Preliminary Land Contamination Risk Assessment

of

Warrenwood Manor
Hornbeam Lane
Essendon
AL9 6JF

for

Nigel Brunt

LBH4395 Ver. 1.0

March 2016

LBH WEMBLEY

Geotechnical & Environmental

Project No: LBH4395

Report Ref: LBH4395 Ver 1.0

Date: 29th March 2016

Report prepared by:

Digitally signed by Callum Ward
DN: cn=Callum Ward, o=LBH Wembley, ou, email=callum@lbhgeo.co.uk, c=GB
Date: 2016.04.25 09:05:48 +01'00'

Callum Ward
BSc FGS

Report approved by:

Digitally signed by Seamus Lefroy-Brooks
DN: cn=Seamus Lefroy-Brooks, o, u=LBH WEMBLEY, email=seamus@LBHGEO.co.uk, c=GB
Date: 2016.04.25 09:12:38 +01'00'

Seamus R Lefroy-Brooks
BSc(hons) MSc CEng MICE CGeol FGS CEnv MIEnvSc FRGS SiLC
RoGEP UK Registered Ground Engineering Adviser

LBH WEMBLEY Geotechnical & Environmental
Unit 12 Little Balmer
Buckingham Industrial Park
Buckingham
MK18 1TF

Tel: 01280 812310

email: enquiry@lbhgeo.co.uk
website: www.lbhgeo.co.uk

Contents

Foreword-Guidance Notes

GENERAL

This report has been prepared for a specific client and to meet a specific brief. The preparation of this report may have been affected by limitations of scope, resources or time scale required by the client. Should any part of this report be relied on by a third party, that party does so wholly at its own risk and LBH WEMBLEY Geotechnical & Environmental disclaims any liability to such parties. The observations and conclusions described in this report are based solely upon the agreed scope of work. LBH WEMBLEY Geotechnical & Environmental has not performed any observations, investigations, studies or testing not specifically set out in the agreed scope of work and cannot accept any liability for the existence of any condition, the discovery of which would require performance of services beyond the agreed scope of work.

VALIDITY

Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances shall be at the client's sole and own risk. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should therefore not be relied upon in the future and any such reliance on the report in the future shall again be at the client's own and sole risk. LBH WEMBLEY Geotechnical & Environmental should in all such altered circumstances be commissioned to review and update this report accordingly.

CONTAMINATION

Unless detailed in the report, no contamination investigation has been undertaken and no consideration has been given to any special measures that may be necessary in connection with possible contamination. Unless specifically commented upon, no approach has been made to the Local Authority or Environment Agency in order to establish any further information or requirements that may affect this site. These further investigations must be made, for example, to establish whether there is a risk of gaseous or liquid migration towards or away from the site. LBH WEMBLEY Geotechnical & Environmental can accept no responsibility for any claims resulting from the presence of Asbestos, Japanese Knot-Weed, Radioactivity or Unexploded Ordnance at this site.

THIRD PARTY INFORMATION

The report may present an opinion on the disposition, configuration and composition of soils, strata and any contamination within or near the site based upon information received from third parties. However, no liability can be accepted for any inaccuracies or omissions in that information.

DRAWINGS

Any plans or drawings provided in this report are not meant to be an accurate base plan, but are used to present the general relative locations of features on, and surrounding, the site.

1. Introduction

1.1 Background

The site is part of a wider development area, which has an extensive planning history (detailed table appended to the report), with multiple applications for the demolition and construction of previous houses, a stable block and a barn. This report relates to application (S6/2015/1107/FP) for the *'Retention of modified land levels and further land remodelling to agreed contours'* and refers to the area outlined in red on the site plan below

The Environment Agency has raised an objection to this application in a letter of 17th December 2015 (Ref NE/2015/124132/01-L01) as follows:

1. *We consider the level of risk posed by this proposal to be unacceptable.*
2. *The application fails to provide assurance that the risks of pollution are understood, as a preliminary risk assessment (including a desk study, conceptual model and initial assessment of risk) has not been provided. It requires a proper assessment whenever there might be a risk, not only where the risk is known.*

Reason: To protect the groundwater. The nature of the material is unknown and potentially contaminative. The site is located in a drinking water protected area and there is a risk of run-off entering the Essendon Brook.

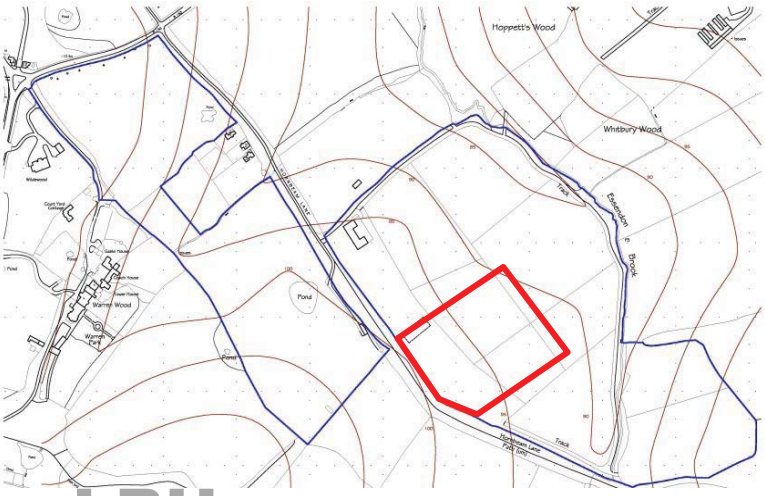
1.2 Brief

LBH WEMBLEY Geotechnical & Environmental have been appointed to prepare a preliminary risk assessment to address the objection from the Environment Agency.

1.3 Report Structure

This report describes the site, its location and topographical setting, including information obtained from a site walkover inspection undertaken on 23rd February 2015 in the company of the Client and the Architect. The report then progresses to a desk study compiled from information obtained from searches and historical maps.

Following the above, an initial land contamination risk assessment is presented including risks to controlled waters. Finally, consideration is given to the scoping of an intrusive investigation.



2. The Site

2.1 Site Location

The site is located some 2km to the south of Essendon, near the village of Wildhill, and can be accessed via Hornbeam Lane. The site itself is approximately 2.5 hectares in size and may be located approximately by National Grid Reference 527420, 206370 or by postcode AL9 6JF.

2.2 Topographical Setting

The site lies on the western slope of the Essendon Brook valley, falling to the northeast. Essendon Brook flows to the north, ultimately towards the River Lea. The southwestern boundary of the site lies at approximately +100m OD while the brook lies at approximately +85m OD. The site and surrounding area appears to have undergone some extensive re-grading within the last few years. Immediately inside the southwestern boundary the site appears to have been lowered by approximately 1.5m as part of a cut and fill exercise to create the present level platform in the top half of the site.

2.3 Site Description

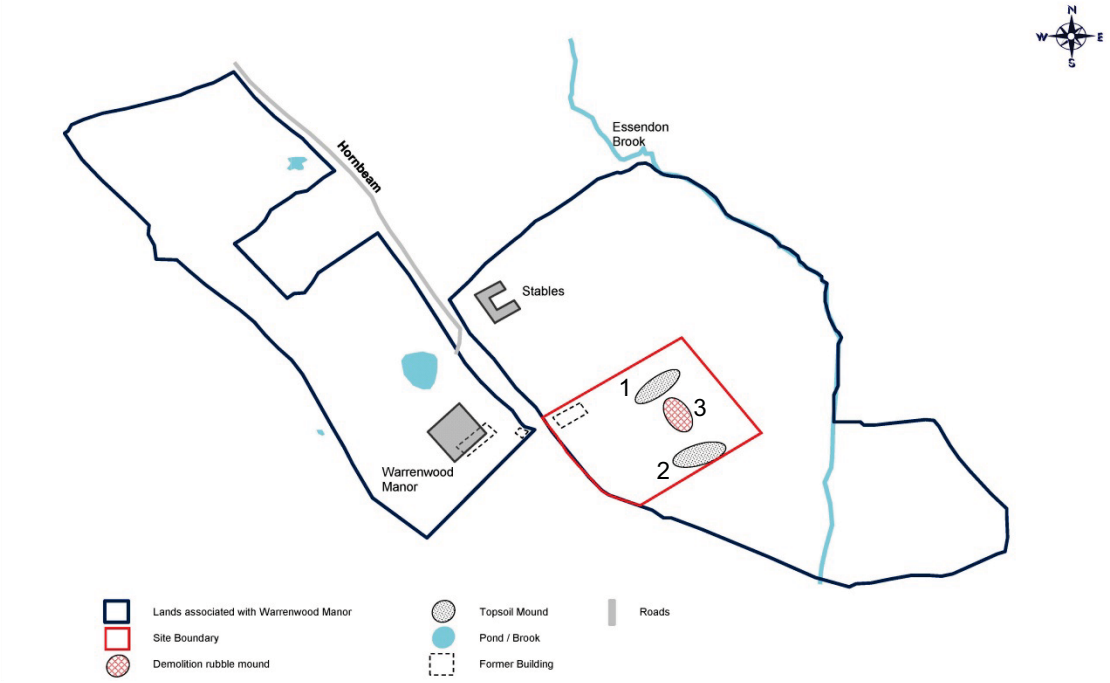
The site (red line) lies within the Warrenwood Manor premises (blue line). The land associated with Warrenwood Manor appears to be used primarily for equestrian purposes.

The site is bounded to the north by a recently formed manege, beyond which is a stable block. The land to the northeast of the site is fenced into paddocks used for the grazing of horses.

View across north-eastern site boundary towards brook

A visual inspection of the current site surface reveals a significant amount of scattered fragments of concrete, brick, glass, plastic and metal with limited vegetation growth.

Typical site surface detail



There are three stockpiles of material located on the site as indicated on the plan above; two of which appear to comprise topsoil, while the third appears to comprise uncrushed demolition material.

View south-westwards across the site, showing the three stockpiles.

Top left, stockpile 3 containing demolition material

Top right, stockpile 2 containing topsoil

Bottom Left, stockpile 1 (in background) containing topsoil

View southwest across site towards recently constructed Warrenwood Manor (behind Trees)

Warrenwood Manor is located on the opposite side of Hornbeam Lane, the surrounding area of which appears to have been cut into the hillside with variously levelled plateaus. There is also a large pond located to the north of the house.

3. Desk Study

3.1 Site History

The site and surrounding area was historically used as agricultural land. Meadow Cottage had been established by the end of the 19th Century on the site of the present Warrenwood Manor.

By the mid-1970s Hornbeam lane appeared to have been upgraded to a vehicular access route, albeit ceasing at Meadow Cottage. The site itself, however, has remained relatively unchanged until recently.

The land associated with Warrenwood Manor has had an extensive recent planning history, which has in turn affected the site and its immediate surroundings.

In the early 1990s, planning permission was granted to demolish Meadow Cottage and construct a replacement house. At a similar time, planning was also granted for a new stable building and a barn; the barn to be located partly on the site.

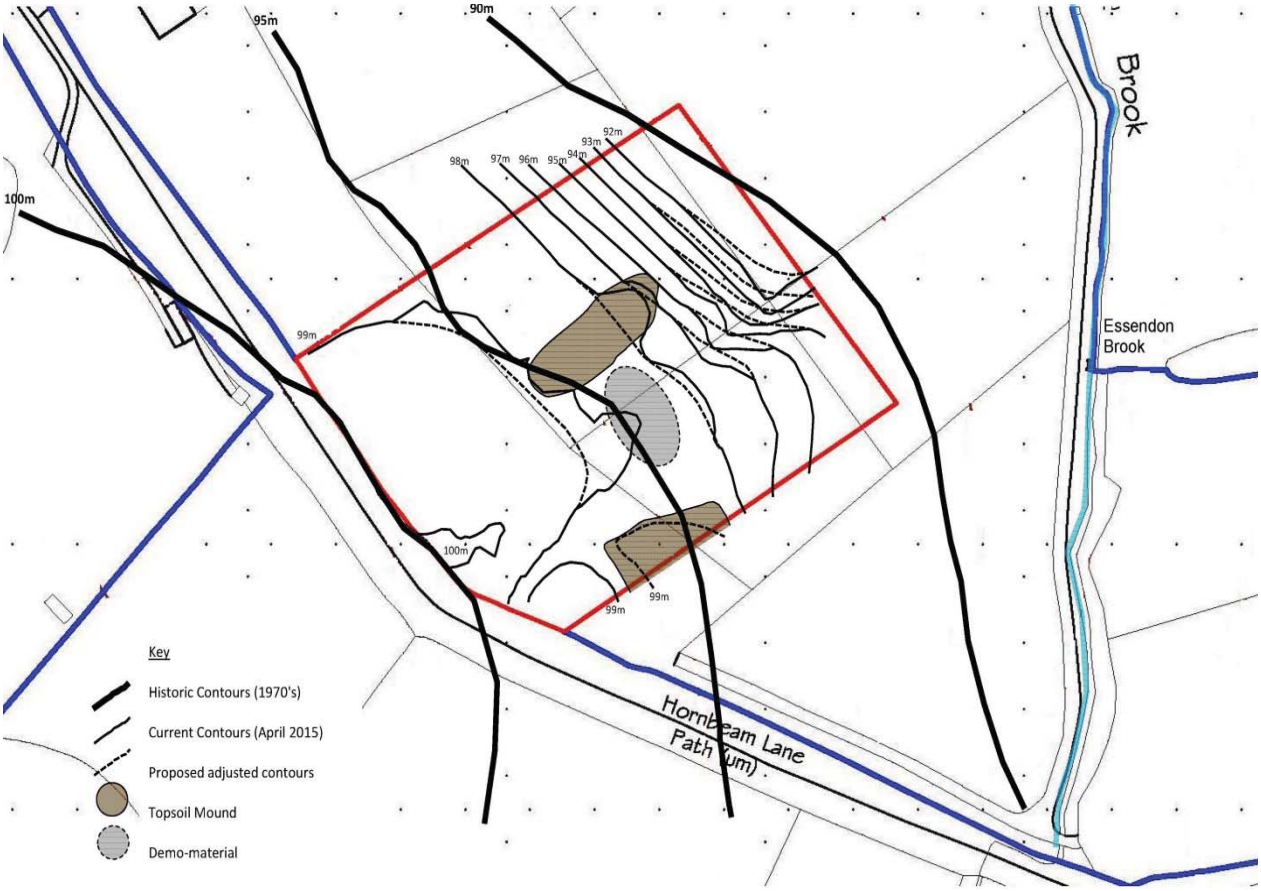
It is understood that the replacement house was only partly constructed. The stable building was also only partially built and only the foundations of the barn had been constructed by 2012. At that time the land adjacent to the partially completed house and stable appears to have contained several piles of presumed demolition material arising from the original house.

It is understood that the current owner bought the site in 2012 as an abandoned construction project.

Planning permission was obtained in early 2013 for the demolition of the partially-built house and barn, and construction of a new house, as well as completing the stable block. It is understood that the foundations of the barn were scrubbed out to form Stockpile 3 and the topsoil in this area was scraped into the Stockpiles 1 and 2 currently occupying the site.

The stables were completed and a manege created on the adjacent land to the north. The partially-built house was demolished and it is understood that the nearby piles of material relating to the original house were moved across to this site.

It would appear that no historical topographical survey is available for the site undertaken prior to the re-grading of the site; additionally no historic LIDAR data has been located for the area.



Plan showing previous, existing and proposed contours

The plan above demonstrates the current contours of the site (thin black lines), and the proposed modifications (dashed) by way of using the two topsoil stockpiles.

However, the heavier black lines derived from 1970s OS mapping indicate that at present, the thickness of recently-placed fill at the site increases from zero along the southwestern boundary to approximately 4m in the central area of the site. Along the northeastern boundary the thickness appears to vary from less than 1m in the north to approximately 3m in the easternmost section of the site.

While it is apparent that the made ground present on the site may be entirely composed of material cleared from the adjacent sites, given the deduced volume of made ground present it is also considered possible that there has been additional importation of material from external sources.

3.2 Geological Information

The British Geological Survey (BGS) records of the area indicate that the site is directly underlain by the London Clay Formation, while alluvial deposits associated with the Essendon Brook are present to the east.

In practice it is likely that there may be a small amount of transitional head or downwashed soil located over the undisturbed London Clay.

3.3 Hydrogeological / Hydrological Information

The Essendon Brook flows north towards the River Lea and is located some 200m to the northeast of the site.

The Environment Agency (EA) classifies the London Clay Formation as Unproductive Strata, defined as *"rock layers or drift deposits with low permeability that has negligible significance for water supply or river base flow"*.

Any thin layer of transitional head or downwashed soil located over the undisturbed London Clay may be expected to exhibit limited permeability but may be sufficient to allow for the near-surface movement of water migrating downslope towards the alluvium surrounding the brook.

The site is not located within a Groundwater Source Protection Zone and does not appear to be affected by flooding from rivers or reservoirs, although there is a low risk of surface water flooding occurring at the site.

There are no active abstraction permits within 500 m of the site and no discharge consents within some 300m of the site.

3.4 Other Environmental Information

There are no recorded or historical landfills registered within 500m of the site.

3.5 Proposed Development

As described above, it is proposed to retain the made ground that is present on the site and to further remodel the slope through spreading the two topsoil stockpiles and removing the construction stockpile.

4. Land Contamination Risk Assessment

4.1 Hazard Identification

The site and the surrounding area do not appear to have had a history of potentially significant contaminative usage.

4.2 Potential Sources of Contamination

The principal potential source of significant contamination that have been identified is limited to the made ground material that has evidently been placed upon the site, which appears to be either demolition material from the previous buildings, or imported from unknown external sources.

4.3 Sensitive Receptors

A number of potentially sensitive receptors can be identified for the proposed development and these include:

- Construction workers & general public
- End-users
- Surface Water / Essendon Brook

4.4 Potential Pathways

A direct pathway to any near-surface contamination will be present for construction workers and the general public if these soils are exposed during earthworks.

The future end users may be exposed to any near-surface contamination, as the entire site will be soft landscaping.

Surface water may potentially be affected by leaching of the more mobile constituents of any soil contamination, which could potentially run-off in to the Essendon Brook. There doesn't appear to be any evidence of man-made drainage beneath the site but it is conceivable that, in addition to surface run-off, there may be a thin layer of semi-permeable transitional head or downwashed soil located over the undisturbed London Clay strata.

4.5 Conceptual Model

An initial conceptual model of the envisaged possible contamination has been developed in the form of a source-pathway-receptor pollutant linkage concept. A pollution linkage requires there to be a source of contamination, a sensitive target that can be adversely affected by the contamination and a pathway via which contamination can reach the target.

4.6 Risk Estimation

In order to evaluate the perceived contamination risks at this site the severity of the risk in terms of the magnitude of the potential consequence of the linkage occurring has been compared with the likelihood of the linkage existing.

The likelihood and consequence of a problem involving each particular pollutant linkage has been attributed a risk rating as shown in the table below:

RATING	1	2	3	4	5
LIKELIHOOD	Very unlikely	Unlikely	Evens	Probable	Highly probable
CONSEQUENCE	Negligible	Minor minor injury / minimum cost / minor health risk	Mild / Medium chronic health risk / risk of injury / appreciable costs to meet regulatory standards		Severe Death / major injury / explosion / maximum cost

On the basis of this qualitative rating system the various potential pollutant linkages have been attributed a risk ranking on the basis of the value of the product of the likelihood and consequence ratings, where a value of less than five is low, between five and ten is medium and above ten is high. A table estimating the risk associated with the envisaged principal possible pollutant linkages for the site, with regard to the proposed end use, is presented below.

SOURCE	RECEPTOR	PATHWAY	LIKELIHOOD	CONSEQUENCE	RISK RANKING
Possible contamination within the made ground	Construction workers, general public and end-users	Oral ingestion of soil or dust, skin contact or inhalation where soil is exposed	3	2	6 (MEDIUM)
	Surface Water / Essendon Brook	Leaching and migration of mobile contamination	2	3	6 (MEDIUM)

4.7 Risk Evaluation

There is inevitable uncertainty associated with the above assessment, but it can be stated that those linkages that have been assessed as medium or high risk would normally warrant some degree of further assessment / mitigation / remediation.

5. Site Investigation Scoping

5.1 Information Gaps

In order to assess the material on site, it will be necessary to investigate for the presence of potential contamination within the full thickness of made ground, as well as confirming the underlying natural ground conditions.

5.1 Geoenvironmental Data Required

The presence or otherwise of contamination should be investigated and testing undertaken to assess the soils in terms of risk to both human health and the Essendon Brook.

5.2 Proposed Ground Investigation

5.2.1 Mechanical Trial Pitting

A series of trial pits are proposed using a mechanical excavator to allow an assessment to be made of the thickness and composition of the made ground and shallow soils and to permit soil sampling.

5.2.2 Soil Sampling

The investigation will need to proceed in a phased manner. Thus, if relatively consistent conditions are encountered that confirm the composition of the made ground to largely reflect the present ground surface material, then an approximate grid of twenty exploratory positions should be sufficient, in conjunction with a sample recovered every 1m or at change in material. A provisional total of forty samples are envisaged on this basis.

Should the investigation reveal significant heterogeneity within the placed fill, then additional investigation and testing may be required in order to de-limit and further assess the extent of any potential problem.

5.2.3 Chemical Testing

Soil contamination testing of the made ground of each sample should include assessment of the following determinands:

- Moisture, phenols, TOC / SOM, Elemental Sulphur, CrVI, pH, Total & Free Cyanide, Thiocyanate, Sulphide, As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, Total Sulphate, Water Soluble Boron,
- Poly-cyclic Aromatic Hydrocarbons (PAH) Speciation EPA16 by GC-MS
- Total Petroleum Hydrocarbons (TPH) Full CWG Speciation by GC-FID including aromatic / aliphatic split, BTEX, MTBE, RBCA Banding
- Asbestos Screening
- Full 2-batch leachate Waste Acceptance Criteria testing

APPENDIX

SITE PLAN

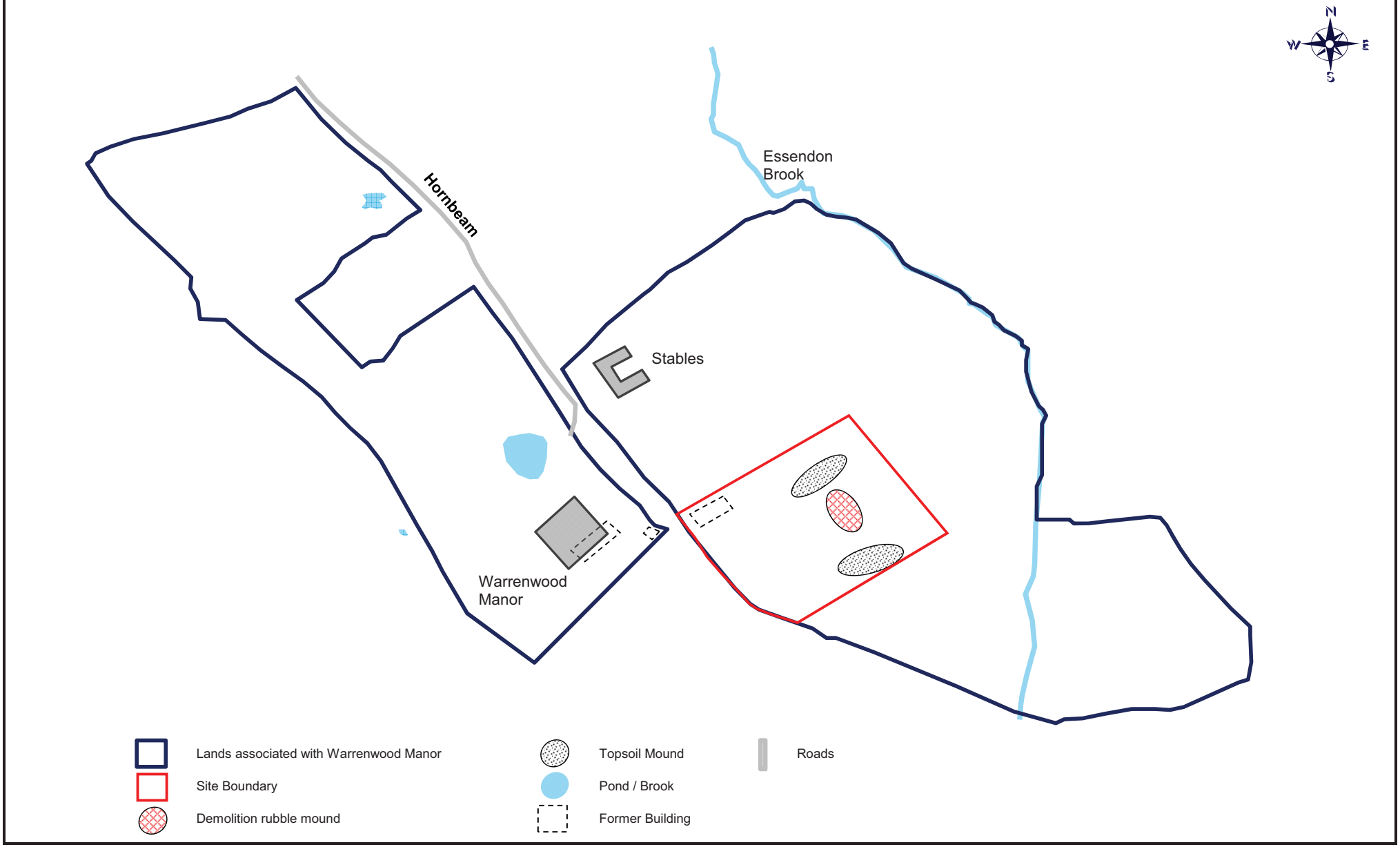
PLANNING HISTORY

EA GPLC3 CHECKLIST

ENVIROCHECK REPORT (Separate folder)

PROJECT: Warrenwood Manor, Hornbeam Lane, Essendon
CLIENT: NB Signs Company Ltd
LBH4395

SITE PLAN



LBH WEMBLEY Geotechnical & Environmental

Planning Application Number	Application Date	Applicant	Agent	Status	Purpose
S6/1980/0064					Two storey extension
C6/1984/0133					Two storey extension
S6/1975/0223/					Vehicular access
S6/1987/0841/OP					Two storey extension
S6/1988/1021/DE					Two storey extension
S6/1989/0652/OP	01/01/1989			Refused	Demolition of house
S6/1990/0042/FP	01/01/1990			Granted	Erection of stable block
S6/1996/0189/OP	01/01/1996			Granted	Demo of house and rebuild
S6/1998/0129/AG	01/01/1998			Decided	Erection of agricultural building
S6/1998/0291/DE	01/01/1998			Granted	Design of building
S6/1998/1132/FP	01/01/1998			Granted	Erection of replacement dwelling
S6/1999/0023/FP	01/01/1999			Refused	Change of use to equestrian
S6/1999/0372/FP	01/01/1999			Granted	Change of use to equestrian
S6/2000/0387/FP	24/03/2000			Granted	Variation of condition
S6/2000/1492/FP	13/11/2000			Refused	Erection of stable block
S6/2000/1520/FP	16/11/2000			Granted	Variation of condition
S6/2001/0499/FP	18/04/2001			Granted	Erection of replacement dwelling
S6/2002/0959/LU	24/06/2002			Decided	Caravans
S6/2009/2556/MA	20/11/2009			Granted	Change of use to equestrian
S6/2009/2574/FP	20/11/2009			Granted	Erection of new dwelling
S6/2011/2490/S73B	09/11/2011			Refused	New landscaping drawings
S6/2011/2492/S73B	09/11/2011			Refused	New landscaping drawings
S6/2013/0919/FP	25/04/2013			Granted	Demolition of part built structure
S6/2015/1105/FP	26/05/2015	Mr N Brunt	PNA	Under Consultation	Retention of barn
S6/2015/1106/FP	26/05/2015	Mr N Brunt	PNA	Under Consultation	retention of parking
S6/2015/1107/FP	**26/05/2015**	**Mr N Brunt**	**PNA**	**Under Consultation**	**modified landscaping**

GPLC3 – Reporting checklists

1.0 Risk assessment (focusing on risks to water)

Checklist 1. Preliminary risk assessment

Contents	Included?
Report objectives	Yes /~~No~~
Site location map and National Grid reference	Yes /~~No~~
Site layout plans*	Yes /~~No~~
Site area in hectares	Yes /~~No~~
Description of site and surroundings	Yes /~~No~~
Details of desk study research undertaken	Yes /~~No~~
Information on past and current activities at the site	Yes /~~No~~
Details of intended future use of the site	Yes /~~No~~
Unique references for all relevant planning applications or permissions at the site	Yes /~~No~~
Historical Ordnance Survey maps* and site plans* and if available, aerial photographs	Yes /~~No~~
Environmental setting including: • superficial deposits and solid geology • hydrology • hydrogeology (including the interaction between all relevant shallow and deep groundwaters and how they flow to potential receptors) • location and status of relevant surface water and groundwater receptors, including all abstracted uses and natural discharge such as springs, river baseflow and wetlands	 Yes /~~No~~ Yes /~~No~~ Yes /~~No~~ Yes /~~No~~

Contents	Included?
Information on site drainage and other man-made potential pollutant pathways, for example underground services	Yes /~~No~~
Identification of potential contaminants of concern and source areas	Yes /~~No~~
Consultations with the local authority	~~Yes~~ /No
Consultations with the Environment Agency	~~Yes~~ /No
Consultations with other appropriate bodies	~~Yes~~ /No
Review and summary of previous reports, with report references	~~Yes~~ /No
Outline conceptual model with nature and location of controlled waters receptors clearly identified	Yes /~~No~~
Description of possible pollutant linkages for controlled waters	Yes /~~No~~
Identification of potentially unacceptable risks to controlled waters, including criteria used to identify those risks	Yes /~~No~~
Discussion of uncertainties and gaps in information	Yes /~~No~~
Description and justification of next steps proposed at the site, for example carry out site investigation and quantitative risk assessment	Yes /~~No~~
* All plans and historical maps extracts should be large scale, to scale, with a north point, and clearly show the site boundary.	

Previous page | Next page