



Preliminary Investigation Report

at

St Helens Close, Cowley, Middlesex UB8 3SZ

for

Philip Pank Partnership

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Prepared by

T A Stempt BSc, MSc, FGS



First check by

Eur Ing R B Higginson BSc, PGDip, CEng, MICE, FGS.



Second check by

This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Commission

Soils Limited was commissioned by Philip Pank Partnership to undertake a Preliminary Investigation on St Helens Close, Cowley, Middlesex UB8 3SZ. The scope of the investigation was outlined in the Soils Limited quotation reference Q21684 dated 25th of July 2019

Caveat

Whilst reasonable skill and care has been taken to determine the site history and the environmental setting within the time constraints applied by the project, it should be appreciated that uncertainties may occur owing to the natural variability of soil material within a defined area or as a result of unknowns that are associated with contaminated land assessment in general. The site conditions may be different from that indicated by this Preliminary Investigation, particularly on a site with a history of past development. No responsibility can be accepted should such conditions alter the recommendations made in this report.

This Preliminary Investigation does not include a detailed UXO risk assessment, it does however contain a basic assessment in accordance with CIRIA C681. In preparing a Preliminary Investigation reference is made to historical maps and web-based sources to assess the risk of the site potentially having been impacted by bombing during the World Wars. The data readily available is not necessarily definitive. Certain areas were bombed heavily such as centres of industrial manufacture, airfields, shipyards, docklands, railways sidings and junctions. The assessment is based on the likely area risk, bomb patterns (i.e. lines of recorded bomb impacts with gaps where an impact would be anticipated) and the age of structures on and in close proximity to the site.

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Section I Introduction

I.1 Objective

The Preliminary Investigation Report was undertaken to advise the client on the risk pertaining to the site, with special reference to historic and current potential contaminative activities and processes. This also included the assessment of their impact on current and future sensitive receptors such as human health, controlled waters, ecological features, building structures and services.

I.2 Site Location

The site was located at St Helens Close, Cowley, Middlesex UB8 3SZ and had an O.S Land Ranger Grid Reference of TQ 05771 81528.

The site location map is presented in Figure 1 and the full Site Walkover is discussed in Section 2.1 of this report.

I.3 Proposed Development

The proposal comprised the removal of the existing concrete and tarmac hardstanding, a low wall on the eastern boundary and the concrete bollards to prevent vehicular access on site. It was proposed to construct one detached and four semi-detached two storey domestic houses. Each of the proposed properties were to have their own private rear gardens and some also included green front public open spaces, each property would also have their own allocated parking spaces.

In compiling this report reliance was placed on drawings 1955 P-02:1955 P-07 dated December 2019 drawn by MEPK Architects. Any change or deviation from the scheme outlined in the drawing could invalidate the recommendations presented within this report. Soils Limited must be notified about any such changes.

The proposed development plans have been provided in Appendix A.

I.4 Legislation and Liability

The primary legislative mechanism for contaminated land management in the UK is Part 2A of the Environmental Protection Act, 1990 (EPA). Part 2A was introduced into the EPA under Section 57 of the Environment Act 1995 to help deal with the substantial legacy of land contamination. The legislation provides powers in relation to the identification, remediation and apportionment of liability for contaminated land. Part 2A applies where there is unacceptable risk, assessed on the basis of the current use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission.

Under Part IIA of the Environment Act 1995, Local Authorities are required to identify contaminated land and serve on every person who is an appropriate person a

remediation notice setting out what is to be done by way of remediation and the period within which it must be done.

If the person who caused, or knowingly permitted, the contaminating substance cannot be found, the owner and/or, occupier for the time being, of the property can be the appropriate person.

Under the legislation, Contaminated Land is defined as: -

“Land which is in such a condition by reason of substances in, on or under the land that significant harm is being caused or that there is a significant possibility of such harm being caused or that pollution of controlled waters is being, or is likely to be caused.”

Where the Act defines harm as:

“harm to the health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property.”

and pollution of controlled waters is defined as: -

“the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter.”

In addition, The Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 introduced the supplementary definition of harm to include: lasting exposure to any person resulting from the after-effects of a radiological emergency, past practice or past work activity.

With regard to contaminated waters, the Environment Act 1995 amends the Water Resources Act 1991 and provides the Environment Agency with the power to force clean-up of historical contamination by issuing a Works Notice, with remediation paid for by the responsible parties.

The Groundwater Regulations (1998) stated that entry of List 1 substances into groundwater must be prevented, and List II substances must be controlled.

1.5 Limitations and Disclaimers

This Preliminary Investigation Report relates to the site located at St Helens Close, Cowley, Middlesex UB8 3SZ and was prepared for the sole benefit of Philip Pank Partnership (The “Client”) for the brief described in the Commission of this report.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report has been prepared by Soils Limited, with all reasonable skill, care and

diligence within the terms of the contract with the Client, incorporation of our General Conditions of Contract of Business and taking into account the resources devoted to us by agreement with the Client.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

There may be other sources of information not included in those listed that hold data relevant to the Preliminary Investigation Report undertaken at the site that could materially affect the conclusions made in this report.

Ownership of land brings with it onerous legal liabilities in respect of harm to the environment. "Contaminated Land" is defined in Section 57 of the Environment Act 1995.

Where a contaminative use is identified in the Preliminary Investigation Report this does not determine whether contamination has actually occurred, or if it has the degree to which it may have taken place. An intrusive investigation(s) and analysis is required to establish the nature and degree of any contamination present.

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Section 2 Site Conditions

2.1 Site Walkover

A site walkover was undertaken in Nov 2020, by Soils limited. During the site walkover observations were made in relation to current activities, evidence of historical activities, sources of potential contamination such as fuel storage tanks, oil drums and chemical storage and evidence of contamination. The walkover also looked for evidence of soil contamination in the form of staining odours and stressed or discoloured vegetation. The notes of the site walkover are presented in Table 2.1 and Table 2.2.

Table 2.1 Site Walkover Record (On-site)

Use of Site	Unused area of land covered by hard standing, slightly overgrown with moss.
Structures	Concrete bollards and a roughly 50cm high brick wall along the eastern edge of the site preventing vehicular access to the site from St Helen's Close.
Site Topography	Slightly sloping down to the east by around 2 degrees according to Google Earth data.
Site covering	Mostly covered by concrete and tarmacadam with some areas of grass on the eastern edge of the site.
Vegetation	Some weeds and shrubs were growing between the cracks in the concrete.
Potential Contamination Sources	None noted.
Odour	None noted.
Drainage	Some manhole covers noted on the site. Site surface water assumed to run off into St Helen's Close where it would be intercepted by surface drainage.
Notes:	

Table 2.2 Site Walkover Record (Off-site)

Use of Land	Private domestic housing in all directions from the site.
Area Topography	The area was dipping down to the south according to ordnance survey contours on the OS Water Network Maps in Appendix D.
Vegetation	Some mature trees immediately adjacent to the site to the west in the neighboring domestic gardens.
Potential Contamination Sources	None noted.
Notes:	

2.2 Site Drainage

Assumed to run off to St Helen's Close where it will be intercepted by surface drainage, which are anticipated to be connected to the mains system.

2.3 Site Photographs

The site photographs have been included within Appendix F.

Section 3 Geology, Hydrogeology, Hydrology and Radon

3.1 Anticipated Geology

The 1:50,000 BGS Geology map showed the site to be situated on the London Clay Formation bedrock, with overlying superficial deposits of the Lynch Hill Gravel Member. The geological map also shows squared sections of “missing” overlying Langley Silt Member, the site itself was located within one of these squared areas. It is likely that the Langley Silt Member was historically excavated out from the site and surrounding area, but may still be present.

3.1.1 Langley Silt Member

The Langley Silt Member, which was formerly known as Brickearth, comprises a geologically recent deposit of brown structureless sandy clay of limited thickness that is usually associated with the underlying River Terrace Gravels. Its former name is derived from its former use in the manufacture of bricks.

The name Brickearth has been applied to sandy superficially deposited soils of differing origins covering soliflucted deposits, stratified estuarine deposits and colluvial sediments.

The name Langley Silt Member has been applied to the deposits that are thought to be in their original position.

3.1.2 Lynch Hill Gravel Member

The rivers of the south-east of England, including the River Thames and its tributaries, have been subject to at least three changes of level since Pleistocene times. One result has been the formation of a complex series of River Terrace Gravels. These terraces represent ancient floodplain deposits that became isolated as the river cut downwards to lower levels.

The Lynch Hill Gravel Member approximates to the third level terrace gravel. The composition of the River Terrace Gravel varies greatly, depending on the source material available in the river's catchment. Deposits generally consist of sand and gravel of roughly bedded flint or chert gravel commonly in a matrix of silt and clay.

3.1.3 London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The upper boundary member of the London Clay Formation is known as the Claygate Member and marks the transition between the deep water, predominantly clay environment and succeeding shallow-water, sand environment of the Bagshot Formation.

The lower boundary is generally marked by a thin bed of well-rounded flint gravel and/or a glauconitic horizon. The formation overlies the Harwich Formation or where the Harwich Formation is absent the Lambeth Group.

In the north London area the upper part of the London Clay Formation has been disturbed by glacial action and may contain pockets of sand and gravel.

3.2 Hydrogeology

To assess the vulnerability of groundwater to contamination, consideration must be given to the leaching characteristics of the overlying soils and the characteristics of the strata in the unsaturated zone. Information on the geological strata such as lithological type and permeability characteristics has been combined with the physical properties of the soil to produce varying degrees of vulnerability.

Table 3.1 presents the hydrological data that is relevant to the site.

Table 3.1 Hydrogeological Assessment

Hydrogeological Data		Comment
On-site Aquifers	Superficial	Langley Silt Member- Unproductive Strata ² Lynch Hill Gravel Member- Principal Aquifer ¹
	Bedrock	Unproductive Strata ²
	Groundwater Vulnerability	High ³
Source Protection Zones (SPZ)		NE 875m Zone II
Abstraction	Potable	1188m E
	Non-potable	700m S
Sensitive land uses		188m E Area of adopted green belt
Surface Water Features		309m E River Pinn
Flood Risk from Rivers or Seas		None
Flood Risk from Surface Water		None on site, high immediately east of the site on St Helens Close
Flood Risk from Groundwater		Potential for groundwater flooding to occur for property situated below ground level.

Notes: ¹Principal Aquifer these are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer. ²Unproductive strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. ³Soils of high leaching potential.

Any works or development which has the potential to have an impact on surface water, aquifer or groundwater quality must be approved by the Environment Agency prior to implementation.

3.3 Hydrology

The approximate elevation of the site was ~30m Above Ordnance Datum (AOD). According to Ordnance Datum Contours on the OS Water Network Map. The anticipated groundwater flow direction is given in Table 3.2.

Table 3.2 Hydrological Assessment

Type	Direction	Notes
Surface water	E	In line with site topography
Groundwater	S	In line with wider topography towards the convergence of the River Pinn and Fray's River
Notes:		

3.4 Radon Gas

The site **was not situated** within an area where protection or risk assessment against the ingress of radon was required. Radon protection measures **will not be required** within the proposed new development. It is not possible in the course of a survey or inspection to determine whether radon gas is present as the gas is colourless and odourless. Tests can be undertaken to assess the concentration of radon in existing structures.

Section 4 Site History

4.1 Historic Map Study

The object of this study was to report on the evidence of site history and redevelopment of the site and its environs from available County Series and Ordnance Survey Maps dating from the mid to late 19th Century to the present day as downloaded from Landmark Environmental.

The published maps only represent a “snap shot” of the site and its environs at the date of the survey. The detail of the information recorded can vary between epochs, map scale and county areas. It should be noted that changes in land uses, processes or activities may have occurred outside of published epochs and these may not have been recorded on subsequent epochs. Also note that as methods of projection, production and recording have changed over time, this can result in geo-reference errors that may indicate the established site boundary is off-centre from its true location on older historical maps. Where this is potentially significant it will be noted.

Any distances quoted for features remote from the site have been scaled from the maps and are only approximate. Where dates have been noted in brackets, these are the actual dates applicable to the map editions and may not reflect the date of the original survey it is based on. The information reported might not represent all pertinent information that could be obtained. The interpretation of the maps and/or other data commented on in this report is subjective.

As part of the review of the historical plans, only features considered to have or to have had a potential contaminative impact on the site and usually within a notional 250m radius are discussed. The north point and approximate extent of the site are indicated on each figure. The historic maps referred to are appended to this report (Appendix B).

Table 4.1 Historic Development of the Site

Site History	Date Range	
	From	To
On the earliest available map, the site is a part of an agricultural field. Adjacent and to the east is a railway line called the Great Western Railway, the site remains as an undeveloped parcel of land adjacent to the Great Western Railway until 1960. The Railway was indicated to be within a cutting.	1868	1960
In 1963-1965 a series of private domestic garages are developed across the site. The site remains developed with domestic garages as the railway line is slowly removed with the cutting indicated to have been backfilled and developed upon. Around 1975 the site becomes bounded to the east by St Helens Close. Google earth historical aerial photography shows the garages to have been demolished and removed by 2005.	1963-1965	2005
The site remains an undeveloped parcel of land as it is at present (2020).	2005	2020
Notes:		

Table 4.2 Historic Off-site Development

Off-site Development	Date Range	
	From	To
On the earliest available map, the surrounding area can be described as rural, with only a few hamlets scattered about, the site was part on an agricultural field. Immediately east of the site was a railway line which headed north-south called the Great Western Railway which was indicated to be within a cutting. The surrounding area remains largely unchanged between 1868 and 1920.	1868	1920
A series of housing developments are constructed 400m south of the site adjacent to the railway line, a sewage works was developed 100m southeast of the site.	1914-1920	1935
By 1935 a second sewage works had been developed 100m northeast of the site and some housing was developed 80m southwest of the site.	1934-1935	1960
By 1960 the former sewage works were both redeveloped into housing alongside a huge development immediately west of the site, which incorporated the development of the domestic garages on site.	1963-1965	1966-1972
By 1966-1972 the railway line is no longer mapped but the cutting immediately east is still mapped as being present. 50m south of the site and continuing southwards the cutting is no longer mapped to be present which means it is likely to have been backfilled.	1966-1972	1971-1975
By 1971-1975 the backfilled railway line to the south has been developed with housing and roadways, and the cutting immediately east of the site looked to have been backfilled with St Helen's Close roadway now mapped in its present day location.	1971-1975	1990
By 1990 the current housing had been developed along St Helen's Close.	1990	2005
The domestic garages on site were demolished by 2005 according to Google Earth historical aerial imagery. No significant redevelopments were noted within the vicinity of the site between 2005-2020.	2005	2020
Notes:		

Table 4.3 Potential Sources of Pollution Indicated from Historic Maps

Source	Direction	Distance (m)	Date Range	
			From	To
Great Western Railway	W	1	1868	1963-1965
Sewage works	SE	100	1920	1963-1965
Sewage works	NE	100	1935	1963-1965
Potential made ground from backfill of railway	E	1	1963-1965	2020
Notes:				

4.2 Bomb damage and the potential for Unexploded Ordnance

As a part of the works a preliminary UXO report was ordered on behalf of the client from 1st Line Defence. This preliminary UXO report advised that a detailed UXO report would be needed. As low-resolution WWII-era aerial imagery depicts a circular depression within open land bordering/around the western vicinity of the site, east of Peachey Lane. This may be potentially indicative of cratering. Moreover, as the site area comprised open land during WWII it is anticipated that the site would have been infrequently accessed. Infrequent access may increase the risk that obvious signs of UXO, such as entry holes or craters, could go unnoticed and unreported.

Commissioning of the detailed UXO report is advised as the findings of a detailed survey may prevent the need for UXO watching brief during ground breaking activities.

Section 5 Environmental Records and Consultation

5.1 Dataset Information

The Landmark Envirocheck Report was obtained by Soils Limited and includes site specific information. The extent of the search has initially been limited to a radius of 250m as it is considered that sources of contamination beyond 250m are unlikely to impact on the site. This search radius may, however, be increased if a significant source of contamination or sensitive receptor is identified within 1000m of the site. A copy of the report is appended to this report in Appendix summarised in Table 5.1, Table 5.2 and Table 5.3.

Table 5.1 Environmental Significance of Data

Source	Direction	Distance (m)
Contaminated Land Register Entries and Notices	None	None
Discharge Consents	S	498 ¹
Integrated Pollution Prevention and Control	None	None
Local Authority Pollution Prevention and Controls		
Local Authority Pollution Prevention and Control Enforcements		
Nearest Surface Water Feature	E	309
Pollution Incidents to Controlled Waters (Significant Incidents only)	S	606 ²
Prosecutions Relating to Authorized Processes	None	None
Registered Radioactive Substances		
Substantiated Pollution Incident Register		
Nearest Potable Abstraction Point		
Nearest Non-Potable Abstraction Point		
Water Industry Act Referrals		
Source Protection Zones		
Extreme Flooding from Rivers or Sea Without Defences		
Flooding from Rivers or Sea Without Defences		
Areas Benefiting from Flood Defences		
Flood Water Storage Areas		
Flood Defences		
BGS Recorded Landfill Sites		
Historical Landfill Sites	SW	485 ³
Licensed Waste Management Facilities	None	None
Local Authority Recorded Landfill Sites		
Potentially Infilled Land (Non-Water)	SE	486 ⁴
Potentially Infilled Lane (Water)	SW	530 ⁴
Registered Landfill Sites	None	None
Registered Waste Transfer Sites		
Registered Waste Treatment or Disposal Sites	SW	841 ⁵
Control of Major Accident Hazards Sites (COMAH)	None	None
Notification of Installations Handling Hazardous Substances		
Planning Hazardous Substance Consents		

Notes: ¹Authorisation Revoked, ²Oils 1994, ³Deposited waste inert commercial and household ⁴Unknown infill ⁵Very Large (Equal to or greater than 250 000 tonnes per year) no known restriction on sources waste

Table 5.2 Potentially Contaminative Contemporary Trade Directory

Potentially Contaminative Contemporary Trade Directory within 250m	Direction	Distance (m)	Status
Waste Disposal Services	S	245	Inactive

Note:

Table 5.3 Geological Hazards

Source	Nearest Distance from Site/Type
Coal Mining Affected Areas	None Recorded
Mining Instability	None Recorded
Natural and Mining Cavities	None Recorded
Potential for Collapsible Ground Stability Hazards	0m NW/Very Low
Potential for Compressible Ground Stability Hazards	No Hazard
Potential for Ground Dissolution Stability Hazards	No Hazard
Potential for Landslide Ground Stability Hazards	0m NW/ Very Low
Potential for Running Sand Ground Stability Hazards	No Hazard
Potential for Shrinking or Swelling Ground Stability Hazards	0m E/Very Low

Notes:

5.2 Site Sensitivity Maps

No other significant potential sources of contamination were shown on the Landmark Envirocheck Site Sensitivity Maps, which have not been listed in Table 5.1, Table 5.2 and Table 5.3, and copies of which are appended to this report (Appendix C).

5.3 Regulatory Enquires

As part of the Preliminary Investigation Report the local authority was contacted and asked to provide any information on potential risks pertaining the site. A review of the local authority planning portal revealed a redevelopment of site on St Peter's Road had an indicated gas risk and also recorded CO₂ at 17.2% on an occasion. This report will be updated if a response is provided by or purchased from the local authority.

5.4 Soil Geochemistry

The BGS soil chemistry for environmental assessments dataset coverage, has been developed from BGS G-BASE and Imperial College Wolfson Atlas data. It contains estimated ambient As, Cd, Cr, Ni and Pb background concentrations for rural topsoils across Great Britain. It also contains the locations and measured concentrations (mg kg⁻¹) of As, Cd, Cr, Cu, Ni, Pb, Sn and Zn in urban topsoil samples, collected from geochemical surveys in 23 major urban centres.

The results of this survey are contoured on the Landmark Environmental check report (Appendix C).

The results of the local soil chemistry are presented in Table 5.4.

Table 5.4 Soil Geochemistry

Determinant	Indicated Soil Geochemistry (mg kg⁻¹)
Arsenic	15-25
Cadmium	<1.8
Chromium	60-90
Lead	150-300 ¹
Nickel	15-30

Note: ¹Indicated exceedances based on a residential with home grown produce land use scenario.

Section 6 Data Collection Summary

6.1 General

The findings of the data collection are summarised below:

Table 6.1 summarises the site Environs, which include geology, hydrogeology, the risk from radon and potential risk from flooding.

Table 6.1 Site Environs

Environs	Summary
Geology	Superficial deposits of the Lynch Hill Gravel Member overlying the London Clay Formation bedrock.
Hydrogeology	Lynch Hill Gravel Member classed as a Principal aquifer and could support shallow groundwater. The London Clay Formation bedrock was unproductive strata and act as an aquiclude to the deep groundwater regime.
Surface Water Flow	Anticipated to be east in line with site topography as the site is covered by hardstanding.
Groundwater Flow	South in line with wider topography and towards
Source Protection Zone (SPZ)	NE 875m Zone II, None on site
Radon	No radon risk.
Flooding	The site had the potential for groundwater flooding to occur for a property situated below ground level
Geological Hazard	Very low potential for collapsible ground stability hazards Very low potential for landslide ground stability hazards Very low potential for shrink and swell ground stability hazards
Local Authority Response	As part of the Preliminary Investigation Report the local authority was contacted and asked to provide any information on potential risks pertaining the site. This report will be updated if a response is provided by or purchased from the local authority.
Soil Chemistry	Potential exceedance of lead for a residential with home grown produce land use scenario.

Notes:

Table 6.2 provides a summary of potential on-site and off-site contamination sources identified during the study of the historic maps, the Landmark Envirocheck Dataset Report and the Site Walkover

Table 6.2 Summary of Potential Contamination Sources

Contaminative Sources/Environmental Impact	Direction¹	Distance (m)	Date Range		Data Source
On-Site			From	To	
None recorded	-	-	-	-	-
Off-Site					
Great western Railway	W	1	1868	1963-1965	HM
Sewage works	SE	100	1920	1963-1965	HM

Contaminative Sources/Environmental Impact	Direction ¹	Distance (m)	Date Range		Data Source
			From	To	
Sewage works	NE	100	1935	1963-1965	HM
Potential made ground from backfill of railway	E	1	1963-1965	2020	HM
Waste Disposal Services	S	245	Inactive		DS

Notes: SW – Site walkover, HM – Historic Maps, DS – Datasheet, GC – Geochemistry, LA – Local Authority, GE Google Earth

Section 7 Preliminary Conceptual Site Model

7.1 General

Environment Agency guidance provided in CLR11 indicates that the Conceptual Site Model should identify those contaminants, pathways and receptors which are 'likely' to represent an 'unacceptable' risk either to human health or the surrounding environment. The following sections present potential contaminants, pathways and receptors based on the information collected during the desktop study. Pathways have been established based on scientific knowledge of the behaviour of the contaminants in the ground.

7.2 Sources and Pathways of Contamination

The Landmark Site Specific Envirocheck Report and Site Walkover have been used to identify potential contaminative sources. These sources have been presented in Table 6.2. An assessment of the likely pathways and the likelihood of each contaminative source that was considered a risk has been presented in Sections Potential Pathways to 7.2.5

7.2.1 Potential Pathways

A review of the potential pathways on and off the site has been undertaken based on the site, ground conditions, hydrology and scientific knowledge of the behaviour of the contaminants in the ground. The pathways applicable to the site and the proposed development have been marked in Table 7.1.

Table 7.1 Applicable Pathways

Pathway	Present	Comment
Inhalation of dust	✓	Possible during construction and future use
Inhalation of vapour/gases	✓	Possible if a source is identified
Ingestion and absorption via direct contact	✓	Possible during construction and future use
Migration via surface runoff	✓	Possible due to the presence of hardstanding
Migration in solution via groundwater	✓	Possible due to the permeable Lynch Hill
Migration of gases via permeable soils	✓	Gravel Member
Direct contact with construction material	✓	
Services and Utilities	✓	Possible

Notes:

7.2.2 Potential Sources of On-site Contamination.

A study of Landmark Envirocheck Report and Site Walkover has identified the following potential on-site sources of contamination which may present a risk to future uses of the proposed development. The sources have presented in Table 7.2

Table 7.2 On-site Potential Contamination Sources

Source	Likely	Reasoning
None Recorded	-	-

Notes:

7.2.3 Potential Off-site Sources of Contamination

A study of Landmark Envirocheck Report and Site Walkover has identified the following potential off-site sources of contamination which may present a risk to future uses of the proposed development.

These sources have been presented in given in Table 7.3.

Table 7.3 Off-site Potential Contamination Sources

Source	Direction	Distance (m)	Likely	Reasoning
Great western Railway	W	1	✓	Likely due to the pollution from steam engines, spillages of oil burning of coal and use of asbestos in breaks.
Sewage works	SE	100	✓	Potential source of ground gas
Sewage works	NE	100	✓	Potential source of ground gas
Potential made ground from backfill of railway	E	1	✓	Unknown backfill within former railway cutting.
Waste Disposal Services	S	245		Distance from site and groundwater flowing south

Notes:

7.3 Potential Contaminants

To ascertain the chemicals associated with identified potential onsite and offsite sources, the Department of the Environment Industry Profiles have been reviewed. In cases where the DOE profiles have no, or limited information other sources have been reviewed detailing the processes involved in the activity carried out on-site.

Table 7.4 presents the range of possible contaminants associated with the onsite and off-site activities and sources identified following a review of historical maps and datasets.

Table 7.4 Potential Contaminants

Potential Contaminative Sources ¹	Contaminants Chemical Properties
Backfill of railway cutting/Made Ground	Metals, Semi-metals and non-metals, PAHs, TPHs, Asbestos, pH, Ground Gases
Former Sewage works	Ground Gases

Notes: ¹Includes Activities and Processes

7.4 Potential Exposure Receptors

The receptors to any potential contamination have been evaluated from our understanding of the current and planned land use of the site, an assessment of surrounding land uses and currently available information pertaining to the site.

The assessment for potential receptors is presented in Table 7.5.

Table 7.5 Potential Receptors

Potential Receptor	Present
Human Health	Future users of the site ✓
	Construction workers on-site ✓
	Service and maintenance workers ✓
	Site neighbours and wider public ✓
Groundwater/Controlled Waters	Surface Water ✓ ¹
	Groundwater/Future Potable Water Supply ✓
Buildings & Materials	Buildings and confined spaces ✓
	Construction materials ✓
	Services and Utilities (e.g drinking water pipes) ✓
Ecosystems	Flora and fauna

Notes: ¹In areas of hard standing only

7.5 Preliminary Conceptual Site Model and Risk Assessment

A preliminary risk assessment has been undertaken based on the proposed development. The assessment has been based on the likelihood of the presence of a pollutant linkage.

A pollutant linkage is the relationship between a contaminant source, a pathway and a receptor. Unless all three elements of a pollutant linkage are present, a risk is not considered to exist. Each of the three elements has been considered within Table 7.1 to Table 7.5. The preliminary conceptual site model and risk assessment is presented in Table 7.6. The classification tables on which the level of risk has been determined have been modified from 'Contaminated land risk assessment: A guide to good practice, 2001, CIRIA C552' and are presented in Appendix G.

Table 7.6 Preliminary Conceptual Site Model and Risk Assessment Methodology

Source (See Table 7.2 and Table 7.3)	Potential Contaminant (See Table 7.4)	Exposure Pathway (See Table 7.1)	Receptor (See Table 7.5)	Initial Assessment from Preliminary Investigation Report Information			Comments	Proposed Investigation	
				Severity	Probability	Risk			
Backfill of former railway cutting/ Made Ground On-site historic and current site usage.	Metals, Semi-metals and non-metals, PAHs, Asbestos	Inhalation of dust	Site Workers/Site Maintenance	Medium	Low	Moderate/Low	Site located on superficial deposits of the Lynch Hill Gravel Member, which is classified as a principal aquifer, The bedrock of the London Clay Formation was classified as unproductive strata and would act as an aquiclude to the deeper groundwater receptors.	Main ground investigation to confirm the ground conditions present and chemical testing prior to undertaking a generic quantitative risk assessment.	
			End Users	Medium	Low	Moderate/Low			
			Off-site Users	Medium	Unlikely	Low			
	TPHs, Ground Gas	Inhalation of Vapour/gases	Site Workers/Site Maintenance	Mild	Low	Low	Surface water run-off is only anticipated in areas of hardstanding. Permeable deposits of the Lynch Hill Gravel Member create a pathway for the migration of ground gases.		
			End Users						
			Off-site Users	Minor	Unlikely	Very low			
	Metals, Semi-metals and non-metals, PAHs, TPHs, pH	Ingestion and absorption via direct contact	Site Workers/Site Maintenance	Medium	Unlikely	Low			
			End Users	Medium	Low	Moderate/Low			
	Metals, Semi-metals and non-metals, PAHs, TPHs, pH	Migration via surface runoff	Surface Water	Medium	Unlikely	Low			
		Migration in solution via groundwater	Surface Water	Medium	Unlikely	Low			
			Shallow Aquifer	Medium	Low	Moderate/Low			
			Deep Aquifer	-	-	-			
		Direct contact with construction material	Buried structures	Mild	Low	Low			
			Buried Services						
	TPHs, Ground Gas	Migration of gases via permeable soils	Site Workers/Site Maintenance	Medium	Low	Moderate/Low			
			End Users						
			Off-site Users	Medium	Low	Moderate/Low			
			Building and confined spaces						
Former Sewage works (Off site historical source)	TPHs, Ground Gas	Migration of gases via permeable soils	Site Workers/Site Maintenance	Medium	Low	Moderate/Low	Site located on superficial deposits of the Lynch Hill Gravel Member, which is classified as a principal aquifer, The bedrock of the London Clay Formation was classified as unproductive strata and would act as an aquiclude to the deeper groundwater receptors.	Main ground investigation to confirm the ground conditions present and chemical testing prior to undertaking a generic quantitative risk assessment.	
			End Users						
			Off-site Users	Medium	Low	Moderate/Low			
			Building and confined spaces						
							Surface water run-off is only anticipated in areas of hardstanding. Permeable deposits of the Lynch Hill Gravel Member create a pathway for the migration of ground gases.		

Section 8 Recommendations

8.1 General

Based on the information obtained during the compilation of this Preliminary Investigation and the preliminary conceptual site model, a potential for a **low/moderate** risk of contamination has been identified, an intrusive investigation is therefore considered to be necessary to further quantify the risks identified. Any subsequent intrusive investigation may reveal additional on-site sources of contamination that were not identified in the Preliminary Investigation and Site Walkover. Any additional sources of contamination or unexpected ground conditions that may promote the migration of contamination will be included and assessed in terms of significance within an updated Conceptual Site Model.

8.2 UXO

As a part of the works a preliminary UXO report was ordered on behalf of the client from 1st Line Defence. This preliminary UXO report advised that a detailed UXO report would be needed. As low-resolution WWII-era aerial imagery depicts a circular depression within open land bordering/around the western vicinity of the site, east of Peachey Lane. This may be potentially indicative of cratering. Moreover, as the site area comprised open land during WWII it is anticipated that the site would have been infrequently accessed. Infrequent access may increase the risk that obvious signs of UXO, such as entry holes or craters, could go unnoticed and unreported. The Preliminary UXO Report can be found in Appendix D.

Commissioning of the detailed UXO report is advised as the findings of a detailed survey may prevent the need for UXO watching brief during ground breaking activities.

8.3 Proposed Further Site Works

An intrusive investigation is considered necessary to quantify the potential risks and remaining uncertainties that have been identified within the preliminary CSM. The preliminary CSM identifies the test parameters relevant to the sources that have a pathway to a receptor. Dependant on the findings of an intrusive investigation the test parameters may be modified. The intrusive investigation will be designed to investigate and assess the pollutant linkages identified in the preliminary Conceptual Site Model.

The general requirements for further environmental investigation are presented in Table 8.1.

Table 8.1 Proposed Further Environmental Investigation

Proposed Works	General Purpose	Required
Investigatory Holes	To collect sufficient samples for a robust assessment	✓
Laboratory Testing	To quantify the risks identified in the Conceptual Site Model	✓

Proposed Works	General Purpose	Required
Risk Assessment	Assess pollutant linkages based on current contaminated land guidance and screening criteria's	✓
Borehole well installation	To allow for continued groundwater and/or gas monitoring	✓ ¹
Remediation	If the site-specific risk assessment reveals that the site was contaminated	✓ ²
Validation & Verification	To validate and verify the remedial objectives based on the site-specific risk assessment	✓ ²

Notes: ¹Gas monitoring will be required ²Dependant on the outcome of the Main Investigation Report

8.4 Discovery Strategy

There may be areas of contamination not identified during the course of the investigation. Such occurrences may also be discovered during the demolition and construction phases for the redevelopment of the site.

Care should be taken during excavation works especially to investigate any soils which appear by eye (e.g. such as fibrous materials, large amounts of ash and unusual discolouration), odour (e.g. fuel, oil and chemical type odours or unusual odours such as sweet odours or fishy odours) or wellbeing (e.g. light headedness and/or nausea, burning of nasal passages and blistering or reddening of skin due to contact with soil) to be contaminated or of unusual and/or different character to standard soils or those analysed.

In the event of any discovery of potentially contaminated soils or materials, this discovery should be quarantined and reported to the most senior member of site staff or the designated responsible person at the site for action. The location, type and quantity must be recorded, and the Local Authority and a competent and appropriate third-party Engineer/Environmental consultant notified immediately. An approval from the Local Authority must be sought prior to implementing any proposed mitigation action.

The discovery strategy must remain on-site at all times and must demonstrate a clear allocation of responsibility for reporting and dealing with contamination. A copy of the strategy must be placed on the health and safety notice board and /or displayed in a prominent area where all site staff are able to take note of and consult the document at any time. Any member of the workforce entering the site to undertake any excavation must be made aware of the potential to discover contamination and the discovery strategy.



Figure 1 – Site Location Map

Job Number

18255

Project

St Helens Close, Cowley, Middlesex UB8 3SZ

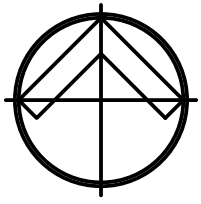
Client

Philip Pank Partnership

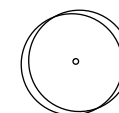
Date

November 2020

Appendix A Proposed Development Plans



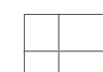
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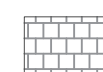
New tree



Hedgerow



Precast slabs



Precast setts



Shrubs



Grass

DRAFT

rev date

Planning

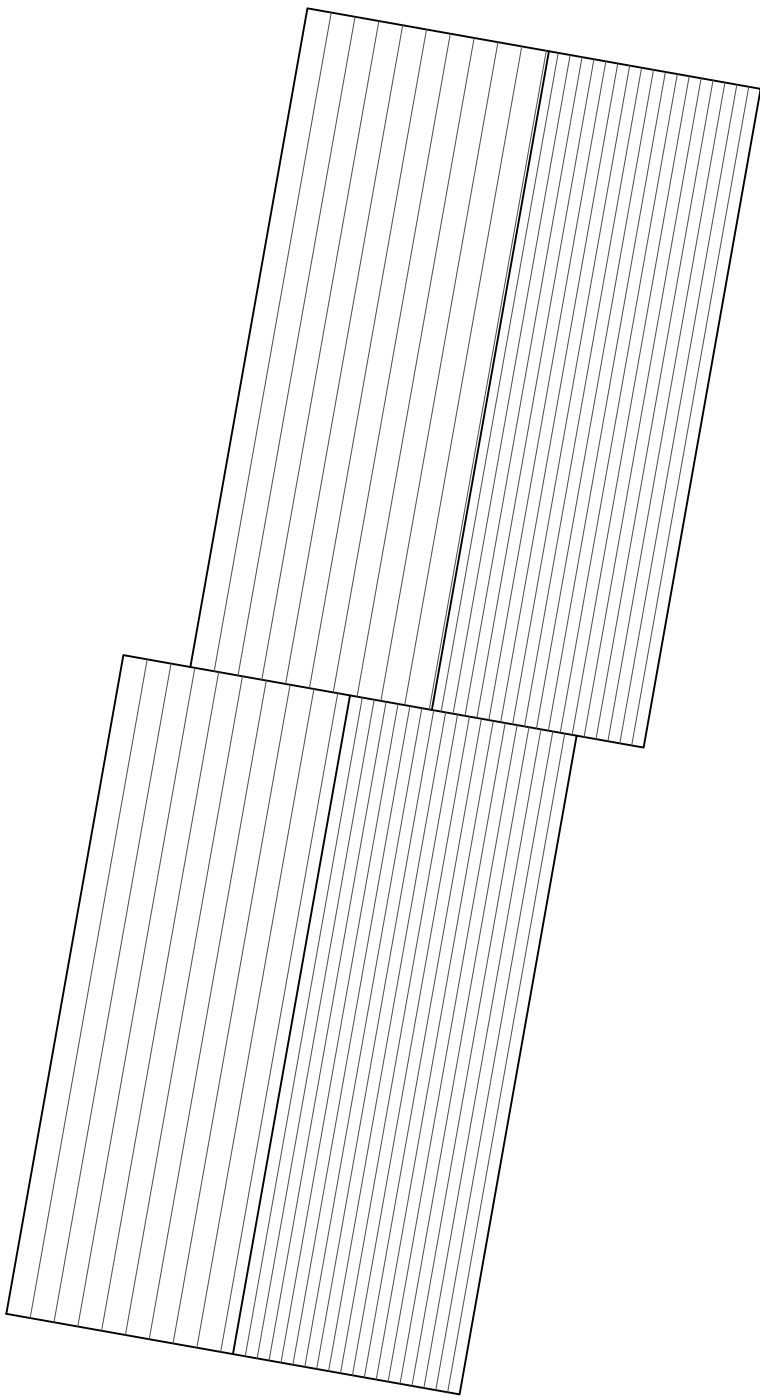
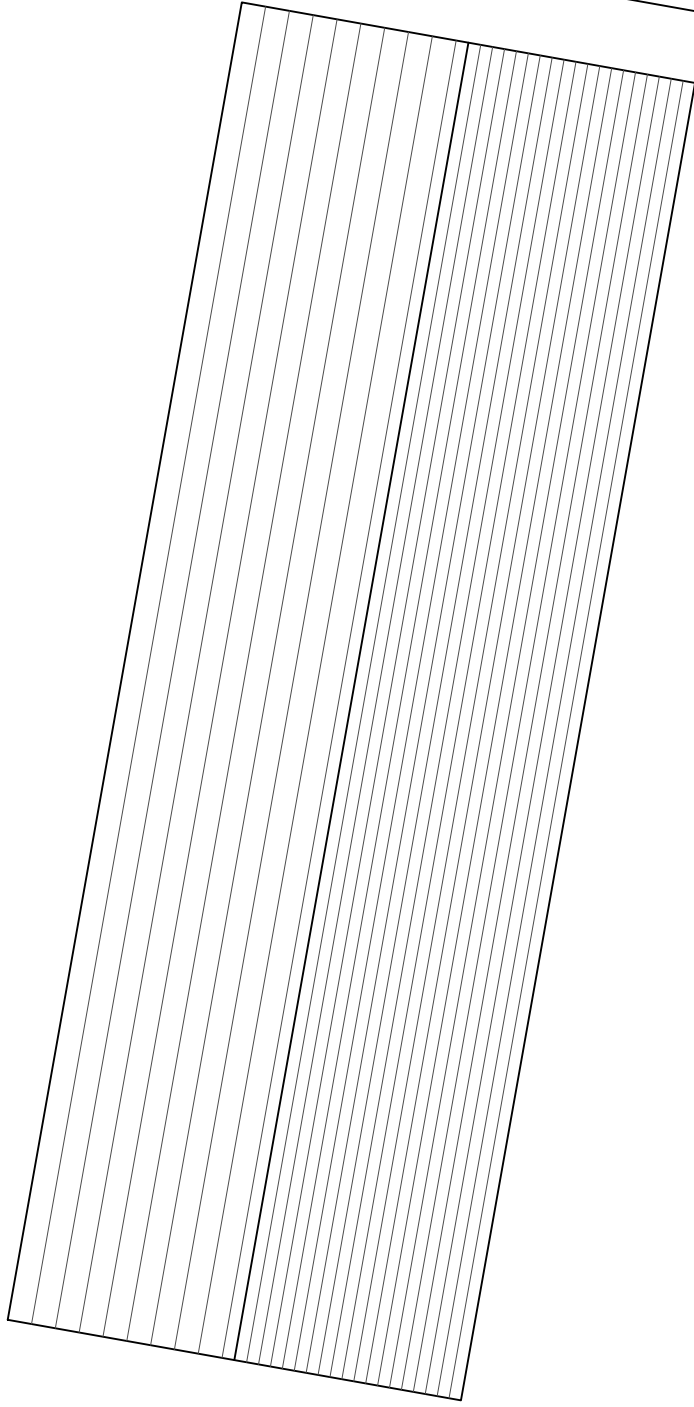
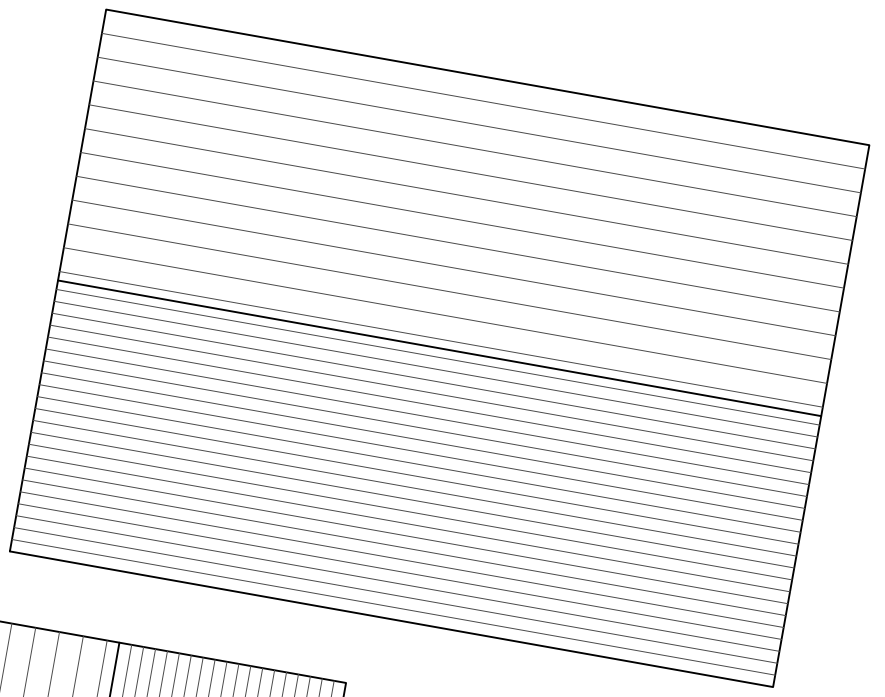
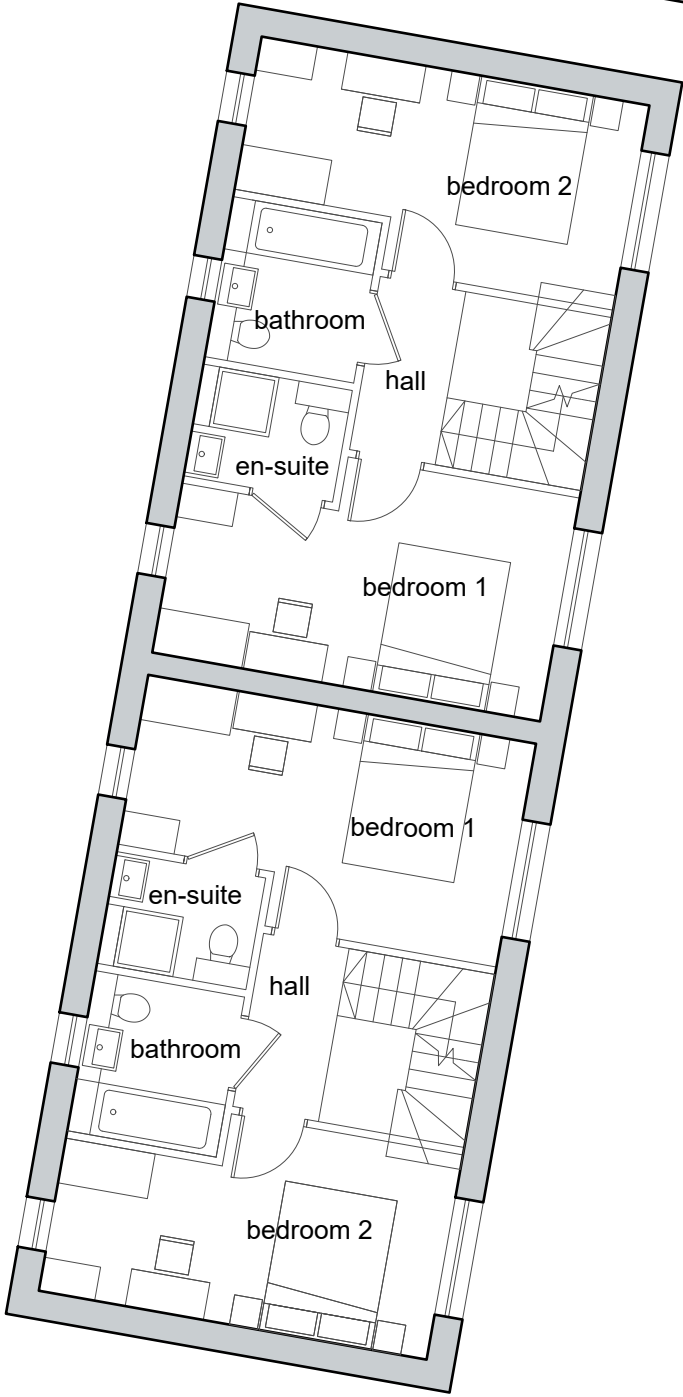
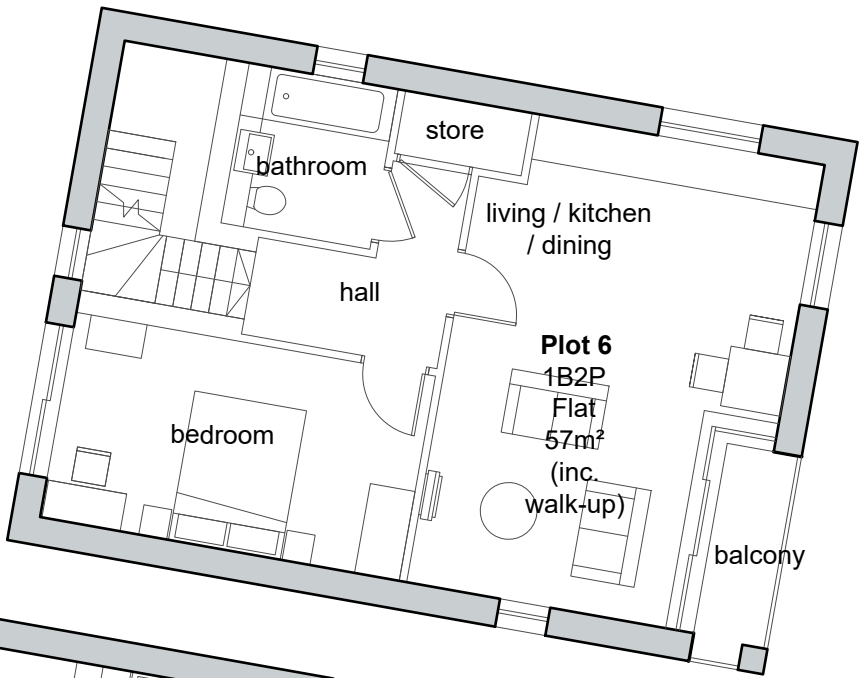
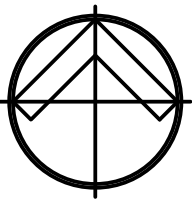
St Helen Close, Cowley UB8
Site layout and ground floor plan

drawn checked

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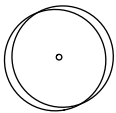
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KEY



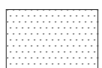
New tree



Shrubs



Hedgerow



Grass



Precast slabs



Precast setts

rev date

drawn checked

Planning

St Helen Close, Cowley UB8
First floor and roof plans

drawing number	revision	scale @ A2	date	drawn	checked
1955 P-03	-	1:100	12.12.19	JS	SC

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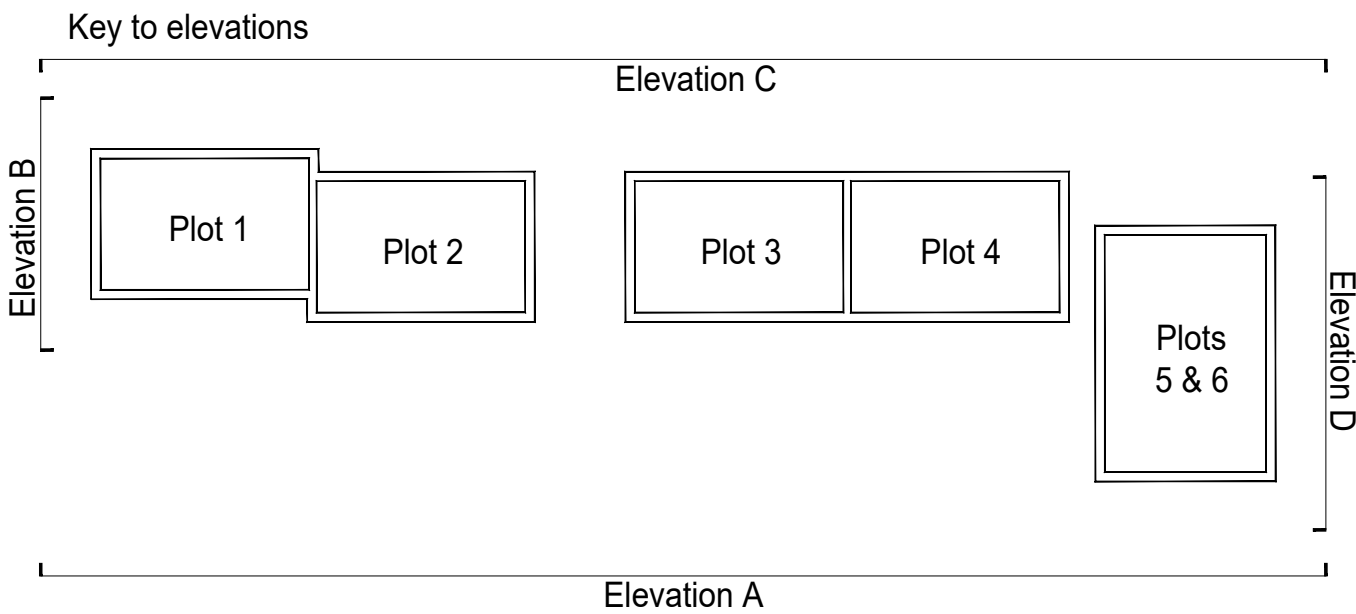




East Elevation (A)



West Elevation (C)



0 1 2 3 4 5 6 7 8 9 10m
Scale @ 1:100

Material Schedule

External walls:

- Chalky / buff multi stock brick

Roofs:

- Concrete tiles
- Dark grey PPC aluminium rainwater pipes and gutters to match windows
- Zinc Dormers
- Dark grey PPC faced canopy over flat block entrances

Windows and doors:

- Dark grey PPC aluminium generally
- Front entrance door timber composite - colour TBC

Balconies

- Dark PPC mild steel metalwork

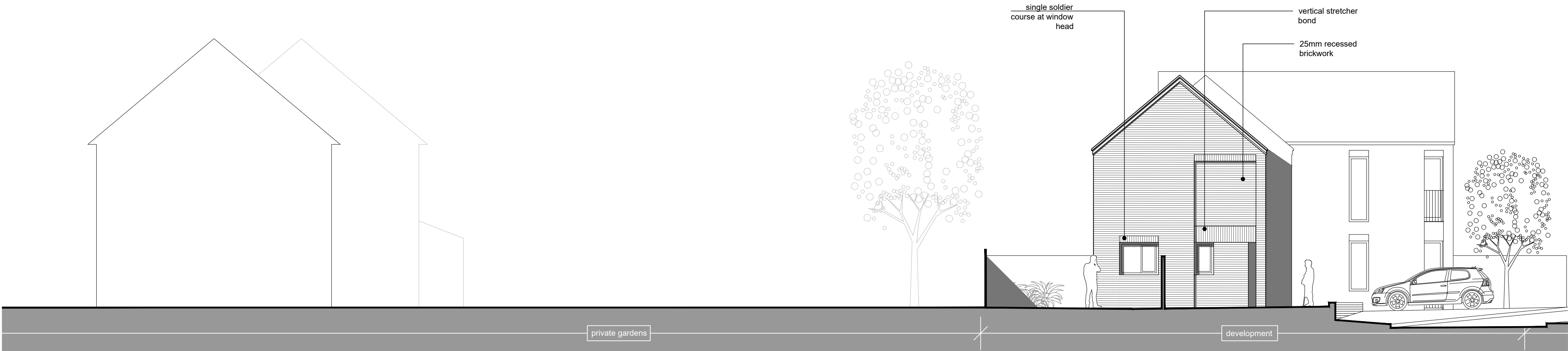
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Planning
St Helen Close, Cowley UB8
Elevations
Sheet 1

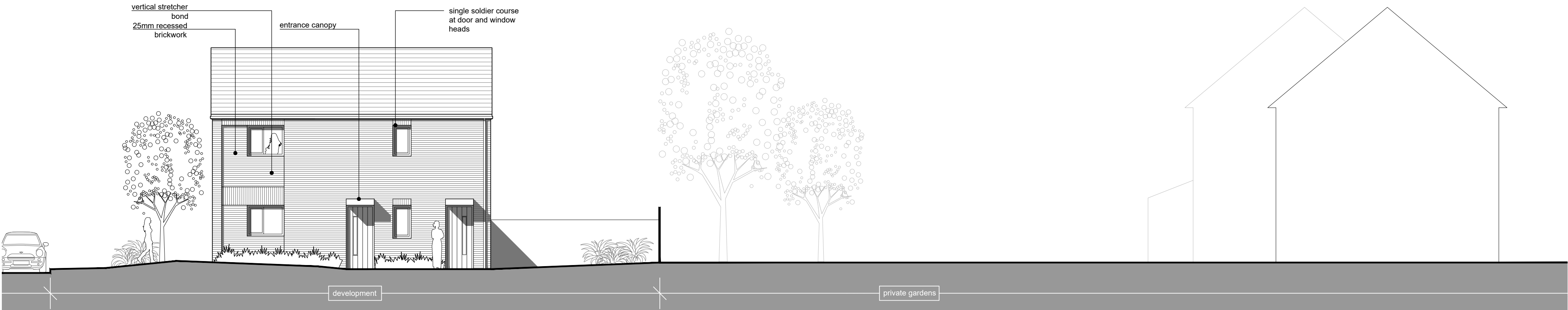
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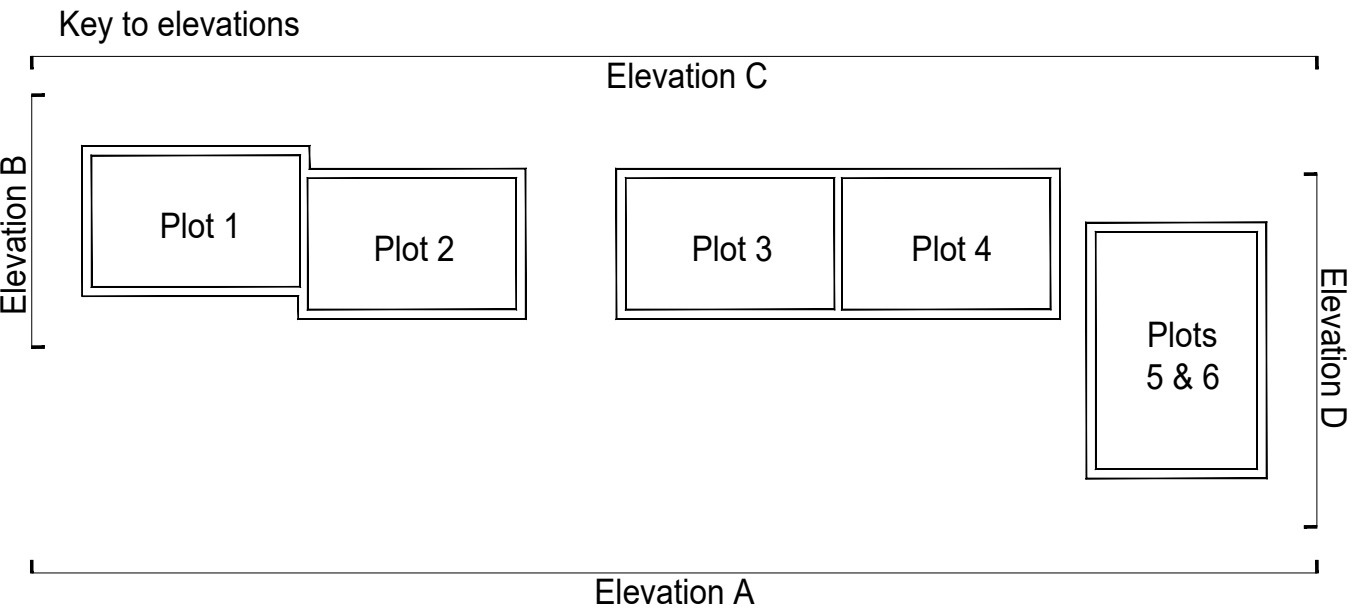




South Elevation (B)



North Elevation (D)



0 1 2 3 4 5 6 7 8 9 10m
Scale @ 1:100

Material Schedule

External walls:

- Chalky / buff multi stock brick

Roofs:

- Concrete tiles
- Dark grey PPC aluminium rainwater pipes and gutters to match windows
- Zinc Dormers
- Dark grey PPC faced canopy over flat block entrances

Windows and doors:

- Dark grey PPC aluminium generally
- Front entrance door timber composite - colour TBC

Balconies

- Dark PPC mild steel metalwork

rev	date	description	drawn	checked
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Planning
St Helen Close, Cowley UB8
Elevations
Sheet 2

drawing number	revision	scale @ A2	date	drawn	checked
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Aerial view looking north-west



View looking north-west

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rev date description drawn checked

Planning

St Helen Close, Cowley UB8

3D Impressions

Sheet 1

drawing number	revision	scale @ A3	date	drawn	checked
1955 P-06	-	NTS	23.01.20	JS	SC

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View looking south-west



Aerial view looking south-east

DRAFT

rev	date	description	drawn	checked
-----	------	-------------	-------	---------

Planning

St Helen Close, Cowley UB8

3D Impressions

Sheet 2

drawing number	revision	scale @ A3	date	drawn	checked
1955 P-07	-	NTS	12.12.19	JS	SC

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Appendix B Country Series and Ordnance Survey Maps

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		
	Surface Level				
	Sketched Contour		Instrumental Contour		
	Main Roads		Minor Roads		
	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				
	County Borough Boundary (England)				
	County Burgh Boundary (Scotland)				
	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
	Bracken		Heath
	Marsh		Reeds
	Building		Glasshouse
	Sloping Masonry		Pylon
	Cutting		Embankment
	Road Under		Road Over
	Level Crossing		Foot Bridge
	Standard Gauge Multiple Track		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
	Civil Parish		
	Boundary Post or Stone		Police Station
	Church		Post Office
	Club House		Public Convenience
	Fire Engine Station		Public House
	Foot Bridge		Signal Box
	Fountain		Spring
	Guide Post		Telephone Call Box
	Mile Post		Telephone Call Post
	Mile Stone		Well

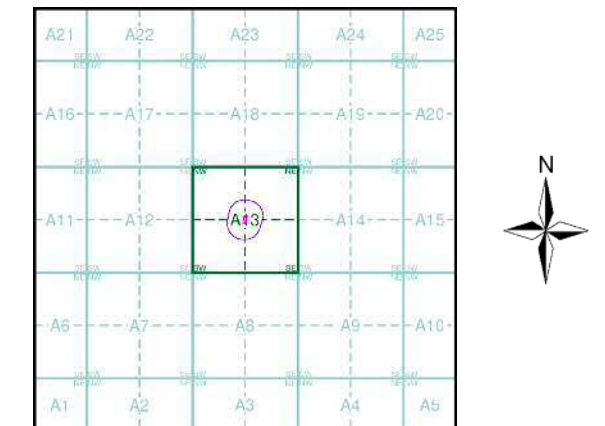
1:10,000 Raster Mapping

	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
	Mean high water (springs)		Mean low water (springs)
	Telephone line (where shown)		Electricity transmission line (with poles)
	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

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Middlesex	1:10,560	1868	3
Buckinghamshire	1:10,560	1881	4
Middlesex	1:10,560	1897	5
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Historical Aerial Photography	1:10,560	1948	13
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10K Raster Mapping	1:10,000	1999	21
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VectorMap Local	1:10,000	2020	23

Historical Map - Slice A



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Search Buffer (m): 1000

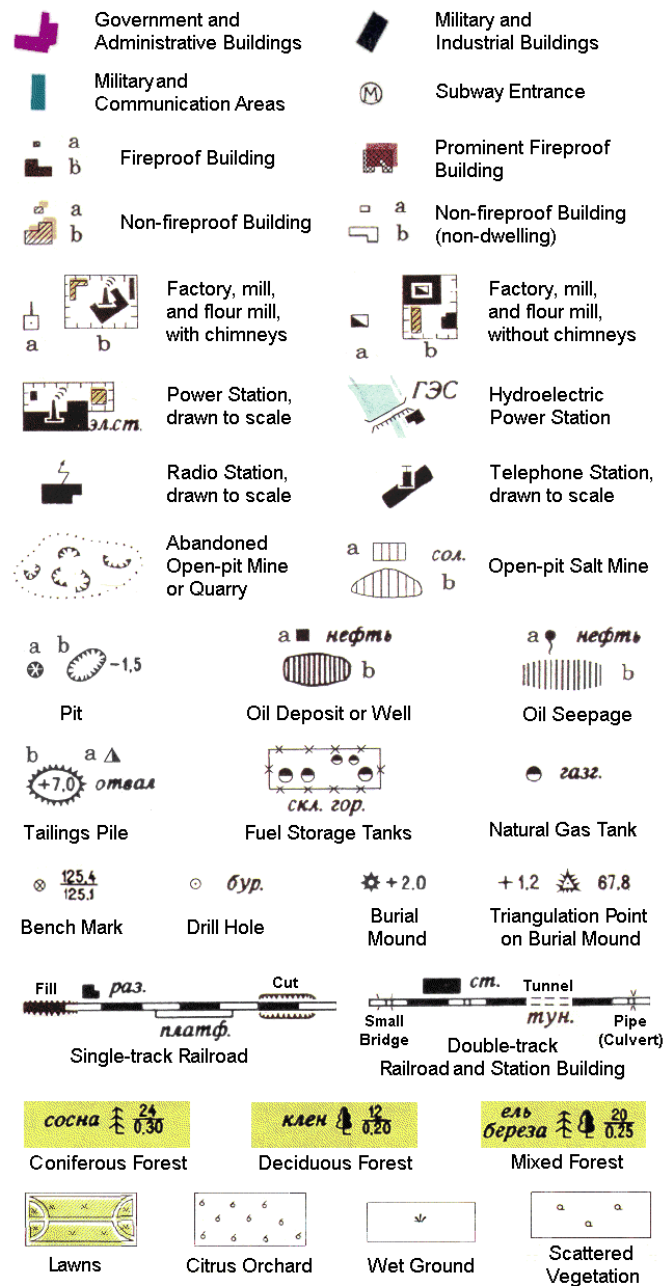
Site Details

St Helens Close, Cowley, UXBRIDGE, UB8 5SZ

Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale



243.8 Values for prominent elevations

186.0 Numbers for spot elevations, depth soundings, contour lines, etc.

0.2 Velocity of the current, width of river bed, depth of river

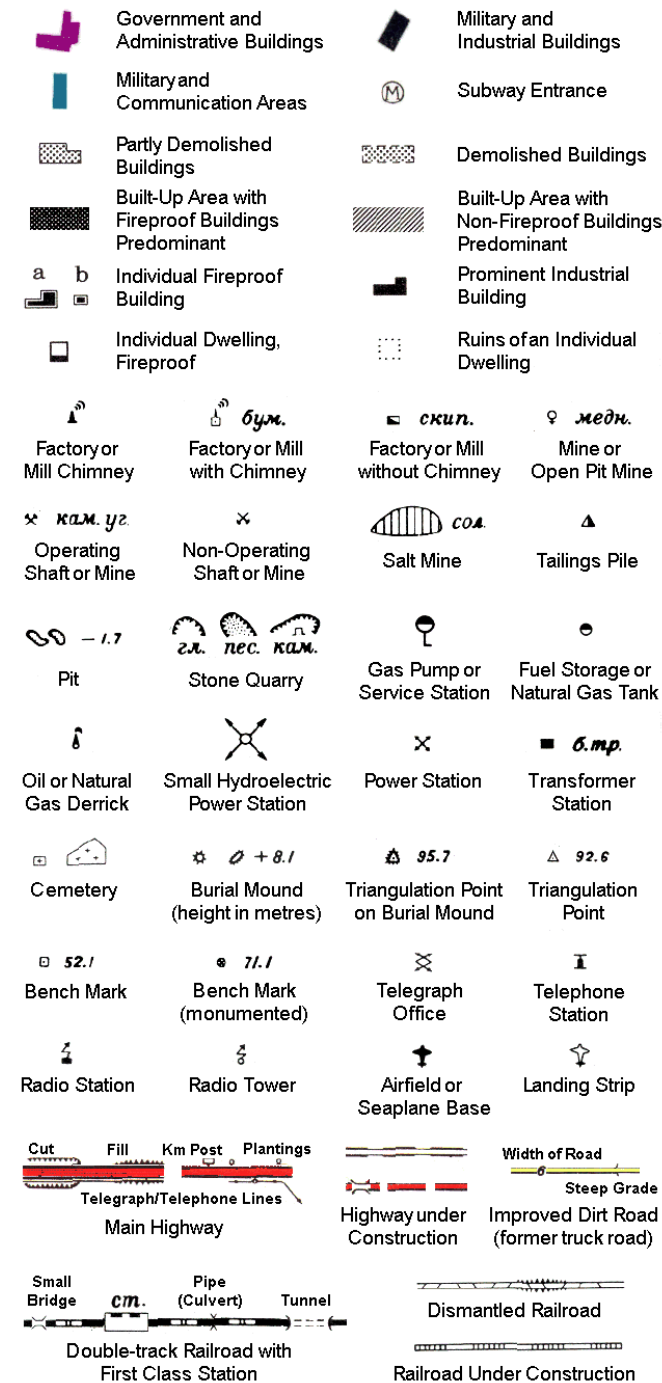
180/12 Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A)	З з (Z)	П п (P)	Ч ч (CH)
Б б (B)	И и (I)	Р р (R)	Ш ш (SH)
В в (V)	Й й (Y)	С с (S)	Щ щ (SHCH)
Г г (G)	К к (K)	Т т (T)	Ъ (-)
Д д (D)	Л л (L)	У у (U)	Ы (Y)
Е е (E)	М м (M)	Ф ф (F)	Ь (')
Ё ё (YO)	Н н (N)	Х х (KH)	Э э (E)
Ж ж (ZH)	О о (O)	Ц ц (TS)	Ю ю (YU or IU)
			Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale



Key to Numbers on Mapping

TQ08_London

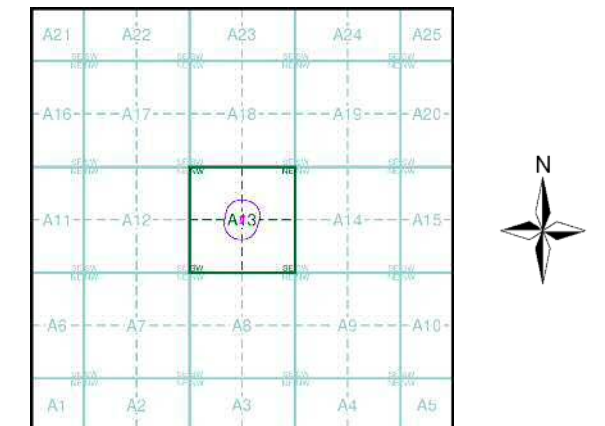
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193	Chemical Plant



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
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Middlesex	1:10,560	1897	5
Buckinghamshire	1:10,560	1900	6
Middlesex	1:10,560	1920	7
Buckinghamshire	1:10,560	1932	9
Middlesex	1:10,560	1935	10
Middlesex	1:10,560	1938	11
Middlesex	1:10,560	1938	12
Historical Aerial Photography	1:10,560	1948	13
Historical Aerial Photography	1:10,560	1948	14
Ordnance Survey Plan	1:10,000	1960	15
Ordnance Survey Plan	1:10,000	1970 - 1974	16
Ordnance Survey Plan	1:10,000	1977	17
London	1:25,000	1985	18
Ordnance Survey Plan	1:10,000	1988	19
Ordnance Survey Plan	1:10,000	1990	20
10K Raster Mapping	1:10,000	1999	21
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VectorMap Local	1:10,000	2020	23

Russian Map - Slice A



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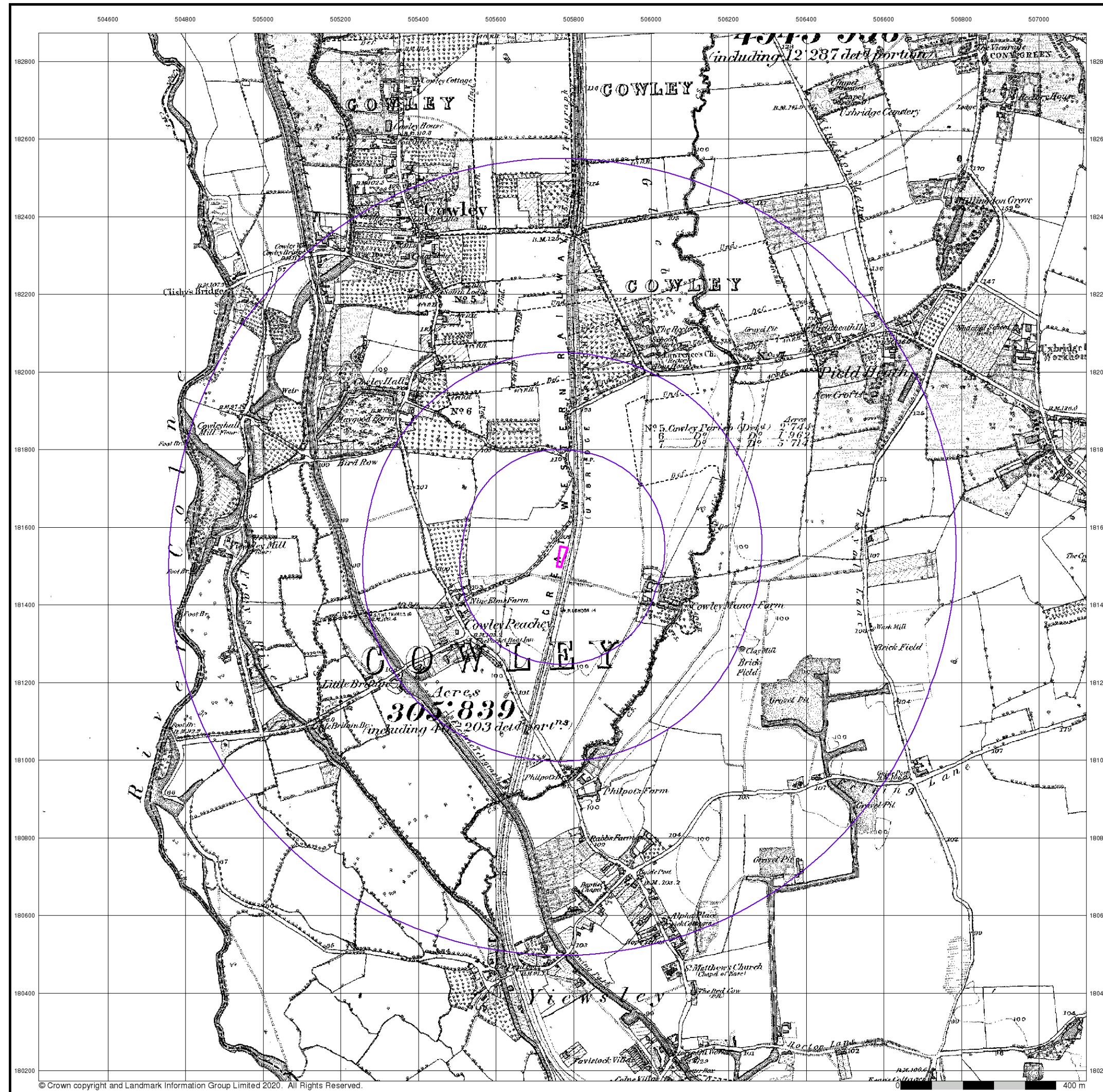
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Customer Ref: 18255
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Slice: A
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Search Buffer (m): 1000

Site Details

St Helens Close, Cowley, UXBRIDGE, UB8 5SZ



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Fax: 0844 844 9951
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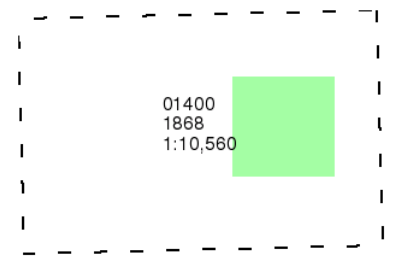
Middlesex

Published 1868

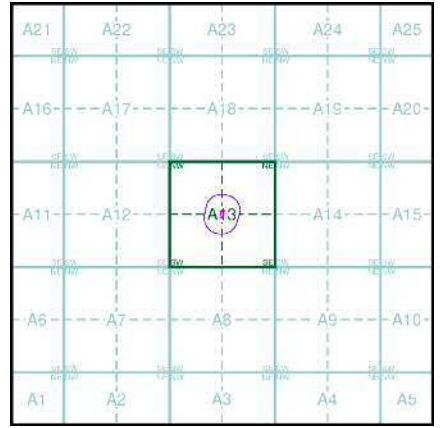
Source map scale - 1:10,560

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

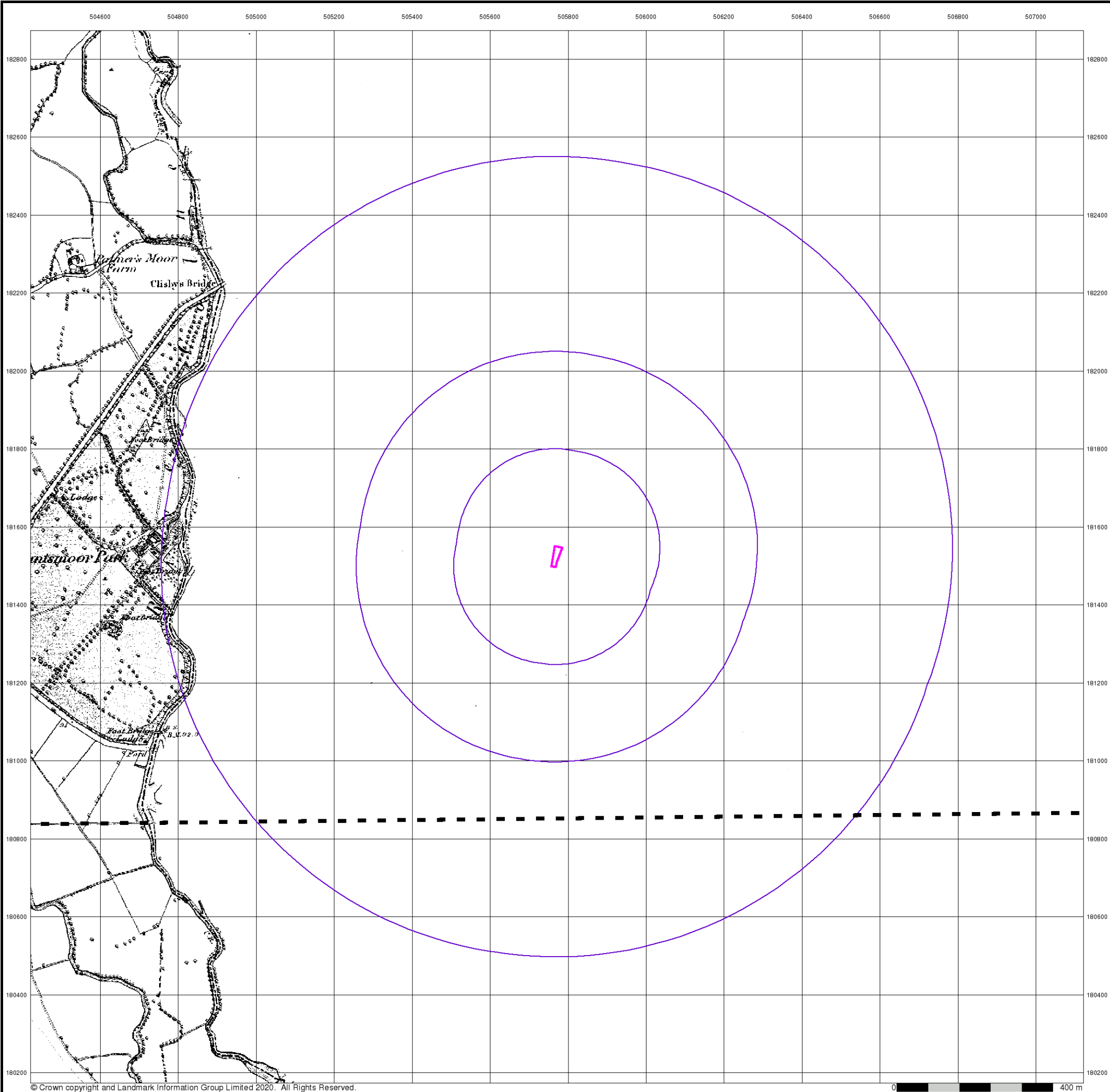
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Customer Ref: 18255
National Grid Reference: 505770, 181520
Slice: A
Site Area (Ha): 0.08
Search Buffer (m): 1000

Site Details

St Helens Close, Cowley, UXBRIDGE, UB8 5SZ



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



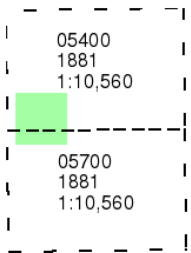
Buckinghamshire

Published 1881

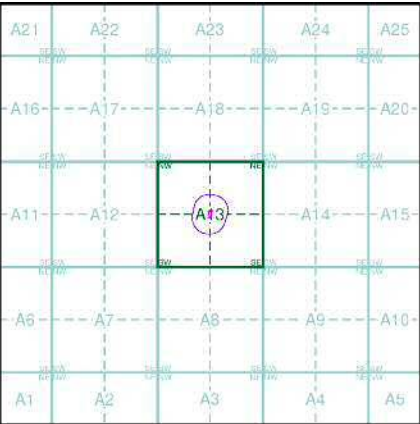
Source map scale - 1:10,560

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.

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