

DESKTOP STUDY REPORT

Site Address:	Rear of Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN
Report Date:	June 2024
Project No.:	18964
Prepared for:	Amie Donne & John King
Planning Application	North Herts Council 22/03300/FP



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REFERENCES

- BRE Report BR211: Radon: Protective measures for new dwellings, 2015. BRE, Watford.
- BRE Digest 365 (2016): Soakaway design. BRE, Watford.
- BRE Special Digest 1: Concrete in Aggressive Ground, 2005.
- BRE, Watford. British Standards Institution (2004) Eurocode 7 – Geotechnical design - Part 1: General rules. BS EN 1997 1. Incorporating Corrigendum No.1. BSI, London
- British Standards Institution (2007) Eurocode 7 – Geotechnical design - Part 2: Geotechnical investigation and testing. BS EN 1997-2. BSI, London
- British Standards Institution (2015) BS 3882 Specification for topsoil and requirements for use. BSI, London
- British Standards Institution (2011) BS 10175 Code of practice for the investigation of potentially contaminated sites. BSI, London
- British Standards Institution (2013) BS 8576 Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOC's), BSI, London
- British Standards Institution BS 5930:2015+A1:2020 Code of practice for ground investigations. BSI, London
- British Standards Institution (2015) BS 8485:2015 Incorporating corrigendum No.1 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. BSI, London
- CIEH & CL:AIRE (2008) Guidance on comparing soil contamination data with a critical concentration. London: Chartered Institute of Environmental Health (CIEH) and CL:AIRE
- CIRIA C665 (2007) Assessing risks posed by hazardous ground gases to buildings.
- CIRIA, London CIRIA Report R143 (1995): The Standard Penetration Test (SPT): Methods and use. CIRIA, London.
- CL:AIRE (2020) Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration. CL:AIRE, Buckinghamshire
- Environment Agency (2020) Land contamination risk management (LCRM)
- Environment Agency, NHBC & CIEH (2008) Guidance for the safe development of housing on land affected by contamination. R & D Publication 66. London: Environment Agency
- Environment Agency (2006) Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination Environment Agency
- LQM/CIEH S4ULs. LQM, 2014
- Ministry of Housing, Communities & Local Government: National Planning Policy Framework. February 2019.
- NHBC Standards 2022. NHBC, Milton Keynes
- NHBC R&D Report 66 (2008)
- Tomlinson M.J (2001): Foundation Design and Construction: 7th Edition. Pearson Prentice Hall, Harlow. UFST.

DESKTOP STUDY GENERAL NOTES

This report has been prepared based on the findings of investigations into the site's conditions using current available data which has been recovered from Envirocheck to provide environmental data in relation to the site and surrounding area. Where possible, local sources have been researched to gain a better understanding of the site's conditions. As part of this review, research has been undertaken with the Local Authority and the Environment Agency to aid in the assessment of the site's condition.

We can confirm that this report has been prepared based on the information gained and that this information is not exhaustive, and that subsequent research may reveal additional facts that may influence the reporting. Where possible, this information has been researched.

All geological information has been researched using the British Geological Society website, (the geology viewer). The disclaimer associated with this portal confirms 'The British Geological Society accept no responsibility for omissions or misinterpretations of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation.'

The accuracy of map extracts cannot be guaranteed, and it should be recognized that different conditions on site may have existed after the various map surveys.

We can confirm that within the assessment of the site, various websites have been visited and as such, we cannot confirm the validity of these sites and as such, this information is accepted de facto and without prejudice. Anyone relying on these sources does so at their own risk, however, Herts & Essex Site Investigations does undertake all reasonable care to ensure this data is relevant and correct.

It should be confirmed that the extent of review of this report has undertaken a broad review of on-site features which would promote a contamination ground risk, however, this does not include ecological features and in particular Japanese Knotweed which should be reviewed under separate cover.

A review of the site will be made to confirm the extent of obvious Asbestos products or sheet materials either on the surface of the site soil or evident above ground, however, does not constitute a full Asbestos Survey by any means. This should be sought under separate cover.

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DOCUMENT INFORMATION AND CONTROL SHEET

Client

Amie Donne & John King

Via

Pinchin Architects Ltd.

Suite 11
Rivers Lodge
West Common
Harpenden
AL5 2JD

Environmental Consultants:

Herts & Essex Site Investigations.
Unit J8 Peek Business Centre
Woodside
Dunmow Road
Bishop's Stortford
Hertfordshire.
CM23 5RG

Tel: 01920 822233
Mobile: 07770274498
E-Mail: csgrey@hesi.co.uk
Web: <http://www.hesi.co.uk>

Project Manager:

Chris Gray, M.Sc.

Principal Author:

Rebecca Chamberlain

Document Status and Approval Schedule

Issue No	Status	Date	Prepared by:	Technical review
			Rebecca Chamberlain	by: Chris Gray
			Signature / Date	Signature / Date
1	Final	18 th June 2024		

SUMMARY

Client	Amie Donne & John King		
Site Location	Land East Of Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN		
Existing Development	Barn in use as storage, with a yard area within the north of the site.		
Proposed Development	Replacement of the existing building with a new structure to form a residential dwelling with driveway and garden.		
Site Settings and Previous Uses	The site area was recorded as a section of open land from the earliest map in 1878 until about 1975 when there are two building in place with the centre of the site, one of which remains in place to date and forms a storage barn. The second barn was removed in about 1994. Surrounding the site to the east the open land remains in place. The south of the site area the open land was used as recreational land from 1924 and remains to date. To the east of the site area there was residential dwelling developed from 1924 and remains in place to date. To the north of the site area there are two larger barns in place about 30 meters from the site area.		
Geological and Hydrological Profile	Geology		Aquifer Classification
	Made Ground	Shallow Made Ground Anticipated	Not Classified
	Lowestoft formation	sandy, silty CLAY with flint and chalk	Secondary Aquifer
	Chalk	Chalk	Principle Aquifer
Nearest Surface Water Feature	The nearest surface water feature is recorded as 151 meters to the southeast of the site which is recorded as a likely pond.		
Groundwater Abstractions	The nearest abstraction well is located 1903 meters to the north of the site which is recorded for Environmental: Transfer between sources. No potable water supplies are recorded surrounding the site.		
Source Protection Zone	The site lies within a zone 3 Source Protection Zone.		
Potential Sources of Contamination	Features On Site - Barn – storage/Yard - Historical barn Features Off Site - None		
Human Health Risk	We would suggest that where there are potential sources of contamination the potential pathways in place within the site area are recorded as :- - Dermal Contact. - Inhalation of dust and fibres. - Ingestion of dust and fibres via home-grown produce with plant uptake. - Inhalation of vapours from soils. - Inhalation of vapours through contaminated groundwaters - Ingestion of contaminated water through water main pipework. - Leaching, lateral migration of shallow groundwater to a target receptor. - Leaching, migration through fissures / cracks which may migrate to a groundwater receptor. - Plant Uptake. - Inhalation Asbestos dust and fibres (from Asbestos within the building). - Inhalation Asbestos dust and fibres (from asbestos within the soil).		
Receptors	Based on the proposed use of the site and the finding of this Desktop Study the following receptors will need to be considered :- - Human Health, (Site Development Personnel). - Human Health, (Residents or staff). - Adjoining Landowners, (unlikely). - Flora. - Groundwater. - Abstraction wells.		
Proposed Investigation Work	Further works should be completed based on this assessment and follow protocols under BS 10175:2011+A2:2017, (Investigation of potentially contaminated sites). These recommended works are as follows :-		
Soils Risk	- Intrusive investigation to assess and recover samples of the made ground and underlying natural geology to consider the geology and soil contamination. - Targeted samples to be recovered from with and/or around the sources noted above - Spatial sampling to be completed across the site area. - Chemical testing to be completed on an appropriate number of samples for the recommend pollutants.		
Ground Gases	- Limited sources of land gases are recorded within and surrounding the site. - The depth and type of made ground within the site should be assessed to confirm that this does not form a source of risk. - If risks are in place an assessment of risk should be completed using RB17 A Pragmatic Approach to Ground Gas Risk Assessment (2012) - With an additional assessment as follow should risk be in place, - Install standpipes within the made ground and underlying superficial deposits to form the response zone for the site. - A minimum of 1 No standpipe should be installed and preferably 3 No standpipes around the site. - Complete six monitoring rounds over falling or low atmospheric pressure or frozen ground conditions.		
Vapour Risk	Soil testing to be undertaken to assess whether contamination that may promote a vapour risk is in place within the site area and the groundwater, where present.		
Groundwater Risks	- Assess soils profile to consider the requirement for installation of standpipes, (Clay or absence of groundwater would suggest limited groundwater risk) - Where significant risk is identified in place, undertake leachate testing on samples to assess mobility of soil contamination. - Should risk be in place within the site monitoring wells should be installed and recover samples of the groundwater for later chemical analysis. - Purge groundwater monitoring wells and recover fresh samples of the groundwater for this testing. - Testing suite to be as per the recommendations within this report.		
Watching Brief	- Maintain a watching brief throughout all site investigation works. - Sample recovery should undertake due diligence to consider the presence of Asbestos as a critical risk. - An engineering description of the samples recovered and depths to be noted for use within environmental reporting. - An olfactoral assessment of the site soils exposed and recovered should be made and recorded for use within the environmental reporting.		
Reporting	- Complete an environmental report in accordance with BS 10175:2011+A2:2017. - Report all findings of the site investigation.		

PRELIMINARY RISK ASSESSMENT – DESKTOP STUDY - PHASE 1 REPORT

1 Context and Objectives of this report

1.1 Introduction

We have been asked by Amie Donne & John King to undertake an investigation of the above site to assess the potential environmental impact of the existing and historical use of the site on the proposed development sufficient to document the level of risk and impact on future users and the environment.

The client is proposing to replace the existing barn to form a residential dwelling with gardens, as such the derivation of risk has been assigned as a 'Residential Land Use with Home-grown Produce'.

1.2 Reference to the Current Planning Application Details

An application is in place with North Herts Council as follows:-

Application no: 22/03300/FP

Application details: Erection of one 4 bedroom dwelling and detached garage following demolition of existing barn including all associated ancillary and landscaping works.

Decision: Conditional Permission 15 Mar 2023.

1.3 Decision Notice Relating to Contaminated Land

Within the above application the following condition is in place which relates to contaminated land and this report should be submitted as part of gaining the planning approval.

(a) No development approved by this permission shall be commenced prior to the submission to, and agreement of the Local Planning Authority of a written preliminary environmental risk assessment (Phase I) report containing a Conceptual Site Model that indicates sources, pathways and receptors. It should identify the current and past land uses of this site (and adjacent sites) with view to determining the presence of contamination likely to be harmful to human health and the built and natural environment.

(b) If the Local Planning Authority is of the opinion that the report which discharges condition (a), above, indicates a reasonable likelihood of harmful contamination then no development approved by this permission shall be commenced until a Site Investigation (Phase II environmental risk assessment) report has been submitted to and approved by the Local Planning Authority which includes:

(i) A full identification of the location and concentration of all pollutants on this site and the presence of relevant receptors, and;

(ii) The results from the application of an appropriate risk assessment methodology

(c) No development approved by this permission (other than that necessary for the discharge of this condition) shall be commenced until a Remediation Method Statement report; if required as a result of (b), above; has been submitted to and approved by the Local Planning Authority.

(d) This site shall not be occupied, or brought into use, until:

(i) All works which form part of the Remediation Method Statement report pursuant to the discharge of condition (c) above have been fully completed and if required a formal agreement is submitted that commits to ongoing monitoring and/or maintenance of the remediation scheme.

(ii) A Remediation Verification Report confirming that the site is suitable for use has been submitted to, and agreed by, the Local Planning Authority.

(e) Any contamination, other than that reported by virtue of condition (a) and (b), encountered during the development of this site shall be brought to the attention of the Local Planning Authority as soon as practically possible; a scheme to render this contamination harmless shall be submitted to and agreed by the Local Planning Authority and subsequently fully implemented prior to the occupation of this site.

Reason: To ensure that any contamination affecting the site is dealt with in a manner that safeguards human health, the built and natural environment and controlled waters.

1.4 Report Objectives

The objective of this report is to assess and understand any potential sources, pathways and receptors associated with the site and preparation of a Conceptual Site Model (CSM) followed by a qualitative risk assessment, in line with UKs current regulatory guidance.

To complete the above the following will be undertaken.

- A visual walkover inspection of the site to review current and recent site activities, the condition of the site, potential ground related hazards and activities or areas that might have the potential to cause ground contamination as well as possible indicators of contamination.
- Review of historical land uses for the site and surroundings with a particular emphasis on identifying potential ground hazards and on-site and off-site contamination sources.
- A review of the geological, hydrological, and hydrogeological setting of the site, and public domain environmental information to build up an understanding of the site and its environmental setting/sensitivity/receptors.

1.5 Management Constraints

The site investigation has been prepared based on a budget and time scales which has been agreed with the client. The desk top study fees have been agreed at this time which will dictate a way forward.

2 Characteristics of the site

2.1 The Site

The site is located on the outskirts of Therfield a rural village with Hertfordshire, the details of which are summarised in Table 1 with the location plan of the site shown in Appendix 3, Sheet 1.

Table 1 **Site Detail**

Site Address:	Rear of Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN
Site assessed under	Site Owners Request - Aid as part of planning and warranties.
Current use of land:	Storage Barn.
Previous use of site, (if known)	As above.
Grid Reference	NGR 533890, 237040
Site Area	0.3 Hectares.
Local Authority	North Herts Council.
Gradient of the site	The site forms a level area.
Proximity of Controlled Waters, (if known)	The nearest surface water feature is recorded as 151 meters to the southeast of the site area, where there is a pond with the garden of a residential dwelling.

2.2 Existing Site Use

The site forms a storage barn with a small yard area and grassland with the south of the site.

2.3 Surrounding Land Uses

The surrounding land uses are detailed below: -

- To the north of the site area a there area more modern storage barns in place.
- To the east of the site area open agricultural land is in place.
- To the south of the site area a recreational Ground is in place.
- To the west of the site area residential land is in place.

2.4 Site Reconnaissance

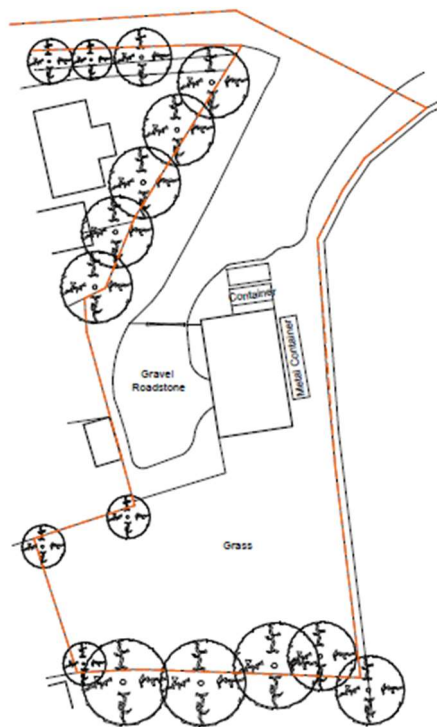
The site walk over visit was undertaken in May 2024 on which the weather conditions were recorded overcast.

Access

The site area can be accessed via a lane which runs from Police Row onto a yard area to the north of the site. a gravel and roadstone driveway leads onto the north of the site area. A gate restricts access to the south section of the site.

The barn can be accessed to the north and west, at the time of the walk over there was storage across the building so only pedestrian access was possible.

Site Area



Within the north of the site area there is a gravel / roadstone yard area, towards the boundary of this area vegetation has started to grow. Towards the southeast there are two storage containers with building materials and equipment in place,

From this area there is access into the barn and also to a yard area to the west of the barn.

The barn forms a double height pitched roof timber framed barn with corrugated sheet roof and cladding possibly containing asbestos. A concrete floor is in place within the building, where some timber racking is in place to aid in the storage of building material and equipment. The area, although cluttered, did not look to contain any sources of contamination.

The yard area to the west of the barn was laid to a gravel and roadstone with vegetation around the boundary, within this area there were vehicles, mini digger, tracked barrow, bowser and trailers parked.

Vegetation

Within the site area there is limited vegetation in place. Towards the boundary of the area there are some weeds and grasses in place and trees are present, mainly along the southern boundary.

Above or below ground fuel or oil storage tanks

By examination of the site no above ground tanks are in place, no features are present to suggest that any below ground fuel tanks would be in place within the site area.

Asbestos Containing Materials

Possible Asbestos containing materials were reviewed on the roof and cladding of the barn, the sheeting looked to be intact and in a good state of repair, suggesting that there is limited risk of this forming a risk of fragment being in place within the soils. From the walk over no obvious fragments were seen in place. We recommend that an asbestos survey of the building be carried out, if not done so already, prior to any further demolition or works on site. A full assessment for asbestos within the fill in site will be required to fully consider risk from Asbestos.

Surrounding Area

Surrounding the site area agricultural land is in place to the east lead to grass at the time of the walk over.

To the west of the site residential land is in place, with the rear gardens backing onto the site boundary. The dwelling is positioned off of Police Row further to the west.

To the north of the site there is a larger yard area with two metal clad barns in place, with farm machinery and equipment in place.

To the south of the site a treed area is in place with a cricket pitch in place beyond.

Site Levels and Ground Cover

The site area forms a level area of land.

The site is mainly laid to a compact gravel and roadstone, with some area of scrub type land towards the boundary.

Current site activities

The current site use forms a storage barn and yard for a building company.

Effluent, Site Drainage and Services

Limited services are known, although no service search is known to us, therefore the location condition nor status of these services is known.

2.5 Site Reconnaissance – Photos

Print 1 View of the yard area within the north of the site.



Print 2 View of the north of the barn and yard area.



Print 3 View of the access to the yard to the west of the barn.



Print 4 View within the barn.



Print 5 View within the yard to the east of the barn looking to the northeast.



Print 6 View within the yard to the east of the barn looking to the northwest.



Print 7 View of the storage within the yard area.



Print 8 View of the storage within the yard area.



Print 9 View of the south of the barn.



Print 10 View of the rear of the barn looking to the north.



Print 11 View to the east of the site – storage contain and looking to the north at the yard off site.



Print 12 View of the storage to the north of the barn



Print 13 View of the grass land within the south of the site area



Print 14 View of the grass land within the south of the site area



Table 2 **Walk Over Inspection Risk**

<i>Feature</i>	<i>Location</i>	<i>Elevation</i>	<i>Is A Risk Assessment Required?</i>	<i>Justification</i>
Storage Barn – possible asbestos sheeting.	On site - E	At GL.	✓	Possible risks in place – historical uses of the barn is not known.
Yard.	On Site – N & W	At GL.	✓	Possible risk in place.
Residential Land.	Off site – W	At GL.	X	Limited sources of contamination in place.
Agricultural Land.	Off site – E	At GL.	X	Limited sources of contamination in place.
Farm yard.	Off site – N 30m	At GL.	✓	Possible risk in place.

3 *Details of Searches Undertaken*

Within this report, various searches have been undertaken to assess the risk associated with the development of the site from the historical and current use of the site and surrounding area. These include: -

- Environmental Data Search 1:10,000.
- Environmental Data Search 1:2,500.
- Site Sensitivity Maps and Data Sheets.
- Historical Maps.
- Internet Search.
- Local Authority Search – Planning Files.
- Consultation with Site Owner / Architect.

4 *Information on Historical and Current Activities on the Site and Surrounding Area*

The history of the site's land-use and development from Victorian times onwards has been researched from Ordnance Survey, (O.S.) maps. Extracts of the O.S. Maps and plans are presented in Appendix 4. Reference to historical maps provides invaluable information regarding the land use/history of the site, but historical evidence may be incomplete for the period pre-dating the first edition and between successive map references.

4.1 *Discussion of the Development History*

A summary of the historical development of the site and surrounding area based on the information obtained from the above sources is provided in Table 3. It should be noted that these maps are only a small section of time and represent the timescales given in each of the map records. It is highly possible that development or features may have been developed within or surrounding the site which may influence the site, and this should be born in mind when assessing the history of the site.

Table 3 *Historic Maps Assessment*

Date	Scale	On Site Feature	Off Site Features
1878	1:2,500	Open Land.	Open Land. Ponds in place to the southeast – 20m & east – 50m
1883	1:10,560		
1898	1:2,500		
1899	1:10,560		
1924	1:2,500		Recreation ground – S 20m
1925	1:10,560		
1947	1:10,560		
1960	1:10,000		
1975	1:2,500	Buildings – 2 no within the centre of the site.	Residential land – W The pond to the south of the site is no longer shown.
1984	1:10,000		
1993	1:2,500		
1994	1:2,500	Smaller barn removed.	
1999	Historic Aerial Photo 1:10,000	North of the site and to the east forms a yard area, the south of the site forms a grassed area.	To the northeast of the site area there is a yard area and two barns in place.
2006	1:10,000		
2024	1:10,000		

Table 4 **Overview of Historic Map Assessment Risk**

Identified Risk	Distance & Direction	Year	Is A Risk Assessment Required?	Justification
Open Land	On and Off Site – N, E, S, W	Pre 1878 - 1975	X	No Source
Buildings - smaller building removed	On Site	1975 – Present 1975 - 1994	✓	Possible risks in place.
Ponds	Off site SE– 20m & E – 50m	Pre 1878 - 1975	✓	These small features may have been infilled and as such could promote a land gas risk, further consideration is needed.
Recreation ground	Off site – S 20m	1924 – Present	X	No Source
Residential land	Off site -W	1924 – Present	X	Limited Sources

5 *Details of the Intended Future Use of the Site*

It is proposed to remove the existing building and in the same location, build a new residential dwelling. Within the north of the site there is an access drive with verges and soft landscaping. To the west of the dwelling a gravel driveway is proposed, with paving to the east and south. The southern section of the site will form a private garden, part of which will be a wild flower meadow.

6 *References of Planning Applications*

From a review of the North Herts Council web site the following applications is recorded for the site area.

Application No: 22/03300/FP

Proposal: Erection of one 4 bedroom dwelling and detached garage following demolition of existing barn including all associated ancillary and landscaping works.

Decision: Conditional Permission 15 Mar 2023

No historical applications are in place in relation to this area.

Form a review of the historical applications surrounding the site, within 25 meters radius, the following applications were of relevance to the site area.

Application Number: 02/00168/1

Proposal: Erection of two stables and hay store.

Decision: Conditional Permission 02 May 2002

No other detail or documents are recorded in place.

Additional applications are in place in relation to extents and garages for the dwelling to the west of the site, no additional information in relation to the site area was gained.

7 *Discussion with Local Authority*

The EPO has been consulted on the proposed application and comments that “There are no objections to this application, with respect to contamination on land. However, the application site is located on **agricultural land**, (a potentially contaminative land use). Also, the development requires the demolition of an existing building. It is possible that the building may be **underlain by made ground**, which may have the potential to contain contaminants harmful to health, and the demolition of the building may allow those present on site to be exposed to any such contaminants which may be present. Should further information be gained, this report will be re-issued.

8 *Consultation with Environment Agency*

Consultation has not been made with the Environment Agency at this time. The information gained from Envirocheck and the EA web site has provided sufficient information at this stage. The assessment of the site should consider the groundwater regime within the site area and the possible risk from both on-site and off-site contamination.

Should heavy or persistent contamination be identified within any Phase 2 or intrusive investigation, consultation will be required and will be undertaken.

9 Consultation with Appropriate Bodies/Local Sources

A request for information relating to the site has been made to confirm the site condition, any potential sources of risk within the site. No additional information has been supplied which could be added to this report. The requested information is as follows :-

- Prior knowledge in relation to the history of the site uses.
- Service search to confirm the location of any and all Gas, Electric, Water Main, Fibre Optic, drainage works.
- Asbestos Containing Materials, (reporting or building management plan).
- Underground Fuel or Oil Tanks.
- Above Ground Fuel or Oil Tanks.
- Petrol Interceptors.
- Pollution Incidents.
- Storage of Chemicals, Pesticides, Herbicides.
- Electric Sub Station Uses.

10 Previous Reporting

No previous reports relating to contaminated land, or the ground conditions are known to us at the time of writing this report which relate to the site specifically.

11 Environmental Settings

11.1 Superficial Deposits and Solid Geology

The ground conditions based on geological maps and BGS information shows the site to be located within an area recorded as Lowestoft Formation, (sandy, silty CLAY with flint and chalk). This is seen to overlie Chalk which will be in place to depth.

11.2 BGS Boreholes

No BGS Boreholes have been identified close to the site.

11.3 Hydrogeology

The published Environment Agency Groundwater Vulnerability Map of the area indicates the site to be located within an area classified as a Secondary Aquifer Undifferentiated. The underlying geology is recorded as an principal aquifer which is likely to be at depth within the chalk.

Principal aquifers provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands.

Secondary undifferentiated are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value.

The nearest abstraction well is located 1903 meters to the north of the site which is recorded for Environmental: Transfer between sources. No potable water supplies are recorded surrounding the site.

The site lies within a zone 3 Source Protection Zone.

Table 5 *Summary of Geological Information*

<i>Geological Unit</i>	<i>Brief Description</i>	<i>Anticipated thickness, (m)</i>	<i>Aquifer Type</i>
Superficial Deposits/Drift On Site			
Filled/Re-worked ground	Made Ground, (Potentially Contaminated Stratum).	0.5-1.00 meters+	Not Classified
Lowestoft Formation	Chalky till, together with outwash sands and gravels, silts and clays.	4-6 meters	Secondary Aquifer Undifferentiated
Solid Geology Deposits			
Chalk	Chalk	15m +	Principal Aquifer

The above information has been taken from the BGS website based on the postcode location of the site.

11.4 Hydrology

The nearest surface water feature is recorded as 151 meters to the southeast of the site which is recorded as a likely pond.

The nearest discharge consent is recorded 274 meters to the southwest of the site, for Sewage Discharges - Final/Treated Effluent - Not Water Company.

No pollution incident to controlled waters are recorded within 900 meters of the site area.

11.5 Implication of groundwater

Considering the underlying secondary aquifer undifferentiated with the principle aquifer below, groundwater links are possible and therefore some degree of assessment will be required to classify the extent of risk to a groundwater system, as well as abstraction wells, surface water features and source protections zones surrounding the site area.

In accordance with Environment Agency guidance document: -

- The Environment Agency's approach to groundwater protection, Version 1.2, (February 2018)

The document confirms: -

- "Selecting compliance points for use in land contamination risk assessments the distance to a set compliance point should not exceed 50 metres for hazardous substances or a maximum of 250 metres for non-hazardous pollutants unless there are specific physical constraints on the ability to use the groundwater resource. Any increases above these specified distances may be justified but must be supported by a sustainability assessment that considers environmental, social and economic factors."

Considering the above, groundwater risk may be in place if significant contamination or a persistent source of contamination are encountered or recorded within the site area, within the information to date risk is considered possible.

11.6 Flooding

Based on the BGS Flood GFS Data the site is recorded within an area with potential for groundwater flooding to occur at surface. Off site to the north and east of the site there are area at a low risk (1000 year return) for flooding from surface water.

Based on a post code search of the Gov.com website the risks are noted as follows.

River and the sea – Very Low.

Surface water – Very Low.

Groundwater – Unlikely.

Reservoirs - Unlikely.

(<https://www.gov.uk/check-long-term-flood-risk>)

This site is recorded within a flood zone 1, land within flood zone 1 has a low probability of flooding from rivers and the sea. (<https://flood-map-for-planning.service.gov.uk/>)

11.7 Landfill Sites

The nearest landfill sites are recorded over 600 meters from the site area.

Potentially Infilled Land has been identified as in place some 351 meters to the west of the site which was unknown and possibly derived from a Quarry or Pit.

To the south and east of the site small ponds were noted within the historical mapping which from about 1975 were no longer shown in place. These locations were recorded within residential gardens and the area remained open land, as such and due to the small scale of these features and the distance from the site, these are unlikely to impact on the site.

11.8 Environmentally Sensitive Sites

Surrounding the site area, no environmentally sensitive receptors are recorded in place.

Table 6 *Sensitivity of Environmental Receptors in the Vicinity of the Site*

Receptor Type	Receptor(s)	Sensitivity	Comments
Groundwater	Secondary Aquifer	Moderate	Possible risk to underlying gravel deposits.
	Principal Aquifer	High	Possible risk within the chalk.
Water Abstraction	Environmental: Transfer between sources	Medium	The nearest abstraction well is located 1903 meters to the north of the site.
Source Protection Zone	Zone 3	Medium	Possible risk within gravel deposits.
Surface Water	Pond	Low	The nearest surface water feature is recorded as 151 meters to the southeast of the site which is recorded as a pond within a residential garden.
Flooding	Site		The site is not recorded within area that is likely to be affected by flooding.
Ecological	NONE		

12 Site Drainage and Other Potential Man-Made Pathways

Limited drainage is recorded in place, although, the site has not been reviewed for drainage routes. A full drainage assessment may aid in the assessment of the site in relation to pathway creation for pollution to migrate.

13 Regulatory Data

Information relating to the potential hazards associated with environmental regulatory controls are summarised in Table 7 and 8. This information is recorded in full within the Envirocheck Data provided within Appendix 5. The salient points recorded within this data are re-created below.

Table 7 **Summary of Regulatory Data - Sources**

<i>Data Sources</i>	<i>On Site</i>	<i>Off Site</i>	<i>Distance from site</i>	<i>Is A Risk Assessment Required?</i>	<i>Justification</i>
Discharge Consents	None	Sewage Discharges - Final/Treated Effluent - Not Water Company	SW 274m	X	
Historical Landfill Sites	None	No information	NW 627m	X	
Potentially Infilled Land (Non-Water)	None	Unknown Filled Ground from 1960	W 351m	X	
Radon Potential - Radon Protection Measures	No radon protective measures are necessary in the construction of new dwellings or extensions		On Site	X	The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level).

Table 8 **Summary of Regulatory Data - Receptors**

<i>Data Receptors</i>	<i>On Site</i>	<i>Off Site</i>	<i>Distance from site</i>	<i>Is this a potential receptor for risk ?</i>	<i>Justification</i>
Nearest Surface Water Feature	None	Pond	SE 151m	X	
Water Abstractions	None	Environmental: between sources	Transfer N 1903m	X	
OS Water Network Lines	None	Inland river	SE 151m	X	
Source Protection Zone	Zone 3		On site	✓	

Table 9 **BGS Estimated Chemistry Data**

<i>BGS Estimated Soil Chemistry Pollutant</i>	<i>BGS Estimated Soil Chemistry (mg / kg)</i>
Arsenic	<15
Cadmium	<1.8
Chromium	60-90
Lead	<100
Nickel	15-30

Considering the background concentrations present, Potential for human health risk is not anticipated within this area.

Table 10 Geological Hazards

<i>Geological Hazard</i>	<i>Distance & Direction</i>	<i>Feature</i>	<i>Risk Assessment Required</i>
Non-Coal Mining Areas of Great Britain	On Site		Negligible
Natural Cavities	Off Site – NW 635m	Solution Pipe x 6	Distance from the site reduces the likelihood although the chalk may form a strata where risks may be present.
Collapsible Ground	On Site		Very Low
Compressible Ground	On Site		Negligible
Ground Dissolution Features	On Site		Low - Solution feature report is recommended.
Landslide	On Site		Very Low
Running Sand	On Site		Very Low
Shrinking or Swelling Clay	On Site		Low

Table 11 Summary of Contemporary Trade Entries

<i>Trade Name</i>	<i>Trade Use</i>	<i>Distance & Direction from Site</i>	<i>Is A Risk Assessment Required?</i>	<i>Comment</i>
X				
No trades are in place around the site, (See Envirocheck Data)				

*NB The above information has been provided by Envirocheck and is taken from the Thomson Directories

14 **Identification of Potential Contaminants of Concern and Source Areas**

Potential sources of contamination are brought forward for further risk assessment which are detailed in Table 14: -

Table 12 Table of Source Risk

Risk Assessment	Source Risk	Associated Contaminants	Source of Information	Location	Date	Considering Site Specific Pathways		
						Assessment Required.	Method of Assessment	
A	On Site Features							
	Buildings - smaller building removed	Metal, semi metals, PAHs, Asbestos, TPHs, VOCs	Walk Over Survey Historical Maps	On site	1975 – Present 1975 - 1994	Possible Soil Risk Possible GW Risk Possible Vapour Risk	Recover Soil Samples Install Standpipes GW & Vapour Assessments	
	Off site Features							
B	Ponds	Land Gases	Historical Maps	Off site - SE– 20m & E – 50m	Pre 1878 - 1975	Possible Land Gas	Land Gas Assessment	

15 Outline Conceptual Model

What must now be considered is what contamination should be identified as a potential hazard because of the use of the site-specific source pathway and receptor. To undertake this task, the risk assessment process is based on guidance provided in CIRIA C552 (2001) Contaminated Land Risk Assessment – A Guide to Good Practice.

The information below incorporates a hazard assessment of the features surrounding the site that could potentially impact on the proposed development and has also been reproduced as a pictorial conceptual site model in Appendix 2. This is based on the information below: -

Table 13 *CIRIA Contaminated Land Risk Assessment Table*

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

Extracted from CIRIA Publication C552 Contaminated Land Risk Assessment

Table 14 Risk Assessment A

Source (Potential Contaminating Use)	Potential Contaminants	Receptors	Pathways	Associated Hazard, [Severity]	Proposed Site Use Risk Assessment		
					Likelihood of occurrence	Potential Risk	Notes
Barn – storage and historical barn	TPHs	Site Users. Construction Workers.	Dermal contact. Inhalation dust and fibres.	Medium	Likely	Moderate	Possible risk in place.
			Ingestion of dust and fibres via home-grown produce and plant uptake.	Medium	Likely	Moderate	Possible risk in place.
			Ingestion of contaminated water through water main pipework.	Medium	Likely	Moderate	Possible risk in place.
			Inhalation of vapours.	Medium	Likely	Moderate	Possible risk in place.
			Inhalation of land Gases.	Medium	Unlikely	Low	Source of land gases from this feature are unlikely.
			Inhalation of vapours through contaminated ground waters.	Medium	Low Likelihood	Moderate / Low	The Lowestoft Formation is unlikely to contain significant amounts of water
		Adjoining Landowners.	Dermal contact. Inhalation of dust and fibres. Ingestion of dust and fibres	Medium	Low Likelihood	Moderate / Low	Limited risk in place.
			Ingestion of home-grown produce.	Medium	Low Likelihood	Moderate / Low	Limited risk in place.
			Ingestion of contaminated water through water main pipework.	Medium	Low Likelihood	Moderate / Low	Limited risk in place.
			Inhalation of vapours.	Medium	Low Likelihood	Moderate / Low	Limited risk in place.
			Inhalation of vapours through contaminated ground waters.	Medium	Low Likelihood	Moderate / Low	Limited risk in place.
		Controlled Surface Water.	Leaching, lateral migration of shallow groundwater to a target receptor.	Medium	Low Likelihood	Moderate / Low	The distance to this feature will reduce the likelihood of risk.
		Ground Water. Abstraction Well.	Leaching, migration through fissures / cracks which may migrate to a groundwater receptor.	Medium	Likely	Moderate	The source protection zone in place within the site may form a receptor that could be impact on although the Lowestoft Formation is unlikely to contain significant amounts of water
	Asbestos	Site Users Construction Workers.	Inhalation dust and fibres (from Asbestos within the building)	Severe	Likely	High	Possible risk in place.
			Inhalation dust and fibres (from asbestos within the soil)	Severe	Likely	High	Possible risk in place.
	Metals Metalloids PAHs	Site Users. Construction Workers.	Direct contact. Inhalation dust and fibres. Dermal contact.	Medium	Likely	Moderate	Possible risk in place.
			Ingestion of home-grown produce.	Medium	Likely	Moderate	Possible risk in place.
		Flora	Plant Uptake. Direct Contact.	Medium	Likely	Moderate	Possible risk in place.
		Controlled Surface Water.	Leaching, lateral migration of shallow groundwater to a target receptor.	Medium	Low Likelihood	Moderate / Low	The distance to this feature will reduce the likelihood of risk.
		Ground Water. Abstraction Well.	Leaching, migration through fissures / cracks which may migrate to a groundwater receptor.	Medium	Likely	Moderate	The source protection zone in place within the site may form a receptor that could be impact on although the Lowestoft Formation is unlikely to contain significant amounts of water
	TPHs	Buildings. Construction Materials. Services	Direct contact with contaminated soils.	Medium	Likely	Moderate	Possible risk in place.
			Direct contact with contaminated groundwater.	Medium	Low Likelihood	Moderate / Low	The Lowestoft Formation is unlikely to contain significant amounts of water

Table 15 Risk Assessment B

Source (Potential Contaminating Use)	Potential Contaminants	Receptors	Pathways	Associated Hazard, [Severity]	Proposed Site Use Risk Assessment		
					Likelihood of occurrence	Potential Risk	Notes
Infilled ponds	CO ₂ , CH ₄ .	Site Users. Construction Workers.	Inhalation of vapours, (gas and organic)	Medium	Unlikely	Low	Due to the nature of this feature and distance from the site, as well as the areas forming open land the risk of migration to the site will be low.
			Explosive risk from Land Gas.	Severe	Unlikely	Moderate / Low	Low risk of explosive concentrations.

Table 16 Overview of Risk Assessments - Proposed Site Use

Receptors	Pathways	A	B
		Barn – storage and historical barn	Infilled ponds
Site Users	Direct Contact, Inhalation of Dust and Fibres, Dermal Contact.	✓	X
	Ingestion of home-grown produce.	✓	X
	Ingestion of contaminated water through water main pipework.	✓	X
	Inhalation of vapours from soils.	✓	X
Construction Workers	Inhalation of vapor from contaminated ground waters.	X	X
	Inhalation of land gas vapours.	X	X
	Inhalation Asbestos dust and fibres (from Asbestos within the building)	✓	X
	Inhalation Asbestos dust and fibres (from asbestos within the soil)	✓	X
Adjoining Landowners	Direct Contact, Inhalation of Dust and Fibres, Dermal Contact.	✓	No Liability from third parties
	Ingestion of home-grown vegetation.	✓	
	Ingestion of contaminated water through water main pipework.	✓	
	Inhalation of vapours from soils.	✓	
	Inhalation of vapours from contaminated ground waters.	X	
Flora	Plant Uptake / Direct Contact.	✓	X
Groundwater; Abstraction Well & Surface Water	Leaching, lateral migration of shallow groundwater to a River or surface water receptor.	X	No Liability from third parties
	Leaching, lateral migration of shallow groundwater system underlying the site and subsequent abstraction well or SPZ.	✓	
Construction Materials	Direct contact with contaminated soils.	✓	X
	Direct contact with contaminated groundwater.	X	X

*NB: Due to Severe Consequence from Asbestos and Explosive Gases, some risk is assessed and potentially in place and therefore highlighted above.

GW Only: Some risks have been assessed as a direct result of potential mobilisation of groundwater contamination that may influence the site. A pictorial conceptual model has been reproduced within this report to confirm the above findings

16 Discussion on Sources of Contamination

Considering the risk assessment and conceptual site model produced, the following contaminants of concern have been identified based on land uses and features.

Table 17 Methodology for further assessment of potential contaminants

<i>Risk Assessment</i>	<i>Land Use</i>	<i>Pollutant</i>
Soil, Groundwater & Vapour Risk		
Risk Assessment A	Barn – storage and historical barn	Moisture Content, pH, Electrical Conductivity, Cyanide, (Free), Cyanide, (Total), Organic Matter, Boron, Sulfate, (2:1 water soluble), Chromium, (Hexavalent), Sulfate, (Total), Arsenic, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc, Speciated PAHs, (EPA Priority 16), Phenols, Asbestos, Total Petroleum Hydrocarbons (aliphatic/ aromatic 8-Band)
Soil Sampling Groundwater & Vapour Assessment		
Risk Assessment B	Infilled ponds	Risk assessment suggests a low risk in place.
Spatial Sampling, (General Assessment)		Moisture Content, pH, Electrical Conductivity, Cyanide, (Free), Cyanide, (Total), Organic Matter, Boron, Sulfate, (2:1 water soluble), Chromium, (Hexavalent), Sulfate, (Total), Arsenic, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc, Speciated PAHs, (EPA Priority 16), Phenols. BS3882:2015
		Asbestos
		25-meter Centres In accordance with BS10175: 2011+A2:2017.
		5-10-meter Centres In accordance with BS10175: 2011+A2:2017.

17 Next Steps

Considering the information gathered to date, we would suggest that an appropriate way forward would be to assess the condition of the subsoil within the site resulting from the historical and former uses of the site as detailed within previous sections of this report. We would suggest that the most viable way of assessing risk will be to consider the following assessment techniques.

The assessment of the site proposed in this report and the following recommendations which are detailed below have been prepared in accordance with key guidance documents as follows: -

- National Planning Policy Framework.
- British Standards 10175:2011+A2:2017.
- Land contamination risk management (LCRM).
- DEFRA: Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, (April 2012).
- Environment Agency, (2010) GPLC1 Guidance Principles for Land Contamination.

The investigation is proposing to undertake the following at the site: -

- Determine the ground and groundwater conditions.
- Determine if there are any obstructions such as old service and foundations, buried tanks, etc.
- Obtain samples of the made ground, natural soils and groundwater, if encountered, for contamination testing at targeted site-specific designed locations. Test soil and groundwater, if encountered, samples for a range of contaminants, as identified in Table 17.
- Obtain samples of soil to test for vapours contaminants, as identified in Table 18.
- Visually appraise soils to consider olfactorily or visual presence of contamination factors, risk, vapours or fragments.
- All laboratory testing should be completed to MCERT/UKAS accredited standard.
- All detection limits provided by chemical laboratories must fall below the set screening values.

17.1 Soil Assessment

Soil sampling will be completed recovering samples in appropriate containers for analysis by the analytical chemist. All sampling will be sent directly to the chemist in cool boxes to retain the integrity of the soil sample.

At least one sample will be recovered and chemically tested from the natural underlying subsoil to consider any pollution within the lower soils. Most of the sampling and chemical analysis will be recovered from the upper made ground / FILL material where risk is likely higher. Should any areas of the soil profile recovered cause concern in terms of visual or olfactoral risk, this will be recorded, and testing completed.

Based on the site area and size of the site, (approximately 3000 m²), we would recommend that the site should be subjected to a sampling density of between 15-20 meter grid pattern or moderate risk pollutants which is broadly in line with that proposed by 10175:2011+A2:2017 and offers a greater density sampling pattern of 10-15 meter grid pattern for high risk pollutant such as Asbestos. As such, we can confirm that a likely 8-10 samples.

locations will be required across the site to provide a 'good' spatial density and an additional 20-22 sample locations being tested for Asbestos.

Having stated the above the main sources of risk are recorded within the north of the site, the grassed area within the south of the site has always been there as such a the testing should be focused in the north of the site.

Table 18 **Soils Assessment - Targeted Sampling**

<i>Feature</i>	<i>Contaminant</i>	<i>Method of Investigation</i>
Barn	Metals, Semi Metals, PAHs, TPHs, Asbestos VOCs	Window Sampler Boreholes
Historical Barn		Hand Auger Boreholes Trial Pits

Table 19 **Soils Assessment – Spatial Sampling**

<i>Feature</i>	<i>Contaminant</i>	<i>Method of Investigation</i>
Made ground	Metals, Semi Metals, PAHs, TPHs, Asbestos VOCs PCBs	Window Sampler Boreholes
Yard areas		Hand Auger Boreholes Trial Pits

Upon completion of on-site sampling and the associated chemical analysis, the soil data will be compared against the Generic Assessment Criteria for residential land with home grown produce derived by AtRisk Soils which has been purchased as a reviewing standard. This has been prepared by Atkins as Soil Screening Values, (SSV's). Additionally, values will be adopted for screening values using LQM / CIEH – Sutable 4 Use Levels in the absence of Atkins adopted values.

17.2 Groundwater Assessment

To gain an understanding of the groundwater system and the level of risk in place, we can confirm that the following works should be completed: -

The Geology within the site should be confirmed.

- The depth of the Geology within the site should be assessed and if ground water is encountered or has the potential to be in place, some assessment of the risk to groundwater and surface water features should be carried out as well as potential human health risk from vapours.
 - Considering the size and nature of the site, the groundwater elevation may be perched at locations and as such, strikes may be local to lenses or pockets of more permeable ground to provide surface water runoff.

Standpipes should be installed across the site, to orientate the groundwater table to identify groundwater flow direction. Three standpipes should be installed for groundwater assessment such that orientation of the groundwater table can be undertaken.

- We would recommend that the installation of the boreholes at the site should be completed in order determine the groundwater elevation, if present. The boreholes should be left for a minimum period of

one week to allow the groundwater to reach equilibrium at which time, purging of the standpipe well should be completed to consist of a minimum of 3 well volumes removed from the standpipes prior to samples being recovered. Should groundwater be identified, sampling of the groundwater can be completed and retained in appropriate containers dependent upon the analysis proposed. The sample should then be sent to the analytical chemist for assessment in appropriate transport conditions.

- It is possible that groundwater assessments may require extending the standpipes through any superficial deposits suggested by the Envirocheck report.
- Considering the size and nature of the site should ground water risk be recorded within the site area each borehole should be sampled and tested for the range of pollutants as identified within this report. The potential risks should be initially assessed against the UK Drinking Water standard as a Tier 1 assessment Criteria with possible further assessments required where heavy contamination or risk deemed in place. Groundwater samples should be compared against the EQS standards, (Environmental Quality Standards).
- The assessment of groundwater will also be used to consider the risks to surface water features and whether the site may impact of this feature.
- Risk assessment A should be tested for so the extent of pollutants can be identified within the groundwater sample.

17.3 Land Gas Assessment

Due to the potential sources of land gases being small pond that were formally in place within garden areas, and the distance from the site will reduce the risk to the site area.

17.4 Vapour Risk Assessment

Considering the potential for vapour risk to be in place from various source as noted below, the following risk are in place.

Table 20 **Vapour Risk Assessment - Response Zone**

<i>Feature</i>	<i>Targeted Response Zone</i>	<i>Location to Target</i>	<i>Vapour risk</i>
Barn	Made Ground	Around the feature	TPHs, VOC's
Historical barn		in the location of the former building	TPHs.
Yard		North of the site area	TPHs.

Considering the above, we would suggest that soil testing is undertaken to assess whether contamination that may promote a vapour risk is in place within the site area and the groundwater.

17.5 Working Brief

It should be noted that this investigation is undertaken to identify the extent of contamination because of historic and ongoing use. Should any areas of the site be encountered within the development that appear potentially contaminated through visual or olfactory assessment outside that discussed within this report, consultation with ourselves should be undertaken to identify the risk associated with the material.

Table 21 *Overview of Works*

Receptor	Scope of Investigation Works Required			Proposed Method of Assessment	Proposed Site Works to Complete
	Assessment of: Soils	Vapour and Gas	Ground Surface Water and		
Human Health	✓	✓	✓	Window Sampling - Soil sampling - Install standpipe# - Groundwater sampling*	Recover samples of the made ground. Assessment of the underlying natural soils to consider contamination. Groundwater Risk Assessment. Vapour Risk Assessment. # Analysis of soil samples for GQRA Assessment. Reporting.
Surface Water	X	X	X	No Action	
Ground Water	✓	✓	✓	Window Sampling - Soil sampling - Install standpipe# - Groundwater sampling*	Recover samples of the made ground. Assessment of the underlying natural soils to consider contamination. Groundwater Risk Assessment. Vapour Risk Assessment. # Analysis of soil samples for GQRA Assessment. Reporting.
Services & Building	✓	✓ #	X	Window Sampling - Soil sampling	Recover samples of the made ground. Vapour Risk Assessment. # Groundwater Assessment. Analysis of soil samples for GQRA Assessment. Reporting.
Geotechnical Assessment	✓	N/A	X	Window Sampling	Recover samples of the natural soils for laboratory testing. Assessment of shallow soils for conventional foundation. Consider deeper or piled foundations. Reporting.

NB * Initial assessments of the site should be undertaken using Leachate Testing and water sampling if required.

Complete soils testing to assess if vaporous contamination is in place within the site area.

APPENDIX ONE

ADDITIONAL INFORMATION

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
533881/237044

Created
18 Jun 2024 12:47

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



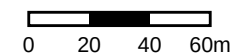
Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
533881/237044

Scale
1:2500

Created
18 Jun 2024 12:47



Page 2 of 2

APPENDIX TWO

CONCEPTUAL MODEL

Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN

Site Conceptual Model - Proposed Site Plan

Potential Pathways

Human Health

- ① Direct contact with contaminants in soil/dust or water
- ② Inhalation of contaminants through soil/dust/particles
- ③ Dermal Contact
- ④ Ingestion of home grown produce
- ⑤ Ingestion of contaminated water through water main pipework
- ⑥ Inhalation of Land Gases / Vapours From Soils
- ⑦ Inhalation of Vapours from Groundwater
- ⑧ Migration to off site Adjoining Land Owners

Flora

- ⑨ Plant uptake & direct contact with soil

Controlled Surface Water, Ground Water & Abstraction Well

- ⑩ Leaching, lateral migration of shallow groundwater to a target receptor

Off Site Sources

- A Migration of contamination to the site area
- B Migration of land gases/ vapours to the site area
- C Migration of contaminated groundwater to the site area

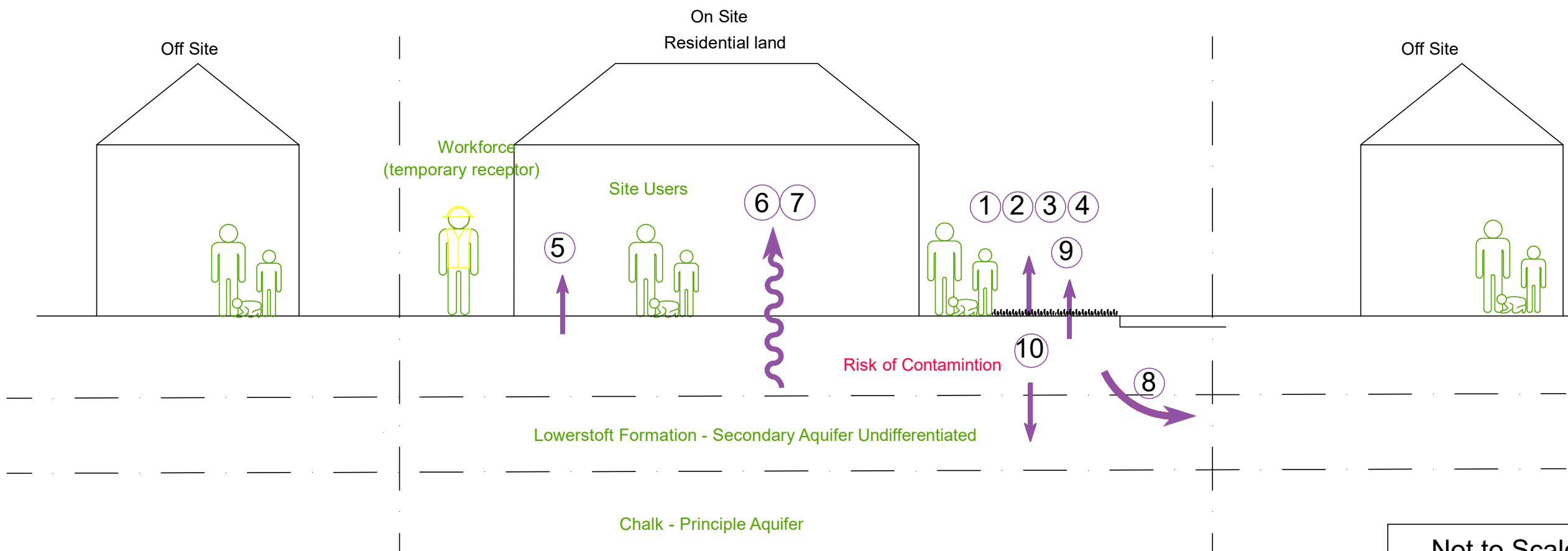
Key

Purple =Possible pathways

Green =Possible receptors

Red =Possible sources

Grey = Not in place within this site



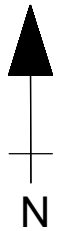
Not to Scale
Sketch No. : DTS / 18964 / 02 / 01

APPENDIX THREE

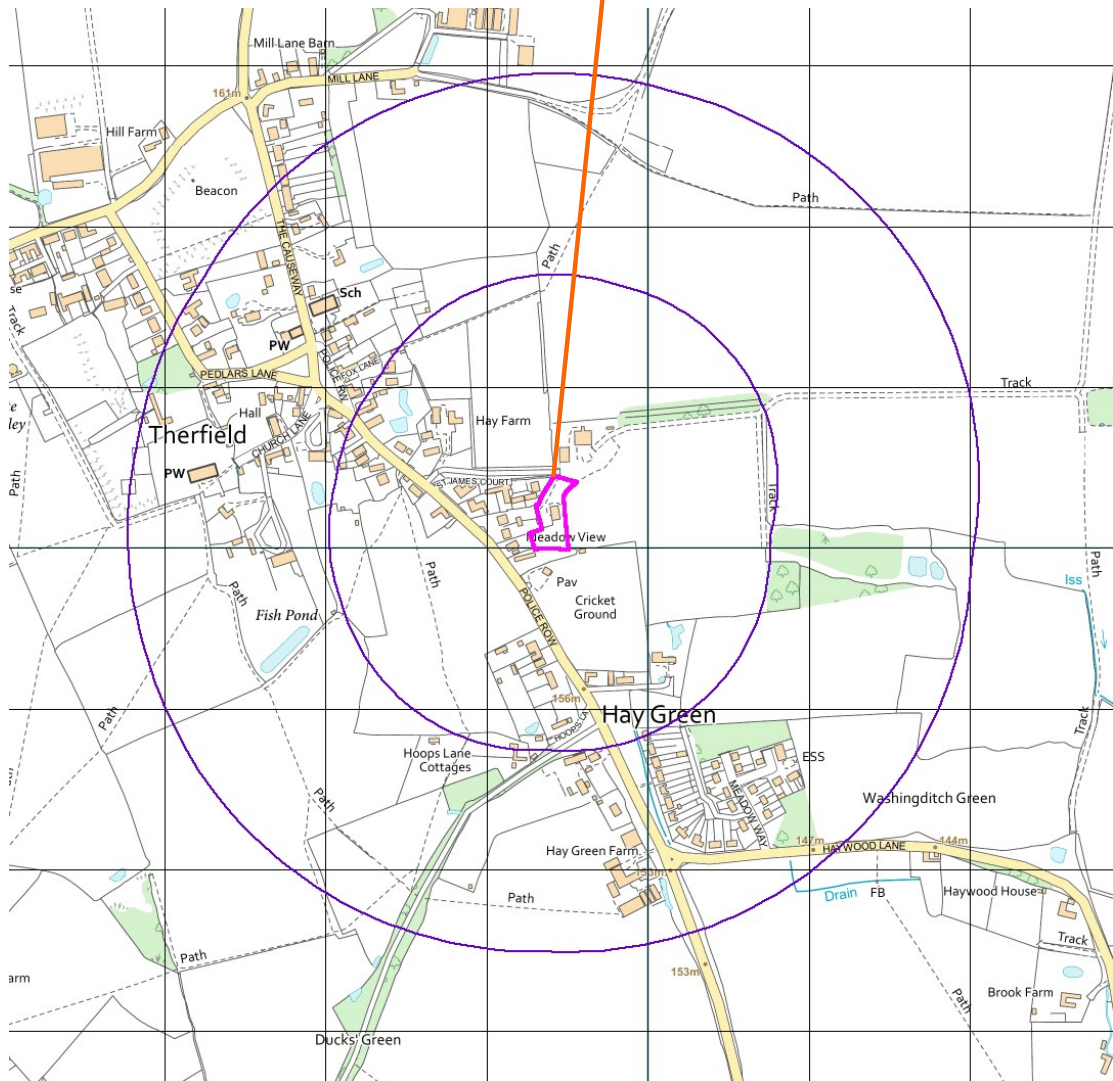
SITE PLANS

Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN

Location Plan

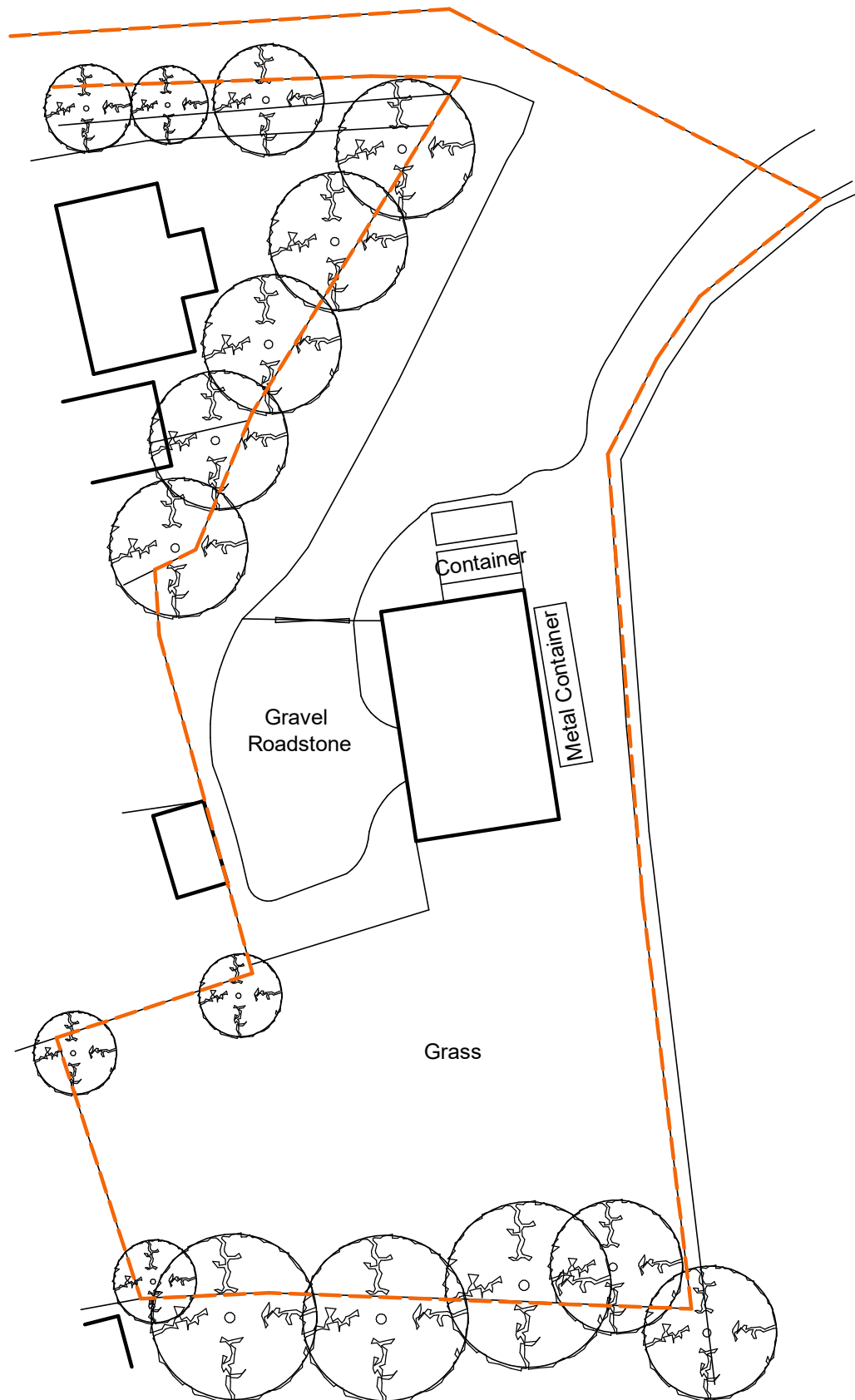
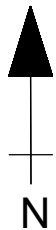


Site Plan



Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN

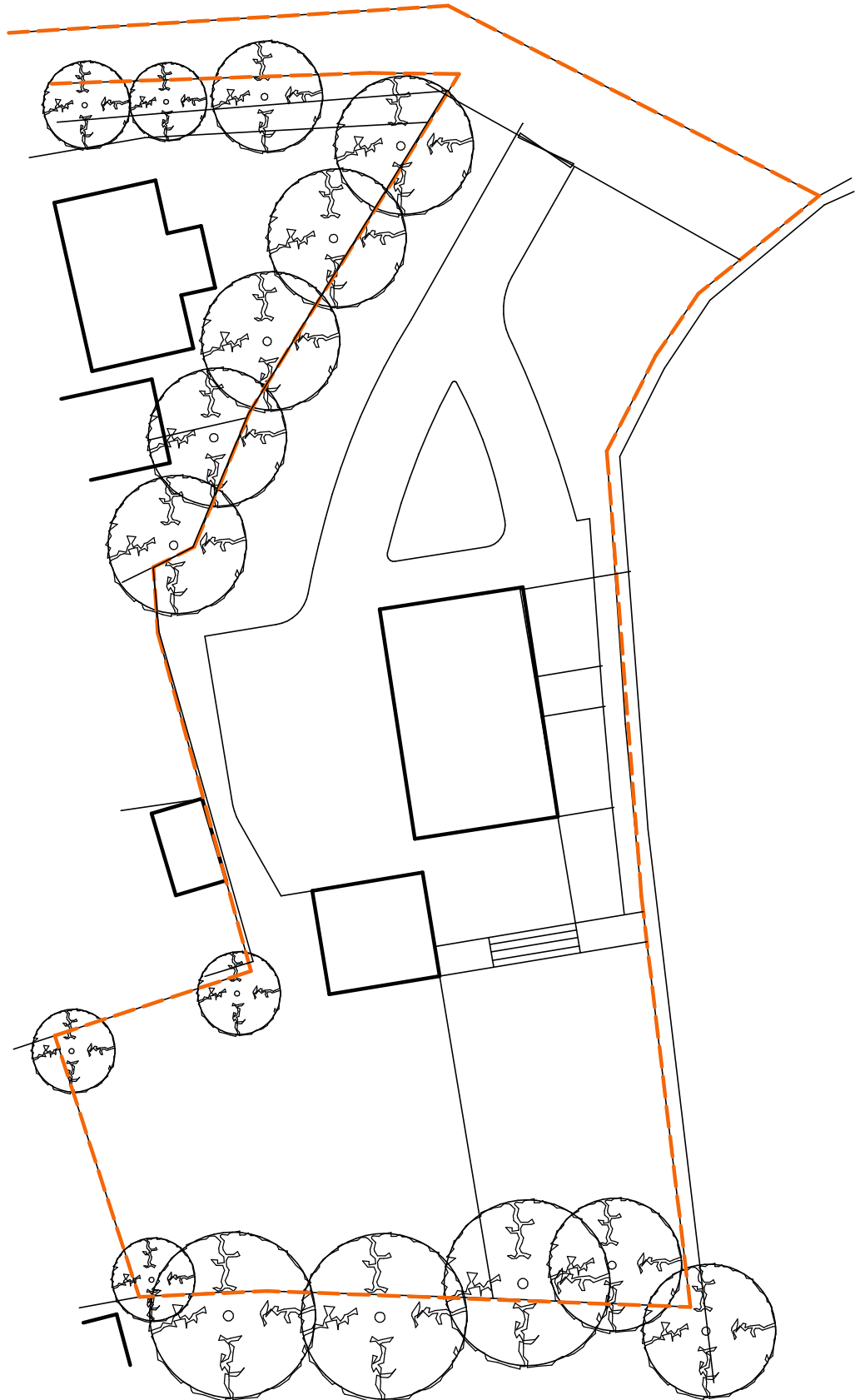
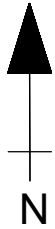
Existing Site Plan



Not to Scale
Sketch No. : DTS / 18964 / 03 / 02

Maple House, St James Court, Therfield, Hertfordshire. SG8 9FN

Proposed Site Plan



Not to Scale
Sketch No. : DTS / 18964 / 03 / 03