



**Castledine
Environmental**

LAND CONTAMINATION SURVEYS

Phase 1 Land Contamination Risk Assessment

for

Proposed Extension to Existing Dwelling and Erection of New Dwelling

on the site of

Christys, Albury End, Ware, Hertfordshire SG11 2HS

Date: October 2023

Status:

Final Report

Reference:

3605D P1 Strachan - Albury End

Date:

11/10/2023

EXECUTIVE SUMMARY

The site is currently occupied by a large dwelling and well-maintained garden areas, which have been present on site since at least circa.1976, prior to which the site was unoccupied, open field.

A non-bunded tank and an ash heap located in the north east of site are considered limited potential sources of contamination, with no further onsite or offsite potential sources identified

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.

At this stage, site proposals are unknown; however, proposals are likely to be residential and as such, sensitive. The site is largely considered to be uncontaminated, save for two potential hotspots located in the north east of site and adjacent to the dwelling (ash heap and tank, respectively). As such, it is recommended that the both the ash-heap and the tank be removed (utilising a professional tank-removal contractor, retaining all associated documentation). With the provision of the above, the risks are reduced to low and it is not considered that any further works or investigation are considered necessary.

This report should be submitted to your Local Planning Authority for agreement.

CONTENTS

<u>1.0</u>	<u>QUALITY ASSURANCE</u>	<u>1</u>
<u>2.0</u>	<u>LIMITATIONS</u>	<u>1</u>
<u>3.0</u>	<u>INTRODUCTION AND SITE PROPOSALS</u>	<u>2</u>
<u>4.0</u>	<u>SCOPE</u>	<u>2</u>
<u>5.0</u>	<u>SITE DESCRIPTION</u>	<u>3</u>
<u>6.0</u>	<u>REGULATORY AUTHORITY AND OTHER ENVIRONMENTAL DATA</u>	<u>4</u>
6.1	HYDROLOGICAL	5
	6.1.1 AQUIFER	5
	6.1.2 ABSTRUCTIONS AND PRIVATE WATER SUPPLIES	6
	6.1.3 SOURCE PROTECTION ZONE	6
	6.1.4 GROUNDWATER VULNERABILITY AND SOIL LEACHING POTENTIAL	6
	6.1.5 POTENTIAL SURFACE WATER	7
	6.1.6 DISCHARGE CONSENTS	7
6.2	PERMITTED PROCESSES	7
6.3	POLLUTION INCIDENTS	7
6.4	RADIOACTIVE SUBSTANCES REGISTRATIONS	7
6.5	WASTE	8
	6.5.1 LICENSED WASTE MANAGEMENT FACILITIES (LOCATIONS)	8
	6.5.2 LANDFILL SITES	8
6.6	HAZARDOUS SUBSTANCES	8
6.7	ECOLOGICAL RECEPTORS	8
6.8	SOILS AND GEOLOGY	8
	6.8.1 SUPERFICIAL DEPOSITS	8
	6.8.2 SUPERFICIAL DEPOSITS PERMEABILITY	9
	6.8.3 BEDROCK DEPOSITS	9
	6.8.4 BEDROCK PERMEABILITY	9
	6.8.5 ARTIFICIAL GROUND	9
	6.8.6 COAL MINING	9
	6.8.7 NON-COAL MINING	9
	6.8.8 SURFACE WORKINGS	10
	6.8.9 RADON	10
6.9	AERIAL PHOTOGRAPHY	10
	6.9.1 GOOGLE MAPS	10
	6.9.2 GOOGLE EARTH	10
6.10	GOOGLE STREET VIEW	11
6.11	HISTORIC MAPPING	11
6.12	CURRENT LAND USE DATA	13
6.13	PETROL AND FUEL SITES	13
6.14	HISTORICAL PETROL AND FUEL SITE DATABASE	13
6.15	POTENTIAL CONTAMINATIVE LAND USES IDENTIFIED ON MAPPING	13

6.16	HISTORICAL TANK DATABASE	14
6.17	HISTORICAL ENERGY FACILITIES	14
6.18	HISTORICAL GARAGE DATABASE	14
<u>7.0</u>	<u>PRELIMINARY CONCEPTUAL SITE MODEL</u>	<u>14</u>
7.1	SOURCES	15
	7.1.1 ONSITE	15
	7.1.2 OFFSITE	15
7.2	PATHWAYS	15
7.3	RECEPTORS	16
<u>8.0</u>	<u>CONCEPTUAL SITE MODEL</u>	<u>17</u>
8.1	PRELIMINARY CONCEPTUAL SITE MODEL	17
	8.1.1 SOIL CONTAMINATION	17
	8.1.2 HAZARDOUS GROUND GAS AND VAPOURS	17
<u>9.0</u>	<u>ENVIRONMENTAL RISK ASSESSMENT</u>	<u>20</u>
<u>10.0</u>	<u>SUMMARY OF RISKS</u>	<u>20</u>
<u>11.0</u>	<u>HUMAN HEALTH</u>	<u>21</u>
	11.1.1 RESIDENTS / END-USERS	21
	11.1.2 SITE WORKERS	21
<u>12.0</u>	<u>CONTROLLED WATERS</u>	<u>21</u>
<u>13.0</u>	<u>STRUCTURES</u>	<u>22</u>
	13.1.1 HAZARDOUS GROUND GAS AND VAPOURS	22
	13.1.2 POTABLE WATER SUPPLY PIPING	22
<u>14.0</u>	<u>OFFSITE RECEPTORS</u>	<u>22</u>
<u>15.0</u>	<u>RECOMMENDATIONS</u>	<u>23</u>
<u>16.0</u>	<u>REFERENCES</u>	<u>24</u>
16.1	LEGISLATION AND REGULATIONS	24
	16.1.1 ACTS	24
	16.1.2 PLANNING REGULATIONS	24
	16.1.3 CONTAMINATED LAND REGULATIONS	24
16.2	STATUTORY GUIDANCE	24
16.3	BRITISH STANDARDS	25
16.4	NON STATUTORY TECHNICAL GUIDANCE	25
	16.4.1 ENVIRONMENT AGENCY	25
	16.4.2 CIRIA PUBLICATIONS	25
	16.4.3 CL:AIRE	25
<u>17.0</u>	<u>APPENDICES</u>	<u>26</u>

LIST OF APPENDICES

APPENDIX A	ENVIRONMENTAL SEARCH	26
APPENDIX B	HISTORICAL MAPPING	26
APPENDIX C	CURRENT SITE PLANS	27
APPENDIX D	SITE PHOTOS AND LOCATIONS	28
APPENDIX E	WATCHING BRIEF	39
APPENDIX F	DISCOVERY STRATEGY	41

LIST OF TABLES

TABLE 1.	SUMMARY OF SIGNIFICANT POLLUTION LINKAGES	18
TABLE 2.	RISK CLASSIFICATION MATRIX	19
TABLE 3.	CLASSIFICATION OF RISK	19

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 AND SITE PROPOSALS

Castledine Environmental have been appointed by Mr. C. Strachan to undertake a Phase 1 Desk study on a site at Christys, Albury End, Ware, Hertfordshire SG11 2HS

4.0 SCOPE

Castledine Environmental have prepared this report for the sole use and reliance of Mr. C. Strachan and associated 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

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;
- To develop a preliminary conceptual site model (CSM).

5.0 SITE DESCRIPTION

The site is located in Albury, Ware in Hertfordshire at National Grid Reference: 542843,223707 and is approximately 0.85ha in area.

The site is an irregular square in shape and is orientated with the corners to the north east, south east, south west and north west. The site is located in a predominantly rural area, within the village of Albury. The site is directly bounded by neighbouring residential properties and their associated garden areas to the north and south, open field to the east and Albury End roadside to the west.

The site interior comprises a large dwelling, an adjoined and a detached garage, an outbuilding and a large garden area, itself occupied by a tennis-courts, BMX track and summerhouse along with scattered garden furniture.

Access to site was provided via driveway leading east off Albury End roadside, leading north to the dwelling and a garage and southwards – via a second garage / outbuilding – to the far south western corner of site. The dwelling on site is then located in the western extent of site and orientated north to south, parallel with the western boundary of site here. The dwelling was seen to be single-storey, constructed of brick with tiled roofing with a small, adjoined garage on the centre of the western face and a larger, timber garage / outbuilding located on the south western corner and extending southwards. The smaller garage was seen to be similarly constructed to the dwelling, with the larger outbuilding being constructed of brick with timber cladding and felt-roofing.

The interior of the smaller garage was seen to possess a concrete floor and was occupied by fire-wood and timber storage along with miscellaneous garden furniture such as gym-equipment, shelving, and tools including a power-washer and gardening tools. A non-bunded, large oil tank was noted in the area between the small garage and the dwelling itself. The tank rested atop bricks, which

themselves sat atop concrete and no significant evidence of hydrocarbon release such as staining or spillages nor olfactory evidence of either was noted around the tank.

The larger of the garages on site was then seen to be formed by four separate rooms. The largest of the rooms comprised a storage-unit for bicycles, roofing tiles and miscellaneous tools, toolboxes and garden-hoses; the second room comprised another storage-unit for 2 no. lawn-mowers and associated fuels and oils; with the remaining room largely unoccupied and used for gym and leisure purposes; and the smallest of the rooms comprised a utility cupboard with a boiler, heating infrastructure and a washing machine within. Concrete flooring was noted throughout this building.

The remainder of site is then occupied by a large, well-maintained and lawned garden area with scattered trees located in the east and north east, a more heavily wooded area in the south of site and a tennis-courts in the northern extent. Two large, discolour circles of lawn were noted which client information indicated were from movements of an inflatable pool. Notable features from within garden area included a summerhouse, located in the south east of site and a burnt-patch of ground and ash heap, located in the north east and adjacent to the tennis-courts.

Potential sources of contamination noted on the site walkover include the non-bunded oil tank located between dwelling and smaller garage and the ash heap in the north east of site. Topographically, the site sits slightly above the level of Albury End roadside, with the remainder of site being level. The surrounding areas are then predominantly 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	62	E	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
3	89	E	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	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

ID	Distance (m)	Direction	Designation	Description
2	16	SW	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.1.2 ABSTRACTIONS AND PRIVATE WATER SUPPLIES

The Groundsure report records no active abstraction sites located 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
1	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: <40% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Mixed

6.1.5 POTENTIAL SURFACE WATER

The Groundsure report records an unnamed watercourse located 82m east, being connected to a large pond located 145m east and leading onwards with a second watercourse record located 211m east of site.

6.1.6 DISCHARGE CONSENTS

The Groundsure report records both a transferred and active discharge consent related to final / treated sewage discharges (not on behalf of the local water company) into groundwaters. The transferred consent was in effect from circa.1975 to 2012 with the active licence active following this date.

6.2 PERMITTED PROCESSES

None recorded within 500m of site.

6.3 POLLUTION INCIDENTS

None recorded 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 the site as being located within the Lee surface waters Nitrate Vulnerable Zone (NVZ) with areas of Designated Ancient Woodland located 241m south east, 742m south west and 842m and 907m south of site.

6.8 SOILS AND GEOLOGY

"Contains British Geological Survey materials © NERC 2023" 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 the Kesgrave Catchment Subgroup, comprising mainly gravels characterised by quartz and quartzite from the Triassic, Carboniferous and Devonian rocks of the West Midlands, Welsh Borderland and possibly south-western Pennines, and by felsic volcanic rocks from northern Wales are then located 67m east; and records of Glacial Head, comprising gravel, sand and clay with lenses of silt, clay or peat and organic material are then located 68m and 90m east 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.

6.8.3 BEDROCK DEPOSITS

Both BGS geological mapping Groundsure report record bedrock geology of the Thanet Sand Formation and Lambeth Group (undifferentiated) underlying site, comprising clay, sand and silt with subsidiary flint, mudstone and sandstone.

Records of the London Clay Formation, comprising a bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay are then located 15m south west of site.

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 COAL MINING

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

6.8.7 NON-COAL MINING

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

"Underground mine workings may have occurred in the past or current mines may be working at significant depth to modern engineering standards. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered."

The Groundsure report also records a ceased operations shale and clay pit formerly located 404m south east of site.

6.8.8 SURFACE WORKINGS

ID	Distance [m]	Direction	Land Usage	Year of Mapping
A	78	SW	Pond	1946
A	78	SW	Pond	1921
A	78	SW	Pond	1896
A	82	SW	Pond	1951
2	140	E	Pond	1981

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 located in a predominantly rural area, within the village of Albury and being directly bounded by neighbouring dwellings and their associated garden areas to the north and south, the roadside west and open field to the east. The site itself is shown as remaining occupied by the dwelling, two garages and outbuilding and large garden area noted on the site walkover. The ash heap can be seen in the far north east of site, adjacent to the tennis-courts.

6.9.2 GOOGLE EARTH

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

Date	Description
December 2000	The site is shown as located in a predominantly rural area, within the village of Albury and being directly bounded by neighbouring dwellings and their associated garden areas to the north and south, the roadside west and open field to the east. The site itself is shown as remaining occupied by the dwelling, two garages and outbuilding and large garden area noted on the site walkover.
October 2003	No discernible change on site nor site relevant change to the surrounding areas.
December 2010	No discernible change on site nor site relevant change to the surrounding areas.
May 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.
April 2017	No discernible change on site nor site relevant change to the surrounding areas.
June 2018	No discernible change on site nor site relevant change to the surrounding areas.
April 2020	Some trees have been removed from the western boundary, in the SW of site and the area is now clearly shown as occupied by the timber-cladded outbuilding / garage seen on the site walkover, following removal of foliage cover.

6.10 GOOGLE STREET VIEW

Google Street View imagery is dated October or May of 2009 with the site viewed off Albury End roadside and facing north east, east and south east. The site appears as seen on the site walkover, being occupied by the dwelling, adjoined garage and outbuilding previously noted. The remainder of site and the rear of site is obscured by buildings arrayed along and inside the western boundary of site.

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: 1879, 1:2,500	The site is shown open field split by a field boundary orientated north-south in the eastern third of site.	The surrounding areas to site comprise dwellings and their associated garden areas directly north with a farm beyond this, being located approx.100m N (with adj. pond), open field to the east and south, the roadside west with further field beyond and a pond approx.60m west, with further ponds located approx.90m (persistent until the present-day) and 110m SW of site.
OS County Series: 1883-1884, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1896-1899, 1:10,560	No discernible change on site.	A clay pit, gravel pit and associated kilns are now located approx.374m SE of site and extending further SE from this location.
OS County Series: 1897, 1:2,500	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1919-1921, 1:10,560	No discernible change on site.	Kilns and clay pit to SE of site no longer marked, however pit remains as does adjacent gravel pit.
OS County Series: 1923, 1:2,500	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1946, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
Provisional: 1951, 1:10,560	No discernible change on site.	Additional farm buildings – likely barns – erected in farmyard approx.100m N of site, replacing the pond here.
National Grid: 1976, 1:2,500	The site is now occupied by the dwelling (named Christys), small garage and larger outbuilding noted on the site walkover, all of which are located in the western extent of site.	New dwellings erected south of site, NW and NE. New, large pond seen in the present-day to the east of site now present. Ponds formerly located approx.120m and 200m NW of site now removed.
National Grid: 1981, 1:10,000	No discernible change on site.	All remaining pits associated with clay and gravel pit approx.374m SE of site now removed.

Map	Onsite	Offsite
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.	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: 2023, 1:10,000	No discernible change on site.	Surrounding areas see little site relevant change.

6.12 CURRENT LAND USE DATA

ID	Distance [m]	Direction	Company	Activity	Category
1	69	N	Indepth Sign Design	Signs	Industrial products
B	96	N	Silo	Hoppers and silos	Farming
B	96	N	Silo	Hoppers and silos	Farming

6.13 PETROL AND FUEL SITES

None recorded within 500m of site.

6.14 HISTORICAL PETROL AND FUEL SITE DATABASE

None recorded within 500m of site.

6.15 POTENTIAL CONTAMINATIVE LAND USES IDENTIFIED ON MAPPING

ID	Distance [m]	Direction	Use	Date
A	374	SE	Clay pit	1896
A	375	SE	Unspecified pit	1921-1946
A	376	SE	Unspecified pit	1951
A	378	SE	Clay pit	1896-1899
B	380	SE	Tramway sidings	1896
B	390	SE	Railway sidings	1896-1899
C	435	S	Brick works	1896
C	445	S	Brick works	1899
B	458	SE	Unspecified kiln	1896
B	460	SE	Unspecified kiln	1896-1899
D	469	S	Tile kiln	1896
D	497	S	Tile kiln	1899

6.16 HISTORICAL TANK DATABASE

None recorded within 500m of site.

6.17 HISTORICAL ENERGY FACILITIES

None recorded within 500m of site.

6.18 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

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

- Ash heap and area of repeated burning (far NE of site, adj. to tennis-courts and noted on site walkover, present from at least circa.2020)
- Non-bunded oil tank (located between dwelling and smaller garage, noted on site walkover and likely present from circa.1976)

7.1.2 OFFSITE

No significant potential sources of offsite contamination have been identified.

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);
- 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

No site proposals are known at this time; however, they are unlikely to be commercial, agricultural or industrial, as such, the likely receptors are site workers during construction, end-users including tenants / residents, children, pets, visitors and site service personnel, underlying aquifers, nearby watercourses and flora and fauna (on and offsite).

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

Site is currently occupied by a large dwelling and well-maintained garden areas, which have been present on site since at least circa.1976, prior to which the site was unoccupied, open field.

A non-bunded tank and an ash heap located in the north east of site are considered limited potential sources of contamination, with no further onsite or offsite potential sources identified.

8.1.2 HAZARDOUS GROUND GAS AND VAPOURS

No significant potential sources of ground gas generation have been identified, with ponds located in the surrounding areas either remaining persistent until the present-day (90m south west & 60m west), being some distance from site (110m south west, 120m and 200m north west) or being redeveloped into a farmyard with structures atop, indicating engineered-quality backfill (100m north). Furthermore, both superficial and bedrock geologies in the local area are recorded as predominantly moderate to very low in permeability, thus reducing likely pathways to site and inhibiting significant migration of ground gases. The non-bunded tank noted adjacent to the dwelling is considered a minor potential source of vapours, however significant evidence of staining or spillages – either visual or olfactory – was not noted on the site walkover.

TABLE 1. SUMMARY OF SIGNIFICANT POLLUTION LINKAGES

Contaminant	Pathway	Receptor	Probability of Pollutant Linkage	Conseq.	Risk	Possible Mitigation
Contaminated Soils (<i>ash heap and non-bunded tank</i>)	Direct Ingestion & Direct Contact	Site Workers (<i>during site works, excavations, eating and drinking</i>)	UI	Md	L	Site workers to wear appropriate PPE for health and safety reasons, considered usage and adherence to relevant HSE guidance during site works considered sufficient mitigation.
Contaminated Soils (<i>ash heap and non-bunded tank</i>)	Inhalation of Dust, Dry Arisings	Site Workers (<i>during site works, excavations, eating and drinking</i>)	UI	Md	L	
Contaminated Soils (<i>ash heap and non-bunded tank</i>)	Crop Uptake & Direct Ingestion, Direct Contact	End Users (<i>residents / tenants, children, visitors, service personnel</i>)	Lw	Md	M/L	At this stage, site proposals are unknown; however, the site is considered to be largely uncontaminated. Limited potential sources of contamination include the non-bunded tank adjacent to the dwelling and an area of repeated burning and an ash heap in the NE of site. As such, once site proposals are known, provision should be made for the removal of the ash heap and material in, around and beneath the feature, and provision should also be made for removal of tank, utilizing a professional tank-removal contractor during the works. With the provision of both of the above, the risks are considered to be LOW.
Contaminated Soils (<i>ash heap and non-bunded tank</i>)	Inhalation of Dust, Dry Arisings	End Users (<i>residents / tenants, children, visitors, service personnel</i>)	Lw	Md	M/L	
Contaminated Soils (<i>ash heap and non-bunded tank</i>)	Crop Uptake & Direct Ingestion, Direct Contact	Flora and Fauna (<i>on and offsite</i>)	UI	Md	L	
Contaminated Soils (<i>ash heap and non-bunded tank</i>)	Vertical and lateral migration (<i>both bedrock and superficial geologies predominantly moderate to very low in permeability</i>)	Controlled Waters (<i>Secondary Undifferentiated & Secondary A</i>)	UI	Md	L	
Contaminated Soils (<i>ash heap and non-bunded tank</i>)	Direct contact (<i>pipe degradation and leaching</i>)	Services (<i>impacted new potable supply piping</i>)	UI	Md	L	
Ground Gases (Methane and CO ₂) (<i>no significant potential sources identified</i>)	Vertical and lateral migration (<i>both bedrock and superficial geologies predominantly moderate to very low in permeability</i>)	Site Workers & Excavations, End Users & Building Envelope (<i>ingress and build-up</i>)	UI	Md	L	
Volatile and Semi-volatile Organic Compounds (<i>non-bunded tank</i>)	Vertical and lateral migration (<i>both bedrock and superficial geologies predominantly moderate to very low in permeability</i>)	Site Workers & Excavations, End Users & Building Envelope (<i>ingress and build-up</i>)	Lw	Md	M/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** to **MODERATE** level of risk with respect to the proposed development.

At this stage, site proposals are unknown; however, proposals are likely to be residential and as such, sensitive. The site is largely considered to be uncontaminated, save for two potential hotspots located in the north east of site and adjacent to the dwelling (ash heap and tank, respectively). As such, it is recommended that the both the ash-heap and the tank be removed (utilising a professional tank-removal contractor, retaining all associated documentation). With the provision of the above, the risks are reduced to low and it is not considered that any further works or investigation are considered necessary.

This report should be submitted to your Local Planning Authority for agreement.

10.0 SUMMARY OF RISKS**11.0 HUMAN HEALTH****11.1.1 RESIDENTS / END-USERS**

The risks to end-users of the site are considered to be low to moderate when assessed against the sensitive, residential end-usage of the site. The site is considered to be largely uncontaminated, with no significant potential sources of contamination identified other than an area of repeated burning and an associated ash-heap in the north east of site and a non-bunded tank, adjacent to the dwelling. Whilst the hazards from soil contamination to end-users across the majority of site are considered to be low, should both the ash-heap and tank remain on site, there exists credible pathways for contamination to impact end-users (inhalation of dusts / ash, direct contact with the material, hydrocarbon release and vapour release from the tank). Once site proposals are known, it will likely be feasible to have these areas removed and investigated and/or remediated, thus effectively severing remaining relevant pollutant linkages on site.

11.1.2 SITE WORKERS

The risks to site workers during site works are considered to be low, due to the lack of significant contamination identified on site, other than two localised areas (ash-heap and tank). With provision for suitable and considered usage of PPE, adherence to relevant HSE guidance during site works and good hygiene and site-work practises, the risks to site workers are considered to be low.

12.0 CONTROLLED WATERS

The risks to controlled waters are considered to be low, due to the lack of significant contamination expected on site, the lack of adjacent or nearby controlled watercourses nor active abstraction sites within 1000m of site and the largely impermeable nature of both superficial and bedrock geologies on site, thus inhibiting significant offsite lateral or vertical migration.

13.0 STRUCTURES**13.1.1 HAZARDOUS GROUND GAS AND VAPOURS**

No significant potential sources of ground gas generation have been identified, with ponds located in the surrounding areas either remaining persistent until the present-day (90m south west & 60m west), being some distance from site (110m south west, 120m and 200m north west) or being redeveloped into a farmyard with structures atop, indicating engineered-quality backfill (100m north). Furthermore, both superficial and bedrock geologies in the local area are recorded as predominantly moderate to very low in permeability, thus reducing likely pathways to site and inhibiting significant migration of ground gases. The non-bunded tank noted adjacent to the dwelling is considered a minor potential source of vapours, however significant evidence of staining or spillages – either visual or olfactory – was not noted on the site walkover.

13.1.2 POTABLE WATER SUPPLY PIPING

The hazards to potable piping are considered to be low, due to the lack of significant contamination expected on site; however, site proposals are unknown at this time and should any new proposed potable piping be laid below or in proximity to the tank on site, there may be impact to piping laid in this area. PAH and 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 OFFSITE RECEPTORS

The site is located adjacent to dwellings, within the village of Albury End and within a predominantly rural area; however, no significant contamination is considered exist on site, thus reducing the risk of credible impact to offsite receptors from onsite features. Furthermore, both superficial and bedrock geologies are recorded as predominantly low in permeability, thus acting to limit some offsite pathways.

15.0 RECOMMENDATIONS

At this stage, site proposals are unknown; however, the site is considered to be largely uncontaminated. Limited potential sources of contamination include the non-bunded tank adjacent to the dwelling and an area of repeated burning and an ash-heap in the north eastern extent of site. As such, once site proposals are known, provision should be made for the removal of the ash heap and material in, around and beneath the feature, and provision should also be made for removal and investigation of the tank location (utilising a professional tank-removal contractor and retaining all associated documentation).

As such, 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.

16.0 REFERENCES**16.1 LEGISLATION AND REGULATIONS****16.1.1 ACTS**

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

16.1.2 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

16.1.3 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

16.2 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.

16.3 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)

16.4 NON STATUTORY TECHNICAL GUIDANCE**16.4.1 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.

16.4.2 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

16.4.3 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)

17.0 APPENDICES

APPENDIX A ENVIRONMENTAL SEARCH

Separate Groundsure Report

APPENDIX B HISTORICAL MAPPING

Separate Map Packs (2 No. files)

APPENDIX D

SITE PHOTOS AND LOCATIONS



Site Walkover Photos

Photo No.1: Facing East off Albury End showing the entrance to the property.



**Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan**

Photo No.2: Facing south past the west of the outbuilding showing a tarmacked driveway area.





Site Walkover Photos

Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan

Photo No.3: Faces north and shows the conservatory on the south end of the main property.

Photo No.4: Taken from the southwest corner of site facing east showing lawned area and trees.





Site Walkover Photos

**Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan**

Photo No.5: Shows the main property from the southern border facing north across the lawn.

Photo No.6: Shows a small summer house on the lawn facing northwest.





Site Walkover Photos

**Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan**

Photo No.7: Faces west across the southern border of site showing lawns and summer house.

Photo No.8: View facing south from the northeast corner of site showing lawn.





Site Walkover Photos

**Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan**

Photo No.9: Facing north showing the northeast corner of site with fruit trees and compost heap.

Photo No.10: Facing northwest in the northeast corner of site showing burn pile and compost heap.





Site Walkover Photos

Photo No.11: Tennis court to the north of the main building facing northwest.



**Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan**

Photo No.12: Facing south across the eastern face of the property showing lawns and soft landscaping.





Site Walkover Photos

Photo No.13: View of the northwest corner of site from Albury End facing southeast.



**Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan**

Photo No.14: Taken from just inside the entrance gate at the northwest corner of site facing slightly southwest.





Site Walkover Photos

Photo No.15: Shows an oil tank atop a brick plinth between the house and garage and facing north.



**Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan**

Photo No.16: Shows a close up of the tarmacked area under the oil tank.





Site Walkover Photos

Photo No.17: Shows the entrance to the garage facing slightly northeast.



**Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan**

Photo No.18: Shows the outbuilding to the southwest of the main house facing slightly northwest.





Site Walkover Photos

Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan

Photo No.19: shows the entrance hallway of the main house facing east.

Photo No.20: Shows the tiled conservatory facing west.





Site Walkover Photos

Photo No.21: Facing north and showing the boiler room to the north of the main house entrance.



**Address: Christys, Albury End SG11 2HS
Client: Mr. Strachan**

Photo No.22: Facing north showing tarmacked driveway running between the road and the garage.



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

