

CHURCHILL RETIREMENT LIVING

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DESK STUDY APPRAISAL

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CONTENTS

1. INTRODUCTION
2. THE SITE
3. PUBLISHED GEOLOGY
4. DESK STUDY ENQUIRIES
5. ASSESSMENT OF GROUND CONDITIONS
6. RECOMMENDATIONS FOR GROUND INVESTIGATIONS
7. SUMMARY

REFERENCES

GENERAL NOTES

TABLE 1	-	Conceptual Site Model
FIGURE 1	-	Site Location Plan
FIGURE 2	-	Site Plan
FIGURE 3	-	Indicative Proposed Development Layout
APPENDIX I	-	Extracts of Historical Maps
APPENDIX II	-	Desk Study Information
APPENDIX III	-	Ground Investigation and Monitoring Data

1. INTRODUCTION

It is proposed to develop a site off Station Road, Great Shelford for residential purposes. The site is currently occupied by several commercial properties (predominantly offices) and a car park. It is understood that the proposed development will comprise a three-storey block of apartments together with car parking and managed soft landscaping. Residents will be of retirement age.

Crossfield Consulting has been commissioned by Churchill Retirement Living to undertake a Desk Study Appraisal of the site to identify possible constraints to the development relating to ground conditions as indicated at the site.

The desk study includes a review of historical maps of the site and surrounding area and an appraisal of the published geological data and information from regulatory authorities. The report presents the results of the study, together with an assessment of the likely ground conditions, including a Preliminary Risk Assessment (PRA) of potential contamination (with a Conceptual Site Model), and an initial appraisal of foundation solutions.

The report has been prepared under the direction and supervision of a Registered Specialist in Land Condition (SiLC).

It is considered that the report complies with the National Planning Policy Framework and is in general accordance with guidance published by the Environment Agency and NHBC together with Policy SC/11: Contaminated Land of South Cambridgeshire Council.

2. THE SITE

2.1 Location

The site is located to the east of Station Road and just to the north of the centre of Great Shelford, and approximately 2km to the south of Cambridge, as shown on Figure 1. The National Grid Reference for the site is TL 4649 5211.

The site is bounded by recently constructed terraced properties/town houses to the north and Station Road to the west. Along the eastern boundary of the site, is a railway line, which appears to be located slightly below site ground levels in a shallow cutting. To the south of the site, is a petroleum fuel depot/distribution centre, which includes several above-ground large bulk tanks, road tanker loading areas, yard and offices.

The general area appears to slope very gently down to the southwest, and towards the River Cam (also known as the Granta), which is approximately 450 m south and southwest of the site.

2.2 Site Description

The following site description is based on the current Ordnance Survey Plan, presented as Figure 2, and photographs accessible via internet-based mapping sites. No site reconnaissance has been undertaken by staff from Crossfield Consulting Limited.

The site is irregular in plan and occupies an area of approximately 0.3 ha. The site and the general surrounding areas appear to be sloping gently down to the southwest.

The site includes several separate single storey and up to three-storey office buildings. The building within the eastern part of the site is understood to be associated with offices for a refrigeration and air conditioning company. The office building within the southern part of the site is associated with an advisory company and all the other offices are vacant. The remaining central part of the site is a car park for the surrounding offices and appears to be asphalt surfaced. There are some decorative bushes present within the southeastern corner and trees in the northeastern corner, but vegetation is largely absent from the site. Bushes are also present along the eastern site boundary with the railway.

2.3 Site History

The site history has been researched with reference to old editions of the County Series and National Grid Ordnance Survey Plans obtained from Emapsite. Extracts from a selection of these plans are presented in Appendix I. The plans indicate that the following development has taken place on and around the site.

The earliest available County Series plan, dated 1886, shows that the site was occupied by several linear buildings, positioned around the perimeter of the site. A pump is recorded immediately beyond the northern site boundary, and is associated with the Railway Inn. Railway lines are present in a shallow cutting immediately to the east of the site, with two sidings extending within the eastern margin of the site. Beyond these, are running lines associated with Shelford Junction, where the lines diverge, south of the site.

By 1903, some residential development had occurred to the west. Two small gravel pits were recorded approximately 200 m to the northeast of the site and beyond the railway.

The 1946 map edition recorded a larger commercial building to the south of the site and by 1959, additional structures were present to the south of the site. The site itself appears to have remained large unchanged.

The 1970 National Grid plan shows a larger building within the eastern part of the site and the buildings within the southern part of the site were associated with a flour mill. Within the eastern margin of the site, the railway sidings had been removed by this date. Immediately south of the site, a fuel depot is recorded and included large above-ground tanks. An electricity substation is indicated immediately north of the site. Substantial residential development had occurred in the general area by this time, including covering the former area of gravel pits.

By 1985, the properties within the site had been identified as a corn mill, and some additional buildings had been constructed at the site. The large building in the eastern margin of the site had been extended by this date, and now extended over the area of the former railway sidings.

The 1992 National Grid plan shows the site as being occupied by a depot and some of the smaller buildings towards the centre of the site had been demolished.

On the basis of available reports regarding the adjoining fuel depot (as referenced), it is understood that the fuel depot was reconfigured with the installation of new above-ground tanks in the early 1990s. Fuel storage then comprised 11 tanks and a total capacity of approximately 500,000 litres, with storage of kerosene, gas oil and diesel together with much smaller quantities of paraffin and waste oil. It is understood that the facility does not include underground tanks.

There are no significant changes shown on site on the 2003 map. However, between 2003 and 2007, the depot building had been demolished and replaced by a small office building, as now present. Since 2008, the Railway Inn and associated car park was redeveloped with housing.

It is noted that the current office buildings along the western and southern margins of the site occupy the same areas as the buildings recorded in 1880s and appear to be essentially the same structures that have been substantially refurbished. The form of the buildings and their names are indicative of their former use, with *The Stables* along the western margin of the site and *Granary House* on the southern side of the site.

3. PUBLISHED GEOLOGY

Geological map data published by the British Geological Survey (BGS) online and in print, on 1:50,000 scale Sheet No. 205 (Saffron Walden), indicates that superficial deposits below the site comprise sand and gravels of River Terrace Deposits.

The solid strata indicated below the site comprise the lowest beds of the Upper Cretaceous Zig Zag Chalk Formation, described as grey chalk. Along the western margin of the site, the thin Totternhoe Stone Member is recorded at crop (a fine calcarenite chalk). On the western side of Station Road, the West Melbury Marly Chalk Formation is recorded (and extends below the Totternhoe Stone Member), and is described as marly chalk with limestone. These chalk strata are indicated to be of approximately 25 m to 30 m thickness and are underlain by the thin Cambridge Green Sand and much thicker Gault Clay strata. The general strata dip is gently down to the southeast.

4. DESK STUDY ENQUIRIES

4.1 Information Sources

Enquiries were made to the GroundSure Environmental and Geological Databases, the Environment Agency, DEFRA and the British Geological Survey (BGS) regarding the site and surrounding area. Information obtained from these enquiries is presented in Appendix II and summarised below. In addition, information has been obtained from the local planning portal and relates primarily to the adjoining fuel depot site, but includes some data located within the site, and relevant factual records are presented in Appendix III.

4.2 Information From Groundsure (including Environment Agency, DEFRA etc) and British Geological Survey

There are no current or historical landfills listed within 250 m of the site boundaries. There are four records of operations within the site having been granted waste exemptions. These relate to either the storage of waste in secure containers or in a secure place.

The database on current industrial land use lists the refrigeration and air conditioning company at the site, though this is just the head office for the company rather than where industrial manufacturing takes place. An electricity substation is recorded immediately east of the site (and is likely to be associated with the adjoining railway line). Shelford Energy, a fuel distributor, is identified as the fuel depot operator to the south and is listed in connection with Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

There are no sites determined as Contaminated Land under Part 2A of the Environmental Protection Act (1990) within 500 m of the site. There are no pollution incidents or facilities with other permits listed within 250 m.

Hydrogeological information indicates that the superficial deposits are classified as a 'Secondary A' aquifer. The solid strata, beneath the site, are classified as a 'Principal' aquifer. The site does not lie within a

groundwater Source Protection Zone. There are no active groundwater abstraction licences recorded within 1 km of the site. However, a historical record is listed for a facility 480 m southwest of the site.

The nearest active surface water abstraction licence relates to spray irrigation from the River Cam located 553 m south of the site.

With reference to the Water Framework Directive and associated defined surface water bodies, it is noted that the site lies very close to the boundary between catchments. The Environment Agency classifies the surface water body (Granta overview) as 'moderate' quality, although recent (2019) chemical data records "Fail" status. The relevant Groundwater body (Cam and Ely Ouse Chalk overview) is consistently rated 'Poor' quality. The relevant online map published by DEFRA/Magic indicates that the site does not lie within a designated Drinking water Safeguard Zone for surface water or groundwater.

The site does not lie within a flood Zone 2 or Zone 3, as designated by the Environment Agency.

The site is located within a Nitrate Vulnerable Zone, as also identified in the WFD data and this designation usually related to farming restrictions. There are no other environmentally sensitive land or property classifications associated with the site or immediate surroundings.

Natural ground subsidence related hazards below the site have been given a hazard rating of 'very low' by the BGS in relation to ground dissolution of soluble rocks. In this category, few dissolution features are likely to be present, such that the BGS does not advise specific consideration of such features.

There are no current or historical mine workings recorded on, or within close proximity to, the site. With reference to the BGS databases of non-coal mining, the eastern half of the site extends into a BGS Class A area, (the lowest hazard category) where sporadic underground mining of chalk of restricted extent may have occurred (and remain unrecorded). The BGS state that the potential for difficult ground conditions are unlikely and need not be considered. Across the remainder of the site, the BGS considers that the classification of mining risk is so low as not to be warranted. No natural cavities or mining-related features are recorded within 1 km of the site.

The BRE Document BR211 – *Radon: Guidance on Protective Measures for New Buildings* (2015) and GroundSure geological database information indicates that the site is not within an area where radon precautions are required in new buildings.

With reference to the BGS database of estimated background soil chemistry, it is noted that a relatively high lead concentration of 100 mg/kg is indicated for the Great Shelford area.

A record of a borehole located to the north of the site has been obtained from the BGS. The borehole log records a 3 m thickness of coarse gravel underlain by chalk to 30 m depth. Blue clay of the Gault Formation underlies the chalk to 83 m depth and sandstone/ironstone of the Lower Greensand Formation is recorded to 85 m depth. Groundwater was recorded at approximately 2 m depth in 1960.

4.3 Information Relating to the Site and Adjoining Oil Depot

Appendix III includes relevant factual records as relating to the development site from ground investigations undertaken in 2008 and 2015 and which extended within the site, together with summary data of groundwater monitoring data over the period 2009 to 2018 both within the site and extending into the adjoining fuel depot area, to the south. The associated reports are listed in the References. It is noted that the strata descriptions on these exploratory hole records are not compliant with BS5930 (such that strata strength etc are not accurately recorded).

A number of phases of ground investigation and monitoring have been undertaken, and some data is available for the period 2009 to 2018.

It is understood that some remediation works were carried out in the fuel depot, and it is understood that groundwater treatment was undertaken between 2009 and 2014. This is reported to have comprised a combination of oil skimming and total fluids “pump and treat” with the objective of reducing the thickness of LNAPL floating on groundwater. There is reference to “over 8 million litres (8,000 cubic metres) of groundwater” having been treated and 1,080 litres of oil removed, with a corresponding reduction in LNAPL thicknesses to “a few millimetres” by system closure in 2014. Full details of these works are not currently available and there is no reference to a verification or completion report, nor to any permits/regulatory acceptance of the works.

Only limited documentation is available, and a letter from the Environment Agency dated 17 December 2019 (as include in Appendix III) appears to indicate that the Agency considered that additional remediation works would be necessary for a redevelopment of the fuel depot area. It is not known if there is any subsequent document that address the outstanding issues.

Within the site, and below tarmac and concrete surfacing, a thin horizon of Made Ground is generally recorded, extending to depths of between 0.3 m and 1.4m. However, at one location, in the centre of the site, Made Ground to depths in excess of 2 m is recorded. The base and extent of this deep Made Ground has not been defined. The Made Ground is described as including coal fragments (although there is no indication of such material in the recorded colour of the strata). Locally, beneath the Made Ground, sandy and gravelly clays (River Terrace Deposits) are recorded to approximately 2 m depth in some areas. Elsewhere, these soils are absent.

Below the River Terrace Deposits, and directly beneath made Ground elsewhere, chalk strata are recorded. Within the chalk, hydraulic conductivity values of between 0.14m/d and 1.29m/d with an average value of 0.5m/d (5.8×10^{-6} m/s) are reported.

Slight hydrocarbon odours are recorded in some areas. Groundwater is recorded between approximately 2 m and 3 m depth, with some seasonal fluctuation (of about 0.5 m). Groundwater measurements undertaken within the site both before and after the remediation works indicates that no non-aqueous phase liquids (LNAPL) were recorded within the site during 12 monitoring events prior to remediation works (2009 to 2014) and 8 monitoring events following remediation (2015 to 2018). However, dissolved phase petroleum hydrocarbons have been recorded within the site, as outlined below.

Within the fuel depot area, significant concentrations of petroleum hydrocarbons were recorded, together with in excess of 350 mm thickness of LNAPL. It appears that this related primarily to aliphatic and aromatic hydrocarbons (C₁₀ to C₂₁ fractions), although other fractions are also recorded at concentrations well above published quality standards, as considered in the completed assessments and submitted to the regulatory authorities. These petroleum fractions were also recorded within the site at levels above published quality standards, although LNAPL appears not to have been detected. The maximum recorded value of Total Petroleum Hydrocarbons (TPH) of 0.42 mg/l is indicated close to the southern boundary of the current site, with decreasing values further into the site (as indicated by the limited data within the site that is presented)

As illustrated in the drawings in Appendix III, it is considered in the reports that the source areas of groundwater impaction relate to recent and former road tanker loading areas towards the centre of the fuel depot and groundwater flow is considered in the reports to be largely away from the development site and extending to the west and southwest.

5. ASSESSMENT OF GROUND CONDITIONS

5.1 Ground Conditions

Based on the available information, it is evident that some Made Ground is present within the site. This includes an area in the central section of the site where Made Ground is recorded to more than 2 m depth. Deeper Made Ground is also likely to be present in the eastern margin of the site, where site development has extended into the area of former railway sidings (indicated to have been located below site levels).

Buried foundations and services will also be present that relate to the existing and former buildings within the site.

The superficial deposits beneath the site are indicated to comprise a limited thickness of sandy and gravelly clays, as recorded to approximately 2 m depth (and absent in some areas).

Below the superficial deposits, and directly below Made Ground in some areas, are chalk strata. These comprise the lowest beds of the Zig Zag Chalk Formation, which rest on 'marly' chalk. In general, these chalk units are of higher strength and lower permeability in comparison to many other chalk strata. The available data confirms that the shallow chalk strata (within approximately 5 m of the surface) are classified as 'low' permeability, as defined in CIRIA C750 (2016).

Groundwater within the site has been recorded between depths of approximately 2 m and 3 m with some slight seasonal fluctuation. Groundwater flow in the vicinity is indicated to be towards the west/southwest.

5.2 Preliminary Environmental Assessment

5.2.1 Potential Sources of Contamination

The site has included stables, a flour mill (and associated granary etc) together with a 'depot'. The depot is listed as being associated with secure waste storage and associated permit exemptions. Although details are not available, as permits appear not to have been required for these operations it is indicated that handling of hazardous substances/materials should not have been included in these site operations. A small section of the site extends over a section of former railway sidings and it appears that the site has been raised in this area above the railway level. Current use of the site comprises offices and some car parking.

A small electricity substation is indicated nearby, but this is understood to be outside the site and located such that coolant leakage/spillage should not enter the site. The area of the substation has been recently developed with residential properties.

Adjoining the site to the south, is a fuel depot, which has been subject to a number of ground investigations and groundwater monitoring over the period 2009 to 2018. In addition, a programme of groundwater treatment/remediation has been undertaken. Currently, a completion/verification report on the remediation works is not available, and it appears that the remediation works are not accepted by the Environment Agency as complete in relation to a proposed residential development of the fuel depot property. Significant LNAPL is reported within the fuel depot area but appears to have been significantly reduced (although not entirely removed) since the remediation works ceased. LNAPL has not been detected within the site, although some dissolved phase petroleum hydrocarbons are recorded within the southern margin of the site. The available data is compatible with a groundwater flow to the west/southwest, as indicated in the available reports.

In view of the foregoing, within the site, there is a potential for some harmful substances to be present as associated with Made Ground materials placed within the site, and the current information includes reference to 'coal fragments'. It is also possible that ashes could be present that may be associated with polyaromatic hydrocarbons (PAHs), sulphates and certain metal compounds. More recent fill materials that include demolition debris, asbestos fibres and/or fragments of asbestos containing materials (ACMs) could also be present.

Although a short section of two railway sidings was formerly present within the eastern margin of the site, these were not associated with any goods loading/unloading and now appear to be buried beneath a thickness of fill materials and the office building on the eastern side of the site. In this context, it is likely that the nature of the fill materials/Made Ground (as outlined above) is of more significance than residues from limited railway operations, now at depth.

It is evident that groundwater within the southern margin of the site has been impacted by petroleum hydrocarbons (with significant dissolved phase concentrations recorded) that appear to have migrated from below the adjoining fuel depot. On the basis of the current data, it appears very unlikely that these petroleum hydrocarbons in groundwater would be associated with a viable source of vapour emissions from volatile fractions. In the context of the remediation works undertaken and continuing degradation of petroleum hydrocarbons, it is unlikely that risks would increase in the future, unless additional unauthorised release/spillage of petroleum fuels into groundwater were to occur.

Based on the information currently available, no significant organic or putrescible materials are indicated as likely within the ground below the site, or within influencing distance, and no viable source of ground gas emissions has been identified at the site or the surrounding area.

5.2.2 Potential Pollutant Linkages and Preliminary Risk Assessment

The available information has been used to produce a preliminary Conceptual Site Model for this site, in accordance with CIRIA C552 (2001) and BS 10175:2011+A2:2017, and this is presented in Table 1.

Based on the Conceptual Site Model, there are certain potential pollutant linkages that have been identified with respect to the proposed development. With regard to human health, the proposed buildings and hardstanding will provide an effective barrier between end users and the existing ground such that there would be no realistic dermal or oral (ingestion) exposure pathways following development.

The proposed development will include areas of managed soft landscaping. Such landscaping will form amenity areas for end users but there will be no private cultivation permitted. Therefore, if shallow soils at the site are impacted with potential contaminants, there could be a risk of dust exposure (largely oral – ingestion and inhalation) if only minimum thicknesses of topsoil are placed in landscaping areas as root mixing and soil organism activity could return impacted soils to shallow depth.

The site appears to be devoid of topsoil, such that it will be necessary to import soils to provide a growing medium for the proposed soft landscaping/planting.

In view of the above, it is likely to be necessary that a capping layer/barrier of controlled imported soils (topsoil, and possibly with subsoil) be placed in areas of proposed soft landscaping. Outside these areas, the proposed hard-surfaced areas and building will mitigate risks relating to oral and dermal exposure pathways. On the basis of the current (relatively limited) data, a significant source of potential volatiles/vapour emissions from impacted groundwater below the site is not indicated and there is no record currently available to indicate that the existing buildings on site have been adversely affected to date or for a pollutant linkage to be valid regarding vapour emissions from the impacted groundwater below the site. However,

subject to further review and assessment following a ground investigation, it would be prudent to include an allowance for the inclusion in the proposed building substructure of a membrane resistant to petroleum hydrocarbon vapours and in conjunction with underfloor passive ventilation and associated protective details. In compliance with current published guidance, the installation of such precautions is now required to be undertaken by qualified specialists, inspected/verified and documented.

Groundworkers may be exposed to the potential contaminants identified above during construction works. Whilst this is a relatively short-term exposure, it is recommended that appropriate personal protective equipment be provided and worn at all times. Soils should be kept damp during groundworks to mitigate aerial migration/dust emissions to neighbouring properties in compliance with standard good practice. Consideration/risk assessment may be necessary to the possible presence of petroleum vapours and precautions in any below-ground confined-space working.

In view of the reported coal within the Made Ground, it will be necessary to assess any significant volumes of coal materials as found to remain below the proposed building, in the context of combustion risk in the event of a building fire (as detailed in ICRCCL 61/84:1986). In the unlikely event that significant volumes of coal materials are encountered below the proposed building, it would be necessary to remove such materials from within 1 m of the ground level below the building, if such materials are shown to be associated with high risk of combustion.

Based on guidance published by UKWIR (2010), the site may be considered as 'brownfield', with respect to the protection of pipes for potable water. Therefore, conventional plastic materials may be constrained or precluded in use for portable water supply pipes in new developments. Hence, it would be prudent to make allowance for the installation of proprietary multi-layer barrier pipes until the policies and requirements of the local water company are known (and such policies may vary from the guidance by UKWIR).

It is not known if Made Ground materials contain sulphates, as may be deleterious to certain buried concrete. It will be necessary to review designs for buried concrete following a ground investigation.

On the basis of the information currently available, no significant sources of potential groundwater contamination are indicated within the site. However, in view of the impaction of groundwater recorded within the site, as relating to migration from the adjoining fuel depot, it will be necessary to consider groundwater protection issues in the design and construction of foundations and infrastructure associated with the proposed development and the following development constraints are identified:

- a. Where feasible, foundations and services (including drains) for the proposed development should be located above groundwater levels (to minimise potential interaction with impacted groundwater).
- b. Where foundations are required to extend below groundwater, a foundation risk assessment is likely to be required (as below).
- c. The installation of services that extend across the southern site boundary and are located below groundwater should preferably be avoided or else detailed to ensure that a possible migration pathway is not introduced.
- d. It will be necessary to assess groundwater quality prior to any dewatering that may be required for temporary works/construction below groundwater that is essential for site development. If groundwater is found to be significantly impacted, a temporary discharge to foul sewer could be constrained or precluded.
- e. Soakaway drainage is likely to be precluded by groundwater protection requirements (and other issues) as detailed in Section 5.5.

With reference to the possible foundation solutions, as outlined in Section 5.4, it is noted that none of the foundation options introduces a potential migration pathway that would provide a discernible change to lateral groundwater flow, penetrate an aquiclude (none is indicated above the chalk strata), or increase risk to groundwater resources. On this basis, the recommended foundations solutions should be compatible with a suitable foundation risk assessment (as may be undertaken when additional details of the proposed foundation solution are defined).

In view of all of the foregoing, it is indicated that the proposed development should be technically feasible and may be implemented in compliance with published policies regarding contaminated land, groundwater protection and risk assessment.

5.3 Assessment of Ground Stability

The site is not within an area of recorded underground mining or other such mineral extraction or known voids. Although chalk strata can be associated with unrecorded abandoned mineworkings, the site is within the margin of the lowest mining risk category as defined by the BGS and the type of chalk indicated below the site is not usually associated with mining.

In theory, chalk strata can be dissolved by water and solution features can fill with loose superficial deposits. Such deposits can be susceptible to collapse settlement (if loads are applied) or to inundation settlement (if large volumes of water are introduced to the superficial materials). However, based on the geological database information and BGS databases, the site is located within an area classified with a 'very low' hazard rating and where solution features have not been recorded in close proximity. This is compatible with the indicated chalk strata below the site, which comprise 'marly' horizons that are less susceptible to solution effects.

In view of the foregoing, it is considered that risks of poor ground support are very low to negligible in relation to past mining or natural solution features. In the very unlikely situation that anomalous ground conditions are indicated during construction then, additional geotechnical inspection and assessment would be recommended.

5.4 Assessment of Foundations and Ground Floor Construction

It is understood that the proposed development will comprise a three-storey block of apartments. An indicative plan of the proposed development layout is shown on Figure 3.

On the basis of the current information, it is likely that the Made Ground and shallow River Terrace deposits would not be suitable to provide the required foundation support. Hence, consideration may be given to the following alternative foundation solutions, which appear to be feasible at this stage:

- Vibro-replacement ground treatment (formation of 'stone columns') in conjunction with shallow reinforced strip footings. It should be appreciated that it will be necessary to obtain confirmation from specialist designers/contractors that the recorded ground conditions are suitable for their specific system, with particular consideration of the 'marly' chalk strata likely to be present at the base of the treatment. This solution will also require preparation of a detailed foundation risk assessment and consideration of potential upward vapour migration from impacted groundwater would be necessary. This solution, if confirmed, should provide a more economical and more sustainable solution in comparison to piles, as below.
- Piled foundation solutions may also be considered, although it should be noted that pile arisings from bored solutions may include materials impacted with petroleum hydrocarbons and possibly classified

as 'hazardous' waste. The vastly increased use of concrete and much increased waste disposal requirements significantly reduce the sustainability of this solution.

In the event that suitable chalk strata and/or River Terrace deposits are identified in the ground investigation at a suitable shallow depth across most of the site, and the deep Made Ground confirmed to be very localised, then it may be feasible to consider the use of trench-fill footings, located within high strength natural strata. However, at this stage, this solution of trench-fill footings is not confirmed to be viable.

In view of the recorded Made Ground, it is recommended that allowance be made for suspended ground floor slabs. Allowance should also be made for a possible requirement for soil volume change effects (potential heave) and associated precautions to floor slabs and foundations near to trees and where unsaturated clays/weathered chalk occur. Reference should also be made to the vapour precautions outlined in Section 5.2.

The site adjoins operational railway lines such that it is likely that construction working methods would need to consider safety issues in relation to the nearby railway.

5.5 Soakaway Drainage

In view of the impacted groundwater recorded below at least part of the site, the significantly impacted groundwater below the adjoining fuel depot (with continued LNAPL evident in the depot area) and with reference to the recorded 'low' permeability strata, together with constraints relating to solution feature/ground support risks, the use of soakaway drainage is expected to be precluded for the proposed development, in line with the guidance in BRE DG365:2016. On this basis, an alternative SuDS drainage solution should be considered.

6. RECOMMENDATIONS FOR GROUND INVESTIGATIONS

It is recommended that a ground investigation be undertaken at the site to obtain appropriate data to confirm the preliminary environmental assessment and to allow an appropriate foundation solution to be confirmed.

It is recommended that, at an initial stage, an investigation uses windowless sampling techniques, which is likely to be compatible with access restrictions at the site. The investigation should extend through Made Ground to assess the natural strata beneath the site. Samples should be recovered for geotechnical and analytical laboratory testing. It would also be beneficial to obtain data regarding current groundwater quality below the site together with any additional available records regarding remediation and/or any continued groundwater monitoring at the adjoining fuel depot.

Depending on the findings of the first phase of investigation (and assuming the development proposals remain largely as the current plans), supplementary ground investigation may be required when suitable access is available. The scope of works will be dependent on the findings of the first phase of works and could include trial pits and/or boreholes as necessary to confirm ground conditions and obtain additional data for design purposes and support more detailed risk assessment, as necessary. If it is proposed not to install precautions against possible vapour intrusion into the proposed building, then additional groundwater monitoring may be necessary.

7. SUMMARY

It is proposed to develop a site off Station Road, Great Shelford for residential purposes. The site is currently occupied by several commercial properties and a car park. It is understood that the proposed development will comprise a three-storey block of apartments together with car parking and managed soft landscaping. Residents will be of retirement age.

Ground conditions at the site are indicated to comprise a variable thickness of Made Ground associated with past redevelopments at the site. Beneath the Made Ground, a limited thickness of River Terrace Deposits (clays) are recorded in some areas. Below this are chalk strata (of 'marly' materials). Groundwater has been recorded at between 2 m and 3 m depth approximately and in the southern margin of the site has been reported to include significant impactation by petroleum hydrocarbons as apparently migrated from the adjoining fuel depot.

A number of potential pollutant linkages are identified, largely in relation to Made Ground indicated on site. In this context, it is likely that the proposed development will require a capping layer/barrier of imported soils, barrier pipe may be required for water supply pipes, a suitable concrete mix used and possible removal of any shallow deposits of highly combustible coaly materials (if present).

Groundwater in the southern section of the site is recorded to have been impacted by petroleum hydrocarbons that appear to have migrated from the fuel depot adjacent to the site. The currently available data indicates the concentrations of volatile fractions may be unlikely to cause harmful emissions into the proposed building and a valid pollutant linkage appears to be unlikely from the current data. However, subject to additional investigation and assessment, it would be prudent for an allowance to be included at this stage for the inclusion of protective vapour-resistant measures to the building substructure.

The site is underlain at relatively shallow depth by chalk strata. With reference to the desk study information, there are no records of voids or similar features in the vicinity, as relating to past mining or natural solution features. On this basis risks of poor ground support are considered to be very low to negligible, such that development should not be precluded or significantly constrained.

In view of the variable shallow strata and locally deep Made Ground (and in conjunction with the recorded groundwater), the use of trench-fill footings may not be feasible.

A suitable foundation solution should be provided either by vibro-replacement ground treatment in conjunction with shallow reinforced strip footings or a piled solution. The use of ground treatment will require confirmation by a specialist designer/contractor and acceptance of a foundation risk assessment by the regulatory authorities may also be required. However, if confirmed, this solution would offer benefits in terms of cost and sustainability.

A suspended ground floor with suitable underfloor void is recommended.

In view of groundwater protection constraints and together with recorded 'low' permeability strata, relatively shallow groundwater and ground support risk issues, soakaway drainage is indicated to be precluded.

A ground investigation should be undertaken to assess the potential pollutant linkages that have been identified, provide additional monitoring data that may be required and to confirm the most appropriate foundation solution. The information included in this report indicates that the proposed development should be technically feasible.

REFERENCES

Site Specific References (relating to the adjoining fuel depot)

SLR (October 2018) *Fuel Depot, 2 Station Road, Great Shelford: Phase 1 Data Review and Preliminary Land Quality Assessment* Ref. 416.05952.00003 –PLQRA Draft v2

SLR (August 2019) *Fuel Depot, 2 Station Road, Great Shelford: Detailed Quantitative Risk Assessment* Ref. 416.05952.00004 –DQRA Final v2

Technical References

BRE (2015) *BR211 – Radon: Guidance on protective measures for new buildings* BRE Press

BSI (2017) *BS 10175:2011+A2:2017 Code of Practice for Investigation of Potentially Contaminated Sites* British Standards Institution

BSI (2020) *BS 5930:2015+A1:2020 Code of Practice for Ground Investigations* British Standards Institution

CIRIA (2001) *CIRIA C552 – Contaminated Land Risk Assessment: A guide to Good Practice* Construction Industry Research Association

CIRIA (2002) *CIRIA C574 – Engineering in Chalk* Construction Industry Research Association

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CIRIA (2014) *CIRIA C735 Good Practice on the Testing and Verification of Protective Systems for Buildings Against Hazardous Ground Gas* Construction Industry Research Association

CIRIA (2016) *CIRIA C750 Groundwater control: design and practice* Construction Industry Research Association

CL:AIRE (2017) *Petroleum Hydrocarbons in Groundwater: Guidance on Assessing Petroleum Hydrocarbons Using Existing Hydrogeological Risk Assessment Methodologies* Contaminated Land

Environment Agency (2013) *Groundwater Protection: Principles and Practice (GP3) version 1.1* EA

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Ministry of Housing, Communities and Local Government (2019) *National Planning Policy Framework*

NHBC (2021) *Standards* National House Building Council

NHBC and Environment Agency (2008) *Guidance for the Safe Development of Housing on Land Affected by Contamination R&D Publication 66: 2008*

South Cambridgeshire District Council (2018) *South Cambridgeshire Local Plan: Adopted* Ref. SCDC/LP/27.09.2018

GENERAL NOTES

1. This report is provided as a preliminary site appraisal only, in the context of the stated development proposals and should not be used in a different context. Further geotechnical assessment, and possibly detailed investigations, will be required prior to finalisation of ground related designs.
2. Where any data supplied by the Client or by other external sources, including previous site investigation data, have been used it has been assumed that the information is correct unless otherwise stated. No responsibility can be accepted by Crossfield Consulting Limited for inaccuracies within the data supplied by others.
3. Any assessments made in this report are based on the ground conditions indicated by the trial pits and desk study. Variations in ground conditions may occur between exploratory hole locations and there may be special conditions appertaining to the site which have not been revealed by the investigation and which have not been taken into account in the report. The assessment may be subject to amendment in the light of additional information becoming available.
4. The report is provided for the sole use by the Client or its assignees and is confidential to the Client's professional advisers. No responsibility whatsoever for the contents of this report will be accepted to any person other than the Client or its assignees.
5. New information, improved practices and legislation may necessitate an alteration to the report in whole, or in part, after its submission. Therefore with any change in circumstances or after the expiry of one year from the date of the report, the report should be referred to Crossfield Consulting Limited for re-assessment and, if necessary, re-appraisal.

TABLES

TABLE 1

CONCEPTUAL SITE MODEL

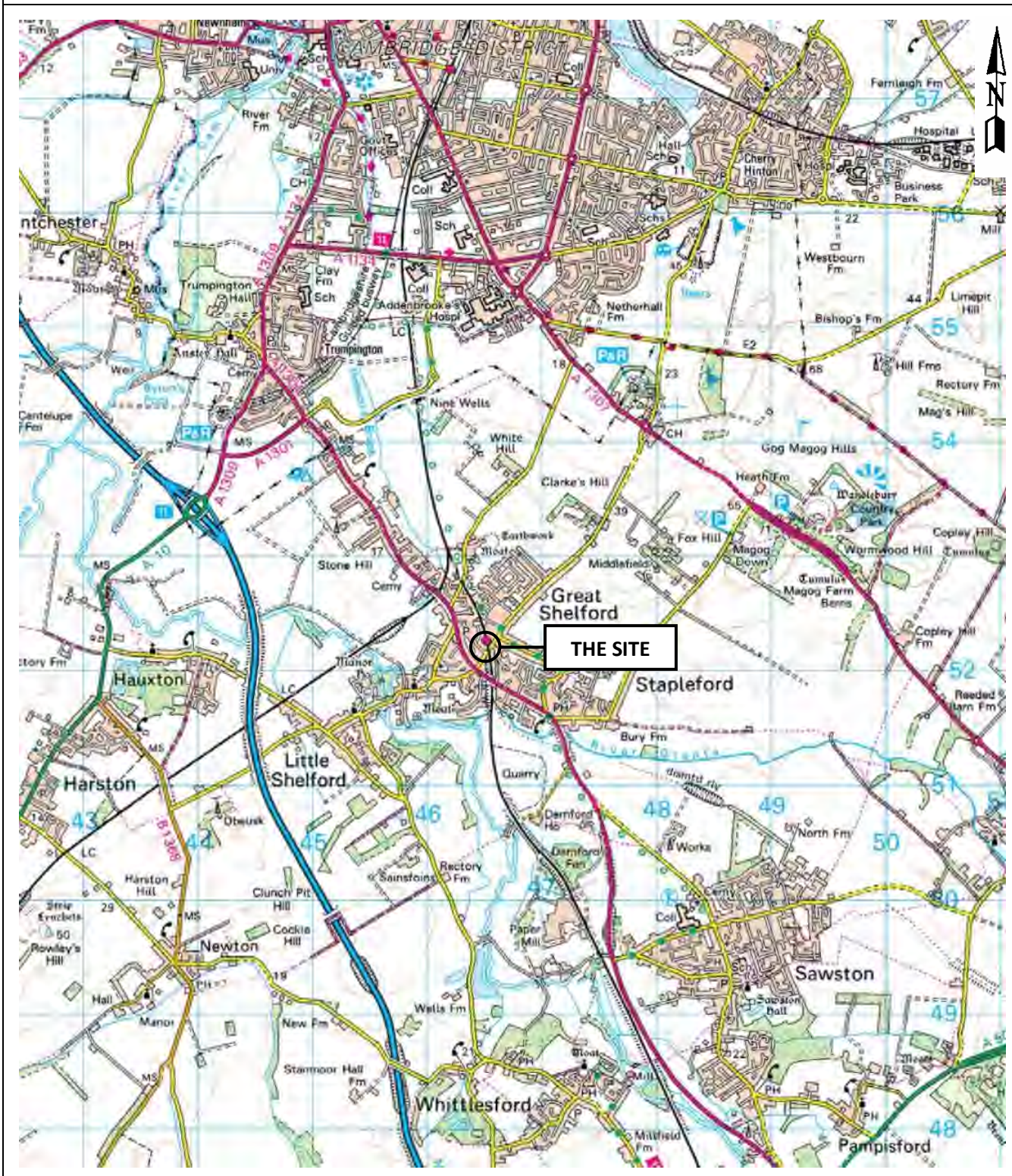
Potential Contaminant Source	Potential Pathway	Receptors and Assessed Pollutant Linkage
<p>Solids <i>Toxic and Phytotoxic metals:</i> Potential minor source associated with Made Ground materials <i>PAHs:</i> Potential source minor associated with Made Ground materials <i>Asbestos:</i> Potential source from demolition materials, if included in Made Ground <i>Sulphates:</i> Potential minor source associated with Made Ground materials</p> <p>Off-Site Source Dissolved phase petroleum hydrocarbons (but no LNAPL) have been recorded within the southern margin of the site, as apparently associated with the adjoining fuel depot.</p> <p>Liquids No evidence of potential source on site</p> <p>Ground Gases <i>Landfill gases:</i> No evidence of potential source <i>Other Ground Gas Sources:</i> No evidence of potential source <i>Radon:</i> No evidence of potential source</p>	<p>Movement of Solids Dermal and oral exposure pathways (including air-borne migration) are present during construction phase but will generally not be present following development due to building and hardstanding effective barriers. Limited landscaping areas after development represent possible dust exposure pathways.</p> <p>Chemical Permeation/Reaction Certain organic compounds (including petroleum fractions) can penetrate or be deleterious to plastic construction materials. Certain concrete mixes can deteriorate if in contact with sulphate-bearing materials.</p> <p>Release into Liquid Phase (Leaching) Metals and PAHs as possible within the site have generally low solubility. Potential for plant uptake of metals.</p> <p>Release into Vapour Phase More volatile fractions of petroleum hydrocarbons in groundwater can release vapours, although based on the current data, a significant release of such vapours is not indicated.</p> <p>Movement of Liquids The strata below the site are indicated to be of low permeability and groundwater flow is indicated not to be directly from the fuel depot into the site. However, some lateral spreading/dispersion of petroleum hydrocarbons into the site is apparent.</p> <p>Movement of Ground Gases Not applicable no source</p>	<p>Human Health <i>End Users:</i> Possible pollutant linkage <i>Groundworkers:</i> Possible pollutant linkage <i>Neighbouring Properties:</i> Possible pollutant linkage</p> <p>Buried Structures & Services <i>Buried concrete:</i> Possible pollutant linkage <i>Potable water pipes:</i> Possible pollutant linkage</p> <p>Landscape Areas Possible pollutant linkage</p> <p>Controlled Waters <i>Groundwater:</i> Principal aquifer at shallow depth, no source protection zone – Possible pollutant linkage, as relating primarily to off-site source</p> <p>Human Health (Ground Gases) No pollutant linkage</p>

NOTES

1. The above conceptual model is based on CIRIA C552 (2001) and BS 10175:2011+A2:2017.
2. The Conceptual Site Model is prepared from available desk study information. .

FIGURES

FIGURE 1



SITE LOCATION PLAN

Scale 1: 50,000

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FIGURE 2



SITE PLAN
1:1250

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INDICATIVE PROPOSED DEVELOPMENT LAYOUT

Scale 1:500

Reproduced from Drawing No. 19/ER010/TN03 by Planning Issues, dated May 2019

APPENDIX I

Site Details:

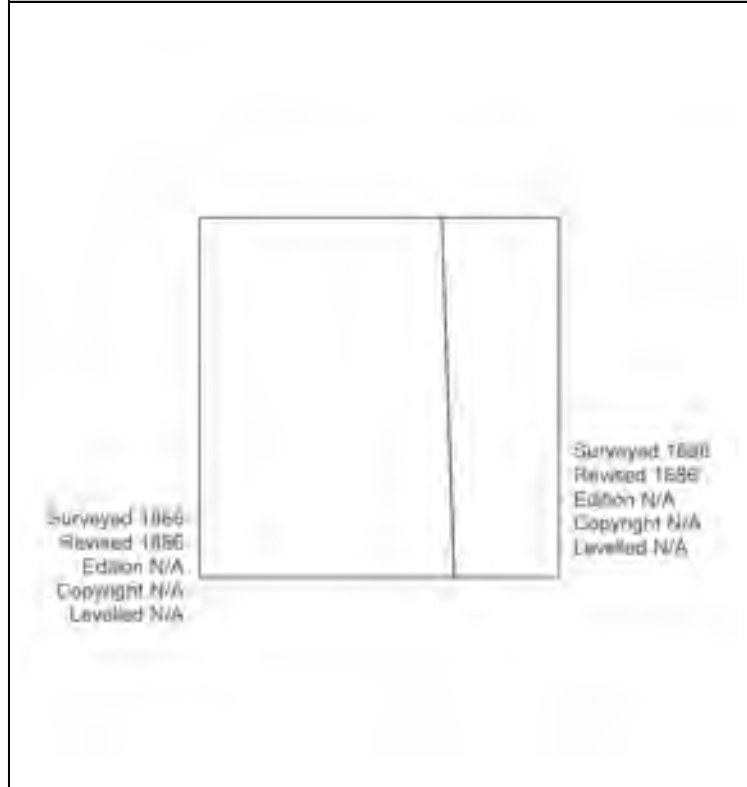
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Report Ref: EMS-681823_895999
Grid Ref: 546487, 252109

Map Name: County Series

Map date: 1886

Scale: 1:2,500

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Site Details:

Client Ref: EMS_681823_895999
Report Ref: EMS-681823_895999
Grid Ref: 546487, 252109

Map Name: County Series

Map date: 1903

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Printed at: 1:2,500



Surveyed 1903
 Revised 1903
 Edition N/A
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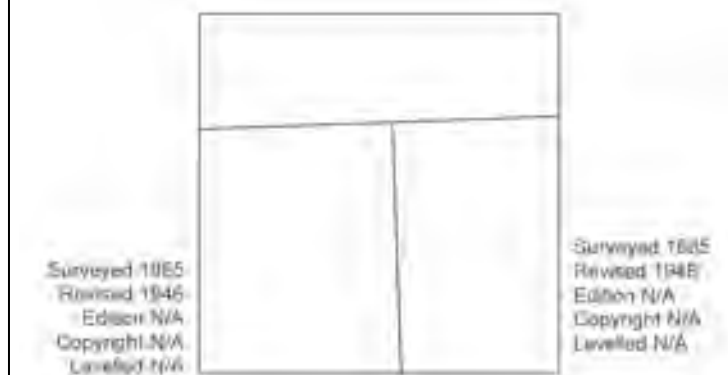
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Report Ref: EMS-681823_895999
Grid Ref: 546487, 252109

Map Name: County Series

Map date: 1946

Scale: 1:10,560

Printed at: 1:10,560



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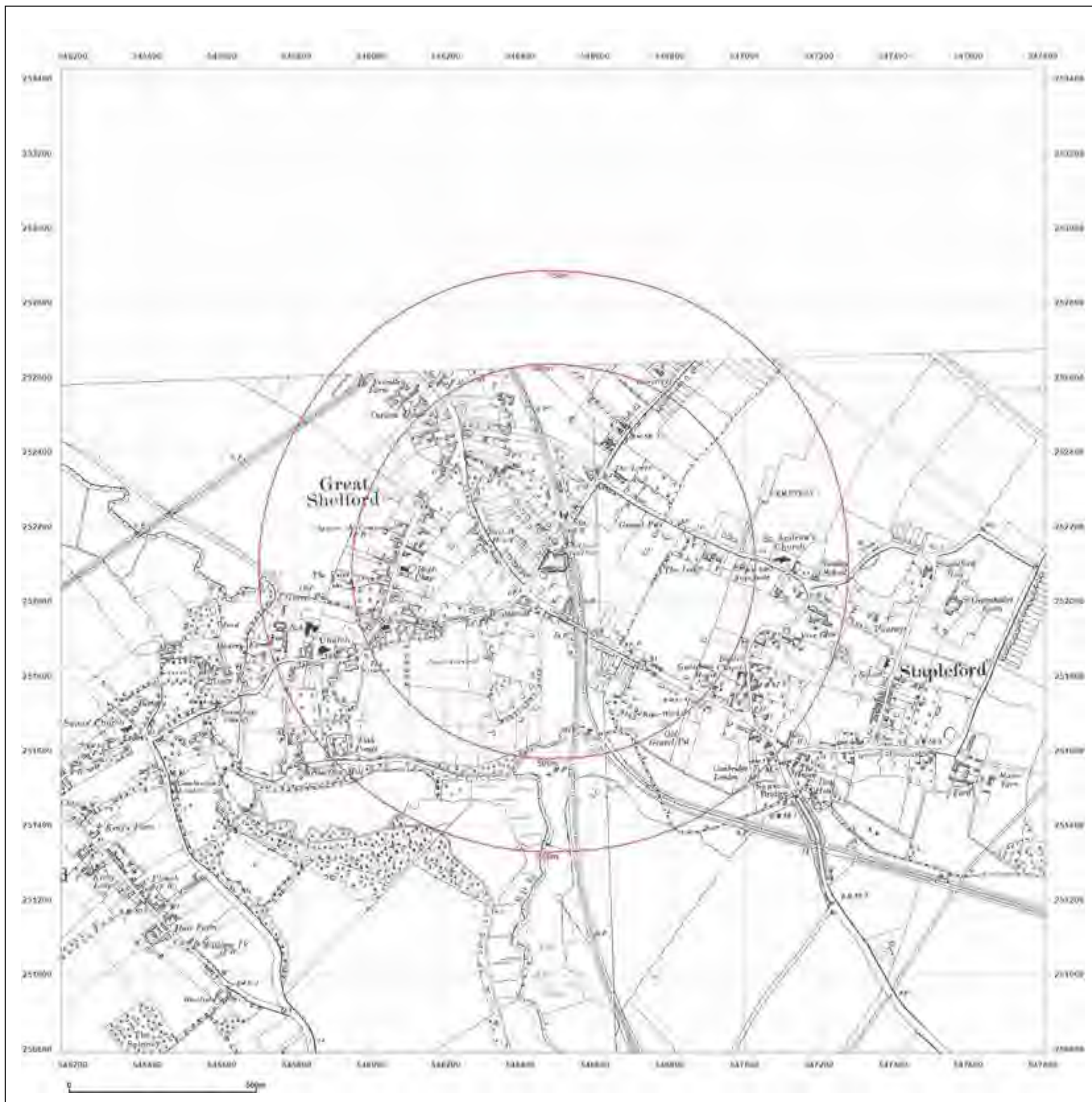


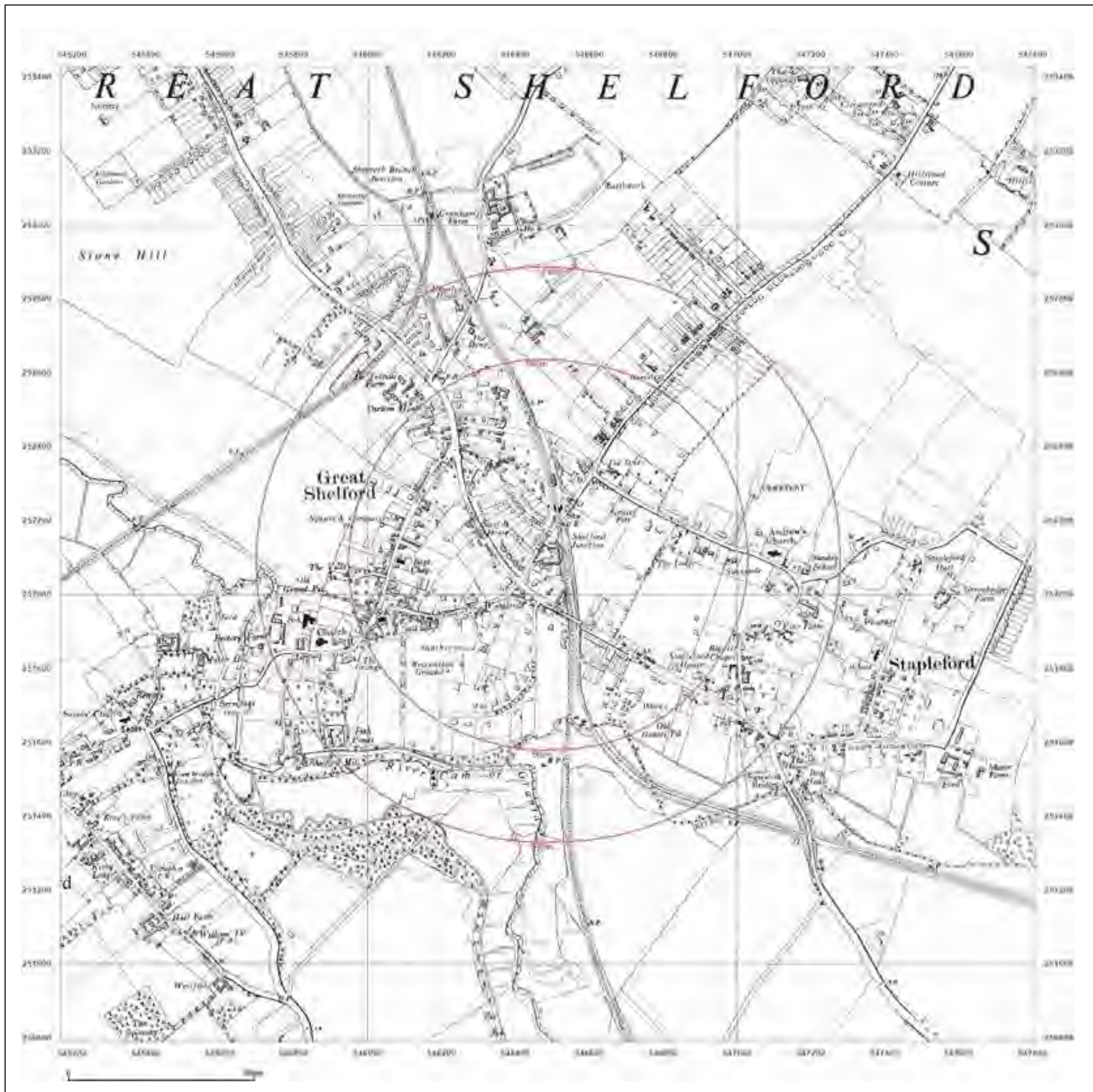
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Site Details:

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Report Ref: EMS-681823_895999
Grid Ref: 546487, 252109

Map Name: Provisional

Map date: 1959

Scale: 1:10,560

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Surveyed N/A
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 Edition N/A
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Site Details:

Client Ref: EMS_681823_895999
Report Ref: EMS-681823_895999
Grid Ref: 546487, 252109

Map Name: National Grid

Map date: 1970

Scale: 1:2,500

Printed at: 1:2,500



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Edition N/A
Copyright 1977
Levelled 1955



Surveyed 1970
Revised 1970
Edition N/A
Copyright 1977
Levelled 1955



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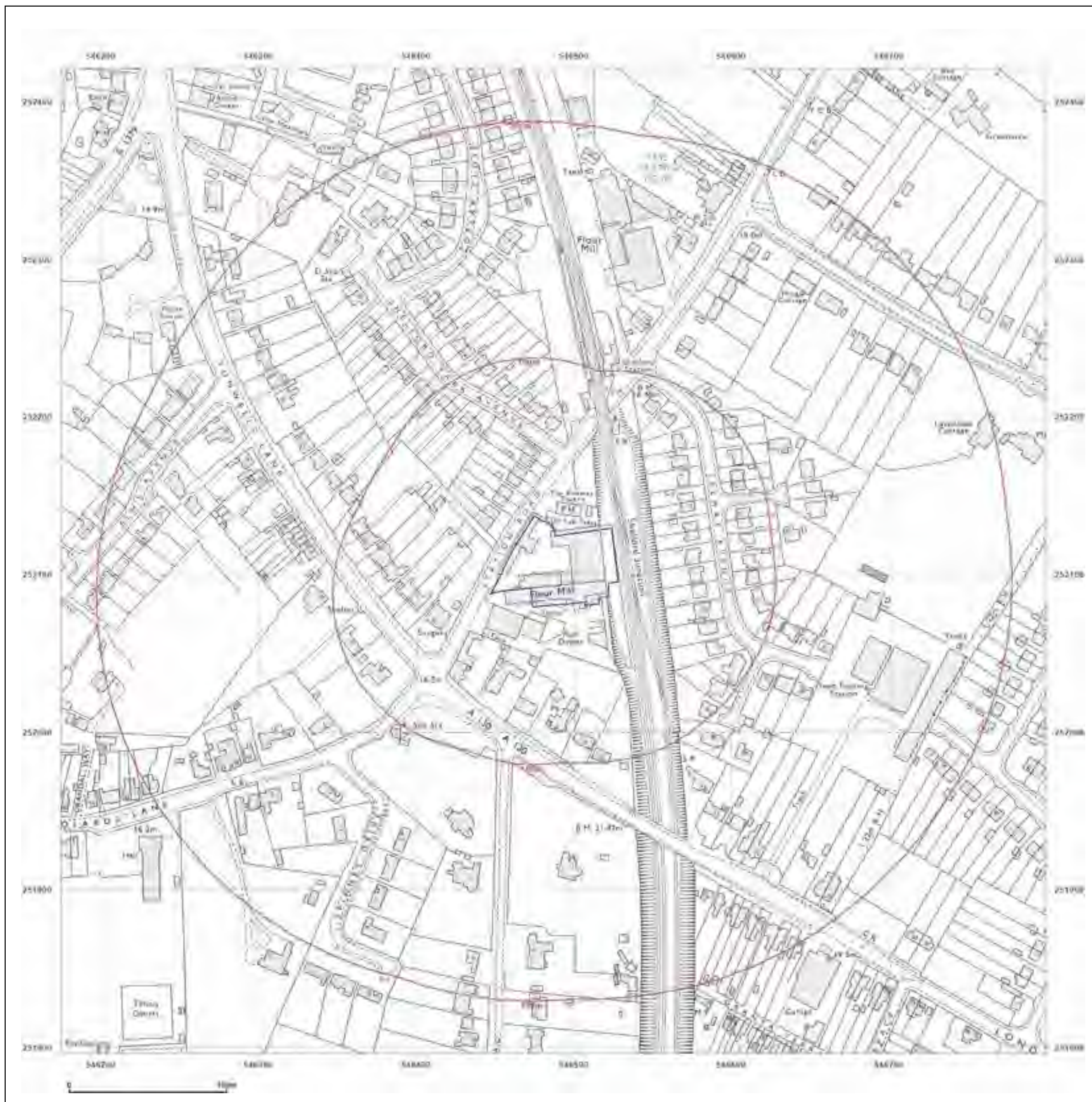


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Site Details:

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Report Ref: EMS-681823_895999
Grid Ref: 546487, 252109

Map Name: National Grid

Map date: 1985

Scale: 1:2,500

Printed at: 1:2,500



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Edition N/A
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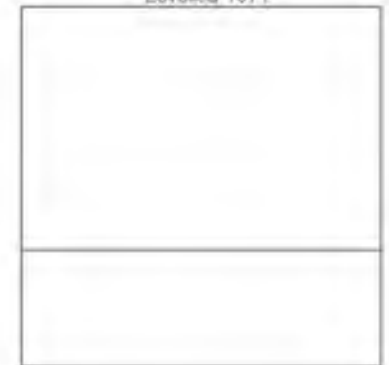
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Scale: 1:2,500

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Site Details:

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Report Ref: EMS-681823_895999
Grid Ref: 546487, 252109

Map Name: National Grid

Map date: 1993

Scale: 1:2,500

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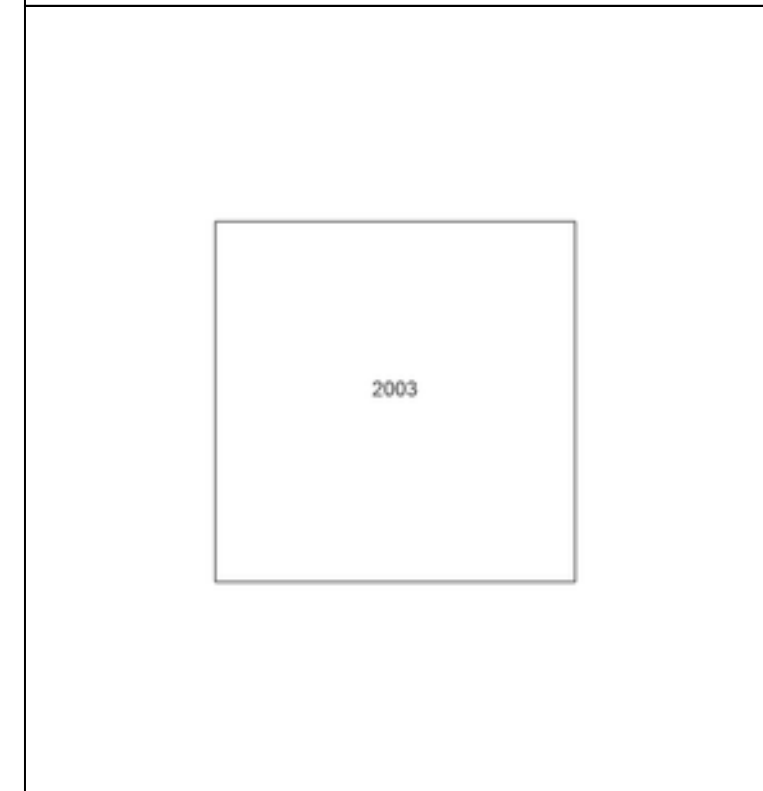
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 Report Ref: EMS-681823_895999
 Grid Ref: 546487, 252109

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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Site Details:

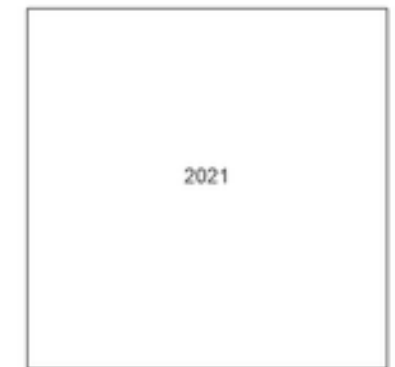
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 Report Ref: EMS-681823_895999
 Grid Ref: 546487, 252109

Map Name: National Grid

Map date: 2021

Scale: 1:10,000

Printed at: 1:10,000



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APPENDIX II

APPENDIX II – DESK STUDY INFORMATION

GroundsureEnviro+Geo Insight Databases

An Enviro+Geo Insight Report has been obtained from Groundsure regarding the site and surrounding area. This includes reference to databases from a variety of sources and include sentries that cover Environment Agency permits, waste sites, hazardous substances, industrial landuse, groundwater vulnerability, source protection zones and floodplains.

Also included is reference to databases that cover geological data, including information regarding mining/mineral extraction, natural cavities and landslips.

A report is included in this Appendix for a search radius of up to 1 km around the site and this report includes a summary table of the search results. A higher resolution copy of the report can be provided on request.

Environment Agency

Water Framework Directive information is provided, as available from the Environment Agency for the relevant catchment. The records are reproduced under the Open Government Licence, available for viewing at <http://www.nationalarchives.gov.uk/doc/open-government-licence>.

Defra

Enquiries were made to the Defra Magic website, managed by Natural England, which provides geographic information about the natural environment from various government departments and agencies. The data is provided in map format and extracts of maps displaying relevant database Information are reproduced in this Appendix.

British Geological Survey

Records of Wells and Exploratory Holes close to the site, held by the British Geological Survey National Geological Records Centre, are presented in this Appendix. The locations of these holes are identified within a plan provided in this Appendix. The records are reproduced under the Open Government Licence, available for viewing at <http://www.nationalarchives.gov.uk/doc/open-government-licence>.

546491 252106

Order Details

Date: 01/04/2021
Your ref: EMS_681823_896000
Our Ref: EMS-681823_896000
Client: emapsite

Site Details

Location: 546491 252106
Area: 0.3 ha
Authority: [South Cambridgeshire District Council](#)



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Summary of findings

p. 2

Aerial image

p. 8

OS MasterMap site plan

p.13

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Contact us with any questions at:

info@groundsure.com

08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	<u>Historical industrial land uses</u>	6	4	20	13	-
16	1.2	<u>Historical tanks</u>	0	3	3	0	-
17	1.3	<u>Historical energy features</u>	0	2	7	6	-
18	1.4	Historical petrol stations	0	0	0	0	-
18	1.5	<u>Historical garages</u>	0	0	1	8	-
19	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
20	2.1	<u>Historical industrial land uses</u>	8	6	28	16	-
23	2.2	<u>Historical tanks</u>	0	6	7	0	-
23	2.3	<u>Historical energy features</u>	0	4	14	15	-
25	2.4	Historical petrol stations	0	0	0	0	-
25	2.5	<u>Historical garages</u>	0	0	1	11	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
27	3.1	Active or recent landfill	0	0	0	0	-
27	3.2	Historical landfill (BGS records)	0	0	0	0	-
28	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
28	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
28	3.5	<u>Historical waste sites</u>	0	0	0	1	-
28	3.6	Licensed waste sites	0	0	0	0	-
29	3.7	<u>Waste exemptions</u>	4	0	0	1	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
30	4.1	<u>Recent industrial land uses</u>	1	2	9	-	-
31	4.2	<u>Current or recent petrol stations</u>	0	0	0	2	-
32	4.3	Electricity cables	0	0	0	0	-
32	4.4	Gas pipelines	0	0	0	0	-
32	4.5	Sites determined as Contaminated Land	0	0	0	0	-



32	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
32	4.7	Regulated explosive sites	0	0	0	0	-
33	4.8	Hazardous substance storage/usage	0	0	0	0	-
33	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
33	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
33	4.11	<u>Licensed pollutant release (Part A(2)/B)</u>	0	0	0	1	-
34	4.12	Radioactive Substance Authorisations	0	0	0	0	-
34	4.13	<u>Licensed Discharges to controlled waters</u>	0	0	0	2	-
34	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
35	4.15	Pollutant release to public sewer	0	0	0	0	-
35	4.16	List 1 Dangerous Substances	0	0	0	0	-
35	4.17	<u>List 2 Dangerous Substances</u>	1	0	0	0	-
35	4.18	<u>Pollution Incidents (EA/NRW)</u>	0	0	0	1	-
36	4.19	Pollution inventory substances	0	0	0	0	-
36	4.20	Pollution inventory waste transfers	0	0	0	0	-
36	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
37	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
38	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
39	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
40	5.4	<u>Groundwater vulnerability- soluble rock risk</u>	Identified (within 0m)				
40	5.5	Groundwater vulnerability- local information	None (within 0m)				
41	5.6	<u>Groundwater abstractions</u>	0	0	0	1	12
44	5.7	<u>Surface water abstractions</u>	0	0	0	2	13
48	5.8	<u>Potable abstractions</u>	0	0	0	0	1
48	5.9	Source Protection Zones	0	0	0	0	-
48	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
49	6.1	Water Network (OS MasterMap)	0	0	0	-	-



49	6.2	Surface water features	0	0	0	-	-
50	6.3	<u>WFD Surface water body catchments</u>	2	-	-	-	-
50	6.4	<u>WFD Surface water bodies</u>	0	0	0	-	-
51	6.5	<u>WFD Groundwater bodies</u>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
52	7.1	Risk of Flooding from Rivers and Sea (RoFRaS)	None (within 50m)				
52	7.2	Historical Flood Events	0	0	0	-	-
52	7.3	Flood Defences	0	0	0	-	-
52	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
53	7.5	Flood Storage Areas	0	0	0	-	-
54	7.6	Flood Zone 2	None (within 50m)				
54	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
55	8.1	<u>Surface water flooding</u>	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
57	9.1	<u>Groundwater flooding</u>	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
58	10.1	<u>Sites of Special Scientific Interest (SSSI)</u>	0	0	0	0	1
59	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
59	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
59	10.4	Special Protection Areas (SPA)	0	0	0	0	0
59	10.5	National Nature Reserves (NNR)	0	0	0	0	0
60	10.6	<u>Local Nature Reserves (LNR)</u>	0	0	0	0	1
60	10.7	Designated Ancient Woodland	0	0	0	0	0
60	10.8	Biosphere Reserves	0	0	0	0	0
60	10.9	Forest Parks	0	0	0	0	0
61	10.10	Marine Conservation Zones	0	0	0	0	0
61	10.11	<u>Green Belt</u>	0	0	0	1	0
61	10.12	Proposed Ramsar sites	0	0	0	0	0



61	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
62	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
62	10.15	Nitrate Sensitive Areas	0	0	0	0	0
62	10.16	<u>Nitrate Vulnerable Zones</u>	2	0	0	0	0
63	10.17	<u>SSSI Impact Risk Zones</u>	1	-	-	-	-
64	10.18	<u>SSSI Units</u>	0	0	0	0	1
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
66	11.1	World Heritage Sites	0	0	0	-	-
67	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
67	11.3	National Parks	0	0	0	-	-
67	11.4	Listed Buildings	0	0	0	-	-
67	11.5	<u>Conservation Areas</u>	0	1	0	-	-
68	11.6	Scheduled Ancient Monuments	0	0	0	-	-
68	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
69	12.1	<u>Agricultural Land Classification</u>	Urban (within 250m)				
70	12.2	Open Access Land	0	0	0	-	-
70	12.3	Tree Felling Licences	0	0	0	-	-
70	12.4	Environmental Stewardship Schemes	0	0	0	-	-
70	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
71	13.1	<u>Priority Habitat Inventory</u>	0	0	2	-	-
72	13.2	Habitat Networks	0	0	0	-	-
72	13.3	Open Mosaic Habitat	0	0	0	-	-
72	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
73	14.1	<u>10k Availability</u>	Identified (within 500m)				
74	14.2	Artificial and made ground (10k)	0	0	0	0	-
75	14.3	<u>Superficial geology (10k)</u>	1	1	0	1	-



76	14.4	Landslip (10k)	0	0	0	0	-
77	14.5	<u>Bedrock geology (10k)</u>	3	0	0	0	-
78	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
79	15.1	<u>50k Availability</u>	Identified (within 500m)				
80	15.2	Artificial and made ground (50k)	0	0	0	0	-
80	15.3	Artificial ground permeability (50k)	0	0	-	-	-
81	15.4	<u>Superficial geology (50k)</u>	1	1	0	1	-
82	15.5	<u>Superficial permeability (50k)</u>	Identified (within 50m)				
82	15.6	Landslip (50k)	0	0	0	0	-
82	15.7	Landslip permeability (50k)	None (within 50m)				
83	15.8	<u>Bedrock geology (50k)</u>	3	0	0	0	-
84	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
84	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
85	16.1	<u>BGS Boreholes</u>	0	0	1	-	-
Page	Section	Natural ground subsidence					
86	17.1	<u>Shrink swell clays</u>	Negligible (within 50m)				
87	17.2	<u>Running sands</u>	Very low (within 50m)				
88	17.3	<u>Compressible deposits</u>	Negligible (within 50m)				
89	17.4	<u>Collapsible deposits</u>	Very low (within 50m)				
90	17.5	<u>Landslides</u>	Very low (within 50m)				
91	17.6	<u>Ground dissolution of soluble rocks</u>	Very low (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
93	18.1	Natural cavities	0	0	0	0	-
94	18.2	<u>BritPits</u>	0	0	1	1	-
94	18.3	<u>Surface ground workings</u>	6	2	8	-	-
95	18.4	Underground workings	0	0	0	0	0
95	18.5	Historical Mineral Planning Areas	0	0	0	0	-



95	18.6	<u>Non-coal mining</u>		1	0	0	0	1
96	18.7	Mining cavities		0	0	0	0	0
96	18.8	JPB mining areas		None (within 0m)				
96	18.9	Coal mining		None (within 0m)				
97	18.10	Brine areas		None (within 0m)				
97	18.11	Gypsum areas		None (within 0m)				
97	18.12	Tin mining		None (within 0m)				
97	18.13	Clay mining		None (within 0m)				
Page	Section	Radon						
98	19.1	<u>Radon</u>	Less than 1% (within 0m)					
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m	
99	20.1	<u>BGS Estimated Background Soil Chemistry</u>	5	1	-	-	-	
99	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-	
100	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-	
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m	
101	21.1	Underground railways (London)	0	0	0	-	-	
101	21.2	Underground railways (Non-London)	0	0	0	-	-	
102	21.3	Railway tunnels	0	0	0	-	-	
102	21.4	<u>Historical railway and tunnel features</u>	3	4	5	-	-	
103	21.5	Royal Mail tunnels	0	0	0	-	-	
103	21.6	<u>Historical railways</u>	0	0	1	-	-	
103	21.7	<u>Railways</u>	0	3	2	-	-	
104	21.8	Crossrail 1	0	0	0	0	-	
104	21.9	Crossrail 2	0	0	0	0	-	
104	21.10	HS2	0	0	0	0	-	



Recent aerial photograph



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Capture Date: 05/04/2020

Site Area: 0.3ha



Recent site history - 2017 aerial photograph



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Capture Date: 09/04/2017

Site Area: 0.3ha



Recent site history - 2013 aerial photograph



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Capture Date: 19/07/2013

Site Area: 0.3ha



Recent site history - 2007 aerial photograph



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Capture Date: 25/08/2007

Site Area: 0.3ha



Recent site history - 1999 aerial photograph



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Capture Date: 18/07/1999

Site Area: 0.3ha



OS MasterMap site plan





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Site Area: 0.3ha



3 Waste and landfill



-  Site Outline
- Search buffers in metres (m)
-  Historical waste sites
-  Waste exemptions

3.1 Active or recent landfill

Records within 500m **0**

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.
This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m **0**

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.
This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m

0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m

0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m

1

Waste site records derived from Local Authority planning records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 27**

ID	Location	Address	Further Details	Date
1	368m SE	Site Address: Waste Transfer Station, London Road, Off A11, Babraham, Cambridge, Cambridgeshire, CB22	Type of Site: Recycling Facility (Extension) Planning application reference: S/1258/17/E1 Description: Scheme comprises EIA regulation 5 and regulation 23 extension of construction and demolition recycling facility including installation of screen and aggregate wash plant and provision of waste material/product stockpile areas. Data source: Historic Planning Application Data Type: Point	-

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m

0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.



3.7 Waste exemptions

Records within 500m

5

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 27**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	On site	THE MALTING, STATION ROAD, GREAT SHELFORD, CAMBRIDGE, CB22 5LR	WEX251091	Storing waste exemption	Not on a farm	Storage of waste in secure containers
A	On site	THE MALTING, STATION ROAD, GREAT SHELFORD, CAMBRIDGE, CB22 5LR	WEX251091	Storing waste exemption	Not on a farm	Storage of waste in a secure place
A	On site	THE MALTING, STATION ROAD, GREAT SHELFORD, CAMBRIDGE, CB22 5LR	WEX107235	Storing waste exemption	Not on a farm	Storage of waste in secure containers
A	On site	THE MALTING, STATION ROAD, GREAT SHELFORD, CAMBRIDGE, CB22 5LR	WEX107235	Storing waste exemption	Not on a farm	Storage of waste in a secure place
2	373m S	Wedd Joinery, 9 Granta Terrace, Stapleford, CB22 5FJ	WEX126837	Using waste exemption	Not on a farm	Burning of waste as a fuel in a small appliance

This data is sourced from the Environment Agency and Natural Resources Wales.

