



**Castledine
Environmental**

LAND CONTAMINATION SURVEYS

Phase 1 Land Contamination

Risk Assessment

for

Demolition of Existing Dwelling and Erection of a New Residential Property

on the site of

**No.42 Van-Diemans Lane,
Littlemore, Oxford OX4 3QD**

Date: January 2024

Status:	Final Report
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Tel: 01509 880399 Email: info@castledineenvironmental.co.uk
4 Wymeswold Road, Hoton, Loughborough, Leicestershire, LE12 5SN

EXECUTIVE SUMMARY

The site is currently occupied by a single storey residential dwelling, which the Client intends to demolish in order to erect a new two-storey residential development.

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. The moderate risk is associated with potential asbestos containing materials within the fabric of the building (based upon the age of the building being pre-1999).

No significant sources of soil contamination nor ground gases have been identified and as such, no further investigation is recommended.

It is however recommended that the building on site should 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. Following completion of the survey and the controlled removal of any identified asbestos, the risk can be reduced to low.

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 AND SITE PROPOSALS

Castledine Environmental have been appointed by Mr. H. Khan to undertake a Phase 1 Desk study on 42 Van-Diemans Lane, Oxford.

The site proposals consist of the demolition of the existing residential property at No.42 and the erection of a new residential dwelling in its place. The proposed development plans annotate the new building will be adjoined to an ongoing residential development within No.40 Van-Diemans Lane.

4.0 SCOPE

Castledine Environmental have prepared this report for the sole use and reliance of Mr. H. Khan and his associated appointees for the purpose of ensuring compliance with:

- Paragraph(s) 174, 179, 183 & 184 of the National Planning Policy Framework 2023.
- Part C1 of the building regulations.
- In support of Oxford Council planning application 23/02757/FUL.

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 approximately 4.29km south east of Oxford City Centre at National Grid Reference 454357, 203388 and is approximately 0.05ha in area.

The site is currently formed by a single residential dwelling, situated in a largely residential area of Littlemore on the south eastern extents of Oxford. The frontage (north) of the property features a mix of overgrown vegetation, gravel, paving stones and a small planting bed area. The rear of the property is formed by a private rear garden comprising artificial grass with a number of cardboard storage boxes present.

An additional area, further south again of the rear garden, is again formed of overgrown vegetation and paving stones with a disused chicken coop, wood, piping and piles of bricks (anecdotal evidence provided by the Client suggest the construction materials are being held onsite for a development at the adjacent property). In the far south, a small area of artificial grass is present with a number of gym equipment present.

The dwelling onsite is presently in use as a residence and the interior of the building was observed to be furnished as such. No significant potential sources of contamination were noted on the site walkover, nor any use or storage of chemicals and fuels, beyond what may be expected for residential usage. 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**

The Groundsure report does not record any superficial aquifers beneath the site.

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

6.1.2 ABSTRACTIONS AND PRIVATE WATER SUPPLIES

No active licenses are recorded within 500m of the site.

6.1.3 SOURCE PROTECTION ZONE

The Groundsure report does not record the site to lie within a Source Protection Zone.

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 bedrock aquifer – High Vulnerability Combined Classification: Productive Bedrock Aquifer, No superficial Aquifer	Leaching class: Intermediate Infiltration values: 40% - 70% Dilution value: <300mm/year.	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: High Aquifer type: Secondary Flow mechanism: Mixed

6.1.5 POTENTIAL SURFACE WATER

The Groundsure report records no hydrological features located within 500m of site.

6.1.6 DISCHARGE CONSENTS

ID	Distance (m)	Direction	Address	Description	Details
A	141	W	Van Diemans Lane	Effluent Type: Sewage Discharges – Pumping Station – Water Company Permit Number: TEMP.2151 Permit Version: 2 Receiving Water: Northfield Brook	Status: Surrendered under EPR 2010 Issue date: 03/09/2010 Effective Date: 03/09/2010 Revocation Date: 19/08/2014
A	141	W	Van Diemans Lane	Effluent Type: Sewage Discharges – Pumping Station – Water Company Permit Number: TEMP.2151 Permit Version: 2 Receiving Water: Northfield Brook	Status: Temporary Consent (Water Act 1989, Section 113) Issue date: 02/11/1989 Effective Date: 02/11/1989 Revocation Date: 02/09/2010
5	174	E	Plot 6 Oxford Science Park, Sandford, Plot 6, Oxford Science Park, Sandford on Thames, Oxford	Effluent Type: Miscellaneous Discharges – Surface Water Permit Number: CNTM.0146 Permit Version: 1 Receiving Water: Northfield Brook	Status: Revoked – Unspecified Issue Date: 13/03/1992 Effective Date: 13/03/1992 Revocation Date: 15/05/1995
7	477	SW	Oxford Science Park, Sandford on Thames, Oxford, Oxfordshire	Effluent Type: Miscellaneous Discharges – Surface Water Permit Number: CNTM.0146 Permit Version: 1 Receiving Water: Northfield Brook	Status: Revoked – Unspecified Issue Date: 09/04/1990 Effective Date: 09/04/1990 Revocation Date: 08/02/1991

6.2 PERMITTED PROCESSES

The Groundsure has not identified any significant permitted pollutant releases within 500m of the site.

6.3 POLLUTION INCIDENTS

The Groundsure report does not record any pollution incidents within 500m of the site.

6.4 RADIOACTIVE SUBSTANCES REGISTRATIONS

The Groundsure report has recorded one radioactive pollutant inventory 306m south of the site, associated with wastewater release at Genesis Cancer Care UK Ltd. Given the distance and controlled nature of the release, it is not considered a significant source to the site.

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

The Groundsure report does not record any active waste management sites within 500m of the site.

6.5.2 LANDFILL SITES

No active or historical landfill sites have been recorded within 500m of the site.

6.6 HAZARDOUS SUBSTANCES

None recorded within 250m of site.

6.7 ECOLOGICAL RECEPTORS

The Groundsure report does not record any significant ecological receptors within 500m of the 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 do not record any superficial deposits beneath the site.

6.8.2 BEDROCK DEPOSITS

BGS geological mapping records a bedrock geology of the Beckley Sand Member, comprising brown to yellow, fine to coarse sandstone with calcareous beds and thin sandy bioclastic limestone. The formation is considered to have weathered to sand at shallow depth.

6.8.3 BEDROCK PERMEABILITY

The Groundsure report records the site as being within an area where both the minimum and maximum permeability of the bedrock geology is recorded as 'high' 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).

6.8.4 ARTIFICIAL GROUND

The Groundsure report records artificial Made Ground (Undivided), recorded between 220m and 447m south, south east and south west of the site. The made ground deposits within 500m correspond with local roads and the development of the Eastern Bypass Road (completed in 1956). It is considered likely that made ground was used to re-profile the ground or for infrastructure purposes and the potential for significant depths of made ground is not considered likely, as bedrock geology is recorded at shallow depth. Additionally, any made ground is likely composed of competent quarry stone (considered inert) and the risk of significant contamination or ground gas hazards to impact the site is considered to be low.

6.8.5 COAL MINING

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

6.8.6 NON-COAL MINING

The Groundsure report does not record any non-coal mining activities, and no mining associated features have been observed on historical OS maps. Therefore, the risk from non-coal mining activities is considered to be low.

6.8.7 SURFACE WORKINGS

ID	Distance [m]	Direction	Land Usage	Year of Mapping
A	208	S	Cuttings	1996
A	208	S	Cuttings	1974

6.8.8 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

Site is shown as occupied by a single residential building within a largely residential area. The dwelling features a gravel frontage with an elongated rear garden, observed to contain artificial grass along with a small shed, paving stones, soil planting beds and further artificial grass in the southernmost extents.

6.9.2 GOOGLE EARTH

Five images are held in the historic imagery dataset, as follows:

Date	Description
October 1999	Site is observed to be occupied by the residential dwelling seen presently, with an elongated rear garden which seems to be formed of vegetation and paving stones. The surrounding land is formed of residential properties with unused vegetated land (later to be formed of allotments) located 35m north with existing allotments and adjacent school located 110m to the north.
October 2006	No significant changes recorded. Allotments are now present 35m north.
September 2015	No significant changes recorded.
July 2019	No significant changes recorded.
June 2022	No significant changes recorded onsite. The adjacent property west of the current site has been demolished, and new foundations can be seen in its place.

6.10 GOOGLE STREET VIEW

The frontage of the site can be viewed facing south from Van-Diemans Lane. The front garden is observed to comprise paving stones, a central path formed of artificial grass, along with a number of surrounding plant pots, as seen on the site walkover. The building of No.42 is formed of a single storey residential building

6.11 HISTORIC MAPPING

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

Map	Onsite	Offsite
Country Series 1878, 1:2,500	The site is situated within an open field. No discernible features are present within site boundaries other than trees along the northern boundary of the site.	The site is located within a largely rural / agricultural area with fields present within all directions and a relatively large wooded area to the north. Four properties are present west, north west, north and north east from between approximately 150m to 385m. the majority area formed of residential / farm buildings with a smithy 385m north west.

Map	Onsite	Offsite
Country Series 1900, 1:10,560	No significant changes recorded onsite.	The town of Cowley is recorded approximately 500m north of the site, and Littlemore recorded 550m to the south west.
Country Series 1900, 1:2,500	No significant changes recorded onsite.	A small building is present approximately 25m west of the site and allotments are now recorded directly north of the site. An area of wooded land to the south has been cleared and a pond is now recorded 250m to the south.
Country Series 1910-1911, 1:10,560	No significant changes recorded onsite.	No significant site-specific changes noted.
Country Series 1911-1914, 1:10,560	No significant changes recorded onsite.	No significant site-specific changes noted.
Country Series 1914-1919, 1:10,560	No significant changes recorded onsite.	No significant site-specific changes noted.
Country Series 1921, 1:2,500	No significant changes recorded onsite.	No significant site-specific changes noted.
Country Series 1921, 1:10,560	No significant changes recorded onsite.	No significant site-specific changes noted.
Country Series 1937, 1:2,500	The site has now been developed with a single residential property with auxiliary buildings recorded to the rear of the building.	The surrounding areas to the north, west and south west have been developed with residential housing with Van-Diemans Lane now recorded along the northern boundary and residential properties present adjacent both sides of No. 42. The smithy is no longer recorded north west of the site, and the allotment gardens directly north of the site no longer recorded, with additional allotments recorded approximately 200m east.
Country Series 1938, 1:10,560	No significant changes recorded onsite.	No significant site-specific changes noted.
National Grid 1954, 1:1,250	No significant changes recorded onsite.	Further residential infilling has occurred to the west, south and east of the site, with the land directly north across Van-Diemans Lane now returned to allotments. The pond located 250m south of the site is no longer recorded and presumed to have been backfilled.
National Grid 1955, 1:1,250	No significant changes recorded onsite.	No significant site-specific changes noted.
National Grid 1957-1960, 1:1,250	No significant changes recorded onsite.	No significant site-specific changes noted.
Provisional 1960-1961, 1:10,560	No significant changes recorded onsite.	No significant site-specific changes noted.
Provisional 1966, 1:10,560	No significant changes recorded onsite.	The Eastern Bypass Road is now recorded 214m south of the site at its closest point.

Map	Onsite	Offsite
National Grid 1975-1976, 1:10,000	No significant changes recorded onsite.	Residential housing has been developed replacing part of the allotment gardens 175m north west of the site.
National Grid 1980, 1:1,250	No significant changes recorded onsite.	Further residential infilling within the allotment gardens to the north.
National Grid 1986-1989, 1:1,250	No significant changes recorded onsite.	Further residential infilling within the allotment gardens to the north.
National Grid 1993-1994, 1:1,250	No significant changes recorded onsite.	No significant site-specific changes noted.
National Grid 2001, 1:10,000	No significant changes recorded onsite.	No significant site-specific changes noted.
Landline 2003, 1:250	No significant changes recorded onsite.	No significant site-specific changes noted.
National Grid 2010, 1:10,000	No significant changes recorded onsite.	No significant site-specific changes noted.
National Grid 2023, 1:10,000	No significant changes recorded onsite.	No significant site-specific changes noted.

6.12 CURRENT LAND USE DATA

ID	Distance [m]	Direction	Company	Activity	Category
1	11	S	Electrical Sub Station	Electrical Features	Infrastructure and Facilities
2	43	N	Pumping Station	Water Pumping Stations	Industrial Features
3	121	NW	Electrical Sub Station	Electrical Features	Infrastructure and Facilities
4	163	NE	Pump	Water Pumping Stations	Industrial Features
B	172	SW	Oxfords Locals Free Online Business Network	Published Goods	Industrial Products
B	184	SW	Majestic Flooring	Construction Completion Services	Construction Services
C	193	S	Electrical Sub Station	Electrical Features	Infrastructure and Facilities
C	203	S	Pumping Station	Water Pumping Stations	Industrial Features

ID	Distance [m]	Direction	Company	Activity	Category
6	215	NE	Electrical Sub Station	Electrical Features	Infrastructure and Facilities

6.13 PETROL AND FUEL SITES

The Groundsure report does not record any fuel stations within 250m of site.

6.14 HISTORICAL PETROL AND FUEL SITE DATABASE

The Groundsure report does not record any historical fuel stations within 250m of the site.

6.15 POTENTIAL CONTAMINATIVE LAND USES IDENTIFIED ON MAPPING

ID	Distance [m]	Direction	Use	Date
C	208	S	Cuttings	1966
C	208	S	Cuttings	1974
E	265	S	Unspecified Factory	1966
F	270	NE	Unspecified Commercial / industrial	1938
G	316	S	Unspecified Depot	1974
F	360	NE	Unspecified Works	1966
F	360	NE	Unspecified Works	1974
K	385	NW	Smithy	1900
K	388	NW	Smithy	1900
K	391	NW	Smithy	1922
K	392	NW	Smithy	1910
M	408	NE	Railway Sidings	1966
2	467	W	Unspecified Factory	1966

6.16 HISTORICAL TANK DATABASE

ID	Distance(m)	Direction	Use	Date
J	384	NE	Tanks	1993
J	386	NE	Unspecified Tank	1972
L	390	NE	Tanks	1993
J	391	NE	Unspecified Tank	1957
J	391	NE	Unspecified Tank	1972
L	391	NE	Tanks	1972
L	391	NE	Unspecified Tank	1957

ID	Distance(m)	Direction	Use	Date
N	432	SE	Unspecified Tank	1986
N	432	SE	Unspecified Tank	1993
N	432	SE	Unspecified Tank	1989
N	432m	SE	Unspecified Tank	1967
N	433m	SE	Unspecified Tank	1994
N	433m	SE	Unspecified Tank	1994
N	433m	SE	Unspecified Tank	1994
G	434m	S	Unspecified Tank	1986
G	435m	S	Unspecified Tank	1976
G	441m	S	Tanks	1968
G	441m	S	Tanks	1967
G	445m	S	Tanks	1988
G	445m	S	Tanks	1993
M	472m	E	Unspecified Tank	1993
R	482m	N	Unspecified Tank	1966
R	482m	N	Unspecified Tank	1993
R	486m	N	Unspecified Tank	1993
R	487m	N	Unspecified Tank	1966
S	496m	SE	Unspecified Tank	1986
S	496m	SE	Unspecified Tank	1976
M	498m	E	Tanks	1972
S	498m	SE	Tanks	1986

6.17 HISTORICAL ENERGY FACILITIES

ID	Distance(m)	Direction	Use	Date
A	116	NW	Electrical Sub Station	1989
A	116	NW	Electrical Sub Station	1993
B	189m	S	Electrical Sub Station	1954
B	189m	S	Electrical Sub Station	1954
D	211m	NE	Electrical Sub Station	1993
D	212m	NE	Electrical Sub Station	1972
D	212m	NE	Electrical Sub Station	1994
D	212m	NE	Electrical Sub Station	1994
E	321m	S	Electrical Sub Station	1989
E	321m	S	Electrical Sub Station	1993
H	326m	S	Electrical Sub Station	1989
H	326m	S	Electrical Sub Station	1993
I	335m	E	Electrical Sub Station	1986
I	335m	E	Electrical Sub Station	1993
I	335m	E	Electrical Sub Station	1989
I	336m	E	Electrical Sub Station	1994
I	336m	E	Electrical Sub Station	1994
I	336m	E	Electrical Sub Station	1994
I	336m	E	Electrical Sub Station	1967
O	432m	NW	Electrical Sub Station	1954
O	432m	NW	Electrical Sub Station	1954

ID	Distance(m)	Direction	Use	Date
O	432m	NW	Electrical Sub Station	1993
1	450m	N	Electrical Sub Station	1993
P	465m	NW	Electrical Sub Station	1969
P	465m	NW	Electrical Sub Station	1968
P	466m	NW	Electrical Sub Station	1993
Q	478m	SW	Electrical Sub Station	1967
Q	479m	SW	Electrical Sub Station	1968
Q	479m	SW	Electrical Sub Station	1988
Q	479	SW	Electrical Sub Station	1993
M	491	E	Electrical Sub Station	1972

6.18 HISTORICAL GARAGE DATABASE

The Groundsure report does not record any historical garages within 500m of the 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

- Former agricultural / pasture land usage, circa. 1878 to 1937. However, no farm buildings or yards have been present onsite.
- Potential asbestos containing materials (ACMs) within the fabric of the building, given the age of the structure (pre-1999).

7.1.2 OFFSITE

- Electrical Substation (11m S), circa 2004 (first identified on aerial photography) to present day

- Surrounding allotment gardens. Currently present 35m north, but allotment gardens have previously been recorded directly north of the northern site boundary circa 1900 to 1980.
- Infilled pond (250m S), circa 1900 to 1954.
- Smithy (385m NW), circa 1878 to 1937.

Potential Sources and Associated Contaminants Identified	
Source	Potential Contaminants
Former agricultural / pasture land usage, circa. 1878 to 1937. No farm buildings, yards or tanks have been identified onsite	Semi volatile organic compounds (SVOCs / pesticides)
Potential ACMs based upon the age of the building (pre-1999)	Asbestos
Offsite Electrical Substation (11m S), circa. 2004 to present day	PCBs
Surrounding Allotment gardens currently 35m north, previously recorded at northern boundary circa 1900 to 1980	Semi volatile organic compounds (SVOCs / pesticides)
Offsite Infilled Pond (250m S) circa 1900 to 1954	Ground gases (CO ₂ , CH ₄)
Offsite Smithy (385m NW) circa 1878 to 1937	Heavy metals, petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), semi volatile organic compounds (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);
- 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

The site proposals are understood to be residential. As such, the likely receptors are: residents / tenants, children, visitors, service personnel, flora and fauna and controlled waters

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 single storey residential dwelling, which the Client intends to demolish in order to erect a new two-storey residential development.

The site has no recorded history of development, other than the current residential building. Prior to this the site was formed of open pasture / agricultural land from between 1878 to 1937. Whilst minor amount of made ground / disturbed ground may be expected beneath the site, it is not likely to be of significant thickness and not considered to pose a risk to the proposed development. No storage of fuels, oils or lubricants, other than what may be expected for residential usage was observed during the site walkover.

An electrical substation is present 11m to the south of the site, and first identified on aerial photography dated 2004 (however, it most likely has been constructed before this period). The substation and associated compounds are offsite and will remain insitu and intact after construction. As PCBs are not considered a particularly mobile form of contamination, the associated risk to end-users of the site is low and no further investigation is considered necessary.

Whilst not observed during the site walkover, asbestos containing material (ACMs) may be present within the fabric of the building given the age of the structure (pre-1999) and it is recommended that an asbestos survey is undertaken for the existing residential property prior to demolition works taking place.

Former arable land and potential associated pesticides have been identified as a potential source; however, any topsoil associated with former agricultural / pasture land usage would have been removed in order to accommodate the current residential dwelling (similarly with offsite allotment gardens to the north which are now formed of residential

properties) and the risk from pesticides is considered to be low. Planter beds are present within the site, but were not observed to be in use at the time of the walkover. Use of pesticides and fertilizers in residential areas is very different from agricultural uses and based on aerial photography between 2004 and present day, the bed have seen little usage, remaining empty or overgrown since this date and as such, onsite pesticide has been discounted as a potential source. The former smithy once located 385m to the north west and last recorded in 1937 has also been discounted as a significant source due to the distance as low possibility of significant migration of contaminants.

8.1.2 GROUND GAS AND HAZARDOUS VAPOURS

One potential sources of ground gases have been identified in the form of an offsite pond previously located 250m to the south and was present between 1900 to 1954, when it is considered to have been infilled. Due to the size of the and distance of the infilled pond, it is not considered to pose a potential risk to the proposed development.

No significant sources of hydrocarbon contamination have been identified. The land has previously been used as agricultural / pasture land; however, no barns, sheds, farm buildings or storage of machinery have been identified on, or nearby to the site, nor have any fuel tanks and therefore the risk from hydrocarbons is considered to be low.

TABLE 1. SUMMARY OF SIGNIFICANT POLLUTION LINKAGES

Contaminant	Pathway	Receptor	Probability of Pollutant Linkage	Conseq.	Risk	Possible Mitigation
Contaminated Soils <i>(Former agricultural / pasture usage, offsite allotment gardens, nearby substation, potential PACMs within fabric of exiting dwellings)</i>	Direct Ingestion & Direct Contact	Site Workers <i>(during site works, excavations, eating and drinking)</i>	Li	Md	L/M	Site workers to wear appropriate PPE with suitable usage, adherence to relevant HSE guidance during site works and provision of an asbestos survey (and subsequent controlled removal, if required) within the site structure considered to sufficient mitigate site worker hazards to low.
Contaminated Soils <i>(Former agricultural / pasture usage, offsite allotment gardens, nearby substation, potential PACMs within fabric of exiting dwellings)</i>	Inhalation of Dust, Dry Arisings	Site Workers <i>(during site works, excavations, eating and drinking)</i>	Li	Md	L/M	
Contaminated Soils <i>(Former agricultural / pasture usage, offsite allotment gardens, nearby substation, potential PACMs within fabric of exiting dwellings)</i>	Crop Uptake & Direct Ingestion, Direct Contact	End Users <i>(residents / tenants, children, visitors, service personnel)</i>	Li	Md	L	No significant sources of contamination have been identified onsite and the current development lacks any topsoil within the front / rear gardens, which have been capped with artificial grass and paving stones. No significant made ground deposits are anticipated beneath the site based upon recorded development history. Potential asbestos containing materials may be present within the fabric of the building, given the age of the structure (pre-1999) and it is recommended that an asbestos survey is undertaken on the current residential building prior to any demolition works. No significant storage of fuels, oils or lubricants have been identified, nor has any significant PAHs and the risk to and new potable water supply is considered to be low, and it is current dwelling is already connected to mains water sources. However, the local water supply company should be contacted regarding their piping specifications One offsite pond (250m south) has been discounted as a significant source due to the distance to, and size of the pond. No onsite sources have been identified and the risk from ground gases is considered to be low No significant sources of hydrocarbons have been identified. Whilst potential pesticide usage has been identified, the topsoil in the former areas has since been removed in order to accommodate residential dwellings (both on and offsite). As such, the risks of residual pesticides presence is considered to be low. The site in not recorded to lie in a Radon Affected Area.
Contaminated Soils <i>(Former agricultural / pasture usage, offsite allotment gardens, nearby substation, potential PACMs within fabric of exiting dwellings)</i>	Inhalation of Dust, Dry Arisings	End Users <i>(residents / tenants, children, visitors, service personnel)</i>	Li	Md	L	
Contaminated Soils <i>(Former agricultural / pasture usage, offsite allotment gardens, nearby substation, potential PACMs within fabric of exiting dwellings)</i>	Crop Uptake & Direct Ingestion, Direct Contact	Flora and Fauna <i>(on and offsite)</i>	Li	Md	L	
Contaminated Soils <i>(Former agricultural / pasture usage, offsite allotment gardens, nearby substation, potential PACMs within fabric of exiting dwellings)</i>	Vertical and lateral migration <i>(bedrock geology pathways)</i>	Controlled Waters <i>(underlying Secondary A Aquifer)</i>	Li	Md	L	
Contaminated Soils <i>(No significant sources of PAHs or hydrocarbons identified)</i>	Direct contact <i>(pipe degradation and leaching)</i>	Services <i>(impacted new potable supply piping)</i>	Li	Md	L	
Ground Gases (Methane and CO ₂) <i>(No significant sources of ground gases identified)</i>	Vertical and lateral migration <i>(bedrock 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>(No significant sources of VOC/SVOCs 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>	Lw	Md	L	
Radon	Vertical and lateral migration	End Users & Building Envelope	UI	Md	L	

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. The moderate risk is associated with potential asbestos containing materials within the fabric of the building (based upon the age of the building being pre-1999).

No significant sources of soil contamination nor ground gases have been identified and as such, no further investigation is recommended.

It is however recommended that the building on site should 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. Following completion of the survey and the controlled removal of any identified asbestos, the risk can be reduced to low.

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 when assessed against the residential end-usage of the site. The site has no recorded history of development other than the current residential development and as such the potential for a significant depth of made ground is considered to be low. No further sources of contamination have been identified onsite and no storage of use of fuels, oils or lubricants beyond what may be expected for residential usage has been observed, and the surrounding area is similarly formed of residential properties.

Topsoil is not present within the front gardens and is mainly composed of paving tone, plant pots and some overgrown vegetation. Topsoil was only within four planter beds present within the southernmost rear garden, and were not in use at the time of the site walkover. Generally, the majority of the site outside of the building footprint has been capped with paving stones or artificial grass.

Additionally, the risk from vapour and ground gas hazards to end-users via the building envelope are considered significant and low, and no significant sources of ground gases or hazardous vapours has been identified within, or close in proximity to the site.

11.1.2 SITE WORKERS

The risks to site workers during site works are considered to be low to moderate, mainly due to the potential for asbestos contamination within the fabric of the building, and as such it is recommended that an asbestos survey is undertaken prior to any development works taking place. Following this, and any subsequent removal (if required), the risk to site workers can be reduce to low.

12.0 CONTROLLED WATERS

The risks to controlled waters are considered to be low. No nearby surface water features have been identified, and no potentially significant sources of contamination have been identified that may pose a risk to the underlying Secondary A Aquifer (Beckley Sand Member).

12.1.1 GROUND GASES AND HAZARDOUS VAPOURS

No significant sources of ground gases or hazardous vapours have been identified in, on or nearby to the site and as such, the risk is considered to be low.

12.1.2 POTABLE WATER SUPPLY PIPING

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. No significant sources of PAHs or hydrocarbons have been identified and as such, the risk to new potable piping is considered to be low. However, as a matter of prudence, it is recommended that the local water supply company is contacted in regards to their piping specifications in that area.

13.0 RECOMMENDATION

Currently, no further works are considered necessary in regards to soil contamination or ground gas/vapour hazards and site hazards are considered overall to be low. It is however recommended that before any development works are undertaken that an asbestos survey of the existing residential dwelling is undertaken in order to ensure site worker safety and that the development works do not cause future contamination of the site.

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.

14.0 REFERENCES**14.1 LEGISLATION AND REGULATIONS****14.1.1 ACTS**

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

14.1.2 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

14.1.3 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

14.2 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.

14.3 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)

14.4 NON STATUTORY TECHNICAL GUIDANCE**14.4.1 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.

14.4.2 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

14.4.3 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)

15.0 APPENDICES

APPENDIX A ENVIRONMENTAL SEARCH

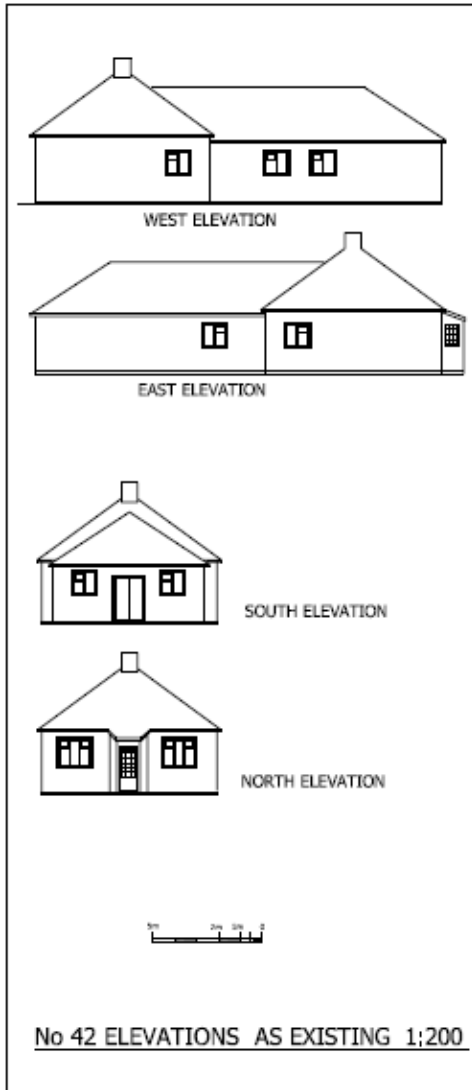
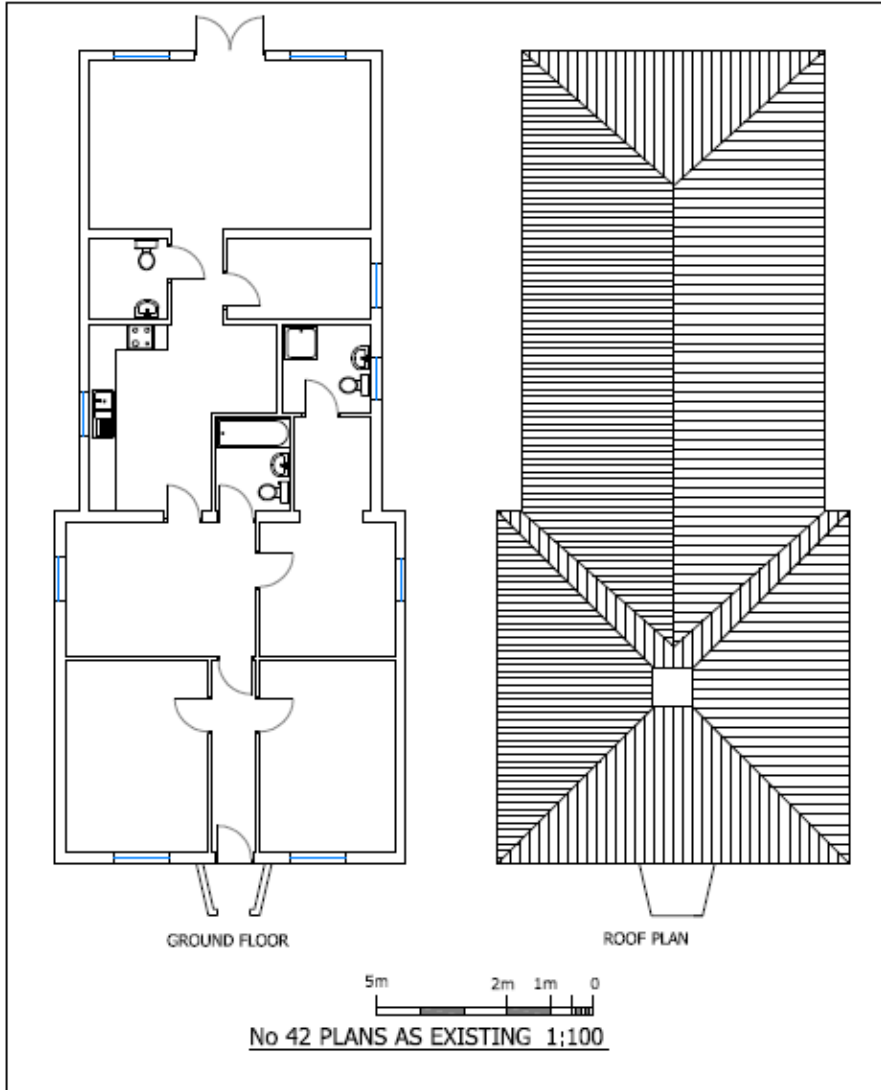
Separate Groundsure Report

APPENDIX B HISTORICAL MAPPING

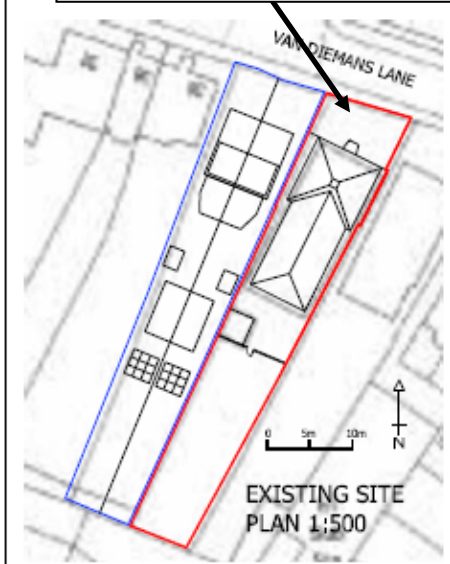
Separate Map Packs (2 No. files)

APPENDIX C

PROPOSED AND CURRENT SITE PLANS



Site at 42 Van-Diemans Lane



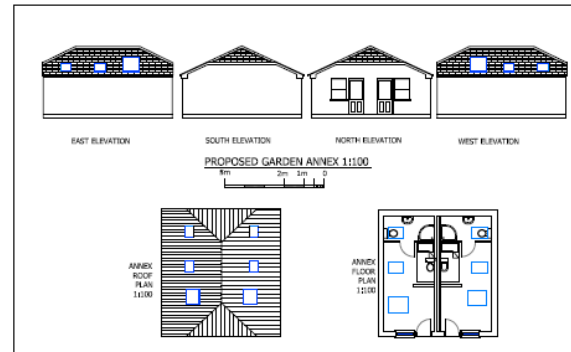
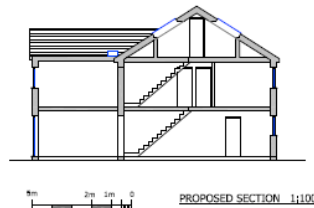
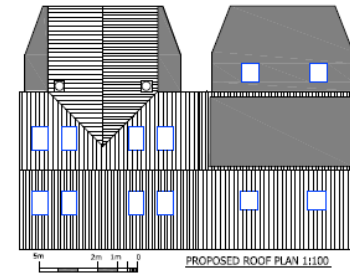
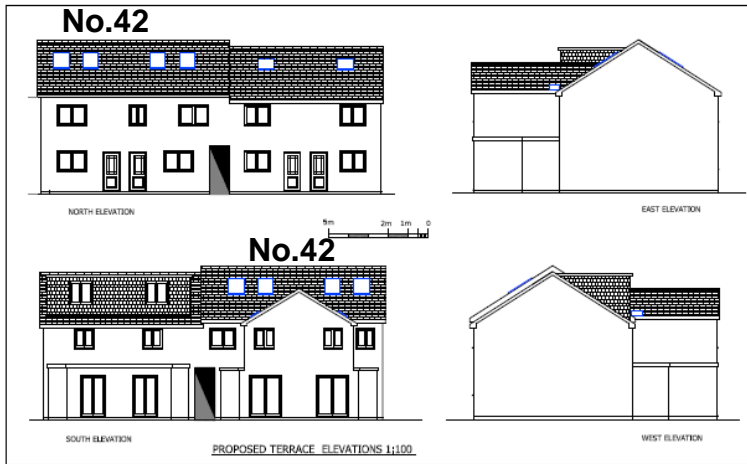
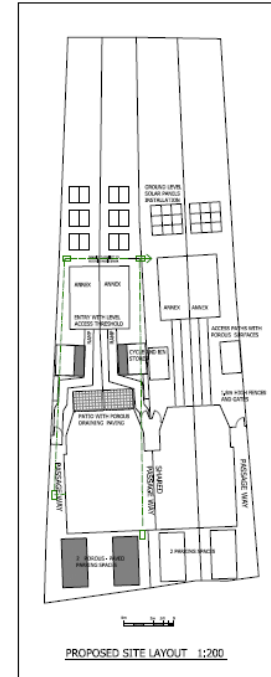
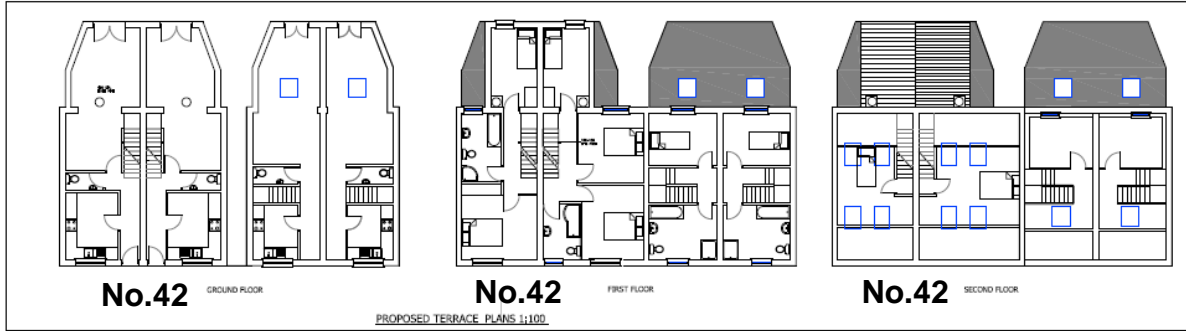
HESS-KINCAID-LEACH Architects

WEST WALES OFFICE
Y GLYN
LLANIDOGWEL (BREI)
CEREDIGION SY25 6RL
e: hkincaid@hesskincaidleach.co.uk
w: www.hesskincaidleach.co.uk

OXFORD OFFICE
39 RADCLIFFE ROAD
OXFORD, OX4 4BX
T/Fax: 01865 249891
pleach@hesskincaidleach.co.uk
www.hesskincaidleach.co.uk

PROJECT TITLE	EXISTING PLANS AND ELEVATIONS	
PROJECT NAME	VAN DIEMANS LANE TERRACE	
CLIENT	HARRIS JAN PROPERTY SERVICES	
DRAWN BY	PVL	CHECKED BY
PROJECT NO	SCALE 1 : 50	
DRAWING NO	0101	ISSUES
SCALE	P01 PRINT SIZE A2	

APPENDIX D SITE PHOTOS AND LOCATIONS



HESS-KINCAID-LEACH Architects	
1001 AVONDALE DRIVE SUITE 100 LAWRENCEVILLE, GA 30046 (770) 962-1111 www.hess-kincaid-leach.com	1001 AVONDALE DRIVE SUITE 100 LAWRENCEVILLE, GA 30046 (770) 962-1111 www.hess-kincaid-leach.com
PROJECT: PROPOSED PLANS AND ELEVATIONS CLIENT: THE OXFORD LANE TRUST DATE: 08/2014 DRAWN BY: JKL CHECKED BY: JKL SCALE: 1 : 100 SHEET: 01 OF 01 PLOT PRINT SIZE: A1	





Site Walkover Photos

**Address: No.42 Van Diemens Lane, Oxford OX4 3QD
Client: Mr. H. Khan**

Photo No.1: View south east of the frontage of No. 42 Van Diemens Lane

Photo No.2: View south of rear garden of No.42



Castledine Environmental, 4 Wymeswold Road, Hoton, Loughborough, Leicestershire LE12 5SN.
Telephone: 01509 880399 Email: info@castledineenvironmental.co.uk



Site Walkover Photos

**Address: No.42 Van Diemens Lane, Oxford OX4 3QD
Client: Mr. H. Khan**

Photo No.3: View south of central rear garden of No.42

Photo No.4: Construction materials stored in rear garden of No.42





Site Walkover Photos

**Address: No.42 Van Diemens Lane, Oxford OX4 3QD
Client: Mr. H. Khan**

Photo No.5: Planting bed (cover with chicken coop and materials) within the southern extents of rear garden.

Photo No.6: Artificial grass and gym equipment in the southern most area of rear garden.



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.

