Preliminary Geo-Environmental Risk Assessment

Banbury 200, Southam Road, Banbury OX16 3AE

Presented to **Lysander**

Issued: January 2021

Delta-Simons Project No. 20-1787.02

Delta-Simons Environmental Consultants
Head Office: 3 Henley Office Park, Doddington Road, Lincoln, LN6 3QR
Tel: 0870 0400 012 | www.deltasimons.com

Report Details

Client	Lysander
Report Title	Preliminary Geo-Environmental Risk Assessment
Site Address	Banbury 200, Southam Road, Banbury, OX16 3AE
Project No.	20-1787.02
Delta-Simons Contact	Martina Young (martina.young@deltasimons.com)

Quality Assurance

Issue No.	Status	Issue Date	Comments	Author	Technical Review	Authorised
2	**Final**	**28/01/2021**	**Proposed development description confirmed**	[redacted]	[redacted]	[redacted]
				David Pacheco Consultant	**Martina Young Principal**	**Paul Bennett Unit Director**

About us

Delta-Simons is a trusted, multidisciplinary environmental consultancy, focused on delivering the best possible project outcomes for customers.

Specialising in Environment, Health & Safety and Sustainability, Delta-Simons provide support and advice within the property development, asset management, corporate and industrial markets. Operating from ten locations - Lincoln, Birmingham, Bristol, Dublin, Leeds, London, Manchester, Newcastle, Norwich and Nottingham - we employ over 100 environmental professionals, bringing experience from across the private consultancy and public sector markets.

Delta-Simons is proud to be a founder member of the Inogen® Environmental Alliance, a global corporation providing multinational organisations with consistent, high quality and cost effective environmental, health, safety, energy and sustainability solutions. Inogen assists multinational clients by resolving liabilities from the past, addressing today's requirements and delivering solutions for the future. With more than 200 offices located on every continent, more than 6,430 staff worldwide, and projects completed in more than 120 countries, Inogen provides a single point of contact for diverse markets as Automotive, Chemical, Consumer Products & Retail, Financial, Food & Beverage, Healthcare, Insurance, Manufacturing, Non Profit Organisations, Oil & Gas, Real Estate, Services Firms, Technology and Transportation, among others.

Executive Summary

Brief	Delta-Simons was instructed by Lysander to prepare a Preliminary Geo-Environmental Risk Assessment for Banbury 200, Southam Road, Banbury, OX16 3AE. The Site is proposed for the storage of operational vehicles, elevational alterations, associated parking, vehicle barriers and associated infrastructure. Demolition of the existing building is not proposed as part of the redevelopment.
Site Use & Surrounding Area	The Site currently comprises a building understood to contain two warehouse areas separated by a brick wall with external areas surfaced with a combination of tarmac and concrete-hardstanding. External areas are currently in use for van storage. The Site is located within a commercial area along Southam Road approximately 1.8 km to the south-west of the M40 motorway.
Environmental Setting	The Site is likely underlain by a sequence of Made Ground with possible localised superficial strata (Alluvium/River Terrace Deposits – Secondary A Aquifers) underlain by bedrock of the Charmouth Mudstone Formation (Secondary Undifferentiated strata). Bird Brook is located adjacent to the northern boundary of the Site flowing to the east where it feeds into the River Cherwell.
Contamination Potential Sources	The Site is shown from the earliest map (dated 1882) to comprise agricultural land, until 1965 when a food processing plant was constructed. It is understood that that former occupants of the Site include Kraft and most recently JDE (coffee manufacturers) until circa 2018. Potential sources of contamination associated with the Site relate to the former use as a food processing plant and the presence of AST/UST and infrastructure associated with the most recent Site use. Potential sources of contamination and ground gas have been identified within the surrounding area of the Site, including previous and current industrial land uses and associated IPPCs, discharge consents adjacent the northern Site boundary and infilled ground within close proximity to the Site.
Contaminated Land Risk Associated with Ownership	There is considered to be a **Low** risk of enforcement action by the regulatory authorities under Part 2A of the Environmental Protection Act, the Water Resources Act or the Environmental Damage Regulations, whilst the Site remains in its current commercial use. The potential for legal action by surrounding landowners / Third Parties based on the potential for contamination to migrate off-Site (ongoing or historically) is considered to be **Low**.
Recommendations and Development Considerations	The current building is not proposed for demolition; therefore, ground investigation is not considered to be required unless to support design of ancillary buildings and changes to the ground surface appropriate to the proposed Site use. As a conservative approach, gas protection measures should be incorporated into all new buildings constructed at the Site. The design and construction of any ancillary structures and infrastructure should take account of the potential geo-hazards identified comprising the likely presence of Made Ground, possible shrinking/swelling clays, compressible soils, shallow groundwater, buried services and potential presence of underground fuel tanks and other obstructions. In addition to this, a retaining wall is located along much of the southern boundary. Any identified underground fuel storage tanks/infrastructure should be appropriately decommissioned and removed together with any hydrocarbon impacted

	soil/groundwater and would require validation by an independent engineer and submission of a validation report to the relevant regulators for approval. A 'hotspot' protocol should be in place during the redevelopment for ground workers to act upon should suspected contamination be identified. The use of PPE and robust health and safety measures by construction workers should mitigate the risk from contaminants in Made Ground. Suitable clean material should be obtained and used as a growing medium in additional landscaped areas. Aggressive ground chemistry may attack buried concrete and therefore, there may be a requirement for upgraded concrete to be used. In the event of a change in Site use or layout, ground investigation is recommended to assess the potential for contamination and ground gases to impact on the proposed development. The investigation will also refine the Site-specific ground model and groundwater regime and enable an assessment of foundation and engineering solutions to be made.
This is intended as a summary only. Further detail and the limitations of the assessment is provided within the main body of the Report.	

Table of Contents

Figures

Appendices

1.0 Introduction

1.1 Appointment

Delta-Simons Environmental Consultants Limited ("Delta-Simons") was instructed by Lysander (the "Client") to prepare a Preliminary (Geo-Environmental) Risk Assessment for land at Banbury 200, Southam Road, Banbury OX16 3AE (the "Site").

1.2 Context & Purpose

The Site is proposed for the storage of operational vehicles, elevational alterations, associated parking, vehicle barriers and associated infrastructure. Demolition of the existing building is not proposed as part of the redevelopment.

The aim of this report is therefore to support the submission of a planning application for the proposed development. 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 2019 (NPPF) (paragraphs 170 & 178-180)[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;
- Complete a Site reconnaissance by undertaking a visual inspection of readily accessible areas of the Site;
- Review of provided relevant third party reports relating to the Site or surrounding area;
- Develop an outline Conceptual Site Model and undertake a Preliminary Risk Assessment with respect to potential contamination focused on the proposed land use;
- Identify potential contamination risks and/or liabilities associated with the proposed redevelopment of the Site; and
- Provide commentary on potential land contamination and geotechnical constraints in the context of the proposed development.

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. 262692758_1_1, dated October 2020);
- Historical Maps included as part of the Envirocheck® Report;
- Information provided by Cherwell District Council and Oxfordshire County Council;

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf
[2] https://www.gov.uk/guidance/land-affected-by-contamination

- Ground Stability and Phase 1 Contaminated Land Desk Study (Ref: 26004/006) by Peter Brett Associates LLP, dated March 2012;
- Ground Conditions Desk Study (Ref: R/161279/001) by Hydrock, dated April 2016;
- Ground Investigation (Ref: R/161279/002) by Hydrock, dated July 2016;
- High level Peer Review of Selected Third-Party Information (70038703/TA/Final) by WSP, dated October 2017;
- Tank Investigation (Ref: 70041591) by WSP, dated January 2018;
- Pre-Construction Phase CDM Information Record and Client Requirements by RPS (undated); and
- Post Contract Health and Safety Information File for the Demolition Works (Ref: C11281) by DSM dated February 2019.

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 Consultant undertaking the Site inspection will observe for evidence of invasive species, particularly Japanese Knotweed. It should be noted however that the Consultant is not a trained ecologist and a separate survey undertaken by an experienced Ecologist should be completed to provide a robust assessment;
- 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 Building Control;
- A commentary has been provided regarding existing Site services in the context of assessing environmental and geotechnical issues, however a detailed review of all overhead or underground services is outside the scope of this assessment;
- Access was not permitted inside the existing warehouse building during the Site walkover survey; therefore, commentary is limited to external areas of the Site only; and
- Information provided by the Local Petroleum Officer for Oxfordshire County Council outlined the potential presence of underground fuel storage tanks in the south-west of the Site. However, it is unclear if the tanks remain on Site or whether they have been decommissioned and/or removed.

2.0 Site Context & Data Review

2.1 Site information

Co-ordinates	Centred approximately at National Grid Reference 445160, 241420.	**Elevation**	99 – 100 m AOD
		Area	3.78 Ha
Site Location	Land at Banbury 200, Southam Road, Banbury, OX16 2QU, UK. The Site is located in northern Banbury, approximately 790 m from the town centre. Oxford is approximately 36 km to the south. The Site is located within a commercial area along Southam Road approximately 1.8 km to the south-west of the M40 motorway. A Site location map is included as Figure 1.		
Current Site Use	The Site currently comprises a building understood to contain two warehouse areas separated by a brick wall with external areas surfaced with a combination of tarmac and concrete-hardstanding. External areas are currently in use for van storage. It is understood that the Site was most recently occupied until circa 2018 by Jacobs Douwe Egberts (JDE) – a coffee manufacturer as part of the wider JDE factory Site which lies to the north of the subject Site. The Site was historically occupied from the mid-1960s by Kraft (food processing plant). A Site Constraints Plan is included as Figure 2.		
Proposed Development Description	The Site is proposed for the storage of operational vehicles, elevational alterations, associated parking, vehicle barriers and associated infrastructure. Demolition of the existing build is not proposed as part of the redevelopment. Reference should be made to finalised drawings submitted as part of the planning pack.		
Site Reconnaissance	Delta-Simons conducted a Site visit on 11th January 2021. A series of Site photographs are presented as Appendix B and a Constraints Plan as Figure 2. Pertinent information that was observed or reported on-Site is summarised as follows: ▲ The Site was a broadly rectangular shaped parcel of land located to the north of Banbury town centre. Vehicle access was gained in the south-east of the Site via an access road in the south east leading off Southam Road. This entrance was secured by large, metal lockable gates. A second locked access point was observed in the north-west leading from Ruscote Avenue. Site levels were generally flat-lying with the Site boundaries comprising a combination of metal and wooden fencing with a vegetated earth mound in the south (Photos 1-3); ▲ The majority of the Site was occupied by a metal framed warehouse building covering approximately 18,000 m^2 with 20 No. Heavy Goods Vehicle (HGV) loading bays along the southern elevation of the building. Access inside the warehouse building was not permitted at the time of the walkover (Photos 4-5); ▲ An area of car parking laid to asphalt hardstanding was noted in the east and south east of the Site. The surfacing was observed to be in good condition with no evidence of wear or repair. A small electrical substation was present adjacent to the north-eastern Site boundary enclosed by wooden fencing. Access to the substation was gained via the adjacent Waitrose (Photos 6-7); ▲ An asphalt access path led around the outside of the warehouse along the northern Site boundary. A retaining wall was observed spanning a large proportion of the northern Site boundary where levels associated the adjacent		

	plot to the north were noted to be approximately 500 mm higher than the subject Site peaking towards the centre of the boundary (Photos 8-9); ▲ A concrete hardstanding access road spanned the entire of the western Site boundary leading to metal access gates in the north-western corner. The gate was locked at the time of the visit. The concrete in this part of the Site was observed to in fair condition with some evidence of cracking and repair particularly in the north western corner (Photo 10); ▲ A surface water course (Bird Brook) was noted in close proximity to the north-western corner of the Site flowing in a north-west to south east direction. The water was observed to be cloudy and water was observed to be discharging into water course from the bank on the northern side. It was not possible to determine if this was via a pipe or directly from the ground. The watercourse appeared to be culverted under the access road off-Site to the north (Photos 11-12); ▲ A small brick structure and an old bike storage area were observed off-Site along the western Site boundary. It is unknown if these structures were formerly part of the subject Site (Photos 13-14). Locked metal gates were present to the south-west of the bike storage area that appeared to lead off-Site to a large concrete hardstanding parking area approximately 1.5 to 2.5 m higher than the subject Site increasing towards the south-west corner. A retaining earth bank spanned this section of the Site boundary (Photo 15); ▲ The south of the Site comprised a concrete hardstanding yard currently in use for van storage and distribution purposes. The concrete was noted to be good condition with no evidence of cracking, wear or repair (Photo 16). Air conditioning units were present adjacent to the warehouse atop of a concrete plinth. Drainage covers indicating a potential interceptor were observed to the north-west of the loading bays (Photo 17). The vegetated earth bank continued to span the south-western section of the boundary where it connected with a large, vegetated mound in the southern extent of the Site. A soft landscaped area formed the south-eastern extent of the Site boundary (Photos 18-21); ▲ An electricity substation, operated by Midlands Power Network, was present in the south of the Site (Photo 22); ▲ A temporary security cabin was present in the south west, close to the Site entrance, with a generator and associated diesel fuel tank (Photos 23-24); ▲ A large metal tank, assumed to be a sprinkler tank, was noted adjacent to the south-western Site boundary associated with the neighbouring Waitrose Site (Photo 25); ▲ It is understood that underground fuel storage tanks (USTs) may be present beneath the south-western part of the Site. However, no evidence of tanks/interceptors/pipework was evident in the external areas in the south-west during the recent Site walkover. It appeared that concrete surfacing had been recently laid in this area. Internal inspection was not undertaken as access could not be gained inside the warehouse; and ▲ No visual or olfactory evidence of significant contamination or asbestos containing materials (ACM) was observed during the walkover.
	The Made Ground at surface represents a potential source of contamination together with localised sources including the tanks (AST and UST) and a potential interceptor and an on-Site electrical substation. There is also potential for sub-surface contamination associated with the Site's former use as a food processing/manufacturing plant.

Current Surrounding Area	**North**	The wider JDE site lies immediately to the north and north-east of the Site with associated tanks and chimneys with further industrial/commercial land uses and a petrol filling station (PFS) beyond.
	East	Waitrose food store beyond which is Southam Road and a combination of industrial land uses and Spiceball Country Park.
	South	Banbury Cemetery with residential housing beyond.
	West	Soft landscaping and car parking bordering onto Ruscote Avenue with residential housing and a retail park beyond.
	Potential off-Site sources of contamination include the wider JDE site to the north, the PFS and the industrial land uses to the east and west of the Site.	

2.2 Environmental Setting

Published Geology	From British Geological Survey (BGS) geological mapping data, the Site is anticipated to be directly underlain by the Charmouth Mudstone Formation (recorded as clay at shallow depths). A thickness of Made Ground is anticipated from surface.
Specific Ground Conditions	There are no BGS recorded boreholes on the Site. The nearest borehole is, located approximately 10 m to the east of the Site (ref SP44SE400, dated February 1989) The geology encountered comprised the following generalised sequence: ▲ Firm dark orange/brown silty clay with rootlets, black organic material and gravel fragments to a depth of 3.0 m below ground level (bgl) interpreted as Superficial Deposits; ▲ Very stiff, blue grey fissured silty clay with occasional fine gravel with occasional shell debris and mudstone fragments to a depth of 7.0 m bgl (maximum depth of the investigation) interpreted as Lower Lias Clay; and ▲ Groundwater was encountered at 2.85 m bgl. A ground investigation conducted by Hydrock (ref: R/161279/002, dated July 2016) was undertaken across the wider JDE site (including the subject Site and land to the north). The recorded ground conditions are summarised as follows: ▲ Topsoil to depths of between 0.3 and 0.4 m bgl; ▲ Made Ground (surface asphalt/concrete hardstanding) overlying sandy gravel or clay comprising flint, concrete, ironstone, sandstone to depths of between 0.3 and 2.6 m bgl; ▲ Alluvium, present beneath the north, south and east of the subject Site comprising soft to firm greenish grey slightly sandy clay with some rootlets and a mild organic odour to depths of between 1.2 and 4.6 m bgl; ▲ River Terrace Deposits comprising loose to medium dense orange clayey gravel or firm (occasionally soft) gravelly clay of sandstone, ironstone and flint to depths between 0.9 to 8.0 m bgl; ▲ Charmouth Mudstone Formation comprising stiff grey thinly laminated clay grading into a very weak thinly laminated grey mudstone with some shell fragments and bands of limestone to a maximum proven depth of approximately 20.14 m bgl (maximum depth of investigation); and

	▲ Groundwater was struck between 0.9 and 5.0 m bgl during the investigation and subsequently monitored as depths of between 0.36 and 3.76 m bgl during the post works monitoring.
Hydrogeology	The Environment Agency (EA) classify the bedrock (Charmouth Mudstone Formation) as a Secondary Undifferentiated Aquifer. Ground conditions recorded from the BGS borehole and the Hydrock ground investigation recorded superficial stratum of Alluvium and River Terrace Deposits locally beneath the Site that would be classified by the EA as Secondary 'A' aquifers. According to the Envirocheck® Report, the Site is located with an area of medium groundwater vulnerability. There is a single groundwater abstraction within 1 km of the Site located approximately 830 m to the north-west. The licence is recorded as revoked/lapsed and was operated by P M & S M Donger for private water supplies (domestic). The Site is not located within a groundwater Source Protection Zone. Previous investigation indicated groundwater to be present at depths of between 0.9 and 5.0 m bgl, although groundwater flow direction was not ascertained. However, in view of the flow direction of a nearby surface watercourse (Bird Brook) which flows towards the River Cherwell to the east, groundwater flow is expected to be in an easterly direction and likely in hydraulic continuity.
Hydrology	The main watercourses in the vicinity of the Site are: ▲ Bird Brook adjacent to the northern boundary of the Site flowing to the east where it feeds into the River Cherwell; ▲ Oxford Canal approximately 350 m to the east of the Site; ▲ River Cherwell approximately 500 m to the east of the Site flowing south; and ▲ Grimsbury Reservoir approximately 610 m to the north-east of the Site. River quality data for the Oxford Canal, monitored in 2000 at the Alcan Intake located approximately 330 m to the north-east, was classified as General Quality Assessment Grade D - poor. According to the Envirocheck® Report, there are no licensed abstraction records from surface water located within 500 m of the Site. The EA classify the majority of the Site as either a medium or high risk from surface water flooding with areas in the north and west classified as low or very low risk. The Site is not at risk of flooding from rivers or the sea and no flood defences, areas benefitting from defences or water storage areas are noted on-Site or in the local area.
Unexploded Ordnance (UXO)	A review of freely available Zetica UXO risk maps indicates that the Site is within a low-risk area from UXO associated with bombing during WWII.
Coal Mining	Reference to the Coal Authority on-line viewer indicates that the Site is not with a Coal Mining Reporting Area, and is not within a Development High Risk Area. Consequently, a Coal Mining Risk Assessment (CMRA) is unlikely to be required under the planning regime.
Radon Gas	The Site lies within an intermediate probability radon area where 1 to 3 % of homes are above the Public Health England recommended "action level" for radon. The Envirocheck Report® indicates that no radon protective measures are necessary in the construction of new buildings at the Site.
Ecological Receptors	It is understood from information provided within the Envirocheck® Report, there are no statutory ecological receptors located within 1 km of the Site.

	The Site is located within the 'Cherwell (Ray to Thames) and Woodeaton Brook' Nitrate Vulnerable Zone.
Heritage Interest	According to Historic England (historicengland.org.uk), the nearest area of heritage interest is located approximately 480 m to the south of the Site associated with a Grade II Listed Building (Orchard House (Health Centre)).
Environmental Sensitivity	The Site is considered to be of a low to moderate environmental sensitivity given the presence of the underlying Secondary Undifferentiated Aquifer, Bird Brook in close proximity to the north to the Site, the absence of any ecological receptors and the commercial/industrial use of the Site and surrounding area.

2.3 Historical Use of the Site & Surrounding Area

Approach	The historical development of the Site and surrounding area has been assessed through a review of available historical OS maps and available online historical satellite imagery. A summary of the key historical Site uses and developments in the surrounding area is presented below. Copies of pertinent historical maps are included as Appendix C.
Historical Features On-Site	From the earliest available mapping records dated 1882, the Site appears to have comprised agricultural land until circa 1965, when a food processing plant and associated car parking was constructed. By the mid 1980's, the building was extended to the north-west and mapped as a factory with a small rectangular structure constructed in the south-east (understood to be have been a pump house and electrical substation). In addition, a structure was shown to the south of the factory, which was later indicated to be an above ground tank in aerial imagery from 1999. The above ground tank was no longer mapped by 2006. The Site appears to have remained largely unchanged since 2006. Potential sources of contamination on Site include: ▲ Previous use as a food processing plant/factory; ▲ Former above ground storage tank in the southern part of the Site; ▲ Electrical substation located in the south-eastern area of the Site; ▲ Made Ground associated with the development of the Site; and ▲ Potential presence of asbestos containing materials (ACM) within the existing building fabric.
Potentially Contaminative Historical Features Off-Site	Potential sources of contamination within 500 m of the Site include: ▲ The wider food processing plant/factory with recorded tanks to the north of the Site shown from 1965 until the present day; ▲ Factory and works with various tanks, chimneys and substations located approximately 100 m and 150 m to the north-west of the Site shown from 1965 until the present day; ▲ An engineering works located approximately 120 m east of the Site shown from 1965 to 1978; ▲ An unspecified works with associated tanks located approximately 160 m east of the Site shown from 1965 to 1978; ▲ Two garages approximately 80 m east and 185 m north-east of the Site shown from 1978 to 1993; ▲ Depot approximately 10 m south of the Site shown from 1978 to 2006;

	▲ Depot approximately 140 m south-east of the Site shown from 1978 to 1993 (later mapped as a garage); and ▲ A printing works and clothing factory 130 m and 160 m to the south-east of the Site respectively shown from 1965 to 1993 (printing works later mapped as Works between 1978 and 1993).

2.4 Environmental Database Review

Approach	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. A full copy of the Envirocheck® Report is provided in Appendix D and the most relevant information is summarised below.
Features On-Site	There are two 'Points of Interest – Manufacturing and Production' for the Site associated with 'unspecified works or factories'. These are assumed to be associated with the former on-Site food processing plant understood to be operated by Kraft (for coffee production).
Potentially Contaminative Features Off-Site	Pertinent entries included within 100 m the Landmark Envirocheck® Report include: ▲ Multiple discharge consents in the surrounding area of the Site, the closest being between 5 m and 10 m to the north/north-east of the Site for trade effluent discharges attached to the wider Jacobs Douwe Egberts Site. The most recent of the consents was dated 4th September 2000. Several consents relating to General Foods/Kraft Foods (the previous occupants of the Site) were recorded approximately 10 m to the north-east of the Site for trade effluent, surface water and cooling water discharges with the most recent consent revoked in August 2000. Further discharge consents within the wider surroundings are those to Alfred Bird & Sons Ltd approximately 50 m to the north-east of the Site for trade cooling discharges noted as revoked in December 1986 and to Smiths Concrete Ltd approximately 95 m to the south-east of the Site for process water discharges, issued November 1983; ▲ Multiple pollution incidents to controlled waters are recorded within 500 m of the Site. The closest incident is located approximately 30 m to the north-west of the Site regarding an unknown pollutant and occurred on 30th June 1995. The incident was recorded as a Minor Incident. Multiple Significant Incidents have been recorded in the surrounding area, two of which were regarding 'unknown sewage' in 1990 and both located approximately 50 m to the north-east of the Site. One further Category 2 incident occurred in 1989 involving an unknown pollutant approximately 80 m to the south-west of the Site. Given the significant time that has lapsed since these incidents, they are considered unlikely to adversely impact the Site; ▲ Multiple Local Authority Pollution Prevention and Control (LAPPC) permits relating to petrol filling stations, the closest are located approximately 70 m to the south-east and 90 m to the east of the Site (both authorisations are noted as revoked); ▲ One Integrated Pollution Control Permit (IPPC) approximately 100 m to the north-east of the Site (Kraft Foods UK Ltd) for combustion processes within the fuel and power industry. The permit was authorised in February 2000 and, as of October 2009, is now an effective IPPC permit for combustion of waste derived fuel (between 3 and 50 Mw). Two further IPPC's are held by Jacobs Douwe Egberts Ops Gb Ltd and Mondelez UK Production Limited for the incineration of non-hazardous waste in an incineration or co-incineration plant with a capacity exceeding 3 tonnes per hour, noted as effective; ▲ Multiple active and inactive contemporary trade directory entries within the surrounding area, the closest being an active entry to Johnsons Cleaners

	approximately 40 m to the east of the Site for Dry Cleaning (situated within Waitrose). Further entries are associated with car dealers (70 m south-east); and ▲ One entry of potentially infilled land (non-water) approximately 270 m south-west of the Site, mapped in 1995. The fill material is unknown and no further details have been provided. The entry does not appear to coincide with any apparent infilled ground recorded on historical map records. There are no BGS, LA and EA registered landfill sites on or within 500 m of the Site.
Implications for Land Contamination Risk	Potential off-Site sources of contamination have been identified that will be considered in the preliminary risk assessment.

2.5 Planning Review/Regulatory Enquiries

On-line Planning Portal	Cherwell District Council	**Date Accessed**	11/01/2021
Findings	Several applications have been identified for the Site and wider area. The applications pertinent to this assessment are summarised below: ▲ 00/00024/F – 'extension of exhaust to standby electrical generator'. The application was noted as permitted on 28/02/2000. A location plan within the supporting documents of the Site noted the proposed extension to be off Site in the wider Kraft complex to the north. It was noted in the location plan that a fuel station (DERV lubricating oil) was located in the south of the Site and that the northern and eastern halls of the warehouse on Site were used for finished goods. A pump house and substation as well as a truck were observed in the east of the Site. Within the decision notice, no conditions relating to contaminated land were observed. ▲ 05/02370/F – 'Resubmission of application 04/02201/F – Demolition of existing obsolete building and construction of new process building in the same area'. The application was noted as permitted on 20/01/2006. The application related to the Site and the surrounding area in use at the time by Kraft. No conditions relating to contaminated land were observed in the decision notice. ▲ 12/00195/DEM – 'Demolition of two warehouses, link abutting main Kraft building, part demolition of building to the rear of the site, demolition of prefabricated building to the rear right hand corner of the site and demolition of office building to the front'. The application was noted as permitted on 05/03/2012. From a demolition plan in the supporting documents of the application it is understood that the warehouse on Site was one of three buildings highlighted for demolition. The decision notice had no conditions relating to contaminated land however Condition 2 stated that that all materials and rubbish resulting from the demolition and clearance of the site should be removed. 12/00002/SO – noted as a screening opinion of the application 12/00195/DEM (noted as screening opinion not requiring EIA on 01/03/2012). ▲ 12/00329/OUT – Application for the proposed food store of 5574 sqm (60,000sqft) gross floor space and up to 7432 sqm (80,000sqft) gross of non-food retail floor space/ New petrol filling station, new vehicular access and associated highway works at Southam Road and associated car parking, hard and soft landscaping and drainage infrastructure works. The application is noted as withdrawn on 18/06/2015.		

	▲ 12.00009/SO – screening opinion for application 12/00329/OUT (noted as screening opinion not requiring EIA on 01/03/2012). ▲ 18/00055/SO – screening opinion for change of use of premises from B8 to B1c/B2/B8, including internal and external alterations, demolition of ancillary structures and new access to Southam Road. The application was decided on 16/08/2018 and a screening opinion was noted as not required. ▲ 18/01246/F – application for the change of use of premises from Class B8 to B1c/B2/B8, including internal and external alterations, demolition of ancillary structures and new access to Southam Road. The application was decided on 20/12/2018. The decision notice held conditions relating to drainage but none regarding contaminated land. Several decision notices relating to 18/01246/F were noted, these being non-material amendments, discharge and variation of conditions. ▲ 19/00105/DISC – discharge of conditions 4 (car parking and cycle parking detail), 5 (pedestrian walkway), 7 (drainage) and 8 (EV charging points). The application for discharge of conditions was confirmed on 13/05/2019. Copies of the consents are reproduced as Appendix E.
Part 2A of the Environmental Protection Act (EPA) 1990	Delta-Simons contacted Cherwell District Council's Contaminated Land Officer (CLO) on 22nd October 2020 to obtain details of the Site's current status with respect to Part 2A of the Environmental Protection Act (EPA) 1990 and other pertinent regulatory information relating to the subject property. A response was received on 10th November 2020, stating that the Site has not been determined as 'contaminated land' under Part 2A of the EPA 1990 or as part of Cherwell Council's Contaminated Land Inspection Strategy, and the Council have no evidence to suggest the land underlying the Site is contaminated. Relevant correspondence is included within Appendix F.
Trading Standards Service – Oxfordshire County Council	The Local Petroleum Officer (part of the Trading Standards for Oxfordshire County Council) was contacted regarding the presence of underground fuel storage tanks at the Site. Pertinent information is summarised below: ▲ Two tanks (petrol and diesel) were installed in the south-eastern area of the Site, referenced Tank 1 and Tank 2. Each tank had a 3,000 gallon capacity and were of single skin steel construction; ▲ Both tanks were reportedly installed in 1972, and both were converted to store diesel in April 1992, effectively decommissioning the tanks from a petroleum licence perspective. The final petroleum licence shows a capacity of 27,276 litres of petrol; ▲ A hand drawn plan from 1975 shows an interceptor and pumps installed next to the southern face of the building apparently under the roof. In 1983 a traffic service area was created away from the building with pipework from the existing tanks and a new interceptor installed. A plan shows the use of changeover chambers, which indicates that both tanks were twin compartments, possibly of 1500 gallons each; ▲ No records of any fuel leakages or tank integrity failures were provided from the Local Authority to Delta Simons; ▲ No information relating to decommissioning or removal of the tanks was available, therefore the status of the tanks is currently unknown; and ▲ The Local Authority reported that they hold no records of any other tanks that may have been on-Site (e.g. diesel or heating oil). A plan indicating the locations of the underground fuel storage tanks is included in Appendix F.

2.6 Previous Reports

List of Reports	Delta-Simons has been provided with the following reports relating to the Site: ▲ Peter Brett Associates LLP Ground Stability and Phase 1 Contaminated Land Desk Study (Ref: 26004/006) dated March 2012; ▲ Hydrock Ground Conditions Desk Study (Ref: R/161279/001) dated April 2016; ▲ Hydrock Ground Investigation (Ref: R/161279/002) dated July 2016; ▲ WSP High level Peer Review of Selected Third-Party Information (70038703/TA/Final), dated October 2017; ▲ WSP Tank Investigation (Ref: 10954) dated January 2018; ▲ Pre-Construction Phase CDM Information Record and Client Requirements by RPS (undated); and ▲ Post Contract Health and Safety Information File for the Demolition Works (Ref: C11281) by DSM dated February 2019. Copies of the reports are provided in Appendix G.
Key Findings - Summary of Ground Stability and Phase 1 Contaminated Land Desk Study by Peter Brett Associates LLP	The desk study was written to support a planning application for the proposed Southam Road Retail Park. The desk study area covers the Site and an additional area to the east which is currently a Waitrose supermarket with associated car parking and hardstanding areas. Information within the desk study has been superseded by information within this report. Information further to this report is as follows: ▲ At the time of reporting the Site was occupied by Kraft Foods and comprised a warehouse unit with temporary office building, gas and electricity outbuildings, truck wash and truck parking areas, access routes and areas of open ground. With respect to ground stability, the report noted: ▲ A potential risk to the Site from possible adverse foundation conditions – hazards associated with ground in areas of deep made ground and superficial deposits (possible alluvium), possible shrinking or swelling hazards associated with clay soils and potential obstructions associated with former warehouse foundations; and ▲ A potential risk from unstable slopes – existing cut slopes along the south-western Site boundary. The report noted that there was no visual evidence of slope instability although any alteration that may occur to slope profiles would require consideration. Photographic evidence from the Site walkover detailed a truck wash and the location of possibly decommissioned underground fuel storage tanks. Contained within the report appendices was an ‘Interpretive report on ground investigation for new evaporates at Kraft Foods’ (Ref: 25186/01) by Geotechnical Engineering Ltd, dated March 2011. The intrusive investigation was undertaken in February 2011 and comprised a single exploratory location advanced using dynamic sampling drilling techniques with rotary core follow on to 9.0 m bgl. A location plan of the borehole was not included within the appendix of the report, it is therefore unknown if the borehole was on Site. Gas monitoring visits were noted to have taken place on three occasions after initial monitoring was carried out (4th, 11th and 18th March 2011). On all occasions, methane was not recorded above the detection limit of < 0.1% by volume. Carbon dioxide levels ranged between 0.3 % and 1.3 % v/v and concentrations of oxygen between 5.0 % and 20.1 %. It was also noted that minimal gas flow rates were detected with a maximum rate of 0.4 l/hr, with all visits occurring at times of high atmospheric pressure (>1000mb). The gas conditions were considered representative of CIRIA Characteristic Situation 1 (CS1).

<table>
<tr><td></td><td>Laboratory contaminant testing was carried out however the copy of the associated appendix is not clear. It was noted in the written section of the report that no exceedances of the adopted Generic Assessment Criteria (GAC) were noted. In addition, no obvious visual or olfactory evidence of contamination was discovered, and the report concluded that no specific remedial requirements were identified as a result of the investigation.</td></tr>
<tr><td>Key Findings – Ground Conditions Desk Study by Hydrock</td><td>Hydrock undertook a desk study for the Site and wider area to the west (development area recorded as 6.10 hectares) in April 2016.

At the time of reporting, the land was noted to be in use as part of the existing Kraft factory with a lorry park and wash in the west. The proposed development of the Site was to be commercial/ industrial although no specific plan had been provided to Hydrock at the time. A walkover of the Site was done in April 2016, a description of the Site was provided however the photolog was not available.

Information within this report has been superseded by the current report.</td></tr>
<tr><td>Key Findings – Ground Investigation by Hydrock</td><td>The Hydrock ground investigation is understood to be a continuation of the above desk study (covering the wider site area) and comprised:

▲ 4 no. rotary cored boreholes to a maximum depth of 20.14 m bgl. BH01 located on Site;

▲ 26 no. window sampler boreholes to a maximum depth of 5.45 m bgl. WS1 to WS18 located on Site;

▲ 9 no. boreholes were installed with gas/groundwater monitoring standpipes. Of these, 6 no. were noted as being on-Site (WS01, WS03, WS09, WS13, WS14 and WS18);

▲ 6 no. monitoring rounds measuring gas concentrations and groundwater levels;

▲ Chemical analysis of soils and groundwater; and

▲ Geotechnical testing of soils and rocks.

The ground investigation was undertaken between the 26th May and 7th June 2016. During the intrusive works, obstructions were encountered in the Made Ground at two on-Site locations:

▲ WS04 (eastern boundary) at 0.9 m bgl. Terminated on concrete.

▲ WS08 (just left off the Western Hall) at 0.5 m bgl. Terminated in hand pit due to refusal.

Ground investigation results indicated that the Site was classified as being representative of a Characteristic Situation 1 (CS1).

<table>
<tr><th colspan="7">GSV (May – June 2016)</th></tr>
<tr><th></th><th>Max CH4 - steady (%v/v)</th><th>Max CO2 - steady (%v/v)</th><th>O2 – steady (%v/v)</th><th>Max flow rate (l/hr)</th><th>Gas Screening Value (CH4) (l/hr)</th><th>Gas Screening Value (CO 2) (l/hr)</th></tr>
<tr><td>WS1</td><td>0.1</td><td>0.8</td><td>19.4 – 20.9</td><td>0.1</td><td>0.001</td><td>0.0008</td></tr>
<tr><td>WS3</td><td>0.1</td><td>2.6</td><td>15.5 – 19.3</td><td>0.1</td><td>0.001</td><td>0.0026</td></tr>
<tr><td>WS9</td><td>0.1</td><td>0.2</td><td>14.4 – 19.7</td><td>0.1</td><td>0.001</td><td>0.0002</td></tr>
<tr><td>WS13</td><td>0.1</td><td>2.1</td><td>17.9 – 20.8</td><td>0.1</td><td>0.001</td><td>0.0021</td></tr>
<tr><td>WS14</td><td>0.1</td><td>1.6</td><td>18.0 – 19.9</td><td>0.1</td><td>0.001</td><td>0.0016</td></tr>
<tr><td>WS18</td><td>0.1</td><td>1.5</td><td>18.2 – 20.2</td><td>0.1</td><td>0.001</td><td>0.0015</td></tr>
</table>

Asbestos was identified in two of the 38 soil samples analysed (whole development area), one of the samples was on-Site, as follows:</td></tr>
</table>

	<table><tr><th>Location</th><th>Depth (m bgl)</th><th>Material</th><th>Asbestos</th><th>Strata</th><th>Quantification Result (%)</th></tr><tr><td>WS03 (in south of eastern carpark)</td><td>0.60</td><td>Hard / cement type material, loose fibres and insulation lagging</td><td>Chrysotile / Amosite</td><td>Made Ground</td><td>0.076</td></tr></table> Soil samples were tested for a suite of analytes comprising metals, polycyclic aromatic hydrocarbons (PAHs) volatile organic compounds (VOCs), benzene, toluene, ethylbenzene and xylene (BTEX) and total petroleum hydrocarbons (TPH). One TPH exceedance was noted by Hydrock in WS03 (Aliphatic >EC12 – EC16 banding 59 mg/kg vs an adopted GAC or 24mg/kg). VOCs in all samples were noted below the detection limit. However, when compared to the generic assessment criteria adopted by Delta-Simons for a commercial end use, no exceedances were noted. Analysis of 5 no. groundwater samples was undertaken over the whole development area (4 no. were located on-Site). The testing included PAHs, VOCs, BTEX and petroleum hydrocarbons. Concentrations were below detection limits for the aforementioned contaminants in all samples. The geotechnical section of the report summarised that obstructions were encountered at shallow depth in two locations and as such further obstructions should be anticipated. In regard to foundations it was noted that ground improvement and potential foundation deepening may be required with pad or piled foundations in the eastern part of the Site and that suitable dewatering would be required. Hydrock also noted that the construction of a ground bearing floor slab would require the over-excavation and replacement of the Made Ground. Soakaway drainage was not considered suitable for the Site. The report concluded that the footprint of the building had not been fully investigated and that further investigation was recommended.
Key Findings – High Level Peer Review of Selected Third Part Information by WSP	WSP were instructed to perform a high level peer review on third party information relating to the Site. The report reviewed information from the following sources and from the Cherwell District Council planning portal: ▲ Peter Brett Associates – Flood Risk Assessment, March 2012; ▲ Hydrock – Ground Conditions Desk Study, April 2016; and); and ▲ Hydrock – Ground Investigation, July 2016. Information pertinent to this report includes that the historic fuel station shown centrally in the south of the Site (former refuelling area) from historic plans was not targeted by the Hydrock ground investigation, however whilst hydrocarbon contamination in the area cannot be discounted, laboratory test results suggest that there is no significant fuel release / hydrocarbon contamination in the area. The report stated that until otherwise stated, the potential for underground diesel storage tanks (USTs) and associated infrastructure in addition to hydrocarbon ground contamination, could not be discounted. The review concluded that WSP considered the Site to be low / medium risk with respect to potential contamination land liabilities due to the uncertainty over the former refuelling infrastructure.
Key Findings – Tank Investigation by WSP	WSP were commissioned by Paloma Capital LLP to undertake a Site investigation of a 0.1-hectare sized area located in the south-west of the Site following a WSP peer review of the previous RPS reports. At the time of reporting the area was noted to be disused and comprised hardstanding and a grassed embankment with an access path. The investigation comprised four boreholes (WS202, WS203, WS205 and WS207) advanced to a maximum depth of 5.0 m bgl on 30th November 2017.The reporting area was found to be underlain by granular and cohesive Made Ground over superficial river Terrace Deposits and Alluvium, with the mudstone bedrock encountered at

approximately 4.2 m bgl. Groundwater was noted within the Made Ground or River Terrace Deposits at depths between 1.26 m and 2.05 m bgl and was inferred to flow east consistent with topography. The investigation did not identify the presence of non-aqueous phase hydrocarbons in the ground or resting on the groundwater beneath the site. Visual and olfactory evidence of hydrocarbon contamination was noted in arising from two locations, as follows:

- WS203 – 1.0 - 1.5 m bgl: Slight black hydrocarbon staining and moderate hydrocarbon odour (field screening of the soil using a PID recorded 1 ppm); and
- WS205 – 2.0 - 2.5 m bgl: Slight hydrocarbon odour (PID reading < 1 ppm).

Soil and groundwater samples were tested for a range of analytes as summarised below:

Determinand	No. soil samples analysed	No. of groundwater samples analysed
Total Petroleum Hydrocarbon Criteria Working Group (TPH CWG) and Benzene, Toluene, Ethylbenzene and Xylene (BTEX)	8	3
Heavy metals	8	3
Hexavalent Chromium	8	3
16 Speciated Polyaromatic Hydrocarbons (PAHs)	8	3
Semi-volatile organic compounds (SVOCs)	2	2
Volatile Organic Compounds (VOCs)	2	2
pH	9	3
Soil Organic Matter	10	N/A
Asbestos Fibre Screen	8	N/A

Soil Testing Results

Soil analysis highlighted the presence of low concentrations of petroleum hydrocarbons in all of the samples with total petroleum hydrocarbons (TPH) reported between 0.92 mg/kg (WS205 at 3.5 – 3.7 m bgl) and 156 mg/kg (WS203 at 1.0 – 1.3 m bgl). The hydrocarbons detected were predominantly the heavier-end compounds (C12 and above), with only trace concentrations or below the laboratory limit of detection (LOD) for the lighter C5 to C12 compounds in the majority of samples tested.

Of the eight samples that were tested for Polycyclic Aromatic Hydrocarbons (PAHs), only one sample (WS205) returned results above the LOD (0.558 mg/kg total PAHs in sample WS205 at 0.7-1.0 m bgl). The concentrations are orders of magnitude below commercial assessment criteria. Concentrations of metals were detected above the LOD in all samples, however, no notably high concentrations were detected. Asbestos was not identified in any of the samples tested.

There were no exceedances of the relevant GAC for any of the soil samples tested, therefore, based on the planned redevelopment scenario, WSP did not consider a significant risk to human health to exist from soil contamination.

	Groundwater Testing Results No light non-aqueous phase liquids (LNAPL) were encountered in any of the monitoring wells during purging or sampling. Three groundwater samples were tested at the laboratory. Petroleum hydrocarbons were not recorded above the laboratory detection limits. PAH concentrations above detection limits were identified in a single sample (WS202), however none of the PAHs identified are volatile compounds, and no concentrations above trace levels (>1 µg/l) were recorded. WSP noted that the concentration of fluoranthene (0.0146 µg/l) detected resulted in a minor exceedance of the GAC applied by WSP with respect to controlled waters receptors, however the risk was considered low given the distance between the contamination source and the surface water receptor and the absence of any ongoing source of contamination, or widespread contamination in the other groundwater samples retrieved. Two of the groundwater samples were analysed for Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs). Both samples returned results below the LOD. Low concentrations of a range of metals, including arsenic, barium, boron, lead, selenium, vanadium and zinc were detected in all samples analysed however no GAC exceedances were reported and results were considered consistent with background conditions rather that highlighting any site specific impact. **Additional Information** JDE Coffee noted the following historic fuel infrastructure at the Site during an on-Site interview with WSP: historic fuel pumps, underground storage tanks (USTs) and above ground storage tanks (ASTs). It was confirmed that an AST was formerly present in the south-east of the Site and had been removed, however JDE Coffee were unclear if USTs in the western part of the Site were removed, still present or backfilled. WSP attended site on 8th January 2018 with a specialist ground survey and geophysics company Zetica who employed the following techniques to observe the presence or absence of USTs within the embankment: ▲ Electromagnetic (EML) & Magnetometer; ▲ Time domain electromagnetic detection (TDEM); and ▲ 3D Ground Penetrating Radar. Survey results were made available on 12th January 2018 and confirmed there to be an area of disturbed ground measuring 10 m x 14 m (and within this an area of buried concrete) across the anticipated location of the USTs but no evidence of a UST being present. The survey also identified a number of utility services and a section of reinforced concrete. It is noted that no investigation into the area indicated to formerly house underground fuel tanks in the western hall was undertaken, and no comment was made by WSP.
Key Findings – RPS Pre-Construction Health and Safety Record	It was noted that the existing warehouse was undergoing the internal strip out of all fixtures/fittings/M&E including associated asbestos removal by DSM Demolition Ltd on behalf of Astec TM Ltd under a separate contract with a proposed completed date of 12th November 2018. The document references the Hydrock Desk Study and Ground Investigation Reports. There was no mention of fuel tanks.

Key Findings – DSM Group Post Contract Health & Safety Information File	It is understood from the information that the project works comprised the internal strip of two warehouses, identified offices and mechanical and electrical (M&E) fittings (stripped of furnishings, ancillary items and asbestos containing materials). The substation on the eastern elevation was also demolished (the floor slab and foundations removed up to 1 m bgl). All waste was reportedly removed from site to waste facilities holding a suitable permit. There is no mention of fuel tanks and no such features are marked in the associated schematic. Asbestos removal documentation is appended to this document. The above documents do not mention any external re-surfacing works.

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 Possible Contaminant Linkages (PPL).

3.2 Potential Contamination Sources

Identified potential contamination sources are presented in the following table:

Reference	Source	Location	Dates Present	Potential Associated Contaminants of Concern
S1	Former industrial use – food processing plant including: ▲ Machinery and plant ▲ Vehicle storage – potential leaks/spills ▲ HGV wash ▲ Pumphouse and electrical substation	Site-wide	1965 to 2018	Asbestos, heavy metals, Polycyclic Aromatic Hydrocarbons (PAH), petroleum hydrocarbons, volatile organic compounds (VOC), hazardous ground gases/vapours Polychlorinated biphenyls (PCB), and detergents
S2	Current vehicle storage – potential leaks/spills	Site-wide	Present	Heavy metals, PAH, petroleum hydrocarbons, VOC
S3	Made Ground deposits Localised asbestos (Chrysotile and amosite - hard / cement type material, loose fibres and insulation lagging) Visual/olfactory evidence of hydrocarbons adjacent to suspected UST Localised exceedance of PAH in groundwater	Site-wide	1980s to present	Asbestos, heavy metals, PAH, petroleum hydrocarbons, VOC, hazardous ground gases/vapours, pH and sulphate
S4	Electrical substation	South	1965 to present	PCB
S5	Former underground petrol and diesel storage tanks (UST's), associated pipework and fuel pumps. Potential fuel tank within south-western extent of existing building	South-west	1972 to present	Heavy metals, PAH, petroleum hydrocarbons, VOC, hazardous ground gases/vapours
S6	Former above ground diesel tank (AST) with associated pumps	South	1980s to 2006	
S7	Possible interceptor tank	South	1972 to present	

S8	Existing AST associated with generator to temporary guard hut	South-west	Present	
S9	Off-Site industrial land uses: ▲ Wider JDE Factory ▲ Engineering Works ▲ Depot ▲ Garage ▲ Printing Works ▲ Unspecified Work & Tanks	 ▲ 2 m north; ▲ 120 m east; ▲ 10 m south; ▲ 80 m east; ▲ 130 m south-east; ▲ 160 m east	 ▲ 1965 to present ▲ 1965 to 1978 ▲ 1978 to 2006 ▲ 1978 to 1993 ▲ 1965 to 1993 ▲ 1965 to 1978	Heavy metals, petroleum hydrocarbons, PAH, PCB, VOC and hazardous ground gases and vapours
S10	Discharge consents by Jacobs Douwe Egberts and Kraft Foods including trade effluent discharges.	5 m to 10 m north and north-east of the Site	1986 to 2000	PCB, petroleum hydrocarbons, pH, sulphates, phenols
S11	IPPCs at the JDE site relating to combustion processes within the fuel and power industry and the incineration of non-hazardous waste	100 m north	2009 to present	Heavy metals, petroleum hydrocarbons, PAH, VOC, pH, sulphate, asbestos, hazardous ground gases and vapours
S12	Multiple contemporary trade directory entries including dry cleaners and car dealers within 100 m	40 m east and 70 m south-east	Unknown to present	
S13	Unknown infilled land (pit, quarry etc)	270 m south-west	Mapped 1995	Hazardous ground gases

* Based on UK Department of the Environment Industry Profiles

It is understood from the information provided within the DSM Group Post Contract Health & Safety Information File that the existing warehouse and offices were stripped of furnishings, ancillary items and asbestos containing materials. The substation on the eastern elevation was also demolished (the floor slab and foundations removed up to 1 m bgl. All waste was reportedly removed from site to waste facilities holding a suitable permit. Asbestos removal documentation is appended to this document. It is therefore considered unlikely that on-Site buildings contain any remnant ACM.

Multiple pollution incidents to controlled waters are recorded within 500 m of the Site. The closest incident is located approximately 30 m to the north-west of the Site regarding an unknown pollutant and occurred on 30th June 1995. The incident was recorded as a Minor Incident. Multiple Significant Incidents have been recorded in the surrounding area, two of which were regarding 'unknown sewage' in 1990 and both located approximately 50 m to the north-east of the Site. One further Category 2 incident occurred in 1989 involving an unknown pollutant approximately 80 m to the south-west of the Site. Given the significant time that has lapsed since these incidents occurred, they are considered unlikely to adversely impact the Site.

Multiple Local Authority Pollution Prevention and Control (LAPPC) permits relating to petrol filling stations are recorded within 500 m of the Site, the closest are located approximately 70 m to the south-east and 90 m to the east of the Site (both authorisations are noted as revoked) and are considered unlikely to adversely impact the Site.

3.3 Potential Receptors

Relevant potential receptors are considered to include:

- R1 - Construction workers.
- R2 - Third parties during construction (adjacent Site users).
- R3 - Future Site users and maintenance workers.
- R4 – Culverted Bird Brook adjacent to the northern boundary of the Site and nearby River Cherwell, Oxford Canal and Grimsbury Reservoir
- R5 - The underlying Secondary Undifferentiated aquifer.
- R6 - The Built Environment (new buildings and infrastructure/utilities).

3.4 Potential Pathways

The potential pathways are considered to be as follows:

- P1 - Direct contact, ingestion or inhalation of soil bound contaminants / dust during or following redevelopment.
- P2 - Inhalation of organic vapours associated with contamination.
- P3 - Migration of ground gas / vapours into on-site buildings causing asphyxiation or risk of explosion.
- P4 - Leaching of contamination into groundwater followed by migration of groundwater to the wider groundwater environment or discharge to surface waters.
- P5 - Direct contact between aggressive ground conditions and new infrastructure.

Source(s)	Pathway(s)	Receptor(s)	Risk Rating	Justification & Mitigation (if required)
Former industrial use – food processing plant Current vehicle storage Made Ground deposits Electrical substation Former AST and UST, associated pipework and fuel pumps Possible interceptor tank Existing AST associated with generator to temporary guard hut S1/S2/S3/S4/S5/S6/S7/S8	P1, P2, P3, P4, P5	R1, R2, R3, R4, R5, R6	**Low to Moderate Risk**	On-Site development includes the current warehouse which was formerly a food processing plant from the mid-1960s. Site-wide Made Ground is anticipated to be present associated with the current development and asbestos may be present within Made Ground. As a potential source of ground gases, the Made Ground is considered to be low. Demolition is not proposed as part of the proposed Site use and groundworks and construction may be limited to small ancillary buildings and infrastructure. The proposed scheme will include the current hardstanding across the majority of the Site with a low potential for future Site users to be directly exposed to soil and groundwater. Previous intrusive investigation undertaken by Hydrock and WSP in 2016 and 2018 respectively did not encounter widespread contamination in soil beneath the Site. Asbestos fibres/cement/insulation lagging was identified locally in a single sample of Made Ground. Visual and olfactory evidence of hydrocarbons was observed in the vicinity of USTs; however, concentrations were all found to be below the Generic Assessment Criteria for a proposed commercial/industrial end use. It is unclear if recorded USTs referenced in previous reports and verified by the petroleum officer are still present on-Site. No visual evidence of any USTs was noted during the Site walkover; however, the purported area had recently been re-laid with new concrete hardstanding. Therefore, at this stage it is not clear whether the interceptor tank, UST's and associated infrastructure have been decommissioned or whether they remain in-situ to be utilised as part of the proposed development at the Site. Identified fuel tanks/infrastructure would require appropriate decommissioning together with removal, including any hydrocarbon impacted soil/groundwater and subsequent validation by an independent engineer and submission of a validation report to the relevant regulators for approval. The current building is not proposed for demolition and the Site is proposed for continued commercial use (van storage). Therefore, ground investigation is not considered to be required unless to support design of ancillary buildings and changes to the ground surface appropriate to the proposed Site use. Ground investigation is recommended in the event of a change in Site layout.

Source(s)	Pathway(s)	Receptor(s)	Risk Rating	Justification & Mitigation (if required)
				A 'hotspot' protocol should be in place during the redevelopment for ground workers to act upon should suspected contamination be identified. The use of PPE and robust health and safety measures by construction workers should mitigate the risk from contaminants and asbestos in Made Ground. Aggressive ground chemistry may attack buried concrete and therefore, there may be a requirement for upgraded concrete to be used. Suitable clean material should be obtained and used as a growing medium in additional landscaped areas (if proposed).
Off-Site industrial land uses Discharge consents by Jacobs Douwe Egberts and Kraft Foods including trade effluent discharges. IPPCs relating to combustion processes within the fuel and power industry and the incineration of non-hazardous waste Multiple contemporary trade directory entries including dry cleaners and car dealers Off-Site infilled ground S9/S10/S11/S12/S13	Leaching of contamination into groundwater. Vertical and lateral migration of contamination through permeable deposits below the Site. P4	Controlled waters. R4/R5	**Low Risk**	The Site is underlain by a Secondary Undifferentiated Aquifer (Charmouth Mudstone Formation) and there are surface water features within close proximity to the Site (Bird Brook adjacent the northern Site boundary). Groundwater results from previous investigations found no significant widespread contamination of groundwater. Only a localised exceedance of PAH was observed in groundwater sampling undertaken previously by others. The predominantly cohesive nature of the underlying soils means that migration of contaminants from the specified off-Site sources is unlikely and the risk from contaminant migration is therefore low.
	Accumulation of gas in enclosed spaces and sub-floor voids. P3	Future Site users. R3	**Low Risk**	Gas monitoring undertaken previously (by others) did not identify elevated concentrations of hazardous ground gases and the Site was assigned a Characteristic Situation 1. In the event of a change in Site use or layout, ground investigation is recommended to assess the potential for contamination and ground gases to impact on the proposed development. As a conservative approach, gas protection measures should be incorporated into all new buildings constructed at the Site.

4.0 Preliminary Ground Engineering Appraisal

4.1 Preliminary Ground Model

Based on the available information, it is anticipated that the Site is likely underlain by a sequence of Made Ground with possible localised superficial strata (Alluvium/River Terrace Deposits) underlain by bedrock of the Charmouth Mudstone Formation. Groundwater was previously recorded at variable depths beneath the Site.

4.2 Plausible Geohazards

The geohazards listed below have been identified to follow guidance presented in the HA document HD22/08 '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.

Information provided in the Envirocheck® Report indicates the following potential ground stability hazards:

- Collapsible ground – very low;
- Compressible ground – no hazard;
- Ground dissolution – no hazard;
- Landslides – low;
- Running sand – no hazard; and
- Shrinking or swelling clay – low.

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 H.

- **Made Ground:** There is anticipated to be a thickness of Made Ground underlying the Site relating to the existing development. Made Ground is typically variable in nature and strength with a potentially low bearing capacity and unacceptable levels of total/differential settlement may occur;
- **Shallow groundwater:** Previous Site investigation data has indicated the presence of groundwater which was present at shallow depths. In addition to this, Bird Brook is located in close proximity to the northern Site boundary. This may cause problems with any excavation below the water table;
- **Buried services:** There is a possibility that a number of buried services are located below and adjacent to the Site which would need to be located and diverted, or disconnected and replaced, as appropriate, prior to the commencement of any future construction works;
- **Relic structures/obstructions**: Given that the Site has been developed, there is a possibility of former, foundations, and other buried obstructions, including possible tanks, beneath the Site;
- **Shrinkable Soils**: The near-surface natural ground conditions may comprise shrinkable soils and appropriate foundation precautions may be required. This should be considered as part of the geotechnical investigation of the Site;
- **Compressible Soils:** Localised Alluvium has been previously recorded by others, and these materials have the potential to be compressible and represent soft spots, which may require removal or ground improvement and are not suitable as founding strata;
- **Boundary Retaining Wall:** A large concrete hardstanding parking area lies approximately between 1.5 to 2.5 m higher than the subject Site increasing towards the south-west corner. A retaining earth bank spanned this section of the Site boundary. No obvious evidence of slope instability was observed during Site reconnaissance; however, a structural assessment may be required in this regard; and

- **Underground Fuel Tanks and Infrastructure**: At this stage it is not clear whether the UST and associated infrastructure in the south-western area of the Site have been decommissioned or whether the AST and oil interceptors will be retained on-Site. The removal of identified AST/UST and associated infrastructure (including an oil interceptor) together with any hydrocarbon impacted soil/groundwater would require validation by an independent engineer and submission of a validation report to the relevant regulators for approval.

Potential solutions and further steps to address the aforementioned issues are discussed in Section 5.0.

5.0 Development Considerations

5.1 Potential Remediation Requirements & Solutions

Summary	The Site is shown from the earliest map (dated 1882) to comprise agricultural land, until 1965 when a food processing plant was constructed. It is understood that that former occupants of the Site include Kraft and most recently JDE (coffee manufacturers) until circa 2018. Potential sources of contamination associated with the Site relate to the former use as a food processing plant and the presence of AST/UST and associated infrastructure associated with the most recent Site use. Potential sources of contamination and ground gas have been identified within the surrounding area of the Site, including previous and current industrial land uses and associated IPPCs, discharge consents adjacent the northern Site boundary and infilled ground within close proximity to the Site.
Soils	A low to moderate risk of contamination is considered to be present on-Site. Limited groundworks are proposed associated with construction of ancillary buildings/infrastructure and the use of PPE and robust health and safety measures by construction workers should mitigate the risk from contaminants and asbestos in Made Ground. It is unclear if recorded USTs referenced in previous reports and verified by the petroleum officer are still present on-Site. No visual evidence of any USTs was noted during the Site walkover; however, the purported area had recently been re-laid with new concrete hardstanding. Therefore, at this stage it is not clear whether the interceptor tank, UST's and associated infrastructure have been decommissioned or whether they will utilised as part of the proposed development at the Site. Identified fuel tanks/infrastructure would require appropriate decommissioning together with removal, including any hydrocarbon impacted soil/groundwater and subsequent validation by an independent engineer and submission of a validation report to the relevant regulators for approval.
Groundwater	Significant widespread groundwater contamination is not anticipated and the presence of hardstanding across the majority of the Site should afford protection to the underlying Secondary Aquifer.
Ground Gas	Gas monitoring undertaken previously (by others) did not identify elevated concentrations of hazardous ground gases and the Site was assigned a Characteristic Situation 1. It is considered unlikely that a significant ground gas risk exists. Ground gas assessment is not considered to be required unless a change in Site plan is proposed. As a conservative approach, gas protection measures should be incorporated into all new buildings constructed at the Site.
Building Fabric & Services	Widespread contamination at the Site is considered unlikely. However, services are recommended to be placed in clean corridors. A drinking water pipeline assessment may be required following soils chemical results. Aggressive ground chemistry may attack buried concrete and therefore there may be a requirement for protection measures to be put in place at the Site. Identified fuel tanks/infrastructure (including the interceptor) should be appropriately decommissioned and removed together with any hydrocarbon impacted soil/groundwater and would require validation by an independent engineer and submission of a validation report to the relevant regulators for approval.

5.2 Geotechnical Considerations

Identified potential geohazards are limited to the presence of Made Ground, potentially shrinking/swelling clays, compressible ground, shallow groundwater, potential underground fuel tanks, buried services and potential buried obstructions. In addition to this, a retaining wall is located along much of the southern boundary. Redevelopment of the Site is not currently proposed as the existing building and external areas will be used for a continued commercial end use. The design and construction of any ancillary structures and infrastructure should take account of the potential geo-hazards identified.

Intrusive ground investigation may be considered appropriate in order to support design of any ancillary structures.

6.0 Conclusions & Recommendations

6.1 Land Contamination

Contamination Risks Associated with Ownership (Current Use)	There is considered to be a **Low** risk of enforcement action by the regulatory authorities under Part 2A of the Environmental Protection Act, the Water Resources Act or the Environmental Damage Regulations, whilst the Site remains in its current commercial use. The potential for legal action by surrounding landowners / Third Parties based on the potential for contamination to migrate off-Site (ongoing or historically) is considered to be **Low**.
Potential Contaminated Land Development Risks	Widespread contamination is considered unlikely and the preliminary risk assessment has identified a **Low to Moderate** risk of soil/groundwater contamination and hazardous ground gas at the Site. Asbestos may be present within the Made Ground.
Plausible Geotechnical Development Risks	Identified potential geohazards are limited to the presence of Made Ground, potentially shrinking/swelling clays, compressible ground, shallow groundwater, potential underground fuel tanks, buried services and potential buried obstructions. In addition to this, a retaining wall is located along much of the southern boundary. Redevelopment of the Site is not currently proposed as the existing building and external areas will be used for a continued commercial end use. The design and construction of any ancillary structures and infrastructure should take account of the potential geo-hazards identified.
Recommendations	The current building is not proposed for demolition; therefore, ground investigation is not considered to be required unless to support design of ancillary buildings and changes to the ground surface appropriate to the proposed Site use. As a conservative approach, gas protection measures should be incorporated into all new buildings constructed at the Site. The design and construction of any ancillary structures and infrastructure should take account of the potential geo-hazards identified comprising the likely presence of Made Ground, possible shrinking/swelling clays, compressible soils, shallow groundwater, buried services and potential presence of underground fuel tanks and other obstructions. In addition to this, a retaining wall is located along the southern boundary. Any identified underground fuel storage tanks/infrastructure should be appropriately decommissioned and removed together with any hydrocarbon impacted soil/groundwater and would require validation by an independent engineer and submission of a validation report to the relevant regulators for approval. A ‘hotspot’ protocol should be in place during the redevelopment for ground workers to act upon should suspected contamination be identified. The use of PPE and robust health and safety measures by construction workers should mitigate the risk from contaminants in Made Ground. Suitable clean material should be obtained and used as a growing medium in additional landscaped areas. Aggressive ground chemistry may attack buried concrete and therefore, there may be a requirement for upgraded concrete to be used. In the event of a change in Site use or layout, ground investigation is recommended to assess the potential for contamination and ground gases to impact on the proposed development. The investigation will also refine the Site-specific ground model and groundwater regime and enable an assessment of foundation and engineering solutions to be made.

Figure 1 – Site Location Map

LEGEND

Site Boundary

LOCKHEED CL

RUSCOTE AVENUE

A422

A361

SOUTHAM ROAD

PINHILL ROAD

NEITHROP AVENUE

NURSERY DRIVE

NURSERY LANE

NEITHROP CL

NORTHCOT LANE

WARWICK ROAD

B4100

CLARKES CT

PW

Fire Station

COPE ROAD

COOPERS

Education Facili

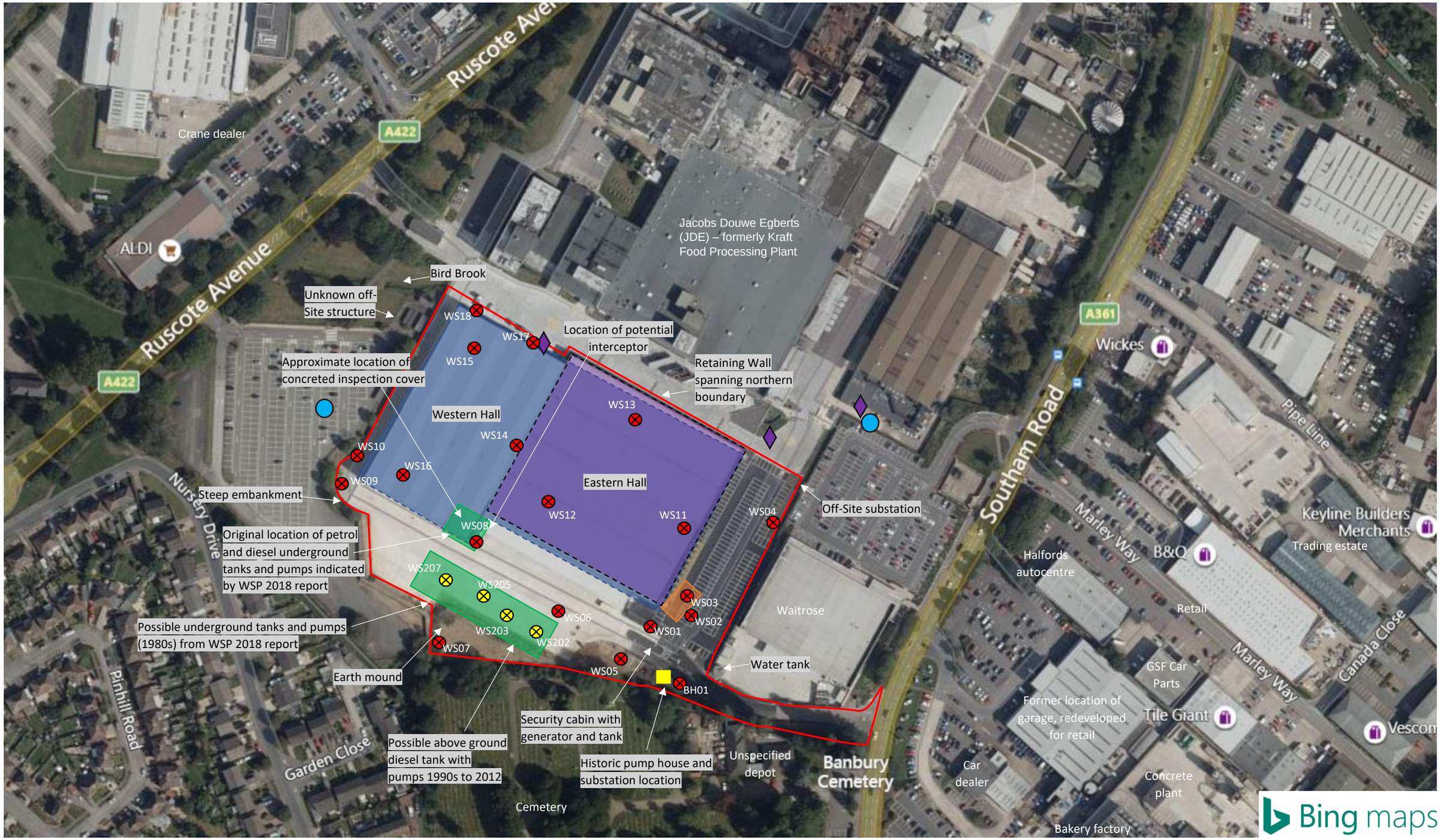
Scale: 1 / 10,000 @ A4

deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Site Location Map
Banbury 200, Southam Road
Banbury

DRAWN BY: BHO	SCALE: To Scale@A4	PROJECT NO: 20-1787
CHECKED BY: MY	REVISION: 1	FIGURE NO: 1
DATE: January 2021		

Figure 2 – Constraints Plan



Site boundary

Former truck wash (approx.)

Former refuelling area (approx.)

Current/historic electricity sub-stations

Pollution incidents to controlled waters

Discharge consents

Former food processing plant

Former Kraft Factory building

Borehole locations – Hydrock 2016 investigation

Borehole locations – WSP 2018 investigation

deltasimons
Environment - Health & Safety - Sustainability

TITLE:

Constraints Plan

Banbury 200, Southam Road, Banbury

DRAWN BY: LB	SCALE: NTS	PROJECT NO: 20-1787.02	
CHECKED BY: JXB	REVISION: -	FIGURE NO: 2	
DATE: 04/11/2020			

Appendix A – Limitations

Limitations

The recommendations contained in this Report represent Delta-Simons professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Delta-Simons obtained, reviewed and evaluated information in preparing this Report from the Client and others. Delta-Simons conclusions, opinions and recommendations has been determined using this information. Delta-Simons does not warrant the accuracy of the information provided to it and will not 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.

This Report was prepared by 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. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone 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 the Consultant.

Appendix B – Site Photographs

20-1787.02 - Site Photographs

Photograph 1 – Access road in the south-eastern corner off Southam Road

Photograph 2 – Site extents looking north-west

Photograph 3 – Second access point in the north-western corner

Photograph 4 – Warehouse building looking north