



**Castledine
Environmental**

LAND CONTAMINATION SURVEYS

Phase 1 Land Contamination Risk Assessment

for

Proposed Change-of-Use of Agricultural Building to Residential Usage consisting of 3 No. Dwellings

on the site of

**Barley Lodge, Thurleston Lane,
Akenham, Suffolk IP1 6TQ**

Date: July 2022

Status:

Final Report

Reference:

3331D P1 Wilkinson Planning - Akenham

Date:

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EXECUTIVE SUMMARY

The site is currently occupied by an agricultural building, which has been present on site since at least circa.1965. Prior to this, the site was largely unoccupied save for a small outbuilding located centrally and in the south of site, until the development of the present-day barn. No significant sources of onsite contamination have been identified and the site is presently and proposed to be entirely encapsulated beneath hardstanding and building footprint.

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

It is not envisaged that any further works or investigation are required.

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.

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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.

For and on behalf of Castledine Environmental

Kevin Castledine

(Director)

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

Castledine Environmental have been appointed by Wilkinson Planning Ltd to undertake a Phase 1 Desk study on a site at Barley Lodge Farm, Thurleston Lane, Akenham, Suffolk IP1 6TQ.

4.0 SCOPE

Castledine Environmental have prepared this report for the sole use and reliance of Wilkinson Planning Ltd and their appointees for the purpose of ensuring compliance with:

- Paragraph(s) 174, 179, 183 & 184 of the National Planning Policy Framework 2021
- Part C1 of the building regulations
- Support of a Planning Application

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

The report consists of a preliminary risk assessment in accordance with BS10175:2011+A2:2017, CLR11 "Model Procedures for the Management of Land Contamination" and LCRM "Land Contamination Risk Management".

The objectives of the report are:-

- To assess historical activities at the site with respect to their potential impact on the site environment.
- 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.
- 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 and
- To develop a preliminary conceptual site model (CSM).

5.0 SITE DESCRIPTION

The site is located in Akenham, Suffolk at National Grid Reference: 615008,249169 and is approximately 0.05ha in area.

The site is irregular in shape and comprises an agricultural building, located on the northern edge of a wider farmyard. The surrounding areas to site are predominantly agricultural field to the north and east, and beyond the farmyard and associated dwellings to the west and south of site.

The site interior comprises a large, redundant agricultural building. The building is orientated east to west and access is provided via a large double-door on the eastern face. The barn was noted to be constructed of cinderblock and corrugated metal cladding, concrete flooring, steel structuring and corrugated roofing (of potentially asbestos containing materials). A small lean-to shed was noted in the southern face of the building, with access to this provided via the eastern face of the structure. The storage of miscellaneous garden furniture, tools, cardboard boxes, shelving and some paint cans were noted within both structures. No tanks or other hydrocarbon storage were noted on site with no visible staining or olfactory evidence of such was noted.

The general agricultural usage of the site along with the PACM materials on the structure are considered potential sources of contamination. 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.

Additional geological and hydrological data was obtained from the British Geological Survey. A copy is presented in Appendix A.

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 nonaquifer in different locations due to the variable characteristics of the rock type

6.1.1.2 BEDROCK GEOLOGY

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	113	NW	Secondary A	Permeably 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.
4	140	N	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

The Groundsure report records 6 No. historical groundwater abstraction licences held within 250m of site. Of these, 3 No. are located 43m west and related to general usages, farming and domestic and were sourced via a borehole at Bower Farm, with the most recent licence recorded as effective from 01/02/1997 and no end date held. The remaining 3 No. historical groundwater abstractions are located 93m west and related to general usages, farming and domestic along with spray irrigation and household usages, with the most recent licence recorded as in effect from 01/02/2002 and with no end date held. A historical potable abstraction licence was also held 93m west of site and possessing the same effective date, with no end date recorded.

6.1.3 SOURCE PROTECTION ZONE

The site is located in a Type 3 Total Catchment Source Protection Zone (SPZ), with a Type 2 Outer catchment SPZ located 33m south and Type 1 Inner Catchment SPZ located 191m south east of site.

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
1	On site	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Unproductive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures
3	On site	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Unproductive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures

The Groundsure report also records the site as being located in an area where:

“Very significant soluble rocks are likely to be present with a high possibility of localised subsidence or dissolution-related degradation of bedrock occurring naturally, especially in adverse conditions such as concentrated surface or subsurface water flow.”

6.1.5 POTENTIAL SURFACE WATER

The Groundsure report records no hydrological features located within 250m of site; however, satellite imagery shows a pond located approximately 81m west of site.

6.1.6 DISCHARGE CONSENTS

None recorded within 250m of site.

6.2 PERMITTED PROCESSES

None recorded within 250m of site.

6.3 POLLUTION INCIDENTS

None recorded within 250m of site.

6.4 RADIOACTIVE SUBSTANCES REGISTRATIONS

None recorded within 250m of site.

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

None recorded within 250m of site.

6.5.2 LANDFILL SITES

None recorded within 250m of site.

6.6 HAZARDOUS SUBSTANCES

None recorded within 250m of site.

6.7 ECOLOGICAL RECEPTORS

The Groundsure report records the site as being located within the River Gipping surface waters nitrate vulnerable zone (NVZ) and the Sandlings and Chelmsford groundwater NVZ, with further records of both located 900m north west and west of site, respectively. No further sensitive land usages are located within 1000m of site.

6.8 SOILS AND GEOLOGY

"Contains British Geological Survey materials © NERC 2022" 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.

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 Groundsure report record bedrock geology of the Thames Group underlying site, comprising mainly silty clays and clays, some sandy or gravelly clays with some silts, sands, gravels and calcareous mudstones.

Records of the Thanet Formation and Lambeth Group (Undifferentiated) are located 113m north west of site and also comprise clays, sands and silts.

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 'moderate' and the minimum permeability as 'very low' and facilitated by mixed flow mechanisms.

6.8.5 ARTIFICIAL GROUND

BGS geological mapping records no artificial deposits located on or within 250m of site.

6.8.6 BGS ESTIMATED BACKGROUND SOIL CHEMISTRY

The Groundsure report records BGS background soil chemistry for the site. This is estimated values providing the likely background concentration of the potentially harmful elements Arsenic, Cadmium,

Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

The Groundsure report records arsenic, lead & bioaccessible lead, cadmium, chromium and nickel at background concentrations of 15mg/kg, 100mg/kg & 60mg/kg, 1.8mg/kg, 60-90mg/kg and 15-30mg/kg, respectively.

Assuming a worst-case generic acceptance threshold (GAC) of 1% soil organic matter (SOM), none of the recordings are above the generic acceptance thresholds of 37mg/kg, 200mg/kg (both lead and bioaccessible lead), 11mg/kg, 910mg/kg and 180mg/kg, respectively.

6.8.7 COAL MINING

The site is not located in a coal mining reporting area.

6.8.8 SURFACE MINING / NONE-COAL MINING

ID	Distance [m]	Direction	Land Usage	Year of Mapping
A	38	W	Pond	1987
A	38	W	Pond	1976
A	49	W	Pond	1938
A	49	W	Pond	1883
A	51	W	Pond	1928
A	53	W	Pond	1953
A	53	W	Pond	1902

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 MAPS

The site is shown as occupied by the agricultural building seen on the site walkover, set on the northern edge of a wider farmyard.

6.9.2 GOOGLE EARTH

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

Date	Description
December 1945	Imagery is indistinct; however, the site appears to be located within a wider farmyard, as in the present-day.
December 2000	The site is now shown as occupied by the agricultural building seen in the present-day, located on the northern edge of a wider farmyard.
February 2003	No discernible change on site.
August 2007	No discernible change on site.
December 2007	No discernible change on site.
September 2017	No discernible change on site.
April 2020	No discernible change on site.
May 2020	No discernible change on site.

6.10 GOOGLE STREET VIEW

Google Street View imagery is unavailable for the site due to its location at the termination of a private access track.

6.11 HISTORIC MAPPING

The following historic maps have been reviewed as part of this assessment, found in the appendices.

Map	Onsite	Offsite
OS County Series: 1881, 1:2,500	The site is shown as occupied by a track leading north and then SW offsite to the adjacent farmyard here.	The site is located in a predominantly agricultural area, on the northern edge of Bower Farm, with areas beyond this being predominantly agricultural field. The pond seen to the west of site in the present-day is also present at this time. A gravel pit is located approx.320m SE of site.
OS County Series: 1881-1883, 1:10,560	Site now appears to be occupied by an outbuilding in the southern area of site.	Surrounding areas see little site relevant change.
OS County Series: 1888, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1902, 1:2,500	Site now clearly occupied by an outbuilding located on centrally in the southern extent of site.	Surrounding areas see little site relevant change.
OS County Series: 1902-1903, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1926, 1:2,500	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1927-1928, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1938, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
Provisional: 1953, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
National Grid: 1965, 1:2,500	The site is now shown as occupied by an open-sided barn.	Small extensions have taken place to farm buildings approx.10m SW of site in Bower Farm.
National Grid: 1970, 1:10,000	No discernible change on site.	Surrounding areas see little site relevant change.
National Grid: 1976- 1978, 1:10,000	No discernible change on site.	Surrounding areas see little site relevant change.
National Grid: 1983- 1997, 1:10,000	No discernible change on site.	The former gravel pit to the SE of site is no longer marked on mapping.

Map	Onsite	Offsite
National Grid: 1994, 1:2,500	No discernible change on site.	New dwellings have been erected approx.58m south and 116m SE of site.
National Grid: 2001, 1:10,000	No discernible change on site.	The barn seen immediately east of site on the site walkover has now been erected.
Landline: 2003, 1:1,250	No discernible change on site.	Surrounding areas see little site relevant change.
National Grid: 2010, 1:10,000	No discernible change on site.	Surrounding areas see little site relevant change.
National Grid: 2022, 1:10,000	No discernible change on site.	Surrounding areas see little site relevant change.

6.12 CURRENT LAND USE DATA

The Groundsure report records no current or recent industrial land usages located within 250m of site.

6.13 PETROL AND FUEL SITES

None recorded within 250m of site.

6.14 HISTORICAL PETROL AND FUEL SITE DATABASE

None recorded within 250m of site.

6.15 POTENTIAL CONTAMINATIVE LAND USES IDENTIFIED ON MAPPING

The Groundsure report records no potentially contaminative land usages located within 250m of site; the nearest record beyond this is a gravel pit located 320m south east of site and identified from historical mapping dated circa.1883.

6.16 HISTORICAL TANK DATABASE

None recorded within 250m of site.

6.17 HISTORICAL ENERGY FACILITIES

None recorded within 250m of site

6.18 HISTORICAL GARAGE DATABASE

None recorded within 250m of site

7.0 POLLUTANT LINKAGE ASSESSMENT

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 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.

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

- Potentially asbestos containing materials on building
- Usage of the site for general farming purposes

7.1.2 OFFSITE

- Old gravel pit (approx.320m SE, circa.1881 to 1983-97)

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;
- Skin contact;
- Inhalation;
- Plant uptake,
- Direct contact by buried structures;
- 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; and
 - 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; and
- Buried water pipes.
- Controlled Waters
- Ecological Receptors
- 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 an agricultural building, which has been present on site since at least circa.1965. Prior to this, the site was largely unoccupied save for a small outbuilding located centrally and in the south of site, until the development of the present-day barn. No significant sources of onsite contamination have been identified and the site is presently and proposed to be entirely encapsulated beneath hardstanding and building footprint.

8.1.2 HAZARDOUS GROUND GAS AND VAPOURS

No significant potential sources of ground gas or vapour generation identified. An old gravel pit has been identified approximately 320m south east of site, present from circa.1881 through to circa.1983-97 and a pond has been identified approximately 38-53m west of site. The gravel pit is not considered a significant hazard to site due to its distance, relatively small size and the predominantly moderate to very low permeability geological formations in the local area, inhibiting migration. The pond to the west of site has been noted to remain persistent until the present-day.

TABLE 1. SUMMARY OF SIGNIFICANT POLLUTION LINKAGES

Contaminant	Pathway	Receptor	Probability of Pollutant Linkage	Consequence	Risk	Possible Mitigation
Contaminated Soils <i>(no significant sources identified, site encapsulated beneath hardstanding and building footprint)</i>	Direct Ingestion & Direct Contact	Site Workers	Lw	Md	M/L	Site workers to wear appropriate PPE for health and safety reasons, considered usage and adherence to relevant HSE guidance during site works will be sufficient to mitigate this risk to LOW.
Contaminated Soils <i>(no significant sources identified, site encapsulated beneath hardstanding and building footprint)</i>	Inhalation of Dust	Site Workers	Lw	Md	M/L	
Contaminated Soils <i>(no significant sources identified, site encapsulated beneath hardstanding and building footprint)</i>	Direct Ingestion & Direct Contact	End Users	UI	Md	L	No significant potential sources of soil contamination identified and site is presently and proposed to be entirely encapsulated beneath hardstanding and building footprint, thus severing relevant pollutant linkages here. Recommend a Watching Brief (inline with Appendix F) be applied during all site works and that the site building be assessed by a suitably competent asbestos contractor, prior to redevelopment, to prevent future contamination arising from PACM materials on the building.
Contaminated Soils <i>(no significant sources identified, site encapsulated beneath hardstanding and building footprint)</i>	Inhalation of Dust	End Users	UI	Md	L	
Contaminated Soils <i>(no significant sources identified, site encapsulated beneath hardstanding and building footprint)</i>	Direct Ingestion	Flora and Fauna	UI	Md	L	
Contaminated Soils <i>(no significant sources identified, site encapsulated beneath hardstanding and building footprint)</i>	Vertical and lateral migration	Controlled Waters	UI	Md	L	
Contaminated Soils <i>(no significant sources identified, site encapsulated beneath hardstanding and building footprint)</i>	Direct contact	Services	UI	Md	L	
Contaminated Soils <i>(no significant sources identified, site encapsulated beneath hardstanding and building footprint)</i>	Direct contact	Services	UI	Md	L	
Ground Gases (Methane and CO ₂) <i>(no significant sources identified; site located in predominantly low permeability geologies)</i>	Vertical and lateral migration	End Users & Building Envelope	UI	Md	L	No significant potential sources of either ground gas or vapour generation identified and site is located in predominantly moderate to very low permeability geological formations, inhibiting migration.
Volatile and Semi-volatile Organic Compounds <i>(no significant sources identified; site located in predominantly low permeability geologies)</i>	Vertical and lateral migration	End Users & Building Envelope	UI	Md	L	
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** level of risk with respect to the proposed development.

It is not envisaged that any further works or investigation are required.

It is recommended that 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.

10.0 SUMMARY OF RISKS**10.1.1 SOIL CONTAMINATION**

The site is currently occupied by an agricultural building, which has been present on site since at least circa.1965. Prior to this, the site was largely unoccupied save for a small outbuilding located centrally and in the south of site, until the development of the present-day barn. No significant sources of onsite contamination have been identified and the site is presently and proposed to be entirely encapsulated beneath hardstanding and building footprint.

10.1.2 GROUND GASSES AND VAPOURS

No significant potential sources of ground gas or vapour generation identified. An old gravel pit has been identified approximately 320m south east of site, present from circa.1881 through to circa.1983-97 and a pond has been identified approximately 38-53m west of site. The gravel pit is not considered a significant hazard to site due to its distance, relatively small size and the predominantly moderate to very low permeability geological formations in the local area, inhibiting migration. The pond to the west of site has been noted to remain persistent until the present-day.

11.0 RECOMMENDATIONS

It is recommended that 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.

12.0 FURTHER ENVIRONMENTAL INVESTIGATION

It is not envisaged that further testing will be required.

13.0 REFERENCES**13.1 LEGISLATION AND REGULATIONS****13.1.1 ACTS**

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

13.1.2 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

13.1.3 CONTAMINATED LAND REGULATIONS

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

13.2 STATUTORY GUIDANCE

- [7] 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
- [8] Communities and local Government, 2018: National Planning Policy Framework.

13.3 BRITISH STANDARDS

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

13.4 NON STATUTORY TECHNICAL GUIDANCE**13.4.1 ENVIRONMENT AGENCY**

- [13] Cassella Stranger, 2002. Model Procedures for the Management of Contaminated Land, Contaminated Land Report (CLR) 11, Department for Environment, Food, and Rural Affairs.

13.4.2 CIRIA PUBLICATIONS

- [14] 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
- [15] 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

13.4.3 CL:AIRE

- [16] 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)

14.0 APPENDICES

APPENDIX A ENVIRONMENTAL SEARCH

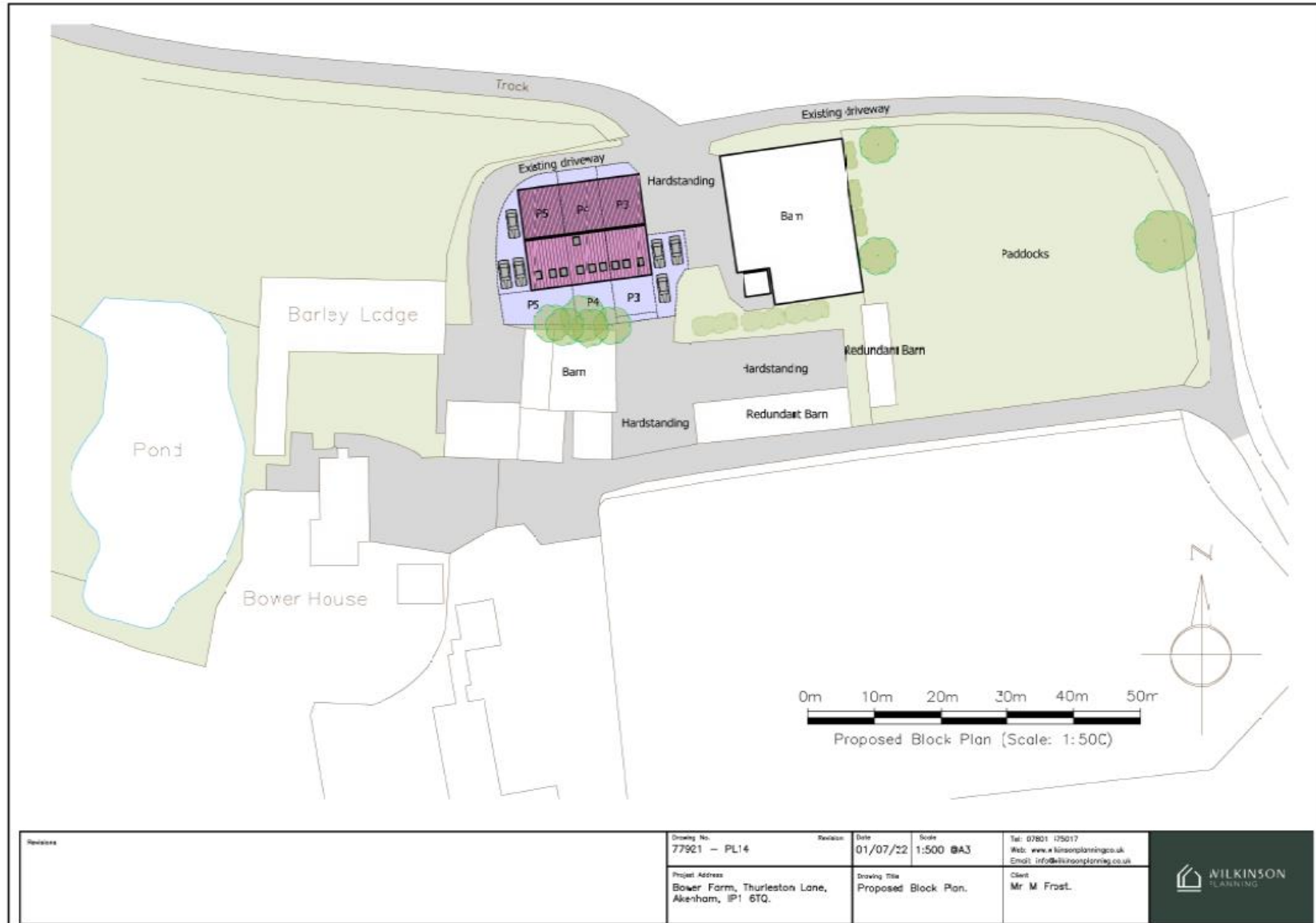
Separate Groundsure Report

APPENDIX B HISTORICAL MAPPING

Separate Map Packs (2 No. files)

APPENDIX C

PROPOSED AND CURRENT SITE PLANS



Revisions	Drawing No. 77921 - PL14	Revision	Date 01/07/22	Scale 1:500 @A3	Tel: 07801 175017 Web: www.wilkinsonplanning.co.uk Email: info@wilkinsonplanning.co.uk
	Project Address Bower Farm, Thurleston Lane, Akenham, IP1 6TQ.	Drawing Title Proposed Block Plan.	Client Mr M Frost.		





APPENDIX D

SITE PHOTOS AND LOCATIONS



Site Walkover Photos

Photo No.1: Facing east from the site access track with the proposed building to be converted to rear of foliage (left)



Address: Barley Lodge, Thurleston Lane, Akenham
Client: Wilkinson Planning Ltd

Photo No.2: Facing south showing the eastern face of the building proposed to be converted



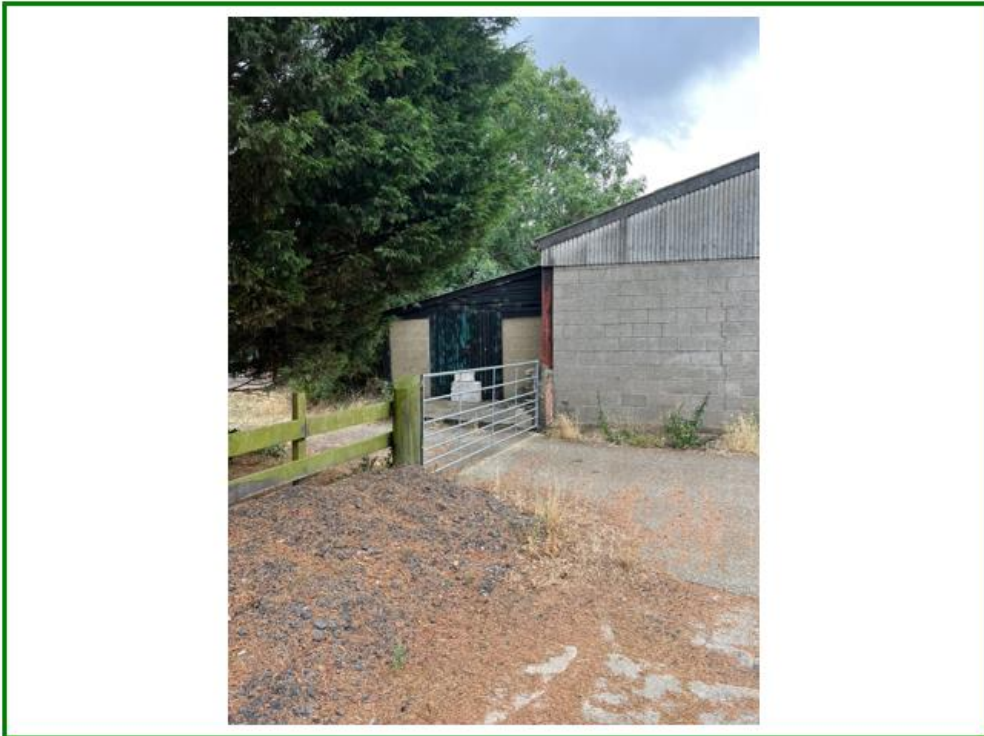


Site Walkover Photos

Address: Barley Lodge, Thurleston Lane, Akenham
Client: Wilkinson Planning Ltd

Photo No.3: Facing east showing lean-to structure on the southern face of proposed building to be converted

Photo No.4: Facing west from inside the lean-to structure showing storage of





Site Walkover Photos

Address: Barley Lodge, Thurleston Lane, Akenham
Client: Wilkinson Planning Ltd

Photo No.5: Facing west showing the inside of the western face of the proposed building to be converted

Photo No.6: Facing east showing the interior of the barn and double-doored access along with misc. storage



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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

