in exterior areas and two from either end of the existing poultry shed);
- Generic environmental sampling across the site (i.e. asbestos, metals, metalloids, PAHs, phenol, SOM, pH);
- Targeted SVOC sampling in exterior areas and TPH CWG and PID usage within the footprint of the poultry shed.

The works will inform the extent of remediation required on site, including the potential for vapour ingress to the final dwellings (and thus installation of a VOC-resistant membrane) the possibility of soil contamination (i.e. replacement with certified clean materials and/or barrier piping specification).

A watching brief (as outlined in Appendix E) should be carried out by the site supervisor during the course of demolition, site clearance and construction works for any obvious contamination (e.g. oil spillage in ground, buried waste, possible asbestos containing material). Should previously unreported or undiscovered contamination be identified, then development should stop and Castledine Environmental should be contacted to determine if further assessment or changes to the remediation scheme are required.

15.0 REFERENCES**15.1 LEGISLATION AND REGULATIONS****15.1.1 ACTS**

- [1] Environmental Protection Act 1990, Part IIA: inserted by Environment Act 1995, Section 57. See Environment Act 1995 for text of Part IIA.

15.1.2 PLANNING REGULATIONS

- [2] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 SI1999/No.293
- [3] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) (Amendment) Regulations 2000 SI2000/No.2867
- [4] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) (Amendment) Regulations 2017 SI2017/No.571

15.1.3 CONTAMINATED LAND REGULATIONS

- [5] The Contaminated Land (England) Regulations 2000. SI2000/No.227
- [6] The Contaminated Land (England) (Amendment) Regulations 2001 SI2001/No.663
- [7] The Contaminated Land (England) Regulations 2006 SI2006/No.1380

15.2 STATUTORY GUIDANCE

- [8] Department of Environment, Food and Rural Affairs. 2012. *Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance*. Department of Environment, Food and Rural Affairs
- [9] Communities and local Government, 2023: National Planning Policy Framework.

15.3 BRITISH STANDARDS

- [10] BS 5930:2015+A1:2020 Code of practice for site investigations
- [11] BS 10175:2011+A2:2017 Investigation of potentially contaminated sites - Code of practice
- [12] BS 8485:2015+A1:2019 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings
- [13] BS 8576:2013 Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs)
- [14] BS 10176:2020 Taking Soil Sample for Determination of Volatile Organic Compounds (VOCs)

15.4 NON-STATUTORY TECHNICAL GUIDANCE**15.4.1 ENVIRONMENT AGENCY**

- [15] Land Contamination Risk Management (LCRM) 2020, updated 2023

15.4.2 CIRIA PUBLICATIONS

- [16] Wilson, S., Oliver, S., Mallett, H., Hutchings, H., and Card, G.. 2007, *C 665 Assessing risks posed by hazardous ground gases to buildings* London: Construction Industry Research and Information Association
- [17] Mallett, H., Cox, L., Wilson, S. and Corban, M... 2014, *C 735 Good practice on the testing and verification of protection systems for buildings against hazardous ground gases* London: Construction Industry Research and Information Association

15.4.3 CL:AIRE

- [18] Card G, Wilson S, Mortimer S. 2012. *A Pragmatic Approach to Ground Gas Risk Assessment. CL:AIRE Research Bulletin RB17.* CL:AIRE, London, UK. ISSN 2047- 6450 (Online)

16.0 APPENDICES

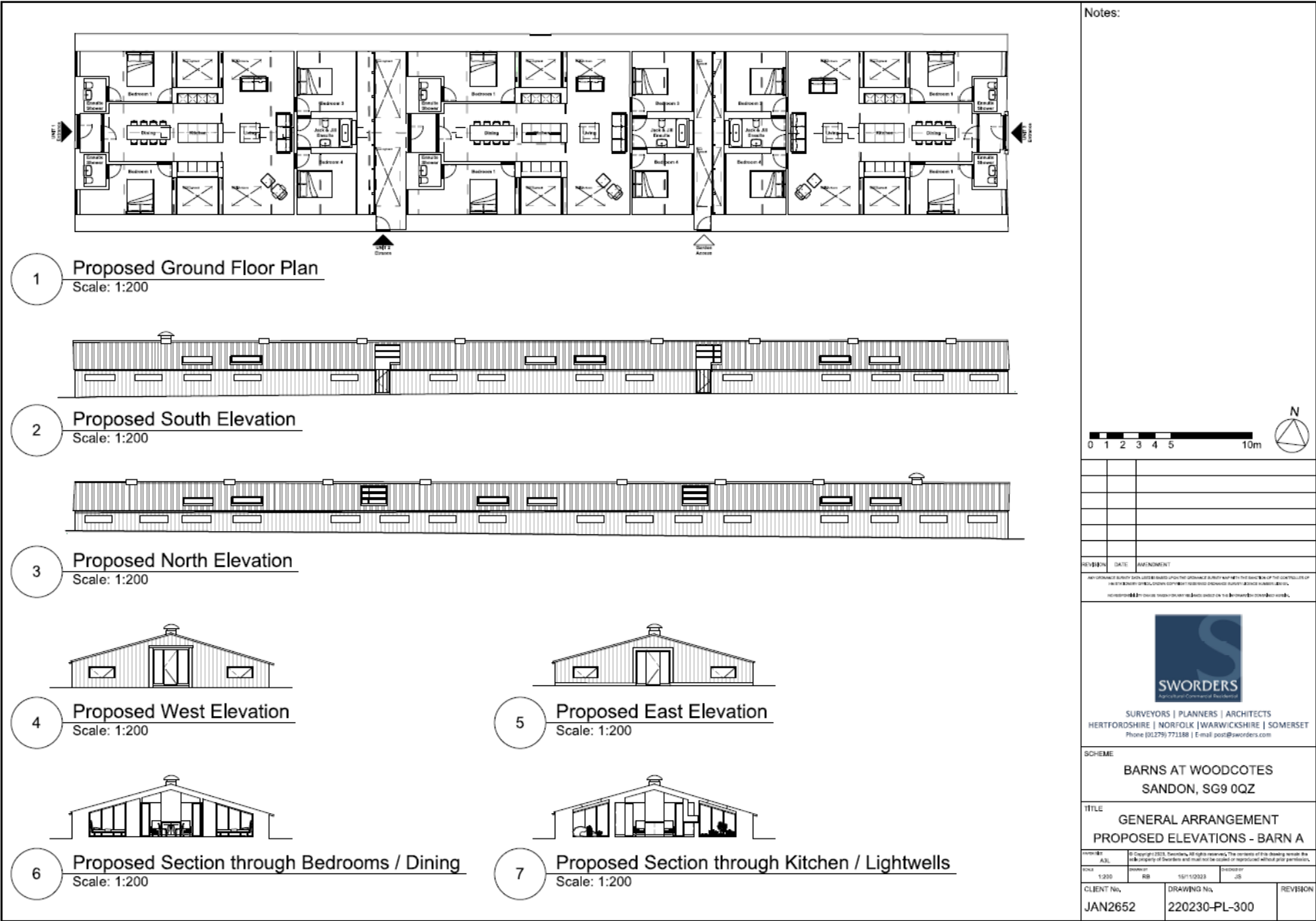
APPENDIX A ENVIRONMENTAL SEARCH

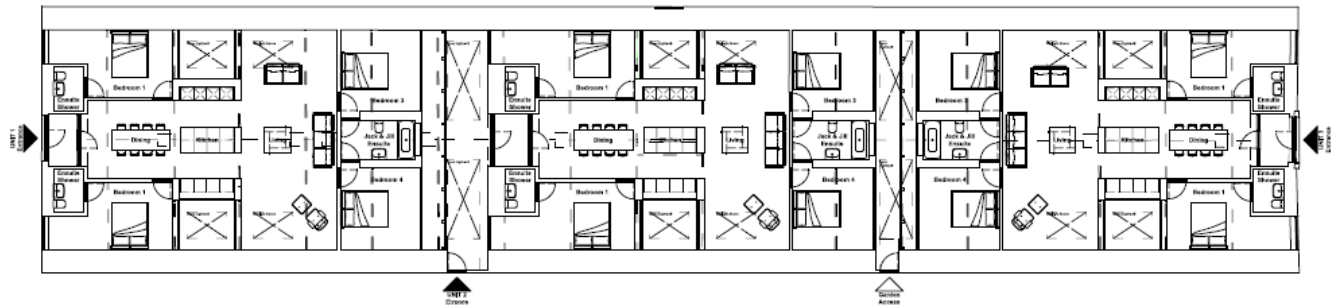
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APPENDIX B HISTORICAL MAPPING

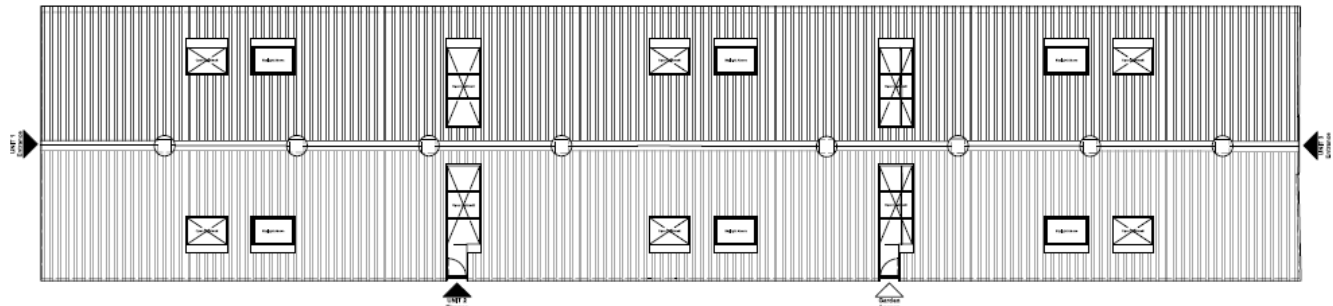
Separate Map Packs (2 No. files)

APPENDIX C PROPOSED AND CURRENT SITE PLANS





1 Proposed Ground Floor Plan
Scale: 1:200



2 Proposed Roof Plan
Scale: 1:200

Notes:



REVISION	DATE	AMENDMENT

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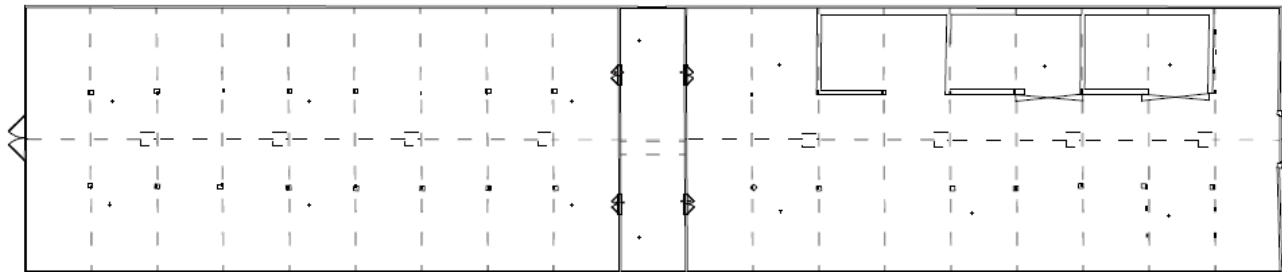
SURVEYORS | PLANNERS | ARCHITECTS
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SCHEME
BARN AT WOODCOTES
SANDON, SG9 0QZ

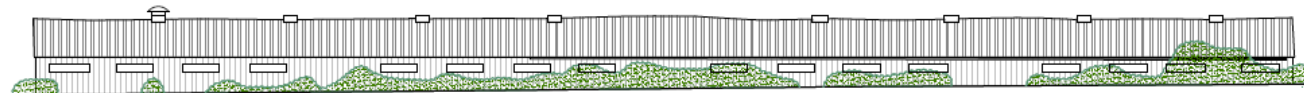
TITLE
GENERAL ARRANGEMENT
PROPOSED PLANS - BARN A

PROJECT A31	DATE 1/2025	DESIGNED BY WB	CHECKED BY JH
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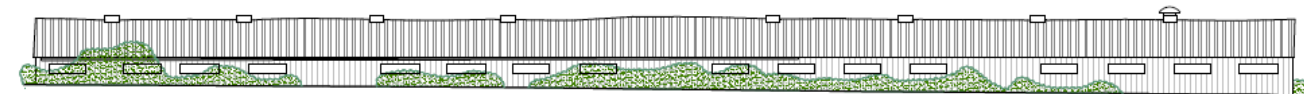
CLIENT No. JAN2652	DRAWING No. 220230-PL-100	REVISION
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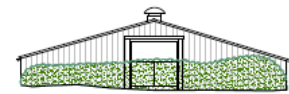
1 Existing Ground Floor Plan
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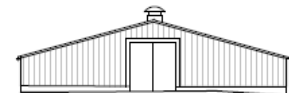
2 Existing South Elevation
Scale: 1:200



3 Existing North Elevation
Scale: 1:200

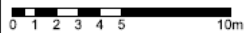


4 Existing West Elevation
Scale: 1:200



5 Existing East Elevation
Scale: 1:200

Notes:



REVISION	DATE	AMENDMENT



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SCHEME
**BARNs AT WOODCOTES
SANDON, SG9 0QZ**

TITLE
**GENERAL ARRANGEMENT
EXISTING ELEVATIONS - BARN A**

Drawn by: AJL	© Copyright 2023, Sworders. All rights reserved. The contents of this drawing remain the sole property of Sworders and must not be copied or reproduced without prior permission.		
Scale: 1:200	Drawn by: JB	15/11/2023	Issued by: JB
CLIENT No: JAN2652	DRAWING No: 220230-PL-030	REVISION	





APPENDIX D

SITE PHOTOS AND LOCATIONS



Site Walkover Photos

Photo No.1: Facing east from the adjacent roadside showing the gated site access (outside red-line boundary)



**Address: Woodcotes, Fears Green, Buntingford
Client: Mrs. G. Jani**

Photo No.2: Facing slightly NE outside the SW corner of site showing the front (western) face of the former poultry shed





Site Walkover Photos

Photo No.3: Facing east showing the northern face of the poultry shed and overgrown exterior area (within red-line)



Address: Woodcotes, Fears Green, Buntingford
Client: Mrs. G. Jani

Photo No.4: Facing SE outside the NW corner of shed





Site Walkover Photos

Photo No.5: Facing east from within the western access to the poultry shed showing concrete flooring and misc. storages



**Address: Woodcotes, Fears Green, Buntingford
Client: Mrs. G. Jani**

Photo No.6: Showing the storage arrayed inside the western extent of the poultry shed (i.e. construction materials, fuel)





Site Walkover Photos

Photo No.7: Showing the storage arrayed inside the western extent of the poultry shed (i.e. mower, workbench, tools)



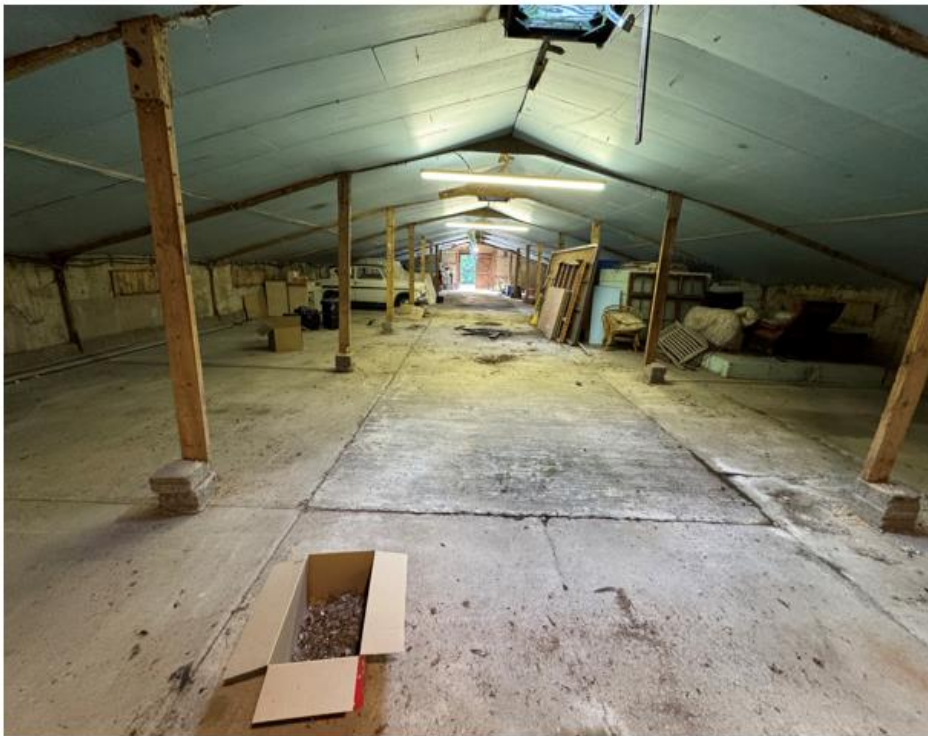
Address: Woodcotes, Fears Green, Buntingford
Client: Mrs. G. Jani

Photo No.8: Showing classic vehicle storage within the central extent of the western half of the poultry shed



Site Walkover Photos

Photo No.9: Facing west inside the western half of the poultry shed showing the full extent of this half of the barn



**Address: Woodcotes, Fears Green, Buntingford
Client: Mrs. G. Jani**

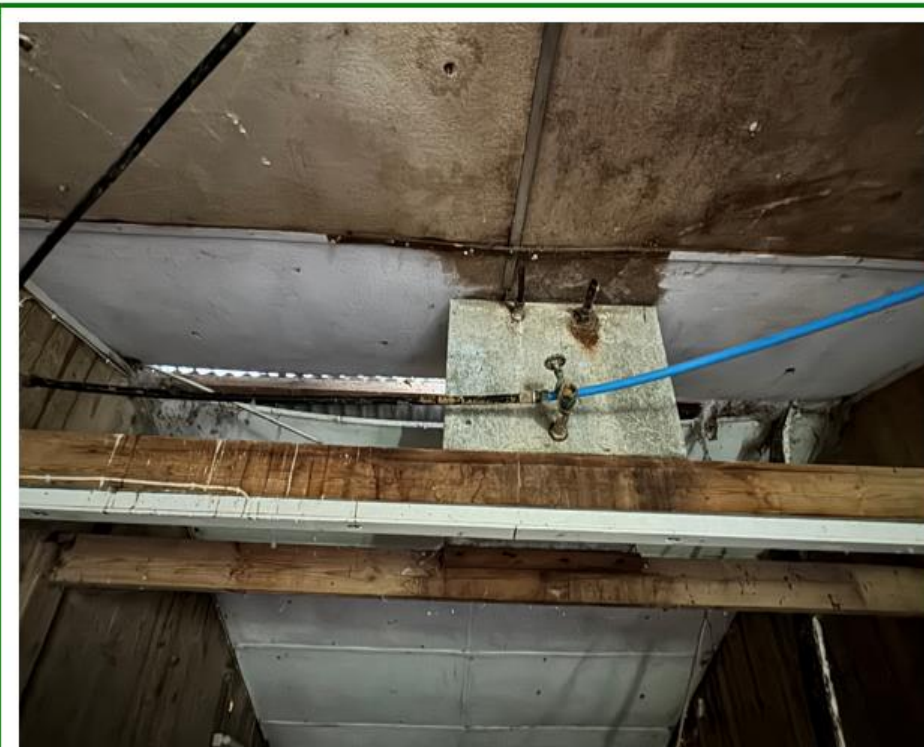
Photo No.10: Small room separating the eastern and western wings of the poultry shed (roofing above allowing water ingress)





Site Walkover Photos

Photo No.11: Tank noted in eaves above the central separating room within the barn (likely water judging from apparatus)



**Address: Woodcotes, Fears Green, Buntingford
Client: Mrs. G. Jani**

Photo No.12: Facing west inside the far eastern extent of the poultry shed and eastern section showing animal pens





Site Walkover Photos

Photo No.13: Further example shot of former animal pens (most recently in use for chickens and sheep)



Address: Woodcotes, Fears Green, Buntingford
Client: Mrs. G. Jani

Photo No.14: Facing west outside the rear (eastern) face of the poultry shed and beyond the eastern boundary of site



APPENDIX E**WATCHING BRIEF**

It remains possible that previously unexpected soil conditions may be encountered during the construction process. Examples may include oily pockets within the soil, potential for asbestos containing materials, black ashy materials, soils exhibiting strong odours, brightly coloured materials, and former demolition materials.

Should previously undiscovered contamination be encountered during the demolition/construction of the new buildings the following course of action should be adhered to:

1. The ground workers should report any suspected contamination immediately to the Client's site supervisor. The supervisor should contact the Client or their appointed agent who will in turn contact Castledine Environmental to request an engineer to visit the site to assess the extent of the 'contamination'.
2. Castledine Environmental shall make records of their inspection, and pass details of these to the Local Authority.
3. Where the conditions revealed differ from those previously anticipated, the Castledine Environmental shall take samples as deemed appropriate to be dispatched for appropriate chemical testing.
4. Depending on the results of the testing either:
 - a. no further work will be required;
 - b. a further detailed risk assessment will be required; and/or
 - c. Localised specific remedial measures will be necessary.Appraisal criteria will vary depending on the nature of the assessment.
5. The results of any such testing will be sent to the Local Authority Pollution Control Section, Local Authority development control section, and the appointed building inspector. If remediation is required, the LA/Building inspector will be informed of the date and time of the proposed works.

6. Remediation will be undertaken in accordance with a method statement submitted for approval. The works shall be supervised where necessary by Castledine Environmental who shall provide a Verification Report for the Local Authorities.
7. A copy of the discovery strategy should be lodged on site and provisions made to ensure that all workers are made aware of their responsibility to observe, report and act on any potentially suspicious or contaminated materials they may encounter.

APPENDIX F

DISCOVERY STRATEGY

