

South West London and St George's  
Mental Health NHS Trust

**Barnes Hospital**

Phase 1 Ground Contamination Desk  
Study

Issue 4 | 30 October 2018

This report takes into account the particular  
instructions and requirements of our client.

It is not intended for and should not be relied  
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Job number 247776-00

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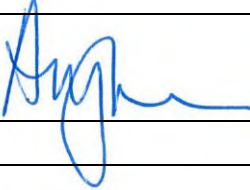
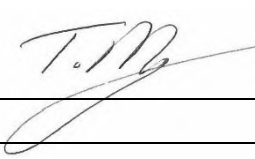
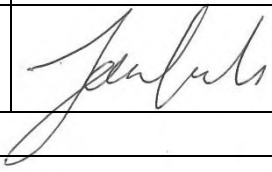
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## Executive summary

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### Introduction

This report presents a desk based study and preliminary risk assessment for ground contamination at Barnes Hospital completed by Ove Arup and Partners Ltd and commissioned by the South West London and St George's Mental Health NHS Trust based on environmental data reports, publicly available information and two site reconnaissance visits.

### Site description and reconnaissance

The site is located on South Worple Way in a residential area of Barnes. It has been used as a hospital since circa 1889, historically as a fever and infectious diseases hospital and more recently a mental health facility. The hospital has had multiple phases of redevelopment and the current buildings onsite date from the original development up to the 1990s.

Development proposals are a mixed use development comprising a health centre, a Special Educational Needs School, up to 80 new build residential units, the conversion of two of the retained Buildings of Townscape Merit for use for up three residential units, the conversion of one Building of Townscape Merit for medical use, car parking, landscaping and associated works. The sensitivity of the proposed development is assessed to be **high**.

Site reconnaissance surveys were undertaken by Arup on 10 February 2016 and 19 September 2018. Internal access to buildings during the earlier visit was limited to areas that were in use or only recently vacated. During the more recent visit, access was possible to areas which were inaccessible during the original visit.

### Ground conditions and environmental setting

The site is likely to be underlain by Made Ground, River Terrace Deposits, a significant thickness of London Clay, Lambeth Group, Thanet Sand and Chalk. The RTD is designated as a secondary A aquifer but has a low sensitivity with no nearby groundwater abstractions. The Chalk is a principal aquifer but is protected by a significant thickness of impermeable strata. The closest surface waters are a culverted stream 100m to the east and Beverley Brook 230m to the southeast. There are no nationally designated ecological receptors within 500m of the site. The site is considered to have a **low** environmental sensitivity.

### Potential for contamination

Potential point sources onsite were identified including fuel tanks, an electrical sub-station, plant rooms and a laundry. Offsite potential sources of contamination were identified as a garage adjacent to the southeast and a cemetery to the west.

Given the past use as a hospital the potential for radiological and pathogen contamination sources have also been considered. There is no site-specific evidence of radiological use; and any pathogens are very unlikely to remain given the time elapsed; as such these are not considered significant. Other more significant potential sources of contamination from the past hospital use include Made Ground, past coal and oil storage, and the possibility for burnt waste.

## Risk assessment

Overall the site is thought to have a generally low potential for widespread contamination, increasing to locally moderate around specific identified point sources, such as tanks. The appraisal presented in the report is summarised in the table below.

Item	Qualitative assessment
Environmental sensitivity	Low
Development sensitivity	High
Potential for significant contamination to be present	Low to locally moderate
	<b>Risk assessment</b>
Risk of harm to human health during development	Low
Risk of harm to human health after development	Low (to moderate around point sources)
Risk of pollution to controlled waters	Low (to moderate around point sources)
Building materials and services	Low

## Recommendations

Once consent is granted, it is recommended that an intrusive geoenvironmental ground investigation is undertaken to determine the local ground conditions and confirm the contamination status of the site. The results of the ground investigation should be used to inform a ground contamination risk assessment report which would update the conceptual site model and risk assessment presented within this report.

The Trust has advised that to their knowledge there has been no historical use of radioactive substances at the site. Further confirmation is currently being sought via an outstanding query raised with the Health and Safety Executive.

Depending on the findings of the intrusive ground investigation and risk assessment it may be necessary to remediate any soil and/ or groundwater contamination at the site prior to redevelopment. This can be managed through planning consent conditions.

If specific remediation measures are recommended for the site, verification records would need to be kept. This information would then need to be presented in a verification report.

If significant asbestos is identified in soils onsite, works should be undertaken in accordance with the Control of Asbestos Regulations 2012. Specific health and

safety measures and monitoring might need to be put in place during development, to meet these requirements.



# 1 Introduction

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## 1.1 Background

South West London and St George's Mental Health NHS Trust (the Trust) is proposing to redevelop Barnes hospital. Ove Arup and Partners Ltd (Arup) has been commissioned by the Trust to complete a ground contamination desk study and preliminary risk assessment (PRA) for the site to support a planning application for the development. This report was initially produced for the Trust in March 2016; with a previous revision also issued in October 2017. The report has now been refreshed and updated, including a recent site reconnaissance visit, to accompany the current planning application.

## 1.2 Report objectives

The objectives of this report are to identify and assess the existing information relating to ground conditions, environmental setting and development constraints as they relate to ground contamination. The report will specifically:

- provide a review of past and current uses of the site and the surrounding area, discussing the environmental setting and nature of potential contaminative sources;
- outline the local geology, hydrogeology and hydrology conditions;
- use the site appraisal data and outline details of the proposed development to inform an initial conceptual model and preliminary risk assessment; and
- provide recommendations regarding the implications of the findings for the redevelopment of the site for the proposed use and identify requirements for intrusive ground investigation.

## 1.3 Information sources

A Groundsure report was commissioned on 5<sup>th</sup> February 2016 and is included in Appendix C. The Groundsure report comprises information on Environment Agency (EA) permits, consents, pollution notifications and mapping, potentially contaminative land uses and sensitive land uses in the EnviroInsight report (Appendix C1); information on the geological setting of the site and potential ground hazards in the GeoInsight report (Appendix C2); and historical ordnance survey mapping and aerial photographs in the MapInsight report (Appendix C3).

A Local Authority search was commissioned from London Borough of Richmond upon Thames (LBRT) and the results were received on 10<sup>th</sup> February 2016. This information is included within Appendix B. British Geological Survey (BGS) borehole logs [1] were also reviewed.

An Arup environmental consultant undertook a site reconnaissance visit on 10<sup>th</sup> February 2016 and a second site reconnaissance visit was completed on 19<sup>th</sup>

September 2018. A selection of photographs and information obtained from the walkovers is included in this report.

During the recent visit conditions at the site had not substantially changed since February 2016. However, one building has been demolished and more of the vacant buildings are now boarded up and fenced off.

No previous ground investigations or previous ground contamination assessments have been made available to be reviewed as part of this study.

## 1.4 Report structure

This report has the following structure:

- section 2 outlines the current configuration of the site and environmental setting;
- section 3 describes the site history;
- section 4 details the anticipated ground conditions, following a review of published records;
- section 5 presents the preliminary conceptual model;
- section 6 provides the preliminary risk assessment; and
- section 7 sets out the conclusions and recommendations.

## 1.5 Limitations

This report has been produced by Arup for use by the Trust in connection with the proposed redevelopment of the Barnes hospital site. It takes into account our client's particular instructions and requirements and addresses their priorities at the time. It is not intended for, and should not be relied upon by any third party and no responsibility is undertaken to any third party in relation to it, except as provided for in Arup's agreement with the Trust.

Arup has based the site appraisal on the sources of information detailed within the report text and believes them to be reliable, but cannot and does not guarantee the authenticity or reliability of third party information. Notwithstanding the efforts made by the professional team in undertaking this contamination assessment it is possible that ground conditions and contamination other than those potentially indicated by this report may exist at the site.

This report provides an assessment of the potential for contamination in the ground. The report does not provide an assessment of the potential for hazardous materials in the building fabric and the implications of those hazardous materials. A survey of hazardous materials in the building, for example asbestos containing materials, has not been carried out by Arup as part of this assessment.

## 2 The site

### 2.1 Site location

The site is located on South Worple Way in Barnes, London, SW14 8SU. The National Grid Reference for the site is TQ 212 756 and the location is illustrated in Figure 1 and Plate 1 below. The site is bounded by South Worple Way to the north, a cemetery to the west and residential properties to the south and east. The location of the site is shown (with a blue outline) below.

Plate 1 Site Location



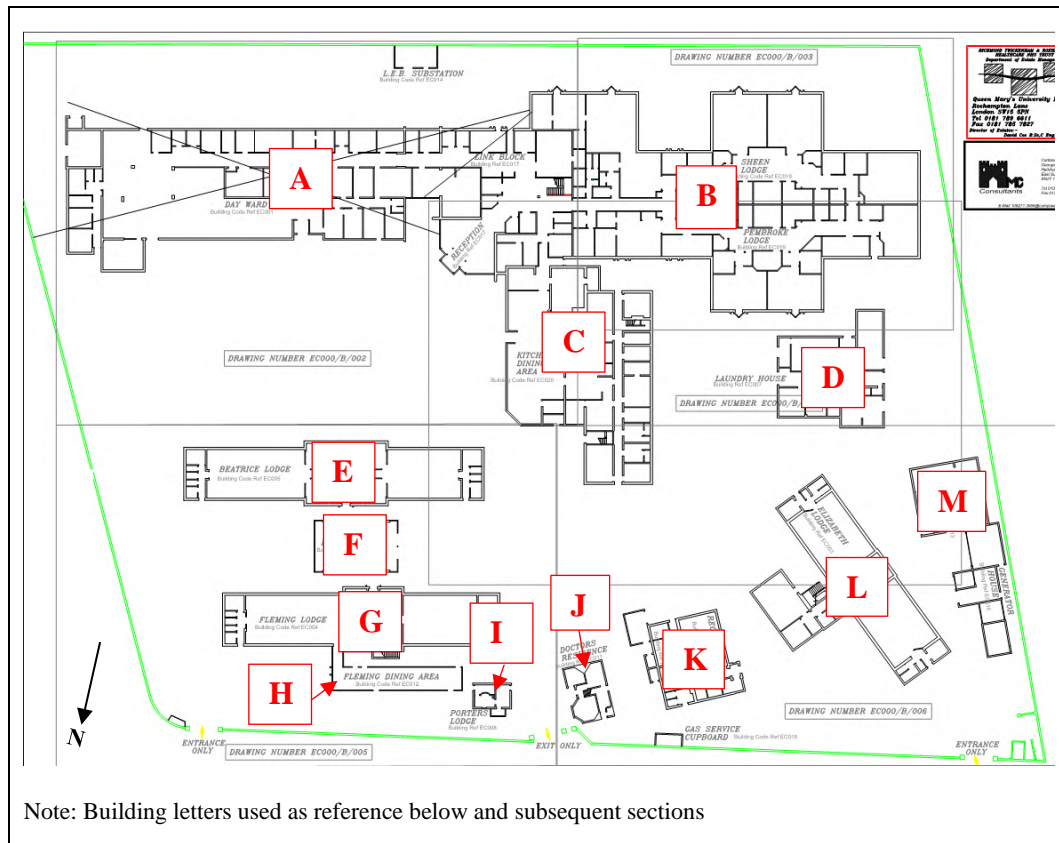
The site is roughly square in shape and is located in a residential area between Barnes, Mortlake and East Sheen. The River Thames is located around 340m to the north.

### 2.2 Site description

The site is occupied by Barnes Hospital. The hospital was built in 1889 originally as an infectious diseases hospital. By the 1950s it was repurposed as a geriatric residential facility and in more recent years was used for elderly mental health patients.

The site comprises a number of predominantly brick built one to two storey buildings varying in age from the late 19<sup>th</sup> century to 1990s. The buildings are surrounded by areas of car parking and soft landscaping. The site layout is illustrated in Figure 2 and Plate 2. Buildings have been labelled for ease of reference throughout the report.

Plate 2 Existing buildings onsite



The majority of the buildings are now vacant, with only a small part of the site accessible and in use as offices (buildings E and F) with a small car park. One building (H), the *Fleming Dining Area*, in the north of the site was demolished in summer 2018.

The site is relatively flat with a slight slope from +9.5m above Ordnance datum (OD) in the southwest to +8m OD in the east. All areas of hardstanding at the site were comprised of tarmac, and the soft landscaping comprised grass, with some small trees and shrubs in the centre of the site and some mature deciduous and coniferous trees along the southern site boundary.

### 2.3 Site reconnaissance visits




An initial site reconnaissance visit was carried out on 10<sup>th</sup> February 2016; a further visit was undertaken on 19<sup>th</sup> September 2018.

During the 2016 visit, ground floor levels of some of the buildings were accessible, though access to locked basement plant rooms was not possible. During the subsequent visit in 2018 the basement plant rooms were made available though all other vacant buildings were boarded up and inaccessible.



Over the course of the two visits the only areas of the site which were inaccessible were small parts of buildings B, C and D and the interiors of buildings H to M. These areas were surveyed from the exterior. Based on available records the access restrictions were not considered to have limited the effectiveness of the site reconnaissance visit. All significant potential sources of contamination are

believed to have been identified. Photographs from the site reconnaissance in 2018 are included in Appendix D.

Table 1 Site reconnaissance photographs

Description	Photograph
<p>13,600 litre diesel tank and filling point, located in the <i>Generator House</i> in building M in the northeast of site.</p> <p>The tank was observed to be in good condition, and the hardstanding beneath it was observed to be intact and unstained, although there was a general smell of diesel in the vicinity of the tank.</p>	
<p>Building D: <i>Laundry House</i>.</p> <p>Large washing machines were observed inside, along with sewing machines and ironing boards. No industrial scale laundry activities or chemical storage were observed.</p>	
<p>Suspected tank base alongside the gas service cupboard on the north boundary of the site. The area was inferred to be an old tank base due to its accessible location near the site boundary, and was observed to have old pipe connections and to be raised on a brick plinth.</p>	

Description	Photograph
<p>Old tank base alongside the bin store in the northwest of the site.</p>	 <p>A photograph showing a brick wall enclosure. Inside, there are several vertical pipes, some with red and black sections, and a concrete base. The ground is covered with dry leaves and some small plants.</p>
<p>Potential chemical and oxygen storage area at the <i>Workshop</i> on the east side of building K.</p>	 <p>A photograph of a brick building with a white door. There are several signs on the wall: a yellow 'HAZARDOUS 2SE CYLINDERS' sign, a white sign with a red 'X' and '2SE', and a yellow 'HAZARDOUS 2SE STORAGE' sign. A window is visible to the left of the door.</p>
<p>Electrical substation in the far south of the site.</p>	 <p>A photograph of a small, single-story brick building with a flat roof. It has three sets of double doors with louvered shutters. A small white table is in the foreground on the left. The building is surrounded by green grass and trees.</p>
<p>Basement level disused plant/boiler room in the basement of Fleming Lodge (building G), with former tank base.</p>	 <p>A photograph of an interior room with concrete walls and floor. A large, rusted metal boiler is the central feature. There is a red bucket on the floor next to it. The room appears to be disused.</p>

Description	Photograph
Symmetrically located basement plant room at <i>Beatrice Lodge</i> (building E), with modern plant installed. The former tank or generator base plinth is visible.	
Doors to locked plant rooms in Building D the <i>Laundry House</i> (left) and Building C (right).	

Other plant rooms were located on the ground floors of buildings C and D. Access to these was not possible, the site contact stated that these contained gas fired boilers only. Given the ages of the buildings it is possible that other fuels may have been used in the past.

The main findings of the two visits are summarised in the table below.

Table 2 Key features and potentially contaminative sources

No.	Feature	Description
1.	Diesel tank	A 3,000 gallon (13,600 litre) diesel tank was present in the northwest of site within the generator house.
2.	Suspected tank base	Located in the northwest of site alongside the historic entrance to site along the northern boundary.
3.	Suspected tank base	Located in the north of site, west of the current site exit, next to the gas service cupboard (as marked on building plans).
4.	Laundry	Located in the Laundry House, providing laundry services for the hospital; possible current or historic chemical storage within this building.
5.	Workshop	Located in building K, warning signs on the building indicate chemical storage.

No.	Feature	Description
6.	Electrical substation	Located on the southern boundary of the site. Markers showing where electrical cables run underground along the southern and western boundaries were also observed.
7.	Plant room	Located at basement level on the northern side of <i>Fleming Lodge</i> . Disused with tank base visible.
8.	Plant room	Located at basement level on the southern side of <i>Beatrice Lodge</i> . In use with modern plant. Historic tank or generator base visible.
9.	Plant room	Located on the southern side of Laundry House, no access during walkovers.
10.	Plant room	Located on the southern side of building C near the kitchens. No access during walkovers.

These features are marked on a plan showing potential sources of contamination in Figure 3.

## 2.4 Local Authority search results and comments

The results of the Local Authority environmental search were received on 10 February 2016. The search provides a summary of the industrial land use records held by the London Borough of Richmond upon Thames, on or close to the site.

The report provided by the Local Authority search is included in Appendix B1, and the findings are summarised in Table 3.

Table 3 Potentially contaminative industrial land use records

Feature	Distance from site	Details
Hospital	Onsite	None provided
Cemetery	Adjacent to the west	None provided
Garage	Adjacent to the southeast	Motor car repair garage, with assumed potential for tanks, due to the historic use.
Previous site investigation	50m southwest	37 Grosvenor Avenue, site investigation for redevelopment (planning permission ref: 93/0529 with a site investigation report submitted in 1994, report not available on the planning portal).
Dry cleaners	170m southeast	Local Authority Pollution Prevention and Control record for a dry cleaning premises.

The location and extent of the garage site is shown on Figure 3.

Details of the previous site investigation 50m southwest of the site were requested and received which confirmed it was a geotechnical investigation comprising of four trial pits with no chemical testing. The details provided surmise that the depth of the Made Ground recorded 50m to the south west of the site was approximately 1.0m. The information provided is included in Appendix B2.



## 2.5 Proposed development

The site is proposed for redevelopment. The currently available plans are indicative and may be subject to change, they are included in Appendix A and are described below.

The current proposals include demolition of most of the existing buildings, with the exception of the *Porter's Lodge* (building I), the *Doctor's Residence* (building J) and building K. The proposed development will be mixed use comprising a health centre, a Special Educational Needs School, up to 80 new build residential units, the conversion of two of the retained Buildings of Townscape Merit (BTMs) for use for up three residential units, the conversion of one BTM for medical use, car parking, landscaping and associated works.

There will be an approximately L-shaped basement, underneath all four new residential blocks, for car parking, cycle storage and plant. This will be accessed via a ramp from the western side of the site.

## 2.6 Environmental setting

### 2.6.1 General

A Groundsure EnviroInsight report was commissioned for this desk study, and a copy is included in Appendix C1. Arup has not been provided with the details of any previous desk studies or ground investigation data for the site, and therefore this report is based on desk based sources of information and the environmental reconnaissance undertaken by Arup.

### 2.6.2 Sensitive land use

The Groundsure report confirms that there are no nationally designated ecological receptors such as Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), National Nature Reserves (NNR), Special Protection Areas (SPA) or RAMSAR sites on or within 1km of the site.

There is one Local Nature Reserve (LNR) within 500m of the site; Barnes Common, which is 480m east of site.

### 2.6.3 Environmental permitting and registers

There are no contaminated land register entries or dangerous or hazardous sites (Control of Major Accident Hazards or Notification of Installations Handling Hazardous Substances) within 500m of the site. There are no records of any radioactive substances storage or disposal onsite or within 500m.

There are three industrial sites holding Part B permits within 500m of the site; all are dry cleaners and the closest is 170m southeast from the site, as shown in the Local Authority search results above (Table 3). There are no other industrial permits, licences or authorisations registered within 500m of the site.

There are four registered discharge consents within 250m of the site. Two of which are unspecified trade discharges that were revoked in 1992, and the remaining two refer to storm sewer overflows 230m to 250m south-east of site interpreted to discharge to Beverley Brook. None of these are considered likely to impact the site.

There is one historical landfill registered within 1km of the site on the northern side of the Thames. Dukes Meadows is 440m north of site and was historically operated by Ham River Grit for gravel extraction and subsequent filling in around 1945 to 1950. No information on the type of waste received is supplied. This landfill will not pose a gas risk to the site, due to the distance and the separation by the River Thames.

There are no active registered landfill sites or other waste treatment, transfer or disposal sites identified by the Groundsure report on or within 1km of the site.

#### 2.6.4 Hydrogeology and hydrology

Expected ground conditions at the site are Made Ground over River Terrace Deposits (RTD) of the Kempton Park Gravel formation underlain by London Clay.

The EA designates the RTD as a secondary A aquifer. The London Clay is unproductive and underlain by the Lambeth Group which includes permeable layers designated as a secondary A aquifer. At depth the site is underlain by the Thanet Sands (secondary aquifer) and the Chalk which is a principal aquifer.

The Groundsure report includes records for two groundwater abstractions within 1km of the site. The closest abstraction is listed as historical, 660m north of the site for use in spray irrigation at Dukes Meadows. The other abstraction listed is active, 860m northwest and also for spray irrigation at Dukes Meadows Golf Club. The site is not situated within a source protection zone (SPZ) for potable water supply.

The nearest surface water feature is Beverley Brook, around 230m southeast of the site. The River Thames is approximately 340m north of the site, and there is also an enclosed culvert linking Beverley Brook to the River Thames running along White Hart Lane around 100m east of the site. There are no EA recorded pollution incidents to controlled waters within 500m of the site.

#### 2.6.5 Radon

The Groundsure GeoInsight report (Appendix C2) confirms that the site is in a lower probability radon area, as less than 1% of homes are above the action level. The Groundsure report states that in those cases no radon protective measures are necessary.

#### 2.6.6 Infilled ground

The cemetery adjacent to the site to the west is highlighted on the Groundsure GeoInsight report as an area of historical ground workings. There is also an

historic burial ground 215m west of the site, which has since been redeveloped with housing.

### **2.6.7 Unexploded ordnance (UXO)**

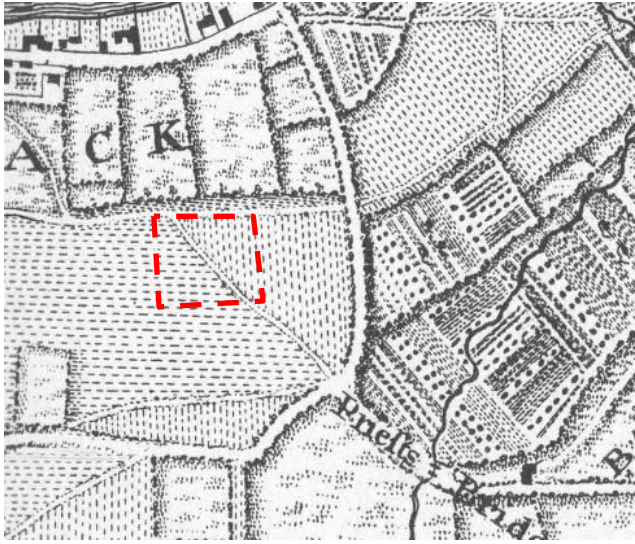

No details or records of UXO are included in the Groundsure report and a specific assessment of risks related to UXO is outside the scope of this report. The site is outside the extent of the London County Council Bomb Damage Maps [2]. Reference to the Bombsight website [3] shows no records of bombs landing onsite but does record bomb strikes within 250m of the site to the north-west, south west, south and east.




### 3 Site history


A review of historical Ordnance Survey (OS) maps included in the Groundsure MapInsight report (dating from 1866 to 2014) and other mapping for the site and the surrounding area available in the Arup library has been included in Table 4 below. The historical OS maps included in the Groundsure report are provided in Appendix C3.

In summary, the site was undeveloped until a fever hospital and mortuary were constructed on the site in the late 19<sup>th</sup> century (between 1869 and 1896). The hospital site (originally for infectious diseases, and later for mental health patients) was then expanded over the years in various development phases, the latest of which was in the 1990s. It is understood that many of the buildings have now been unused for many years.

Table 4 Site history

Map extract	Description
	<p><b>John Roque Map 1746</b></p> <p><b>Onsite:</b> The approximate location of the site is highlighted in red.</p> <p>The site was open fields, and the map pre-dates the development of the cemetery and railway, which are both shown on the earliest available OS mapping from 1866.</p> <p><b>Offsite:</b> The surrounding area was also largely comprised of open fields. The footpath passing diagonally through the site from Priests Bridge remains today to the south east of the site.</p>
<p><b>1869 1:2,500.</b> No significant change on or offsite</p>	
	<p><b>1896 1:1,056</b></p> <p><b>Onsite:</b> The western half of the site was originally developed with the fever hospital, mortuary and offices in the late 19<sup>th</sup> century.</p> <p>The office and mortuary building is still present today as building K. The building in the west of site is still present as the laundry, building D.</p> <p><b>Offsite:</b> Residential development to the north east and south west of the site had occurred but the immediate vicinity of the site remains undeveloped, except for the railway adjacent to the north.</p>

Map extract	Description
	<p><b>1913 1:2,500</b></p> <p><b>Onsite:</b> The hospital had expanded to occupy the entire site. Buildings I, J and parts of buildings C and L had been constructed. An additional mortuary in the northeast of site was also developed with further buildings in the far south of site that would be subsequently redeveloped.</p> <p><b>Offsite:</b> Residential properties adjacent to the site in the east (Buxton Road) and south (Grosvenor Avenue) had been built.</p>
<p><b>1919 1:2,500.</b> No significant change on or offsite.</p>	
	<p><b>1933 1:2,500</b></p> <p><b>Onsite:</b> Further buildings had been built including buildings E and G (Fleming and Beatrice Lodges) and most of building C. The building in the northeast is no longer shown. Other small buildings are shown in the west, south and east that will be subsequently redeveloped.</p> <p><b>Offsite:</b> A site, shown on later maps as a garage, has been built to the southeast of site and an omnibus depot is shown approximately 120m to the north-west.</p>
<p><b>1940 1:2,500.</b> No significant change on or offsite</p>	
	<p><b>1951 1:1,250</b></p> <p><b>Onsite:</b> A Nurses' Home had been developed in the south of site, a small square building had been constructed in the northeast, and other buildings in the east of site had been demolished.</p> <p><b>Offsite:</b> A garage is shown approximately 20m to the south east.</p>
<p><b>1966 1:1,250.</b> <b>Onsite:</b> the only change is the addition of building F, linking the two lodges (E and G). <b>Offsite:</b> no significant change</p>	

Map extract	Description
	<p><b>1991 1:1,250</b></p> <p><b>Onsite:</b> Development of: the current mortuary and generator house (building M), <i>Fleming Dining Area</i> (building H, recently demolished), building A, and two buildings which have since been demolished in the northwest and centre of site.</p> <p>The electricity substation on the southern site boundary is shown.</p> <p><b>Offsite:</b> The omnibus depot to the north west is now labelled as a bus station.</p>
<p><b>1994 1:1,250. Onsite:</b> The recent site layout is shown including development of building B.</p> <p><b>Offsite:</b> No significant change.</p>	

The historical use of the site as a hospital introduces the potential for a number of contaminants. However, given that the hospital has only ever been used as a convalescence ward for infectious diseases, geriatric or mentally ill patients the scope of chemical usage onsite is significantly reduced. The Trust have confirmed that they do not hold any records of use of radioactive materials on site while in their ownership and based on knowledge of the historic use of the site none is suspected to have occurred before they took ownership. The site is therefore assumed to have a very low risk of the presence of radioactive substances related to medical use.

The primary potential source of contamination from this type of hospital site is considered to be from fuel storage for boilers and generators used in heating and laundering. There is also a high potential for asbestos in the buildings and any associated services or ducting.

## 4 Ground conditions

### 4.1 Geology

The regional geology of the site was determined by examining information included in the Groundsure report, available geological maps held by Arup and available BGS records [1]. The expected sequence of strata is summarised in Table 5 below.

Table 5 Anticipated site stratigraphy

Stratum	Approximate level at top (mOD)	Approximate thickness (m)
Made Ground	+9	1 to 2 (may be deeper around the basement level of building B)
River Terrace Deposits (Kempton Park Gravel)	+6 to +8	3 to >6
London Clay Formation	0	50 to 70
Lambeth Group	-50 to -70	Not known
Thanet Sand Formation	Not known	Not known
Chalk	Not known	Not known

No previous ground investigation reports have been made available. The ground conditions have been estimated with reference to nearby BGS boreholes.

Two 45m deep boreholes to the south west and south of the site included in the BGS database indicate Made Ground over sandy gravel of between 3.3m and 6.0m thickness over clay. As the subject site is slightly closer to the River Thames it is expected that the RTD will be the same or thicker than that observed in the boreholes to the south, and as such it may be more than 6m thick onsite. The London Clay was proven to a depth of at least 150 feet (45 metres) in the two BGS boreholes. As such there is expected to be a significant thickness of London Clay underlying the site.

The nearest BGS borehole records for boreholes that penetrate the full thickness of the London Clay are located to the northwest of the site at the former Mortlake brewery and across the river within Dukes Meadows. These boreholes indicate a thickness of London Clay of between around 50m and 70m.

### 4.2 Groundwater

From the BGS records closest to the site, groundwater levels are expected to be around +3m OD at the site. Ground levels onsite are between +8m and +9m OD so groundwater might be around 5m or 6m below ground level (bgl). However, this would need to be confirmed by ground investigation and may be subject to local variations.

## 5 Preliminary conceptual model

---

### 5.1 Contaminated land framework

Land contamination is regulated under several regimes, including environmental protection, pollution prevention and control, waste management, planning and development control and health and safety. The potential presence of ground contamination at a site could give rise to the following potential effects:

1. Construction related issues, including:
  - Health and safety (on and offsite) with associated additional mitigation;
  - Increased costs, particularly for materials management and waste disposal or soil treatment;
  - Possible delays;
  - Additional planning conditions and requirements to discharge before during and after development;
2. Design issues, including:
  - Ground gas protection measures;
  - Aggressive ground conditions;
  - Pile design (limiting pathways to groundwater);
  - Design of cover layers;
  - Remediation design;
3. A potential requirement for statutory remediation, for the current use (Part 2A);
4. The requirement for remediation under planning consent for a change of use; and
5. The requirement for EIA and associated additional mitigation.

The National Planning Policy Framework (NPPF) [4] places responsibility on the developer and/or the land owner for securing a safe development with respect to land contamination issues. The NPPF defines site investigation information as including a risk assessment of land potentially affected by contamination. It states that all investigations of land potentially affected by contamination should be carried out in accordance with established procedures.

The UK framework for the assessment of contaminated land endorses the principle of risk assessment and a “suitable for use” approach to contaminated land. Remedial action is only required if there are unacceptable risks to human health or the environment, taking into account the use of the land and its environmental setting. The assessment of the impacts arising from potentially contaminated land is based upon considerations of plausible pollution linkages (PPL) between contamination sources and sensitive receptors.



The methodology of risk assessment is normally set out in terms of significant pollutant linkages (referred to as contaminant linkages in the latest version of the Part 2A statutory guidance [5]) within a source-pathway-receptor model of the site. All three of these elements must be present for a site, or area of a site, to be determined as contaminated.

A preliminary contamination risk assessment has been undertaken using this framework based on the following information:

- historical or current potentially contaminative activities operating on and in the vicinity of the site;
- sensitivity of the site in the context of the wider environmental setting and ground conditions; and
- sensitivity of the site itself, the proposed development and potential receptors.

## 5.2 Potential sources of contamination

Potential historical and current sources of ground contamination at the site have been identified based on a review of historical maps, the Local Authority search and environmental reconnaissance visits. They are listed in Table 6 below, together with associated potential contaminants.

Table 6 Summary of potential sources of ground contamination onsite

Potential sources of contamination	Common contaminants
Diesel tank	Petroleum hydrocarbons and volatile organic compounds (VOCs)
Previous fuel tanks (identified in the north of site during the walkover)	Petroleum hydrocarbons and VOCs
Made Ground from past phases of development	Metals, polycyclic aromatic hydrocarbons (PAH), asbestos
Electrical sub-station. (If spills or leaks occur, which is unlikely as failures in electricity supply are usually identified.)	Polychlorinated biphenyls (PCBs), transformer oils
Laundry	Detergents, hydrocarbons, asbestos (it is possible chlorinated solvents maybe have been used although this is considered unlikely in a hospital laundry),
Plant rooms. (Boilers are currently gas fuelled, but may have housed oil and/or coal in the past.)	Hydrocarbons, PAHs, VOCs and metals
General hospital land use, including storage of chemicals.	Medicines, solvents and asbestos <sup>1</sup> .
Medical waste. Burnt medical waste may have been disposed onsite historically.	Pathogens (very unlikely <sup>2</sup> ) metals and PAH.
<p>Note 1: In addition to the potential presence within buildings such as asbestos lagging, cement products and other products</p> <p>Note 2: Various studies have shown that pathogens and bacteria do not survive long outside the human body and it is unlikely that medical wastes will have been disposed of onsite for a long time</p>	

There is the potential for further point sources of contamination, such as tanks or plant rooms to have been present in the past, given that a number of historic buildings have been demolished.

A number of offsite sources have been identified including:

- a garage to the south-east of site, which may have included fuel storage tanks at some point during its history;
- a dry cleaner, 170m to the south east;
- the railway just to the north of site; and
- the cemetery, adjacent to the west.

### 5.3 Potential receptors

The following potential receptors have been identified during construction works and future occupation following development of the site:

- construction workers and neighbours during development;
- site users (adults and children) after development. Based on current development plans this would include residents, school children, patients, workers, maintenance staff and visitors;
- surface water receptors including Beverley Brook and the River Thames, although these are some distance from the site;
- groundwater within the secondary A aquifer; and
- building materials and services.

The principal aquifer in the Chalk is known to be protected by a significant thickness of London Clay and Lambeth Group cohesive layers in the local area such that any development is unlikely to penetrate these layers. Consequently, the principal aquifer is not considered to be a plausible receptor. There are no designated ecological receptors on or close to the site.

### 5.4 Potential pathways

Potential pathways that may be present during redevelopment and operation include:

- human health by ingestion of soils and/or dust, dermal contact with soils or groundwater and inhalation of dust, vapour or ground gas;
- controlled waters by leaching from overlying soils and migration of dissolved phase contamination;
- controlled waters by migration of free phase contamination (if present, for instance from leaking tanks), or via preferential pathways (if created by piling or penetrative construction techniques) to groundwater aquifers;
- ground gas and vapour by ingress into enclosed spaces within buildings;

- aggressive ground conditions or hydrocarbons impacting construction materials.

Building materials and services would generally be appropriately specified for the ground conditions within the geotechnical design process, but may need to be considered if unusual conditions are encountered.

## 5.5 Summary

A summary of the initial plausible pollutant linkages related to the proposed development are presented in Table 7.

Table 7 Plausible pollutant linkages

Sources	Pathways	Receptors
Soil contamination arising from historical site uses	Direct contact with soil and dust indoors and outdoors including dermal contact, ingestion and inhalation. Ingestion of home-grown produce.	Future site users.
	Direct contact with soil and dust including dermal contact, ingestion and inhalation.	Construction workers
	Inhalation of soil dust, fibres and vapours.	Site neighbours.
	Leaching of soil contaminants to groundwater and transport via intergranular flow.	RTD aquifer underlying the site.
		Surface water.
Direct contact with contaminated soil or groundwater.	Material fabric of building and infrastructure.	
Free phase hydrocarbons or solvents from onsite fuel tanks or offsite sources	Inhalation of vapours from soil or groundwater indoors and outdoors.	Future site users.
	Inhalation of vapours from soil or groundwater outdoors	Construction workers.
	Migration via intergranular flow or migration of free phases as a non-aqueous liquid (NAPL)	RTD aquifer underlying the site.
Surface water.		
Made Ground with a high organic content generating ground gas	Inhalation following ingress into buildings.	Future site users and visitors.
	Build-up of gas leading to explosion.	Material fabric of building and infrastructure and site users.

## 6 Preliminary risk assessment

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### 6.1 Introduction

A preliminary contamination risk assessment has been undertaken based on the historical use of the site, the environmental setting and current use. The risk characterisations provided below have been qualitatively assessed using a range from very high to very low. The risk classifications have been based on the CIRIA guidance C552 [6] and professional judgement. A brief description of each is provided below:

- **Very high risk;** there is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm to a designated receptor is currently happening. Urgent investigation (if not undertaken already) and remediation are likely to be required;
- **High risk;** it is likely that harm will arise to a designated receptor from an identified hazard. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely to be over the longer term;
- **Moderate risk;** it is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk. Some remedial works may be required in the longer term;
- **Low risk;** it is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild. Investigation might be considered as an informative action but may not be necessary; and
- **Very low risk;** there is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is likely mild or may not be noticed. Further investigation is unlikely unless some further development works or disturbance is expected.

An additional classification of **negligible** risk is used when there is no plausible pollutant linkage between identified hazards and the receptors due to the absence of a pathway or receptor (i.e. without intervention).

### 6.2 Site sensitivity

The site is located on the secondary A aquifer of the RTD. The site is not located within an SPZ and there are no groundwater abstractions in the vicinity of the site. There is a significant thickness of London Clay and cohesive Lambeth Group soils underlying the site acting as an aquiclude for the principal aquifer in the Chalk and Thanet Sands at depth. The environmental sensitivity of the site is assessed as **low**.

The proposed development based on current design drawings includes a health centre, primary and nursery schools, residential apartments and residential houses with private gardens. The proposed land use is therefore of **high** sensitivity and includes the most sensitive type of receptors (young children).

## 6.3 Potential for contamination

### 6.3.1 Onsite

Potential sources of contamination onsite relate to the current and historical use as a hospital. No other potentially contaminative historical uses have been identified onsite by the desk study. In general, although a list of potentially contaminative activities has been identified based on the site history and reconnaissance visits, hospital facilities such as this would not be regarded as a significantly contaminating industry. It is more likely that low levels would be found, or locally higher levels in areas where indiscriminate disposal may have occurred or tanks and pipes may have leaked.

Fuel storage is known to have occurred onsite, and the locations of present and historic fuel tanks and plant rooms are potential point sources of contamination. Other site uses including: the laundry, potential chemical storage and the electrical sub-station, also represent potential contamination sources. There is likely to be a layer of Made Ground over most of the site produced by the phases of redevelopment during the site's history, which could be contaminated. Overall the site is thought to have a generally **low** potential for significant widespread contamination although this would increase to moderate locally around current and historical tanks, or other features described in Section 5.2.

### 6.3.2 Offsite

A garage has been identified adjacent to the site in the southwest. This has the potential for be a source of hydrocarbon contamination, especially if fuel tanks have been present at the garage in the past. However, it is relatively small scale.

No other significant offsite sources have been identified, and therefore the potential for significant contamination onsite from offsite sources is assessed to be **very low**.

## 6.4 Risk of harm to human health

### 6.4.1 Construction workers and neighbours during development

Construction workers could be exposed to soil contamination through dermal contact, ingestion and inhalation. The potential for significant widespread contamination has been assessed to be low. Locally there may be more elevated levels associated with features described in Section 5.2.

The risk of harm to human health during construction works will be mitigated by wearing appropriate PPE and adopting good hygiene practices, and site good management, including hand washing facilities and having separate areas of eating away from the work area. This is standard practice for construction sites. If more elevated contamination is identified, which might include spills and leaks, asbestos in the Made Ground, or buried wastes, then additional precautions and measures during the works may be required.

Construction workers and neighbours may be at risk from inhalation of soil dust, fibres and vapours. Some potential sources of hydrocarbon contamination have been identified which could pose a vapour risk if contamination is present. There is a potential for asbestos contamination in any Made Ground. If the presence of asbestos was confirmed by ground investigation, this could pose a risk to construction workers and neighbours via inhalation of fibres and would require mitigation.

Overall the risks to construction workers and neighbours during construction are assessed as **low** across the site, assuming asbestos is not widespread in the Made Ground, and locally higher around old tanks or disposal areas. The conditions should be checked by a ground investigation that comprises a mix of general testing across the Made Ground and some targeted locations around the features identified in Section 5.2.

#### 6.4.2 Site users after development

The proposed development is of a high sensitivity, and future site users (including young children) could be exposed to soil contamination via ingestion, dermal contact and inhalation pathways both indoors and outdoors. Site users could also be exposed through consumption of home grown produce from residential areas with gardens and the primary school.

Several potential sources have been identified onsite and future users will include young children. Risks to future site users are considered to be generally **low** but **moderate** around potential point sources. Further investigations are required as described above.

### 6.5 Risk of pollution to controlled waters

The site has a low environmental sensitivity due to the distance to any potential surface water receptors, and the low sensitivity of the RTD aquifer and lack of abstractions in the vicinity. However, contamination of the RTD should be prevented, and if any contamination is identified, for instance from leaking tanks, then some remedial action may be required, subject to the extent and further risk assessment.

Groundwater levels at the site may be around 4m to 5m bgl within the RTD (subject to confirmation). There is the potential for free product or dissolved phase organic contaminants (hydrocarbons and chlorinated solvents) from the sources identified onsite. If significant levels of contamination are present these may migrate via infiltration and intergranular flow to the RTD aquifer under the site, however, the attenuation and dilution that would occur over the distance

travelled to any surface water receptors makes the likelihood of any significant impact low. Overall the risk of significant pollution of controlled waters is assessed to be **low**. Investigations should be completed locally around former and current tanks to confirm the status of the groundwater.

## 6.6 Building materials and services

Building materials including concrete, metal and plastic placed within contaminated ground can be subject to degradation from contact with contaminants. This is particularly an issue with plastic water supply pipes laid within hydrocarbon impacted soils, which can ultimately lead to contamination of drinking water supplies. Following ground investigation and testing, it will be necessary to specify concrete for use in foundations, possibly other materials and water supply pipes. If significant contamination is identified it may also be necessary to lay services within clean service corridors.

Considering the past use of the site the risk to building materials and services is assessed to be **low**.

## 7 Conclusions and recommendations

### 7.1 Conclusions

This report presents a desk based review and assessment of the potential risks from contamination, based on the information sources described. A review of the site history has identified that the site has only been used as a hospital in the past.

The site has been identified as having a **low** environmental sensitivity based on the existing site conditions. There are no nationally designated ecological receptors within 500m of the site, the closest surface water feature is over 200m from the site and the River Thames is over 300m to the north. There are no nearby groundwater abstractions and the secondary A aquifer in the RTD underlying the site is of low sensitivity. The principal aquifer within the Chalk beneath the site is protected by a significant thickness of impermeable strata.

The proposed development is considered to have a **high** sensitivity as it may include residential gardens and child receptors.

Several potentially contaminative sources have been identified based on: a review of the historical use and phases of redevelopment of the site; a review of the Local Authority search; and as identified during the site reconnaissance visits. The main sources include current and past fuel tanks, an electrical substation, laundry and plant rooms, hospital activities onsite and a garage adjacent to the site in the southeast. There is the potential for buried waste (for instance ash or other medical wastes). Radioactive sources are not considered likely at the site given the type of hospital use. Made Ground is likely to be present, and may be extensive. It is not unusual for Made Ground to include demolition materials and ash.

The potential for significant widespread contamination at the site is **low** although this would increase to moderate locally around current and historic tanks, or other features described in Section 5.2. It is also possible that additional potential point sources for contamination may have existed in the past, as a number of buildings have been demolished.

The appraisal presented in this report is summarised in Table 8 below.

Table 8 Summary of qualitative risk assessment

Item	Qualitative assessment
Environmental sensitivity	<b>Low</b>
Development sensitivity	<b>High</b>
Potential for significant contamination to be present	<b>Low</b> to locally moderate
	<b>Risk assessment</b>
Risk of harm to human health during development	<b>Low</b>
Risk of harm to human health after development	<b>Low</b> (to moderate around point sources)
Risk of pollution to controlled waters	<b>Low</b> (to moderate around point sources)
Building materials and services	<b>Low</b>



## 7.2 Recommendations

### 7.2.1 Radioactive sources

The Trust have confirmed that they do not hold any records of use of radioactive materials on site while in their ownership and based on knowledge of the historic use of the site none is suspected to have occurred before they took ownership. Further confirmation is currently being sought via an outstanding query raised with the Health and Safety Executive (HSE), the response to which should be consulted prior to ground investigations on site.

### 7.2.2 Ground investigation

Given the potential sources of contamination identified on the site, and the proposed sensitive future land use, an intrusive geoenvironmental ground investigation is recommended.

The investigation, which can be undertaken in parallel and combined with any geotechnical investigation required prior to development, should comprise excavation of boreholes, trial pits or windowless sampling holes spaced across the site to provide a general spatial coverage. In addition, the investigation should include targeted locations near the identified potential point sources of contamination, both onsite (tanks, substation, plant rooms and laundry) and at the boundary with offsite sources (garage to the southeast).

The scope of the ground investigation should comprise sampling and testing of soil strata, and in particular the Made Ground. The investigation should also include installations to allow monitoring and sampling of groundwater, especially around the tanks and point sources and some gas and vapour monitoring wells. Ground investigation may be undertaken in multiple phases, for example prior to and post-demolition depending on the access available. The ground investigation techniques should be in accordance with BS10175 2013[7] and other British Standards.

Consideration should be given to the potential to encounter UXO in advance of the ground investigation and other possible constraints such as ecology, invasive species and archaeology.

### 7.2.3 Decommissioning of tanks

Prior to demolition all potential contamination sources including fuel tanks such as the 3,000 gallon diesel tank, identified during the site reconnaissance visits, should be safely decommissioned and removed from site. If tank removal is necessary, it should be undertaken by a specialist contractor and would likely include emptying residual fuel or water, degassing and additional ventilation measures. The decommissioning and removal of fuel storage tanks is described in Environmental Agency guidance PPG27 [8]. It is noted that this guidance has been removed from the gov.uk web site, although it does contain useful procedures. It is available from other related websites, such as Netregs [9] for

Scotland and Ireland. If additional or new contamination is identified during decommissioning, then some investigation and clean-up may be required.

During demolition of the existing buildings, any remaining equipment located within the plant rooms (including boilers, generator and water tanks) should be removed from site. During this process a watching brief should be maintained to identify any potential evidence of contamination. Where identified this should be documented and included in any verification reporting.

#### **7.2.4 Risk assessment**

The results of the ground investigation(s) should be used to inform a ground contamination risk assessment report which would quantify the levels of contamination in terms of the risks to the receptors. The conceptual site model and preliminary risk assessment presented within this report would be updated in light of the ground investigation findings, and, if required, a remediation strategy would be devised to mitigate any identified risks.

#### **7.2.5 Remediation**

Depending on the findings of the intrusive investigation and the levels of any contamination identified onsite, remediation measures could include cover layers of uncontaminated 'clean' soils in areas of soft landscaping, targeted excavation and removal of contamination hotspots, and/or other techniques such as specific clean-up techniques for onsite contamination if identified.

If specific remediation measures are recommended for the site, verification records would need to be kept, which could include: proof of cover layer thickness, verification soil sampling results, air or dust monitoring records and waste disposal testing and tickets. This information would then need to be presented in a verification report. General records should be kept in any case, demonstrating good practice in safety, materials management and waste disposal.

#### **7.2.6 Asbestos**

If significant asbestos is identified in soils onsite, works might need to be licenced under the Control of Asbestos Regulations (CAR) 2012 and associated guidance by CL:AIRE (2016) Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction & Demolition materials: Industry Guidance (CAR-SOIL). Specific health and safety measures and monitoring might need to be put in place during development.

## References

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- [1] British Geological Survey, OpenGeoscience website (historical borehole log scans) – accessed October 2015.  
<http://www.bgs.ac.uk/opengeoscience/>
- [2] London Topographical Society (2005). The London County Council Bomb Damage Maps 1939-1945. London Topographical Society and London Metropolitan Archives. LTS Publication No. 164
- [3] Bomb Sight Website. <http://bombsight.org>. Details bombing for London and surrounding area between October 1940 and June 1941.
- [4] Department for Communities and Local Government (2018): National Planning Policy Framework, HMSO.
- [5] Department for Environment, Food and Rural Affairs (April 2012), Environmental Protection Act 1990: Part 2A, Contaminated Land Statutory Guidance.
- [6] CIRIA (2001) Contaminated Land Risk Assessment – Guide to Good Practice (C552).
- [7] BSI (2013) Investigation of potentially contaminated sites – Code of practice (BS10175 A1:2013)
- [8] Environment Agency (2004) PPG27 Installation, decommissioning and removal of underground storage tanks.
- [9] Netregs website, <http://www.netregs.org.uk/>

## Figures

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Figure 1 Site location

Figure 2 Site layout

Figure 3 Potential contamination sources



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

**Legend**

 Site boundary

F1	2018-10-02	AJ	TM	CB
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Issue	Date	By	Chkd	Appd
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**ARUP**

13 Fitzroy Street  
London  
W1T 4BQ

Client  
**South West London and St Georges Mental Health NHS Trust**

Job Title  
**Barnes Hospital**

**Site location plan**

Scale at A4  
**1:10,000**

Job No <b>226594-00</b>	Drawing Status <b>For Issue</b>
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Drawing No <b>Figure 1</b>	Issue <b>F1</b>
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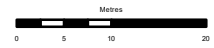


**Legend**

- Demolished building
- Site zone in use
- Site boundary
- A** Building labels

F1	2018-10-02	AJ	TM	CB
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Issue	Date	By	Chkd	Appd
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**ARUP**

13 Fitzroy Street  
London  
W1T 4BQ

Client  
**South West London and St Georges Mental Health NHS Trust**

Job Title  
**Barnes Hospital**

**Site layout plan**

Scale at A4  
**1:800**

Job No <b>226594-00</b>	Drawing Status <b>For Issue</b>
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Drawing No <b>Figure 2</b>	Issue <b>F1</b>
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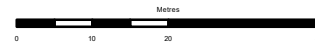




**Legend**

-  Potential contamination sources
-  Site boundary

F1	2018-09-28	AJ	TM	CB
Issue	Date	By	Chkd	Appd



**ARUP**

13 Fitzroy Street  
London  
W1T 4BQ

Client  
**South West London and St Georges Mental Health NHS Trust**

Job Title  
**Barnes Hospital**

**Potential sources of contamination**

Scale at A4  
**1:1,000**

Job No <b>226594-00</b>	Drawing Status <b>For Issue</b>
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Drawing No <b>Figure 3</b>	Issue <b>F1</b>
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## Appendix A

Proposed development drawings

NOTES:  
 DO NOT SCALE FROM THIS DRAWING.  
 ALL DIMENSIONS TO BE CHECKED ON SITE.  
 ALL OMISSIONS AND DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

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--- Site Boundary



HH Footprint Revision	31/10/18	GH	A
Revision description	Date	Check	Rev

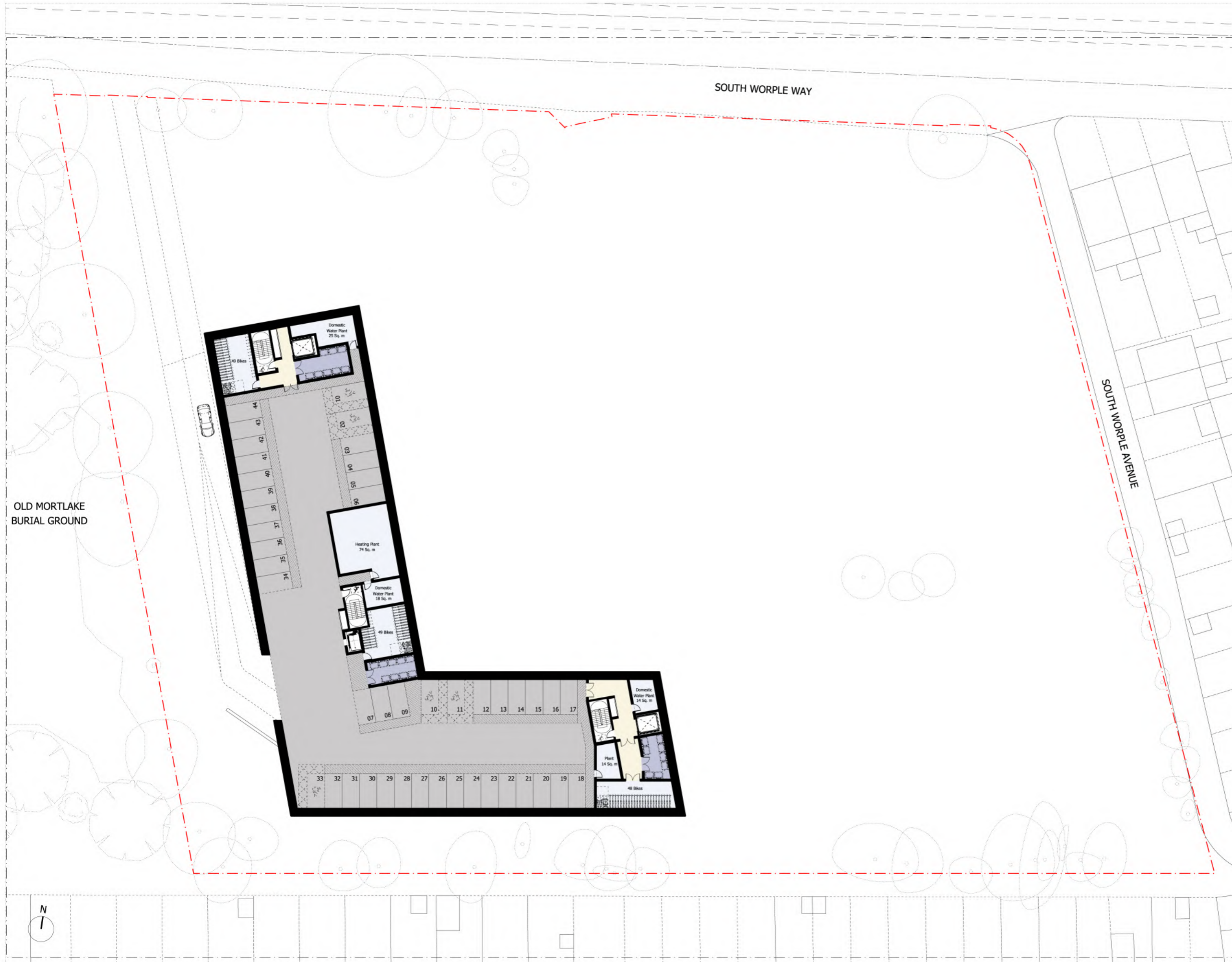
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Project  
**Barnes Hospital**  
 South Worple Way  
 Barnes, SW14 8SU

Drawing  
**Proposed**  
**Ground Floor**

Drawn	Date	Scale
RLe	01/11/2018	1: 250@A1 1: 500@A3
Job number	Drawing number	Revision
18002	G200_P_00_001	A



NOTES:  
 DO NOT SCALE FROM THIS DRAWING.  
 ALL DIMENSIONS TO BE CHECKED ON SITE.  
 ALL OMISSIONS AND DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

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--- Site Boundary

Revision description	Date	Check	Rev
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## SQUIRE & PARTNERS

The Department Store  
 248 Ferndale Road, London SW9 8FR  
 T: 020 7278 5555  
 info@squireandpartners.com  
 www.squireandpartners.com

Project  
**Barnes Hospital**  
 South Worple Way  
 Barnes, SW14 8SU

Drawing  
**Proposed**  
 Lower Ground Floor

Drawn	Date	Scale
RLe	25/10/2018	1:250(A1)
Job number	Drawing number	Revision
18002	G200_P_LG_001	-

## **Appendix B**

Local Authority records

# B1 Local Authority environmental search results

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# CONTAMINATED LAND ENQUIRY

Site Name: Barnes Hospital  
South Worple Way  
Barnes  
London  
SW14 8SU

Date: 10/02/2016

On Behalf of:  
Ms Emma Boucher  
Arup  
13 Fitzroy Street  
London  
W1T 4BQ

**Ms Emma Boucher**  
**Arup**  
**13 Fitzroy Street**  
**London**  
**W1T 4BQ**

**Date: 10 February 2016**

**Dear Emma Boucher,**

**RE: Request for Information – Barnes Hospital**  
**Our ref: EE-000143**

I refer to your recent contaminated land enquiry for a site at Barnes Hospital, South Worple Way, Barnes, London, SW14 8SU.

Richmond Council, as a Local Authority, has a duty under Part 2A of the Environmental Protection Act 1990, to investigate its area for the purpose of identifying contaminated land. In fulfilment of this duty we have compiled a database of land that may be potentially contaminated based on the locations of former historical industrial land uses within the borough. The database currently holds close to 1,500 records.

We have searched our database in response to your enquiry. A table showing all the industrial land use records that were identified by the search of our database is given in the appendix to this response.

**I would like draw your particular attention to the standard disclaimer notice below.**

#### **DISCLAIMER NOTICE**

The London Borough of Richmond upon Thames has provided the above information based upon data currently available to the Council. This information has been obtained from the Council's own researches as well as from a number of third party sources. This data set is not yet complete and is constantly being updated and reviewed. Therefore, the information given above, including that regarding the inspection priority of sites, may be subject to change at any time in the future upon the receipt of additional information.

All information is supplied on the distinct understanding that the Council does not warrant the accuracy of any of the information and on the basis that neither the Council nor any officer, servant or agent of the Council is legally responsible, either in contract or in tort, for any inaccuracies, or omissions herein contained whether arising from inadvertence or negligence or from any other cause whatsoever.



I hope you find this information useful. Please do not hesitate to contact me should you require any further information or have any further queries.

Yours Faithfully



**Simon Makoni**  
**Scientific Officer**  
Direct Tel: 0208 831 6454  
Email: [simon.makoni@richmond.gov.uk](mailto:simon.makoni@richmond.gov.uk)

## 1. APPENDIX - CONTAMINATED LAND ENQUIRY GIS SEARCH REPORT

DATE: 10 February 2016      TIME: 11:15

Buffer Search Radius: 50, 100, 200, 250, 2000 metres

Search Feature ID: Barnes Hospital

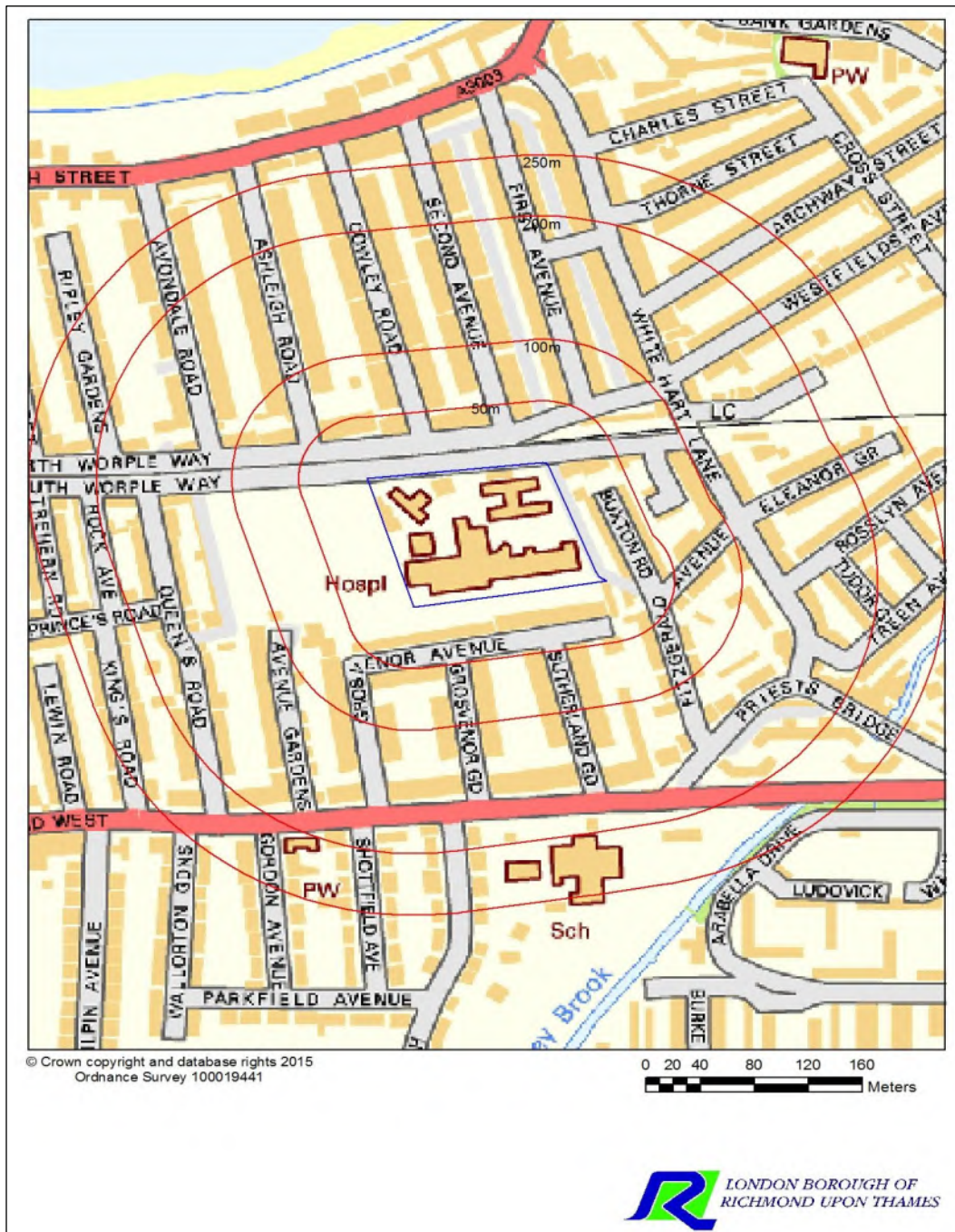
Search Feature Layer Name: Environmental Searches

Approx. area of search feature: 14,293m<sup>2</sup>

Site Centre Coordinates (British National Grid): 521209, 175686

Selection Summary: A total of 7 features were selected on 4 out of 7 target layers (total includes the search feature).

## 2. Site Location Map



## 2.7 Aerial Photograph



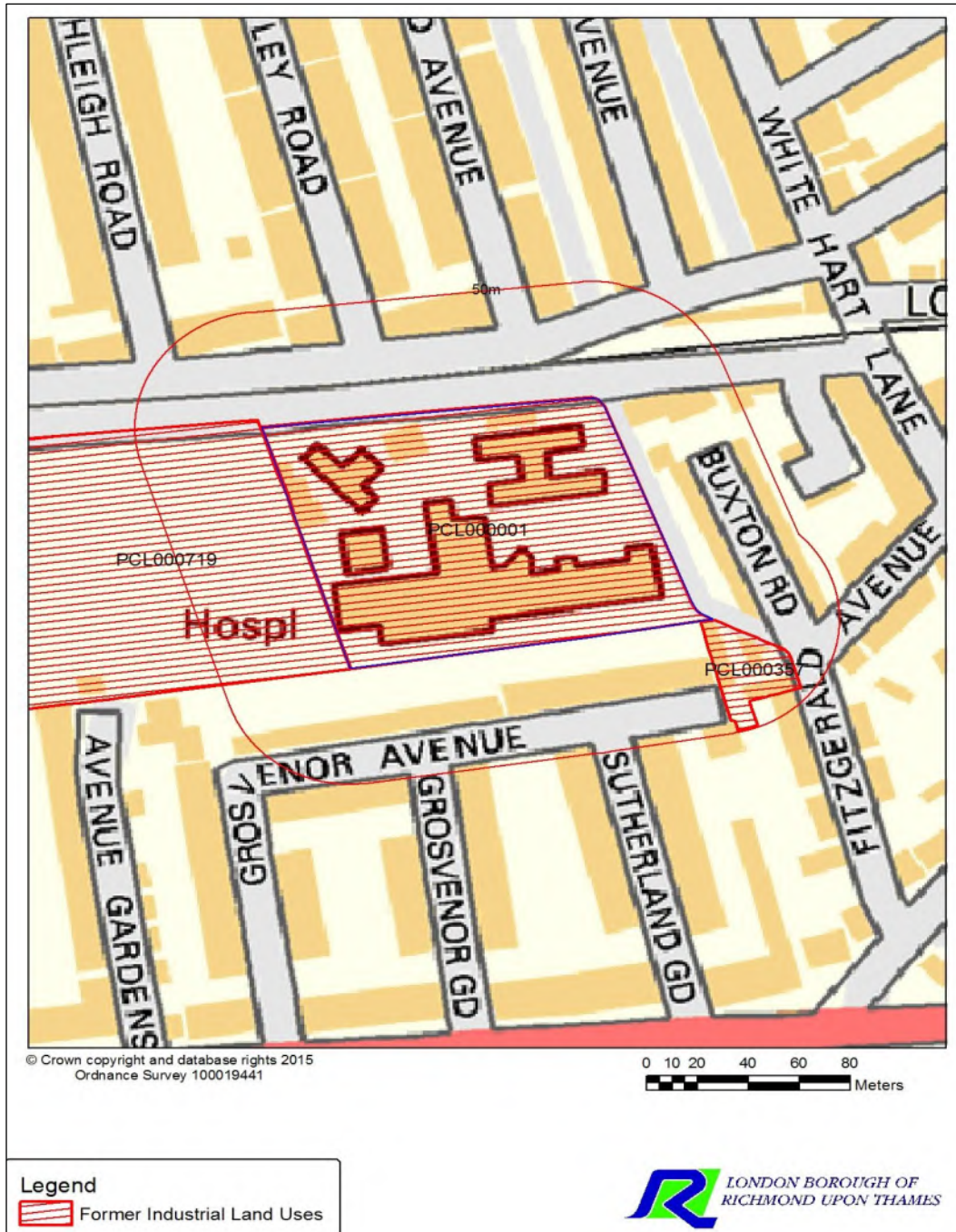
### 3. Summary Datasheet

Search Layer Name	Search Distance	Data Available	No. of features identified
Former Industrial Land Uses	50 m	Yes	3
Recent Contaminated Land Planning Consultations	50 m	Yes	2
Site Investigations	50 m	Yes	1
Private Water Supplies	2000 m	No	0
Environmental Permits (LAPPC)	250 m	Yes	1
EA Authorised Landfill Sites	250 m	No	0
EA Historic Landfill Sites	250 m	No	0

NB: Total for layer Environmental Searches includes the search feature.

#### 4. Former Industrial Land Uses

This layer consists of information that has been collated by the Council as part of its duty to inspect its area for the purposes of identifying contaminated land under Part 2A of the Environmental Protection Act 1990. These records include statutorily determined sites (contaminated land and special sites) and sites where potentially contaminative activities have occurred (former industrial uses).



#### 4.1 GIS Attribute Data for Former Industrial Land Uses

##### *Selection Summary for layer*

2 feature(s) identified on site.

1 feature(s) identified off site within 50 metres

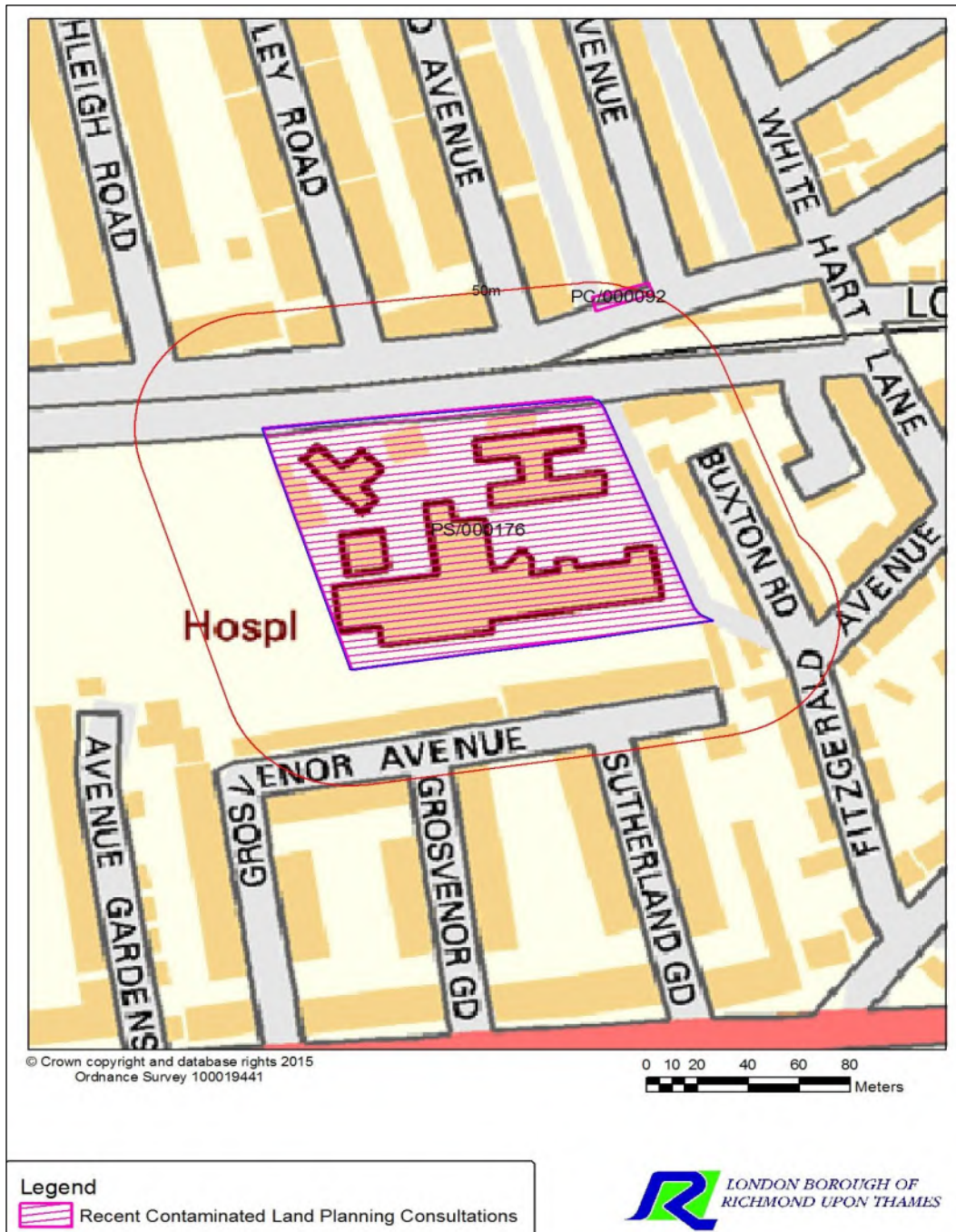
ID	Name	Location	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
<b>On Site</b>					
PCL000001	SOUTH WORPLE WAY 1	SOUTH WORPLE WAY	0.00	14329	521209, 175686
<p><b><u>Previous Industrial Uses</u></b></p> <p>Industry Profile: Hospitals  Year Use Established: 1914  Year Use Ended: 1920  Comments: Barnes Urban District Council Isolation Hospital  Note: No Data  Area: 31250</p> <p>Industry Profile: Hospitals  Year Use Established: 1978  Year Use Ended: 1987  Comments: R/684/02. Hospital. South Worple Way, Mortlake  Note: Map Source 1978  Area: 31250</p> <p>Industry Profile: Hospitals  Year Use Established: 1890  Year Use Ended: 1914  Comments: LM/0177. Hospitals  Note: Source: 1890s  Area: 31250</p> <p>Industry Profile: Hospitals  Year Use Established: 1938  Year Use Ended: 1947  Comments: LM/0283. Hospitals  Note: 1930?s historical polygon data  Area: 31250</p> <p>Industry Profile: Hospitals  Year Use Established: 1948  Year Use Ended: 1975  Comments: LM/0333. Hospital  Note: 1940-1960?s historical polygon data  Area: 31250</p> <p>Industry Profile: Hospitals  Year Use Established: 1988  Year Use Ended: 2004  Comments: LM/0379. Hospitals  Note: 1980-1990?s historical polygon data  Area: 31250</p> <p>Industry Profile: Hospitals  Year Use Established: 1920  Year Use Ended: 1937  Comments: LM/0227  Note: 1920?s historical polygon data  Area: 31250</p> <p><b><u>Part 2A Risk Ranking</u></b>  PRIORITY: Medium</p>					

ID	Name	Location	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
PCL000719	AVENUE GARDENS 1	AVENUE GARDENS	0.00	14777	521076, 175672
<p><b><u>Previous Industrial Uses</u></b>            Industry Profile: Cemetery or Graveyard            Year Use Established: 1874            Year Use Ended: 2004            Comments: Cemetery or Graveyard            Note: No Data            Area: 31250</p> <p><b><u>Part 2A Risk Ranking</u></b>            PRIORITY: Low Medium</p>					
<b>Identified Off-site - Within 50m</b>					
PCL000357	FITZGERALD AVENUE 1	FITZGERALD AVENUE	0.38	972	521315, 175626
<p><b><u>Previous Industrial Uses</u></b>            Industry Profile: Road vehicles: Garages and filling stations            Year Use Established: 1993            Year Use Ended: 2004            Comments: Gearboxes            Note: No Data            Area: 972</p> <p>Industry Profile: Road vehicles: Garages and filling stations            Year Use Established: 1952            Year Use Ended: 1976            Comments: LM/0576. Potential Tanks            Note: LM historical tank and substation data            Area: 972</p> <p>Industry Profile: Road vehicles: Garages and filling stations            Year Use Established: 1987            Year Use Ended: 1989            Comments: R/1016/03. Motor Car Repairs.Fitzgerald Avenue,East Sheen            Note: Thomson - Richmond Area 1987-89            Area: 972</p> <p><b><u>Part 2A Risk Ranking</u></b>            PRIORITY: Low Medium</p>					



## 5. Recent Contaminated Land Planning Consultations

This dataset contains information on planning consultations that have been assessed in relation to potential land contamination within the last 2 years. The dataset should not be considered to be, by any means, complete. It is included just to provide an indication of whether the site of interest or neighbouring properties have been assessed in terms of contaminated land as part of the redevelopment process.



## 5.1 GIS Attribute Data for Recent Contaminated Land Planning Consultations

### *Selection Summary for layer*

1 feature(s) identified on site.

1 feature(s) identified off site within 50 metres

ID	Name	Address	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
<b>On Site</b>					
PS/000176	Barnes Hospital	Mortlake & Barnes Common	0.00	14254	521209, 175687
<b>Identified Off-site - Within 50m</b>					
PC/000092	68 First Avenue	FIRST AVENUE	37.95	131	521266, 175788