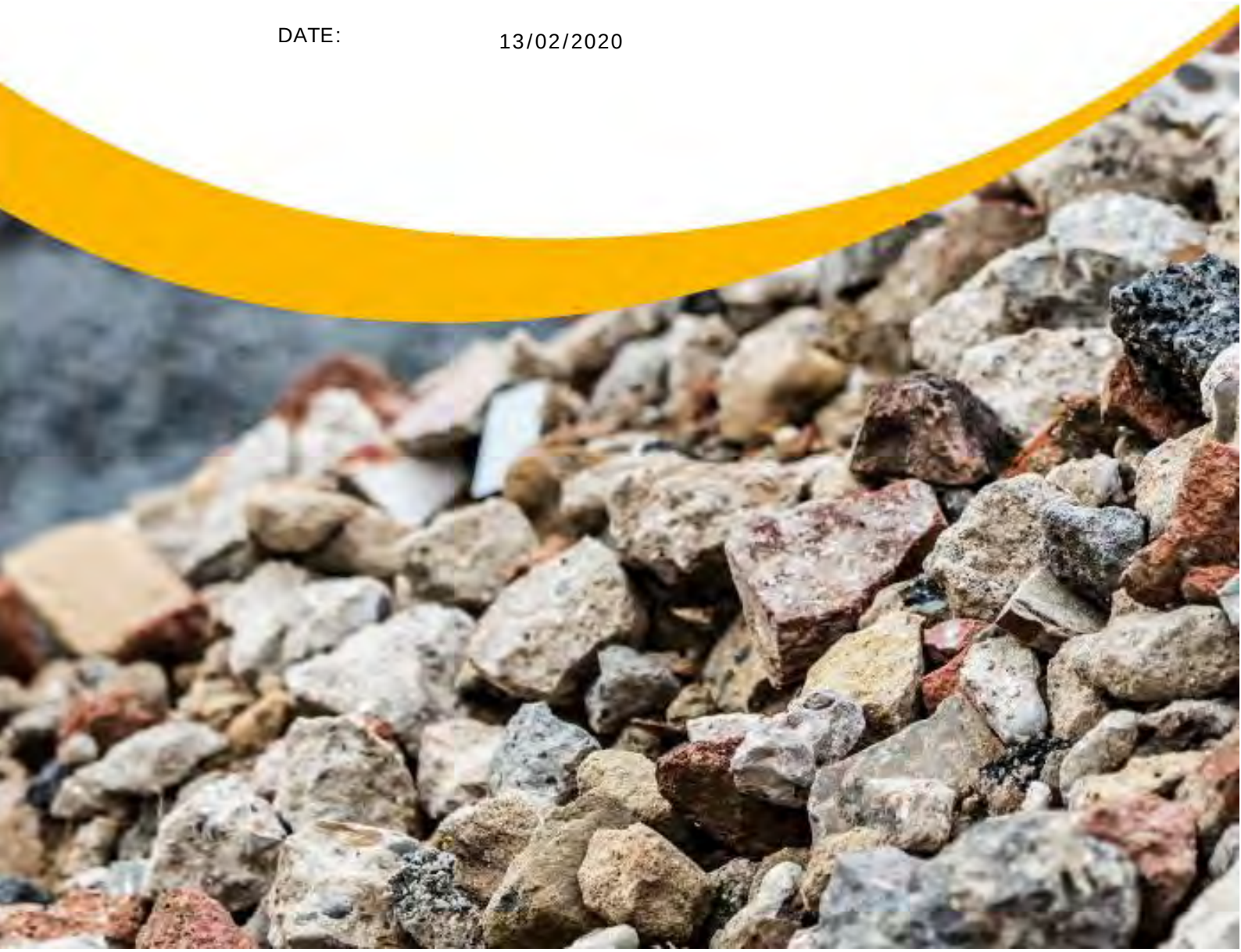
GEOSPHERE ENVIRONMENTAL

REPORT NUMBER: 4673,EC,AR,DS/DESK/SG,TP/13-02-20

SITE: Manor Farm, Frog End, Shepreth, Royston, SG8 6RE

DATE: 13/02/2020



DOCUMENT CONTROL SHEET

Report Number:	4673,EC,AR,DS/DESK/SG,TP/13-02-20
Client:	M Scott Properties Ltd
Project Name:	Manor Farm, Frog End, Shepreth, Royston, SG8 6RE
Project Number:	4673,EC,AR,DS
Report Type:	Phase 1 – Desk Study and Preliminary Risk Assessment
Status	Final
Date of Issue:	13 February 2020

Issued By:

Prepared By:	Reviewed By:	Authorised By:
Stephen Gilchrist Principal Geotechnical Consultant	Thomas Powling Director	Paul Davies Director

VERSION RECORD

Version	Version	Version	Version	Version

EXECUTIVE SUMMARY

Site Location / Description		The subject site was situated to the south west of the developed boundary of Shepreth village, approximately 380m south of Shepreth Rail Station and adjacent to the west of All Saints Church. The site may be located by National Grid Reference (NGR) TL 390 474. At the time of the preparation of this report, the site comprised a number of roughly rectangular agricultural fields which had either been ploughed recently or remained as semi- ruderal.
History		The historical maps indicated the site to be largely open undeveloped agricultural land over the historical period studied (1886 – 2020), with the exception of land Parcel C where a number of properties were noted to exist from the earliest map until their removal in the 1970's. The surrounding land has largely remained open and undeveloped with structures associated with Shepreth located to the north east and south west.
Conceptual Model		The desk-based research and historical review identified potential hazards on the site to include anthropogenic materials noted at the surface, Made Ground associated with former properties and contaminants associated with stockpiles. Although these were identified to be representative of point sources rather than a site-wide concern. The desk-based research and historical review did not identify any contaminants that may impact upon the site.
Conclusions and Recommendations		It is recommended that a preliminary intrusive ground investigation is undertaken to target potential contaminant sources to determine the extent within soil strata and, if necessary, the groundwater. This investigation should be focussed on the areas of risk noted by the conceptual model at this stage, although it would be prudent to get a number of gas monitoring wells across the site to assess the general ground gas regime and if it is influenced by the underlying Chalk bedrock.
This Executive Summary only provides a summary of the site data and its assessment. It does not provide a definitive engineering analysis and is for guidance only. It is recommended that the reader reviews the report in its entirety and any material referenced therein.		

CONTENTS

CONTENTS

TABLES

Page No.

1. INTRODUCTION

Geosphere Environmental Ltd was commissioned by the Client: M Scott Properties Ltd, to undertake a Phase 1 Desk Study and Preliminary Risk Assessment at Manor Farm, Frog End, Shepreth, Royston, SG8 6RE.

The primary objectives of the preliminary risk assessment are to:

- Provide an assessment of environmental sensitivity at the site and the surrounding area in relation to any suspected or known contamination which may significantly affect the site and the proposed development; and
- Indicate whether further works are required, and the nature of the works, to enable a more complete assessment of the site.

These are to be achieved by:

- Undertaking a walkover of the site;
- Researching and assessing the available information regarding the current site status, including recorded geology, hydrogeology and hydrology of the site and surrounding area, as well as the history of the site;
- Developing a Conceptual Site Model.

2. SITE SETTINGS

2.1 Site Description

The subject site was situated to the south west of the developed boundary of Shepreth village, approximately 380m south of Shepreth Rail Station and adjacent to the west of All Saints Church. The site may be located by National Grid Reference (NGR) TL 390 474.

A Site Location Plan, Drawing reference 4673,EC,AR,DS/003/Rev0, is provided within Appendix 3.

A site walkover was undertaken on 6 February 2020. At the time of the walkover the site comprised a number of roughly rectangular agricultural fields which had either been ploughed recently or remained as semi- ruderal. The total area of the site covered 22.45 hectares (ha) with a roughly level topography.

For the purpose of this report, the site has been separated into a number of areas so that the appropriate assessments may be undertaken at a localised scale. The separate areas have been described under the following sections, which are illustrated within Drawing reference 4673,EC,AR,DS/004/Rev0, provided within Appendix 3.

2.1.1 Parcel A

This land parcel was situated furthest north of the total site area and may be located by National Grid Reference (NGR) TL 39060 47627.

At the time of the walkover the land parcel comprised an open undeveloped area of semi-ruderal/arable land which was demarcated by a number of mature hedge and tree species, the majority of which included Sycamore, Hawthorne, Blackthorne, Maple and Willow.

The land parcel was bounded in the north east and eastern corner by wooden post and rail fencing, whilst the north west boundary was formed by mixed fence types. Beyond the north west and north east boundaries were residential properties associated with Meldreth Road and High Street and an equine paddock existed beyond the eastern corner. The south east and south west boundaries were open and were demarcated with a number of hedges and trees mentioned above. Beyond the south east boundary was open arable land, whilst Parcel B, existed beyond the south west boundary.

A drainage ditch was noted adjacent to the north east boundary, approximately 0.5m and 1.0m in depth, and was noted to be dry in the south east, becoming damp at the base in the north west. Elsewhere, electricity transmission lines existed adjacent to the south west boundary, crossing the site in the south east. A small number of brick and tile fragments were noted at the surface in the northern corner of the land parcel, which may indicate the presence of Made Ground in this area.

Direct access to the site was formed from Meldreth Road, in the north west, via a soft surfaced open strip of land between the surrounding residential properties.

2.1.2 Parcel B

This land parcel was situated to the south west of Parcel A, and may be located by National Grid Reference (NGR) TL 38961 47434.

At the time of the walkover the land parcel comprised an open undeveloped area of ruderal land with evidence of former use as agricultural land through the presence of crop stubble.

The north east boundary of the site was largely formed by the boundary of Parcel A, although a small section in the north was formed by mixed hedgerow, whilst in the south the boundary was open with a number of trees lining its length. The south east boundary was open and undeveloped with a footpath and Parcel D continuing beyond. The south west boundary was formed by a wooden post and wire mesh fence, in poor condition, continuing its entire length with a number of trees and the continuation of the footpath and Parcel C continuing beyond the boundary in the south. A protected wildlife area, wetland and Site of Special Scientific Interest (SSSI) was noted beyond the south west boundary, in the north, whereby the land falls away from the land parcel by approximately 1.5m. The north west boundary was formed by a wooden post and wire mesh fence, in reasonable condition, beyond which was an approximately 2.0m high embankment associated with an adjacent railway line.

Elsewhere onsite, electricity transmission lines were noted in the north west of the site, approximately 15m from the adjacent site boundary.

2.1.3 Parcel C

This land parcel was situated to the south of Parcel B, and may be located by National Grid Reference (NGR) TL 38950 47199.

At the time of the walkover the land parcel comprised an open undeveloped area of ploughed agricultural land with a border of grassland adjacent to the boundaries.

Both the south east and south west boundaries were formed by trees and hedgerows with an approximate 1.0m to 1.5m drainage ditch adjacent to the boundary, which was noted to have between 300mm and 500mm of stagnant, but clear, water at its base. Agricultural land extended beyond the boundaries in their relative directions. The north west boundary was formed by a wooden post and wire mesh fence, in a very poor state of repair, beyond which was the area of SSSI mentioned previously within Parcel B. The north east boundary was formed by trees and hedgerows, beyond which was the footpath mentioned previously.

A manhole cover was noted to exist adjacent to the north east boundary, suspected to relate to drainage, although no outfall was noted to exit along the drainage ditches in the south east/west.

2.1.4 Parcel D

This land parcel was situated to the south east of Parcel B, and may be located by National Grid Reference (NGR) TL 39277 47254.

At the time of the walkover the land parcel largely comprised an open undeveloped area of ploughed agricultural land with a border of grassland adjacent to the boundaries. Beyond a drainage ditch, situated in the north west and transecting the site, was a small area of semi-woodland/ruderal land which was being partially used as storage for agricultural equipment.

An area of reserved and unploughed land was situated through the centre of the main ploughed field, extending towards the south west boundary, together with a number of mature trees which continued adjacent to the south west boundary and towards the southern corner. A pond was noted to exist in the southern corner of the land parcel.

The north east boundary was largely formed by a wooden post and wire mesh fence, extending towards the ditch in the north, beyond which was an area of grazing for livestock. In the north and beyond the drainage ditch, the boundary was open with further ruderal land and equipment storage noted beyond, which included a number of tractors and other farming vehicles. The south east boundary was largely formed by a hedgerow, with the roadway of Frog End located beyond. In the southern corner of the land parcel, woodland formed the boundaries, continuing northwards to form the entirety of the south west and north west boundaries. A footpath was noted to exist beyond both the south west and north west boundaries, with agricultural land situated further south eastward.

A number of small rubble and soil stockpiles were noted to exist adjacent to the drainage ditch, sporadically along its length, and in the area of reserved land. The stockpiles were largely covered by vegetation, although plastic and metal waste items were exposed at the crests of the stockpiles. Two agricultural pieces of equipment were noted to exist onsite towards the northern corner of the ploughed field, both of which were trailers; one resembled a seed bin whist the other was for bulk storage, neither of were motor powered.

In the north of the site were three items of agricultural equipment, trailers, all of which were forms of ground preparation for agriculture and were not motor powered. A plastic container of unknown contents was noted on one of the trailers, although no leaks or spillages were noted on its surface of beneath it. Elsewhere in this area were a number of patched of grain, indicating possible former stockpiles or 'cleaning out' of equipment.

A Site Location Plan and Site Plan are provided within Appendix 6.

A photographic record of all four sections are presented in Appendix 7 of this report.

2.2 Geological Setting

Details of the geology underlying the site have been obtained from the British Geological Survey (BGS) digital mapping at a scale of 1:50,000, which is provided within the Envirocheck Report included in Appendix 4.

2.2.1 Superficial Deposits

The geological map of the area did not indicate the site to be underlain by any superficial soil deposits, although an area of Alluvium was noted to exist adjacent and beyond the site boundary in the south west. Similarly, beyond the north west boundary of the site, within 50m, was an outcrop of River Terrace Deposits.

No other superficial deposits were noted to exist in the surrounding area.

2.2.2 Bedrock Geology

The geological map indicated bedrock Geology underlying the site comprised the West Melbury Marly Chalk Formation.

The bedrock soils in the surrounding area indicates the Totternhoe Stone and Zig Zag Chalk to outcrop approximately 500m south east of the site, whilst the Gault Formation outcropped approximately 2000m north west, although given the regional sequence of soil strata it is likely that the Gault Formation outcrops beneath the West Melbury Marly Chalk, at depth.

The nearest borehole records; BGS borehole record number 538635 located within 50m north of the site (NGR TL38820 47720), indicated the Gault to be encountered beneath the West Melbury Marly Chalk approximately 17.0m below ground level.

2.2.3 Geohazards and Ground Workings

Table 1 overleaf, summarises the factors that may have a potential impact upon the engineering of the proposed development:

Table 1 – Geohazards and Ground Workings				
Potential Hazard	**Recorded Risk [m] / [Direction]**			**Comments**
	Onsite	**Within 250m**	**Within 500m**	
BGS Mineral Sites.	None.	None.	484m/SW – Moor End Cement Works: Opencast Chalk.	Six further entries of opencast Chalk operations at 600m/W, 625m - 792m (single site – 3 entries), 629m/NE and 921m/E.
Man-Made Mining Cavities.	None.	None.	None.	Four entries located between 579m/S, 590m/SW, 734m/SW 881m/S.
Non-Coal Mining Areas.	Rare.	No Entries.	No Entries.	-
Collapsible Ground.	No – Very Low Hazard.	No Entries.	No Entries.	-
Compressible Ground.	No – Moderate Hazard.	No Entries.	No Entries.	-
Ground Dissolution.	No – Very Low Hazard.	No Entries.	No Entries.	-
Landslide.	No – Very Low Hazard.	No Entries.	No Entries.	-
Running Sand.	Low Hazard.	56m/NE – Very Low Hazard.	No Entries.	-
Shrinking or Swelling Clay.	No – Very Low Hazard.	No Entries.	No Entries.	-

2.3 Hydrogeological Setting

2.3.1 Underlying Aquifers

The hydrogeological data provided within the Envirocheck Report indicates the bedrock to be a Principal Aquifer. No superficial aquifer exists beneath the site, although the Alluvial soils and River Terrace Deposits noted in the surrounding areas are designated as Secondary (A) Aquifers, which have significance to local groundwater supplies.

The Environment Agency defines a Principal Aquifer as 'layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale'.

2.3.2 Groundwater Vulnerability

The bedrock soils beneath the site, and including the superficial soils noted adjacent to the site, are classified as having high groundwater vulnerability.

The Environment Agency defines areas of high groundwater vulnerability as 'areas able to easily transmit pollution to groundwater. They are characterised by high leaching soils and the absence of low permeability superficial deposits'.

Soils of high leaching potential are soils that readily transmit liquid discharges because they are either shallow or susceptible to rapid by-pass flow directly to rock, gravel or groundwater.

2.3.3 Source Protection Zones

The site was not located within a groundwater source protection zone (SPZ).

There were three records of groundwater abstraction within 500m of the site. The closest well was situated approximately 126m north east of the site and was used for general agriculture under licence number 6/33/30/*g/081, although the status of this licence is 'Revoked'. The nearest active entry was located approximately 338m/SE and was used for private general use under licence number 6/33/30/*G/0205.

2.3.4 Rising Groundwater

The current data would imply that the site was within an area where exceptional structures, deep foundations, deep basements, and shallow foundations and basements, were at potential risk from rising groundwater.

Within land Parcel A, and the majority of Parcel B, the data indicates possible groundwater flooding within properties situated below ground level, whereas an area of land adjacent to the south west boundary of Parcel B, and the entirety of land Parcels C and D, have the potential for groundwater flooding at the surface.

2.4 Hydrological Setting

The hydrological setting of the site indicates a number of recorded networks in the surrounding area, the nearest of which are situated adjacent to the southern boundaries of land Parcels B (to the north), C and D. Further to which, a drainage network is shown to transect land parcel D in the north, extending adjacent to the north west boundary of land parcel.

In addition to the above, the site walkover noted a largely dry drainage ditch adjacent to the north east boundary of Parcel A, whilst a pond existed in the south corner of Parcel D.
In the surrounding area, Guilden Brook is noted to exist within 10m of land Parcel C, extending northwards and within 80m south west of land Parcel B. The River Shep was noted to exist within approximately 130m east of land Parcel A.
There were a number of revoked surface water abstractions located within a 500m distance from the site, although the nearest active entry was located approximately 610m east of the site and was used for general agriculture, including Spray Irrigation.

2.5 Radon

The HPA 'Indicative Atlas of Radon' 2007 (ref. R.1), indicates the site to lie within an area where there is a probability of <1% to 3% of present or future homes being above the action level of 200Bq/m^3. As such, the site is classified as a Radon Affected Area. This is confirmed by the Building Research Establishment, Report 211, 2007, (ref. R.2).

2.6 Nitrate Vulnerable Zone

The site was located within an area designated as a nitrate vulnerable zone. This is related to the Anglian Chalk for groundwater and the Ely Ouse and Cut-off channel for surface water.

The Nitrates Directive, (ref. R.3) defines a nitrate vulnerable zone as:

- Surface freshwater which contains or could contain, if preventative action is not taken, nitrate concentrations greater than 50mg/l;
- Groundwater which contains or could contain, if preventative action is not taken, nitrate concentrations greater than 50mg/l;
- Natural freshwater lakes or other freshwater bodies, estuaries, coastal waters and marine waters, which are eutrophic or may become so in the near future if protective action is not taken.

3. ENVIRONMENTAL SEARCHES

3.1 Environmental Searches Summary

The environmental searches are detailed fully within the Envirocheck Report presented within Appendix 3.

Table 2 shown below, summarises the most relevant findings:

Table 2 - Environmental Searches Summary

Activity	Distance From The Site			Comments [m]/[direction]
	Onsite	Within 250m	250m to 500m	
1. Incidents and Registers				
Discharge Consents.	0	2	5	1m/NE – Ref. Pr1nfg0735: Agricultural effluents to the River Rhee, effective May 1963 – July 1991. 111m/SW – Ref Prcnf14448: Sewage Discharges to a tributary of the River Shep, effective November 2000.
Pollution Incidents to Controlled Waters.	1	1	2	On Site (Parcel B/NW) – Incident Ref. 1575, March 1992: Cat 3 (Minor), Unknown pollutant. 64m/SW – Incident Ref. 2949, January 1995: Cat 3 (Minor), Oil pollutant.
2. Flooding				
Extreme Flooding from Rivers or Sea without Defences.	YES	YES	YES	Onsite: Error in site boundary, flooding area is off-site. Offsite: Continuing west beyond the site boundary and associated with Guilden Brook 104m/N: Associated with the River Shep.
Flooding from Rivers or Sea without Defences.	YES	YES	YES	Onsite: Error in site boundary, flooding area is offsite. Offsite: Continuing west beyond the site boundary and associated with Guilden Brook 104m/N: Associated with the River Shep.
3. Landfills and Waste Treatment / Disposal Sites - NONE				
4. Contemporary Trade Entries of Concern				
Contemporary Trade Directory Entries.	0	2	14	167m/N – Joinery. 301m/N – Science Apparatus. 316m/N – Scientific Instruments (2 entries). 333m – 405m/SE – Refrigeration (1 active entries/*2 inactive entries*). 459m/SE – Electronic equipment manufacture. *<u>Inactive Entries</u>* *386m/SE – Packaging.* *442m/SE – Furniture repair.* *442m/SE – Car dealers.* *442m/SE – Car body repair.* *442m/SE – Industrial/commercial machinery.*

Table 2 - Environmental Searches Summary

Activity	Distance From The Site			Comments [m]/[direction]
	Onsite	Within 250m	250m to 500m	
				459m/SE – Car Body repairs
Commercial Services.	0	0	5	305m/N – Vehicle Repair, Testing and Servicing. 421m - 422/NE – Distribution and Haulage. 442m/SE - Vehicle Repair, Testing and Servicing. 470m/E – Vehicle Repair, Testing and Servicing.
Manufacturing and Production.	0	0	3	293m/N – Factory. 314m/N – Factory. 379m/SE – Livestock Farming.
Public Infrastructure.	0	2	3	221m/NE – Weir. 226m/NE – Weir. 362m/S – Slurry Bed. 395m/SE – Rail Station (2 entries).
Recreational and Environmental.	0	1	1	110m/N – Playground. 389m/N – Playground.
5. Designed Environmentally Sensitive Sites				
Sites of Special Scientific Interest.	1	0	0	Onsite: Error in site boundary, SSSI is offsite in W-SW and associated with L-Moor, Shepreth under Natural England as a Local Wildlife Site.

Where no relevant or significant data records exist for an activity, it is removed from the summary table, however, all data is included within Appendix 3.

4. SITE HISTORY

4.1 Historical Maps

A review of the history of the site has been conducted based upon the historical maps included within the Envirocheck report included in Appendix 4.

The relevant changes of the subject site and immediate surrounding area from the large-scale mapping are detailed in Table 3 below:

Table 3 - Historical Summary

Date	Potentially Contaminative Land Uses / Significant Changes	
	Onsite [Direction]	**Offsite [Distance/Direction]**
1886 - 1887 (1:2,500) **1886** (1:10,560)	• Parcel A: indicated as comprising open undeveloped land. • Parcel B: indicated as comprising open undeveloped land. A roadway is noted to exist in the south east in the current location of the footpath. • Parcel C: indicated as comprising a number of properties with areas of orchard and open undeveloped land. • Parcel D: Indicated as residing in its present-day layout as part of Manor Farm including two areas of orchard/woodland.	• Surrounding area largely open and undeveloped with largely residential development associated with Shepreth largely within 250m north east. • Land associated with Manor Farm, including structures, continues Northward of Parcel D. • 100m/N (Parcel D) – Pond. • 200m/NE – Pond. • 175m/E – River Shep and Moat in its present-day location. • ~250m/NE – Corn Mill and Hall Yards. • 100m/SE - Properties associated with Frog End. • Huckles Lane indicated adjacent to the south west of Parcel D in the present-day location of a footpath. • 20m/S – Small area of forest. • Area of present-day SSSI labelled as Shepreth Common, extending westwards and upto 500m from the site. • Hitchin and Cambridge Branch railway located adjacent to the site boundary in the north west, residing in its present-day location. • Meldreth Road located in its present-day location, adjacent to the north west boundary of the site.
1903 (1:2,500) **1903 - 1904** (1:10,560)	• No significant changes of note.	• 300m/SW – Cement Works and pit. • Allotment situated adjacent to the north west of Parcel A.
1948 – 1949 *ap (1:10,560)	• Site shown as largely agricultural with properties located in Parcel C.	• Expansion of cement works pit.
1950 (1:10,560)	• South east section of Parcel A shown as an orchard.	• A commercial type development is noted adjacent to the north east boundary (Parcel A). • 200m/NE – Smithy.
1960 (1:10,000)	• No significant changes of note.	• Further development of commercial type development adjacent to the north east boundary to form a yard. • Cement Works noted as disused.
1975 - 1976	• Properties in Parcel C no longer noted.	• Area of forest to the south noted as reduced in size.

Table 3 - Historical Summary

Date	Potentially Contaminative Land Uses / Significant Changes	
	Onsite [Direction]	**Offsite [Distance/Direction]**
(1:2,500)	• Area of woodland / orchard noted in south east corner of Parcel D. • Electricity transmission line noted in its present-day location in the north west of Parcel B.	• Structures associated with disused cement works no longer noted, pit noted as containing water. • Small scale residential development adjacent to the north west of the site extending to the north east. • 125m/NE (Parcel A) Small-scale residential development. • Corn mill and smithy no longer noted.
1989 (1:2,500) **1980 - 1984** (1:10,000)	• No significant changes of note.	• Further small-scale residential development adjacent and to the north of the site.
1994/1996 (1:2,500) **1993** (1:10,000)	• No significant changes of note, although Parcel D has two areas listed as 'NC Seat' which is an unknown designation at this stage.	• No significant changes of note.
2000 *ap (1:2,500) **2000** (1:10,000)	• Area of forest no longer noted in Parcel C no longer noted. • Parcel D shown as comprising two agricultural fields separated by forest. Further forest noted in present-day locations. • Site largely noted to be agricultural.	• No significant changes of note.
2006 - 2020 (1:10,560)	• Parcel D shown as comprising a single agricultural field.	• No significant changes of note.

• Notes:
• It should be noted that the dates of the maps do not always correspond with the time of the surveys.
• *ap – Aerial Photography

Where no significant factors or changes occur within a map edition(s) it is summarised with "No significant changes of note".

Please note that the alignment and extent of the detailed site area in early map editions is often mis-aligned compared to modern mapping due to variation in mapping/digitisation processes; this is compensated for where possible within the interpretation.

5. CONCEPTUAL MODEL

The risk assessment methodology is based upon current guidelines (ref. R.4), and legislation (refs. R.5 and R.6).

The current guidance requires that a conceptual model be formulated, based upon the findings of the research. The conceptual model is limited at this stage to the identification and assessment of potential 'hazards', identified or suspected from the results of the research; the potential 'receptors' that may be affected and the anticipated 'pathways' to those receptors. The findings are summarised in the following subsections.

The guidance proposes a four-stage approach for the assessment of contamination and the associated risks. The four stages are listed below:

- Hazard Identification;
- Hazard Assessment;
- Risk Estimation; and
- Risk Evaluation.

In accordance with the guidance, (ref. R.4), only the first two stages are addressed in a preliminary risk assessment; should hazards exist which are a potential risk then more intrusive investigation works are recommended.

5.1 Hazard Identification: Onsite

The desk-based research and historical review identified the following potential hazards on the site:

- Parcel A: Northern site corner where anthropogenic materials were observed at the surface;
- Parcel C: Made Ground associated with former properties;
- Parcel D: Contaminants associated with stockpiles.

The following potential sources have been discounted:

- Parcel B: Pollution incident – Recorded to be minor and any contaminant likely to have dissipated to acceptable concentrations since recorded date.

Some risks have been considered but ultimately discounted for further assessment given the limited potential for contamination to be realistically present. These are the former land uses of the site in various Parcels for agricultural purposes and/or orchards. The adjacent SSSI has also been discounted as a potential receptor.

5.2 Hazard Identification: Offsite

The desk-based research and historical review did not identify any potential hazards offsite that may impact upon the site.

5.3 Hazard Assessment

The preliminary risk assessment has identified a few potential sources of contamination that may pose risk to human health and the Controlled Waters. Potential pollutant linkages that require further consideration are presented in Table 4 shown overleaf:

Table 4 – Conceptual Model

Sources	PATHWAYS: Root Uptake	Direct Contact	Ingestion	Respiration	Gas Accumulation	RECEPTORS: Plants	End Users	Structures (Concrete)	Services/Utilities	Construction Workers	Controlled Waters (GW)	Risk Rating	Comments
Parcel A: Northern site corner where anthropogenic materials were observed.	U	L	U	N	U	N	Mo	N	N	Mo	Mi	NR-HR	This source may be representative of deeper Made Ground induced by agricultural working and include asbestos fragments. General investigation in this locality.
Parcel C: Made Ground associated with former properties.	L	L	L	U	L	Mi	Mo	Mi	Mi	Mo	Mi	NR-MR	A number of contaminants may be associated with this source, and a general spread of investigation in the locality would be prudent.
Parcel D: Contaminants associated with stockpiles.	U	L	L	U	U	Mi	Mo	N	N	Mo	Mi	LR-MR	Risks are likely to be prevalent during site movements or if introduced to the wider soils.

Legend:

See Comparison of Consequence Against Probability within Appendix 5 for Key to Legend.

Probability:	
Negligible (N)	
Unlikely (U)	
Likely (L)	
Highly Likely (HL)	

Consequence (Severity):	
Negligible (N)	
Mild (Mi)	
Moderate (Mo)	
Severe (S)	

Risk Rating:	
Very High Risk	**VH**
High Risk	**HR**
Medium Risk	**MR**
Low Risk	**LR**
Negligible Risk	**NR**

6. CONCLUSIONS AND RECOMMENDATIONS

Based upon the findings of the preliminary risk assessment and site walkover, a number of potential contaminant sources and pathways to potential receptors have been identified.

It is recommended that a preliminary intrusive ground investigation is undertaken to target the potential contaminant sources to determine the extent of any contamination within soil strata and, if necessary, the groundwater. This investigation should be focussed on the areas of risk noted by the conceptual model at this stage, although it would be prudent to get a number of gas monitoring wells across the site to assess the general ground gas regime and if it is influenced by the underlying Chalk bedrock.

Should redevelopment of the be proposed, it may be financially prudent to undertake a geotechnical investigation of the site at the same time as any environmental investigation to enable a suitable foundation solution to be designed.

Any ground investigation should be designed in general accordance with CLR 4, undertaken in compliance with BS10175, (ref. R.7) and BS5930, (ref. R.8).

Furthermore, cohesive ground conditions and the presence of mature trees should be taken into consideration. Any excavation of foundations should be carried out in accordance with the NHBC standards.

It is recommended that this report be submitted to the Local Authority as part of the planning submission for the site.