soils
LIMITED

Basement Impact Assessment

at
50 Rochester Place, London NW1 9JX

for
Croft Structural Engineers

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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

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

Commission

Soils Limited was commissioned by Croft Structural Engineers to undertake a Basement Impact Assessment (BIA) on land at 50 Rochester Place, London NW1 9JX. The scope of the investigation was outlined in the Soils Limited quotation reference Q16585 dated 17th June 2015.

This document comprises the Basement Impact Assessment and **must** be read in conjunction with the findings of the intrusive investigation, geotechnical laboratory testing results and groundwater monitoring data that were supplied to Soils Limited by Ground and Water Ltd. (geotechnical and environmental consultants).

Soils Limited, following instructions by the client, have not undertaken any intrusive works and have relied solely on the findings of the intrusive investigation, geotechnical laboratory testing results and groundwater monitoring data supplied by Ground and Water Ltd. for the preparation of this Basement Impact Assessment.

Standards

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

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Section 1 Introduction

1.1 Objective of Investigation

This report comprises a Basement Impact Assessment which is in accordance with the *London Borough of Camden Development Policy DP27 – Basements and Lightwells* and the LB Camden guidance document *"Camden geological, hydrogeological and hydrological study – Guidance for subterranean development"* produced by Arup, *which* describe a risk-based impact assessment with regard to hydrology, hydrogeology and land stability. This has been used as relevant background technical guidance to the development of the Basement Impact Assessment (BIA).

The objective of this investigation was to establish the impact and risk of the proposed basement at 50 Rochester Place, London NW1 9JX. The assessment would determine the impact on the surroundings structures with respect to groundwater and land stability and in particular to assess whether the development will affect the stability of neighbouring properties, local and regional hydrogeology and whether any identified impacts can be appropriately mitigated by the design of the development.

It is recognised that any Basement Impact Assessment is a live document and that further detailed assessments will be ongoing, if appropriate, as the design and construction progresses.

1.2 Location

The site was located on 50 Rochester Place, London NW1 9JX at Land Ranger Grid Reference of TQ 290 844.

The site location plan is given in Figure 1 and aerial photography in Figure 2.

1.3 Proposed Development

The proposed redevelopment is to comprise the construction of a basement in alignment with the footprint of the existing ground floor. The proposed basement is to be used for a storage/archive area and is also to include toilets/bathroom.

The top of the proposed slab would be 2.82 m below the bottom of the existing ground floor slab, therefore the proposed excavations for the basement slab construction were anticipated to a depth of ~3.0-3.5 m below existing ground level.

The existing and proposed plans showed no areas of soft landscaping.

In compiling this report reliance was placed on the architectural drawings by *AWDM, existing and proposed plans on 01/06/15* and was supplied by the Client. Any change or deviation from the scheme outlined in the drawing could invalidate the recommendations presented within this report. Soils Limited must be notified about any such changes.

The proposed development layout as provided by the client is included in Appendix B.

1.4 Limitations and Disclaimers

This Basement Impact Assessment relates to the site located at 50 Rochester Place, London NW1 9JX and was prepared for the sole benefit of Croft Structural Engineers (The “Client”) to the brief described in Section 1.1 of this report.

This document comprises the Basement Impact Assessment and must be read in conjunction with the findings of the intrusive investigation, geotechnical laboratory testing results and groundwater monitoring data that were supplied to Soils Limited by Ground and Water Ltd. (geotechnical and environmental consultants). Soils Limited have incorporated the data supplied by Ground and Water Ltd. into the preparation of the Basement Impact Assessment following instructions by the client.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

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

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 to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Section 2 Site Conditions

2.1 Site Details

The site comprised a garage (MDA Motors Garage). The site was bordered by residential properties comprising a 2-storey mews house to the immediate south-east with domestic gardens to the immediate north-east. Rochester Place with 4-storey flats beyond were noted to the south-west. To the north-west the site was bordered with commercial properties.

The site was fully occupied by the garage and did not include any areas of soft landscaping. Semi-mature trees were noted to the immediate north-east within the domestic gardens of the adjoining residential property.

The site was flat-lying, with the wider topography sloping at a shallow gradient downward in a south / south-west direction, with an average gradient of <1°.

2.2 Published Geological Data

The 1:50,000 BGS map showed the site to be located on bedrock of the London Clay Formation with no overlying superficial geology recorded. The soils of the Lambeth Group were underlying the London Clay Formation, with the Thanet Sand Formation below and the Lewes Nodular, Seaford and Newhaven Chalk Formation at depth.

2.2.1 London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

In the north London area the upper part of the London Clay has been disturbed by periglacial processes and may contain pockets of sand and gravel.

2.2.2 Lambeth Group

The Lambeth Group, formerly known as the Woolwich and Reading Beds, occurs in the London and Hampshire Basins, where it directly overlies the Chalk or Thanet Sand Formation, and is succeeded by the Harwich and London Clay Formation. Although generally less than 50 metres thick, its lithological variability and position beneath much of London has concerned tunnelling engineers since the early 19th century.

The relationship between the different depositional environments is seen in central and south-east London, where deposits of fine-grained sand, flint gravel beds, mottled clay, shell beds and altered beds form a complex interdigitating sequence, which is divided into three formations and several informal lithological units.

2.2.3 Thanet Sand Formation

The Thanet Sand Formation comprises mainly of fine-grained light yellow to grey sand becoming silt with depth. The basal level comprises a layer of glauconitic clayey fine sand with green glauconitic coated flints.

2.2.4 Lewes Nodular, Seaford and Newhaven Chalk Formation

According to the BGS website (www.bgs.ac.uk/lexicon/lexicon.cfm?pub=LECH), the Lewes Nodular Chalk Formation is "Composed of hard to very hard nodular chalks and hardgrounds (which resist scratching by finger-nail) with interbedded soft to medium hard chalks (some grainy) and marls; some griotte chalks. The softer chalks become more abundant towards the top. Nodular chalks are typically lumpy and iron-stained (usually marking sponges). Brash is rough and flaggy or rubbly, and tends to be dirty. First regular seams of nodular flint, some large, commence near the base and continue throughout."

Seaford Chalk Formation can be described as firm white chalk with conspicuous semi-continuous nodular and tabular flint seams. Hardgrounds and thin marls are known from the lowest beds. Some flint nodules are large to very large.

The Newhaven Chalk Formation is a soft white friable microporous limestone composed of coccolith biomicrites with a varying proportion of larger shell fragments.

2.3 Hydrology

The nearest surface water feature was the Grand Union Canal recorded ~375 m to south of the site as shown on Figure 2.1.

The site was recorded at an elevation of approximately 30 m AOD, and the Grand Union Canal was at approximately 25 m AOD, although given that it is lined, there will not be hydraulic connectivity with the underlying aquifer / groundwater.

Figure 2.1. Surface Water Features (North to top, NTS)

2.4 Hydrogeology

Information presented by the Environment Agency classifies the London Clay Formation bedrock as unproductive strata.

Any water infiltrating the London Clay Formation will generally tend to flow vertically downwards at a very slow rate. Due to the predominantly cohesive nature of the soils, the groundwater flow rate is anticipated to be very slow. Published permeability data for the London Clay Formation indicates the horizontal permeability to generally range between 10^{-10} m/s and 10^{-8} m/s, with an even lower vertical permeability.

2.5 Shallow Groundwater and Surface Runoff

The shallow groundwater flow direction would correspond to the natural relief of the surrounding ground. The area's topography was sloping gently in a mainly southerly and also to a south-westerly direction.

The hydraulic gradient was <1º, for a slope percentage estimated to be ~1.3% based on average change in elevation (~5 m) over the distance (~375 m) to the Grand Union Canal, and flow rates would be extremely low, of the order of 5 mm per year, given the very low permeability (10^{-10} m/s) unproductive strata underlying the site.

2.6 Deep Groundwater

The Chalk group, combined with the sands of the Thanet Sand Formation and the Lambeth Group, make up the water-bearing basal aquifer of the London Basin. The deep groundwater at the site is at approximately –28 m AOD within the Chalk as of January 2015, which is around 4 m higher than in 2000 (Environment Agency, 2015, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/429468/2015_London_GWL_Report_online.pdf). These geological formations lie below the London Clay Formation.

'*The low permeability nature of the London Clay overlying these aquifer units prevents the water table reaching the surface and causes artesian pressure to build up underneath the London Clay. As groundwater pressure increases on the London Clay, it is increasingly saturated, albeit slowly. The London Clay is extensively fissured locally, and therefore rapid ingress of groundwater at higher elevations is possible on a small scale'* (EA, 2015, p. 5-6).

The site is at ~30 m AOD, i.e. around 58 m higher than the water table, the level of which is maintained relatively constant below London by controlled abstractions. Therefore no interaction with the deep groundwater is likely to be possible and as such it does not need to be considered further as part of this assessment.

Section 3 Screening

3.1 Introduction

The Ove Arup 2008 Scoping Study prepared for the London Borough of Camden requires that any development proposal that includes a subterranean basement should be screened to determine whether or not a full BIA is required.

A number of screening tools are included in the Arup document (Ref: Camden geological, hydrogeological and hydrological study, Issue01/November 2010), which includes a series of questions within a screening flowchart for three categories; surface water flow, groundwater flow and land stability. Responses to the questions are tabulated below.

3.2 Surface Flow and Flooding Screening Assessment

The response to the Surface Flow and Flood Screening Assessment is given in Table 3.1.

Table 3.1 – Surface Flow and Flooding Screening

Question	Response
1. Is the site within the catchment of the pond chains of Hampstead Heath?	**No –** Hampstead Heath ponds catchment shown approximately 2.1 km to north-west of site.
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 –** Drainage will be taken to combined sewers in public highway.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	**No –** Existing and proposed plans showed no areas of soft landscaping, both showed the site to be fully covered in hardstanding.
4. Will the proposed basement development 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 –** Overall proportions of hard standing would not change as above.
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	**No –** Overall proportions of hard standing would not change. The nearest downstream water course was the Grand Union Canal, recorded ~375 m to south of the site, approximately at an elevation 5 m lower than the site.
6. Is the site in an area known to be at risk from surface water flooding?	**No –** Flood Risk Maps show that the proposed basement is not located on a floodplain or within a flood risk area.

The above assessment has not identified any potential issues.

3.3 Subterranean (Groundwater) Screening Assessment

The response to the Subterranean (Groundwater) Screening Assessment is given in Table 3.2.

Table 3.2 – Subterranean (Groundwater) Screening

Question	Response
1a. Is the site located directly above an aquifer?	**No –** Geological maps show the site is located on bedrock of the London Clay Formation, an Unproductive Stratum, with no overlying superficial deposits.
1b. Will the proposed basement extend beneath the water table surface?	**Unknown –** It is considered unlikely given the setting of the site but it may be that the proposed basement extends beneath the water table surface. It will need to be confirmed by a ground investigation.
2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line?	**No** – The nearest Surface Water Feature, Grand Union Canal, was recorded ~375 m to south of the site.
3. Is the site within the catchment of the pond chains of Hampstead Heath?	**No –** Hampstead Heath ponds catchment shown approximately 2.1 km to north-west of site.
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	**No –** Existing and proposed plans showed no areas of soft landscaping, both showed the site to be fully covered in hardstanding.
5. As part of the 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 –** Proportion of hard surfaced / buildings are to remain the same and no soakaway or permeable surfacing planned.
6. 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 Feature, Grand Union Canal, was recorded ~375 m to south of the site.

The assessment has identified the following potential issues:

Q1b It is considered unlikely given the setting of the site but it may be that the proposed basement extends beneath the water table surface. It will need to be confirmed by a ground investigation.

3.4 Stability Screening Assessment

The response to the Stability Screening Assessment is given in Table 3.3.

Table 3.3 – Stability Screening

Question	Response
1. Does the existing site include slopes, natural or manmade, greater than 7°?	**No –** Site appeared to be flat-lying.
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7°?	**No** – The proposed basement is not to alter existing site landscaping elevations.
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	**No –** The neighbouring land is generally flat-lying or sloping by <1°.
4. Is the site within a wider hillside setting in which the general slope is greater than 7°?	**No –** The wider area is sloping in a south / south-westerly direction by <1°.
5. Is the London Clay the shallowest strata at the site?	**Yes** – The London Clay Formation is recorded as the shallowest strata, to be confirmed by the ground investigation.
6. Will any trees be felled as part of the proposed 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 will be felled during 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 –** Anticipated geology was London Clay Formation, which would potentially be subject to shrink-swell subsidence. There was no visual evidence of subsidence at the site or properties in the vicinity.
8. Is the site within 100 m of a watercourse or potential spring line?	**No** – The site was not located within 100 m of a known watercourse or spring line.
9. Is the site within an area of previously worked ground?	**No -** The relevant geological map did not show any Made Ground or Worked Ground within or in close proximity to the site.
10. Is the site within an aquifer?	**No** - Geological maps show the site is located on bedrock of the London Clay Formation, an Unproductive Stratum.
11. Is the site within 50 m of the Hampstead Heath ponds?	**No** – The nearest Surface Water Feature, Grand Union Canal, was recorded ~375 m to south of the site.
12. Is the site within 5 m of a highway or pedestrian right of way?	**Yes** – the proposed basement is located within 5 m of Rochester Place.
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	**Unknown** – the proposed basement is under an existing garage with properties to both sides, believed to be commercial to NW and house to SE, thus a difference in foundations depth relative to neighbouring properties is expected, unless the adjoining properties include basements.
14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	**Unknown** – but given its location this is considered unlikely.

The assessment has identified the following potential issues:

Q5 The London Clay Formation is recorded as the shallowest strata at the site.
Q7 The anticipated bedrock geology would suggest a susceptibility to shrink-swell subsidence.
Q12 The proposed basement is located within 5 m of a highway or pedestrian right of way.
Q13 Unknown, the proposed basement is under an existing garage with properties to both sides, believed to be commercial to NW and house to SE, thus a difference in foundations depth relative to neighbouring properties is expected, unless the adjoining properties include basements.
Q14 Unknown, but considered unlikely.

Section 4 Scoping

4.1 Introduction

The purpose of scoping is to assess in more detail the issues of concern identified in the screening process (i.e. where the answer is "yes" or "unknown" to any of the questions posed) to be investigated in the impact assessment. Potential hazards are assessed for each of the identified potential impact factors.

The scoping stage is furthermore to assist in defining the nature of the investigation required to assess the impact of the issues of concern identified in the screening process. The scope of the investigation must comply with the guidance issued by the London Borough of Camden and be a suitable basis on which to assess the potential impacts.

4.2 Potential Impacts

The following potential impacts were identified in Table 4.1.

Table 4.1 – Potential Impacts

Screening Flowchart Question	Potential Impacts	Discussion
Will the proposed basement extend beneath the water table surface?	Alteration of existing groundwater flow regime, which in turn could potentially cause local increase or decrease of groundwater levels.	It may be that the proposed basement extends beneath the water table, though this will need to be confirmed by a ground investigation, as locally perched pockets of groundwater could be present. **Well installation and groundwater monitoring necessary**.
Is the London Clay the shallowest strata at the site?	Potential for shrink-swell subsidence in ground surrounding proposed basement.	Ground investigation to establish soil conditions by means of boreholes. Effects mitigated at design stage.
Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	No vegetation or trees were noted on site. Any changes to vegetation near the site could adversely affect foundations of adjoining structures.	Ground investigation to establish soil conditions by means of boreholes. Effects mitigated at design stage.
Is the site within 5 m of a highway or pedestrian right of way?	Excavation of a basement could result in structural damage to the roads/footways or buried services.	Site investigation to establish soil conditions. Effects mitigated at design stage.
Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Basement could undermine neighbouring structures if not correctly allowed for at the design stage.	Subject to the adjoining properties include basements, the foundations to the basement are likely to be significantly below the neighbouring properties. Effects mitigated at design stage.
Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	Excavation of the basement could result in damage to underground utilities, from ground movement during basement construction.	Site investigation to establish soil conditions. Effects mitigated at design stage. Further enquiries to establish must be undertaken by the designers.

Section 5 Intrusive Investigation

5.1 Ground Conditions

Based on information supplied by Ground and Water Ltd. (geotechnical and environmental consultants), on 27th June 2015 one windowless sampler boreholes (WS1) to 6.0 m bgl (below ground level) and a dynamic probe hole (DP1) to 10.0 m bgl from the existing ground floor level.

A groundwater monitoring well was installed into the windowless sampler borehole to 5.0 m bgl.

The borehole locations are outlined in Figure 3.

Table 5.1 outlines the depths of each trial-hole.

Table 5.1 – Investigatory Depths of Trial-holes

Trial-hole (WS)	Final Depth (m bgl)
WS1	6.0
DP1	10.0

Ground conditions as given by Ground and Water Ltd are presented below; detailed information including logs as given by Ground and Water Ltd are presented in Appendix A:

Made Ground (MG)
Head Deposits (HD)
London Clay Formation (LCF)

Table 5.2 summarises the ground conditions encountered.

Table 5.2 – Ground Conditions

Stratum	Epoch	Depth Range (m bgl)		Thickness (m)	Description
		Top	Bottom		
MG	Recent	GL	1.20	1.20	Concrete over grey brown very gravelly sandy CLAY. Sand is fine to medium grained. Gravel is occasional to abundant, fine to coarse, subangular to subrounded flint, brick and concrete fragments.
HD	Quaternary	1.20	2.30	1.10	Orange brown with occasional grey mottling silty CLAY with pockets of fine orange brown sand.
LCF	Cretaceous	2.30	6.00	Not proven	Brown and grey mottled silty CLAY with rare fine selenite crystals and pockets of orange silt.

5.1.1 Made Ground

Made Ground was encountered to a depth of 1.20 m bgl and comprised concrete over grey brown very gravelly sandy CLAY. Sand is fine to medium grained. Gravel is occasional to abundant, fine to coarse, subangular to subrounded flint, brick and concrete fragments.

5.1.2 Head Deposits

Soils described on the logs as Head Deposits were found directly beneath the and comprised orange brown with occasional grey mottling silty CLAY with pockets of fine orange brown sand to a depth of 2.30 m bgl.

5.1.3 London Clay Formation

The London Clay Formation was encountered to the base of the borehole, from a depth of 2.30 m to a depth of 6.00 m bgl and inferred in DP1 to a depth of 10.0 m bgl. It comprised brown and grey mottled silty CLAY with rare fine selenite crystals and pockets of orange silt.

5.1.4 Roots

Fine roots were encountered in WS1 to 2.00 m bgl. 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. Supplied site surveys may not include substantial shrubs or bushes and is also unlikely to have data or any trees, bushes or shrubs removed prior to or following the site survey.

Where trees are mentioned in the text this means existing trees, substantial bushes or shrubs, recently removed trees (approximately 20 years to full recovery on cohesive soils) and those planned as part of the site landscaping).

5.1.5 Groundwater

Groundwater equilibrium conditions may only be conclusively established if a series of observations are made via groundwater monitoring wells. A groundwater monitoring well was installed into the windowless sampler borehole to 5.0 m bgl.

Groundwater was not encountered during drilling but was recorded during the subsequent monitoring undertaken on 13th August 2015 at a depth of 1.05 m bgl. It is likely that this is perched water within granular horizons found in the Made Ground or sandy pockets of the underlying Head Deposits.

The intrusive investigation and monitoring visit were conducted in June and August (2015) respectively, when groundwater levels should be near to their annual minimum (i.e. lowest) elevation, which typically occurs around September. Isolated pockets of groundwater may be perched within any Made Ground found at other locations around the site.

Section 6 Basement Impact Assessment

6.1 Mitigation of Adverse Effects

This section of the report addresses the potential impacts identified by the scoping study and the relevant findings of the ground investigation and mitigation measures, where required.

Will the proposed basement extend beneath the water table surface?

Potential Impacts: The basement could extend below the water table surface and thus affect the groundwater flow regime, which in turn could potentially cause local increase or decrease of groundwater levels.

Ground Investigation Findings: The ground investigation identified Made Ground to a depth of 1.20 m overlying soils of the Head Deposits to 2.30 m bgl over the London Clay Formation to ~6.00 m bgl. Typical thickness of the London Clay Formation in this area is approximately 80 m.

Groundwater was not encountered during drilling but was recorded during the subsequent monitoring undertaken on 13th August 2015 at a depth of 1.05 m bgl. It is likely that this is perched water within granular horizons found in the Made Ground or sandy pockets of the underlying Head Deposits. The basement level was anticipated to be ~3.00-3.50 m bgl, however given that the water recorded was considered to be perched and also considering the predominantly cohesive nature of the soils encountered beneath the Made Ground, the relevant effect on groundwater flow regime would be very low to negligible. However, it is possible that in winter months, or if groundwater rises, dewatering may be required to prevent the base of the excavation blowing before the slab was cast. The advice of a reputable dewatering contractor, familiar with the type of ground and groundwater conditions encountered on this site, should be sought prior to finalising the design of the excavation for the basement.

Mitigation: Appropriate measures undertaken in design and construction phase.

Is the London Clay the shallowest strata at the site?

Potential Impacts: Potential for shrink-swell subsidence in ground surrounding proposed basement.

Ground Investigation Findings: The London Clay Formation was encountered to the base of the borehole, from a depth of 2.30 m to a depth of 6.00 m bgl and inferred in DP1 to a depth of 10.0 m bgl. It comprised brown and grey mottled silty CLAY with rare fine selenite crystals and pockets of orange silt. Geotechnical laboratory analysis of three samples taken from the London Clay Formation established a high volume change potential in accordance with BRE Digest 420 and NHBC Chapter 4.2. The relevant results are presented in Appendix A.

Mitigation: Design of foundations and basement in accordance with NHBC and BRE guidance in respect of volume change potential soils.

Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?

Potential Impacts: No vegetation or trees were noted on site. Any changes to vegetation near the site could adversely affect foundations of adjoining structures.

Ground Investigation Findings: Soils of the London Clay Formation were encountered to the full depth of the investigation at ~6.00 m bgl, recording a high volume change potential. Fine roots were encountered in WS1 to 2.00 m bgl. No vegetation or trees were noted on site or are to be part of the proposed redevelopment. Semi-mature trees were noted beyond site, to the north-east of the property.

Mitigation: Design of foundations and basement in accordance with NHBC and BRE guidance in respect of volume change potential soils and accounting for any proposed changes in vegetation and foundations of adjoining structures.

Is the site within 5 m of a highway or pedestrian right of way?

Potential Impacts: Excavation of a basement could result in structural damage to the roads/ footways or buried services.

Ground Investigation Findings: The basement would be constructed on the London Clay Formation with excavations through the Made Ground and the underlying Head Deposits; excavations within the Made Ground particularly may be unstable.

Mitigation: Design of permanent and/or temporary works to ensure induced ground movements are within tolerable limits and temporary works to prevent damage during construction.

Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?

Potential Impacts: Basement could undermine adjacent structures if not correctly allowed for at the design stage.

Ground Investigation Findings: As discussed above, the basement would be constructed on the London Clay Formation with excavations through the Made Ground and the underlying Head Deposits; excavations within the Made Ground particularly may be unstable.

Mitigation: Appropriate measures undertaken in design and construction phase**.** Close supervision will be made during the construction phase. Movement monitoring of neighbouring and nearby structures will be undertaken before construction starts and continued through the construction phase and for an appropriate period thereafter.

Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?

Potential Impacts: Excavation of the basement could result in damage to underground utilities, from ground movement during basement construction.

Ground Investigation Findings: As discussed above, the basement would be constructed on the London Clay Formation with excavations through the Made Ground and the underlying Head Deposits; excavations within the Made Ground particularly may be unstable.

Mitigation: Acquire plans of underground services / tunnels, etc., for the development site area, if relevant. Design of permanent works to ensure induced ground movements are within tolerable limits, temporary works to prevent damage during construction and monitoring movement throughout construction.

6.2 Surrounding Buildings

This section considers the potential effects of basement construction on nearby properties.

Detrimental effects would be manifested as cracking and more serious structural damage. Many old buildings in London do exhibit signs of historic movement and repair. In practice, it is often difficult to attribute cracks visible in a structure to specific site construction activities unless a detailed survey of the affected structure and its founding strata had been undertaken before the construction works.

Any observed changes in the state of the building can then be causally linked to the works with more confidence and less debate than if no pre-works condition survey had been undertaken. Surveys require the cooperation of the property owners, as entry by surveyors into the property will be necessary. This would normally be undertaken in collaboration with the neighbour's party wall surveyors.

Close supervision will be made during the construction phase. Movement monitoring of neighbouring and nearby structures will be undertaken before construction starts and continued through the construction phase and for an appropriate period thereafter.

The data from the site investigation as supplied by Ground and Water Ltd. (geotechnical and environmental consultants) has established soil and groundwater conditions. The client's engineer can prepare working drawings and construction method statements that will mitigate adverse effects of nearby properties.

6.3 Residual Impacts

Groundwater was not encountered during drilling but was recorded during the subsequent monitoring undertaken on 13th August 2015 at a depth of 1.05 m bgl. It is likely that this is perched water within granular horizons found in the Made Ground or sandy pockets of the underlying Head Deposits. The basement level was anticipated to

be ~3.00-3.50 m bgl but given that the water recorded was considered to be perched and also considering the predominantly cohesive nature of the soils encountered beneath the Made Ground, the relevant effect on groundwater flow regime would be very low to negligible. However, it is possible that in winter months, or if groundwater rises, dewatering may be required to prevent the base of the excavation blowing before the slab was cast. The advice of a reputable dewatering contractor, familiar with the type of ground and groundwater conditions encountered on this site, should be sought prior to finalising the design of the excavation for the basement.

Appropriate measures undertaken in design and construction phase will ensure the basement will not undermine adjacent structures.

The proposed basement extension will not be a hindrance against the possibility of future basement construction to adjoining properties.

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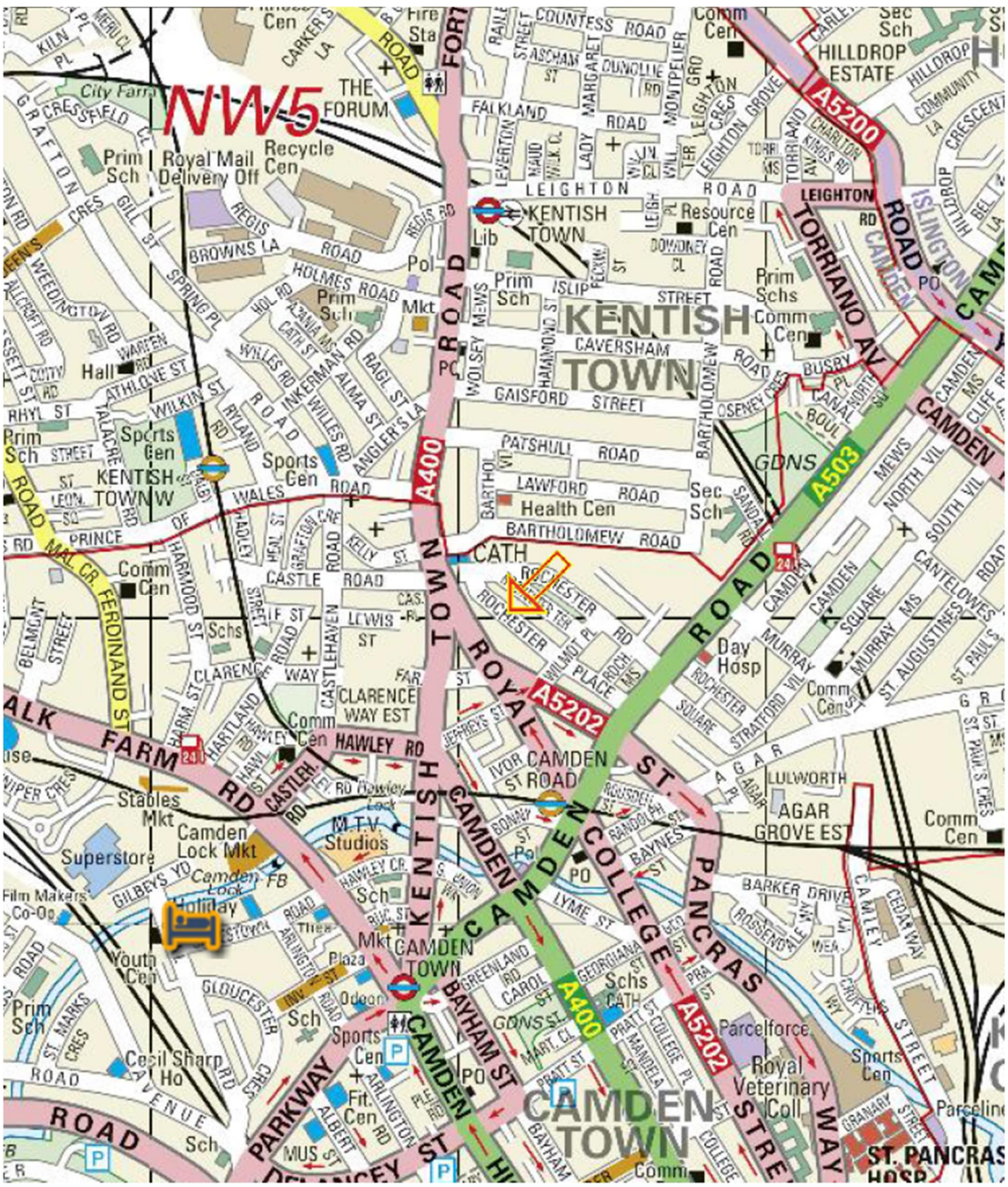


Figure number
1

Title
Site Location Map

Project
50 Rochester Place, London NW1 9JX

Date
August 2015

Client
Croft Structural Engineers

Reference
15051

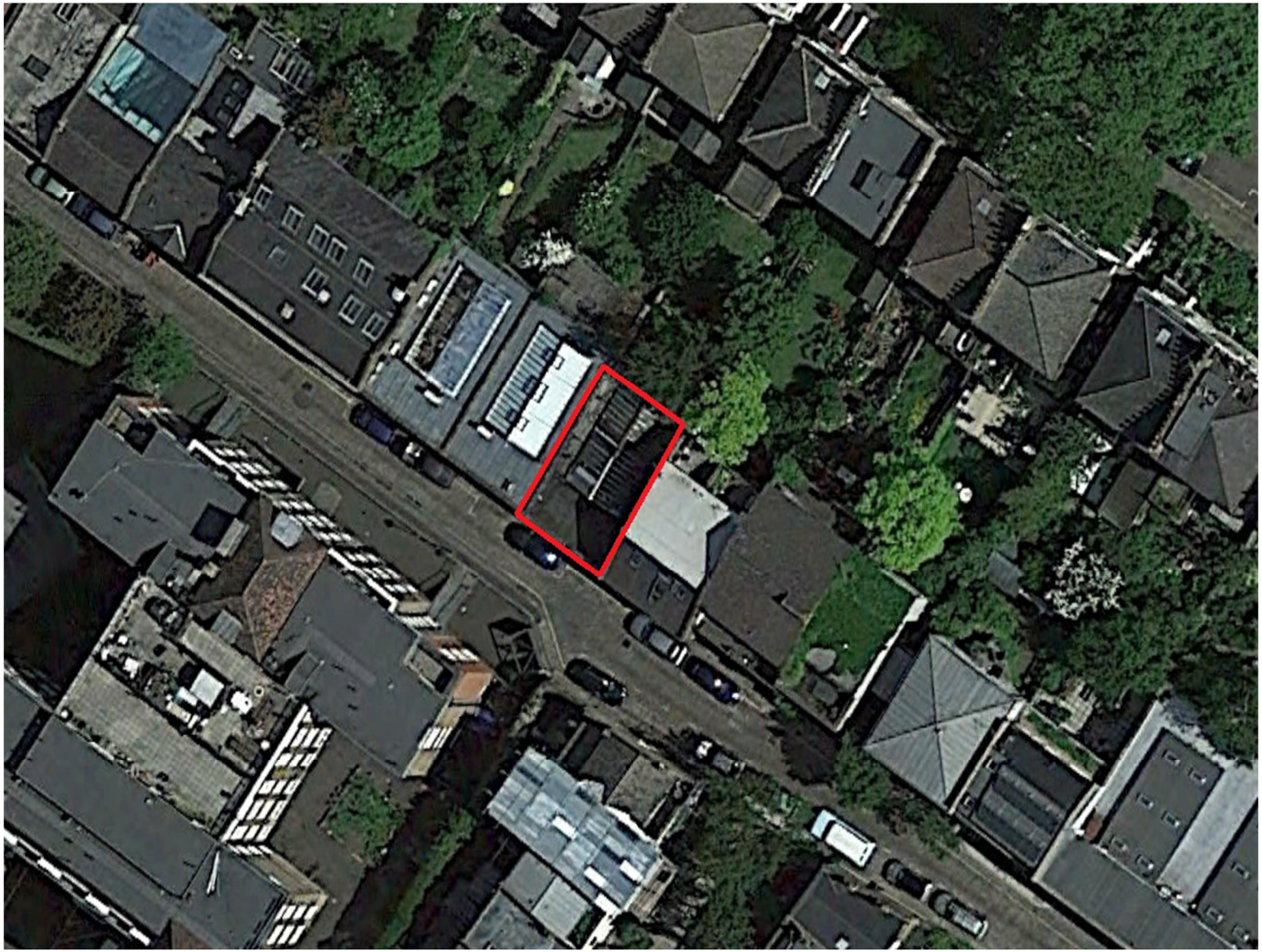


Figure number
2

Project
50 Rochester Place, London NW1 9JX

Client
Croft Structural Engineers

Title
Aerial Photograph

Date
August 2015

Job Number
15051

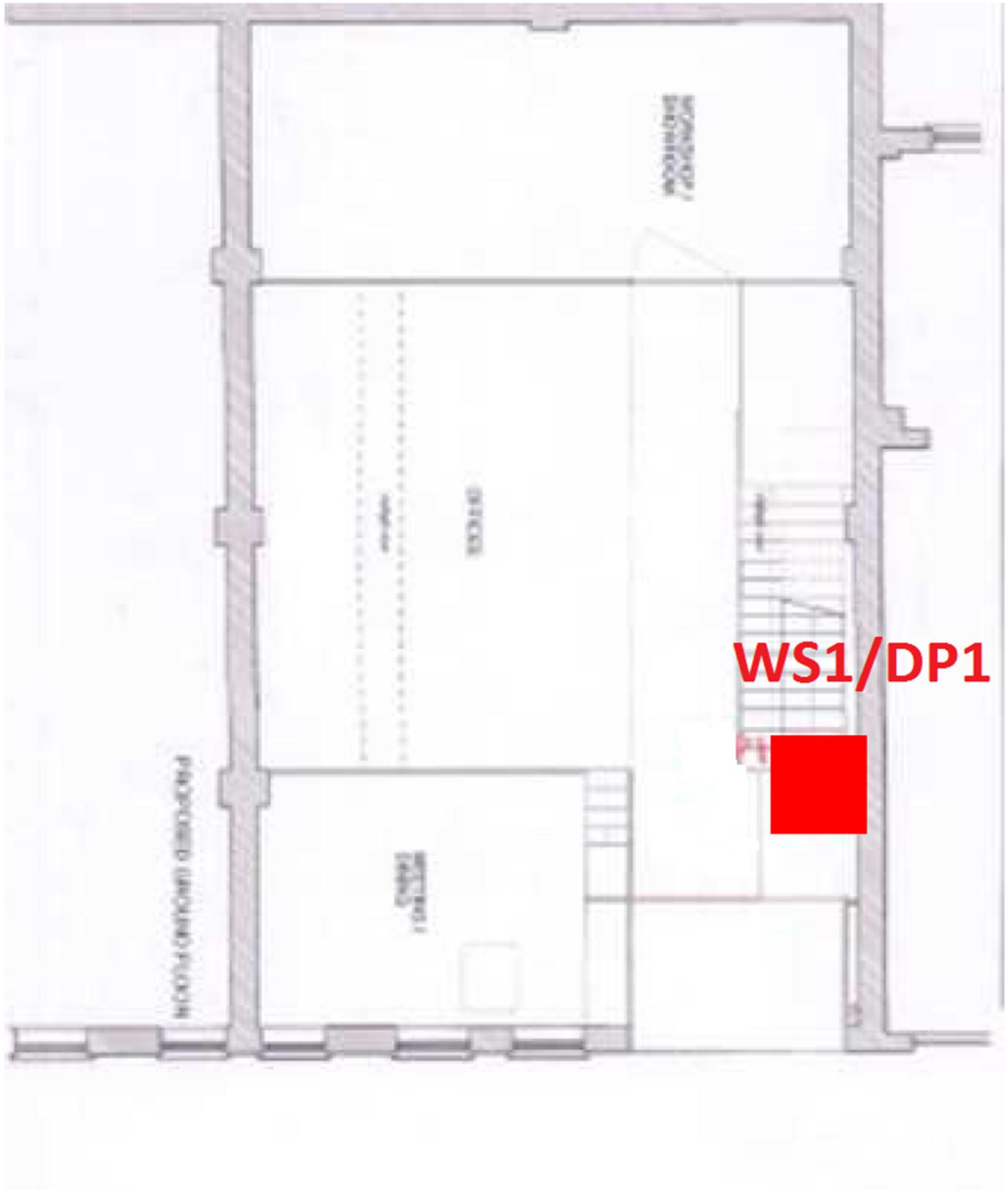


Figure number
3

Project
50 Rochester Place, London NW1 9JX

Client
Croft Structural Engineers

Title
Trial Hole Location Plan

Date
August 2015

Job Number
15051

Appendix A Information Provided by Ground and Water Ltd

Ground and Water Ltd
Tel: 0333 600 1221
email: enquiries@groundandwater.co.uk
www.groundandwater.co.uk

Borehole No
WS1
Sheet 1 of 1

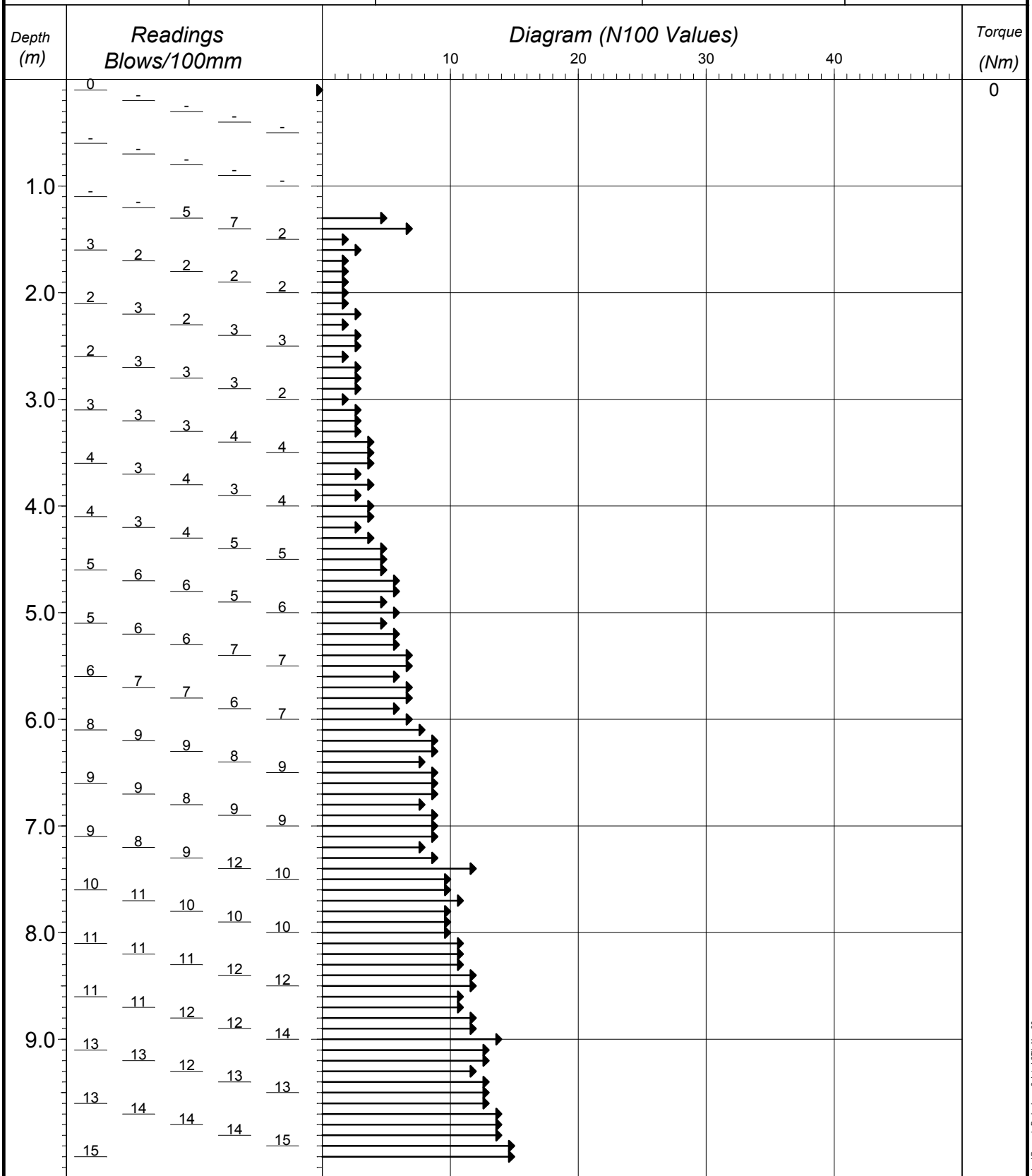
Project Name	Project No.	Co-ords: -	Hole Type
50 Rochester Place,	GWPR1315		WS
Location: Camden, London NW1 9JX		Level: -	Scale 1:50
Client: Michael Anastassiades		Dates: 27/06/2015	Logged By SJM

Well	Water Strikes	Samples & In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.14			CONCRETE
		0.30	D					MADE GROUND: Grey brown very gravelly sandy clay. Sand is fine to medium grained. Gravel is occasional to abundant, fine to coarse, sub-angular to sub-rounded flint, brick and concrete fragments.
		0.50	D		0.60			
		0.80	D					MADE GROUND: Grey brown slightly gravelly silty clay. Gravel is rare, fine, sub-angular to sub-rounded flint and brick.
		1.00	D		1.20			HEAD DEPOSITS: Orange brown, with occasional grey mottling, silty clay with pockets of fine orange brown sand.
		1.50	D					
		2.00	D					
		2.50	D		2.30			LONDON CLAY FORMATION: Brown and grey mottled silty CLAY with rare fine selenite crystals and pockets of orange silt.
		3.00	D					
		3.50	D					
		4.00	D					
		4.50	D					
		5.00	D					
		5.50	D					
		6.00	D		6.00			End of Borehole at 6.00 m
			Type	Results				

Remarks: No groundwater encountered.
Fine roots to 2.00m bgl.
19mm groundwater monitoring pipe installed to 5.00m bgl.

DYNAMIC PROBING

Probe No **DP1**			
Client **Michael Anastassiades**		Sheet 1 of 1	
Site **50 Rochester Place,**		Project No **GWPR1315**	
E -	N -	Level -	Date **27/06/2015** Logged by **SJM**



Fall Height **500**		Cone Base Diameter **43**	
Hammer Wt **50.00**		Final Depth **10.00**	
Probe Type **DPH**		Log Scale 1:50	

ground &water
geotechnical and environmental consultants

Ground and Water Ltd
Tel: 0333 600 1221
email: enquiries@groundandwater.co.uk
www.groundandwater.co.uk

AGS

Summary of Classification Test Results

Job No.	Project Name	Programme	
19194	50 Rochester Place, Camden, London NW1 9JX	Samples received	15/07/2015
		Schedule received	14/07/2015
Project No.	Client	Project started	16/07/2015
GWPR1315	Ground and Water Ltd	Testing Started	25/07/2015

Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top	Base	Type		%	%	%	%	%	
BH1		1.00		D	Brown, dark grey, orange brown and blue grey sandy gravelly silty CLAY (gravel is fm and sub-angular to angular)	23					
BH1		1.50		D	Brown and blue grey slightly fine sandy silty CLAY with rare fine gravel	20	99	77	24	53	
BH1		2.00		D	Brown and blue grey slightly sandy silty CLAY with rare fine gravel	28					
BH1		2.50		D	Brown slightly fine sandy silty CLAY	29	100	75	26	49	
BH1		3.00		D	Brown and blue grey slightly fine sandy silty CLAY	30					
BH1		3.50		D	Brown and blue grey slightly fine sandy silty CLAY	30	100	78	27	51	
BH1		4.00		D	Brown and blue grey slightly fine sandy silty CLAY with rare fine gravel	29					
BH1		4.50		D	Brown and blue grey slightly fine sandy silty CLAY with traces of selenite crystals	29	100	77	27	50	
BH1		5.00		D	Brown and blue grey slightly fine sandy silty CLAY	30					
BH1		5.50		D	Brown slightly fine sandy silty CLAY	28					

Test Methods: BS1377: Part 2: 1990:
Natural Moisture Content : clause 3.2
Atterberg Limits: clause 4.3 and 5.0

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

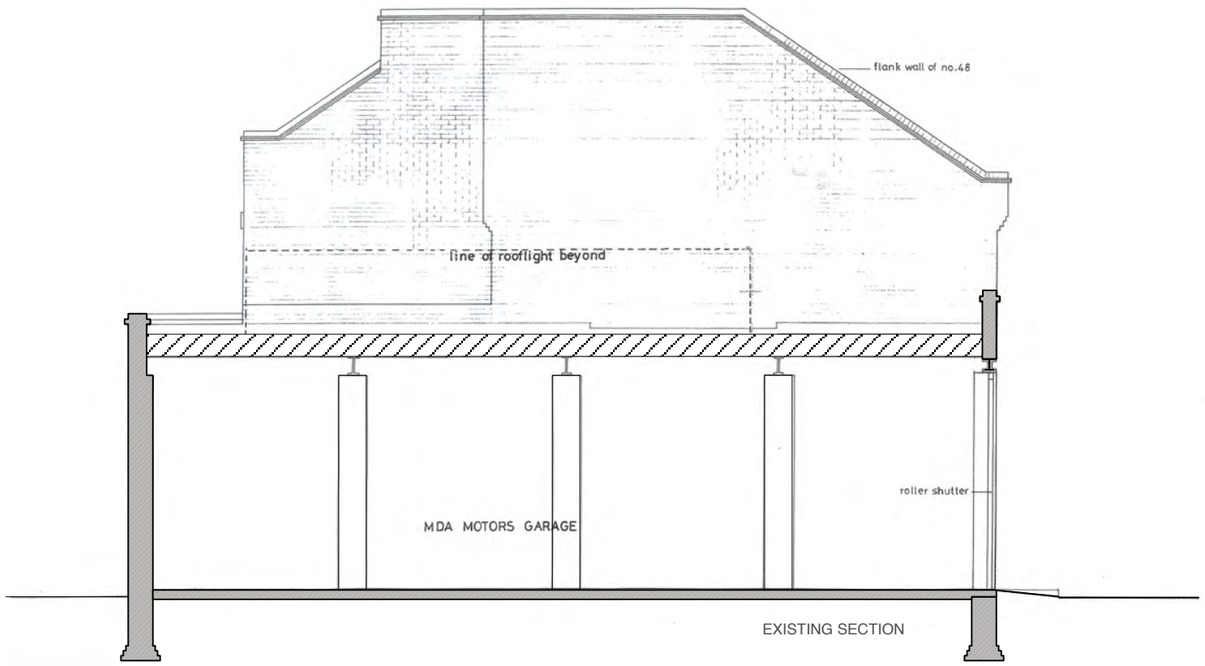
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved

Initials **J.P**

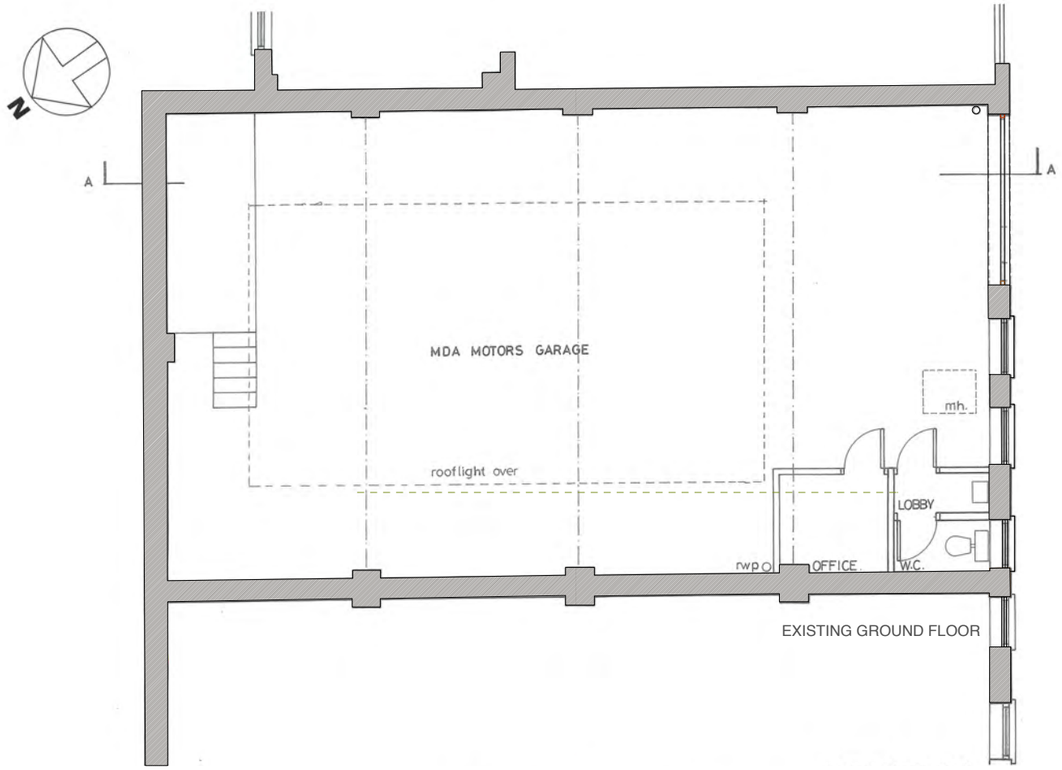
Date: 27/07/2015

Appendix B Proposed and Existing Plans and Section

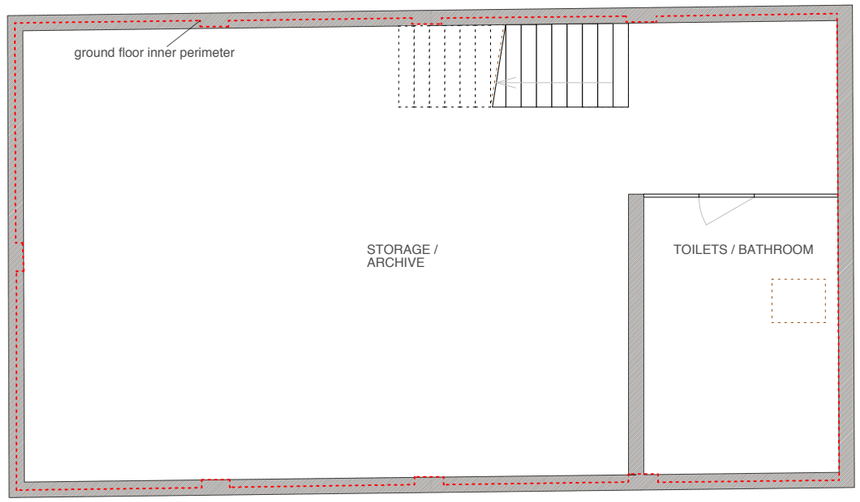


EXISTING SECTION

EXISTING FRONT ELEVATION



EXISTING GROUND FLOOR



PROPOSED BASEMENT v2
'full footprint'

preplanning application

existing plans
page 1 of 2
1 / 100 (A3)

project:
50 Rochester Place, London NW1 9JX

buro:
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+32 3 237 45 51
wdm@awdm.be
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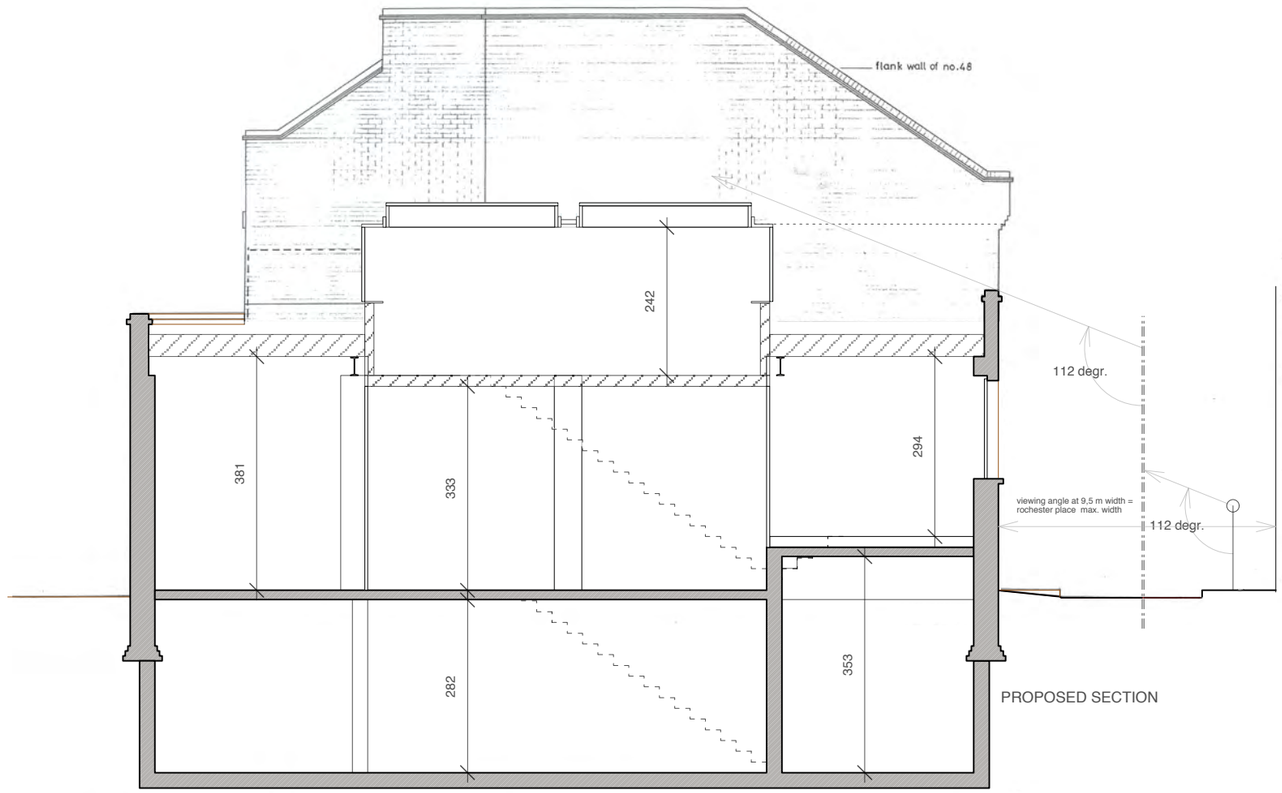
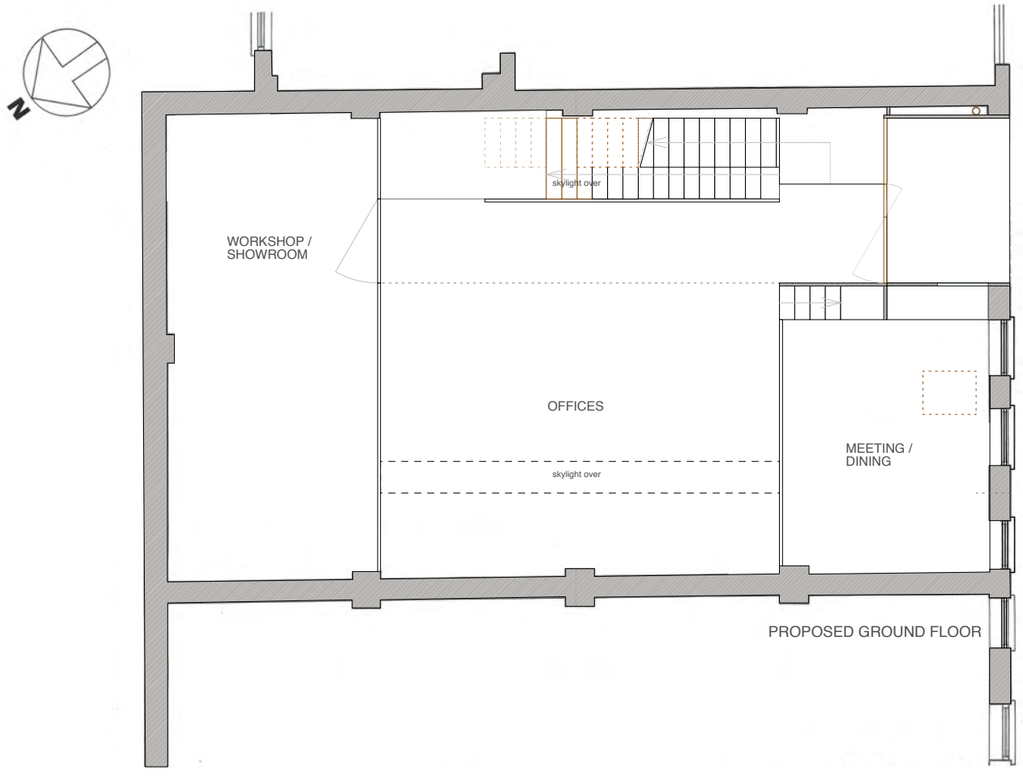
client:
Michael Anastassiades
122 Lower Marsh
London SE1 7AE

drawn by wdm on 01/06/2015

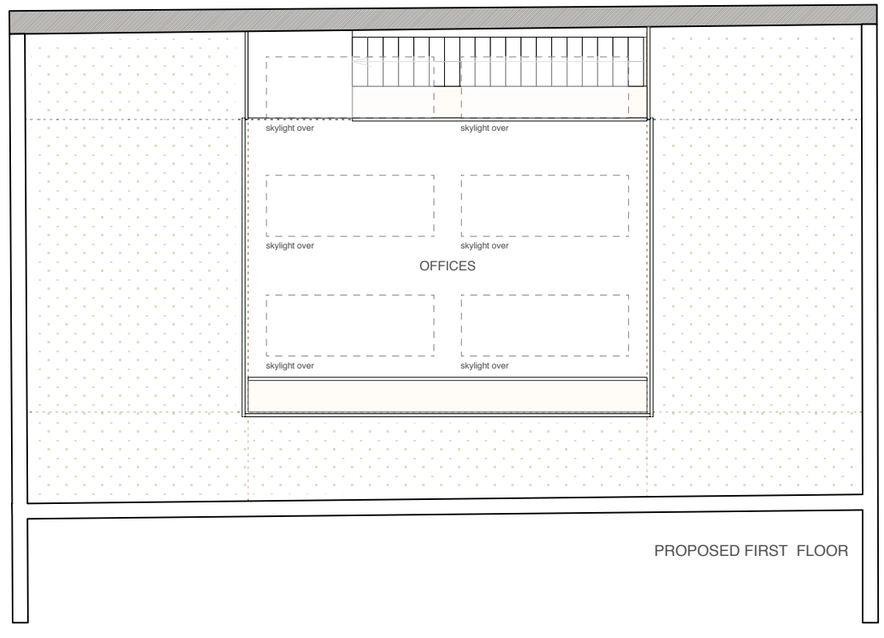


PROPOSED SECTION

PROPOSED FRONT ELEVATION



PROPOSED GROUND FLOOR



PROPOSED FIRST FLOOR

preplanning application

proposed plans
page 2 of 2
1 / 100 (A3)

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