



Chase New Homes Limited

**Friends School, Saffron
Walden**
Desk Study Report – Revision 1

June, 2024



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EXECUTIVE SUMMARY

Card Geotechnics Limited (CGL) was commissioned by Chase New Homes Limited to undertake a desk study for the proposed redevelopment of the site located at the former Friends School, Mount Pleasant Road, Saffron Walden. In May 2024, CGL were commissioned to update the report to include recent database searches and to confirm whether the previous conclusions and recommendations of the report remain appropriate for the proposed development of the playing fields area.

The site can be split into two sections: the northwestern section was most recently in use as a school, and is currently undergoing residential redevelopment under planning permission UTT/23/1853/FUL. The eastern section of the site comprises a large playing field with an area of woodland in the southeast of the site. It is noted that the eastern area of the site has not changed since the original desk study report was produced in 2018.

Based on the available background information the ground conditions for the site are anticipated to comprise Made Ground in the areas of previous development and superficial Lowestoft Formation in the southeast of the site over the Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated) of the Upper Chalk. Groundwater is expected to be present in the Upper Chalk, though the depth is presently unknown. The Upper Chalk is classed as a Principal Aquifer and the Lowestoft Formation as a Secondary (Undifferentiated) Aquifer. The site is within a source protection zone for a groundwater abstraction point located southwest of the site.

The available historical maps indicate the school was established in the late 1890s and expanded slowly until around 1980 when the most recent layout was established. The playing field and wood in the southeast of the site appears to have remained undeveloped. Several potential sources of contamination were identified, including heating oil tanks and associated underground pipework in the area of the school buildings, a substation in the northeast corner of the playing field, potential Made Ground in the area of previous development and fly tipping materials in the south eastern area of the playing field.

Based on the historical information there is considered to be a low to medium risk to human health and controlled waters from the potential sources identified in the northwest and northeast of the site. No potential sources were identified in the centre and south of the site and in these areas generally a low risk to human health and controlled waters is considered. There is also considered to be a low to medium risk from ground gases associated with potential Made Ground around the school area and the off-site infilled reservoir. It is anticipated that the risk to human health could be mitigated through the implementation of capping (building footprints, hardstanding and soil capping) and gas/vapour

barriers. Prior to development the tanks will need to be decommissioned and removed, and the underlying soils investigated for the potential presence of hydrocarbons. Depending on the findings of the ground investigation and subsequent risk assessment, groundwater remediation may be required.

Based on the ground conditions anticipated from the information available conventional shallow strip or trench fill foundations within the Upper Chalk or Lowestoft Formation are considered to be feasible for low rise housing. Trench fill foundations with reinforcement, piles or raft foundations may be required where foundations span different soil types or if shallow groundwater is encountered. Heave precautions may be required for foundations in the Lowestoft Formation. Suspended floor slabs may be required where Made Ground and superficial deposits are present at formation level, where the Upper Chalk is present at formation level, ground bearing floor slabs may be feasible. Conventional soakaways are considered to be feasible where the Upper Chalk is present and permeable paving may be feasible where superficial deposits are present.






A phase 2 geotechnical ground investigation is considered to be necessary within the area of the playing field, to provide information for detailed design. It is considered that the investigation should provide information on the shallow ground and groundwater conditions, and the permeability characteristics of the shallow soils. The investigation should also appropriate in-situ and laboratory testing to inform geotechnical design parameters for the site. Further environmental investigation is not considered necessary for the playing field based on the lack of potential significant contamination sources.

1. INTRODUCTION

Card Geotechnics Limited (CGL) has been commissioned by Chase New Homes Limited to produce a desk study for the proposed redevelopment of a site located at Friends School, Mount Pleasant Road, Saffron Walden, CB11 3EB.

This report is intended to provide information on the potential geoenvironmental and geotechnical setting of the site and to provide initial outline considerations on risks and constraints for the proposed redevelopment of the site.

This report provides the following:

-  Observations during site walkovers in 2018 and 2024;
-  A summary of the historical development, environmental setting of the site and surrounding area based on a review of available third party historical maps and environmental, geological hydrogeological records;
-  A preliminary assessment of potential contamination sources and associated risks for the site based on the site setting and proposed development;
-  Preliminary appraisal of considerations for foundation design; and
-  Recommendations for further works.

At the time of updating this report, it is noted that the development plans for the north western area of the site (the main school site) have been approved and development is underway as part of planning permission reference UTT/23/1853/FUL. It is understood that this Desk Study report is being updated to support the future planning application associated with the Playing Fields area of the wider site.

A glossary of frequent abbreviations is included after the figures.

2. SITE SETTING

2.1 Site Location

The site is located at the former Friends School, Mount Pleasant Road, Saffron Walden, CB11 3EB in a predominantly residential area. The Ordnance Survey National Grid Coordinates for the approximate centre of the site are E554062, N237560. A site location plan is included as Figure 1.

2.2 Site Description and Walkover

The site is approximately 9.5 hectares in size and is roughly an inverted 'L' shaped with redevelopment focused in the former school buildings forming one arm in the northwest of the site and the playing fields and small area of woodland forming the other arm. A site layout plan is included as Figure 2.

Site walkovers were undertaken by a CGL engineer on 4 July 2018 and 8 February 2024. The findings are incorporated into the following site description and a selection of photographs from the walkovers are included as Appendix A along with a plan showing their locations.

In 2018, the northwest of the site comprised a number of buildings for the former school. The external areas were generally tarmac or paving hardstanding with limited area of soft landscaping. A tank farm was present immediately west of the main school building and is understood to have supplied three previous oil fired boilers at the site which were replaced by biomass or gas boilers in the early 2000s. The tank farm comprised four above ground tanks with a bund, constructed of a concrete base and brick walls. At the time of the July 2018 visit, the bund appeared to be in a good condition, dry, and no evidence of oil was noted within the bund. Two separate (plastic) oil tanks were present next to the swimming pool which are understood to feed the boilers for this structure (although this could not be confirmed by the contact on site). The boiler rooms were located within basement units and connected to the oil tanks by underground pipe work, though the routes of these are currently unknown. It is understood that some of the more modern buildings south of the main school building did not have oil boilers, instead using gas boilers, due to the distance to the tank farm.

Although an asbestos survey was beyond the scope of the site walkover and this report, several of the ancillary buildings were noted to have roofs composed of possible cement bound asbestos sheeting, therefore an asbestos survey was recommended.

In 2024, the northwestern area of the site was undergoing redevelopment including conversion of existing buildings and redevelopment of 96 residential units, community and recreation facilities, and areas of open space.

In 2018 and 2024, the playing fields comprised grass soft landscaping and no structures were noted in the eastern part of the site. The playing fields were bordered to the east and south by a strip of vegetation with frequent tall trees. In 2024, evidence of vegetation clearance along the northern boundary was apparent to facilitate the installation of a Heras style fence along the perimeter of the site.

During the 2024 walkover, stockpiles of arisings from the redevelopment of the main school site were observed in the north western corner of the field. Evidence of fly tipped material was noted within the south eastern area of the main field area, in and amongst trees, which included large household appliances, children's toys and equipment, household furniture, garden waste, builders waste including plasterboard and foam insulation, suspected asbestos cement sheeting, and household waste/recycling products. From aerial imagery, this material may have been dumped in 2020/2021.

The site plan provided by the Client in 2018, indicates that an electrical substation was present in the northeast corner of the site. However this could not be found during the 2018 walkover, possibly due to the overgrown vegetation along the perimeter of the field. No access to a substation could be identified from Mount Pleasant Road either. It is understood from the Client that the substation was decommissioned by the electricity company prior to the Client acquiring the site in 2018.

In the southeast of the site, there is a small area of woodland with numerous trees, which was noted to be heavily vegetated. No access into this area was undertaken in 2024.

3. HISTORICAL DEVELOPMENT

3.1 Sources of Information

The historical development of the site has been traced from historical Ordnance Survey Maps dating from 1877 to 2024 provided by Groundsure, which are included as Appendix B.

3.2 Summary of Historical Development

A summary of the historical development of the site and surrounding area are presented in Table 1 below. The distances quoted are approximate and taken from the nearest site boundary.

Table 1. Summary of the Historical Development of the Site and Surrounding Area

| Year | On site | Off site |
|--------------|--|--|
| 1877 | A small building was present in the northwest corner of the site and the remainder of the site was undeveloped fields | <p>A Reservoir was present on the western site boundary</p> <p>Two Windmills (Corn) were present 10m north and 50m east of the site</p> <p>A number of houses with gardens were present 10m west and 50m southwest of the site, labelled as <i>Mount Pleasant</i> and <i>Pleasant Valley</i> respectively</p> <p>Two Wells were present 50m southwest of the site. One Well was present 50m east of the site. Three Wells were present 600m northeast of the site</p> <p>A Foundry (Iron and Brass) was present 200m north of the site</p> <p>The Saffron Walden Railway was present north of the site running roughly northeast/southwest and was approximately 150m from the site at the closest point. A Goods Shed and Station were present 250m north of the site</p> <p>A Pesthouse was present 100m southeast of the site</p> <p>A Malthouse was present 300m north of the site</p> <p>A Hospital was present 400m northwest of the site</p> <p>A Gasworks was present 600m northeast of the site</p> <p>A Cemetery was present 700m northeast of the site</p> <p>Claypits were present 600m and 800m south of the site</p> |
| 1896 to 1898 | A large structure had been built in the northwest of the site, labelled as <i>Friends' School</i> | <p>A number of houses had been built along <i>Mount Pleasant Road</i> immediately north of the site</p> <p>The Pesthouse had been relabelled as a <i>Fever Hospital</i></p> <p>A Cement Works and two Chalk Pits were present 600m to 750m east of the site</p> <p>A Chalk Pit was present 950m southwest of the site</p> <p>A Sewage Works was present 1km northwest of the site</p> |
| 1919 to 1923 | <i>Friends School</i> had been expanded eastward and the smaller fields in the northeast of the site had been merged together. The fields in the northwest of the site, immediately south of the school building were indicated to contain trees | <p>A Sanatorium was present immediately southwest of the site.</p> <p>The Reservoir immediately west of the site was shown to be partially on site due to slight changes in the maps. A Water Tower was recorded next to the Reservoir</p> <p>Rows of houses had been built 20m west and 100 southwest of the site, along <i>Debden Road</i></p> <p>The Windmill (Corn) east of the site was no longer present</p> <p>The Fever Hospital south of the site had been relabelled as an <i>Isolation Hospital</i></p> <p>A Rifle Range was present 750m southwest of the site</p> <p>The Chalk Pit southwest of the site was no longer recorded</p> |
| 1938 | No substantial changes recorded | A Water Works had been built 450m southwest of the site |

| Year | On site | Off site |
|--------------|--|--|
| 1948 | No substantial changes recorded | A large unlabelled structure was present 15m west of the site. The <i>Rifle Range</i> southwest of the site was no longer present |
| 1952 | Two small structures had been built in the northwest corner of the site. A small structure had been built in the west of the site, immediately south of the main school structure | The <i>Gasworks</i> and <i>Cement Works</i> had been relabelled as <i>Works</i> The <i>Windmill (Corn)</i> north of the site was labelled as disused |
| 1969 to 1972 | The majority of the fields in the southeast of the site appear to have been incorporated into the school grounds. One field in the southeast corner of the site appears to have been still been separate. Several <i>Tennis Courts</i> were present in the west and south east of the site. Trees were recorded along the north-eastern, western and south-eastern site boundaries of the school's fields An <i>Electrical Substation</i> was recorded in the northeast corner of the site. | A large residential development had been built between 200m and 600m southwest of the site. The areas northeast of the site had also been developed with residential properties The previously unlabelled large structure west of the site was had been labelled as <i>Tudor Works</i> The <i>Sanatorium</i> southwest of the site was no longer recorded The disused <i>Windmill</i> north of the site had been replaced by residential properties An <i>Electrical Substation</i> was present 30m southwest of the site. The <i>Reservoir</i> immediately adjacent to the western site boundary was no longer recorded, though the <i>Water Tower</i> was still present The <i>Gasworks</i> northeast of the site was recorded to be a <i>Depot</i> , though a round structure, potentially a gas holder, was still indicated to be present The <i>Isolation Hospital</i> southeast of the site was no longer recorded The <i>Water Works</i> south of the site had been relabelled as a <i>Pumping Station</i> The <i>Railway</i> north of the site was indicated to have been dismantled and the <i>Goods Shed</i> was no longer recorded to be present A <i>Chimney</i> was recorded to be present 400m north of the site A <i>Factory</i> and <i>Works</i> were recorded to be present 700m northeast of the site |
| 1978 to 1983 | An extension had been built onto the main school building in the north of the site A building had been constructed in the west of the site A small structure had been built in the field in the southeast corner of the site | A large number of houses had been built on the fields to the southeast and south of the site A <i>Depot</i> was present 250m north of the site A large structure had been built over the former <i>Reservoir</i> immediately west of the site |
| 1986 | No substantial changes recorded | No substantial changes recorded |
| 1989 to 1991 | No substantial changes recorded | The <i>Works</i> east of the site was recorded as <i>Southgates Industrial Park</i> The <i>Chimney</i> north of the site was no longer recorded The <i>Depot</i> north of the site was no longer present |
| 1994 | No substantial changes recorded | No substantial changes recorded |
| 2002 | No substantial changes recorded | No substantial changes recorded |
| 2024 | No substantial changes recorded | No substantial changes recorded |

Based on the historical maps there has been little development at the site other than the construction of the school buildings in the northwest corner since the 1890s, which have been extended over the years. The centre and southeast of the site appear to have remained undeveloped fields and then school grounds and the small woodland. A substation is indicated to be present in the northeast corner of the site since the around 1970. No further changes to the site have been recorded on the OS maps since the mapping from 1978/1983.

In the surrounding area there has been some limited potentially contaminative activity, in particular the infilled reservoir immediately adjacent to the site and the works to the west of the site. A railway line and associated goods sheds were present 150m north and northwest of the site but were dismantled around 1970.

4. ANTICIPATED GROUND CONDITIONS

4.1 Published Geology

According to the British Geological Survey (BGS) Digital Geological Map of Great Britain¹ the site is underlain by the Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated) of the White Chalk Subgroup, herein referred to as the Upper Chalk. The superficial deposits of the Lowestoft Formation (Diamicton) are indicated to be present southeast of the site and to extend into the southeast corner of the site. Made Ground is also expected to be present in the northwest of the site where previous development has occurred for the school buildings.

The Lowestoft Formation is typically encountered as a chalky till with frequent flint and chalk gravel and localised pockets or channels of sand and gravel. The clay matrix typically has a high carbonate content.

The Upper Chalk is anticipated to comprise weathered structureless chalk over white structured chalk with flint.

4.2 Unpublished Geology

There are records of 15 historical boreholes held by the BGS within 250m of the site. A total of 14 of these are for shallow boreholes to a maximum depth of 3m below ground level (bgl), located between 140m and 220m northeast of the site. These boreholes encountered a thin layer of Topsoil or Made Ground, up to 0.5m thick. The logs indicate that this was generally underlain by between 0.0m and 0.9m of sandy silt to silty sand referred to as Head Deposits on the logs and then weathered structureless Chalk to the base of the window sampler boreholes. The other historical record relates to a 35m deep borehole located 150m southwest of the site which indicates Chalk was encountered from the surface to base though no descriptions are given for the chalk encountered. No records of groundwater strikes were included on the logs.

Copies of the historical borehole logs and a plan showing their location is included as Appendix C.

4.3 Ground Conditions – Main School Area.

Since the original issue of the Phase 1 Desk Study report in 2018, the main school area in the north west of the site has been the subject of a ground investigation by CGL². Ground conditions within this

¹ Natural Environment Research Council, (2017). British Geological Survey Geology of Britain Viewer. [<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>] – Accessed 02/07/2018

² CGL (2023). Geotechnical and Geoenvironmental Interpretative Report. Friends school, Mount Pleasant Road, Saffron Walden. Revision 01. CG/28695B. February 2023.

area were confirmed to be relatively consistent with those expected based on the published geological records. Conditions comprised a relatively thin cover of Made Ground over Head Deposits and Chalk. It is noted that the Head Deposits encountered were localised and are outside of the areas where the superficial deposits of the Lowestoft Formation were expected.

The shallow chalk is structureless, either clast or matrix dominated. No groundwater has been encountered during the intrusive ground investigation or subsequent monitoring (utilising installations within windowless sampler boreholes). Infiltration testing (soakaways and falling head permeability tests) indicates that the shallow head deposits and chalk are of variable permeability.

4.4 Hydrology and Hydrogeology

The Environment Agency (EA) has produced an aquifer designation system consistent with the requirements of the EU Water Framework Directive. The designations have been set for superficial and bedrock geology and are based on the importance of aquifers for potable water supply, and their role in supporting surface water bodies and wetland ecosystems.

The Upper Chalk is classified as a 'Principal Aquifer' indicating it has a high intergranular and/or fracture permeability, meaning it can provide a high level of water storage and may support water supply or river base flow on a strategic scale. The superficial Lowestoft Formation is classified as a 'Secondary (undifferentiated) Aquifer' indicating that this stratum has layers which are designated as Secondary aquifers and Unproductive strata in different locations to the variable characteristic of the stratum. The depth of the groundwater is not recorded on the nearby historical BGS borehole logs but was recorded to be approximately 50m bgl in a well located approximately 1km southeast of the site. The Environment Agency Baseline Report for the area³ indicates that the regional groundwater flow around Saffron Walden is towards the northwest.

An updated Disclosure Report (Enviro+Geo Insight Report) has been obtained for the site from Groundsure to provide information on the environmental conditions and records for the area and is included as Appendix D. The environmental disclosure report indicates that there is a potable groundwater abstraction point located 410m southwest of the site at the Affinity Water Limited pumping station off Debden Road. The southern half of the site is indicated to be within the Zone 2 (Outer Catchment) of the groundwater Source Protection Zone (SPZ) and the northern half of the site within the Zone 3 (Total Catchment) of the groundwater SPZ. The SPZ is associated with the abstraction borehole, assumed to be abstracting from the chalk.

³ Ander E.L., Shand P., Griffiths K.J., Lawrence A.R., Hart P, Pawley J., (2004). *Baseline Report Series 13: The Great Ouse Chalk Aquifer, East Anglia. British Geological Survey Commissioned Report No. CR/04/236N.*

There are no further records of other potable groundwater abstraction points within 2km of the site. However, there are eight records relating to four non-potable abstractions wells located 540m north of the site at Saffron Walden Steam Laundry Company, two wells located 890m east of the site at Engelmann Farm and one well located 1600m northwest of the site at Saffron Walden Golf Club. In addition, there are six records of surface water abstractions, all of which are non-potable, and relate to use for spray irrigations, general use (category 2) and general farming & domestic use and are located between 1440m and 1950m from the site.

The nearest surface water feature to the site is the River Slade located 370m east of the site, which runs roughly northwest/southeast. An unlabelled stream or drain is also present 400m southeast of the site and appears to join the River Slade approximately 550m southeast of the site.

The Enviro+Geo Insight Report indicates the site is not within a surface water flood zone and the Environment Agency's Risk of Flooding from Rivers and the Sea (RoFRaS) rating for the site is very low, which indicates a probability of flooding of less than 1 in 1000 in any given year. The site is also indicated to be within an area with a limited potential for groundwater (clearwater) flooding from the underlying Chalk.

4.5 Ground Hazards

This section presents a summary of the anticipated ground hazards for the site based on the desk study information and the updated disclosure report (Enviro+Geo Insight Report) obtained from Groundsure which is included as Appendix D.

There are five records of historical ground workings on the site which relate to unspecified heaps in 1919, 1938, 1947 and 1952. There are also ten records of historical ground workings within 250m of the site, two relate to the former reservoir immediately west of the site and the other eight relating to cuttings located between 130m and 220m west to north west of the site.

The Insight Report indicates that the study site is recorded to be within an area with a rare chance for non-coal mining according to the BGS, which indicates that 'sporadic underground mining of restricted extent may have occurred but the potential for difficult ground conditions is unlikely, localised and are at a level where they need not be considered'. There are no records of other mining related activity within 1km of the site.








The Insight Report indicates the superficial Lowestoft Formation has a low risk of shrink-swell clay and ground dissolution of soluble rocks, a very low risk of landslides, collapsible deposits and running sands and a negligible risk of compressible deposits.


The Upper Chalk is indicated to have a very low risk of collapsible deposits and a negligible risk of shrink-swell clay, landslides, compressible deposits and running sands. In addition, the Insight report indicates that there are no records of natural cavities recorded within 1km of the site and gives a very low risk for dissolution features. However, notwithstanding this, the chalk is a soluble rock and therefore it is considered that the potential risk of dissolution features cannot be discounted at this stage.

5. ENVIRONMENTAL SETTING

5.1 Environmental Disclosure Report

This subsection provides a summary of the pertinent information from the Groundsure environmental disclosure report included as Appendix D.

-  There are 63 records of potentially contaminative historical land uses within 250m of the site. Three of these relate to unspecified heaps on the site between 1919 and 1952 and ten relate to a former windmill (Corn Windmill / Unspecified Windmill / Disused Windmill) supposedly on/adjacent to the site north east boundary between 1877 and 1947. Five records relate to the former Sanatorium/Isolation Hospital/Fever Hospital located immediately southwest of the site and two relate to Works, located 15m west of the site. The remaining records relate to other off-site uses including railway sidings, buildings and cuttings, the iron and brass foundry, a timber yard, unspecified works, unspecified depots, and several unspecified tanks.
-  There are six records of historical tanks within 250m of the site, two of which relate to onsite tanks from 1969 to 1996 and are considered to likely relate to the oil tanks in the northwest of the site observed during the 2018 walkover. The other records relate to unspecified tanks located 50m west, 210m northwest and 230m north of the site.
-  There are 68 records of historical energy features within 250m of the site, two of which relate to an electrical substation within the site boundary, considered to be the substation indicated on historical maps to be located in the northeast corner of the site. The other records are also for electrical substations, the closest of which are recorded to be 25m southwest and 65m west of the site.
-  There are nine records of historical garages and vehicle repair sites within 250m of the site. The nearest of which was located 70m west and 90m northwest of the site.
-  The 2018 Groundsure report flagged up two records relating to infilled land – reservoir, which was indicated to be on the western boundary of the site. It is noted that the 2024 Groundsure report has not recorded this feature.
-  There are no records of List 2 Dangerous Substances Inventory sites within 250m of the study site.
-  There are no records of licensed discharge consents pollution incidents within 250m of the site.

 There are no records of historical landfill within 500m of the site.

5.2 Radon

With reference to the British Research Establishment (BRE) and Health Protection Agency (HPA) guidance documents on radon, the site is not indicated to be within a radon affected area and less than 1% of new properties are above the action level. Therefore, radon protection measures are not anticipated to be necessary for developments at the site.

5.3 Regulatory Enquiries

5.3.1 Building Control

Building control at Uttlesford District Council were contacted to enquire about the ground conditions in the area and typical foundation designs. They reported that in a recent residential development the houses had conventional shallow foundations into competent chalk. In addition, they indicated that previous excavations for the primary school on the site encountered structured chalk at shallow depths.

They also indicated that dissolution features are rare in the area but could be present and that conventional soakaways into the chalk are generally acceptable in the area of the site.

5.3.2 Environmental Health

The Environmental Health team at Uttlesford District Council were contacted to enquire as to whether they had any records of contamination in the vicinity of the site. However, no response has been received.

6. PRELIMINARY RISK ASSESSMENT

6.1 Introduction

Historical contamination of the land may represent harm to human health and the environment. Current UK legislation stipulates that the risk associated with any potential land contamination is assessed and, if necessary, remediated. Under the Town and Country Planning Act 1990 (as amended), potential land contamination is a ‘material planning consideration’ which together with the National Planning Policy Framework (March 2012) means that the planning authority must consider individual applicants for planning permission. It is the responsibility of the developer to carry out the remediation where it is required, to satisfy the local authority that the remediation has been carried out as agreed.

Additionally, Part 2A of the Environment Protection Act 1990 required that a significant source-pathway receptor linkage exists to determine a site as contaminated land. This means that there has to be a contaminant present, a receptor that could be harmed by this contaminant, and a pathway linking the two. Part 2A deals with the contamination risk from a site in its current use, however, the planning system requires that the proposed use is considered. Where remediation is carried out under the planning system, it should be ensured that the site is in such a condition that it would still not meet the definition of contaminated land under Part 2A.

6.2 Preliminary Conceptual Site Model

A preliminary conceptual site model (CSM) has been compiled based on the findings of the desk study and walkover to identify the potential sources of contamination and associated potential pollutant linkages which have been considered for the site. A pictorial representation of the preliminary CSM is included as Figure 3.

6.2.1 Potential Sources


The desk study and site walkovers have identified the following potential sources of contamination:

On site potential sources:

- A tank farm is located in the northwest of the site and is understood to be connected to several former boilers in the school buildings via a network of underground pipes. There are also two tanks present adjacent to the swimming pool understood to have fed boilers in this building. Whilst no indication of leaks or spillages were observed during the site walkover, there is the potential for hydrocarbons to have leaked from these tanks and/or the

underground pipework into the underlying ground. (by 2024, these have been removed as part of the current redevelopment in the area)


- A substation is reported to have been present in the northeast corner of the site, though it could not be identified during the walkover. Given the age of the substation, there is the potential for hydrocarbon and polychlorinated biphenyls (PCBs) to have leaked from the substation.
- There is the potential for Made Ground to be present in the northwest of the site where there has been previous development. In addition, the desk study has indicated that there were historically a number of spoil heaps on the site. This material could potential be a source of heavy metal, hydrocarbon or asbestos contamination. It could also act as a source of ground gas generation if it contains an appreciable organic matter content.
- Fly tipping was observed during the 2024 walkover, in the south eastern area of the playing field. This material could potential be a source of heavy metal, hydrocarbon or asbestos contamination, albeit likely very localised.


 *Off-site potential sources:*


- A number of potentially contaminative activities have been identified in the surrounding area but most of these are considered to be too far from the site to represent a likely risk to the site. The nearby offsite sources considered in this risk assessment include the infilled reservoir on the western site boundary (which depending on the material used to infill the reservoir could act as a source of heavy metal, hydrocarbon and ground gas) and a works located 70m west of the site.


6.2.2 Potential Pathways


The potential exposure pathways that may be present at the site include:

 *Ingestion and inhalation* – Contamination within the Made Ground may be ingested (including ingestion of homegrown produce) or inhaled via dust generation or soil gases/vapours.

 *Direct and dermal contact* – Direct or dermal (skin) contact with contaminated soil, dust or water can result in the uptake of contaminants.


 *Soil gas migration* – Ground gases and vapours can migrate through the permeable soil matrix. This also includes the potential for off-site gases or vapours to migrate onto site from surrounding sources.


 *Groundwater migration* – Contaminants in the soil can be leached into infiltrating precipitation which can then migrate to the underlying groundwater body within the Upper Chalk and impact on the Principal Aquifer.


 *Root uptake* – Plants and vegetation can absorb contaminants from soil and groundwater through their roots


6.2.3 Potential Receptors


The following potential receptors have been considered for the site based on the proposed continued use as an open storage yard:

 *Future site occupants and construction workers* – Primarily at risk from direct/dermal contact with or ingestion of exposed soil contamination and dusts, and from the inhalation of ground gases, vapours and dust.

 *Neighbouring site occupants* – Primarily at risk from inhalation of ground gases, vapours or dust which have migrated off-site either as soil gases or dissolved in groundwater and inhalation of windblown dust.

 *Buildings and Structures* – Buried concrete and services, such as water supply pipes, can be damaged by exposure to chemically aggressive ground conditions. Ground gases and vapours can accumulate in buildings and structures, presenting an explosive or asphyxiation risk.

 *Controlled waters* – The majority of the site is indicated to be directly underlain by the Upper Chalk, a Principal Aquifer, and the superficial Lowestoft Formation is potentially present in the southeast of the site and is a Secondary (Undifferentiated) Aquifer. The nearby River Slade could also be impacted if it is in hydraulic continuity with the underlying groundwater.

 *Plants and vegetation* – Primarily at risk from exposure to phototoxic contaminants in shallow soils and groundwater

6.3 Preliminary Qualitative Risk Assessment

A qualitative risk assessment has been undertaken based on the findings of the desk study information and the potential pollutant linkages that may exist at the site in accordance with Contaminated Land

Report (CLR) 11⁴. The risks identified are in accordance with the CLR 6⁵ site prioritisation and categorisation rating system, which is summarised below in Table 2.

Table 2. Risk Rating Terminology

| Risk Rating | Description |
|------------------------|--|
| High Risk | Contaminants very likely to represent an unacceptable risk to identified targets Site probably not suitable for proposed use Enforcement action possible, Urgent action required |
| Medium Risk | Contaminants likely to represent an unacceptable risk to identified targets Site probably not suitable for proposed use Action required in the medium term |
| Low Risk | Contaminants may be present but unlikely to create unacceptable risk to identified targets Site probably suitable for proposed use Action unlikely to be needed whilst site remains in current use |
| Negligible Risk | If contamination sources are present they are considered to be minor in nature and extent Site suitable for proposed use No further action required |

Based on the above terminology, an assessment of the potential risks posed by the potential pollutant linkages identified for the site is outlined in Table 3 below.

Table 3. Preliminary Qualitative Risk Assessment

| Source/Medium | Receptor | Potential Exposure Pathway | Risk Rating |
|--|--|--|--|
| Organic or inorganic contaminants from tanks, Made Ground, substation identified in the school area. Fly tipping observed within south eastern area of playing field | Future site occupants | Ingestion or dermal contact with contaminated soils & dust and inhalation of particulates, asbestos fibres or vapours | In the vicinity of identified sources: Low to medium Other areas of site: low |
| | Construction workers | | In the vicinity of identified sources: Low to medium Other areas of site: low |
| | Neighbouring site occupants | Inhalation of particulates, asbestos fibres or vapours | Low |
| | Buildings and buried structures and services | Direct contact with contaminated soils or groundwater. | In the vicinity of identified sources: Low to medium Other areas of site: low |
| | Controlled Waters (Underlying Principal and Secondary Aquifers and nearby River Slade) | Leaching of contaminants by percolating groundwater and subsequent lateral or vertical migration to the underlying Chalk (Principal Aquifer) or Lowestoft Formation (Secondary Aquifer) and potentially lateral migration to the nearby Blackwater River if in hydraulic continuity with groundwater | In the vicinity of identified sources: Low to medium Other areas of site: low |
| | Plants and vegetation | Root uptake of phytotoxic contaminants | Low |
| Off-site contamination, such as the infilled | Future site occupants | Migration of off-site contaminants with perched water or as vapours through the | Low to medium |

⁴ The Environment Agency, (2004). *Model Procedures for the Management of Land Contamination*. CLR 11.

⁵ M.J. Carter Associates, (1995). *Prioritisation and Categorisation Procedure for Sites which may be Contaminated*. Department of Environment. CLR 6.

| <i>Source/Medium</i> | <i>Receptor</i> | <i>Potential Exposure Pathway</i> | <i>Risk Rating</i> |
|--|---|---|--------------------|
| reservoir or nearby substations | | underlying soils and accumulation within site area | |
| Ground gases and vapours generated from on-site and off-site sources | Internal building spaces and site occupants | Migration of ground gases through permeable soils and accumulation in internal spaces | Low to medium |

From the above, there are considered to be very few plausible sources of contamination within the playing fields area of the site. Risks identified are considered to be low to medium.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Geoenvironmental Conclusions and Recommendations

There is considered to be a potential low to medium risk to human health and controlled waters in the northwest and northeast of the site from the potential sources of contamination identified; oil tanks and associated pipework, possible Made Ground, and the former electrical substation. Other than evidence of fly tipping in the south eastern area of the site, no other potential sources of contamination were identified in the rest of the site and therefore outside of the identified potential source areas, the risk to human health and controlled waters is generally considered to be low. However an infilled reservoir has been identified on the western boundary of the site and presents a low to medium potential risk to the north western area of the site from ground gases.

The 2018 Phase 1 desk study report recommended that targeted site investigation was undertaken to evaluate the potential pollutant linkages. It is noted that such investigation was undertaken in the north western area of the site in 2022². Contamination (metals and PAHs) was recorded within four samples of the Made Ground at the site. No asbestos was detected in any of the samples. Made Ground was considered to present a low to medium risk to future site occupiers and a low risk to construction workers (assuming appropriate risk assessment, PPE and good site hygiene practices, and based on likely exposure duration).

It was noted that access to the areas of fuel storage were not possible at the time of the investigation, however on the basis that the concrete bund was observed to be in a good condition, a contamination watching brief (including inspection and sampling of the underlying and surrounding soils) and discovery strategy during tank removal / demolition were considered to be required in place of additional ground investigation. Remediation mitigation measures for the Main School area included: removal of above ground fuel tanks, maintaining of contamination watching brief during groundworks, removal of Made Ground or placement of clean soil capping (cover system) layers within soft landscaping where Made Ground is at formation level, and the use of standard plastic or metal water supply pipes (but not copper).

With the exception of fly tipping observed in the south eastern area of the playing field, no significant sources of contamination, or previous phases of development, have been identified within the playing fields and therefore no specific remediation is anticipated in these areas. This is further justified by the lack of significant contamination identified during the 2022 investigation² of the north western area of the site, in which no evidence of contamination from the anticipated sourced was identified.






It may be possible to re-use the topsoil in this area as growth mediums within areas of soft landscaping/gardens, subject to chemical acceptability.

It is considered that a full environmental ground investigation within the playing fields is unnecessary and instead it is recommended that a contamination watching brief and discovery strategy is maintained during the groundworks. A follow up geotechnical ground investigation is anticipated in due course to confirm foundation design, and this could be used to ground truth and confirm the conceptual site model for the playing fields area.

7.2 Preliminary Geotechnical Recommendations

Based on the findings of the desk study the anticipated ground conditions at the site are Made Ground in the area of previous development and superficial Lowestoft Formation in the southeast of the site over the Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated) of the Upper Chalk. Groundwater is anticipated to be relatively shallow, but the depth has not been confirmed to date.



Based on these anticipated ground conditions:

-  Strip or trench fill foundations within the Upper Chalk or superficial deposits are considered to be feasible for low rise buildings. Trench fill foundations with reinforcement are recommended to mitigate for differential settlement, where foundations span different soil types (i.e. cohesive, granular and/or chalk).
-  Heave precaution may be required for foundations in the superficial deposits, depending on the volume change potential of these soils;
-  No evidence of dissolution features has been identified, although ground investigation will be required to confirm this and a watching brief will need to be maintained during construction – an alternative foundation strategy (e.g. piles or rafts) may be required for new structures if dissolution features are identified;
-  Suspended floor slabs are anticipated to be required where Made Ground or superficial deposits are present at formation level, ground bearing floor slabs may be feasible where weathered chalk is present at formation level, following proof rolling with a non-vibratory roller.
-  Conventional soakaways are considered to be feasible within the Upper Chalk, and permeable paving may be possible within the superficial deposits (anticipated in the south-eastern area of the site).

7.3 Ground Investigation Recommendations

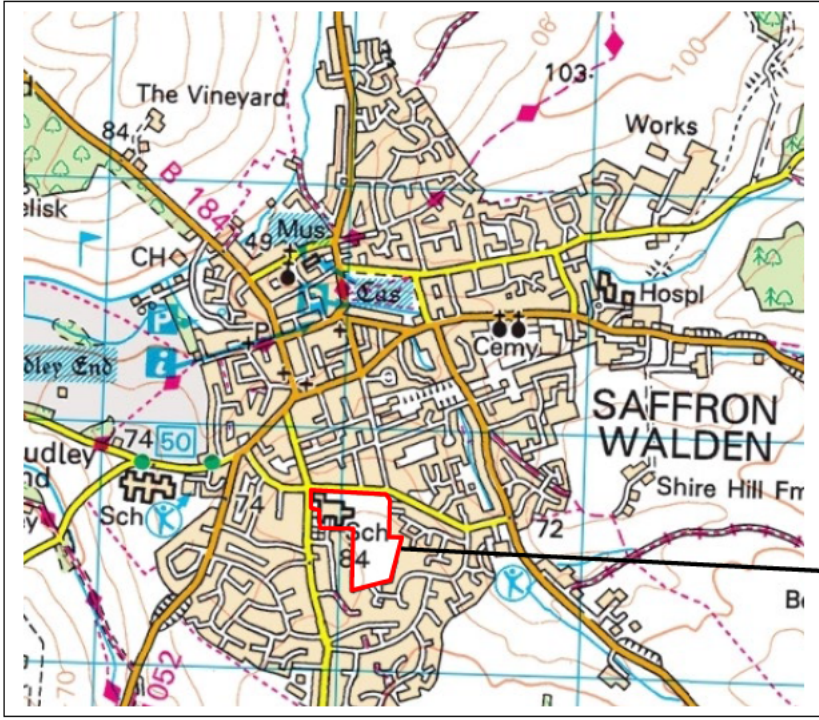
A Phase 2 geotechnical ground investigation is considered to be necessary to provide information for detailed design. No further environmental investigation is considered necessary at this stage, based on the lack of potential significant contaminant sources within the playing field.

The objectives of the ground investigation should be to provide information on:

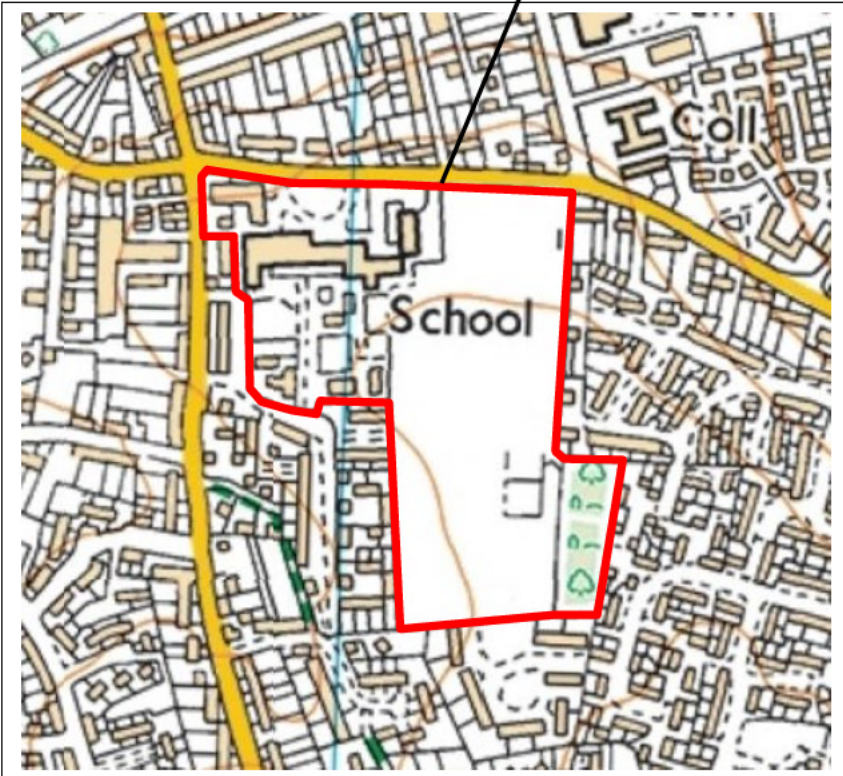
-  The shallow ground conditions and groundwater conditions across the site; and
-  Soakaway/permeability characteristics of the shallow soils.

The investigation should include appropriate in-situ testing, laboratory testing and groundwater/ground gas monitoring to inform geotechnical design parameters.


FIGURES

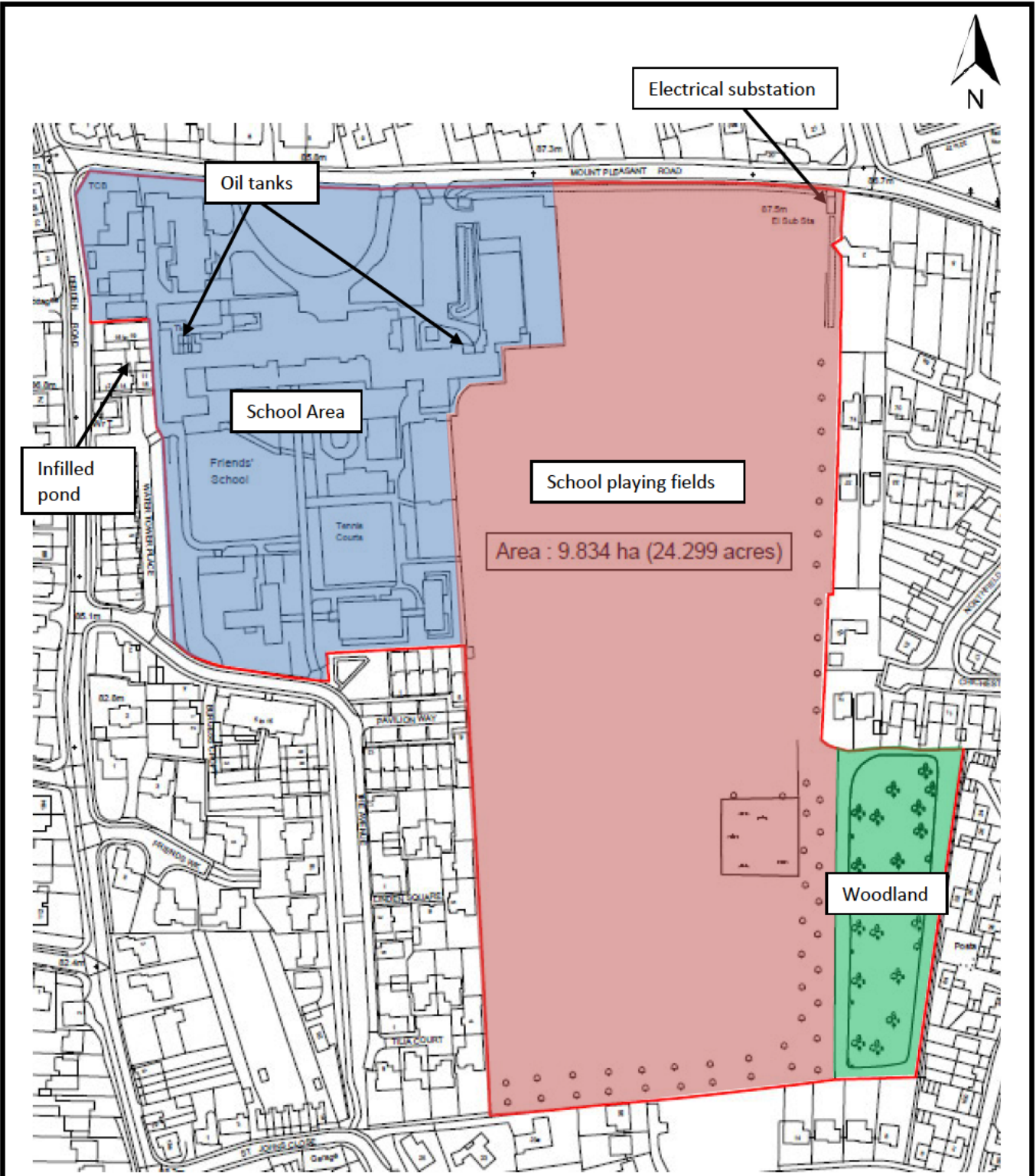


Site Location




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|---|--|------------------------------|
| Client Chase New Homes Limited | Project Friends School, Saffron Walden | Job No CG/39877 |
|  | Title Site location plan | Figure No Figure 1 |

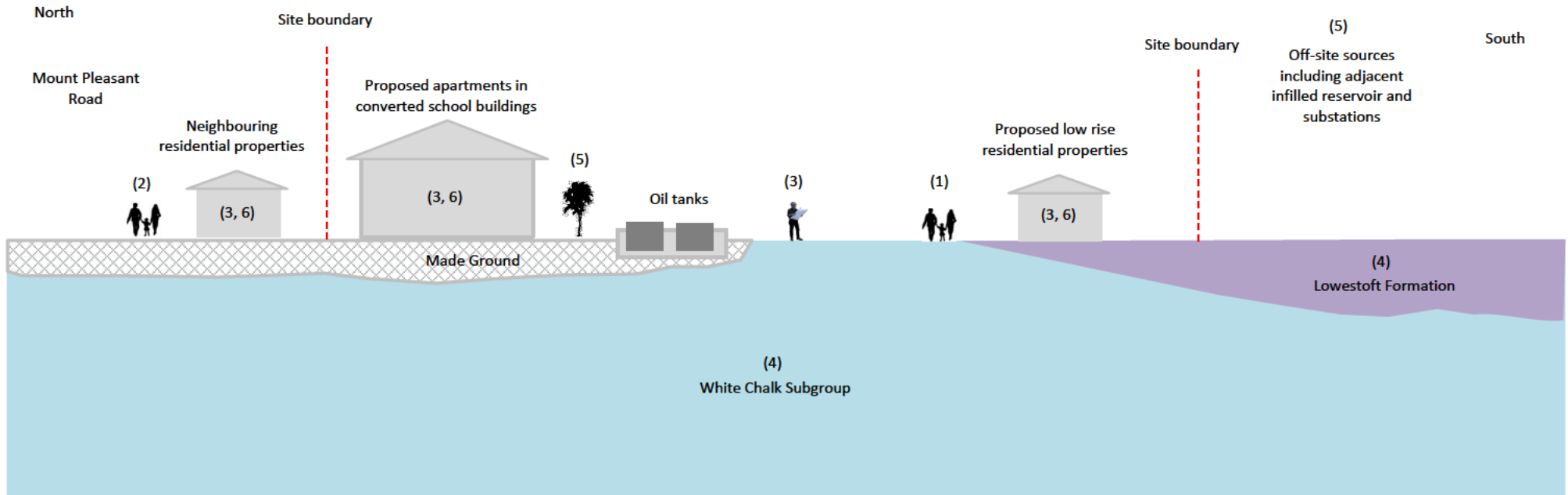



Drawing not to scale
 Extract from drawing provided by client

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|---|---|---------------------------------------|
| <p>Client Chase New Homes Limited</p> | <p>Project Friends School, Saffron Walden</p> | <p>Job No CG/39877</p> |
|  | <p>Title Site layout plan</p> | <p>Figure No Figure 2</p> |

Potential Pollutant Linkages and associated risk ratings

1. Ingestion of soil and dust, inhalation of asbestos fibres particulates and vapours and dermal contact with soil by future site occupants → **Low to medium risk in vicinity of sources, low for rest of site**
2. Inhalation of particulates, asbestos fibres and vapours by neighbouring site occupants → **Low risk**
3. Ingestion of soil and dust, inhalation of asbestos fibres particulates and vapours and dermal contact with soil by construction workers → **Low to medium risk in vicinity of sources, low for rest of site**
3. Direct contact with contaminants in soil and groundwater by buildings and buried structures and services → **Low to medium risk in vicinity of sources, low for rest of site**
4. Leaching of contaminants into groundwater and lateral/vertical migration to controlled waters → **Low to medium risk in vicinity of sources, low for rest of site**
5. Migration on to site of contamination from nearby off-site sources → **Low to medium risk**
6. Ingress and accumulation of ground gases and vapours, from on-site or off-site sources, in internal spaces → **Low to medium risk**
7. Root uptake of phytotoxic contaminants by plants and vegetation → **Low risk**



| | | |
|---|--|--|
| <p>Client</p> <p>Chase New Homes Limited</p> | <p>Project</p> <p>Friends School, Saffron Walden</p> | <p>Job No.</p> <p>CG/39877</p> |
|  | <p>Title</p> <p>Preliminary Conceptual Site Model</p> | <p>Figure No.</p> <p>Figure 3</p> |