

Preliminary Geo-Environmental Risk Assessment

Banbury Logistics Park, Oxford

Presented Greystoke Land

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Protecting people and planet

Report Details

Client	Greystoke Land
Report Title	Preliminary Geo-Environmental Risk Assessment
Site Address	Banbury Logistics Park, land adjacent to A361, Oxford, OX16 3AD
Report No.	21-2141.02
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Quality Assurance

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As part of Lucion Services, our combined team of 500 in the UK has a range of specialist skill sets in over 50 environmental consultancy specialisms including asbestos, hazardous materials, ecology, air and water services, geo-environmental and sustainability amongst others.

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Executive Summary

Brief	Delta-Simons was instructed by Greystoke Land to produce a Preliminary Geo- Environmental Risk Assessment for vacant land off A361, Oxford for the proposed development of a sustainable logistics park comprising commercial / distribution units with associated ancillary infrastructure and access.
Site Use & Surrounding Area	The Site currently comprises a large area of greenfield, comprising agricultural fields which are separated by hedgerow. An access road is located within the northern extent of the Site, leading to a likely farmhouse / farmyard. The Site is bordered by further agricultural land to the north and east, and the A422 to the south and the A362 to the west with a logistics park beyond subsequently the M40.
Environmental Setting	The Site is likely underlain by a sequence of Topsoil and / or limited Made Ground underlain by weathered bedrock deposits of the Charmouth Mudstone Formation and possible the Dryham Formation (both Secondary Undifferentiated aquifers) on the easternmost portion of the Site. The Site is not located within a source protection area and there are no licensed aroundwater abstraction licenses within 1 km of the Site boundary.
Contamination Potential Sources	Limited potential sources of contamination have been identified associated with the current and former use of the Site as agricultural land.
Contamination Land Risk Associated with Ownership	There is considered to be a low risk of enforcement action by the regulatory authorities. The potential for legal action by surrounding landowners / Third Parties based on the potential for contamination to migrate off-Site (ongoing or historically) and result in private or statutory nuisance is considered to be low.
Development Considerations	Widespread or significant contamination is considered unlikely and the preliminary risk assessment has identified a low risk of soil / groundwater contamination and a low to moderate risk of hazardous ground gas at the Site. Potential geohazards have been identified associated with shallow clay deposits at the Site due the pyritic nature and the effects of frost heave and shrink and swell associated with the trees. This will require further investigation to determine the extent and properties of the clay deposits and allow for development of an accurate ground model for foundation design.
Uncertainty and Data Gaps	This assessment is based on desk study information only. No Site-specific ground investigation data has made available for review.
Recommendations	It is recommended that an intrusive Site investigation is undertaken to provide an assessment of foundation and engineering solutions to be made. It would be prudent to undertake sampling to assess the potential for contamination and provide a ground gas risk assessment to investigate the risk of gases to impact on the proposed development. Consideration should be given to sampling and analysis of topsoil as a surplus would be anticipated given proposed development. The analysis of these soils would be required to inform re-use options of material off-site.
This is intended as a provided within the	a summary only. Further detail and the limitations of the assessment are main body of the Report.





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1.0 Introduction

1.1 Appointment

Delta-Simons Limited ("Delta-Simons") was instructed by Greystoke Land (the "Client") to prepare a Preliminary (Geo-Environmental) Risk Assessment for a proposed sustainable logistics park located adjacent to A361, Oxford, OX16 3AD (the "Site").

This Report was undertaken in accordance with Delta-Simons fee proposal dated 31st March 2022. The standard limitations associated with this Assessment are presented in Appendix A.

1.2 Context & Purpose

The aim of this Report is to consider the potential for land contamination and geotechnical constraints present at the Site in order to support an outline planning application for the proposed development.

It is understood that the proposed development for the Site is the construction of a sustainable logistics park comprising commercial / distribution units with associated ancillary infrastructure and access. A Proposed Site Layout plan has been provided and it is considered that earthworks will be required in order to deliver the proposed elevations, see Drawing 1.

To that end this study assesses the likely environmental and geotechnical issues associated with soil and groundwater conditions that may affect the proposed development of the Site. This Report is designed in general accordance with guidance on Land Contamination: Risk Management pages of the GOV.UK web pages, the relevant requirements of the National Planning Policy Framework (NPPF) (as revised 2021) (paragraphs 174 & 183-184)¹ and the Planning Practice Guidance (Land Affected by Contamination)².

1.3 Scope of Works

- Review of the environmental setting of the Site, including the current use / status of the Site and surrounding area, and review of the geology, hydrogeology and hydrology;
- Review of the historical activities of the Site and surrounding area;
- Review of regulatory information relating to the Site;
- Review of the online planning records for the Site;
- Consult and review information from the Local Authority in relation to Part 2A of the 1990 Environmental Protection Act;
- Review online records of potential unexploded ordnance risks;
- Complete a Site reconnaissance by undertaking a visual inspection of readily accessible areas of the Site;
- Develop an outline Conceptual Site Model and undertake a Preliminary Risk Assessment with respect to potential contamination focussed on the proposed land use;
- Provide commentary on potential land contamination and geotechnical constraints in the context of the proposed development.

Data sources used in this assessment are listed in Appendix B.

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004408/NPPF_JULY_2021.pdf ² https://www.gov.uk/guidance/land-affected-by-contamination





1.4 Limitations

The standard limitations associated with this Assessment are presented in Appendix A. In addition, there are the following specific limitations that apply to this Assessment:

- The Site boundary was altered after the acquisition of the Landmark Envirocheck Report. As a result, the red-line boundary within the Envirocheck should be considered to be superceded.
- The Consultant undertaking the Site inspection maintained a general awareness for evidence of invasive plant species, particularly Japanese Knotweed. While none were observed during the walkover, it should be noted that the Consultant is not a trained ecologist and a separate survey undertaken by an experienced Ecologist would be necessary if a more robust assessment is needed;
- The Report includes an initial assessment of unexploded ordnance (UXO) risks for the Site using online data sources. A detailed UXO assessment falls outside of the scope of this Report, further specialist assessment may be required; and
- The Report includes a preliminary assessment for the potential for radon gas hazards. A detailed radon assessment falls outside of the scope of this Report, and the requirement for radon mitigation measures in the proposed development should be identified separately to the satisfaction of the Local Authority.





2.0 Site Context & Data Review

The following sections provide a summary of the key site features based on the data sources listed in Appendix B. All distances, measurements and dates are approximate and the accuracy limitations of the data sources should be noted.

2.1 Site Information

Co-ordinates	Centred at National Grid Reference 447584, 242284.	Elevation	98 - 122 m AOD
		Area	45.34 Ha
Site Location	The Site is located off the A361, i 11 of the M40 is located adjacen	n the north-easter t to the south-wes	n outskirts of Banbury. Junction t of the Site.
	A Site Location Map is provided a	as Figure 1.	
	<u>Google Maps Link</u>		
	[Google, Imagery © 2022 Getmapp The GeoInformation Group, Map dat	ing plc, Infoterra Lt ta ©2022]	d & Bluesky, Maxar Technologies,
Site Occupant(s)	It is understood that the fields are	e tenanted for catt	le grazing.
Site Description	Delta-Simons conducted a Site visit on 28 th March 2022. A series of photographs are presented as Appendix D, and a Site Layout Plan (Site boundary in red) is provided as Figure 2. Pertinent information from the Site is summarised below:		
	• The Site can be accessed via a lane east off the A361 or from the south via the A422 east bound;		
	 The lane east off the A361 lead two-storey structure with a c by derelict barns and sto containing materials (ACM) v evidence of hydrocarbon/ga observed, although no evide could be found in the vicinity 	ads to a farmhouse ourtyard of hard s orage buildings. were identified wi as-based heating a ence of an above of the farmhouse	e / farmyard (located off-Site), a standing opposite, surrounded Evidence potential asbestos thin the structures. In addition, and cooking systems could be or below ground storage tank ;
	• Another area of hardstanding coming off the A422 eastbou	g is present in the ınd;	e south off the Site, off the lane
	• No other structures are pre- structure in the eastern most	sent on-Site, othe field; and	r than a small brick outhouse
	• Overhead electric cables, on	telephone poles,	cross a number of the fields.
Topography	A topographical survey was undertaken by Monument Geomatics Limited in November 2021. The topographical survey shows that the Site slopes from 155.47 metres Above Ordnance Datum (m AOD) in the north-east to 96.30 m AOD in the north-west of the Site.		
Description of Surrounding Land Uses	The Site is bordered by further agricultural land to the north and east, the A422 to the south and the A361 and Junction 11 of the M40 to the west with a logistics park beyond.		

Historical and/or contemporary potential sources of significant contamination have not been noted on the Site during the site walkover. Given the agricultural nature of the surrounding land, it is considered that significant off-Site sources of contamination can be discounted at this time.





2.2 Physical Setting

The physical setting of the subject property can influence the susceptibility to, and relative magnitude of, environmental impacts and liabilities associated with on- and off-Site sources of contamination. The following table provides physical setting information for the subject property and surrounding area.

Published Geology	British Geological Survey (BGS) online viewer (<u>bgs.ac.uk/viewer</u>) and geological mapping (<u>bgs.ac.uk/maps</u>) (1:50,000 Sheet Number 201, Banbury) indicates that ground conditions at the Site comprise:
	Made Ground: The Site is not recorded as being within an area underlain by artificial or Made Ground deposits. In addition, when considering the nature of the Site, it is unlikely that notable Made Ground deposits are present at the Site.
	Superficial deposits: No superficial deposits are mapped at the Site; however, weathered bedrock deposits may be present.
	Bedrock: Jurassic Charmouth Mudstone Formation comprising mudstone across the majority of the Site. Deposits of the Jurassic Dyrham Formation comprising interbedded siltstone and mudstone are indicated to be present across the eastern and south-eastern areas of the Site.
	There are no BGS recorded boreholes (<u>bgs.ac.uk/viewer</u>) on the Site. However, there are several within the local surrounding area to the west considered to be associated with the development of the M40. A BGS borehole (Ref. SP44SE175) is located adjacent to the south-west was progressed in 1978 to a base depth of 10 metres below ground level (m bgl). The boreholes is summarised as follows:
	 Topsoil from ground level to 0.20 m bgl;
	• Stiff brownish orange mottled brown fissured slightly sandy silty CLAY with some roots. Desicated. (Colluvium) from 0.20 m to 0.70 m bgl;
	• Firm light brown mottled brownish orange fissured silty CLAY becoming firm to stiff light brown and grey mottled brownish orange fissured silty CLAY; (Weathered Lower Lias) from 0.70 m to 2.25 m bgl;
	• Stiff grey and light brown silty CLAY with light and dark brown iron staining on joint surface and traces of fine gypsum crystals at 2.50 m bgl from 2.25 m to 3.60 m bgl.
	• Very stiff to hard grey jointed calcareous silty CLAY with some shells from 3.60 m to 3.85 m bgl;
	 Moderately strong grey shelly silty LIMESTONE from 3.85 m to 4.15 m bgl;
	• Very stiff to hard grey jointed calcareous silty CLAY with some shells. Strong grey shelly silty LIMESTONE from 4.15 m to 5.15 m bgl;
	• Very stiff to hard grey jointed silty CLAY with occasional small shells. (Lower Lias) from 5.15 m to 9.90 m bgl;
	• Moderately strong grey shelly silty LIMESTONE from 9.90 m to the base of the borehole at 10.00 m bgl.
	A water strike was recorded at 1.20 m bgl.
	It should be noted that the BGS record bedrock deposits of the Charmouth Mudstone Formation across the Site, however, the above BGS boreholes has identified limestone deposits. The bedrock deposits may therefore vary locally across the Site.





Site-Specific Geology	No on-site information has been identified for review.
Aquifers and Groundwater	The Environment Agency (EA) data <u>magic.defra.gov.uk</u> provides the following aquifer classification and designations:
Receptors	Bedrock: The Charmouth Mudstone Formation and Dyrham Formation are both classified as Secondary Undifferentiated Aquifers.
	Source Protection Zones: The Site is not in a designated groundwater Source Protection Zone.
	Groundwater Abstractions: There are no licensed groundwater abstraction licences recorded within 500 m of the Site boundary.
Groundwater Levels and Flow Direction	The reviewed BGS borehole information indicated the presence of a water strike at 1.20 m bgl. There is the possibility that there may be some additional perched water above the clay and weathered mudstone deposits.
	Groundwater is expected to flow to the west, towards the River Cherwell.
Hydrology	The nearest watercourse is the River Cherwell (Main River - responsibility of the EA to maintain) which is located approximately 250 m west of the Site at its closest point. The River Cherwell flows in a generally southerly direction past the Site.
	A land drain is shown approximately 200 m off the north-eastern corner of the Site, which would flow in an easterly direction based on the Site topography. A drainage ditch also runs adjacent to the north-western Site boundary. It is likely that further land drainage ditches run throughout the Site along field boundaries.
	According to the Envirocheck Report, there are no licensed abstraction records from surface water located within 500 m of the Site.
	It is understood that a Flood Risk Assessment and Drainage Strategy by Delta- Simons (January 2022, 21-2141.01) has been provided to the Client. The findings should be read alongside this report.
Mining & Quarrying	Reference to the Coal Authority on-line viewer (<u>bgs.ac.uk/coalauthority</u>) indicates that the Site is not with a Coal Mining Reporting Area. Consequently, a Coal Mining Risk Assessment (CMRA) is unlikely to be required under the planning regime.
	The Envirocheck report records a BGS Recorded Mineral Site approximately 190 m to the south-east named as 'Grimsbury Green', which was a former opencast clay and shale mine.
Ground Stability	The Envirocheck Report indicates the following hazards in the area of the Site:
Hazards	Dissolution hazards - no hazard
	Landslide - very low to moderate
	Shrinking and swelling clay hazards - low
	Collapsible ground - very low
	Compressible ground - no hazard
	Running sands - no hazard
Radon Gas	Public Health England (<u>ukradon.org</u>) data indicates that the majority of the Site lies within an area of elevated radon potential, with a maximum radon potential of 10-





30 %.The north-eastern portion of the Site lies within an area with a maximum radon potential greater than 30%.
A detailed radon assessment falls outside of the scope of this Report, and the requirement for radon mitigation measures in the proposed development should be identified separately to the satisfaction of the Local Authority. It would be prudent at this stage to allow for incorporation of appropriate radon protection within buildings.

2.3 Sensitive Land Use

Ecological	From the information provided within the Envirocheck Report, there are no significant statutory ecological receptors located within 500 m of the Site.
Receptors	The Site is located within a Nitrate Vulnerable Zone (Cherwell [Ray to Thames)] and Woodeaton Brook).
Heritage Interest	Historic England Records (<u>historicengland.org.uk</u>) indicate that no areas of designated heritage interest are located on the Site or within the immediate surrounding area.

2.4 Historical Use of the Site & Surrounding Area

2.4.1 Approach

The historical development of the Site and surrounding area has been assessed through a review of historical maps, aerial photographs, internet sources, previous reports and Google Earth historical satellite imagery. A summary of the key historical Site uses and developments in the surrounding area is presented below. Copies of selected historical maps are included as Appendix E.

2.4.2 Historical Information Review

The following table provides a review of the historical information for the Site, adjacent and surrounding area.

Date	Source	Site Description	Surrounding Area
1884	OS Mapping	The Site comprised several agricultural fields across field boundaries. Several ponds are present.	The areas surrounding the Site are observed to largely comprise agricultural land. Huscote Farm with likely agricultural buildings is located is located off-Site within the Site boundary. Seale's Farm is located approximately 300 m north-east and Huscote Mill (corn) approximately 250 m north-west. A brick field with associated areas of earth cuttings are denoted adjacent to
			the south-eastern area of the Site.
1900	OS Mapping	No other significant changes observed.	A brick works and associated earth cuttings (potentially associated with clay extraction) are recorded between 100 m and 200 m to the south. The brick field is denoted as an old clay pit. No other significant changes observed.





Date	Source	Site Description	Surrounding Area
1922	OS Mapping	No significant changes observed.	No significant changes observed. The old clay pit is no longer recorded and a well and pond are denoted. The brick works to the south is no longer recorded and a pond is located in the footprint of the potential former clay extraction area.
1938	OS Mapping	No significant changes observed.	Huscote Mill (located to the north- west) is noted to be disused.
1991 - 2021	OS Mapping, Google Earth	A sheepfold is located on the southern portion of the Site, no other significant changes observed, and the Site remains in this layout until the present day.	The M40 motorway, A361 and A432 are developed adjacent to the south, south-west and west.

2.4.3 Historical Use Summary

Based on a review of the compilation of historical sources dating back to 1884, it appears that the subject Site has largely been in use as agricultural land to present day.

The surrounding area was also in use as agricultural land with a farm located off-Site within the Site boundary and 150 m north-east. A brick field was also recorded adjacent the south-east on the earliest reviewed mapping dated 1884 up to 1900, when it was denoted as an old clay pit. By 1922, the old clay pit was no longer recorded and a pond and well were located in its position. A brick works, and associated earth cuttings were recorded within 100 m south from 1900 up to 1922. By 1991, the M40 motorway and local surrounding road network had been developed adjacent to the Site.

Potentially contaminative land uses identified in the surrounding area include agricultural buildings at Huscote Farm, the brick works and associated infilled former clay extraction pit located adjacent to the south-east and approximately 100 m south.

2.4.4 Unexploded Ordnance (UXO)

The Zetica Regional Unexploded Bomb Risk Map for the area of the Site (<u>zeticauxo.com</u>) indicates that there is a low risk of UXO in the area of the Site. The Risk Map is included in Appendix F.

A detailed UXO assessment falls outside of the scope of this Report, and specialist assessment may be required to support future groundworks.

2.5 Environmental Database Review

The Landmark Envirocheck[®] Report provides a database of environmental information held by various statutory bodies including the EA, Local Authority (LA), Health & Safety Executive (HSE) and Public Health England amongst others. It must be noted that due to a Site boundary change after the Envirocheck[®] Report was ordered, some entries shown as on-Site within the Envirocheck[®] Report are now located off-Site. A copy of the Envirocheck Report is provided in Appendix G and the most relevant information is summarised below.

Features On-Site	The Landmark Envirocheck [®] Report does not list any environmentally significant entries relating to the Site.
Potentially Contaminative Features Off-Site	There is a landfill located adjacent to the south-eastern boundary of the Site, named as Banbury Lane, which is listed as a historical landfill site, Local Authority





Recorded Landfill Site and a Registered Landfill Site. The following relevant information was identified:
• The first input of waste was dated June 1988 and the last was dated December 1989. The license is noted to have either lapsed or been cancelled or surrendered;
• The type of waste accepted was solid inert (sub & topsoil, clay); and
• The waste source was noted to be waste produced / controlled by the license holder. The license holder was named as John Jones (Excavation) Ltd.
In addition, the Landmark Envirocheck® Report lists the following entries located within 250 m of the Site:
• A Category 3 (Minor Incident) pollution incident to controlled waters is noted to have occurred approximately 210 m to the south-east of the Site involving an unknown pollutant;
• There is a BGS Recorded Mineral Site located approximately 195 m south-east named as 'Grimsbury Green'. It relates to opencast extraction of common clay and shale from the Charmouth Mudstone Formation. This is not considered to relate to the brick field as identified on historical mapping; and
• A Point of Interest - Manufacturing and Production entry for livestock farming (A J A Astell & Son) located approximately 145 m to the north-east.

2.6 Planning Review/Regulatory Enquiries

On-line Planning Review	Cherwell District Council	Date Accessed	28/04/2022
On-Site Applications	 The following pertinent planning application identified at the Site relates to the proposed development, summarised below: <u>22/00385/SO</u> - 'Screening opinion - proposed construction of a commercial development of between 1.2 million and 1.5 million square feet of logistics / warehousing and associated infrastructure and landscaping at Junction 11 M40, Banbury, OX172BH', dated February 2022. It was decided in March 2022 that an EIA would be required to support the application for the proposed development. No relevant information in relation to land contamination is included within the supporting documentation. 		
Part 2A of the Environmental Protection Act (EPA) 1990	Cherwell District Council's contaminated la information on the Site. No response has been re However, given the known history and current area, it is considered that the Site would be cons under Part 2A.	and officer was o eceived at the time o use of the Site and idered a low priority	contacted for of report issue. d surrounding for inspection

2.7 Previous Reports

No third-party reports have been made available to review from the Client or sourced through a review of planning application records.





3.0 Conceptual Site Model

3.1 Introduction

A Conceptual Site Model (CSM) represents the relationships between contaminant sources, pathways and receptors, to support the identification and assessment of contaminant linkages.

3.2 Overall Site Sensitivity

The Site is considered to be of a low to moderate environmental sensitivity given the presence of the underlying bedrock Secondary Undifferentiated Aquifers and the absence of a Source Protection Zone or groundwater abstractions and the on-Site and nearby surface water courses.

3.3 Potential Contamination Sources

A source is a contaminant or pollutant that is in, on or under the land that has the potential to cause harm or pollution.

The following identified potential contamination sources are considered in the CSM:

- Residual contaminants from the use of the Site as agricultural fields potential historical use of pesticides / fertilisers.
- Off-Site brick works and infilled land may be a source of leachate material, however, due to the age of the landfilled materials and the nature of the input materials recorded, this is not considered to be environmentally significant. However, at this stage, it cannot be discounted.
- Ground gas from adjacent landfilled material it is considered unlikely due to the age of the landfilled materials and the nature of the input materials recorded i.e., inert soil, however, it cannot be enitirely discounted at this stage.

3.4 Potential Pathways

A pathway is a route by which a receptor is or could be affected by contaminant.

The potential pathways are considered to be as follows:

- Direct contact, ingestion or inhalation of soil bound contaminants / dust during or following redevelopment.
- Inhalation of organic vapours associated with contamination.
- Migration of ground gas / vapours into on-Site buildings causing asphyxiation or risk of explosion.
- Leaching of contamination into groundwater followed by migration of groundwater to the wider groundwater environment or discharge to surface waters.
- Contaminated surface water runoff; and
- Direct contact between aggressive ground conditions and new infrastructure.

3.5 **Potential Receptors**

A receptor is something that could be adversely affected by a contaminant, for example a person, controlled waters, an organism, an ecosystem, or Part 2A receptors such as buildings crops or animals.

Relevant potential receptors are considered to include:

- Future Site users and maintenance workers;
- Construction workers;
- Third parties during construction (adjacent Site users and adjacent residents); and
- On-Site surface watercourses (ponds) and the nearby River Cherwell watercourse.





Contaminant Linkage Assessment					
Source(s) Pathway(s) Receptor(s) Risk Comments		Comments	Requires Investigation		
	Direct contact/ ingestion and inhalation of dust and vapours.	Site users.	Low Risk	Whilst significant potential sources of contamination have not been identified associated with the current use of the Site, there remains the potential for localised contamination associated with current and historical agricultural Site uses. However, given the proposed development to a commercial end-use, which will be predominantly covered by buildings and hardstanding, the risk to Site users is considered to be low. No significant potential sources of volatile contamination have been identified. It would be prudent to undertake a limited programme of soil sampling and analysis to further assess the risk.	Yes
contaminated soils and/or groundwater located beneath the Site.	Direct contact, ingestion and inhalation of dust and vapours.	Maintenance workers during any future sub- surface works at the Site.	Low Risk	Site workers may become exposed to localised contaminated soils and shallow groundwater during intrusive groundworks undertaken at the Site. Safe working practices should be undertaken and appropriate Personal Protective Equipment (PPE) should be used that will reduce the risk to low. Intrusive investigation will inform potential risks in new development areas.	Yes
	Leaching of contaminants and vertical migration.	On-Site surface watercourses.	Low Risk	Significant potential sources of contamination have not been identified associated with the current and historical uses of the Site, therefore the risk to surface watercourses is considered to be Low.	No
	Permeation of hydrocarbons through plastic pipe work.	Water supply pipes.	Low Risk	Hydrocarbons, especially aromatics and chlorinated solvents are known to permeate plastic pipes, particularly when encountered at high concentrations. Given the absence of evidence of significant fuel or oil sources, the risk of contamination migrating into areas containing water supply pipes is considered to be low.	No





Contaminant Linkage Assessment					
Source(s)	Source(s) Pathway(s) Receptor(s) Risk Comments		Requires Investigation		
	Lateral migration through any groundwater beneath the Site.	Off-Site receptors (neighbouring properties/ users).	Low Risk	Given that significant potential sources of contamination have not been identified associated with the current or historical uses of the Site, the risk to off-Site receptors is considered to be Low.	No
Ground gas.	Vertical and lateral migration of ground gases.	Site users & the buildings on-Site.	Low to Moderate Risk	An adjacent landfill Site has been identified to the south-east. Although the migration of ground gas is considered unlikely due to the age of the landfilled materials and the recorded nature of the input materials recorded i.e., inert soil, it cannot be discounted at this stage. It is recommended that a targeted programmes of ground gas monitoring is undertaken in the vicinity of the landfill site in order to further assess the risk.	Yes
Potentially contaminated soil and groundwater from off-Site sources.	Lateral migration and subsequent inhalation.	Future Site users	Low Risk A former landfill site was located adjacent to the south-eastern boundary, given the anticipated direction of groundwater flow, the Site is considered to be hydrogeologically downgradient of the landfill, therefore the risk from this is considered to be Low to Moderate based on the age and the nature of the landfilled material (i.e. inert soils).		Yes





4.0 Conclusions & Recommendations

4.1 Land Contamination Risks and Liabilities

Uncertainty and Data Gaps	This assessment is based on desk study information only. No Site-specific ground investigation data has been made available for review.
Soils	Significant widespread soil contamination is not anticipated. Localised contamination may be present associated with the current and former uses of the Site as agricultural land.
Groundwater	Significant widespread groundwater contamination is not anticipated.
Ground Gas	It is considered unlikely that a significant ground gas risk exists although it would be prudent to allow for basic ground gas protection measures until monitoring data is available for interpretation.
Potential Contaminated Land Development Risks	Widespread contamination is considered unlikely and the preliminary risk assessment has identified a low risk of soil/groundwater contamination and a low to moderate risk of hazardous ground gas at the Site.

4.2 Geotechnical Considerations

Uncertainty and Data Gaps	This assessment is based on desk study information only. No Site-specific ground investigation data has been made available for review.			
Preliminary Ground Model	Based on the reviewed information, it is anticipated that the Site is likely underlain by a sequence of Topsoil (with the potential for limited Made Ground), directly underlain by weathered bedrock deposits of the Charmouth Mudstone Formation.			
Plausible Geo-Hazards	The geohazards listed below have been identified to follow guidance presented in the HE document CD622 'Managing Geotechnical Risk' (2019) which aims to identify and manage the geotechnical risks associated with a scheme throughout its lifespan, from planning to construction to maintenance. The following geohazards are considered to be substantial ground related risks associated with the proposed development. A substantial risk is defined by Delta-Simons in Appendix C.			
	• The weathered Charmouth Mudstone Formation may be recovered as cohesive clay deposits. As such, shallow cohesive soils may be subject to shrink and swell where trees / hedgerows are removed / planted;			
	 Areas of perched / shallow groundwater may be present at the Site; 			
	• The Charmouth Mudstone Formation is likely to comprise of weathered mudstone, likely recovered as clay soils. These soils are likely to be of low permeability which does not typically provide favourable drainage characteristics and soakaway drainage is may not be feasible; and			
	• The ground model has the potential to provide localised aggressive ground conditions.			
Geotechnical Development Implications	It is considered likely that earthworks will be required to facilitate future redevelopment. Further assessment, in the form of intrusive investigation, will be required to determine an appropriate foundation and earthworks solution for new buildings associated with the Site's redevelopment.			





4.3 Recommendations and Other Development Considerations

Ground Investigation Recommendations	It is recommended that an intrusive Site investigation is undertaken to provide an assessment of foundation and engineering solutions to be made. It would be prudent to undertake sampling to assess the potential for contamination and provide a ground gas risk assessment to investigate the risk of gases to impact on the proposed development. Consideration should be given to sampling and analysis of topsoil as a surplus would be anticipated given proposed development. The analysis of these soils would be required to inform re-use options of material off-site.	
Other Development Considerations	 The following development considerations/potentially pertinent factors coul be anticipated with respect the site: Ecological surveys; and Flood Risk Assessment. 	





Drawings





Drawing 1 - Proposed Site Plan









NOTES: Copyright Chetwoods (Birmingham) Limited. No implied licence exists. Contractors must verify all dimensions on site before commencing any work or shop drawings. This drawing is not to be scaled. Use figured dimensions only. Subject to statutory approvals and survey. Building areas are liable to adjustment over the course of the design process due to the ongoing construction detailing developments.

Please note the information contained within this drawing is solely for the benefit of the employer and should not be relied upon by third parties. The CDM hazard management procedures for the Chetwoods aspects of the design of this project are to be found on the "Chetwoods - Hazard Analysis and Design Risk Assessment" and/or drawings. The full project design teams comprehensive set of hazard management procedures are available from the Principle Designer appointed for the project.

NB.

- SUBJECT TO SURVEYS,
- **CONSTRAINTS & PLANNING.**
- •LAYOUT TO BE TRACKED. • RED LINE INDICATIVE ONLY.



+44 (0)121 234 7500 www.chetwoods.com 32 Frederick Street, Birmingham, B1 3HH s#ctadedd LAND EAST OF JUNCTION 11, M40, BANBURY Client GREYSTOKE CB Drawing Title ILLUSTRATIVE SITE LAYOUT Scale Size Drawn Checked 1:2000 A1 AW TW 21/12/2021 riginator Zone Level Type Role Number

5166 CA 00 00 DR A 05001 P8

Figures





Figure 1 - Site Location Map







Figure 2 - Site Layout Plan





<image/> <image/>	DPAWNER: BCALE (@A4): PROJECT NO:
A Celtasimons NVironment - Health & Safety - Sustainability	EC 1:10,237 21-2141.01 CHECKED BY: REVISION FIGURE NO: DATE: 29 April 2022 2

Appendices





Appendix A - Limitations





Limitations

This Report was prepared by Delta-Simons Ltd (Delta-Simons) for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. Delta-Simons does not intend, without its written consent through a formal letter of reliance or warranty, for this Report to be disseminated to any party other than the named Client or to be used or relied upon by any party other than the named Client. Use of the Report by any other party is unauthorised and such use is at the sole risk of the user. Any party using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by Delta-Simons. Unless explicitly agreed otherwise, in writing, this Report has been prepared under Delta-Simons' Standard Terms and Conditions as included within our proposal to the Client.

The recommendations contained within this Report represent Delta-Simons professional opinions, based upon the information detailed within the Report, exercising the reasonable skill and care to be expected of a professional consultant holding itself out as having the competence, experience and resources necessary for the purpose of carrying out similar work in scope and character to the services performed. The Report needs to be considered in the light of the proposal and associated limitations of scope. The Report needs to be read and considered in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the Report.

Where Delta-Simons has obtained, reviewed and evaluated information in preparing this Report from the Client and others and Delta-Simons conclusions, opinions and recommendations has been reasonably determined using this information, Delta-Simons does not warrant the accuracy of the third-party information provided to it and cannot be responsible for any opinions which Delta-Simons has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

Site surveys document the conditions encountered at the time of survey only and conditions may change due to natural processes or human intervention. As such, surveys represent an assessment at a specific point in time and Delta-Simons cannot be responsible for adverse conditions which arise or become apparent after the time of the survey or for conditions which sit outside the scope for which the survey or Report was commissioned.

Where intrusive investigations have been completed, information, comments and opinions given in this report are based on the ground conditions encountered during the site work period and on the results of laboratory and field tests performed during the investigation. Ground conditions are inherently variable such that no investigation can be exhaustive to the extent that all adverse conditions are revealed. Conditions may therefore be present beneath the site that were not apparent in the data reviewed or obtained as part of this assessment. It should be noted that groundwater levels vary due to seasonal and other effects and may at times differ to those measured during the investigation. Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions. Where risk assessment is undertaken, this is based upon the standards, guidance and common practice at the time of the assessment and Delta-Simons cannot be responsible for conditions which become apparent following changes in guidance or practice or advancements in scientific knowledge which change the position in relation to assessment of risk.

No aspect of this Report constitutes a design. Where this information is used in design, the designer should verify the information has been used appropriately.

Where budgets are prepared and presented within the Report, these are for information only to indicate the likely magnitude of a cost and do not represent an invitation to treat for the works. All budgets and programmes presented should be reviewed and verified by appropriately qualified and experienced independent Project Managers and Cost Consultants.





Appendix B - Data Sources

In completing this Assessment, Delta-Simons has utilised the following data sources and third-party information:

- Current and Historical Ordnance Survey (OS) maps;
- British Geological Survey (BGS) data;
- Environment Agency (EA) online data;
- Coal Authority (CA) online data;
- A Landmark Envirocheck Report for the Site (Ref. 293547534_1_1), dated April 2022; and
- Historical Maps included as part of the Envirocheck Report.





Appendix C - Risk Definitions





Contaminated Land Risk Definitions

The following methodology is based on the methodology presented in CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice 2001. It requires the classification of the:

Magnitude of the potential consequence (severity) of the Risk occurring: and

Magnitude of the Probability (likelihood) of the Risk occurring.

The classifications are then compared to indicate the risk presented by each pollutant linkage.

	Human Health	Controlled Waters	Buildings/Services
Severe Consequence	Acute or chronic permanent impact on human health.	Sensitive controlled water pollution ongoing, or just about	Catastrophic collapse
Medium Consequence	Chronic permanent impact on human health	Gradual pollution of sensitive controlled water	Degradation of materials
Mild Consequence	Chronic temporary impact on human health	Gradual pollution of non- sensitive controlled water	Damage to building rendering it unsafe.to occupy (e.g. foundation damage resulting in instability).
Minor Consequence	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc).	Slight discoloration of water	Easily repairable effects of damage to buildings, structures and services, i.e. discoloration of concrete

Consequence to Receptor Definition Matrix

Probability Definitions

Probability	Definition in Context
Higher	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution. Positive evidence of source, pathway and receptor.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term. Suspect source, pathway, and receptor
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term. No evidence of hazard, pathway, and receptor





		Consequence/Magnitude of impact			
		Severe Medium Mild Mind			Minor
y	High	Very High	High	Moderate	Moderate/Low
robabilit	Likely	High	Moderate	Moderate/low	Low
	Low Likelihood	Moderate	Moderate/low	Low	Very Low
Ē	Unlikely	Moderate/low	Low	Very Low	Very Low

Standard Risk Matrix

Classified Risks and Likely Action

Significance Level	Definition/Comments
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
	Demonstrable contaminated land situation, highest threat & liability level, urgent action recommended.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term. Likely contaminated land situation, risk assessment and action recommended.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, if is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term. Plausible contaminated land situation, risk assessment and possible action recommended.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild. Unlikely contaminated land situation, possible risk assessment and possible action.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe. Negligible risk, no action recommended except vigilance for changes in conditions.





Geotechnical Risk Classification

The geohazards listed in the report within Section 4 follow guidance presented in Clayton, C.R.I. (2001) *Managing Geotechnical Risk*, Thomas Telford and the Highways Agency document CD622 '*Managing Geotechnical Risk*' (2008) which aims to identify and manage the geotechnical risks associated with a scheme throughout its lifespan, from planning to construction to maintenance.

For each geohazard the probability of the hazard occurring (P) has been considered together with the impact it would have (I) if it were to happen to calculate the risk rating between 1 and 25.

Risks that fall within Moderate, Significant and Severe categories below are considered to be *substantial* and are therefore listed within the report.

Probability	(P)	
Very Likely (VLk)	5	
Likely (Lk)	4	X
Plausible (P)	3	
Unlikely (U)	2	
Very Unlikely (VU)	1	

Impact	(I)	
Very High (VH)	5	
High (H)	4	
Medium (M)	3	
Low (L)	2	
Very Low (VL)	1	

(R)	Risk
20 - 25	Severe
15 - 19	Substantial
10 - 14	Moderate
5 - 9	Minor
1 - 4	Negligible





Appendix D - Site Photographs





Site Photographs



Photograph 2 - Access along the track on the northern portion of the Site







Photograph 4 - Eastern portion of the Site, looking south-west







Photograph 6 - Relict structures considered to relate to a former water tank in the easternmost field







Photograph 8 - Looking north-west towards new development across A361





Appendix E - Historical Mapping





Historical Mapping Legends

Ordnance Survey County Series 1:10,560	Ordnance Survey Plan 1:10,000	1:10,000 Raster Mapping
Gravel Sand Other Pit Pit Pit Pits	مرتب Chalk Pit, Clay Pit ومرتب Gravel Pit در Chalk Pit, Clay Pit در Gravel Pit در Chalk Pit	Gravel Pit Gravel Pit or slag heap
Orchard Shingle	Sand Pit Disused Pit	Rock (scattered)
Reeds Marsh	Kefuse or Lake, Loch	ີູ້້ໍ້ຈີ Boulders Boulders ເວັ້າ (scattered)
A 2 5	Dunes 200 Boulders	Shingle Mud Mud
Mixed Wood Deciduous Brushwood	ネ Coniferous A Non-Coniferous	Sand Sand (
		Top of cliff
Fir Furze Rough Pasture	ே Coppice பில_ Scrub புர Coppice ரிரி Bracken பிலு Heath பிர , Rough ரி Grassland	General detail — — — — Underground detail — — — Overhead detail — — — — Narrow gauge railway Multi-track
Arrow denotes Arrow denotes Trigonometrical flow of water Station	<u> معنا</u> د Marsh ،،،∖Y/،، Reeds <u>معنا</u> د Saltings	railway Civil, parish er
🕂 Site of Antiquities 🔹 🛧 Bench Mark	Direction of Flow of Water Building	County boundary County boundary Community Condary District Unitory
Pump, Guide Post, Well, Spring, Signal Post Boundary Post • 285 Surface Level	Glasshouse Sand	Metropolitan, Constituency London Borough boundary boundary
Sketched Instrumental Contour Contour	Pylon —— □ — — Electricity Transmission Pole Line	Area of wooded vegetation Area of vegetation Area of v
Main Roads Un-Fenced Un-Fenced Un-Fenced Un-Fenced	Cutting Embankment Standard Gauge	Coniferous Coni
Sunken Road	Road '' ' Road Level Foot Under Over Crossing Bridge	수 Orchard 《 Coppice 수 수 Orchard 《 Coppice 수 수
Railway over	Siding, Tarriway or Mineral Line Narrow Gauge	ளம் Rough லம் Grassland லயம் Heath
Railway over Road Level Crossing	Geographical County	∩ Scrub
Road over River or Canal Stream	— — — — — Administrative County, County Borough or County of City Municipal Borough, Urban or Rural District,	Water feature Elow arrows
Road over Stream	Burgh or District Council Borough, Burgh or County Constituency Shown only when not coincident with other boundaries	MHW(S) Mean high Mean low water (springs) water (springs)
————— County Boundary (Geographical)	Civil Parish Shown alternately when coincidence of boundaries occurs	Telephone line (where shown)
- · - · - · County & Civil Parish Boundary	BP, BS Boundary Post or Stone Pol Sta Police Station	(with poles) ← Bench mark Triangulation BM 123.45 m (where shown) △ station
Co. Boro. Bdy.	Ch Church PO Post Office CH Club House PC Public Convenience F E Sta Fire Engine Station PH Public House	Point feature Pylon, flare stack • (e.g. Guide Post ⊠ or lighting toward
Co. Burgh Bdy.	FB Foot Bridge SB Signal Box Fn Fountain Spr Spring	or Mile Stone)
RD. Bdy. Rural District Boundary	GP Guide Post TCB Telephone Call Box MP Mile Post TCP Telephone Call Post MS Mile Stone W Well	General Building
		Building

DeltaSimons

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Northamptonshire	1:10,560	1883 - 1884	2
Oxfordshire	1:10,560	1885	3
Oxfordshire	1:10,560	1900	4
Northamptonshire	1:10,560	1923	5
Northamptonshire	1:10,560	1938	6
Historical Aerial Photography	1:10,560	1948	7
Ordnance Survey Plan	1:10,000	1955	8
Ordnance Survey Plan	1:10,000	1968	9
Ordnance Survey Plan	1:10,000	1978	10
Ordnance Survey Plan	1:10,000	1994	11
10K Raster Mapping	1:10,000	1999	12
10K Raster Mapping	1:10,000	2006	13
VectorMap Local	1:10,000	2021	14

Historical Map - Slice A



Order Details

Order Number: Customer Ref: National Grid Reference: 447380, 241830 Slice: Site Area (Ha): Search Buffer (m):

293743707_1_1 21-2141.02 Α 73.45 1000

Site Details

Land off Junction 11 of M40, BANBURY, OX16 3AD



Tel: Fax: Web:

0844 844 9952 0844 844 9951 www.envirocheck.co.uk







