



PHASE 1 DESK STUDY REPORT

for the site at

6-12 LONDON ROAD, LIPHOOK, HAMPSHIRE, GU30 7AN

on behalf of

METIS HOMES LIMITED C/O MAPLEDEAN PROJECTS LIMITED

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File Reference: Ground and Water/Project Files/ GWPR3874 6-12 London Road, Liphook, Hampshire, GU30 7AN.		

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Site Investigations

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EXECUTIVE SUMMARY

Proposed Development	At the time of reporting, November 2020, the proposed development was understood to comprise the demolition of on-site structures and construction of 10No. low-rise two-storey residential dwellings with associated private garden areas, car parking and communal planting spaces. The development would include additional guest and public parking areas to the south of the site. Vehicle access to the development would be gained via Haslemere Road to the south with additional a footpath granting access via London Road to the north.
Geology	The BGS Geological Map (Solid and Drift (1: 50 000)) for the Liphook area (Haslemere Sheet No. 301) revealed the site was located on the bedrock deposits of the Hythe Formation. No superficial deposits were noted due to their likely absence. No areas of Made Ground and/or Worked Ground were noted within a 250m radius of the site.
Hydrogeology	The Desk Study revealed the site was underlain by a Principal Aquifer associated with the bedrock deposits of the Hythe Formation. No designation was given for the superficial deposits due to their likely absence.
Radon	The site was identified to be located in an area where mandatory Radon protection measures were not required .
UXO	An internet search identified the site to be located within a Low Risk area associated with UXO.
On-site Sources of Contamination	This Desk Study revealed that at the time of the earliest historical mapping (1869 – 1874) the site was recorded to comprise a chapel in the southeast of the site. Further smaller buildings were also noted within the central part of the main area. A review of numerous sources has been consulted and any source of contamination summarised in Section 6.2 and 6.3 of this desk study report. Sources of on-site contamination are considered to be: Made Ground; current site use with storage of vehicles and ‘waste’ materials.
Off-site Sources of Contamination	From historical mapping and Groundsure Datasheets numerous off-site sources of contamination were identified, however given incomplete SPR linkages, negligible impact was noted on-site. Off-site sources of contamination are considered to be: Builder’s yard; smithy; garage; tanks; railway.
Potential On-site Receptors	The potential receptors were considered to be: <ul style="list-style-type: none"> • Human Health – End users of the site, Site operatives during redevelopment and maintenance works, and Neighbours and members of the public. • Building Materials and Services – Buried concrete, Confined spaces, underground services and water pipes. • Groundwater and Controlled Waters – Principal Aquifer and Surface water. • Flora and Fauna – Vegetation within soft landscaped areas.
Ground-Gas Risk	Limited sources of ground gases were identified within the report and as such, a Moderate Risk from ground gas generation and migration was identified, associated with the Made Ground.

1.0 INTRODUCTION

1.1 General

Ground and Water Limited were instructed by Maplean Projects Limited, on the 16th September 2020, to conduct a Phase 1 Desk Study of the site known as 6 – 12 London Road, Liphook, Hampshire GU30 7AN. The scope of the investigation was detailed within the Ground and Water Limited email fee proposal ref.: GWQ5396, dated 11th March 2020 and GWQ5841 dated 16th September 2020.

This report has been prepared by Alecander Ovens, who is a registered Risk Assessor with the Society of Brownfield Risk Assessment (SoBRA). Alecander Ovens has successfully demonstrated to SoBRA, through provision of evidence and peer-scrutiny, that he has the necessary skills and knowledge to perform and critically evaluate Generic Quantitative Land Contamination Risk Assessments. Confirmation of the registration can be found on the SoBRA website at www.sobra.org.uk/accreditation/register-of-sobra-risk-assessors.

1.2 Aims of Investigation

This Phase 1 Desk Study was undertaken to advise the client on risk factors pertaining to the site, with special reference to former and present day potential contaminative uses and their impact on sensitive receptors. Sensitive receptors included human health, controlled waters, buildings, building materials and services.

1.3 Conditions and Limitations

This report has been prepared based on the terms, conditions and limitations outlined within Appendix A of this report.

2.0 SITE SETTING

2.1 Site Location

The site comprised an ~4054m² irregular-shaped plot of land largely associated with the area of and to the south of 4 – 12 London Road. The site was located on the central plot of land to the south of London Road (B2131) and to the north of Haslemere Road within the central portion of the village of Liphook, within east Hampshire. The approximate O.S National Grid reference for the site was SU 84039 31592. A site location plan is given within Figure 1. A plan showing the site development area is given within Figure 2.

2.2 Site Description

A site walkover was undertaken by a representative of Ground and Water Limited on the 28th September 2020. A description of the site, as noted during the site walkover, is tabulated below. An aerial view of the site showing an approximate site boundary is given within Figure 3.

Site Description Sheet: 6 – 12 London Road, Liphook	
Use of site	At the time of the site walkover on Thursday 28 th September 2020, the site was used as a carpark, and general brownfield space used for parking and storage of old vehicles and 'waste'.
Site topography	The site was noted to be generally flat and level with no major slopes or undulations during the walkover.
Area topography	The surrounding area sloped very slightly downhill to the north, east, south and west. The site was in the centre of a very gentle hill, rising ~3ft from the surrounding area.
Structures on-site	Two wooden sheds (~1.5x3m each) were noted in the eastern corner of the site.
Structures off-site and use of the surrounding ground	Residential buildings were observed on all sides of the site except to the east, where a commercial building was situated.
Boundary features	A mix of ~0.75-2m brick wall, ~1.00m-2.00m hedges, ~1.50m-2.00m wooden fencing, and ~2.00mm mesh fencing. North-east boundary comprised ~1.50m brick wall and ~2.00m wooden fencing along Longbourn Row. South-eastern boundary comprised ~0.75m brick wall and ~1.50 – 2.00m hedges around carpark on Haslemere Road. In addition, ~1.50m – 2.00m hedges on both sides of track leading NW from carpark. Western boundary comprised ~2.00m brick wall, 2.00m fencing, ~4.00m – 12.00m mature and semi-mature trees, and bushes. North-western boundary comprised residential boundary with properties on London Road.
Site covering	The site covering mainly comprised concrete hardstanding, coarse gravel, grass and general muddy areas with a small area of loose paving in the north.
Contamination sources on-site	Potential sources of contamination include fuels and oils from the cars parked on-site. A stockpile of material was also present to the west of the site.
Contamination sources off-site	Potential sources of contamination include residential and commercial waste arising from construction activities to the north-west of the site.
Vegetation on-site	The site contained a number of low-lying grasses and bushes (~0.50 m - 1.00m) in addition, the site contained a number of semi-mature (3.00m – 5.00m) and mature (6.00 – 15.00m) trees of varying species along the boundary perimeter.
Vegetation off-site	Mature (6.00 – 15.00m) trees of varying species along the boundary perimeter.
Services	Electrical services arising from spotlights on residential buildings to the north-west, and one spotlight along a fence boundary in the centre of the site. Limited drainage around residential buildings to the north-west.

2.3 Proposed Development

At the time of reporting, November 2020, the proposed development was understood to comprise the demolition of on-site structures and construction of 10No. low-rise two-storey residential dwellings with associated private garden areas, car parking and communal planting spaces. The

development would include additional guest and public parking areas to the south of the site. Vehicle access to the development would be gained via Haslemere Road to the south with additional a footpath granting access via London Road to the north. The proposed development plan – plan view can be viewed in Figure 4.

2.4 Geology

The British Geological Survey (BGS) geological map of the Liphook area (Haslemere Sheet 301 – Solid and Drift) revealed that the site was located directly on bedrock deposits of the Hythe Formation.

No Artificial Ground was recorded to be present within 500m of the site. Superficial deposits of Alluvium and River Terrace Deposits were recorded ~430m north, associated with the River Wey.

Hythe Formation

The deposits of the Hythe Formation comprise medium-grained, glauconitic sandstones with some thin siliceously cemented units. Chert beds are common. The beds span the Lower Aptian-Upper Aptian boundary and range from the deshayesi zone up to (at least) the bowerbanki zone. The thickness of the Hythe Formation varies from 10m to approximately 92m. The beds thicken markedly eastwards into the Weald.

BGS Boreholes

The BGS maintain a record of boreholes drilled across the country. The nearest available borehole in similar geology was located ~20m north-east (SU83SW65).

This borehole recorded yellow clayey sands overlying finer grained sands to ~8.00m. Bargate stone is noted to underlie the sands to 13.10m bgl. No record of groundwater was noted, however, at 13.10m bgl, the borehole indicates ‘very hard, from under which water came’.

2.5 Hydrogeology and Hydrology

A study of the aquifer maps on the DEFRA website, revealed the site to be located on a **Principal Aquifer** relating to the bedrock deposits of the Hythe Formation. No designation was given to the superficial deposits due to their likely absence.

Principal Aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. These are aquifers previously designated as major aquifers.

Examination of the Defra website showed that the site was not located within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

The nearest surface water feature was an unnamed pond located ~56m to the south-east of the site. The nearest major surface water feature was the River Wey located 490m north-east of the site. The River Wey was determined to flow in a north-west to easterly orientation towards Haslemere, in line with local topography.

From analysis of hydrogeological and topographical maps groundwater was anticipated to be encountered at shallow to moderate depth (5.00 – 8.00m bgl) within the Hythe Formation. Some amounts of perched water may be present within the shallow soils, particularly above any cohesive

horizon. It was considered that the groundwater was flowing in a norther-eastern direction in line with the local topography and towards the River Wey.

The site was located within a **Flood Zone 1**, i.e. an area with a very low probability of flooding (less than 1 in 1,000 annual probability) of river or sea flooding.

The site is at negligible risk from groundwater flooding. Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures, such as basements or cellars.

2.6 Radon

BRE 211 (2015) Map 4 of the Hampshire, Berkshire and South Oxfordshire area revealed the site **was not** located within an area where mandatory protection measures against the ingress of Radon were likely to be required.

Groundsure datasheets and the Public Health England website ukradon.org classify the site in a lower probability radon area (where less than 1% of the homes are estimated to be at or above the Action Level) and a risk assessment is **not** required.

3.0 HISTORICAL REVIEW

3.1 Historical Map Review

The objective of this search was to report on the history of the site and its environs from available County Series and Ordnance Survey maps, dated from 1869 to 2020, and downloaded from GroundSure Environmental Insight. Only features considered to have a potential contaminative impact on the site and usually within a notional 250m radius of the site boundaries are discussed. Other features may be included to provide context. Any distances quoted for features remote from the site have been scaled from the maps and are only approximate. The historical maps referred to are given within Appendix C. The implications of the map search are discussed later within this report.

Environmental Significance of Data from Historical Maps			
Date	Scale	Site	Environs
1869 – 1874	1:2,500 x 2 1:10,560 x 3	The site is recorded to comprise a building in the south-eastern extreme of the site area labelled 'Bible Christian Chapel', with further smaller buildings in the central part of the main area in the north-west. Field boundary lines indicate that a track may have been present to the main area of the site, with access from a road to the south-east.	The site's environs comprise limited residential dwellings along three unnamed roads, labelled as Liphook. All buildings are to the south-west of the site. Larger buildings are labelled as Anchor Hotel and Osbourne house, ~90m and ~150m south-west respectively. Two smithies are noted within Liphook, ~65m south-west and ~50m south. A pond is recorded between ~60 – 90m east of the site.
1895 – 1899	1:2,500 x 2 1:10,560 x 3	The area in the south-west of the main portion is separated into long thin garden areas. An additional building is recorded in the center of the site.	Limited expansion of Liphook. Buildings to the east of the site, and along the road to the north. The smithy ~50m south was no longer recorded.
1910 – 1914	1:2,500 x 2 1:10,560 x 4	No significant change recorded to site.	Limited change to the immediate environs. Expansion of Liphook along an unlabeled road to the north-west. A 'Mission Church' is recorded to the east and small buildings are noted to the immediate east of the site.
1937	1:2,500 x 1	No significant change recorded to site.	Further expansion of Liphook along the roads to the west and east of the site, mainly comprising residential dwellings. The smithy ~65m south-west is no longer recorded. Some of the smaller buildings to the immediate east are recorded to be replaced by a large building. A bowling green, tennis ground and recreation ground, with pavilion is noted ~100m north-east.
1957 – 1958	1:2,500 x 1 1:10,560 x 1	Buildings in the center of the site are noted to be recorded as one, with an additional building recorded. Two buildings are recorded in the east of the site.	An electrical sub-station is recorded ~50m north-east of the site. Significant expansion of Liphook, along the roads primarily, with new estates included. Large industrial buildings are recorded from ~175m south-east, extending >~350m south-east. Tanks of various sizes are noted around the warehouses, with the nearest to site ~110m south-east. The main road that runs north-south is labelled 'London Road'
1970 – 1973	1:2,500 x 2	The larger of the two buildings in the east of the site was no longer recorded. The chapel in the south-east was recorded as 'car park'.	The area to the immediate east of the site, with the large building is labelled as 'Builder's Yard'. A garage is labelled ~50m south. The main road is labelled 'A3 London Road', with the main east-west road labelled 'B2131'.
1976 – 1984	1:2,500 x 3 1:10,000 x 1	No significant change recorded to site.	Further expansion of Liphook to the east of the site, comprising residential dwellings.
1988 – 1993	1:2,500 x 3	No significant change recorded to site.	No significant change recorded to the site's environs.

Environmental Significance of Data from Historical Maps			
Date	Scale	Site	Environs
2001 – 2003	1:1,250 x 1 1:10,000 x 1	No significant change recorded to site.	No significant change recorded to the site's environs.
2010	1:10,000 x 1	No significant change recorded to site.	The large industrial buildings to the south-east, are no longer recorded and replaced with numerous housing estates and a superstore.
2020	1:10,000 x 1	No significant change recorded to site.	No significant change recorded to the site's environs.

3.2 Historical Aerial Photography Review

The objective of this search was to report on the history of the site and its environs from available aerial photography, dated from 1999 to 2018, and downloaded from GroundSure Environmental Insight and accessed online from Google Earth.

The earliest aerial photography, 1999, identified the site to comprise a car park in the south of the site, with a track to a further car park in the centre of the site. Numerous trees are located along the boundaries, with a line of trees dissecting the centre of the site. The surrounding areas mainly comprise residential dwellings, with larger buildings noted to the immediate east, separated by a car park and to the south, separated by trees. A Large industrial building is noted to the south ~100m.

No significant change is observed from the 2005, 2013 and 2018 aerial photography. Between the 2013 and 2018 aerial photography, the line of trees that dissect the centre of the site are noted to have been removed.

4.0 GROUNDSURE DATASHEETS

4.1 GroundSure Datasheets

GroundSure Environmental and Geological Datasheets were obtained for the site. Unless the data indicates a significant risk, only information within a 250m buffer zone has been included. A copy of the GroundSure Datasheets is presented in Appendix D and a summary is given below and overleaf.

Environmental Significance of Data Search	
Source	Type / On-site or nearest distance from site / date
Historical Industrial Sites	
Potentially Contaminative Uses identified from 1:10,000 scale mapping	Nine off-site records noted within 250m: 3 x Smithy, 1m southwest (1870), 53-60m southwest (1895-1898); 1 x Unspecified Commercial / Industrial, 28m southeast (1957); 1 x Unspecified Depot, 83m south (1974); 1 x Railway Sidings, 119m south (1957-1974); 1 x Unspecified Tank, 200m southeast (1974); 1 x Fire Engine Station, 227m south (1974); 1 x Telephone Exchange, 246m southwest (1974).
Historical Tanks identified from 1:1,250 and 1: 2,500 scale mapping	Seven off-site records noted within 250m: 7 x Unspecified tank, 115m south (1958-1993), 151m south (1958-1993), 198m southeast (1958-1993), 205-206m southeast (1958-1993), 248-249m (1958-1993).
Historical Energy Features identified from 1:1,250 and 1: 2,500 scale mapping	Six off-site records noted within 250m: 6 x electricity substation, 23-24m west (1970-1993), 37m northeast (1958-1999), 133m east (1958-1999), 184m southwest (1958-1999).
Historical petrol and fuel stations identified from 1:1,250 and 1: 2,500 scale mapping	No records on-site or within 250m.
Historical Garage and Motor Vehicle Repair features identified from 1:1,250 and 1: 2,500 scale mapping	Two off-site records noted within 250m: 2 x Garage, 10-12m southwest (1958-1993).
Historical military sites identified from 1:1,250 and 1: 2,500 scale mapping	No records on-site or within 250m.
Potentially Infilled Land identified from 1:10,000 scale mapping	No records on-site or within 250m.
Environmental Permits, Incidents and Registers	
Industrial Sites holding licences and / or authorisations	
Records of historic IPC Authorisations	No records on-site or within 250m.
Records of Part A (1) and IPPC Authorised Activities	No records on-site or within 250m.
Records of Red List Discharge Consents	No records on-site or within 250m.
Records of List 1 and List 2 Dangerous Substances Inventory Sites	No records on-site or within 250m.
Records of Part A (2) and Part B Activities and Enforcements	No records on-site or within 250m.
Records of Category 3 or 4 Radioactive Substances Authorisations	No records on-site or within 250m.
Records of Licensed Discharge Consents	No records on-site or within 250m.
Records of Planning Hazardous Substance Consents and Enforcements	No records on-site or within 250m.
Dangerous or Hazardous Sites	
Records of COMAH & NIHHS sites	No records on-site or within 250m.
Environment Agency Recorded Pollution Incidents	
Records of National Incidents Recording System, List 1 and 2	No records on-site or within 250m.

Environmental Significance of Data Search	
Source	Type / On-site or nearest distance from site / date
Sites Determined as Contaminated Land under Part 2A EPA 1990	
Records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990	No records on-site or within 250m.
Landfill and other Waste Sites	
Landfill Sites	
Records of Environment Agency Registered Landfill Sites	No records on-site or within 250m.
Records of Environment Agency Historic Landfill Sites	No records on-site or within 250m.
Records of BGS / DoE non-operational landfill sites	No records on-site or within 250m.
Records of Landfills in Local Authority and Historical Mapping	No records on-site or within 250m.
Records of Waste exemptions	No records on-site or within 250m.
Records of Environment Agency Licensed Waste Sites	No records on-site or within 250m.
Current Land Uses	
Records of Potentially Contaminative Industrial Sites within 250m of the site	Twelve off-site records noted within 250m: 1 x Artist Gallery Printing, 12m north; 7 x electricity substation, 31m west, 40m northeast, 113m south, 136m east, 181m southwest, 181m south, 226m west; 1 x Inwood stoves & fireplaces, 55m southwest; 1 x Liphook mobility, 59m southwest; 2 x Gas governor, 77m northwest, 220m west.
Records of Petrol and Fuel Sites	Two record noted within 250m: 1 x 37m west (OBSOLETE); 1 x 203m southeast (SAINSBURYS).
Records of National Grid Underground Electricity Cables	No records on-site or within 250m.
Records of National Grid Gas Transmission Pipelines	No records on-site or within 250m.
Hydrogeology and Hydrology	
Groundwater Abstraction Licences	
Records of Aquifer within Superficial Deposits	No records on-site or within 250m.
Records of Aquifer within Bedrock Deposits	One record noted on-site or within 250m: 1 x Principal Aquifer, on-site.
Records for Groundwater Abstraction Licences	No records on-site or within 250m. Nearest record noted 1346m southeast.
Records for Surface Water Abstraction Licences	No records on-site or within 250m. Nearest record 1808m east.
Records for Potable Water Abstraction Licences	No records on-site or within 250m. Nearest record noted 1346m northwest (Active).
Source Protection Zones	
Records for Source Protection Zones	No records on-site or within 250m.
Records of Source Protection Zones within Confined Aquifer	No records on-site or within 250m.
Records for Groundwater Vulnerability and Soil Leaching Potential	Two records noted on-site and within 250m: 2 x Principal Aquifer with high leaching potential, on-site.
Records for Detailed River Network entries	No records on-site or within 250m.
Records for surface water features	No records on-site or within 250m.
WFD Surface water body catchments	Two records noted on-site: 1 x River WB Catchment (South Wey, Haslemere to Bordon); 1 x River WB Catchment (Hollywater and Deadwater at Bordon).
WFD Surface water bodies	No records on-site or within 250m.

Environmental Significance of Data Search	
Source	Type / On-site or nearest distance from site / date
WFD Groundwater bodies	One record noted on-site: 1 x Godalming Lower Greensand, on-site (Chemical Rating – Poor).
Flooding	
Records for Environment Agency indicative Zone 2 floodplain	No records on-site or within 50m.
Records for Environment Agency indicative Zone 3 floodplain	No records on-site or within 50m.
What is the Risk of Flooding from Rivers and the Sea (RoFRaS) Rating for the Site?	No records on-site or within 50m.
Records for Flood Defences	No records on-site or within 250m.
Records for Areas Benefiting from Flood Defences	No records on-site or within 250m.
Records for Areas Used for Flood Storage	No records on-site or within 250m.
Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the boundary of the study site?	No records on-site or within 50m.
What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?	Negligible
Designated Environmentally Sensitive Sites	
Records of Sites of Special Scientific Interest (SSSI)	No records on-site or within 250m.
Records of National Nature Reserves (NNR)	No records on-site or within 250m.
Records of Special Areas of Conservation (SAC)	No records on-site or within 250m.
Records of Special Protection Areas (SPA)	No records on-site or within 250m.
Records of RAMSAR sites	No records on-site or within 250m.
Records of Ancient Woodland	No records on-site or within 250m.
Records of Local Nature Reserves (LNR)	No records on-site or within 250m.
Records of World Heritage Sites	No records on-site or within 250m.
Records of Environmentally Sensitive Areas	No records on-site or within 250m.
Records of Areas of Outstanding Natural Beauty	No records on-site or within 250m.
Records of National Parks (NP)	No records on-site or within 250m.
Records of Nitrate Sensitive Areas	No records on-site or within 250m.
Records of Nitrate Vulnerable Zones	No records on-site or within 250m.
Records of Green Belt	No records on-site or within 250m.

Geological Significance of Data Search	
Geology	
Artificial Ground	
Are there any records of Artificial / Made Ground within 250m of the site boundary?	No records on-site or within 250m.
Are there any records relating to permeability of artificial ground within the study site boundary?	No records on-site or within 250m.
Superficial Deposits and Landslips	
Records of Superficial Deposits / Drift Geology	No records on-site or within 250m.
Are there any records relating to permeability of superficial ground within the study site boundary?	No records on-site or within 250m.
Are there any records of landslip within a 250m radius?	No records on-site or within 250m.
Are there any records relating to permeability of landslips within the study site boundary?	No records on-site or within 250m.
Bedrock, Solid Geology & Faults	
Records of Bedrock / Solid Geology	One record noted on-site and one within 250m: 1 x Hythe Formation.
Are there any records relating to permeability of bedrock ground within 250m of the study site boundary?	One record noted on-site and within 250m: 1 x Mixed flow type, on-site, High permeability.
Bedrock faults and other linear features	No records on-site or within 250m.
Radon	
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so, what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.
Ground Workings	
Historical Surface Ground Working Features from small scale mapping	Five record noted within 250m: 5 x Pond, 46-57m northeast (1870-1974).
Historical Underground Working Features from small scale mapping	No records on-site or within 250m.
BGS Current Ground Workings	No records on-site or within 250m.
Mining, Extraction & Natural Cavities	
Historical Mining areas	No records on-site or within 250m.
Coal Mining areas	No records on-site or within 250m.
Are there JPB Mining areas within 1000m of the site boundary?	No records on-site or within 250m.
Non-Coal Mining areas	One record noted on-site and within 250m: 1 x Class A, sporadic underground mining of sand may have occurred.
Non-Coal Mining cavities	No records on-site or within 250m.
Natural Cavities	No records on-site or within 250m.
Brine Extraction areas	No records on-site or within 250m.
Gypsum Extraction areas	No records on-site or within 250m.
Tin Mining areas	No records on-site or within 250m.
Clay Mining areas	No records on-site or within 250m.
Natural Hazard Findings	
Shrink-Swell Clay	One on-site record: 1 x Negligible.
Landslides	One on-site record: 1 x Very low.

Geological Significance of Data Search	
Ground Dissolution of Soluble Rocks	One on-site record: 1 x Negligible.
Compressible Deposits	One on-site record: 1 x Negligible.
Collapsible Deposits	One on-site record: 1 x Very low risk on-site.
Running Sands	One on-site record: 1 x Low.
Borehole Records	
BGS recorded boreholes	Ten off-site records noted within 250m: 1 x 25m northeast, Liphook (13.0m); 7 x 39m northwest, 109m, 127m, 128m, 132m, 174m, 183m north, Childerstone House (Confidential); 1 x 63m southwest, Chemists Shop (16.46m); 1 x 85m southwest, Royal Anchor Hotel (2.0m)
Estimated Background Soil Chemistry	
Records of background estimated soil chemistry	Three on-site records and one record noted within 250m: Arsenic: 15mg/kg and Bioaccessible arsenic no data; Cadmium: 1.8mg/kg; Chromium: 60 – 90mg/kg; Lead: 100mg/kg and Bioaccessible lead: 60mg/kg; Nickel: 15 – 30mg/kg.
Railways and Tunnels	
Tunnel records	No records on-site or within 250m.
Historical Railway and Tunnel Feature records	Seven records noted within 250m: 2 x Railway Sidings, 119-121m south (1957-1974), 132m south (1958-1984).
Historical Railways records	No records on-site or within 250m.
Active Railways records	No records on-site or within 250m.
Railway Project records	No records on-site or within 250m.

5.0 PLANNING DATABASE AND ONLINE REVIEW

5.1 Online Planning Database

A review of the East Hampshire Borough Council Planning Database revealed 70No. planning application for the post code GU30 7AN, where 12 No. related to properties 6 – 12 London Road, between September 1994 and April 2020.

A brief summary has been tabulated below.

Planning Applications on the East Hampshire Borough Council Planning Database			
Application No. and Date	Address	Development Details	Decision
28415/006 (Apr 2020)	Longbourn House, 12 and 12A London Road, Liphook GU30 7AN	Change of use from ground floor office unit into one residential dwelling.	Approved
28415/007 (Apr 2020)	Longbourn House, 12 and 12A London Road, Liphook GU30 7AN	Conversion of self-contained ground floor from office into 1 residential unit.	No Objection
28415/004 (Jan 2017)	12 London Road, Liphook GU30 7AN	Removing exiting shop front and replacing with new.	Permission
55952 (Jan 2015)	10 London Road, Liphook GU30 7AN	Fell four cherry trees in the rear garden.	No Objection
35249/001 (Feb 2007)	6 London Road, Liphook GU30 7AN	Change of use from office to residential.	Permission
28415/003 (Jul 2005)	12 London Road, Liphook GU30 7AN	Fell one willow and prune one yew tree	No Objection
28415/002 (Apr 2002)	12 London Road, Liphook GU30 7AN	Fell one willow and one cypress tree	No Objection
35249 (Jan 2000)	6 London Road, Liphook GU30 7AN	Change of use to an office	Permission
21255/014 (Oct 1997)	8 London Road, Liphook GU30 7AN	Rear external fire escape	Permission
21255/011 (Sep 1994)	8 – 10 London Road, Liphook GU30 7AN	Outline: 9 dwellings and parking.	Created during migration
21255/012 (Mar 1995)	8 – 10 London Road, Liphook GU30 7AN	Change of use from retail to offices with demolition of covered area	Permission
21255/013 (Feb 1997)	8 – 10 London Road, Liphook GU30 7AN	Change of use of first floor of former shop and two storey building at rear to office.	Permission

5.2 Unexploded Ordnance (Online)

An internet search was undertaken to identify the risk from unexploded ordnance (UXO). The findings of the UXO risk maps are summarised such that: 3No. Luftwaffe bombing targets within 5km (1.5km, 2.5km and 3km northwest); No decoy sites, docks, industry, military, transport or utilities. The site is located within a Low bomb risk area.

A review of historical mapping sheets from 1938 (pre-blitz) and 1955 (post-blitz), obtained as part of the assessment in Section 3, did not identified any clearings or changes to road layout and/or changes to building locations.

An Internet search revealed no further information pertinent to the desk study.

6.0 SUMMARY OF FINDINGS

The findings of the Phase 1 Desk Study are summarised in this section of the report. Where appropriate, all sources of information have been grouped together to provide a complete overview of the available information.

6.1 Site Setting

The site comprised an ~4054m² irregular-shaped plot of land largely associated with the area of and to the south of 4 – 12 London Road.

Topography

The site was noted to be generally flat and level with no major slopes or undulations during the walkover.

The surrounding area sloped very slightly downhill to the north, east, south and west. The site was in the centre of a very gentle hill, rising ~1.00m from the surrounding area.

Geology and Radon

The British Geological Survey (BGS) geological map of the Liphook area (Haslemere Sheet 301 – Solid and Drift) revealed that the site was located directly on bedrock deposits of the Hythe Formation.

No Artificial Ground was recorded to be present within 500m of the site. Superficial deposits of Alluvium and River Terrace Deposits were recorded ~430m north, associated with the River Wey.

The nearest available borehole in similar geology was located ~20m north-east (SU83SW65), which recorded yellow clayey sands overlying finer grained sands to ~8.00m. Bargate stone is noted to underlie the sands to 13.10m bgl. No record of groundwater was noted, however, at 13.10m bgl, the borehole indicates ‘very hard, from under which water came’.

The site was located within an area where mandatory protection measures against the ingress of radon were **not** likely to be required. The site was **not** in a radon affected area, and **no** protection measures were deemed necessary.

Hydrogeology and Hydrology

The site was located on a Principal Aquifer relating to the bedrock deposits of the Hythe Formation.

Examination of the DEFRA records showed that the site was not located within a Groundwater Source Protection Zone (SPZ), as classified in the Policy and Practice for the Protection of Groundwater.

The nearest surface water feature was an unnamed pond located ~56m to the south-east of the site. The nearest major surface water feature was the River Wey located 490m north-east of the site. The River Wey was determined to flow in a north-west to easterly orientation towards Haslemere, in line with local topography.

From analysis of hydrogeological and topographical maps groundwater was anticipated to be encountered at shallow to moderate depth (5.00 – 8.00m bgl) within the Hythe Formation. Some amounts of perched water may be present within the shallow soils, particularly above any cohesive

horizon. It was considered that the groundwater was flowing in a norther-eastern direction in line with the local topography and towards the River Wey.

Examination of the Environment Agency records showed that the site fell within a Flood Zone 1, an area with less than 1 in 1,000 annual probability of river or sea flooding. The site is at very low risk of surface water flooding.

The site is at negligible risk from groundwater flooding. Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures, such as basements or cellars.

Unexploded Ordnance

An internet search was undertaken to identify the risk from unexploded ordnance (UXO). The findings of the UXO risk maps are summarised such that: 3No. Luftwaffe bombing targets within 5km (1.5km, 2.5km and 3km northwest); No decoy sites, docks, industry, military, transport or utilities. The site is located within a Low bomb risk area.

A review of historical mapping sheets from 1938 (pre-blitz) and 1955 (post-blitz), obtained as part of the assessment in Section 3, did not identified any clearings or changes to road layout and/or changes to building locations.

6.2 Present Day Uses (All Sources)

Current Site Use

At the time of the Site Walkover in September 2020, the site was used as a car park for the parking of cars, storage of old vehicles and the storage of 'waste' materials.

Current Use of Surrounding Area

The surrounding area comprised residential dwellings on three sides and commercial buildings to the east. The high street was noted further afield to the southwest.

A review of the Groundsure datasheets identified potential present day sources of contamination, summarised as; An artist gallery printing (12m north), seven electricity substations (between 31m west and 226m west), a inwood stoves and fireplaces (55m southwest), a Liphook mobility (59m southwest) and two gas governors (77m northwest to 220m west).

6.3 Historical Uses (All Sources)

Historical Land Use of the Site

At the time of the earliest historical mapping (1869 – 1874) the site was recorded to comprise a chapel in the southeast of the site. Further smaller buildings were also noted within the central part of the main area. Limited change was recorded within the 1895 mapping when the western portion was noted to comprise residential gardens. No significant change was recorded until 1957 mapping, when the central buildings were noted to be one building. Two new buildings were recorded in the east of the site. The chapel was replaced by a car park on the 1970 – 1973 mapping. No significant change occurred to site following this edition.

A review of the Groundsure datasheets did not identify any historical on-site contaminative land uses of the site.

The planning database search identified that buildings on the site had undergone change from retail to office buildings, with some later changing from office buildings to residential end-use. On

numerous occasions (April 2002, July 2005, January 2015) planning applications were filed associated with the felling of trees within the site area.

Historical Land Use of the Surrounding Area

At the time of the earliest historical maps (1869 – 1874), the surrounding area was recorded to comprise limited residential dwellings along three main unnamed roads. Two smithies were recorded within Liphook (~50m south and ~65m southwest). A pond was recorded ~60-90m east. Over the following historical mapping the area of Liphook expands, most notably post between 1937 and 1957 mapping editions and again between 1957 and 1976 editions. Large industrial buildings with associated tanks are noted from the 1957 mapping, ~175m southeast extending >350m further southeast. From 1970, the area to the immediate east of the site is labelled as a 'Builder's yard', and a 'garage' is labelled ~50m south. Later mapping indicates that Liphook undergoes further expansion, with the industrial buildings to the southeast not recorded from the 2010 edition of the mapping.

The significant and potentially contaminative uses of the surrounding area from all historical mapping sheets reviewed is summarised below. The years provided indicate the years that historical mapping sheets record it to be present / absent and do not indicate the exact years that it was present. Distances are relative to the site. Surrounding historical contaminative uses are:

- Builder's Yard, immediate east (1970 – 2020);
- Smithy, ~50m south, ~65m southwest (1869 – 1895/1937);
- Electrical Substation, ~50m north (1957 – 2020);
- Garage, ~50m south (1970 – 2020);
- Industrial buildings with associated tanks, ~110m southeast (1957 – 2010).

A review of the available Groundsure datasets identified numerous historical uses of contaminative nature. The information considered pertinent to this Desk Study is summarised below:

- Smithy, 1m southwest (1870), 53 – 60m southwest (1895 – 1898);
- Garage, 10-12m southwest (1958 – 1993);
- Electrical Substation, ~23 – 24m west (1970 – 1993), 37m northeast (1958 – 1999), 133m east (1958 – 1999) and 184m southwest (1958 – 1999).
- Unspecified commercial / industrial, 28m southeast (1957);
- Unspecified depot, 83m south (1974);
- Unspecified tank, 115m – 151m south (1958 – 1993), 198 – 206m southeast (1958 – 1993), 248 – 249m southeast (1958 – 1999);
- Railway sidings, 119m south (1957 – 1974);
- Fire station, 227m south (1974);
- Telephone exchange, 246m southwest (1974).

6.4 Proposed Development

At the time of reporting, November 2020, the proposed development was understood to comprise the demolition of on-site structures and construction of 10 No. low-rise two-storey residential dwellings with associated private garden areas, car parking and communal planting spaces. The development would include additional guest and public parking areas to the south of the site. Vehicle access to the development would be gained via Haslemere Road to the south with additional a footpath granting access via London Road to the north.

7.0 PHASE 1 RISK ASSESSMENT

7.1 Conceptual Site Model

A Conceptual Site Model (CSM) is provided in Section 7.8 of this report.

7.2 Contaminant Source-Pathway-Receptor Model

In the UK, the assessment of risk from contamination follows the source-pathway-receptor (SPR) approach. For an environmental risk to be present there must be a source of contamination, a receptor or receptors, and a pathway for contaminants to migrate or be absorbed. If one of these three elements are absent, it is considered that there is no risk of harm. If, however, there is a linkage between any given source and any given receptor, then a risk-based approach is used to assess the significance or impact of the pollutant linkage.

The Phase 1 Desk Study has been used to identify potential on-site and off-site sources of contamination, which are summarised in this section of the report. Additional potential sources of contamination, identified within the Desk Study and summarised in Section 6, have been discounted based on the absence of a realistic SPR linkage (i.e. the distance from the site or the nature or age of any potential contamination sources).

For ease of reference and understanding, the risks have been assigned within this risk assessment against four possible levels / categories:

- **Negligible** - Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is no risk to environmental receptors. Therefore, there is no need to further assess this potential source of contamination.
- **Low risk** – Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be a risk to environmental receptors. However, it is considered that further investigation to confirm this is recommended.
- **Moderate risk** – Regarding this potential SPR linkage, the site may not be suitable for the proposed end-use and there may be a risk to environmental receptors. Further investigation is required to confirm this.
- **High risk** – Regarding this potential SPR linkage, site probably or certainly not suitable for proposed end-use and there is likely to be a risk to environmental receptors. Contaminants probably or certainly present and very likely to have an unacceptable impact on key targets. Urgent action required in the short term.

7.3 Potential On-site Sources of Contaminants

At the time of the earliest historical mapping (1869 – 1874) the site was recorded to comprise a chapel in the southeast of the site. Further smaller buildings were also noted within the central part of the main area. A review of numerous sources has been consulted and any source of contamination summarised in Section 6.2 and 6.3 of this desk study report.

The Phase 1 Desk Study revealed the following on-site sources of contamination:

- The site has undergone limited change throughout the period studied within this Desk Study, however a degree of construction and demolition has occurred at the site. Given the age of the buildings, it is considered that contaminants may be encountered within any Made Ground.

Contaminants of concern typically encountered within Made Ground deposits include; metals, Petroleum Hydrocarbons (TPHs), Polycyclic aromatic hydrocarbons (PAHs), asbestos, sulphates and volatile organic compounds (VOCs). Ground gases also have the potential of being

generated as a result of the variability of the Made Ground.

- At the time of the site walkover, the site was found to be used as a car park, as well as for the storage of old vehicles and the storage of 'waste' materials.

Contamination associated with this will most likely include PAHs, TPHs, sulphates, cyanide and metals also possible. Ground gases also have the potential of being generated as a result of the degradation of hydrocarbons.

- An internet search for UXO within the vicinity of site identified that the site was within a low risk area. The nearest Luftwaffe bombing target was located 1.5km to the northeast.

As a result of the internet search, no further action is required at this stage for the presence of UXO at the site and as a result has been **discounted from further consideration**.

7.4 Potential Off-site Sources of Contaminants

The Phase 1 Desk Study revealed the following off-site sources and where applicable the DEFRA 'Potential contaminants for the assessment of the land' (CLR8) has been utilised for contaminants of concern. The sources of contamination identified are:

- Builder's Yard, immediately east (1970 – 2020).

The exact use of the yard is not known, however, this type of industry typically have the following contaminants: metals and semi-metals, asbestos, TPHs, PAHs, solvents and inorganic chemicals.

- Smithy, ~1m – 65m south and southwest (1869 – 1937).

Smithies are usually small businesses with limited potential for significant contamination. Contaminants associated with a blacksmiths include TPHs, PAHs, namely benzo (a) pyrene, and heavy metals.

- Garage, 10 – 50m south/southwest (1958 – 1993).

Garages have the potential to undertake a wide range of tasks on vehicles, with the potential of causing contaminants. Potential contamination associated with a garage include: lubricant oils; brake fluids (constitute mainly of polymerised glycols and ethers. Waste fluid is generated during repair work on brake systems); solvents (chlorinated hydrocarbons, carbon tetrachloride, paraffin and proprietary degreasing compounds); paints (lead-based paints, zinc-rich epoxy primers, polyurethanes as decorative finishes); TPHs.

- Electricity substation, 23m west (1970 – 1993), 37m northeast (1958 – 1999), 50m north (1957 – 2020).

Transformers which form part of older sub-stations in some cases used heat transfer fluids containing Polychlorinated Biphenyls (PCBs) which are toxic and persistent contaminants. These fluids containing PCBs tend to be viscous and adhere to soil particles and as a result do not tend to travel far from source. The sale and use of PCBs in the UK was phased out during the 1970s and therefore the presence of these at the time is unlikely, therefore the risk of contamination from electricity substations is **not considered further**.

- Unspecified Tanks and Industrial buildings, ~110m southeast (1957 – 2010).

The use of the tanks and buildings is not known and it may have stored water or had the potential to store fuels. Therefore, potential contaminants include; PAHs and TPHs.

- Railway Sidings, 119m south (1957 – 1974).

Railways and associated infrastructure have the potential to migrate contaminants around as well as storing contaminants on their land. Contaminants associated with railway land include metals such as cadmium, chromium, nickel and lead, asbestos, PAHs, Total Petroleum Hydrocarbons (TPH) and ethylene glycol, which is a common component in anti-freeze. Asbestos from the brakes of historical locomotives had the potential to become airborne on the approach to stations and therefore can migrate away from railway land.

- Limited current surrounding retail industries including artist gallery printing, inwood stoves and fireplaces, Liphook mobility. Given the nature of these industries and the current regulations, it considered that these are unlikely to represent an off-site source of contamination.
- Fire Station, 227m south (1974).

Fire stations have the limited potential to pose a risk to their environs, however, their land has the potential to store fuels and water and/or foam for fighting fires. Historically, Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) was added to water due to its water and heat resistant nature. It is becoming widespread within the environment due to its persistent nature. Contaminants of concern include; TPHs, PAHs and PFAS. It is considered that the effect of these contaminants at the site would be negligible so have not been considered further

7.5 Potential Receptors

At the time of reporting, November 2020, the proposed development was understood to comprise the demolition of on-site structures and construction of 10 No. low-rise two-storey residential dwellings with associated private garden areas, car parking and communal planting spaces. The development would include additional guest and public parking areas to the south of the site. Vehicle access to the development would be gained via Haslemere Road to the south with additional a footpath granting access via London Road to the north.

Based on the proposed development, the potential receptors are presented below and comprise:

Human Health

- End users of the site (future site user and visitors);
- Site operatives during redevelopment and future maintenance works; and,
- Neighbours and members of the public.

Building Materials and Services

- Buried concrete;
- Confined spaces;
- Underground services; and
- Water Pipes

Groundwater and Controlled Waters

- Principal Aquifer (Hythe Formation);
- Surface water and watercourses.

Flora and Fauna

- Vegetation within soft landscaped areas;
- Vegetation within public open space;
- Existing vegetation.

7.6 Potential Pathways for Contaminant Migration from Off-site Sources

Anthropogenic (or artificial) pathways for contaminant and ground-gas migration can be present in the form of land drains, leaking sewage supply pipes and site drainage. Granular backfill to trenches for cables, gas pipes, water pipes etc. can also provide pathways for movement of mobile contaminants and contaminated groundwater.

The natural bedrock of the Hythe Formation is recorded to have high permeability and therefore could act as a pathway for contaminants at onto the site. Any unrecorded Made Ground is also likely to act as a migration pathway for contaminants.

7.7 Contaminant Absorption Pathways

The potential pathways for contaminant absorption by receptors are as follows:

Human Health:

- Direct ingestion of soil and soil derived dust;
- Dermal contact of impacted soil and soil derived dust;
- Ingestion of home grown produce, including soil attached;
- Ingestion of soil and groundwater with elevated concentration of determinands;
- Inhalation of impacted dust (indoors and outdoors) with elevated concentration of determinands;
- Inhalation of volatiles (indoors and outdoors) with elevated concentrations of determinands.

The pathways identified above are the pathways that are considered applicable for all Human Health receptors. The current geological model indicates that groundwater is considered to be present at depth (5.00 – 8.00m bgl) and therefore it considered that exposure to any contaminants within the groundwater are negligible. If during the site investigation shallow groundwater is identified it will be appropriate to consider risks through this pathway.

Building Materials and Services

- Direct contact;
- Explosion.

Groundwater and Ground-gas:

- Vertical and lateral migration in permeable strata horizons;
- Via anthropogenic pathways (service runs).

Vegetation

- Direct uptake of groundwater;
- Direct uptake of contaminants in the soil.

7.8 Tabulated Conceptual Site Model

The tabulated Conceptual Site Model developed as part of this Desk Study is outlined overleaf.

Tabulated Conceptual Site Model – Pollutant Linkage Summary			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
On-site			
Potential Made Ground: <ul style="list-style-type: none"> • Heavy metals and semi-metals. • Poly-cyclic aromatic hydrocarbons (PAHs). • Total petroleum hydrocarbons (TPHs). • Volatile organic carbons and semi-volatile organic carbons (VOCs and SVOCs). • Asbestos and asbestos containing materials (ACMs). 	Human Health <ul style="list-style-type: none"> • Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Ingestion of soil with elevated concentration of determinands • Dermal contact with impacted soils • Ingestion of homegrown produce, including soils attached • Inhalation of impacted dust with elevated concentration of determinands • Inhalation of volatiles (indoor and outdoor) with elevated concentration of determinands. 	<ul style="list-style-type: none"> • End Users (Residents). • Future site visitors. • Construction workers during development. • Construction workers during maintenance. • Neighbours and public. 	Moderate
	Controlled Waters <ul style="list-style-type: none"> • Anthropogenic (man-made) pathways • Vertical and lateral migration in permeable strata 	<ul style="list-style-type: none"> • Principal Aquifer – Bedrock. • Surface Water. 	Moderate
	Vegetation <ul style="list-style-type: none"> • Direct uptake of groundwater • Direct uptake of determinands in the soil 	<ul style="list-style-type: none"> • Vegetation within soft landscaped areas. • Vegetation within POS • Existing vegetation 	Low
Historical land-uses, including current uses: <ul style="list-style-type: none"> • Heavy metals and semi-metals. • Poly-cyclic Aromatic Hydrocarbons (PAHs). • Total petroleum hydrocarbons (TPHs). • Volatile organic carbons (VOCs) and semi-volatile organic carbons (SVOCs). • BTEX compounds used as markers • Asbestos and asbestos containing materials (ACMs). 	Human Health <ul style="list-style-type: none"> • Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Ingestion of soil with elevated concentration of determinands • Dermal contact with impacted soils • Ingestion of homegrown produce, including soils attached • Inhalation of impacted dust with elevated concentration of determinands • Inhalation of volatiles (indoor and outdoor) with elevated concentration of determinands. 	<ul style="list-style-type: none"> • End Users (Residents). • Future site visitors. • Construction workers during development. • Construction workers during maintenance. • Neighbours and public. 	Moderate
	Controlled Waters <ul style="list-style-type: none"> • Anthropogenic (man-made) pathways 	<ul style="list-style-type: none"> • Principal Aquifer – Bedrock. • Surface Water. 	Moderate

Tabulated Conceptual Site Model – Pollutant Linkage Summary			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
	<ul style="list-style-type: none"> Vertical and lateral migration in permeable strata 		
	<p style="text-align: center;">Vegetation</p> <ul style="list-style-type: none"> Direct uptake of groundwater Direct uptake of determinands in the soil 	<ul style="list-style-type: none"> Vegetation within soft landscaped areas. Vegetation within POS Existing vegetation 	Low
Aggressive ground conditions with Made Ground and natural ground; <ul style="list-style-type: none"> Sulphates. 	<p style="text-align: center;">Building Materials and Services</p> <ul style="list-style-type: none"> Direct contact with aggressive ground conditions 	<ul style="list-style-type: none"> Buried concrete. Underground services. 	Moderate
Contamination into water pipes: <ul style="list-style-type: none"> Poly-cyclic aromatic hydrocarbons (PAHs); and Total petroleum hydrocarbons (TPHs). 	<p style="text-align: center;">Buildings and Services</p> <ul style="list-style-type: none"> Direct contact with aggressive ground conditions 	<ul style="list-style-type: none"> Underground services. Water Pipes. 	Moderate
Ground gases generated by Made Ground/degradable materials: <ul style="list-style-type: none"> Carbon dioxide; Methane; Hydrogen sulphide; and Carbon monoxide. 	<p style="text-align: center;">Ground gas</p> <ul style="list-style-type: none"> Migration through anthropogenic & natural pathways Inhalation Explosive risk (methane only) Asphyxiating gases 	<ul style="list-style-type: none"> Future site residents. Buildings (especially with confined spaces). Construction workers, service and maintenance operatives (especially in confined spaces). 	Moderate
Unexploded Ordnance (UXO).	<p style="text-align: center;">Human Health</p> <ul style="list-style-type: none"> Explosive risk 	<ul style="list-style-type: none"> End Users (Residents and visitors). Construction workers during development and maintenance. Neighbours and public. 	Negligible
	<p style="text-align: center;">Buildings and Services</p> <ul style="list-style-type: none"> Explosive risk 	<ul style="list-style-type: none"> Building. Underground services. 	Negligible

Tabulated Conceptual Site Model – Pollutant Linkage Summary			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Off-site			
Nearby Historical Industrial Land-Uses (Smithy/Unspecified commercial/Depot/Telephone Exchange): <ul style="list-style-type: none"> • Heavy metals and semi-metals. • Poly-cyclic Aromatic Hydrocarbons (PAHs). • Total petroleum hydrocarbons (TPHs). • Volatile organic carbons (VOCs) and semi-volatile organic carbons (SVOCs). • Solvents. 	<p style="text-align: center;">Human Health</p> <ul style="list-style-type: none"> • Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Ingestion of soil with elevated concentration of determinands • Dermal contact with impacted soils • Ingestion of homegrown produce, including soils attached • Inhalation of impacted dust with elevated concentration of determinands • Inhalation of volatiles (indoor and outdoor) with elevated concentration of determinands. 	<ul style="list-style-type: none"> • End Users (Residents). • Future site visitors. • Construction workers during development. • Construction workers during maintenance. 	Moderate
	<p style="text-align: center;">Vegetation</p> <ul style="list-style-type: none"> • Direct uptake of groundwater • Direct uptake of determinands in the soil 		
Historical Tanks: <ul style="list-style-type: none"> • PAHs; • TPHs; • VOCs and SVOCs. 	<p style="text-align: center;">Human Health</p> <ul style="list-style-type: none"> • Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Ingestion of soil with elevated concentration of determinands • Dermal contact with impacted soils • Ingestion of homegrown produce, including soils attached • Inhalation of impacted dust with elevated concentration of determinands • Inhalation of volatiles (indoor and outdoor) with elevated concentration of determinands. 	<ul style="list-style-type: none"> • End Users (Residents). • Future site visitors. • Construction workers during development. • Construction workers during maintenance. 	Low
	<p style="text-align: center;">Vegetation</p> <ul style="list-style-type: none"> • Direct uptake of groundwater • Direct uptake of determinands in the soil 		

Tabulated Conceptual Site Model – Pollutant Linkage Summary			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Historical Garages: <ul style="list-style-type: none"> • Heavy metals and semi-metals; • PAHs; • TPHs; • VOCs and SVOCs; • Inorganics; • Solvent. 	Human Health <ul style="list-style-type: none"> • Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Ingestion of soil with elevated concentration of determinands • Dermal contact with impacted soils • Ingestion of homegrown produce, including soils attached • Inhalation of impacted dust with elevated concentration of determinands • Inhalation of volatiles (indoor and outdoor) with elevated concentration of determinands. 	<ul style="list-style-type: none"> • End Users (Residents). • Future site visitors. • Construction workers during development. • Construction workers during maintenance. 	Moderate
	Vegetation <ul style="list-style-type: none"> • Direct uptake of groundwater • Direct uptake of determinands in the soil 	<ul style="list-style-type: none"> • Vegetation within soft landscaped areas. • Vegetation within POS • Existing vegetation 	Low
Historical Electricity sub-station: <ul style="list-style-type: none"> • Poly-chlorinated biphenyls (PCBs) 	Human Health <ul style="list-style-type: none"> • Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Ingestion of soil with elevated concentration of determinands • Dermal contact with impacted soils • Ingestion of homegrown produce, including soils attached • Inhalation of impacted dust with elevated concentration of determinands • Inhalation of volatiles (indoor and outdoor) with elevated concentration of determinands. 	<ul style="list-style-type: none"> • Construction workers during development. • Construction workers during maintenance. 	Negligible (Source considered is at significant distance for contaminants)

7.9 Recommendations and Phase 2 Objectives

This section of the report will present recommendations for the further investigation of each plausible pollutant linkage identified by the Conceptual Site Model.

It is recommended that an intrusive ground investigation is undertaken at the site to evaluate the risk that contaminants of concern within the soils and groundwater may affect end-users. This should determine the underlying ground and groundwater conditions and include an assessment of the level of contamination to enable the evaluation of the ground-related risks associated with the proposed redevelopment. Consideration should be given to the testing of soil samples recovered from exploratory holes for chemical laboratory testing. The testing should be for a broad range of contaminants in accordance with DEFRA / CLEA methodologies and the Conceptual Site Model.

Soils:

It is possible that asbestos and asbestos containing materials will be incorporated within the existing structure, e.g. as insulation or pipe cladding. A specialist asbestos management survey should be carried out prior to any demolition works to ensure that any potential asbestos/ACM identified is appropriately managed, including removal from site.

On the basis of the Phase 1 Site Assessment the following contaminants of concern have been identified and should be included in the chemical analysis suite for the ground investigation:

- Asbestos.
- Semi-metals and heavy metals;
- Poly-cyclic aromatic hydrocarbons (PAH's);
- Fuel oils – speciated TPH including full aliphatic/aromatic split;
- Volatile/semi-volatile organic compounds – BTEX Used as marker compounds;
- Sulphates;
- Cyanide.

The list above does not imply that these chemicals are present on-site or that they are likely to cause contamination issues at the site. The ground investigation will be used to prove the presence or prove the absence of these contaminants. The sampling and testing strategy must be in line with current standards.

Limited sources of contamination have been identified at the site and therefore no targeted sampling is required.

Groundwater:

If analytical results show elevated concentrations of contaminants of concern in the soil samples then there might be a requirement to assess the potential risks of surface water runoff and leachability of contaminants migrating into the Principal Aquifer groundwater underlying the site. This might mean leachate testing on soils samples is required or groundwater sampling and testing.

Ground-gas:

The Conceptual Site Model has determined that there is a moderate potential risk from ground gases at the site and limited off-site sources of ground gases. Limited sources of ground gas have also been identified. Total organic carbon laboratory analysis should be considered within the soil samples in order to ensure that a pragmatic approach to ground gas risk assessment can be carried out.

Materials and services

Sub-surface concrete may be damaged due to being in contact with aggressive ground conditions. Sampling should be undertaken where the proposed foundations will be in contact with natural ground and Made Ground and tested for aggressive ground conditions (sulphates/pH). Classification should then be undertaken of the ground conditions in accordance with Building Research Establishment Special Digest 1, 2005, 'Concrete in Aggressive Ground'.

If hydrocarbon contamination, staining or odours are noted at the depth of proposed water pipes, testing of poly-cyclic aromatic hydrocarbons and total petroleum hydrocarbons should be undertaken.

7.10 Discovery Strategy

Although unlikely, there may be areas of contamination that have not been identified during the course of the Desk Study. For example, there may have been underground storage tanks (UST's) not identified during the Desk Study for which there is no historical or contemporary evidence. Such occurrences may be discovered during the investigation for the redevelopment of the site.

Groundworkers should be instructed to report to the Site Manager any evidence for such contamination; this may comprise visual indicators, such as fibrous materials within the soil, discolouration, or odours and emission. Upon discovery advice must be taken from a suitably qualified person before proceeding, such that appropriate remedial measures and health and safety protection may be applied.

Should a new source of contamination be suspected or identified then the Local Authority will need to be informed.

7.11 Geotechnical Review

The BGS have identified a negligible hazard associated with compressible deposits, shrinking / swelling Clay and ground dissolution of soluble rocks. A very low hazard of landslides and collapsible deposits and a low risk of running sands was also recorded.

A review of the data available on <https://www.lidarfinder.com/> did not reveal any features of concern (e.g. potential infilled ground or potential dissolution features).

No known records of natural cavities were present within 500m from the site, based on the PBA database, according to GroundSure.

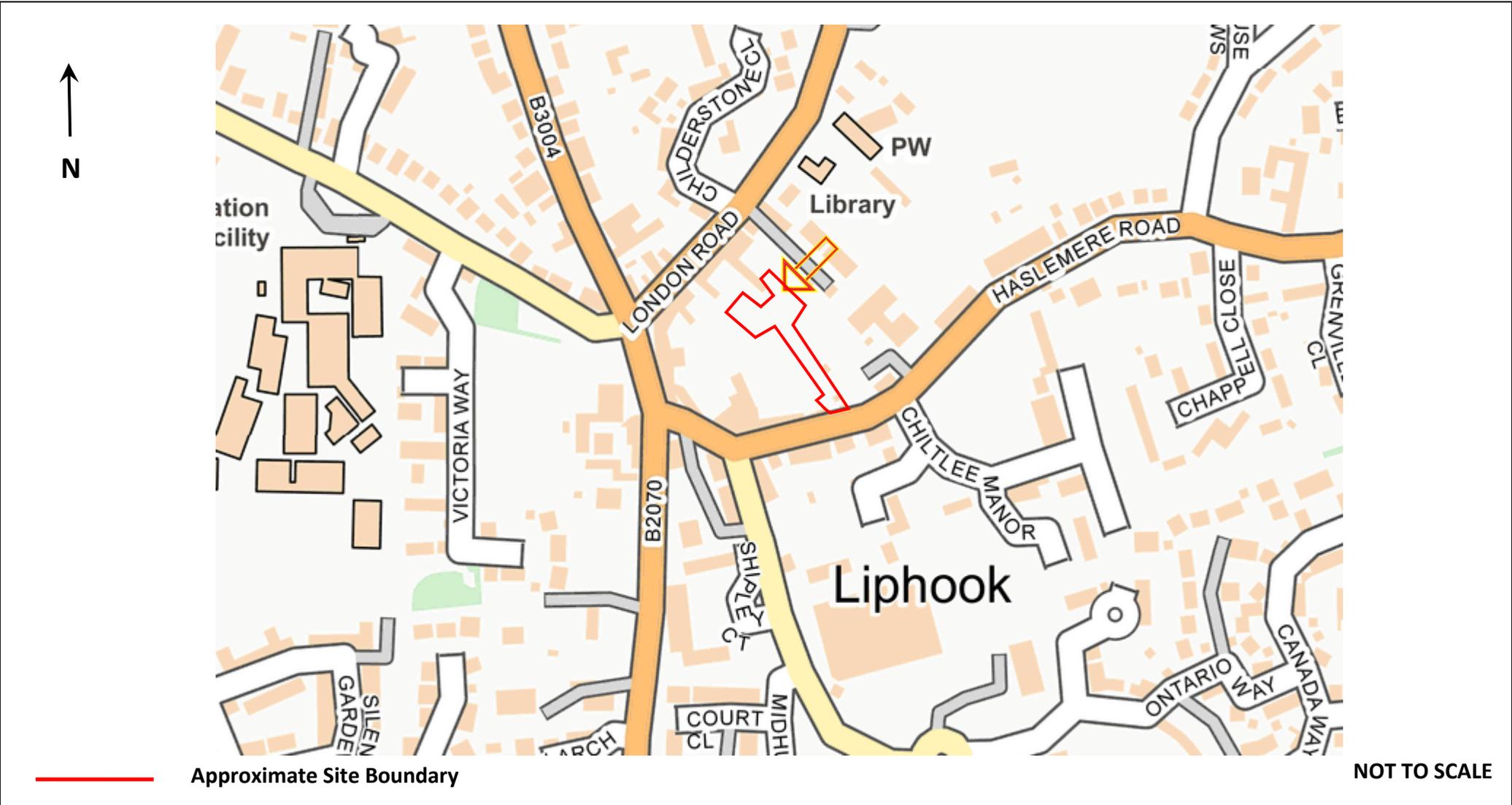
No pits/quarrying or mining features were identified on-site or within the site's close environs from the historical mapping or the site walkover. The Groundsure datasheets identified a Class A mining on-site, defined as sporadic underground mining of sand may have occurred.

No mining cavities were recorded within the JPB database on site. No records of mining were also noted on site, based on BritPits, surface ground workings or underground workings.

Review of the planning database indicates that numerous trees have been removed during recent years and as a result moisture recovery of the soils are likely to be ongoing. The presence of roots may need to be taken into account during the design of the foundations subject to the findings of an investigation.

When designing foundations, the potential presence of aggressive ground conditions should be taken into consideration. Further investigation may be required in accordance with the guidance established in BRE Special Digest 1 (SD1) (2005) 'Concrete in aggressive ground'. The BGS do not record any details regarding the potential for aggressive ground conditions within shallow units identified at the site.

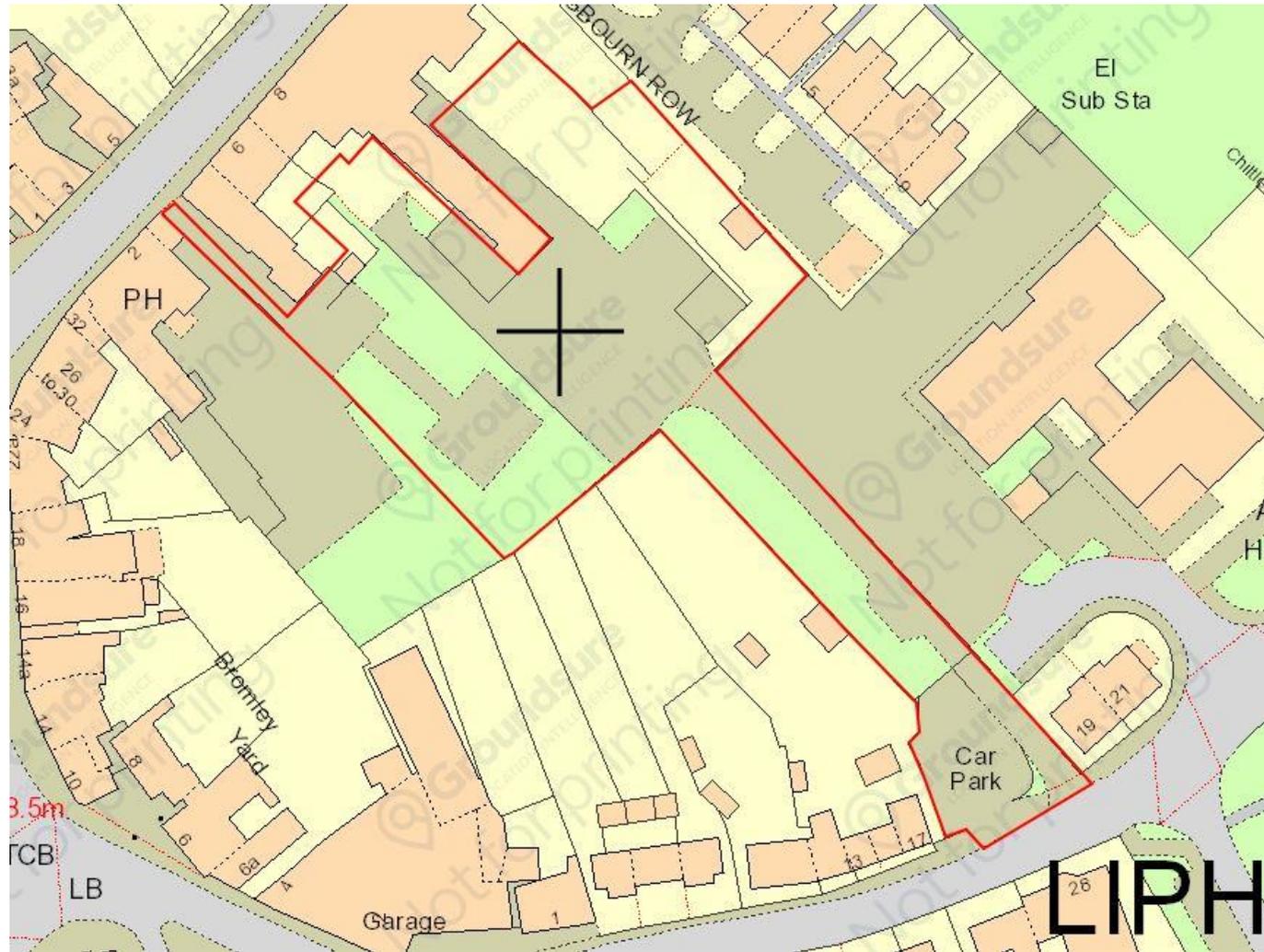
It is recommended that as part of the site-specific ground investigation on-site, geotechnical testing is undertaken to determine the underlying ground conditions and to evaluate any geotechnical related risks associated with the proposed redevelopment of the site.



Project: 6 – 12 London Road, Liphook, Hampshire, GU30 7AN.	
Client: Metis Homes Limited c/o Mapledean Projects Limited	Date: November 2020
Site Location Plan	Ref: GWPR3874

Figure 1

ground&water



Approximate
Site Boundary



NOT TO SCALE

Project:

6 – 12 London Road, Liphook, Hampshire, GU30 7AN.

Client:

Metis Homes Limited c/o Mapledean Projects Limited

Date:

November 2020

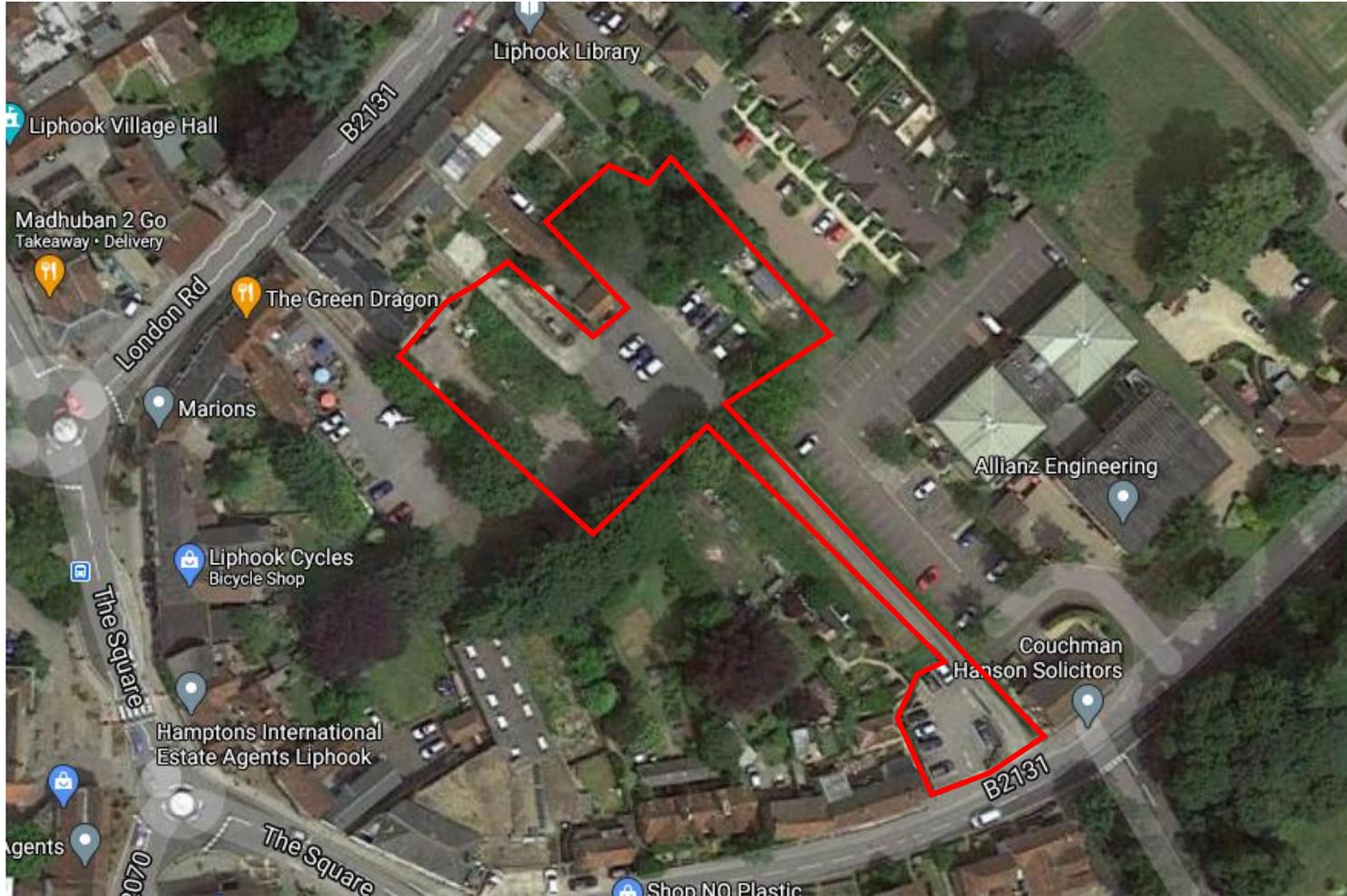
Site Development Area

Ref:

GWPR3874

Figure 2





Approximate Site Boundary

NOT TO SCALE

Project:
6 – 12 London Road, Liphook, Hampshire, GU30 7AN.

Client:
Metis Homes Limited c/o Mapledean Projects Limited

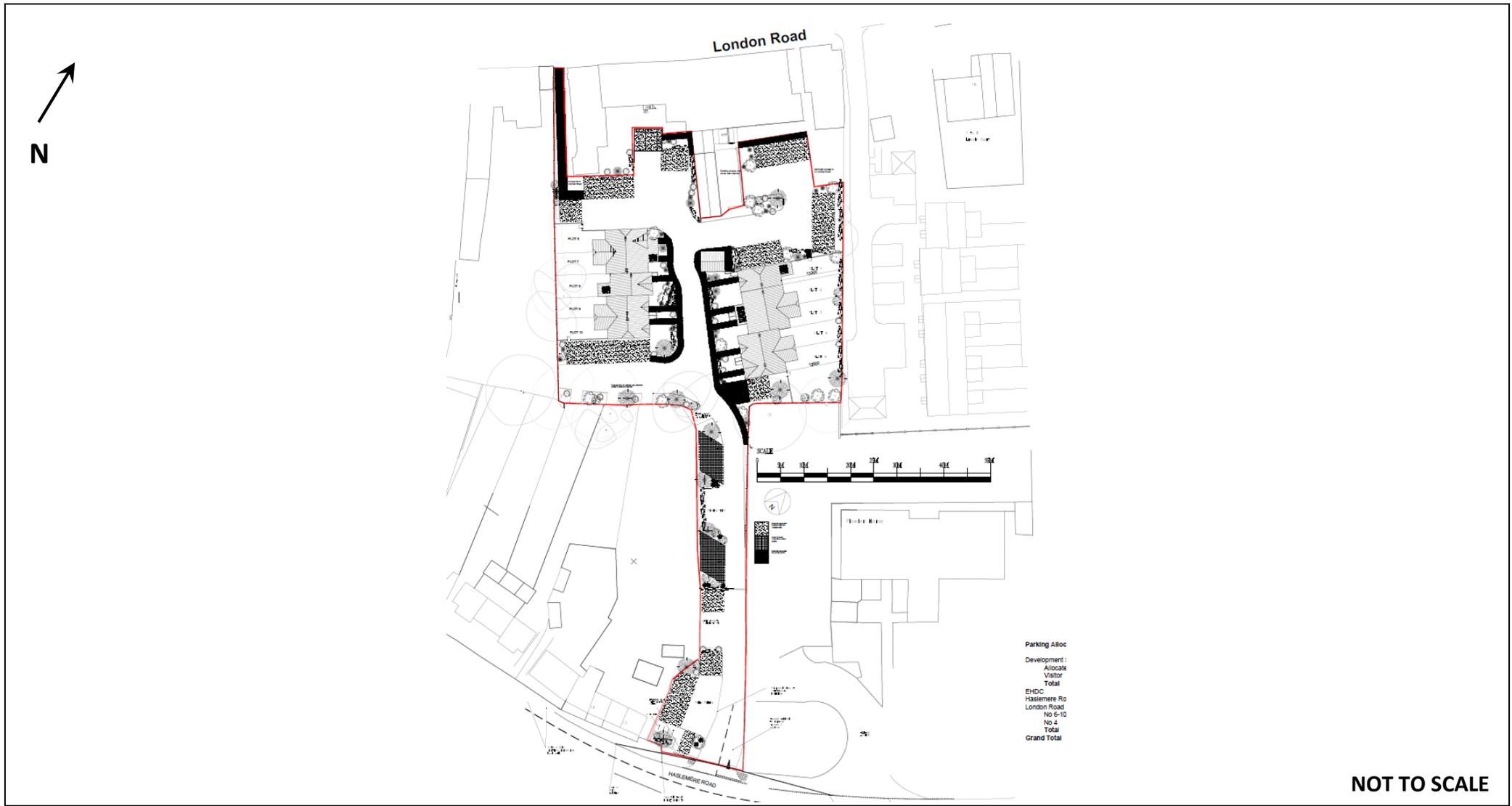
Date:
November 2020

Aerial View of Site

Ref:
GWPR3874

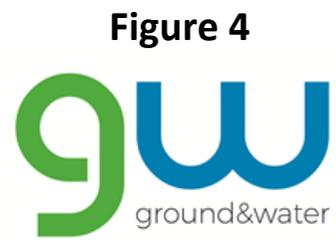
Figure 3





NOT TO SCALE

Project:		6 – 12 London Road, Liphook, Hampshire, GU30 7AN.	
Client:	Metis Homes Limited c/o Mapledean Projects Limited	Date:	November 2020
Proposed Development – Plan View		Ref:	GWPR3874



APPENDIX A

Conditions and Limitations

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

The report has been prepared based on information, data and materials, which were available at the time of writing. Any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report (“you” or “the Recipient”) are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

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

Any recipient must consider any other factors apart from the report of which they and their experts and advisers are or should be aware of. The information, data, conclusions, opinions and judgements set out in the report may relate to specific contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous ground activities. The ground conditions have been sampled or monitored in recorded locations and testing for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment / contaminated land considerations.

The conclusions and recommendations relate to Site; 6 – 12 London Road, Liphook GU30 7AN.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and / or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and / or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text, this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

APPENDIX B
Site Photographs

Photo 1



Photo 2



Photo 3



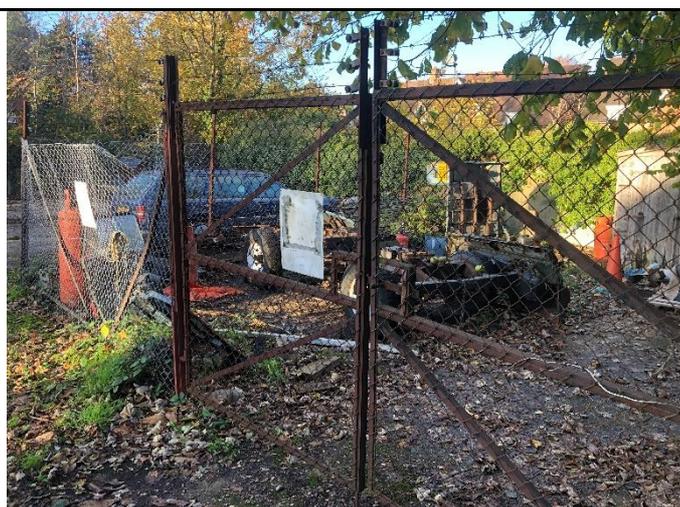
Photo 4



Photo 5



Photo 6



Project: 6 – 12 London Road, Liphook, Hampshire, GU30 7AN

Client: Mapledean Projects Limited

Date: November 2020

Appendix B: Site Walkover Photographs

Ref: GWPR3874

Plate 1:



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Project: 6 – 12 London Road, Liphook, Hampshire, GU30 7AN

Client: Mapledean Projects Limited

Date: November 2020

Appendix B: Site Walkover Photographs

Ref: GWPR3874

Plate 2:

