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Your Ref:

Our Ref: **15/24032-1**
August 2015

13 KEMPLAY ROAD

LONDON, NW3 1TA

BASEMENT IMPACT ASSESSMENT

Prepared for

Kemplay Road Limited

CONTENTS

1.0 INTRODUCTION

1.1 Project Objectives

At the request of Kemplay Road Limited, a Basement Impact Assessment has been carried out at the above site in support of a planning application.

The purpose of this assessment is to consider the effects of a proposed basement construction on the local slope stability, surface water and groundwater regime at the existing residential property.

The recommendations and comments given in this report are based on the information contained from the sources cited and may include information provided by the Client and other parties, including anecdotal information. It must be noted that there may be special conditions prevailing at the site which have not been disclosed by the investigation and which have not been taken into account in the report. No liability can be accepted for any such conditions.

This report does not constitute a full environmental audit of either the site or its immediate environs.

1.2 Planning Policy Context

The information contained within this BIA has been produced to meet the requirements set out by Camden Planning Guidance – Basements and Lightwells (CPG4) including Camden Development Policies DP27 – Basements and Lightwells (Ref 1) in order to assist London Borough of Camden with their decision making process.

As recommended by the Guidance for Subterranean Development (Ref 1) the BIA comprises the following steps

1. Initial **screening** to identify where there are matters of concern
2. **Scoping** to further define the matters of concern
3. **Site Investigation and study** to establish baseline conditions
4. **Impact Assessment** to determine the impact of the basement on baseline conditions
5. **Review and Decision Making** (to be undertaken by LBC)

2.0 SITE DETAILS

(National Grid Reference: 526752, 185675)

2.1 Site Location

The site is located to the south of Kemplay Road in Hampstead, North London, NW3 1TA and comprises a two storey end of terrace residential property with front and rear garden areas.

The site covers an area of approximately 0.03 hectares and the general area is under the authority of the London Borough of Camden.

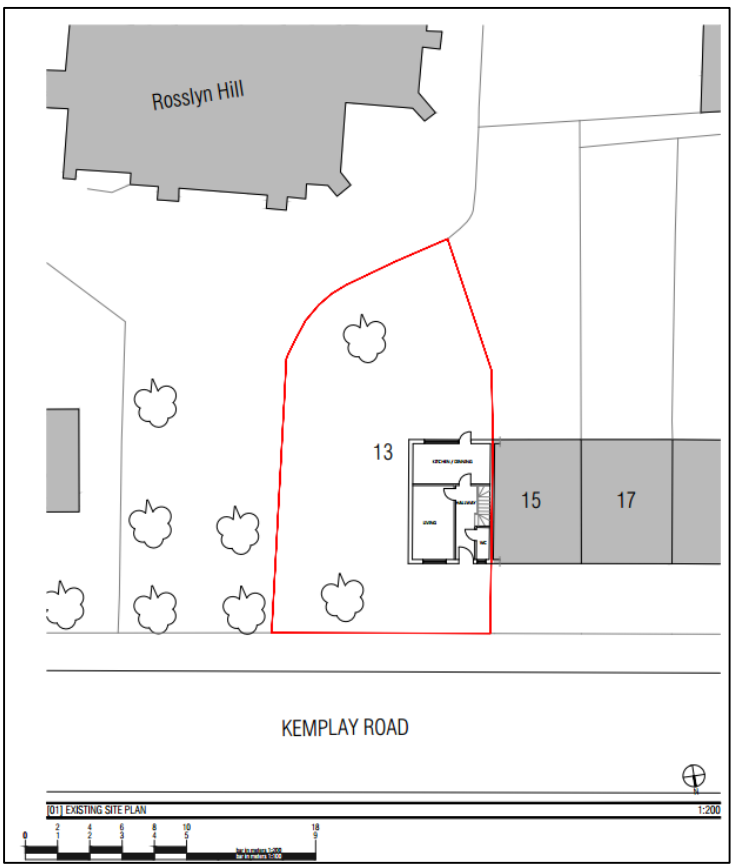

Figure 1. Site Location Plan

2.2 Site Layout and History

The site was attended on 30th July 2015 for the purposes of conducting the site walkover.

The site is accessed from Kemplay Road located to the north and comprises of a two storey end of terrace residential property with front and rear garden areas.

The property is bound by Kemplay Road to the north, with residential properties to the west and the Rosslyn Hill Chapel to the east and south.

There was a slight slope measured along Kemplay Road from around 90mOD at the western end of the road to 85mOD at the eastern end. This equates to around a 4-5˚ slope angle. The general area also slopes to the east and south-east.

There is a slight step up from the road to the front of the property, but this is less than 0.5m in height.

There are two large trees within the property grounds, one to the front and one to the rear of the property. There are also multiple large trees within the church grounds to the east and south.

From historical map evidence it would appear that the current property was built between 1954 and 1966 and has remained on-site unchanged since its initial construction. The surrounding area has been predominantly residential throughout its history.

2.3 Previous Reports

A Phase 1 Preliminary Risk Assessment (PRA) (SAS Report Ref: 15/24032) was conducted by Site Analytical Services Limited in August 2015 and the results are discussed in this BIA.

2.4 Geology

The 1:50000 Geological Survey of Great Britain (England and Wales) covering the area is detailed in Figure 1 below and indicates the site to be underlain by the Claygate Member with the London Clay Formation at depth. Deposits of the overlying Bagshot Formation are indicated to be approximately 210m to the west of the site, whilst the boundary to the underlying London Clay Formation is approximately 120m to the east.

- Claygate Member: The Claygate Member (or Claygate Beds) are classed as a member of the London Clay Formation and described as silty and fine-grained sands which have an average thickness of approximately 16m in the London area.

- London Clay Formation: The London Clay Formation comprises clay, silt and sand and at this site location a thickness of between 70m and 100m is likely.

- Deeper strata is not of interest for this study.

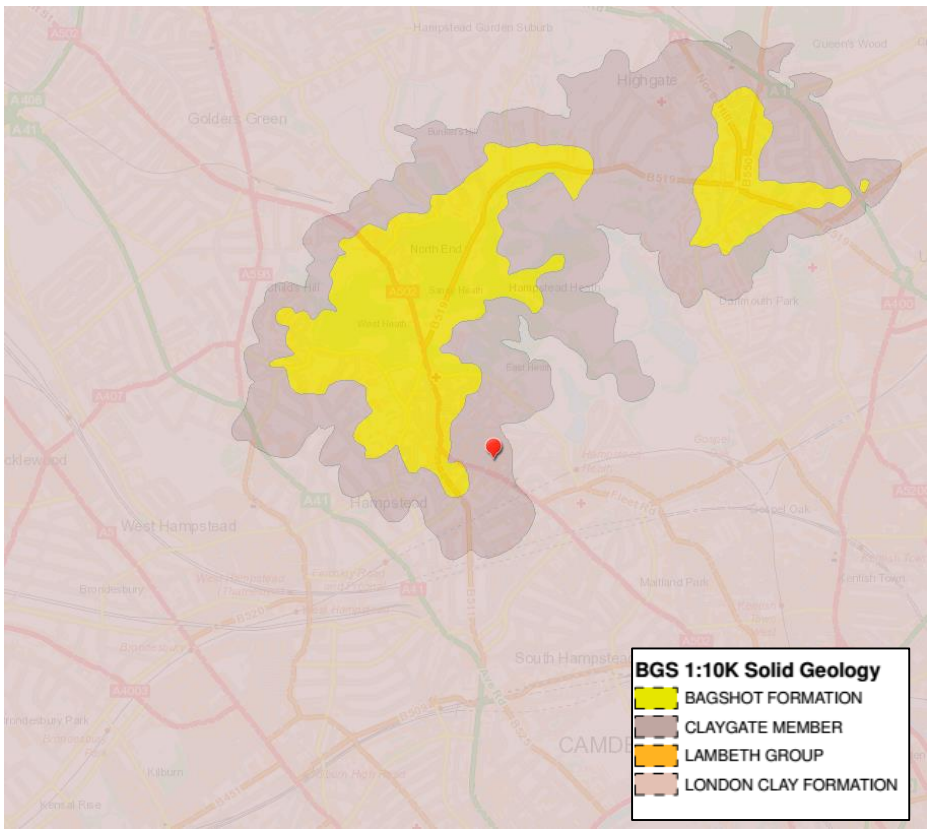

Figure 2. Geology of the Site (Ref. BGS Geoindex)

The British Geological Survey maintains an archive of historical exploratory hole logs throughout the UK. SAS has searched the database and have found that there are two relevant boreholes logs within 250m of the site.

The closest (BGS Reference TQ28NE6) is located 107m north-west of the site and details Made Ground down to 2.03m depth followed by the Claygate Member to 12.19m depth with the London Clay Formation to 109m depth. The other historical borehole within 250m of the site (TQ28NE304) is not available to view online with records being held internally by the BGS.

2.5 Hydrology and drainage

2.5.1 Surface Water

According to Mayes (1997) rainfall in the local area averages around 610mm and significantly less than the national average of around 900mm.

Evapotranspiration is typically 450 mm/yr resulting in about 160 mm per year as 'hydrologically effective' rainfall which is available to infiltrate into the ground or run-off as surface water flow.

According to publications regarding Lost Rivers of London (Barton, 1992) and (Talling, 2011) the site is not within 100m of any of the old river systems (Figure 3).

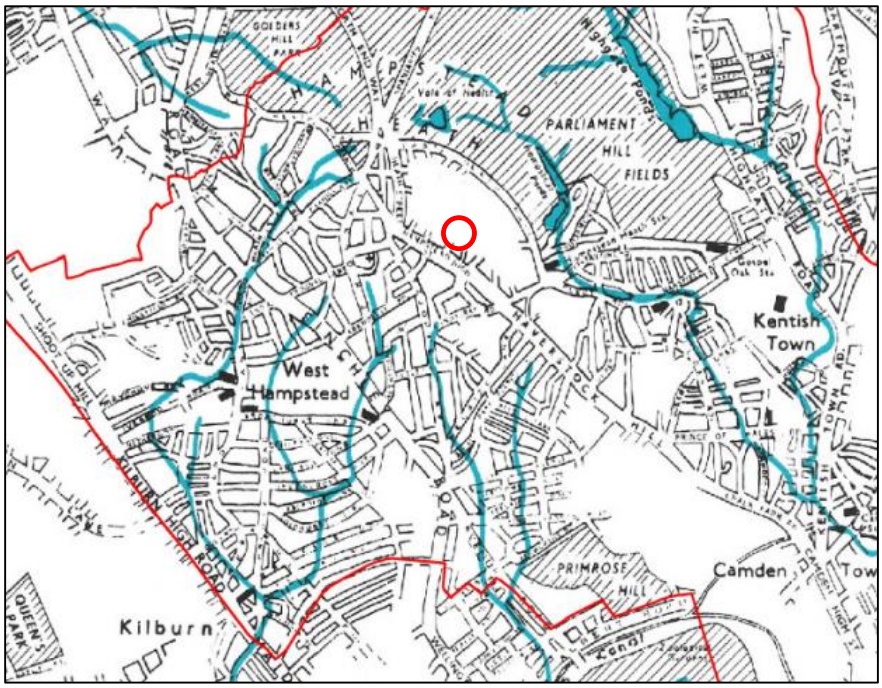

Figure 3. Location of site (circled) relative to the 'Lost Rivers' of London (Source: Barton, 1992)

The closest surface water feature are the Hampstead Ponds, located 463m north-east of the site.

The area located immediately around the site is highly developed with more than 80% of the surface covered with hardstanding. Most of the rainfall in the area will run-off hard surface areas and be collected by the local sewer network.

Surface drainage from the site is assumed to be directed to drains flowing downhill to the east along Kemplay Road.

2.5.2 Flood Risk

2.5.2.1 River or Tidal flooding

According to Environment Agency Flood maps the site area does not fall within an area at risk of flooding from rivers, seas or reservoirs. Based on this information a flood risk assessment will not be required.

2.4.2.2 Surface water flooding

Figure 4 shows that Kemplay Road did not flood during either the 1975 or the 2002 flood events. The closest road to the property which flooded in Willow Road located 250m to the north which flooded in 2002.

Figure 4. Exact from Figure 15 of the Camden CPG4 (Ref 1) showing roads which flooded in 1975 (light blue), in 2002 (dark blue) and 'areas with potential to be at risk from surface water flooding' (wide light blue bands)

The risk of surface water flooding to the site is modelled by the Environment Agency and contained within the Envirocheck Report for the site as detailed in Figure 5 below. This modelling shows a very low risk of flooding (the lowest category for the national background level of risk) for No.13 and the surrounding area.

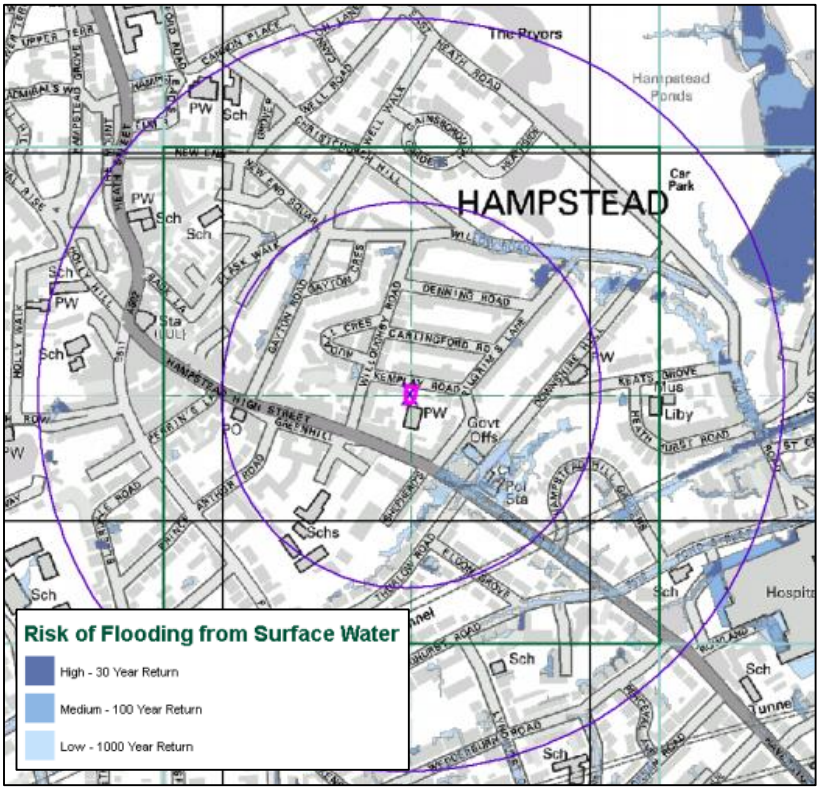

Figure 5. Extract from the Environment Agency's 'Risk of Flooding from Surface Water'. Ordnance Survey Crown copyright 2015. All rights reserved.

2.4.2.3 Sewer flooding

The London Regional Flood Risk Appraisal (2009) advises that foul sewer flooding is most likely to occur where properties are connected to the sewer system at a level below the hydraulic level of the sewage flow, which in general are often basement flats or premises in low lying areas. There is no record of sewer flooding having occurred at 13 Kemplay Road and therefore the risk of sewer flooding is considered low.

2.6 Hydrogeological setting

The Environment Agency Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) and also their role in supporting surface water flows and wetland ecosystems.

The Claygate Member is permeable, capable of storing and transmitting groundwater and is considered to be a Secondary A Aquifer; The underlying London Clay Formation is classed as unproductive strata or a non-aquifer. These are deposits with a low permeability that have negligible significance for water supply or river base flow.

Groundwater within the silty sandy clays of the Claygate Member is considered to be dominated by fissure flow. The absence of any significant sand bed horizons reduces the water bearing potential of the Claygate Member to that similar to the underlying London Clay. Due to the very low permeability of the London Clay, any groundwater flow will be at very low rates. Published data for the permeability of the London Clay indicates the horizontal permeability to generally range between 1×10^{-10} m/s and 1×10^{-8} m/s, with an even lower vertical permeability. However, the Claygate Member is sandier in composition and permeability is expected to be higher.

Local perched groundwater may occur near surface in Made Ground, and possibly also in any Head deposits which overlie the Claygate Member, in at least the winter and early spring seasons.

The presence of interbedded sands, silts and clays of the Claygate Member gives rise to various springs. The direction of groundwater flow within the Claygate Member beneath the site is likely to be controlled by the local topography and is therefore likely to be in a easterly and south easterly direction.

Other hydrogeological data obtained from the Phase 1 Preliminary Risk Assessment (PRA) (SAS Report Ref: 15/24032) for the site include:

- The underlying soil classification of the site is of high leaching potential.
- There are no source protection zones within 1 kilometre site.
- There are no groundwater abstraction licences listed within one kilometre of the site.
- There are no surface water abstraction licences within 1km of the site.
- According to the British Geological Survey there are no historical wells located within 100m of the site.

2.7 Proposed Development

It is proposed to demolish the current end of terrace property and construct a detached two storey residential property with a single storey basement to approximately 3.00m maximum depth and a single storey side garage.

2.8 Results of Basement Impact Assessment Screening

A screening process has been undertaken for the site and the results are summarised in Table 1 below:

Table 1: Summary of screening results

Item	Description	Response	Comment
Sub-terranean (Ground water Flow)	1a. Is the site located directly above an aquifer.	Yes	The site lies above the Claygate Member. These deposits have been designated as Secondary A Class; permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
	1b. Will the proposed basement extend beneath the water table surface.	Unknown	Given the presence of an aquifer below the site it is possible that groundwater will be encountered during any excavations for the proposed basement.
	2. Is the site within 100m of a watercourse, well (used / disused) or potential spring line.	No	The nearest surface water feature is the Hampstead Heath Ponds located 463m north-east of the site. According to publications regarding Lost Rivers of London (Barton, 1992) and (Talling, 2011), the site is not within 100m of a former river or watercourse.
	3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas.	No	The amount of hardstanding on-site is not expected to change.
	4. As part of site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS).	No	Existing drainage paths are to be utilised where possible. Whether soakaways/SUDS are used on the proposed development is to be confirmed (beyond the scope of this report). An appropriately qualified engineer should be engaged to ensure mandatory requirements are met.
	5. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond or spring line.	No	The nearest surface water is recorded is located 463m north-east of the site. There are no wells located within 100m of the site and the site is not within 100m of any geological boundary which can be associated with the formation of springs (for example Claygate Beds and underlying London Clay Formation)

Slope Stability	1. Does the existing site include slopes, natural or man-made greater than 7 degrees (approximately 1 in 8).	No	The site does not contain any slopes and is relatively flat.
	2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees (approximately 1 in 8).	No	Re-profiling of landscaping at the site is not proposed.
	3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees (approximately 1 in 8).	No	There was a slight slope measured along Kemplay Road from around 90mOD at the western end of the road to 85mOD at the eastern end. This equates to around a 4-5˚ slope angle.
	4. Is the site within a wider hillside setting in which the general slope is greater than 7 degrees (approximately 1 in 8).	No	There is a general slope in the area very gently towards the south down to the River Thames but this is less than 7 degrees.
	5. Is the London Clay the shallowest strata at the site.	No	With reference to available BGS records, the soil strata below the site is the Claygate Member. The boundary to the underlying London Clay Formation is 120m to the east and therefore the site is not considered to be close to this stratigraphic boundary.
	6. Will any trees be felled as part of the development and/or are any works proposed within any tree protection zones where trees are to be retained.	No	It is understood that no trees are to be felled as part of the development.
	7. Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site.	Unknown	The Claygate Member has some potential for shrink-swell
	8. Is the site within 100m of a watercourse or a potential spring line.	No	The nearest surface water feature is the Hampstead Heath Ponds located 463m north-east of the site. According to publications regarding Lost Rivers of London (Barton, 1992) and (Talling, 2011), the site is not within 100m of a former river or watercourse; The nearest historic surface water is recorded as a tributary to the Westbourne located approximately 500m south-west of the site.
	9. Is the site within an area of previously worked ground.	No	According to the records held by the BGS the site is not underlain by any worked ground, made ground, infilled ground or landscaped ground

	10. Is the site within an aquifer. If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction.	Unknown	Given the presence of an aquifer below the site it is likely that groundwater will be encountered during any excavations for the proposed basement, however this will be confirmed by the ground investigation.
	11. Is the site within 50m of the Hampstead Heath Ponds?	No	The site is away from this area
	12. Is the site within 5m of a highway or pedestrian right of way.	Yes	The site lies within 5m of Kemplay Road.
	13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.	Yes	The development will increase the depths of foundation at the site, although the foundation depths of the adjacent property (No. 15) are unknown.
	14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines.	Unknown / outside scope of report	A full statutory service search was outside the scope of this report and must be completed prior to any excavations.
Surface Water and Flooding	1. Is the site within the catchment of the pond chains on Hampstead Heath	No	The site is away from this area.
	2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route.	No	The amount of hardstanding on-site is not changing, therefore surface water will not be impacted by the development.
	3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas.	No	The amount of hardstanding on-site is not expected to increase.
	4. Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses.	No	As no changes are occurring above the ground, surface water will not be impacted by the development.
	5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses.	No	As no changes are occurring above the ground at the location of the basement, surface water will not be impacted by the development.
	6. Is the site in an area known to be at risk from surface water flooding, such as South Hampstead, West Hampstead, Gospel Oak and King's Cross, or is it at risk from flooding, for example because the basement is below the static water level of a nearby water feature	No	Because the site is elevated well above the flood plain of the River Thames at about 95.0mOD, it is shown as being outside Flood Zone as defined on the Environment Agency Flood Zone maps. According to Environment Agency Surface Water Flood maps (Reference 10) the site itself is not at risk from surface water flooding.

The Screening Exercise has identified the following potential issues which will be carried forward to the Scoping Phase

Subterranean Groundwater Flow

- Is the site located directly above an aquifer
- Will the proposed basement extend beneath the water table surface

Slope Stability

- Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site.
- Is the site within an area of previously worked ground.
- Is the site within an aquifer. If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction.
- Is the site within 5m of a highway or pedestrian right of way.
- Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.

3.0 SCOPING PHASE

The purpose of the scoping phase is to assess in more detail the factors to be investigated in the impact assessment. Potential impacts are assessed for each of the identified impact factors and recommendations are stated.

Subterranean (Groundwater Flow)

Potential Issue (Screening Question)		**Potential impacts and actions**
1a	Is the site located directly above an aquifer?	**Potential impact**: Infiltration could be reduced. **Action**: Ground Investigation required, then review.
1b	Will the proposed basement extend beneath the water table surface?	**Potential impact:** Local restriction of groundwater flows (perched groundwater or below groundwater table). **Action:** Ground investigation required, then review.

Slope Stability

7	Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site?	**Potential impact:** If a new basement is not excavated to below the depth likely to be affected by tree roots this could lead to damaging differential movement between the subject site and adjoining properties. **Action:** Ground investigation required, then review
10	Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	**Potential impact:** Inadequate provision of dewatering can lead to collapse of excavations. Inappropriate dewatering can cause removal of fines and/or unacceptable increases ineffective stress, both of which can cause ground structures to settle. **Action:** Ground investigation required in order to enable a proper assessment of the appropriate forms of groundwater control.
12	Is the site within 5m of a highway or a pedestrian right of way?	**Potential impact:** Excavation of basement causes loss of support to footway/highway and damage to the services beneath them. **Action:** Ensure adequate temporary and permanent support by use of best practice working methods.
13	Will the proposed basement substantially increase the differential depth of foundations relative to neighbouring properties?	**Potential impact:** Loss of support to the ground beneath the foundations to No. 15 if basement excavations are inadequately supported. **Action:** Ensure adequate temporary and permanent support by use of best practice methods.

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