Phase 1 (Desk Study) Investigation Report

On a site at

Finchley Bell, Finchley Road, London

For

Caldecotte Consultants

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Contents

APPENDICES

EXECUTIVE SUMMARY

Location	The site is approximately 0.06ha in area and is centred on national grid reference 526070, 185030. Access to the site can be gained off Finchley Road to the east.
History	Historical Ordnance Survey maps, from 1871 to 2012 **Onsite** Earliest maps show site to be undeveloped land within network of fields with Finchley Station bounding the site to the north. 1915 plans show a cluster of buildings within the northern site boundaries. These are assumed to be roughly unaltered to present. **Offsite** 1871-present Environs: Predominantly fields and more recently residential properties and industrial works/units. Significant urban development of London from 1896 to present.
Geology & Hydrogeology	Solid – London Clay Formation (Clays). Drift – No drift deposits are noted to be on site. Faults – There are no known surface faults on site. Groundwater – Unproductive Strata.
Mineral Extraction	The site is located in an area where a Coal Authority Report is not required.
Anticipated Ground Conditions	Clay (London Clay Formation). Made ground may be present in areas of buildings and basement.
Contamination Summary	The following on site sources of ground contamination have been identified: • Potential Made Ground present at the site, contaminentats may include heavy metals, sulphates, polyaromatic and total petroleum hydrocarbons, asbestos etc. • Potential for spillage and leakage of petroleum hydrocarbons and surfactants from parked cars. The following off site sources of ground contamination have not been identified. • Ground gas from historical landfill within 250m The level of contamination on site is currently considered likely to be negligable to low.

Foundation Summary	Traditional strip / trench footings within the anticipated clay material is anticipated to be suitable for this site. Foundations may require deepening due to trees in accordance with NHBC Standards along with deepening due to made ground. There is a likely retaining element to be required for the proposed development where adjacent to Finchly Road. Considering the likely foundation types on site suspended floor slabs are likely to be required. No radon protective measures required, other ground gases to be confirmed through an intrusive investigation.
Soakaways / Drainage	Natural ground conditions are anticipated to be predominantly low permeability. Soakaways are considered unlikely to be viable.
Further Works	• Undertake investigation initially utilising a window sampling rig to inspect and sample near surface (<4m) soils and obtain limited geotechnical design parameters of natural soils (potentially further drilling if deep madeground is encountered or high loadings are proposed); • Installation and subsequent monitoring of gas wells to allow gas risk assessment to be undertaken should made ground containing appreciable amounts of degradable materials be encountered during the site works.; • Laboratory analysis (including asbestos testing) of natural and made ground materials to determine chemical characteristics; • Production of a Phase II Geo-Environmental Assessment Report presenting findings, assessments and conclusions; • Preparation of Remediation Strategy detailing the works required to protect end users and the environment (if required); and • UXB Desk Based Assessment

FACTUAL INFORMATION

1.0 INTRODUCTION

1.1 This report describes a desk study carried out for Caldecotte Consultants on a site at the former Finchley Bell Public House, 317 Finchley Road, London.

1.2 For the purpose of this assessment the proposed development is understood to be a mixed use of Commercial on the ground floor with Residential Flats above. In the absence of specific information to the contrary, it has been assumed that site levels will not change significantly.

1.3 The objectives of this report were to obtain information from a variety of sources in relation to the site in order to assess geo-environmental issues pertinent to the proposed development.

1.4 This report has been produced on behalf of the Client, Caldecotte Consultants, and no responsibility is accepted to any Third Party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of Opus. If any unauthorised Third Party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

1.5 Findings and opinions conveyed via the desk study within this report are based on information obtained from a variety of sources as detailed within this report, which Opus believes are reliable. Nevertheless, Opus cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

1.6 The site plans enclosed in this report should not be scaled from.

1.7 All comments on ground conditions, ground gases and potential contaminants are from desk study information only and should be verified through an intrusive investigation along with suitable laboratory testing and interpretation.

2.0 THE SITE

2.1 Location & Access

2.1.1 The site is located to the east of Finchley Road, London, centred on approximate National Grid Reference 526070, 185030 as shown on drawing no. DO J-D1097.00-401 R0, Site Location Plan.

2.1.2 Access to the site can be gained off of Finchley Road to the east.

2.2 Site Description

2.2.1 The site is approximately 0.06 hectares in area and is roughly rectangular in shape.

2.2.2 A site walkover was carried out on 12 March 2013 and the following observations made;

2.2.3 The site is currently occupied by a former Public House occupying approximately two thirds of the site area.

2.2.4 The site is bound by Finchley Road to the East, the North London Overground line to the north and residential dwellings to the west and south. The western boundaries are marked by a 2.0m high wooden fence with concrete fence posts. The eastern boundary is marked by the on site external walls associated with the public house. The northern site boundary is marked by a 2m high brick wall.

2.2.5 The site slopes to the west with a level drop from the front of the public house to the rear. This results in the property being two stories at the front and three stories at the rear where the basement is at ground level.

2.2.6 The front of the existing Public House marks the eastern and southern boundary of the site with the rear of the site being paved. Where the public house is absent the site boundaries are marked by a brick wall to the north and wooden fence to the west.

2.2.7 There was no visual evidence of contamination on site however there was a potential for asbestos containing products to be contained within the fabric of the existing public house on site.

2.2.8 Several mature and semi mature trees were noted to the site boundaries including mature conifer and birch along the western site boundary.

3.0 DESK STUDY

3.1 Sources of Information

3.1.1 The following sources of information have been consulted as part of the desk study for the site;

(a) Envirocheck Database Report;
(b) Historical Ordnance Survey Maps via Envirocheck;
(c) The Environment Agency (EA);
(d) BGS Geological Mapping;
(e) BGS online mapping.

3.2 Site History

3.2.1 The history of the site is recorded over selected periods by the maps inspected, copies of which are supplied in Appendix 'A'. The account presented in this report is restricted by specific time periods represented by these maps only.

3.2.2 Available historical Ordnance Survey maps, from 1871 to 2012, of the site and surrounding area were inspected. All significant changes are described as follows;

Period	On Site	Off Site
1871-1894	Undeveloped land adjacent to Finchley Road Station to the north. Slight evidence of a cutting along the northern boundary.	Finchley Road Station labelled directly to the north within a cutting. A larger cutting also labelled Finchley Road Station shown approximately 200m to the south. Finchley Road orientated north south shown running adjacent to the eastern boundary of the site.
1896	No significant changes	General increase in residential development, industrial buildings and expansion of the railway.
1915 - 1995	Two buildings are shown within the south eastern area of the site, these remain unaltered to 1995 therefore the building layout is assumed to be that seen at present day.	Further general increase in the residential and railway expansion. Works depot shown approximately 200m to the west of the site adjacent to the railway line
1920	No significant changes	Further development of residential and industrial buildings within the areas surrounding the site. Air shaft labelled approximately 350m to the east of the site boundaries.
1938 -1950	No significant changes	Development and expansion of residential areas in the north, east and south.

Period	On Site	Off Site
1951-1958	No significant changes	Cocoa Factory labelled approximately 300m to south west of site boundaries.
1959	Land drain shown crossing the northern portion of the site from west to east.	Works shown 10m to the north of the site. Two garages are labelled 50m to the north east of the site boundaries.
1966-1968	Garage shown occupying footprint as found at time of writing this report.	Works labelled 80m to the north of the site. General increase in surrounding development.
1974-2012	No significant changes	No significant changes with the exception of the works to the north reducing in size.

3.3 Geology, Hydrogeology and Hydrology

3.3.1 According to the inspected published geological information there are no superficial deposits on site. It is anticipated that there will be a minimal layer of made ground topsoil from previous residential and commercial use and specifically around the building footprint and potentially on the northern boundary.

3.3.2 The underlying bedrock strata is shown to be fine silty, sandy clay of the London Clay Formation.

3.3.3 There are no surface faults shown within the site boundaries or within the local area.

3.3.4 According to Environment Agency (EA) the bedrock below the site is designated as a Non Aquifer/Unproductive Strata. These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

3.3.5 The site is not located within a current known Source Protection Zone.

3.3.6 The Envirocheck report shows the nearest surface water feature to be located 984m to the south east of the site as an unnamed feature.

3.4 Mineral Extraction

3.4.1 According to The Coal Authority and The Law Society; Coal Mining and Brine Subsidence Claim Searches: Directory and Guidance – 6th edition, the site is not located in an area where a Coal Authority Report is required.

3.5 Environmental Considerations

3.5.1 Specific details relating to the environmental setting of the site are presented within the environmental database report included as Appendix 'B'. The salient issues which relate to the site are summarised as follows:

- There is one registered historic landfill site within 250m of the site, this is located at 210m to the south, no further details are recorded;
- There are two recorded Local Authority Pollution Prevention and Controls within 500m of the site. The nearest is located at 131m to the south east of the site boundaries associated with a dry cleaning service;
- There are no recorded Pollution Incident to Controlled Waters registered within 500m of the site;
- There are no water abstractions registered within 500m of the site;
- There are no discharge consents located within 500mm of the site;
- There are no Fuel Station Entries located within 500m of the site;
- There are 33 Contempory Trade Directory Entries within 250m of the site. The nearest active entry being located at 49m to the east of the site boundaries associated with a Laundrette; and
- There are no environmentally sensitive sites, for example, Sites of Special Scientific Interest (SSSI), Natural Reserves, Conservation areas etc., located within a 500m radius of the site;

There are no other pertinent features contained within the Envirocheck Report which may affect the redevelopment of the site.

3.5.2 A site specific enquiry has been made to Barnet Borough Council; no response has been received yet. Their response will be forwarded under a separate cover.

3.6 Radon

3.6.1 The Building Research Establishment have produced their revised document BR211 ("Radon guidance on protective measures for new buildings" 2007 Edition). This provides a staged framework to determine whether radon protective measures should be afforded to new dwellings.

3.6.2 The site lies within an area requiring no radon protective measures.

3.7 Asbestos

3.7.1 It should be considered that asbestos containing materials (ACM's) may be present within the fabric of the existing buildings along with made ground on site.

3.8 Unexploded Ordnace

3.8.1 Given the proximity of the site to central London, a review was of undertaken the Zetica, UXB hazard map. This map shows that 220 high explosive, 4 Parachute Mines and 11 incendiary bombs were dropped on the Borough of Finchley. This therefore classifies the site is low-medium risk in relation to unexploded Ordnace and therefore it is recommended that a UXB desk study is undertaken for this site. A copy of the risk map is included as Appendix C.

4.0 PRELIMINARY CONCEPTUAL SITE MODEL

4.1 Potential Sources of Contamination

4.1.1 The following potential **on site** sources of ground contamination have been identified:

- Potential for deep Made Ground present asscociated with development on site, contaminentats may include heavy metals, sulphates, polyaromatic and total petroleum hydrocarbons, asbestos etc.
- Potential for spillage and leakage of petroleum hydrocarbons and surfactants from parked cars.

4.1.2 Potential **off site** sources of ground contamination have been identified:

- Possess ground gas associated with historic landfill.

4.2 Receptors of Contamination and Migration Pathways

4.2.1 Receptors are defined as human or non-human organisms that have the potential to experience adverse effects from direct or indirect exposure to contaminated material.

4.2.2 Migration pathways are defined as the courses chemicals take from a source to an exposed organism or receptor. The exposure pathway can be direct (i.e. stays within the same exposure media) or indirect transport from one medium to another takes place.

4.2.3 The following potential human health and environmental receptors have been identified:

- Future site occupants
- Site construction and maintenance workers
- Neighbouring occupants
- Future building materials;
- Vegetation, proposed/existing landscaping;
- Surface water drains on and off site;

4.2.4 The following potential migration pathways have been identified:

- Inhalation

  Breathing dust and vapours from contaminated soil in outdoor air. Vapours can also migrate into buildings resulting in inhalation by the occupants.

- Ingestion

  Eating and swallowing of contaminated soil and/or groundwater either by deliberate consumption, indirectly by eating or smoking with dirty hands or by ingestion of fugitive dust.

- Dermal Contact

  Direct contact with contaminated soil and groundwater, causing skin conditions such as dermatitis etc. Certain contaminants can be absorbed into the body through the skin or enter directly through open cuts or abrasions.

- Migration of Contaminated Water

  Contaminated groundwater can migrate laterally or vertically dependent on permeability, preferential pathways, man-made voids etc.

- Leaching

  Infiltration of water through soil can leach out soluble contaminants resulting in groundwater pollution.

- Aggressive Attack

  Building materials can be damaged by direct contact with aggressive ground conditions, for example sulphate attack on concrete and hydrocarbon attack on plastics.

- Uptake By Plants And Vegetables

  Some contaminants may be toxic to plants but not necessarily to human health at the same concentrations. In addition, plants may uptake contaminants through their roots, which in the case of homegrown vegetables may later be consumed by humans. Contaminated soil adhered to vegetables can also be potentially ingested if not properly washed before consumption. Plant growth can also be adversely affected by landfill gas.

4.3 Source-Pathway-Receptors Relationships

4.3.1 The following potential **Source-Pathway-Receptor** relationships have been identified for the site bearing in mind the development proposals;

1. Source	2. Pathway	3. Receptor
Contaminated soil	Ingestion Dermal contact Inhalation (outdoor air)	Construction workers Future occupants
Contaminated soil	Inhalation (indoor air)	Future occupants
Contaminated soil	Leaching and migration	Controlled waters
Contaminated soil & groundwater	Aggressive attack	Building materials
Contaminated soil	Root uptake to plants	Future occupants
Contaminated groundwater	Ingestion Dermal contact Inhalation (outdoor air)	Construction workers Future occupants
Contaminated groundwater	Inhalation (indoor air)	Future occupants
Contaminated groundwater	Exposure during earthworks	Construction workers
Contaminated groundwater	Migration to surface water courses. (nearest surface water is located along the southern boundary of the site).	Controlled waters
Ground Gas and vapours (Various sources on and off site).	Migration of ground gases	Future occupants

5.0 PRELIMINARY GEOTECHNICAL ASSESSMENT

5.1 Ground Conditions

5.1.1 The following assessment of the ground conditions expected on site is based solely on the desk study information. It is therefore subject to confirmation or otherwise through appropriate intrusive site investigation.

5.1.2 It is anticipated that the ground conditions on site will generally comprise made ground: topsoil and deeper made ground where there are structures.

5.1.3 The underlying natural ground is thought to be variably weathered strata of the bedrock which is silty sandy clay of the London Clay Formation.

5.2 Foundation Design

5.2.1 The following assessment of likely foundation types is based solely on desk study information and is therefore subject to confirmation or otherwise through appropriate intrusive site investigation techniques. The assessment also assumes that ground levels will remain similar to those at present. If this is not the case then some amendments to the recommendation given may be required.

5.2.2 It is anticipated that traditional strip / trench fill foundations within the clay shall be suitable for the proposed development. Consideration should be given to the volume change potential of the clay and the requirement for deepening of the foundations due to the presence of made ground and the presence of trees within the west of the property.

5.2.3 The public house building on site shows evidence of a basement. This below ground structure will require fully breaking resulting in the likely requirement of a retaining element to any future. Foundations designs will need to take the level alteration and its location into consideration.

5.3 Ground Floor Construction

5.3.1 Where existing made ground, topsoil and / or any newly placed fill is less than 600mm then a ground bearing floor slab will be appropriate. However considering the likely conditions and foundations on site it is anticipated that suspended ground floors will be required.

5.3.2 Radon protective measures are not required on this site. However a gas risk assessment is required due to the off site source identified.

5.4 Road Pavement

5.4.1 A minimum CBR value of 1% on made ground and 1-2% for natural clay may be assumed at this stage, however this should be confirmed with in situ CBR testing which may allow a higher CBR values to be adopted.

5.4.2 Should there be a significant sudden change in made ground depth then consideration will have to be given to either reinforcement within any road construction or thickening of any road construction.

5.5 Surface Water Drainage

5.5.1 On the basis of the desk study, it is considered the natural cohesive ground conditions anticipated on site shall be unsuitable for soakaways as a method of surface water disposal, therefore an alternative method of surface water drainage should be sought.

5.5.2 It is recommended that a full drainage survey is commissioned for the site prior to demolition to identify any existing drainage connections which will aid in future site development design.

6.0 RESULTS OF THE INVESTIGATION

6.1 Potential Contamination Sources and Environmental Sensitivity

6.1.1 The desk study indicates that the site comprised open land and then a public house from 1915 to present.

6.1.2 Land immediately surrounding the site generally comprises residential and commercial properties, associated road networks and industrial properties.

6.1.3 The potential on site sources of contamination are likely to be heavy metals, sulphates, polyaromatic hydrocarbons, total petroleum hydrocarbons and asbestos associated with the sites use as a public house from 1915 to the time of writing this report and any made ground associated with the demolition of former buildings on site and the basement.

6.1.4 Potential off site sources of contamination are associated with ground gas from the historic landfill.

6.1.5 Consideration of any on site contamination will need to be made in the context of the proposed development. At this stage, it is understood that the site is to be redeveloped with commercial units at the ground floor and residential flats above. As such an allowance should be made for providing adequate protection to end users of the development.

6.1.6 Intrusive investigation and analysis of samples of material recovered from the site will be required to assess the potential risks to end users.

6.2 Ground Gas

6.2.1 Given the information reviewed, it is considered that there is a risk of hazardous ground gases affecting the proposed development. Therefore an appropriate gas risk assessment should be undertaken for this site.

6.2.2 The Envirocheck Report states that there is no requirement for radon protective measures within the proposed development.

6.3 Potential Environmental Remediation Measures

6.3.1 Based on the proposed development and the information obtained from the desk study, it is recommended that consideration be given to any potential remedial measures which may be required locally, when assessing abnormal development costs.

6.3.2 At this stage, a preliminary assessment of possible remedial requirements has been made based on our experience of similar sites.

6.3.3 Made ground found to be affected by concentrations of contaminations which may pose a potential risk to end users could either be removed from any garden or public open spaces areas of the site, or covered with an appropriate cover system. The thickness of the cover

system will depend on the concentrations present. If asbestos fibres are present at least 1000mm of cover will be required for all areas of garden and open space. If such materials are not present, then it may be possible to reduce this to of the order of 600mm within private gardens. Within landscaped areas or small front gardens this could be reduced further, to at least 300mm.

6.3.4 The available information indicates that there may be materials on site suitable for use in any required capping layer. Suitable testing should be carried out as part of the intrusive investigation to confirm the quality of materials present.

6.3.5 At this stage it should be considered that there would be a requirement for imported topsoil for use in the garden areas.

6.3.6 Not with standing the above, considering the proposed end use, significant garden or public open space areas are unlikely for this development.

7.0 FURTHER WORKS

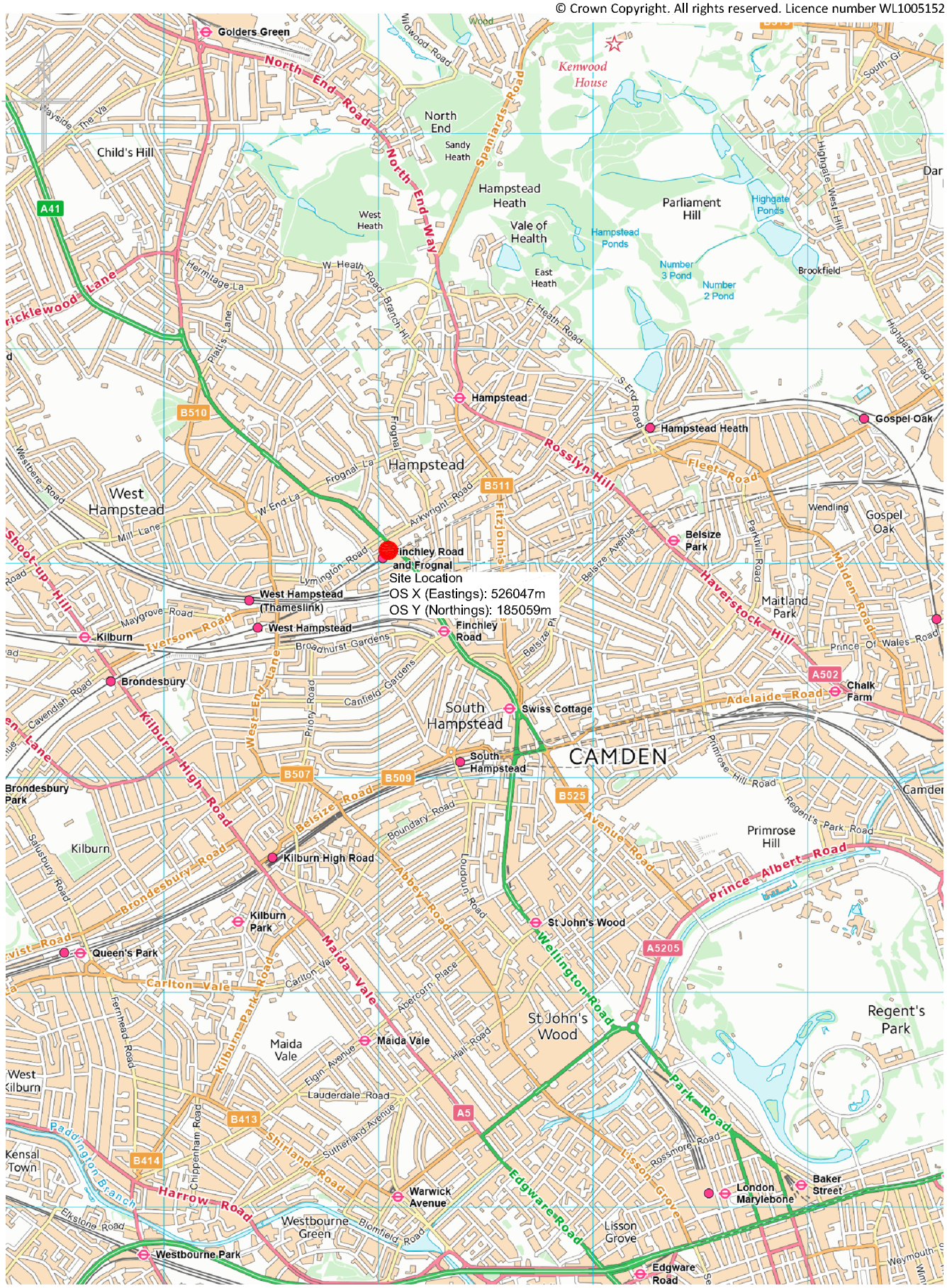
7.1 Based on the information available to date, it is recommended that an intrusive ground investigation be carried out to address the following issues which may affect the proposed development:

- On site ground conditions;
- Assessment of chemical characteristics on site;
- Nature and strength of underlying strata (foundation design);
- Aggressive nature of ground to buried concrete; and
- Assessment of ground gas emissions.

7.2 It is considered that the intrusive investigation required to address the above and enable a full assessment of the issues associated with the development of this site should comprise the following works:

- Undertake investigation initially utilising a window sampling rig to inspect and sample near surface (<4m) soils and obtain limited geotechnical design parameters of natural soils (potentially further drilling if deep madeground is encountered or high loadings are proposed);
- Installation and subsequent monitoring of gas wells to allow gas risk assessment to be undertaken should made ground containing appreciable amounts of degradable materials be encountered during the site works.;
- Laboratory analysis (including asbestos testing) of natural and made ground materials to determine chemical characteristics;
- Production of a Phase II Geo-Environmental Assessment Report presenting findings, assessments and conclusions;
- Preparation of Remediation Strategy detailing the works required to protect end users and the environment (if required).
- UXB Desk Based Assessment.

DRAWINGS



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Project: Finchley Bell, Finchley Road, London

Sheet: Site Location Plan

Revision	Amendment	Approved	Date
R0	First Issue	DRS	04.04.13

Drawn	Designed	Approved	Revision Date
MJ	PT	DRS	04.04.13

Project No.	Scale	Drawing No.	Sheet. No.	Revision
J-D1097.00	NTS	DO J-D1097.00	401	R0

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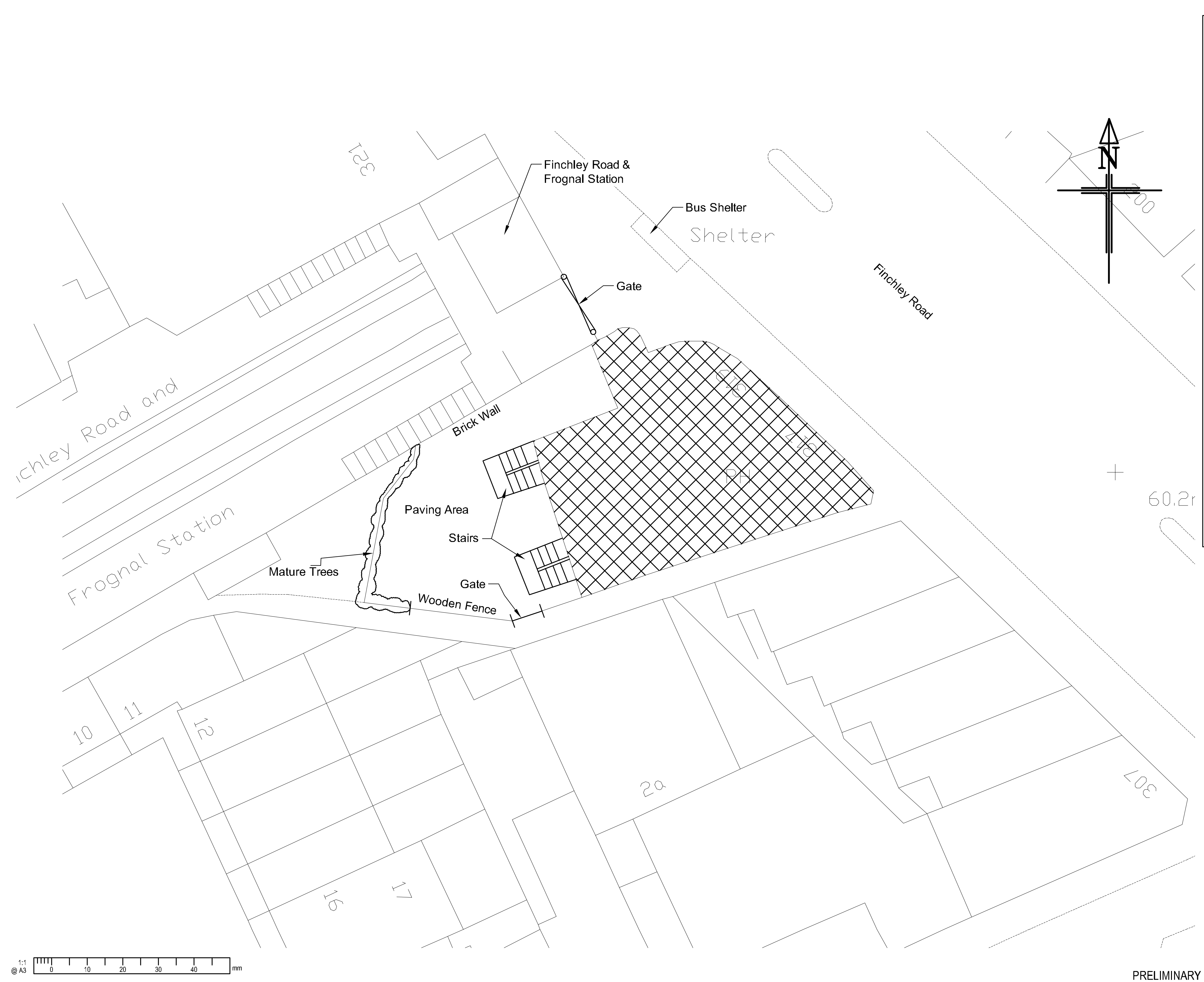

Key:

Finchley Bell Public House

Revision	Amendment	Approved	Revision Date
R0	First Issue	DRS	04.04.13

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Scale: 1:200 @ A3

Project: Finchley Bell, Finchley Road, London

Sheet: Site Features Plan

PRELIMINARY

Drawing No.	Sheet No.	Revision
DO J-D1097.00	402	R0

APPENDIX A
Historical Plans