GeoDyne

Geotechnical &
Environmental
Consultants

Sunnydale Close
Surfleet

# Combined Phase I Desk Study and Phase II Exploratory Investigation For Ashwood Homes

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| **Project No: D40008** | | **Date: 31st March 2020** | |
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| Comments | | | |

## EXECUTIVE SUMMARY

| GEOTECHNICAL CONSIDERATIONS | |
|---|---|
| Ground Conditions | Made Ground was not encountered at the site.<br><br>Topsoil was encountered at the surface in the exploratory holes to an average depth of approximately 0.40m begl. The Natural Strata typically comprised firm sandy clayey SILT which became more sandy / less clayey with depth, underlain by loose to medium dense (locally very loose to loose) very silty SAND to the base of the exploratory holes. Firm very silty CLAY was locally encountered beneath the Topsoil to depths of up to 1.00m begl. In all cases, the Clay was underlain by the Silt (described above). Similar firm Clay was also noted at depth in localised areas of the site from depths in excess of 1.50m begl. |
| Foundation Design | Structural Engineer designed strip or raft foundations. The natural soils appear suitable to support a nett allowable ground bearing pressure of up to 75kN/m$^2$. Foundations should be advanced to a minimum depth of 0.90m below existing or proposed ground level (whichever being the deeper). It is important to ensure that all foundation excavations are kept as shallow as possible to avoid potential decreases in soil strength from affecting foundation integrity. |
| Floor Slab Design | Ground bearing floor slabs may be adopted at the site provided that there is less than 0.60m of suitably compacted geotechnically competent sub-slab fill beneath proposed slabs. |
| Ground Gas Precautions | No ground gas precautions relating to carbon dioxide or methane are required. |
| Radon | No radon precautions are required at the site. |
| Building Near Trees | Foundation designs may need to be adjusted where building near existing, proposed or recently removed trees and hedgerows, in accordance with BRE Digest 240. Medium volume change potential should be assumed for design purposes. |
| Water | Foundation excavations are unlikely to require dewatering. However, deeper excavations (i.e. sewers, for example) may encounter water seepage, which should be controllable utilising minor sump pumping techniques, in the first instance. |
| Excavations/Stability | Excavations approaching depths of 1.70m begl are likely to require trench support for stability and health and safety reasons. The assessment of excavations and provision of support will be the responsibility of the contractor on site. |
| Sulphate Classification | DS-1 and AC1. |
| Coal Mining | No coal mining precautions or associated investigation works are required at the site. |
| CBRs | The remoulded soaked CBR testing has revealed CBR values for the Natural Strata between 0.2% and 4.1%. |
| Surface Water Drainage | The results from the programme of in-situ infiltration rate testing have indicated that traditional soakaways and permeable paving are unlikely to be viable for the site and it may be prudent to investigate alternative methods for draining the site, at this stage. |
| ENVIRONMENTAL CONSIDERATIONS | |
| Soil Contamination Assessment | The soils may be considered to be uncontaminated in the context of the proposed end-use. There are considered to be no specific risks posed to Controlled Waters by the findings of the laboratory analysis undertaken. |
| Remediation Proposals | No specific remediation works will be required other than the provision of existing topsoil in proposed gardens and any other areas of soft landscape to provide a suitable growing media for plants. |
| GENERAL CONSIDERATIONS | |
| Construction Workers | Construction personnel should use appropriate PPE/RPE equipment and hygiene facilities. |
| Utilities | We would recommend that our report is supplied to utility companies and their recommendations are adhered to. |
| Unforeseen Circumstances | Should any areas of potentially contaminated soil/anomalous features be encountered we would recommend consultation with GeoDyne. |
| Flood Risk | The desk study information has revealed the site to lie within an area identified as being at risk of flooding. It is recommended that advice be sought from a Drainage Consultant with respect to this matter. |
| Licenses etc. | The Contractor/Developer is responsible for, and must ensure that, all necessary licenses, permits, plans, registrations and approvals are in place prior to commencing with the construction works at the site. |
| Statutory Consultation | We would recommend that our report is issued to the Local Authority (and NHBC or other Warranty Provider). |

# 1.0 INTRODUCTION

## 1.1 Introduction

GeoDyne Limited has been appointed by the Client, Ashwood Homes, to undertake a combined Phase I Desk Study & Phase II Exploratory Investigation on land located to the northeast of Sunnydale Close, Surfleet, Lincolnshire. A site location plan (Figure No. D40008/01) is included in Appendix I.

## 1.2 Project Understanding

We understand that it is proposed to develop the site with low-rise residential properties incorporating private gardens. It is also understood that current development proposals incorporate an area of Public Open Space (POS). A proposed layout plan is included in Appendix II.

This understanding has formed the basis of our report. Where our understanding is incorrect, it may be necessary to review our assessment to ensure that it continues to apply.

## 1.3 Objectives

The scope of works detailed herein have been designed to ascertain the key geotechnical and environmental issues pertaining to the proposed development.

## 1.4 Scope of Works

Based on the defined objectives of the works (detailed in Section 1.3), the scope of the Phase I Desk Study included the following:

- A site walkover.
- Review of available historical and contemporary Ordnance Survey publications relating to the site.
- Review of the site's geology, hydrology, hydrogeology and groundwater vulnerability.
- Review of the site's coal mining status.
- Review of the site's radon status.
- Commission of a full detailed Landmark Envirocheck Report relating to the site.
- Commission of Landmark geological mapping data.
- Production of a preliminary Conceptual Site Model (pCSM).

Phase II Exploratory Investigation works comprised:

- A sub-contracted sub-surface utility scan.
- A series of mechanically excavated trial pits across the site.
- A series of window sampling boreholes across the site.
- Geotechnical and environmental soil testing.
- A programme of in-situ soakaway testing.
- A initial programme of ground gas and water level monitoring.
- Revision of the pCSM.

## 1.5 Limitations

The conclusions and recommendations made in this report are limited to those that can be made based on the findings of the investigation.

Where comments are made based on information obtained from third parties, GeoDyne Limited assumes that all third party information is true and correct. No independent action has been undertaken to validate the findings of third parties.

This report has been prepared in accordance with our understanding of current good practice. However, changes to good practice, guidance or legislation may necessitate revision of this report after the date of issue.

GeoDyne Limited has prepared this report for the sole use and reliance of Ashwood Homes, in accordance with our standard Conditions & Limitations (included in Appendix XIV). This report may not be used or relied upon by any unauthorised third party without the explicit written agreement of GeoDyne Limited. Reliance may not be placed on our report until all invoices associated with the project have been paid.

## 2.0 SITE DESCRIPTION & HISTORY

### 2.1 Site Description

The site comprises an irregular shaped parcel of land located to the northeast of Sunnydale Close, Surfleet, Lincolnshire. The site may be located centred around approximate Ordnance Survey National Grid Reference 525250E 327950N. The site covers an area of approximately 3 hectares.

At the time of our works (February 2020), the site essentially comprised the majority of an undeveloped, sensibly level, grassed field.

A drainage ditch defined the majority of the southern and western site boundaries. Wooden (typically rear-garden) fences formed the northern site boundary and were present beyond the ditch to the west. The eastern site boundary was partially formed by a disused glasshouse. The site boundary in the northeast and southeast were not defined by specific features; additional discrete smaller areas within the field were present immediately to the northeast and southeast of the site.

The immediate surrounding area typically comprised residential housing and cropped fields. A series of agriculture-related buildings were present to the immediate east of the site which included the glasshouse, a warehouse, a house and several smaller structures including sheds. An electricity sub-station was present to the front of the warehouse.

A pumping station was present to the southwest of the site, immediately beyond the site boundary.

A depot was present to the west of the site (beyond the drain) which was revealed as '*Moto-Bins*', a motorcycle parts and accessories supplier.

An annotated site plan showing the main features of the site and the immediate surrounding area is included as Appendix III of this report (Figure No. D40008/02) and a plan showing general views of the site is included as Appendix IV (Figure No. D40008/03)

An aerial photograph of the site, obtained from the Landmark Analysis tool commissioned as part of our works, is presented in Figure 1 on the following page, with the current OS mapping plan for the site and surrounding area presented in Figure 2. It should be noted that Figures 1 and 2 portray a slightly larger overall site area.

Figure 1: Recent Aerial Imagery of the site.

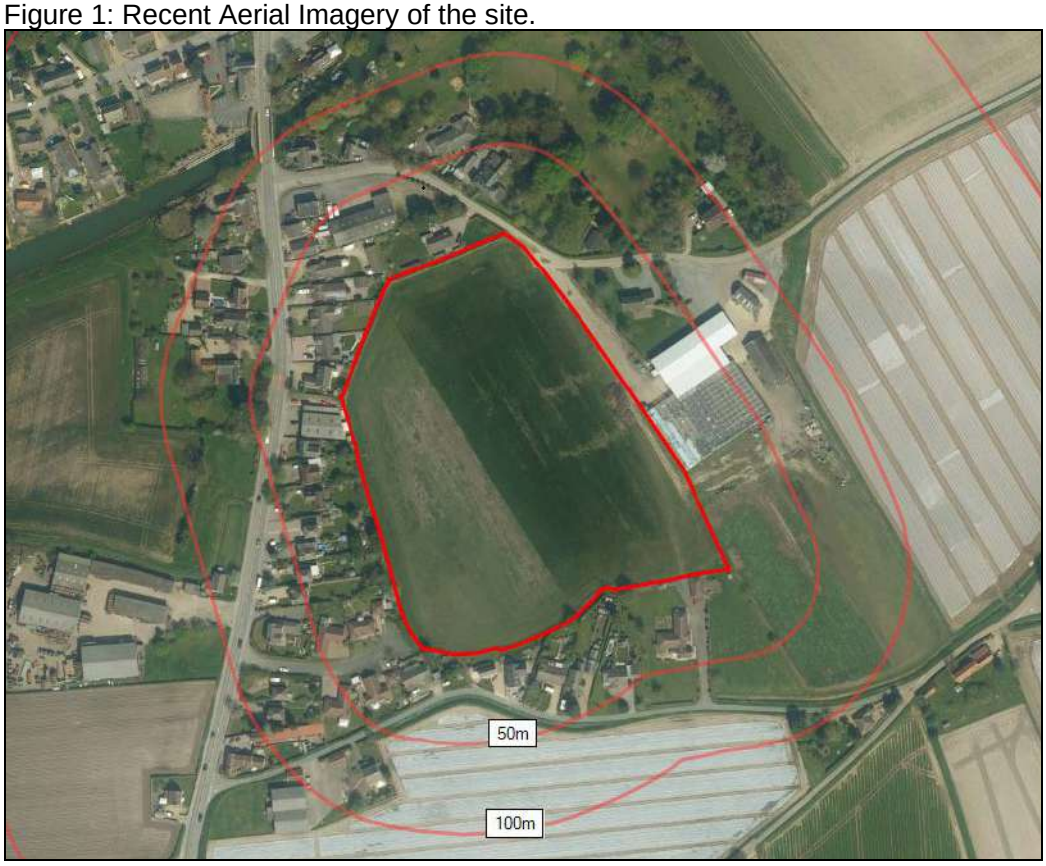
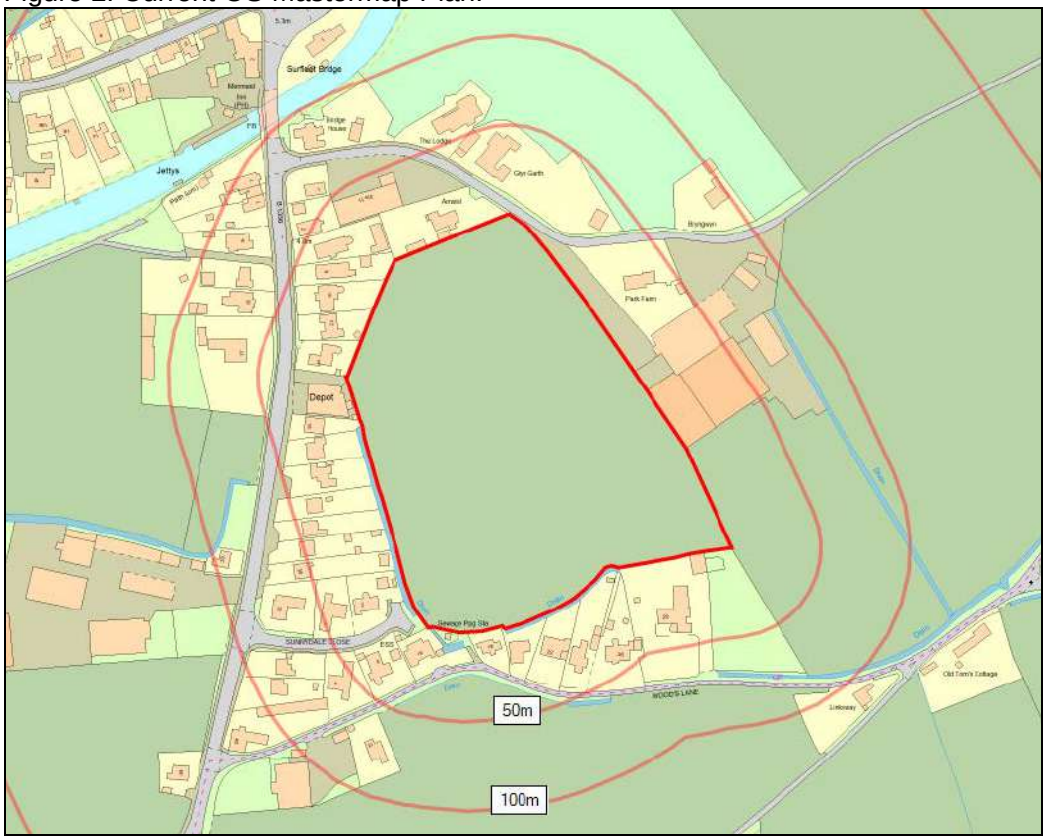



Figure 2: Current OS Mastermap Plan.



## 2.2 Site History

The historical and contemporary Ordnance Survey publications included within the Landmark Envirocheck Report have been reviewed by GeoDyne to establish the history of the site and its environmental setting. The historical Ordnance Survey maps are included as Appendix V of this report.

We would note that the boundary marked on the historical sheets within the Envirocheck Report appears to 'shift' on several of the maps due to scaling inaccuracies between maps of differing dates. This is a function of Envirocheck transposition algorithms. It should be noted that the Envirocheck Report portrays a slightly larger overall site area.

As part of the historical map review, on and off-site features have been assessed using the up-to-date site boundary as indicated on the proposed layout plan included in Appendix II.

The key findings of the historical search are summarised in Table 1.

TABLE 1 – HISTORICAL PUBLICATION DATA

| Date | Features on Site | Features off Site |
|---|---|---|
| 1880s | • The site comprises parts of two undeveloped (potentially agricultural) fields separated by a drain which is present in the east of the site. Three footpaths are present across the site that link to form a triangle. | • A drain is present to the immediate south and west of the site and a drain is present approximately 10m to the northeast of the site. Additional drains are indicated within the immediate surrounding area.<br>• An orchard is indicated to the immediate south of the site.<br>• '*Wood's Lane*' is present approximately 25m to the south of the site and a north-south oriented road (later Surfleet Road) is present approximately 40m to the west of the site.<br>• Presumed residential dwellings are present in the immediate surrounding area.<br>• Ponds are present approximately 60m to the northeast and 150m to the west of the site. The pond to the northeast is no longer present in the late 1880s.<br>• The River Glen and '*Surfleet Bridge*' are present approximately 95m to the northwest of the site. |
| 1890s | • No maps available for viewing. | • No maps available for viewing. |
| 1900s | • The site remains essentially unchanged. | • The pond to the northeast of the site is no longer present (presumed infilled). |
| 1910s and 1920s | • No maps available for viewing. | • No maps available for viewing. |
| 1950s | • The drain in the east of the site is no longer present (presumed infilled or culverted). | • A series of presumed agriculture-related buildings have been constructed approximately from 10m to the east of the site.<br>• Additional small buildings have been constructed to the north of the site. |
| 1960s | • No maps available for viewing. | • No maps available for viewing. |
| 1970s | • The footpaths are no longer indicated at the site. | • Presumed residential dwellings are present to the immediate west and south of the site. The orchard is no longer indicated to the south of the site.<br>• A number of structures approximately 80m to the north of the site have been demolished.<br>• A '*Store*' has been constructed approximately |

| TABLE 1 – HISTORICAL PUBLICATION DATA | | |
|---|---|---|
| Date | Features on Site | Features off Site |
| | | 30m to the north.<br>• The pond to the west of the site is no longer present (presumed infilled). A building has been constructed at the location of the former pond.<br>• A large agriculture-related building to the east of the site is indicated to be a glasshouse.<br>• Several drains in the surrounding area are no longer present (presumed infilled or culverted). |
| 1980s | • The site remains essentially unchanged. | • A '*Depot*' is indicated to the immediate west of the site. The former presumed residential structures are no longer present at this location.<br>• An electricity sub-station is indicated to the immediate southwest of the site.<br>• A presumed residential structure is present to the immediate north of the site.<br>• The glasshouse to the east of the site is no longer present. However, a new glasshouse is present to the south of the former one, approximately 20m to the east of the site.<br>• The store is now labelled as '*Works*'.<br>• A pond is present approximately 200m to the west of the site. A presumed agriculture-related structure has been constructed adjacent to this feature.<br>• Several drains in the surrounding area are no longer present (presumed infilled or culverted). |
| 1990s | • The site remains essentially unchanged; however the historical map reveals the site to be occupied by several crops. | • The aerial photograph indicates that the glasshouse to the east of the site has increased in size and is now present to the immediate east of the site. |
| 2000 | • The site remains essentially unchanged. | • The glasshouse to the east of the site appears to have reduced in size. |
| 2006 and 2020 | • The site remains essentially unchanged. | • The glasshouse to the east of the site appears to have increased in size. A large presumed agriculture-related structure is present to the immediate north of the glasshouse (approximately 10m to the east of the site). |

## 2.3 Aerial Photography & Historical Map Overlays

As part of the commissioned Landmark Report, the use of the Landmark Envirocheck Analysis tool was purchased to provide site specific aerial photographic imagery, and to provide the ability to undertake limited historical map overlay manipulation.

The following picture (Figure 3) shows an overlay of the historical map publication from 1901 which shows the former drain in the east of the site. Figure 4 shows an overlay of a later historical map publication from 1951 where former drain is no longer visible and is presumed infilled or culverted.

Figure 3: The 1:10,560 Scale Historical Map from 1906.

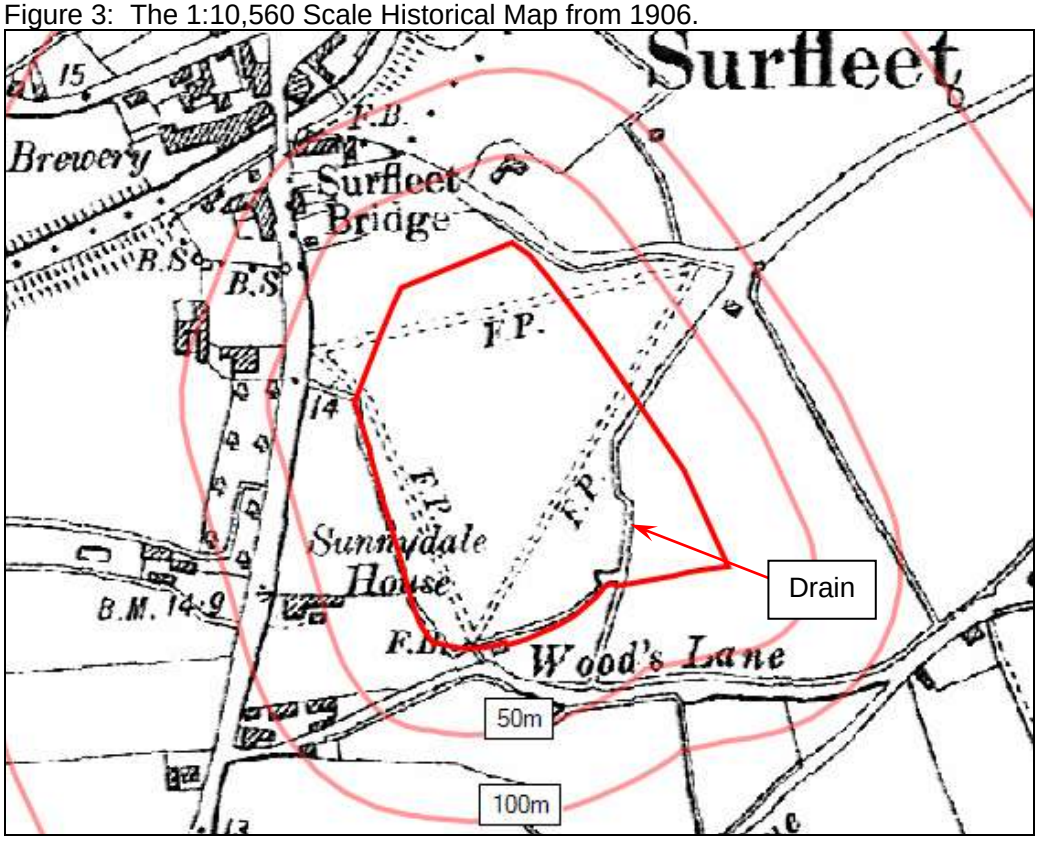
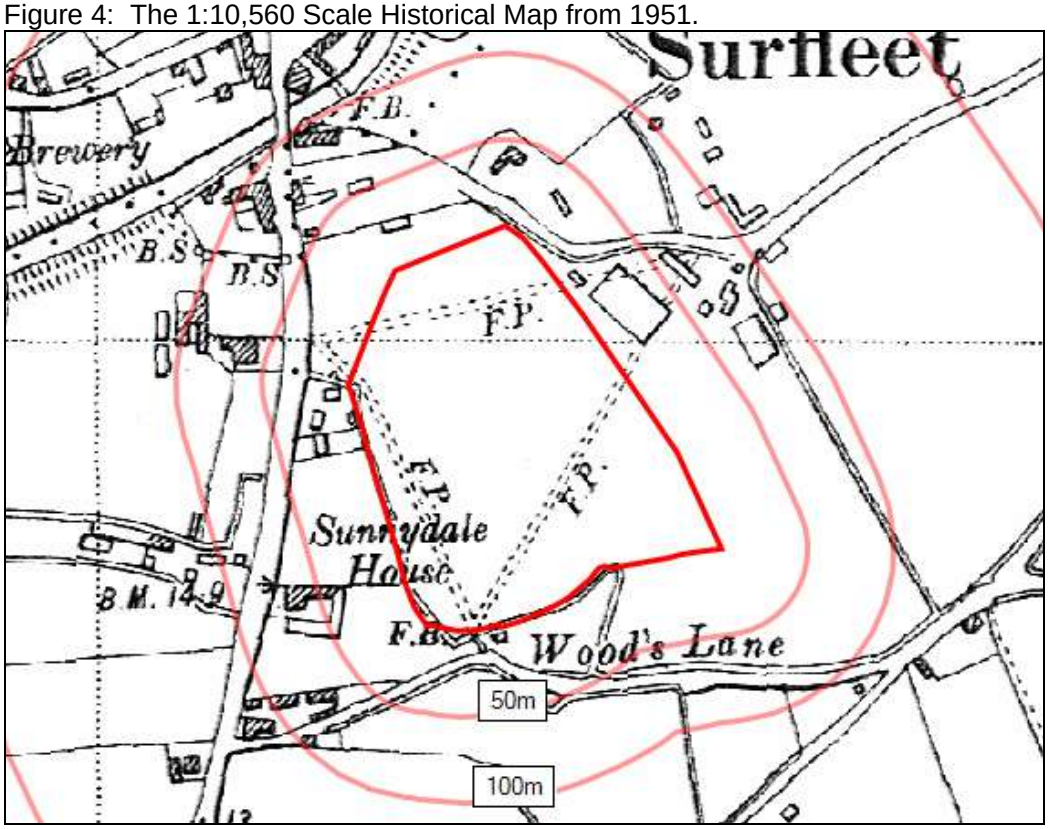



Figure 4: The 1:10,560 Scale Historical Map from 1951.



## 3.0 GEOLOGY & ENVIRONMENTAL SETTING

### 3.1 Geological References

The following geological publications were referred to:

- BGS 1:50000 Series Sheet 144 *'Spalding'* (1992).
- Landmark geological map sheets (included in Appendix VI).
- The BGS online interactive map viewer and Lexicon of Named Rock Units.
- The Coal Authority online interactive map viewer.

### 3.2 Geology

The entire site and immediate surrounding area are indicated to be underlain by superficial drift deposits comprising Tidal Flat Deposits (formerly referred to as the Terrington Beds), which date from the Quaternary. These deposits are typically described as marine alluvium comprising salt marsh, tidal creek and river deposits (i.e. sandy silt, sand and clay). Drift deposits have the potential to alter rapidly in character and geotechnical properties both laterally and vertically over relatively short distances and may also be water bearing. Tidal Flat Deposits may also contain peat as pockets, lenses or discrete layers.

Beneath the drift deposits across the entirety of the site, bedrock of the Oxford Clay Formation is indicated to be present, which dates from the Jurassic. The Oxford Clay Formation is described on the BGS Lexicon of Named Rock Units as *'Silicate-mudstone, grey, generally smooth to slightly silty, with sporadic beds of argillaceous limestone nodules'.*

### 3.3 Faults

No faults are indicated to be present within the boundary of the site or within the immediate vicinity of the site, on the geological maps viewed.

### 3.4 Man-Made Deposits

The geological publications do not show the presence of any man-made deposits (i.e. Made Ground, Worked Ground or Landscaped Ground) beneath the site, or within a 250m radius of the site. We would note however the potential presence of Made Ground at the site associated with the former drain that used to pass through the eastern portion of the site (see Figures 3 and 4). Made Ground may also be present associated with infilled former ponds and drains in close proximity to the site.

Any infill materials to these features are considered to represent potential sources of hazardous ground gas (i.e. carbon dioxide and methane) that may, under the right circumstances, affect the proposed development site. However, due to the small scale of these features, the risk of ground gas generation is considered to be very low.

### 3.5 Landmark Envirocheck Report

A Landmark Envirocheck Report was commissioned to assist in ascertaining the environmental setting of the site. The full Envirocheck Report is presented in Appendix VII and has revealed the following key relevant information (details are only listed where they are within potential influencing distance of the site).

It should be noted that the Envirocheck Report portrays a slightly larger overall site area. The up-to-date site boundary (as indicated on the proposed layout plan included in Appendix II) has been used for the purposes of summarising the environmental setting of the site.

#### 3.5.1 Agency and Hydrological

Aquifer Status

The aquifer designation maps are presented in Appendix VII and are based on geological mapping provided to Landmark by the British Geological Survey. Different aquifer classifications may be applied to superficial (drift) deposits (typically forming shallow perched groundwater units where present) and bedrock aquifers (which may contain regional groundwater units). Possible aquifer designations comprise Principal Aquifers, Secondary (A, B or Undifferentiated) Aquifers and Unproductive Strata.

The superficial deposits (i.e. Tidal Flat Deposits) and the underlying bedrock (i.e. Oxford Clay Formation) are classified as *'Unproductive Strata'*.

Unproductive Strata are described by the Environment Agency as *'rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.*'

Source Protection Zone Status

The site is not shown to lie within a Source Protection Zone (SPZ), as designated by the Environment Agency. SPZs relate to the protection of groundwater resources principally for public drinking water supply.

Flood Risk Status

The site is indicated to be situated within an area at risk from flooding from rivers or sea without defences.

This report does not constitute a formal flood risk assessment.

BGS Groundwater Flooding Susceptibility

The Landmark Envirocheck Report indicates that the site does not lie within an area with potential for groundwater flooding to occur at the surface.

However, the map included in Appendix VII within the Landmark report indicates that localised areas of the site are at a low risk of flooding from surface water.

Water Abstractions

There is one entry listed 151m to the west of the site, which was associated with spray irrigation and operated by Mr A Battley. The status has been revoked.

Pollution Incidents to Controlled Waters

There is one entry listed within 250m of the site, at 94m to the northwest. The entry involved the discharge of an unknown pollutant into the River Glen and has been classified as a Minor Incident.

Discharge Consents

There are five entries listed with 250m of the site.

- Three entries appear to relate to a single location 3m to the southwest of the site, all operated by Anglian Water Services Ltd and involved sewerage emergency discharges into '*Fen Drain*'. One of these entries appears active but the remaining two have been revoked.
- One entry 133m to the north of the site, at a café / restaurant / pub operated by C.D Wilcox that involved an unknown discharge onto land. The discharge consent was revoked in 1997.
- One entry 144m to the east of the site, at a domestic property operated by Mr Steven Rogers that involves a treated sewerage effluent into a tributary of the River Glen. A revocation date has not been supplied.

Surface Water

A drain is present to the immediate south and west of the site which is classified in the Landmark Envirocheck Report as an Inland River. Additional Inland Rivers are present within the vicinity of the site which largely appear to relate to drains. One Inland River relates to the River Glen, approximately 95m to the north of the site. A pond is present from approximately 240m to the west of the site.

### 3.5.2 Waste

Landfill Sites

There are no existing or former landfill sites identified on site or within a 250m radius of the site.

Potentially Infilled Land (Water)

There are no Potentially Infilled Land (Water) entries at the site or within 250m of the site within the Landmark Envirocheck Report. However, a number of features have been identified on the historical maps summarised in Table 1. These features include a former on-site drain and former drains and ponds within the vicinity of the site.

### 3.5.3 Hazardous Substances

There are no sites associated with hazardous substances (i.e. sites dealing with explosives etc.) identified on the site, or within a 250m radius of the site, in the Landmark Envirocheck Report.

### 3.5.4 Geological Issues

BGS Soil Chemistry

The BGS has prepared estimated soil concentration maps for several metals (including Arsenic, Lead, Nickel, Chromium and Cadmium), which are extrapolated from records available for use within their assessments.

Whilst potentially useful for the inference of Natural Metal Enrichment (NME) of the natural soils in a general locale, the data should not be used to inform any detailed decisions with regards to the chemistry of a particular site as it does not allow for anthropogenic effects. Estimates of the soil chemistry at the site indicate anticipated concentrations of Arsenic of <15mg/kg, Cadmium of <1.8mg/kg, Chromium of 60-90mg/kg, Lead <100mg/kg and Nickel of 15-30mg/kg.

Based on the information supplied within the Envirocheck report, the site is not shown to be located within an area where Natural Metal Enrichment of the underlying natural soils is likely to be present. However, this is only applicable to the specific determinands listed above.

Ground Stability Hazards

No significant ground stability hazards have been identified by the Landmark Envirocheck Report that relate to the site (including from collapsible, ground dissolution, landslide and shrinking or swelling clay ground stability hazards). However, it should be noted that the site is listed as having a Moderate Hazard Potential associated with both the Potential for Compressible Ground and Running Sand.

Radon

The Landmark Envirocheck Report identifies that the site lies within a lower probability Radon area and no Radon protective measures are necessary in the construction of new dwellings or extensions.

BGS Borehole Records

There are no BGS borehole records within the immediate vicinity of the site.

### 3.5.5 Industrial Land Use

There are no industrial land use entries identified at the site.

Contemporary Trade Directory Entries

There are six contemporary trade directory entries recorded within 250m of the site comprising three active entries and three inactive entries.

The active entries relate to road haulage services 49m to the southwest of the site, car breakdown & recovery services 202m to the northwest of the site and garage services 229m to the northwest of the site.

The inactive entries relate to road haulage services 87m to the northeast of the site in addition to tyre dealers and car & commercial repairs at 230m to the northwest of the site.

Additionally, a depot was revealed to the west of the site (beyond the drain) during the site walkover. The depot was identified as '*Moto-Bins*', a motorcycle parts and accessories supplier. Anecdotal evidence from the current depot owner suggests that no fuel tanks are or have historically been used / stored within the depot that could potentially impact the site.

Points of Interest – Commercial Services

There are three entries recorded within 250m of the site. One entry relates to a distribution and haulage service at 50m to the southwest of the site and two entries relate to vehicle repair, testing and servicing at 230m to the northwest of the site.

Points of Interest – Manufacturing and Production

There are three entries recorded within 250m of the site. One entry relates to a farm 33m to the southeast of the site. The remaining two entries relate to a works 35m to the northwest of the site.

Points of Interest – Public Infrastructure

There is one entry recorded at 250m of the site, at 1m to the southwest which relates to a sewage pumping station.

### 3.5.6 Sensitive Land Use

The site is identified as being within a Nitrate Vunerable Zone. In our experience the majority of this area of the country is defined as a Nitrate Vunerable Zone and this classification is considered not to present a potential risk to the site.

## 3.6 Land Use Assessment

As part of the land use assessment, reference has been made to the *'Desk Reference Guide to potentially Contaminative Land Uses'* produced by Mr P Syms and published jointly by the ISVA (The professional Society for Valuers and Auctioneers) in association with The Royal Institution of Chartered Surveyors (RICS) and the Chartered Institute of Environmental Health (CIEH).

We have also made reference to the Department for Environment, Food and Rural Affairs and the Environment Agency Contaminated Land Report CLR8 '*Potential Contaminants for the Assessment of Land*' (March 2002). Although now formally withdrawn, this document identifies key contaminants which may potentially be present at a site as a result of a given historical land use and is considered useful as a desk based ready reference guide.

### 3.6.1 On Site Assessment

At the time of our works (February 2020), the site essentially comprised the majority of an undeveloped, sensibly level, grassed field. Based on the reviewed historical information, the site has essentially remained unchanged according to the earliest available historical maps of the 1880s.

Based on the information obtained from our desk study enquiries, our walkover of the site and experience of similar sites, potential general soil contamination that may be present could include:

- Metals and metalloids associated with any potential localised Made Ground beneath the site.
- Polycyclic Aromatic Hydrocarbons (PAHs) from any ashy inclusions and/or carbonaceous inclusions in the near surface soils.
- Pesticides associated with the potential agricultural use of the site.
- Hazardous ground gases (i.e. methane and carbon dioxide) associated with any Made Ground associated with the potential infilling of the former drain at the site or with any natural peat / organic deposits potentially beneath the site.

### 3.6.2 Off Site Assessment

The site lies within an area with a very limited number of commercial and industrial activities, the closest of which is a motorcycle parts and accessories depot to the west of the site (beyond a drain) that became present on historical maps in the 1980s. Anecdotal evidence suggests that no fuel tanks are or have historically been used / stored within the depot that could potentially impact the site.

With regards to potential sources of chemical contamination, based on the findings of the Phase I Desk Study enquiries, there are no significant potentially contaminative land uses known to be present within close proximity to the site.

Based on the information obtained from the desk study, the following sources of potentially hazardous ground gas (i.e. carbon dioxide and methane) have been identified within potential influencing distance (i.e. <250m) of the site:

- Peat / organic deposits within the sites general environs.
- Made Ground potentially associated with infill materials to the former drains ditches and ponds in close proximity the site.

## 4.0 PRELIMINARY CONCEPTUAL SITE MODEL

### 4.1 General

The DEFRA publication '*Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance*' (dated April 2012) states the following with regards to the production of a Conceptual Site Model (CSM) for a site:

'*The process of risk assessment involves understanding the risks presented by land, and the associated uncertainties. In practice, this understanding is usually developed and communicated in the form of a "conceptual model"*'. The development of a CSM is typically undertaken in an iterative process, reflecting the changes in understanding as more detailed site information becomes available.

In developing a CSM, and specifically in the context of land contamination, consideration needs to be given to three essential elements; which form the basis of any risk present. The statutory guidance sections 3.8 and 3.9 (April 2012) states the following:

*(a)* '*A "contaminant" is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters.*
*(b) A "receptor" is something that could be adversely affected by a contaminant, for example a person, an organism, and ecosystem, property, or controlled waters...*
*(c) A "pathway" is a route by which a receptor is or might be affected by a contaminant.*

*The term "contaminant linkage" means the relationship between a contaminant, a pathway and a receptor.*' For a contaminant linkage to be plausible, all three elements need to be present.

In undertaking a risk assessment and deriving a CSM for the purposes of the redevelopment of a site (i.e. planning and development control) reference has been made to both the Model Procedures for the Management of Land Contamination, as well as the National Planning Policy Framework (NPPF, dated July 2018).

The preliminary CSM should identify the hazards (source of potential contamination) and should set out the potential pollutant linkages with a view to identifying the nature and magnitude of the potential risks to receptors.

In order to undertake the foregoing assessment, consideration is required with respect to the probability or likelihood of the linkage occurring and the severity and significance of the potential consequences; taking account the nature of the pollutant linkage and the potential severity of the hazard and the sensitivity of the receptor within the context of the proposed land use (in consideration of the planning regime).

Consideration of consequence/severity, probability/likelihood and risk has been based on the following guidance documentation:

- CIRIA C552 '*Contaminated Land Risk Assessment, A Guide to Good Practice*', 2001.
- EA R&D publication 66 '*Guidance for the Safe Development of Housing on Land Affected by Contamination*', 2008.

## 4.2 Classification of Consequences

In order to apply a consequence classification to a particular potential pollutant linkage, it is first necessary to define the terminology used within the classification system. The following terminology and definitions detailed in Table 2 have been adopted within our assessment, based on the guidance referenced in Section 4.1.

TABLE 2 – CLASSIFICATION OF CONSEQUENCES

| Classification | Definition |
|---|---|
| Severe | • Acute risks to human health.<br>• Short-term risk of pollution of controlled waters or significant impact on controlled waters; e.g. large-scale pollution or very high levels of contamination.<br>• Catastrophic damage to buildings or property (such as building explosion causing collapse).<br>• Ecological system effects – immediate risks of major damage which is likely to result in irreversible substantial adverse changes in the functioning of the ecosystem or harm to a species of special interest that endangers the long-term maintenance of the population. |
| Medium | • Chronic risks to human health.<br>• Pollution of sensitive water resources (such as leaching of contaminants into controlled waters) causing a significant effect on water quality.<br>• Ecological system effects – Immediate risks of significant damage which may result in substantial adverse changes to the ecosystems functioning or harm to a species of special interest that may endanger the long-term maintenance of the population.<br>• Significant damage to buildings, structures and services (for example foundation damage or rendering the building unsuitable for habitation). |
| Mild | • Non-permanent health effects to human health (i.e. exposure is unlikely to lead to 'significant harm' in the context of Part 2A of the Environmental Protection Act 1990.<br>• Pollution of controlled waters or non-sensitive water resources (for example non-classified groundwater) that results in a short-lived effect to water quality or a marginal effect on amenity value, agriculture or commerce.<br>• Minor damage to buildings, structures and services.<br>• Ecological system effects – Minor or short-term damage which is unlikely to result in substantial adverse changes to the ecosystems functioning or harm to a species of special interest.<br>• Substantial damage to non-sensitive environments (such as arable farmland for example). |
| Minor | • No measurable effects on human health including non-permanent health effects to human health that are easily preventable by appropriate use of PPE/RPE.<br>• Minor pollution of controlled waters including non-sensitive water resources with no discernible effects on water quality or ecosystems.<br>• Minor damage to non-sensitive environments (including arable farmland for example).<br>• Easily repairable effects of damage to buildings, structures, services or the environment (for example discolouration of concrete, loss of plants in a landscaping scheme etc.). |

## 4.3 Classification of Probability

Once the possibility of a pollutant linkage has been established (noting that probability classification does not apply when there is no possibility of a linkage being present), the probability should be classified in accordance with Table 3.

| TABLE 3 – CLASSIFICATION OF PROBABILITY | | |
|---|---|---|
| Classification | Definition | Likelihood |
| High Likelihood | There is a pollutant linkage and an event is highly likely to occur in the short-term, and is almost inevitable over the long-term OR there is evidence at the receptor of harm or pollution occurring. | >95% likelihood of Consequence Occurring |
| Likely | There is a pollutant linkage and it is probable that an event will occur. It is not inevitable, but possible in the short-term and likely over the long-term. | 50 – 95% likelihood of Consequence Occurring |
| Low Likelihood | There is a pollutant linkage and circumstances are possible under which an event could occur. It is by no means certain that even over a longer period such an event would take place, and less likely in the short-term. | 5 – 49% Likelihood of Consequence Occurring |
| Unlikely | There is a pollutant linkage and it is improbable that an event would occur even in the very long-term. | <5% likelihood of Consequence Occurring |

## 4.4 Classification of Risk

In order to establish the relevant risk term applicable to the identified pollutant linkage, one of the risk phrases identified within Table 4 must be adopted, with the definitions of each risk term detailed within Table 5.

| TABLE 4 - RISK CLASSIFICATION MATRIX (BASED ON C552 CIRIA, 2001) | | | | | |
|---|---|---|---|---|---|
| | | Consequence of Risk | | | |
| | | Severe | Medium | Mild | Minor |
| Probability (Likelihood) | High Likelihood | Very High | High | Moderate | Moderate/Low |
| | Likely | High | Moderate | Moderate/Low | Low |
| | Low Likelihood | Moderate | Moderate/Low | Low | Negligible |
| | Unlikely | Moderate/Low | Low | Negligible | Negligible or No Potential Risk |

| TABLE 5 - RISK CLASSIFICATION DEFINITIONS (BASED ON C552 CIRIA, 2001) | |
|---|---|
| Very High | There is a high probability that severe harm will arise to a designated receptor from an identified hazard OR there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required. |
| High | Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term. |
| Moderate | It is possible that harm could arise to a designated receptor from an identified hazard. However, there is a low likelihood that such harm would be severe, or if any harm were to occur it is more likely that the harm would be mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term. |
| Moderate/Low | It is possible that harm could arise to a receptor. However, a combination of likelihood and consequence results in a risk that is above low but is not of sufficient concern to be classified as moderate. It can be driven by cases where there is an acute risk which carries a severe consequence, but where the exposure is unlikely. Such harm would at worst normally be mild. The risk is unlikely to present a substantial liability. Some limited further investigation may be required to clarify the risk and any associated liability. If subsequent remediation works are necessary, they are likely to be limited in extent. |
| Low | It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild. |
| Negligible | There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is unlikely to be any worse than mild. No liability would be associated with such risks. |
| No Potential Risk | There is no potential risk or liability where no pollutant linkage has been established. |

## 4.5 Contaminant [C] - Pathway [P] - Receptor [R] Considerations

The following CPR assessment has been undertaken based on the assumption of a residential with plant uptake end-use for the proposed development.

## 4.6 Consideration of Potential Sources of Contamination [C]

Based on the findings of our desk study works, the potential key sources of contamination at the site that would require consideration for the derivation of a preliminary CSM would be the following:

| TABLE 6 – SUMMARY OF POTENTIAL CONTAMINANT SOURCES | |
|---|---|
| Areas of Potential Concern (APCs) | Associated Contaminants |
| General Made Ground & Near Surface Soils | • Metals & Metalloids.<br>• PAHs.<br>• Pesticides.<br>• Ground gases (including methane & carbon dioxide). |
| Off-Site Made Ground | • Ground gases (including methane & carbon dioxide). |

## 4.7 Consideration of Potential Pathways [P]

The potential pathways at the site are primarily:

- Direct ingestion of soil (either directly or as soil particles attached to produce).
- Inhalation of fugitive dust and vapours.
- Direct skin contact with the ground.
- Direct ingestion of home-grown produce.
- Direct ground contact with construction materials (including supply pipes).
- Vertical and lateral migration of contamination.
- Vertical and lateral migration of potentially hazardous ground gases/vapours.

## 4.8 Consideration of Potential Receptors [R]

The potential receptors at the site are:

- The final end users (residents - typically long term (chronic) exposure) and site visitors – (typically short term (acute) exposure).
- The construction personnel (i.e. site workers) involved with the development of the site (typically short term (acute) exposure).
- Neighbouring properties (off-site receptors).
- Controlled Waters (i.e. underlying groundwater and nearby surface waters).
- Buildings and construction materials (including buried utilities).

## 4.9 Preliminary Risk Assessment / Conceptual Site Model

Our preliminary conceptual model of possible pollutant linkages, applicable to the proposed site usage and based on our current understanding, is summarised in Table 7.

| TABLE 7 – PRELIMINARY RISK ASSESSMENT SUMMARY TABLE<br>DESK STUDY | | | | | | |
|---|---|---|---|---|---|---|
| Potential Contaminant Source [C] | Potential Pathway(s) [P] | Potential Receptor [R] | Probability of CPR Linkage | Consequence of CPR Linkage | Risk Level | Comments / Justification |
| General Made Ground & Near Surface Soils | Direct contact, ingestion or inhalation of fugitive dust | End users | Likely | Medium | Moderate | Made Ground may be present on site, associated with infill materials to a former drain. With the exception of the potential use as a cropped field, no potentially significant historical contaminative land uses have been identified at the site. End users are likely to come into contact with the in-situ soils.<br>Further consideration of this potential linkage should be provided during the course of the Phase II Exploratory Investigation works. |
| | Direct contact, ingestion or inhalation of fugitive dust | Site personnel | Likely | Medium | Moderate | Made Ground may be present on site, associated with infill materials to a former drain. With the exception of the potential use as a cropped field, no potentially significant historical contaminative land uses have been identified at the site. Site personnel will inevitably into contact with the in-situ soils.<br>Further consideration of this potential linkage should be provided during the course of the Phase II Exploratory Investigation works. |
| | Plant uptake | End users | Likely | Medium | Moderate | Made Ground may be present on site, associated with infill materials to a former drain. With the exception of the potential use as a cropped field, no potentially significant historical contaminative land uses have been identified at the site. Growing of vegetables for private consumption may be anticipated at the site.<br>Further consideration of this potential linkage should be provided during the course of the Phase II Exploratory Investigation works. |
| | Vertical and lateral migration | Neighbouring properties | Low Likelihood | Medium | Moderate/Low | Made Ground may be present on site, associated with infill materials to a former drain. With the exception of the potential use as a cropped field, no potentially significant historical contaminative land uses have been identified at the site. Further consideration of this potential linkage should be provided during the course of the Phase II Exploratory Investigation works. |
| | Leaching of contaminants through unsaturated zone and/or vertical and lateral migration | Controlled Waters | Low Likelihood | Medium | Moderate/Low | Made Ground may be present on site, associated with infill materials to a former drain. With the exception of the potential use as a cropped field, no potentially significant historical contaminative land uses have been identified at the site. Both the underlying superficial (drift) deposits and bedrock are classified as Unproductive Strata. The site does not lie within a designated SPZ. |

| TABLE 7 – PRELIMINARY RISK ASSESSMENT SUMMARY TABLE<br>DESK STUDY | | | | | | |
|---|---|---|---|---|---|---|
| Potential Contaminant Source [C] | Potential Pathway(s) [P] | Potential Receptor [R] | Probability of CPR Linkage | Consequence of CPR Linkage | Risk Level | Comments / Justification |
| | | | | | | A drain is present to the immediate west and south of the site.<br>Further consideration of this potential linkage should be provided during the course of the Phase II Exploratory Investigation works. |
| | Direct contact or contact with vapours | Plastic buildings products (e.g. water supply pipes) and buried concrete | Low Likelihood | Mild | Low | Made Ground may be present on site, associated with infill materials to a former drain. With the exception of the potential use as a cropped field, no potentially significant historical contaminative land uses have been identified at the site. Any localised Made Ground may contain elevated levels of contaminants that may affect plastic building products.<br>Further consideration of this potential linkage should be provided during the course of the Phase II Exploratory Investigation works. |
| | Vertical and lateral migration of ground gases to indoor air | End users of new buildings (asphyxiation) or new buildings (damage via explosion) | Low Likelihood | Severe | Moderate | Made Ground may be present on site, associated with infill materials to a former drain. Peat / organic deposits may also be present beneath the site. These deposits may represent potential sources of hazardous ground gases. Phase II Exploratory works will provide further information relating to the possible presence of significant depths of Made Ground at the site. |
| Off-Site Made Ground | Vertical and lateral migration of ground gases to indoor air | End users of new buildings (asphyxiation) or new buildings (damage via explosion) | Low Likelihood | Severe | Moderate | Peat / organic deposits within the sites general environs and Made Ground potentially associated with infill materials to the former drains and ponds around the site may represent potential sources of hazardous ground gases.<br>Further consideration of this potential linkage (including a programme of ground gas monitoring) should be provided during the course of the Phase II Exploratory Investigation works. |

The foregoing preliminary conceptual model highlights the potential plausible pollutant linkages that may relate to the site and would therefore require addressing by appropriate Phase II Exploratory Works. The information contained within the conceptual model should be confirmed and revised upon completion of an appropriate intrusive investigation, as detailed in the following sections.

## 5.0 GROUND INVESTIGATION

### 5.1 Introduction

Sub-Surface Utility Avoidance Scan

Prior to the commencement of our intrusive works at the site a sub-contracted sub-surface utility scan was undertaken to attempt to avoid buried services during the intrusive works. Based on the results of the service scan and taking account of the requirement to avoid buried services, the exploratory holes were positioned to maximise the amount of information obtained at the site.

Trial Pits

A total of twenty-five trial pits (TP1 to TP25) and five soakaway pits (SA1 to SA5) were excavated at the site between 11th and 13th February 2020. The pits were excavated to depths of up to 3.20m below existing ground level (begl).

Window Sampling Borehole Works

Five window sampling boreholes (WS1 to WS5) were advanced at the site on 14th February 2020. The majority of the boreholes were advanced to a depth of 4.00m below existing ground level (begl). One borehole (WS3) was advanced to a depth of 3.00m begl.

Standard Penetration Tests (SPTs) were undertaken generally at 1m centres in order to provide initial strength data for the near surface soils.

Following completion, three of the window sampling boreholes (WS1, WS2 and WS4) were installed with combined ground gas and water monitoring wells in order to facilitate an initial programme of ground gas and water level monitoring.

Exploratory Hole Locations/Logs

The approximate locations of the exploratory holes are indicated on the plan presented in Appendix VIII of this report (Figure No. D40008/04). The exploratory hole logs are presented in Appendix IX of this report.

### 5.2 Ground Conditions

The general ground conditions encountered across the site may be summarised as follows.

#### 5.2.1 Made Ground

Made Ground was not encountered at the site.

#### 5.2.2 Topsoil

Slightly sandy clayey very silty TOPSOIL was encountered at the surface in the exploratory holes to an average depth of approximately 0.40m begl.

### 5.2.3 Natural Strata

Beneath the Topsoil, the Natural Strata typically comprised firm sandy clayey SILT which became more sandy / less clayey with depth, underlain by loose to medium dense (locally very loose to loose) very silty SAND to the base of the exploratory holes. It should be noted that from a visual perspective, the excavated Silt soils appeared to be cohesive on composition.

Firm very silty CLAY was locally encountered beneath the Topsoil in 4No. exploratory holes (TP21, TP22, WS1, WS2) to depths of up to 1.00m begl. In all cases, the Clay was underlain by the Silt (described above). Similar firm Clay soils were also noted at depth in localised areas of the site (TP11, TP14, SA2 and WS3) from depths in excess of 1.50m begl.

The soils are considered to be typically representative of Tidal Flat Deposits which are indicated by geological publications to underlie the site.

## 5.3 Visual & Olfactory Evidence of Soil Contamination

We would note that no obvious visual or olfactory evidence of significant soil contamination was identified during the course of the site works (such as ashy soils, hydrocarbons or asbestos fragments, for example).

## 5.4 Water

Water seepages were observed within the trial pits at variable depths of between 1.70m and 2.70m begl. Water seepages were encountered from typically shallower depths of 1.00m within the boreholes.

## 5.5 Stability

The majority of the trial pits collapsed to the approximate depth of the base of the topsoil when excavating below depths in the region of 1.70m to 3.00m begl. Three localised trial pits in the northern extent of the site remained stable (TP9, TP10, TP11) during excavation and for the short amount of time they remained open following completion.

The boreholes were cased to the maximum depth of the borehole (typically 4m) begl to prevent sidewall collapse during drilling.

## 5.6 Plates

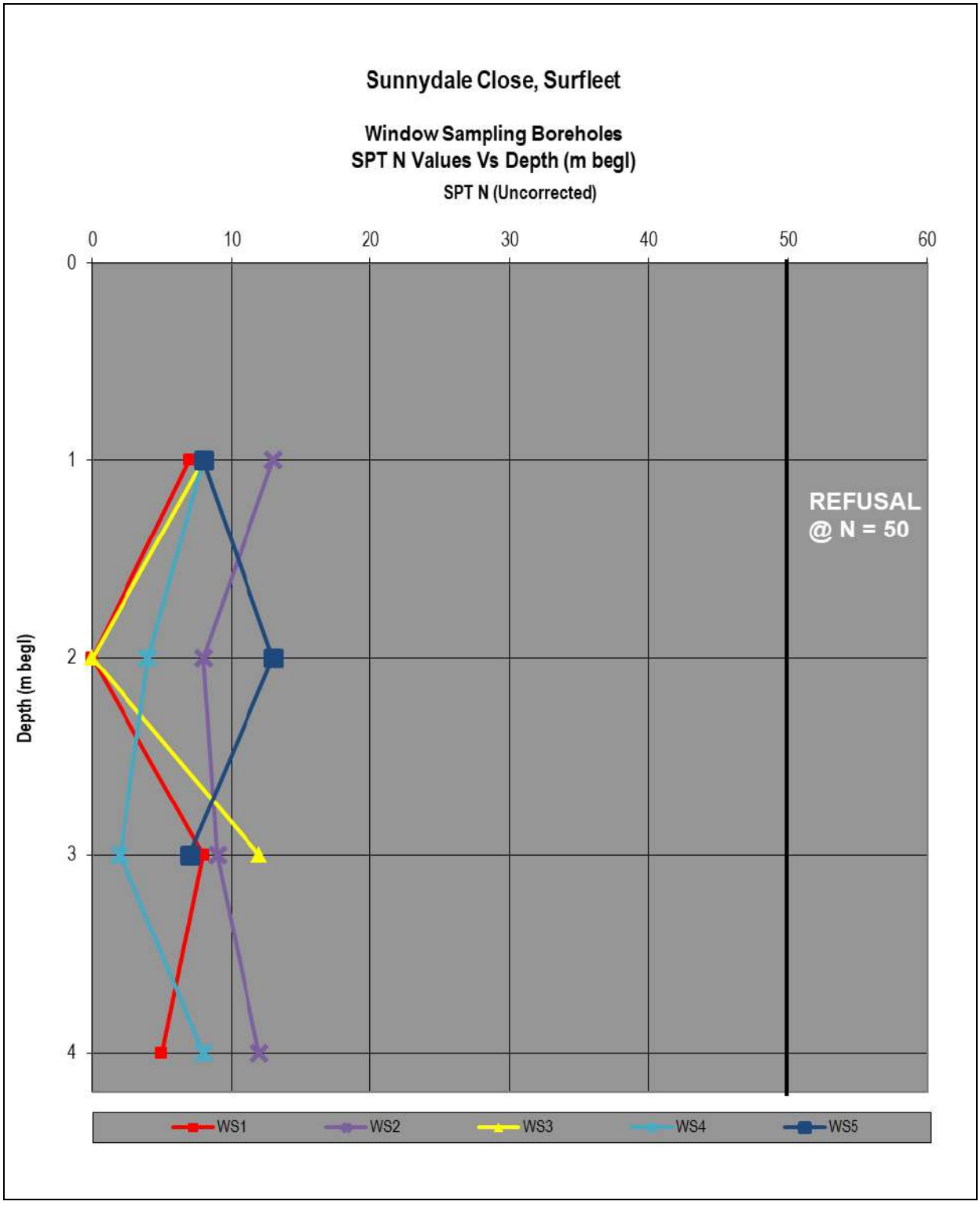
A photographic record of the exploratory investigation was obtained during the intrusive works. Selected photographs of the intrusive works are presented on the Plates presented in Appendix X of this report (Plate Nos. 1 to 16).

## 5.7 Standard Penetration Test (SPT) Data

In order to establish a strength/depth profile of the strata beneath the site, SPT testing was undertaken in the boreholes.

The uncorrected SPT ‘N’ values within the natural drift deposits, at a depth of 1.00m were ranged between 7 and 13. At a depth of 2.00m, uncorrected SPT ‘N’ values ranged between 0 and 13. At depths of 3.00m and greater, uncorrected SPT ‘N’ values ranged between 2 and 12.

An SPT Vs Depth Chart of the data obtained from the boreholes advanced at the site is shown on the chart below.



## 5.8 Soakaway Testing

Three soakaway tests (SA2, SA4 and SA5) were conducted in deep pits (i.e. 1.80m or 1.90 begl) to determine the suitability of traditional soakaways for the site. Two additional soakaway tests (SA1 and SA3) were conducted in shallower soakaway pits advanced to depths of 0.70m and 0.80m begl to determine the suitability of permeable paving as a possible drainage solution for the site.

The approximate locations of the soakaway pits are included on the plan presented in Appendix VIII (Figure No. D40008/04).

The water level failed to significantly drop within any of the soakaway test pits for the duration of the testing period, therefore infiltration rates have not been calculated.

## 6.0 LABORATORY TESTING & CONTAMINATION ASSESSMENT

### 6.1 Introduction

As part of our works a suite of geotechnical laboratory soils testing has been undertaken, which comprised the following:

- 8No. Plasticity Index tests.
- 2No. Particle Size Distribution tests.
- 5No. Water soluble sulphate tests.
- 10No. pH tests.
- 5No. Remoulded Soaked CBR tests.
- 3No. Loss on Ignition tests.

In addition, environmental soil testing was carried out on visually representative samples recovered from the exploratory holes. The testing strategy was based on the land use assessment and preliminary CSM derived by the desk study works, and was considered sufficient to enable an assessment of the chemical status of the soils at the site. The following testing has been undertaken as part of our works:

- 10No. Contamination suites (including metals, speciated Polycyclic Aromatic Hydrocarbons and Total Organic Carbon).
- 4No. Combined pesticide screens - Organochlorine & Organophosphate (OCP & OPP).

All laboratory soil test results are included in Appendix XI.

### 6.2 Geotechnical Soil Test Results

Water Soluble Sulphate/pH

Water soluble sulphate testing was undertaken on 5No. samples of the Natural Strata obtained during the site works. The testing revealed water soluble sulphate concentrations of between <10mg/l $SO_4$ and 380mg/l $SO_4$ within the samples analysed. The pH values of the samples of soils analysed (excluding topsoil) ranged between 8.63 and 8.91.

In accordance with the Building Research Establishment publication Special Digest 1 '*Concrete in Aggressive Ground*' (2005) the mean of the highest two sulphate results should be used to indicate the Design Sulphate Class (i.e. 215mg/l $SO_4$), together with the lowest of the pH values (8.63).

Therefore, in accordance with Special Digest 1:2005 the site falls into Design Sulfate Class DS-1 and an Aggressive Chemical Environment for Concrete (ACEC) classification of AC-1. This classification has been made based on the assumption of a natural ground location with potentially mobile groundwater conditions beneath the site.

Plasticity Index Tests

A total of 8No. Plasticity Index tests have been undertaken on selected samples of the near surface Natural Strata obtained during the site works. In accordance with NHBC standards Chapter 4.2 *'Building Near Trees'* and BRE Digest 240 '*Low-rise buildings on shrinkable clay soils: Part 1*' (1993) the reported PI values may be modified based on the portion of the sample passing the 425μm sieve.

The result of the PI analysis is summarised in Table 8.

| TABLE 8 – SUMMARY OF PLASTICITY INDEX (PI) DATA | | | | |
|---|---|---|---|---|
| Sample Ref. | Reported PI Value (%) | Portion <425μm (%) | Modified PI Value (%) | Volume Change Potential |
| TP9, 1.00-1.50m (SILT) | Non-Plastic | | | |
| TP11, 1.50-2.50m (CLAY) | 24 | 100 | 24 | Medium |
| TP17, 1.00-1.50m (SILT) | Non-Plastic | | | |
| TP23, 0.80-1.30m (SILT) | Non-Plastic | | | |
| WS1,1.00-1.50m (SILT) | Non-Plastic | | | |
| WS2, 1.40-1.60m (SILT) | Non-Plastic | | | |
| WS3, 1.50-2.00m (CLAY) | 25 | 100 | 25 | Medium |
| WS4, 0.70-1.00m (SILT) | Non-Plastic | | | |

The testing has revealed that the near surface Silt soils analysed may be classified as non-plastic. The testing also revealed that the localised near surface Clay soils analysed, may be regarded as being of medium volume change potential. As stated in Section 5.2.3, from a visual perspective the excavated Silt soils appeared to be cohesive in composition and on this basis and together with the findings of the PSD tests (see below) soils of a medium volume change potential should therefore be assumed for design purposes.

Particle Size Distribution (PSD) Tests

PSD analysis was undertaken on two samples of the visually granular soils (i.e. very silty Sand obtained during the site works. The testing reveals that these soils contain a fines content (i.e. Clay / Silt) significantly in excess of 35%. Therefore, these soils have the potential to behave as shrinkable soils.

Loss on Ignition

Loss on ignition testing was undertaken on three samples of the Natural Strata across the site at depths of between 1.50m and 1.70m. The Natural Strata at one of these locations (SA2) was noted to contain occasional plant remains. At the remaining two locations, the Natural Strata was noted to be grey with shell fragments.

The analysis revealed loss on ignition values of between 4.9% and 9.9%.

The results indicate that the shallow Natural Strata from depths of approximately 1.50m begl has the potential to be compressible and subject to peat wastage (i.e. biodegradation).

Remoulded Soaked California Bearing Ratio (CBR) Testing

Remoulded soaked California Bearing Ratio testing was undertaken on 5No. samples of shallow Natural Strata across the site. The results of the recompacted CBR testing are summarised in Table 9 below. CBR values for the top and bottom of the remoulded soaked sample are recorded. The approximate locations of the CBR samples are shown on the plan presented in Appendix XII (Figure No. D40008/05).

| TABLE 9 – SUMMARY OF LABORATORY CBR TEST RESULTS | | | | |
|---|---|---|---|---|
| Sample Ref. | Depth (m begl) | Initial Moisture Content (%) | CBR Value Sample Top (%) | CBR Value Sample Bottom (%) |
| LB1; TP9 (SILT) | 0.60-1.10 | 24 | 0.2 | 0.5 |
| LB2; TP12 (SILT) | 0.70-1.20 | 25 | 2.6 | 4.1 |
| LB3; TP15 (SILT) | 0.60-1.10 | 26 | 0.4 | 0.6 |
| LB4; TP18 (SILT) | 0.60-1.10 | 25 | 0.4 | 0.5 |
| LB5; TP19 (SILT) | 0.55-1.05 | 26 | 0.3 | 0.4 |

### 6.3 Contamination Assessment Rationale

We understand that it is proposed to develop the site with low-rise residential properties incorporating private gardens. It is also understood that current development proposals incorporates an area of Public Open Space (POS).

#### 6.3.1 Assessment Methodology

In order to undertake a Generic Quantitative Risk Assessment (GQRA) we have adopted the Suitable for Use Levels (S4ULs) published by LQM/CIEH in their publication referenced: Nathanail, C.P., McCaffrey, C. Gillett, A.G., Ogden, R.C. and Nathanail, J.F, 2015. '*The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham. All rights reserved.*' In the absence of an S4UL screening value, we have made reference to the Category 4 Screening Levels (C4SLs) published by DEFRA.

In consideration of the available generic land uses utilised in the derivation of the adopted screening criteria, we have adopted a residential end-use with plant uptake scenario for the purposes of our assessments.

For assessment purposes, we have adopted a policy whereby determinands within the dataset are individually compared to the relevant screening value (i.e. individual S4ULs). Where determinands within the dataset are less than the appropriate screening value, the determinand is considered to be present at an acceptable concentration and no further assessment is required. Additional comment, statistical assessment or further Detailed Quantitative Risk Assessment (DQRA) may be provided where elevated values are revealed.

#### 6.3.2 Selection of Soil Organic Matter (SOM) Content

The SOM content and soil type are used to provide an assessment of the applicability of the screening values adopted (the S4UL values are typically based upon SOM of 1%, 2.5% and 6%, as applicable, with all metals derived utilising 6% SOM as standard).

Where available at Tier 1 level, determinands have in the first instance been compared to screening values adopting a conservative SOM of 1%.

Where the determinand exceeds the relevant screening value at 1% SOM, a site-specific SOM may be adopted as appropriate to derive more site-specific screening values and the dataset reassessed.

### 6.4 Sampling Strategy

The sampling strategy for the site was primarily to retrieve visually representative soil samples from a selection of locations that provide an initial coverage across the entire site area (where access allowed).

The sampling strategy was based on a review of the historical, geological and environmental information obtained from the Desk Study enquiries and the current and proposed site setting together with and the ground conditions encountered during our Phase II exploratory works.

Specific areas of potential concern were identified at the site with respect to ground contamination including the former on site drain, former crop and the off-site depot to the west of the site. Exploratory holes were therefore advanced to target these specific areas and also to provide general site coverage, taking account the access restrictions and the presence of known buried services.

Table 10 summarises the reasoning behind the exploratory hole positions.

TABLE 10 – REASONING FOR EXPLORATORY HOLE LOCATION

| Exploratory Hole Reference | Reasoning Behind Location |
|---|---|
| TP1 – TP25, WS1 – WS5, SA1 – SA5 | General site coverage, targeting the former potentially cropped areas and avoiding known utilities. |
| TP7, TP8, TP19, TP20, TP23, TP24 | Targeted to the former drainage ditch in the southeast of the site. |
| TP2 | Targeted to the off-site depot 5m to west of the site. |
| WS1, WS2 and WS4 | General site coverage for the purposes of installing ground gas monitoring points. |
| Key<br>TP – Trial Pit<br>SA – Soakaway Test Pit<br>WS – Window Sampling Borehole | |

The ground conditions encountered during our Phase II works revealed the presence of two distinct types of material, i) natural Topsoil and ii) the underlying Natural Strata.

Representative samples of these soil types were obtained during our Phase II works and subjected to chemical analysis for a suite of contaminants deemed appropriate based on the findings of the Desk Study and the ground conditions encountered during the intrusive investigation. It is noted that the suite of contaminants detailed in Section 4.6 were considered to remain applicable as an initial chemical screen of the encountered soils following completion of the site investigation works.

## 6.5 Contamination Analysis

Contamination tests were undertaken on visually representative samples of the natural Topsoil (6No.) and underlying Natural Strata (4No.) obtained from the site during our works.

In addition, four samples of the topsoil across the site were subjected to pesticide analysis.

For initial assessment purposes, we have collated the results into two datasets, for individual comparison of the reported determinand concentrations against appropriate Tier 1 GACs, namely topsoil and the underlying undisturbed Natural Strata.

Please note that screening values have only been used for determinands where they are present at concentrations in excess of the LOD on at least one occasion.

## 6.6 Contamination Soil Test Results

### 6.6.1 Topsoil

The contamination assessment for the natural Topsoil at the site is summarised in Table 11.

TABLE 11 – SUMMARY OF TIER 1 GAC ASSESSMENT (TOPSOIL - RESIDENTIAL WITH PLANT UPTAKE END-USE)

| Contaminants – Potentially Harmful to Human Health | No. of Samples Tested | Concentration Range (mg/kg) | Tier 1 GAC (mg/kg) | Tier 1 GAC Exceeded (Yes/No) |
|---|---|---|---|---|
| Metals | | | | |
| Arsenic | 6 | 6 – 8 | 37 S4UL | No |
| Chromium III | 6 | 15 – 21 | 910 S4UL | No |
| Copper | 6 | 7 – 11 | 2400 S4UL | No |
| Lead | 6 | 22 – 78 | 200 C4SL | No |
| Nickel | 6 | 12 – 15 | 130 S4UL | No |
| Selenium | 6 | <1 – 1 | 250 S4UL | No |
| Zinc | 6 | 44 – 61 | 3700 S4UL | No |
| PAH | | | | |
| Acenaphthylene | 6 | <0.1 – 0.2 | 170 S4UL | No |
| Anthracene | 6 | <0.1 – 0.5 | 2400 S4UL | |
| Benzo(a)anthracene | 6 | <0.1 – 0.7 | 7.2 S4UL | No |
| Benzo(a)pyrene | 6 | <0.1 – 0.4 | 2.2 S4UL | No |
| Benzo(b)fluoranthene | 6 | <0.1 – 0.4 | 2.6 S4UL | No |
| Benzo(b)fluoranthene | 6 | <0.1 – 0.4 | 2.6 S4UL | No |
| Chrysene | 6 | <0.1 – 0.6 | 15 S4UL | No |
| Fluoranthene | 6 | <0.1 – 2.4 | 280 S4UL | No |
| Fluorene | 6 | <0.1 – 0.2 | 170 S4UL | No |
| Indeno(123-cd)pyrene | 6 | <0.1 – 0.1 | 27 S4UL | No |
| Naphthalene | 6 | <0.1 – 0.2 | 2.3 S4UL | No |
| Phenanthrene | 6 | <0.1 – 0.2 | 95 S4UL | No |
| Pyrene | 6 | <0.1 – 1.8 | 620 S4UL | No |

Key
S4UL – CIEH/LQM Suitable 4 Use Levels (2015). Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3026. All rights reserved.
C4SL – value for Lead taken from DEFRA publication SP1010 and based on a residential (with home-grown produce) end-use.

All of the determinands assessed for the Topsoil were present at individual concentrations below the Limit of Detection of the method of analysis adopted by the laboratory or below the appropriate Tier 1 GAC based on a residential with plant uptake end-use.

### 6.6.3 Natural Strata

The contamination assessment for the Natural Strata at the site is summarised in Table 12.

TABLE 12 – SUMMARY OF TIER 1 GAC ASSESSMENT
(NATURAL STRATA - RESIDENTIAL WITH PLANT UPTAKE END-USE)

| Contaminants – Potentially Harmful to Human Health | No. of Samples Tested | Concentration Range (mg/kg) | Tier 1 GAC (mg/kg) | Tier 1 GAC Exceeded (Yes/No) |
|---|---|---|---|---|
| Metals | | | | |
| Arsenic | 4 | 1 – 6 | 37 $_{S4UL}$ | No |
| Chromium III | 4 | 12 – 18 | 910 $_{S4UL}$ | No |
| Copper | 4 | 2 – 4 | 2400 $_{S4UL}$ | No |
| Lead | 4 | 6 – 10 | 200 $_{C4SL}$ | No |
| Nickel | 4 | 10 – 15 | 130 $_{S4UL}$ | No |
| Zinc | 4 | 23 – 41 | 3700 $_{S4UL}$ | No |

Key
S4UL – CIEH/LQM Suitable 4 Use Levels (2015). Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3026. All rights reserved.
C4SL – value for Lead taken from DEFRA publication SP1010 and based on a residential (with home-grown produce) end-use.

All of the determinands assessed for Natural Strata were present at individual concentrations below the Limit of Detection of the method of analysis adopted by the laboratory or below the appropriate Tier 1 GAC based on a residential with plant uptake end-use.

## 6.7 Pesticides

4No. samples of the Topsoil from across the site were tested for a suite of pesticides. The results typically revealed individual concentrations below the Limit of Detection of the method of analysis adopted by the laboratory (0.01 mg/kg, 0.10 mg/kg or 0.50mg/kg). However, concentrations of pendimethalin (0.01mg/kg) and DDE (0.02mg/kg) were detected within one sample (WS2, 0.1m).

We would note that there are presently no publicly available generic screening criteria for soils for the other pesticide determinands specific to the UK setting. We have therefore reviewed other sources of screening criteria for comparison purposes.

USEPA (United States Environmental Protection Agency) have co-operated to prepare Screening Levels (SLs) '*Regional Screening Level (RSL) Resident Soil Table November 2017*' for use within Superfund sites (i.e. contaminated land). USEPA have provided a screening level of 19000mg/kg for pendimethalin and a screening level of 2mg/kg for DDE. The pesticide concentrations recorded within topsoil sample at WS2 do not exceed these values.

## 6.8 Contamination Assessment Summary

Human Health

Contamination testing was carried out on selected samples of the Topsoil and the underlying Natural Strata. It was considered appropriate to base our sampling and investigation strategy on the potential contamination issues identified within our land use assessment taking into account the proposed end-use and the historical and existing use of the site.

On the basis of the chemical contamination assessment undertaken, the soils may be considered to be uncontaminated for the proposed residential with plant uptake end-use (i.e. in relation to human health).

We would additionally note that no visual or olfactory evidence of significant contamination was identified during the course of the exploratory investigation works.

Controlled Waters

Given the low contaminant concentrations revealed by the testing, together with the generally low groundwater sensitivity of the area, there are considered to be no specific risks posed to Controlled Waters by the findings of the laboratory analysis undertaken.

## 7.0 GROUND GAS & WATER LEVEL MONITORING RESULTS

### 7.1 Introduction

Based on the potential presence of on and off-site sources of potentially harmful ground gas, monitoring points were installed in selected completed boreholes to facilitate an initial programme of monitoring (i.e. for methane and carbon dioxide).

### 7.2 Monitoring Installations

Upon completion, three of the window sampling boreholes (WS1, WS2 and WS4) were installed with combined ground gas and water monitoring standpipes to depths of up to 4.00m begl to facilitate an initial programme of monitoring.

The ground gas and water monitoring data obtained from the site is presented in Appendix XIII of this report.

### 7.3 Results of the Ground Gas Monitoring

A total of six ground gas and water monitoring visits have been undertaken at the site over a six week period. The ground gas monitoring results are summarised in Table 13.

TABLE 13 – SUMMARY OF GROUND GAS MONITORING DATA

| Parameter | Minimum | Maximum |
|---|---|---|
| Methane (v/v) | 0.0 | 0.0 |
| Carbon Dioxide (v/v) | 0.0 | 1.6 |
| Oxygen (v/v) | 19.7 | 21.1 |
| Peak Flow (L/h) | 0.0 | 0.0 |
| Steady Flow (L/h) | 0.0 | 0.0 |

KEY
v/v - % by volume
L/h – litres/hour

Periods of rapidly falling atmospheric pressure are considered to be the optimum barometric conditions for gas emissions from the ground. The majority of the gas monitoring visits were carried out during periods of falling atmospheric pressure, including a fall of 16mb in the 24hour period prior to monitoring on 20th February 2020.

The atmospheric pressure trends are summarised below:

- 20th February – Fall of 16mb in the 24hour period prior to monitoring
- 24th February – Fall of 8mb in the 24hour period prior to monitoring
- 5th March – Fall of 13mb in the 24hour period prior to monitoring
- 11th March – Rise of 9mb in the 24hour period prior to monitoring
- 19th March – Rise of 6mb in the 24hour period prior to monitoring
- 23rd March – Fall of 2mb in the 24hour period prior to monitoring

The atmospheric pressure trends noted during the monitoring period do not appear to have affected the ground gas flow rates recorded during the monitoring period. No variations in flow rates were noted during the monitoring carried out, as no flow rates were recorded on any of the monitoring visits, including the visit carried out following a period of rapidly falling atmospheric pressure. The highest recorded carbon dioxide concentration of 1.6% by volume was detected when the atmospheric pressure fell by only 2mb (essentially steady) in the 24 hours prior to monitoring on 23rd March 2020.

Water was recorded during the course of the monitoring programme, at depths of between 0.51m and 1.41m begl.

## 7.4 Appropriate Guidance

### 7.4.1 British Standard & CIRIA

The results of the gas monitoring have been reviewed with reference to the following documentation:

- British Standard BS 8485 '*Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*' (2019).
- CIRIA Report C665 '*Assessing risks posed by hazardous ground gases to buildings*' (2007).
- CIRIA Report C735 '*Good practice on the testing and verification of protection systems for buildings against hazardous ground gases*' (2014).

### 7.4.2 Gas Screening Value Calculation

8485:2015+A1:2019 and CIRIA Report C665 recommend a risk-based methodology to ground gas assessment, the first step of which includes the calculation of a site-specific Gas Screening Value (GSV). The GSV of a particular ground gas regime equates to:

- GSV (l/h) = maximum borehole flow rate (l/h) x (maximum gas concentration/100).

The GSV should be calculated for both Methane and Carbon Dioxide (where appropriate) to determine a site-specific Characteristic Situation for each gas. The higher the calculated GSV, the greater the risk posed by the presence of ground gas. The CIRIA guidance document notes that '*…the GSV is a guideline value and not an absolute threshold*'.

### 7.4.3 Site Classification

The next step in the assessment process is determining the sites classification. Table 2 of 8485:2015+A1:2019+A1:2019 (reproduced below) presents six Characteristic Situations (CS) to assist in the classification of the site, based on the calculated GSV for Methane and Carbon Dioxide.

**Table 2** — *CS by site characteristic GSV*

| CS | Hazard potential | Site characteristic GSV [A)] L/h | Additional factors |
|---|---|---|---|
| CS1 | Very low | <0.07 | Typically <1% methane concentration and <5% carbon dioxide concentration (otherwise consider an increase to CS2) |
| CS2 | Low | 0.07 to <0.7 | Typical measured flow rate <70 L/h (otherwise consider an increase to CS3) |
| CS3 | Moderate | 0.7 to <3.5 | – |
| CS4 | Moderate to high | 3.5 to <15 | – |
| CS5 | High | 15 to <70 | – |
| CS6 | Very high | >70 | – |

A) The figures used in this column are empirical.

*NOTE The CS is equivalent to the characteristic GSV in CIRIA C665 [6].*

### 7.4.4 Proposed Building Type

In accordance with 8485:2015+A1:2019+A1:2019, the CS classification for the site should be considered in conjunction with the proposed Building Type to determine the appropriate level of ground gas protection measures that should be installed to mitigate the risk posed by ground gases.

8485:2015+A1:2019+A1:2019 notes '*The Building Type is determined based the proposed construction and use of the building, together with the control of future structural changes to the building and its maintenance (the building's management) should be assessed, since potential risks posed by ground gases are strongly influenced by these factors*'.

Subject to the development proposals, each building may be categorised as a whole, or for each different part of the building.

The Building Types presented in Table 3 of 8485:2015+A1:2019+A1:2019, are reproduced below.

**Table 3** — *Building types*

| | Type A | Type B | Type C | Type D |
|---|---|---|---|---|
| **Ownership** | Private | Private or commercial/ public, possible multiple | Commercial/ public | Commercial/ industrial |
| **Control (change of use, structural alterations, ventilation)** | None | Some but not all | Full | Full |
| **Room sizes** | Small | Small/ medium | Small to large | Large industrial/ retail park style |

- **Type A building**: private ownership with no building management controls on alterations to the internal structure, the use of rooms, the ventilation of rooms or the structural fabric of the building. Some small rooms present. Probably conventional building construction (rather than civil engineering). Examples include private housing and some retail premises.
- **Type B building**: private or commercial property with central building management control of any alterations to the building or its uses but limited or no central building management control of the maintenance of the building, including the gas protection measures. Multiple occupancy. Small to medium size rooms with passive ventilation of rooms and other internal spaces throughout ground floor and basement areas. May be conventional building or civil engineering construction. Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres) and parts of hotels.
- **Type C building**: commercial building with central building management control of any alterations to the building or its uses and central building management control of the maintenance of the building, including the gas protection measures. Single occupancy of ground floor and basement areas. Small to large size rooms with active ventilation or good passive ventilation of all rooms and other internal spaces throughout ground floor and basement areas. Probably civil engineering construction. Examples include offices, some retail premises, and parts of some public buildings (such as schools, hospitals, leisure centres and parts of hotels).
- **Type D building**: industrial style building having large volume internal space(s) that are well ventilated. Corporate ownership with building management controls on alterations to the ground floor and basement areas of the building and on maintenance of ground gas protective measures. Probably civil engineering construction. Examples are retail park sales buildings, factory shop floor areas, warehouses. (Small rooms within these style buildings should be separately categorized as Type B or Type C).

*NOTE 2 Type A buildings are those where the risk of failure of the gas protection measures is likely to be most significant to the safety of the occupants and Type D buildings are those where this same risk is likely to be least significant.*

### 7.4.5 Gas Protection Score (Number of Points to be Achieved)

Table 4 of 8485:2015+A1:2019+A1:2019, reproduced below, should be used to derive the minimum level of gas protection applicable to the Building Type, based on the CS determined from the calculated GSV. The Gas protection Score in Table 4 below is used to determine the level and type of protection measures used.

**Table 4** — *Gas protection score by CS and type of building*

| CS | Minimum gas protection score (points) | | | |
|---|---|---|---|---|
| | High risk | | Medium risk | Low risk |
| | Type A building | Type B building | Type C building | Type D building |
| 1 | 0 | 0 | 0 | 0 |
| 2 | 3.5 | 3.5 | 2.5 | 1.5 |
| 3 | 4.5 | 4 | 3 | 2.5 |
| 4 | 6.5 [A)] | 5.5 [A)] | 4.5 | 3.5 |
| 5 | — [B)] | [A1] 6 [A1] [A)] | 5.5 | 4.5 |
| 6 | — [B)] | — [B)] | [A1] — [B)] [A1] | [A1] 6 [A1] |

[A)] Residential buildings should not be built on CS4 or higher sites unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.

[B)] The gas hazard is too high for this empirical method to be used to define the gas protection measures.

### 7.4.6 Methods of Achieving Gas Protection Scores

The appropriate level of precautions, to be designed in accordance with the point scoring system of 8485:2015+A1:2019, should therefore be determined for the specific type of developments based on the GSV and CS of the site. These may include a combination of two or more of the following three types of protection measures, which could be used to achieve the required score:

- The structural barrier of the floor slab, or of the basement slab and walls if a basement is present;
- Ventilation measures; and
- Gas resistant membrane which may include an element of verification and potentially integrity testing.

Verification and integrity testing should be undertaken in accordance with CIRIA report C735 '*Good practice on the testing and verification of protection systems for buildings against hazardous ground gases*' (2014) and would be detailed in a Remediation Method Statement report in advance of construction which should be agreed with the Local Planning Authority.

The points achieved for each element of the ground gas precautions are summarised in Tables 5, 6 and 7 of the British Standard. These tables are reproduced below.

**Table 5** — *Gas protection scores for the structural barrier*

| Floor and substructure design (see Annex A) | Score [A] |
|---|---|
| Precast suspended segmental subfloor (i.e. beam and block) | 0 |
| Cast in situ ground-bearing floor slab (with only nominal mesh reinforcement) | 0.5 |
| Cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations | 1 or 1.5 [B] |
| Basement floor and walls conforming to BS 8102:2009, Grade 2 waterproofing [C] [D] | 2 |
| Basement floor and walls conforming to BS 8102:2009, Grade 3 waterproofing [C] [D] | 2.5 |

[A] The scores are conditional on breaches of floor slabs, etc., being effectively sealed.

[B] To achieve a score of 1.5 the raft or suspended slab should be well reinforced to control cracking and have minimal penetrations cast in (see **A.2.2.2**).

[C] The score is conditional on the waterproofing being provided by a suitable structural barrier with the design and detailing of the walls and floor meeting the requirements for Type B protection. The score cannot be assigned for Type A (waterproof membrane) or Type C (drained cavity wall).

[D] If a membrane is installed beneath and around the basement to provide Type A waterproofing (BS 8102:2009), it can be assigned a gas protection score in accordance with Table 7, if it meets all the criteria for a gas resistant membrane in that table.

**Table 6** — *Gas protection scores for ventilation protection measures*

| Protection element/system | Score | Comments |
|---|---|---|
| (a) Pressure relief pathway (usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building) | 0.5 | Whenever possible a pressure relief pathway (as a minimum) should be installed in all gas protection measures systems.<br>If the layer has a low permeability and/or is not terminated in a venting trench (or similar), then the score is zero. |

**Table 6** *(continued)*

| Protection element/system | Score | Comments |
|---|---|---|
| (b) Passive sub floor dispersal layer: | 2.5 | Performance criteria for methane and carbon dioxide are shown in Figure B.6 and Figure B.7, respectively. |
| Very good performance: | 1.5 | |
| Good performance: | | |
| Media used to provide the dispersal layer are:<br>• Clear void<br>• Polystyrene void former blanket<br>• Geocomposite void former blanket<br>• No-fines gravel layer with gas drains<br>• No-fines gravel layer | | The ventilation effectiveness of different media depends on a number of different factors including the transmissivity of the medium, the width of the building, the side ventilation spacing and type and the thickness of the layer. The selected score should be assigned taking into account the recommendations in Annex B. Passive ventilation should be designed to meet at least "good performance", see Annex B. |
| (c) Active dispersal layer, usually comprising fans with active abstraction (suction) from a subfloor dilution layer, with roof level vents. The dilution layer may comprise a clear void or be formed of geocomposite or polystyrene void formers | 1.5 to 2.5 | This system relies on continued serviceability of the pumps, therefore alarm and response systems should be in place.<br>There should be robust management systems in place to ensure the continued maintenance of the system, including pumps and vents. Active ventilation should always be designed to meet at least "good performance", as described in Annex B. |
| (d) Active positive pressurization by the creation of a blanket of external fresh air beneath the building floor slab by pumps supplying air to points across the central footprint of the building into a permeable layer, usually formed of a thin geocomposite blanket | 1.5 to 2.5 | This system relies on continued operation of the pumps, therefore alarm and response systems should be in place.<br>The score assigned should be based on the efficient "coverage" of the building footprint and the redundancy of the system. Active ventilation should always be designed to meet at least "good performance". |
| (e) Ventilated car park (floor slab of occupied part of the building under consideration is underlain by a basement or undercroft car park) | 4 | Assumes that the car park is vented to deal with car exhaust fumes, designed to *Buildings Regulations 2000, Approved Document F* [9]. |

**Table 7** — *Gas protection score for the gas resistant membrane*

| Protection element/system | Score | Comments |
|---|---|---|
| Gas resistant membrane meeting all of the following criteria:<br>• sufficiently impervious ⟨A1⟩ , both in the sheet material [A)] and in the sealing of sheets and sealing around sheet penetrations, to prevent any significant passage of methane and/or carbon dioxide through the membrane; ⟨A1⟩<br>• sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;<br>• ⟨A1⟩ *Text deleted* ⟨A1⟩<br>• sufficiently strong ⟨A1⟩ [B)] ⟨A1⟩ to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc); ⟨A1⟩ and to withstand in-service stresses (e.g. settlement if placed below a floor slab); ⟨A1⟩<br>• capable, after installation, of providing a complete barrier to the entry of the relevant gas; and<br>• verified in accordance with CIRIA C735 [N1]. | 2 | The performance of membranes is heavily dependent on the quality and design of the installation, resistance to damage after installation and integrity of joints.<br>⟨A1⟩ *Text deleted* ⟨A1⟩<br>If a membrane is installed that does not meet all the criteria in column 1 then the score is zero. |

[A)] ⟨A1⟩ A membrane with a methane gas transmission rate <40.0 ml/day/m²/atm (average) for sheets and joints (tested in accordance with BS ISO 15105-1:2007 manometric method) is regarded as sufficiently impervious.

[B)] For example, reinforced LDPE (virgin polymer) membranes having a minimum mass per unit area of 370 g/m² and not significantly less than 0.4 mm thickness between the reinforcement scrim (tested in accordance with Procedure D (2 mm diameter tip) of BS EN ISO 9863-1:2016) installed above floor slabs are considered sufficiently strong to meet the performance criteria (see also **C.3**). Thicker and more robust membranes or an additional membrane protection layer should be installed directly beneath cast-in-situ floor slabs. ⟨A1⟩

## 7.5 Ground Gas Analysis

### 7.5.1 Gas Screening Value & Site Classification

The ground gas monitoring undertaken to date has identified no methane and a maximum carbon dioxide concentrations of 1.6% v/v by volume. Measureable steady flow rates were not recorded during the monitoring visits. In the absence of a measurable steady flow rate, the limit of detection of the gas monitoring instrument (0.1 l/h) should be utilised. The atmospheric pressure trends noted during the monitoring period do not appear to have affected the low ground gas concentrations recorded.

The GSV for carbon dioxide at the site may be calculated as follows:

- 0.1 x (1.6/100) = 0.0016 l/h

Therefore, with a maximum GSV of 0.0016 l/h, a carbon dioxide concentration of 1.6% by volume, no methane concentration and no measurable steady flow rate, the site may be classified as '**CS1**' in accordance with Table 2 of BS 8485 and based on the visits undertaken.

### 7.5.2 Building Type

We understand that it is proposed to construct low-rise residential properties at the site. In accordance with Table 3 of BS 8485, **Building Type A** is considered to be the most appropriate classification.

### 7.5.3 Gas Protection Score

On the basis of Characteristic Situation (CS1) and the development proposals with structures that may be designated as Building Type A and in accordance with Table 4 of BS 8485:2015+A1:2019, the minimum gas protection score for the site is 0 points.

### 7.5.4 Comments

The results of the gas monitoring carried out indicate that no ground gas precautions would be required for the site based on the gas protection score of zero in accordance with BS 8485:2015+A1:2019.

# 8.0 REVISED CONCEPTUAL SITE MODEL

## 8.1 Introduction

In accordance with the approach detailed within Section 4.0, the Conceptual Site Model (CSM) for the site should be refined following acquisition and collection of additional data following completion of the site investigation works.

Our revised assessment following the acquisition and collection of information from the site investigation works is provided in Table 14.

| TABLE 14 – REVISED RISK ASSESSMENT SUMMARY TABLE<br>PHASE II EXPLORATORY INVESTIGATION | | | | | | |
|---|---|---|---|---|---|---|
| Potential Contaminant Source [C] | Potential Pathway(s) [P] | Potential Receptor [R] | Probability of CPR Linkage | Consequence of CPR Linkage | Risk Level | Comments / Justification |
| General Made Ground & Near Surface Soils | Direct contact, ingestion or inhalation of fugitive dust | End users | Unlikely | Medium | Low | Made Ground was not encountered at the site. The soils may be regarded as uncontaminated, based on a residential with plant uptake end-use and the testing undertaken. |
| | Direct contact, ingestion or inhalation of fugitive dust | Site personnel | Unlikely | Medium | Low | Made Ground was not encountered at the site. The soils may be regarded as uncontaminated, based on a residential with plant uptake end-use and the testing undertaken.<br><br>We would recommend that site personnel use appropriate PPE and welfare facilities in accordance with normal working practices. |
| | Plant uptake | End users | Unlikely | Medium | Low | Made Ground was not encountered at the site. The soils may be regarded as uncontaminated, based on a residential with plant uptake end-use and the testing undertaken. |
| | Vertical and lateral migration | Neighbouring properties | Unlikely | Mild | Negligible | Made Ground was not encountered at the site. The soils may be regarded as uncontaminated, based on a residential with plant uptake end-use and the testing undertaken. No significant sources of potential mobile hydrocarbon contamination have been identified on site and there was no obvious visual or olfactory evidence of any significant contamination (i.e. hydrocarbon impacted soils, for example). |
| | Leaching of Contaminants through unsaturated zone and/or vertical and lateral migration | Controlled Waters | Unlikely | Mild | Negligible | Made Ground was not encountered at the site. The soils may be regarded as uncontaminated, based on a residential with plant uptake end-use and the testing undertaken. No significant sources of potential mobile hydrocarbon contamination have been identified on site and there was no obvious visual or olfactory evidence of any significant contamination (i.e. hydrocarbon impacted soils, for example). |
| | Direct contact or contact with vapours | Plastic buildings products (i.e. water supply pipes) and buried concrete | Unlikely | Mild | Negligible | No sources of potentially mobile hydrocarbon contamination have been identified on site.<br>Design Class DS-1/ACEC Class AC-1. (BRE Spec. Digest 1:2005). |
| | Vertical and lateral migration of ground gases to indoor air | End users of new buildings (asphyxiation) or new buildings (damage via explosion) | Unlikely | Medium | Low | Based on the ground gas monitoring undertaken, the site may be classified as Characteristic Situation 'CS1' in accordance with BS8485:2015+A1:2019. |
| Off-Site Made Ground | Vertical and lateral migration of ground gases to indoor air | End users of new buildings (asphyxiation) or new buildings (damage via explosion) | Unlikely | Medium | Low | Based on the ground gas monitoring undertaken, the site may be classified as Characteristic Situation 'CS1' in accordance with BS8485:2015+A1:2019. |

# 9.0 CONCLUSIONS & RECOMMENDATIONS

## 9.1 Site Summary

At the time of our works (February 2020), the site essentially comprised the majority of an undeveloped, sensibly level, grassed field. Based on the reviewed historical information, the site has essentially remained unchanged according to the earliest available historical maps of the 1880s.

The site is indicated to be underlain by superficial drift comprising Tidal Flat Deposits. The underlying bedrock is indicated to comprise the Oxford Clay Formation.

## 9.2 Geotechnical Information

### 9.2.1 Ground Conditions

Made Ground was not encountered at the site.

Slightly sandy clayey very silty Topsoil was encountered at the surface in the exploratory holes to an average depth of approximately 0.40m begl.

Beneath the Topsoil, the Natural Strata typically comprised firm sandy clayey SILT which became more sandy / less clayey with depth, underlain by loose to medium dense (locally very loose to loose) very silty SAND to the base of the exploratory holes.

Firm very silty CLAY was locally encountered beneath the Topsoil to depths of up to 1.00m begl. In all cases, the Clay was underlain by the Silt (described above). Similar firm Clay was also noted at depth in localised areas of the site from depths in excess of 1.50m begl.

### 9.2.2 Foundation Design

Foundations for the proposed development are likely to comprise Structural Engineer designed strip or raft foundations (to suit the loading characteristics of the proposed structures and incorporate mesh reinforcement, if considered appropriate).

The natural soils underlying the site at shallow depth (i.e. Silt), appear suitable to support a nett allowable ground bearing pressure of up to 75kN/$m^2$. This bearing pressure is considered appropriate due to the presence of underlying Tidal Flat Deposits, which have the potential to alter rapidly in character and geotechnical properties both laterally and vertically over relatively short distances and contain variable groundwater conditions/levels.

Based on laboratory test results, the soils may be considered to be of medium volume change potential for design purposes. Therefore, in all circumstances, foundations should be advanced to a minimum depth of 0.90m below existing or proposed ground level (whichever being the deeper) and founded within undisturbed suitably competent natural soils.

Should any localised Made Ground, disturbed ground or soft spots be encountered at founding depth, foundations will require further deepening to encounter underlying undisturbed suitably competent natural soils.

We would note that a gradual wetting of the soils was observed with depth within the trial pits excavated at the site and the sides of the trial pits began to slump after the excavations had been deepened in excess of approximately 1.70m begl. On the basis of the foregoing, it is important to ensure that all foundation excavations are kept as shallow as possible to avoid potential decreases in soil strength from affecting foundation integrity.

The use of a deeper founding solution (i.e. piles, for example) may need to be considered if there is a need to raise site levels and/or where excessive loads from buildings are present and shallow foundations are not deemed appropriate, subject to advice from a Structural Engineer.

The use of piles at the site would be subject to advice from a specialist piling contractor to confirm the depths of the piles and the most feasible and cost efficient type of pile to be used at the site. It would be necessary to undertake further intrusive works at the site involving cable percussive boreholes to assess the deeper ground conditions to assist with a piled foundation solution for the proposed development.

### 9.2.3 Floor Slab Design

Where strip foundations are considered appropriate, ground bearing floor slabs may be adopted at the site provided that there is less than 0.60m of suitably compacted geotechnically competent sub-slab fill beneath proposed slabs. Alternatively, a suspended slab may be adopted, which may be either cast in-situ or a pre-cast suspended floor with a clear ventilated void (i.e. beam and block).

### 9.2.4 Ground Gas Precautions

Based on the findings of the gas monitoring undertaken at the site, no ground gas precautions relating to carbon dioxide or methane are required.

### 9.2.5 Radon

No radon precautions are required at the site.

### 9.2.6 Building Near Trees

Foundation designs (including floor slabs) will need to be adjusted where building near existing, proposed or recently removed trees and hedgerows, in accordance with NHBC Standards Chapter 4.2 *'Building near trees'*. Soils of a medium volume change potential should be assumed for design purposes.

### 9.2.7 Water

Water seepages were observed within the trial pits at variable depths of between 1.70m and 2.70m begl. Water seepages were encountered from typically shallower depths of 1.00m within the boreholes. Water was encountered within each of the boreholes during the programme of monitoring, at depths of between 0.51m and 1.41begl.

Based on the ground conditions encountered during the intrusive works, foundation excavations are unlikely to require dewatering. However, deeper excavations (i.e. sewers, for example) may encounter water seepage, which should be controllable utilising minor sump pumping techniques, in the first instance. However, excavations are prone to instability (see Section 9.2.8).

Excavations may be susceptible to standing water following periods of wet weather. It should be noted that groundwater levels may vary due to seasonal or other effects. Excavations undertaken in the typically wetter winter months may result in different conditions than those encountered during our works.

### 9.2.8 Excavations / Stability

The majority of the trial pits collapsed to the approximate depth to the base of the Topsoil when excavating below depths in the region of 1.70m to 3.00m begl. Three localised trial pits in the northern extent of the site remained locally stable (TP9, TP10, TP11) during excavation and for the short amount of time they remained open following completion.

The boreholes were cased to the maximum depths of the borehole (typically 4m) begl to prevent sidewall collapse during drilling.

On this basis, excavations approaching depths of 1.70m begl are likely to require trench support for stability and health and safety reasons. The assessment of excavations and provision of support will be the responsibility of the contractor on site.

The natural soils may be subject to deterioration and softening if excavations are left open and exposed to wet weather. Any softened soils should be removed from excavations prior to the pouring of concrete.

### 9.2.9 Sulphate Classification

In accordance with BRE Special Digest 1 (2005), the site falls into Design Sulphate Class DS-1 and an Aggressive Chemical Environment for Concrete (ACEC) classification of AC-1.

Therefore, an appropriate concrete mix should be adopted in accordance with BRE Special Digest 1 for all buried concrete in contact with the ground.

### 9.2.10 Coal Mining

No coal mining precautions or associated investigation works are required at the site.

### 9.2.11 California Bearing Ratios (CBRs)

The remoulded soaked CBR testing has revealed CBR values for the Natural Strata between 0.2% and 4.1%.

### 9.2.12 Surface Water Drainage

The results from the programme of in-situ infiltration rate testing have indicated that traditional soakaways and permeable paving are unlikely to be viable for the site and it may be prudent to investigate alternative methods for draining the site, at this stage.

## 9.3 Environmental Considerations

### 9.3.1 Soil Contamination Assessment

Contamination testing was carried out on selected samples of the surface Topsoil and the underlying Natural Strata.

<u>Human Health</u>

On the basis of the chemical contamination assessment undertaken, the soils may be considered to be uncontaminated in the context of the proposed end-use (i.e. in relation to human health).

Controlled Waters

Given the low contaminant concentrations revealed by the testing, there are considered to be no specific risks posed to Controlled Waters by the findings of the laboratory analysis undertaken.

We would note that no obvious visual or olfactory evidence of significant soil contamination of was identified during the course of the site works.

### 9.3.2 Remediation Proposals / Re-Use of Soils

No specific remediation works will be required other than the provision of existing topsoil in proposed gardens and any other areas of soft landscape to provide a suitable growing media for plants. It may be necessary to increase the thickness of topsoil around the root balls of trees to suit the proposed planting regime.

### 9.3.3 Gardens & Areas of Soft Landscape

The existing topsoil at the site is considered chemically suitable for re-use within the proposed development (based on laboratory testing). The physical suitability of these soils should be assessed and determined on site by the developer.

Should there be a requirement to import topsoil to the site (although unlikely), it will be necessary to test the topsoil at source to ensure it is suitably clean (prior to importation) in accordance with CLEA/generic guidance. The topsoil should also conform to BS3882: 2015 '*Specification for topsoil*', with respect to the presence of foreign objects, and ideally nutrient levels etc. The results of the chemical analysis on topsoil proposed for importation should be forwarded to the Local Authority (Environmental Health Officer) for approval (prior to importation).

### 9.3.4 Re-use of Existing Natural Strata

The Natural Strata may be regarded as suitable for re-use within proposed gardens or areas of soft landscape as subsoil (to raise levels, as appropriate) or for landscaping/capping on alternative developments (subject to regulatory approval and the production of any necessary plans or permits) where surplus arisings are generated from the site.

### 9.3.5 Off Site Disposal & Waste Acceptance Criteria Testing

If off-site disposal is required the chemical testing regime can be different to the chemical testing required to assess the suitability of the soils for retention on site and the risks to human health. Therefore, a separate contamination assessment may be required to include bespoke leachate analysis (i.e. Waste Acceptance Criteria [WAC] testing) to classify the soils for off-site disposal with testing criteria to assess whether the soil is hazardous, non-hazardous or inert waste. However, the existing chemical test data will assist this process.

If disposal is necessary then the environmental laboratory test results (included within Appendix XI) should be provided to several landfill operators for consideration and cost provision in the first instance, prior to the material being removed from the site.

## 9.4 General Considerations

### 9.4.1 Construction Workers

No contamination has been identified that requires specific PPE. However, it is recommended that construction personnel involved with direct contact with the soils at the site use appropriate PPE equipment (i.e. boots, gloves and overalls) together with hygiene facilities in accordance with general health and safety guidelines.
A copy of this report should be included in the site health and safety file, and site workers should be made fully aware of the sites setting.

### 9.4.2 Utilities

Prior to development of the site, we would recommend that a copy of this report is supplied to utility companies, and that their recommendations relating to appropriate supply pipes are adhered to.

### 9.4.3 Unforeseen Circumstances

Should any areas of potentially contaminated soil be encountered during site construction works we would recommend consultation with GeoDyne to ensure that our recommendations continue to apply. Any potentially contaminated soils should be left in-situ and subjected to further assessment, to potentially include further chemical testing and risk assessment.

The following procedure should be adhered to if any areas of previously unidentified suspected contamination are encountered during the development of the site:

i. Suspected contaminated material will remain in-situ.
ii. GeoDyne to be notified. We will then undertake a visual assessment of the possible contamination, followed by appropriate sampling/testing (as necessary).
iii. If necessary, contamination will then be treated or removed from site. All necessary remediation works should be validated by testing in accordance with an approved strategy, with the relevant Regulators informed accordingly.

### 9.4.4 Flood Risk

The desk study information has revealed the site to lie within an area identified as being at risk of flooding. It is recommended that advice be sought from a Drainage Consultant with respect to this matter.

### 9.4.5 Licenses, Permits, Registrations, Plans and Approvals

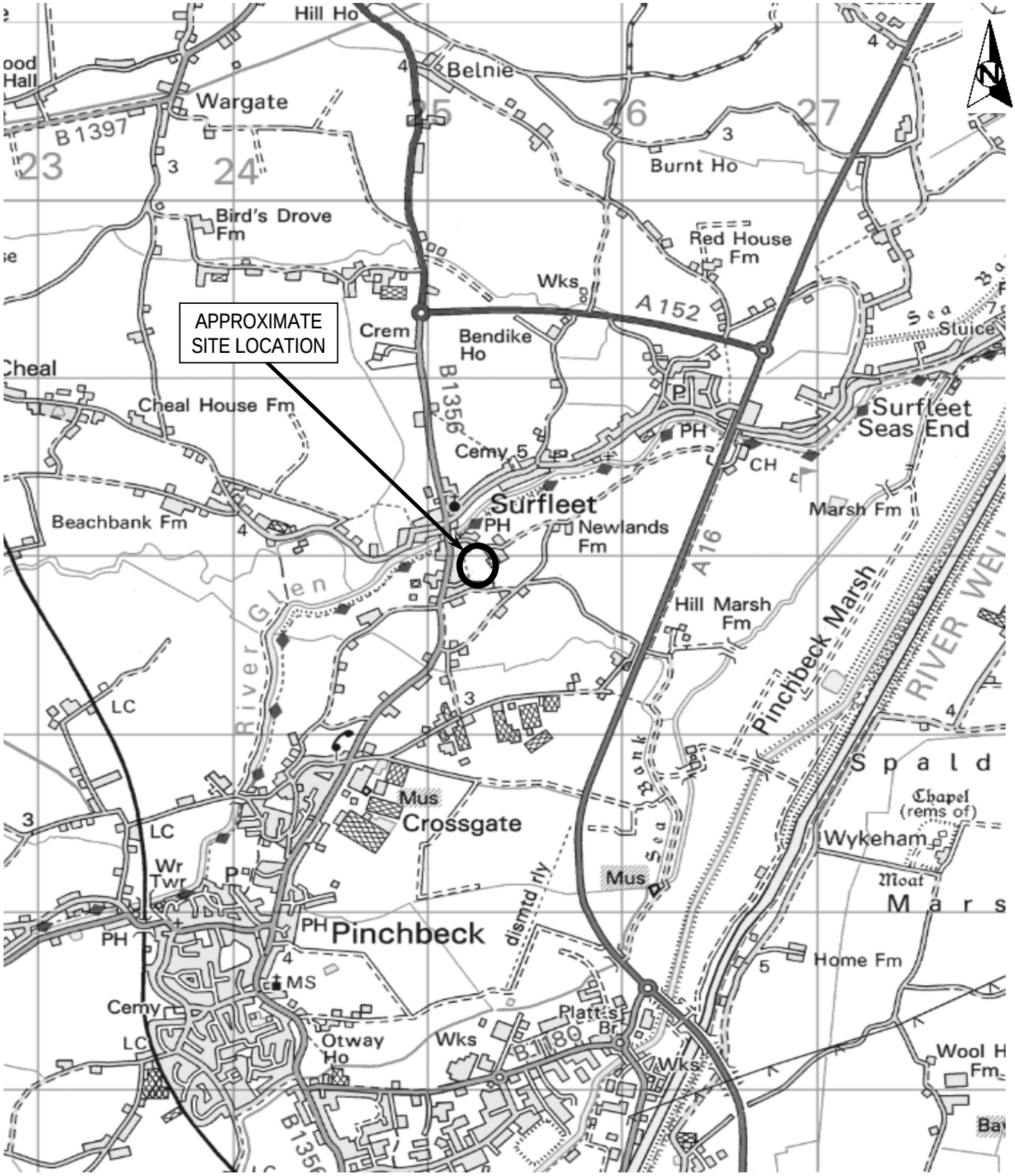
The Contractor/Developer is responsible for, and must ensure that, all necessary licenses, permits, plans, registrations and approvals are in place prior to commencing with the construction works at the site. These may include any Materials Management Plans (MMPs), Site Waste Management Plans (SWMPs) and/or Environmental Permits/Exemptions as necessary to enable the completion of the proposed works. Any MMP should be accompanied by a Qualified Person Declaration (QPD) and will require verification in due course.

### 9.4.6 Statutory Consultation

In accordance with normal planning requirements, we would recommend that a copy of our report is issued by the Client to the Local Authority (and NHBC or other Warranty Provider, if necessary) for review/comment and approval prior to commencing with the development of the site.

**APPENDIX I**

**Site Location Plan**
**(Figure No. D40008/01)**




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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Site Location Plan | Figure No. | D40008/01 |

GeoDyne

**APPENDIX II**

**Proposed Site Layout Plan**




SCHEDULE

| | | |
|---|---|---|
| CLYDE | 3 bed | 10 no |
| AVON | 3 " | 8 |
| AIRE | 3 " | 6 |
| CORONATION | 3 " | 2 |
| NENE | 3 " | 7 |
| LOCK | 3 " | 4 |
| MERE | 3 " | 8 |
| RIBBLE | 4 " | 2 |
| SEVERN | 4 " | 4 |
| BALMORAL | 4 " | 5 |
| TAY | 4 " | 2 |
| TOTAL | | 58 units |

| | | |
|---|---|---|
| Affordable (25%) * | | |
| A516 | 1 bed | 2 no |
| A732 | 2 " | 9 |
| A902 | 3 " | 9 |
| TOTAL | | 20 units |
| GRAND TOTAL | | 78 units |

NKW DESIGN
43 York Road
Wellesbourne
Northamptonshire
NN29 7SG
T: 07933 864130
M: 07957 837164
E: natalie@nkwdesign.co.uk

PROJECT: SUNNYVALE CLOSE, SURFLEET

TITLE: FEASIBILITY LAYOUT - Combined

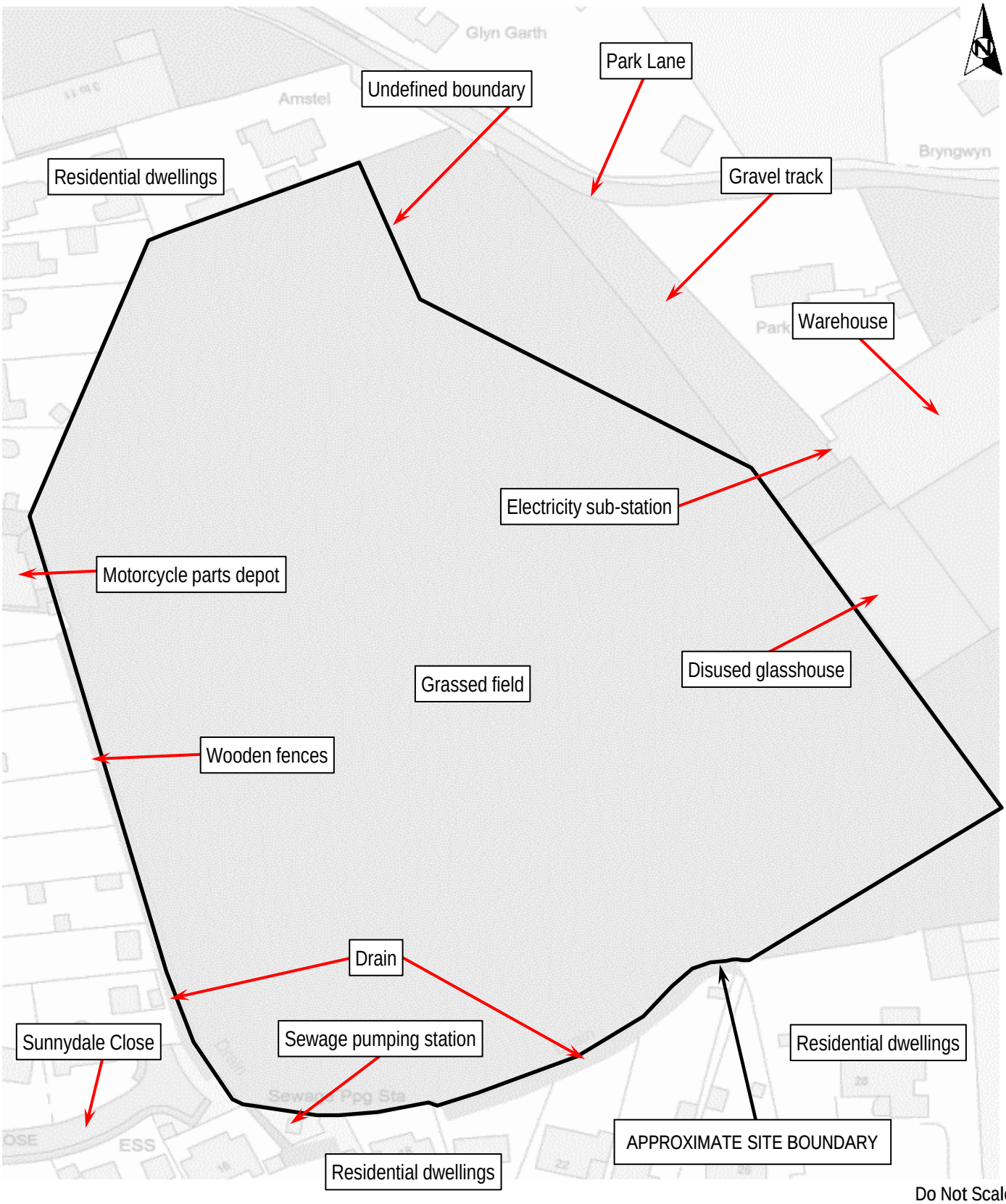
CLIENT: ASHWOOD HOMES
1 Goodison Road, Lincs Gateway Business Park, Spalding, PE12 6FY T: 01406 490590

| SCALE | DATE | DRAWN |
|---|---|---|
| 1:500 @ A1 | JAN 2020 | NKW |

DRAWING NUMBER: 1280-002 REVISION:

**APPENDIX III**

**Annotated Site Plan**
**(Figure No. D40008/02)**




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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| Project | Sunnydale Close<br>Surfleet | Approved | PK |
| | | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| Title | Annotated Site Plan | Rev. | |
| | | Figure No. | D40008/02 |

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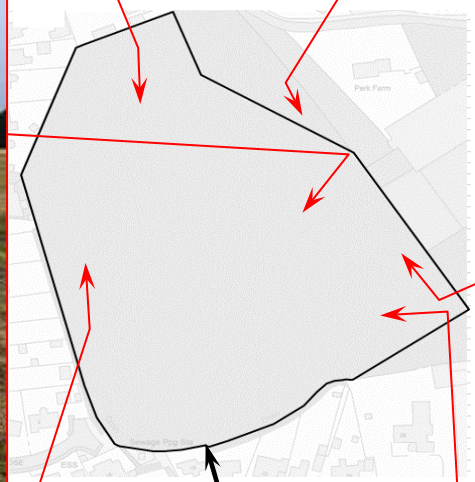
**APPENDIX IV**

**Site Plan Showing General Site Views**
**(Figure No. D40008/03)**











APPROXIMATE SITE BOUNDARY





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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| Project | Sunnydale Close<br>Surfleet | Approved | PK |
| | | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| Title | Annotated Site Plan | Rev. | |
| | | Figure No. | D40008/03 |

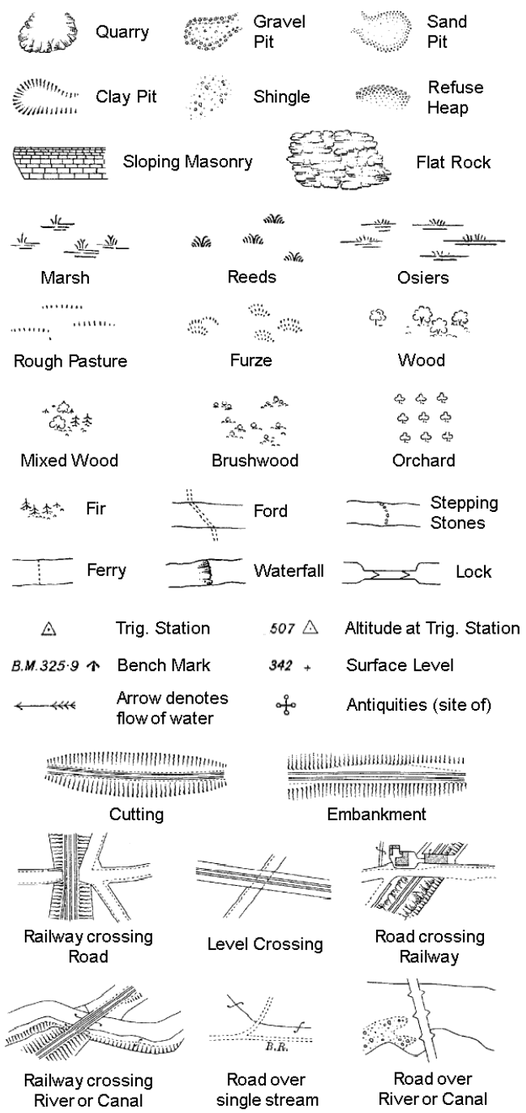
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**APPENDIX V**

**Historical Plans**

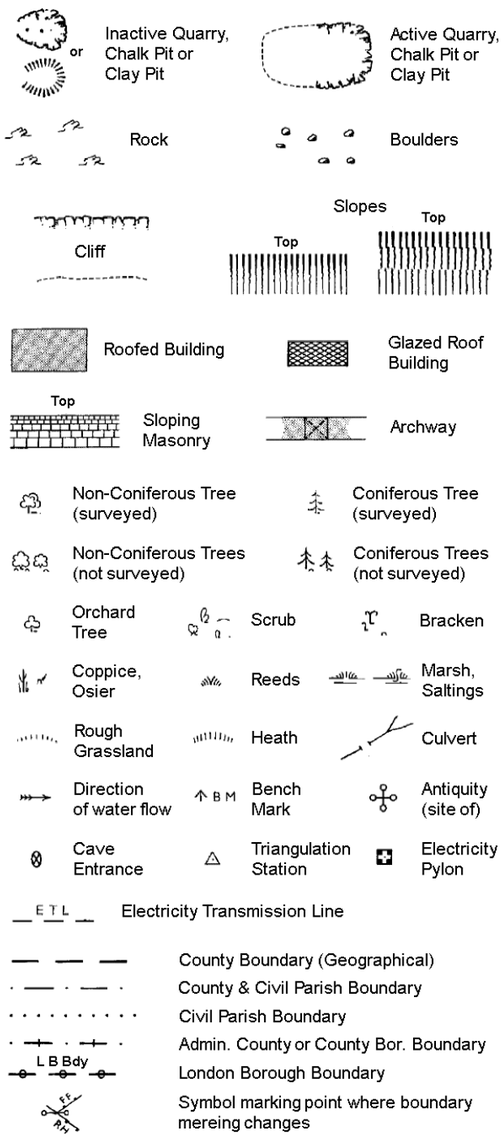
# Historical Mapping Legends

## Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



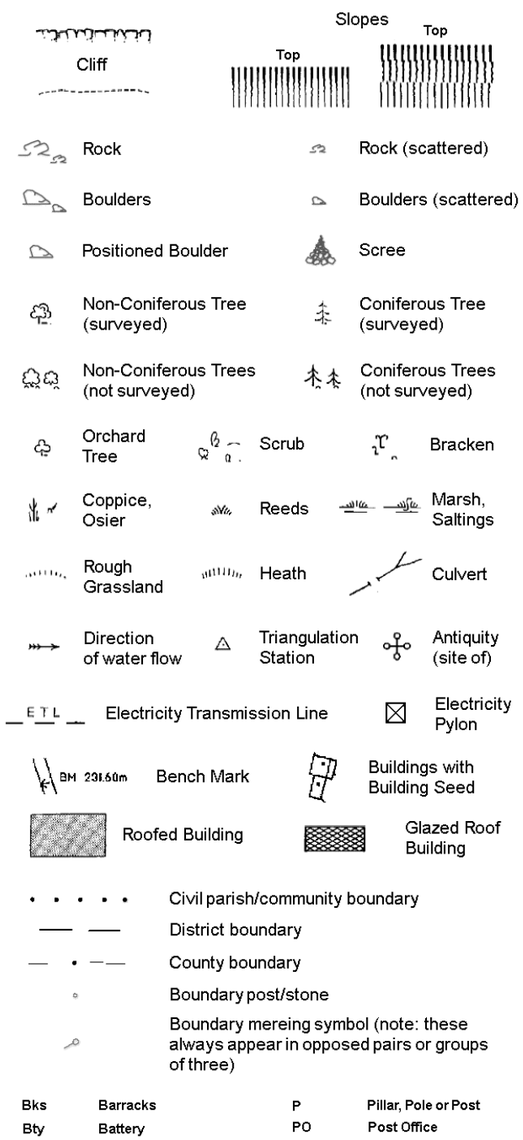

| | | | |
|---|---|---|---|
| *B P B S* | Boundary Post or Stone | *P.C.B* | Police Call Box |
| *B.R.* | Bridle Road | *P* | Pump |
| *E.P* | Electricity Pylon | *S.P* | Signal Post |
| *F.B.* | Foot Bridge | *Sl.* | Sluice |
| *F.P.* | Foot Path | *Sp.* | Spring |
| *G.P* | Guide Post or Board | *T.C.B* | Telephone Call Box |
| *M.S* | Mile Stone | *Tr.* | Trough |
| *M.P M.R* | Mooring Post or Ring | *W* | Well |

## Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250




| | | | |
|---|---|---|---|
| BH | Beer House | P | Pillar, Pole or Post |
| BP, BS | Boundary Post or Stone | PO | Post Office |
| Cn, C | Capstan, Crane | PC | Public Convenience |
| Chy | Chimney | PH | Public House |
| D Fn | Drinking Fountain | Pp | Pump |
| El P | Electricity Pillar or Post | SB, S Br | Signal Box or Bridge |
| FAP | Fire Alarm Pillar | SP, SL | Signal Post or Light |
| FB | Foot Bridge | Spr | Spring |
| GP | Guide Post | Tk | Tank or Track |
| H | Hydrant or Hydraulic | TCB | Telephone Call Box |
| LC | Level Crossing | TCP | Telephone Call Post |
| MH | Manhole | Tr | Trough |
| MP | Mile Post or Mooring Post | Wr Pt, Wr T | Water Point, Water Tap |
| MS | Mile Stone | W | Well |
| NTL | Normal Tidal Limit | Wd Pp | Wind Pump |

## Large-Scale National Grid Data 1:2,500 and 1:1,250



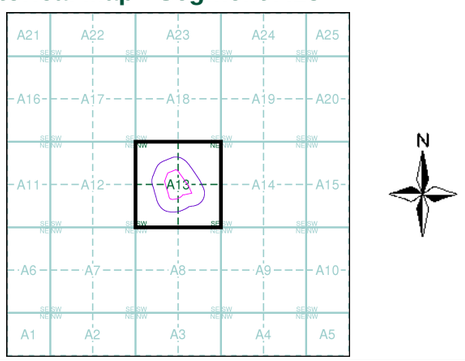

| | | | |
|---|---|---|---|
| Bks | Barracks | P | Pillar, Pole or Post |
| Bty | Battery | PO | Post Office |
| Cemy | Cemetery | PC | Public Convenience |
| Chy | Chimney | Pp | Pump |
| Cis | Cistern | Ppg Sta | Pumping Station |
| Dismtd Rly | Dismantled Railway | PW | Place of Worship |
| El Gen Sta | Electricity Generating Station | Sewage Ppg Sta | Sewage Pumping Station |
| El P | Electricity Pole, Pillar | SB, S Br | Signal Box or Bridge |
| El Sub Sta | Electricity Sub Station | SP, SL | Signal Post or Light |
| FB | Filter Bed | Spr | Spring |
| Fn / D Fn | Fountain / Drinking Ftn. | Tk | Tank or Track |
| Gas Gov | Gas Valve Compound | Tr | Trough |
| GVC | Gas Governer | Wd Pp | Wind Pump |
| GP | Guide Post | Wr Pt, Wr T | Water Point, Water Tap |
| MH | Manhole | Wks | Works (building or area) |
| MP, MS | Mile Post or Mile Stone | W | Well |

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## Historical Mapping & Photography included:

| Mapping Type | Scale | Date | Pg |
|---|---|---|---|
| Lincolnshire | 1:2,500 | 1888 | 2 |
| Lincolnshire | 1:2,500 | 1904 | 3 |
| Ordnance Survey Plan | 1:2,500 | 1973 | 4 |
| Additional SIMs | 1:2,500 | 1985 | 5 |
| Large-Scale National Grid Data | 1:2,500 | 1995 | 6 |
| Large-Scale National Grid Data | 1:2,500 | 1996 | 7 |
| Historical Aerial Photography | 1:2,500 | 1999 | 8 |

## Historical Map - Segment A13



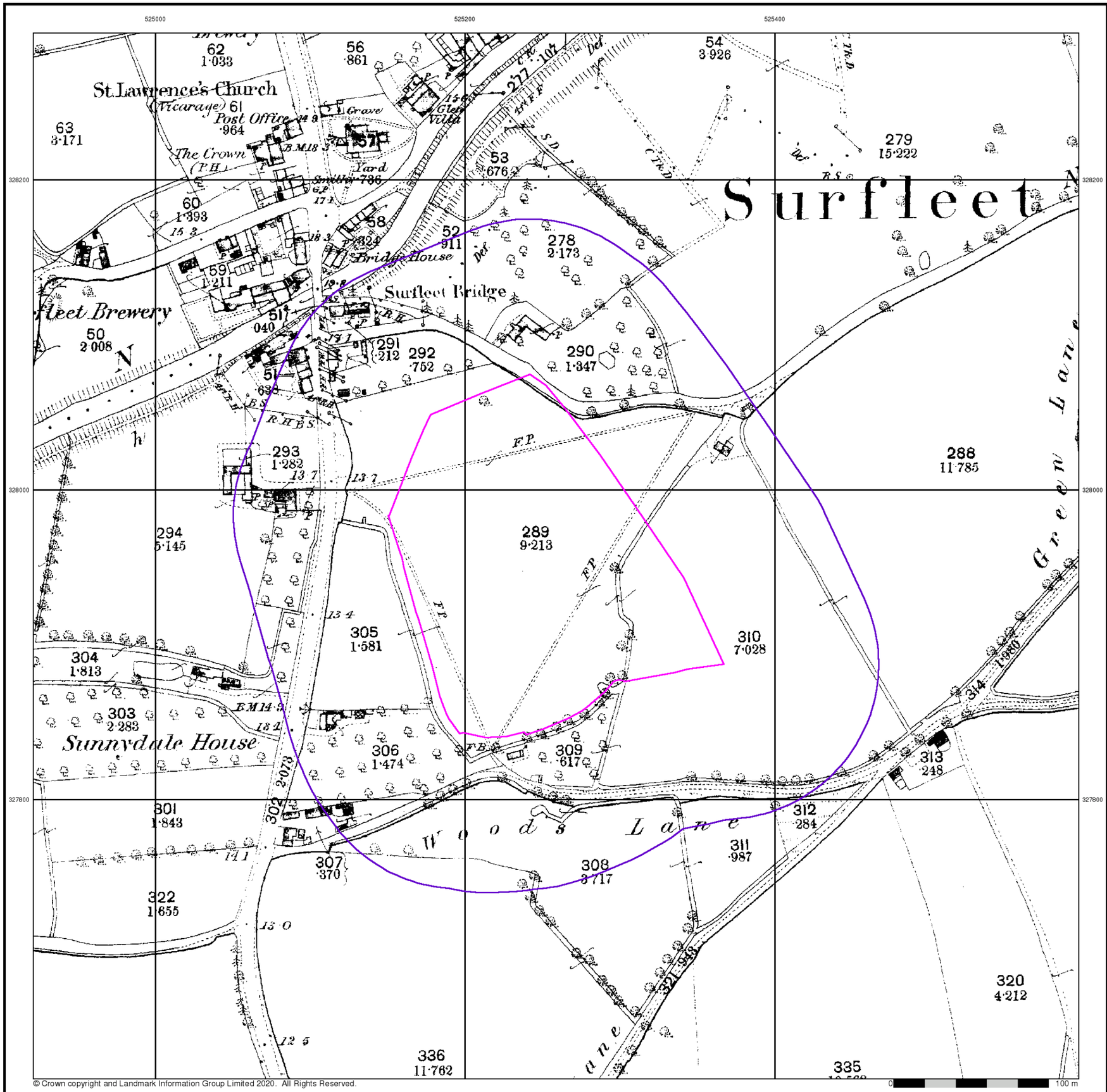

## Order Details

Order Number: 231991905_1_1
Customer Ref: D40008
National Grid Reference: 525250, 327950
Slice: A
Site Area (Ha): 3.14
Search Buffer (m): 100

## Site Details

Sunnydale Close, Surfleet


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Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk




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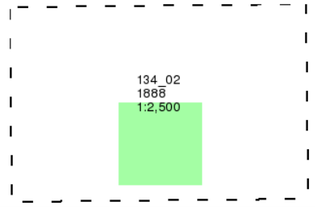
## Lincolnshire

## Published 1888

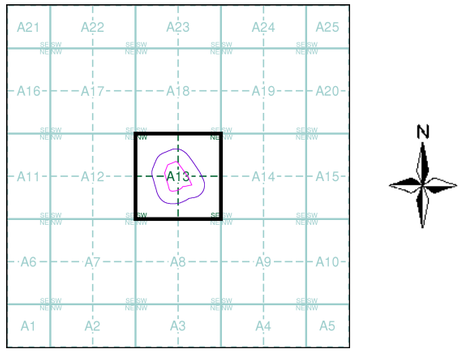
## Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

## Map Name(s) and Date(s)




## Historical Map - Segment A13



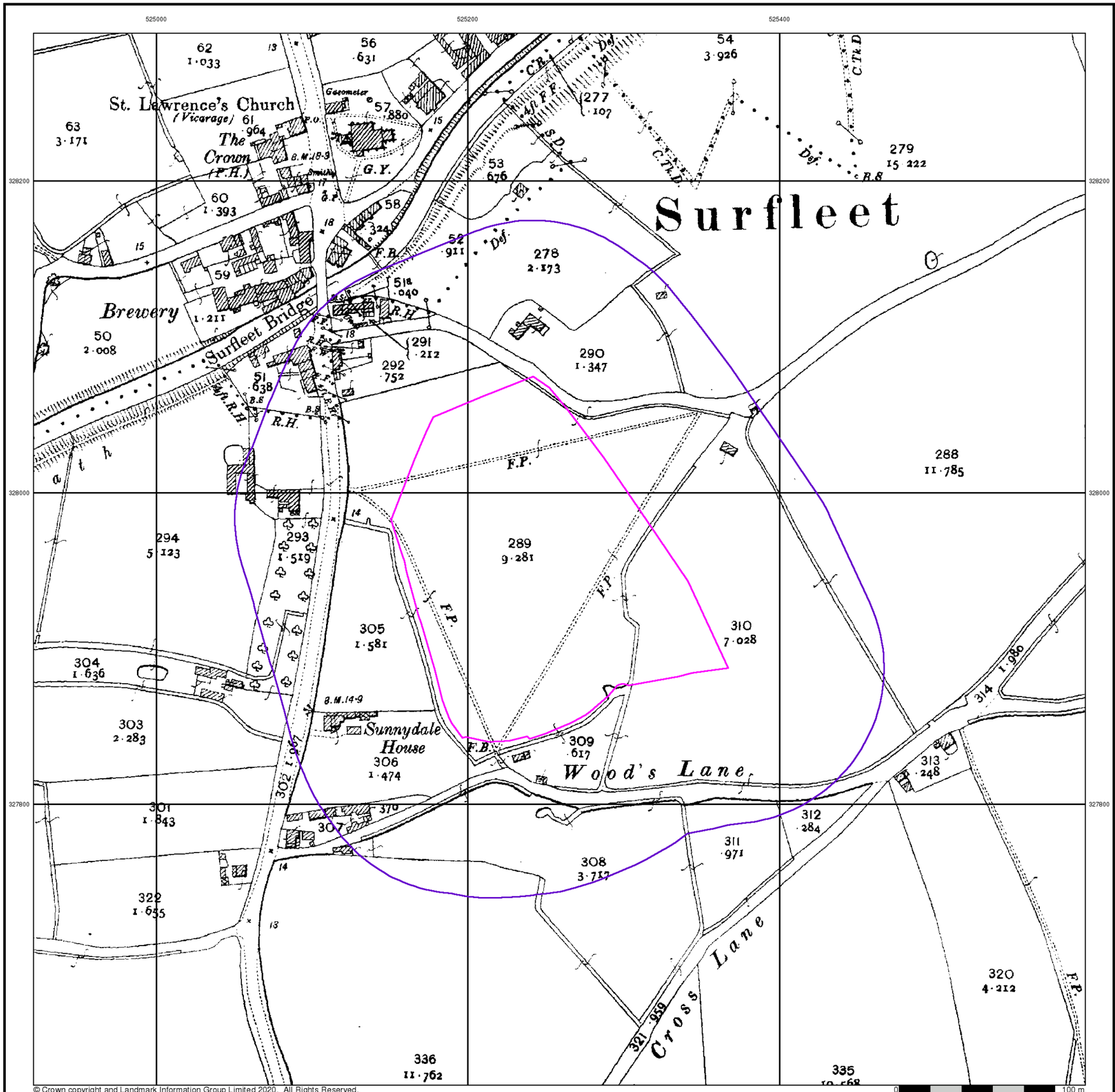

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| Search Buffer (m): | 100 |

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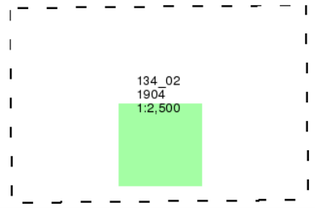
## Lincolnshire

## Published 1904

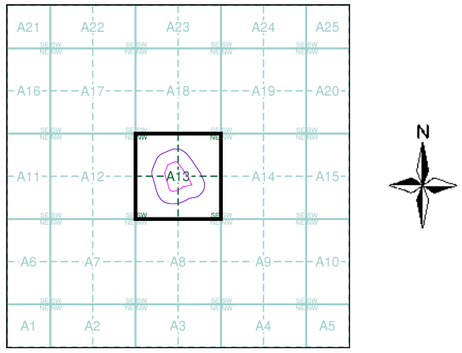
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## Map Name(s) and Date(s)




## Historical Map - Segment A13



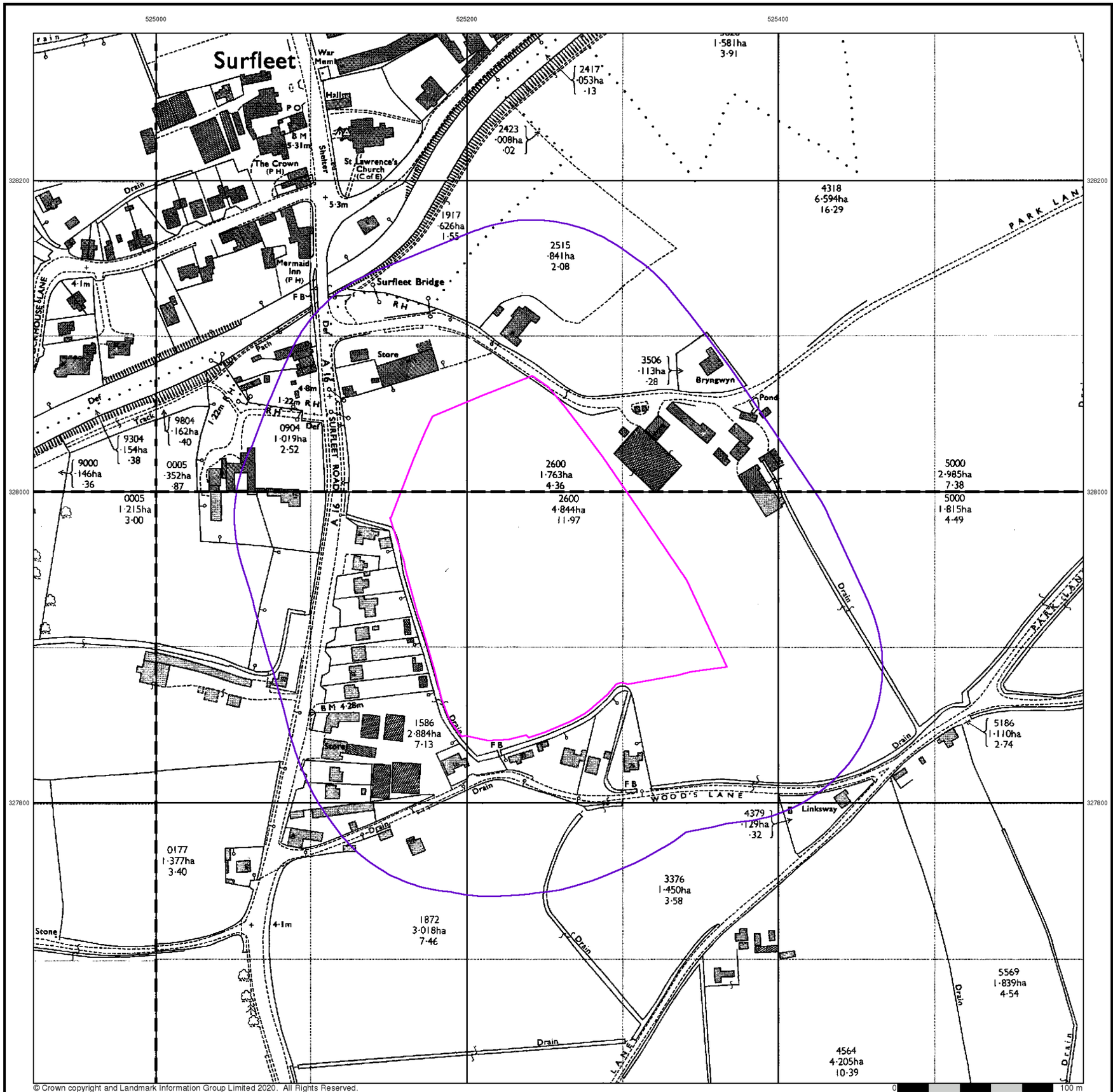

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| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
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| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 100 |

## Site Details

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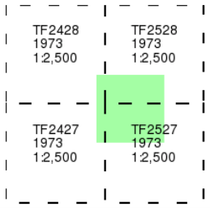
## Ordnance Survey Plan

## Published 1973

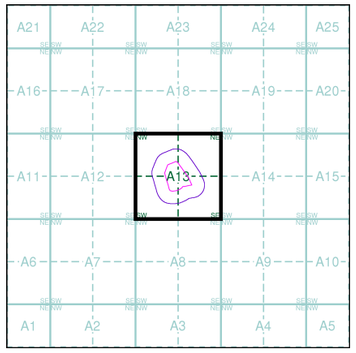
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## Map Name(s) and Date(s)




## Historical Map - Segment A13



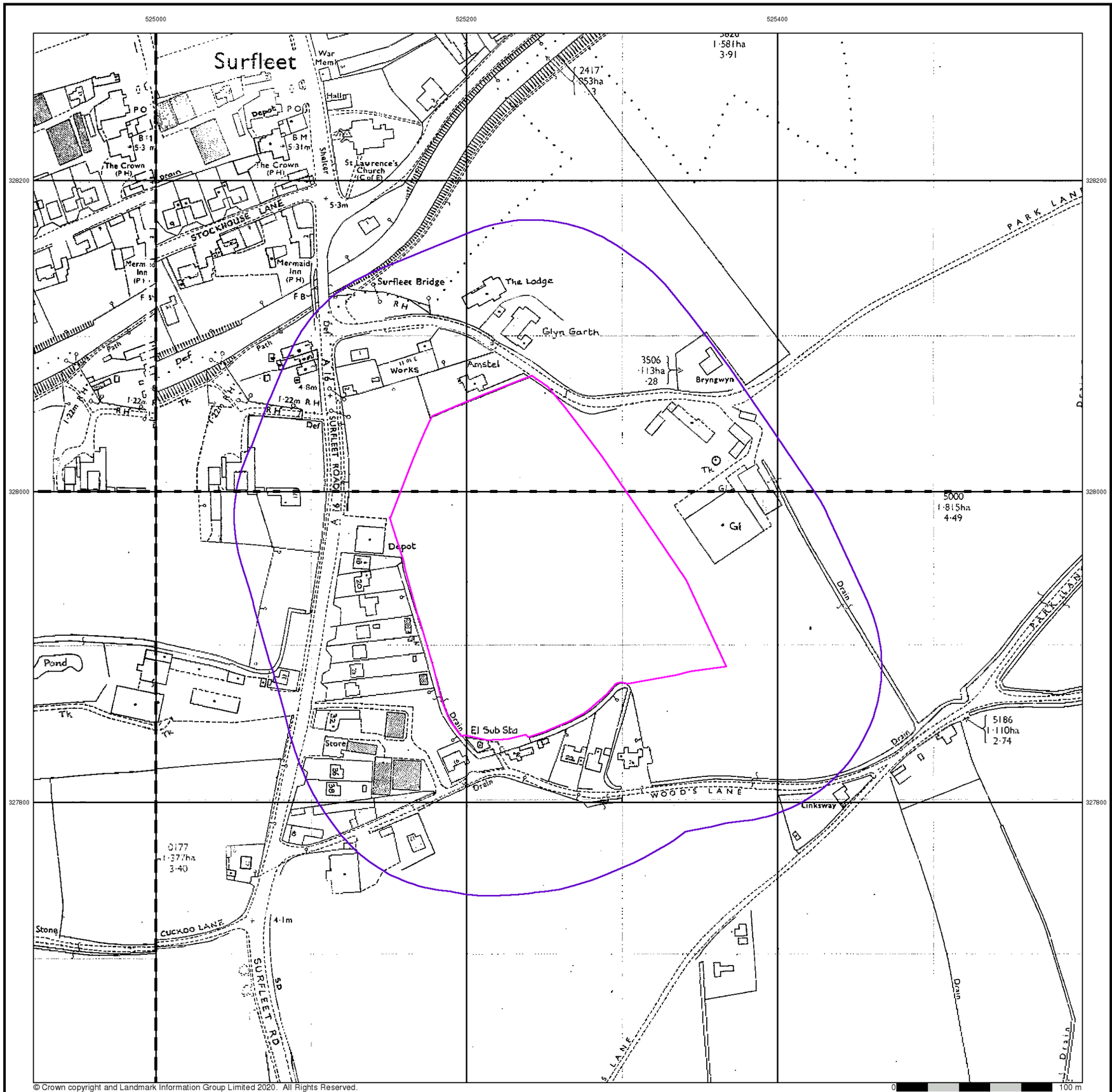

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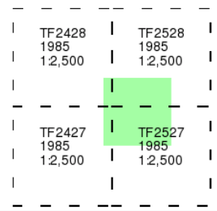
## Additional SIMs

**Published 1985**

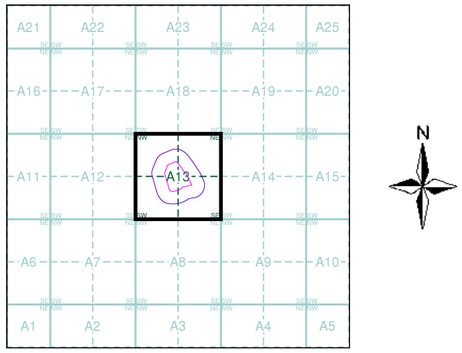
**Source map scale - 1:2,500**

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

## Map Name(s) and Date(s)




## Historical Map - Segment A13



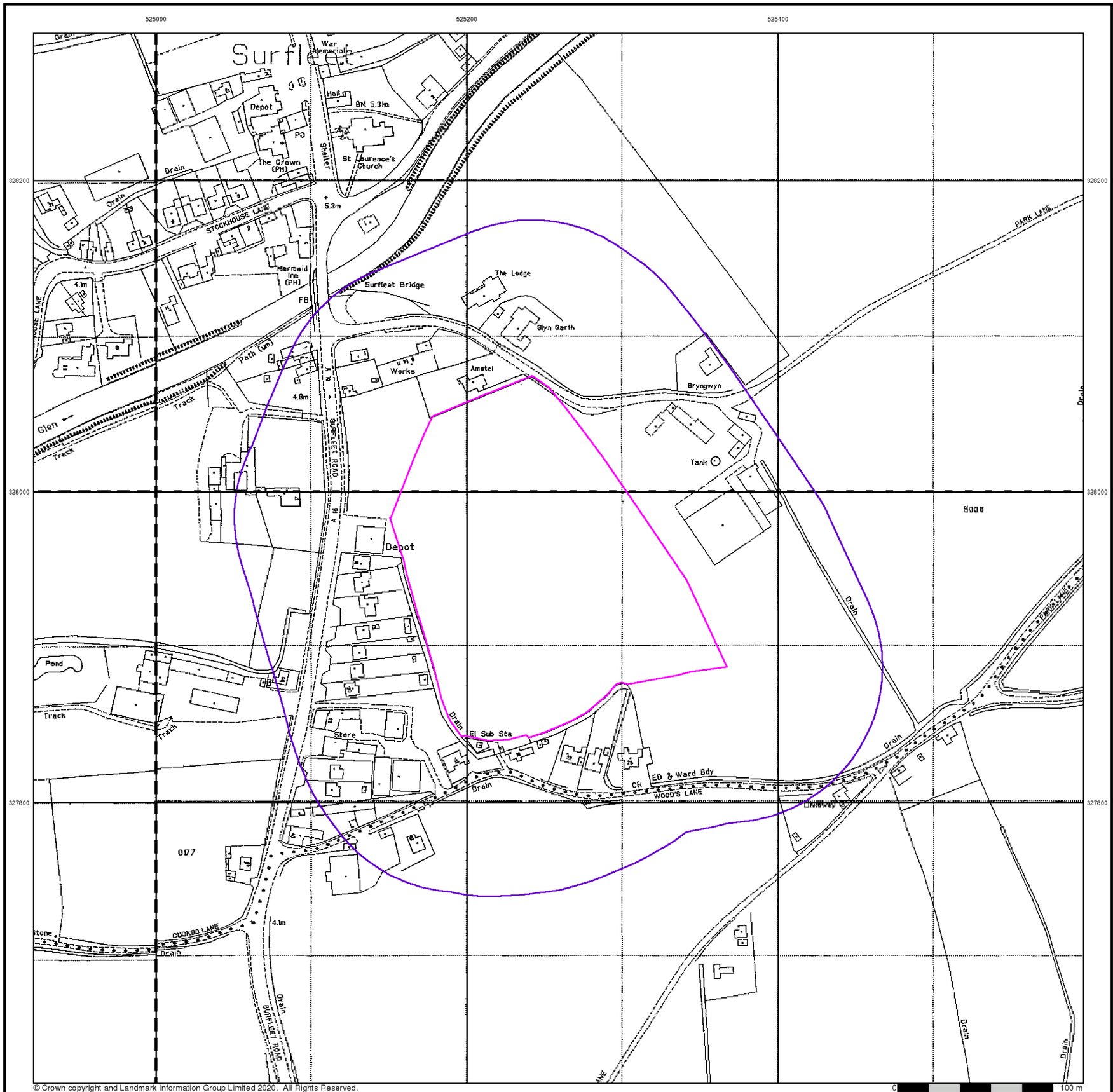

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## Site Details

Sunnydale Close, Surfleet

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Web: www.envirocheck.co.uk




# GeoDyne

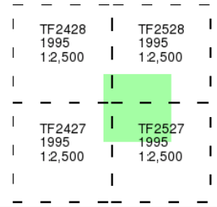
## Large-Scale National Grid Data

**Published 1995**

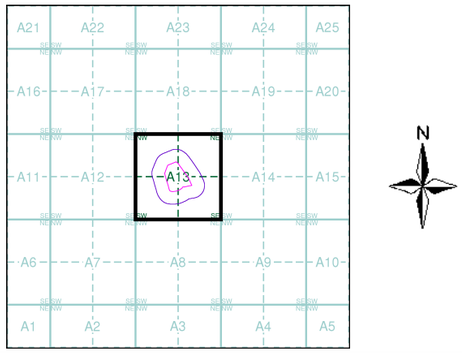
**Source map scale - 1:2,500**

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

## Map Name(s) and Date(s)




## Historical Map - Segment A13




## Order Details

| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 100 |

## Site Details

Sunnydale Close, Surfleet


Landmark INFORMATION GROUP

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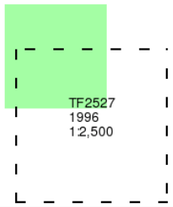
## Large-Scale National Grid Data

**Published 1996**

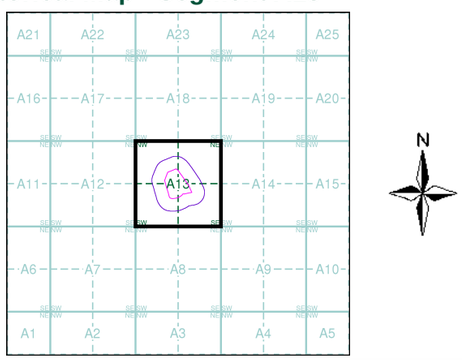
**Source map scale - 1:2,500**

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

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## Historical Map - Segment A13




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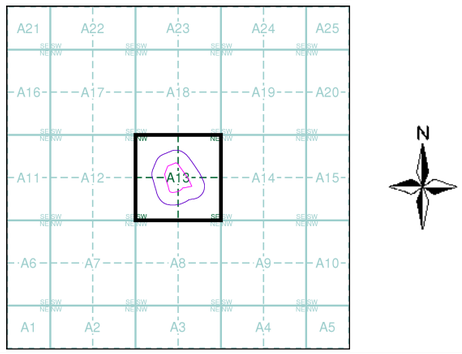

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## Historical Aerial Photography

**Published 1999**

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

### Historical Aerial Photography - Segment A13




### Order Details

| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 100 |

### Site Details

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# Historical Mapping Legends

## Ordnance Survey County Series 1:10,560

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
·285 Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. Rural District Boundary
Civil Parish Boundary

## Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Pylon
Electricity Transmission Line
Sloping Masonry
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
Standard Gauge Single Track
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

| | | | |
|---|---|---|---|
| BP, BS | Boundary Post or Stone | Pol Sta | Police Station |
| Ch | Church | PO | Post Office |
| CH | Club House | PC | Public Convenience |
| F E Sta | Fire Engine Station | PH | Public House |
| FB | Foot Bridge | SB | Signal Box |
| Fn | Fountain | Spr | Spring |
| GP | Guide Post | TCB | Telephone Call Box |
| MP | Mile Post | TCP | Telephone Call Post |
| MS | Mile Stone | W | Well |

## 1:10,000 Raster Mapping

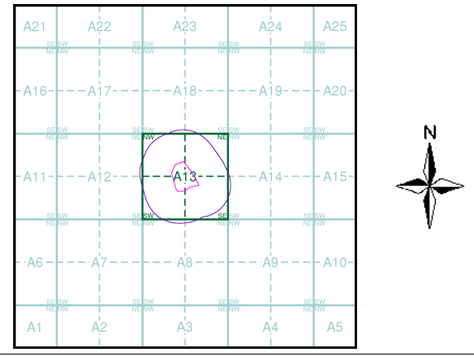
Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

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## Historical Mapping & Photography included:

| Mapping Type | Scale | Date | Pg |
|---|---|---|---|
| Lincolnshire | 1:10,560 | 1887 - 1888 | 2 |
| Lincolnshire | 1:10,560 | 1906 | 3 |
| Lincolnshire | 1:10,560 | 1906 | 4 |
| Lincolnshire | 1:10,560 | 1906 | 5 |
| Lincolnshire | 1:10,560 | 1932 | 6 |
| Lincolnshire | 1:10,560 | 1951 | 7 |
| Ordnance Survey Plan | 1:10,000 | 1956 | 8 |
| Ordnance Survey Plan | 1:10,000 | 1975 | 9 |
| Ordnance Survey Plan | 1:10,000 | 1990 | 10 |
| 10K Raster Mapping | 1:10,000 | 2000 | 11 |
| 10K Raster Mapping | 1:10,000 | 2006 | 12 |
| VectorMap Local | 1:10,000 | 2020 | 13 |

## Historical Map - Slice A



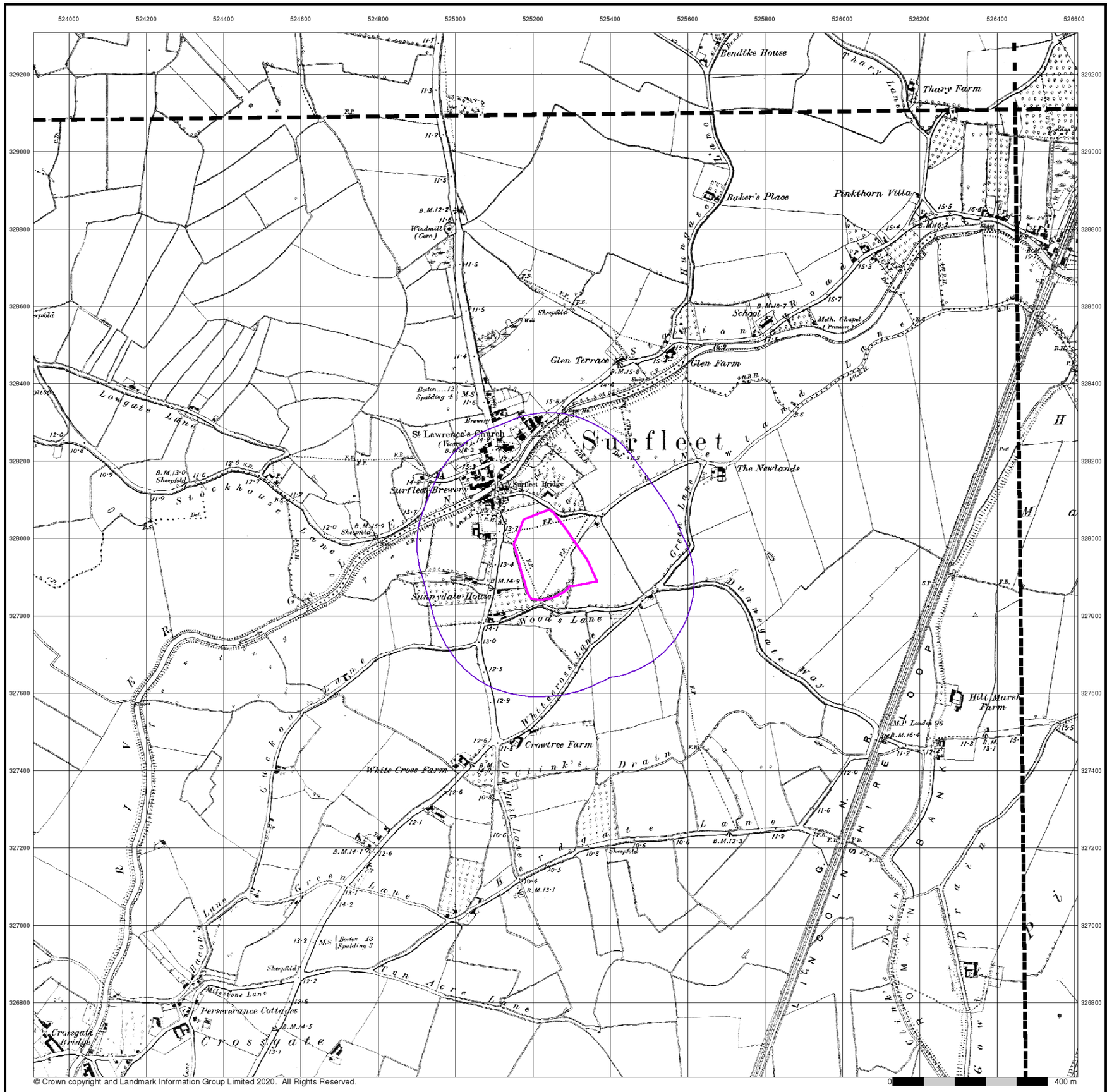

## Order Details

Order Number: 231991905_1_1
Customer Ref: D40008
National Grid Reference: 525250, 327950
Slice: A
Site Area (Ha): 3.14
Search Buffer (m): 250

## Site Details

Sunnydale Close, Surfleet


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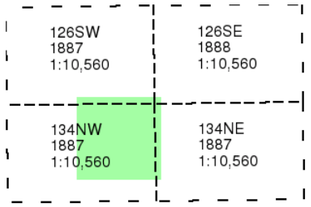
## Lincolnshire

## Published 1887 - 1888

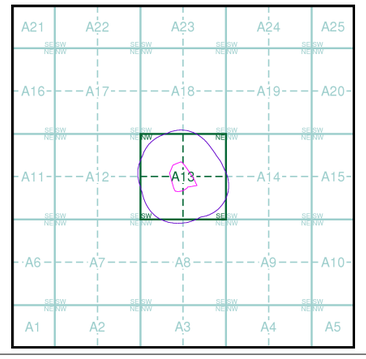
## Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A



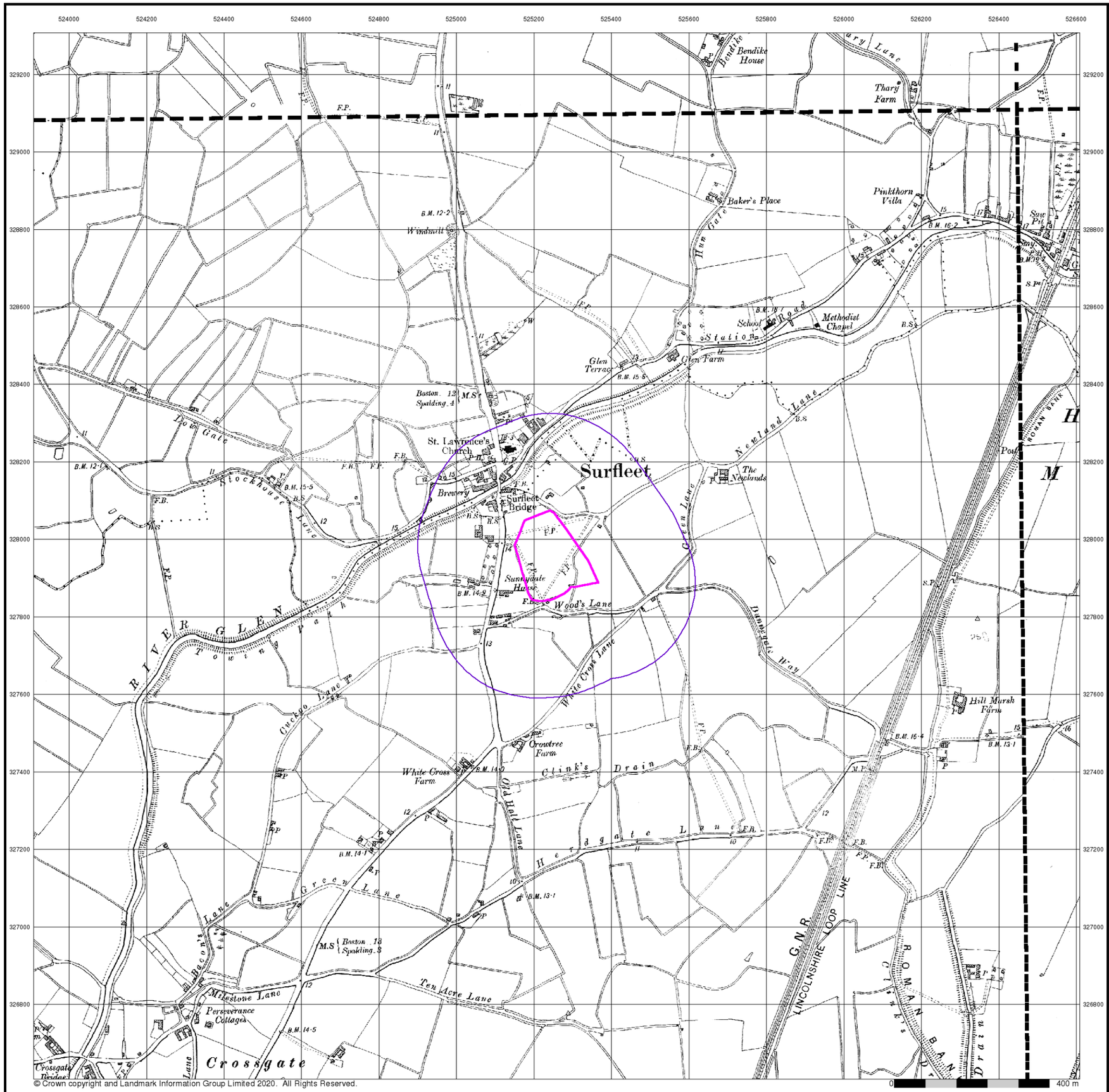

## Order Details

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| Order Number: | 231991905_1_1 |
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## Lincolnshire

## Published 1906

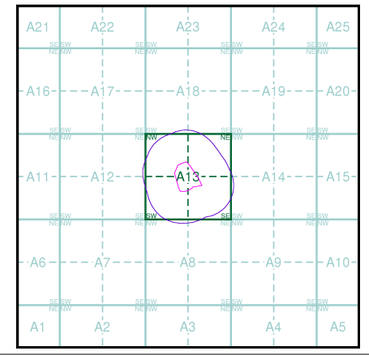
## Source map scale - 1:10,560

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## Map Name(s) and Date(s)

| | |
|---|---|
| 126SW 1906 1:10,560 | 126SE 1906 1:10,560 |
| 134NW 1906 1:10,560 | 134NE 1906 1:10,560 |

## Historical Map - Slice A



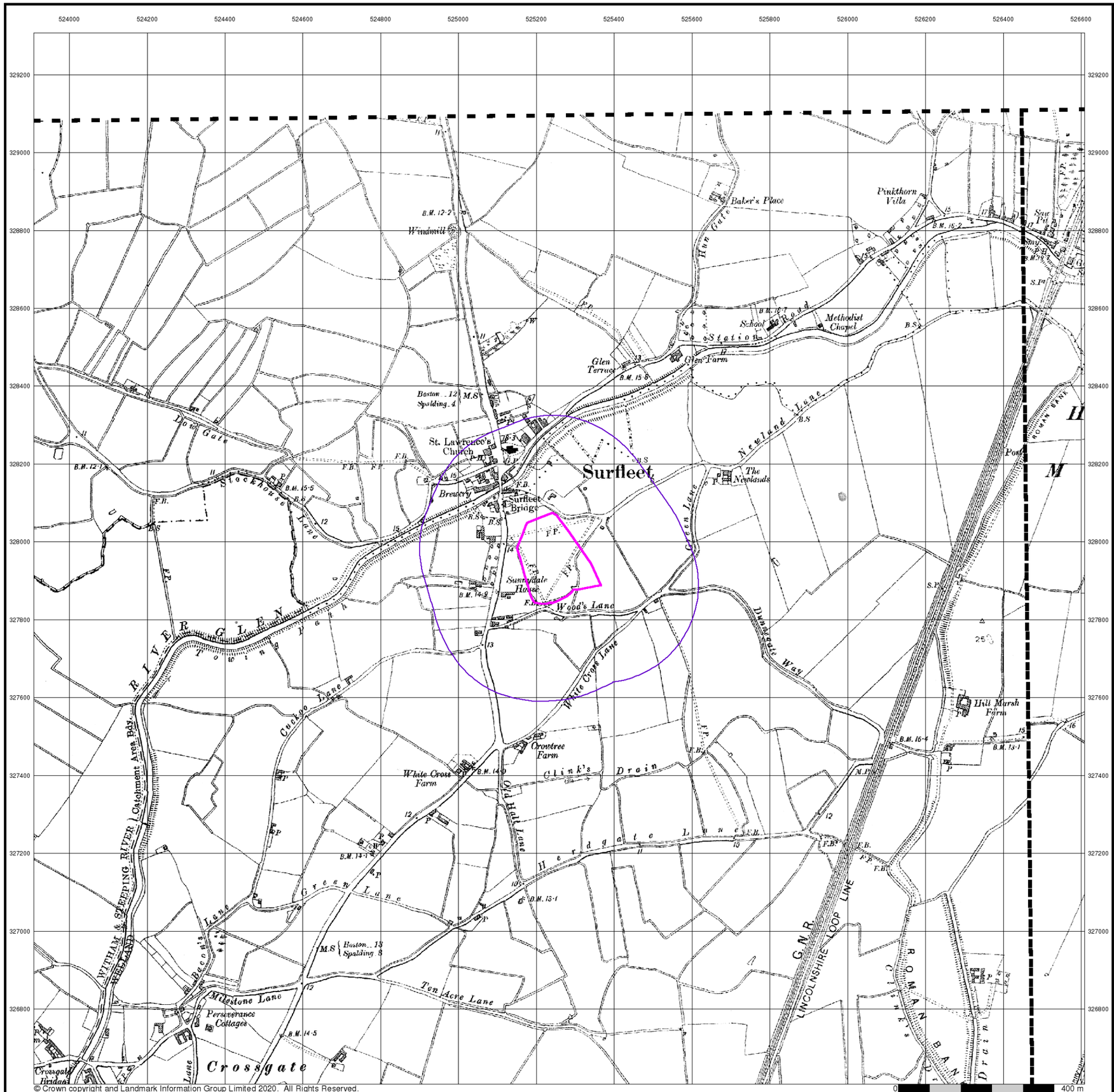

## Order Details

| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

## Site Details

Sunnydale Close, Surfleet

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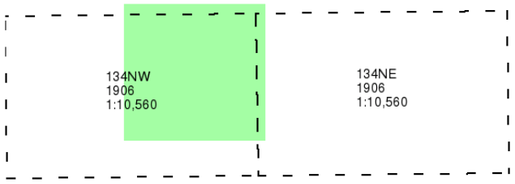
## Lincolnshire

## Published 1906

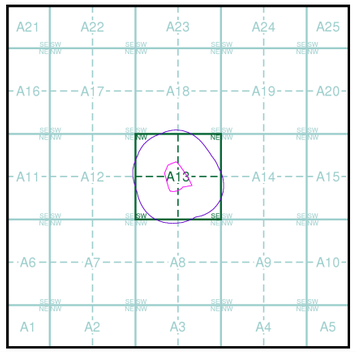
## Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A




## Order Details

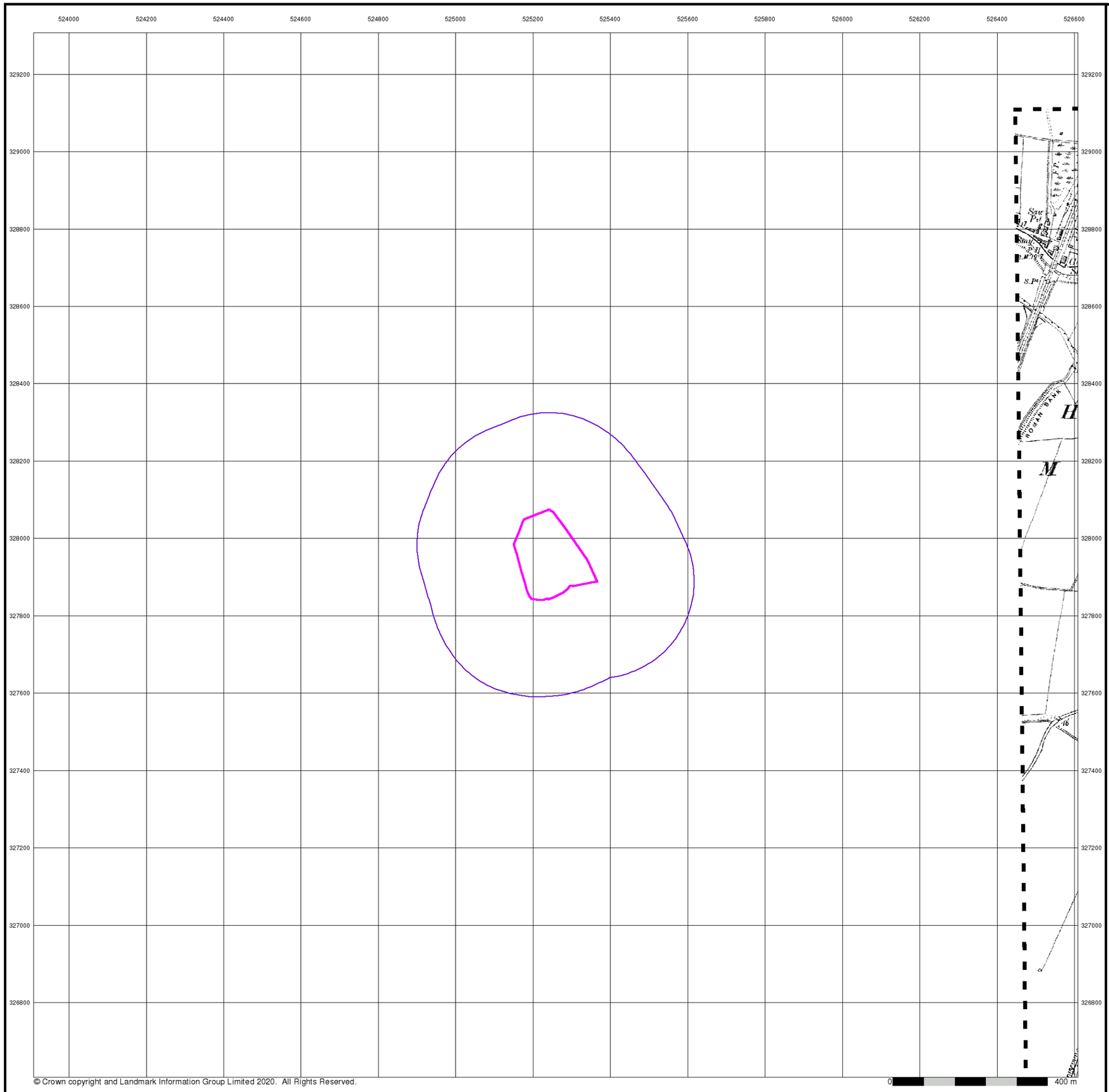
| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
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| Slice: | A |
| Site Area (Ha): | 3.14 |
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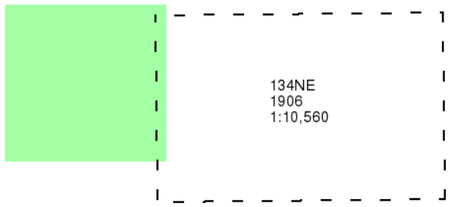
## Lincolnshire

## Published 1906

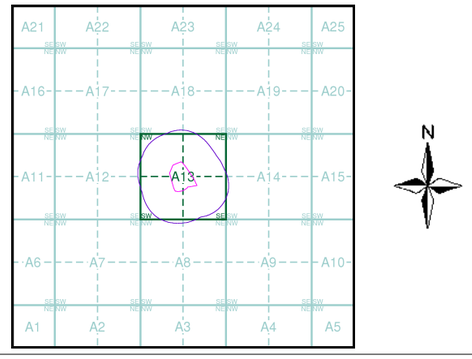
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## Map Name(s) and Date(s)




## Historical Map - Slice A




## Order Details

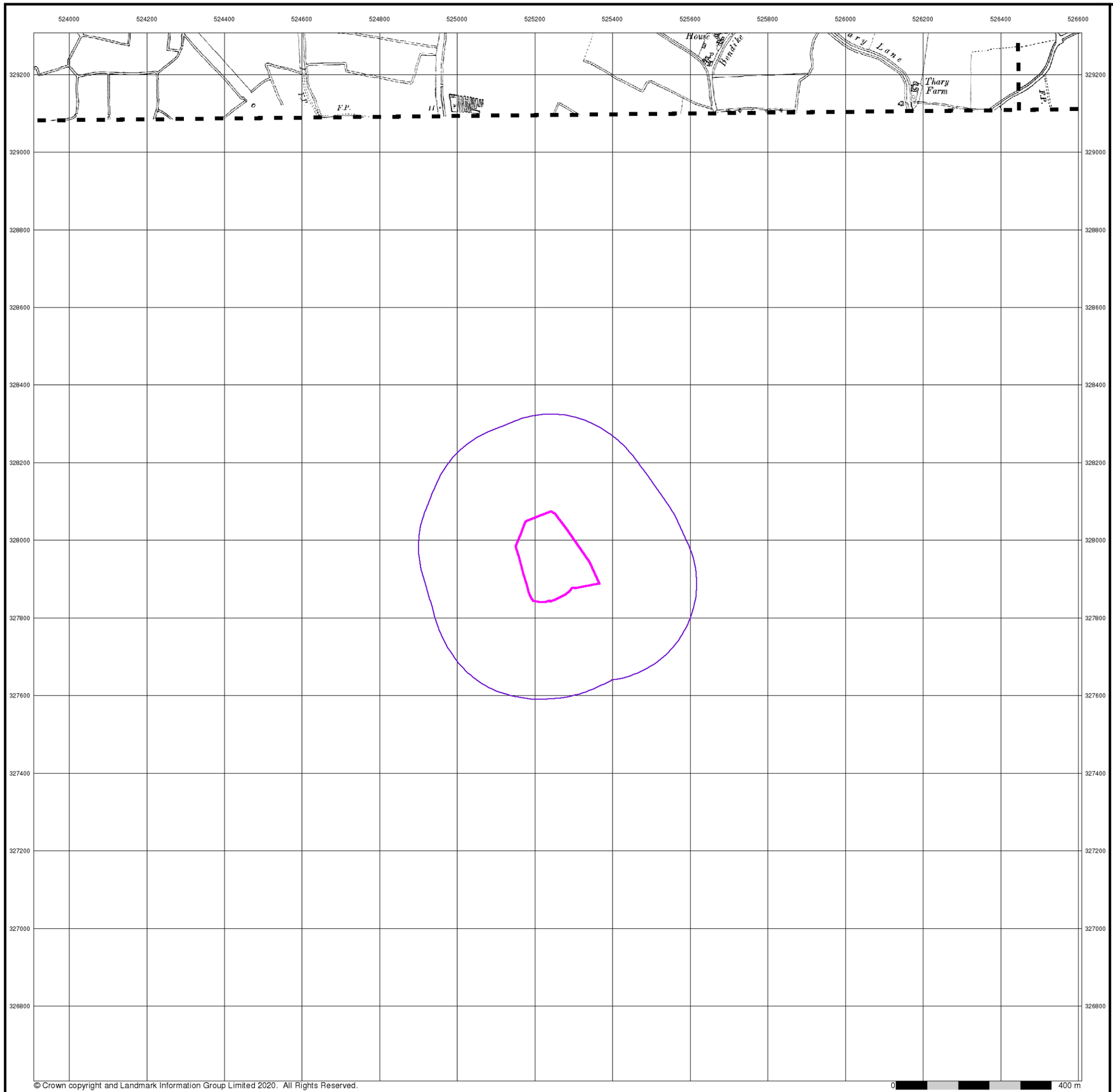
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|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
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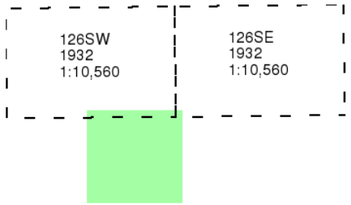
## Lincolnshire

## Published 1932

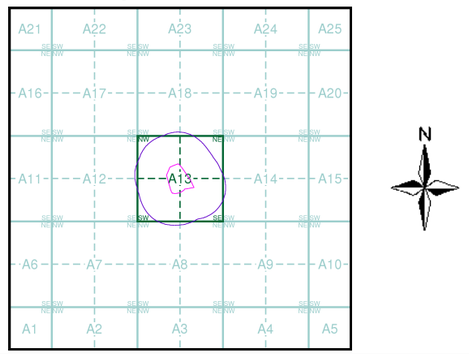
## Source map scale - 1:10,560

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## Map Name(s) and Date(s)




## Historical Map - Slice A



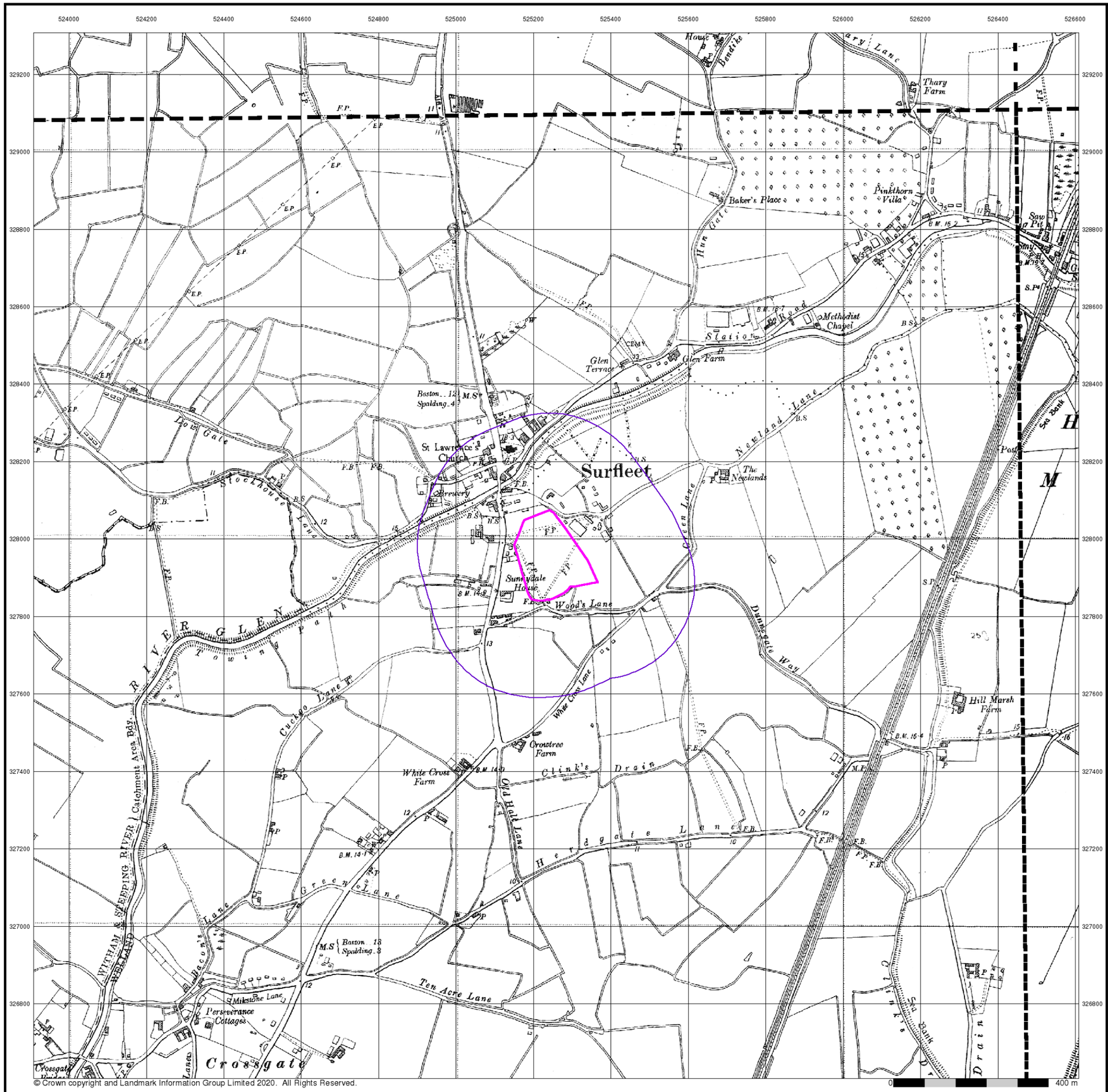

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## Lincolnshire

## Published 1951

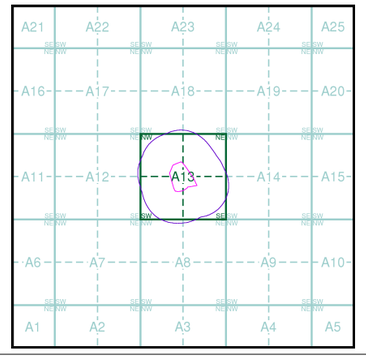
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## Map Name(s) and Date(s)

| | |
|---|---|
| 126SW 1951 1:10,560 | 126SE 1951 1:10,560 |
| 134NW 1951 1:10,560 | 134NE 1951 1:10,560 |

## Historical Map - Slice A



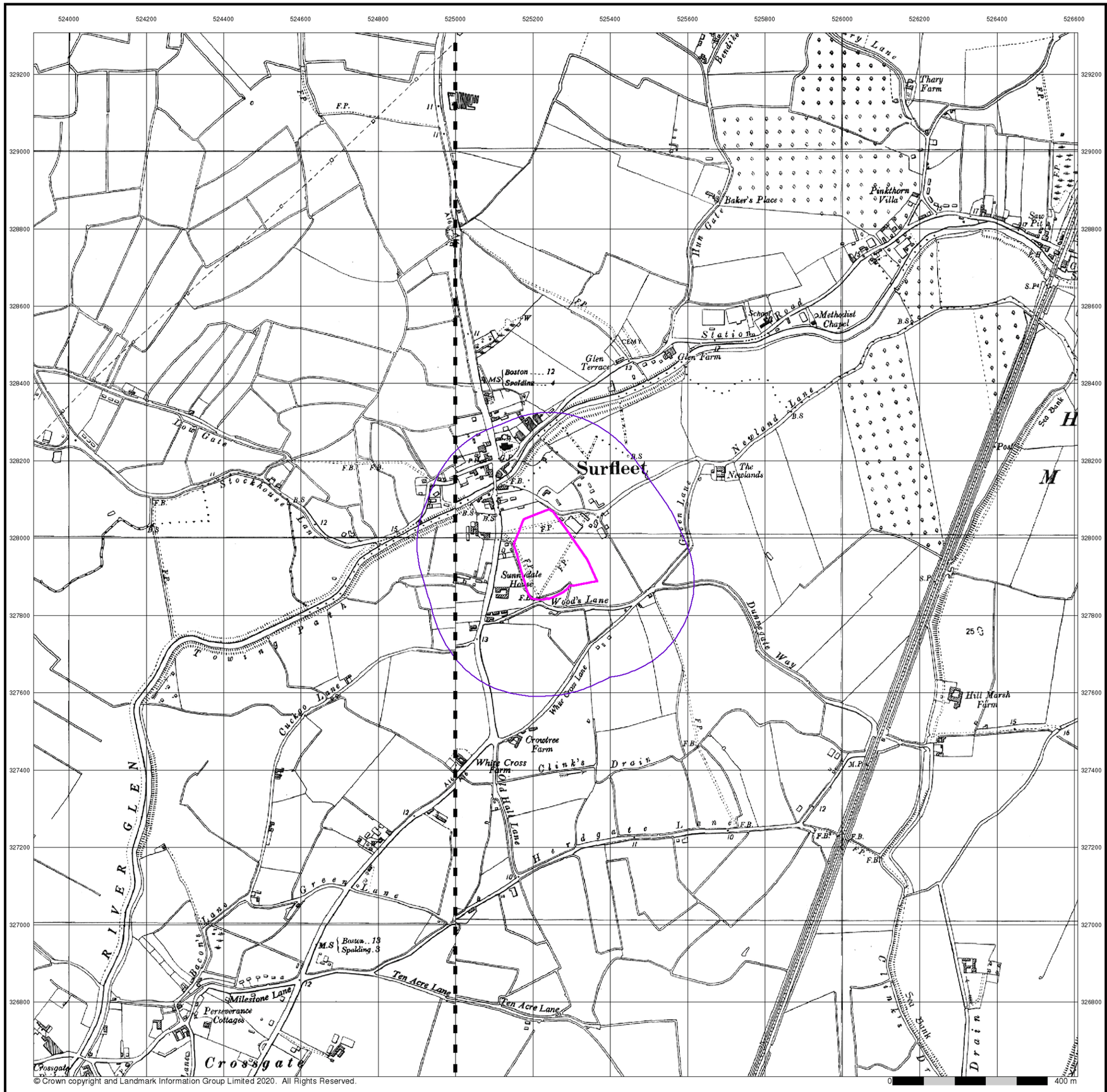

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| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
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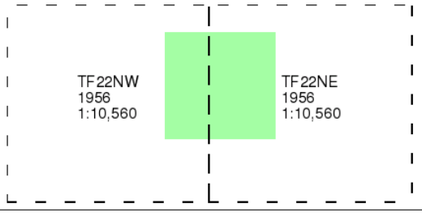
## Ordnance Survey Plan

## Published 1956

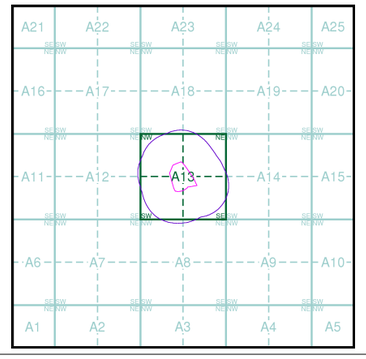
## Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A



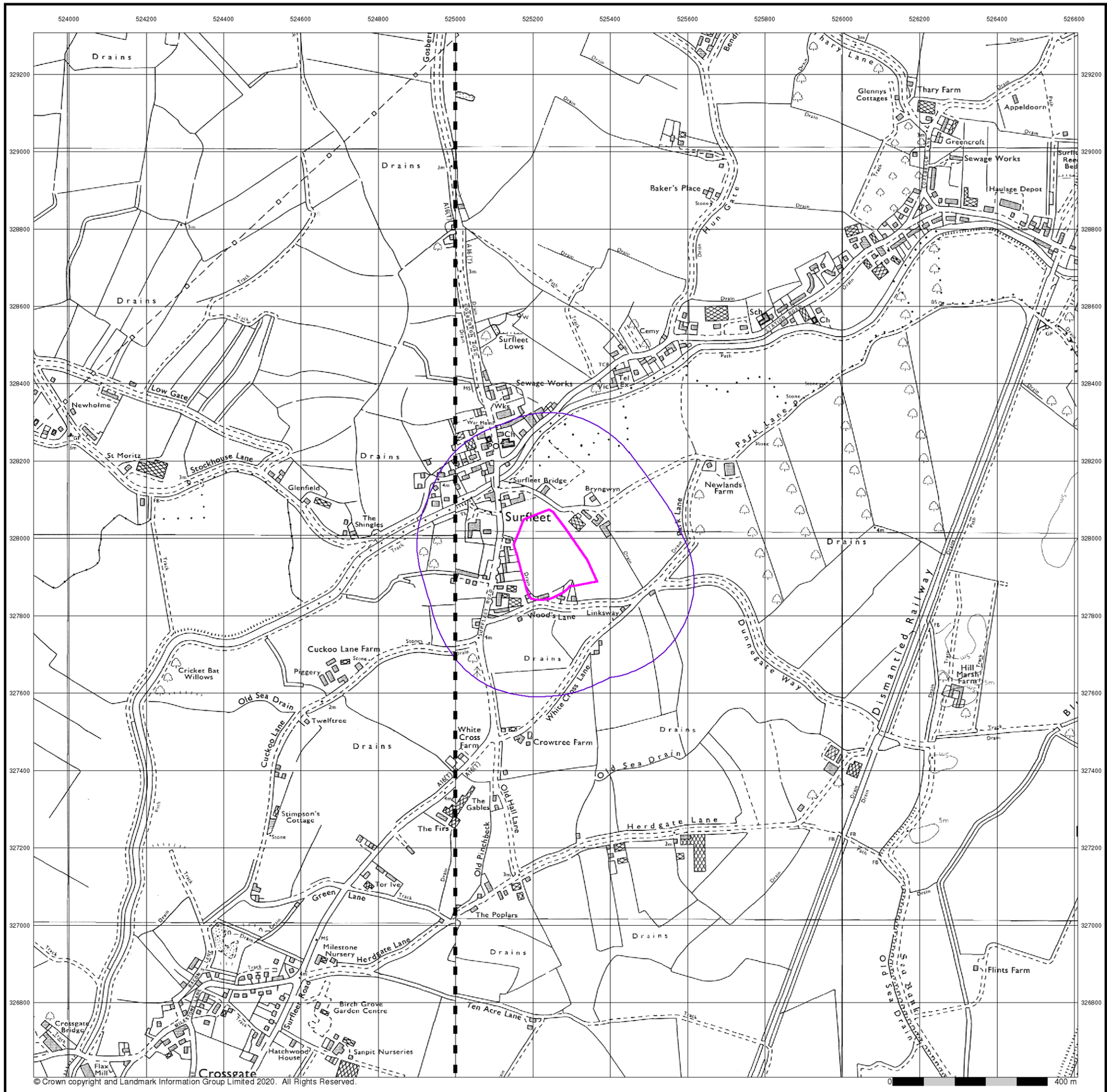

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| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

## Site Details

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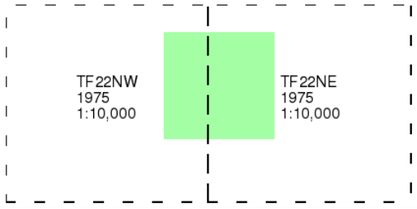
## Ordnance Survey Plan

## Published 1975

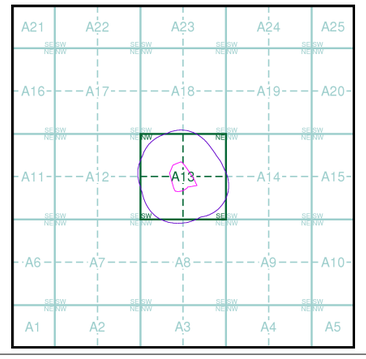
## Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A



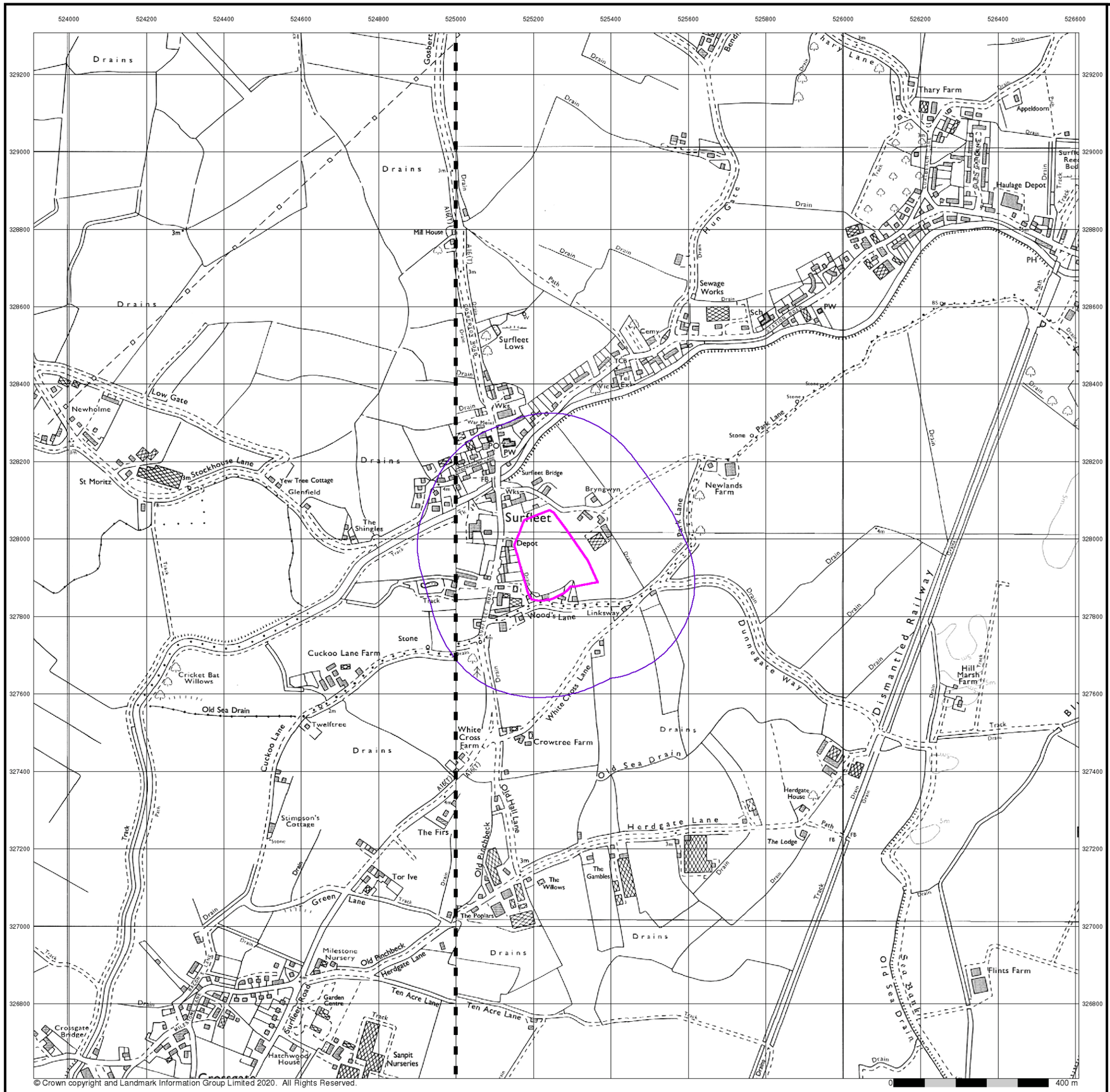

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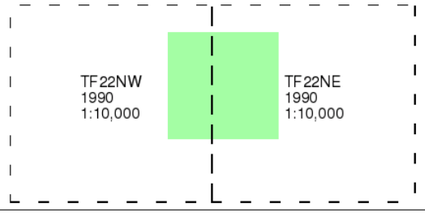
## Ordnance Survey Plan

## Published 1990

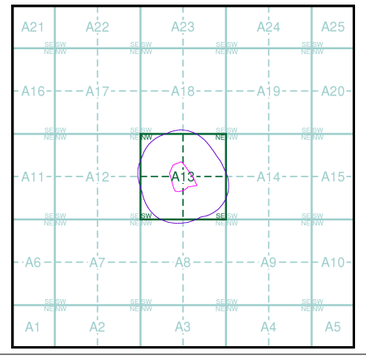
## Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A



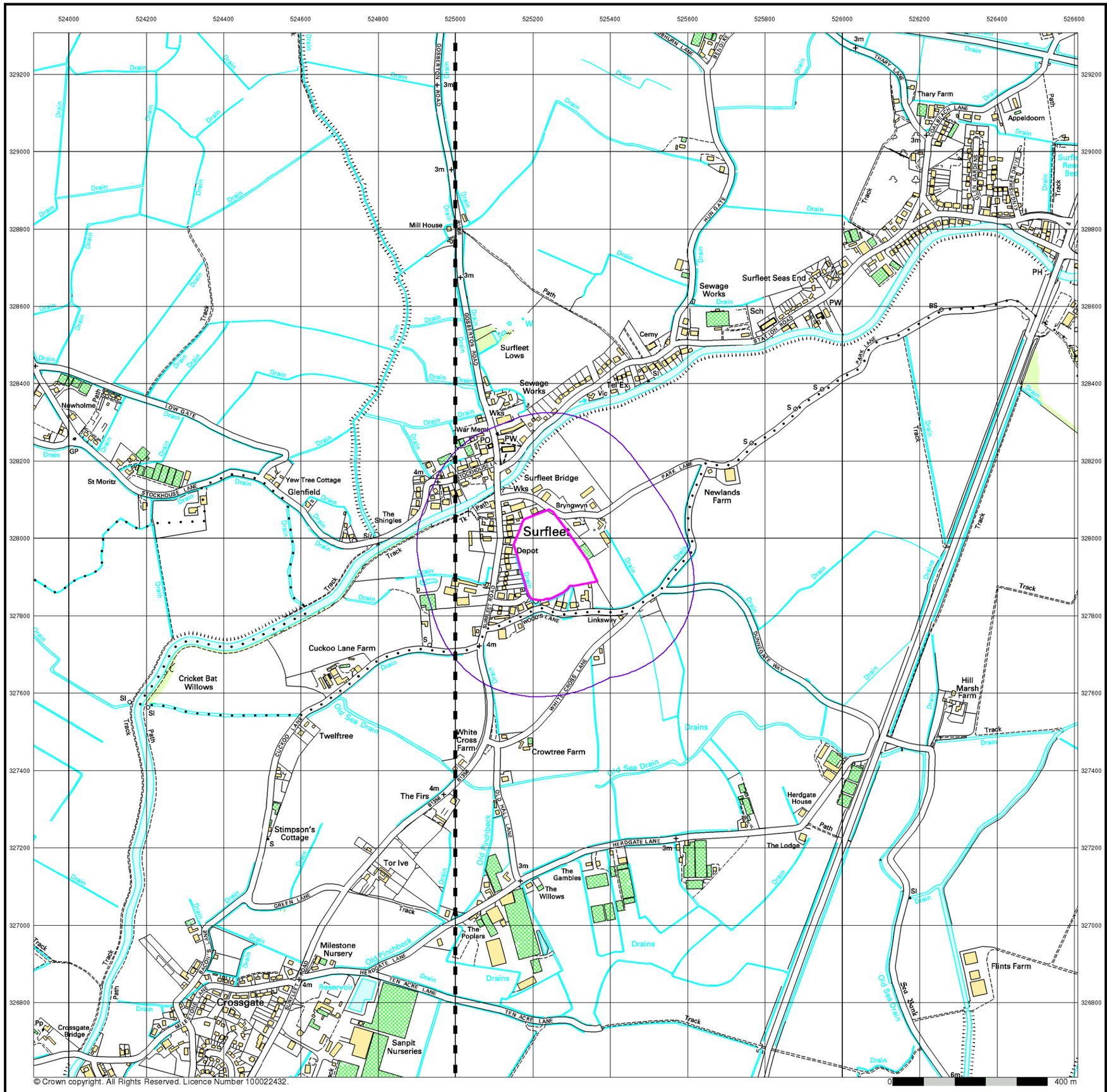

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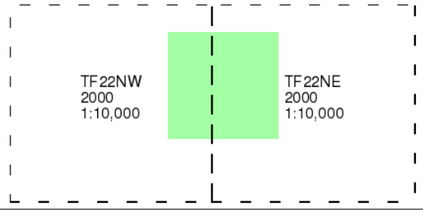
## 10k Raster Mapping

## Published 2000

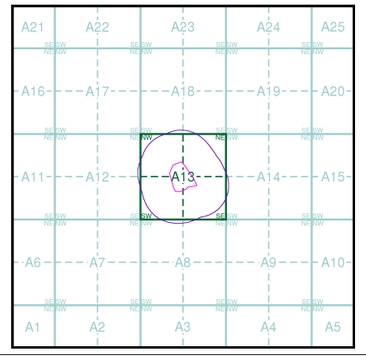
## Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

## Map Name(s) and Date(s)




## Historical Map - Slice A




## Order Details

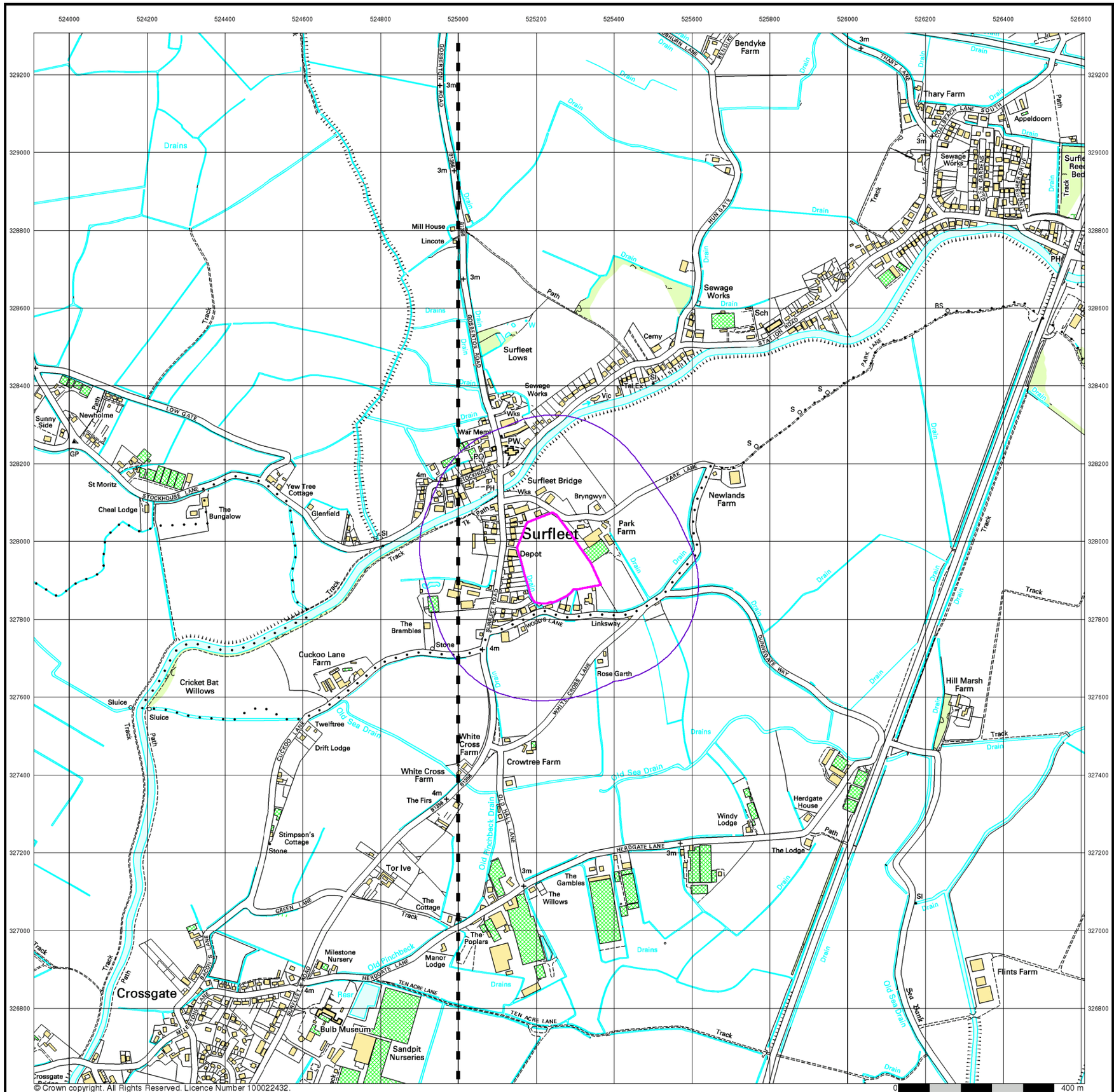
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| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

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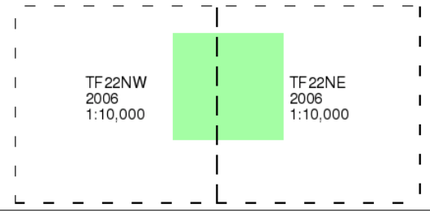
## 10k Raster Mapping

## Published 2006

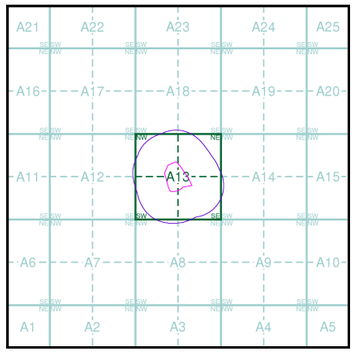
## Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

## Map Name(s) and Date(s)




## Historical Map - Slice A



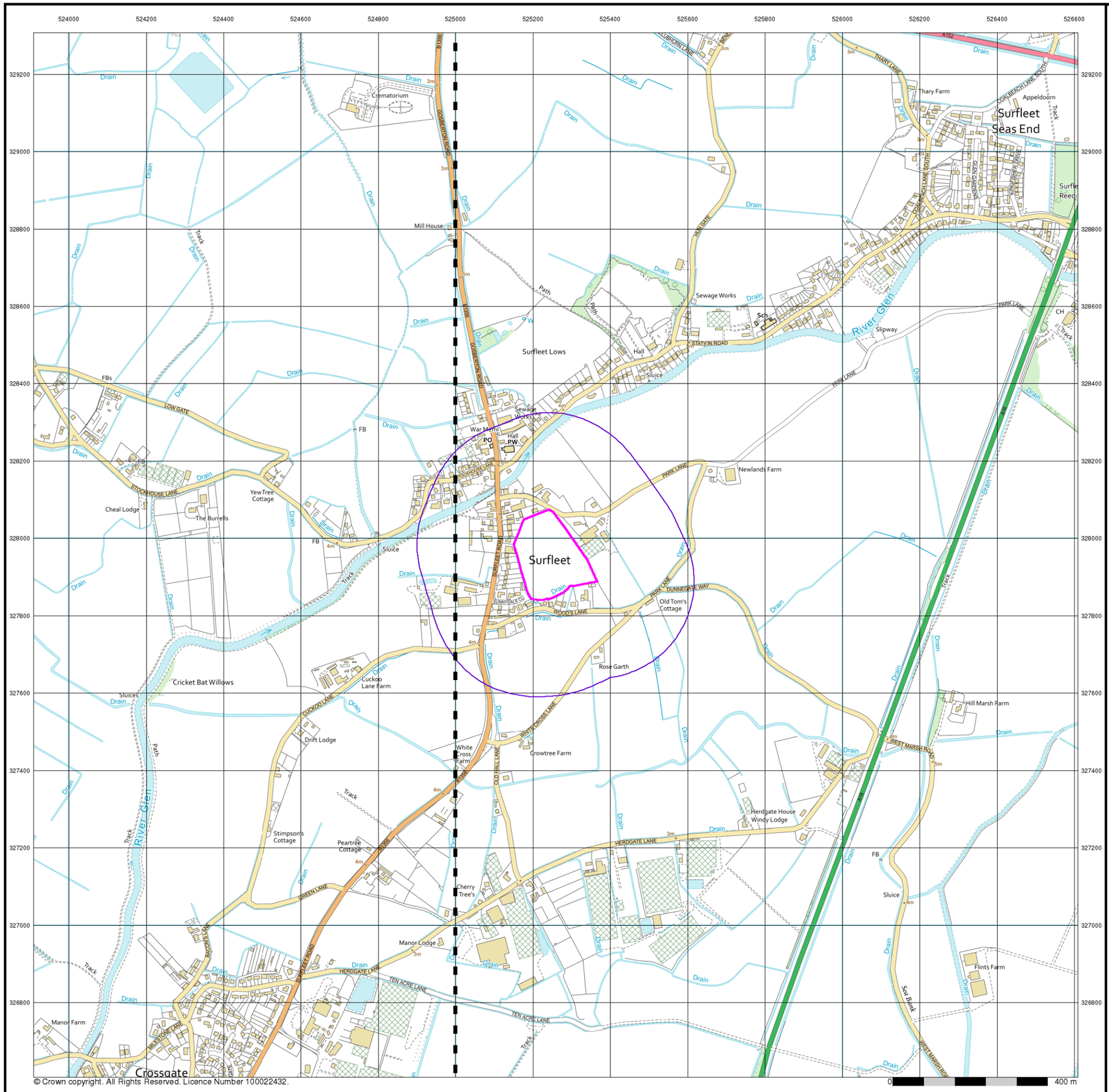

## Order Details

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| Order Number: | 231991905_1_1 |
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| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

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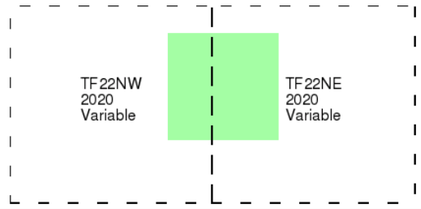
## VectorMap Local

**Published 2020**

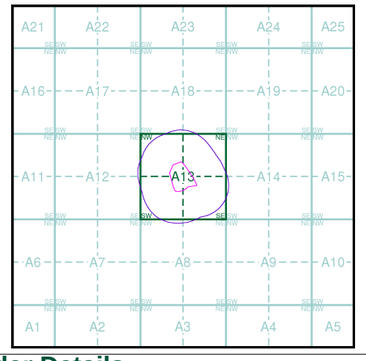
**Source map scale - 1:10,000**

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

## Map Name(s) and Date(s)




## Historical Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 231991905_1_1 |
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**APPENDIX VI**

**Landmark Geological Maps**

# Geology 1:50,000 Maps Legends

## Artificial Ground and Landslip

| Map Colour | Lex Code | Rock Name | Rock Type | Min and Max Age |
|---|---|---|---|---|
| | MGR | Made Ground (Undivided) | Artificial Deposit | Not Supplied - Holocene |

## Superficial Geology

| Map Colour | Lex Code | Rock Name | Rock Type | Min and Max Age |
|---|---|---|---|---|
| | TFD | Tidal Flat Deposits | Clay and Silt | Not Supplied - Holocene |

## Bedrock and Faults

| Map Colour | Lex Code | Rock Name | Rock Type | Min and Max Age |
|---|---|---|---|---|
| | OXC | Oxford Clay Formation | Mudstone | Not Supplied - Callovian |

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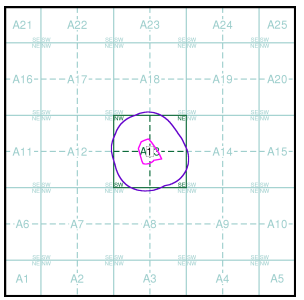
## Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

## Geology 1:50,000 Maps Coverage

**Map ID:** 1
**Map Sheet No:** 144
**Map Name:** Spalding
**Map Date:** 1992
**Bedrock Geology:** Available
**Superficial Geology:** Available
**Artificial Geology:** Available
**Faults:** Not Supplied
**Landslip:** Not Available
**Rock Segments:** Not Supplied

## Geology 1:50,000 Maps - Slice A

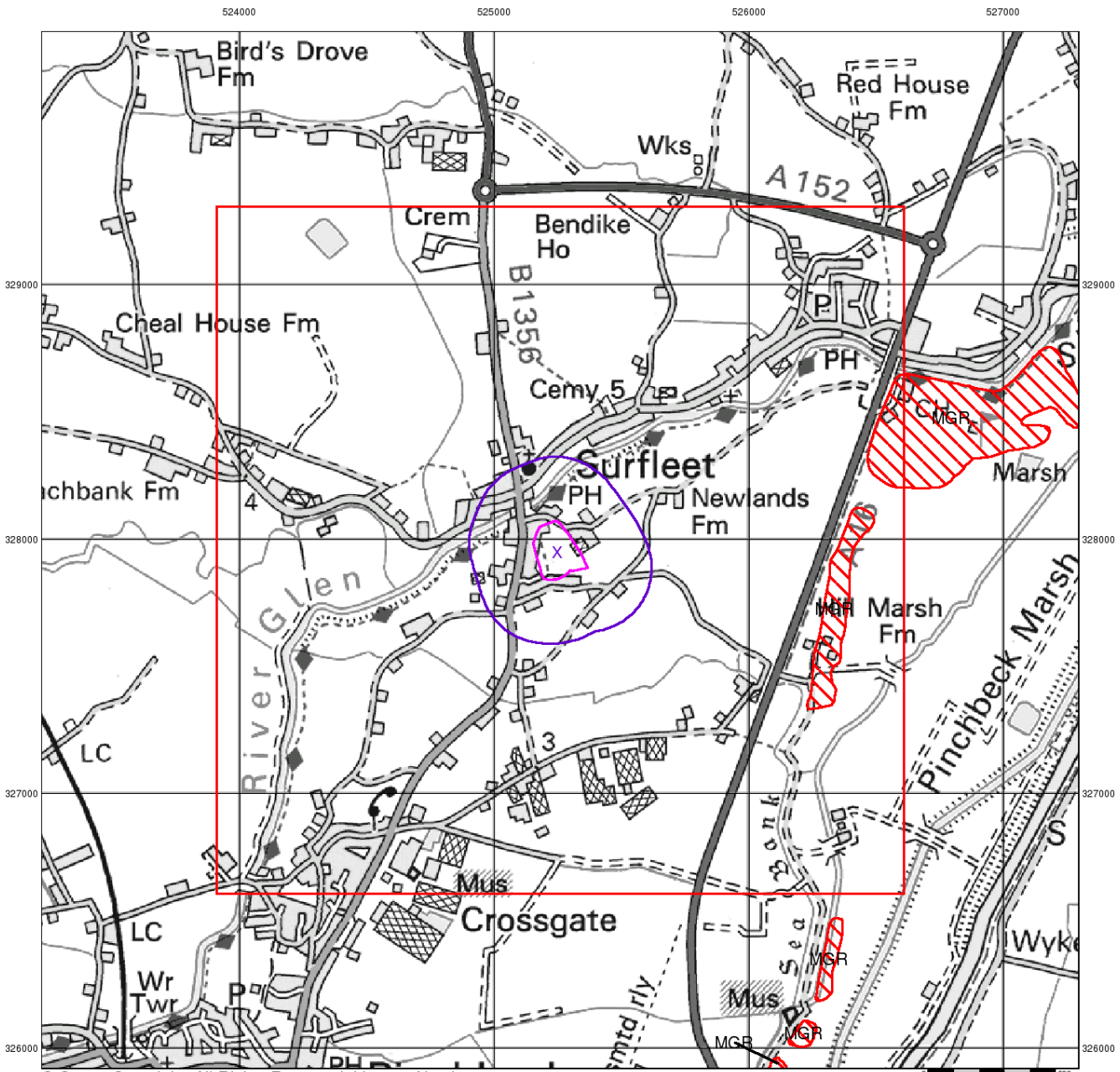



## Order Details:

Order Number: 231991905_1_1
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National Grid Reference: 525250, 327950
Slice: A
Site Area (Ha): 3.14
Search Buffer (m): 250

## Site Details:

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## Artificial Ground and Landslip

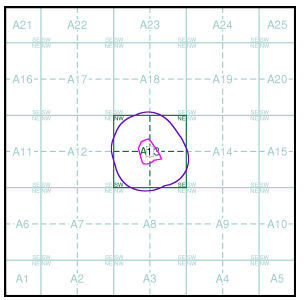
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

## Artificial Ground and Landslip Map - Slice A



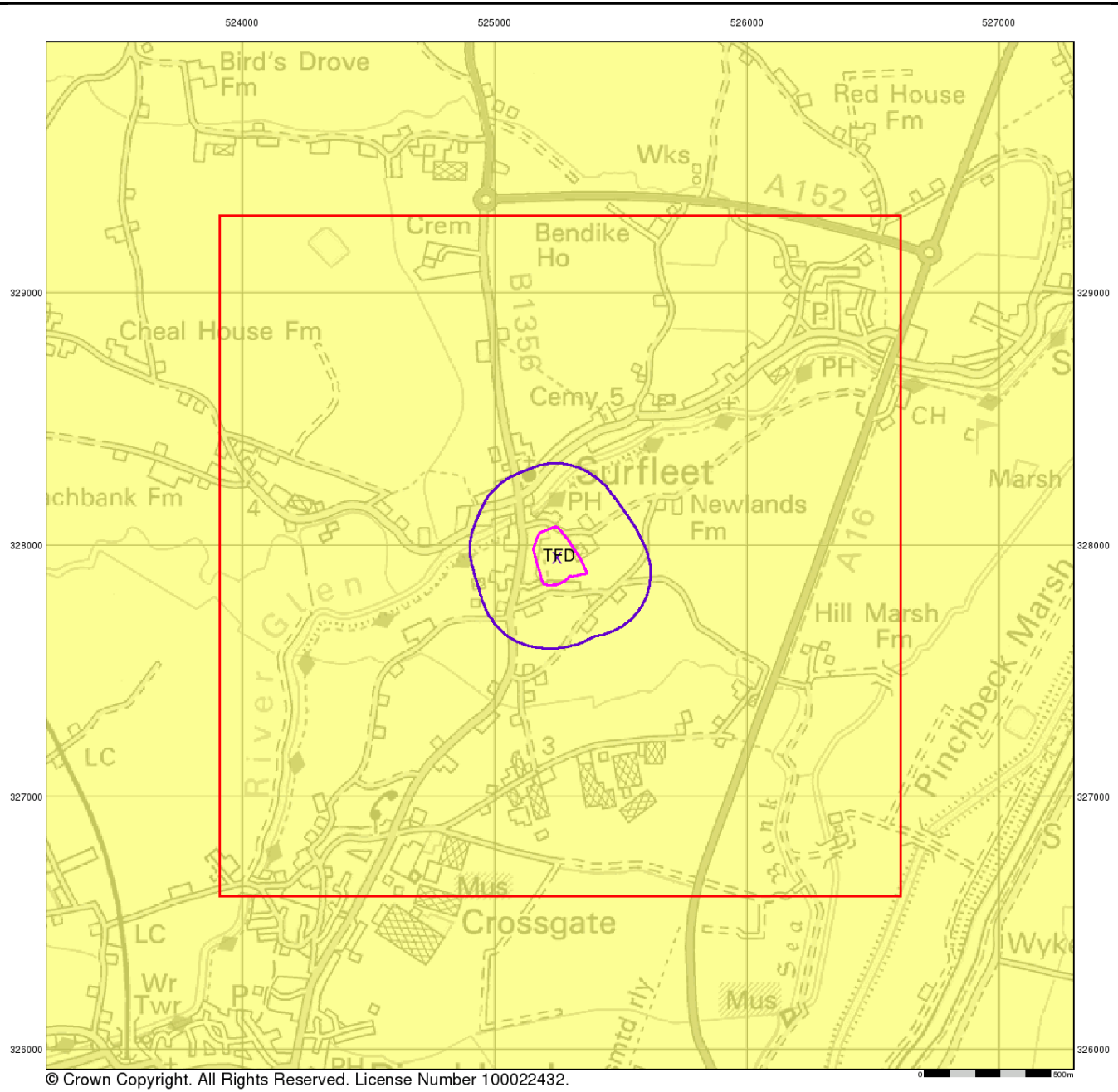

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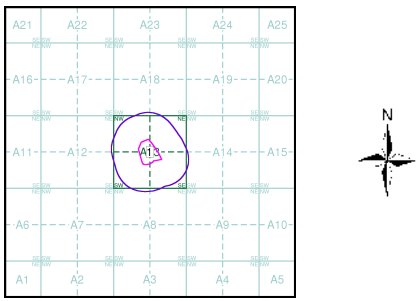
## Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

## Superficial Geology Map - Slice A



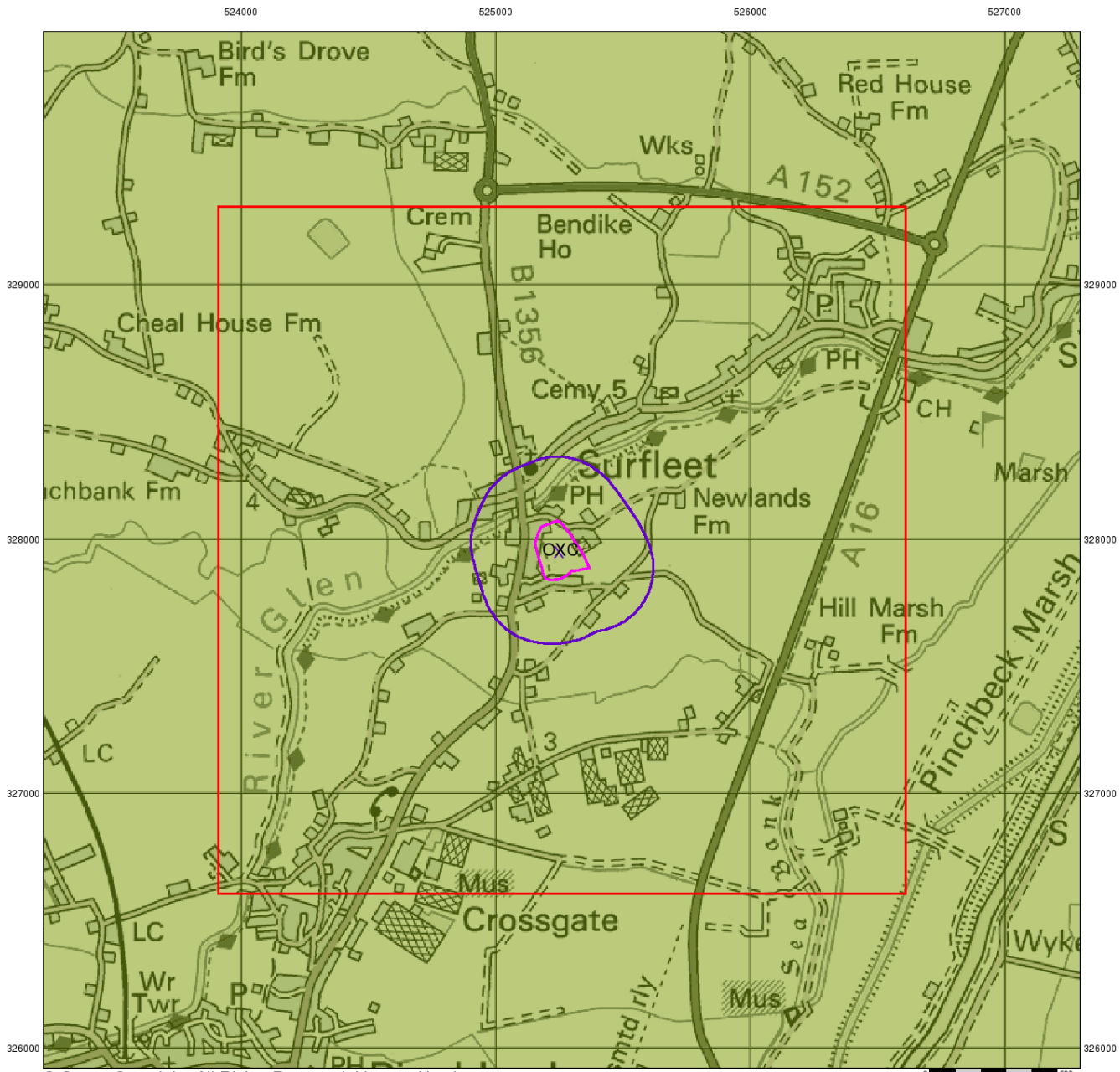

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## Bedrock and Faults

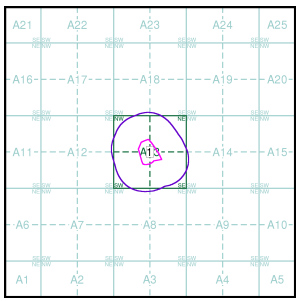
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

## Bedrock and Faults Map - Slice A



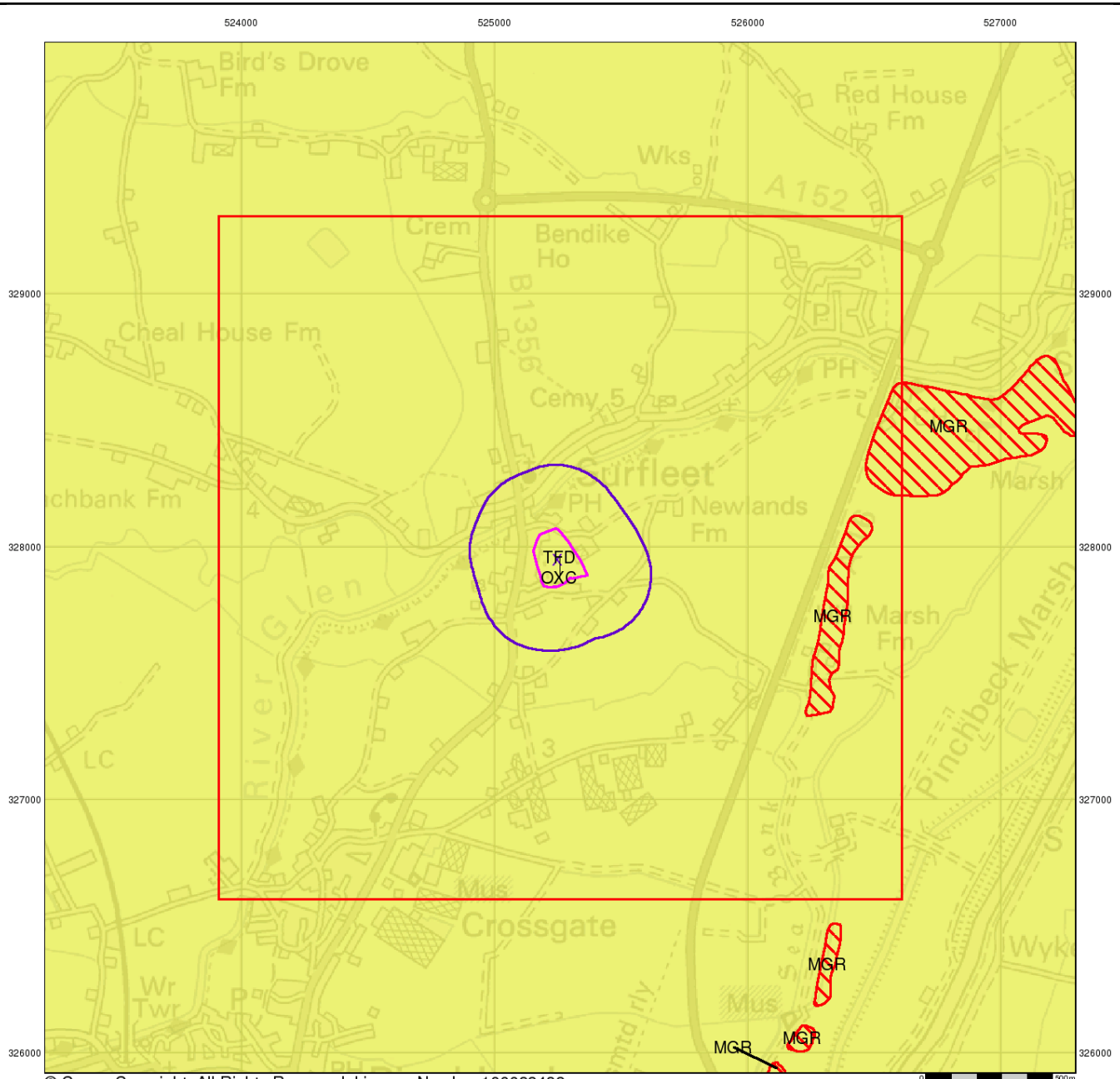

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| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

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## Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

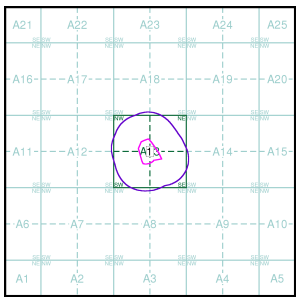
## Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

## Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

## Combined Geology Map - Slice A




## Order Details:

| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Reference: | D40008 |
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| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

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**APPENDIX VII**

**Landmark Envirocheck Report**

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# Envirocheck® Report:

## Datasheet

### Order Details:

**Order Number:**
231991905_1_1

**Customer Reference:**
D40008

**National Grid Reference:**
525250, 327950

**Slice:**
A

**Site Area (Ha):**
3.14

**Search Buffer (m):**
250

### Site Details:

Sunnydale Close
Surfleet

### Client Details:

Mr J Hollands
GeoDyne Ltd
Clarendon House
Clarendon Business Park
Clumber Avenue
Nottingham
NG5 1AH

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**Introduction**

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.
In this datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.


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**Report Version v53.0**

GeoDyne

# Summary

| Data Type | Page Number | On Site | 0 to 250m (*up to 500m) |
|---|---|---|---|
| **Agency & Hydrological** | | | |
| BGS Groundwater Flooding Susceptibility | | | |
| Contaminated Land Register Entries and Notices | | | |
| Discharge Consents | pg 1 | | 5 |
| Prosecutions Relating to Controlled Waters | | | n/a |
| Enforcement and Prohibition Notices | | | |
| Integrated Pollution Controls | | | |
| Integrated Pollution Prevention And Control | | | |
| Local Authority Integrated Pollution Prevention And Control | | | |
| Local Authority Pollution Prevention and Controls | | | |
| Local Authority Pollution Prevention and Control Enforcements | | | |
| Nearest Surface Water Feature | pg 2 | Yes | |
| Pollution Incidents to Controlled Waters | pg 2 | | 1 |
| Prosecutions Relating to Authorised Processes | | | |
| Registered Radioactive Substances | | | |
| River Quality | pg 2 | 2 | |
| River Quality Biology Sampling Points | pg 2 | | 1 |
| River Quality Chemistry Sampling Points | pg 3 | | 3 |
| Substantiated Pollution Incident Register | | | |
| Water Abstractions | pg 5 | | 1 (*1) |
| Water Industry Act Referrals | | | |
| Groundwater Vulnerability Map | pg 6 | Yes | n/a |
| Groundwater Vulnerability - Soluble Rock Risk | | | n/a |
| Groundwater Vulnerability - Local Information | | | n/a |
| Bedrock Aquifer Designations | pg 6 | Yes | n/a |
| Superficial Aquifer Designations | pg 6 | Yes | n/a |
| Source Protection Zones | | | |
| Extreme Flooding from Rivers or Sea without Defences | pg 6 | Yes | |
| Flooding from Rivers or Sea without Defences | pg 6 | Yes | Yes |
| Areas Benefiting from Flood Defences | | | |
| Flood Water Storage Areas | | | |
| Flood Defences | pg 7 | | Yes |
| OS Water Network Lines | pg 7 | 1 | 23 |

GeoDyne

# Summary

| Data Type | Page Number | On Site | 0 to 250m (*up to 500m) |
|---|---|---|---|
| **Waste** | | | |
| BGS Recorded Landfill Sites | | | |
| Historical Landfill Sites | | | |
| Integrated Pollution Control Registered Waste Sites | | | |
| Licensed Waste Management Facilities (Landfill Boundaries) | | | |
| Licensed Waste Management Facilities (Locations) | | | |
| Local Authority Landfill Coverage | pg 10 | 2 | n/a |
| Local Authority Recorded Landfill Sites | | | |
| Potentially Infilled Land (Non-Water) | | | |
| Potentially Infilled Land (Water) | | | |
| Registered Landfill Sites | | | |
| Registered Waste Transfer Sites | | | |
| Registered Waste Treatment or Disposal Sites | | | |
| **Hazardous Substances** | | | |
| Control of Major Accident Hazards Sites (COMAH) | | | |
| Explosive Sites | | | |
| Notification of Installations Handling Hazardous Substances (NIHHS) | | | |
| Planning Hazardous Substance Consents | | | |
| Planning Hazardous Substance Enforcements | | | |

GeoDyne

# Summary

| Data Type | Page Number | On Site | 0 to 250m (*up to 500m) |
|---|---|---|---|
| **Geological** | | | |
| BGS 1:625,000 Solid Geology | pg 11 | Yes | n/a |
| BGS Estimated Soil Chemistry | pg 11 | Yes | Yes |
| BGS Recorded Mineral Sites | | | |
| BGS Urban Soil Chemistry | | | |
| BGS Urban Soil Chemistry Averages | | | |
| CBSCB Compensation District | | | n/a |
| Coal Mining Affected Areas | | | n/a |
| Mining Instability | | | n/a |
| Man-Made Mining Cavities | | | |
| Natural Cavities | | | |
| Non Coal Mining Areas of Great Britain | | | |
| Potential for Collapsible Ground Stability Hazards | | | |
| Potential for Compressible Ground Stability Hazards | pg 11 | Yes | Yes |
| Potential for Ground Dissolution Stability Hazards | | | |
| Potential for Landslide Ground Stability Hazards | pg 11 | Yes | Yes |
| Potential for Running Sand Ground Stability Hazards | pg 11 | Yes | Yes |
| Potential for Shrinking or Swelling Clay Ground Stability Hazards | pg 12 | Yes | Yes |
| Radon Potential - Radon Affected Areas | | | n/a |
| Radon Potential - Radon Protection Measures | | | n/a |
| **Industrial Land Use** | | | |
| Contemporary Trade Directory Entries | pg 13 | | 6 |
| Fuel Station Entries | | | |
| Points of Interest - Commercial Services | pg 13 | | 3 |
| Points of Interest - Education and Health | | | |
| Points of Interest - Manufacturing and Production | pg 13 | | 3 |
| Points of Interest - Public Infrastructure | pg 14 | | 1 |
| Points of Interest - Recreational and Environmental | | | |
| Gas Pipelines | | | |
| Underground Electrical Cables | | | |

| Data Type | Page Number | On Site | 0 to 250m (*up to 500m) |
|---|---|---|---|
| **Sensitive Land Use** | | | |
| Ancient Woodland | | | |
| Areas of Adopted Green Belt | | | |
| Areas of Unadopted Green Belt | | | |
| Areas of Outstanding Natural Beauty | | | |
| Environmentally Sensitive Areas | | | |
| Forest Parks | | | |
| Local Nature Reserves | | | |
| Marine Nature Reserves | | | |
| National Nature Reserves | | | |
| National Parks | | | |
| Nitrate Sensitive Areas | | | |
| Nitrate Vulnerable Zones | pg 15 | 1 | |
| Ramsar Sites | | | |
| Sites of Special Scientific Interest | | | |
| Special Areas of Conservation | | | |
| Special Protection Areas | | | |
| World Heritage Sites | | | |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 1 | **Discharge Consents**<br>Operator: Anglian Water Services Limited<br>Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY)<br>Location: Woods Lane, Surfleet, Spalding, Pe11 4an<br>Authority: Environment Agency, Anglian Region<br>Catchment Area: Not Supplied<br>Reference: Aw5nf560<br>Permit Version: 2<br>Effective Date: 6th March 2019<br>Issued Date: 6th March 2019<br>Revocation Date: Not Supplied<br>Discharge Type: Public Sewage: Storm Sewage Overflow<br>Discharge Environment: Freshwater Stream/River<br>Receiving Water: Fen Drain<br>**Status: Varied under EPR 2010**<br>Positional Accuracy: Located by supplier to within 10m | A13SW (SW) | 3 | 2 | 525200 327840 |
| 1 | **Discharge Consents**<br>Operator: Anglian Water Services Ltd<br>Property Type: Not Given<br>Location: Woods Lane<br>Authority: Environment Agency, Anglian Region<br>Catchment Area: Not Given<br>Reference: AW5NF/560<br>Permit Version: Not Supplied<br>Effective Date: Not Supplied<br>Issued Date: 10th August 1971<br>Revocation Date: Not Supplied<br>Discharge Type: Sewerage Emergency Discharge<br>Discharge Environment: Freshwater Stream/River<br>Receiving Water: Fen Drain<br>**Status: Not Supplied**<br>Positional Accuracy: Located by supplier to within 100m | A13SW (SW) | 3 | 2 | 525200 327840 |
| 1 | **Discharge Consents**<br>Operator: Anglian Water Services Limited<br>Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY)<br>Location: Woods Lane, Surfleet, Spalding, Pe11 4an<br>Authority: Environment Agency, Anglian Region<br>Catchment Area: Not Given<br>Reference: Aw5nf560<br>Permit Version: 1<br>Effective Date: 10th August 1971<br>Issued Date: 10th August 1971<br>Revocation Date: 5th March 2019<br>Discharge Type: Public Sewage: Storm Sewage Overflow<br>Discharge Environment: Freshwater Stream/River<br>Receiving Water: Fen Drain<br>**Status: Pre National Rivers Authority Legislation where issue date < 01/09/1989**<br>Positional Accuracy: Located by supplier to within 10m | A13SW (SW) | 3 | 2 | 525200 327840 |
| 2 | **Discharge Consents**<br>Operator: C.D. Willcox<br>Property Type: FOOD+BEVERAGE SERVICES/CAFE/RESTAURANT/PUB<br>Location: Mermaid Inn At Surfleet, Lincs.<br>Authority: Environment Agency, Anglian Region<br>Catchment Area: Not Supplied<br>Reference: Pr5lf3013<br>Permit Version: 1<br>Effective Date: 22nd April 1966<br>Issued Date: 22nd April 1966<br>Revocation Date: 31st July 1997<br>Discharge Type: Unknown<br>Discharge Environment: Onto Land<br>Receiving Water: Land<br>**Status: Pre National Rivers Authority Legislation where issue date < 01/09/1989**<br>Positional Accuracy: Located by supplier to within 100m | A13NW (N) | 133 | 2 | 525200 328200 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 3 | **Discharge Consents**<br>Operator: Mr Steven Rogers<br>Property Type: Domestic Property (Single)<br>Location: The Cottage White Cross Lane, Surfleet, Lincolnshire, Lincolnshire, Pe11 3ys<br>Authority: Environment Agency, Anglian Region<br>Catchment Area: East Glen River (Manthorpe)<br>Reference: Npswqd011019<br>Permit Version: 1<br>Effective Date: 31st March 2010<br>Issued Date: 31st March 2010<br>Revocation Date: Not Supplied<br>Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company<br>Discharge Environment: Freshwater Stream/River<br>Receiving Water: Trib Of River Glen<br>**Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)**<br>Positional Accuracy: Located by supplier to within 10m | A13SE (E) | 143 | 2 | 525506 327858 |
| | **Nearest Surface Water Feature** | A13SE (SE) | 0 | - | 525296 327876 |
| 4 | **Pollution Incidents to Controlled Waters**<br>Property Type: Not Given<br>Location: Spalding District<br>Authority: Environment Agency, Anglian Region<br>Pollutant: Unknown<br>Note: River Glen<br>Incident Date: 1st June 1992<br>Incident Reference: 1328<br>Catchment Area: Not Given<br>Receiving Water: Freshwater Stream/River<br>Cause of Incident: Unknown<br>Incident Severity: Category 3 - Minor Incident<br>Positional Accuracy: Located by supplier to within 100m | A13NW (NW) | 94 | 2 | 525100 328100 |
| | **River Quality**<br>Name: Glen<br>GQA Grade: River Quality C<br>Reach: Surfleet...Blue Gowt Drain<br>Estimated Distance (km): 3<br>Flow Rate: Flow less than 1.25 cumecs<br>Flow Type: River<br>Year: 2000 | A13NW (NW) | 0 | 2 | 525189 328016 |
| | **River Quality**<br>Name: Glen<br>GQA Grade: River Quality C<br>Reach: Bourne Eau...Surfleet<br>Estimated Distance (km): 14<br>Flow Rate: Flow less than 1.25 cumecs<br>Flow Type: River<br>Year: 2000 | A13NW (NW) | 0 | 2 | 525182 328010 |
| 5 | **River Quality Biology Sampling Points**<br>Name: Glen<br>Reach: Surfleet To Blue Gowt Drain<br>Estimated Distance: 3.00<br>Positional Accuracy: Located by supplier to within 100m<br>Year: 1990<br>GQA Grade: River Quality Biology GQA Grade A - Very Good<br>Year: 1995<br>GQA Grade: River Quality Biology GQA Grade A - Very Good<br>Year: 2000<br>GQA Grade: River Quality Biology GQA Grade B - Good<br>Year: 2002<br>GQA Grade: River Quality Biology GQA Grade B - Good<br>Year: 2003<br>GQA Grade: River Quality Biology GQA Grade B - Good<br>Year: 2004<br>GQA Grade: River Quality Biology GQA Grade B - Good<br>Year: 2005<br>GQA Grade: River Quality Biology GQA Grade B - Good<br>Year: 2006<br>GQA Grade: River Quality Biology GQA Grade B - Good<br>Year: 2007<br>GQA Grade: River Quality Biology GQA Grade B - Good<br>Year: 2008<br>GQA Grade: River Quality Biology GQA Grade B - Good<br>Year: 2009<br>GQA Grade: River Quality Biology GQA Grade B - Good | A13NW (NW) | 94 | 2 | 525100 328100 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 5 | **River Quality Chemistry Sampling Points**<br>Name: Glen<br>Reach: Bourne Eau To Surfleet<br>Estimated Distance: 14.00<br>Objective: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m<br>Year: 1990<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1993<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1994<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1995<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1996<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1997<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 1998<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 1999<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2000<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2001<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2002<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2003<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2004<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2005<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2006<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2007<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2008<br>GQA Grade: River Quality Chemistry GQA Grade B - Good<br>Compliance: Not Supplied<br>Year: 2009<br>GQA Grade: River Quality Chemistry GQA Grade B - Good<br>Compliance: Not Supplied | A13NW (NW) | 114 | 2 | 525098 328129 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 5 | **River Quality Chemistry Sampling Points**<br>Name: Glen<br>Reach: Surfleet To Blue Gowt Drain<br>Estimated Distance: 3.00<br>Objective: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m<br>Year: 1990<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1993<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1994<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1995<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1996<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1997<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 1998<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 1999<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2000<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2001<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2002<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2003<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2004<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2005<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2006<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2007<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2008<br>GQA Grade: River Quality Chemistry GQA Grade B - Good<br>Compliance: Not Supplied<br>Year: 2009<br>GQA Grade: River Quality Chemistry GQA Grade B - Good<br>Compliance: Not Supplied | A13NW (NW) | 114 | 2 | 525098 328129 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 5 | **River Quality Chemistry Sampling Points**<br>Name: Glen<br>Reach: Blue Gowt Drain To Surfleet Seas End Slui<br>Estimated Distance: 1.00<br>Objective: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m<br>Year: 1990<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1993<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1994<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1995<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1996<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 1997<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 1998<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 1999<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2000<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2001<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2002<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2003<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2004<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2005<br>GQA Grade: River Quality Chemistry GQA Grade D - Fair<br>Compliance: Not Supplied<br>Year: 2006<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2007<br>GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good<br>Compliance: Not Supplied<br>Year: 2008<br>GQA Grade: River Quality Chemistry GQA Grade B - Good<br>Compliance: Not Supplied<br>Year: 2009<br>GQA Grade: River Quality Chemistry GQA Grade B - Good<br>Compliance: Not Supplied | A13NW (NW) | 114 | 2 | 525098 328129 |
| 6 | **Water Abstractions**<br>Operator: Mr A Battley<br>Licence Number: 5/31/14/*s/031<br>Permit Version: Not Supplied<br>Location: River Glen At, SURFLEET<br>Authority: Environment Agency, Anglian Region<br>Abstraction: Spray Irrigation<br>Abstraction Type: Not Supplied<br>Source: Stream<br>Daily Rate (m3): 0<br>Yearly Rate (m3): 5850<br>Details: Status: Revoked<br>Authorised Start: Not Supplied<br>Authorised End: Not Supplied<br>Permit Start Date: Not Supplied<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A13NW (W) | 151 | 2 | 525001 328001 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **Water Abstractions**<br>Operator: Proctor Bros (Gosberton) Ltd<br>Licence Number: 5/31/14/*s/169<br>Permit Version: Not Supplied<br>Location: Farm Drains , PINCHBECK<br>Authority: Environment Agency, Anglian Region<br>Abstraction: Spray Irrigation<br>Abstraction Type: Not Supplied<br>Source: Stream<br>Daily Rate (m3): 100<br>Yearly Rate (m3): 6000000<br>Details: Status: Perpetuity<br>Authorised Start: Not Supplied<br>Authorised End: Not Supplied<br>Permit Start Date: Not Supplied<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A8NW (SW) | 483 | 2 | 525001 327401 |
| | **Groundwater Vulnerability Map**<br>Combined Classification: Unproductive Aquifer (may have productive aquifer beneath)<br>Combined Vulnerability: Unproductive<br>Combined Aquifer: Unproductive Bedrock Aquifer, Unproductive Superficial Aquifer<br>Pollutant Speed: High<br>Bedrock Flow: Well Connected Fractures<br>Dilution: <300 mm/year<br>Baseflow Index: >70%<br>Superficial Patchiness: >90%<br>Superficial Thickness: >10m<br>Superficial Recharge: Low | A13SW (SW) | 0 | 3 | 525249 327948 |
| | **Groundwater Vulnerability Map**<br>Combined Classification: Unproductive Aquifer (may have productive aquifer beneath)<br>Combined Vulnerability: Unproductive<br>Combined Aquifer: Unproductive Bedrock Aquifer, Unproductive Superficial Aquifer<br>Pollutant Speed: High<br>Bedrock Flow: Well Connected Fractures<br>Dilution: <300 mm/year<br>Baseflow Index: >70%<br>Superficial Patchiness: >90%<br>Superficial Thickness: >10m<br>Superficial Recharge: Low | A13NW (N) | 0 | 3 | 525249 328000 |
| | **Groundwater Vulnerability - Soluble Rock Risk**<br>None | | | | |
| | **Bedrock Aquifer Designations**<br>Aquifer Designation: Unproductive Strata | A13SW (SW) | 0 | 3 | 525249 327948 |
| | **Superficial Aquifer Designations**<br>Aquifer Designation: Unproductive Strata | A13SW (SW) | 0 | 3 | 525249 327948 |
| | **Extreme Flooding from Rivers or Sea without Defences**<br>Type: Extent of Extreme Flooding from Rivers or Sea without Defences<br>Flood Plain Type: Fluvial Models<br>Boundary Accuracy: As Supplied | A13SW (SW) | 0 | 2 | 525249 327948 |
| | **Flooding from Rivers or Sea without Defences**<br>Type: Extent of Flooding from Rivers or Sea without Defences<br>Flood Plain Type: Fluvial Models<br>Boundary Accuracy: As Supplied | A13SW (SW) | 0 | 2 | 525249 327948 |
| | **Flooding from Rivers or Sea without Defences**<br>Type: Extent of Flooding from Rivers or Sea without Defences<br>Flood Plain Type: Fluvial Models<br>Boundary Accuracy: As Supplied | A13NW (NW) | 212 | 2 | 525025 328195 |
| | **Areas Benefiting from Flood Defences**<br>None | | | | |
| | **Flood Water Storage Areas**<br>None | | | | |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **Flood Defences**<br>Type: Flood Defences<br>Reference: Not Supplied | A13NW (NW) | 114 | 2 | 525133 328154 |
| | **Flood Defences**<br>Type: Flood Defences<br>Reference: Not Supplied | A13NW (NW) | 151 | 2 | 525024 328073 |
| 7 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 10.1<br>Watercourse Level: Underground<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SW (SW) | 0 | 4 | 525190 327849 |
| 8 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 24.6<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SW (SW) | 1 | 4 | 525198 327843 |
| 9 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 72.8<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SE (SE) | 1 | 4 | 525296 327874 |
| 10 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 110.4<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SW (W) | 2 | 4 | 525166 327925 |
| 11 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 24.3<br>Watercourse Level: Underground<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SW (S) | 2 | 4 | 525240 327840 |
| 12 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 101.2<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SW (S) | 24 | 4 | 525224 327816 |
| 13 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 24.5<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SE (S) | 52 | 4 | 525275 327800 |
| 14 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 275.0<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SW (W) | 70 | 4 | 525096 327923 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 15 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 140.8<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SE (SE) | 70 | 4 | 525360 327817 |
| 16 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 199.6<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13NE (NE) | 81 | 4 | 525390 328020 |
| 17 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 3099.3<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: River Glen<br>Catchment Name: Welland<br>Primacy: 1 | A13NW (NW) | 105 | 4 | 525115 328132 |
| 18 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 1134.1<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: River Glen<br>Catchment Name: Welland<br>Primacy: 1 | A13NW (NW) | 109 | 4 | 525102 328126 |
| 19 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 3.8<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: River Glen<br>Catchment Name: Welland<br>Primacy: 1 | A13NW (NW) | 109 | 4 | 525104 328128 |
| 20 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 22.2<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SE (SE) | 128 | 4 | 525473 327816 |
| 21 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 397.1<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SE (E) | 131 | 4 | 525491 327848 |
| 22 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 269.6<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SE (SE) | 147 | 4 | 525480 327794 |
| 23 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 277.2<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SE (E) | 160 | 4 | 525524 327856 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 24 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 91.7<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SW (SW) | 169 | 4 | 525074 327727 |
| 25 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 289.1<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SE (E) | 178 | 4 | 525544 327879 |
| 26 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 544.3<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SE (S) | 191 | 4 | 525352 327682 |
| 27 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 252.5<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SE (SE) | 206 | 4 | 525544 327784 |
| 28 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 68.0<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13NW (NW) | 219 | 4 | 525026 328206 |
| 29 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 116.9<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SW (SW) | 224 | 4 | 525019 327707 |
| 30 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 64.2<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Welland<br>Primacy: 2 | A13SW (SW) | 233 | 4 | 525088 327637 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **Local Authority Landfill Coverage**<br>Name: South Holland District Council<br>- Has no landfill data to supply | | 0 | 6 | 525249<br>327948 |
| | **Local Authority Landfill Coverage**<br>Name: Lincolnshire County Council<br>- Had landfill data but passed it to the relevant environment agency | | 0 | 5 | 525249<br>327948 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **BGS 1:625,000 Solid Geology**<br>Description: Kellaways Formation And Oxford Clay Formation (Undifferentiated) | A13SW (SW) | 0 | 1 | 525249 327948 |
| | **BGS Estimated Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Soil Sample Type: Rural Soil<br>Arsenic Concentration: <15 mg/kg<br>Cadmium Concentration: <1.8 mg/kg<br>Chromium Concentration: 60 - 90 mg/kg<br>Lead Concentration: <100 mg/kg<br>Nickel Concentration: 15 - 30 mg/kg | A13SW (SW) | 0 | 1 | 525249 327948 |
| | **BGS Estimated Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Soil Sample Type: Rural Soil<br>Arsenic Concentration: <15 mg/kg<br>Cadmium Concentration: <1.8 mg/kg<br>Chromium Concentration: 40 - 60 mg/kg<br>Lead Concentration: <100 mg/kg<br>Nickel Concentration: 15 - 30 mg/kg | A13SW (W) | 151 | 1 | 525000 327948 |
| | **BGS Measured Urban Soil Chemistry**<br>No data available | | | | |
| | **BGS Urban Soil Chemistry Averages**<br>No data available | | | | |
| | **Coal Mining Affected Areas**<br>In an area that might not be affected by coal mining | | | | |
| | **Non Coal Mining Areas of Great Britain**<br>No Hazard | | | | |
| | **Potential for Collapsible Ground Stability Hazards**<br>Hazard Potential: No Hazard<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 0 | 1 | 525249 327948 |
| | **Potential for Collapsible Ground Stability Hazards**<br>Hazard Potential: No Hazard<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (W) | 151 | 1 | 525000 327948 |
| | **Potential for Compressible Ground Stability Hazards**<br>Hazard Potential: Moderate<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 0 | 1 | 525249 327948 |
| | **Potential for Compressible Ground Stability Hazards**<br>Hazard Potential: Moderate<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (W) | 151 | 1 | 525000 327948 |
| | **Potential for Ground Dissolution Stability Hazards**<br>Hazard Potential: No Hazard<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 0 | 1 | 525249 327948 |
| | **Potential for Ground Dissolution Stability Hazards**<br>Hazard Potential: No Hazard<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (W) | 151 | 1 | 525000 327948 |
| | **Potential for Landslide Ground Stability Hazards**<br>Hazard Potential: Very Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 0 | 1 | 525249 327948 |
| | **Potential for Landslide Ground Stability Hazards**<br>Hazard Potential: Very Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (W) | 151 | 1 | 525000 327948 |
| | **Potential for Running Sand Ground Stability Hazards**<br>Hazard Potential: Moderate<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 0 | 1 | 525249 327948 |
| | **Potential for Running Sand Ground Stability Hazards**<br>Hazard Potential: Moderate<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (W) | 151 | 1 | 525000 327948 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **Potential for Shrinking or Swelling Clay Ground Stability Hazards**<br>Hazard Potential: Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 0 | 1 | 525249 327948 |
| | **Potential for Shrinking or Swelling Clay Ground Stability Hazards**<br>Hazard Potential: Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (W) | 151 | 1 | 525000 327948 |
| | **Radon Potential - Radon Affected Areas**<br>Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level).<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 0 | 1 | 525249 327948 |
| | **Radon Potential - Radon Protection Measures**<br>Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 0 | 1 | 525249 327948 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 31 | **Contemporary Trade Directory Entries**<br>Name: J L E Logistics Ltd<br>Location: 28, Surfleet Road, Surfleet, Spalding, Lincolnshire, PE11 4AG<br>Classification: Road Haulage Services<br>**Status: Active**<br>Positional Accuracy: Automatically positioned to the address | A13SW (SW) | 49 | - | 525128 327885 |
| 32 | **Contemporary Trade Directory Entries**<br>Name: S R Wright<br>Location: Park La, Surfleet, Spalding, Lincolnshire, PE11 4AF<br>Classification: Road Haulage Services<br>**Status: Inactive**<br>Positional Accuracy: Manually positioned to the road within the address or location | A13NE (NE) | 87 | - | 525368 328058 |
| 33 | **Contemporary Trade Directory Entries**<br>Name: Tears Recovery<br>Location: 6 Gosberton Road, Surfleet, Spalding, Lincolnshire, PE11 4AB<br>Classification: Car Breakdown & Recovery Services<br>**Status: Active**<br>Positional Accuracy: Automatically positioned to the address | A13NW (NW) | 202 | - | 525079 328225 |
| 33 | **Contemporary Trade Directory Entries**<br>Name: B & M Autos<br>Location: 10, Gosberton Road, Surfleet, Spalding, PE11 4AB<br>Classification: Garage Services<br>**Status: Active**<br>Positional Accuracy: Automatically positioned to the address | A13NW (NW) | 229 | - | 525069 328250 |
| 33 | **Contemporary Trade Directory Entries**<br>Name: Ats Euromaster Ltd<br>Location: 10, Gosberton Road, Surfleet, Spalding, Lincolnshire, PE11 4AB<br>Classification: Tyre Dealers<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13NW (NW) | 230 | - | 525069 328250 |
| 33 | **Contemporary Trade Directory Entries**<br>Name: Budget Spares<br>Location: 10, Gosberton Road, Surfleet, Spalding, Lincolnshire, PE11 4AB<br>Classification: Car & Commercial Repairs<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13NW (NW) | 230 | - | 525069 328250 |
| 34 | **Points of Interest - Commercial Services**<br>Name: J L E Logistics Ltd<br>Location: 28 Surfleet Road, Surfleet, Spalding, PE11 4AG<br>Category: Transport, Storage and Delivery<br>Class Code: Distribution and Haulage<br>Positional Accuracy: Positioned to address or location | A13SW (SW) | 50 | 7 | 525128 327885 |
| 35 | **Points of Interest - Commercial Services**<br>Name: B & M Autos<br>Location: 10 Gosberton Road, Surfleet, Spalding, PE11 4AB<br>Category: Repair and Servicing<br>Class Code: Vehicle Repair, Testing and Servicing<br>Positional Accuracy: Positioned to address or location | A13NW (NW) | 230 | 7 | 525069 328250 |
| 35 | **Points of Interest - Commercial Services**<br>Name: B & M Autos<br>Location: 10 Gosberton Road, Surfleet, Spalding, PE11 4AB<br>Category: Repair and Servicing<br>Class Code: Vehicle Repair, Testing and Servicing<br>Positional Accuracy: Positioned to address or location | A13NW (NW) | 230 | 7 | 525068 328250 |
| 36 | **Points of Interest - Manufacturing and Production**<br>Name: Dobney<br>Location: 28 Woods Lane, Surfleet, Spalding, PE11 4AN<br>Category: Farming<br>Class Code: Arable Farming<br>Positional Accuracy: Positioned to address or location | A13SE (SE) | 33 | 7 | 525338 327850 |
| 37 | **Points of Interest - Manufacturing and Production**<br>Name: Works<br>Location: PE11<br>Category: Industrial Features<br>Class Code: Unspecified Works Or Factories<br>Positional Accuracy: Positioned to an adjacent address or location | A13NW (NW) | 33 | 7 | 525161 328077 |
| 37 | **Points of Interest - Manufacturing and Production**<br>Name: Works<br>Location: Not Supplied<br>Category: Industrial Features<br>Class Code: Unspecified Works Or Factories<br>Positional Accuracy: Positioned to an adjacent address or location | A13NW (NW) | 35 | 7 | 525160 328078 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 38 | **Points of Interest - Public Infrastructure**<br>Name: Sewage Pumping Station<br>Location: PE11<br>Category: Infrastructure and Facilities<br>Class Code: Waste Storage, Processing and Disposal<br>Positional Accuracy: Positioned to an adjacent address or location | A13SW (SW) | 1 | 7 | 525202 327842 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 39 | **Nitrate Vulnerable Zones**<br>Name: Glen Nvz<br>Description: Surface Water<br>Source: Environment Agency, Head Office | A13SW (SW) | 0 | 3 | 525249 327948 |

| Agency & Hydrological | Version | Update Cycle |
|---|---|---|
| **Contaminated Land Register Entries and Notices**<br>South Holland District Council - Environmental Services | October 2013 | Annual Rolling Update |
| **Discharge Consents**<br>Environment Agency - Anglian Region | October 2019 | Quarterly |
| **Enforcement and Prohibition Notices**<br>Environment Agency - Anglian Region | March 2013 | Annual Rolling Update |
| **Integrated Pollution Controls**<br>Environment Agency - Anglian Region | October 2008 | Variable |
| **Integrated Pollution Prevention And Control**<br>Environment Agency - Anglian Region | October 2019 | Quarterly |
| **Local Authority Integrated Pollution Prevention And Control**<br>South Holland District Council - Environmental Services | October 2014 | Variable |
| **Local Authority Pollution Prevention and Controls**<br>South Holland District Council - Environmental Services | October 2014 | Annual Rolling Update |
| **Local Authority Pollution Prevention and Control Enforcements**<br>South Holland District Council - Environmental Services | October 2014 | Variable |
| **Nearest Surface Water Feature**<br>Ordnance Survey | November 2019 | |
| **Pollution Incidents to Controlled Waters**<br>Environment Agency - Anglian Region | September 1999 | Not Applicable |
| **Prosecutions Relating to Authorised Processes**<br>Environment Agency - Anglian Region | March 2013 | Annual Rolling Update |
| **Prosecutions Relating to Controlled Waters**<br>Environment Agency - Anglian Region | March 2013 | Annual Rolling Update |
| **Registered Radioactive Substances**<br>Environment Agency - Anglian Region | June 2016 | |
| **River Quality**<br>Environment Agency - Head Office | November 2001 | Not Applicable |
| **River Quality Biology Sampling Points**<br>Environment Agency - Head Office | July 2012 | Annually |
| **River Quality Chemistry Sampling Points**<br>Environment Agency - Head Office | July 2012 | Annually |
| **Substantiated Pollution Incident Register**<br>Environment Agency - Anglian Region - Northern Area | October 2019 | Quarterly |
| **Water Abstractions**<br>Environment Agency - Anglian Region | October 2019 | Quarterly |
| **Water Industry Act Referrals**<br>Environment Agency - Anglian Region | October 2017 | Quarterly |
| **Groundwater Vulnerability Map**<br>Environment Agency - Head Office | June 2018 | As notified |
| **Bedrock Aquifer Designations**<br>Environment Agency - Head Office | January 2018 | Annually |
| **Superficial Aquifer Designations**<br>Environment Agency - Head Office | January 2018 | Annually |
| **Source Protection Zones**<br>Environment Agency - Head Office | October 2019 | Quarterly |
| **Extreme Flooding from Rivers or Sea without Defences**<br>Environment Agency - Head Office | November 2019 | Quarterly |
| **Flooding from Rivers or Sea without Defences**<br>Environment Agency - Head Office | November 2019 | Quarterly |

| Agency & Hydrological | Version | Update Cycle |
|---|---|---|
| **Areas Benefiting from Flood Defences**<br>Environment Agency - Head Office | November 2019 | Quarterly |
| **Flood Water Storage Areas**<br>Environment Agency - Head Office | November 2019 | Quarterly |
| **Flood Defences**<br>Environment Agency - Head Office | November 2019 | Quarterly |
| **OS Water Network Lines**<br>Ordnance Survey | October 2019 | Quarterly |
| **Surface Water 1 in 30 year Flood Extent**<br>Environment Agency - Head Office | October 2013 | Annually |
| **Surface Water 1 in 100 year Flood Extent**<br>Environment Agency - Head Office | October 2013 | Annually |
| **Surface Water 1 in 1000 year Flood Extent**<br>Environment Agency - Head Office | October 2013 | Annually |
| **Surface Water Suitability**<br>Environment Agency - Head Office | October 2013 | Annually |
| **BGS Groundwater Flooding Susceptibility**<br>British Geological Survey - National Geoscience Information Service | May 2013 | Annually |
| **Waste** | **Version** | **Update Cycle** |
| **BGS Recorded Landfill Sites**<br>British Geological Survey - National Geoscience Information Service | June 1996 | Not Applicable |
| **Historical Landfill Sites**<br>Environment Agency - Head Office | October 2019 | Quarterly |
| **Integrated Pollution Control Registered Waste Sites**<br>Environment Agency - Anglian Region | October 2008 | Not Applicable |
| **Licensed Waste Management Facilities (Landfill Boundaries)**<br>Environment Agency - Anglian Region - Northern Area | November 2019 | Quarterly |
| **Licensed Waste Management Facilities (Locations)**<br>Environment Agency - Anglian Region - Northern Area | October 2019 | Quarterly |
| **Local Authority Landfill Coverage**<br>Lincolnshire County Council<br>South Holland District Council - Environmental Services | <br>May 2000<br>May 2000 | <br>Not Applicable<br>Not Applicable |
| **Local Authority Recorded Landfill Sites**<br>Lincolnshire County Council<br>South Holland District Council - Environmental Services | <br>May 2000<br>May 2000 | <br>Not Applicable<br>Not Applicable |
| **Potentially Infilled Land (Non-Water)**<br>Landmark Information Group Limited | December 1999 | Not Applicable |
| **Potentially Infilled Land (Water)**<br>Landmark Information Group Limited | December 1999 | Not Applicable |
| **Registered Landfill Sites**<br>Environment Agency - Anglian Region - Northern Area | March 2003 | Not Applicable |
| **Registered Waste Transfer Sites**<br>Environment Agency - Anglian Region - Northern Area | March 2003 | Not Applicable |
| **Registered Waste Treatment or Disposal Sites**<br>Environment Agency - Anglian Region - Northern Area | March 2003 | Not Applicable |

| Hazardous Substances | Version | Update Cycle |
|---|---|---|
| **Control of Major Accident Hazards Sites (COMAH)**<br>Health and Safety Executive | April 2018 | Bi-Annually |
| **Explosive Sites**<br>Health and Safety Executive | March 2017 | Annually |
| **Notification of Installations Handling Hazardous Substances (NIHHS)**<br>Health and Safety Executive | November 2000 | Not Applicable |
| **Planning Hazardous Substance Enforcements**<br>South Holland District Council<br>Lincolnshire County Council - Highways and Planning Department | January 2016<br>June 2010 | Variable<br>Variable |
| **Planning Hazardous Substance Consents**<br>Lincolnshire County Council - Highways and Planning Department<br>South Holland District Council | August 2007<br>January 2016 | Variable<br>Variable |
| **Geological** | **Version** | **Update Cycle** |
| **BGS 1:625,000 Solid Geology**<br>British Geological Survey - National Geoscience Information Service | January 2009 | Not Applicable |
| **BGS Estimated Soil Chemistry**<br>British Geological Survey - National Geoscience Information Service | October 2015 | Annually |
| **BGS Recorded Mineral Sites**<br>British Geological Survey - National Geoscience Information Service | October 2019 | Bi-Annually |
| **CBSCB Compensation District**<br>Cheshire Brine Subsidence Compensation Board (CBSCB) | August 2011 | Not Applicable |
| **Coal Mining Affected Areas**<br>The Coal Authority - Property Searches | March 2014 | Annual Rolling Update |
| **Mining Instability**<br>Ove Arup & Partners | October 2000 | Not Applicable |
| **Non Coal Mining Areas of Great Britain**<br>British Geological Survey - National Geoscience Information Service | May 2015 | Not Applicable |
| **Potential for Collapsible Ground Stability Hazards**<br>British Geological Survey - National Geoscience Information Service | January 2019 | Annually |
| **Potential for Compressible Ground Stability Hazards**<br>British Geological Survey - National Geoscience Information Service | January 2019 | Annually |
| **Potential for Ground Dissolution Stability Hazards**<br>British Geological Survey - National Geoscience Information Service | January 2019 | Annually |
| **Potential for Landslide Ground Stability Hazards**<br>British Geological Survey - National Geoscience Information Service | January 2019 | Annually |
| **Potential for Running Sand Ground Stability Hazards**<br>British Geological Survey - National Geoscience Information Service | January 2019 | Annually |
| **Potential for Shrinking or Swelling Clay Ground Stability Hazards**<br>British Geological Survey - National Geoscience Information Service | January 2019 | Annually |
| **Radon Potential - Radon Affected Areas**<br>British Geological Survey - National Geoscience Information Service | July 2011 | Annually |
| **Radon Potential - Radon Protection Measures**<br>British Geological Survey - National Geoscience Information Service | July 2011 | Annually |

| Industrial Land Use | Version | Update Cycle |
|---|---|---|
| **Contemporary Trade Directory Entries**<br>Thomson Directories | October 2019 | Quarterly |
| **Fuel Station Entries**<br>Catalist Ltd - Experian | December 2019 | Quarterly |
| **Gas Pipelines**<br>National Grid | July 2014 | |
| **Points of Interest - Commercial Services**<br>PointX | December 2019 | Quarterly |
| **Points of Interest - Education and Health**<br>PointX | December 2019 | Quarterly |
| **Points of Interest - Manufacturing and Production**<br>PointX | December 2019 | Quarterly |
| **Points of Interest - Public Infrastructure**<br>PointX | December 2019 | Quarterly |
| **Points of Interest - Recreational and Environmental**<br>PointX | December 2019 | Quarterly |
| **Underground Electrical Cables**<br>National Grid | December 2015 | |

| Sensitive Land Use | Version | Update Cycle |
|---|---|---|
| **Ancient Woodland**<br>Natural England | August 2018 | Bi-Annually |
| **Areas of Adopted Green Belt**<br>South Holland District Council | November 2019 | As notified |
| **Areas of Unadopted Green Belt**<br>South Holland District Council | November 2019 | As notified |
| **Areas of Outstanding Natural Beauty**<br>Natural England | June 2019 | Bi-Annually |
| **Environmentally Sensitive Areas**<br>Natural England | January 2017 | |
| **Forest Parks**<br>Forestry Commission | April 1997 | Not Applicable |
| **Local Nature Reserves**<br>Natural England | March 2019 | Bi-Annually |
| **Marine Nature Reserves**<br>Natural England | July 2019 | Bi-Annually |
| **National Nature Reserves**<br>Natural England | July 2019 | Bi-Annually |
| **National Parks**<br>Natural England | April 2017 | Bi-Annually |
| **Nitrate Vulnerable Zones**<br>Environment Agency - Head Office<br>Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA) | December 2017<br>October 2015 | Bi-Annually |
| **Ramsar Sites**<br>Natural England | April 2019 | Bi-Annually |
| **Sites of Special Scientific Interest**<br>Natural England | March 2019 | Bi-Annually |
| **Special Areas of Conservation**<br>Natural England | June 2019 | Bi-Annually |
| **Special Protection Areas**<br>Natural England | April 2019 | Bi-Annually |

# Data Suppliers

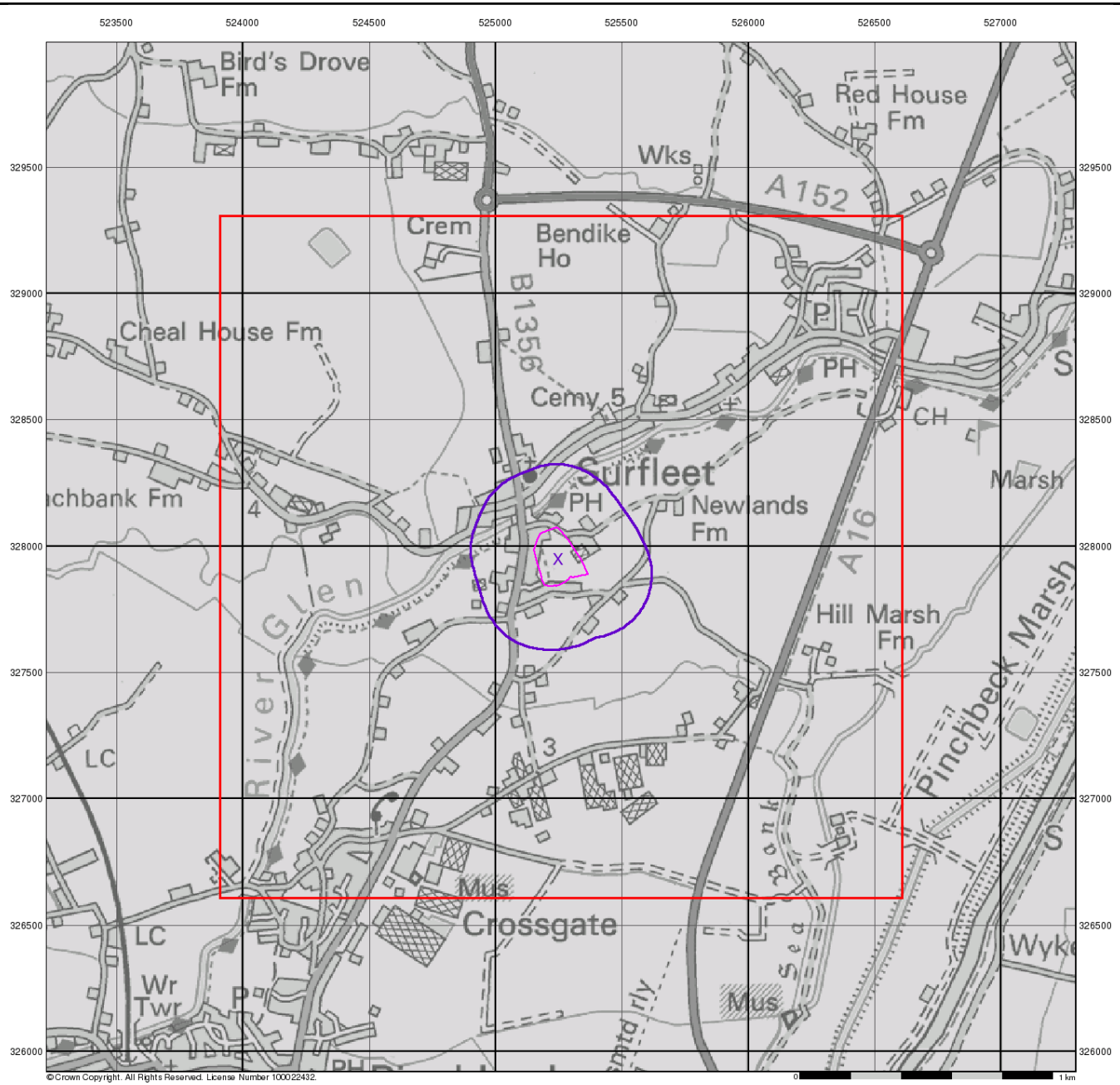
A selection of organisations who provide data within this report

| Data Supplier | Data Supplier Logo |
|---|---|
| **Ordnance Survey** | |
| **Environment Agency** | |
| **Scottish Environment Protection Agency** | |
| **The Coal Authority** | |
| **British Geological Survey** | |
| **Centre for Ecology and Hydrology** | |
| **Natural Resources Wales** | |
| **Scottish Natural Heritage** | |
| **Natural England** | |
| **Public Health England** | |
| **Ove Arup** | |
| **Peter Brett Associates** | |

# Useful Contacts

| Contact | Name and Address | Contact Details |
|---|---|---|
| 1 | **British Geological Survey - Enquiry Service**<br>British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG | Telephone: 0115 936 3143<br>Fax: 0115 936 3276<br>Email: enquiries@bgs.ac.uk<br>Website: www.bgs.ac.uk |
| 2 | **Environment Agency - National Customer Contact Centre (NCCC)**<br>PO Box 544, Templeborough, Rotherham, S60 1BY | Telephone: 03708 506 506<br>Email: enquiries@environment-agency.gov.uk |
| 3 | **Environment Agency - Head Office**<br>Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD | Telephone: 01454 624400<br>Fax: 01454 624409 |
| 4 | **Ordnance Survey**<br>Adanac Drive, Southampton, Hampshire, SO16 0AS | Telephone: 03456 05 05 05<br>Email: customerservices@ordnancesurvey.co.uk<br>Website: www.ordnancesurvey.gov.uk |
| 5 | **Lincolnshire County Council**<br>4th Floor, City Hall, Lincoln, Lincolnshire, LN1 1DN | Telephone: 01522 552222<br>Fax: 01522 552288<br>Email: PublicRelations@lincolnshire.gov.uk<br>Website: www.lincolnshire.gov.uk |
| 6 | **South Holland District Council - Environmental Services**<br>Council Offices, Priory Road, Spalding, Lincolnshire, PE11 2XE | Website: www.sholland.gov.uk |
| 7 | **PointX**<br>7 Abbey Court, Eagle Way, Sowton, Exeter, Devon, EX2 7HY | Website: www.pointx.co.uk |
| 8 | **Natural England**<br>County Hall, Spetchley Road, Worcester, WR5 2NP | Telephone: 0300 060 3900<br>Email: enquiries@naturalengland.org.uk<br>Website: www.naturalengland.org.uk |
| - | **Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards**<br>Chilton, Didcot, Oxfordshire, OX11 0RQ | Telephone: 01235 822622<br>Fax: 01235 833891<br>Email: radon@phe.gov.uk<br>Website: www.ukradon.org |
| - | **Landmark Information Group Limited**<br>Imperium, Imperial Way, Reading, Berkshire, RG2 0TD | Telephone: 0844 844 9952<br>Fax: 0844 844 9951<br>Email: customerservices@landmarkinfo.co.uk<br>Website: www.landmarkinfo.co.uk |

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.




GeoDyne

## Groundwater Vulnerability

### General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

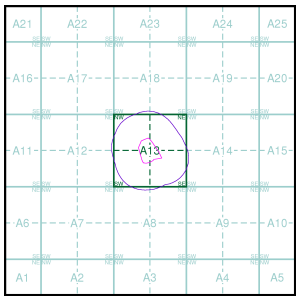
### Agency and Hydrological

| Bedrock Aquifers | Superficial Aquifers |
|---|---|
| High Vulnerability, Principal Aquifer | High Vulnerability, Principal Aquifer |
| High Vulnerability, Secondary Aquifer | High Vulnerability, Secondary Aquifer |
| Medium Vulnerability, Principal Aquifer | Medium Vulnerability, Principal Aquifer |
| Medium Vulnerability, Secondary Aquifer | Medium Vulnerability, Secondary Aquifer |
| Low Vulnerability, Principal Aquifer | Low Vulnerability, Principal Aquifer |
| Low Vulnerability, Secondary Aquifer | Low Vulnerability, Secondary Aquifer |

Unproductive Aquifer

Soluble Rock

### Site Sensitivity Context Map - Slice A



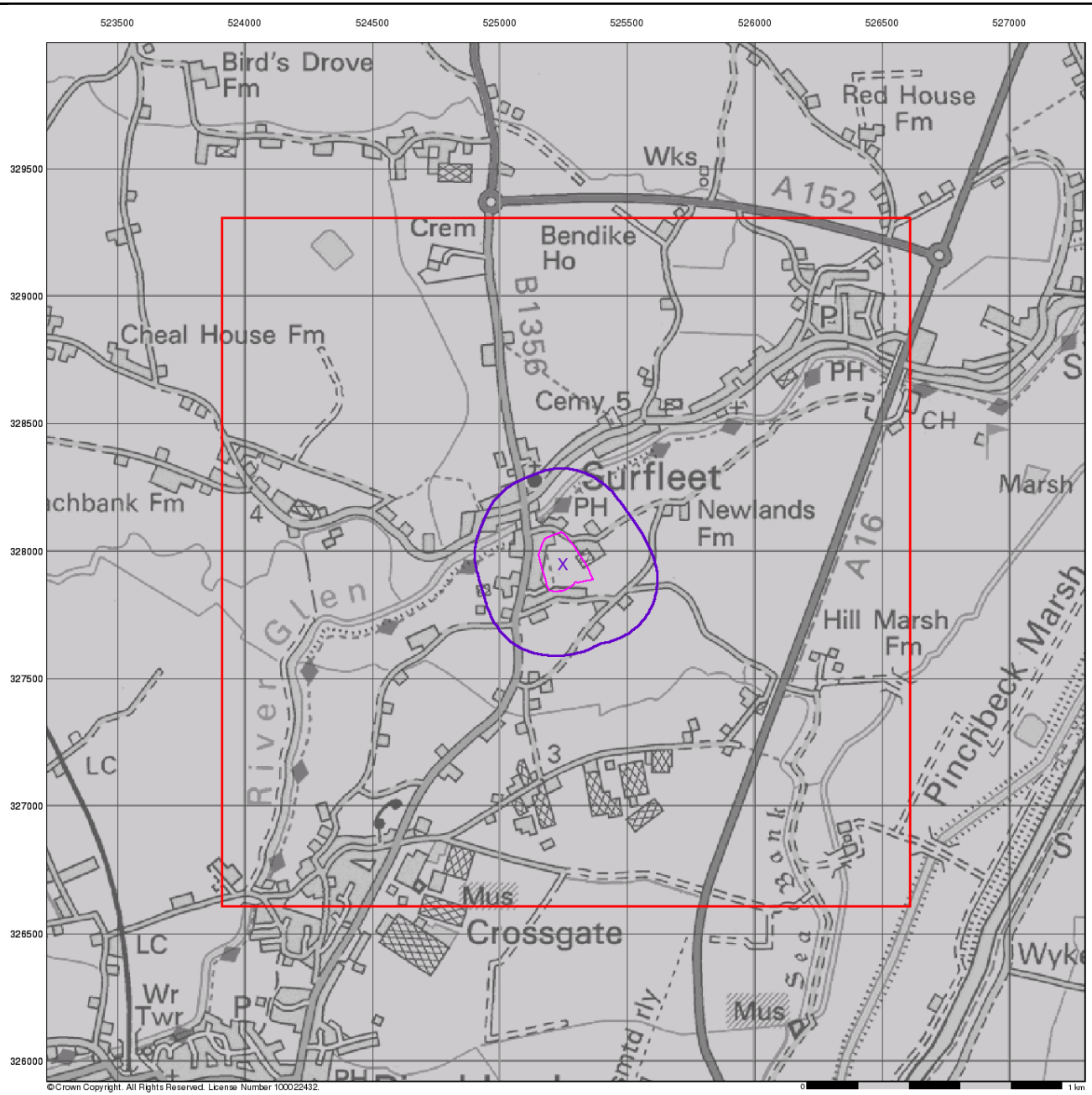

### Order Details

| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

### Site Details

Sunnydale Close, Surfleet

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# GeoDyne

## Bedrock Aquifer Designation

### General

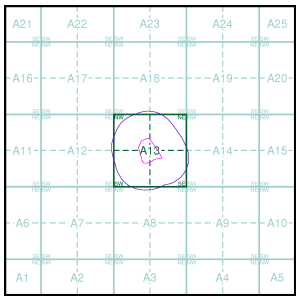
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

### Agency and Hydrological

**Geological Classes**

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

### Site Sensitivity Context Map - Slice A



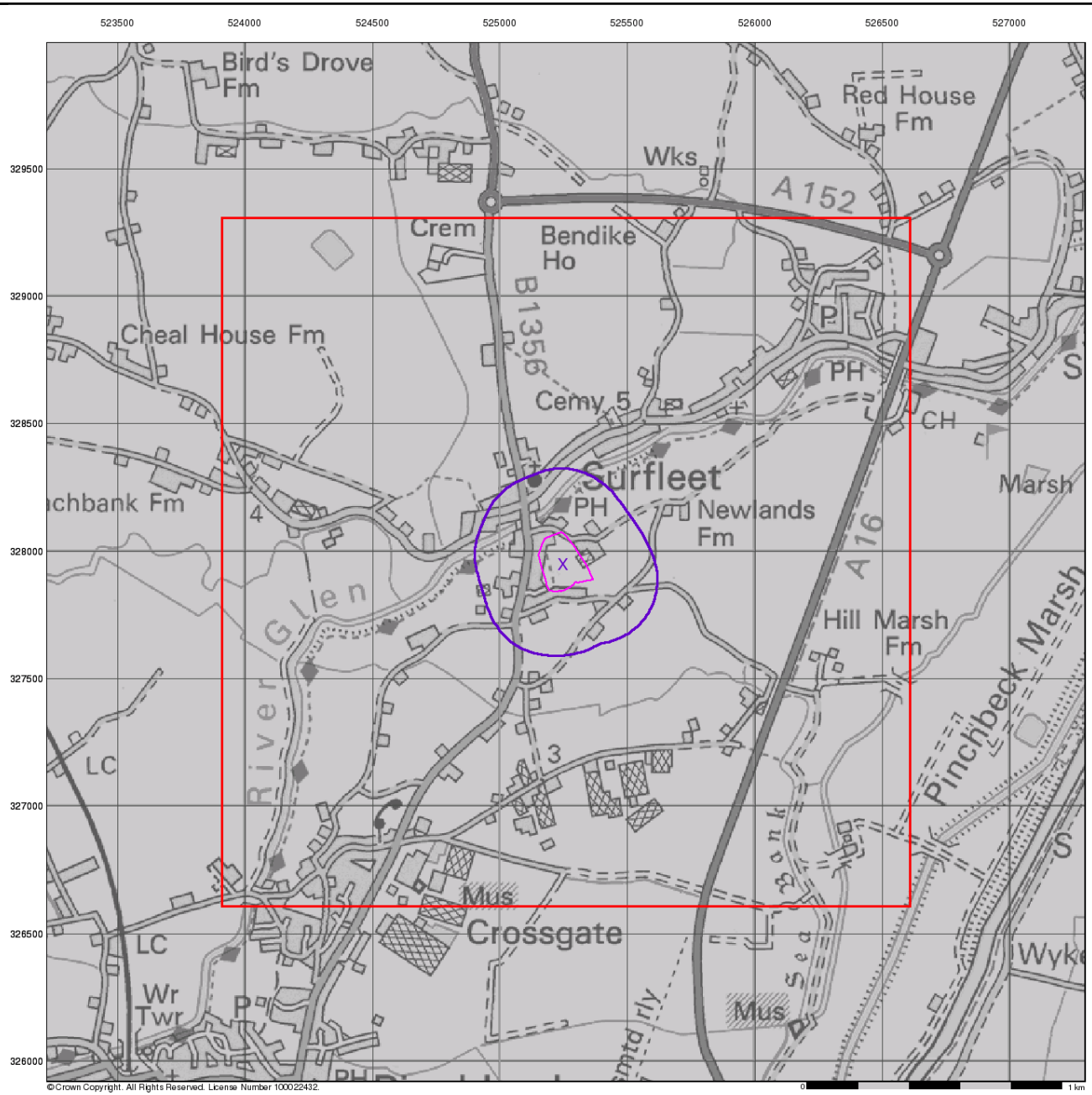

### Order Details

| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

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# GeoDyne

## Superficial Aquifer Designation

### General

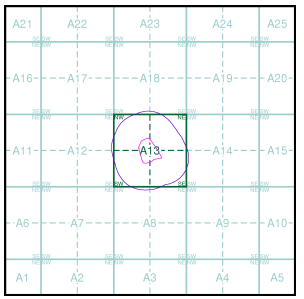
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

### Agency and Hydrological

**Geological Classes**

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

### Site Sensitivity Context Map - Slice A



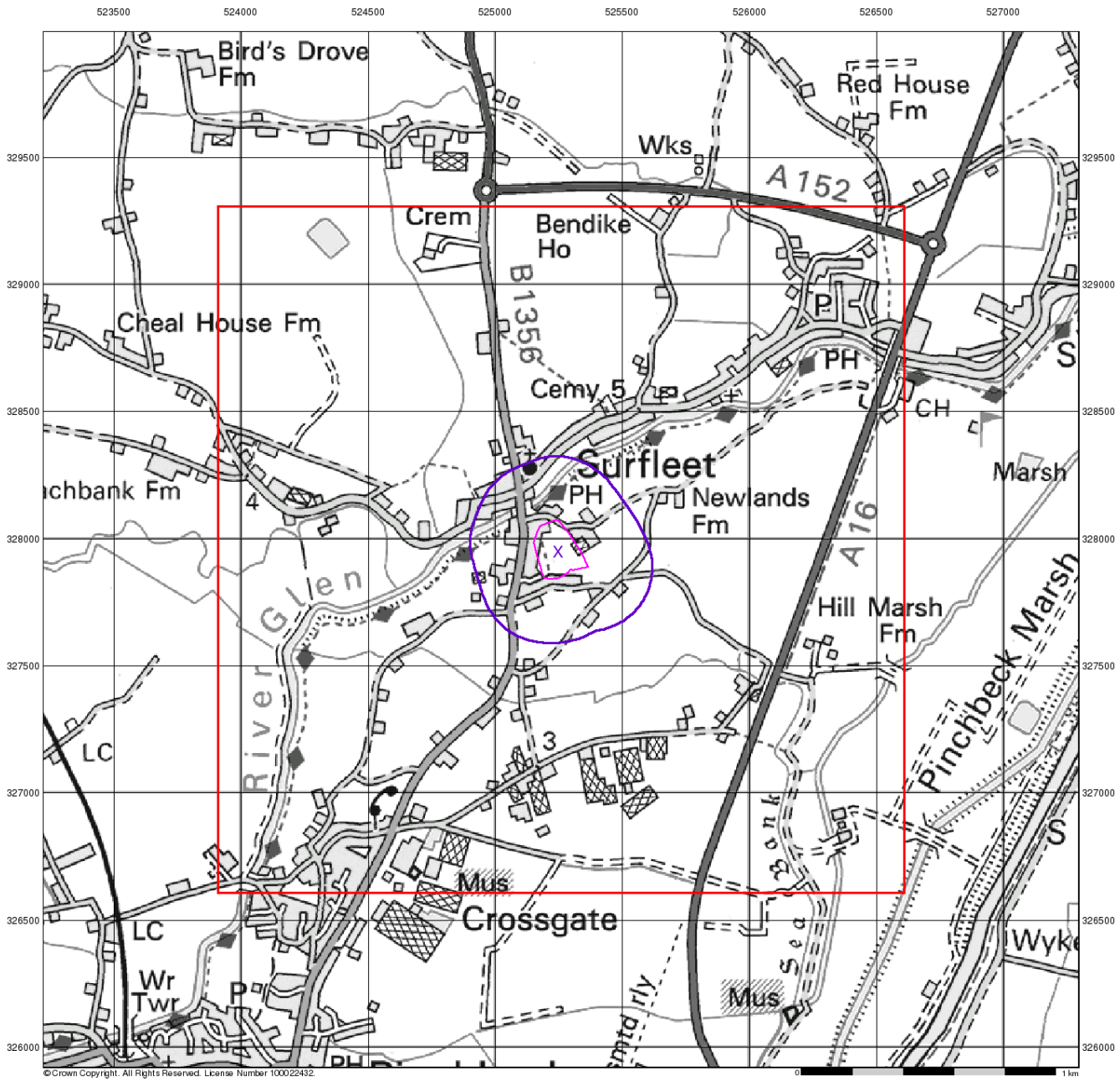

### Order Details

| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

### Site Details

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## Source Protection Zones

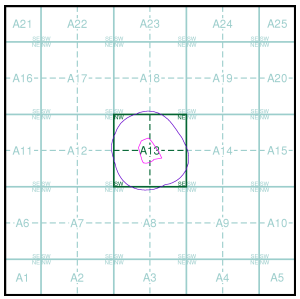
### General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

### Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

### Site Sensitivity Context Map - Slice A



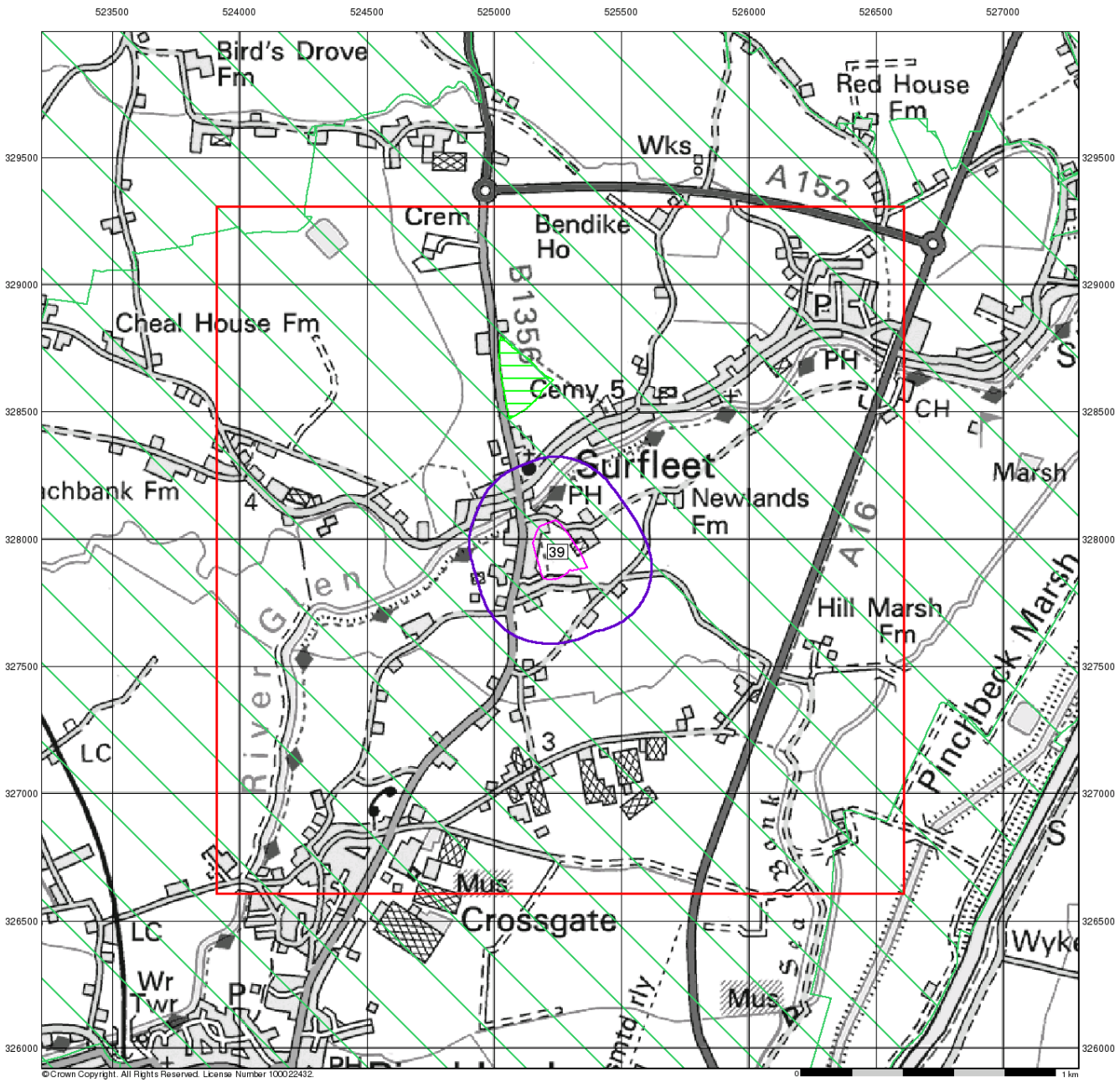

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| Search Buffer (m): | 250 |

### Site Details

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# GeoDyne

## Sensitive Land Uses

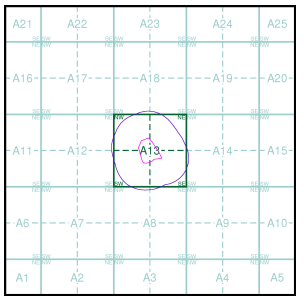
### General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

### Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

### Site Sensitivity Context Map - Slice A



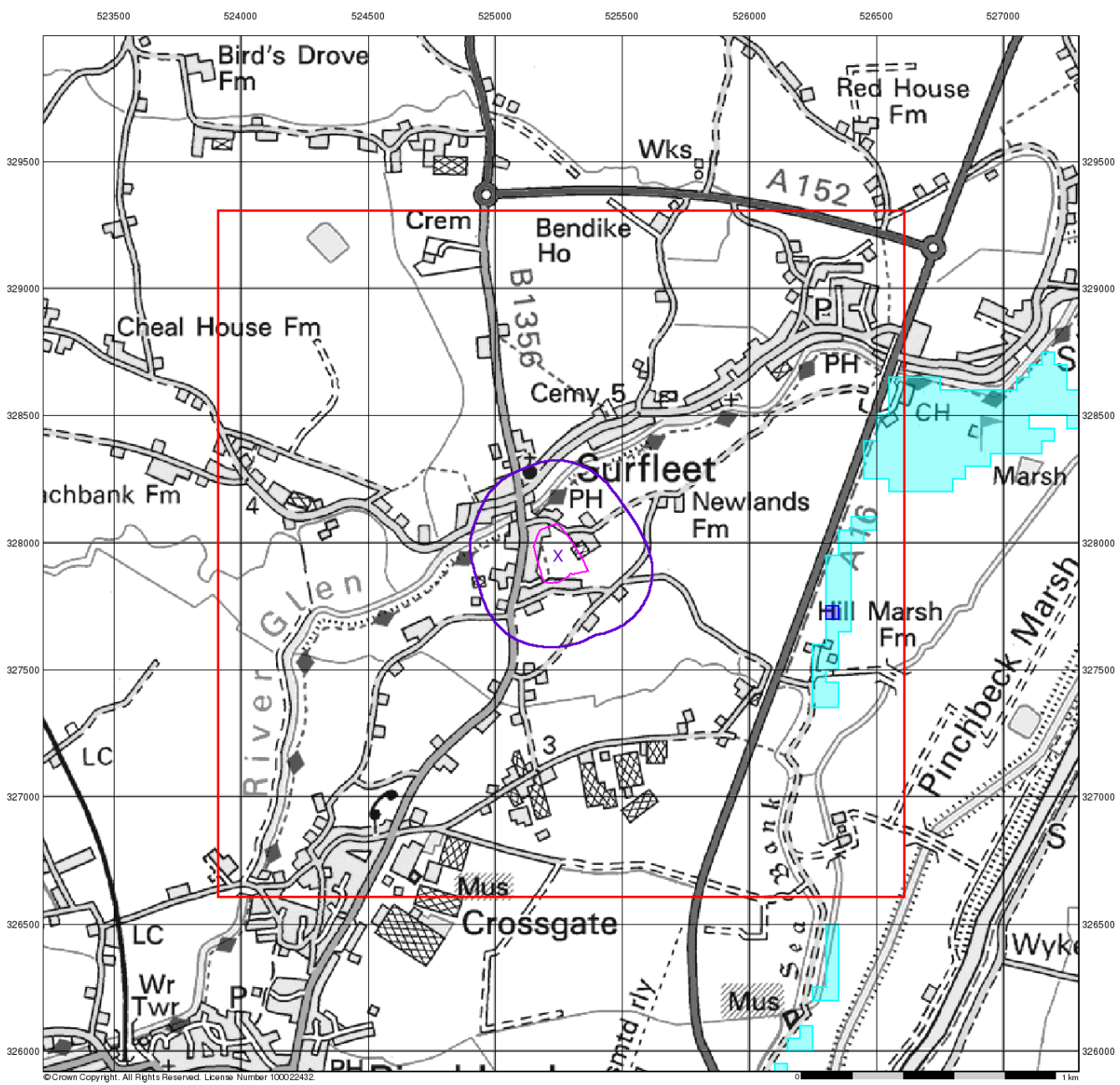

### Order Details

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| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

### Site Details

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Web: www.envirocheck.co.uk




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## BGS Flood GFS Data

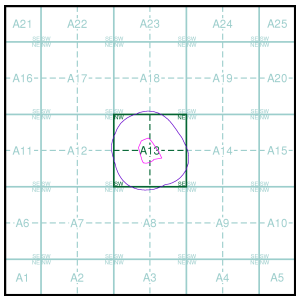
### General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice

### Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

### Site Sensitivity Context Map - Slice A



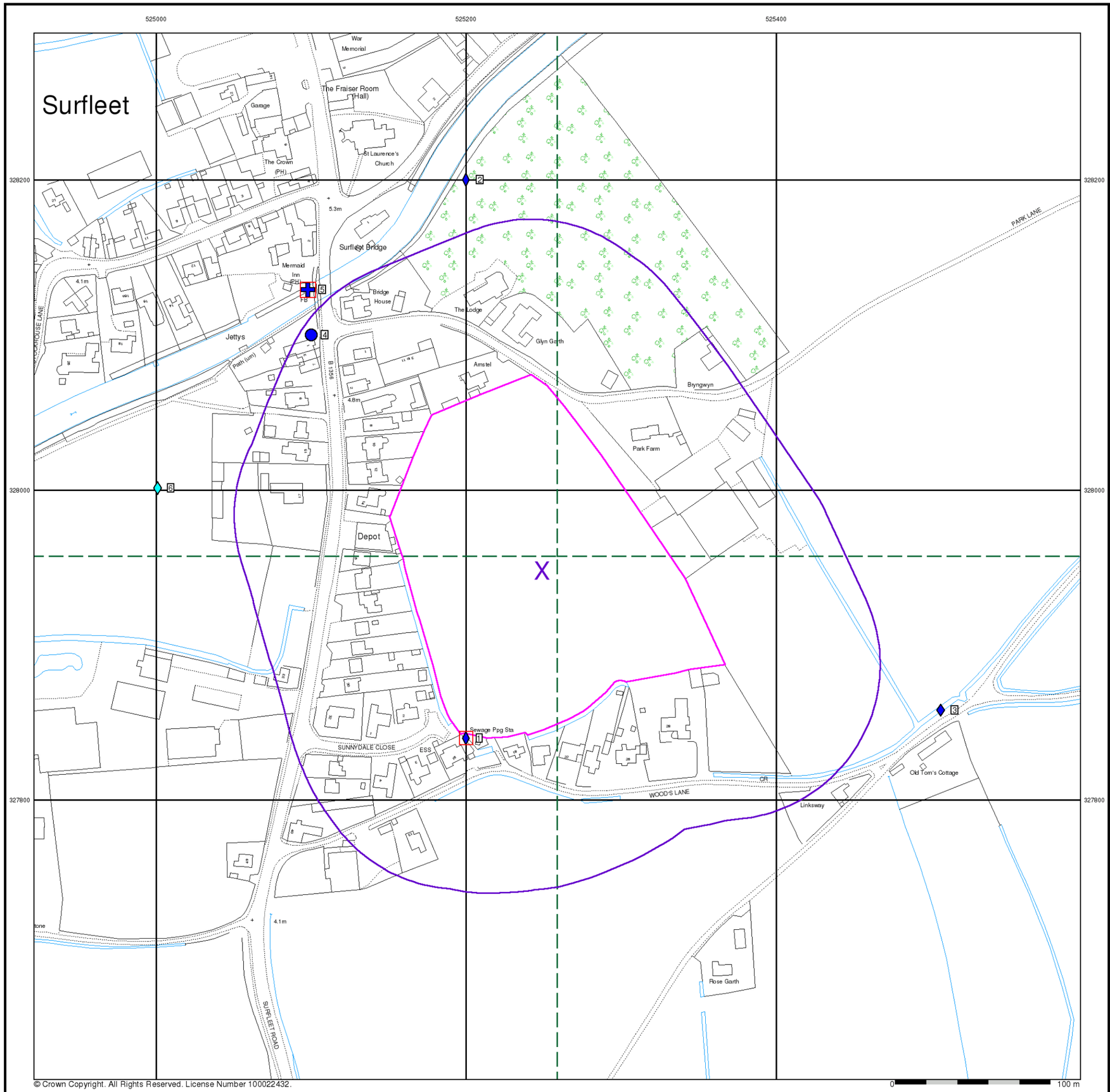

### Order Details

| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

### Site Details

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GeoDyne

## General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location
- Pylon
- Overhead Transmission Line

## Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

## Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

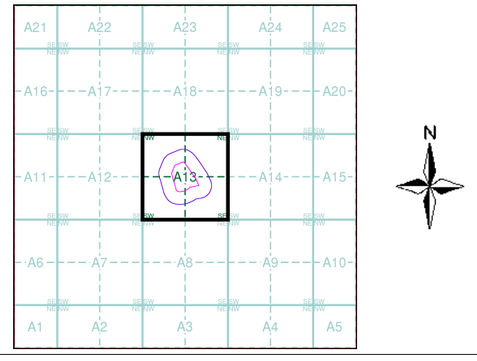
## Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

## Geological

- BGS Recorded Mineral Site

## Site Sensitivity Map - Segment A13



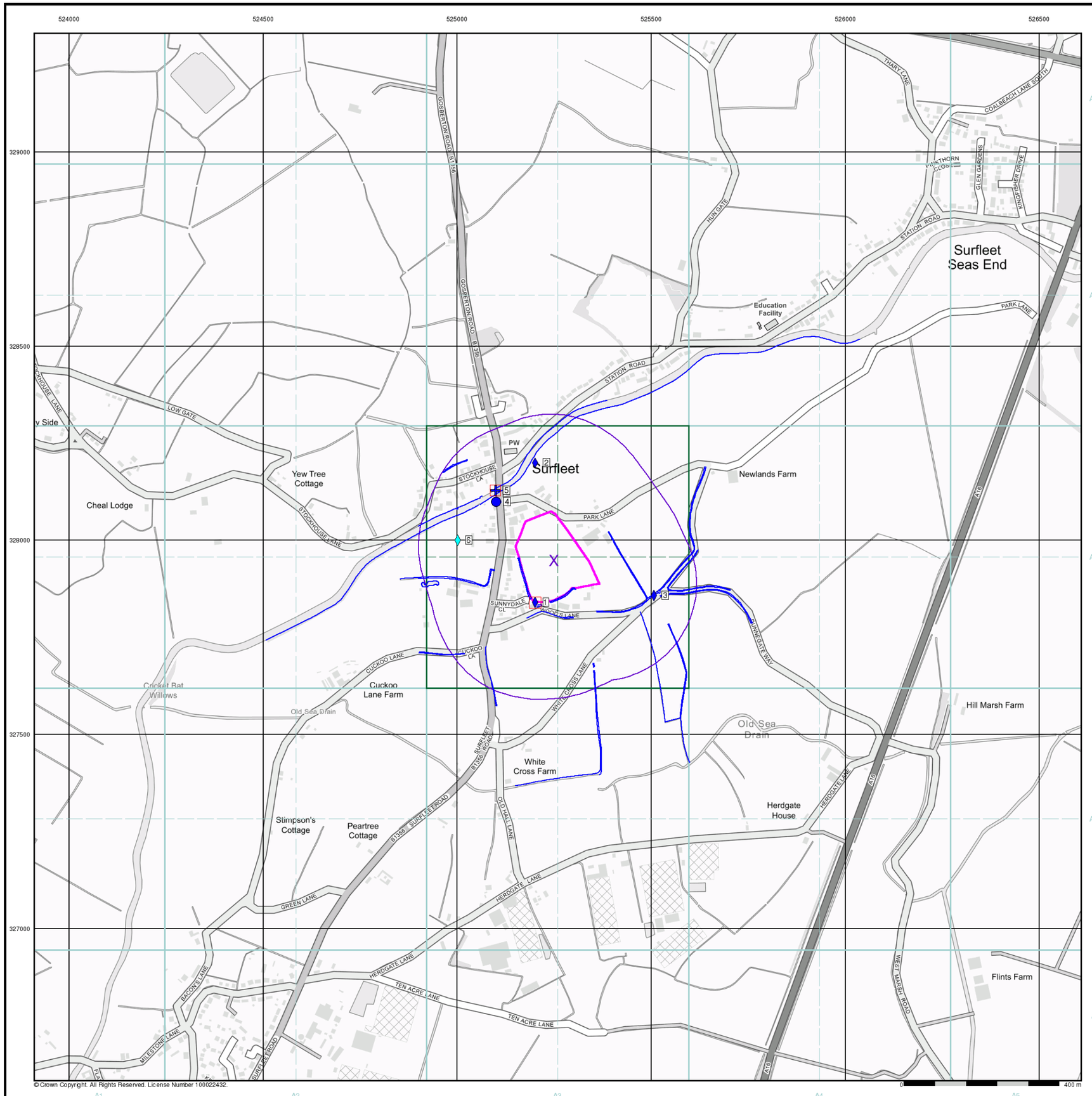

## Order Details

| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Plot Buffer (m): | 100 |

## Site Details

Sunnydale Close, Surfleet

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GeoDyne

## General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

## Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

## Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

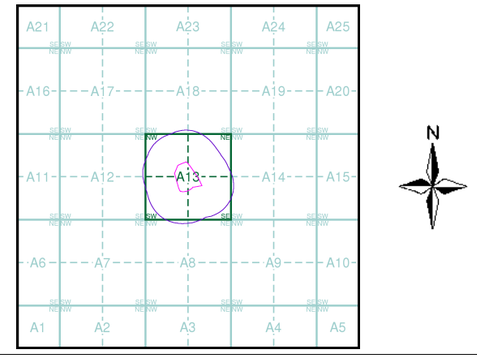
## Geological

- BGS Recorded Mineral Site

## Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
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- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

## Site Sensitivity Map - Slice A




## Order Details

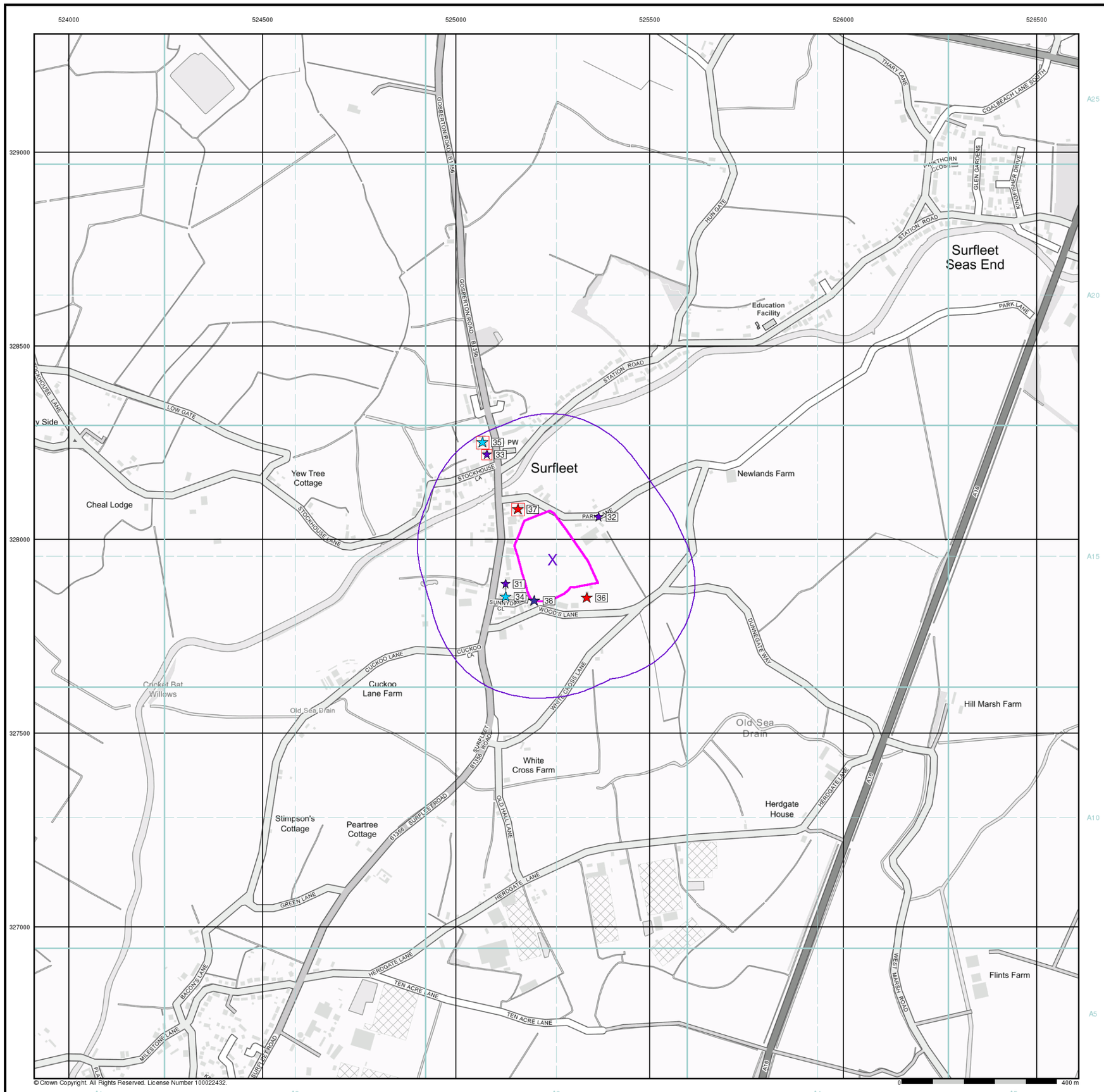
| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

## Site Details

Sunnydale Close, Surfleet


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GeoDyne

# Industrial Land Use Map

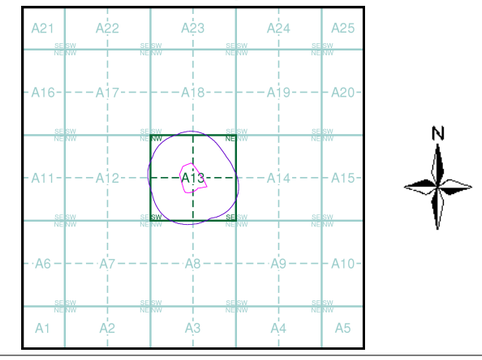
## General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Slice
Map ID

## Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Gas Pipeline
- Points of Interest - Commercial Services
- Points of Interest - Education and Health
- Points of Interest - Manufacturing and Production
- Points of Interest - Public Infrastructure
- Points of Interest - Recreational and Environmental
- Underground Electrical Cables

## Industrial Land Use Map - Slice A



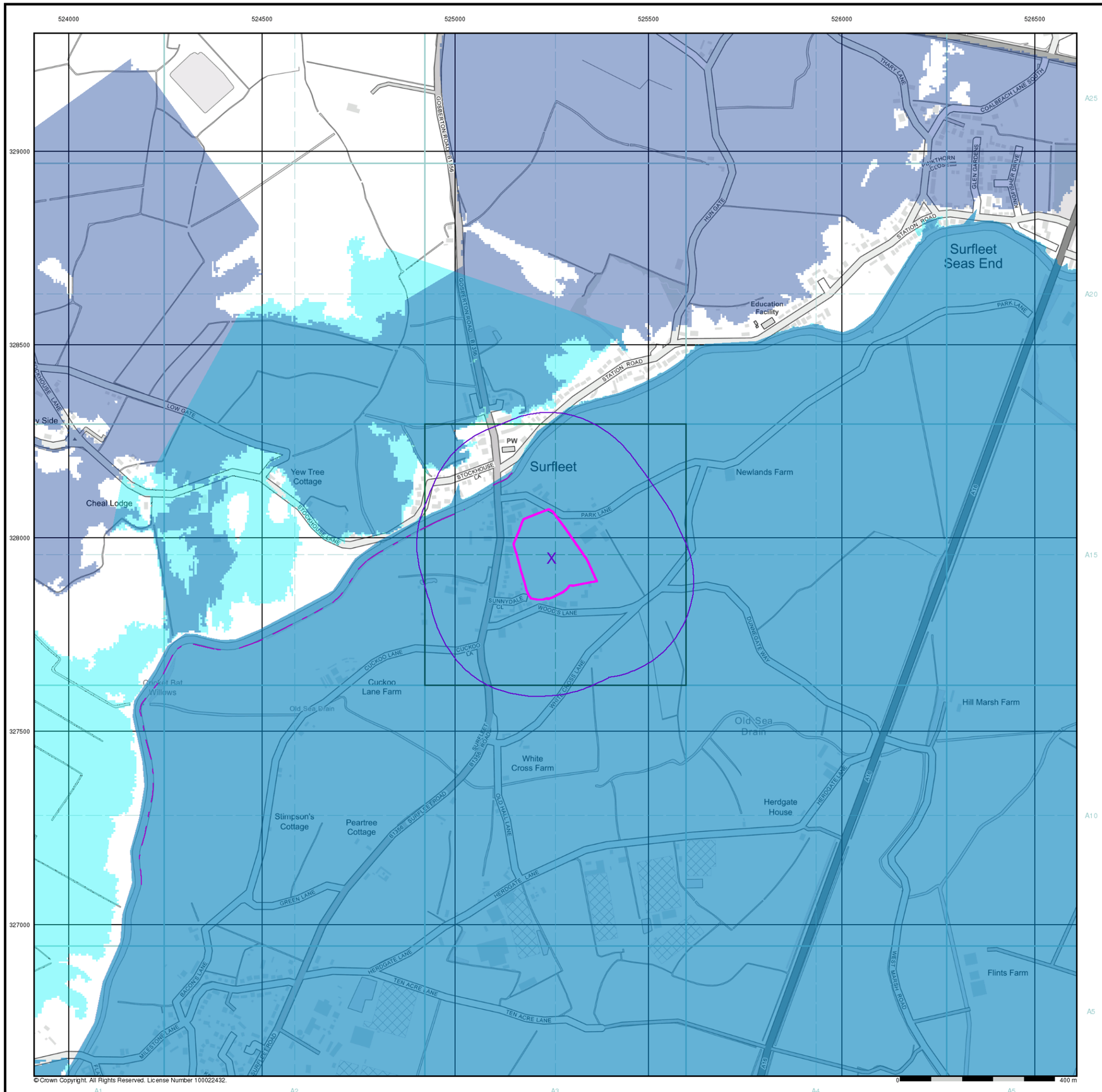

## Order Details

| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
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## Site Details

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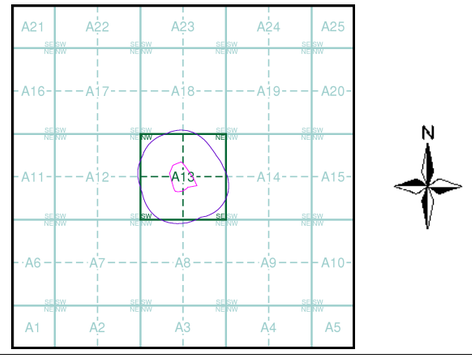
## General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

## Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

## Flood Map - Slice A



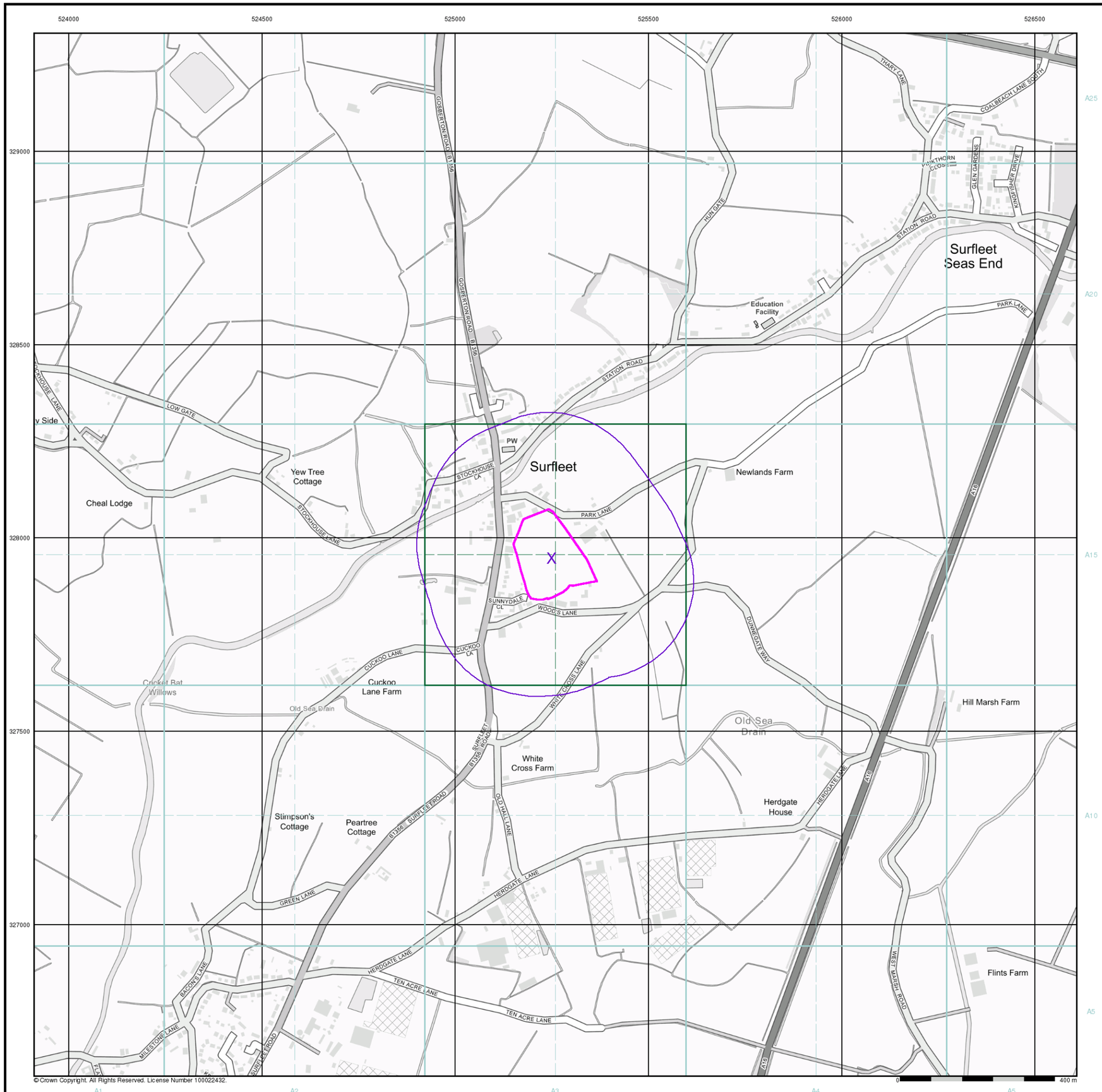

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## Site Details

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GeoDyne

## General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

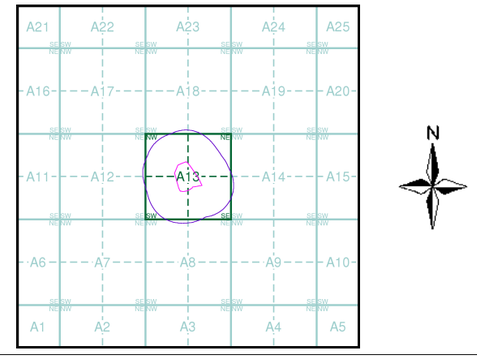
## Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

## Borehole Map - Slice A



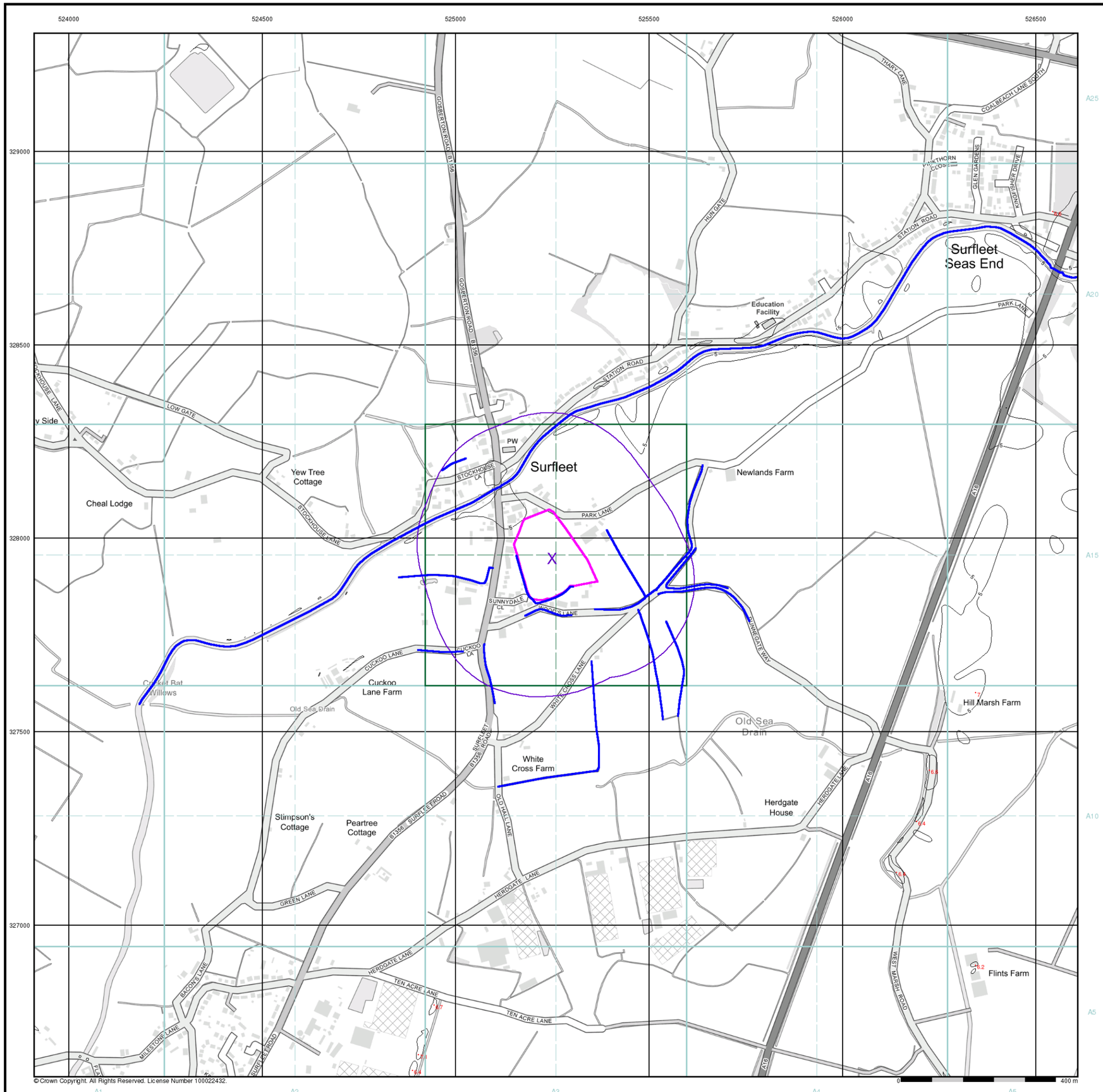

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GeoDyne

## General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

## OS Water Network Data

- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Drain
- Other
- Lake
- Transfer
- Lock Or Flight Of Locks
- Sea

## Contours (height in meters)

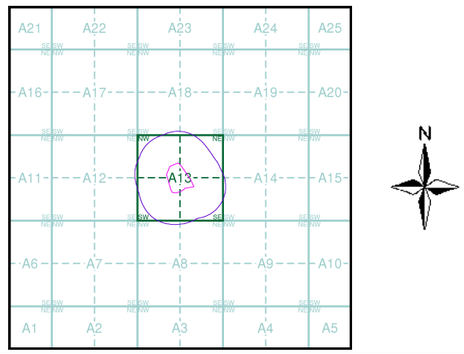
Standard Contour 105 100 95

Master Contour

Spot Height 167.3

- MLW Mean Low Water
- MHW Mean High Water

## OS Water Network Map - Slice A




## Order Details

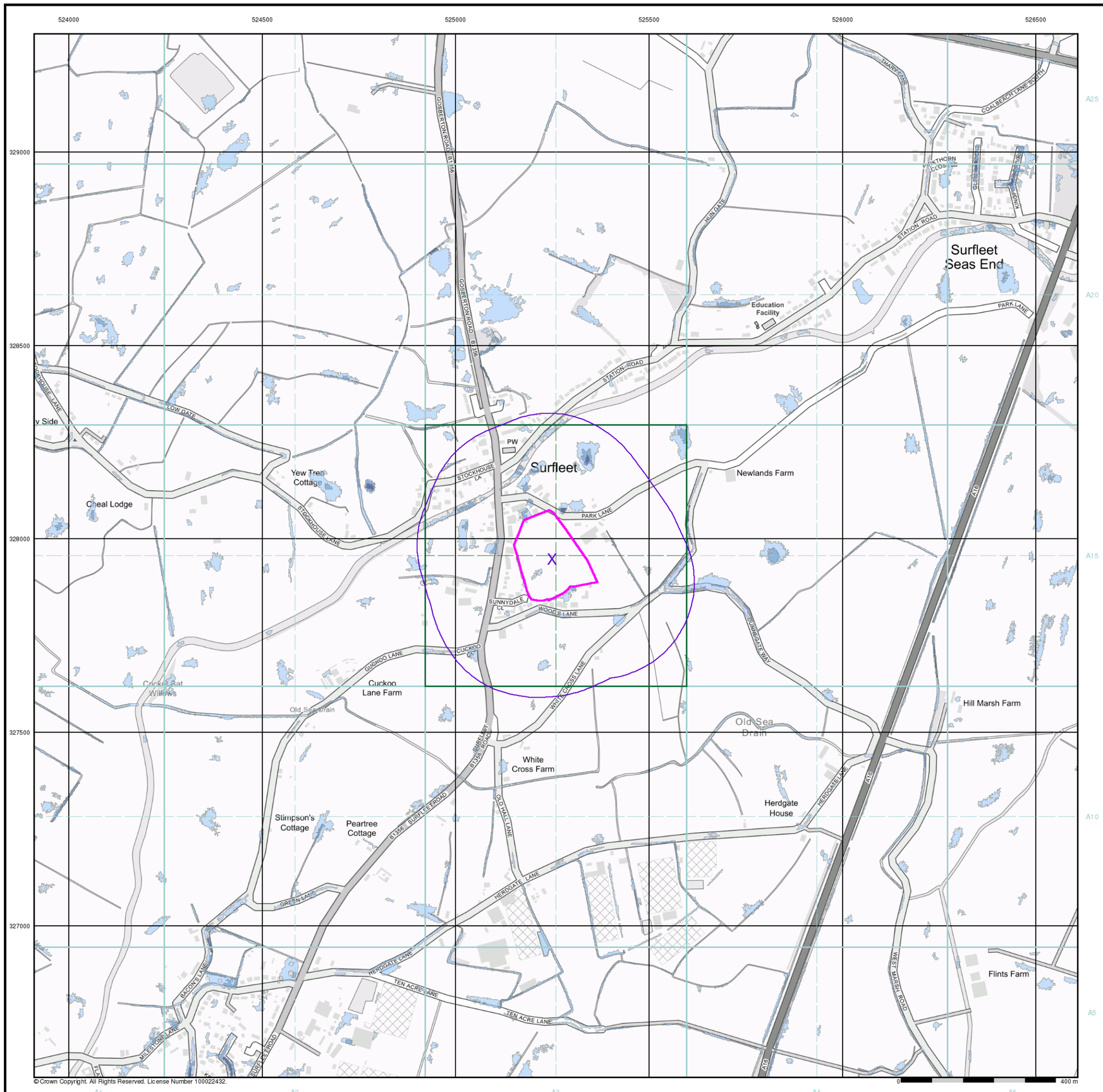
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| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

## Site Details

Sunnydale Close, Surfleet

Landmark INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk




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## General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

## Risk of Flooding from Surface Water

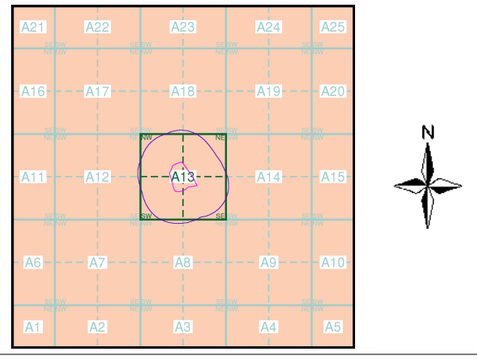
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

## Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

## EA/NRW Suitability Map - Slice A




## Order Details

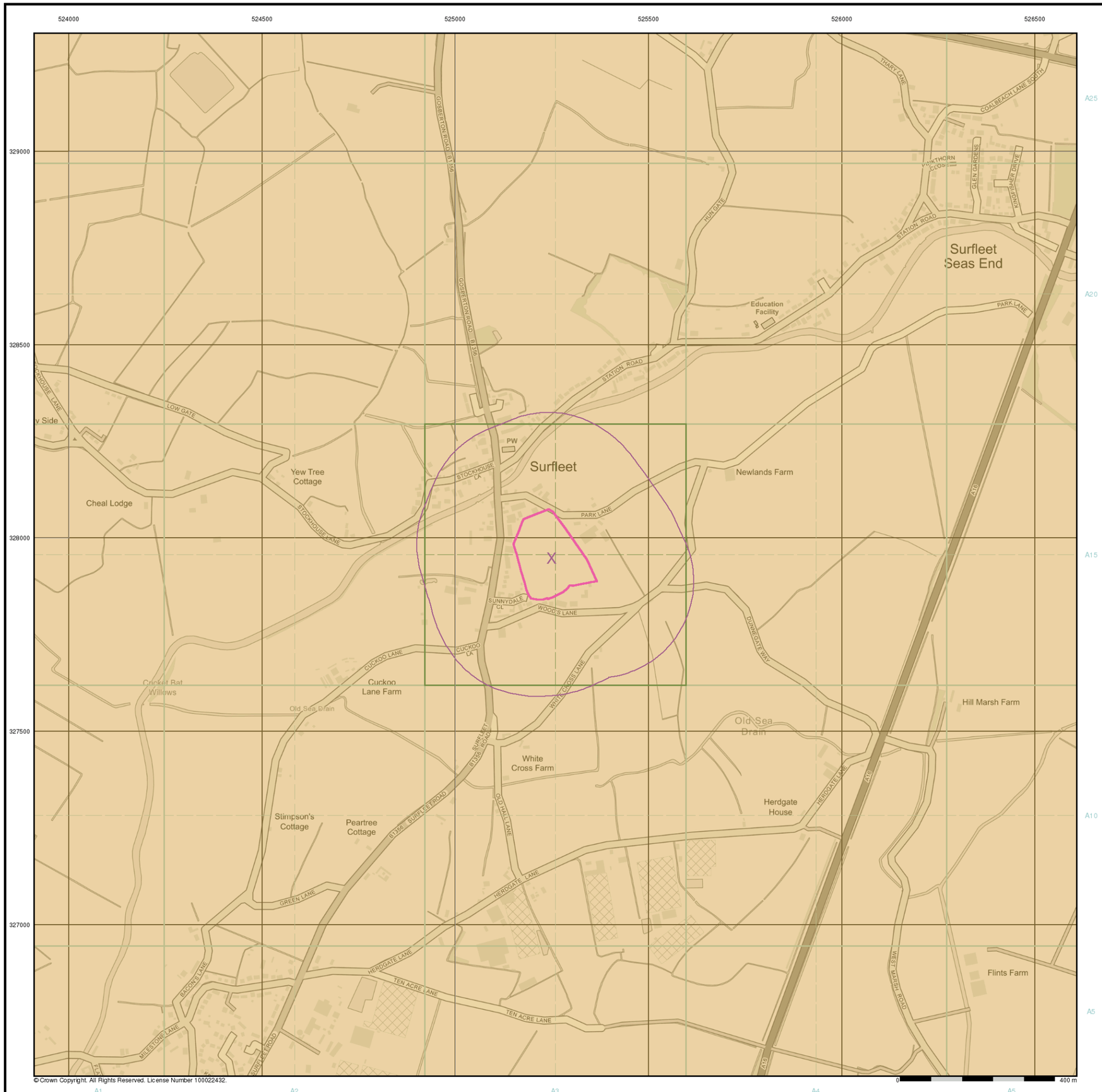
| | |
|---|---|
| Order Number: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

## Site Details

Sunnydale Close, Surfleet


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## General

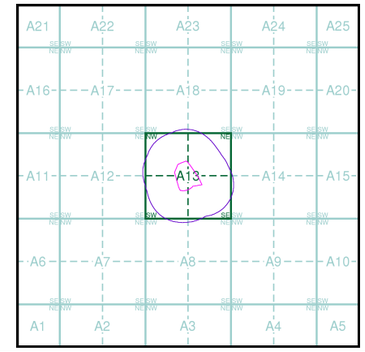
Specified Site | Specified Buffer(s) | X Bearing Reference Point

## Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg

- < 15
- 15 - 25
- 25 - 35
- 35 - 45
- 45 - 60
- 60 - 120
- > 120

## Estimated Soil Chemistry Arsenic - Slice A



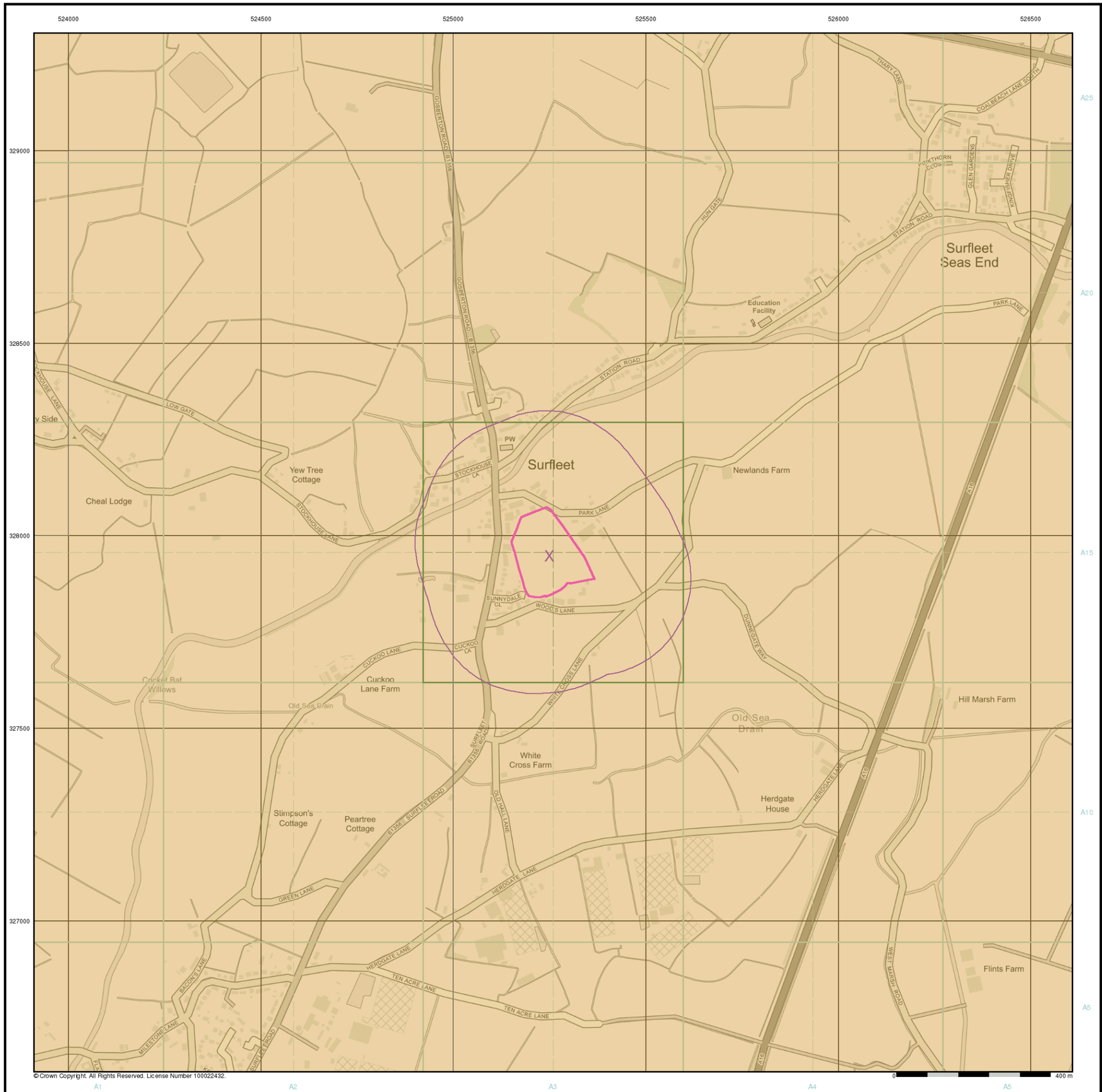

## Order Details

| | |
|---|---|
| Order Details: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

## Site Details

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## General

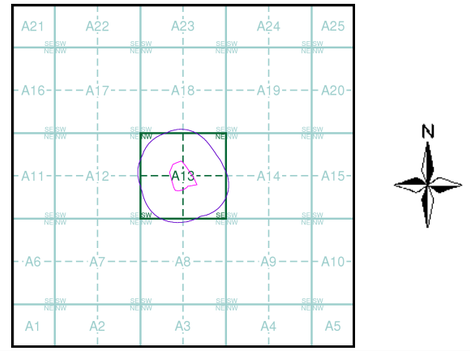
Specified Site | Specified Buffer(s) | X Bearing Reference Point

## Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg

- < 1.8
- 1.8 - 2.2
- 2.2 - 3.0
- > 3.0

## Estimated Soil Chemistry Cadmium - Slice A



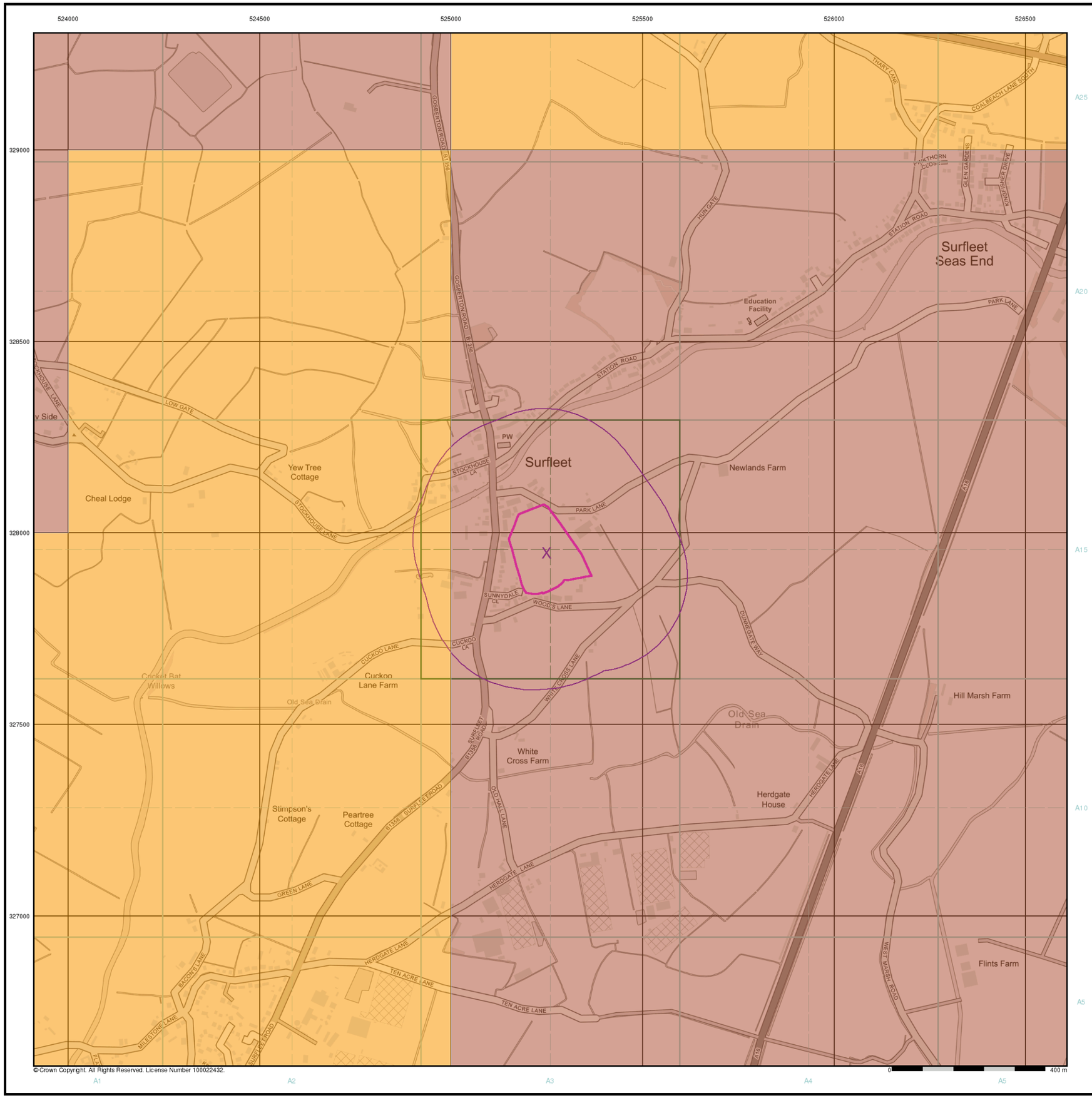

## Order Details

| | |
|---|---|
| Order Details: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

## Site Details

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## General

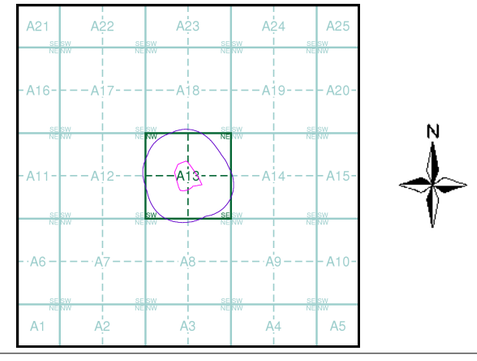
Specified Site | Specified Buffer(s) | X Bearing Reference Point

## Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg

- < 20
- 20 - 40
- 40 - 60
- 60 - 90
- 90 - 120
- 120 - 180
- > 180

## Estimated Soil Chemistry Chromium - Slice A




## Order Details

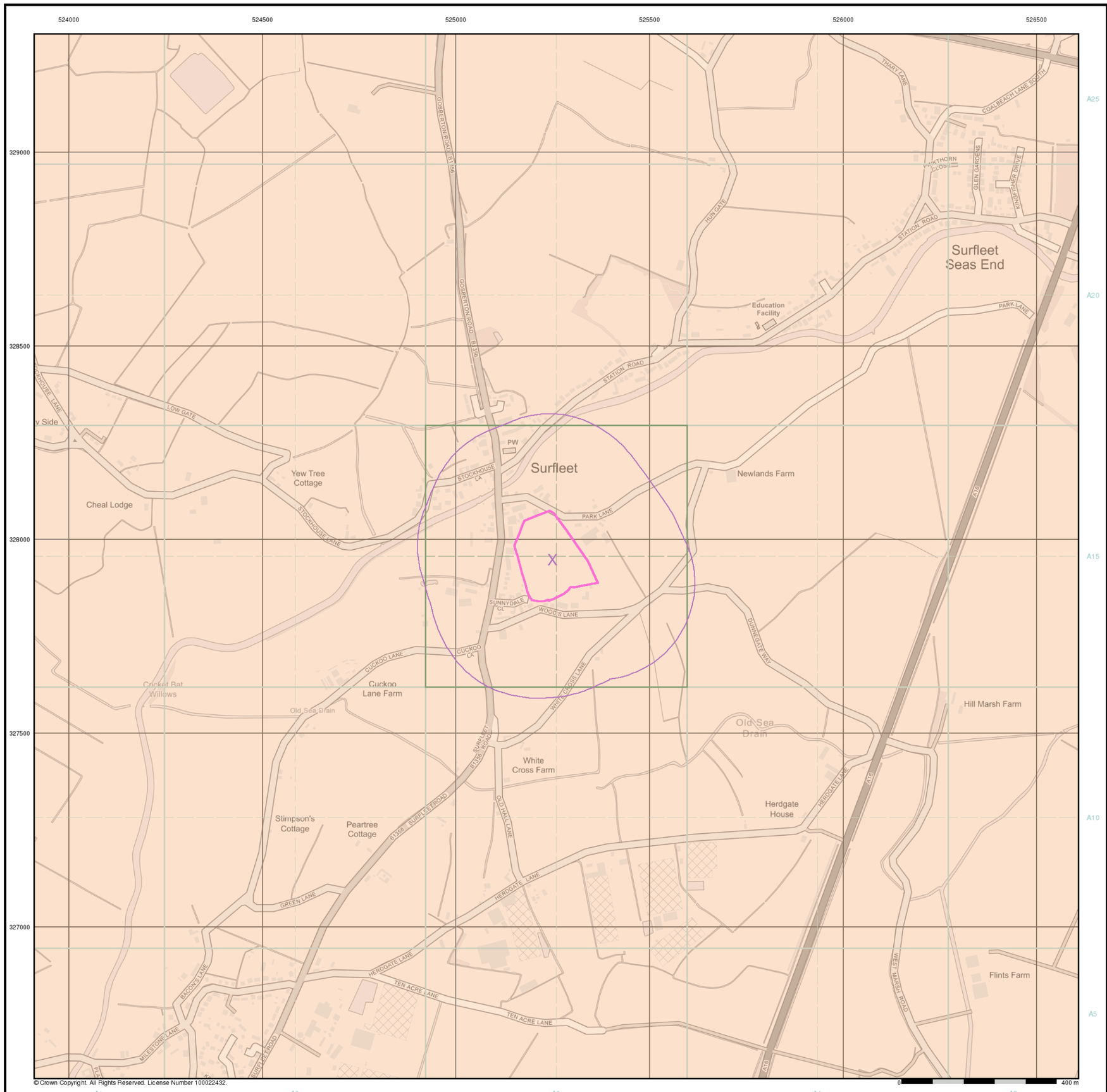
| | |
|---|---|
| Order Details: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

## Site Details

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## General

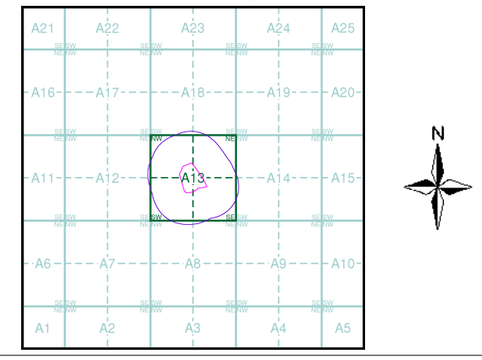
Specified Site | Specified Buffer(s) | X Bearing Reference Point

## Estimated Soil Chemistry Lead

Lead Concentrations mg/kg

- <100 mg/kg
- 100 - 200
- 200 - 300
- 300 - 600
- 600 - 1200
- >1200

## Estimated Soil Chemistry Lead - Slice A



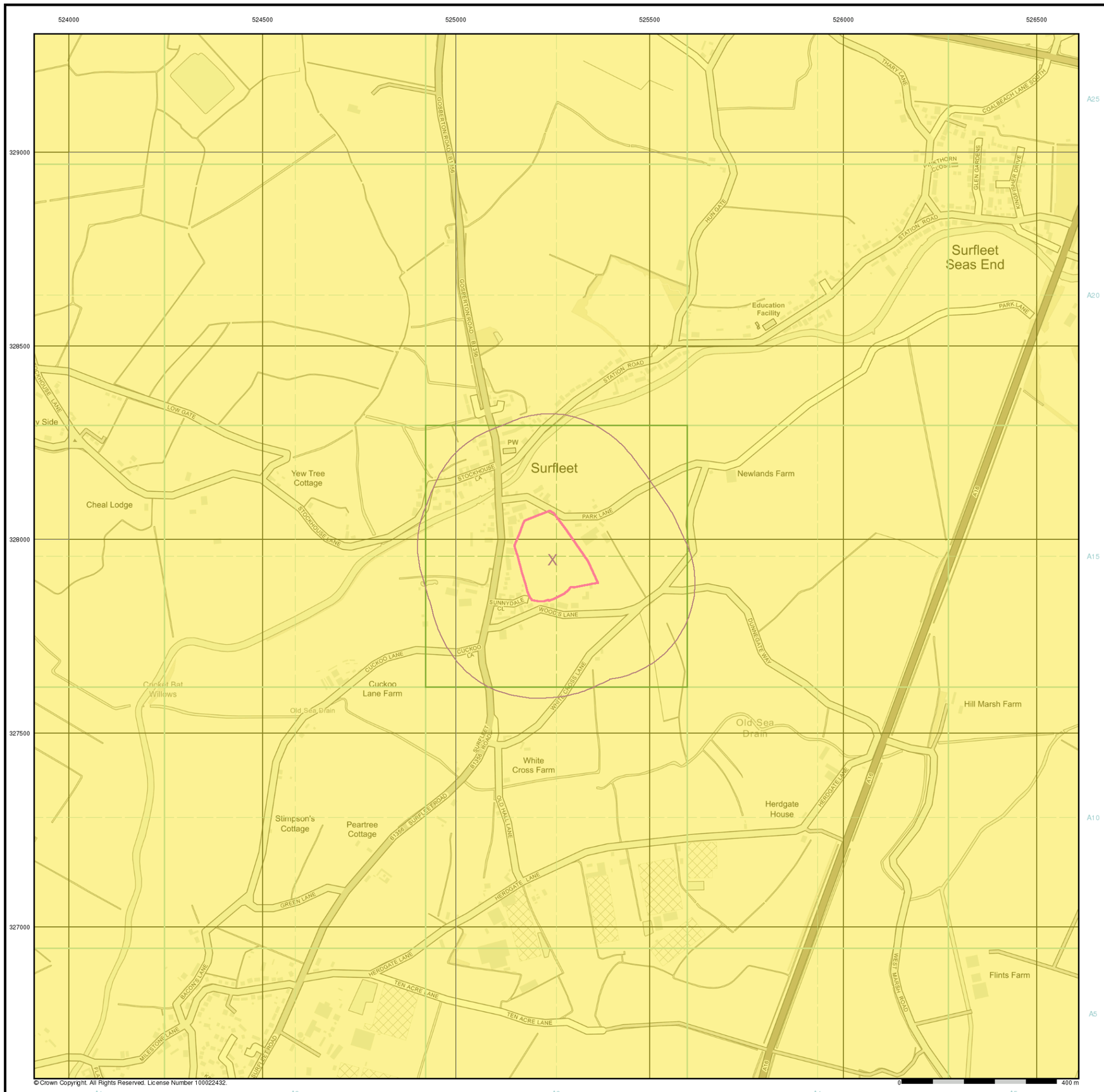

## Order Details

| | |
|---|---|
| Order Details: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

## Site Details

Sunnydale Close, Surfleet

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## General

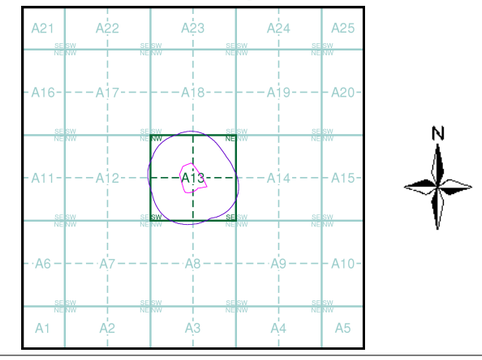
Specified Site | Specified Buffer(s) | X Bearing Reference Point

## Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg

- < 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 80
- 80 - 100
- > 100

## Estimated Soil Chemistry Nickel - Slice A




## Order Details

| | |
|---|---|
| Order Details: | 231991905_1_1 |
| Customer Ref: | D40008 |
| National Grid Reference: | 525250, 327950 |
| Slice: | A |
| Site Area (Ha): | 3.14 |
| Search Buffer (m): | 250 |

## Site Details

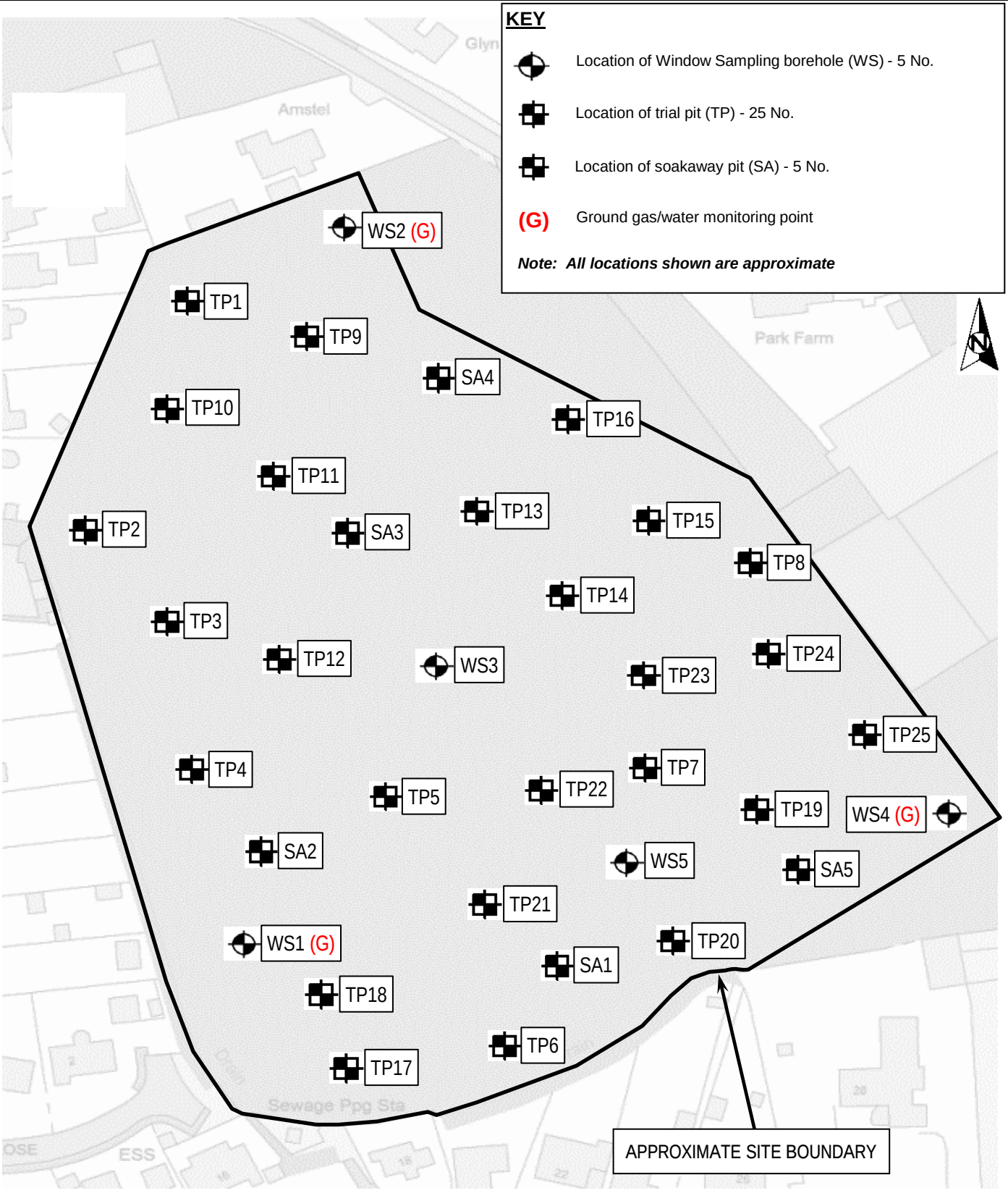
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**APPENDIX VIII**

**Exploratory Hole Location Plan**
**(Figure No. D40008/04)**




Do Not Scale

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| Project | Sunnydale Close<br>Surfleet | Approved | PK |
| | | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| Title | Exploratory Hole Location Plan | Rev. | |
| | | Figure No. | D40008/04 |

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**APPENDIX IX**

**Exploratory Hole Logs**
**(TP1 to TP25, SA1 to SA5, WS1 to WS5)**

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# TP1

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.10 | T1 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.50<br>0.60 | T2 | D | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | |
| End of Trial Pit at 3.20m | | 3.20 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.50m when excavating below 3.00m.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP1 |
| **Date:** 11/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP2

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.40 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.50 | T3 | D | | | |
| ...5mm peat band at 0.80m to 0.85m | | | | | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | |
| | | 2.50 | | | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 2.60 | T4 | D | | | |
| | | 3.00 | | | | | |
| End of Trial Pit at 3.00m | | | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.40m when excavating below 2.60m.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP2 |
| **Date:** 11/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP3

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.20 | T5 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.40 | | | | | |
| | | 0.60 | T6 | D | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.70 | | | | | ▽ |
| End of Trial Pit at 2.80m | | 2.80 | | | | | |

**Remarks:**

1.Partial collapse of western face to 0.40m when excavating below 2.70m.
2.Water encountered at approximately 2.70m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP3 |
| **Date:** 11/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP4

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.30 | T7 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) ...becoming more sandy and greyish brown with depth | | 0.40 | | | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.80 | | | | | ▽ |
| End of Trial Pit at 2.90m | | 2.90 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.20m when excavating below 2.80m.
2.Water encountered at 2.50m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP4 |
| **Date:** 11/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP5

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.20 | T8 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.40<br>0.50 | T9 | D | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | |
| Loose to medium dense grey very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.90 | | | | | |
| End of Trial Pit at 2.90m | | 2.90 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.40m when excavating below 2.60m.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP5 |
| **Date:** 11/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP6

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.30 | T10 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.40 | | | | | |
| | | 0.60 | T11 | D | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.80 | | | | | |
| End of Trial Pit at 3.00m | | 3.00 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.40m when excavating below 2.60m.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| **Project:** | | | **Client:** | |
|---|---|---|---|---|
| **Sunnydale Close, Surfleet** | | | **Ashwood Homes** | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP6 |
| **Date:** 11/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP7

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.10 | T12 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) ...becoming more sandy and greyish brown with depth | | 0.40 | | | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.70 | | | | | ▽ |
| End of Trial Pit at 2.80m | | 2.80 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 1.50m when excavating below 2.80m.
2.Water encountered at 2.60m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP7 |
| **Date:** 11/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP8

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.20 | T13 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.40 | | | | | |
| ...becoming more sandy and greyish brown with depth | | 1.00 | T14 | D | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.90 | | | | | |
| End of Trial Pit at 3.10m | | 3.10 | | | | | |

**Remarks:**
1.Sides generally stable.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP8 |
| **Date:** 11/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP9

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.40 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.60 - 1.10 | LB1 | LB | | | |
| | | 1.00 - 1.50 | B1 | B | | | |
| End of Trial Pit at 2.60m | | 2.60 | | | | | |

**Remarks:**
1.Sides generally stable.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| **Project:** | | | **Client:** | |
|---|---|---|---|---|
| **Sunnydale Close, Surfleet** | | | **Ashwood Homes** | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP9 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP10

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.10 | T16 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.30 | | | | | |
| ...firm to stiff grey slightly silty clay band from 1.30m to 1.40m | | | | | | | |
| End of Trial Pit at 2.90m | | 2.90 | | | | | |

**Remarks:**
1.Sides generally stable.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP10 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP11

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.40 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | | | | |
| | | 0.60 | T17 | D | | | |
| Firm brown mottled orange slightly sandy very silty CLAY (TIDAL FLAT DEPOSITS) | | 1.50 - 2.50 | B2 | B | | | |
| | | 1.50 | | | | | |
| | | 2.40 | | | | | ▽ |
| Firm dark grey slightly clayey slightly sandy SILT (TIDAL FLAT DEPOSITS) | | | | | | | |
| End of Trial Pit at 3.00m | | 3.00 | | | | | |

**Remarks:**
1.Sides generally stable.
2.Water encountered at 2.60m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP11 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP12

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.40 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | | | | |
| | | 0.70 - 1.20 | LB2 | LB | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | |
| | | 1.70 - 2.20 | B3 | B | | | ▽ |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.70 | | | | | |
| | | 3.00 | | | | | |
| End of Trial Pit at 3.00m | | | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.40m when excavating below 2.60m.
2.Water encountered at 1.70m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP12 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP13

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.10 | T18 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.40<br>0.50 | T19 | D | | | |
| Firm dark grey slightly clayey slightly sandy SILT (TIDAL FLAT DEPOSITS) | | 2.20 | | | | | |
| End of Trial Pit at 3.40m | | 3.40 | | | | | |

**Remarks:**
1.Partial collapse of eastern face when excavating below 3.10m.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP13 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP14

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.20 | T20 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.30 | | | | | |
| Firm dark grey clayey SILT with occasional complete shells (TIDAL FLAT DEPOSITS) | | 1.30 | | | | | |
| ...becoming more clayey with depth | | 1.50 | T21 | D | | | |
| Soft to firm dark grey silty CLAY with occasional complete shells (TIDAL FLAT DEPOSITS) | | 2.30 | | | | | |
| End of Trial Pit at 3.00m | | 3.00 | | | | | |

**Remarks:**
1.Sides generally stable.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP14 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP15

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.10 | T22 | D | | | |
| | | 0.30 | | | | | |
| Firm brown slightly sandy very clayey SILT (TIDAL FLAT DEPOSITS) | | 0.45 - 0.95 | LB3 | LB | | | |
| ...becoming more sandy with depth | | | | | | | |
| Firm dark grey slightly clayey occasionally very clayey slightly sandy SILT (TIDAL FLAT DEPOSITS) | | 2.60 | | | | | |
| End of Trial Pit at 3.20m | | 3.20 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 1.60m when excavating below 3.10m.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP15 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP16

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.30 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.50 | T23 | D | | | |
| Firm dark grey slightly clayey slightly sandy SILT (TIDAL FLAT DEPOSITS) | | 3.20 | | | | | |
| End of Trial Pit at 3.50m | | 3.50 | | | | | |

**Remarks:**
1.Sides generally stable.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP16 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP17

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.30 | T24 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.40 | | | | | |
| ...becoming more sandy and greyish brown with depth | | 1.00 - 1.50 | B4 | B | | | |
| End of Trial Pit at 2.80m | | 2.80 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.30m when excavating below 2.60m.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP17 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP18

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.20 | T25 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.40 | | | | | |
| | | 0.60 - 1.10 | LB4 | LB | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | ▽ |
| End of Trial Pit at 1.90m | | 1.90 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.10m when excavating below 1.80m.
2.Water encountered at 1.70m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP18 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP19

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.30 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.55 - 1.05 | LB5 | LB | | | |
| | | 0.60 | T26 | D | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | |
| ...frequent orange discolouration at 1.50m to 1.70m | | | | | | | ▽ |
| End of Trial Pit at 2.40m | | 2.40 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.10m when excavating below 1.90m.
2.Water encountered at 1.90m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP19 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP20

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.10 | T27 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.30 | | | | | |
| | | 0.50 | T28 | D | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | |
| ...frequent orange discolouration at 1.20m to 1.30m | | | | | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.80 | | | | | |
| End of Trial Pit at 2.30m | | 2.30 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.30m when excavating below 2.00m.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP20 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP21

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.40 | | | | | |
| Firm light brown very silty CLAY (TIDAL FLAT DEPOSITS) | | 0.50 | T29 | D | | | |
| | | 1.00 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) ...becoming more sandy and greyish brown with depth | | | | | | | |
| | | 1.80 | | | | | |
| End of Trial Pit at 1.80m | | | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.10m when excavating below 1.70m.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP21 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP22

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.10 | T30 | D | | | |
| Firm light brown very silty CLAY (TIDAL FLAT DEPOSITS) | | 0.30 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS)<br>...becoming more sandy and greyish brown with depth | | 0.70 | T31 | D | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.80 | | | | | |
| End of Trial Pit at 2.30m | | 2.30 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.20m when excavating below 2.00m.
2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP22 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP23

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.30 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.80 - 1.30 | B5 | B | | | |
| ...becoming more sandy and greyish brown with depth | | 1.90 | | | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | | | | | | ▽ |
| End of Trial Pit at 3.00m | | 3.00 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.30m when excavating below 2.90m.
2.Water encountered at 2.40m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP23 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP24

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | 0.10 | T32 | D | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.40<br>0.50 | T33 | D | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.50 | | | | | ▽ |
| End of Trial Pit at 2.60m | | 2.60 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 0.30m when excavating below 2.50m.
2.Water encountered at 2.30m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP24 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# TP25

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.30 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | |
| | | 1.70 | T34 | D | | | |
| Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 2.10 | | | | | ▽ |
| End of Trial Pit at 3.10m | | 3.10 | | | | | |

**Remarks:**

1.Trial pit sides collapsing to 1.60m when excavating below 2.70m.
2.Water encountered at 2.60m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** TP25 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# SA1

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.40 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | | | | |
| | | 0.70 | | | | | |
| End of Trial Pit at 0.70m | | | | | | | |

**Remarks:**

1.Sides generally stable.
2.No water encountered.
3.Pit dimensions: 0.60m wide x 1.20m long x 0.70m deep

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** SA1 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# SA2

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.40 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | | | | |
| | | 1.60 | | | | | |
| Soft to firm dark grey silty organic CLAY with occasional plant remains (TIDAL FLAT DEPOSITS) | | 1.70 | T15 | D | | | |
| | | 1.90 | | | | | |
| End of Trial Pit at 1.90m | | | | | | | |

**Remarks:**

1.Sides generally stable.
2.No water encountered.
3.Pit dimensions: 0.60m wide x 1.30m long x 1.90m deep

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** SA2 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# SA3

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.40 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | | | | |
| | | 0.80 | | | | | |
| End of Trial Pit at 0.80m | | | | | | | |

**Remarks:**

1.Sides generally stable.
2.No water encountered.
3.Pit dimensions: 0.60m wide x 1.10m long x 0.80m deep

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** SA3 |
| **Date:** 12/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# SA4

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.40 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | | | | |
| ...occasional interbedded very silty clay layers, typically from 1.60m | | | | | | | |
| End of Trial Pit at 1.90m | | 1.90 | | | | | |

**Remarks:**

1.Sides generally stable.
2.No water encountered.
3.Pit dimensions: 0.60m wide x 1.40m long x 1.90m deep

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** SA4 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# SA5

**Project No:** D40008

Sheet 1 of 1

| Description of Strata | Legend | Depth (m) | Sample Ref | Sample Type | Field Test Type | Field Test Result | Ground-water |
|---|---|---|---|---|---|---|---|
| Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | | | | | | |
| | | 0.40 | | | | | |
| Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | | | | |
| ...becoming more sandy and greyish brown with depth | | | | | | | ▽ |
| End of Trial Pit at 1.80m | | 1.80 | | | | | |

**Remarks:**

1.Soakaway sides partially collapsing to 1.60m when excavating below 1.70m.
2.Water encountered at 1.70m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample ▽ = Water Strike (m) ▼ = Steady Water Level (m)

| | | | | |
|---|---|---|---|---|
| **Project:** Sunnydale Close, Surfleet | | | **Client:** Ashwood Homes | |
| **Logged:** CB | **Checked:** PK | **Field Book Ref:** CB20/01 | **Plant:** JCB 3CX | **Drawing No.** SA5 |
| **Date:** 13/02/2020 | **Approved:** PK | | **Scale:** 1:25 | |

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# WS1

Project No. D40008

Sheet 1 of 1

| Samples and Tests | | | | Description of Strata | Legend | Depth & (Thickness) (m) | Casing (m) | Ground-water | Installation |
|---|---|---|---|---|---|---|---|---|---|
| Depth (m) | Type | Sample Ref | SPT "N" Value | | | | | | |
| 0.20 | D/J | TJ35 | | Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | (0.40) | | | |
| | | | | | | 0.40 | | | |
| | | | | Firm light brown very silty CLAY (TIDAL FLAT DEPOSITS) | | (0.30) | | | |
| | | | | | | 0.70 | | | |
| 1.00 - 1.45 | C | | 7 | Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | ▽ | |
| 1.00 - 1.50 | B | B6 | | | | (1.30) | | | |
| 2.00 - 2.45 | C | | 0 | | | 2.00 | | | |
| | | | | Very loose becoming loose grey very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | | | | |
| 3.00 - 3.45 | C | | 8 | | | (2.00) | | | |
| 4.00 - 4.45 | C | | 5 | | | 4.00 | 4.00 | | |
| | | | | End of Borehole at 4.00m | | | | | |

**Remarks**

1.Borehole cased to 4.00m to prevent collapse.
2.Water encountered at 1.00m.
3.Plain pipe installed from ground level to 1.00m in a bentonite surround. Slotted pipe installed from 1.00m to 4.00m in a gravel surround.
4.Bung, valve and lockable cover.

**Key**

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
▽ = Water Strike (m)
▼ = Steady Water Level (m)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project:** | Sunnydale Close, Surfleet | | | **Client:** | Ashwood Homes | | |
| **Logged:** | CB | **Checked:** | PK | **Field Book Ref:** | **Plant:** | Competitor Rig | **Drawing Ref:** |
| **Date:** | 14/02/2020 | **Approved:** | PK | CB20/01 | **Scale:** | 1:25 | WS1 |

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# WS2

Project No. D40008

Sheet 1 of 1

| Samples and Tests | | | | Description of Strata | Legend | Depth & (Thickness) (m) | Casing (m) | Ground-water | Installation |
|---|---|---|---|---|---|---|---|---|---|
| Depth (m) | Type | Sample Ref | SPT "N" Value | | | | | | |
| 0.10 | D/J | TJ36 | | Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | (0.30) | | | |
| | | | | | | 0.30 | | | |
| | | | | Firm light brown very silty CLAY (TIDAL FLAT DEPOSITS) | | | | | |
| | | | | | | 0.50 | | | |
| | | | | Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | | |
| 1.00 - 1.45 | C | | 13 | | | | | | |
| | | | | | | (1.40) | | | |
| 1.40 - 1.60 | B | B7 | | ...very silty clay between 1.40m and 1.60m | | | | | |
| | | | | | | 1.90 | | | |
| 2.00 - 2.45 | C | | 8 | Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | | | | |
| | | | | | | (2.10) | | | |
| 3.00 - 3.45 | C | | 9 | | | | | | |
| 4.00 - 4.45 | C | | 12 | End of Borehole at 4.00m | | 4.00 | 4.00 | | |

**Remarks**

1.Borehole cased to 4.00m to prevent collapse.
2.Water encountered at 2.10m.
3.Plain pipe installed from ground level to 1.00m in a bentonite surround. Slotted pipe installed from 1.00m to 3.50m in a gravel surround.
4.Bung, valve and lockable cover.

**Key**

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
= Water Strike (m)
= Steady Water Level (m)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project:** | Sunnydale Close, Surfleet | | | **Client:** | Ashwood Homes | | |
| **Logged:** | CB | **Checked:** | PK | **Field Book Ref:** | **Plant:** | Competitor Rig | **Drawing Ref:** |
| **Date:** | 14/02/2020 | **Approved:** | PK | CB20/01 | **Scale:** | 1:25 | WS2 |

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# WS3

Project No. D40008

Sheet 1 of 1

| Samples and Tests | | | | Description of Strata | Legend | Depth & (Thickness) (m) | Casing (m) | Ground-water | Installation |
|---|---|---|---|---|---|---|---|---|---|
| Depth (m) | Type | Sample Ref | SPT "N" Value | | | | | | |
| | | | | Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | (0.40) | | | |
| | | | | Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.40 | | | |
| 1.00 - 1.45 | C | | 8 | | | (1.10) | | | |
| 1.50 - 2.00 | B | B8 | | Firm grey mottled brown very silty CLAY with occasional shell fragments (TIDAL FLAT DEPOSITS) | | 1.50 | | | |
| 1.60 | D | T37 | | | | | | | |
| 2.00 - 2.45 | C | | 0 | ...soft from 2.00m | | (0.90) | | | |
| | | | | Very soft dark grey slightly sandy very silty organic CLAY (TIDAL FLAT DEPOSITS) | | 2.40 | | | |
| | | | | | | (0.40) | | | |
| | | | | Firm dark grey slightly sandy silty organic CLAY (TIDAL FLAT DEPOSITS) | | 2.80 | | | |
| 3.00 - 3.45 | C | | 12 | End of Borehole at 3.00m | | 3.00 | 3.00 | | |

**Remarks**

1.Borehole cased to 3.00m to prevent collapse.
2.No water encountered.

**Key**

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
= Water Strike (m)
= Steady Water Level (m)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project:** | Sunnydale Close, Surfleet | | | **Client:** | Ashwood Homes | | |
| **Logged:** | CB | **Checked:** | PK | **Field Book Ref:** | **Plant:** | Competitor Rig | **Drawing Ref:** |
| **Date:** | 14/02/2020 | **Approved:** | PK | CB20/01 | **Scale:** | 1:25 | WS3 |

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# WS4

Project No. D40008

Sheet 1 of 1

| Samples and Tests | | | | Description of Strata | Legend | Depth & (Thickness) (m) | Casing (m) | Ground-water | Installation |
|---|---|---|---|---|---|---|---|---|---|
| Depth (m) | Type | Sample Ref | SPT "N" Value | | | | | | |
| 0.20 | D/J | TJ38 | | Brown slightly sandy clayey very silty TOPSOIL (TOPSOIL) | | (0.40) | | | |
| | | | | | | 0.40 | | | |
| 0.70 - 1.00 | B | B9 | | Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | | | | |
| 1.00 - 1.45 | C | | 8 | | | (1.40) | | ▽ | |
| | | | | | | 1.80 | | | |
| 2.00 - 2.45 | C | | 4 | Very loose to loose dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | | | | |
| 3.00 - 3.45 | C | | 2 | | | (2.20) | | | |
| 4.00 - 4.45 | C | | 8 | | | 4.00 | 4.00 | | |
| | | | | End of Borehole at 4.00m | | | | | |

**Remarks**

1.Borehole cased to 4.00m to prevent collapse.
2.Water encountered at 1.10m.
3.Plain pipe installed from ground level to 1.00m in a bentonite surround. Slotted pipe installed from 1.00m to 4.00m in a gravel surround.
4.Bung, valve and lockable cover.

**Key**

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
▽ = Water Strike (m)
▼ = Steady Water Level (m)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project:** | Sunnydale Close, Surfleet | | | **Client:** | Ashwood Homes | | |
| **Logged:** | CB | **Checked:** | PK | **Field Book Ref:** | **Plant:** | Competitor Rig | **Drawing Ref:** |
| **Date:** | 14/02/2020 | **Approved:** | PK | CB20/01 | **Scale:** | 1:25 | WS4 |

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# WS5

Project No. D40008

Sheet 1 of 1

| Samples and Tests | | | | Description of Strata | Legend | Depth & (Thickness) (m) | Casing (m) | Ground-water | Installation |
|---|---|---|---|---|---|---|---|---|---|
| Depth (m) | Type | Sample Ref | SPT "N" Value | | | | | | |
| 0.10 | D/J | TJ39 | | Brown slightly sandy clayey very silty TOPSOIL (TIDAL FLAT DEPOSITS) | | (0.50) | | | |
| | | | | Firm brown slightly sandy clayey SILT (TIDAL FLAT DEPOSITS) | | 0.50 | | | |
| 1.00 - 1.45 | C | | 8 | | | (0.90) | | ▽ | |
| 1.40 - 1.70 | B | B10 | | Loose to medium dense greyish brown very silty predominantly fine grained SAND (TIDAL FLAT DEPOSITS) | | 1.40 | | | |
| 2.00 - 2.45 | C | | 13 | | | (1.60) | | | |
| 3.00 - 3.45 | C | | 7 | End of Borehole at 3.00m | | 3.00 | 3.00 | | |

**Remarks**
1.Borehole cased to 3.00m to prevent collapse.
2.Water encountered at 1.00m.

**Key**
D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample
S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
▽ = Water Strike (m)
▼ = Steady Water Level (m)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project:** | Sunnydale Close, Surfleet | | | **Client:** | Ashwood Homes | | |
| **Logged:** | CB | **Checked:** | PK | **Field Book Ref:** | **Plant:** | Competitor Rig | **Drawing Ref:** |
| **Date:** | 14/02/2020 | **Approved:** | PK | CB20/01 | **Scale:** | 1:25 | WS5 |

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# APPENDIX X

## Plates




| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Trial Pit TP1 | Plate No. | 1 |

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Recovered Arisings from Trial Pit TP1 | Plate No. | 2 |

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Trial Pit TP3 | Plate No. | 3 |

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Recovered Arisings from Trial Pit TP3 | Plate No. | 4 |

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Trial Pit TP9 | Plate No. | 5 |

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Recovered Arisings from Trial Pit TP9 | Plate No. | 6 |

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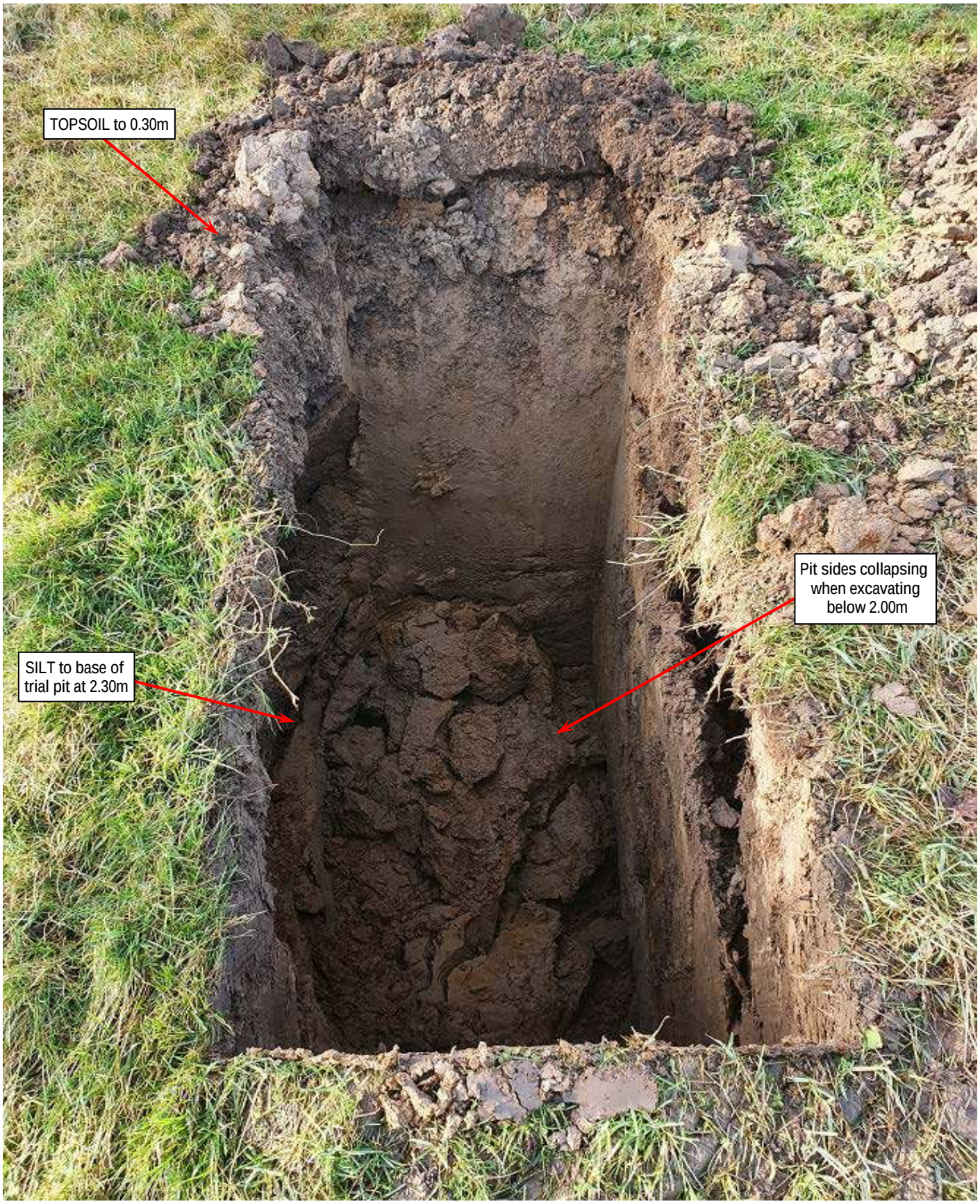

| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Trial Pit TP17 | Plate No. | 7 |

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Recovered Arisings from Trial Pit TP17 | Plate No. | 8 |

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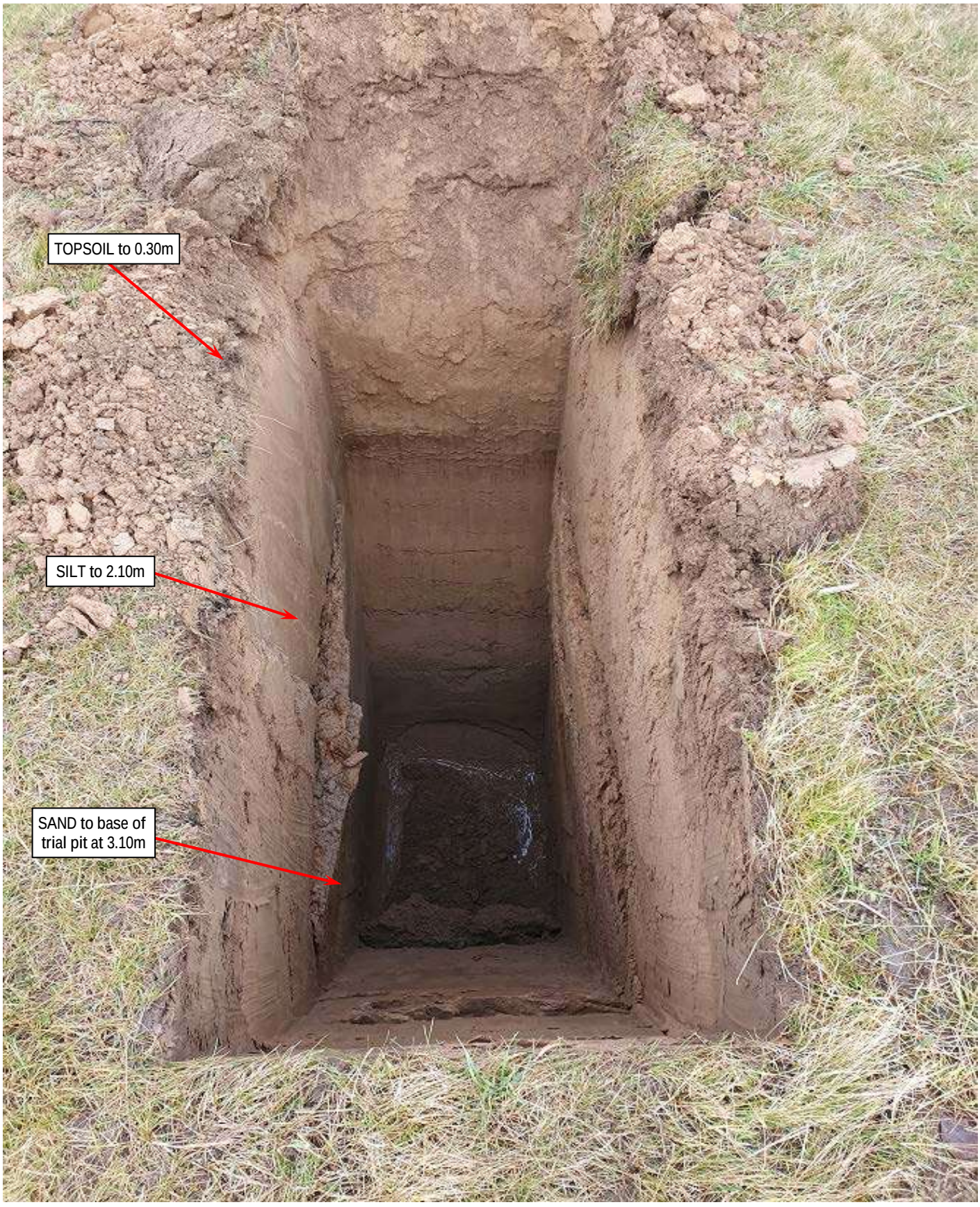

| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Trial Pit TP20 | Plate No. | 9 |

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Recovered Arisings from Trial Pit TP20 | Plate No. | 10 |

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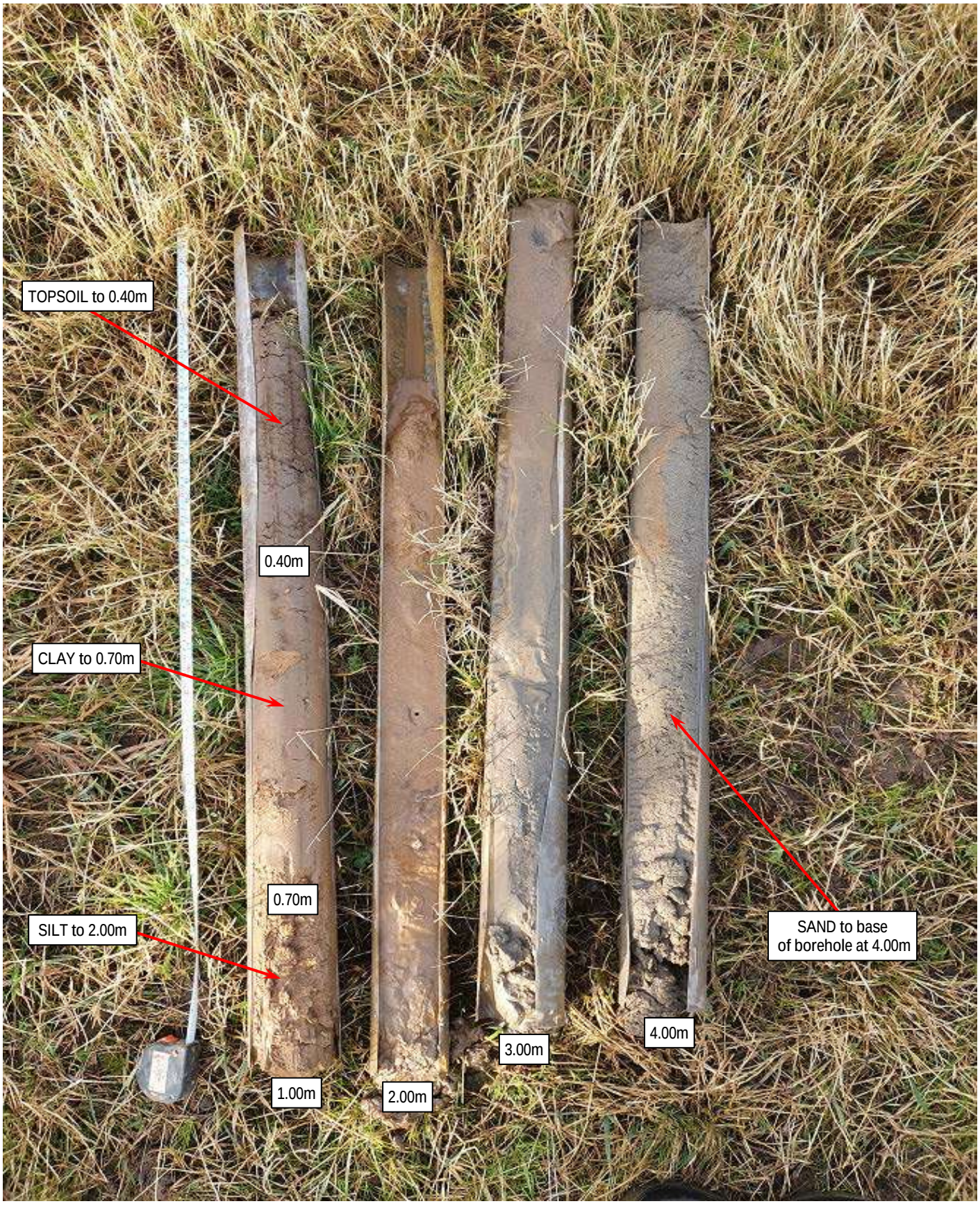

| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Trial Pit TP25 | Plate No. | 11 |

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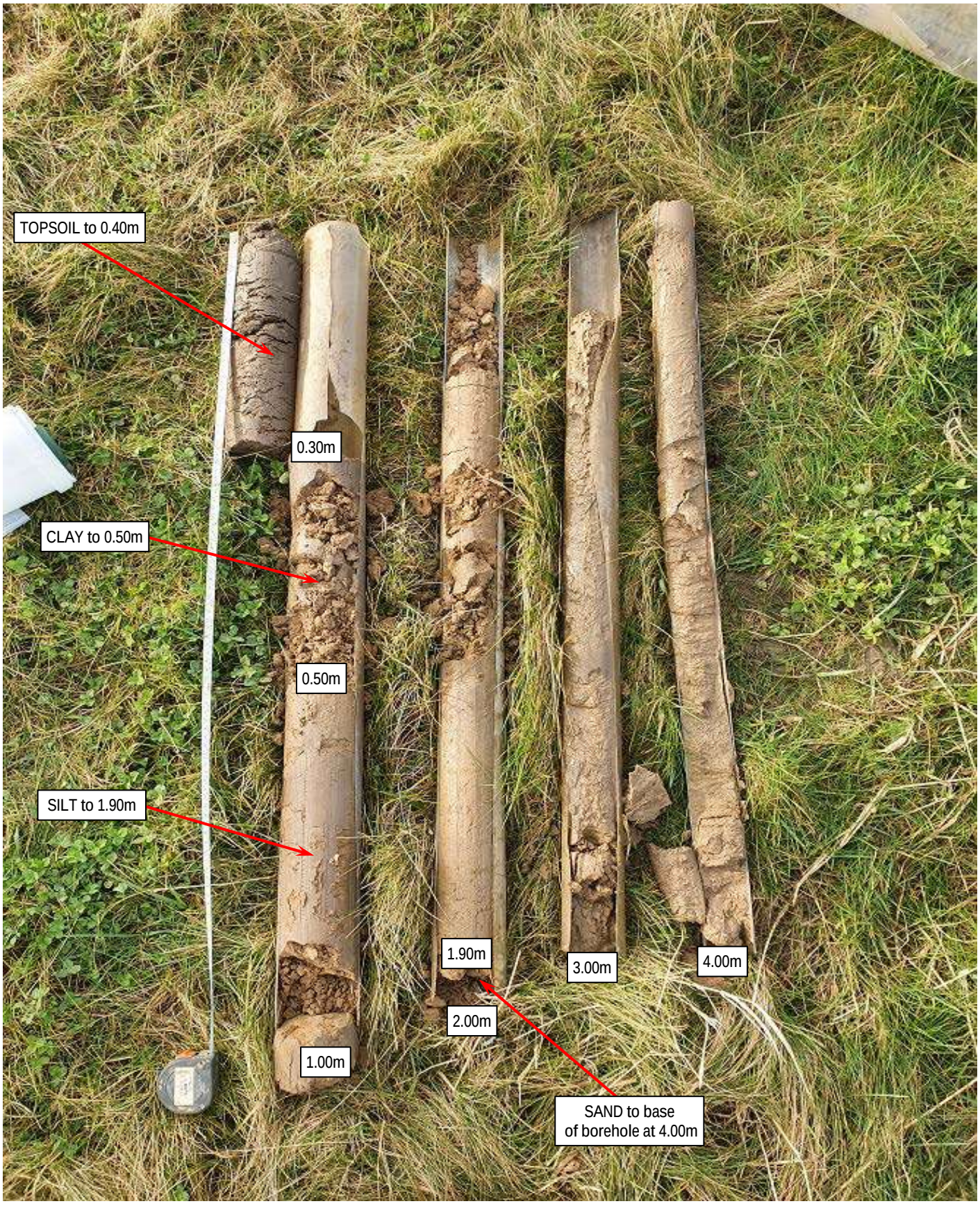
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|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Recovered Arisings from Trial Pit TP25 | Plate No. | 12 |

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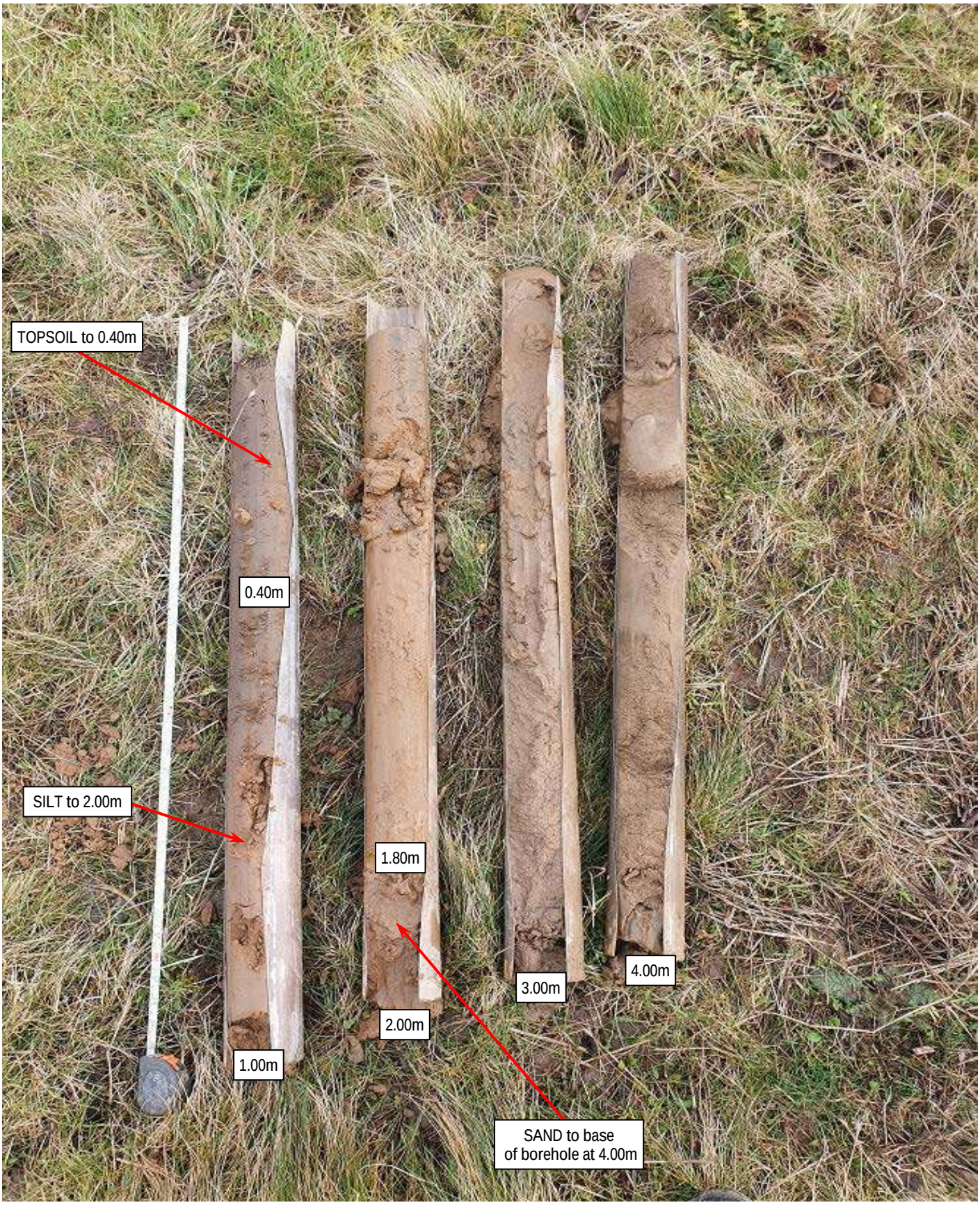

| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Recovered Cores from Borehole WS1 | Plate No. | 13 |

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Recovered Cores from Borehole WS2 | Plate No. | 14 |

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Recovered Cores from Borehole WS4 | Plate No. | 15 |

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| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| | | Approved | PK |
| Project | Sunnydale Close<br>Surfleet | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| | | Rev. | |
| Title | Soakaway Test Pit SA3 - During soakaway testing | Plate No. | 16 |

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# APPENDIX XI

## Laboratory Soil Test Results

# LABORATORY REPORT

4043

**Contract Number: PSL20/1217**

Report Date: 17 March 2020

Client's Reference: D40008

Client Name: Geodyne Derby
9 Brunel Parkway
Pride Park
Derby
DE24 8HR

**For the attention of: Gavin Hallam**

Contract Title: Sunnydale Close, Surfleet

Date Received: 26/2/2020
Date Commenced: 26/2/2020
Date Completed: 17/3/2020

**Notes: Opinions and Interpretations are outside the UKAS Accreditation**

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Checked and Approved Signatories:

| | | |
|---|---|---|
| R Gunson<br>(Director) | A Watkins<br>(Director) | R Berriman<br>(Quality Manager) |
| L Knight<br>(Senior Technician) | S Eyre<br>(Senior Technician) | S Royle<br>(Laboratory Manager) |



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**awatkins@prosoils.co.uk**

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

| Hole Number | Sample Number | Sample Type | Top Depth m | Base Depth m | Description of Sample |
|---|---|---|---|---|---|
| TP9 | B1 | | 1.00 | 1.50 | Brown very sandy SILT. |
| TP11 | B2 | | 1.50 | 2.50 | Brown sandy very silty CLAY. |
| TP12 | B3 | | 1.70 | 2.20 | Brown very sandy SILT. |
| TP17 | B4 | | 1.00 | 1.50 | Brown slightly gravelly very silty SAND. |
| TP23 | B5 | | 0.80 | 1.30 | Brown very sandy SILT. |
| WS1 | B6 | | 1.00 | 1.50 | Brown very sandy SILT. |
| WS2 | B7 | | 1.40 | 1.60 | Brown very sandy SILT. |
| WS3 | B8 | | 1.50 | 2.00 | Brown sandy very silty CLAY. |
| WS4 | B9 | | 0.70 | 1.00 | Brown very sandy SILT. |
| WS5 | B10 | | 1.40 | 1.70 | Brown very sandy SILT. |
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# SUMMARY OF SOIL CLASSIFICATION TESTS

**(BS1377 : PART 2 : 1990)**

| Hole Number | Sample Number | Sample Type | Top Depth m | Base Depth m | Moisture Content % Clause 3.2 | Linear Shrinkage % Clause 6.5 | Particle Density $Mg/m^3$ Clause 8.2 | Liquid Limit % Clause 4.3/4 | Plastic Limit % Clause 5.3 | Plasticity Index % Clause 5.4 | Passing .425mm % | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TP9 | B1 | | 1.00 | 1.50 | 27 | | | | NP | | | |
| TP11 | B2 | | 1.50 | 2.50 | 32 | | | 50 | 26 | 24 | 100 | High plasticity CH. |
| TP17 | B4 | | 1.00 | 1.50 | 29 | | | | NP | | | |
| TP23 | B5 | | 0.80 | 1.30 | 25 | | | | NP | | | |
| WS1 | B6 | | 1.00 | 1.50 | 30 | | | | NP | | | |
| WS2 | B7 | | 1.40 | 1.60 | 22 | | | | NP | | | |
| WS3 | B8 | | 1.50 | 2.00 | 38 | | | 53 | 28 | 25 | 100 | High plasticity CH. |
| WS4 | B9 | | 0.70 | 1.00 | 25 | | | | NP | | | |
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**SYMBOLS :** **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

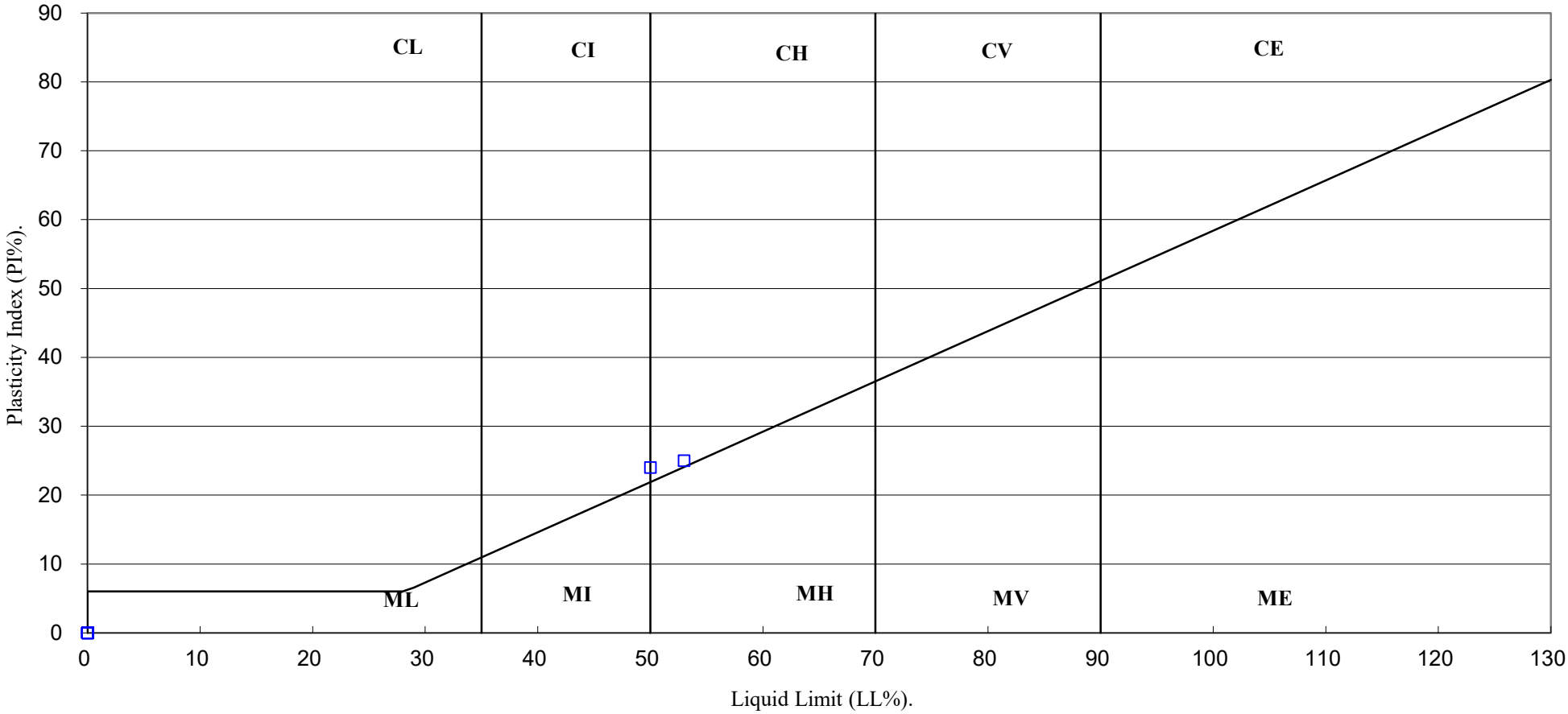
UKAS TESTING 4043

PSL Professional Soils Laboratory

**Sunnydale Close, Surfleet**

**Contract No:**
**PSL20/1217**
**Client Ref:**
**D40008**

# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.




| | | | |
|---|---|---|---|
| UKAS TESTING 4043 | PSL Professional Soils Laboratory | Sunnydale Close, Surfleet | Contract No: PSL20/1217 Client Ref: D40008 |

# PARTICLE SIZE DISTRIBUTION TEST

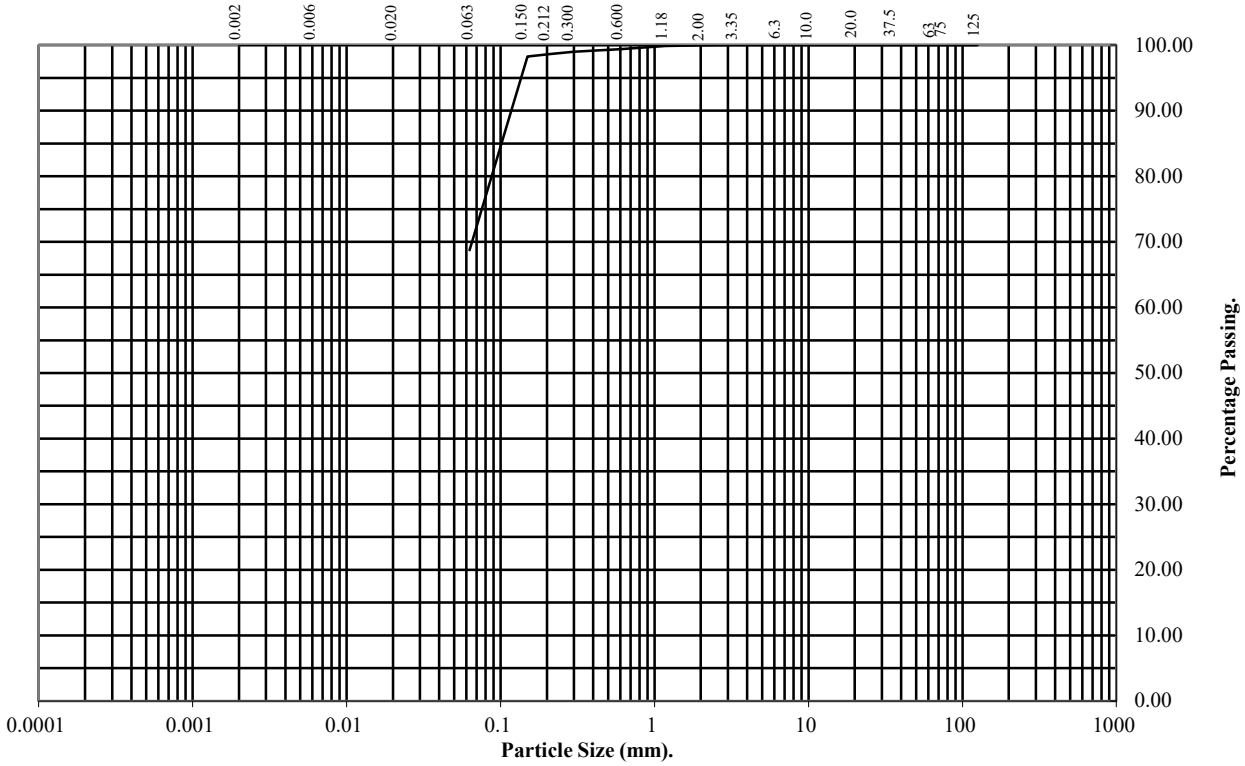
**BS1377 : Part 2 : 1990**

Wet Sieve, Clause 9.2

**Hole Number:** TP12 **Top Depth (m):** 1.70

**Sample Number:** **Base Depth(m):** 2.20

**Sample Type:** B3




| BS Test Sieve (mm) | Percentage Passing |
|---|---|
| 125 | 100 |
| 75 | 100 |
| 63 | 100 |
| 37.5 | 100 |
| 20 | 100 |
| 10 | 100 |
| 6.3 | 100 |
| 3.35 | 100 |
| 2 | 100 |
| 1.18 | 100 |
| 0.6 | 99 |
| 0.3 | 99 |
| 0.212 | 99 |
| 0.15 | 98 |
| 0.063 | 69 |

| Soil Fraction | Total Percentage |
|---|---|
| Cobbles | 0 |
| Gravel | 0 |
| Sand | 31 |
| Silt/Clay | 69 |

**Remarks:**

See Summary of Soil Descriptions

# PARTICLE SIZE DISTRIBUTION TEST

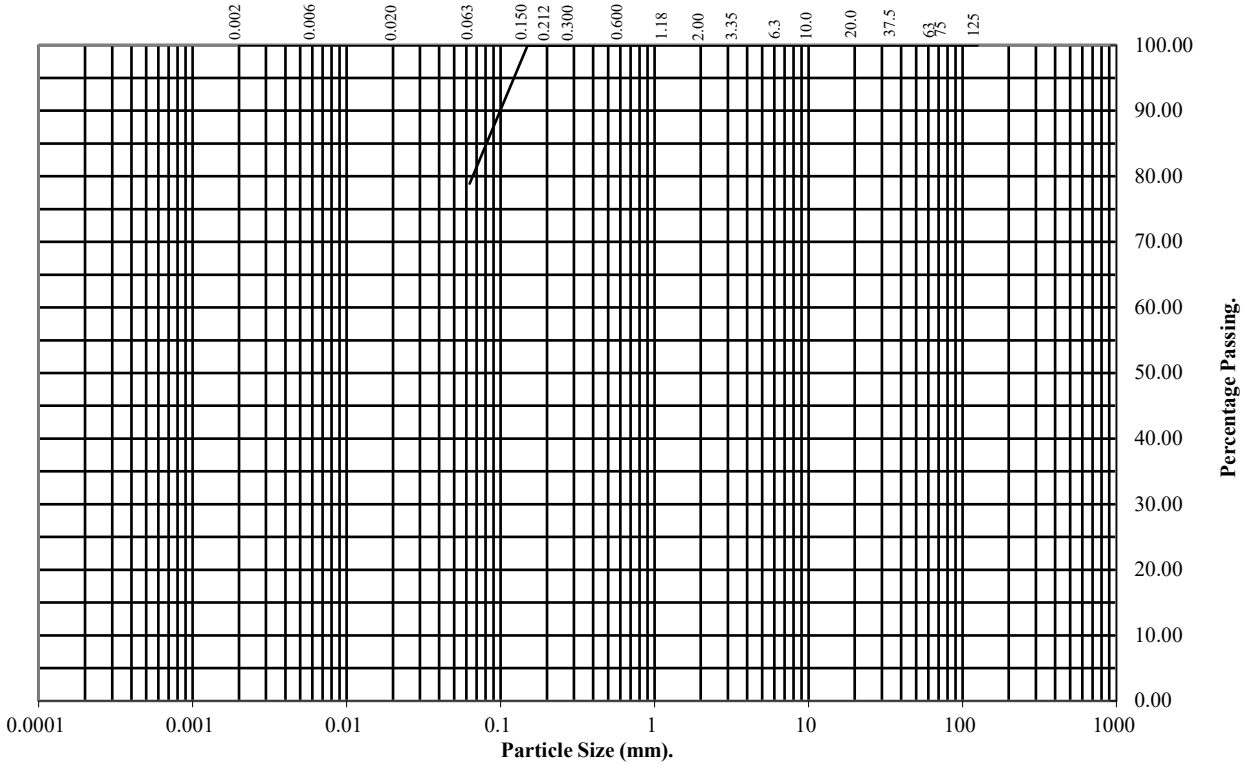
**BS1377 : Part 2 : 1990**

Wet Sieve, Clause 9.2

**Hole Number:** **WS5** **Top Depth (m):** **1.40**

**Sample Number:** **Base Depth(m):** **2.20**

**Sample Type:** **B10**




| BS Test Sieve (mm) | Percentage Passing |
|---|---|
| 125 | 100 |
| 75 | 100 |
| 63 | 100 |
| 37.5 | 100 |
| 20 | 100 |
| 10 | 100 |
| 6.3 | 100 |
| 3.35 | 100 |
| 2 | 100 |
| 1.18 | 100 |
| 0.6 | 100 |
| 0.3 | 100 |
| 0.212 | 100 |
| 0.15 | 100 |
| 0.063 | 79 |

| Soil Fraction | Total Percentage |
|---|---|
| Cobbles | 0 |
| Gravel | 0 |
| Sand | 21 |
| Silt/Clay | 79 |

**Remarks:**

See Summary of Soil Descriptions

# LABORATORY REPORT

4043

**Contract Number: PSL20/1045**

Report Date: 11 March 2020

Client's Reference: D40008

Client Name: Geodyne Derby
9 Brunel Parkway
Pride Park
Derby
DE24 8HR

**For the attention of: Gavin Hallam**

Contract Title: Sunnydale Close, Surfleet

Date Received: 19/2/2020
Date Commenced: 19/2/2020
Date Completed: 11/3/2020

**Notes: Opinions and Interpretations are outside the UKAS Accreditation**

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)
A Watkins (Director)
R Berriman (Quality Manager)

S Royle (Laboratory Manager)
S Eyre (Senior Technician)
L Knight (Senior Technician)



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**awatkins@prosoils.co.uk**

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

| Hole Number | Sample Number | Sample Type | Top Depth m | Base Depth m | Description of Sample |
|---|---|---|---|---|---|
| TP9 | LB1 | | 0.60 | 1.10 | Brown slightly clayey SILT. |
| TP12 | LB2 | | 0.70 | 1.20 | Brown SILT. |
| TP15 | LB3 | | 0.60 | 1.10 | Brown SILT. |
| TP18 | LB4 | | 0.60 | 1.10 | Brown slightly clayey SILT. |
| TP19 | LB5 | | 0.55 | 1.05 | Brown clayey SILT. |
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UKAS TESTING
4043

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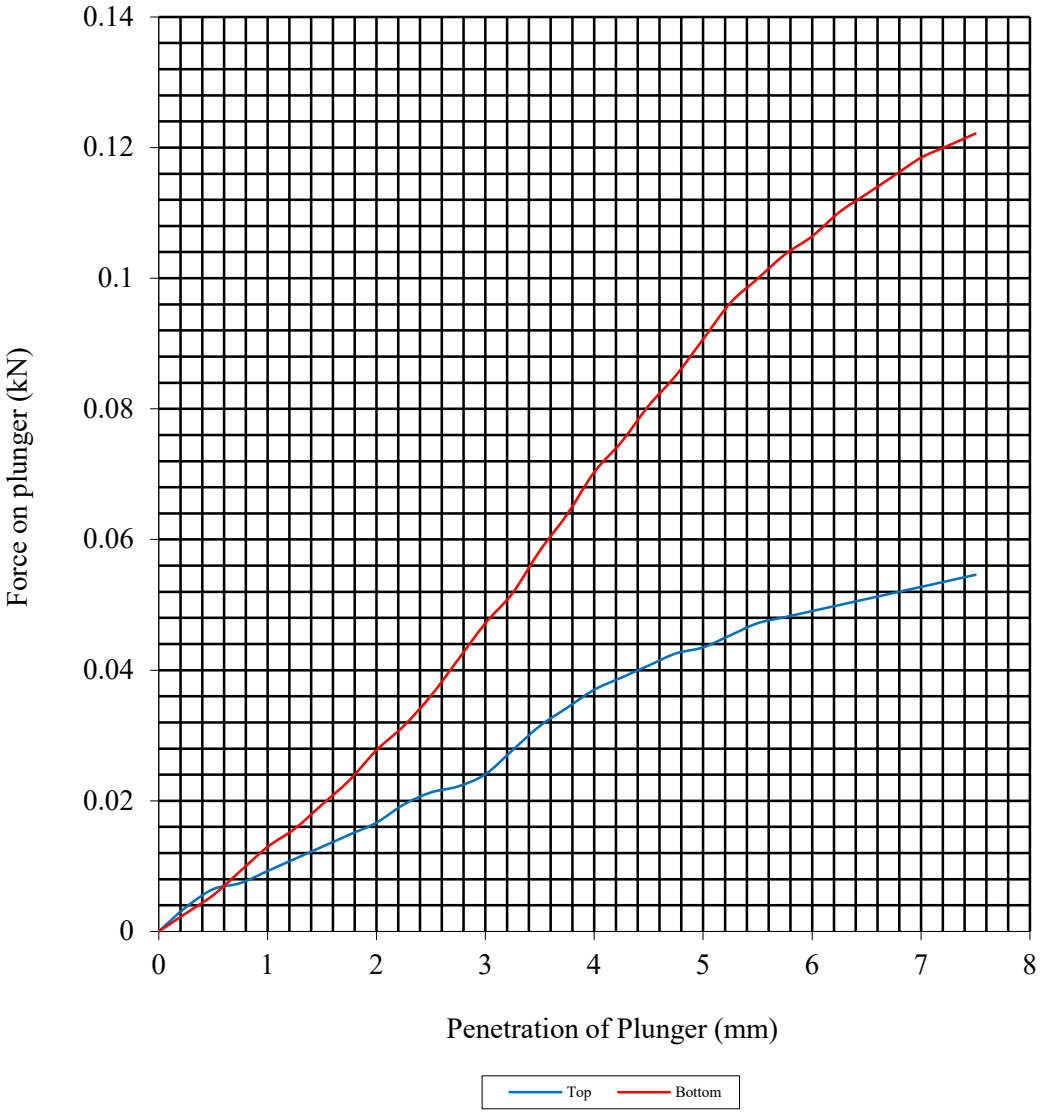
Sunnydale Close, Surfleet

| Contract No: |
|---|
| PSL20/1045 |
| Client Ref: |
| D40008 |

# CALIFORNIA BEARING RATIO TEST

**BS 1377 : Part 4 : 1990**

| | | | |
|---|---|---|---|
| **Hole Number:** | **TP9** | **Top Depth (m):** | **0.60** |
| **Sample Number:** | **LB1** | **Base Depth (m):** | **1.10** |
| **Sample Type:** | | | |




| Initial Sample Conditions | | Sample Preparation | | Final Moisture Content % | | C.B.R. Value % | |
|---|---|---|---|---|---|---|---|
| Moisture Content: | 24 | Surcharge Kg: | 4.20 | Sample Top | 25 | Sample Top | 0.2 |
| Bulk Density Mg/m3: | 1.87 | Soaking Time hrs | 96 | Sample Bottom | 25 | Sample Bottom | 0.5 |
| Dry Density Mg/m3: | 1.50 | Swelling mm: | -0.35 | Remarks : See Summary of Soil Descriptions. | | | |
| Percentage retained on 20mm BS test sieve: | | | 0 | | | | |
| Compaction Conditions | | 2.5kg | | | | | |

UKAS TESTING 4043

PSL Professional Soils Laboratory

**Sunnydale Close, Surfleet**

**Contract No:** PSL20/1045

**Client Ref:** D40008

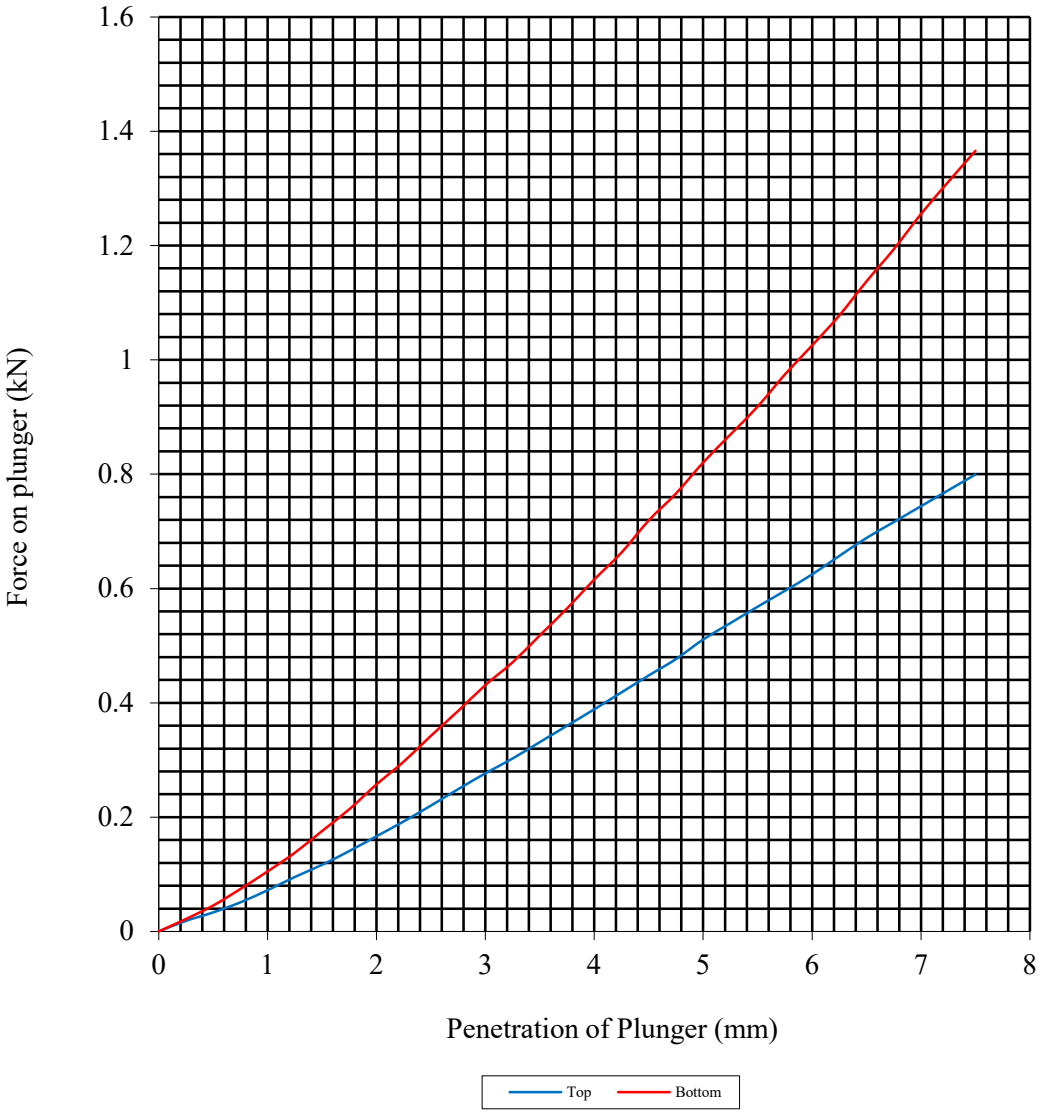
# CALIFORNIA BEARING RATIO TEST

**BS 1377 : Part 4 : 1990**

**Hole Number:** TP12 **Top Depth (m):** 0.70

**Sample Number:** LB2 **Base Depth (m):** 1.20

**Sample Type:**




| Initial Sample Conditions | | Sample Preparation | | Final Moisture Content % | | C.B.R. Value % | |
|---|---|---|---|---|---|---|---|
| Moisture Content: | 25 | Surcharge Kg: | 4.20 | Sample Top | 26 | Sample Top | 2.6 |
| Bulk Density Mg/m3: | 1.81 | Soaking Time hrs | 96 | Sample Bottom | 26 | Sample Bottom | 4.1 |
| Dry Density Mg/m3: | 1.44 | Swelling mm: | -0.50 | Remarks : See Summary of Soil Descriptions. | | | |
| Percentage retained on 20mm BS test sieve: | | | 0 | | | | |
| Compaction Conditions | | 2.5kg | | | | | |

UKAS TESTING 4043

PSL Professional Soils Laboratory

**Sunnydale Close, Surfleet**

**Contract No:** PSL20/1045

**Client Ref:** D40008

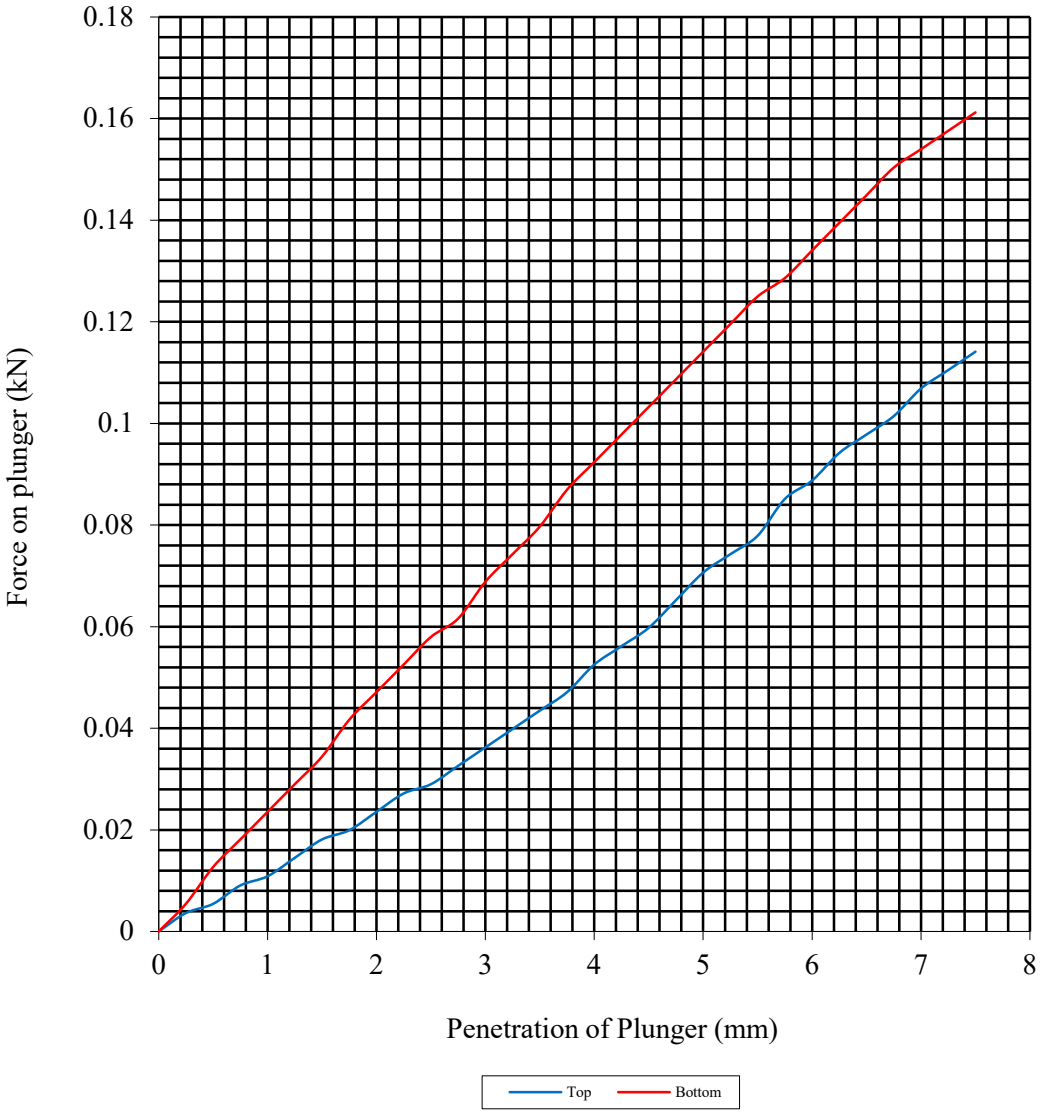
# CALIFORNIA BEARING RATIO TEST

**BS 1377 : Part 4 : 1990**

**Hole Number:** TP15 **Top Depth (m):** 0.60

**Sample Number:** LB3 **Base Depth (m):** 1.10

**Sample Type:**




| Initial Sample Conditions | | Sample Preparation | | Final Moisture Content % | | C.B.R. Value % | |
|---|---|---|---|---|---|---|---|
| Moisture Content: | 26 | Surcharge Kg: | 4.20 | Sample Top | 27 | Sample Top | 0.4 |
| Bulk Density Mg/m3: | 1.85 | Soaking Time hrs | 96 | Sample Bottom | 27 | Sample Bottom | 0.6 |
| Dry Density Mg/m3: | 1.47 | Swelling mm: | -1.00 | Remarks : See Summary of Soil Descriptions. | | | |
| Percentage retained on 20mm BS test sieve: | | | 0 | | | | |
| Compaction Conditions | | 2.5kg | | | | | |

UKAS TESTING 4043

PSL Professional Soils Laboratory

**Sunnydale Close, Surfleet**

**Contract No:** PSL20/1045

**Client Ref:** D40008

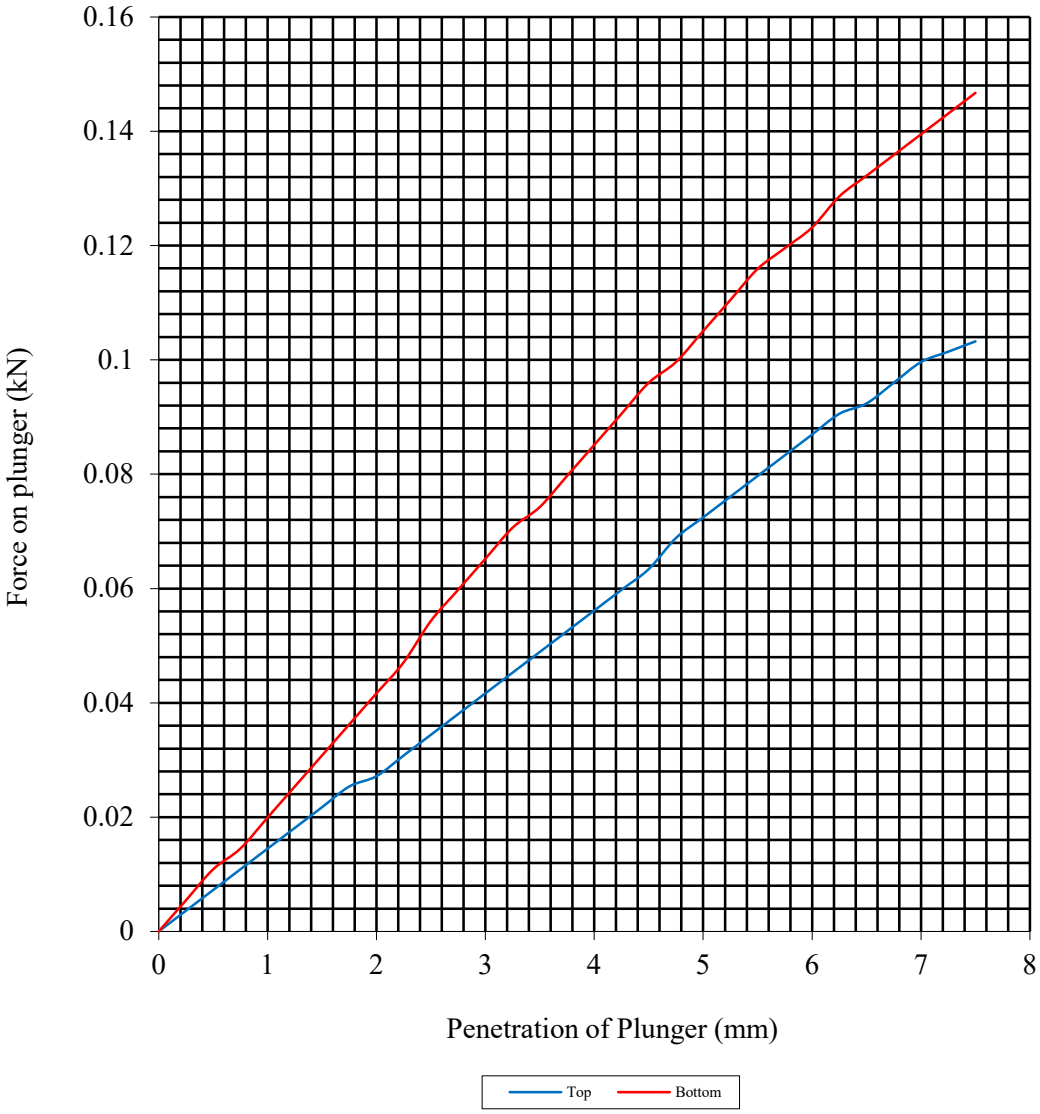
# CALIFORNIA BEARING RATIO TEST

**BS 1377 : Part 4 : 1990**

**Hole Number:** TP18 **Top Depth (m):** 0.60

**Sample Number:** LB4 **Base Depth (m):** 1.10

**Sample Type:**




| Initial Sample Conditions | | Sample Preparation | | Final Moisture Content % | | C.B.R. Value % | |
|---|---|---|---|---|---|---|---|
| Moisture Content: | 25 | Surcharge Kg: | 4.20 | Sample Top | 26 | Sample Top | 0.4 |
| Bulk Density Mg/m3: | 1.91 | Soaking Time hrs | 96 | Sample Bottom | 26 | Sample Bottom | 0.5 |
| Dry Density Mg/m3: | 1.54 | Swelling mm: | -0.11 | Remarks : See Summary of Soil Descriptions. | | | |
| Percentage retained on 20mm BS test sieve: | | | 0 | | | | |
| Compaction Conditions | | 2.5kg | | | | | |

UKAS TESTING 4043

PSL Professional Soils Laboratory

**Sunnydale Close, Surfleet**

**Contract No:** PSL20/1045

**Client Ref:** D40008

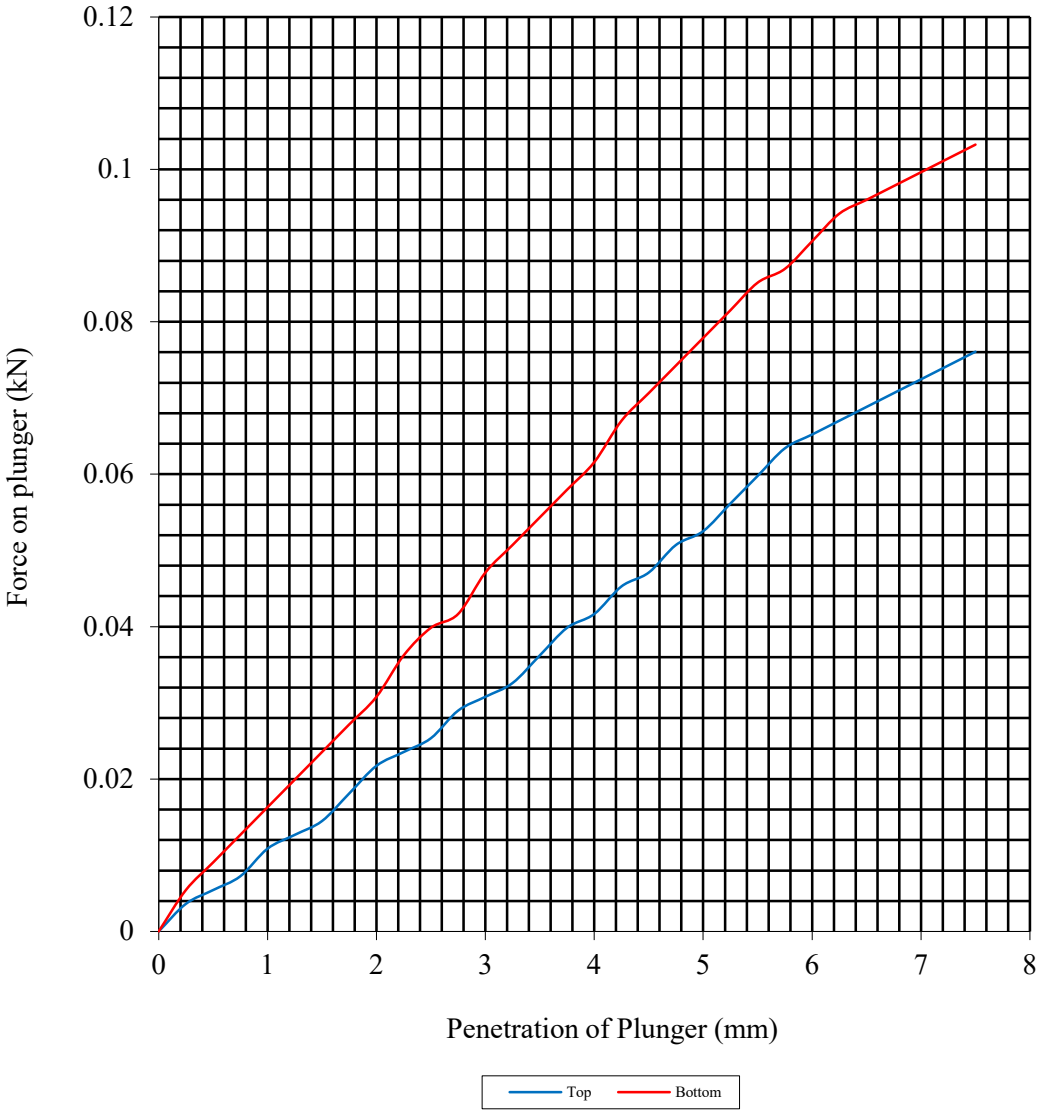
# CALIFORNIA BEARING RATIO TEST

**BS 1377 : Part 4 : 1990**

**Hole Number:** TP19 **Top Depth (m):** 0.55

**Sample Number:** LB5 **Base Depth (m):** 1.05

**Sample Type:**




| Initial Sample Conditions | | Sample Preparation | | Final Moisture Content % | | C.B.R. Value % | |
|---|---|---|---|---|---|---|---|
| Moisture Content: | 26 | Surcharge Kg: | 4.20 | Sample Top | 28 | Sample Top | 0.3 |
| Bulk Density Mg/m3: | 1.86 | Soaking Time hrs | 96 | Sample Bottom | 27 | Sample Bottom | 0.4 |
| Dry Density Mg/m3: | 1.47 | Swelling mm: | -0.94 | Remarks : See Summary of Soil Descriptions. | | | |
| Percentage retained on 20mm BS test sieve: | | | 0 | | | | |
| Compaction Conditions | | 2.5kg | | | | | |

UKAS TESTING 4043

PSL Professional Soils Laboratory

**Sunnydale Close, Surfleet**

**Contract No:** PSL20/1045

**Client Ref:** D40008

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

# FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 20/01874
**Issue Number:** 1 **Date:** 02 March, 2020

**Client:**
GeoDyne (Derby)
9 Brunel Parkway
Pride Park
Derby
Derbyshire
UK
DE24 8HR

**Project Manager:** Chris Bowley
**Project Name:** Sunnydale Close, Surfleet
**Project Ref:** D40008
**Order No:** D40008
**Date Samples Received:** 25/02/20
**Date Instructions Received:** 25/02/20
**Date Analysis Completed:** 02/03/20

**Prepared by:**

Melanie Marshall
Laboratory Coordinator

**Approved by:**

Danielle Brierley
Client Manager

**Envirolab Job Number: 20/01874**

**Client Project Name: Sunnydale Close, Surfleet**

**Client Project Ref: D40008**

| Lab Sample ID | 20/01874/5 | 20/01874/9 | 20/01874/15 | 20/01874/17 | 20/01874/18 | 20/01874/21 | 20/01874/28 | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | T5 | T9 | T15 | T17 | T18 | T21 | T28 | | | |
| Client Sample ID | TP3 | TP5 | SA2 | TP11 | TP13 | TP14 | TP20 | | | |
| Depth to Top | 0.20 | 0.50 | 1.70 | 0.60 | 0.10 | 1.50 | 0.50 | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 11-Feb-20 | 11-Feb-20 | 12-Feb-20 | 12-Feb-20 | 12-Feb-20 | 12-Feb-20 | 13-Feb-20 | | | |
| Sample Type | Soil - D | Soil - D | Soil - D | Soil - D | Soil - D | Soil - D | Soil - D | | | |
| Sample Matrix Code | 5AE | 4 | 5E | 4A | 4AE | 5A | 4A | | | |
| % Stones >10mm$_A$ | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | % w/w | 0.1 | A-T-044 |
| pH$_D^{M\#}$ | 8.33 | 8.82 | - | 8.91 | 8.45 | - | 8.81 | pH | 0.01 | A-T-031s |
| Sulphate (water sol 2:1)$_D^{M\#}$ | - | <0.01 | 0.38 | <0.01 | - | - | 0.02 | g/l | 0.01 | A-T-026s |
| Loss on ignition (550degC)$_D^{M\#}$ | - | - | 9.9 | - | - | 4.9 | - | % w/w | 0.6 | A-T-030s |
| Total Organic Carbon$_D^{M\#}$ | 1.32 | 0.69 | - | 0.53 | 1.51 | - | 0.56 | % w/w | 0.03 | A-T-032s |
| Arsenic$_D^{M\#}$ | 6 | 5 | - | 2 | 6 | - | 6 | mg/kg | 1 | A-T-024s |
| Cadmium$_D^{M\#}$ | <0.5 | <0.5 | - | <0.5 | <0.5 | - | <0.5 | mg/kg | 0.5 | A-T-024s |
| Copper$_D^{M\#}$ | 11 | 2 | - | 3 | 9 | - | 2 | mg/kg | 1 | A-T-024s |
| Chromium$_D^{M\#}$ | 18 | 12 | - | 14 | 15 | - | 18 | mg/kg | 1 | A-T-024s |
| Chromium (hexavalent)$_D$ | <1 | <1 | - | <1 | <1 | - | <1 | mg/kg | 1 | A-T-040s |
| Chromium (trivalent) | 18 | 12 | - | 14 | 15 | - | 18 | mg/kg | 1 | Calc |
| Lead$_D^{M\#}$ | 24 | 6 | - | 8 | 78 | - | 7 | mg/kg | 1 | A-T-024s |
| Mercury$_D$ | <0.17 | <0.17 | - | <0.17 | <0.17 | - | <0.17 | mg/kg | 0.17 | A-T-024s |
| Nickel$_D^{M\#}$ | 15 | 10 | - | 12 | 13 | - | 15 | mg/kg | 1 | A-T-024s |
| Selenium$_D^{M\#}$ | <1 | <1 | - | <1 | <1 | - | <1 | mg/kg | 1 | A-T-024s |
| Zinc$_D^{M\#}$ | 60 | 23 | - | 29 | 56 | - | 33 | mg/kg | 5 | A-T-024s |

**Envirolab Job Number: 20/01874**

**Client Project Name: Sunnydale Close, Surfleet**

**Client Project Ref: D40008**

| Lab Sample ID | 20/01874/5 | 20/01874/9 | 20/01874/15 | 20/01874/17 | 20/01874/18 | 20/01874/21 | 20/01874/28 | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | T5 | T9 | T15 | T17 | T18 | T21 | T28 | | | |
| Client Sample ID | TP3 | TP5 | SA2 | TP11 | TP13 | TP14 | TP20 | | | |
| Depth to Top | 0.20 | 0.50 | 1.70 | 0.60 | 0.10 | 1.50 | 0.50 | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 11-Feb-20 | 11-Feb-20 | 12-Feb-20 | 12-Feb-20 | 12-Feb-20 | 12-Feb-20 | 13-Feb-20 | | | |
| Sample Type | Soil - D | Soil - D | Soil - D | Soil - D | Soil - D | Soil - D | Soil - D | | | |
| Sample Matrix Code | 5AE | 4 | 5E | 4A | 4AE | 5A | 4A | | | |
| **PAH-16MS** | | | | | | | | | | |
| Acenaphthene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Acenaphthylene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Anthracene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Benzo(a)anthracene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Benzo(a)pyrene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Benzo(b)fluoranthene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Benzo(ghi)perylene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Benzo(k)fluoranthene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Chrysene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Dibenzo(ah)anthracene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Fluoranthene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Fluorene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Indeno(123-cd)pyrene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Naphthalene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Phenanthrene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Pyrene$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |
| Total PAH-16MS$_A^{M\#}$ | <0.1 | <0.1 | - | <0.1 | <0.1 | - | <0.1 | mg/kg | 0.1 | A-T-019s |

**Envirolab Job Number: 20/01874**

**Client Project Name: Sunnydale Close, Surfleet**

**Client Project Ref: D40008**

| Lab Sample ID | 20/01874/35 | 20/01874/36 | 20/01874/37 | 20/01874/38 | 20/01874/39 | | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TJ35 | TJ36 | T37 | TJ38 | TJ39 | | | | | |
| Client Sample ID | WS1 | WS2 | WS3 | WS4 | WS5 | | | | | |
| Depth to Top | 0.20 | 0.10 | 1.60 | 0.20 | 0.10 | | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | | | | | |
| Sample Type | Soil - D | Soil - D | Soil - D | Soil - D | Soil - D | | | | | |
| Sample Matrix Code | 6AE | 6AE | 5A | 6AE | 6AE | | | | | |
| % Stones >10mm$_A$ | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | % w/w | 0.1 | A-T-044 |
| pH$_D$[M#] | 8.19 | 8.50 | 8.63 | 8.51 | 8.19 | | | pH | 0.01 | A-T-031s |
| Sulphate (water sol 2:1)$_D$[M#] | - | - | 0.05 | - | - | | | g/l | 0.01 | A-T-026s |
| Loss on ignition (550degC)$_D$[M#] | - | - | 6.0 | - | - | | | % w/w | 0.6 | A-T-030s |
| Total Organic Carbon$_D$[M#] | 1.49 | 1.51 | 0.87 | 1.56 | 1.53 | | | % w/w | 0.03 | A-T-032s |
| Arsenic$_D$[M#] | 6 | 6 | 1 | 8 | 7 | | | mg/kg | 1 | A-T-024s |
| Cadmium$_D$[M#] | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | | | mg/kg | 0.5 | A-T-024s |
| Copper$_D$[M#] | 7 | 11 | 4 | 7 | 10 | | | mg/kg | 1 | A-T-024s |
| Chromium$_D$[M#] | 18 | 17 | 18 | 18 | 21 | | | mg/kg | 1 | A-T-024s |
| Chromium (hexavalent)$_D$ | <1 | <1 | <1 | <1 | <1 | | | mg/kg | 1 | A-T-040s |
| Chromium (trivalent) | 18 | 17 | 18 | 18 | 21 | | | mg/kg | 1 | Calc |
| Lead$_D$[M#] | 22 | 34 | 10 | 22 | 33 | | | mg/kg | 1 | A-T-024s |
| Mercury$_D$ | <0.17 | <0.17 | <0.17 | <0.17 | 0.23 | | | mg/kg | 0.17 | A-T-024s |
| Nickel$_D$[M#] | 14 | 14 | 15 | 12 | 15 | | | mg/kg | 1 | A-T-024s |
| Selenium$_D$[M#] | 1 | <1 | <1 | <1 | <1 | | | mg/kg | 1 | A-T-024s |
| Zinc$_D$[M#] | 47 | 61 | 41 | 44 | 58 | | | mg/kg | 5 | A-T-024s |
| | | | | | | | | | | |
| **OCP+OPP Combined Pest Suite (incl. Atrazine and Simazine)** | | | | | | | | | | |
| Dichlobenil$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Tecnazene$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Trifluralin$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| alpha-Hexachlorocyclohexane (HCH)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Hexachlorobenzene (HCB)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Simazine$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Atrazine$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| beta-Hexachlorocyclohexane (HCH)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Quintozene (PCNB)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Chlorothalonil$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| delta-Hexachlorocyclohexane (HCH)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Triallate$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Heptachlor$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Aldrin$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Triadimefon$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |

**Envirolab Job Number: 20/01874**

**Client Project Name: Sunnydale Close, Surfleet**

**Client Project Ref: D40008**

| Lab Sample ID | 20/01874/35 | 20/01874/36 | 20/01874/37 | 20/01874/38 | 20/01874/39 | | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TJ35 | TJ36 | T37 | TJ38 | TJ39 | | | | | |
| Client Sample ID | WS1 | WS2 | WS3 | WS4 | WS5 | | | | | |
| Depth to Top | 0.20 | 0.10 | 1.60 | 0.20 | 0.10 | | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | | | | | |
| Sample Type | Soil - D | Soil - D | Soil - D | Soil - D | Soil - D | | | | | |
| Sample Matrix Code | 6AE | 6AE | 5A | 6AE | 6AE | | | | | |
| Telodrin$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Isodrin$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Pendimethalin$_A$ | <0.01 | 0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Heptachlor epoxide$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| trans-Chlordane (Gamma)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| o,p-DDE (2,4)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Endosulphan I (Alpha)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| cis-Chlordane (Alpha)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| p,p-DDE (4,4)$_A$ | <0.01 | 0.02 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Dieldrin$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| o,p-DDD (2,4)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Endrin$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Endosulphan II (Beta)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| p,p-DDD (4,4)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| o,p-DDT (2,4)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Endrin Aldehyde$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Endrin Ketone$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Endosulphan Sulphate$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| p,p-DDT (4,4)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| o,p-Methoxychlor$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| p,p-Methoxychlor$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Permethrin I (cis)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Permethrin II (trans)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Dichlorvos$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Mevinphos$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Demeton-S$_A$ | <0.50 | <0.50 | - | <0.50 | <0.50 | | | mg/kg | 0.5 | A-T-056 |
| Demeton-O$_A$ | <0.50 | <0.50 | - | <0.50 | <0.50 | | | mg/kg | 0.5 | A-T-056 |
| Phorate$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Dimethoate$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Propetamphos$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Diazinon (Dimpylate)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Disulfoton$_A$ | <0.10 | <0.10 | - | <0.10 | <0.10 | | | mg/kg | 0.1 | A-T-056 |
| Etrimphos$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Chlorpyrifos-methyl$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |

**Envirolab Job Number: 20/01874**

**Client Project Name: Sunnydale Close, Surfleet**

**Client Project Ref: D40008**

| Lab Sample ID | 20/01874/35 | 20/01874/36 | 20/01874/37 | 20/01874/38 | 20/01874/39 | | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TJ35 | TJ36 | T37 | TJ38 | TJ39 | | | | | |
| Client Sample ID | WS1 | WS2 | WS3 | WS4 | WS5 | | | | | |
| Depth to Top | 0.20 | 0.10 | 1.60 | 0.20 | 0.10 | | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | | | | | |
| Sample Type | Soil - D | Soil - D | Soil - D | Soil - D | Soil - D | | | | | |
| Sample Matrix Code | 6AE | 6AE | 5A | 6AE | 6AE | | | | | |
| Parathion (Ethyl Parathion)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Methyl Parathion$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Pirimiphos-methyl$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Fenitrothion$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Fensulphothion$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Fenthion$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Malathion$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Chlorfenvinphos$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Chlorpyrifos$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Trichloronate$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Prothiofos (Tokuthion)$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Ethion$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Triazophos$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Sulprofos$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Carbophenothion$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Phosalone$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Azinphos-methyl$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Azinphos-ethyl$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |
| Coumaphos$_A$ | <0.01 | <0.01 | - | <0.01 | <0.01 | | | mg/kg | 0.01 | A-T-056 |

**Envirolab Job Number: 20/01874**

**Client Project Name: Sunnydale Close, Surfleet**

**Client Project Ref: D40008**

| Lab Sample ID | 20/01874/35 | 20/01874/36 | 20/01874/37 | 20/01874/38 | 20/01874/39 | | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TJ35 | TJ36 | T37 | TJ38 | TJ39 | | | | | |
| Client Sample ID | WS1 | WS2 | WS3 | WS4 | WS5 | | | | | |
| Depth to Top | 0.20 | 0.10 | 1.60 | 0.20 | 0.10 | | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | 14-Feb-20 | | | | | |
| Sample Type | Soil - D | Soil - D | Soil - D | Soil - D | Soil - D | | | | | |
| Sample Matrix Code | 6AE | 6AE | 5A | 6AE | 6AE | | | | | |
| **PAH-16MS** | | | | | | | | | | |
| Acenaphthene$_A^{M\#}$ | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Acenaphthylene$_A^{M\#}$ | <0.1 | 0.2 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Anthracene$_A^{M\#}$ | <0.1 | 0.5 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Benzo(a)anthracene$_A^{M\#}$ | <0.1 | 0.7 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Benzo(a)pyrene$_A^{M\#}$ | <0.1 | 0.4 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Benzo(b)fluoranthene$_A^{M\#}$ | <0.1 | 0.4 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Benzo(ghi)perylene$_A^{M\#}$ | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Benzo(k)fluoranthene$_A^{M\#}$ | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Chrysene$_A^{M\#}$ | <0.1 | 0.6 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Dibenzo(ah)anthracene$_A^{M\#}$ | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Fluoranthene$_A^{M\#}$ | <0.1 | 2.4 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Fluorene$_A^{M\#}$ | <0.1 | 0.2 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Indeno(123-cd)pyrene$_A^{M\#}$ | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Naphthalene$_A^{M\#}$ | <0.1 | <0.1 | <0.1 | 0.2 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Phenanthrene$_A^{M\#}$ | <0.1 | 3.3 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Pyrene$_A^{M\#}$ | <0.1 | 1.8 | <0.1 | <0.1 | <0.1 | | | mg/kg | 0.1 | A-T-019s |
| Total PAH-16MS$_A^{M\#}$ | <0.1 | 10.6 | <0.1 | 0.2 | <0.1 | | | mg/kg | 0.1 | A-T-019s |

## REPORT NOTES

**General**
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

**Soil chemical analysis:**
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

**TPH analysis of water by method A-T-007:**
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

**Electrical Conductivity of water by Method A-T-037:**
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

**Asbestos:**
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

**Predominant Matrix Codes:**
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
**Secondary Matrix Codes:**
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

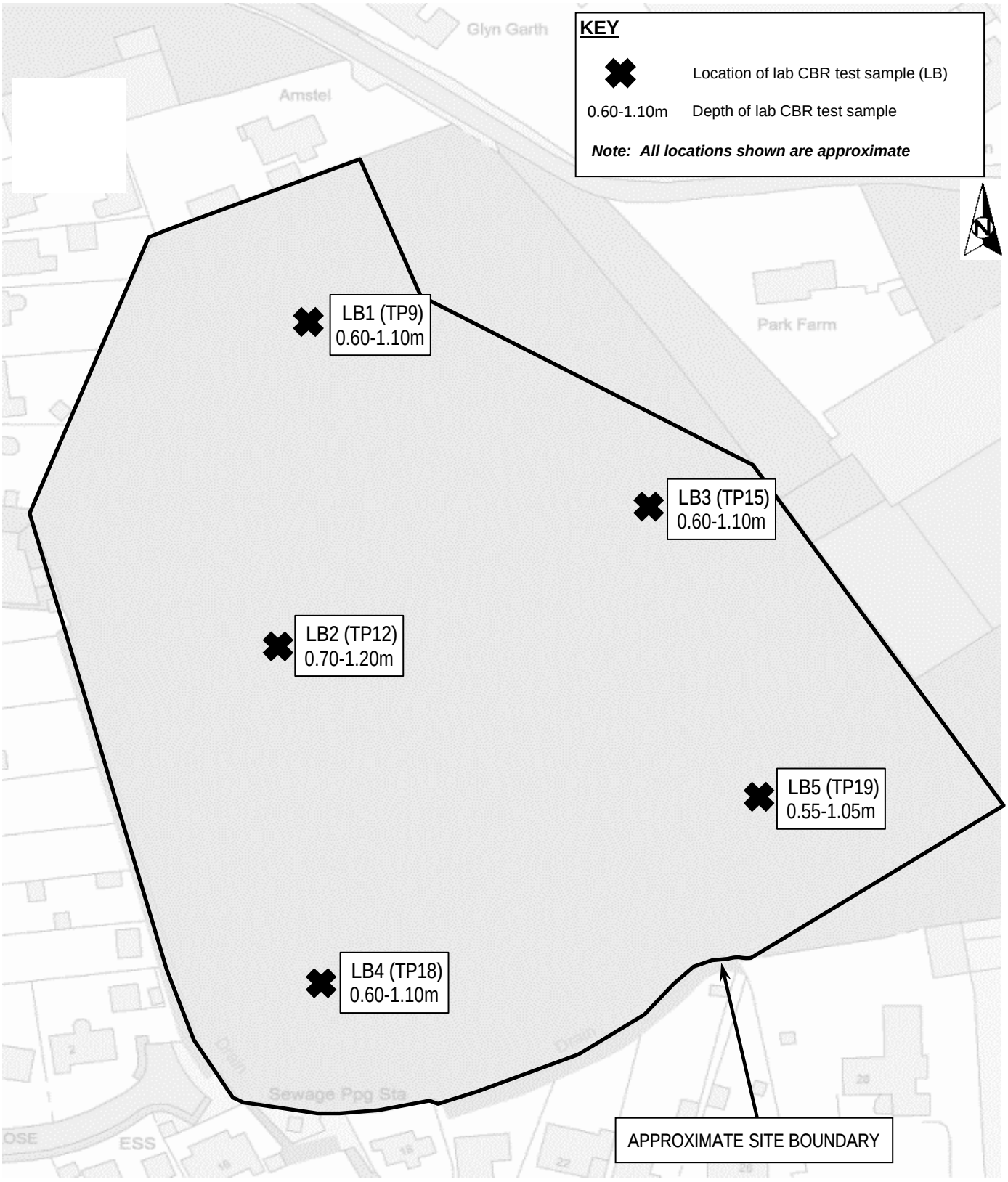
**Key:**
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

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**APPENDIX XII**

**Laboratory CBR Test Location Plan**
**(Figure No. D40008/05)**




Do Not Scale

REPRODUCED FROM THE ORDNANCE SURVEY MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. CROWN COPYRIGHT RESERVED. LICENCE NO. LAN 1001274

| | | | |
|---|---|---|---|
| Project No. | D40008 | Drawn | CB |
| Client | Ashwood Homes | Checked | PK |
| Project | Sunnydale Close<br>Surfleet | Approved | PK |
| | | Scale | NTS |
| | | Date Drawn | 13/03/2020 |
| Title | Laboratory CBR Test Location Plan | Rev. | |
| | | Figure No. | D40008/05 |

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**APPENDIX XIII**

**Ground Gas & Water Level Monitoring Results**

| | |
|---|---|
| Project No. | D40008 |
| Client | Ashwood Homes |
| Site Location | Sunnydale Close, Surfleet |
| Date | 20-02-2020 |
| Weather | Windy and overcast |
| Atmospheric Pressure Trend | Fall of 16mb in the 24hour period prior to monitoring |
| Equipment | GA2000+ & Dipmeter |
| Operator | BP |

| MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665 / BS8485:2015 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Borehole No. | Time (00:00) | Ambient Pressure (mb) | | Methane (% v/v) | Carbon Dioxide (% v/v) | Oxygen (% v/v) | Time to steady gas readings (secs) | Duration of gas monitoring (secs) | Gas Flow (l/hr) | Depth to groundwater (m begl) | Other Issues i.e. odour, condition of installation, etc |
| WS1 | 10:15 | 1002 | Peak | 0.0 | 0.0 | 20.8 | 10 | 120 | 0.0 | 0.76 | |
| | | | Steady | 0.0 | 0.0 | 20.8 | | | 0.0 | | |
| WS2 | 10:33 | 1002 | Peak | 0.0 | 0.0 | 20.8 | 10 | 120 | 0.0 | 0.80 | |
| | | | Steady | 0.0 | 0.0 | 20.9 | | | 0.0 | | |
| WS4 | 10:24 | 1002 | Peak | 0.0 | 0.7 | 20.1 | 40 | 120 | 0.0 | 1.18 | |
| | | | Steady | 0.0 | 0.7 | 20.1 | | | 0.0 | | |
| Ambient | | | | 0.0 | 0.0 | 20.9 | | | | | |

Notes

Cell is highlighted in the following conditions

1. Where Methane exceeds 1% v/v (after BR212)
2. Where Carbon Dioxide exceeds 5% v/v (after BR212)
3. Where Oxygen is below 16% (Coal Authority guidance)

Where cell is highlighted further consideration of the recorded value is required in accordance with the specified guidance documents

NA - Not Applicable/ Not Available

BOH - Bottom of Hole

ND - Not Determined

NGW - No groundwater encountered

NR - None Recorded

| | |
|---|---|
| Project No. | D40008 |
| Client | Ashwood Homes |
| Site Location | Sunnydale Close, Surfleet |
| Date | 24-02-2020 |
| Weather | Windy and overcast with showers |
| Atmospheric Pressure Trend | Fall of 8mb in the 24hour period prior to monitoring |
| Equipment | GA2000+ & Dipmeter |
| Operator | BP |

| MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665 / BS8485:2015 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Borehole No. | Time (00:00) | Ambient Pressure (mb) | | Methane (% v/v) | Carbon Dioxide (% v/v) | Oxygen (% v/v) | Time to steady gas readings (secs) | Duration of gas monitoring (secs) | Gas Flow (l/hr) | Depth to groundwater (m begl) | Other Issues i.e. odour, condition of installation, etc |
| WS1 | 12:09 | 1001 | Peak | 0.0 | 0.0 | 20.9 | 0 | 120 | 0.0 | 0.51 | |
| | | | Steady | 0.0 | 0.0 | 20.9 | | | 0.0 | | |
| WS2 | 12:20 | 1001 | Peak | 0.0 | 0.1 | 20.8 | 40 | 120 | 0.0 | 0.49 | |
| | | | Steady | 0.0 | 0.0 | 21.1 | | | 0.0 | | |
| WS4 | 12:02 | 1001 | Peak | 0.0 | 0.3 | 20.3 | 90 | 120 | 0.0 | 1.05 | |
| | | | Steady | 0.0 | 0.0 | 20.6 | | | 0.0 | | |
| Ambient | | | | 0.0 | 0.0 | 21.1 | | | | | |

Notes

Cell is highlighted in the following conditions

1. Where Methane exceeds 1% v/v (after BR212)
2. Where Carbon Dioxide exceeds 5% v/v (after BR212)
3. Where Oxygen is below 16% (Coal Authority guidance)

Where cell is highlighted further consideration of the recorded value is required in accordance with the specified guidance documents

NA - Not Applicable/ Not Available

BOH - Bottom of Hole

ND - Not Determined

NGW - No groundwater encountered

NR - None Recorded

| | |
|---|---|
| Project No. | D40008 |
| Client | Ashwood Homes |
| Site Location | Sunnydale Close, Surfleet |
| Date | 05-03-2020 |
| Weather | Overcast |
| Atmospheric Pressure Trend | Fall of 13mb in the 24hour period prior to monitoring |
| Equipment | GA2000+ & Dipmeter |
| Operator | BP |

| MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665 / BS8485:2015 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Borehole No. | Time (00:00) | Ambient Pressure (mb) | | Methane (% v/v) | Carbon Dioxide (% v/v) | Oxygen (% v/v) | Time to steady gas readings (secs) | Duration of gas monitoring (secs) | Gas Flow (l/hr) | Depth to groundwater (m begl) | Other Issues i.e. odour, condition of installation, etc |
| WS1 | 13:18 | 995 | Peak | 0.0 | 0.0 | 21.0 | 30 | 120 | 0.0 | 0.80 | |
| | | | Steady | 0.0 | 0.0 | 21.0 | | | 0.0 | | |
| WS2 | 13:07 | 995 | Peak | 0.0 | 0.1 | 20.4 | 70 | 120 | 0.0 | 0.71 | |
| | | | Steady | 0.0 | 0.0 | 20.9 | | | 0.0 | | |
| WS4 | 13:26 | 995 | Peak | 0.0 | 1.0 | 19.7 | 35 | 120 | 0.0 | 1.19 | |
| | | | Steady | 0.0 | 1.0 | 19.7 | | | 0.0 | | |
| Ambient | | | | 0.0 | 0.0 | 21.1 | | | | | |

Notes

Cell is highlighted in the following conditions

1. Where Methane exceeds 1% v/v (after BR212)
2. Where Carbon Dioxide exceeds 5% v/v (after BR212)
3. Where Oxygen is below 16% (Coal Authority guidance)

Where cell is highlighted further consideration of the recorded value is required in accordance with the specified guidance documents

NA - Not Applicable/ Not Available

BOH - Bottom of Hole

ND - Not Determined

NGW - No groundwater encountered

NR - None Recorded

| | |
|---|---|
| Project No. | D40008 |
| Client | Ashwood Homes |
| Site Location | Sunnydale Close, Surfleet |
| Date | 11-03-2020 |
| Weather | Sunny becoming cloudy with a southwesterly wind |
| Atmospheric Pressure Trend | Rise of 9mb in the 24hour period prior to monitoring |
| Equipment | GA2000+ & Dipmeter |
| Operator | BP |

| MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665 / BS8485:2015 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Borehole No. | Time (00:00) | Ambient Pressure (mb) | | Methane (% v/v) | Carbon Dioxide (% v/v) | Oxygen (% v/v) | Time to steady gas readings (secs) | Duration of gas monitoring (secs) | Gas Flow (l/hr) | Depth to groundwater (m begl) | Other Issues i.e. odour, condition of installation, etc |
| WS1 | 12:34 | 1007 | Peak | 0.0 | 0.0 | 20.7 | 20 | 120 | 0.0 | 0.90 | |
| | | | Steady | 0.0 | 0.0 | 20.7 | | | 0.0 | | |
| WS2 | 12:25 | 1007 | Peak | 0.0 | 0.2 | 20.2 | 65 | 120 | 0.0 | 0.89 | |
| | | | Steady | 0.0 | 0.0 | 20.7 | | | 0.0 | | |
| WS4 | 12:43 | 1007 | Peak | 0.0 | 1.0 | 20.1 | 30 | 120 | 0.0 | 1.32 | |
| | | | Steady | 0.0 | 1.0 | 20.1 | | | 0.0 | | |
| Ambient | | | | 0.0 | 0.0 | 20.8 | | | | | |

Notes

Cell is highlighted in the following conditions

1. Where Methane exceeds 1% v/v (after BR212)
2. Where Carbon Dioxide exceeds 5% v/v (after BR212)
3. Where Oxygen is below 16% (Coal Authority guidance)

Where cell is highlighted further consideration of the recorded value is required in accordance with the specified guidance documents

NA - Not Applicable/ Not Available

BOH - Bottom of Hole

ND - Not Determined

NGW - No groundwater encountered

NR - None Recorded

| | |
|---|---|
| Project No. | D40008 |
| Client | Ashwood Homes |
| Site Location | Sunnydale Close, Surfleet |
| Date | 19-03-2020 |
| Weather | Overcast |
| Atmospheric Pressure Trend | Rise of 6mb in the 24hour period prior to monitoring |
| Equipment | GA2000+ & Dipmeter |
| Operator | BP |

| MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665 / BS8485:2015 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Borehole No. | Time (00:00) | Ambient Pressure (mb) | | Methane (% v/v) | Carbon Dioxide (% v/v) | Oxygen (% v/v) | Time to steady gas readings (secs) | Duration of gas monitoring (secs) | Gas Flow (l/hr) | Depth to groundwater (m begl) | Other Issues i.e. odour, condition of installation, etc |
| WS1 | 11:40 | 1028 | Peak | 0.0 | 0.0 | 21.1 | 0 | 120 | 0.0 | 0.92 | |
| | | | Steady | 0.0 | 0.0 | 21.1 | | | 0.0 | | |
| WS2 | 11:28 | 1028 | Peak | 0.0 | 0.9 | 20.3 | 80 | 120 | 0.0 | 1.07 | |
| | | | Steady | 0.0 | 0.1 | 20.9 | | | 0.0 | | |
| WS4 | 11:49 | 1028 | Peak | 0.0 | 1.4 | 20.2 | 65 | 120 | 0.0 | 1.38 | |
| | | | Steady | 0.0 | 1.4 | 20.2 | | | 0.0 | | |
| Ambient | | | | 0.0 | 0.0 | 21.1 | | | | | |

Notes

Cell is highlighted in the following conditions

1. Where Methane exceeds 1% v/v (after BR212)
2. Where Carbon Dioxide exceeds 5% v/v (after BR212)
3. Where Oxygen is below 16% (Coal Authority guidance)

Where cell is highlighted further consideration of the recorded value is required in accordance with the specified guidance documents

NA - Not Applicable/ Not Available

BOH - Bottom of Hole

ND - Not Determined

NGW - No groundwater encountered

NR - None Recorded

| | |
|---|---|
| Project No. | D40008 |
| Client | Ashwood Homes |
| Site Location | Sunnydale Close, Surfleet |
| Date | 23-03-2020 |
| Weather | Sunny, light breeze |
| Atmospheric Pressure Trend | Fall of 2mb in the 24hour period prior to monitoring |
| Equipment | GA2000+ & Dipmeter |
| Operator | GH |

| MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665 / BS8485:2015 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Borehole No. | Time (00:00) | Ambient Pressure (mb) | | Methane (% v/v) | Carbon Dioxide (% v/v) | Oxygen (% v/v) | Time to steady gas readings (secs) | Duration of gas monitoring (secs) | Gas Flow (l/hr) | Depth to groundwater (m begl) | Other Issues i.e. odour, condition of installation, etc |
| WS1 | 14:44 | 1025 | Peak | 0.0 | 0.0 | 20.8 | 10 | 120 | 0.0 | 0.96 | |
| | | | Steady | 0.0 | 0.0 | 20.8 | | | 0.0 | | |
| WS2 | 14:52 | 1025 | Peak | 0.0 | 0.6 | 20.5 | 30 | 120 | 0.0 | 1.12 | |
| | | | Steady | 0.0 | 0.2 | 20.6 | | | 0.0 | | |
| WS4 | 14:37 | 1025 | Peak | 0.0 | 1.6 | 19.9 | 15 | 120 | 0.0 | 1.41 | |
| | | | Steady | 0.0 | 1.6 | 19.9 | | | 0.0 | | |
| Ambient | | | | 0.0 | 0.0 | 20.8 | | | | | |

Notes

Cell is highlighted in the following conditions

1. Where Methane exceeds 1% v/v (after BR212)
2. Where Carbon Dioxide exceeds 5% v/v (after BR212)
3. Where Oxygen is below 16% (Coal Authority guidance)

Where cell is highlighted further consideration of the recorded value is required in accordance with the specified guidance documents

NA - Not Applicable/ Not Available

BOH - Bottom of Hole

ND - Not Determined

NGW - No groundwater encountered

NR - None Recorded

GeoDyne

**APPENDIX XIV**

**Conditions & Limitations**

# Conditions & Limitations

**Phase I Desk Studies**

1. Works undertaken to provide the basis of the Phase I Desk Study report comprise a review of information available from a number of sources/parties (potentially also including the Client) together with a walk over of the site (where applicable and included within the quotation). The opinions given in the Phase I Desk Study are based on the information available from third parties/sources that has been obtained within the available timeframe. GeoDyne Limited assumes all third party information to be true and correct and therefore cannot accept liability for the accuracy of such information supplied.

2. Should additional information become available that may affect the comments and opinions made within the Phase I Desk Study, GeoDyne Limited reserves the right to review such information and make modifications to comments/opinions as appropriate.

3. It should be borne in mind that a Phase I Desk Study collates available information to generate a conceptual model of the site. The actual geotechnical and environmental considerations can only be fully quantified by intrusive investigation works to confirm the accuracy of the conceptual site model.

**Phase II Intrusive Investigations**

1. Our quotation assumes that access to the site will be arranged by others at no cost to ourselves.

2. We have assumed that free access is available throughout to the entire site and that works can be undertaken during a single mobilisation. Where restricted access is encountered, or where additional unscheduled mobilisations are required, additional costs may be incurred to the client.

3. We have assumed that all available information relating to buried services will be supplied by the Client at no cost to ourselves. No responsibility will be accepted for damage to underground services that have not been brought to our prior attention by the Client.

4. All excavations/boreholes will be backfilled with compacted arisings upon completion, with any excess arisings left proud of ground levels. Excess arisings will not be removed from the site unless specifically requested by the Client. Where we are requested to remove excess arisings, all associated costs will be passed to the Client.

5. We will attempt to leave the site in a clean and tidy state, however, it must be understood that some disturbance of the site is unavoidable during intrusive works.

6. Exploratory holes are positioned approximately on site by GeoDyne Limited. Should the client require precise locations of all exploratory points, additional fees will be incurred. It must be borne in mind that backfilled trial pits can create ‘soft spots’, therefore, should the Client wish to designate ‘no dig’ zones, for example under the footprint of proposed structures, these must be brought to our attention prior to commencement of works.

7. Groundwater observations relate to conditions encountered at the time of investigation. It must be understood that groundwater levels may vary as a result of recent climatic conditions or seasonal variation.

8. Trial pits and boreholes examine only a small proportion of the total site area. No liability can be accepted for conditions not revealed in exploratory holes, particularly between positions. All extrapolations of available data are given in good faith.

**Payment**

1 Payment terms are strictly 28 days from the invoice date.

2 Prior to commencement of works, we require receipt of formal written instruction from the party accepting full financial responsibility for the work. In the absence of such an instruction, we would expect the instructing Consulting Engineers/Architects to accept full financial responsibility for the works.

3 Receipt of instruction to commence work shall be taken as acceptance and compliance of the foregoing conditions.

**Liability**

1. GeoDyne Limited offer £5,000,000.00 Professional Indemnity Insurance (in aggregate over the year). This shall be the limit of our liability for works undertaken. No individual liability shall be implied to, or accepted by, any employee for works undertaken for and on the behalf of GeoDyne Limited.