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**Grid Ref:** 526895, 184672

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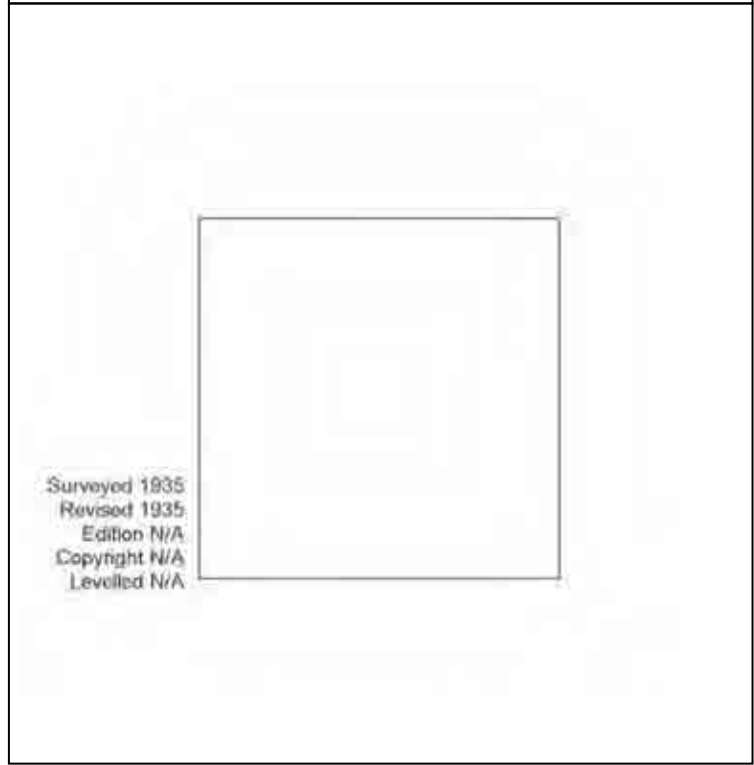
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**Grid Ref:** 526895, 184672

**Map Name:** 1056 Scale Town Plan

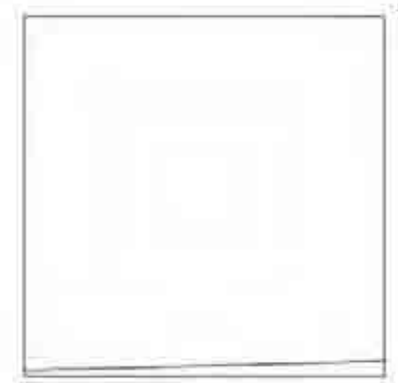
**Map date:** 1919

**Scale:** 1:1,056

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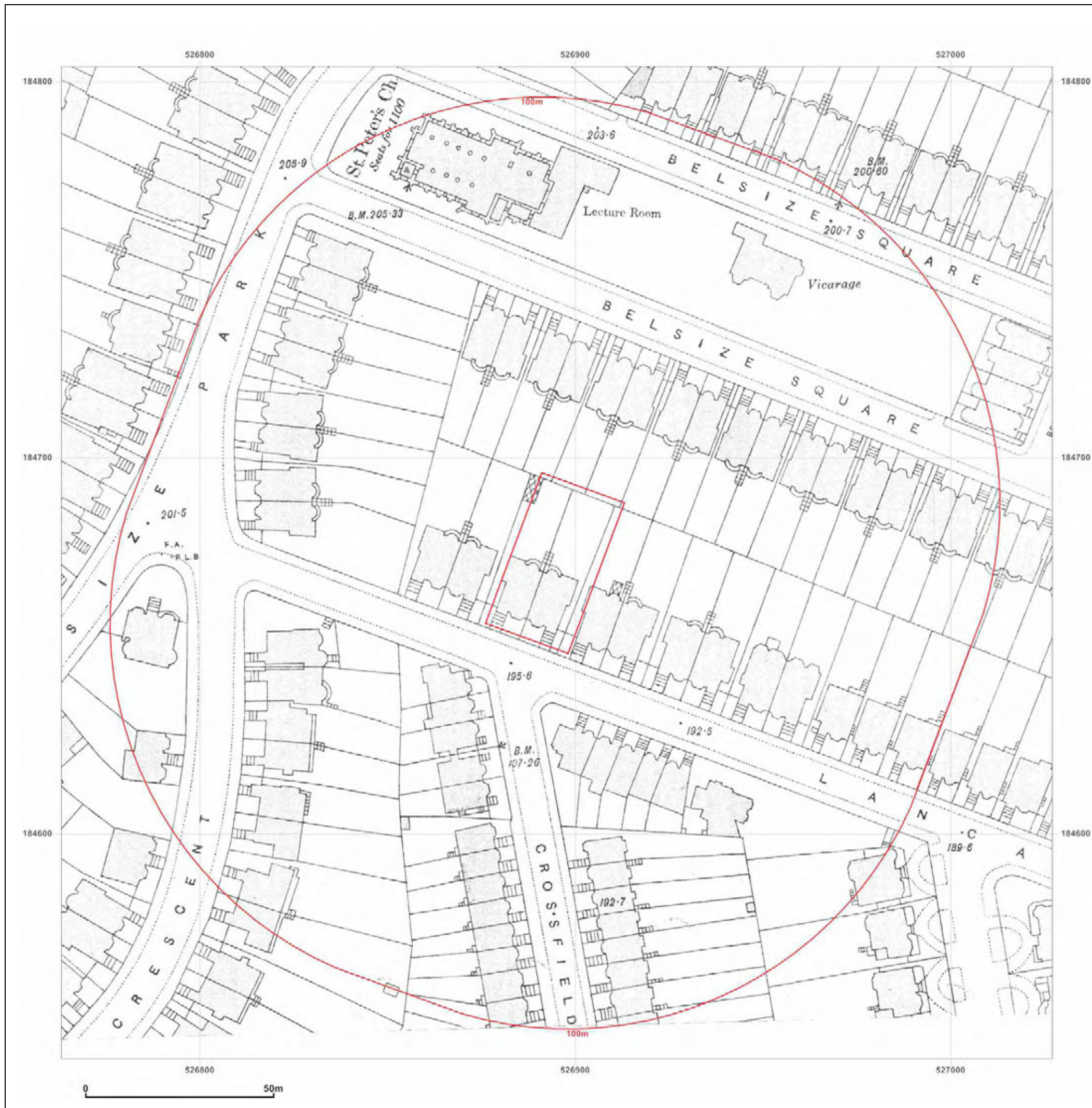


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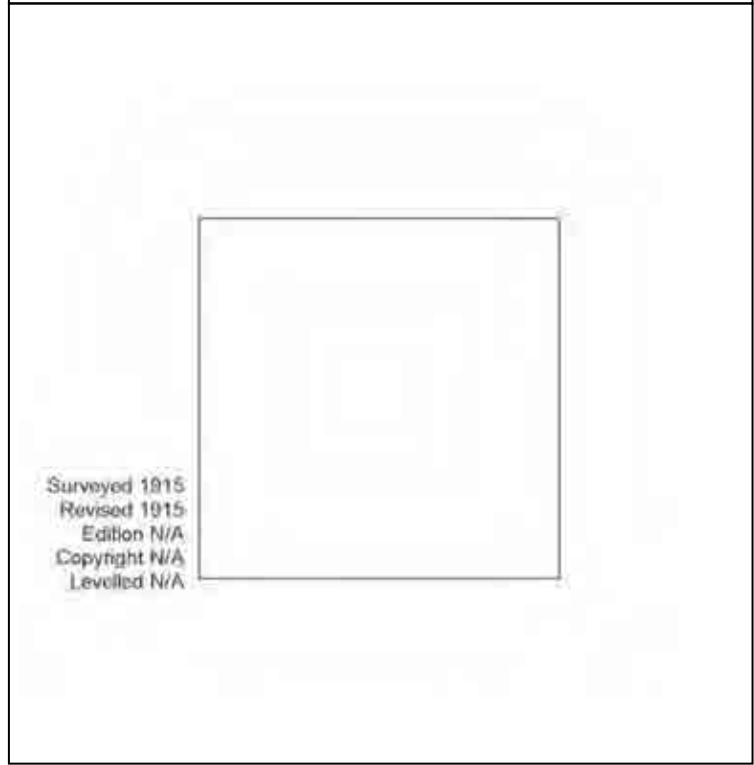
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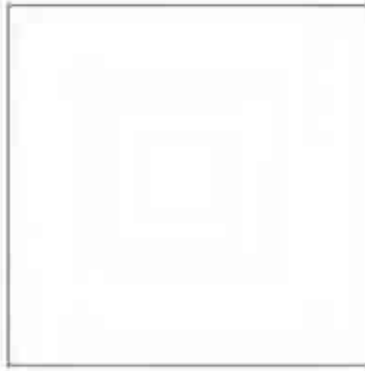


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**Grid Ref:** 526895, 184672

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**Map date:** 1896  
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**Report Ref:** HYD-1205803  
**Grid Ref:** 526895, 184672

**Map Name:** 1056 Scale Town Plan

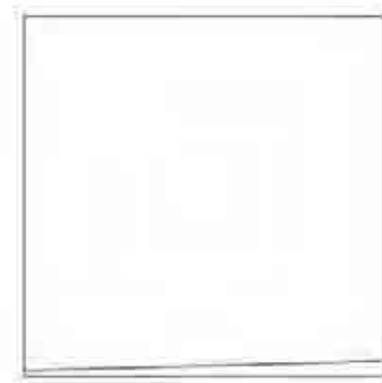
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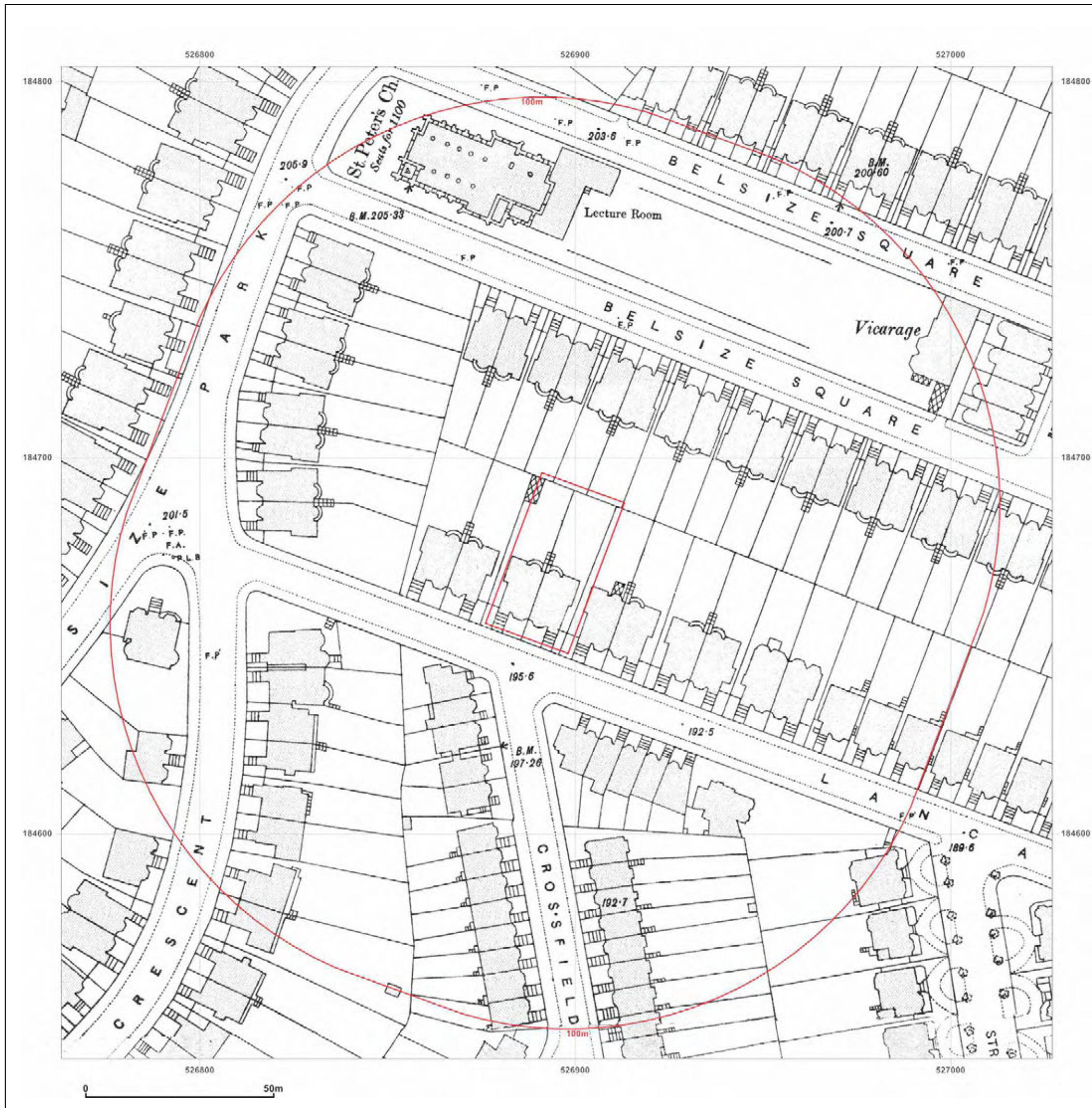


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**Client Ref:** PO N5092 / C13868  
**Report Ref:** HYD-1205803  
**Grid Ref:** 526895, 184672

**Map Name:** 1056 Scale Town Plan

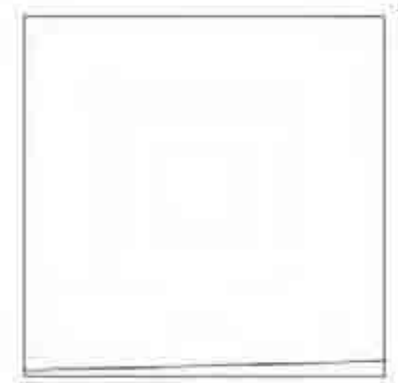
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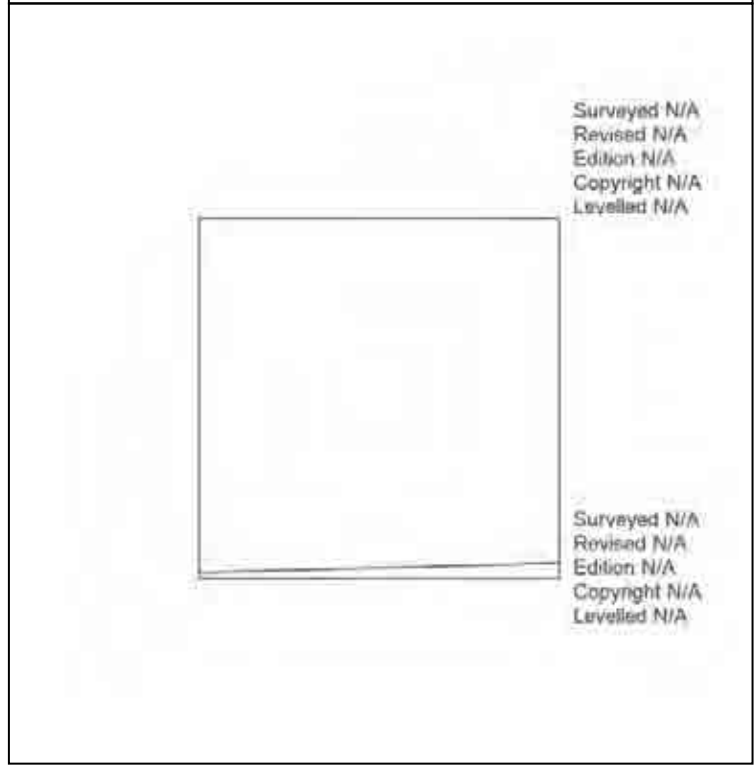
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**Report Ref:** HYD-1205803  
**Grid Ref:** 526895, 184672

**Map Name:** 1056 Scale Town Plan

**Map date:** 1871

**Scale:** 1:1,056

**Printed at:** 1:1,056



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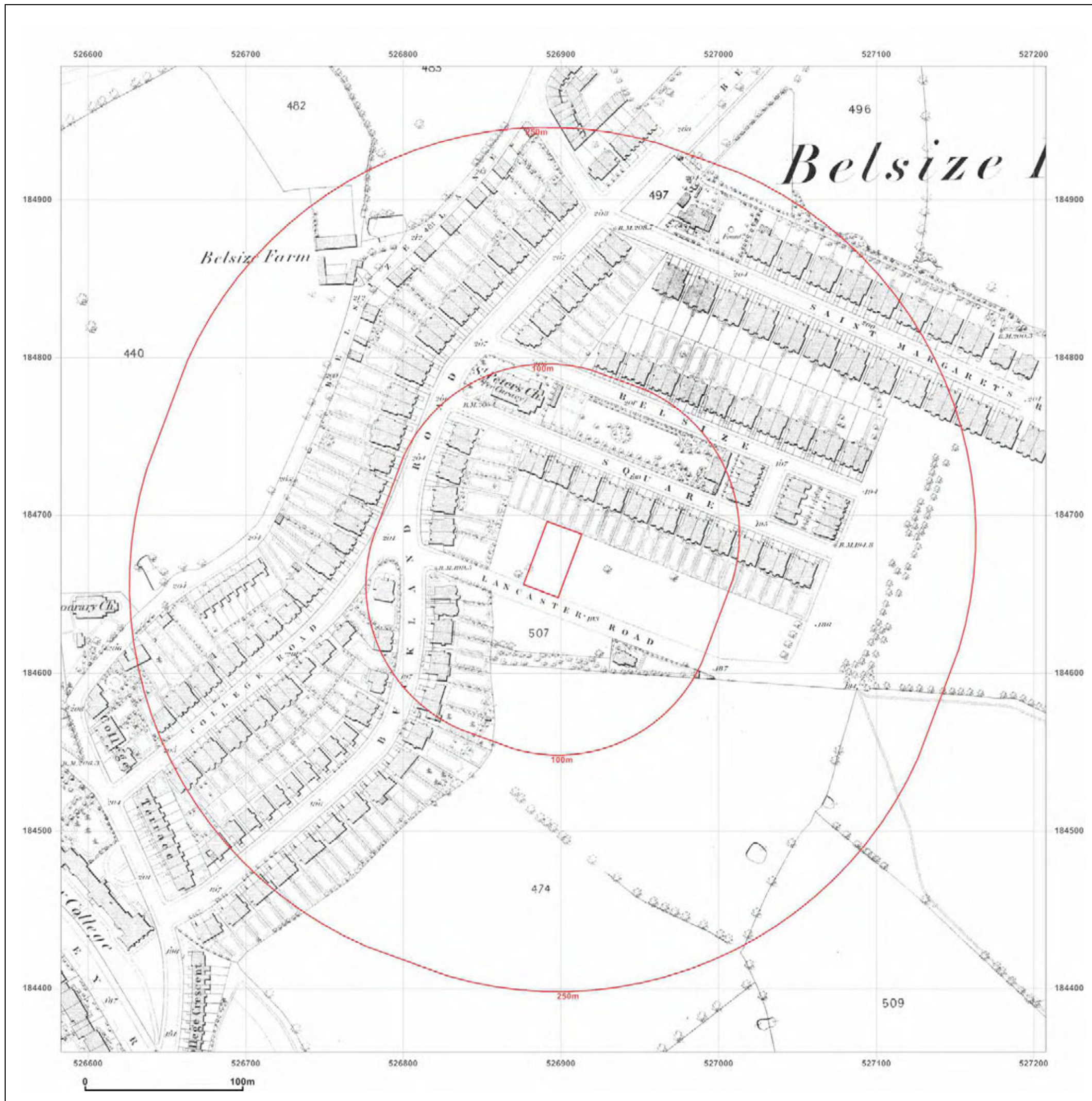
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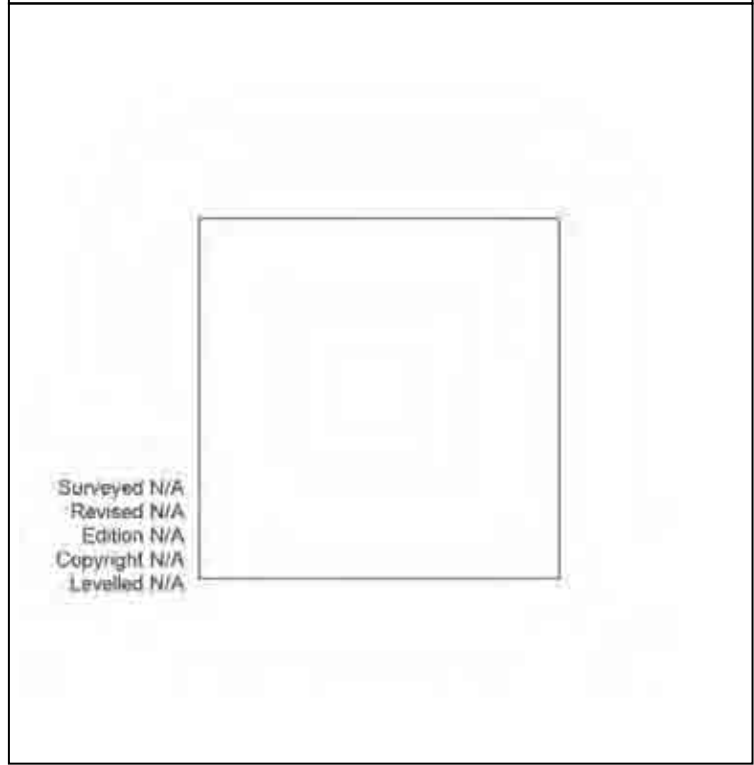
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**Report Ref:** HYD-1205803  
**Grid Ref:** 526895, 184672

**Map Name:** County Series

**Map date:** 1871

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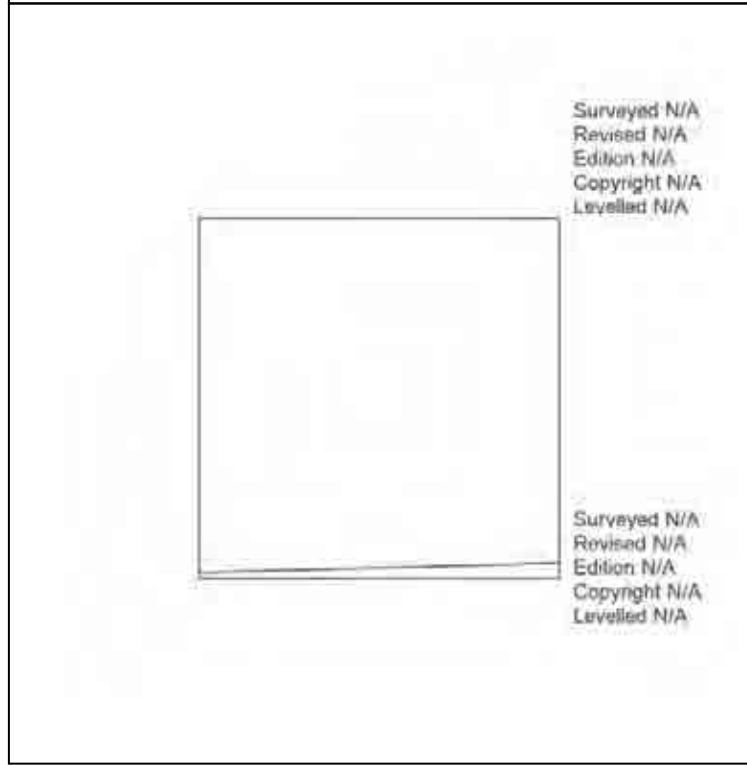
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**Report Ref:** HYD-1205803  
**Grid Ref:** 526895, 184672

**Map Name:** 1056 Scale Town Plan

**Map date:** 1866-1868

**Scale:** 1:1,056

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## **Appendix D**

### DESK STUDY RESEARCH INFORMATION



Hydrock Consultants Ltd

2-4 Hawthorn Park, Holdenby Road,  
Northampton, NN6 8LD

Report Reference: HYD-1205805

Your Reference: PO N5092 / C13868

Report Date 5 Dec 2013

Report Delivery Method: Email - pdf

## GroundSure Geoinsight

Address: UNIVERSITY COLLEGE HOSPITAL, CLIFFORD PUGH HOUSE 5-7, LANCASTER GROVE, LONDON,  
NW3 4HE

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Geolnsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 01752 347 515 quoting the above report reference number.

Yours faithfully,

Hydrock

Enc.  
GroundSure Geolnsight

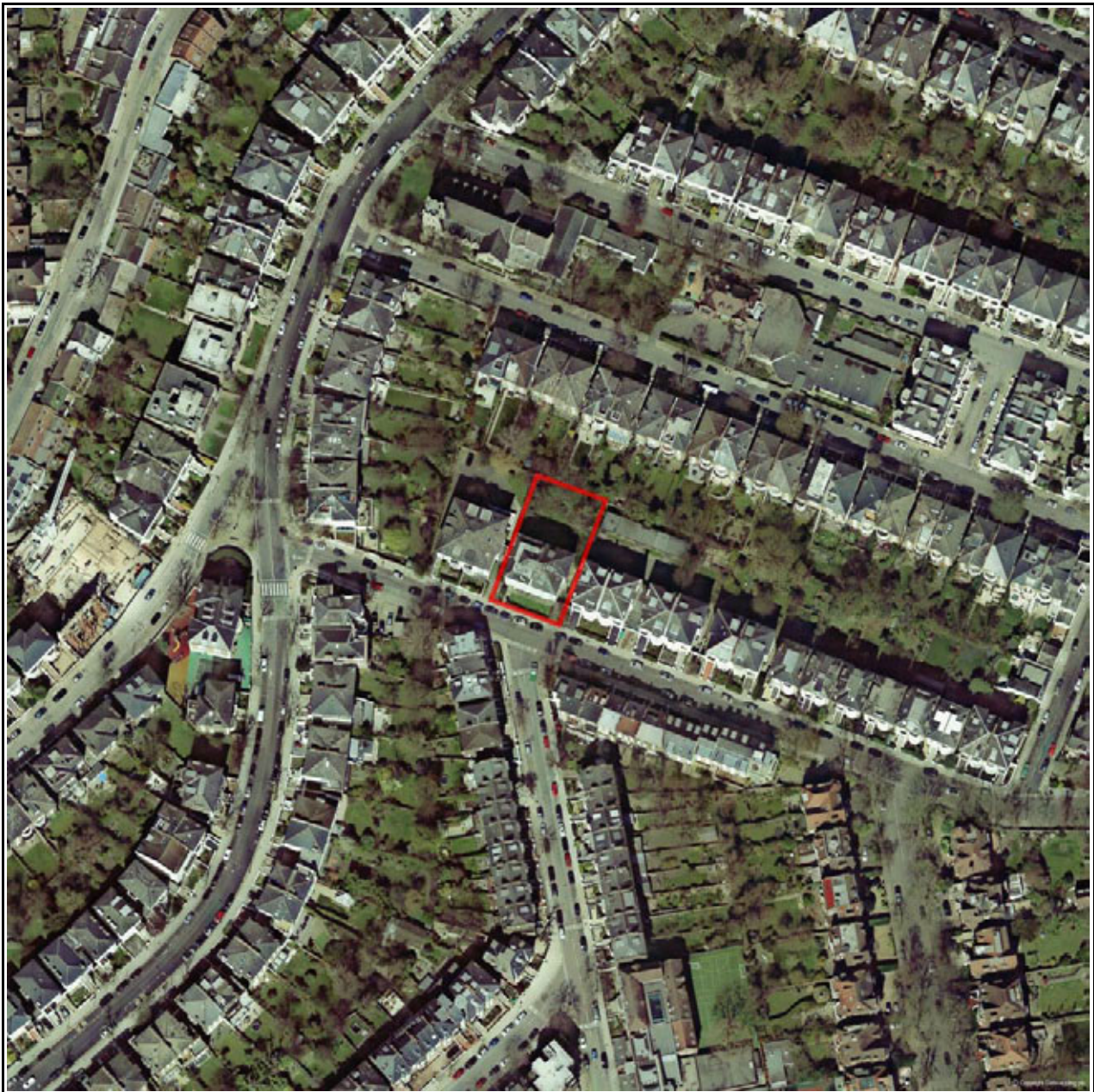


# GroundSure GeoInsight

Address: UNIVERSITY COLLEGE HOSPITAL, CLIFFORD PUGH HOUSE 5-7, LANCASTER GROVE, LONDON, NW3 4HE  
Date: 5 Dec 2013  
Reference: HYD-1205805  
Client: Hydrock Consultants Ltd

NW N NE

W E



SW S SE

Aerial Photograph Capture date: 20-Apr-2013  
Grid Reference: 526895,184672  
Site Size: 0.10ha

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# Overview of Findings

The GroundSure GeoInsight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and GroundSure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

## Section 1: Geology

|                                       |   |  |
|---------------------------------------|---|--|
| 1.1 Artificial Ground                 | 1.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?   | No   |
|                                       | 1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?  | No   |
| 1.2 Superficial Geology and Landslips | 1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?   | No   |
|                                       | 1.2.2 Are there any records relating to permeability of superficial geology within the study site boundary?   | No   |
|                                       | 1.2.3 Are there any records of landslip within 500m of the study site boundary?   | No   |
|                                       | 1.2.4 Are there any records relating to permeability of landslips within the study site boundary?   | No   |
| 1.3 Bedrock, Solid Geology & Faults   | 1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.   |  |
|                                       | 1.3.2 Are there any records relating to permeability of bedrock within the study site boundary?   | Yes  |
|                                       | 1.3.3 Are there any records of faults within 500m of the study site boundary?   | No   |
| 1.4 Radon data                        | 1.4.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?  | The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level |
|                                       | 1.4.2 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? | No radon protective measures are necessary   |

## Section 2: Ground Workings

|   | On-site | 0-50m | 51-250 | 251-500      | 501-1000     |
|---|---------|-------|--------|--------------|--------------|
| 2.1 Historical Surface Ground Working Features from Small Scale Mapping | 0       | 0     | 0      | Not Searched | Not Searched |
| 2.2 Historical Underground Workings from Small Scale Mapping            | 0       | 0     | 0      | 29           | 46           |
| 2.3 Current Ground Workings   | 0       | 0     | 0      | 0            | 0            |

| Section 3: Mining, Extraction & Natural Cavities | On-site | 0-50m | 51-250 | 251-500 | 501-1000 |
|--|---------|-------|--------|---------|----------|
| 3.1 Historical Mining                            | 0       | 0     | 0      | 5       | 29       |
| 3.2 Coal Mining                                  | 0       | 0     | 0      | 0       | 0        |
| 3.3 Johnson Poole and Bloomer Mining Area        | 0       | 0     | 0      | 0       | 0        |
| 3.4 Non-Coal Mining                              | 0       | 0     | 0      | 0       | 0        |
| 3.5 Non-Coal Mining Cavities                     | 0       | 0     | 0      | 0       | 0        |
| 3.6 Natural Cavities                             | 0       | 0     | 0      | 0       | 0        |
| 3.7 Brine Extraction                             | 0       | 0     | 0      | 0       | 0        |
| 3.8 Gypsum Extraction                            | 0       | 0     | 0      | 0       | 0        |
| 3.9 Tin Mining                                   | 0       | 0     | 0      | 0       | 0        |
| 3.10 Clay Mining                                 | 0       | 0     | 0      | 0       | 0        |

| Section 4: Natural Ground Subsidence    | On-site    |
|---|------------|
| 4.1 Shrink Swell Clay                   | Moderate   |
| 4.2 Landslides                          | Very Low   |
| 4.3 Ground Dissolution of Soluble Rocks | Null       |
| 4.4 Compressible Deposits               | Negligible |
| 4.5 Collapsible Deposits                | Very Low   |
| 4.6 Running Sand                        | Negligible |

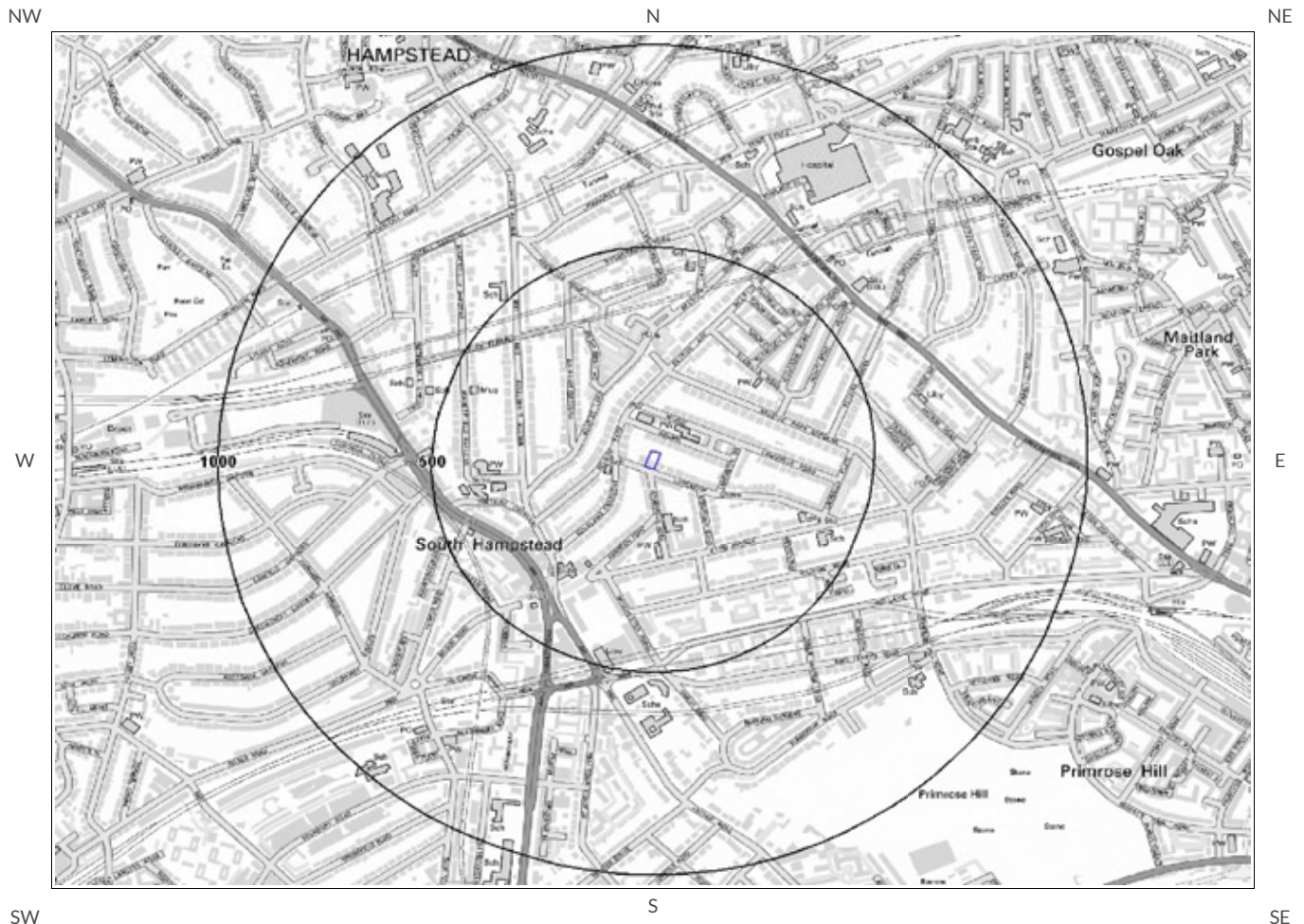
| Section 5: Borehole Records | On-site | 0-50m | 51-250 |
|-----------------------------|---------|-------|--------|
| 5 BGS Recorded Boreholes    | 0       | 0     | 0      |

| Section 6: Estimated Background Soil Chemistry | On-site | 0-50m | 51-250 |
|--|---------|-------|--------|
| 6 Records of Background Soil Chemistry         | 1       | 0     | 1      |



# 1 Geology

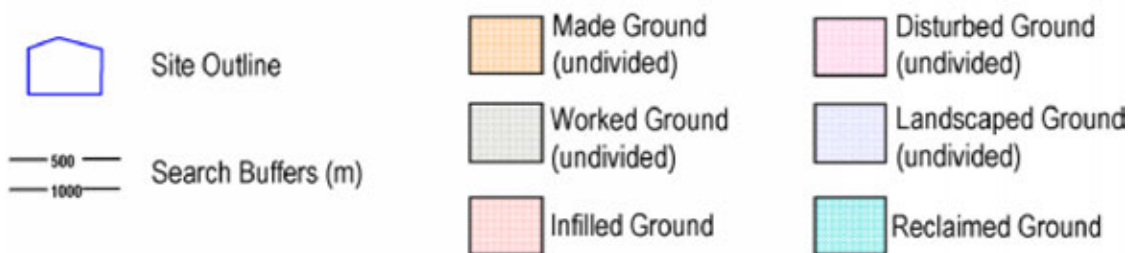
## 1.1 Artificial Ground Map



Artificial Ground Legend



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# 1 Geology

## 1.1 Artificial Ground

### 1.1.1 Artificial/ Made Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:256

Are there any records of Artificial/Made Ground within 500m of the study site boundary? No

Database searched and no data found.

---

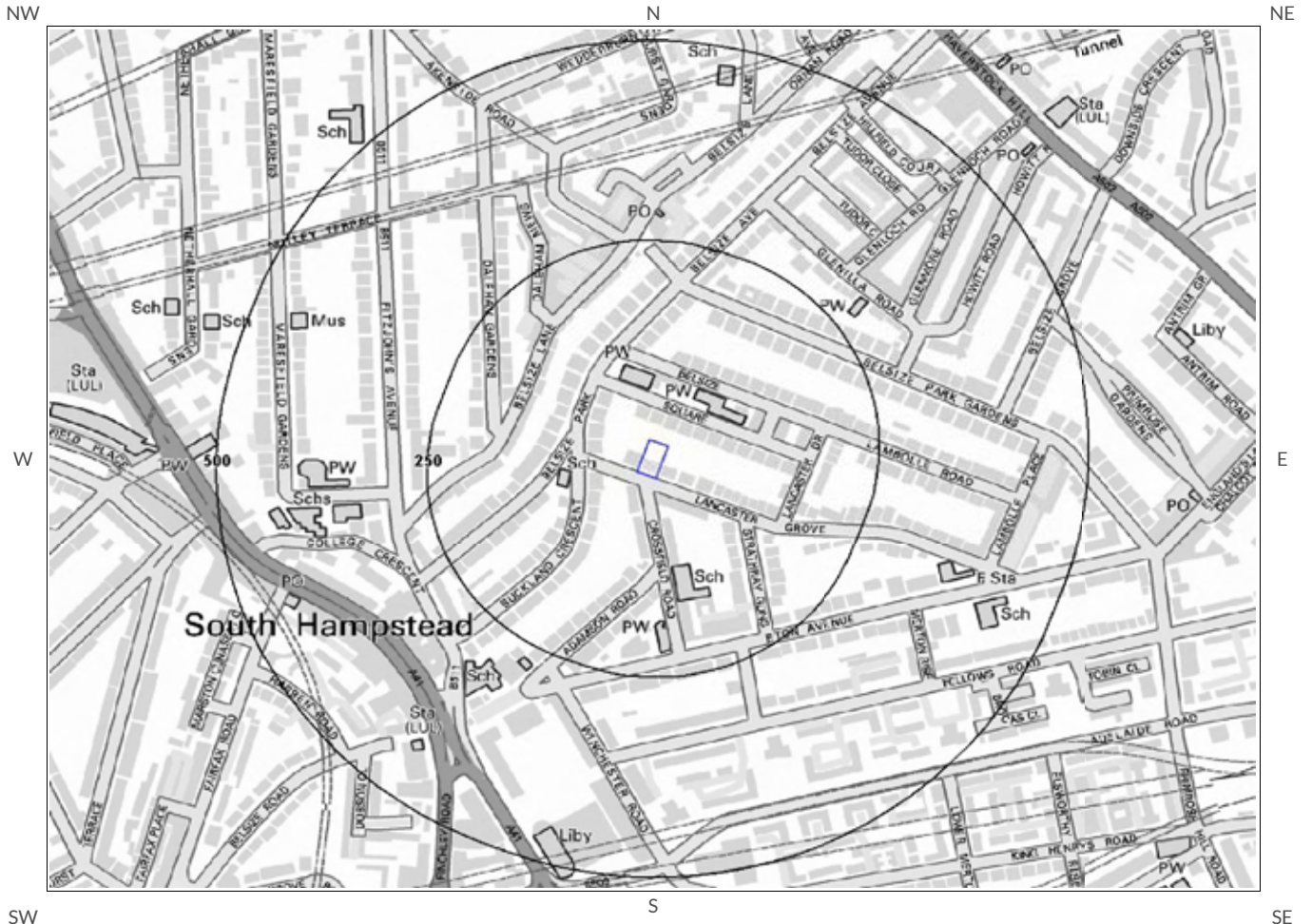
### 1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

Database searched and no data found.

---


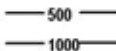
# 1.2 Superficial Deposits and Landslips Map



Superficial Deposits and Landslips Legend



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-  Site Outline
-  Search Buffers (m)

# 1.2 Superficial Deposits and Landslips

## 1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? No

Database searched and no data found.

---

## 1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? No

Database searched and no data found.

---

## 1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

---

## 1.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site\*\* boundary? No

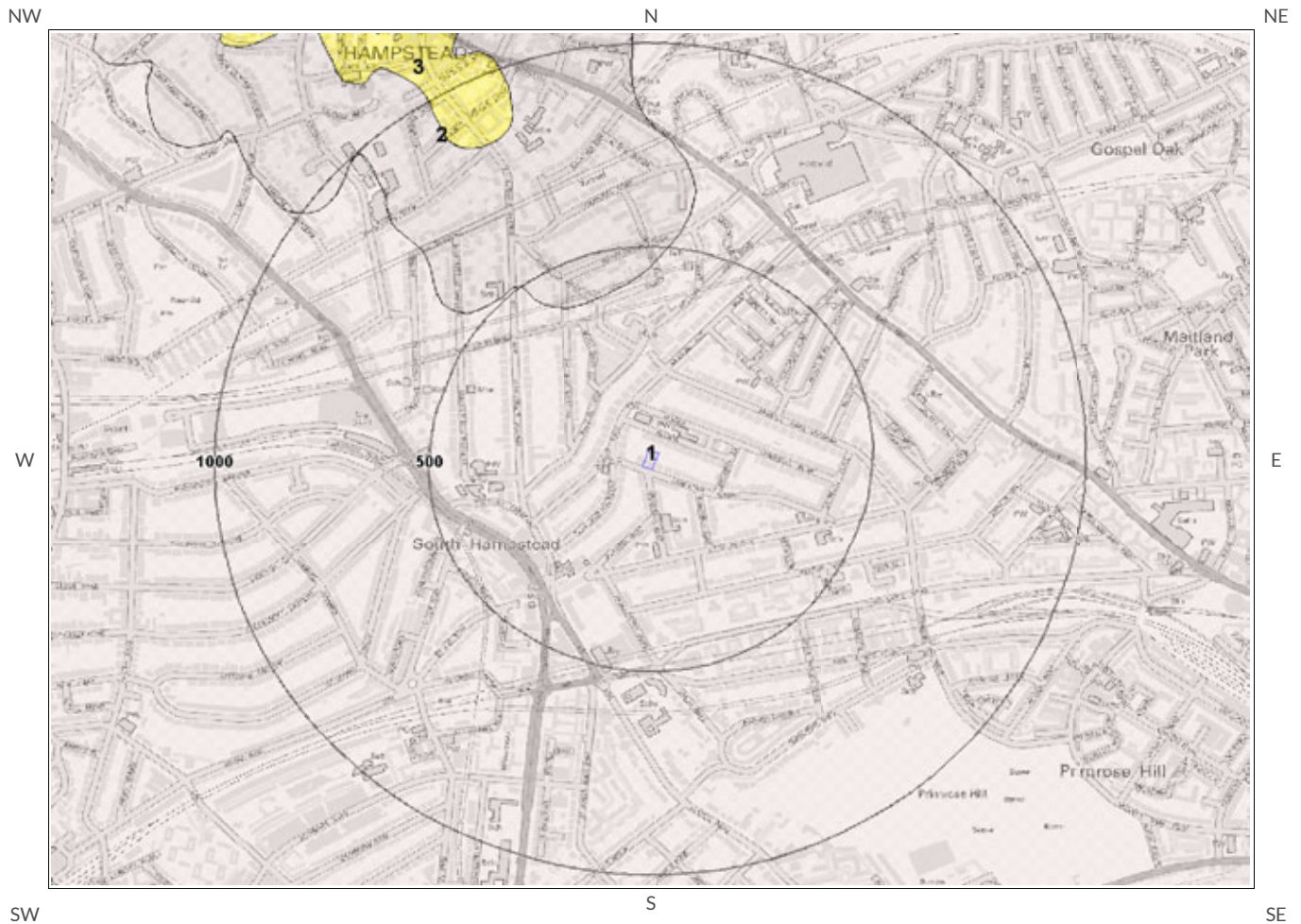
Database searched and no data found.

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---

\* This includes an automatically generated 50m buffer zone around the site




# 1.3 Bedrock and Faults Map



Bedrock and Faults Legend



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-  Site Outline
  -  500
  -  1000
- Search Buffers (m)

# 1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:256

## 1.3.1 Bedrock/ Solid Geology

Records of Bedrock/ Solid Geology within 500m of the study site boundary:

| ID | Distance (m) | Direction | LEX Code  | Description                                 | Rock Age |
|----|--------------|-----------|-----------|---|----------|
| 1  | 0.0          | On Site   | LC-CLSS   | London Clay Formation - Clay, Silt And Sand | Eocene   |
| 2  | 389.0        | N         | CLGB-CLSS | Claygate Member - Clay, Silt And Sand       | Eocene   |

## 1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site\* boundary? Yes

| Distance (m) | Direction | Flow Type | Maximum Permeability | Minimum Permeability |
|--------------|-----------|-----------|----------------------|----------------------|
| 0.0          | On Site   | Mixed     | Moderate             | Very Low             |

## 1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

\* This includes an automatically generated 50m buffer zone around the site

# 1.4 Radon Data

## 1.4.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level

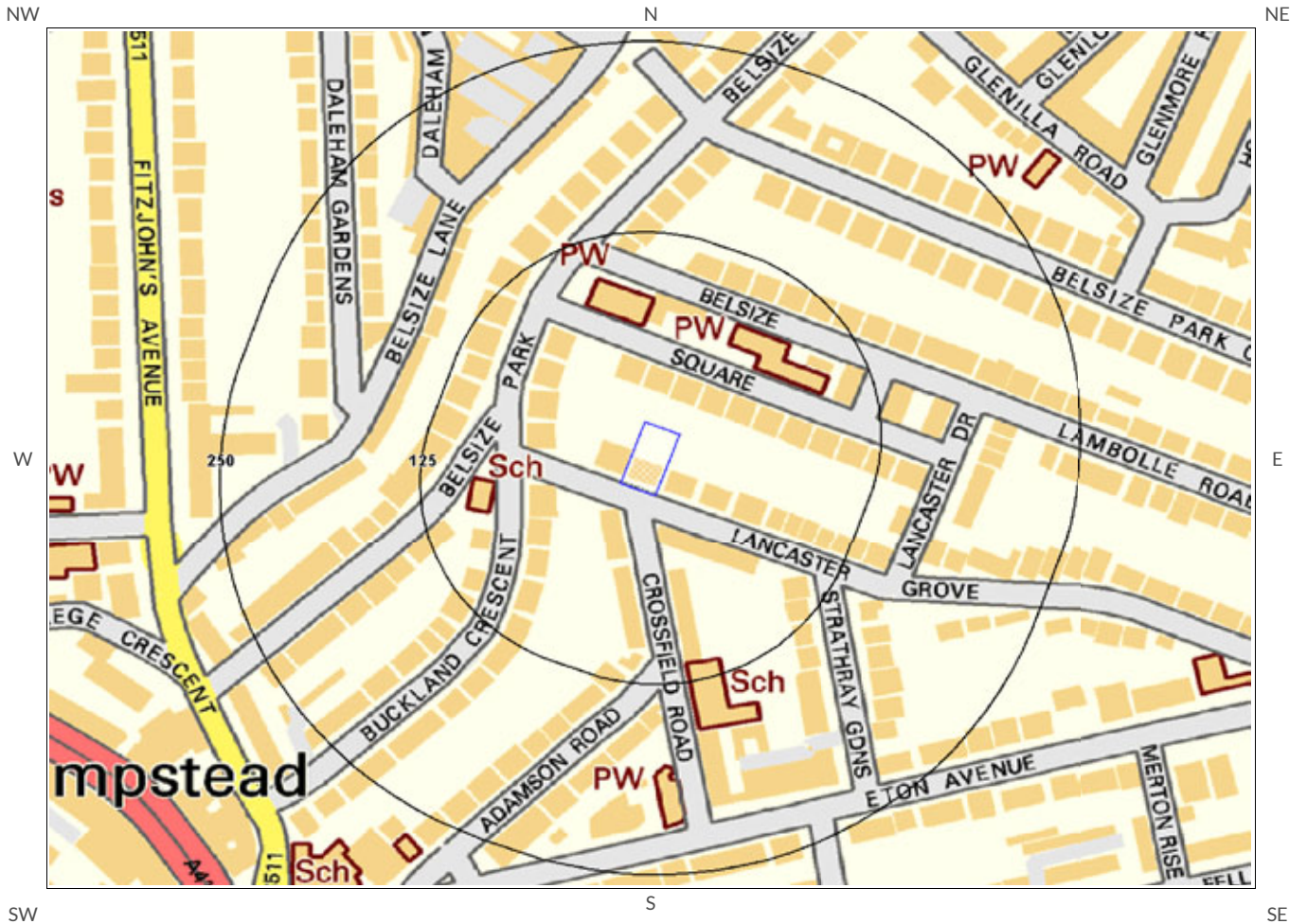
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## 1.4.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary

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# 2 Ground Workings Map



Ground Workings Legend



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-  Site Outline
-  Historic Surface Ground Workings
-  Historic Underground Workings
-  Current Ground Workings
-  Search Buffers (m)





## 2 Ground Workings

### 2.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? No

Database searched and no data found.

### 2.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? Yes

The following Historical Underground Working Features are provided by GroundSure:

| ID        | Distance (m) | Direction | NGR              | Use               | Date |
|-----------|--------------|-----------|------------------|-------------------|------|
| Not shown | 347.0        | N         | 526842<br>185044 | Tunnel            | 1866 |
| Not shown | 349.0        | N         | 527203<br>185151 | Tunnel            | 1995 |
| Not shown | 349.0        | N         | 527203<br>185151 | Tunnel            | 1974 |
| Not shown | 349.0        | N         | 527203<br>185151 | Tunnel            | 1965 |
| Not shown | 349.0        | N         | 527203<br>185151 | Tunnel            | 1958 |
| Not shown | 350.0        | NW        | 526752<br>185021 | Unspecified Shaft | 1866 |
| Not shown | 372.0        | NW        | 526419<br>184933 | Tunnels           | 1989 |
| Not shown | 372.0        | NW        | 526419<br>184933 | Tunnels           | 1968 |
| Not shown | 372.0        | NW        | 526419<br>184933 | Tunnels           | 1973 |
| Not shown | 372.0        | NW        | 526419<br>184933 | Tunnels           | 1957 |
| Not shown | 408.0        | N         | 527029<br>185170 | Tunnel            | 1995 |
| Not shown | 408.0        | N         | 527029<br>185170 | Tunnel            | 1974 |
| Not shown | 408.0        | N         | 527029<br>185170 | Tunnel            | 1965 |
| Not shown | 408.0        | N         | 527029<br>185170 | Tunnel            | 1958 |

| ID        | Distance (m) | Direction | NGR              | Use       | Date |
|-----------|--------------|-----------|------------------|-----------|------|
| Not shown | 415.0        | NW        | 526706<br>185071 | Air Shaft | 1920 |
| Not shown | 428.0        | S         | 526978<br>184220 | Tunnel    | 1973 |
| Not shown | 428.0        | S         | 526978<br>184220 | Tunnel    | 1989 |
| Not shown | 428.0        | S         | 526978<br>184220 | Tunnel    | 1968 |
| Not shown | 428.0        | S         | 526978<br>184220 | Tunnel    | 1957 |
| Not shown | 455.0        | SW        | 526471<br>184430 | Air Shaft | 1957 |
| Not shown | 459.0        | SW        | 526483<br>184398 | Tunnel    | 1973 |
| Not shown | 459.0        | SW        | 526483<br>184398 | Tunnel    | 1968 |
| Not shown | 459.0        | SW        | 526483<br>184398 | Tunnel    | 1957 |
| Not shown | 467.0        | SW        | 526462<br>184429 | Air Shaft | 1940 |
| Not shown | 477.0        | S         | 527028<br>184182 | Tunnels   | 1957 |
| Not shown | 478.0        | S         | 526989<br>184174 | Air Shaft | 1940 |
| Not shown | 479.0        | S         | 527018<br>184178 | Tunnel    | 1989 |
| Not shown | 479.0        | S         | 527018<br>184178 | Tunnel    | 1973 |
| Not shown | 479.0        | S         | 527018<br>184178 | Tunnel    | 1968 |
| Not shown | 506.0        | NW        | 526326<br>184952 | Tunnels   | 1989 |
| Not shown | 506.0        | NW        | 526326<br>184952 | Tunnels   | 1973 |
| Not shown | 506.0        | NW        | 526326<br>184952 | Tunnels   | 1968 |
| Not shown | 506.0        | NW        | 526326<br>184952 | Tunnels   | 1957 |
| Not shown | 516.0        | NW        | 526464<br>184994 | Air Shaft | 1973 |
| Not shown | 516.0        | NW        | 526464<br>184994 | Air Shaft | 1989 |
| Not shown | 519.0        | NW        | 526461<br>184996 | Air Shaft | 1940 |
| Not shown | 522.0        | NW        | 526461<br>184995 | Air Shaft | 1920 |
| Not shown | 553.0        | SW        | 526504<br>184237 | Air Shaft | 1957 |
| Not shown | 555.0        | S         | 526740<br>184111 | Air Shaft | 1973 |
| Not shown | 555.0        | S         | 526740<br>184111 | Air Shaft | 1968 |
| Not shown | 559.0        | SW        | 526499<br>184237 | Air Shaft | 1920 |
| Not shown | 561.0        | SW        | 526496<br>184238 | Air Shaft | 1940 |
| Not shown | 594.0        | S         | 527362<br>184138 | Tunnel    | 1973 |
| Not shown | 594.0        | S         | 527362<br>184138 | Tunnel    | 1968 |

| ID        | Distance (m) | Direction | NGR              | Use               | Date |
|-----------|--------------|-----------|------------------|-------------------|------|
| Not shown | 594.0        | S         | 527362<br>184138 | Tunnel            | 1989 |
| Not shown | 595.0        | S         | 527368<br>184142 | Tunnels           | 1957 |
| Not shown | 618.0        | SE        | 527156<br>184083 | Air Shaft         | 1968 |
| Not shown | 618.0        | SE        | 527156<br>184083 | Air Shaft         | 1989 |
| Not shown | 618.0        | SE        | 527156<br>184083 | Air Shaft         | 1973 |
| Not shown | 618.0        | SE        | 527156<br>184083 | Air Shaft         | 1940 |
| Not shown | 618.0        | SE        | 527156<br>184083 | Air Shaft         | 1957 |
| Not shown | 620.0        | SE        | 527162<br>184082 | Air Shaft         | 1894 |
| Not shown | 647.0        | NE        | 527336<br>185182 | Unspecified Shaft | 1866 |
| Not shown | 652.0        | NE        | 527277<br>185236 | Air Shaft         | 1912 |
| Not shown | 654.0        | NE        | 527274<br>185237 | Air Shaft         | 1940 |
| Not shown | 660.0        | NE        | 527282<br>185240 | Air Shaft         | 1920 |
| Not shown | 672.0        | NW        | 526591<br>185300 | Ventilating Shaft | 1865 |
| Not shown | 673.0        | NW        | 526647<br>185330 | Tunnel            | 1995 |
| Not shown | 673.0        | NW        | 526647<br>185330 | Tunnel            | 1974 |
| Not shown | 673.0        | NW        | 526647<br>185330 | Tunnel            | 1965 |
| Not shown | 673.0        | NW        | 526845<br>185427 | Tunnel            | 1958 |
| Not shown | 737.0        | NW        | 526240<br>185137 | Tunnel            | 1958 |
| Not shown | 750.0        | SW        | 526471<br>183522 | Tunnel            | 1957 |
| Not shown | 750.0        | SW        | 526452<br>183836 | Tunnel            | 1968 |
| Not shown | 750.0        | SW        | 526471<br>183522 | Tunnel            | 1973 |
| Not shown | 750.0        | SW        | 526471<br>183522 | Tunnel            | 1989 |
| Not shown | 774.0        | SE        | 527589<br>184287 | Air Shafts        | 1989 |
| Not shown | 798.0        | NE        | 527466<br>185268 | Air Shaft         | 1912 |
| Not shown | 804.0        | NE        | 527471<br>185273 | Air Shaft         | 1920 |
| Not shown | 809.0        | SW        | 526463<br>183954 | Air Shaft         | 1968 |
| Not shown | 809.0        | SW        | 526463<br>183954 | Air Shaft         | 1940 |
| Not shown | 809.0        | SW        | 526463<br>183954 | Air Shaft         | 1957 |
| Not shown | 810.0        | SW        | 526465<br>183953 | Air Shaft         | 1920 |
| Not shown | 836.0        | SE        | 527650<br>184271 | Air Shafts        | 1989 |

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| ID        | Distance (m) | Direction | NGR              | Use        | Date |
|-----------|--------------|-----------|------------------|------------|------|
| Not shown | 970.0        | SW        | 526440<br>183785 | Air Shafts | 1940 |

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## 2.3 Current Ground Workings

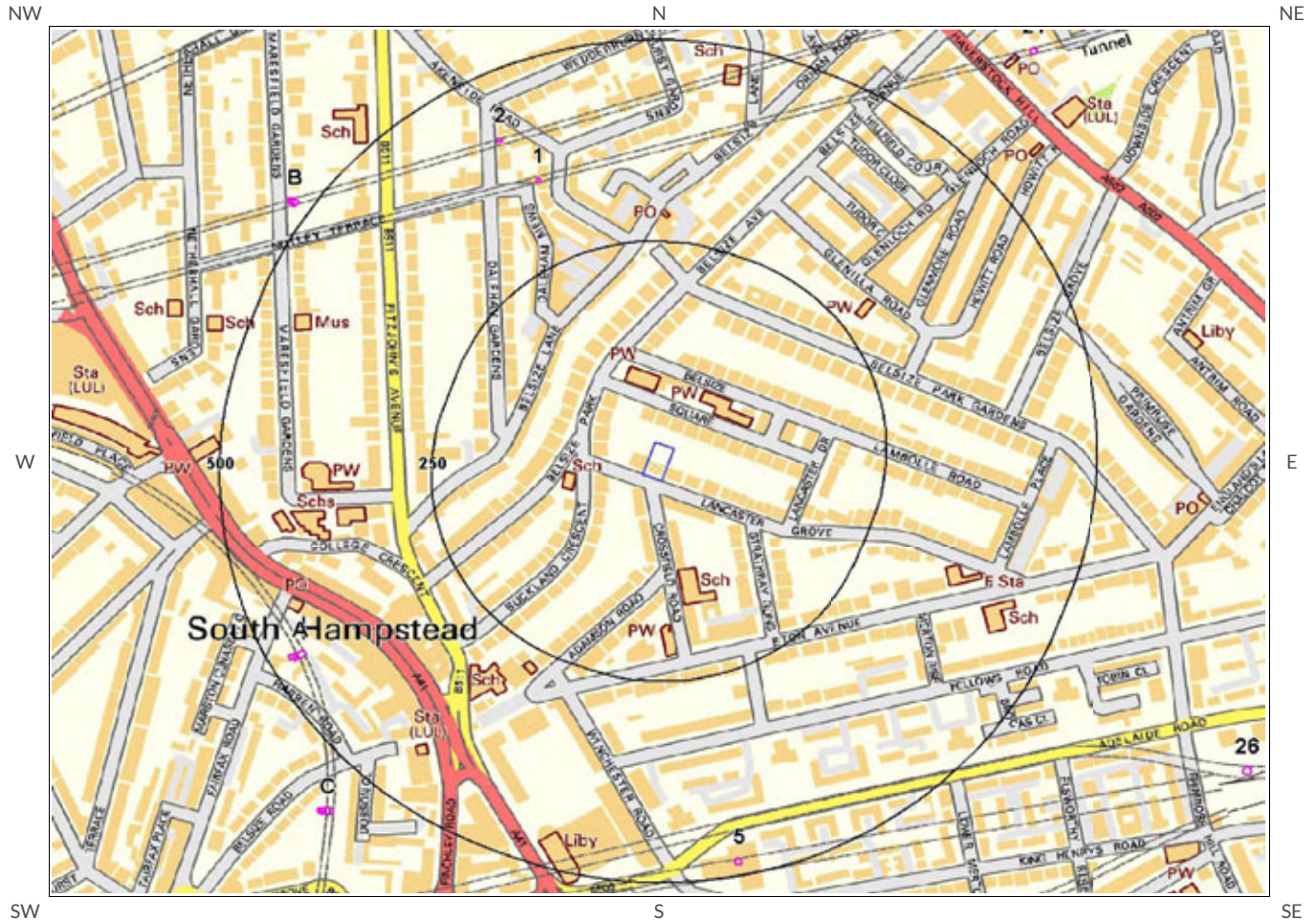
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? No

Database searched and no data found.

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# 3 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

Mapping sourced from 

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