Southern Testing
Environmental & Geotechnical

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Desk Study and Walkover Survey Report

Project Name: 3 Belsize Crescent

Location: London, NW3 5QY

Client: Cubhill Limited

Project ID: J13531

Report Date: 20 March 2018

Report Issue: 1

SUMMARY

The site comprises a link-detached building, which is currently vacant. It is proposed to redevelop the internal part of the building, and change the land use from offices/commercial to residential.

Geological records indicate the site to be underlain by London Clay.

A desk study was carried out and indicates that the site has a history of residential and commercial use. The surrounding area is predominantly residential.

Geological records indicate that the site is underlain by London Clay.

A vehicle maintenance garage was present to the south east of the site; however, this area has been redeveloped into housing. No further significant potential sources of contamination were noted on site or in the surrounding area.

It is considered that no further investigation should be required.

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For and on behalf of Southern Testing Laboratories Limited

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A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in a Project Order form completed by Mr. J. Zekaria of Cubhill Limited, dated 5th March 2018.

2 Location

The site is located 0.55 km north east of Finchley Road underground station, on the south western side of Belsize Crescent. This is about 20m north west of the junction with Belsize Lane. The approximate National Grid Reference of the site is TQ 26829 84958. The site location is indicated on Figure 1 within Appendix A.

3 Proposed Construction

It is proposed to change the existing land use from offices to residential dwellings.

For the purposes of the contamination risk assessment, the proposed development land use is classified as Residential without consumption of Homegrown Produce CLEA Model Ref [1] / C4SL Report Ref [2].

The gas sensitivity of the proposed development is rated as High CIRIA C665 Ref [3].

4 Object

This is a Phase 1 Desk Study and Walkover Survey investigation (Tier 1).

The object of the investigation was to assess the likely nature and extent of soil, groundwater and soil gas contamination on the site.

5 Scope

This report presents our desk study findings and our interpretation of these data.

A UXO risk assessment was not requested within our brief for the investigation.

As with any site there may be differences in soil conditions between exploratory hole positions.

This report is not an engineering design and the figures and calculations contained in the report should be used by the Engineer, taking note that variations will apply, according to variations in design loading, in techniques used, and in site conditions. Our figures therefore should not supersede the Engineer's design.

The site investigation has been completed with reference to BS 5930 Ref [4] and BS 10175 Ref [5].

Geotechnical issues are not considered in this report

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd believes are reliable. Nevertheless, Southern Testing Laboratories Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Cubhill Limited and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report may not be appropriate to alternative development schemes.

Detailed information on the proposed development, such as detailed final layout, loadings and serviceability limits was not provided. Accordingly, where geotechnical design advice is provided it is on the prescriptive basis allowed for by Eurocode 7: employing conventional and conservative design rules.

The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

B DESK STUDY AND WALKOVER SURVEY

6 Desk Study

A desk study has been carried out. Reference has been made to the following information sources:

- Online Geological Maps Ref [6] & Ref [7]
- Online Hydrogeological Maps Ref [8]
- Aerial Photographs
- Historical Ordnance Survey Maps
- Environmental Databases
- BGS Online Historical Borehole Records Ref [9]
- Environment Agency Website (WIYBY) Ref [10]
- Environment Agency Gov.UK Website Flood Risk Ref [11]
- Bomb Maps
- UK Radon Ref[12] and BRE Radon Ref [13]
- Google Earth (for old aerial photographs)

The environmental databases search report compiled for this desk study contains site-specific environmental data drawn from data sets that comprise publicly available information together with data from third parties, some of which is under review. Accordingly, Southern Testing Laboratories Limited does not warrant its accuracy, reliability or completeness.

The full report is included in Appendices C and D, a summary of the salient features is included in the following sections of this report.

6.1 Geology

The British Geological Survey Map No 256 (North London) indicates that the site geology consists of London Clay.

6.1.1 London Clay

London Clay is a well-known stiff (high strength) blue grey, fissured clay, which weathers to a brown colour near the surface. It contains thin layers of nodular calcareous mudstone - "claystone" from place to place, and crystals of water clear calcium sulphate (selenite) are common. Although slopes will stand in the clay at steep angles in the short term, the long-term stable slope angle is about 7^{o} for grassed, or cleared slopes, and a few degrees more for wooded slopes.

6.2 Historical Borehole Records

A search was made of previous exploratory hole records both from the online British Geological Survey database[9] and Southern Testing in-house records. Details of the most relevant boreholes are shown in the table below:

BH Reference	Final Depth (mbgl)	Location relative to the subject site	Remarks
TQ28NE38 (BGS record)	6.09	600m east-north-east (junction of Belsize Avenue and Haverstock Hill).	Recorded Made Ground over Clay (assumed to be London Clay).

BH Reference	Final Depth (mbgl)	Location relative to the subject site	Remarks
TQ28NE48	43.58	650m east (Belsize Park Station).	Made Ground to about 4m, overlying yellow clay (possibly weathered London Clay), overlying blue clay (London Clay). The top of the unweathered London Clay was at about 7.5m bgl. The borehole was dry.
TQ28SE2335	30	About 500m south west (Fitzjohn's Avenue)	Made Ground to 3m, overlying London Clay. The borehole way dry.
Southern Testing record	5	330m east (Glenilla Road).	Made Ground, overlying Head and London Clay.

No borehole records were available that were closer to the site. Based on this, and the available geological maps, the site is considered to be underlain by London Clay. Made Ground is expected on site, and it is possible that clay Head may be present.

6.3 Geological Hazards and Mining Activities

Data from various sources relating to potential geological hazards at the site are summarized below. The Hazard Potentials listed for the BGS data are as presented in the Envirocheck report, derived from various generic BGS sources, **which are not considered as site-specific**. It is important that this information is considered in context of the actual site topography, ground conditions encountered during future investigation, and development proposals.

Data Source	Hazard	Hazard Potential to Site	Remarks
BGS	Potential for Collapsible Ground Stability Hazard	Very Low	
	Potential for Compressible Ground Stability Hazard	No Hazard	
	Potential for Ground Dissolution Stability Hazard	No Hazard	
	Potential for Landslide Ground Stability Hazard	Very Low	
	Potential for Running Sand Ground Stability Hazard	No Hazard	
	Potential for Swelling or Shrinkage Clay Ground Stability Hazard	Moderate	The site is underlain by London Clay.
	Shallow Mining Hazard	Very Low	
	BGS recorded mineral site	Very Low	

Data Source	Hazard	Hazard Potential to Site	Remarks
ARUP [Ref[14]]	Mining Instability	Very Low	
CCS [Ref[15]] KURG [Ref [16]]	Underground Openings	Very Low	

6.4 Radon Risk

With reference to the Envirocheck report, UK Radon Ref[12] and BRE Radon Ref [13] guidance: no radon protection is required on this site.

6.5 Hydrology and Hydrogeology

Data from the Environment Agency and other information relating to controlled waters is summarised below.

Data		Remarks	Possible Hazard to/from Site (Y/ N)
Aquifer Designation	Superficial Deposits	None present.	N
	Bedrock	London Clay – Unproductive Strata	N
Groundwater Vulnerability		Non-Aquifer (Negligibly Permeable)	N
Abstractions		The closest abstraction is 673m to the south of the site. It should be noted that not all the locations of private domestic water sources are always known to the Environment Agency, and therefore others may exist.	N
Source Protection Zones		The site is not within a Source Protection Zone	N
Surface Water Flood Risk		The site is not shown within an area mapped as being at risk.	N
Groundwater Flood Risk		The site is not shown to be within an area mapped as being at risk.	N
Surface Water Features		The closest surface water feature is 659m to the south.	N
Marine / Fluvial Flood Risk		The site is not shown within an area mapped as being at risk.	N
Reservoir Flood Risk		The site is not shown within an area mapped as being at risk.	N
Discharge Consents		None are listed.	N

Due to the impermeable nature of the underlying London Clay, the potential for contamination to migrate onto the subject site is considered negligible. Localised spills or leaks are unlikely to affect the site, given the proposed development.

6.6 Historical Ordnance Survey Maps

Copy extracts of historical Ordnance Survey plans dating from 1871 to 2018 were obtained and are presented in Appendix C. A summary of the salient features is presented below.

On the earliest available maps, the site is located within an area of open fields. Houses are present extending away from about 40m to the south east of the site. A ventilation shaft for a railway tunnel is shown about 100m to the north west of the site; the railway tunnel runs approximately southwest to northeast. By about 1895 a building is present that covers the site and extends into the surrounding area. The surrounding land has been developed, predominantly into residential land uses. The building appears to be unchanged in subsequent maps.

Between about 1919 and 1954 a glazed roof structure is shown adjacent to the south of the site. On the 1954 map this is shown as a 'garage' (assume to be a vehicle maintenance garage). The garage is no longer shown on the 1967 map; instead the area is labelled as 'Burdett Mews' and comprises terraced properties around a central courtyard. An electricity substation is shown about 100m to the north west on the 1991 map. Given the relatively recent construction, it is considered unlikely to represent a significant hazard to the site.

6.7 Environmental Databases

Data Source	Distance (m)	Direction	Details	Possible Hazard to Site
Historical Industrial Land Use	Various	NW	Air shafts are listed as being 90 and 201m to the north west.	N
	5	SE	(on historical maps) – Garages	Y
Current Industrial Land Use	50	NE	Operational dry cleaners at 52 Belsize Lane.	N
	90	SW	Garage services.	N
	94	SW	Dry cleaners.	N
	94	SW	Carpet, curtain and upholstery cleaners.	N
Current and Historical Landfills	-	-	None within 750m of the site.	N
Infilled Land	90	NW	Potentially filled ground (1996 map)	N
	356	W	Potentially filled ground (1996 map)	N
Fuel Sites	446	NE	Operational BP filling station at 215 Haverstock Road.	N
Pollution Incidents	-	-	None recorded.	N
IPPC/LAPPC Authorisations	49	NE	Dry cleaning (as above).	N
Hazardous Substances Consents	-	-	None recorded.	N
Sensitive Land Uses	-	-	None recorded within 700m of the site.	N

The site is located in an area that has a predominantly residential history. The most significant potential source of contamination is the former garage to the south east of the subject site, which is considered to have been a maintenance garage. Potential contaminants arising from this include fuel oils which may have leaked or spilled during the operation of the garage. The garages were redeveloped into 'Burdett Mews' by about 1967. The potential for contaminants arising from the former garages to migrate to the site is considered to be very low.

Potentially infilled land (non-water) is mapped about 90m to the north west of the subject site. There is a potential land gas risk to the site, arising from this infilled land. At this stage, it is not clear what the infilled land relates to.

The underlying soils are mapped as being London Clay, which is likely to be of very low permeability. Groundwater flow is assumed to follow the local topography, which dips down towards the south.

It is considered unlikely that contamination would migrate to the site.

7 Site Walkover Survey

7.1 General Site Description and Boundaries

The site comprises a link-detached building, which is three and a half stories in height with an additional single level basement that extends out beneath the road (Belsize Crescent) at the front of the property. The north western boundary lies along the front courtyard of No. 5 Belsize Crescent. The subject site is connected to No. 1 Belsize Crescent via an archway that provides access to Burdett Mews. There is further accommodation / office space above the archway, which is part of No. 1 Belsize Crescent. Burdett Mews, which is to the south of the site, comprises two-storey terraced houses around a courtyard. The houses in Burdett Mews appear to be of relatively newer construction than the subject site. The subject site shares a party wall with one of the terraced houses in Burdett Mews.

7.2 Topography and Drainage

There is an existing single level basement within the property that extends out beneath Belsize Crescent by about 2m. Drainage appears to be via mains sewers.

The area slopes down to the south at about 1 - 3 degrees.

7.3 Vegetation

There is no vegetation on or near the site.

7.4 Site Photographs

A series of photographs showing views around the site and surrounding area is included in Appendix B.

C PRELIMINARY SITE MODELS

8 Geological Ground Model

From the desk study information and walkover undertaken at this site the following geological model has been formulated.

The soils beneath the site are mapped as comprising London Clay. It is believed that the site has not been previously redeveloped, and it is therefore unlikely to contain significant Made Ground deposits. However, this could only be confirmed through an intrusive investigation.

The depth to groundwater is unknown.

9 Conceptual Site Model

In the context of this report, the conceptual model summarises the potential pollutant linkages identified for the site and forms the basis of the risk assessment for the site. The preliminary model comprises the potential sources of contamination, receptors that could be harmed and exposure pathways identified from the desk study and walkover survey. These potential linkages form the basis upon which the investigation is designed and reported.

9.1 Potential Sources of Contamination

The site has a history of commercial use as residential accommodation and offices and is located within a residential area.

Few potentially contaminative uses have been identified, either on site or in the locality.

Potential contaminants associated with these uses have been compiled from DoE industry profiles and our experience of such sites.

9.1.1 On-Site Sources

No significant potential on-site sources of contamination were identified in this Desk Study and Walkover Survey. Made Ground may be present beneath the existing building and within the local area, as part of the construction works undertaken previously.

Made Ground may be present underlying the site. The following potential contaminants may be present:

Source	Potential Contaminants
Made Ground	Heavy metals, Asbestos Containing Materials, PAH compounds, Soil Gas Emissions

9.1.2 Off-Site Sources

The site may be impacted by contamination migrating from beyond the site boundary. The following potential off-site sources have been identified.

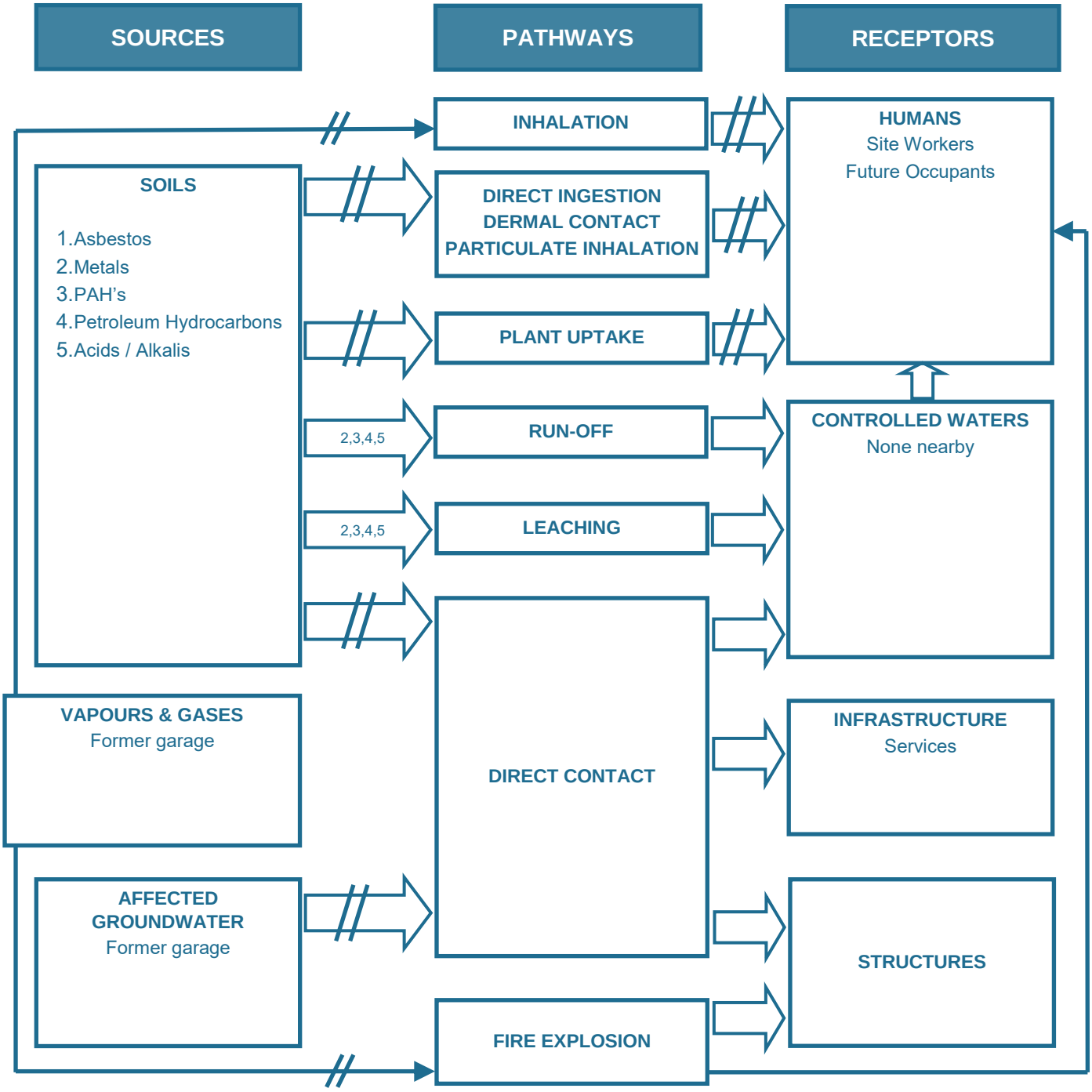
Potential Source	Distance from Site Boundary (m)	Direction	Potential Contaminants	Likely hazard to Site
Maintenance garage	5	SE	Metals, PAHs, petroleum hydrocarbons, acids, alkalis, asbestos containing materials	Low
Infilled Land	90	NW	Possibly land gases	Very Low

The garage (presumed to be a maintenance garage), was located in the mews area adjacent to the rear (south east) of the subject site. There is a low risk that the potential contaminants associated with this may have migrated beneath the site through the shallow soils. However, we understand that garages have been redeveloped into housing during the late 1960s. It is likely that the potential contamination sources have been removed. Given the length of time that has lapsed since the redevelopment of the garages, any localised spills or leaks will likely have broken down and naturally degraded.

In addition, the underlying soils are mapped as comprising London Clay, which is considered to have very low permeability. The topography of the area slopes down towards the south, away from the site. It is considered, therefore, that contamination from the nearby former garages would not migrate to the site. The records of infilled land (90m to the north west) cannot be substantiated at this stage. It is not clear what the infilled land represents as it is only recorded on the 1992 OS map. The risks to the proposed conversion of the existing buildings is considered to be negligible from this source at this stage. Other sources were considered to be at too great a distance away from the site to represent significant hazard.

9.2 Pollutant Linkages and Conceptual Site Model Summary

The following diagram shows the potential pollutant linkages identified for the site and summarises the preliminary conceptual model:



// Denotes potential pollutant linkage not complete.

10 Conclusions and Recommendations

The proposed development comprises a conversion of the existing building into residential land use. The development does not include the excavation of any soils, and there are no external areas.

This report has been compiled through a study of the available historical, geological and environmental data. A potential source of contamination was identified, comprising former garages adjacent to the south east of the site. However, the garages have since been redeveloped into housing thereby removing the potential source, and the underlying soils are likely to be of very low permeability. It is considered that the potential risk to the subject site is, therefore, very low. At this stage, no further investigation should be required.